

GUIDE

# COMMUNICATION NETWORK

BUILDINGS

DIGITAL INFRASTRUCTURES



[\*\*--> CATALOGUE PAGES INSIDE\*\*](#)

**THE GLOBAL SPECIALIST** IN ELECTRICAL AND  
DIGITAL BUILDING INFRASTRUCTURES





# NETWORK INFRASTRUCTURES

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# COMMUNICATION NETWORK

BUILDINGS  
DIGITAL INFRASTRUCTURES





## Legrand's expertise

The Legrand group is a world leader in communication networks for data transmission. Its investment in the development and design of structured cabling systems and solutions has enabled it to develop its offer and achieve the highest performance levels.

These solutions are ideal for today's multimedia networks, technologies and applications.

## A complete global solution

Legrand provides complete ranges, to meet three requirements:

- Network performance
- Network protection
- Accessibility of the infrastructures inherent to the communication networks of service sector buildings (offices, hotels, shopping centres, university campuses, healthcare establishments, etc.)

This guide has been designed to provide you with technical answers and the product-based solutions to your problems.

# NETWORK PERFORMANCE

## LCS<sup>2</sup> complete systems with a 25-year guarantee

These systems are suitable for fibre optic cables as well as copper cables. Measurements of LCS<sup>2</sup> components and links are validated by independent laboratories 3P Third Party Testing and ETL.

## LCS<sup>2</sup> category 6<sub>A</sub> designed to exceed all application requirements

LCS<sup>2</sup> cat. 6<sub>A</sub> (up to 500 MHz), cat. 6 (up to 250 MHz) and cat. 5e (up to 100 MHz) systems have been designed as coherent entities to optimise their performance from the technical room to the workstation.

With LCS<sup>2</sup> category 6<sub>A</sub>, Legrand guarantees installed channel performance exceeding all category 6<sub>A</sub> crosstalk requirements by **5dB /TIA\*** or **3dB /ISO\*** and exceeding all category 6<sub>A</sub> return loss requirements by **3dB /ISO-TIA\*** for configurations and installations conforming to standards, as well as on-site testing conducted by verified testing agents.

*\* Depending on the degree of accuracy offered by the tester at the test point.*

### Guaranteed applications

10Base-T	155 Mbps ATM
100Base-TX	270 Mbps digital video
1000Base-T	Broadband video
1000Base-TX	1.2 Gbps (CBIG) ATM
10GBase-T	10 Gigabit Ethernet

### Compliance with standards

ANSI/TIA/EIA 568-C2  
ISO/IEC – 11801 (second edition) class E<sub>A</sub> amendment 2

### LCS<sup>2</sup> Cat. 6<sub>A</sub> channel components

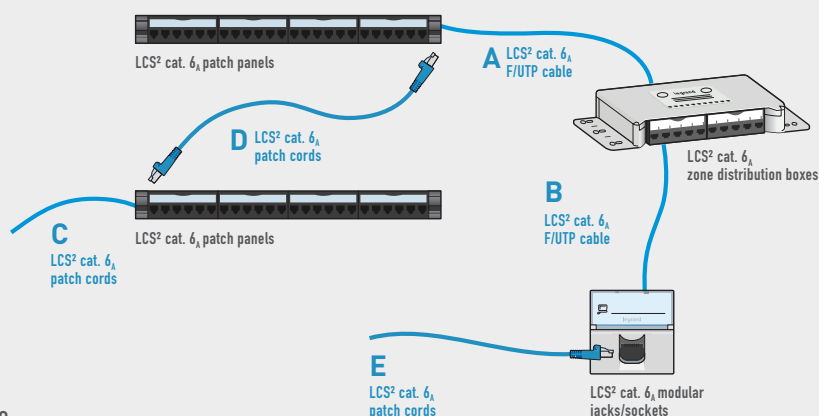
- LCS<sup>2</sup> category 6<sub>A</sub> F/UTP cables Cat.No 0 327 78
- LCS<sup>2</sup> category 6<sub>A</sub> RJ 45 sockets
- LCS<sup>2</sup> category 6<sub>A</sub> patch panels
- LCS<sup>2</sup> category 6<sub>A</sub> patch cords

### 100 metre horizontal channel

The LCS<sup>2</sup> category 6<sub>A</sub> channel is designed to offer flexibility. Legrand LCS<sup>2</sup> solutions have been designed to optimise application performance by using all standardised channel lengths and configurations.

With Legrand LCS<sup>2</sup> category 6<sub>A</sub> solutions, it is no longer necessary to determine specific installation specifications or particular patch cable width limits.

## WIRING PRINCIPLE

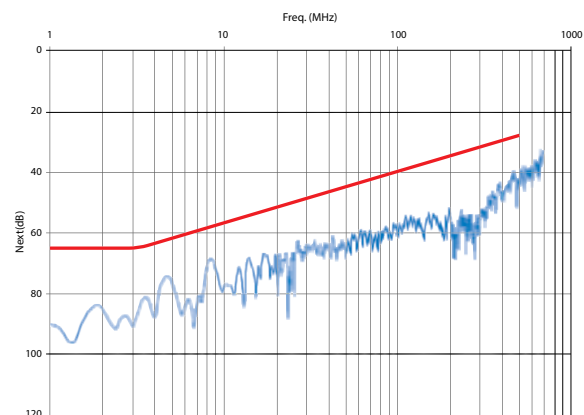


## LCS<sup>2</sup> category 6<sub>A</sub> performance

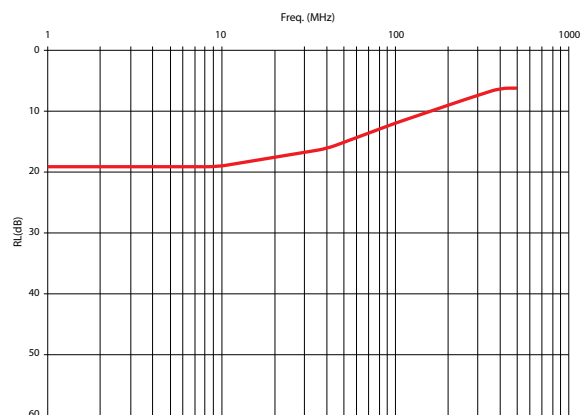
The results of independent trials shown below allow comparison of worst performance obtained from a 100-metre LCS<sup>2</sup> channel with 4 connectors conforming with ISO standard category 6<sub>A</sub> specifications.

The significant margins shown for each measured parameter demonstrate the technical superiority of the LCS<sup>2</sup> category 6<sub>A</sub> solution.

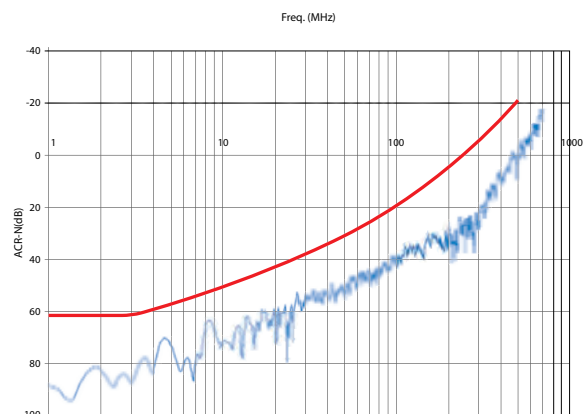
These performance margins are consistent across the ISO/TIA standard tested frequency range and even beyond.



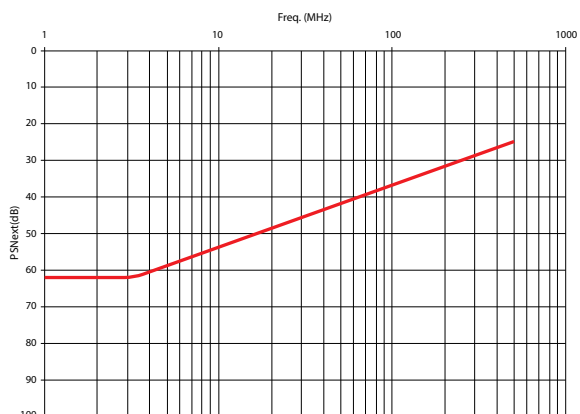
NEXT



RETURN LOSS



ACR-N



PS NEXT

Frequency [MHz]	NEXT [dB] ISO11801 Channel Class E <sub>A</sub>	NEXT [dB] LCS <sup>2</sup> Channel Class E <sub>A</sub>	ACR-N [dB] ISO11801 Channel Class E <sub>A</sub>	ACR-N [dB] LCS <sup>2</sup> Channel Class E <sub>A</sub>	RL [dB] ISO11801 Channel Class E <sub>A</sub>	RL [dB] LCS <sup>2</sup> Channel Class E <sub>A</sub>	PS NEXT [dB] ISO11801 Channel Class E <sub>A</sub>	PS NEXT [dB] LCS <sup>2</sup> Channel Class E <sub>A</sub>	PS ACR-N [dB] ISO11801 Channel Class E <sub>A</sub>	PS ACR-N [dB] LCS <sup>2</sup> Channel Class E <sub>A</sub>	ACR-F [dB] ISO11801 Channel Class E <sub>A</sub>	ACR-F [dB] LCS <sup>2</sup> Channel Class E <sub>A</sub>	PS ACR-F [dB] ISO11801 Channel Class E <sub>A</sub>	PS ACR-F [dB] LCS <sup>2</sup> Channel Class E <sub>A</sub>
1	65	68	61	64	19	22	62	65	58	61	63.3	66.3	60.3	63.3
4	63	66	58.9	61.9	19	22	60.5	63.5	56.4	59.4	51.2	54.2	48.2	51.2
10	56.6	59.6	50.1	53.1	19	22	54	57	47.5	50.5	43.3	46.3	40.3	43.3
20	51.6	54.6	42.5	45.5	17.5	20.5	49	52	39.8	42.8	37.2	40.2	34.2	37.2
31.25	48.4	51.4	36.9	39.9	16.5	19.5	45.7	48.7	34.2	37.2	33.4	36.4	30.4	33.4
62.5	43.4	46.4	27	30	14	17	40.6	43.6	24.2	27.2	27.3	30.3	24.3	27.3
100	39.9	42.9	19	22	12	15	37.1	40.1	16.2	19.2	23.3	26.3	20.3	23.3
200	34.8	37.8	4.7	7.7	9	12	31.9	34.9	1.8	4.8	17.2	20.2	14.2	17.2
250	33.1	36.1	-0.8	2.2	8	11	30.2	33.2	-3.7	-0.7	15.3	18.3	12.3	15.3
300	31.7	34.7	-5.6	-2.6	7.2	10.2	28.8	31.8	-8.6	-5.6	13.7	16.7	10.7	13.7
400	29.6	32.6	-14.1	-11.1	6	9	26.6	29.6	-17.1	-14.1	11.2	14.2	8.2	11.2
500	27.9	30.9	-21.4	-18.4	6	9	24.8	27.8	-24.5	-21.5	9.3	12.3	6.3	9.3



## LCS<sup>2</sup> fibre optic high density system



19" - Fibre optic drawer with front and rear cable management, 2U (p. 135)

LCS<sup>2</sup> high density fibre optic drawers are easy to install and maintain, offering complete accessibility and built-in coiling accessories.



19" high density fibre optic drawer and cassettes (p. 109)

### A flexible and easy to install system

A ready made system compared to traditional installation: fully populated modules and preterminated trunks. Installation is cut to a minimum: one single connection connects 12/24 fibres instantly. (MTP/MPO interfaces)

- Easy installation of 24-fibre modules (12-fibre modules available on request)
- Fixed mid-module position for easy patch cord installation and port access: no need for extraction tool
- Open chassis for front and rear module access
- Front and rear cable management
- A or C polarity (B available on request)
- Compatible with 1 U - 5 modules chassis (up to 120 LC ports) and with 2 U - 12 modules chassis (up to 288 LC ports)

### Custom solutions available on request

- Preterminated MTP/MPO trunks
- Factory preterminated module
- Terminated end (MTP, LC, breakout module, etc.)
- Splice module

## Fibre optic solutions in buildings tackling the latest challenges in buildings

LCS<sup>2</sup> FTT0/FTTD solutions will satisfy the needs of users with its enhanced performance in terms of speed, energy saving and modularity over increasing distances.



FTT0 switch for trunking (p. 111)



FTT0 switch for false ceiling/false floor (p. 111)

### Economic and environmental performance for full IP convergence buildings

- Gross speed up to 300 m in OM 3 and thousands of metres in OS 1/OS 2
- Less equipment required in technical rooms
- Optimised digital infrastructure thanks to better fibre density
- Energy saving switches: consumption of the transmitted data is lower through the fibre material (no ventilation inside)

# Varicon-L server cabinets and Cold Corridor® high performance cooling system

Choosing suitable cooling equipment is a major consideration to ensure efficient data center operation and optimum payback.



Varicon-L server cabinets (p. 126)



Varicon-L server cabinets (p. 128) and airflow optimisation for data center applications

- Energy efficient and reliable system: Cold Corridor®
  - Airflow segregation: 85% efficiency on cold air containment
  - Constant air conditions for servers thanks to homogeneous temperature distribution, which increases equipment lifetime
- Scalable and compact solutions: Variconcondition H<sub>2</sub>O row based cooling units
  - Possible to spread investment during growth process by adding cooling units in a row or Cold Corridor®
  - Raised floor is not required. Heat load and cooling capacity are brought very close to one other, reducing the airflow path and consequently energy consumption

# NETWORK PROTECTION

**UPS** The guarantee  
of optimum  
“continuity of service”

Legrand offers a range of solutions to ensure maximum protection for electrical and data systems, people and property.

Legrand's UPS range is divided into 3 different families ensuring the offer is suitable for all applications with solutions providing the best performance levels in terms of power and backup time. Legrand UPS are ideal for all your requirements.



#### **Modular**

UPS up to 120 kVA providing maximum safety (power and control), for applications requiring easy expansion and fast maintenance.



**Conventional**  
UPS providing a safe, reliable power supply up to 10 kVA.



**Line Interactive**  
UPS up to 3 kVA. Ideal protection for individual workstations, telephone switchboards or home automation applications and even for small service sector companies.

Incorporating an environmentally-friendly approach to technological development and to address a constantly changing market, Legrand is now offering its new range of UPS and additional functions to ensure maximum continuity of service for all installations.

#### ■ **High efficiency**

The innovative design and high quality of the components used enable our UPS to achieve up to 96% efficiency, leading to significant energy savings.

#### ■ **Advanced technology**

The On-line Double Conversion technology ensures provision of a top quality power supply and maximum energy efficiency.

#### ■ **Environmentally responsible approach**

Our UPS are built with the greatest care with a view to sustainable development. Moreover, Legrand has developed an innovative testing system which reduces the energy consumed for each device manufactured.

#### ■ **Reliable electronics**

The optimum sizing of the power stages and thorough testing of each unit ensure excellent reliability.

#### ■ **Latest generation components**

A careful search for the best electronic components on the market, together with the most up-to-date manufacturing methods, ensure that Legrand UPS use leading-edge technology and provide optimum reliability.

#### ■ **High performance batteries**

The batteries used in Legrand UPS are the best on the market. The innovative charging system significantly extends battery life by up to 50%.



# IP CCTV a solution that is ideal for your network

CCTV is incorporated in your digital infrastructure to carry information from both local and remote cameras.

To implement high quality IP solutions, it is essential to have a reliable bandwidth providing a certain speed. With Legrand cameras you only need 1.5 Mbps to 4 Mbps bandwidth to obtain high quality images.



Dome cameras



Compact cameras



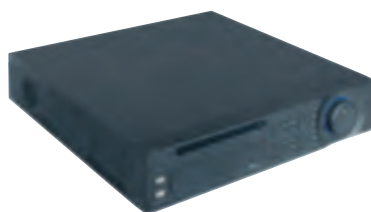
Modular cameras



Motorised cameras



Encoders



Video recorders



Monitors



VMS software

IP CCTV is a complete solution providing high definition (HD and Full HD) photographed scenes. It is therefore possible to zoom in using 'recognition' mode to identify people.

## A scalable solution

In particular it enables you to manage an analogue installation or an IP installation using the same software. The IP products are ONVIF profile S so that they can be integrated in third-party software for integrators.



Driving network video through global standardization

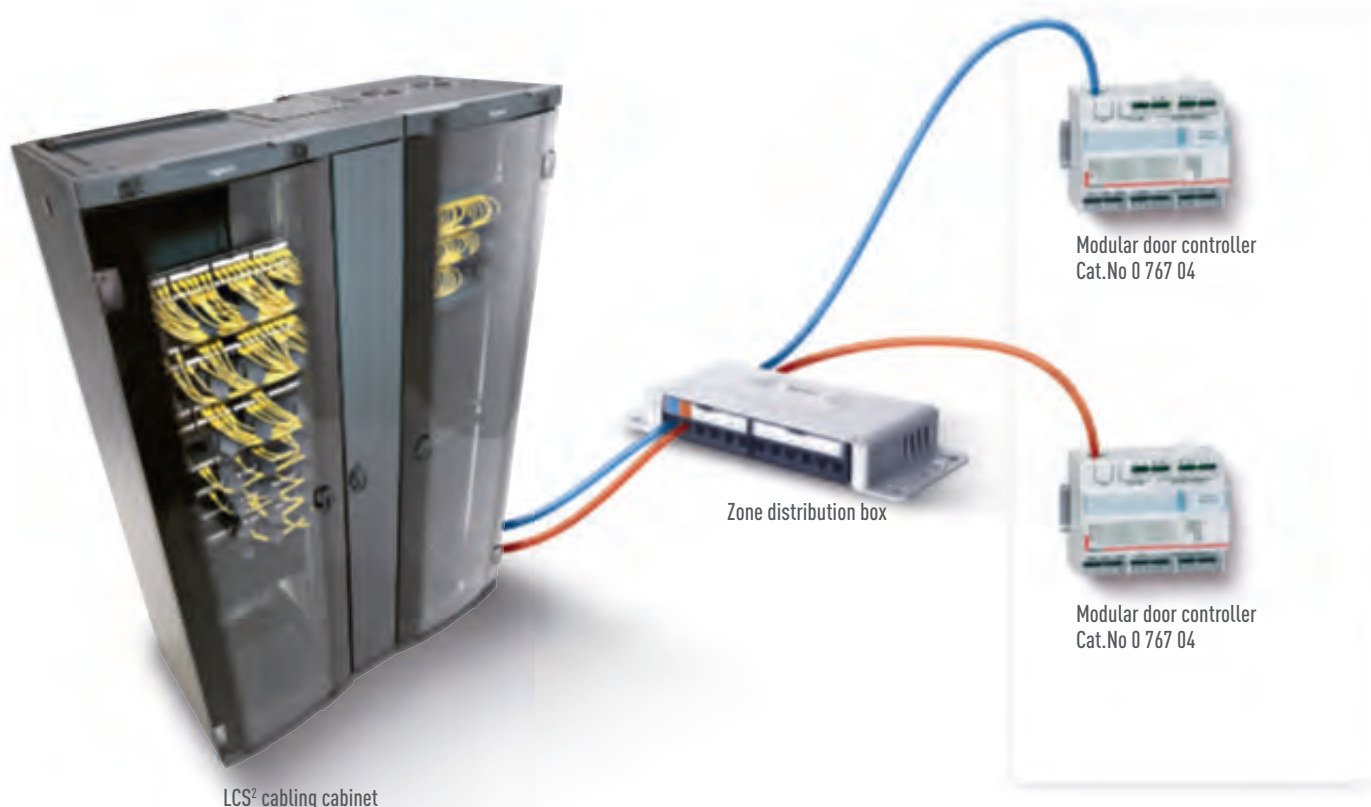
The Open Network Video Interface Forum (ONVIF) is an industry group dedicated to the development of standards relating to open IP video networking enabling the use of compliant products over non-proprietary networks.

# Centralised access control solutions for managing the flows of people

Centralised access control solutions are designed for organisations or companies which need to manage office buildings, healthcare or educational establishments from one or more control stations (up to 10,000 users).

This range meets the requirements for managing the flows of people both internally and externally.

Our centralised solutions can be supported by your structured cabling network.



## 3 main current technologies for readers to be used on their own or in combination



Fingerprint reader  
MOSAIC



Badge reader  
SOLIROC



Coded keypad  
ARTEOR

Access control enables interoperability with other systems such as video surveillance.

# Legrand enclosures the first layer of protection

When you consider the devastating impact that downtime or data loss can have on a business, the network protection appears obvious. Enclosures are the first physical layer of protection for a network.



Enclosures protect networks and live equipment against **accidental external damage or contact:**

- IP 20 (conforming to IEC/EN 60529) provides protection against solid objects and liquids
- IK 08 (conforming to IEC/EN 60062) provides protection against mechanical shock.

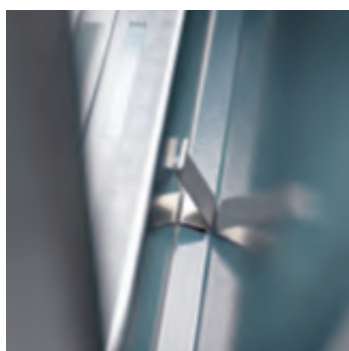
Enclosures also protect against **unauthorised access**. All cabinets are lockable to prevent malicious acts or unintended operation by unauthorised personnel.

More importantly, enclosures must **ensure the safety of people**. As they house the AC power for active equipment (switches, servers, PABX, etc.), cabinets must protect people against electrical shock in the event of a fault. That's why Legrand implements strict controls in terms of enclosure design and manufacture. All metal parts in enclosures are linked together to guarantee earthing.

## Accessories automatically integrate this function to prevent accidents



Quick-fixing system provides automatic earthing on patch panels and shelves.



Automatic earthing clip earths the side and rear panels.



# NETWORK ACCESSIBILITY

Legrand offers a comprehensive range of products from cable management to workstation products for cable distribution and network accessibility solutions in buildings.

## Cablofil® a full cable management solution

Cablofil is the most versatile cable tray. Made from welded steel wires, Cablofil meets the strictest safety standards and satisfies the customer's need for reliability and fast, economical installation.

Available in a large choice of surface treatments, it is also possible to obtain the entire range of RAL colours in applying a resin-based paint.



**Data cabling** - In order to manage data installations and master their complexity, it is necessary to have a high performance cabling system which has the capacity to evolve. With the relevant standards in mind, CABLOFIL® helps design, organise and arrange a variety of cabling systems, whilst also ensuring system safety.

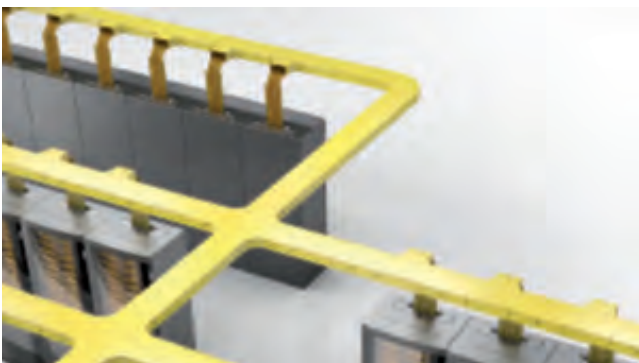
First and foremost, a cable tray must act as an effective, resistant and durable support for cables. The mechanical performance of all products and accessories is tested against the very demanding requirements imposed by the international standard IEC 61537 and can ensure large spans and support big loads. The open structure maximises ventilation and therefore reduces installation and operational costs.

## P31 OFT cable management solutions for fibre optic cables

Specially designed to meet the requirements of data center, the P31 OFT range provides excellent technical performance levels and can be used for building complex installations using both fibre optic and copper. The rails and accessories provide a high degree of strength and excellent withstand to heavy loads.

The integration of the P31 OFT provides a high degree of uniformity for all cable routing with its metal construction and metric lengths.

This range, with its specific dimensions and dedicated accessories, ensures compliance with the fibre optic bending radius right up to where the cables are routed down to the VDI patch cabinets.

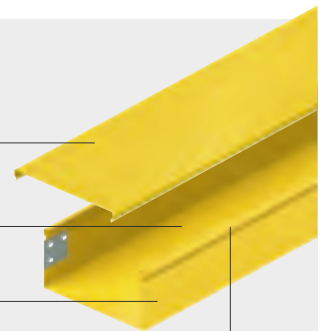


Cover for reinforced  
mechanical protection

Smooth, flat base

Strong metal body for  
excellent load withstand

Smooth, rounded edges



# LCS<sup>2</sup> Cabinets ensure evolution and maintenance

A network is a living organism. Cabinets must offer features and solutions which will allow for expansion and maintenance.

## LCS<sup>2</sup> cabinets facilitate network access and scalability



Total accessibility: thanks to the removable side panels



Easy access at the rear: pivoting body on wall-mounting cabinets



Dedicated space for cable management with easy access via door to cabling unit

### Note:

In the case of crowded freestanding cabinets, cabinet capacity can be increased using vertical extensions. For example, in a 42 U 800 mm wide cabinet, a set of 2 vertical trim plates can be used to increase the capacity by 12 U.

# Installation supports for workstations

## Networks within reach

Wall-mounted trunking, ceiling-mounted columns, floor-mounted floor boxes, multi-outlet extensions or mini-columns - there are supports to suit all workspace configurations.

### Wall-mounted supports



#### DLP trunking

Can be installed quickly and easily to supply workstations with power and data.  
The system is easy to adapt to different room configurations.

### Ceiling-mounted supports



#### Columns

Supplied through a false ceiling, columns distribute power and data as closely as possible to the workstation.

### Floor-mounted supports



#### Floor boxes

Can be installed discreetly in a concrete or raised floor.  
Floor boxes to be fitted with power and data sockets. Equipped versions available with Easybar and fast connection systems.



#### Multi-outlet extensions

To bring power and data to floor level or under the desk or meeting room table.  
Multi-outlet extensions are available either fitted with power and data sockets or equipped according to user requirements.



#### Mini-columns

Discreet and handy connection point underneath the desk. Four compartments to be fitted with power and data sockets.



## Desk-mounted supports

With its new offer of integrated office solutions, Legrand provides users with functionality, ergonomics, comfort and speed of installation for various office building areas. Pop-up boxes and power and data desk grommets integrate harmoniously in all types of furniture for meeting rooms, private or open plan offices.



### Pop-up boxes

Our sleek new ergonomically designed pop-up boxes provide real ease of use and rapid connection solutions for mobile applications with mains voltage or ELV sockets.



### Desk grommets

An ingenious ergonomically designed system that can be used to provide power, connect to the data network or recharge a mobile phone.



### Desktop modules

Our desktop modules provide a high degree of flexibility and ease of use for both office-based and desk based users.



### Meeting multi-outlet extensions

A turnkey solution perfectly suited to the specific connection needs of mobile users in meeting rooms.



### Flush mounting office modules

Can be installed in any office furniture or wall partition and configured according to the needs of the user.

APPLICATION  
EXAMPLE

# DATA CENTER



Varicondition Cold Corridor® (p. 128)



Metered PDU (p. 130)

# Performance and reliability at the heart of the data center



19" high density fibre optic drawer (p. 135)



Modular UPS

► Legrand's global solution also includes: cable management, security systems, power equipment...



## APPLICATION EXAMPLE

# OFFICE



Active zone distribution box (p. 111)



Patch panel (p. 88)



# Flexible cabling systems

## Minimise upgrade costs



RJ 45 socket (p. 91)



LCS² cabinet (p. 114)

► Legrand's global solution also includes: UPS, CCTV, cable management, power equipment...

APPLICATION  
EXAMPLE

# HYPER- MARKET



Cablofil wire mesh



Fibre optic socket (p. 110)

# Safety of property and people and well-being of customers



Dome IP camera



Ethernet switch (p. 102)

► Legrand's global solution also includes: UPS, cable management, power equipment...



APPLICATION  
EXAMPLE

# HEALTH



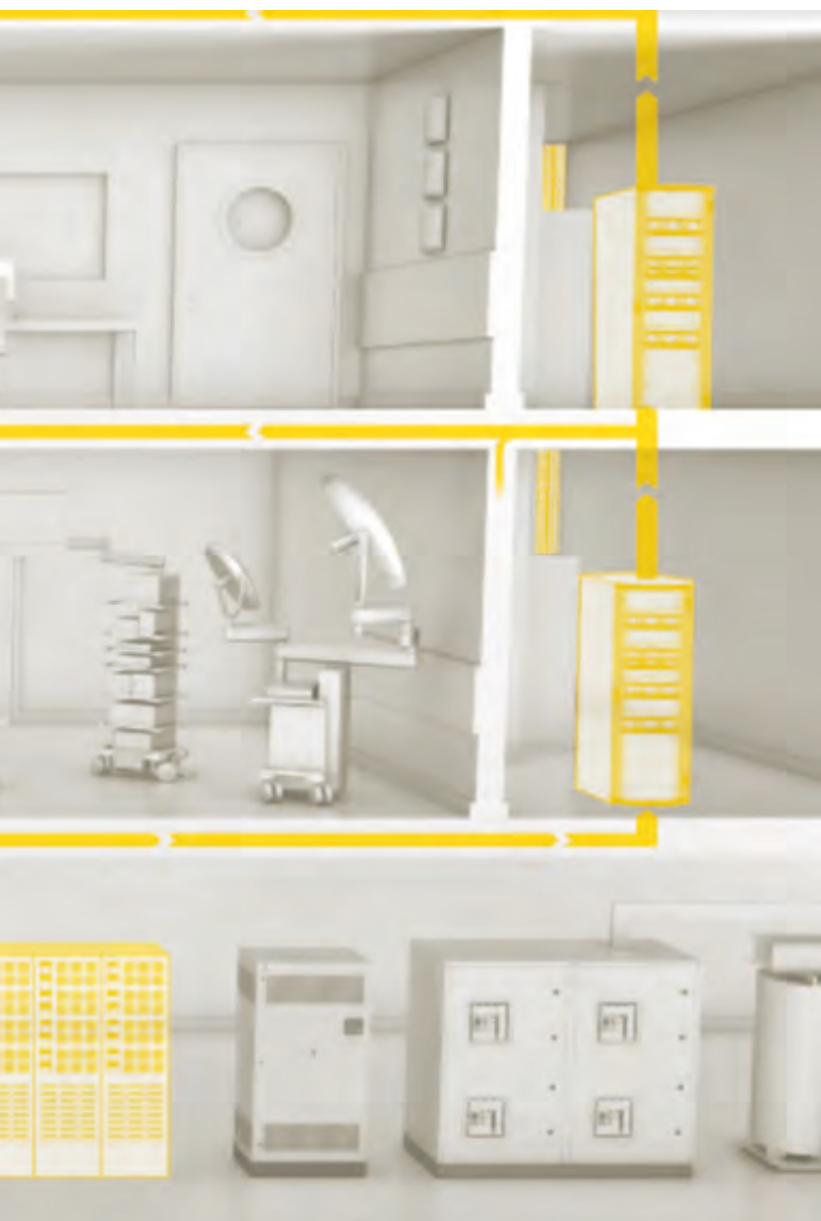
Antimicrobial RJ 45 socket



Zone distribution box (p. 90)



# Security of people and their data



Access control



Analyser for RFID patch panels (p. 132)

► Legrand's global solution also includes: UPS, emergency lighting, power equipment, security systems...

## APPLICATION EXAMPLE

# CAMPUS



AVS socket (p. 139)



DLP trunking system

# Simplicity and safety when providing information



RJ 45 with controlled access (p. 91)

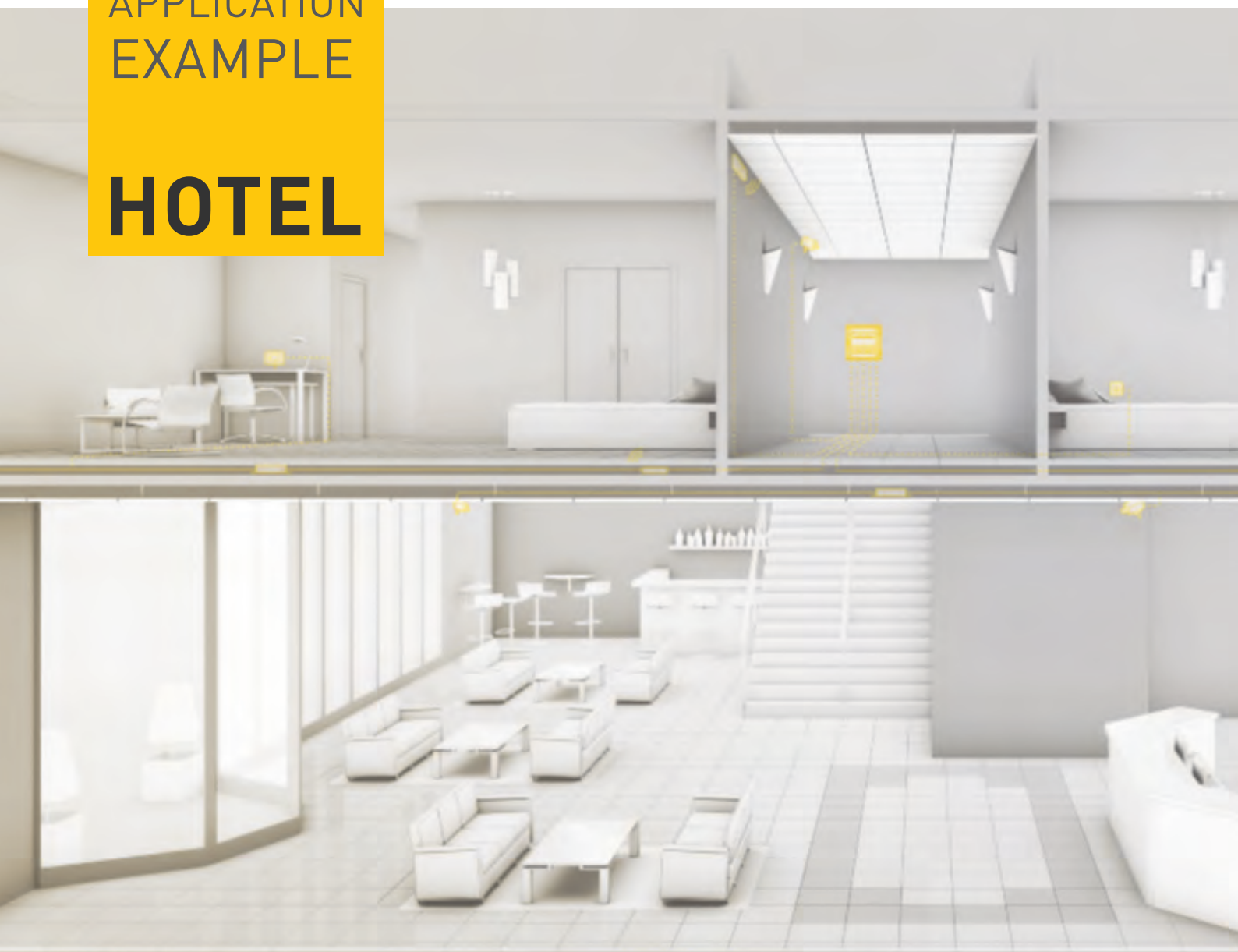


Wi-Fi access point (p. 105)

► Legrand's global solution also includes: power equipment, security systems...

## APPLICATION EXAMPLE

# HOTEL



RJ 45 sockets 45°



19" wall-mounting cabinet (p. 120)



# Availability and efficiency for the best service



Retractable RJ 45 socket (p. 96)



Patch cord (p. 88)

► Legrand's global solution also includes: wiring device, power equipment, cable management...

# 1

# STRUCTURED CABLING

## 1.1 - Introduction and logic of structured cabling

IT and Telecommunications are at the heart of all activities. They require structures capable of carrying various signals (telephony, data, etc.) **flexibly, reliably and quickly**. Structured cabling is the response to these requirements. It has two key objectives: to group together companies' connection systems and to provide flexible management of the installations for distributing communication services, including telephony and

data. A structured cabling installation reduces the costs of any modifications for the entire lifetime of the system, enabling **quick reconfiguration** of the transmission network, without having to work directly on the support infrastructure.

## 1.2 - Wiring structure

### 1.2.1 - Network topology

The term wiring implies the infrastructure (generally passive) at the origin of the network which is used to interconnect users and resources. There are numerous wiring configurations (loop, bus, star, etc.), each with its own advantages and disadvantages, both in terms of technology and scalability.

The only connection structure used for structured cabling systems is the hierarchical star, which provides a great deal of flexibility both in the installation phase and in extension and/or modification phases.

The physical connection structure is that actually used for the cables linking the nodes.

The logical structure refers to the method used by the nodes to communicate with one another. It is determined by the active network devices and the protocols used. The physical and logical structures are quite likely to be different.

The structure is referred to as a **hierarchical star**, as the wiring system may have several interconnection levels, depending on its complexity.

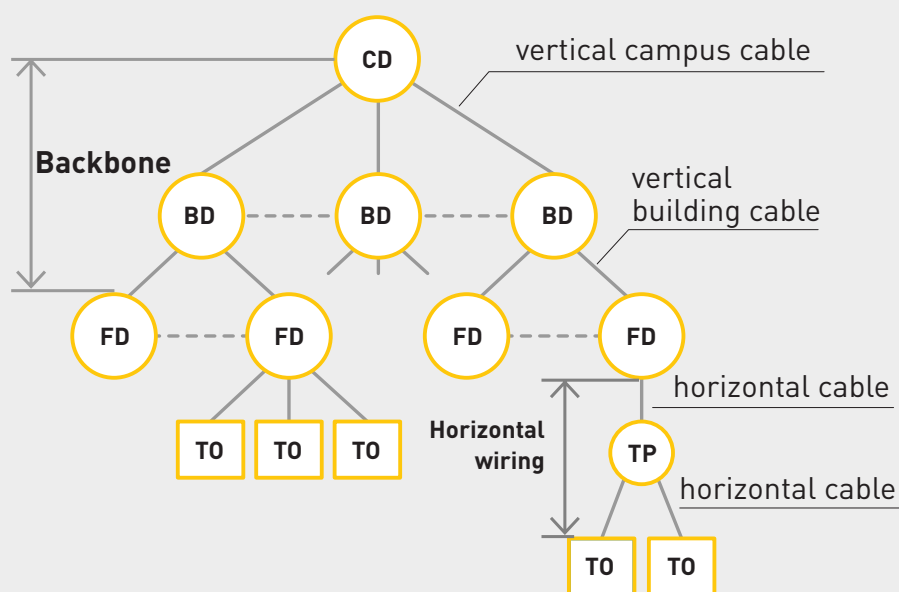
There are generally three levels, as follows:

**Floor wiring** (horizontal wiring)

**Building wiring** (vertical wiring)

**Campus wiring**

### EXAMPLE OF THE STRUCTURE OF A WIRING SYSTEM



## 1.2.2 - Patching

Each hierarchical level in the wiring system is therefore a series of cables converging towards a neutral point. The horizontal wiring is all the cables which run to the floor distributor from each telecommunications outlet. The vertical wiring consists of the cables which converge towards the building distributor (BD) from the floor distributors (FD), etc. Each branch of the wiring ends at an active device which connects the users to the network.

Extension and/or modernisation of the network, reconfiguration of the layout of the areas, reorganisation, replacement of devices, etc., are modifications which generally require a change of (user)/logical port cable connections. To meet this requirement, the principle of **patching** has been introduced.

The patch cord physically links a given user (identified by a port on the patch panel) to the network itself (identified by a port on the network device) and provides a high degree of flexibility in terms of reconfiguration. If, for example, a single user has to be moved from the workstation he/she usually occupies, it is very easy to reassign all the network services to the new workstation.

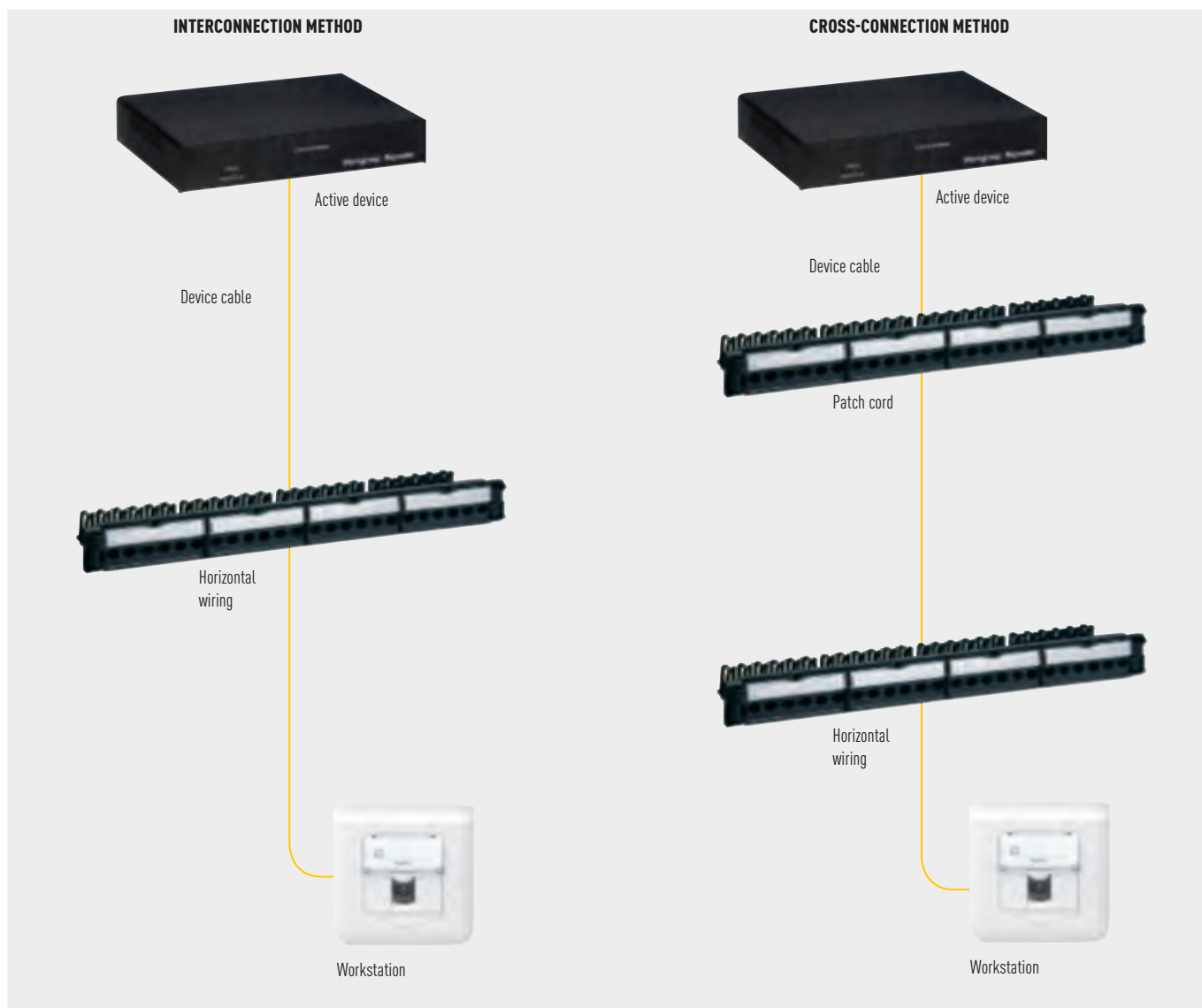
The type of structure just described is also called **simple patching**, as all the cords link the cable identification panel

directly to the active device. It is also possible to create a slightly more complex structure, called **double patching**, in which the active device itself is also linked permanently to the ports on a panel identical to that which terminates the cables from the installation. In this case, the network connections are configured between two panels, i.e. between the "cable side" panel and the "device side" panel. The choice of this more complex, and more costly, structure (which requires twice the number of panels) is primarily associated with the need to protect the active devices. Frequently moving the network connections may damage the connectors involved.

If the damaged connector is in a patch panel, the damage is limited and can be repaired quickly (the connector can be replaced quickly). Conversely, if the damaged connector is on an active device, it is then necessary to send the whole device to the support centre, which involves much higher costs and has a much greater impact on the operation of the network. With double patching, which is also called "Cross Connection", the ports on the device are no longer directly involved in the patching operations.

This principle applies to all the neutral points in the structure (FD, BD and CD) and is independent of the cable technology (copper or fibre optic).

### INTERCONNECTION AND CROSS-CONNECTION METHODS



### 1.2.3 - Working area

From a structural point of view, the working area consists of all the components required to link the user's device to the horizontal wiring: depending on the different installation architectures, the working area can include telecommunications outlets (TO), multi user telecommunications outlet assemblies (MUTOA), the consolidation point (CP), the transition point (TP) and the connection cord of the device. All these components help to improve the wiring of an area that is generally problematic as it is subject to numerous structural, environmental and topological constraints, and also potentially subject to change, being moved, reorganisation of the areas, etc. The working area wiring must be freely adaptable to suit different and changing situations. Components such as the multi user telecommunications outlet assembly (MUTOA) and the consolidation point have been introduced to deal with just such requirements. A MUTOA device brings together several users' data sockets in a single point. These users can position themselves anywhere within a relatively large radius, the only limit being that of the maximum length of the device's cord, which is 20 m.

The introduction of the CP (consolidation point) is another technique which provides some freedom for reconfiguring the area. The floor wiring is subdivided into two main parts: the fixed (or permanent) wiring which runs from the technical room to a predefined location in the area to be served and is not modified over time, and a reconfigurable part from the CP which links the telecommunications outlets (TO). If the layout of the office is changed, all that needs to be changed is the last portion of the wiring without having to do anything to the whole of the section, which would require work that would doubtless be more complex and more costly.

#### NOTES:

Various definitions used in this document are listed below.

- WA - Working Area. This is the area in which the work is carried out and where the user interacts with the data and telephone systems, computers, printers, faxes, etc.

- TO - Telecommunications Outlet. This is the telephone socket in each working area. The user can plug his/her devices into this in order to access services.

- MUTOA - Multi User Telecommunications Outlet Assembly. This is a multiple data socket which can serve several users.

- TR - Telecommunications Room. This is the technical room containing the enclosures with the panels and devices for the floor wiring.

- FD - Floor Distributor. This is the floor enclosure located in the TR. It is the neutral point of the horizontal wiring where all the cables from the user workstations converge and from which the connections for the vertical wiring depart.

- ER - Equipment Room. This is the building's technical room in which the central network devices and the enclosures for the building's (vertical) wiring are located.

- BD - Building Distributor. This is the building enclosure located in the ER. It is the neutral point of the vertical wiring where all the cables from the various FD (floor distributors) converge and from which the connections for the campus wiring (if there are any) depart.

- CD - Campus Distributor. This is the campus enclosure, located in the main ER. It is the neutral point of the campus wiring where all the cables from the various BD (building distributors) converge.

- CP - Consolidation Point. This is a zone box which links the floor distributor (FD) to the telecommunications outlet (TO).

### 1.2.4 - Horizontal wiring

Horizontal wiring comprises all the components used to transport information from the user's IT structures to the floor distributor contained in the TR for this wiring branch. The working area wiring is therefore part of the horizontal wiring, which comprises:

- The device cords
- The telecommunications outlet
- The cable
- A possible CP (consolidation point) or the TP
- The patching systems which make up the floor distributor (FD)
- The patch cords
- The device cables

The horizontal wiring is the most critical part of the whole structured cabling system. Firstly, it is structurally complex and includes a large number of cables which must reach various distributed points in a more or less uniform way over quite large areas. Secondly, it is the part of the wiring that is most subject to modification and being moved over time. The technological choices made and the attention given to the infrastructure project supporting this part of the installation will be very important in terms of performance levels and overall cost of the system.

### 1.2.5 - Vertical wiring

The vertical wiring represents the upper levels of the hierarchical structure described in section 1.2.1. The system which links the floor distributors (FD) on the various floors to the building distributor (BD) is generally referred to as the building backbone. Likewise the campus backbone links the various BDs to the CD (campus distributor). This backbone is generally made up of structures for transporting cables between isolated buildings within complexes that are sometimes huge.

These descriptions refer in all cases to typical situations: in reality, each application can differ, often quite considerably, from this general description.

Vertical wiring presents very different installation problems from those of horizontal wiring.

The topology is simpler, and the wiring runs to and from different points. It is easier to create the service spaces in the structure through which to run the cables. The cable runs are not affected by expansion of the network and any updates, modifications, extensions, etc. However the installation of backbones requires the application of special techniques, for both copper and fibre optic cables, whether indoor vertical wiring or campus vertical wiring running outside buildings is involved. In addition, the reliability of the work carried out is particularly critical as each cable is not just associated with a single user but with all the users on a floor, in the wing of a building, in a whole building or even a group of buildings, depending on the hierarchical level of the network structure in question.



### 1.2.6 - Technical rooms

The telecommunications rooms (TR) and equipment rooms (ER) are technical rooms, i.e. areas designed to contain structured cabling equipment and devices. The difference between TR and ER is essentially connected with their hierarchical positions in the wiring structure. A telecommunications room (TR) is the point at which all the cables from the floor wiring converge and from which the vertical wiring cables depart. It contains the hardware structures for patching (panels, patch cords, etc.), the floor distributor (FD), the active network devices and those

required for telecommunications. The equipment room (ER) is intended to serve an entire building or group of buildings: it is therefore the room in which all the interconnections are made in the hierarchical layout of the vertical wiring. It contains the hardware structures for termination and patching (BD and CD) and the active devices. In view of the "hierarchical" position of the equipment room (ER) and the complexity, costs and critical nature of all the devices it contains, an ER project must meet very stringent requirements and comply with very strict rules.

## 1.3 - Performance of the wiring system: classes and categories

Now let's take a look at the problem of performance levels, i.e. technological compliance with the intended function of the wiring. The task of each wiring structure is to transport data encoded according to a given protocol.

The need to exchange data ever more quickly necessitates upgrading of the protocols.

If we just look at Ethernet protocols (the most widely used), it will be seen that whereas the transmission speed of the first wiring systems was 10 Mbps, today's network performance is now a thousand times faster, at around 40 Gbps. In the following sections we will describe the essential parameters for defining performance levels.

### 1.3.1 - Bandwidth

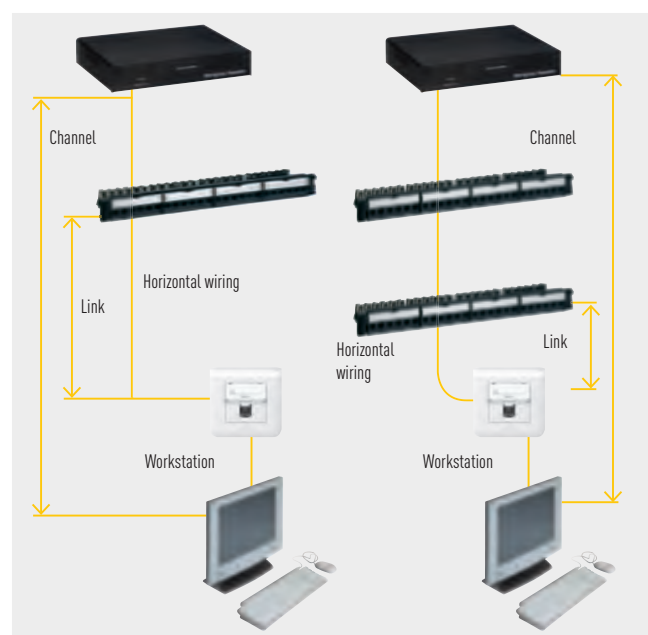
When describing the performance of a wiring system, irrespective of the technology used for the transport medium, whether it is copper or a wireless system, reference is always made to its bandwidth, expressed in Hertz (its multiples, MHz and GHz). The bandwidth represents the frequency range within which the system operates. A series of electrical parameters is defined within this range, with specific limits given in the reference standards (eg: EN 50173 series).

The performance of a wiring system can be expressed according to a division into classes (according to the ISO/IEC, CENELEC and CEI standards) or categories (TIA/EIA standard).

The category is a parameter which identifies the characteristics of each component in the wiring system. The class identifies the expected performance levels of the system, once all the components have been cabled. The class is checked by means of tests using instruments. These tests must be carried out:

- On the link: fixed horizontal part of the wiring system. The portion from the patch panel to the connector at the workstation
- On the channel: portion which, as well as the link, also includes the patch cords (between patch panels) and the connection to the peripheral at the workstation.

#### ACTIVE DEVICE



Class	Category	Speed*	Bandwidth	Applications
A	1		100 KHz	no longer used
B	2		1 MHz	no longer used
	3		10 MHz	no longer used
C	3		16 MHz	no longer used
D	5	1 Gbps	100 MHz	data
E	6	1 Gbps	250 MHz	broadband data
EA	6 <sub>A</sub>	10 Gbps	500 MHz	broadband data
F	7	10 Gbps	600 MHz	broadband data
FA	7 <sub>A</sub>	10 Gbps	1000 MHz	broadband data
Optical		≥ 40 Gbps	2 GHz	broadband data

# 2

# STANDARDS

## 2.1 - General

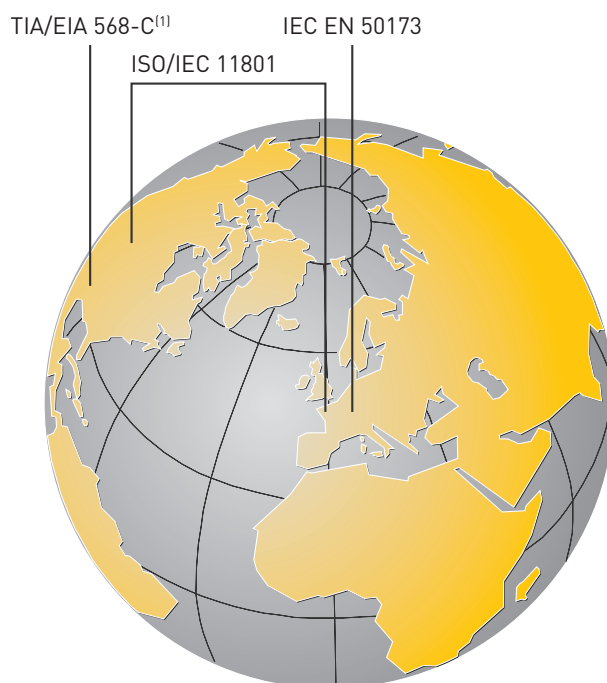
The reference standards for structured cabling include the design and installation of the overall system and the technical characteristics of each component. The standards are structured differently for each continent, but they all cover all the important topics.

The standards include requirements in terms of:

- Performance
- Safety
- Conformity of the installation

The main reference standards for wiring mainly contain performance requirements and are listed below:

- United States: TIA/EIA 568- C<sup>(1)</sup>
- Europe: EN 50173 (project), EN 50174 (planning and installation)
- Rest of the world: ISO/IEC 11801 (project) and other standards on specific topics (see 2.4)



<sup>1)</sup> The TIA/EIA 568-C series supersedes the previous TIA-EIA 568-A and 568-B series. The contents of the previous series are however kept and incorporated with new requirements. References to the previous series A and B that can be found in the technical literature, although not stringent, must however be considered as still valid.

### Other important standards:

Safety:

- United States: NEC - National Electrical Code
- Europe: HD 60364 series
- Rest of the world: IEC 60634 series
- Italy CEI 64-8.

Fire resistance (properties of the materials used for cable sheaths):

- IEC 60332-1, 2: flame propagation (single cable)
- IEC 60332-3: fire propagation (cable bundle)
- IEC 60331: integrity of the service under fire conditions (single cable).

All these standards impose various levels of tests in terms of severity and specifications for the cable type (copper, fibre optic, etc.).

Smoke emission (LS), and irritant and corrosive substances (ZH):

- IEC 61304-1, 2
- CEI 20-38.

Properties of the sheaths of fibre optic cables, with regard to its installation:

- Indoor (liquid tight, IEC 60974-2)
- Outdoor (cables not attached, IEC 60974-3).

## 2.2 - ISO/IEC, IEC (rest of the world)

### 2.2.1 - ISO/IEC standards for structured cabling in general

11801: International standard ISO/IEC 11801 defines the specific requirements for the design of the structured cabling system in each of the installation areas listed in the European standards.

In future, it is planned to have a subdivision in the international standards similar to that in the European standards.

International standard ISO/IEC 14763-2 defines the installation, planning, management and maintenance rules for wiring. ISO/IEC 14763-3: Testing of fibre optic cabling.

### 2.2.2 - IEC standards for cabling components

#### Copper cables for horizontal wiring:

Wiring class	Cable category	Maximum frequency (MHz)	Standard	Type of cable
D	5	100	IEC 61156-5	Shielded
D	5	100	IEC 61156-5	Unshielded
E	6	250	IEC 61156-5	Shielded
E	6	250	IEC 61156-5	Unshielded
E <sub>A</sub>	6 <sub>A</sub>	500	IEC 61156-5	Shielded
E <sub>A</sub>	6 <sub>A</sub>	500	IEC 61156-5	Unshielded
F	7	600	IEC 61156-5	Shielded*
F <sub>A</sub>	7 <sub>A</sub>	1000	IEC 61156-5	Shielded*

\* Categories 7 and 7<sub>A</sub> shielded cable only, with pairs shielded individually

#### Copper cords:

Wiring class	Cable category	Maximum frequency (MHz)	Standard	Type of cable
D	5	100	IEC 61156-6	Shielded
E	6	250	IEC 61156-6	Shielded
E	6	250	IEC 61156-6	Unshielded
E <sub>A</sub>	6 <sub>A</sub>	500	IEC 61156-6	Shielded
E <sub>A</sub>	6 <sub>A</sub>	500	IEC 61156-6	Unshielded
F	7	600	IEC 61156-6	Shielded*
F <sub>A</sub>	7 <sub>A</sub>	1000	IEC 61156-6	Shielded*

\* Categories 7 and 7<sub>A</sub> shielded cable only, with pairs shielded individually

#### FIBRE OPTIC CABLES: CONFORMING TO THE EUROPEAN STANDARD

#### FIBRE OPTIC CORDS: CONFORMING TO THE EUROPEAN STANDARD

#### COPPER CONNECTORS: CONFORMING TO THE EUROPEAN STANDARD (IEC 60603-7 SERIES + IEC 61076-3-104)

#### FIBRE OPTIC CONNECTORS: CONFORMING TO THE EUROPEAN STANDARD

## 2.3 - TIA/EIA (United States)

The American standards are, in the strict sense, national standards and are therefore applicable to a given area. In the specific field of structured cabling, they are the latest standards, and thus often the only reference in existence for the most innovative solutions, or are quoted in all cases as a reminder.

The ISO/IEC and EN standards often inherit their content at a later stage and do not always correspond with them 100%.

The TIA/EIA 568-C series specifies the minimum requirements for wiring in individual commercial buildings or in complexes. It specifies the physical, electrical and transmission requirements, the maximum possible lengths and the characteristics of the components. The wiring systems described cover a maximum distance of 3000 m and areas of approximately 1,000,000 m<sup>2</sup>, with connection of up to 50,000 users.

The TIA/EIA 568-C series supersedes the previous TIA/EIA 568-B series, adopting its content and incorporating it in that of class E<sub>A</sub> which is designated category 6<sub>A</sub> in American territory (different notation: capital "A" and same term as that used for the requirements for conduits, links and components). To be more precise, the requirements relating to class E<sub>A</sub>/category 6<sub>A</sub> are not completely equivalent: those in the TIA/EIA series are less restrictive.

### 2.3.1 - TIA/EIA standards for structured cabling in general

Project

TIA/EIA 568-C.0: Structured cabling, general principles.

TIA/EIA 568-C.1: Requirements specific to wiring in commercial premises and offices.

TIA/EIA 570-B: Requirements specific to wiring in residential environments.

TIA/EIA 942-A: Infrastructure requirements for data centers.

TIA/EIA 1005: Infrastructure requirements for industrial premises.

TIA/EIA 1179: Structured cabling for hospital environments

Planning and installation.

TIA/EIA 569-C: Cable pathways and spaces.

TIA/EIA 606-A: Cable routing.

TIA/EIA 607/B: Requirements specific to earthing.

### 2.3.2 - TIA/EIA standards for wiring components

TIA/EIA 568-C.2: Components for copper wiring.

TIA/EIA 568-C.3: Components for fibre optic wiring.

## 2.4 - CENELEC (EUROPE)

### 2.4.1 - Cenelec standards for structured cabling in general

The Cenelec standards define the requirements for the structured cabling system, in particular:

■ Class (D, Ex, Fx - copper; OF-l - fibre optic): transmission requirements for a channel or a permanent link

■ Category (5e, 6x, 7x - copper; Oxy - fibre optic): transmission requirements for components (cables, connectors and cords)

The standards define "reference layouts" with correspondence between the class of the channel and the component category. For example: a reference layout for a class E channel can certainly be created using category 6 components. The same channel can, however, be created differently: using higher category components, and also lower category components (by reducing the length).

The standards specifically relating to wiring are then subdivided into design, installation, planning and component standards, as specified below.

#### EN 50173

The EN 50173 series defines the design requirements for copper and fibre optic structured cabling systems in various different installation areas.

EN 50173-1: Definitions and general characteristics

EN 50173-2: Specific requirements for offices and commercial sites

EN 50173-3: Specific requirements for industrial environments

EN 50173-4: Specific requirements for residential environments

EN 50173-5: Specific requirements for data centers

#### EN 50174

The EN 50174 series contains the practical installation requirements for copper and fibre optic structured cabling systems, in particular:

EN 50174-1: Planning, management and maintenance

EN 50174-2: Installation inside standard buildings and specific information for commercial, residential, industrial and data center buildings: backbones and horizontal wiring

EN 50174-3: Installation outside buildings.

#### EN 50310

Standard EN 50310 defines the specific requirements for earthing a structured cabling system.

#### EN 50346

Standard EN 50346 contains the requirements in terms of methods and instruments for testing both copper and fibre optic structured cabling.

### 2.4.2 - Cenelec standards for the wiring components

The European standards on wiring components are included in the system standards (inherent in section 2.3.1) and define the transmission requirements that must be met by each device in order to constitute transmission channels that comply with them.



## Copper cables for horizontal wiring

Wiring class	Cable category	Maximum frequency (MHz)	Cable standard	Type of cable
<b>D</b>	5	100	EN 50288-2-1	Shielded
<b>D</b>	5	100	EN 50288-3-1	Unshielded
<b>E</b>	6	250	EN 50288-5-1	Shielded
<b>E</b>	6	250	EN 50288-6-1	Unshielded
<b>E<sub>A</sub></b>	6 <sub>A</sub>	500	(TIA/EIA 568-C.2); EN 50288-10-1	Shielded
<b>E<sub>A</sub></b>	6 <sub>A</sub>	500	(TIA/EIA 568-C.2); EN 50288-11-1	Unshielded
<b>F</b>	7	600	EN 50288-4-1	Shielded*
<b>F<sub>A</sub></b>	7 <sub>A</sub>	1000	EN 50288-9-1	Shielded*

\* Categories 7 and 7<sub>A</sub> shielded cable only, with pairs shielded individually

## Copper cords

Wiring class	Cable category	Maximum frequency (MHz)	Cable standard	Type of cable
<b>D</b>	5	100	EN 50288-2-2	Shielded
<b>D</b>	5	100	EN 50288-3-2	Unshielded
<b>E</b>	6	250	EN 50288-5-2	Shielded
<b>E</b>	6	250	EN 50288-6-2	Unshielded
<b>E<sub>A</sub></b>	6 <sub>A</sub>	500	(TIA/EIA 568-C.2); EN 50288-10-2	Shielded
<b>E<sub>A</sub></b>	6 <sub>A</sub>	500	(TIA/EIA 568-C.2); EN 50288-11-2	Unshielded
<b>F</b>	7	600	EN 50288-4-2	Shielded*
<b>F<sub>A</sub></b>	7 <sub>A</sub>	1000	EN 50288-9-2	Shielded*

\* Categories 7 and 7<sub>A</sub> shielded cable only, with pairs shielded individually

## Fibre optic cables for horizontal wiring: type of fibre + location of the cable (indoor or outdoor)

Channel class	Mode/window (nm)	Type of fibre (equiv. category)	Reference standard
<b>OF-25</b>	M/650;	OP1	EN 60793-2-40 (A4a.2)
<b>OF-50</b>	M/650; M/850; M/1300	OP1; OP2	EN 60793-2-40 (A4a.2; A4g)
<b>OF-100</b>	M/650; M/850; M/1300	OP1; OP2	EN 60793-2-40 (A4a.2; A4g)
<b>OF-100</b>	M/850	OH1	EN 50793-2-30 (A3c)
<b>OF-100</b>	M/850; M/1300	OM1	EN 60793-2-10 (A1a) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-100</b>	M/850; M/1300	OM2	EN 60793-2-10 (A1b) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-100</b>	M/850; M/1300	OM3	EN 60793-2-10 (A1a.2) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-100</b>	M/850; M/1300	OM4	EN 60793-2-10 (A1a.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-200</b>	M/650; M/850; M/1300	OP2	EN 60793-2-40 (A4f)
<b>OF-200</b>	M/850	OH1	EN 50793-2-30 (A3c)
<b>OF-300</b>	M/850; M/1300; S/1310; S/1550	OM1	EN 60793-2-10 (A1a) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-300</b>	M/850; M/1300; S/1310; S/1550	OM2	EN 60793-2-10 (A1b) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-300</b>	M/850; M/1300; S/1310; S/1550	OM3	EN 60793-2-10 (A1a.2) + EN 60794-2 (ind.), EN 60794-3 (out.)

## Fibre optic cables for horizontal wiring: type of fibre + location of the cable (indoor or outdoor) (continued)

Channel class	Mode/window (nm)	Type of fibre (equiv. category)	Reference standard
<b>OF-300</b>	M/850; M/1300; S/1310; S/1550	OM4	EN 60793-2-10 (A1a.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-300</b>	M/850; M/1300; S/1310; S/1550	OS1	EN 50793-2-50 (B1.3, B6.a) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-300</b>	M/850; M/1300; S/1310; S/1550	OS2	EN 50793-2-50 (B1.3, B6.a) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-2000</b>	M/850; M/1300; S/1310; S/1550	OM1	EN 60793-2-10 (A1a) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-2000</b>	M/850; M/1300; S/1310; S/1550	OM2	EN 60793-2-10 (A1b) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-2000</b>	M/850; M/1300; S/1310; S/1550	OM3	EN 60793-2-10 (A1a.2) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-2000</b>	M/850; M/1300; S/1310; S/1550	OM4	EN 60793-2-10 (A1a.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-2000</b>	M/850; M/1300; S/1310; S/1550	OS1	EN 50793-2-50 (B1.3, B6.a) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-2000</b>	M/850; M/1300; S/1310; S/1550	OS2	EN 50793-2-50 (B1.3, B6.a) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-5000</b>	S/1310; S/1550	OS2	EN 50793-2-50 (B1.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
<b>OF-10000</b>	S/1310; S/1550	OS2	EN 50793-2-50 (B1.3) + EN 60794-2 (ind.), EN 60794-3 (out.)

P: Plastic; M: Multimode "100% silica"; S: Singlemode "100% silica"; H: Hybrid singlemode (plastic sheath + glass core)

### Fibre optic cords:

- 100% silica: General specifications EN 60794-1-1 + EN 60794-1-2 + specific requirements for the cable + standards for the connectors used
- Plastic: standards under consideration
- Hybrid: standards under consideration

### Copper connectors:

Category	Standard
<b>5/unshielded</b>	EN 60603-7-2
<b>5/shielded</b>	EN 60603-7-3
<b>6/unshielded</b>	EN 60603-7-4
<b>6/shielded</b>	EN 60603-7-5
<b>6<sub>A</sub>/unshielded</b>	EN 60603-7-41
<b>6<sub>A</sub>/shielded</b>	EN 60603-7-51
<b>7 (shielded only)</b>	EN 60603-7-7; EN 61076-3-104
<b>7<sub>A</sub> (shielded only)</b>	EN 60603-7-71; EN 61076-3-104

### Fibre optic connectors:

There are different types of fibre optic connector according to the type of fibre (100% silica, hybrid, plastic, step index, graded index, etc.) and the mechanical connection (by switch, PC) or angled connection (APC).

All types of connector must comply with the:

- Safety requirements in standard EN 60825-1
- Colour codes in standard EN 60794-2, to prevent any connection errors with different mode cables

Comply with the physical requirements listed in the following table (source EN 50173-1).

## SC PC Multimode

No.	Characteristics		Specification	Reference
a)	Characteristics in terms of optical performance			
	Maximum attenuation	Connectors	0.5 dB for 95% of the connections 0.75 dB for 100% of the connections	EN 61300-3-4
		Joint	0.2 dB	EN 61300-3-4
	Maximum return loss	Multimode	20 dB	EN 61300-3-6
b)	Physical characteristics			
	Compatibility of the termination with the cable			
	Nominal diameter of the sheath (µm)		125	EN 60793-1-20
	Nominal diameter of the secondary coating (µm)		-	EN 60794-1-1
	Outer diameter of the cable (µm)		-	EN 60794-1-1
c)	Mechanical characteristics			
	Resistance to wear (duration) cycles		≥ 500 (see NOTE 1)	EN 61300-2-2
	Strength of the coupling mechanism		68.6 N	EN 61300-2-6
	Tension on the cable		90 N	EN 61300-2-4
d)	Environmental specifications			
	Cold		-10°C 96 h (see NOTE 1)	EN 61300-2-17
	Dry heat		60°C 96 h (see NOTE 1)	EN 61300-2-18
	Damp heat		40°C, 93% RH 96 h (see NOTE 1)	EN 61300-2-19
	Impact		1 m 5 times (see NOTE 1)	EN 61300-2-12
	Vibration		10 Hz to 55 Hz 0.75 mm 30 min in each of the 3 directions (see NOTE 1)	EN 61300-2-1
	Change of temperature test		+60°C/-10°C at a rate of 1°C/min 30 min at extremities 5 cycles (see NOTE 1)	EN 61300-2-22

**NOTE 1** Maximum variation during the test < 0.2 dB, initial and final attenuation < 0.75 dB

**NOTE 2** Initial and final attenuation < 0.75 dB

**NOTE 3** Maximum variation during the test < 0.5 dB, initial and final attenuation < 0.75 dB

The most common mechanical types are:

LC



Clip locking

SC



Push-pull locking

LC Duplex



SC Duplex

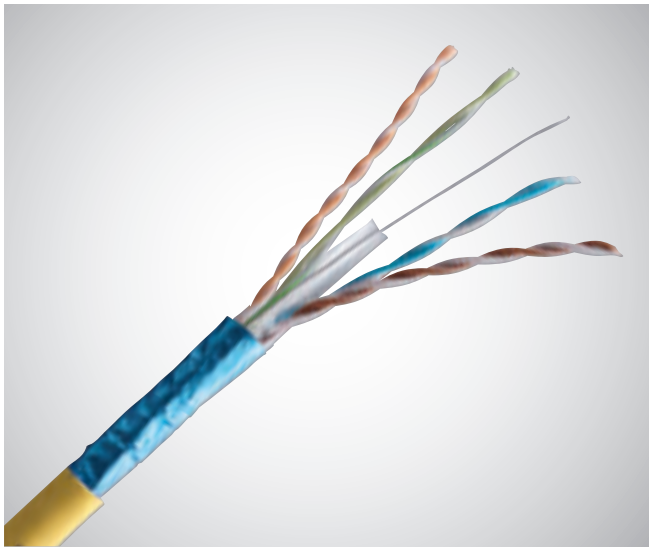


There are then connectors with 12 or 24 fibres (MPO) for the most advanced applications (10GbaseT, and the future 40GbaseT and 100GbaseT).

# 3

# COPPER TRANSMISSION MEDIUM

## 3.1 - Cable



The cable is one of the most critical components in horizontal wiring for the performance of the whole link, in terms of both quality of the product and conformity of the installation.

Any cable installation error will seriously compromise the performance of the installation.

For structured cabling systems, the standard requires the use of category 5e, 6 and 6<sub>A</sub> (100 MHz, 250 MHz et 500 MHz respectively) twisted, symmetrical 4-pair cables with an impedance of 100 Ω 1).

The cable can be of the following type:

- Unshielded U/UTP (Unshielded Twisted Pairs)
- Shielded F/UTP (Foiled Twisted Pairs)
- Double shielding SF/UTP or S/FTP.

NOTE 1): To date, category 7 is not very widely used, even though it is standardised and can offer high performance levels. It is used for reasons of form factor, cost and where there are installation difficulties.

### Legrand cable solutions

	Sheath	Marking	Storage/installation temperature	Operating temperature
<b>Cat. 6<sub>A</sub> F/UTP 100 Ω</b>	LSZH (zero halogen cables) conforming to standard NFC 32062, flame retardant conforming to standards IEC 332-1 and NFC 32070 2.1 - Ø 7.8 mm - Colour: RAL 1018 yellow	LEGRAND 32778 4 pairs 24 AWG F/UTP 100 ohms LSZH cat. 6a 500 MHz - CHECKED AGAINST ISO 11801 IEC 332-1 EN 50173 - TIA/EIA 568B - VPN/NVP .....% Batch no. + length in metres	0 to +50°C	-20 to +60°C
<b>Cat. 6 U/UTP 100 Ω</b>	PVC or LSZH cables conforming to standard NFC 32062, flame retardant conforming to standards IEC 332-1 and NFC 32070 2.1 - Ø 6.4 mm - Colour: RAL 5015 blue	LEGRAND (4 pairs or 2x4 pairs) 24 AWG UTP 100 ohms 250 MHz (PVC or LSZH) cat. 6 250 MHz - CE CHECKED AGAINST ISO 11801 IEC 332-1 EN 50173-1 TIA/EIA 568A Batch no. + length in metres	0 to +50°C	-20 to +60°C
<b>Cat. 6 F/UTP 100 Ω</b>	PVC or LSZH cables conforming to standard NFC 32062, flame retardant conforming to standards IEC 332-1 and NFC 32070 water-repellent synthetic tape - Ø 7 mm - Colour: RAL 5015 blue	LEGRAND (4 pairs or 2x4 pairs) 24 AWG FTP 100 ohms 250 MHz (PVC or LSZH) cat. 6 250 MHz - CE CHECKED AGAINST ISO 11801 IEC 332-1 EN 50173-1 TIA/EIA 568A Batch no. + length in metres	0 to +50°C	-20 to +60°C
<b>Cat. 5e U/UTP 100 Ω</b>	PVC or LSZH cables conforming to standard NFC 32062, flame retardant conforming to standards IEC 332-1 and NFC 32070 2.1 - Ø 5.2 mm - Colour: RAL 7035 light grey	Cat. No. LEGRAND (4 pairs or 2x4 pairs) 24 AWG UTP 100 ohms (PVC or LSZH) cat. 5e CE CHECKED AGAINST ISO 11801, IEC 332-1, EN 50173-1, TIA/EIA 568A Batch no. + length in metres	-15 to +70°C	+5 to +40°C

**NOTE:** for all other types of cable, please contact the Legrand sales network

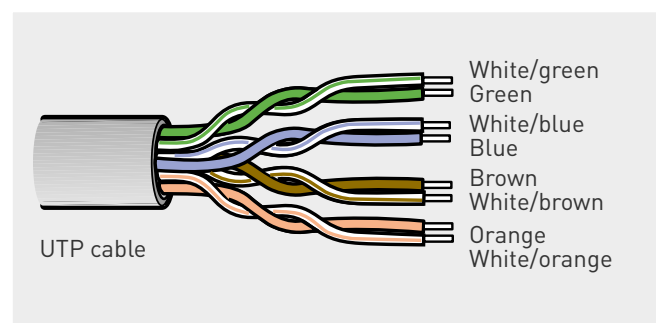


Data transmission cables are made up of four pairs arranged inside a sheath according to a specific layout, which is necessary to reduce attenuation and crosstalk problems. This layout consists of twisting the pairs of conductors individually. These pairs are identified using standard colours. Each of the pairs has a different pitch, and is in turn twisted differently inside the outer sheath. The conductor size permitted by the standards is between 22 and 26 AWG: 24 AWG is the most commonly used in all cases. The acronym AWG (American Wire Gauge) corresponds to the unit of measurement used by the American standards to measure the cross-sections of cables. As it is a ratio, the smallest cross-sections correspond to the largest AWG sizes. The appropriateness of using cables with different types of sheath must be assessed according to the area in which the wiring system is installed. The most commonly used cable sheath is PVC or LSZH (low smoke zero halogen).

According to the IEC and CEI specifications, cables with LSZH sheath must be used:

- In public areas
- In very busy areas
- Installations subject to a final test by public or safety bodies, such as local health authorities and fire services. If there is a fire, cables with this type of sheath emit very little smoke and do not release any toxic gases.

## UTP CABLE



AWG cable conversion table

AWG	Ø (mm)	Cross-section (mm²)	AWG	Ø (mm)	Cross-section (mm²)
1	7.250	42.400	16	1.290	1.3100
2	6.540	33.600	17	1.150	1.0400
3	5.190	21.200	18	1.024	0.8230
4	5.190	21.200	19	0.912	0.6530
5	4.620	16.800	20	0.812	0.5190
6	4.110	13.300	21	0.723	0.4120
7	3.670	10.600	22	0.644	0.3250
8	3.260	8.350	23	0.573	0.2590
9	2.910	6.620	24	0.511	0.2050
10	2.590	5.270	25	0.455	0.1630
11	2.300	4.150	26	0.405	0.1280
12	2.050	3.310	27	0.361	0.1020
13	1.830	2.630	28	0.321	0.0804
14	1.630	2.080	29	0.286	0.0646
15	1.450	1.650	30	0.255	0.0503

New ref.	Old ref.	Description
U/UTP	UTP	Unshielded twisted multipair cable
F/UTP	FTP	Twisted multipair cable (external foil screen)
U/FTP	FTP PIMF	Shielded twisted multipair cable (foil screened in pairs)
F/FTP	FFTP	Shielded twisted multipair cable (foil screened in pairs and outer general shielding)
S/FTP	SFTP	Twisted multipair cable (foil screened in pairs and outer braid)

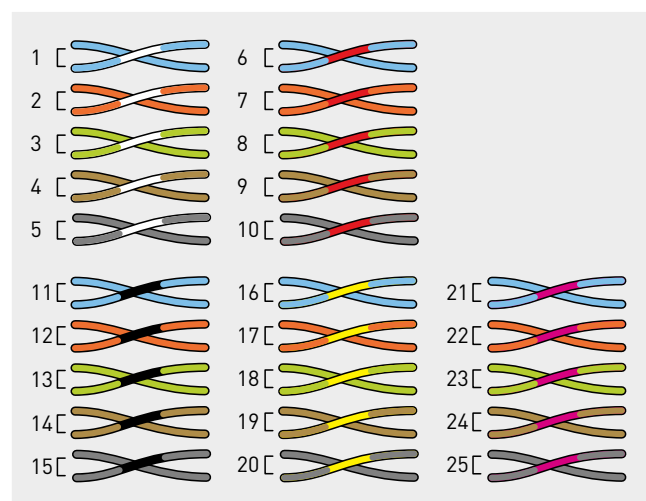
X/XXX

- Symmetrical pair: TP = Twisted pair
- Shielding of pairs U = Unscreened, F = Foil screened in pairs
- External shielding: U = Unshielded, F = Foil screened sheath, S = Braided shielding

### 3.1.1 - Multipair cable

Multipair cables for telecommunications are mainly used to transmit telephone services to the workstation. The cables used are generally made up of 50 and 100 pairs. Cables with larger numbers of pairs should not generally be used. There are also Category 5 multipair cables, generally with 25 and 50 pairs. These cables are normally used for specific solutions, specified by the design office when the project is drawn up. The pairs inside multipair cables are standard colours. The specifications and colour code must be followed when installing 25-pair cables.

## COLOUR CODES OF MULTIPAIR CABLES



## 3.2 - Connectors for workstations

The connectors have the colour codes defined in the standards, according to which a structured cabling system can be installed. These colours are the same as those on 4-pair cables.

A standard installation, which uses 4-pair copper cables, must always be wired with the same sequence of colour codes, irrespective of the application and the type of service for which they are to be used (telephony or data transmission).

Legrand offers two types of connector:

- TOOLLESS connectors (do not require a connection tool)

- Type 110 connectors (require a connection tool)

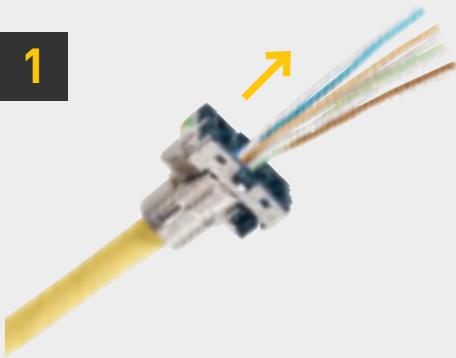
The connectors are available in cat. 5e UTP and FTP, 6 UTP, FTP and STP, 6<sub>A</sub> UTP and STP, in all wiring device ranges.

### 3.2.1 - Toolless connection

The new TOOLLESS connector is at the heart of the performance of the LCS<sup>2</sup> system. A perfect connection can be obtained in just a few seconds, giving a link providing excellent performance levels, from the patch panel through to the workstation.

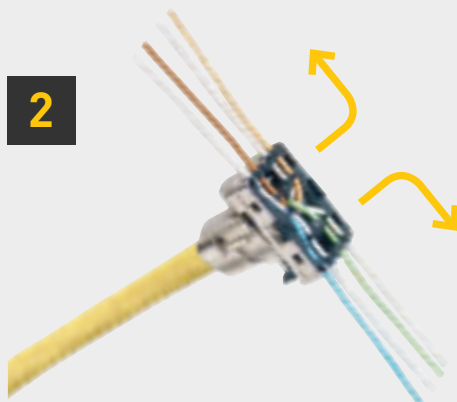
#### ASSEMBLY

1



Insert the cable in the connection module.

2



Separate the pairs and insert them in the corresponding locations, complying with the colour code. The module automatically ensures compliance with 13 mm, the cut in the centre and the splitting of the pairs.

3



Clip the connector onto the module. The connector helps to ensure correct assembly.

4



Turn the ring to complete the connection and cut off any excess cable using wire cutters.

The new TOOLLESS connector for quick, tool-free connection is available in all categories for installation on patch panels and on workstations.

TOOLLESS connectors are coloured so that their category can be easily and safely identified: yellow cat. 6<sub>A</sub>, blue cat. 6, grey cat. 5e.



No tool

6<sub>A</sub>


6



6

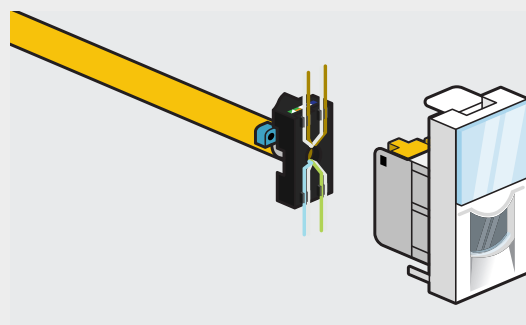
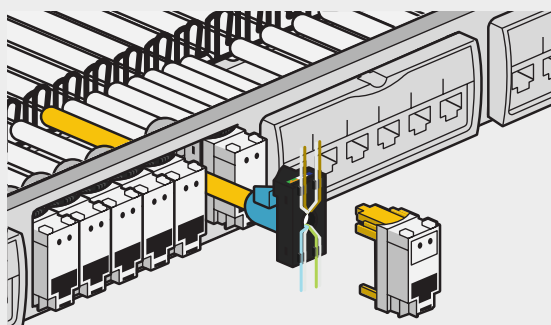


5e



## TWO TYPES OF CONNECTOR

Different TOOLLESS connectors are used for the patch panel and the terminal socket: the connection ring on the panel connector is larger to make it easier to use and for repeated installation. The ring is smaller on the module connector so that it is easier to install in a flush-mounting box. The two connectors are not interchangeable.



3.2.2 - Type 110 connection

The type 110 solution is wired using a tool and has been updated with a new range of connectors.



RJ 45 Keystone socket, cat. 6 UTP and 5e UTP



Type 110 connection with tool



With tool

3.2.3 - Connection methods

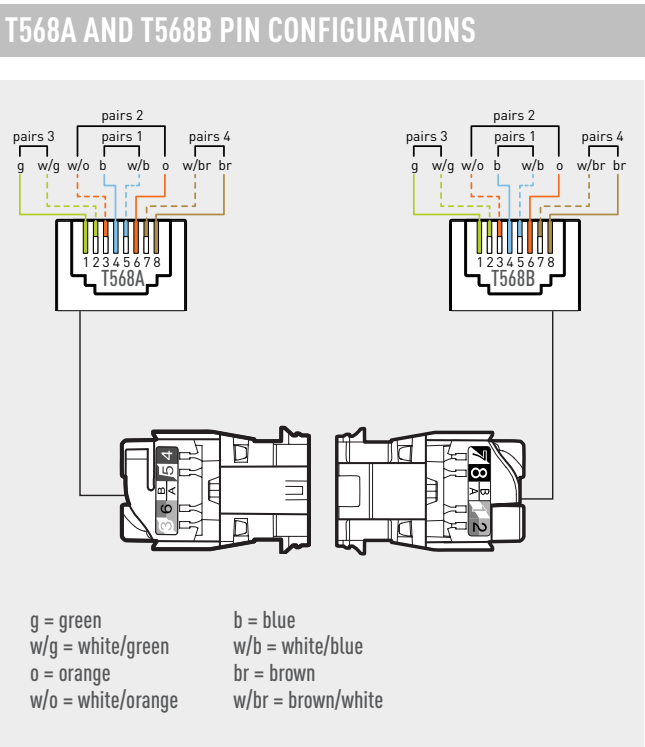
T568A and T568B: the standards specify two connection types, governed respectively by the following recommendations:  
T568A and T568B in ANSI/TIA/EIA 568-C.

These two methods are identical in terms of performance and applications supported. The only difference is the reversal of pair 2 and pair 3. It is easy to see that, due to the reversal of the pairs, both methods cannot be present in the same wiring system at the same time. The network applications would not operate correctly. The prevailing trend is to build installations using the T568B connection method. It is however possible to come across existing installations built using the T568A method.

Pin connection by application type

RJ 45 application	Pin no.							
	1	2	3	4	5	6	7	8
Telephony (analogue and digital)				■	■			
ISDN			■	■	■	■		
10/100/1000 Ethernet Mbps	■	■	■			■		
Token Ring			■	■	■	■		
Ethernet 1 Gbps/10 Gbps	■	■	■	■	■	■	■	■

**Note:** this table shows that pins 7 and 8 are not used. There are however specific applications which also use these two pins.





## 3.3 - Patch panels

Patch panels are used to make wiring tidier and reconfigurable. Legrand offers two types of panel:

- Toolless patch panel
- Type 110 patch panel.

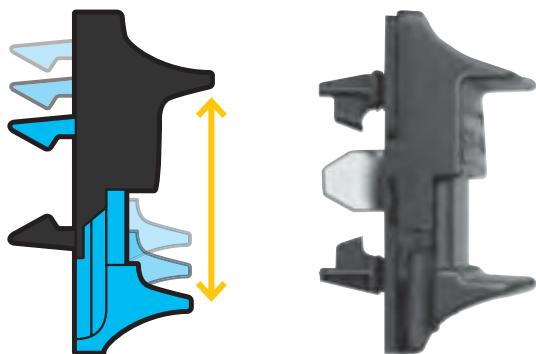
The new patch panels have been designed to optimise installation and maintenance: each connector connects individually to a front panel installation. Cable management is also made easier by a cable guide.

The panels are available in their complete versions in cat. 6<sub>A</sub> STP, cat. 6 UTP, FTP and STP and cat. 5e UTP and FTP, and modular versions with units of six RJ 45 connectors.

The new QUICK-FIX system reduces installation times as no screws are required.



Patch panels with QUICK-FIX screw-free attachment. Full interoperability with other commercially available products.



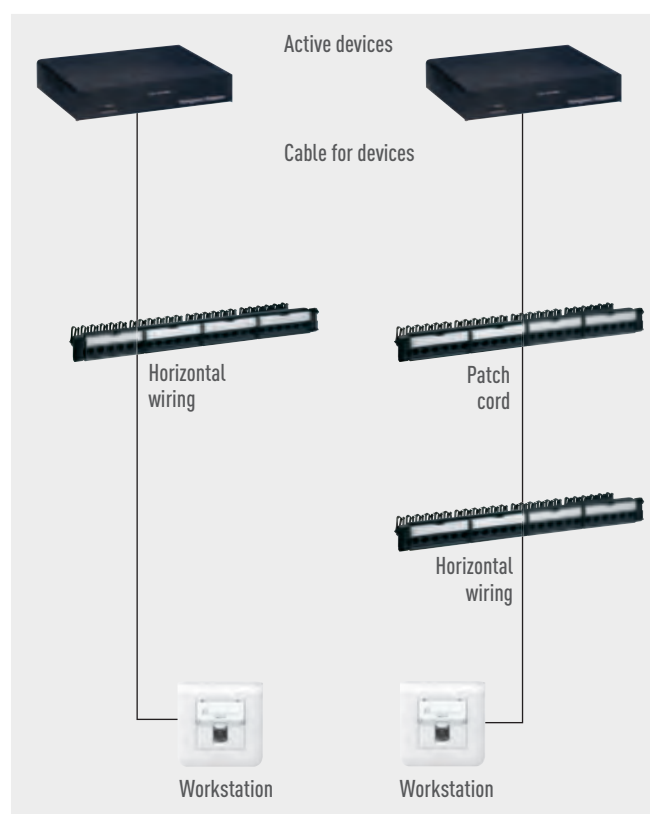
Detail of the mechanical spring for fixing to the upright, with stabiliser

### 3.3.1 - Patching methods

There are two methods for patching in racks: the first, referred to as interconnection, is used for small to medium sized installations, as the active device is reached directly from the patch panel via the corresponding cable. The second method is called cross-connection. Here, patching is not carried out directly on the active device, but between patch panels. The type of patching must be chosen at the project stage.

The panels must be chosen according to the number of distributed ports, and it is standard practice not to saturate them totally. Leave at least 10% free space on the total number of modules connected, to allow for any future extension.

### INTERCONNECTION AND CROSS CONNECTION METHODS



### 3.3.2 - TOOLLESS patch panels

TOOLLESS patch panels use the same connection method as TOOLLESS connectors. The connectors do not require any tools for connecting the cable.

For this solution, Legrand offers a complete range of patch panels:

- Modular patch panels with 24 ports
- Complete patch panels with 24 ports.



### 3.3.3 - Type 110 patch panels

Type 110 patch panels use the same connection method as the 110 connector. The special tool is required to wire each connector. Legrand offers complete 24 port patch panels.



### 3.3.4 - Telephone patch panels

The use of patch panels can make it easier to interconnect the different panels. There is a choice of two types of patch panel:

- Type 110 telephone panel
- TOOLLESS telephone panel.

The type 110 telephone panel is available with 50 cat. 3 RJ 45 connectors in a rack unit. As with all 110 connectors, the telephone connectors also require a connection tool for their wiring. The TOOLLESS telephone panel is available with 48 cat. 3 RJ 45 TOOLLESS connectors in a rack unit, with the Quick-Fix system. This type of solution does not require a connection tool for wiring the connectors.



## 3.4 - Patch cords



Measurement of LCS<sup>2</sup> components and links are validated by independent laboratories 3P Third Party Testing and ETL.

The patch cords must be excellent quality, and the male and female connectors must be electrically and mechanically compatible.

For this reason, compliance with the following recommendations is necessary:

- Only use factory-assembled patch cords
- Do not use horizontal cables to make patch cords yourself
- Test patch cords individually to check their performance, as this is not possible with generally available conventional instruments.

Legrand patch cords are available in various lengths, in categories 5e UTP and FTP, 6 UTP, FTP and STP, and 6<sub>A</sub> UTP and STP.

## 4

# FIBRE OPTIC TRANSMISSION MEDIUM

## 4.1 - Cable

The fibre optic is a transmission medium that enables a larger bandwidth to be used than copper cables. With fibre optic cables, transmission is based on the propagation of light pulses, generated by an LED or a laser source in the infrared band, along a glass fibre. Inside an fibre optic, the signal can either be propagated in a straight line, or be reflected many times. Straight line propagation mode is said to be zero order. Singlemode fibres only use one mode to propagate light. The diameter of their cores is between 8 and 10  $\mu\text{m}$ . Multimode fibres allow several propagation modes, and the diameter of their cores is 50  $\mu\text{m}$  or 62.5  $\mu\text{m}$  (the latter is now hardly ever used).

The diameter of the cladding is generally 125  $\mu\text{m}$ . Multimode fibres are used in indoor installations and enable more economical devices to be used. They are however subject to the phenomenon of modal distortion, when the different modes propagate at slightly different speeds, which limits the maximum distance at which the signal can be received correctly.

Singlemode fibres are used in outdoor installations as they can cover much longer distances and reach much higher speeds.

Multimode fibres are divided into two categories: step index and graded index fibres.

Legrand supplies the following fibre optic cable solutions:

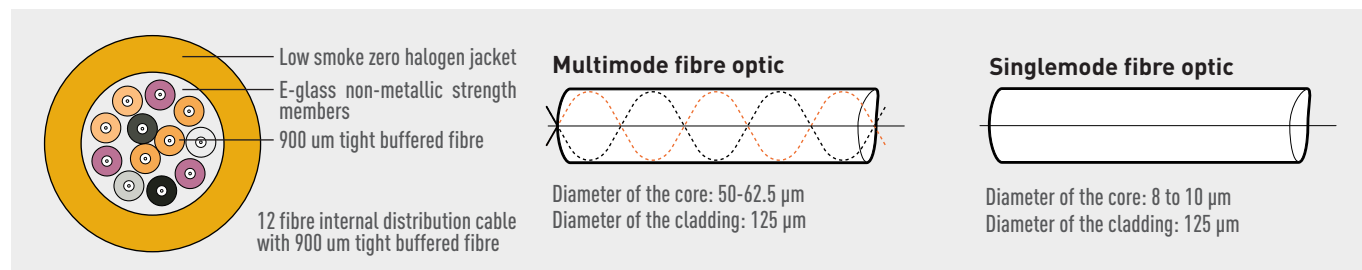
- Multimode cables (50/125 microns, 6 to 24 fibres), available in 2000 m reels

- Singlemode cables (9/125 microns, 6 to 24 fibres), available in 2000 m reels

The various types of cable are also available with different types of coating:

- LSZH and/or flame retardant
- Armoured
- Armoured, anti-rodent

### EXPLODED VIEW OF A MULTIFIBRE CABLE CONTAINING 6 SINGLE FIBRES



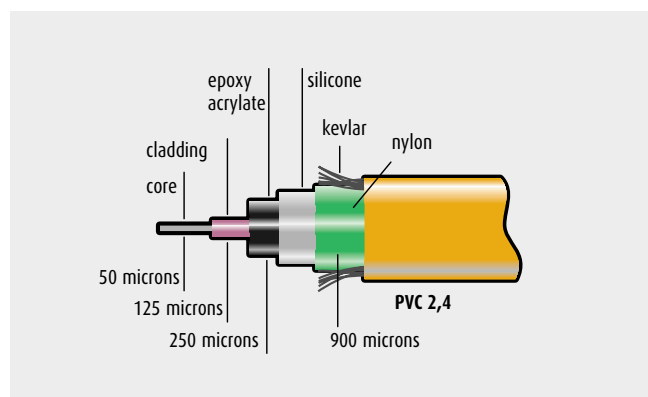
#### 4.1.1 - Advantages

Fibre optic have the following major advantages in relation to copper cables:

- Total immunity to electromagnetic interference
- High transmission capacity
- Low attenuation
- Very compact

The use of fibre optic is recommended for vertical wiring. In some situations, it is even possible to run the fibre optic right up to the office (FTTO - Section 7) or to the workstation (FTTD). The presence of fibre optic necessitates the use of devices with optical interfaces.

### DIAGRAM OF A SINGLE FIBRE CABLE



### 4.1.2 - Characteristics

The fibre optic is made of an internal part, called the core, and an external part, called the cladding. The light ray injected at one end of the fibre remains confined between the two layers of material and is guided along the length of the fibre due to the differences in the refraction indexes of the materials from which the core and the cladding are made.

The fibres, which are mechanically very fragile, are covered in the cladding and placed in the fibre optic cables using the most diverse technologies to meet the requirements of different applications.

Fibres are normally identified by the abbreviation 50/125 µm (or 9/125 µm), which indicates that the core is 50 µm and the cladding 125 µm.

### 4.1.3 - Fibre optic backbones

If the application is an Ethernet network, it is advisable to install a cable with at least 6 fibres, two of which will be used for Ethernet transmission, while the other 4 will be for future uses or simply as a back-up. It must be remembered that attaching connectors is one of the most costly elements. This does not necessarily have to be done at the same time as the fibre is installed for all optical conductors. It is possible to postpone this operation, leaving the fibres free inside the specific unit. Likewise, ascending fibres must be interfaced

at an active neutral point (hub or switch) which has optical connections. Inside racks, fibres are connected in a fibre optic drawer with feedthroughs.

This operation requires the same number of feedthroughs as there are fibres.

The fibre optic drawer generally has appropriate protective devices and accessories to prevent the connected fibre being subjected to any mechanical stresses.

The connection is made using small coupling tubes called "splice protection" tubes.

### 4.1.4 - Installing the fibre optic

The fibre optic is installed in different ways depending on the location, the type of fibre and the level of safety required by the end user. The fibre optic must be run in the support infrastructures. As this structure is mainly used for vertical wiring applications which concern two levels, two main connections can be identified.

First level: between the buildings on a campus, and thus in the infrastructures linking the buildings.

Second level: between the floors in a building. The only infrastructure is therefore the cable. They must therefore be pulled in the conduits using the specially inserted Kevlar layer. In installations requiring a high degree of safety, it is recommended that the fibre optic cables are protected by steel conduits.

## 4.2 - Fibre optic connectors



Connectors are attached to the fibre optic by mechanically coupling the two fibres. Passing the light ray from one fibre to the other requires the core to be coupled at both ends of the fibre.

In view of the dimensions of the areas to be coupled, it is clear that the devices for the interconnection must have specific characteristics in terms of quality and precision.

Fibre optic connectors consist of one part called the ferrule, and a support body.

The ferrule is generally made of ceramic or a composite material. It has a hole drilled in its centre and takes the terminal part of the fibre. This terminal part is connected to the ferrule using different technologies (mechanical couplers, heat-cured epoxy resins, infrared sensitive resins, 2-component adhesives, etc.). The head of the ferrule, which contains the termination of the fibre, must therefore be polished until a totally flat surface is obtained. ST (round bayonet connector) and SC (square clip-on connector) connectors are generally used. There are also various new types of connector, for example LC connectors.

These are the latest generation, high density connectors which are very compact in comparison with the traditional SC connectors.

LCS<sup>2</sup> fast-connection fibre optic connectors are easy to connect, reliable and robust, and can be re-used up to 5 times. A microswitch is used to make a mechanical connection to lock the fibre inside the connector. There is an illuminated indicator in the connector to check for any connection errors at the end of the process. These connectors do not require any type of adhesive or special tool.

For installing connectors on loose fibre cables (250 µm), use connection kits Cat. Nos. 0 330 48 and 0 330 49.

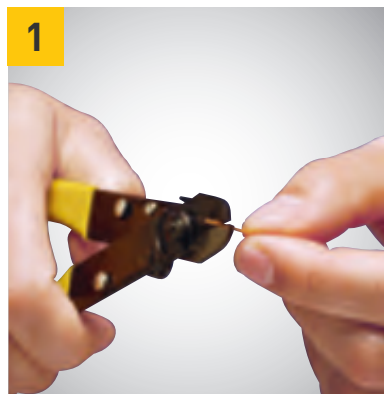


## 4.3 - Tool case for fibre optic connection

The kit Cat. No. 0 326 90 contains all the tools needed for connecting SC, ST and LC connectors. A connection takes less than 3 minutes with this kit.

4

FIBRE OPTIC



Remove the sheath from the fibre



Cut the fibre



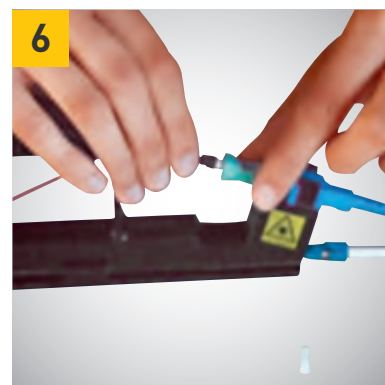
Check that the cut is correct



Insert the fibre in the connector



Slide the microswitch on the connector to make the connection



Slide the dust cover into the connector

## 4.4 - Fibre optic feedthrough sockets (connectors)

To make fibre optic connections directly at the workstation (Fibre To The Desk connections), there are ST and SC duplex fibre optic feedthrough sockets and LC fibre optic connectors for workstations in all Legrand wiring accessory ranges.



## 4.5 - Fibre optic drawers

The fibre optic drawer is the equivalent of the patch panel for copper cables. Its function is to house all the connectors connected to the fibre optic cable, thus enabling connection to the active devices on the network.

The LCS<sup>2</sup> range offers:

- A fibre optic patch drawer Cat. No. 0 355 09 to contain 4 fibre optic units with ST, SC or LC connectors, for a total of 48 fibres

- Fibre optic units for 6 and 12 fibres for mounting on 19" fibre optic drawer Cat. No. 0 355 10

There must be the necessary space for the connected fibres, and occasionally a support to maintain the correct bending radius to ensure insertion of the fibre in the feedthrough socket. This modular solution meets all connection requirements without adversely affecting the performance of the system

- A range of high density fibre optic drawers Cat. Nos. 0 326 40/41/42 which take OM4 and OS1/OS2 cassettes with prefitted connectors with an MTP high density connector and 24 LC or 12 SC outlets at the rear Cat. Nos. 0 325 45/46/47/48.



19" high density fibre optic drawer - 24 OF



High density fibre optic cassette and unit - 6 OF



Fibre optic floor cabinet



Fibre optic units

### Installation recommendations

The fibre optic drawer has accessories for managing the fibre optic, to avoid any excessive mechanical stress. The drawer is supplied with optional accessories to ensure correct management the bending radiuses of pigtails and to protect splices.



## 4.6 - Patch cords

Fibre optic patch cords perform the same function as copper cords. They are both used to connect fibre optic drawers together, for patching between active devices and fibre optic drawers and for patching at workstations (Fibre To The Desk) with terminals which have inputs for fibre optic.

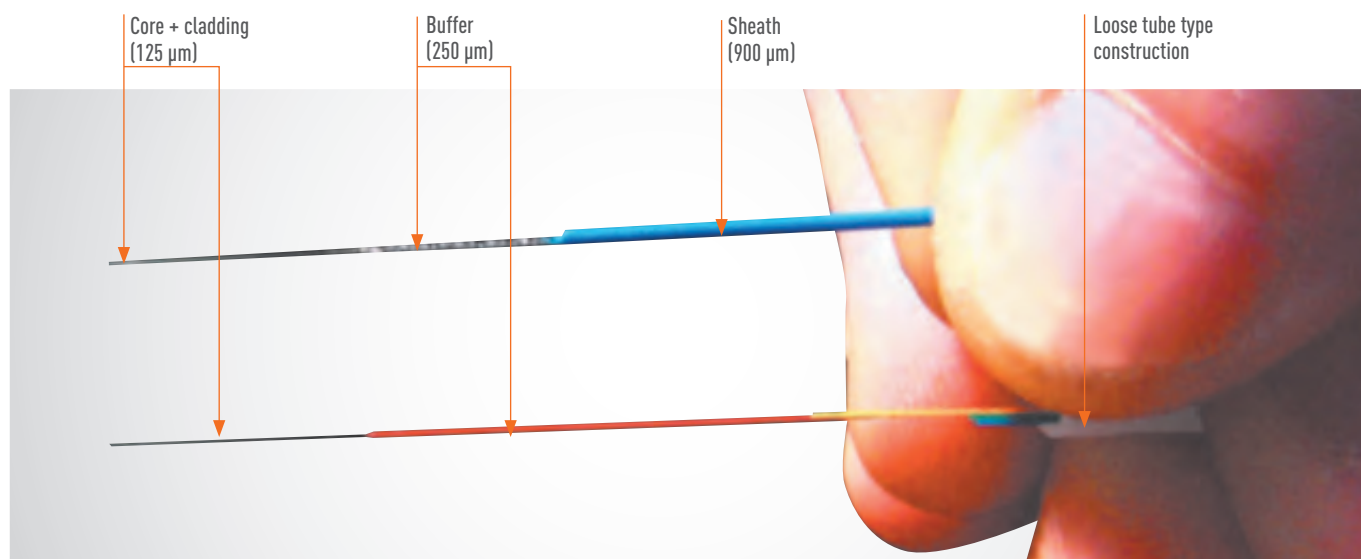
Legrand offers fibre optic patch cord solutions, both multimode OM2, OM3 and OM4 50/125  $\mu\text{m}$  and singlemode OS1/OS2 9/125  $\mu\text{m}$ , with combinations of SC, ST and LC connectors.



Multimode patch cord OM2 50/125  $\mu\text{m}$

## 4.7 - Connection kit

This is essential for connecting loose structure cables with individual fibres covered by a 250  $\mu\text{m}$  diameter sheath to connectors.



# 5

# Wi-Fi TRANSMISSION MEDIUM

The wireless network is one in which the signal is transmitted by radio waves. No connection cables are necessary. This gives wireless technology:

- A great deal of flexibility in terms of the positioning of the stations
- A high degree of mobility
- Guaranteed widespread connectivity, even in areas where there is no appropriate wiring structure or where it is not possible to create one.

A network can be accessed wirelessly using a device call an "access point" which is physically connected to the network

infrastructure. This access point provides access to one or more "client" devices located in the coverage area of the radio signal created by the access point.

Radio frequency refers to a high frequency alternating signal transmitted along a copper cable which can be transmitted in space via an antenna. The radio waves are propagated in a straight line simultaneously in all directions by the antenna.

## 5.1 - Wireless transmission standard

The body responsible for the standardisation of wireless local area networks is the IEEE (Institute of Electrical and Electronics Engineers) Working Group for wireless LAN, called IEEE 802.11.

The following standards have been established by IEEE 802.11:

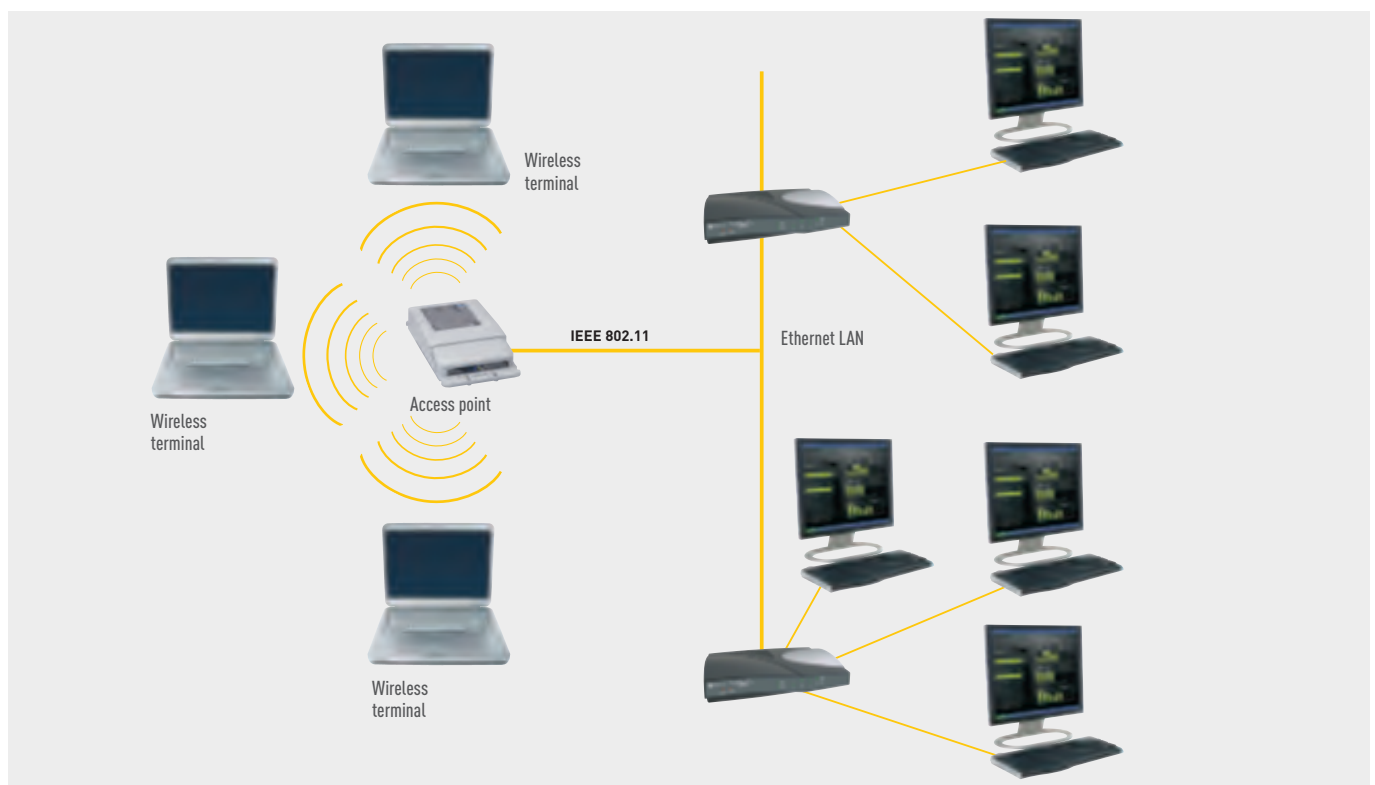
- IEEE 802.11 - The initial 2 Mbps, 2.4 GHz standard
- IEEE 802.11a - 54 Mbps, 5 GHz standard (1999, approved in 2001)
- IEEE 802.11b - Enhancement of standard 802.11, supporting 5.5 and 11 Mbps (1999)
- IEEE 802.11e - Enhancement: Quality of service

- IEEE 802.11g - 54 Mbps, 2.4 GHz standard (compatible with 802.11b) (2003)

- IEEE 802.11i (ratified 24 June 2004) - Enhanced security

- IEEE 802.11n ratified 2009 - Enhanced range and bandwidth available due to MIMO technology (up to 300 Mbps with 2 antennae and a 40 MHz channel width).

### WIRELESS LOCAL AREA NETWORKS





## 5.2 - Components for wireless networks

**Access point.** This is the device that enables a mobile user to connect to a wireless network. The access point is connected to a wired network. It receives or sends (it can communicate by radio in one direction) the radio signal to the users by means of antennae and transmission-reception devices. The access point is the device which communicates with the clients and with other access points. It is connected to the network and also performs all the management, access control, roaming and even security functions.

**Power over Ethernet (PoE) devices.** Devices which receive the power supply via the structured cabling. The DC power supply is provided to an access point directly via the network cable, which performs the dual function of transmitting data and supplying the power. This is very useful when the access point is positioned in a location a long way from a power source or to avoid having to have a local power supply. The power can be supplied by the network switch. The power supply can also be added to a wiring system by inserting a PoE device supplying power to the free pairs of the network cable.



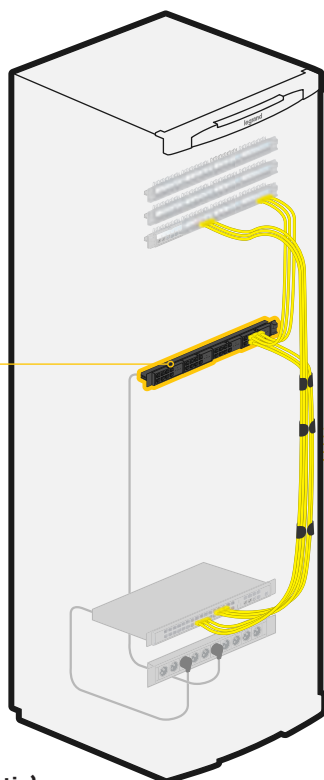
### Centralised management software

For centralised management of Wi-Fi access points.



### PoE INJECTOR

Each PoE unit can manage up to 4 Wi-Fi access points. Can be installed in the patch panel.



### The LCS<sup>2</sup> offer (copper and fibre optic)

This comprises:

- Cabinets and panels
- Devices (patching and reels, etc.)
- Sockets: cat. 6A, cat. 6 and cat. 5e
- Cables and cords: U/UTP, F/UTP, SF/UTP



### Wi-Fi access points installed in false ceilings or wall-mounted, and controlled remotely (802.11n)

This enables the network to be extended up to 600 m<sup>2</sup> free space. Can be installed in the false ceiling or in the wall. Provides a maximum theoretical speed of 300 Mbps. The network administrator can use the software to manage the network remotely. Security ensured using encryption methods such as WPA 2. Conforms to the 802.11a/b/g/n standards.

### Wi-Fi access points which can be flush-mounted in Legrand 802.11a/11b/g range of wiring accessories

To be installed in 4-module flush-mounting boxes. The network administrator can use the software to manage the network remotely. Range 100 m<sup>2</sup>, ideal for small working areas.

### Connections

In false ceiling for managed Wi-Fi access points. On the ground for wall-mounted and wired access points and RJ 45 sockets.

### RJ 45 connectors

For access to the wired distribution system. Available in cat. 6A, cat. 6 and cat. 5e.



# 6

# HOUSING REQUIREMENTS

Legrand offers a series of solutions for cabinets for structured cabling in commercial buildings, ranging from the main distributor to the floor distributor.

**All products comply with the following standards:**

<b>IEC 60297-3-100 DIN 41414-7</b>	(NF C 20-150, NF C 20-151). Dimensions of mechanical structures of the 482.6 mm (19 in) series
<b>EIA-310-E</b>	Cabinets, racks, panels and associated equipment (ANSI/EIA/-310-E-2005)
<b>IEC 60950-1 EN 60950-1 C 77-210-1 IEC 60529</b>	Safety of information technology equipment
<b>IEC 62262 EN 62262</b>	(NF C 20-010) Degrees of protection provided by enclosures (IP code) (EN 50102, NF C 20-015). Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

**LCS² cabinets can be integrated in installations complying with the following standards:**

<b>ISO IEC 11801</b>	Information technology - Generic cabling for customer premises
<b>EN 50173-1</b>	Information technology - Generic cabling systems
<b>EN 50174-1 and 2 C 90-480-1 and 2</b>	Information technology - Cabling installation
<b>IEC 60364-4-41</b>	Low voltage electrical installations - Protection for safety - Protection against electric shock
<b>NF C 15-100 Part 4-41 UTE C90-483</b>	Low voltage electrical installations - Recommendations Residential cabling for communication networks

## 6.1 - LAN requirements



### 6.1.1 - Freestanding cabling cabinets

#### General characteristics

LCS² 19" freestanding cabinets have been designed to answer to esthetic, easy installation and efficient maintenance needs. They have a single color finish, Anthracite Grey RAL 7016.

Metallic freestanding cabinets (textured polyester coating) provide excellent resistance to corrosion and scratching.

LCS² 19" freestanding cabinets have a reversible curved front door (single or double) made of screen-printed safety glass.

The cabinets can be joined together with baying kits and can be completed with a cabling unit.

All the different cabinet versions have common features and equipment:

- Equipped with 4 x 19" depth-adjustable uprights
- Removable panels
- Automatic equipotential connection
- Levelling feet adjustable from the inside
- Protection index (weatherproof) against solid objects and liquids: IP 20 conforming to IEC/EN 605 29
- Protection index against mechanical impact: IK 08 conforming to IEC/EN 60062.

The structure can be completely dismantled in case of difficult room access.

The freestanding cabinets can be equipped with a PDU (Power Distribution Unit p. 122) for providing electric power.

## Optimised cable and patch cord management

LCS<sup>2</sup> freestanding cabinets are designed to ensure **easy cable and patch cord management**: dedicated unit for cords, cable entries at the top and bottom of cabinets, new management panels for perfect organisation and circulation of patch cords.



**Optimised cable management**  
The cabinets offer lots of space beside the 19" uprights to guide and fix large quantities of cables.



**Cable entries: top and bottom 19" cut-outs** receive 19" plates with brushes and 19" fan plates. Cabling units have a cut-out for direct cable trunking entry.



**Management panels: with rings** to guide and protect the patch cords.



**Linking interface:** protects the cables and guarantees the bending radius between the cabinet and the cable trunking.

## Simplified assembly

LCS<sup>2</sup> freestanding cabinets are easy to equip. They offer considerable time savings on site and allow full accessibility with their removable side and rear panels and a structure that can be entirely dismantled.



**Removable side panels** for full accessibility



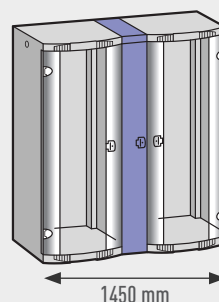
**Automatic earthing clip** for earthing the side and rear panels



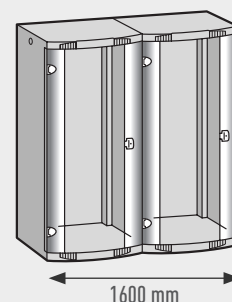
**Dual marking of 19" uprights** for easy installation

Several combinations are possible to meet various needs: combination of 2 cabinets with baying kit, side by side or with cabling unit. The use of a cabling unit saves floor space.

## COMBINATIONS TO SUIT VARIOUS NEEDS



Two 600 mm wide cabinets with a cabling unit

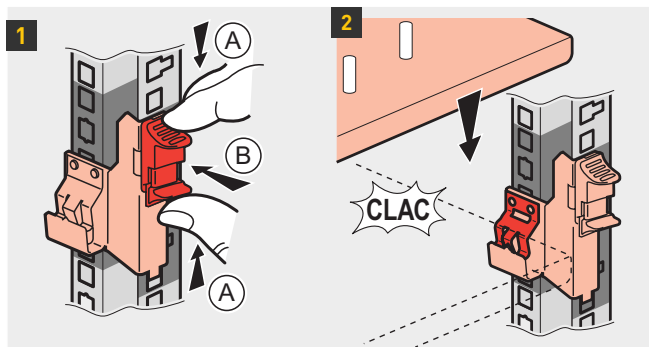


Two 800 mm wide cabinets side by side

## Quick-fixing principle

For easier and faster installation of shelves and cable management accessories, screw-free mounting equipment is available (no tool required).

## EXAMPLE FOR FIXED SHELVES



6.1.2 - Server cabinets



General characteristics

LCS<sup>2</sup> server cabinets have been designed to meet the main need of the user: full accessibility  
Similar design to the other cabinets in the range:

- Anthracite grey RAL 7016 finish
- Reversible front and rear microperforated (80%) metal door.

A cabinet for server requirements:

- Load capacity: 630 kgs
- Equipped with 4 x 19" depth-adjustable uprights
- Removable side panels
- Top and bottom cable entries
- Levelling feet adjustable from the inside
- Metallic cabinets (textured polyester coating) provide excellent resistance to corrosion and scratching
- protection index (weatherproof) against solid objects and liquids: IP 20 conforming to IEC/EN 605 29
- protection index against mechanical impact: IK 08 conforming to IEC/EN 60062.

Full accessibility

LCS<sup>2</sup> server cabinets are designed to be fully accessible:

- Reversible rear and front doors
- Choice of locking system: without key, front door can be fitted with a European DIN cylinder (with option to complete with a handle), rear door can be fitted with a key cylinder
- Removable panels
- Cable entries: open bottom, top cable entries in 19" pre-cut format, capable of taking 19" plates with brushes, fans, etc,
- Can be equipped with screwless tray fixing for cable trays (Cablofil).

The server cabinets can be completely dismantled where access is difficult.

Top and bottom cable entries

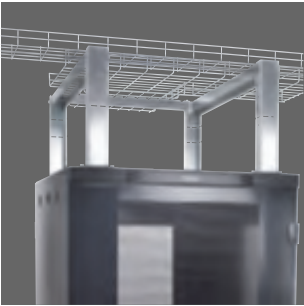
	Top	Bottom
Width 600		
Width 800		



Front door with handle



Keyless locking system  
(view of rear door)



Cable trays  
Support with screwless tray fixing - Cablofil



### 6.1.3 - Racks



#### General characteristics

LCS<sup>2</sup> 19" HD (high density) racks with 45 U capacity are available in 2 versions with different depths of upright: 267 mm or 413 mm. Uprights are designed with U marking and tapped holes for fixing 19" equipment.

They can receive:

- 19" metal management panels
- 19" Power Distribution Units
- DIN rail kit.

Designed in light stainless steel aluminium, with black powder finish, resistant to marks and scratches.

The structure can be equipped with:

- Cord management grid for creating a space (63 mm or 165 mm) between 2 joined racks or an isolated rack for running cables and cords to the front and rear. A version is available with a door which opens in both directions
- Cable tray support to be fitted the full depth of the rack to support a high cable tray
- Lower finishing plate for finishing the lower part of the rack and providing protection against dust.

#### Advanced cable management

LCS<sup>2</sup> racks offer full cable management for optimising network performance and are particularly suitable for high-density cabling (e.g. data centers, SANs, main distributors, etc.).

Type of equipment for optimised cable management:

- Channel type 19" uprights for guiding and fixing cables
- Integrated upper trunking for right-left cord routing that complies with the bending radiuses
- Straps with hook and loop type closure
- Innovative cord management grid creates a space between 2 joined racks for running cables and cords to front and rear. Maintain side cord channels every 1 U

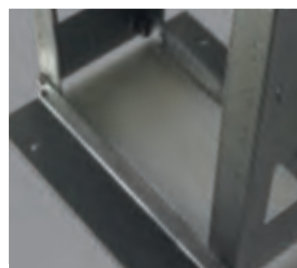
In addition to the support strength, LCS<sup>2</sup> cable management systems provide flexibility from the system design stage through to any future extensions.



Innovative cord management grids  
With individual conduit for each rack unit and door which opens in both directions.



Cord management panels with cover  
With conduits for vertical and horizontal cord organization.

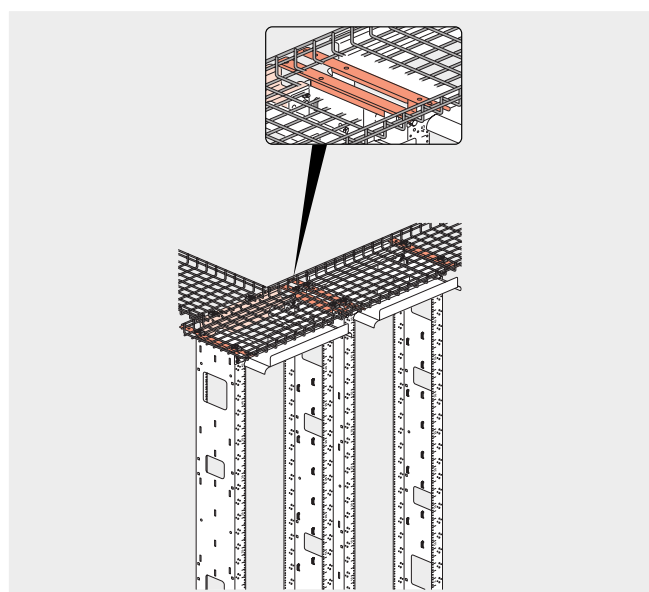


Light stainless steel aluminium construction  
With black powder finish, resistant to marks and scratches.



Integrated upper trunking  
For compliance with the bending radius and organised running of cords.

#### FITTING CABLE TRAY SUPPORTS TO THE RACKS





### 6.1.4 - Wall-mounting cabinets



#### General characteristics

Wall-mounting cabinets are available in 2 versions: 19" or compact 10".

The 10" cabinets are suitable for small business applications up to 36 RJ 45 sockets.

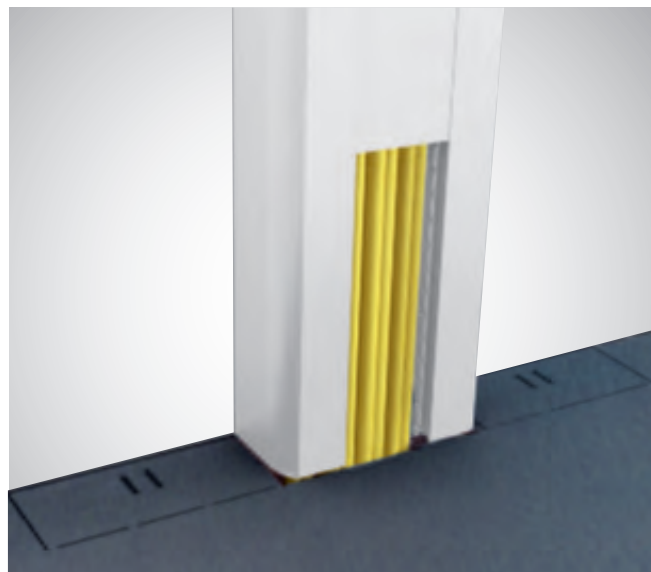
The 19" cabinets are available in 2 versions: fixed or pivoting, allowing free access to the rear of the cabinet to facilitate installation and maintenance.

These 2 cabinets have the **same design**:

- A single color finish: Anthracite grey RAL 7016
  - Reversible curved screen-printed door made of safety glass.
- All the cabinets have **common features and equipment**:
- 2 x 19" depth-adjustable uprights
  - Removable side panels
  - Rear pre-cut cable entries
  - Top and bottom perforations for natural ventilation
  - Protection index (weatherproof) against solid objects and liquids: IP 20 conforming to IEC/EN 605 29
  - Protection index against mechanical impact: IK 08 conforming to IEC/EN 60062.

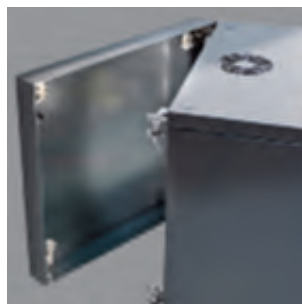
#### Easy access, high-quality finish

LCS<sup>2</sup> wall-mounting cabinets ensure easy access for quick installation and easy maintenance thanks to the removable side panels and flexible cable entries (in the fixed cabinets). Installation anywhere can be possible with these new wall-mounting cabinets where maintaining aesthetic quality is very important.



#### Flexible cable entries

DLP format cable entries at the top and bottom, bandable, with ability to attach cables using cable ties



Full accessibility for cable management and maintenance  
Removable side panels on all LCS<sup>2</sup> cabinets  
19" cabinets also available with pivoting body to enable easy access at the back  
Ability to fix cable management ring on structural uprights of 19" fixed cabinets



High-quality finish. A unique design: curved door, screen-printed glass.

## 6.1.5 - PDU - Power Distribution Units

### General characteristics

The PDU is a unit which provides electric power for IT equipment.

Available in 2 versions:

- 19"
- Vertical for mounting at the rear of LCS<sup>2</sup> cabinets (cabling and server) and Varicon-L server cabinets.

The cases are metal for total rigidity.

The sockets outlets are adapted to the relevant country's electrical standard:

- Local standards: German, BS, French etc.
- International standards: C13 and C19
- Single phase or three-phase.

The PDU integrate features such as MCB protection and voltage protection and can also be metered.

### Metered PDU

Measures consumption to provide better installation management: balancing circuits, displaying available capacity, preventing overloads and power failures. The information is read locally.

Main characteristics of these PDUs:

- Measurement of the total PDU current
- Measurement from 0 to 32 A
- 2-digit display.



Vertical PDU



Vertical PDU with energy metering system



19" PDU

## 6.2 - Data center requirements

Data centers increasingly opt to apply energy-efficient cooling techniques, such as Free Cooling and Fresh Air Cooling.

The first step in implementing such techniques is to segregate hot and cold air using Cold Corridors®. The next is airflow optimisation in the rack. The latter, however, is often not adequately addressed unfortunately, despite the fact that airflow optimisation is certainly the next stage in the process of rendering data centers more energy efficient.

Furthermore, airflow optimisation is not only essential to the favourable operation of server, network and storage equipment, but also to the temperature control and general stability of a data center.

Legrand offers a solution from server cabinet to Cold Corridor® and row-based cooling system to provide cooling as close to the servers as possible.

### 6.2.1 - Varicon-L

Varicon-L server cabinets have been designed to house the heart of the data center: the servers. They provide a means of support, protection, cooling, power and connection.

**A simple design** helps you build your own data center cabinets:

- Color finish black RAL 9011
- Front and rear microperforated (80%) metal door
- 41 U or 46 U capacity.

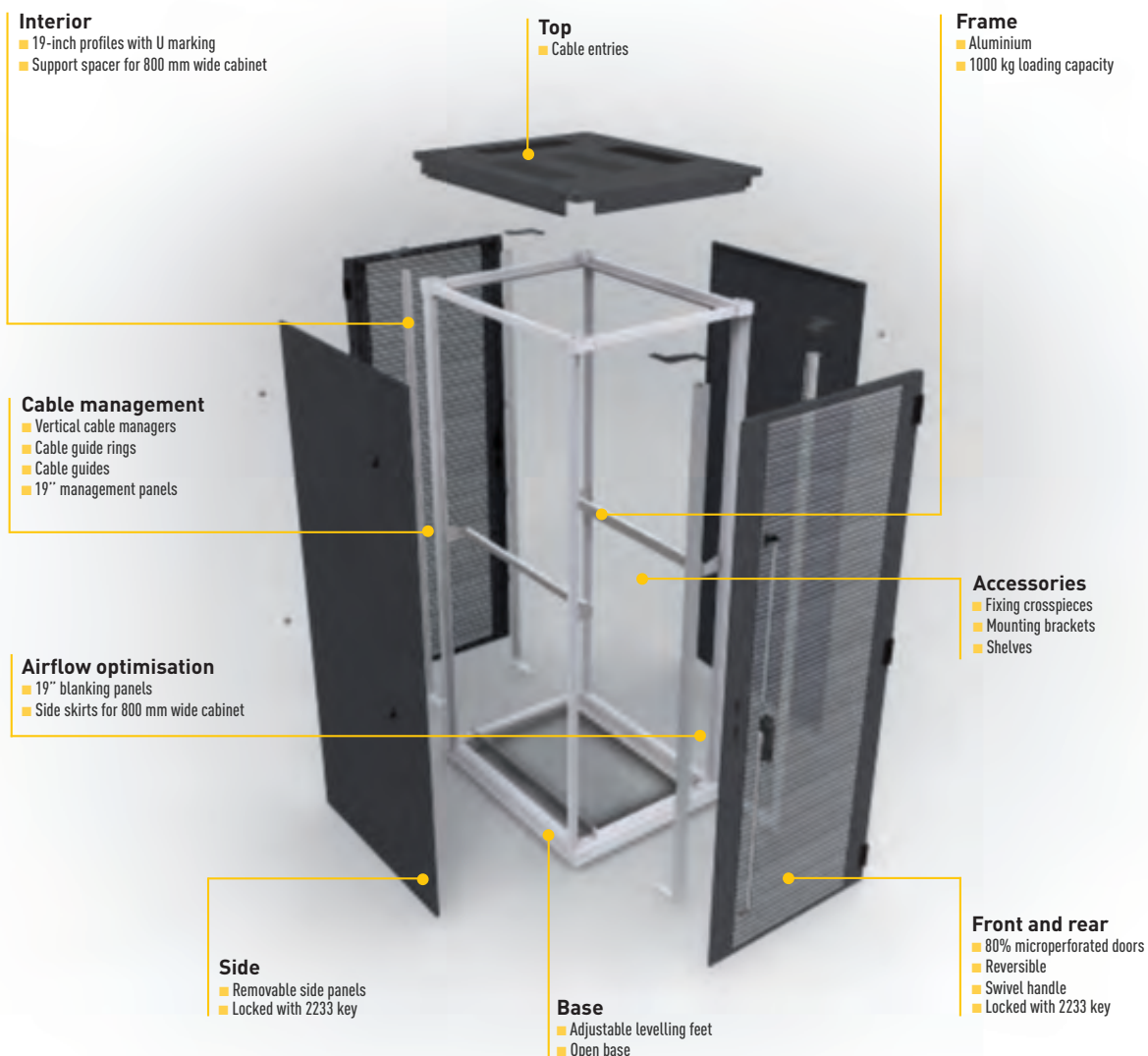
The server cabinets can be joined to extension cabinets with baying kits.

These servers cabinets can be equipped with:

- PDU (Power Distribution Unit) p. 122
- Cable management accessories
- Equipment mounting brackets
- Airflow management equipment.

Main characteristics:

- Load capacity: 1000 kgs
- Equipped with 4 x 19" depth-adjustable uprights with U marking
- Lockable and reversible doors with 2 point locking handle. Locked with 2233 key
- Removable side panels
- Top and bottom cable entries
- Levelling feet adjustable from the inside
- Protection index against mechanical impact: IK 08 conforming to IEC/EN 60062.



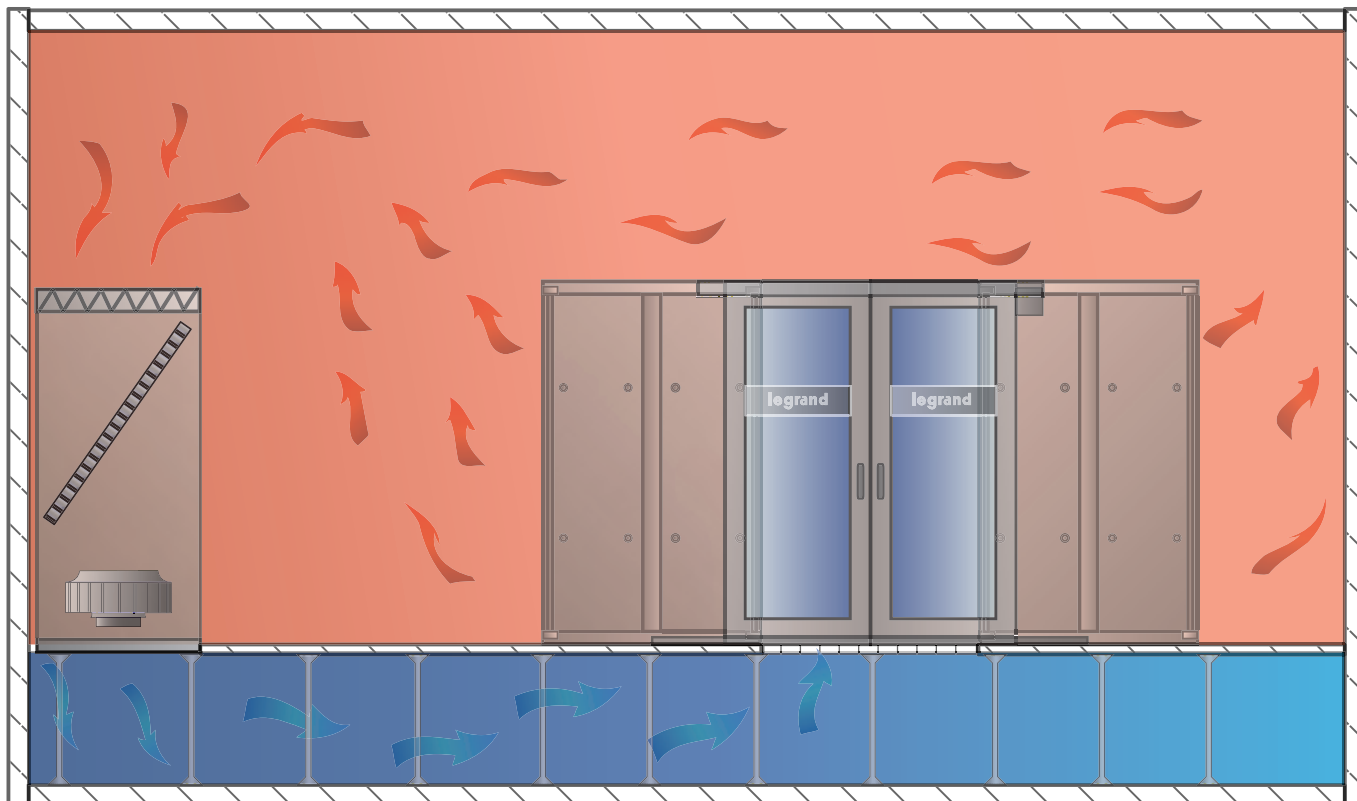
### 6.2.2 - Cold Corridor®

The Cold Corridor® basic principle is the segregation of hot and cold airflows at row level.

Airflow segregation is a vital step towards the achievement of integrated energy saving throughout data centers. However, the two main benefits to be gained by installing a Cold Corridor® are:

- Constant air conditions for your IT equipment
- Considerable energy saving potential.

Constant air conditions around server equipment also substantially reduce the risk of hotspots. The levels of predictability and reliability increase for your valuable IT equipment.



The basic Cold Corridor® system comprises the following:

- Manual sliding double doors with window made of safety glass. Position a double door at each end of the corridor
- Roof modules: cover the 1200 mm wide corridor
  - 3 available widths 100, 200 or 600 mm
  - The 100 and 200 mm modules are solid metal. The 600 mm module consists of a metal frame with a glass window
  - Match the number and sizes of the modules to the length of the rows of cabinets
  - Provide one 100 or 200 mm solid module at each end of the corridor and between each 600 mm module
- Roof profile: takes the roof modules
  - Is positioned on the roofs of the cabinets. Enables the cabinets to be moved without having to dismantle the corridor roof.



Varicon-L server cabinets organized in Cold Corridor®

### 6.2.3 - Row-based cooling

The row-based cooling principle is the integration of active cooling in the Cold Corridor®.

This row-based cooling system moves the cooling much closer to the heat source and reduces the distance between the cooling and IT equipment. Benefits include cooling accuracy and efficiency and a reduced airflow path.

This solution is perfectly suitable for rooms with a low ceiling or no raised floor.

Row-based cooling is specially adapted to the construction of high density clusters, even in existing circumstances. Furthermore, the fact that there is no need to install a (high) raised floor in this case enables a further reduction in the amount of investment required.

The main characteristics of the row-based cooling system are:

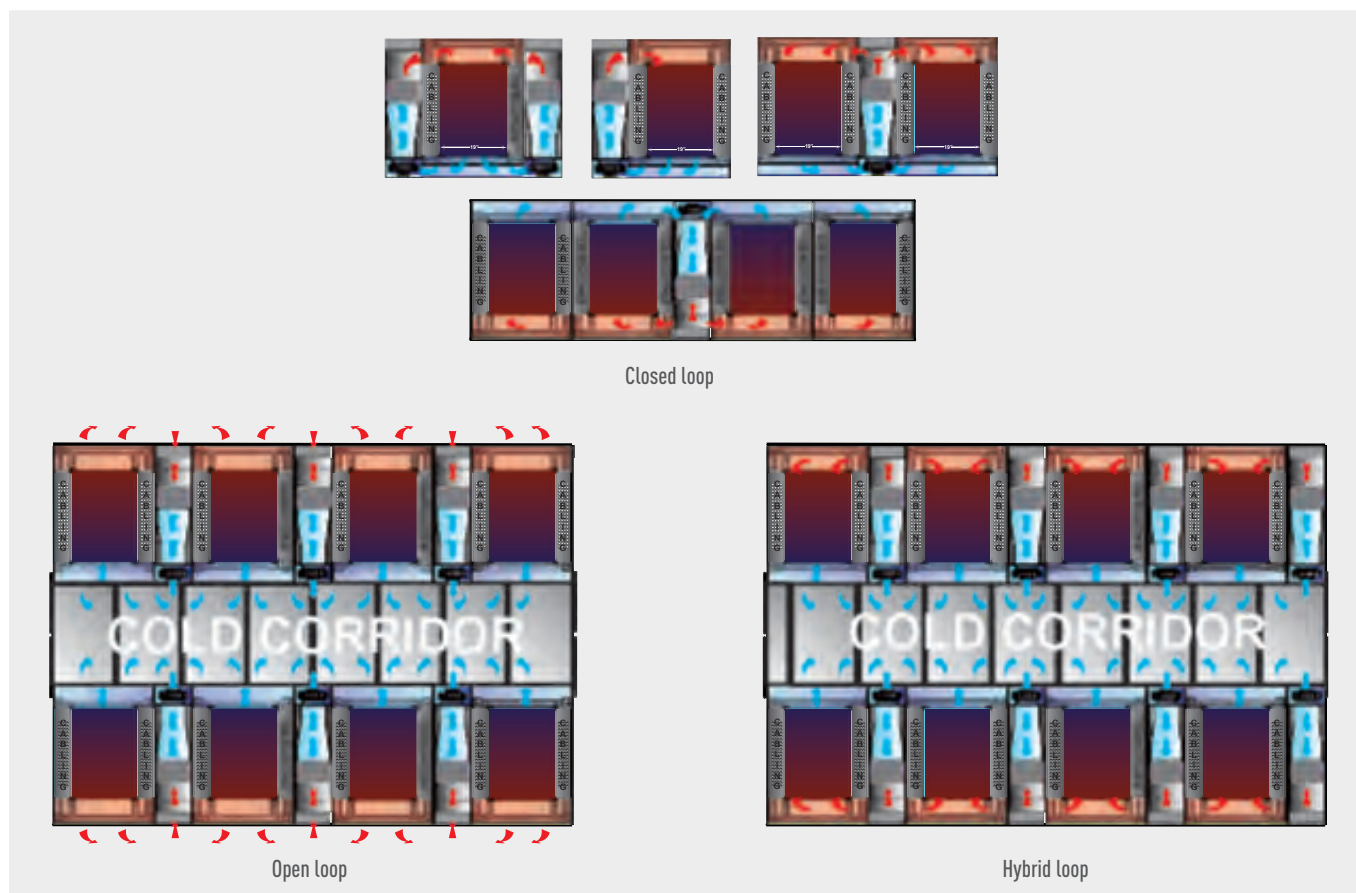
- Water cooling technology
- 24 kW cooling capacity per unit
- Hot swappable components.



Varicondition H<sub>2</sub>O row-based cooling unit



## STUDY OF INTEGRATING AIR CONDITIONING UNITS IN ROWS



### 6.2.4 - Metered, Smart PDU and Environmental Monitoring system

Metered PDU are used to measure the consumption for better management of the installation: balancing circuits, displaying available capacity, preventing overloads and power failures. The information is read locally.

Main characteristics of these PDU:

- Measurement of the total PDU current
- Measurement from 0 to 32 A
- 2-digit display.

Smart PDU provide local and remote power monitoring and environmental monitoring via IP. Use a network interface via web browser to:

- View power [Volt, Amps, VA, kWh] with less than 1% deviation
- View temperature and humidity levels
- Receive alerts if conditions exceed defined thresholds
- Switch outlets on or off individually (managed PDU version)

Power measurement is at PDU level for monitored PDU and at outlet level for managed PDU.

Environmental Monitoring System gives informations about the environment in which active products run. You have remotely all the data (temperature, humidity and door cabinet status for example) to guarantee their operation and lifetime. You can get alarms in case of incident (e.g. unnormal temperature elevation). EMS functions can be either integrated in smart PDU or sold separately.



Vertical PDU with energy metering system

# 7

# NETWORK WIRING PROJECT

## 7.1 - Topology and definition of the specifications

### 7.1.1 Topology of structured cabling

A structured cabling system is created for a LAN (Local Area Network ) using a star-shaped topology, in which the centre of the star is made up of one or more patch panels. In the star-shaped topology, the cables converge towards a main concentration point with normally corresponds to the location of the equipment to be connected.

Central point of the star



Workstation



### 7.1.2 Definition of the specifications

To ensure the integrity of a project, the requirements must be defined, in terms of description, installation diagrams and request for quotation and also in terms of specifications. A typical wiring structure must include the following points:

- Introduction (purpose of the document, timescales, contractual aspects)
- Reference regulations and standards
- Description of the operation (area to be wired, requirements in terms of applications and integration between installations)
- Description of the installation architecture
- Description of the performance levels
- Technical specifications
- Construction
- Tests and checks to be carried out
- Documentation to be provided.

Breaks in communications or poor quality of the service provided, due to the use of inappropriate components or an installation error, may have serious consequences. The wiring defined by standard IEC EN 50173 applies to a wide range of services, including telephony, data, image and video.

These standards and those in the EN 50173 series define:

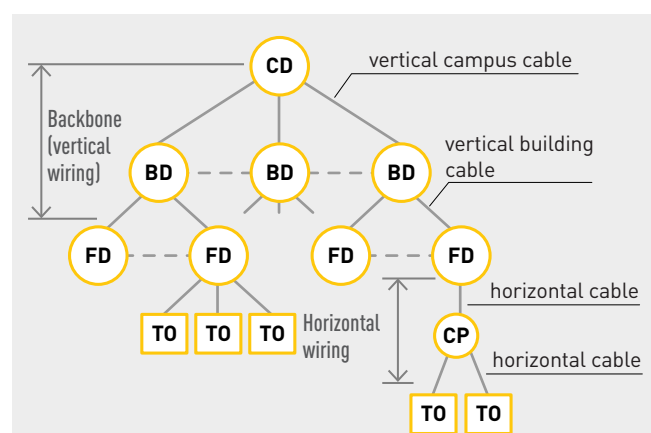
- The structure and minimum configuration of the generic wiring
- The design requirements
- The operating requirements for the links
- The conformity requirements
- The testing procedures.

## 7.2 - Functional components of a wiring structure

The generic wiring system is a star-shaped hierarchical structure. The functional components of a generic wiring system are as follows:

- Campus distributor (CD)
- Vertical campus cable
- Building distributor (BD)
- Vertical building cable
- Floor distributor (FD)
- Horizontal cable
- Consolidation point (CP)
- Telecommunications outlet (TO).

### EXAMPLE OF THE STRUCTURE OF A WIRING SYSTEM



## 7.3 -Wiring subsystems

The number and type of subsystems defined for a wiring system depend on the geographical characteristics, the size of the campus or the building and the user's requirements. In the case of a single building, the main concentration point is the building equipment room. There is no need for a vertical campus wiring system. However, a large building can be treated like a campus, using a vertical campus wiring subsystem and several equipment rooms. The cables must be installed between the adjacent levels in the structure, to form a hierarchical star-shaped structure which provides the high

degree of flexibility necessary for the various applications. The generic wiring contains three subsystems which are connected together:

- Campus backbone
- Building backbone
- Horizontal wiring.

## 7.4 -Design rules

The structured wiring system is an infrastructure which must be taken into account at the building design stage. The standards (TIA/EIA 568, ISO/IEC - 11801 and EN 50173) give extremely simple design and installation specifications whose application enables structured cabling systems to be designed and created without taking the future applications into consideration. The principle of these standards is based on the relationship between the provision of the services and the space.

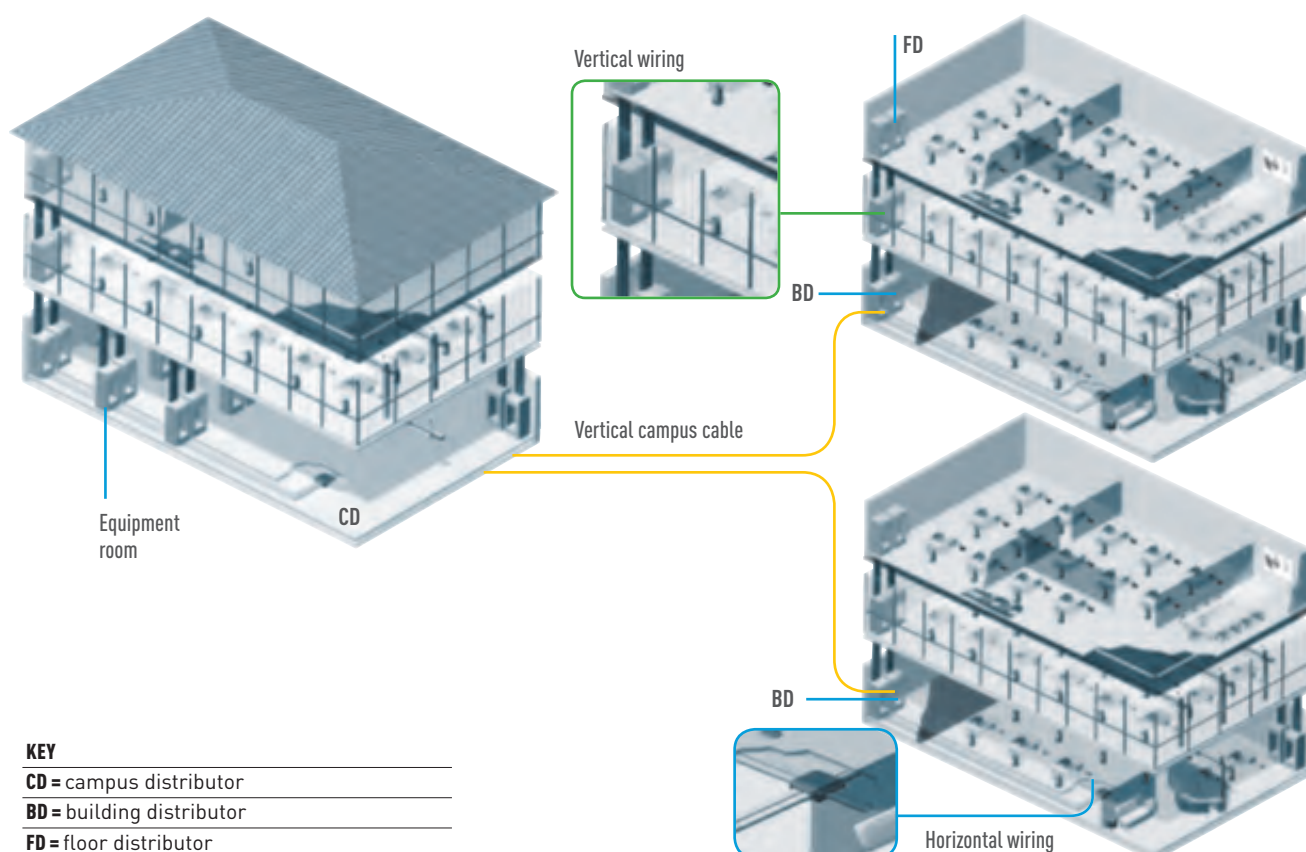
The connections depend on the surface areas, independently of how these areas will be used at different times. One workstation every 10 m<sup>2</sup> will make it possible to reconfigure the spaces without having to contact the installation company to install new lines. The use of open plan areas has played a major role in the establishment of structured cabling systems, with the main advantage being the provision of sufficient equipment, irrespective of how the wired areas are used.

For installations larger than 5000 m<sup>2</sup>, created with full IP, or

those in building structures which have various restrictions (eg: weight limits on ageing raised access floors, saturation of the cable ducts, protected historic buildings, etc.), the infrastructure can be created using FTTO (Fibre To The Office). This recommends the use of fibre optic vertically and horizontally from the building distributor right up to the usage areas, and including the floor distributor. This enables the outgoing fibres to be distributed via 4 to 6 fibre cables to the manageable area switches.

Fibre optic is used for the vertical and horizontal wiring up to the connection of the SFP ports on the switches which can be in the false ceiling, raised access floor, wall-mounted or in trunking. These switches convert the optical signal to a copper signal, provide PoE/PoE+ with their associated power supply, and are fully manageable.

This architecture thus reduces the cost of the technical rooms item.



### KEY

CD = campus distributor

BD = building distributor

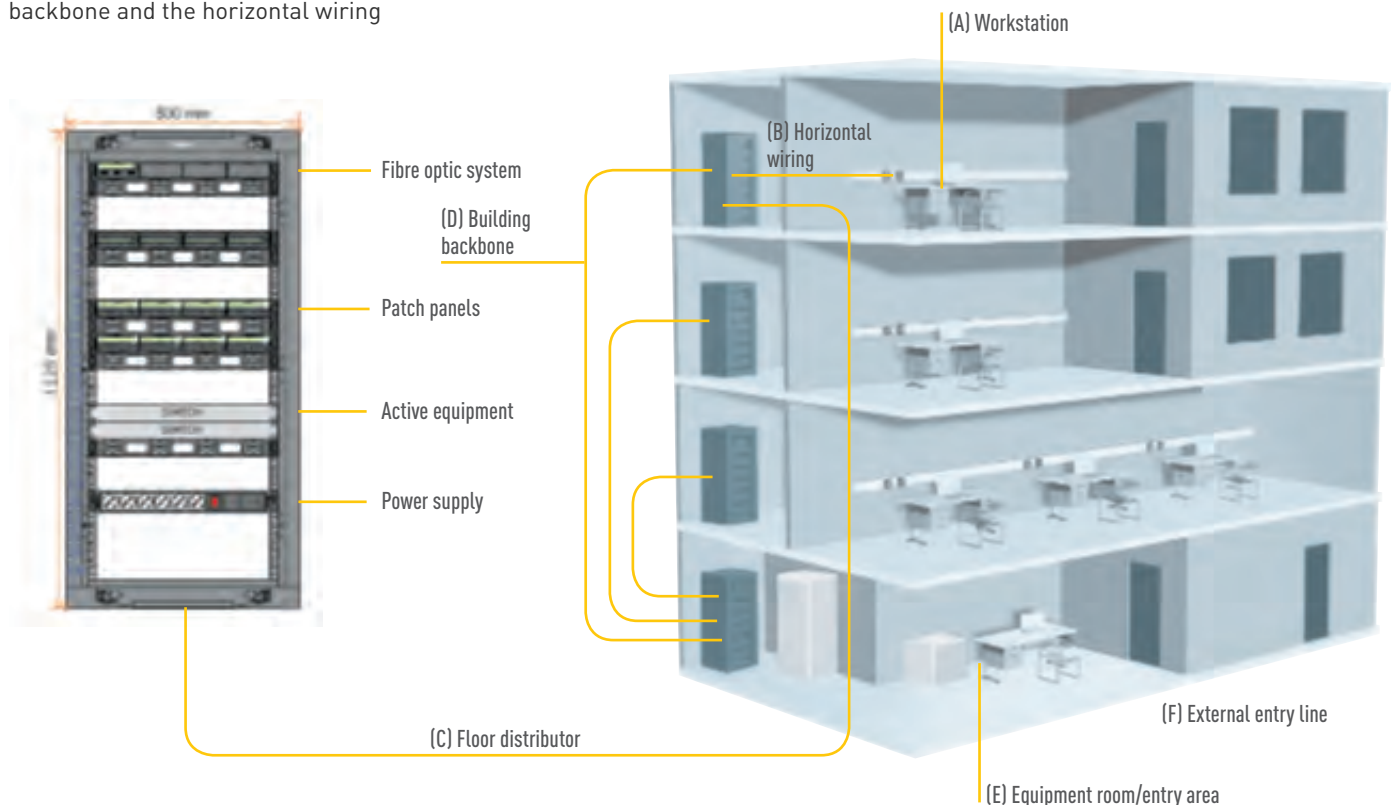
FD = floor distributor

## 7.5 - Main components of structured cabling

A structured cabling system is subdivided into subsystems in which the active and passive components are installed. The main subsystems which make up the structured cabling are:

- A - Workstation: this includes the components between the telecommunications outlet and the terminal equipment. The data terminal (PC, printer, etc.), the connection cable and any adaptors are also part of the workstation
- B - Horizontal wiring: this runs from the telecommunications outlet to the floor distributor. It includes the horizontal wiring, the multimedia socket, the cable terminations and the interconnection or patch panel
- C - Floor distributor: the floor distributor is the area of the building housing the terminations and patch panels of the backbone and the horizontal wiring

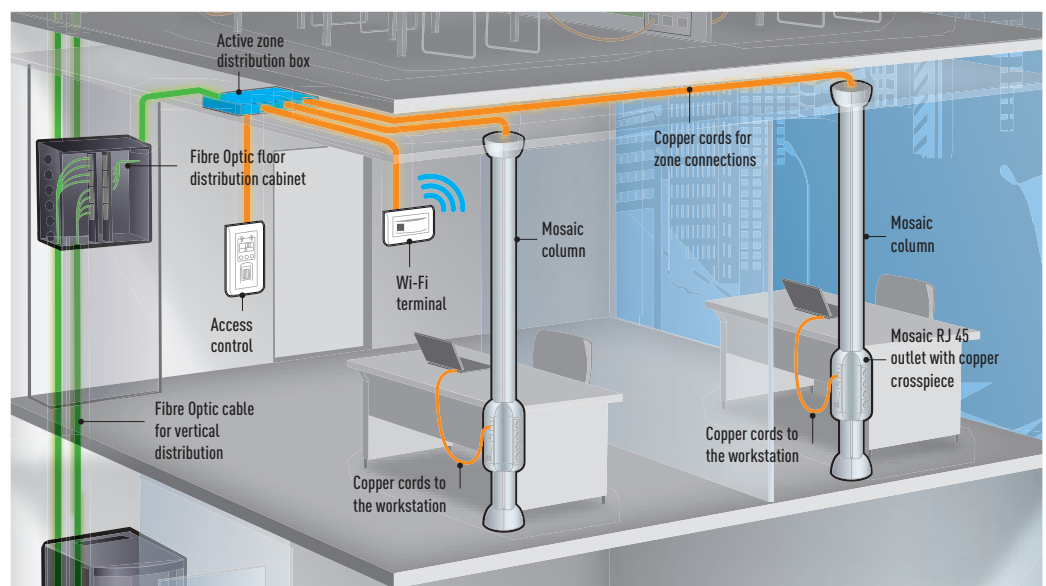
- D - Building backbone: this connects the floor distributors, the equipment room/entry area. It includes the vertical cables, the main and secondary patching points and the cables between the equipment room and entry area in the building
- E - Equipment room: this is the room housing all the main network equipment serving the wiring
- Entry area: this is the area of the building where the connection is made between the part of the wiring outside the building and that inside the building normally the backbone).



### Fibre To The Office: digital infrastructure

Example of a configuration for fibre optic distribution in false ceilings or raised access floors

The individual desk is equipped with a zone distribution box that can be installed in a false ceiling or raised access floor. The optical signal is converted to a copper signal by the active zone box. The active zone box distributes five RJ 45 Gigabit outlets, including four PoE/PoE+ ports (max. 120 W).





## 7.5.1 - Workstation

### Telecommunications outlet

The telecommunications outlet distributes the various services to the workstation. The workstation can have a minimum of two connection points (one for telephony, the other for data). Telecommunications outlets must be positioned in areas that are easy to access. A high density of telecommunications outlets increases the flexibility of the wiring. It is advisable to provide at least two telecommunications outlets per working area measuring at least 10 m<sup>2</sup>, each connected to a connection cable. The outlets must have a permanent label that is visible to the user. Any possible adaptors such as baluns and impedance converters must be outside the outlet. There are two types of telecommunications outlet:

#### Copper

Two 8-pin connectors for connecting the 4-pair 100 ohm symmetrical copper cable.

Legrand offers the following connector solutions:

- Type 110 with insulation displacement by Impact Tool or Tool kit
- TOOLLESS which does not require any tools to connect the cable.

All connectors are available in the various wiring accessory ranges. The various services can be provided at two workstations, using finishing plates that can contain up to four RJ 45 connectors. In this case, a mixture of connectors are used without plates that match the Legrand wiring accessory ranges.

#### Fibre optic

This type of solution is called FTDD (Fibre To The Desk: interconnection principle using fibre optic) and is used in installations in which data is transmitted entirely via fibre optic. This type of installation must provide devices for converting the optical signal. A feedthrough socket for 50/125 µm or 9/125 µm fibre optic is installed as the telecommunications outlet. Legrand offers the following solutions for optical sockets and coupling connectors:

- SC duplex
- ST duplex
- LC.

All feedthrough sockets and coupling connectors are available in the various Legrand wiring accessory ranges.

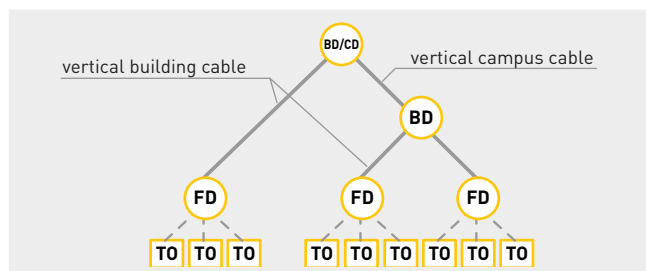
## 7.5.2 - Horizontal wiring

Horizontal wiring includes the horizontal cables, the mechanical terminations of the horizontal cables, the telecommunications outlets and the cross-connections in the telecommunications room.

The following main rules must be complied with when creating horizontal wiring:

- The horizontal cables must be continuous, from the telecommunications room to the telecommunications outlet
- If necessary use a consolidation point between a floor distributor (FD) and any telecommunications outlet (TO)
- Comply with the maximum connection lengths given in the table (in accordance with IEC EN 50173-1).

## MAXIMUM LENGTHS OF CONNECTIONS



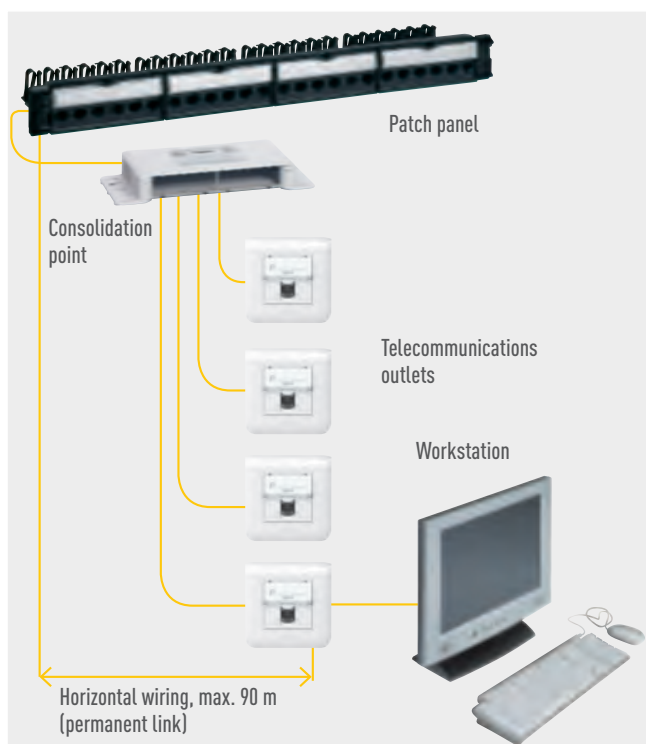
Length (m)	Type of connection
90	Horizontal wiring (between FD and TO)
5	Patch cord between the telecommunications outlet (TO) and the equipment
5	Connection jumpers inside the telecommunications room

### Consolidation point

The regulations stipulate that there must be no breaks or joins in the lines linking the floor distributors to the sockets at the workstations. A consolidation point may however be installed between the floor distributor (FD) and the telecommunications outlet (TO), using zone boxes. The use of a consolidation point to create area wiring is helpful in open plan areas which require a high degree of flexibility in terms of reconfiguration of the working areas. Only one consolidation point is permitted, and it must only contain passive connections. The following points must also be remembered:

- The consolidation point can serve a maximum of twelve working areas
- The consolidation point must be placed in an area that is accessible to staff
- A consolidation point must comply with the labelling and documentation specifications and must be included in the wiring management system
- The consolidation point can only contain passive connection hardware.

## EXAMPLE OF INSTALLATION OF A CONSOLIDATION POINT





## Main characteristics of the Consolidation Point (CP)



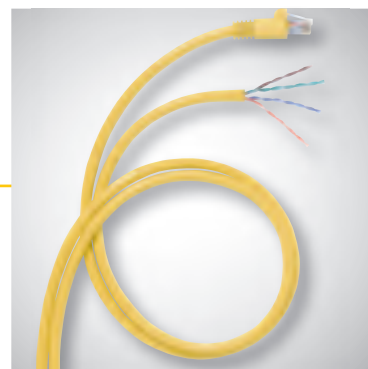
Possibility of installing 2 units of 6 RJ 45 connectors (for up to 12 sockets) for each unit



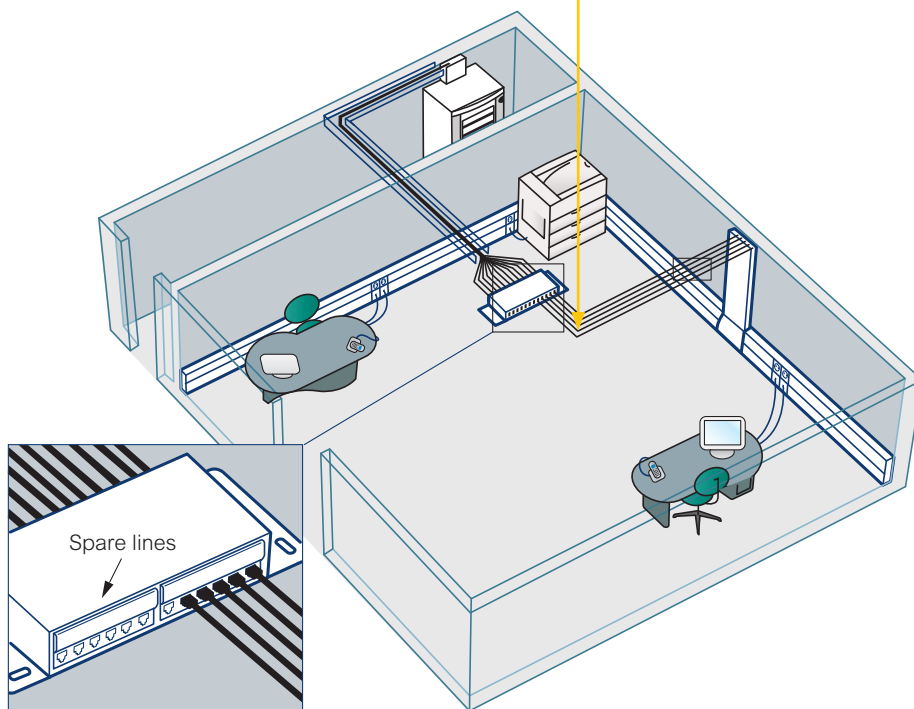
Maximum flexibility of use due to the ability to install the same number of fibre optic and copper connectors in the same unit



Accessories for fibre optic management



Patch cord, 5, 8 or 20 m



### 7.5.3 - Building backbone

#### Building backbone (from BD to FD)

This runs from the equipment room to the telecommunications room. The subsystem includes the vertical cables of the building, the mechanical terminations at both ends of the cables and the cross-connections in the equipment room. The following main rules must be complied with when creating a building backbone:

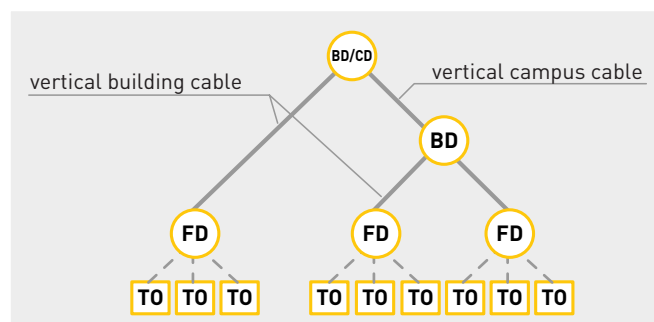
- The vertical cables of the building must not contain any transition points
- The vertical copper cables must not contain any joints.

#### Campus backbone (from CD to BD)

This runs from the campus distributor to the building distributor which is generally located in a separate building. The campus distributor includes the vertical cables, the mechanical termination of the cables (both in the campus equipment room and the building technical room) and the cross-connections in the campus equipment room. The following main rules must be complied with when creating a campus backbone:

- There must be no more than two hierarchical patching levels in the vertical wiring, in order to limit impairment of the signal for passive systems and to simplify the management of the cables and connections
- No more than one patch cord may be crossed to reach the campus equipment room when departing from a floor distributor (FD).

#### BUILDING BACKBONE PRINCIPLE



#### KEY

**CD** = campus distributor

**BD** = building distributor

**FD** = floor distributor

**TO** = telecommunications outlet

#### Sizing the technical rooms

Each 1000 m<sup>2</sup> area for offices requires at least one telecommunications room. If possible, create a telecommunications room for each floor in the structure. If a floor is not used very much, this floor can be "served" from the telecommunications room on an adjacent floor.

#### Vertical wiring distances

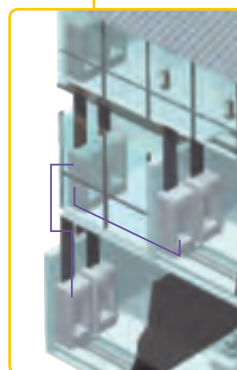
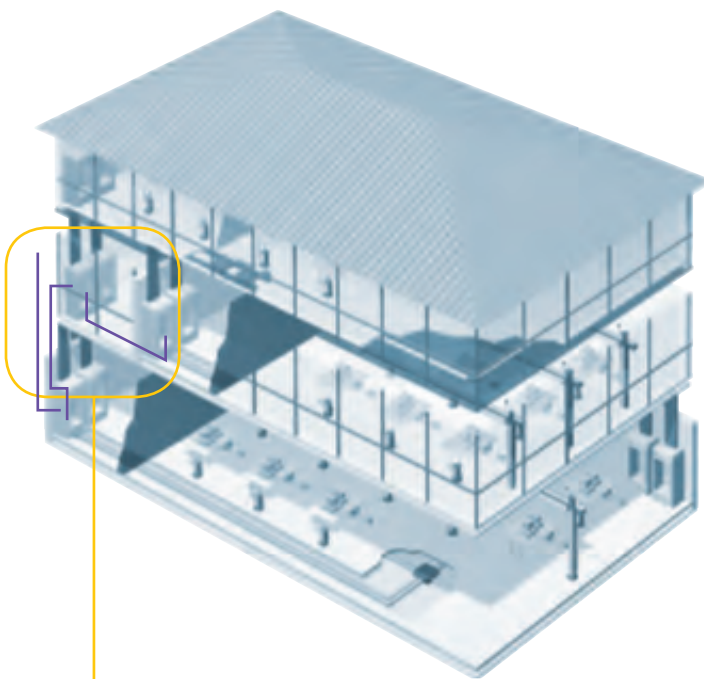
The following can be used to create backbones:

- 62.5/125 µm or 50/125 µm multimode fibre optic cables (recommended for creating backbones), or as an alternative, singlemode fibre optic cables
  - Cat. 5e, 6, 6A 100 ohm, multipair symmetrical copper cables.
- The maximum distance of the vertical wiring between the campus distributor (CD) and the associated distributor in the cabinet must not exceed the distance limits given below.

#### Telecommunication enclosures

Each telecommunication enclosure must have direct access to the backbone. When selecting the type of cabinet or enclosure, it is advisable to establish the minimum dimensions, calculating the rack units occupied by the passive and active equipment already defined at project stage.

Second factor to be taken into account: the possibility of future extensions.



It is not possible to have more than 2 hierarchical patching levels

## Maximum lengths of vertical connections in accordance with standard IEC EN 50173-1 (06/2003)

Maximum lengths (m)	Type of connection
2000	Campus backbone + building backbone + horizontal wiring
1500	Campus backbone + building backbone
500	Equipment room + telecommunications room
20	Patch cord in the building and campus equipment rooms

## Recommended vertical wiring methods

Subsystem	Type of medium	Recommended use
Campus backbone	Symmetrical cables	According to requirements*
	Fibre optic	Resolution of problems due to differences in earthing potential and other sources of interference
Building backbone	Symmetrical cables	Low to medium speed telephony and data
	Fibre optic	Medium to high speed data

\* Symmetrical cables can be used in the campus vertical wiring subsystem if the bandwidth of fibre optics is not required.  
Eg: telephone lines

### 7.5.4 - Data backbones (vertical wiring)

Although for telephony the project and the components used in the vertical wiring are relatively standardised, for vertical data wiring the dependence on the type of application is much more obvious. This dependence does not involve loss of flexibility of the installation: the horizontal wiring, in terms of which the installation is qualified, is not affected as a result of the creation or modification of the backbone. The connections can still be used at the performance levels indicated by the reference category or class. In addition it should be noted that the modification or replacement of a backbone is not generally a difficult operation in terms installation and that the inherent transfer of the applications only requires limited downtime of the network. It is advisable to allow for future extensions (during the project stage), both in terms of users and of bandwidth, to avoid too many modifications of the vertical wiring. Modification or replacement of a backbone does not require the wiring system to be re-certified.

Vertical data wiring can be carried out in 2 ways:

- Using a multimode fibre optic (recommended)
- Using a twisted pair copper cable, impedance 100 ohms or category 5e (applications up to 100 MHz) or 6 (applications up to 250 MHz) or 6<sub>A</sub> (up to 500 MHz).

#### Backbones for Ethernet applications

To date, applications refer to standards with connection via cable and fibre optic. To choose the correct reference standard for vertical connections, the maximum distances that can be covered and the maximum permitted speed must be taken into account, assessing the costs and advantages of each option.



Vertical wiring

#### Components for telephone system installation

Type 110 connection blocks, which manage the pairs individually, are normally used for connection in the main cabinet. A type 110 block can take up to 100 pairs, i.e. 100 telephone lines in the case of traditional 2-wire analogue telephones. The connection cross-section capacity must be at least equal to the number of internal telephone lines. However the possibility of increasing the number of pairs that can be connected should be provided. Many telephone switchboards are extendable and this possibility must be taken into account at the project stage. RJ 45 panels can however be used to replace the type 110 blocks. Using RJ 45 patch panels involves partial use of the pairs available on the RJ 45 panel. For patching, 110-RJ 45 patch cables must be used to transmit the signal to the horizontal distribution (if this has been done using RJ 45 panels), and type 110-110 patch cables if the horizontal wiring is done using type 110 blocks, or RJ 45-RJ 45 patch cords if the whole installation is built using RJ 45 patch panels. On the switchboard side, the use of patch cords will be identical depending on whether the internal lines have been connected on RJ 45 panels or type 110 blocks. An RJ 45 panel is often used for horizontal distribution and a type 110 block for connecting the internal lines on the switchboard side and for the vertical cables.

## 7.5.5 - Technical rooms

The technical rooms constitute the centre of the wired infrastructure star. They are dedicated areas from which the building backbones or the campus connections and the horizontal distribution cables depart or where they terminate. The data, voice, multimedia, automation, control and security services must be managed in the technical rooms and distributed from them to the groups of users in a specific building. There are two different technical rooms:

- Floor technical rooms
- Building technical rooms.

### Floor technical room TR (telecommunications room)

Telecommunications rooms are the management location where the vertical wiring of the building is interfaced with the horizontal distribution, transporting the services from the main vertical trunking to the working areas.

Each building should have one or more telecommunications rooms. If the infrastructures are shared by several companies, any cohabitation of devices and services intended for different owners must be avoided. If it is not possible to have a telecommunications room for each company, it is essential to separate and identify each owner's areas, distribution blocks and devices.

At the TR project stage, it is important to take into account not only the normal requirements of the traditional telephony and data transmission services, but also all the services that may be used in the future if the functions of the infrastructure are extended: IP CCTV, access control, automation, energy management, alarms and sound systems.

It is therefore very important to calculate the space needed for the network devices, the other active equipment and any future extensions in the cabinets. As a result, no problems in terms of slots in the racks or problems of physical space in the telecommunications room will be encountered.

The telecommunications room must contain the following

equipment and devices: rack cabinets comprising:

- Active equipment for the data networks, floor distributors, backbone terminations, telephony management devices and the safety, control and automation services
- Infrastructures for horizontal cable distribution
- Air conditioning systems to maintain the temperature between 18 and 24°C and 30 to 55% ambient humidity
- Fire protection and safety systems
- Electrical safety systems, ensuring that all the metal parts of the infrastructure are connected to the equipotential bonding system in accordance with the standards.

### Building technical room ER (equipment room)

The equipment room is where the whole infrastructure is managed and where all the functions of the structured cabling system are managed.

In buildings where there are fewer than 100 working areas, the equipment room corresponds to the telecommunications room, in that they can be managed using a single central point in the star network.

In large buildings, with more than 100 working areas, the main, and also possibly secondary, vertical connections depart from the equipment room and run to all the telecommunications rooms.

The equipment room must be designed and positioned so that it can house all the active and passive equipment for the operational management of the services and also the management systems for the air conditioning and uninterruptible power supplies.

All the IT services (room containing the EDP central computer, servers and data storage devices) must be located in the equipment room or in the immediate vicinity.

## 7.6 - Considerations for wireless network projects

Wireless networks require very specific project and layout rules and procedures.

To be sure of creating a compliant structure, it is important to know the user's requirements, which may be:

- Structural requirements, i.e. the type of area to be covered (closed or open plan offices, function rooms with or without obstacles, open spaces, etc.)
- Requirements in terms of performance, which consist of defining the minimum useful band to ensure signal coverage in each room
- Requirements in terms of density, i.e. how many users are anticipated in each area
- Requirements in terms of safety
- Requirements in terms of mobility, to ensure connection even when moving.

Once the user's requirements have been defined, a project can be built and the number and type of access points to be installed (802.11a/b/g/n) in each space can be established.

Next phase: the analysis (visual and using instruments) of the areas in which the wireless network is to be installed. This analysis establishes the basic characteristics of the areas, to assess the presence of obstacles that may cause interference, such as fire doors, metal cabinets, walls, etc.

The availability and layout of power supply points for connecting the access points must also be analysed and the decision made whether it is necessary to supply these via data cable.

Given the possibility of varying the transmission medium according to the installation area (people, topology, equipment, compatibility, etc.), it is advisable to carry out a site study before installation in order to check that the project has been designed correctly.

Knowing that the behaviour of radio waves is unpredictable, one of the most difficult parameters to determine is the sizing of the coverage cell for an access point, also remembering that when the distance increases, the signal weakens and the communication switches to the lower speed.

The access points must therefore be installed in such a way as to ensure the best performance at each point in the area in question. Once the structure, the areas and the sizes of the cells have been analysed, it is possible to obtain the number of access points to be installed.

If adequate performance levels cannot be obtained with a single point, a group must be used. This consists of activating several access points in the same coverage area. To avoid any interference problems, the devices must be programmed on different channels.

# 8

# CHECKING THE INSTALLATION

## 8.1 - General

Testing the transmission performance is the phase which, once the installation has been completed, is designed to demonstrate its compliance with the wiring regulations (EN 50173 series, ISO/IEC 11801, TIA/EIA 568C, see section 2). In practice it consists of measuring a whole series of transmission parameters in a certain frequency range, and checking compliance with the limit values over the whole measurement range (eg: Class E<sub>A</sub> 1...500 MHz).

Although selecting of compliant components is a necessary requirement, this is not sufficient to ensure that the nominal transmission performance levels are complied with in the actual installation.

The wiring must be installed in accordance with good practice. In this respect it is advisable to follow the instructions in the specific standard (EN 50174-2, ISO/IEC 14763-2, etc. see section 2). These two requirements are the prelude to a positive test.

Some errors may nevertheless have been made during installation. The final test will establish whether errors have been made and if they have compromised compliance. If the test is negative, the cause must be found and corrected. This is not always easy, especially in large-scale installations. For this reason it is important to carry out the initial phases rigorously.

The guidelines for doing so are given in this section.

Standard IEC 61935-1 specifies the testing methods for each transmission parameter for copper wiring, and the requirements for the measurement instrument.

The testing of structured cabling systems is governed by standard EN 50346.

The standard indicates how to conduct the test. It also gives references to the original testing methods, for both copper and fibre optic, but does not provide any information on how to resolve any non-compliance problems.

The regulations for structured cabling are voluntary. There are no legal provisions making it compulsory for the installer to provide a declaration of conformity, as is the case for electrical installations.

The value of the test report is not the same as the declaration of conformity of the electrical installation.

However, in practice, the customer generally requests the test report as proof of the positive completion of the work.

To summarise, a test report makes it easy to:

- Prove that the installation complies with the required nominal performance
  - Fulfil a contractual obligation (customers often require a final test as a condition of acceptance of the work)
  - Guarantee the installation supplied for a certain period (according to the contractual guarantee terms)
- The verification takes the form of a process stipulating checks and tests:
- Visual
  - Static electrical
  - Of the transmission parameters.

These phases are generally sequential. For example, a negative static electrical test makes testing the transmission parameters meaningless before the cause of this negative outcome has been eliminated.

But this is not a set rule: the decision on how to proceed can be made according to the type of result of each preliminary phase. The testing of optical systems is similar. It is described in section 7.5 and stipulates the following checks and tests:

- Visual
- Conformity of the connectivity
- The transmission parameters.

## 8.2 - Copper wiring

### 8.2.1 - Copper wiring: visual check

This phase is simple and immediate, and involves:

- Checking the catalogue numbers of the components installed
- Checking there are no excessive mechanical stresses on the cables (eg: identification of points characterised by visibly incorrect bending radiuses)
- Checking that the cable ties do not tighten the bundles too much; and checking the sheaths are not distorted
- Checking the wiring of the sockets and patch panels, and that all conductors are connected correctly
- Checking that all functional earth connections are present (cable shielding, connectors, etc.)
- Checking that the cords are compatible with the nominal class of the link.

### 8.2.2 - Copper wiring: static electrical test

The static electrical test is used to verify:

- The complete connection of each link, i.e. the electrical continuity
- The correspondence with the topological diagram
- Compliance with the polarity, if required
- That there are no accidental short circuits between each conductor
- The isolation between conductors and to earth
- The correspondence between the installation diagram and the installation itself
- The continuity of the foil screen, if present (FTP, STP, S/FTP). This test may not be included on some models of certification instruments.



Some certification instruments stop the test procedure if there are static electrical errors. On other models, it is possible to force the continuation of the test. However, it is not necessarily worthwhile continuing the test on the transmission parameters. This possibility must be assessed according to the types of error found when carrying out the static electrical test. A few suggestions on the most frequent causes of failure of the static electrical test are given below.

Mapping errors:

#### Open:

- Conductors broken due to stresses, generally on the connection points
- One of the two connectors used for the test is not connected (another one has been inadvertently connected in its place)
- Damaged connector
- Cuts or breaks inside the cable
- Conductors connected to the wrong pins
- Cables for specific applications (eg: Ethernet, wiring of single conductors 1-2, 3-6).

#### Short-circuit:

- Incorrect termination
- Damaged connector
- Presence of conductive dirt between the pins of the connectors (the shape of the RJ 45 encourages dust and fluff deposits)
- Cables for specific applications (eg: control systems)
- Inverted pairs: conductors connected to the wrong pins on at least one of the two terminations.

#### Twisted pairs:

- Conductors connected to the wrong pins on at least one of the two terminations
- Mixture of 568 A and 568 B connections
- Crossed cables (pairs 1-2 and 3-6 cross).

#### Pairs separated:

Conductors connected to the wrong pins on at least one of the two terminations.

The instrument used to carry out this testing, the certification instrument, consists of a transmitting unit and a receiving unit which, when connected to the ends of the connection to be tested, exchange test signals enabling processing of all the transmission parameters which the system standards (EN 50173, ISO/IEC 11801, TIA/EIA 568C) require to be checked. A resident software program launches an automatic measurement routine, which carries out all the necessary measurements in the frequency range concerned (eg: 1...500 MHz for class E<sub>A</sub>) and compares them with the corresponding limits.

The instrument must be configured by selecting the limits to be applied, which vary according to the regulations (there are currently slight differences between EN, ISO/IEC and TIA/EIA) and the type of measurement to be performed (channel or permanent link).

The difference between a channel and a permanent link is whether the connection cords on the part to be measured are included (channel) or omitted (permanent link).

The maximum length of the permanent link is 90 m, while that of the channel is 100 m (90 m link + 2 x 5 m cords) if two fixed sockets only are present at the ends. If there are intermediate patch panels or transition points, the standards provide formulae to proportionally reduce the maximum lengths. As a guide: 1 m/patch panel. The actual length of the link can be calculated in detail by taking into account the formulae given in standard EN 50173-1. For example, for a class E<sub>A</sub> link:

$$B = 105 - 3 - F \cdot X$$

Where:

**B:** actual length of the link

**F:** Number of patch panels

**X:** Relationship between the attenuation of the cord and the attenuation of the cable, in dB/m.

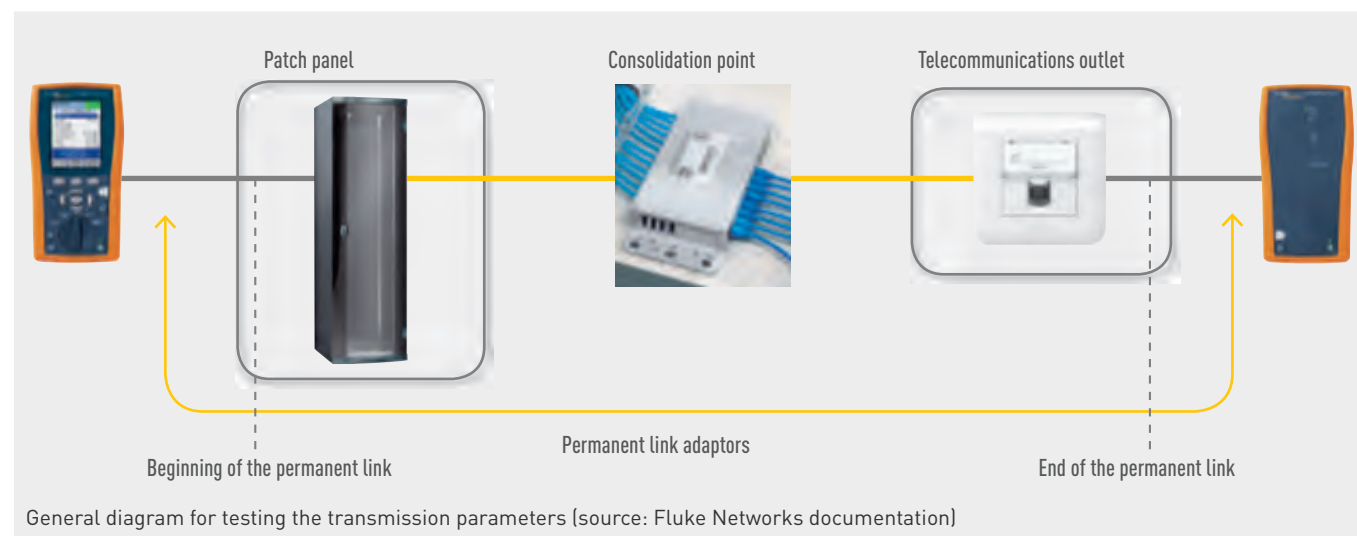
Before starting the certification, the propagation velocity of the light in the cable being tested must be configured, in accordance with the instructions of the manufacturer (NVP), and the instrument for measuring the channel or the permanent link must be provided.

The provisions for carrying out the test procedure correctly are in standard EN 50346.

## 8.2.3 - Copper wiring: testing the transmission parameters

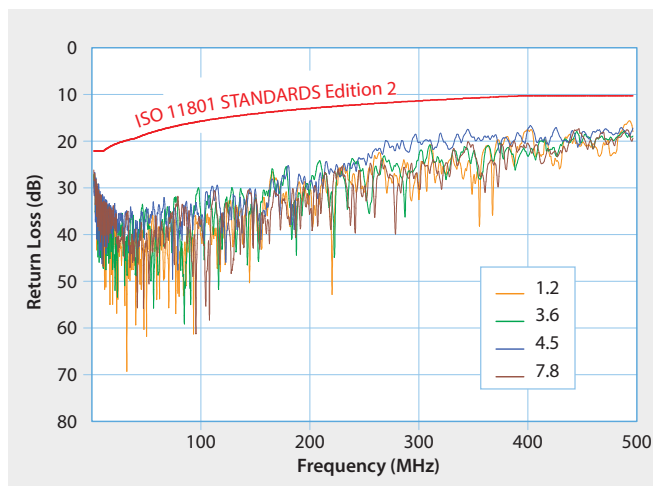
Testing the transmission parameters is the fundamental phase of all the processes and enables the installation to be declared compliant. If they are carried out meticulously, the visual check and static electrical test will provide the best preparation for this phase.

### GENERAL DIAGRAM FOR CHECKING THE TRANSMISSION PARAMETERS



The final result of the test is a frequency distribution of a series of curves, the number of which varies according to the parameter.

All these curves must comply with a regulatory limit.



Example of the result of a transmission parameter test (NEXT, near end crosstalk)

The above figure shows an example of a NEXT (near end crosstalk) test. The red curves represents the regulatory limit according to the frequency (eg: 1...500 MHz, class E<sub>A</sub>). The different coloured curves represent the attenuation measurement carried out by injecting a test signal on the pair AA terminated on its impedance, and measured on one of the three adjacent pairs (terminated on both sides on the characteristic impedance) on the same side as that of the injection (near end). Switching over the measurements on the four pairs, taking the measurement on each of the three adjacent pairs and taking the measurements on both sides of the link, the following is obtained:

$3 \times 4 \times 2 = 24$  curves. To obtain a positive result, all these curves must remain below the limit, while the minimum value of the difference in dB between the limit curve and all the points on the curves measured constitutes the margin of compliance.

Similar considerations can be applied for all the other parameters: attenuation, return loss, PSNEXT, ACR, ANEXT, PSANEXT, AACR, PSAACR, LCL, propagation delay, propagation time difference, etc.

The software which controls the operation of the certification instruments is constantly being updated in line with changes to the standards.

The installer must therefore check that the most recent version is being used.

The software versions may differ according to the type of parameter to be measured, the limit values and their definition and/or calculation algorithm.

The manufacturers of certification instruments generally supply software updates free of charge on their websites.

The instrument must be calibrated at regular intervals by a specialist laboratory or by the manufacturer, to ensure its measurement accuracy.

This operation must not be confused with self-calibration, which must be carried out before each measurement, and which is simply a measurement cord compensation procedure, the purpose of which is to provide the exact reference for the measurements to be carried out.

If the test is positive, the installation can then be declared as conforming to the selected standard (EN50173, ISO/IEC 11801, TIA/EIA 568) and the final report can be drawn up.

If the result is negative, the cause of this failure must be found and eliminated.

A few suggestions on the most frequent causes of errors are given below.

#### General errors:

- Has the class/category been selected correctly?
- Has the software of the certification instrument been updated?
- Have the correct measurement heads been used?
- Is a channel or a permanent link being tested?
- Has an appropriate propagation velocity (NVP) been entered?
- Although the limit values can be accepted temporarily, they require an additional examination, according to the parameters, as specified below.

#### Errors on the length of the wiring:

- Measured length longer than the authorised limits:
  - The cable is too long. Assess the possibility of reducing the cable coils at the connections or follow other installation routes.
- The propagation velocity (NVP) has not been set correctly
- Measured length obviously shorter than that installed:
  - Intermediate break on the cable
  - One or more pairs are much too short:
  - Cable damaged
  - Connection error.
- Propagation delay/propagation time difference (above the limits):
  - Cable too long (propagation delay)
  - The cable uses different insulating materials for the pairs of which it is made up (if this is the case, replace it).
- Attenuation:
  - Too long
  - Poor quality cords
  - High impedance in the connections (a specific measurement must then be carried out)
  - Incorrect use of lower category components (eg: 5e cord in a class E link).
- Incorrect execution of the self-calibration routine on the certification instrument
- NEXT and PSNEXT ("fail"):
  - The connectors/sockets have not been connected in line with the "unwinding" rules for each pair (poor twisting)
  - Poor impedance matching between connectors and sockets (most probably as a result of mixing components from different manufacturers for category 6 and higher)
  - Use of an incorrect measurement head on the certification instrument
  - Poor quality cords, connectors, sockets or cables
  - Cable ties too tight in cable bundles
  - Presence of elements creating interference near the link
  - See return loss errors: NEXT errors can be a result of return loss, due to the large width of the reflected signal.
- NEXT and PSNEXT ("pass" when there is an error - masked "fail", which could appear in the future):
  - A good quality cable can withstand minor knots and kinks
  - Incorrect test procedure selected: a "poor" class E link may pass the class D test which has been configured in error (also test the frequency range).
- "Fail" at low frequencies and "pass" at high frequencies: in reality, the problem concerns the whole frequency range and may be due to one of the above causes

- Return loss ("fail"):
  - Characteristic impedance of the cords incorrect (other than 100  $\Omega$ )
  - Damaged cords have lost the characteristic impedance value
  - Loss of the "twisting" pitch during installation
  - Too many cables in the boxes containing the telecommunications outlets
  - Poor quality connectors/sockets
  - Poor quality cable: characteristic impedance not uniform along the whole length
  - Poor impedance matching between connectors and sockets (most probably as a result of mixing components from different manufacturers for category 6 and higher)
  - Erroneous use of a cable with 120  $\Omega$  characteristic impedance (previous generation components)
  - Too much stock of cables in the cabinets
  - Instrument self-calibration error and/or inappropriate selection of measurement cables and heads.

- Return loss ("pass" when there is an error - masked "fail", which could appear in the future):
  - A good quality cable can withstand minor knots and kinks
  - Incorrect selection of lower limits
  - "Fail" at low frequencies and "pass" at high frequencies: in reality, the problem concerns the whole frequency range and may be due to one of the above causes.
- ELFEXT and PSELFEXT:
  - See NEXT
  - Too much cable in coils that are too tight.
- Resistance:
  - Cable too long
  - Oxidised contacts
  - Conductors incorrectly connected in connectors or sockets
  - Cable with abnormally thin conductors (check the nominal AWG) or poor quality cord.

## 8.3 - Fibre optic wiring

### 8.3.1 - Fibre optic wiring: visual check

This phase is simple and immediate, and involves:

- Checking the catalogue numbers of the components installed
- Checking there are no excessive mechanical stresses on the cables (eg: identification of points characterised by obviously incorrect bending radiuses)
- Checking that the cable ties are not too tight on the bundles; and checking the sheaths are not distorted
- Checking the wiring of sockets and patch panels, i.e. that all conductors are connected correctly
- Checking the cleanliness of the interface surfaces of the components
- Checking that the cords are compatible with the type of fibre optic in the link (eg: 50/125  $\mu\text{m}$ ).

Devices to assist with visual checking and cleaning the surfaces of the connectors are commercially available.



Example of microscope for visually checking the surfaces of the connectors and connector cleaning kit

### 8.3.2 - Testing the connectivity

As for copper wiring, this phase involves establishing whether the connections have been made correctly.

A device called a visual fault locator injects visible light into the termination of a link and checks that it exits at the other end. This system can also be used to identify breaks, excessive folds and macroscopic connection errors on connectors. Less serious errors of this type may not be detected during the connectivity test, but can be identified using the more accurate reflectometry test.



Examples of commercially available visual fault locator devices

### 8.3.3 - Testing the transmission parameters

The following transmission parameters must be tested for optical links:

- Attenuation (dB)
- Polarities
- Length (m)
- Return loss (dB)
- Propagation time (ns), optional.

The transmission parameters for fibre optic wiring are tested using the following methods:

- Photometry
- Reflectometry.

Photometry tests: these are based on measuring the attenuation of a light pulse, of the nominal wavelength for the type of link, applied between the two ends by a certification instrument.

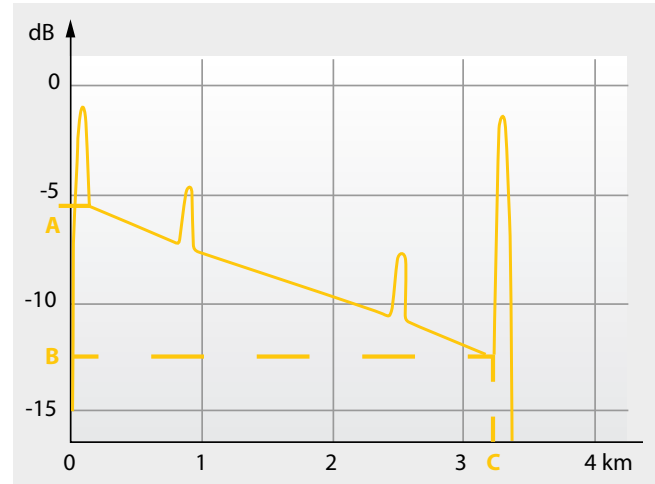
The certification instruments must record the following wavelengths (in accordance with standard EN 50346):

- Multimode fibres:
  - 850 nm  $\pm$  30 nm
  - 1300 nm  $\pm$  20 nm.
- Singlemode fibres:
  - 1310 nm  $\pm$  10 nm
  - 1550 nm  $\pm$  20 nm.

As for the tests on copper cables, the certification instrument consists of a transmitting unit and a receiving unit which exchange signals. Measurement of the optical attenuation of the signal is adequate to certify a link. However, if there are problems, it is necessary to perform additional reflectometry measurements in order to find the causes of the failures.

Reflectometry tests: these are based on measuring the time taken by a light pulse to travel the distance of the link forwards and backwards (after reflection). A specific instrument called an OTDR is used for this.

There are two types of reflected signal: "strong" and "weak". The former, generated by Fresnel reflection, indicate the presence of microcracks in the fibre. Weak reflections are caused by back-scattering of the light and are used to measure the attenuation.



Example of reflectometry measurement: the decreasing trend is used to measure the attenuation (AB). The peaks correspond to Fresnel reflection situations, located at specific points where there are discontinuities inside the fibre, due to connections. At C, the attenuation after the peak falls to  $-\infty$ , a clear sign of a break.



Examples of photometric certification instruments



Example of an OTDR

Reflectometry measurements must be carried out using the "launch fibre", i.e. a piece of cable that is in addition to the link to be checked, which is used to resolve the issue of the "dead zone" of the instrument and thus analyse the entire length of the link. The first few metres of cable would not be visible without the launch fibre.

Putting together all the above information, the most effective method for testing fibre optic wiring can be summarised in five points:

- 1) Visual check of the cable on the reel: preliminary check of the type of cable, and to ensure there is no macroscopic damage
- 2) Reflectometry measurement of the bare fibre before installation: check to ensure there is no micro-damage on the cable
- 3) Reflectometry measurement of the bare fibre after installation: check to ensure there is no micro-damage on the cable, which has occurred during installation
- 4) Visual check + cleaning of the connectors
- 5) Final test on the installed fibre fitted with connectors: using photometry and/or reflectometry method.

## 9

# SUPPORT

## 9.1 - Project performance guarantee

The performance of an installation must stand the test of time. This is why Legrand offers the installer the opportunity to guarantee the long-term continuity of performance of a cat. 6<sub>A</sub>, 6, 5e or OM1, OM2, OM3, OM4, OS1 or OS2 LCS<sup>2</sup> cabling system. Two guarantees ensure the durability of your installations:

### The 25-year performance guarantee:

Legrand offers the installer the guarantee of continuity of performance levels of an LCS<sup>2</sup> cabling system on link or channel over time.

### 3-year extended guarantee on additional products:

By taking out the Performance guarantee opposite, the usual 2-year Legrand guarantee is extended to 5 years for the following products:

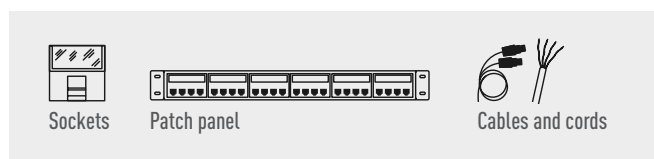
- Enclosures
- Cabinets
- Patching accessories (feedthroughs, shelves, etc.).

### 9.1.1 - 25-year link or channel performance guarantee

The link guarantee relates to an assembly consisting of the following components:

- Patch panel
- Copper or fibre optic cable
- Terminal socket
- Zone distribution box
- Fibre optic cassette and/or fibre optic drawer with feedthrough
- Pigtail.

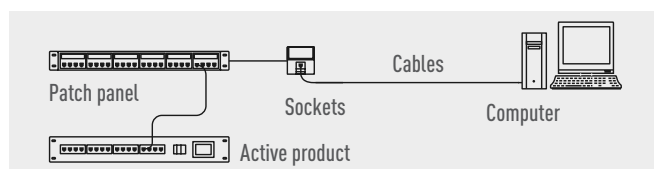
Performance is measured over a maximum length of 90 m for copper links. For fibreoptic links see the contract.



A channel is defined by the standards as being an assembly consisting of the following components:

- Patch cord or jumper
- Patch panel
- Copper or fibre optic cable
- RJ 45 socket
- User cord
- Zone distribution box
- Fiber optic cassette and/or fiber optic drawer with feedthrough.

Performance is measured over a maximum length of 100 m for a copper channel. For a fibre optic channel respect the maximum length associated with each performance level (refer to the contract).



### 9.1.2 - 3-year guarantee extension

The guarantee extension means a period in addition to the initial guarantee delivered by Legrand in the frame of its general sales conditions, and a three (3) year extension of the guarantee covering correct operation on products referred to as ADDITIONAL PRODUCTS, excluding all other products and equipment:

- Enclosures
- Cabinets
- Patching accessories (feedthroughs, shelves, etc.).

### 9.1.3 - Conditions of the 25-year guarantee

The Guarantee only applies to the installation carried out at the worksite for which the details are given in the Installation Identity Document.

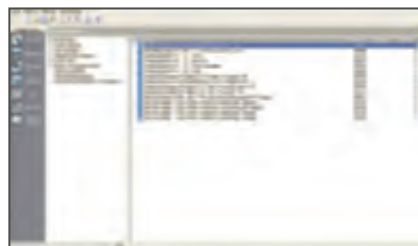
The INSTALLER can only benefit from the Extended Guarantee if all the following conditions have been met:

- The installer has stored the components used in the installation under conditions that are appropriate to their nature
- The installer has carried out the installation in strict compliance with good practice and in accordance with the following combination of conditions:
  - All the components used in the cabling system must be Category 5e, 6 or 6<sub>A</sub> or OM2, OM3, OM4, OS or OS2 components of LEGRAND LCS<sup>2</sup> cabling systems, listed in the Installation Identity Document, or failing that, products recommended and approved by LEGRAND
  - The installation must be carried out in accordance with the rules defined in installation standards EN 50174, EN 55022 and ISO 11801 or EN 50173, which are in force on the date the Guarantee is granted
  - For a CHANNEL Performance Guarantee, all the patch cords and user cords must be original LEGRAND components. The length of a patch cord is limited to 5 meters.
  - As well as the signed agreement, the Installer has delivered to LEGRAND the Installation Identity Document, consisting of:
    - The completed Worksite Details
    - List of VDI PRODUCTS and ADDITIONAL PRODUCTS with their quantities
    - The «Key Points» document completed, checked and signed to indicate that the INSTALLER has complied with these points
    - A copy of the installed equipment layout plan bearing the installer's company stamp
    - Documentation on the installation acceptance test carried out in accordance with current standards.
  - The INSTALLER must ensure that the data for the installation acceptance test conform to the values specified in the performance standards
  - Any subsequent modifications must comply with the conditions listed above. Any "new phase of work" type extension to the installation must form the subject of a new agreement.



## 9.2 - LCS Pro<sup>2</sup> software: all the products you need for an LCS project

The new LCS Pro<sup>2</sup> software lets you select your products quickly and easily, view your cabinets and much more...



Automatic determination of catalogue numbers by selecting the features and options



Easy project management  
Technical records, purchase orders, document printing



Visual display of the enclosure layout with option to make changes

### Discover the new features:

- Create the block diagram of your installation
- Find Cat. Nos automatically by selecting characteristics and options
- Display the cabinet installation and amend it if required
- Manage your projects: technical summaries, purchase orders, document printing.



## 9.3 - Top-level training at Innoval

Being in close contact with engineers at the cutting edge of technological advances, Legrand trainers offer you practical classes in workshops. Discover the aesthetic, technical and innovative potential of Legrand products and systems in a real-life situation. Take the opportunity to meet experienced people who understand your business and speak your language. We offer you very useful and practical classes.

### Innoval Centre, Limoges<sup>(1)</sup>

This is the training nerve centre for the Legrand Group, offering an overall view of the solutions designed by the whole of the Legrand Group for the residential, commercial and industrial markets.

Its 15 training rooms have been designed and equipped with individual computers and workshop areas to promote the practical acquisition of new skills and allow participants to handle actual products.

### Innoval Centre, Bagnolet<sup>(1)</sup>

Showcasing Legrand's specialist solutions for the commercial and industrial sectors, the Bagnolet Innoval centre offers the expertise and ideal tools for you to develop your knowledge in the fields of VDI, power/high voltage, lighting management and security systems.

The two training rooms at the Innoval Centre in Bagnolet have interactive panels for the lively communication of theoretical knowledge, as well as workshop areas for the immediate practical application of acquired skills.



### Comprehensive classes

- Copper installation: essential for commercial sites
- Fibre optic: use and testing of an installation
- Copper: use and testing of an installation.

### Classes to understand different methods

For example using a fibre optic backbone and connecting and testing the fibre optic links, as per the standards in force.

**Classes to convert the telephone** and computer network needs of your clients into complete and upgradeable solutions, and cabling them as per the standards in force.



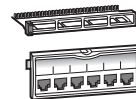
<sup>(1)</sup> To adapt for your country

# DIGITAL INFRASTRUCTURES SYSTEMS FOR COMMUNICATIONS NETWORKS IN COMMERCIAL BUILDINGS

## LCS<sup>2</sup> systems

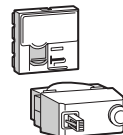


**P. 80**  
LCS<sup>2</sup>,  
cabinets and  
enclosures  
Selection chart



**P. 88**  
LCS<sup>2</sup>, cat. 6<sub>A</sub>  
patch panels  
and connector units

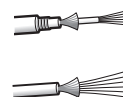
## LCS<sup>2</sup> copper



**P. 96**  
LCS<sup>2</sup>, cat. 6  
RJ 45 sockets

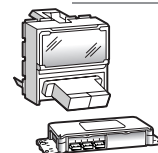


**P. 103**  
LCS<sup>2</sup>, double sockets  
and adaptors

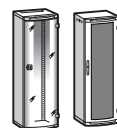


**P. 106**  
LCS<sup>2</sup>,  
fibre optic cables

## LCS<sup>2</sup> fibre optic



**P. 110**  
LCS<sup>2</sup>, fibre optic  
sockets, and zone  
distribution boxes



**P. 114**  
LCS<sup>2</sup>, 19" cabling and  
server freestanding  
cabinets and  
equipment

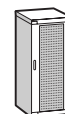
## LCS<sup>2</sup> cabinets



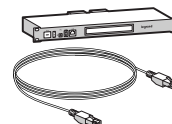
**P. 120**  
LCS<sup>2</sup>,  
19" wall-mounting  
cabinets and  
accessories



## Legrand Server System

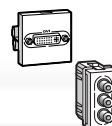


**P. 126**  
Varicon-L  
19" server cabinets  
and equipment



**P. 132**  
Smart patching for  
fibre and copper

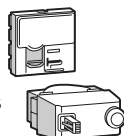
## Audio/Video System



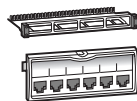
**P. 139**  
Audio/video  
Sockets



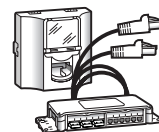
**P. 89**  
LCS², cat. 6<sub>A</sub>  
cables, cords and  
zone distribution boxes



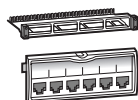
**P. 91**  
LCS² cat. 6<sub>A</sub>  
RJ 45 sockets



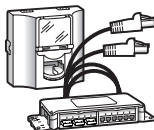
**P. 92**  
LCS², cat. 6 patch  
panels and  
connector units



**P. 93**  
LCS², cat. 6 cables,  
cords, zone distribution  
boxes and cooper  
feedthroughs



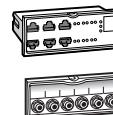
**P. 98**  
LCS², cat. 5e  
patch panels  
and connector units



**P. 99**  
LCS², cat. 5e cables,  
cords, zone distribution  
boxes and cooper  
feedthroughs



**P. 101**  
LCS², cat. 5e  
RJ 45 sockets



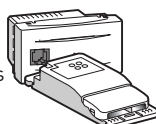
**P. 102**  
LCS²: panels, connector  
units, switches, PoE, etc.



**P. 103**  
LCS², system  
installation  
accessories



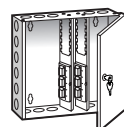
**P. 104**  
Telephone,  
panels units, cables  
and data sockets



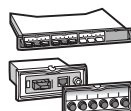
**P. 105**  
Switches and Wi-Fi  
access points  
Mosaic and Arteor



**P. 107**  
LCS², Tool case  
fibre optic connectors  
and pigtails



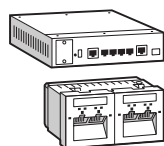
**P. 108**  
LCS², 19" fibre optic  
drawers



**P. 108**  
LCS², fibre optic  
drawers, converters  
and cassettes



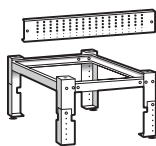
**P. 109**  
LCS², 19" high density  
fibre optic drawer



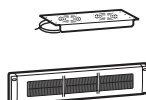
**P. 111**  
LCS², fibre optic  
FTTO



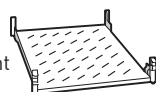
**P. 112**  
LCS²,  
fibre optic  
patch  
cords



**P. 116**  
Plinths, adjustable  
height plinths



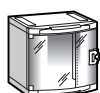
**P. 117**  
LCS², cable entries,  
thermal management  
and wiring



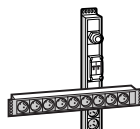
**P. 118**  
LCS²,  
19" equipment



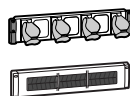
**P. 119**  
19" racks



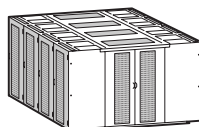
**P. 121**  
LCS²,  
10" wall-mounting  
cabinets



**P. 122**  
Power Distribution  
Units and DIN rail  
kit



**P. 127**  
Equipment for  
Varicon-L, 19"  
server cabinets



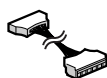
**P. 128**  
Varicondition Cold  
Corridor® and  
Varicondition H<sub>2</sub>O



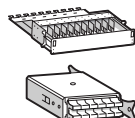
**P. 130**  
Smart PDU



**P. 131**  
Metered PDU



**P. 134**  
Copper and fibre



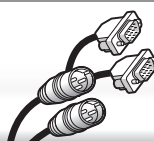
**P. 135**  
LCS², 19" high density  
fibre optic drawer



**P. 137**  
Cables and cords OM4



**P. 141**  
Audio/video  
Patch panel



**P. 141**  
Audio/video  
Cords and cables

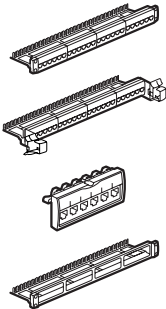
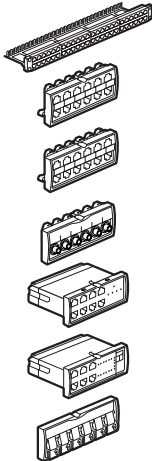
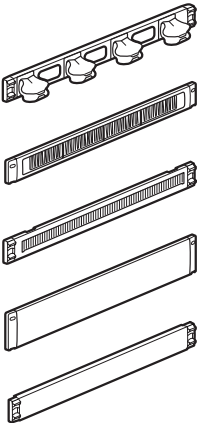
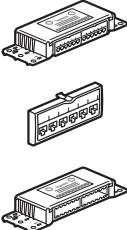


**P. 142**  
Audio/video  
Kits

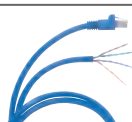


## Selection chart for equipment and cabinets

configure your LCS<sup>2</sup> system

LCS² PANELS AND CONNECTOR UNITS (see p. 89, 92, 98)			LCS² cat. 6 <sub>A</sub>	LCS² cat. 6	LCS² cat.5e
	Patch panels 1U Fitted with 24 connectors	STP	Quick-fixing 0 335 73	Quick-fixing 0 335 63	-
		FTP	-	Quick-fixing 0 335 62	0 335 52
	High density patch panels	STP	0 335 86	-	-
		FTP	-	0 335 68	-
		UTP	-	0 335 67	-
	Units of 6 x RJ 45 connectors	STP	0 335 76	0 335 66	-
		FTP	-	0 335 65	0 335 55
	Blanking plate		0 335 91	0 335 91	0 335 91
Patch panel 1 U To be fitted with 4 units		Quick-fixing 0 335 90	Quick-fixing 0 335 90	0 335 90	
ADDITIONAL LCS² PANELS AND UNITS (see p. 102)					
			LCS²		
	Telephone panels 1 U Fitted with 4 units of 12 ports	3-6/4-5 contacts (digital)	Quick-fixing	0 335 31	
		4-5/7-8 contacts (analogue)		0 335 30	
	Telephone units Fitted with 12 ports	3-6/4-5 contacts (digital)	0 335 33		
		4-5/7-8 contacts (analogue)	0 335 32		
	Doubler units	Ethernet/Ethernet FTP	0 335 39		
		Telephone/Ethernet FTP	0 335 37		
		Telephone/telephone	0 335 35		
	Video streaming unit	6 x "F" connectors	0 335 34		
	Switch units	7 x RJ 45 ports	0 335 02		
		6 x RJ 45 ports + 1 LC type optic port	0 335 05		
Power over Ethernet (PoE) injector	4 ports	0 335 01			
Controlled access units		0 334 71/72/73/74/75			
LCS² 19" FEEDTHROUGH PANELS AND BLANKING PLATES (see p. 118)					
	Metal, 2 axes	1 U	Quick-fixing	0 465 22	
		2 U		0 465 23	
	Plastic with brushes, snap on	1 U	0 465 28		
		2 U	0 465 29		
	Metal with brushes	1 U	Quick-fixing	0 465 30	
		2 U		0 465 31	
	Plastic blanking plate, snap on	1 U	0 465 32		
		2 U	0 465 33		
	Metal blanking plate	1 U	Quick-fixing	0 465 38	
		2 U		0 465 39	
3 U		0 465 40			
LCS² ZONE DISTRIBUTION BOXES (see p. 90, 94, 100)			LCS² cat. 6 <sub>A</sub>	LCS² cat. 6	LCS² cat.5e
	Zone distribution box Equipped with 12 x RJ 45 connectors	STP	0 335 49	0 335 46	-
		FTP	-	0 335 45	-
		UTP	-	0 335 44	-
	Units of 6 x RJ 45 connectors	STP	-	0 335 66	-
		FTP	-	0 335 65	0 335 55
		UTP	0 335 77	0 335 64	0 335 54
	Fibre optic accessory		-	0 335 20	0 335 20
	Zone distribution box - To be fitted with 4 units		-	0 335 40	0 335 40



















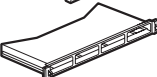
Cords specifically for zone distribution boxes  
see p. 90, 94, 100








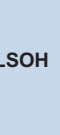

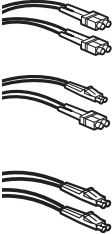
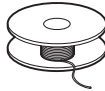
## Selection chart for equipment and cabinets

configure your LCS<sup>2</sup> system (continued)

PLAIN MOSAIC RJ 45 SOCKETS (see p. 91, 96, 101)				LCS² cat. 6 <sub>A</sub>	LCS² cat. 6	LCS² cat.5e
	1 module	STP		0 765 73	0 765 63	-
		FTP		-	0 765 62	-
UTP		0 765 71	0 765 61	0 765 51		
	2 modules	STP		0 765 76	0 765 66	-
		FTP		-	0 765 65	-
		UTP		0 765 74	0 765 64	0 765 54
	2 x 45° modules	STP		0 765 08	0 765 07	0 765 01
		FTP		-	0 765 05	-
		UTP		0 765 09	0 765 03	0 765 01
	90° sockets	STP		-	0 765 93	-
		FTP		-	0 765 92	-
		UTP		-	0 765 91	-
	Antimicrobial	STP		0 765 84	0 765 83	-
		FTP		-	0 765 82	-
		UTP		-	0 765 81	-
	With controlled access	STP		0 765 99	0 765 96	-
		FTP		-	0 765 95	-
		UTP		0 765 90	0 765 94	0 765 97
	Green shutter	STP		0 765 24	-	-
		FTP		-	0 765 22	-
	Orange shutter	STP		0 765 25	-	-
		FTP		-	0 765 23	-
	2 x RJ 45 sockets	FTP		-	0 765 46	-
		UTP		-	0 765 44	0 765 41
	Copper feedthroughs	STP		0 786 28	-	-
		FTP		-	0 786 23	-
		UTP		-	0 786 22	0 786 20
	Doubler sockets	Ethernet/Ethernet	FTP	0 765 39	0 765 39	-
			UTP	0 765 38	0 765 38	0 765 38
		Telephone/Ethernet	FTP	0 765 37	0 765 37	-
			UTP	0 765 36	0 765 36	0 765 36
		Telephone/telephone		0 765 35	0 765 35	0 765 35
WI-FI ACCESS POINTS (see p. 105)						
	Wall-mounted manageable Wi-Fi access points	With RJ 45 socket, dual-band and dual-radio		0 779 14	0 779 14	0 779 14
		Dual-band and dual-radio		0 779 13	0 779 13	0 779 13
	Manageable Wi-Fi access point (false ceiling)			0 335 21	0 335 21	0 335 21
	Manageable Wi-Fi access point (surface-mounted)			0 335 22	0 335 22	0 335 22
	Centralised configuration software			0 335 24	0 335 24	0 335 24
	PoE injector	4 inputs/4 outputs		0 335 01	0 335 01	0 335 01
		1 input/1 output		0 327 37	0 327 37	0 327 37
FIBRE OPTIC EQUIPMENT (see p. 108)				Singlemode		Multimode
	LC units	For 6 fibres		0 335 13		0 335 18
		High density - For 12 fibres		-		0 335 19
	SC units	For 6 fibres		0 335 12		0 335 17
	ST unit	For 6 fibres		-		0 335 16
	Copper/fibre optic converters	10/100 base T to 10/100 base SX		-		0 335 06
		1000 base T to 1000 base SX/LX		-		0 335 07
	Switch units	6 x RJ 45 ports + 1 LC type optic port		0 335 05		
	Fibre optic racks 1 U - For 4 fibre optic units			0 335 10		
	Fibre optic cassettes for patch panel			0 335 11		

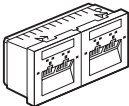

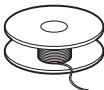
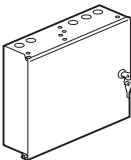
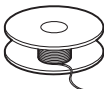
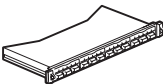
# Selection chart for equipment and cabinets

configure your LCS<sup>2</sup> system (continued)

RJ 45 PATCH CORDS AND USER CORDS (see p. 89, 93, 99)						LCS² cat. 6 <sub>A</sub>	LCS² cat. 6	LCS² cat. 5e		
		S/FTP	Impedance 100 ohms	1 m		0 517 80	0 517 52	-		
				2 m		0 517 81	0 517 53	-		
				3 m		0 517 82	0 517 54	-		
				5 m		0 517 83	0 517 55	-		
		F/UTP	Impedance 100 ohms	1 m		-	0 517 62	0 516 40		
				2 m		-	0 517 63	0 516 41		
				3 m		-	0 517 64	0 516 42		
				5 m		-	0 517 65	0 516 43		
		U/UTP	Impedance 100 ohms	1 m		0 518 82	0 517 72	-		
				2 m		0 518 83	0 517 73	-		
				3 m		0 518 84	0 517 74	-		
				5 m		0 518 85	0 517 75	-		
		S/FTP	Impedance 100 ohms	1 m	RAL 3020	0 518 70	-	-		
					RAL 6026	0 518 66	-	-		
				2 m	RAL 3020	0 518 71	-	-		
					RAL 6026	0 518 67	-	-		
				3 m	RAL 3020	0 518 72	-	-		
					RAL 6026	0 518 68	-	-		
				5 m	RAL 3020	0 518 73	-	-		
					RAL 6026	0 518 69	-	-		
				F/UTP	Impedance 100 ohms	1 m	RAL 3020	-	0 518 54	-
							RAL 6026	-	0 518 50	-
						2 m	RAL 3020	-	0 518 55	-
							RAL 6026	-	0 518 51	-
		3 m	RAL 3020			-	0 518 56	-		
			RAL 6026			-	0 518 52	-		
		U/UTP	Impedance 100 ohms	5 m	RAL 3020	-	0 518 57	-		
					RAL 6026	-	0 518 53	-		
				1 m	RAL 3020	0 518 78	0 518 62	-		
					RAL 6026	0 518 74	0 518 58	-		
				2 m	RAL 3020	0 518 79	0 518 63	-		
					RAL 6026	0 518 75	0 518 59	-		
				3 m	RAL 3020	0 518 80	0 518 64	-		
					RAL 6026	0 518 76	0 518 60	-		
		5 m	RAL 3020	0 518 81	0 518 65	-				
			RAL 6026	0 518 77	0 518 61	-				
COPPER CABLES (305 OR 500 M REELS) (see p. 89, 93, 99)										
	S/FTP	4 pairs	500 m	0 327 77	-	-				
	SF/UTP	4 pairs	500 m	-	0 327 57	-				
		2 x 4 pairs	500 m	-	0 328 59	-				
		305 m	-	0 328 56	0 327 52					
	F/UTP	4 pairs	500 m	0 327 78	0 327 56	0 328 50				
		2 x 4 pairs	500 m	0 328 78	0 327 76	0 327 74				
		305 m	-	0 327 54	0 327 50					
	U/UTP	4 pairs	500 m	-	0 328 61	0 328 53				
		2 x 4 pairs	500 m	-	0 328 63	0 328 55				
		FIBRE OPTIC PATCH CORDS (see p. 112)					OS1/OS2 (UPC) singlemode 9/125 µm	OM4 multimode 50/125 µm	OM3 multimode 50/125 µm	
	SC/SC duplex cords	1 m	0 326 00	0 326 30	0 326 09					
		2 m	0 326 01	0 326 31	0 326 10					
		3 m	0 326 02	0 326 32	0 326 11					
	SC/LC duplex cords	1 m	0 326 03	-	0 326 12					
		2 m	0 326 04	-	0 326 13					
		3 m	0 326 05	-	0 326 14					
	LC/LC duplex cords	0.5 m	0 326 28	0 326 33	-					
		1 m	0 326 06	0 326 34	0 326 15					
		2 m	0 326 07	0 326 35	0 326 16					
		3 m	0 326 08	0 326 36	0 326 17					
		5 m	0 326 29	0 326 37	-					
		OPTICAL CABLES (REEL) (see p. 106)								
			Indoor/Outdoor	6 fibres		0 325 12	0 326 65/66	0 325 10		
				12 fibres	Loose tube	0 325 14	-	-		
	Tight buffer				0 325 50	0 326 67	0 325 11			
24 fibres	Loose tube			0 325 51	-	0 325 53				
	Tight buffer			-	0 326 68	0 325 52				
Outdoor, reinforced steel, anti-rodent	6 fibres			0 325 13	-	-				
	12 fibres		0 325 15	-	-					

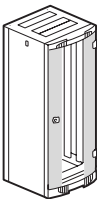
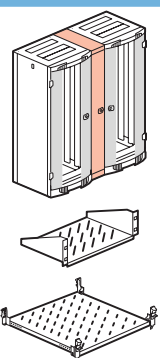
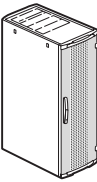
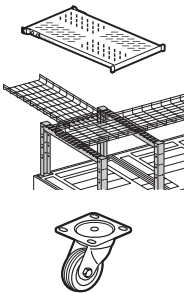
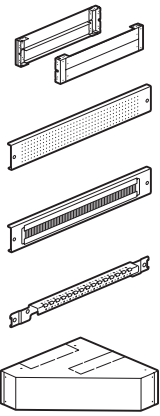
## Selection chart for equipment and cabinets

for FTT0 infrastructure

EQUIPMENT FOR INDIVIDUAL WORKSTATIONS			EQUIPMENT FOR SHARED WORKSTATIONS			
  	RJ 45 socket, cat. 6 - FTP - 2 modules		0 765 65	Fibre optic/copper converter switch		0 779 05
	Cat. 6 cords - RJ 45/stripped - F/UTP	Length 8 m	0 517 96	Power supply for fibre optic/copper switch		0 779 06
		Length 15 m	0 517 97	OM3 multimode optical cord 50/125 µm - SC/LC	3 m	0 326 14
	Active zone box		0 326 80		SC/LC > 3 m	consult our customised offer
	False ceiling support for active zone box		0 326 81	Ready-assembled zone distribution box		0 335 43
	Raised access floor support for active zone box		0 326 82			
ZONE BOX <=> FLOOR DISTRIBUTOR LINK						
	Fast-connection connector 50 µm OM3/OM4 900 µm - LC/UPC		0 326 58	Fast-connection connector 50 µm OM3/OM4 900 µm - SC/UPC		0 326 57
	Pigtail 10 Gb - OM3 - 50/125 µm - LC		0 326 23	Pigtail 10 Gb - OM3 - 50/125 µm - SC		0 326 22
	OM3 multimode fibre optic cable 50/125 µm - 6 fibres				0 325 10	
EQUIPMENT FOR FLOOR DISTRIBUTOR						
	Modular cabinet					0 462 90
	Fibre optic floor distributor cabinet - ready-assembled					0 462 91
	Fast-connection connector - 50 µm OM3/OM4 900 µm - SC/UPC					0 326 57 x 2
	Pigtail 10 Gb - OM3 - 50/125 µm - SC					0 326 22 x 2
FLOOR DISTRIBUTOR <=> BUILDING DISTRIBUTOR LINK						
	Pigtail 10 Gb - SC (for input) - OM3 - 50/125 µm - SC (incoming)					0 326 22
	OM3 multimode fibre optic cable 50/125 µm - 24 fibres					0 325 52
	Pigtail 10 Gb - SC (for output) - OM3 - 50/125 µm - SC (outgoing)					0 326 22
EQUIPMENT IN THE GENERAL BUILDING DISTRIBUTOR						
	19'' fibre optic drawer - equipped with SC units					0 335 09
	Fast-connection connector - 50 µm OM3/OM4 900 µm - SC/UPC					0 326 57
	Pigtail 10 Gb - OM3 - 50/125 µm - SC					0 326 22

## Selection chart for equipment and cabinets


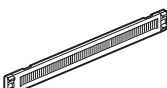
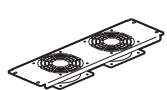
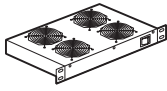
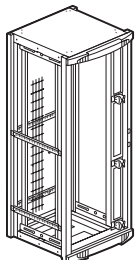
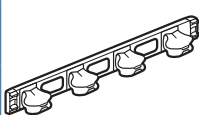
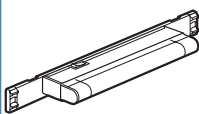
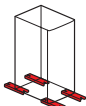
configure your LCS<sup>2</sup> system

LCS <sup>2</sup> 19" CABINETS (see p. 114)				Depth 600 mm	Depth 800 mm	Depth 1000 mm
	Single front door	24 U	Width 600 mm	0 463 00	-	-
		29 U	Width 600 mm	0 463 06	-	-
		33 U	Width 600 mm	0 463 12	-	-
		42 U	Width 600 mm	0 463 18	0 463 19	-
			Width 800 mm	0 463 21	0 463 22	0 463 23
		42 U extension <sup>(1)</sup>	Width 600 mm	0 463 30	-	-
			Width 800 mm	-	0 463 33	-
	Double front door	47 U	Width 800 mm	-	0 463 28	0 463 29
	42 U	Width 800 mm	0 463 41	0 463 42	0 463 43	
EQUIPMENT FOR LCS <sup>2</sup> 19" CABINETS (see p. 114, 118)				For cabinet depth 600 mm	For cabinet depth 800 mm	For cabinet depth 1000 mm
	Cabling unit for 42 U cabinet			0 463 34	0 463 35	-
	Direct baying kit			0 463 37	0 463 38	0 463 39
	Fixed shelf Projecting fixing on 2 x 19" uprights, 2 U	Depth 115 mm		0 465 00	0 465 00	0 465 00
		Depth 200 mm		0 465 01	0 465 01	0 465 01
		Depth 360 mm		0 465 02	0 465 02	0 465 02
	Fixed shelf Fixing on 4 x 19" uprights	50 kg max., 1 U		0 465 05	0 465 06	0 465 07
		100 kg max., 1 U		-	-	0 465 17
	Telescopic shelf, fixing on 4 x 19" uprights, 1 U			0 465 08	0 465 09	0 465 10
	Set of 2 fixed runners			0 465 11	0 465 12	0 465 13
LCS <sup>2</sup> 19" SERVER CABINETS (see p. 114)				Depth 1000 mm		
	42 U	Width 600 mm		0 463 85		
		Width 800 mm		0 463 86		
EQUIPMENT FOR LCS <sup>2</sup> 19" SERVER CABINETS (see p. 114, 118)				For cabinet depth 1000 mm		
	Baying kit			0 463 39		
	Fixed shelf Projecting fixing on 2 x 19" uprights, 2 U	Depth 115 mm		0 465 00		
		Depth 200 mm		0 465 01		
		Depth 360 mm		0 465 02		
	Fixed shelf Fixing on 4 x 19" uprights	50 kg max., 1 U		0 465 07		
		100 kg max., 1 U		0 465 17		
	Telescopic shelf Fixing on 4 x 19" uprights	50 kg max., 1 U		0 465 10		
		100 kg max., 2 U		0 465 18		
	Set of 2 fixed sliders			0 465 13		
	Cable guide support			0 464 79 (+ 0 464 78)		
	Set of 4 casters, 500 kg max.			0 464 82		
PLINTH FOR LCS <sup>2</sup> 19" CABINETS AND SERVER CABINETS (see p. 116)						
	Plinth kit, height 100 mm	For cabinet width 600 mm		0 464 50		
		For cabinet width 800 mm		0 464 51		
	Plinth kit, height 200 mm	For cabinet width 600 mm		0 464 52		
		For cabinet width 800 mm		0 464 53		
	Set of 2 solid side traps	For cabinet depth 600 mm		0 464 54 <sup>(2)</sup>		
		For cabinet depth 800 mm		0 464 56 <sup>(2)</sup>		
		For cabinet depth 1000 mm		0 464 58 <sup>(2)</sup>		
	Ventilated trap, height 100 mm	For cabinet width/depth 600 mm		0 464 60		
		For cabinet width/depth 800 mm		0 464 61		
	Trap with brushes, height 100 mm	For cabinet width/depth 600 mm		0 464 62		
		For cabinet width/depth 800 mm		0 464 63		
	Cross bar	For cabinet depth 600 mm		0 476 93		
		For cabinet depth 800 mm		0 476 94		
		For cabinet depth 1000 mm		0 476 95		
Linking interface		For cabinet depth 600 mm		0 464 66		
Plinth for cabling unit, trap height 100 mm				0 464 64 <sup>(2)</sup>		

1: Cabinets with no side panels supplied with baying kit - 2: Double the number of traps for a height of 200 mm

## Selection chart for equipment and cabinets

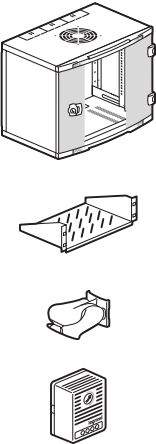
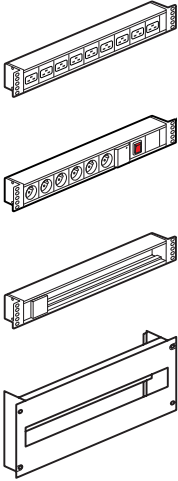
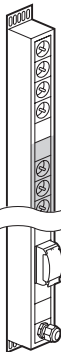
configure your LCS<sup>2</sup> system (continued)

CABLE ENTRIES FOR LCS² 19" CABINETS AND SERVER CABINETS (see p. 117)			
 	Plastic plate with brushes, snap on	1 U	0 465 28
		2 U	0 465 29
	Metal plate with brushes	1 U	0 465 30
		2 U	0 465 31
THERMAL MANAGEMENT FOR LCS² 19" CABINETS AND SERVER CABINETS (see p. 117)			
 	19" 3 U plate with 230 V ~ fans	2 fans	0 464 87
		3 fans	0 464 88
	1 U ventilation drawer	2 fans, depth 150 mm	0 464 89
		4 fans, depth 300 mm	0 464 90
	Thermostat	Adjustable from 5 to 60°C	0 348 48
CABLE MANAGEMENT FOR LCS² 19" CABINETS AND SERVER CABINETS (see p. 117, 118)			
 	Set of 3 cable management supports	For cabinet width/depth 600 mm	0 464 72
		For cabinet width/depth 800 mm	0 464 73
		For cabinet depth 1000 mm	0 464 74
	Flat cable guide	For 33 U cabinet	0 464 76
		For 42 U cabinet	0 464 77
	U-shaped cable guide, 3 m	Width 200 mm	0 464 69
		Width 400 mm	0 464 70
	Vertical cable management grille	For 42 U cabinet, width 800 mm	0 331 35
	Vertical cable manager	For 42 U cabinet, width 800 mm	0 464 80
	Patch extension	For 42 U cabinet, width 800 mm	0 464 81
	19" management panels, 2 axes	1 U	0 465 22
2 U		0 465 23	
ACCESSORIES FOR LCS² 19" CABINETS AND SERVER CABINETS (see p. 117, 118)			
 	Accessories	230 V~ lighting kit, 1 U	0 464 85
		Anti-tilt kit	0 464 84
		Floor fixing kit	0 464 86
		Set of 4 casters - 380 kg max.	0 464 83
	Vertical PDU supports	For 42 U cabinets	0 465 75
		For 47 U cabinets	0 465 76



# Selection chart for equipment and cabinets

configure your LCS<sup>2</sup> system (continued)

LCS² 19" FREESTANDING CABINETS AND EQUIPMENT (see p. 120)				FIXED		PIVOTING
				Depth 400 mm	Depth 580 mm	Depth 600 mm
	6 U	Height 350 mm x width 600 mm	0 462 00	-	-	
	9 U	Height 500 mm x width 600 mm	0 462 01	0 462 06	0 462 11	
	12 U	Height 600 mm x width 600 mm	0 462 02	0 462 07	0 462 12	
	16 U	Height 800 mm x width 600 mm	0 462 03	0 462 08	0 462 13	
	21 U	Height 1000 mm x width 600 mm	-	0 462 09	0 462 14	
	Fixed shelves	Depth 115 mm	0 465 00	0 465 00	0 465 00	
		Depth 200 mm	0 465 01	0 465 01	0 465 01	
		Depth 360 mm	-	0 465 02	0 465 02	
	Equipment	Cable entry plate with brush	-	-	0 462 55	
		Cable management ring	0 465 41 <sup>(1)</sup>	0 465 41/42	-	
		230 V ~ fan	0 462 60	0 462 60	0 462 60	
		Thermostat	0 348 48	0 348 48	0 348 48	
Set of 4 casters		-	-	0 462 64		
19" POWER DISTRIBUTION UNITS (PDUs) (see p. 122, 123)						
	PDU 2P+E	9 x 2P+E sockets	French standard	0 465 50		
			German standard	0 465 60		
		12 x C13 sockets	0 465 51			
		9 x C19 sockets	0 465 52			
		6 x 2P+E sockets	French standard	0 465 54		
			German standard	0 465 62		
		6 x 2P+E sockets Switch with indicator	French standard	0 332 88		
		6 x 2P+E sockets Circuit breaker	French standard	0 332 37		
			German standard	0 332 38		
		6 x 2P+E sockets Tamperproof (UPS)	French standard	0 332 87		
	5 x 2P+E sockets	British standard	6 339 00			
	6 x 2P+E sockets	British standard	0 465 65			
	PDU with surge protector	6 x 2P+E sockets French standard	0 332 78			
	PDU to be equipped	Takes 16 Mosaic modules	0 332 79			
Multiapplication 19" rail DIN kit	Rail DIN kit with front cover	0 465 46				
	Rear cover	0 465 47				
VERTICAL POWER DISTRIBUTION UNITS (PDUs) (see p. 122)						
	PDU 2P+E	24 x 2P+E sockets	French standard	0 465 80 <sup>(2)</sup>		
			German standard	0 465 88 <sup>(2)</sup>		
			British standard	0 465 89 <sup>(2)</sup>		
		24 x C13 sockets	0 465 81 <sup>(2)</sup>			
		16 x C13 + 6 x C19 sockets Cord with IEC 60309 plug - 16 A	0 465 84 <sup>(2)</sup>			
24 x C13 + 3 x C19 sockets Cord with IEC 60309 plug - 32 A 3-phase supply	0 465 85 <sup>(2)</sup>					

1. Except for 6 U cabinet

2: Mounting in LCS<sup>2</sup> cabling and server cabinet with mounting bracket Cat.Nos 0 465 75/76. Mounting in Varicon-L server cabinet with 2 mounting brackets Cat.Nos 6 466 55/57

Smart and metered PDUs  
See p. 130, 131

LCS<sup>2</sup> 10" wall-mounting  
See p. 121



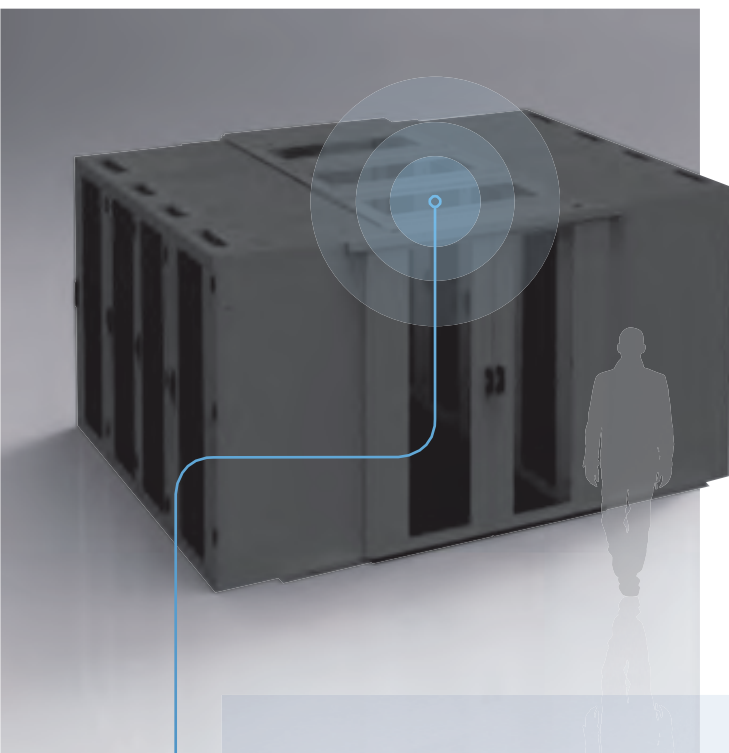
## Selection chart for panels and cords for audio/video applications

ASSEMBLED PANELS, AUDIO/VIDEO APPLICATIONS (see p. 141)		
	19" panel equipped with HD 15 units	0 335 98
	19" panel equipped with HDMI units	0 335 97
	19" panel equipped with XLR units	0 335 96
	19" panel equipped with 9-way SUB-D units	0 335 99
CORDS FOR AUDIO/VIDEO APPLICATIONS (see p. 141)		
	HD 15 cord - 10 m	0 517 23
	HD 15 cord + 3.5 mm jack - 2 m	0 517 22
	HDMI 1.4 cord - 10 m <span>April 2014</span>	0 517 20
	HDMI 1.4 cord - 5 m <span>April 2014</span>	0 517 27
	HDMI 1.4 cord - 1.5 m <span>April 2014</span>	0 517 26
	XLR cord - 10 m	0 517 24
	9-way SUB-D cord - 10 m	0 517 25
CABLES FOR AUDIO/VIDEO APPLICATIONS (see p. 141)		
	VGA cable - 20 m	0 327 81
	HDMI cable - 20 m	0 327 80



# Performance and reliability at the heart of the server room

Legrand is innovative and offers complete solutions to provide continuity of service and optimise the energy performance of your Data Center and server rooms.



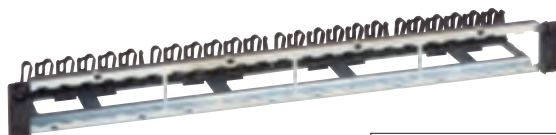
## DEDICATED SOLUTIONS SUCH AS:

- Varicon-L 19" server cabinets
- High density fibre optic drawer
- Metered and smart PDU...

Please refer to pages 126 to 131  
for more information



0 335 73



0 335 90



0 335 76


Connector cat. 6<sub>A</sub>  
shielded STP

Pack	Cat.Nos	Patch panel cat. 6 <sub>A</sub> 24 x RJ 45 connectors
		Panel supplied with quick-fixing system Universal mounting for all freestanding or wall-mounted cabinets Panel ensures automatic earthing of each connector Fitted with rear cable guide to hold cables during maintenance Fitted with 4 units of 6 x LCS <sup>2</sup> RJ 45 cat. 6 <sub>A</sub> quick-fixing crimp connectors, with wiring schemes T 568 A and T 568 B Supplied with numbered colour labels Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-2 and TIA/EIA 568C 19" panel - 1 U
1	0 335 84	UTP panel - 8 contacts
1	0 335 85	UTP high density panel - 8 contacts
1	0 335 73	STP - metal shielding 360°
1	0 335 86	STP high density panel - 360° metal shielding

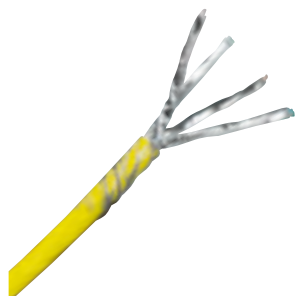
		<b>Modular panel</b>
		Panel supplied with quick-fixing system Universal mounting for all freestanding or wall-mounted cabinets Panel ensures automatic grounding of each connector Fitted with rear cable guide to hold cables during maintenance Modular empty panel for up to 4 units Takes the following equipment: - units of 6 x LCS <sup>2</sup> RJ 45 connectors - telephone inlet units - fibre optic units - PoE injector units - video streaming units - switch units - telephone/Ethernet doubler units - copper/fibre optic converter units - blanking plates 19" panel - 1 U
1	0 335 90	

		<b>Units of 6 x RJ 45 connectors cat. 6<sub>A</sub></b>
		Fitted with 6 x LCS <sup>2</sup> RJ 45 cat. 6 <sub>A</sub> quick-fixing crimp connectors, with wiring schemes T 568 A and T 568 B Supplied with colour labels Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-2 and TIA/EIA 568C
2	0 335 77	UTP unit - 8 contacts
2	0 335 76	STP unit - metal shielding 360°
10	0 335 91	Blanking plate for 19" panel - Black

## Legrand cabling system LCS<sup>2</sup> category 6<sub>A</sub> - cables



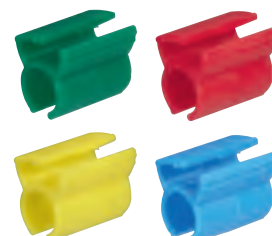
## Legrand cabling system LCS<sup>2</sup> category 6<sub>A</sub> - cords



0 327 77



0 517 82



0 518 90

Pack	Cat.Nos	Cables for cat. 6 <sub>A</sub> LANs
		Cables with 4 pairs or 2 x 4 twisted pairs 100 ohms LSZH sleeve: no halogen Yellow RAL 1018 Colour code TIA/EIA Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568C Performance 500 MHz
500 <sup>1</sup>	0 327 87	<b>LSZH</b> <b>U/UTP - 4 pairs</b> Performance 500 MHz Length 500 m Supplied on reel Weight 25 kg
500 <sup>1</sup>	0 327 78	<b>F/UTP - 4 pairs</b> Performance 500 MHz Length 500 m Supplied on reel Weight 25 kg
500 <sup>1</sup>	0 328 78	<b>F/UTP - 2x4 pairs</b> Performance 500 MHz Length 500 m Supplied on reel Weight 65 kg
500 <sup>1</sup>	0 327 77	<b>S/FTP - 4 pairs</b> Performance 600 MHz Length 500 m Supplied on reel Weight 30 kg

1: in metre(s)

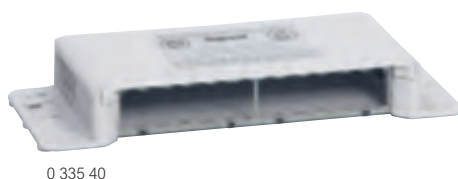
Pack	Cat.Nos	RJ 45 cat. 6 <sub>A</sub> patch cords and user cords
		RJ 45 - RJ 45 right Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568C
		<b>PVC</b> <b>U/UTP unscreened impedance 100 Ω</b>
5	0 518 82	Length 1 m
5	0 518 83	Length 2 m
5	0 518 84	Length 3 m
5	0 518 85	Length 5 m
		<b>LSZH</b>
5	0 518 78	Length 1 m
5	0 518 79	Length 2 m
5	0 518 80	Length 3 m
5	0 518 81	Length 5 m
5	0 518 74	Length 1 m
5	0 518 75	Length 2 m
5	0 518 76	Length 3 m
5	0 518 77	Length 5 m
		<b>PVC</b> <b>S/FTP shielded impedance 100 Ω</b>
5	0 517 80	Length 1 m
5	0 517 81	Length 2 m
5	0 517 82	Length 3 m
5	0 517 83	Length 5 m
		<b>LSZH</b>
5	0 518 70	Length 1 m
5	0 518 71	Length 2 m
5	0 518 72	Length 3 m
5	0 518 73	Length 5 m
5	0 518 66	Length 1 m
5	0 518 67	Length 2 m
5	0 518 68	Length 3 m
5	0 518 69	Length 5 m
1	0 518 90	<b>Kit for identification</b> Kit of 200 coloured rings (red, green, yellow and blue) for identifying RJ 45 cords Snap onto patch cords

# Legrand cabling system LCS<sup>2</sup> category 6<sub>A</sub>

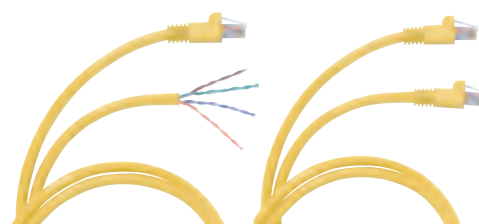
zone distribution boxes and cords specifically for zone distribution boxes



0 335 49



0 335 40



0 517 86

0 515 23

Pack	Cat.Nos	Zone distribution boxes
		<p>For ELV distribution in a zone Fitted with 2 units of 6 x cat. 6<sub>A</sub> RJ 45 LCS<sup>2</sup> connectors and adaptability of the installation</p> <p>Installed on false ceiling or false floor</p> <p>Connect to the patch panel or the floor cabinet</p> <p>Connection to workstation for RJ 45 cords</p> <p>Can take switch Cat.No 0 335 02 or PoE injector</p> <p>Cat.No 0 335 01 or 6-connector units Cat.No 0 335 76</p> <p>Conform to standards UTE C 15-900, NF C 15-100, NF C 20-730, EN 50-174.2, CEI 60950,</p> <p>ISO/IEC 11801 Ed. 2.0, EN 50173-2 and TIA/EIA 568</p> <p>Colour code TIA/EIA 568 A and C</p> <p>Cords and cables: ISO 11801 Ed.2.0, EN 50173-1, TIA/EIA 568</p> <p>Technical characteristics:</p> <ul style="list-style-type: none"> <li>- polycarbonate PC hood</li> <li>- polypropylene PP base</li> <li>- RAL 7035</li> <li>- hold connector units in place in the box: 100 N</li> <li>- cables anchored on support using Colring cable ties</li> </ul> <p><b>Cat. 6<sub>A</sub> zone distribution boxes</b></p> <p>Fitted with 2 units of 6 x LCS<sup>2</sup> connectors</p> <p>RJ 45 cat. 6<sub>A</sub> and RJ 45 blanking plates</p> <p>Supplied with Colring cable ties</p>
2	0 335 49	STP
1	0 335 40	<p><b>Self-assembly zone distribution box</b></p> <p>Used for mounting LCS<sup>2</sup> RJ 45 cat. 6<sub>A</sub> (p. 88), cat. 6 (p. 92) and cat. 5e (p. 98) connector units, fibre optic accessories or blanking plates</p>

Pack	Cat.Nos	Cat. 6 <sub>A</sub> cords - RJ 45/stripped
		<p>RJ 45 - straight stripped</p> <p>Clip into zone distribution boxes and connect to an RJ45 socket LCS<sup>2</sup> connector on the stripped side</p> <p>Cords prepared in factory, "ready for wiring"</p> <p>Conform to standards ISO/IEC 11801 Ed. 2.0 (2011), EN 50173-1 and EIA/TIA 568 C2</p>
4	Yellow RAL 1018 0 517 86	<b>S/FTP screened impedance 100 Ω</b> Length 8 m
4	0 517 87	Length 15 m
4	0 517 88	Length 20 m
		<p><b>Cat. 6<sub>A</sub> cords - RJ 45/RJ 45</b></p> <p>For direct connection via RJ 45 male plug to the zone distribution box and to the RJ 45 socket with copper feedthrough, to ensure:</p> <ul style="list-style-type: none"> <li>- Safe connection</li> <li>- Speed and reliability of connection</li> </ul>
4	Yellow RAL 1018 0 515 23	<b>S/FTP screened impedance 100 Ω</b> Length 8 m
4	0 515 24	Length 15 m
4	0 515 25	Length 20 m



# Legrand cabling system LCS<sup>2</sup> category 6<sub>A</sub>

## RJ 45 sockets



Sockets with LCS<sup>2</sup> quick-fixing crimp connector  
Take AWG 22 single-core cables up to AWG 26 and AWG multicore cables  
Contacts marked with dual colour code and wiring schemes T 568 A and T 568 B  
Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-1 and TIA/EIA 568C

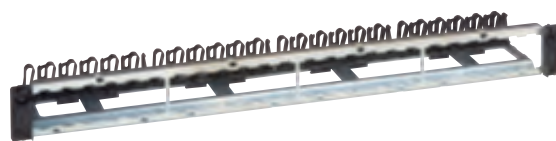
Pack	Cat.Nos	Mosaic RJ 45 sockets cat. 6 <sub>A</sub>	Pack	Cat.Nos	Arteor RJ 45 socket cat. 6 <sub>A</sub>
		<b>STP - 1 module</b> 360° metal shielding			360° metal shielding
10	0 765 73	○ White	10	5 723 06	<b>STP - 1 module</b> ○ White
10	0 794 73	● Aluminium	10	5 728 06	● Magnesium
		<b>STP - 2 modules</b> 360° metal shielding	10	5 723 52	○ White with green shutter
10	0 765 76	○ White	10	5 728 52	● Magnesium with green shutter
10	0 794 76	● Aluminium	10	5 723 51	○ White with orange shutter
		○ White with green shutter	10	5 728 51	● Magnesium with orange shutter
		○ White with orange shutter			<b>STP with controlled access - 2 modules</b> Supplied with 2 keys for 5 sockets
		<b>STP 45° - 2 modules</b> ○ White	5	5 723 50	○ White with red shutter
		<b>STP with controlled access - 2 modules</b> 360° metal shielding Supplied with 2 keys for 5 sockets	5	5 728 50	● Magnesium with red shutter
5	0 765 99	○ White with red shutter			<b>UTP - 1 module</b> ○ White
		<b>UTP - 1 module</b> ○ White	10	5 723 49	● Magnesium
10	0 765 71	● Aluminium	10	5 728 49	○ White with green shutter
10	0 794 71	○ White with green shutter	10	5 723 59	● Magnesium with green shutter
10	0 765 26	○ White with orange shutter	10	5 728 59	○ White with orange shutter
10	0 765 27		10	5 723 58	● Magnesium with orange shutter
		<b>UTP - 2 modules</b> ○ White			<b>UTP with controlled access - 2 modules</b> Supplied with 2 keys for 5 sockets
10	0 765 74	● Aluminium	5	5 723 57	○ White with red shutter
10	0 794 74		5	5 728 57	● Magnesium with red shutter
		<b>UTP with controlled access - 2 modules</b> Supplied with 2 keys for 5 sockets			<b>Celiane RJ 45 socket cat. 6<sub>A</sub></b>
5	0 765 90	○ White with red shutter	10	0 673 46	<b>STP - 360° metal shielding</b> To create a 1-gang socket, combine mechanism Cat.No 0 673 46 and a cover plate Cat.No 0 682 51 (white) or Cat.No 0 685 51 (titanium). To create a 2-gang socket, combine 2 mechanisms Cat.No 0 673 46 and a cover plate Cat.No 0 682 52 (white) or Cat.No 0 685 52 (titanium)
		<b>UTP 45° - 2 modules</b> ○ White	10	0 673 47	<b>UTP</b> To create a 1-gang socket, combine mechanism Cat.No 0 673 46 and a cover plate Cat.No 0 682 51 (white) or Cat.No 0 685 51 (titanium). To create a 2-gang socket, combine 2 mechanisms Cat.No 0 673 46 and a cover plate Cat.No 0 682 52 (white) or Cat.No 0 685 52 (titanium)
		<b>Copper feedthrough sockets</b> Easy connection at the rear through simply inserting a male plug Provides network access for the RJ 45 socket Used to create cat. 6 and cat. 5e links Conforming to standards ISO 11801 Ed.2, EN 50173-1 and EIA/TIA 568 in the context of use with zone distribution boxes Multidirectional cord entry Installation possible in all supports min. depth 40 mm 2 modules			<b>Keystone RJ 45 socket cat. 6<sub>A</sub></b>
		<b>Cat. 6<sub>A</sub> STP</b> ○ White	10	0 331 54	STP socket - metal shielding 360° with quick-fixing crimp connectors
10	0 786 28	● Aluminium	10	0 331 55	UTP socket - metal shielding 360° with quick-fixing crimp connectors
10	0 786 29		20	6 327 79	Surface mounting box 1 or 2 ports For keystone connectors Provides solution for integration of keystone in surface mounting installations

# Legrand cabling system LCS<sup>2</sup> category 6

## patch panels, connector units



0 335 62



0 335 90



0 335 65



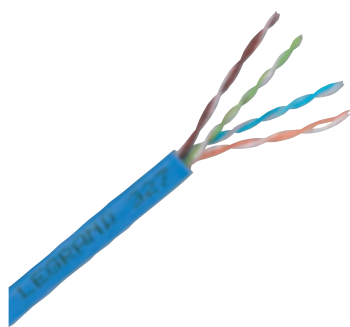
Cat. 6 connector  
STP shielded

Pack	Cat.Nos	Patch panels cat. 6 24 x RJ 45 quick-fixing connectors
		<p>Panels supplied with quick-fixing system Universal mounting for all freestanding or wall-mounted cabinets Panels ensure automatic earthing of each connector Fitted with rear cable guide to hold cables during maintenance Fitted with 4 units of 6 x LCS<sup>2</sup> RJ 45 cat. 6 quick-fixing crimp connectors, with colour code and wiring schemes T 568 A and T 568 B Supplied with numbered colour labels Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-2 and TIA/EIA 568C 19" panel - 1 U</p>
1	0 335 61	UTP panel - 8 contacts
1	0 335 67	UTP high density panel - 8 contacts
1	0 335 62	FTP panel - 9 contacts
1	0 335 68	FTP high density panel - 9 contacts
1	0 335 63	STP panel - metal shielding 360°
		<b>UTP through panel</b> 24 x RJ 45 connectors
1	0 335 89	UTP through panel
		<b>Patch panels cat. 6 24 x RJ 45 connectors, 110 connection</b>
		<p>Panels supplied with screws Universal mounting for all freestanding or wall-mounted cabinets Fitted with 4 units of 6 X RJ 45 cat. 6 connectors, connection with 110 tool, with colour code and wiring schemes T 568 A and T 568 B Supplied with labels numbered from 1 to 24 Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-2 and TIA/EIA 568 19" 1 U panels</p>
1	0 335 82	UTP panel - 8 contacts
1	0 335 83	UTP angle patch panel - 8 contacts Connection with 110 tool

Pack	Cat.Nos	Modular panels
		<p>Panels supplied with quick-fixing system Universal mounting for all freestanding or wall-mounted cabinets Panels ensure automatic earthing of each connector Fitted with rear cable guide to hold cables during maintenance Empty panels to be fitted with 4 units Take the following equipment: - 6 LCS<sup>2</sup> RJ 45 connector units - telephone inlet units - fibre optic units - PoE injector units - video streaming units - switch units - telephone/Ethernet doubler units - copper/fibre optic converter units - blanking plates 19" panel - 1 U</p>
1	0 335 90	
		<b>Units of 6 x RJ 45 connectors cat. 6</b>
		<p>Fitted with 6 x LCS<sup>2</sup> RJ 45 cat. 6 quick-fixing crimp connectors, with colour code and wiring schemes T 568 A and T 568 B Supplied with colour labels Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568</p>
2	0 335 64	UTP unit - 8 contacts
2	0 335 65	FTP unit - 9 contacts
2	0 335 66	STP unit - metal shielding 360°
10	0 335 91	Blanking plate for 19" panel - Black

## Legrand cabling system LCS<sup>2</sup> category 6

### cables



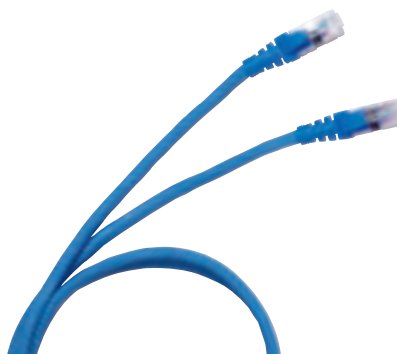
0 327 54

Pack	Cat.Nos	Cables for cat. 6 LANs
		Cables with 4 pairs or 2 x 4 twisted pairs 100 ohms Blue RAL 5015 Colour code TIA/EIA Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568 C
		<b>U/UTP - 4 pairs</b>
305 <sup>1</sup>	LSZH 0 327 54	PVC Length 305 m Supplied in cardboard box Weight 16 kg
500 <sup>1</sup>	0 328 61	Length 500 m Supplied on reel Weight 18 kg
305 <sup>1</sup>	0 327 55	Length 305m Supplied in cardboard box Weight 13 kg
		<b>U/UTP - 2 x 4 pairs</b>
500 <sup>1</sup>	0 328 63	Length 500 m Supplied in cardboard box Weight 38 kg
		<b>F/UTP - 4 pairs</b>
305 <sup>1</sup>	0 328 56	Length 305 m Supplied on reel Weight 17 kg
500 <sup>1</sup>	0 327 56	Length 500 m Supplied on reel Weight 25 kg
		<b>F/UTP - 4 pairs</b>
305 <sup>1</sup>	0 328 57	Length 305 m Supplied in cardboard box Weight 17 kg
		<b>F/UTP - 2 x 4 pairs</b>
50 <sup>1</sup>	0 327 76	Length 500 m Supplied on reel Weight 48 kg
		<b>SF/UTP - 4 pairs</b>
500 <sup>1</sup>	0 327 57	Length 500 m Supplied on reel Weight 29 kg
500 <sup>1</sup>	0 327 59	Length 500 m Supplied on reel Weight 30 kg
		<b>SF/UTP - 2 x 4 pairs</b>
500 <sup>1</sup>	0 328 59	Length 500 m Supplied on reel Weight 52 kg

1: in metre(s)

## Legrand cabling system LCS<sup>2</sup> category 6

### cords

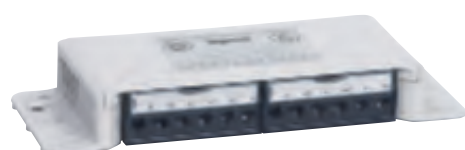


0 517 62

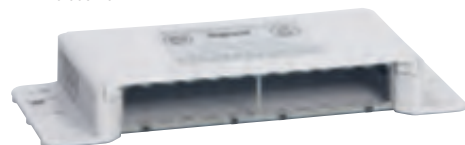
Pack	Cat.Nos	RJ 45 cat. 6 patch cords and user cords
		RJ 45 - RJ 45 right <b>U/UTP unscreened impedance 100 Ω</b>
		PVC
1	0 517 72	Length 1 m
1	0 517 73	Length 2 m
1	0 517 74	Length 3 m
1	0 517 75	Length 5 m
		LSZH
1	0 518 62	0 518 58 Length 1 m
1	0 518 63	0 518 59 Length 2 m
1	0 518 64	0 518 60 Length 3 m
1	0 518 65	0 518 61 Length 5 m
		PVC
1	0 517 62	Length 1 m
1	0 517 63	Length 2 m
1	0 517 64	Length 3 m
5	0 517 65	Length 5 m
		LSZH
1	0 518 54	0 518 50 Length 1 m
1	0 518 55	0 518 51 Length 2 m
1	0 518 56	0 518 52 Length 3 m
1	0 518 57	0 518 53 Length 5 m
		PVC
		<b>SF/UTP shielded impedance 100 Ω</b>
5	0 517 52	Length 1 m
5	0 517 53	Length 2 m
5	0 517 54	Length 3 m
5	0 517 55	Length 5 m
20	6 327 79	Surface mounting box 1 or 2 ports For keystone connectors Provides solution for integration of keystone in surface mounting installations

## Legrand cabling system LCS<sup>2</sup> category 6

### zone distribution boxes



0 335 46



0 335 40



0 335 40 fitted with SC fibre optic unit, accessory  
Cat.No 0 335 20 and a 6 x RJ 45 connector unit

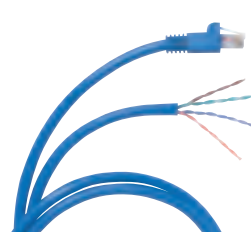


0 335 20 fibre optic  
accessory

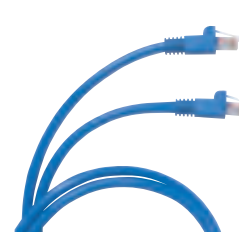
Pack	Cat.Nos	Zone distribution boxes
		<p>For ELV distribution in a zone fitted with 1 to 12 RJ 45 sockets</p> <p>Centralise connections to guarantee flexibility and adaptability of the installation</p> <p>Installed on false ceiling or false floor</p> <p>Connect to the patch panel or the floor cabinet</p> <p>Connection to an RJ 45 socket with stripped cord or to a Mosaic RJ 45 socket with copper feedthrough with an RJ 45/RJ 45 cord</p> <p>IP 21 - IK 07</p> <p>Conform to standards UTE C 15-900, NF C 15-100, NF C 20-730, EN 50-174.2, CEI 60950, ISO/IEC 11801 Ed. 2.0, EN 50173-2 and TIA/EIA 568</p> <p>Colour code TIA/EIA 568 A and C</p> <p>Cords and cables: ISO 11801 Ed.2.0, EN 50173-1, TIA/EIA 568</p> <p>Technical characteristics:</p> <ul style="list-style-type: none"> <li>- polycarbonate PC hood</li> <li>- polypropylene PP base</li> <li>- RAL 7035</li> <li>- hold connector units in place in the box: 100 N</li> <li>- Cables anchored on support using Colring cable ties</li> </ul> <p><b>Zone distribution boxes cat. 6</b></p> <p>Fitted with 2 x 6 LCS<sup>2</sup> connector units</p> <p>RJ 45 cat. 6 and RJ 45 blanking plates</p> <p>Supplied with Colring cable ties</p>
1	0 335 44	UTP
1	0 335 45	FTP
1	0 335 46	STP
1	0 335 40	<b>Self-assembly zone distribution box</b> Used for mounting LCS <sup>2</sup> RJ 45 cat. 6 connector units (p. 92)

## Legrand cabling system LCS<sup>2</sup> category 6

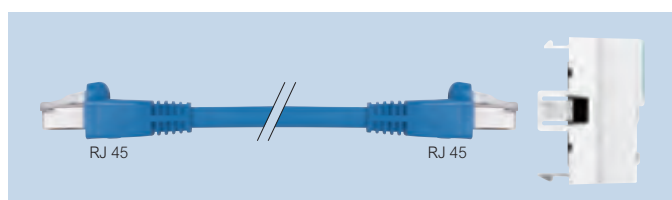
### cords specifically for zone distribution boxes



0 517 57



0 515 13



Connection principle

Pack	Cat.Nos	Cords cat. 6 - RJ 45/stripped AWG 24
		<p>RJ 45 - straight stripped</p> <p>Clip on and off in the zone distribution boxes and connection via LCS<sup>2</sup> connector of an RJ 45 socket by the stripped side</p> <p>Cords prepared in factory, "ready for wiring"</p> <p>Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568</p> <p>Blue RAL 5015</p> <p>Wiring in T 568 B</p> <p><b>U/UTP unscreened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p> <p><b>F/UTP screened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p>
4	0 517 57	
4	0 517 58	
4	0 517 59	
4	0 517 96	
1	0 517 97	
4	0 517 98	
		<p><b>Cords cat. 6 - RJ 45/RJ 45</b></p> <p>For direct connection via RJ 45 male plug to the zone distribution box and to the RJ 45 socket with copper feedthrough to ensure:</p> <ul style="list-style-type: none"> <li>- safe connection</li> <li>- speed and reliability of connection</li> </ul> <p>Blue RAL 5015</p> <p><b>U/UTP unscreened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p> <p><b>F/UTP screened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p>
4	0 515 10	
4	0 515 11	
4	0 515 12	
4	0 515 13	
4	0 515 14	
4	0 515 15	

## Legrand cabling system LCS<sup>2</sup> category 6 feedthrough sockets



0 786 22



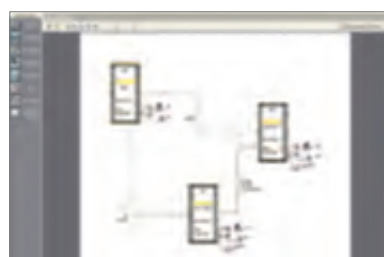
0 786 26

Pack	Cat.Nos	Sockets with copper feedthrough cat. 6
		Easy connection at the rear through simply attaching a male plug Ensures network access for the RJ 45 socket Used to create cat. 6 links According to standards ISO 11801 Ed.2, EN 50173-1 and TIA/EIA 568 within the framework of operation with zone distribution boxes Multidirectional cord entry Installation possible in all supports with min. 40 mm depth 2 modules
10	Mosaic 0 786 22	<b>Cat. 6 UTP Mosaic</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> </ul>
10	0 786 26	
10	0 786 23	<b>Cat. 6 FTP Mosaic</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> </ul>
10	0 786 27	
10	Arteor 5 723 31	<b>Cat. 6 UTP Arteor</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
10	5 728 31	
10	5 723 33	<b>Cat. 6 FTP Arteor</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
10	5 728 33	

## NEW LCS PRO<sup>2</sup> SOFTWARE

### Your LCS<sup>2</sup> cabinet in a few clicks

Select your products and visualise your cabinet simply and quickly with the new LCS Pro2 software... and complete your study with Chantier Chrono software which integrates trunking, columns, floor and feeder boxes



■ LCS Pro<sup>2</sup> allows you to **automatically find** Cat.Nos by selecting characteristics and options



■ LCS Pro<sup>2</sup> lets you **visualise the cabinet installation** and amend it if required



■ LCS Pro<sup>2</sup> allows you to **easily manage your projects**: technical summaries, purchase orders, document printing

In addition to LCS Pro<sup>2</sup>, Chantier Chrono extends the selection to trunking, columns, floor and feeder boxes





# Legrand cabling system LCS<sup>2</sup> category 6

## RJ 45 sockets



Sockets with LCS<sup>2</sup> quick-fixing crimp connector. Take AWG 22 single-core cables up to AWG 26 and AWG 24 multicore cables. Contacts marked with dual colour code and wiring schemes T 568 A and T 568 B. Conforming to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568

Pack	Cat.Nos	Mosaic RJ 45 sockets cat. 6	Pack	Cat.Nos	Mosaic RJ 45 sockets cat. 6 (continued)
10	0 765 61	<b>UTP - 1 module</b>	5	0 765 46	<b>FTP 2 x RJ 45 with quick-fixing accessory - 3 modules</b>
10	0 794 61	○ White	5	0 794 85	For snap-on mounting on trunking with 45 mm cover
10	0 786 06	● Aluminium			○ White
10	0 794 12	○ White, connection with 110 tool			● Black
10	0 765 81	● Aluminium, connection with 110 tool			
		○ White antimicrobial			
10	0 765 64	<b>UTP - 2 modules</b>			<b>FTP with controlled access - 2 modules</b>
10	0 794 64	○ White	5	0 765 95	Supplied with 2 keys for 5 sockets
10	0 786 07	● Aluminium			○ White with red shutter
10	0 794 13	○ White, connection with 110 tool			
		● Aluminium, connection with 110 tool			
		<b>UTP with controlled access - 2 modules</b>			<b>FTP 45° - 2 modules</b>
5	0 765 94	Supplied with 2 keys for 5 sockets	10	0 765 05	○ White
		○ White with red shutter			
		<b>UTP 90° - 2 modules</b>			<b>FTP 2 x RJ 45 45° - 2 modules</b>
10	0 765 91	Vertical snap-on socket for column module	5	0 765 06	○ White
		○ White			
		<b>UTP 45° - 2 modules</b>			<b>FTP retractable RJ 45 sockets - 4 modules</b>
1	0 765 03	○ White	1/10	0 765 33	With integrated retractable cord (0.9 m)
1	0 765 14	○ White, connection with 110 tool	1/10	0 794 33	Winds up automatically with a pushbutton
					○ White
		<b>UTP 45° - 2 x RJ 45 - 2 modules</b>			● Aluminium
1	0 765 04	○ White			
					<b>FTP 90° - 2 modules</b>
		<b>UTP retractable RJ 45 socket - 4 modules</b>	10	0 765 92	Vertical snap-on socket for column module
1	0 765 32	With integrated retractable cord (0.9 m)	10	0 794 92	○ White
		Winds up automatically with a pushbutton			● Aluminium
		○ White			
		<b>UTP - 1 module</b>			<b>Shielded STP - 1 module</b>
5	0 794 81	● Black	10	0 765 63	○ White
			5	0 765 83	○ White antimicrobial
		<b>UTP 2 x RJ 45 with quick-fixing accessory - 3 modules</b>			<b>Shielded STP - 2 modules</b>
5	0 765 44	For snap-on mounting on DLP trunking with 45 mm cover	10	0 765 66	○ White
		○ White			
		<b>FTP - 1 module</b>			<b>STP - 2 modules</b>
10	0 765 62	○ White	5	0 794 86	● Black
10	0 794 62	● Aluminium			
10	0 765 82	○ White antimicrobial			<b>Shielded STP with controlled access - 2 modules</b>
			5	0 765 96	Supplied with 2 keys for 5 sockets
		<b>FTP - 2 modules</b>			○ White with red shutter
10	0 765 65	○ White			
10	0 794 65	● Aluminium			<b>STP 45° - 2 modules</b>
10	0 765 22	○ White with green shutter	10	0 765 07	Vertical snap-on socket for column module
10	0 765 23	○ White with orange shutter			○ White
					<b>Shielded STP 90° - 2 modules</b>
			10	0 765 93	Vertical snap-on socket for column module
					○ White

# Legrand cabling system LCS<sup>2</sup> category 6

## RJ 45 sockets (continued)



0 673 45 + titanium cover plate  
0 685 51



0 778 91



0 695 69



0 904 67

Pack	Cat.Nos	Arteor RJ 45 socket cat. 6
10	5 723 02	<b>UTP - 1 module</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> <li>○ White, connection with 110 tool</li> <li>● Magnesium, connection with 110 tool</li> <li>○ White with orange shutter</li> <li>● Magnesium with orange shutter</li> <li>○ White with green shutter</li> <li>● Magnesium with green shutter</li> </ul>
10	5 728 02	
10	5 723 25	
10	5 728 25	
10	5 723 54	
10	5 728 54	
10	5 723 55	
10	5 728 55	
10	5 723 14	<b>UTP - 2 modules</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> <li>○ White, connection with 110 tool</li> <li>● Magnesium, connection with 110 tool</li> </ul>
10	5 728 14	
10	5 723 26	
10	5 728 26	
10	5 723 24	<b>UTP - 2 modules - round</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
10	5 728 24	
5	5 723 53	<b>UTP with controlled access - 2 modules</b> Supplied with 2 keys for 5 sockets <ul style="list-style-type: none"> <li>○ White with red shutter</li> <li>● Magnesium with red shutter</li> </ul>
5	5 728 53	
1	5 723 39	<b>UTP retractable RJ 45 sockets - 4 modules</b> With integrated retractable cord (0.9 m) Winds up automatically with a pushbutton <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
1	5 728 39	
10	5 723 22	<b>FTP - 1 module</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
10	5 728 22	
10	5 723 16	<b>FTP - 2 modules</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
10	5 728 16	
10	5 723 23	<b>Shielded STP - 1 module</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
10	5 728 23	
10	5 723 17	<b>Shielded STP - 2 modules</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
10	5 728 17	
10	0 673 44	<b>Celiane RJ 45 sockets cat. 6</b> <b>UTP socket</b> To create a 1-gang socket, combine mechanism Cat.No 0 673 44 and a cover plate Cat.No 0 682 51 (white) or Cat.No 0 685 51 (titanium) To create a 2-gang socket, combine 2 mechanisms Cat.No 0 673 44 and a cover plate Cat.No 0 682 52 (white) or Cat.No 0 685 52 (titanium) UTP socket

Mosaic and Arteor sockets with copper feedthrough **p. 91, 95, 100**

Mosaic and Arteor audio/video sockets **p. 139**

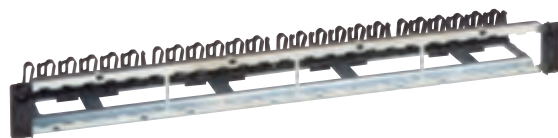
Pack	Cat.Nos	Celiane RJ 45 sockets cat. 6 (continued)
10	0 673 54	<b>UTP retractable RJ 45 socket - 4 modules</b> With integrated retractable cord (0.9 m) Winds up automatically with a pushbutton To create a 1-gang socket, combine mechanism Cat.No 0 673 54 and a cover plate Cat.No 0 682 55 (white) or Cat.No 0 685 55 (titanium) <b>FTP socket</b> To create a 1-gang socket, combine mechanism Cat.No 0 673 45 and a cover plate Cat.No 0 682 51 (white) or Cat.No 0 685 51 (titanium). To create a 2-gang socket, combine 2 mechanisms Cat.No 0 673 45 and a cover plate Cat.No 0 682 52 (white) or Cat.No 0 685 52 (titanium) FTP socket
10	0 673 45	<b>FTP retractable RJ 45 socket - 4 modules</b> With integrated retractable cord (0.9 m) Winds up automatically with a pushbutton To create a 1-gang socket, combine mechanism Cat.No 0 673 55 and a cover plate Cat.No 0 682 55 (white) or Cat.No 0 685 55 (titanium) <b>STP socket</b> To create a 1-gang socket, combine mechanism Cat.No 0 673 96 and a cover plate Cat.No 0 682 51 (white) or Cat.No 0 685 51 (titanium). To create a 2-gang socket, combine 2 mechanisms Cat.No 0 673 46 and a cover plate Cat.No 0 682 52 (white) or Cat.No 0 685 52 (titanium) STP socket
10	0 673 96	
10	0 331 81	<b>Keystone RJ 45 sockets cat. 6</b> UTP socket with fast connection Surface mounting box 1 or 2 ports For keystone connectors Provides solution for integration of keystone in surface mounting installations
20	6 327 79	
10	0 778 91	<b>Soliroc RJ 45 sockets cat. 6 - IK 10</b> IP 20 For at-risk areas or areas with no surveillance FTP socket
5/100	0 695 69	<b>Plexo RJ 45 sockets cat. 6 - IP 55 closed flap IK 07</b> Protection against water, dust. For industrial sites FTP socket <ul style="list-style-type: none"> <li>○ Grey/white</li> </ul> UTP socket <ul style="list-style-type: none"> <li>○ Grey/white</li> </ul> Adaptor for RJ 45 socket Weatherproofing ensured (IP 44) plug inserted <ul style="list-style-type: none"> <li>○ Grey/white</li> </ul>
1/20	0 695 61	
1	0 695 81	
1	0 904 67	<b>Plexo 66 RJ 45 socket cat. 6 - IP 66 - IK 08</b> <b>FTP socket</b> 9 contacts Weatherproofing ensured (IP 66) with plug inserted Inclined 90° <ul style="list-style-type: none"> <li>● Grey RAL 7016/T029</li> </ul>

# Legrand cabling system LCS<sup>2</sup> category 5e

## patch panels, connector units



0 335 52



0 335 90



0 335 55



FTP cat. 5e connector

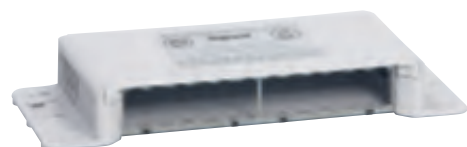
Pack	Cat.Nos	Patch panels cat. 5e 24 x RJ 45 connectors
		<p>Panels supplied with quick-fixing system Universal mounting for all freestanding or wall-mounted cabinets Panels ensure automatic earthing of each connector Fitted with rear cable guide to hold cables during maintenance Fitted with 4 units of 6 x LCS<sup>2</sup> RJ 45 cat. 5e quick-fixing crimp connectors, with colour code and wiring schemes T 568 A and T 568 B Supplied with colour labels numbered from 1 to 24 Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568 19" panel - 1 U</p>
1	0 335 51	UTP panel - 8 contacts
1	0 335 82	UTP panel - 8 contacts - connection with 110 tool
1	0 335 52	FTP panel - 9 contacts
		<p><b>UTP through panel</b> 24 RJ 45 connectors UTP through panel</p>
1	0 335 88	
		<p><b>Patch panels cat. 5e 24 x RJ 45 connectors 110</b></p> <p>Panels supplied with screws Universal mounting for all freestanding or wall-mounted cabinets Fitted with 4 units of 6 x RJ 45 cat. 6 connectors, connection with 110 tool, with colour code and wiring schemes T 568 A and T 568 B Supplied with labels numbered from 1 to 24 Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-2 and TIA/EIA 568 19" 1 U panels</p>
1	0 335 80	UTP panel - 8 contacts - connection with 110 tool
1	0 335 81	UTP angle patch panel - 8 contacts - connection with 110 tool

Pack	Cat.Nos	Modular panel
		<p>Panel supplied with quick-fixing system Universal mounting for all freestanding or wall-mounted cabinets Panel ensure automatic grounding of each connector Fitted with rear cable guide to hold cables during maintenance Modular empty panels for up to 4 units Take the following equipment: - units of 6 x LCS<sup>2</sup> RJ 45 connectors - telephone inlet units - fibre optic units - PoE injector units - video streaming units - switch units - telephone/Ethernet doubler units - copper/fibre optic converter units - blanking plates 19" panel - 1 U</p>
1	0 335 90	
		<p><b>Units of 6 x RJ 45 connectors cat. 5e</b></p> <p>Fitted with units of 6 x LCS<sup>2</sup> RJ 45 cat. 5e connectors with quick-fixing crimp connectors, with colour code and wiring schemes T 568 A and T 568 B Supplied with colour labels Conforms to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568</p>
2	0 335 54	UTP unit
2	0 335 55	FTP unit
10	0 335 91	Blanking plate for 19" panel - Black



## Legrand cabling system LCS<sup>2</sup> category 5e

### zone distribution boxes



0 335 40



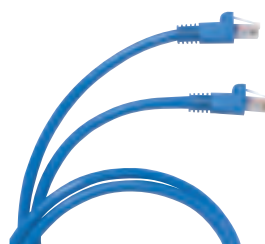
0 335 40 fitted with SC fibre optic unit, accessory  
Cat.No 335 20 and a 6 x RJ 45 connector unit



Pack	Cat.Nos	Zone distribution boxes
1	0 335 40	<p>For ELV distribution in a zone fitted with 1 to 12 RJ 45 sockets</p> <p>Centralise connections to guarantee flexibility and adaptability of the installation</p> <p>Installed on false ceiling or false floor</p> <p>Connect to the patch panel or the floor cabinet</p> <p>Connection to an RJ 45 socket with stripped cord or to a Mosaic RJ 45 socket with copper feedthrough with an RJ 45/RJ 45 cord</p> <p>IP 21 - IK 07</p> <p>Conform to standards UTE C 15-900, NF C 15-100, NF C 20-730, EN 50-174.2, CEI 60950, ISO/IEC 11801 Ed. 2.0, EN 50173-2 and TIA/EIA 568</p> <p>Colour code and wiring schemes T 568 A and T 568 B</p> <p>Cords and cables: ISO 11801 Ed.2.0, EN 50173-1, TIA/EIA 568</p> <p>Technical characteristics:</p> <ul style="list-style-type: none"> <li>- polycarbonate PC hood</li> <li>- polypropylene PP base</li> <li>- RAL 7035</li> <li>- hold connector units in place in the box: 100 N</li> <li>- Cables anchored on support using Colring cable ties</li> </ul> <p><b>Self-assembly zone distribution box</b></p> <p>Used for mounting LCS<sup>2</sup> RJ 45 cat. 5e connector units (p. 98)</p>

## Legrand cabling system LCS<sup>2</sup> category 5e

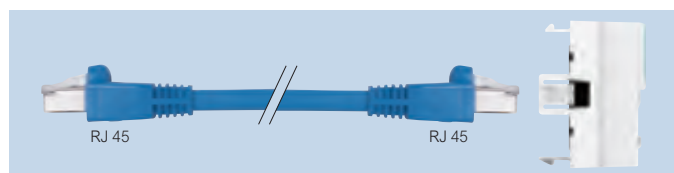
### cords specifically for zone distribution boxes feedthrough sockets



0 515 03



0 786 25



Connection principle

Pack	Cat.Nos	Cat. 5e cords - RJ 45/stripped
		<p>RJ 45 - straight stripped. Clip on and off in the zone distribution boxes and RJ 45 socket connection via LCS<sup>2</sup> connector via the stripped side. Cords prepared in factory, "ready for wiring". Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568. Grey RAL 7035</p> <p>Wiring in T 568 B</p> <p><b>U/UTP unscreened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p> <p><b>F/UTP screened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p>
4	0 517 90	
4	0 517 91	
4	0 517 92	
4	0 517 93	
4	0 517 94	
4	0 517 95	
		<p><b>Cat. 5e cords - RJ 45/RJ 45</b></p> <p>For direct connection via RJ 45 male plug to the zone distribution box and to the RJ 45 socket with copper feedthrough to ensure:</p> <ul style="list-style-type: none"> <li>- safe connection</li> <li>- speed and reliability of connection</li> </ul> <p>Grey RAL 7035</p> <p><b>U/UTP unscreened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p> <p><b>F/UTP unscreened impedance 100 Ω</b></p> <p>Length 8 m</p> <p>Length 15 m</p> <p>Length 20 m</p>
4	0 515 00	
4	0 515 01	
4	0 515 02	
4	0 515 03	
4	0 515 04	
4	0 515 05	
		<p><b>Sockets with copper feedthrough cat. 5e</b></p> <p>Easy connection at the rear through simply attaching a male plug. Ensures network access for the RJ 45 socket. Used to create cat. 5e links. According to standards ISO 11801 Ed.2, EN 50173-1 and TIA/EIA 568 within the framework of operation with zone distribution boxes. Multidirectional cord entry. Installation possible in all supports with a min. 40 mm depth. 2 modules</p> <p><b>Cat. 5e UTP</b></p> <p>○ White</p> <p>● Aluminium</p> <p>○ White</p> <p>● Magnesium</p> <p><b>Cat. 5e FTP</b></p> <p>○ White</p> <p>● Aluminium</p> <p>○ White</p> <p>● Magnesium</p>
10	Mosaic 0 786 20	
10	0 786 24	
10	Arteor 5 723 30	
10	5 728 30	
10	Mosaic 0 786 21	
10	0 786 25	
10	Arteor 5 723 32	
10	5 728 32	



# Legrand cabling system LCS<sup>2</sup> category 5e

## RJ 45 sockets



Sockets with LCS<sup>2</sup> quick-fixing crimp connector  
Take AWG 22 single-core cables up to AWG 26 and AWG 26 multicore cables  
Contacts marked with dual colour code and wiring schemes T 568 A and T 568 B  
Side cable entry for easy installation in all supports  
Conforms to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568

Pack	Cat.Nos	Mosaic RJ 45 sockets cat. 5e
10	0 765 51	<b>UTP - 1 module</b>
10	0 794 51	○ White
10	0 786 05	● Aluminium
		○ White, connection with 110 tool
10	0 765 54	<b>UTP - 2 modules</b>
10	0 794 54	○ White
10	0 765 18	● Aluminium
		○ White, connection with 110 tool
		<b>UTP with controlled access - 2 modules</b>
		Supplied with 2 keys for 5 sockets
5	0 765 97	○ White with red shutter
		<b>UTP - 2 x RJ 45 with quick-fixing accessory - 3 modules</b>
		For snap-on mounting on DLP trunking with 45 mm cover
5	0 765 41	○ White
		<b>UTP retractable RJ 45 socket - 4 modules</b>
		With integrated retractable cord (0.9 m)
		Winds up automatically with a pushbutton
1	0 765 30	○ White
		<b>UTP 45° - 2 modules</b>
10	0 765 01	○ White
		<b>2 x RJ 45 UTP 45° - 2 modules</b>
5	0 765 02	○ White
		<b>FTP - 1 module</b>
10	0 765 52	○ White
10	0 794 52	● Aluminium
		<b>FTP - 2 modules</b>
10	0 765 55	○ White
10	0 794 55	● Aluminium
		<b>FTP with controlled access - 2 modules</b>
		Supplied with 2 keys for 5 sockets
10	0 765 98	○ White with red shutter
		<b>FTP - 2 x RJ 45 with quick-fixing accessory - 3 modules</b>
		For snap-on mounting on Mosaic trunking with 45 mm cover
5	0 765 42	○ White

Pack	Cat.Nos	Arteor RJ 45 socket cat. 5e
10	5 723 03	<b>UTP - 1 module</b>
10	5 728 03	○ White
10	5 723 28	● Magnesium
10	5 728 28	○ White, connection with 110 tool
		● Magnesium, connection with 110 tool
10	5 723 15	<b>UTP - 2 modules</b>
10	5 728 15	○ White
10	5 723 29	● Magnesium
10	5 728 29	○ White, connection with 110 tool
		● Magnesium, connection with 110 tool
10	5 723 04	<b>FTP - 1 module</b>
10	5 728 04	○ White
		● Magnesium
10	0 331 80	<b>Keystone RJ 45 socket cat. 5e</b>
20	6 327 79	UTP socket with fast crimping connection
		Surface mounting box
		1 or 2 ports
		For keystone connectors
		Provides solution for integration of keystone in surface mounting installations
1/20	0 695 57	<b>Plexo RJ 45 sockets, cat. 5e - IP 55 closed flap IK 07</b>
1/20	0 695 56	Protection against water, dust
		For industrial sites
1	0 695 81	FTP socket
		○ Grey/White
		UTP socket
		○ Grey/White
		Adaptor for RJ 45 socket
		Ensures weatherproofing (IP 44) with the plug inserted
		○ Grey/White

Mosaic and Arteor sockets with copper feedthrough **p. 91, 95, 100**

Mosaic and Arteor audio/video sockets **p. 139**

## Legrand cabling system LCS<sup>2</sup>

LCS<sup>2</sup> system additional products cat. 6<sub>A</sub>, LCS<sup>2</sup> cat. 6, LCS<sup>2</sup> cat. 5e



0 335 39



0 335 34



0 335 12



0 335 16



0 334 75



0 335 02



0 332 93



0 335 01

Pack	Cat.Nos	Modular panels
1	0 335 90	<p>Panels supplied with captive screws and cage nuts or with quick fixing. Universal mounting for all freestanding or wall-mounted cabinets. Panels ensure automatic earthing of each connector. Fitted with rear cable guide to hold cables in place during maintenance</p> <p>Modular empty panels for up to 4 units</p> <p>Take the following equipment:</p> <ul style="list-style-type: none"> <li>- units of 6 x LCS<sup>2</sup> RJ 45 connectors</li> <li>- telephone inlet units</li> <li>- fibre optic units</li> <li>- PoE injector units</li> <li>- video streaming units</li> <li>- switch units</li> <li>- telephone/Ethernet doubler units</li> <li>- copper/fibre optic converter units</li> <li>- blanking plates</li> </ul> <p>19" panel - 1 U</p>
2	0 335 54	<b>Doubler units</b>
2	0 335 55	Units of 6 x LCS <sup>2</sup> RJ 45 doubler connectors for fast tool-free connection. Used with doubler sockets (p. 103)
10	0 335 91	UTP unit
		FTP unit
		Blanking plate for 19" panel - Black
1	0 335 39	<b>Ethernet/Ethernet doublers 100 base T</b>
1	0 335 38	FTP - 9 contacts
		UTP - 8 contacts
1	0 335 37	<b>Telephone/Ethernet doublers 100 base T</b>
1	0 335 36	FTP - 9 contacts
		UTP - 8 contacts
1	0 335 35	<b>Telephone/telephone doubler</b>
		45 contacts
1	0 335 34	<b>Video streaming unit</b>
		Unit of 6 "F" connectors for video circuits
1	0 335 13	<b>Fibre optic units</b>
1	0 335 12	Clip directly onto fibre optic enclosure
		Cat.No 0 335 10 (p. 108), on the patch panels with fibre optic cassette Cat.No 0 335 11 (p. 108) or in the zone distribution boxes with fibre optic accessory Cat.No 0 335 20 (p. 110)
1	0 335 13	<b>Singlemode fibre units (9/125 µm)</b>
1	0 335 12	LC unit for 6 singlemode fibres
		SC unit for 6 singlemode fibres
1	0 335 16	<b>Multimode fibre units (62.5 and 50/125 µm)</b>
1	0 335 17	ST unit for 6 multimode fibres
1	0 335 18	SC unit for 6 multimode fibres
1	0 335 19	LC unit for 6 multimode fibres
1	0 335 19	High-density LC unit for 12 multimode fibres
10	0 517 40	<b>Blanking plates</b>
10	0 517 41	<b>Set of 12 blanking plugs for RJ 45 LCS<sup>2</sup> connector</b>
		White
		Black
10	0 335 91	<b>Blanking plate for 19" panel</b>
		Black

Pack	Cat.Nos	Controlled access units
2	0 334 71	Solution for making an RJ 45 passive connection on sensitive networks secure. A cord can be locked/unlocked using the unlocking tool. Suitable for all 19" patch panels in the LCS <sup>2</sup> Legrand cabling system range, cat. 5e, cat. 6 and cat. 6 <sub>A</sub>
2	0 334 72	Compatible with the cords in the LCS <sup>2</sup> Legrand cabling system range, cat. 5e, cat. 6 and cat. 6 <sub>A</sub>
2	0 334 73	<b>Controlled access units</b>
2	0 334 74	Unlocking tool not supplied
2	0 334 75	Black shutter
		Blue shutter
		Red shutter
		Orange shutter
		Green shutter
5	0 334 70	<b>Unlocking tool for controlled access units</b>
		Unlocking tool
1	0 335 02	<b>Ethernet switches 100 Mbps</b>
		Mounted in the patch panel
		Conform with standards IEEE 802-3, EN 500 81-1 and EN 500 82-1 (Conformity with EMC requirements)
1	0 335 05	<b>Switch units for patch panel</b>
		Clip directly onto the patch panels
		7 RJ 45 ports at the front, 1 of which is a cascade port
1	0 335 05	Power supply with transformer provided
		6 RJ 45 ports + 1 LC type optic port with front-mounted cascade 100 base FX type LC
		Power supply via transformer provided
1	0 332 93	<b>Boxes to be installed on shelf</b>
		5 RJ 45 port switch
		Power supply via transformer provided
1	0 332 91	Dimensions: 116 x 70 x 25
		8 RJ 45 port switch
		Power supply via transformer provided
		Dimensions: 171 x 98 x 29
1	0 335 06	<b>Copper/fibre optic converter units</b>
1	0 335 07	Simply and quickly permit copper to fibre conversion and vice versa
		Clip directly onto the patch panels
		Fitted with an SC type fibre optic connector
		10/100 base T to 10/100 base FX type SC
		1000 base T to 1000 base SX type SC
1	0 335 01	<b>Midspan Power over Ethernet (PoE) injectors</b>
		4 inlets/outlets
		Used for supplying 4 Wi-Fi access points
1	0 327 37	Clips directly onto a patch panel
		1 inlet/outlet
		Used for supplying a Wi-Fi access point
		Direct connection to the patch panel

# Legrand cabling system LCS<sup>2</sup>

## doubler sockets, adaptors and accessories



0 539 49



0 533 00 in position  
(no cord supplied)



0 533 01



0 327 60



0 517 09

### Pack Cat.Nos RJ 45 doubler sockets

10	Mosaic		<b>Ethernet/Ethernet</b>
	0 765 39		
10	Mosaic		<b>Telephone/Ethernet</b>
	0 765 38		
10	Mosaic		<b>Telephone/telephone</b>
	0 765 37		
10	Arteor		<b>FTP - 9 contacts</b>
	5 723 36		
10	Arteor		<b>FTP - 9 contacts</b>
	5 728 36		
10	Mosaic		<b>UTP - 8 contacts</b>
	0 765 36		
10	Arteor		<b>UTP - 8 contacts</b>
	5 723 35		
10	Arteor		<b>UTP - 8 contacts</b>
	5 728 35		
10	Mosaic		<b>UTP - 8 contacts</b>
	0 765 35		

### Mobile doublers

10	0 327 83		Clip into RJ 45 sockets to double applications TV/computer network or telephone double connector
10	0 327 47		Telephone/telephone doubler
10	0 327 45		Computer network/telephone doubler
10	0 327 46		L1/L2 telephone doubler
10	0 327 48		Computer network/computer network double connector

### Weatherproof adaptors

10		<b>IP 55 - IK 07</b>	Allow all functions to be adapted 2 Mosaic modules IP 55 operation Adaptor with smoked flap Adaptor with smoked flap lockable by special tool Adaptor for RJ socket ensuring IP 44 waterproofness cable already connected Locking tool (used for changing vandal-proof screws)
1		<b>Soliroc adaptor</b>	Used for adapting all functions 2 Mosaic modules IK 10 - IP 55 Adaptor with flap Adaptor without flap
1		<b>Hypra adaptor</b>	IP 55 adaptor base

### Pack Cat.Nos Cable protection accessories

3	0 533 00		<b>Plastic material</b> IP 66/67 guaranteed connection with the pair Cat.No 0 533 02 IP 55 with no connection for base with shutter Protection for RJ 45 shielded or unshielded cables ensuring a link of category 5 Conform to standards of the IEC 60603-7 series and to standard IEC 61076-3-106 (version 5) Compatible with products on the market conforming to the standards listed
3	0 533 01		<b>Plug</b> Integrated PE with sealing ring and clamping blades Tool-free assembly Ability to protect cables of category 5e
3	0 533 02		<b>Flush-mounting base</b> Locking base Supplied with RJ 45 female/female coupler cat. 5e
3	0 533 03		<b>Kit</b> Flush-mounting base + plug <b>Protective flap</b> Fits on base Cat.No 0 533 01

### RJ plugs for round cables

50	0 517 01		<b>RJ 11</b> Gold-coated contacts 1.2 µm 4 contacts, width 9.65 mm
50	0 517 02		<b>RJ 12</b> 6 contacts, width 9.65 mm
50	0 517 03		<b>RJ 45 cat. 5e</b> 8 contacts, width 11.70 mm 9 contacts, width 11.70 mm
50	0 517 06		<b>RJ 45 sleeves</b> Black White

### Stripping tool

1	0 332 62		<b>Stripping tool</b> Slits the sheath and releases the conductors by rotation For twisted pair cables Does not damage the conductors

1	0 327 60		<b>Cutting pliers</b> For twisted pair and fibre optic cable Cut wires cleanly without damaging the copper

### Crimping tool for RJ 45 plugs

1	0 517 09		<b>Crimping tool for RJ 45 plugs</b> Used for crimping plugs RJ 4/6/8/9 contacts Ratchet control of crimping mechanism Able to cut and strip cables Tool with 3 crimping points High resistance steel material

### 110 tool

1	0 332 60	110 tool
1	0 332 61	Replacement blade

# Legrand cabling system LCS<sup>2</sup>

telephone sockets, patches panels, cables and data sockets



Pack	Cat.Nos		
1	Mosaic 0 787 65	Arteor -	<b>SUB D sockets - 2 modules</b> 9 contacts - Screw terminals connection to link type RS 232 series 9 contacts - Soldering connection to link type RS 232 series 15 contacts - Soldering connection For example used for specialized line type X21 between 2 distant devices
1	0 787 67	-	
1	0 787 66	-	
1			<b>Female USB DATA sockets - for data transfer</b> Used to bring connections closer to the user For connecting USB devices (scanner-printer, external hard disk). Max. cable length: 5 m. Recommended cable: USB A 1 module <b>Preterminated</b> USB 3.0. Equipped with a 15 cm cord ○ White - square version ● Magnesium - square version <b>Connection via screw terminals</b> USB 2.0. Cross section - 1 mm <sup>2</sup> ○ White ● Aluminium ● Magnesium
1	Mosaic 0 787 46	Arteor 5 720 94	
1	-	5 725 94	
1	0 787 61	5 722 75	<b>Female USB DATA amplifier - for data transfer</b> Used to bring connections closer to the user in case of large distances For connecting USB devices (digital school board / interactive whiteboard...) located more than 5 m away from a source (computer...) The kit includes a transmitter (1 module) and a receiver (1 module) The link between the transmitter and the receiver is made via a RJ 45 / RJ 45 cord ○ White
1	0 792 84	-	
1	-	5 727 75	
1			<b>Telephone sockets</b> <b>RJ 11 and RJ 12 sockets</b> Equipped with a modular Jack connector with 1/4 turn terminal for fast connection Tap-off possible ○ White - RJ 11, 4 contacts 1 module ● Aluminium - RJ 11, 4 contacts - 1 module ● Magnesium - RJ 11, 4 contacts - 1 module ○ White - RJ 11, 4 contacts - 2 modules ● Magnesium - RJ 11, 4 contacts - 2 modules ○ White - RJ 12, 6 contacts - 2 modules ● Magnesium - RJ 12, 6 contacts - 2 modules <b>ISDN socket</b> Self-stripping 1/4 turn terminals for fast connection. Tap-off possible ○ White - 8 contacts, 2.5 mm <sup>2</sup> earth terminal
10	Mosaic 0 787 30	Arteor 5 723 00	
10	0 792 31	-	
10	-	5 728 00	<b>Telephone sockets (continued)</b> <b>Single master - 2 modules</b> With IDC connection Conform to British Telecom ○ White ● Magnesium <b>Single secondary - 1 module</b> With IDC connection Conform to British Telecom ○ White ● Magnesium
10	0 787 31	5 723 13	
10	-	5 728 13	
10	0 787 32	5 723 12	<b>Patch panel telephone 50 ports 110 connect</b> 19" panel - 1 U <b>Cables for telephone networks cat. 3</b> PVC sleeve Colour white Colour code TIA/EIA <b>U/UTP - 50 pairs</b> Length 500 m Supplied on reel <b>U/UTP - 100 pairs</b> Length 500 m Supplied on reel
10	-	5 728 12	
10	-	5 728 12	
10	0 787 34	-	<b>Panels and units for incoming telephone</b> <b>Panels assembled - 1 U</b> Fitted with 4 LCS <sup>2</sup> RJ 45 units of 12 ports with fast tool-free connection 3-6/4-5 contacts for digital telephone 4-5/7-8 contacts for analogue telephone <b>Incoming telephone units for self-assembly panels</b> Fitted with 12 LCS <sup>2</sup> RJ 45 ports with quick tool-free connection 3-6/4-5 contacts for digital telephone 4-5/7-8 contacts for analogue telephone

# Legrand cabling system LCS<sup>2</sup> Wi-Fi

switches, distributors and Wi-Fi access points



Technical characteristics p. 146

## Pack Cat.Nos Flush-mounting 10/100 base T switches

		For networking computer peripherals without a patch panel: computers, printers, servers, etc. Possibility of extending an existing network by simply replacing an RJ 45 socket Tool-free connection Conform with standards IEEE 802.3 (Ethernet) and EN 500 81/82-2 (EMC requirements) Installation in all supports with minimum 40 mm depth 6 ports at the front + 1 side RJ 45 connector for cabling and carrying out link tests Port status display integrated into the RJ 45 connectors Labelling of each port from 1 to 6 and marker holder for switch identification 6 modules
1	Mosaic 0 779 01	<b>Non-manageable</b>
1	0 779 00	PoE power supply (Power over Ethernet - standard 802.3 af) 230 V~ power supply
1	Arteor 5 720 84	PoE power supply (Power over Ethernet - standard 802.3 af) ○ White
1	5 720 83	230 V~ power supply ○ White



## 1 0 332 80 Mosaic VDI distribution block without connectors

1	0 332 80	16 modules Dimensions: 135 x 223 x 57 mm For small patch panel For mounting a Mosaic switch Cat.Nos 0 779 00/01/20
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## Manageable Wi-Fi access points 802.11n

		Coverage area: 600 m <sup>2</sup> . Dual band 2.4 GHz or 5 GHz Conforms with standard 802.11 a, b, g, n Theoretical speed: 300 Mbps gross MIMO 2x2, supports up to 4 SSIDs False ceiling integration - PoE power supply (Power over Ethernet - standard IEEE 802.3 af) Network connection via a tool-free RJ 45 connector The installation must include at least: - a Wi-Fi access point (false ceiling) - a PoE injector Cat.No 0 335 01 conforming with 802.3 af (LCS <sup>2</sup> unit format) to be installed in the patch cabinet Can be configured centrally via controller Cat.No 0 332 25 or via configuration software Cat.No 0 335 24 or individually The management function allows the network administrator to manage Wi-Fi access points remotely via a web https interface Security via WEP, WPA and WPA2 (802.11i) encryption and 802.1x authentication QOS WMM compatible and supports SNMP management Guest access: independent access to the private Wi-Fi network Energy saving with standby management
1	0 335 22	Wi-Fi surface-mounted access point 802.11n
1	0 335 21	Wi-Fi ceiling-mounted access point 802.11n

## Pack Cat.Nos Manageable Wi-Fi access points 802.11a and b/g

		Dual-band and dual-radio Conform with standards 802.11a and 802.11b/g Gross speed: 54 Mbps max. on each frequency (802.11a and 802.11g) simultaneously Can be installed in addition to a new or existing LCS/LCS <sup>2</sup> structured cabling system to meet mobile working requirements Can be integrated into all compatible supports with minimum 40 mm depth Tool-free network connection via RJ 45 connector PoE power supply (Power over Ethernet - standard 802.3 af) The installation must include at least: - Wi-Fi access point - a PoE injector conforming with 802.3af (LCS <sup>2</sup> unit format) to be installed in the patch panel The management function allows the network administrator to manage Wi-Fi access points remotely via a web interface Security via WPA2 encryption (802.11i) and 802.1x authentication Guest access: allows visitors free access to the Internet (access independent of the main Wi-Fi network). 4 modules
1	Mosaic 0 779 14	With RJ 45 socket on front ○ White
1	0 779 13	With no RJ 45 socket ○ White
1	Arteor 5 723 76	With RJ 45 socket on front ○ White
1	5 728 76	With RJ 45 socket on front ● Magnesium
1	5 723 77	With no RJ 45 socket ○ White
1	5 728 77	With no RJ 45 socket ● Magnesium
1	Celiane 0 673 66	With RJ 45 socket on front

## Wi-Fi network management system

		<b>Access point manager (disembedded)</b> APs centralised configuration software Access point manager
1	0 335 24	

## Midspan Power over Ethernet (PoE) injectors

1	335 01	4 inlets/outlets Used for supplying 4 Wi-Fi access points Clip directly onto a patch panel
1	327 37	1 inlet/outlet Used for supplying a Wi-Fi access point Direct connection to the patch panel

RJ 45 Patch cords and user cords cat. 6  
p. 93



# Legrand cabling system LCS<sup>2</sup> fibre optic

## fibre optic cables



0 325 15



0 325 06



0 325 10



0 325 08

Fibre optic cables:

- fibre colour code: FOTAG
- standard: EN 50173-2, ISO IEC 11801

Pack	Cat.Nos		OS1/OS2 singlemode fibre optic cables (9/125 µm)
	Loose tube	900 µm Tight buffer	
2000 <sup>1</sup>	0 325 12	-	For 9/125 µm singlemode installations (OS1) Yellow jacket Indoor/outdoor (universal) 6 fibres
2000 <sup>1</sup>	0 325 13	-	Outdoor, corrugated steel tape 6 fibres
2000 <sup>1</sup>	0 325 14	0 325 50	Indoor/outdoor (universal) 12 fibres
2000 <sup>1</sup>	0 325 15	-	Outdoor, corrugated steel tape 12 fibres
2000 <sup>1</sup>	0 325 51	-	Indoor/outdoor (universal) 24 fibres
	Loose tube	900 µm Tight buffer	OM2 multimode fibre optic cables (50/125 µm)
2000 <sup>1</sup>	-	0 325 55	For 50/125 µm multimode installations (OM2) Orange jacket Indoor/outdoor (universal) 4 fibres
2000 <sup>1</sup>	0 325 04	0 325 08	Indoor/outdoor (universal) 6 fibres
2000 <sup>1</sup>	0 325 05	-	Outdoor, corrugated steel tape 6 fibres
2000 <sup>1</sup>	0 325 06	0 325 09	Indoor/outdoor (universal) 12 fibres
2000 <sup>1</sup>	0 325 07	-	Outdoor, corrugated steel tape 12 fibres
	Loose tube	900 µm Tight buffer	OM3 multimode fibre optic cables (50/125 µm)
2000 <sup>1</sup>	-	0 325 10	For 50/125 µm multimode installations (OM3) Green jacket 10 Gigabit Ethernet compliant Indoor/outdoor (universal) 6 fibres
2000 <sup>1</sup>	-	0 325 11	Indoor/outdoor (universal) 12 fibres
2000 <sup>1</sup>	0 325 53	0 325 52	Indoor/outdoor (universal) 24 fibres

Pack	Cat.Nos	OM4 multimode fibre optic cables (50/125 µm)
		For 50/125 µm multimode installations (OM4) Blue sheaths 10 Gigabit Ethernet compliant
500	0 326 65	Indoor/outdoor (glass strands) 6 fibres - 500 m
1000	0 326 66	Indoor/outdoor (glass strands) 6 fibres - 1000 m
1000	0 326 67	Indoor/outdoor (glass strands) 12 fibres - 1000 m
1000	0 326 68	Indoor/outdoor (glass strands) 24 fibres - 1000 m

1: in metre(s)

# Legrand cabling system LCS<sup>2</sup> fibre optic

## optic connectors and pigtails



Installation and performance principles **p. 158**

Pack	Cat.Nos	Tool case for preparing fibre optic for fibre optic connectors
1	0 326 90	Provides the tools required for preparing fibre optic cables, for carrying out initial tests of the connection of fibres to connectors and the accessories for easy connection in all situations Comprises: - installation instructions and video - stripping tool (for fibres and cables) - cleaving tool - microscope for checking the quality of the cut - visual fault locator with cord - accessories (ultra-strong scissors, marker, protective glasses, etc.)
1	0 326 91	<b>Update kit for case Cat.No 0 331 93</b> Comprises: - visual fault locator with cord - adaptors for connectors - connector support for easier connection - fibre positioning label to be affixed to the cleaver in case Cat.No 0 331 93
		<b>Fast-connection connectors</b> Quick to connect, reliable and can be reused up to 5 times Microswitch for locking the fibre inside the connector and illuminated indicator for checking for faults at the end of the process These connectors do not require any glue, polishing or special tools For installation on tight jacketed fibre (Ø 900 µm) For loose jacketed fibre (Ø 250 µm), use a spreader Cat.Nos 0 330 48 or 0 330 49
10	0 326 57	<b>Multimode connectors</b> SC/UPC connector 50 µm OM3/OM4 900 µm
10	0 326 58	LC/UPC connector 50 µm OM3/OM4 900 µm
10	0 326 56	ST/UPC connector 50 µm OM3/OM4 900 µm
10	0 326 62	SC connector 62.5 µm OM1 900 µm
10	0 326 61	ST connector 62.5 µm OM1 900 µm
10	0 326 52	<b>Singlemode connectors</b> SC/UPC connector 9 µm OS1/OS2 900 µm
10	0 326 53	LC/UPC connector 9 µm OS1/OS2 900 µm
10	0 326 54	SC/APC connector 9 µm OS1/OS2 900 µm

Pack	Cat.Nos	Pigtails
		Supplied with 900 µm sleeve, 1 m
10	0 326 70	<b>10 Gb - 50/125 µm - OM4</b> LC connectors
1	0 326 71	Kit of 12 pigtails LC connectors
1	0 326 22	<b>10 Gb - 50/125 µm - OM3</b> SC connector
1	0 326 23	LC connector
1	0 326 27	6 x LC-PC connectors
1	0 326 26	12 x LC-PC connectors
1	0 326 19	<b>9/125 µm - OS1/OS2</b> SC/APC connector
1	0 326 20	SC connector
1	0 326 21	LC connector
1	0 326 24	12 x LC-UPC connectors
1	0 326 25	6 x LC-UPC connectors
1	0 327 44	<b>Thermoretractable sleeve for pigtails</b> 40 mm - pack of 50 sleeves
		<b>Glue-on connectors 50/125 and 62.5/125 µm</b> Supplied with sleeve 900 µm Connectors with ceramic ferrule Typical attenuation: 0.3 dB
10	0 331 27	ST connector
10	0 331 47	SC connector
10	0 331 00	LC connector
		<b>Breakout kits</b> For 900 µm of fibre optic Take 250 µm fibre diameters
1	0 330 48	6 fibre breakout kit
1	0 330 49	12 fibre breakout kit

# Legrand cabling system LCS<sup>2</sup> fibre optic

## 19" fibre optic drawers



Pack	Cat.Nos	Floor distribution fibre optic cabinets
1	0 462 90	Reversible metal cabinets with key lock IP20 - IK 08 Maximum capacity: - 24 fibres with ST connectors - 48 fibres with SC connectors - 96 fibres with LC connectors Up to 4 fibre optic units can be fitted Cat.Nos 0 325 70/71/72/73/74/75/76/77/78/79, 0 335 12/13/16/17/18/19 and 0 327 86 4 cable entries (2 at the top and 2 at the bottom) 12 cable outlets, 22 mm diameter (3 at the top, 3 at the bottom and 6 at the sides) Supplied with 1 black ISO 20 cable gland to hold the incoming cable and 15 feedthrough covers Supplied with fibre optic accessories for the fibre coiling The outgoing cables can be clamped using a clamp at the back of the cabinet Can take 2 cassettes for pigtails Cat.No 0 329 07 (incoming and outgoing) 292 x 323 x 92 mm Black RAL 9005 Modular cabinet
1	0 462 91	Cabinet equipped with 2 SC fibre optic units for 12 multimode fibres

Pack	Cat.Nos	19" slide-in modular fibre optic drawers
1	0 335 10	Limit switch stop with 45° slope Depth 220 mm, height 1 U Maximum capacity: - 24 x ST and SC connectors ST - 48 x LC connectors Supplied with screws and wiring accessories Takes up to 4 fibre optic units (see below)
1	0 335 09	Supplied with 24 SC connectors

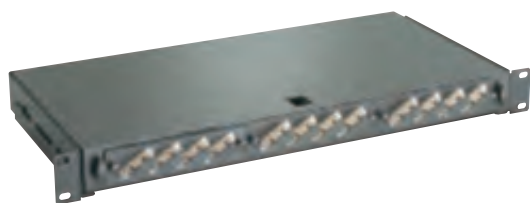
Pack	Cat.Nos	Fibre optic units
1	0 335 13	Clip directly onto the fibre optic drawer Cat.No 0 335 10 or on the patch panels with fibre optic cassette Cat.No 0 335 11
1	0 335 12	<b>Singlemode fibre units (9/125 µm)</b> LC unit for 6 singlemode fibres SC unit for 6 singlemode fibres
1	0 335 16	<b>Multimode fibre units (62.5 and 50/125 µm)</b> ST unit for 6 multimode fibres
1	0 335 17	SC unit for 6 multimode fibres
1	0 335 18	LC unit for 6 multimode fibres
1	0 335 19	High-density LC unit for 12 multimode fibres

Pack	Cat.Nos	Switch/fibre optic unit
1	0 335 05	Clips directly onto the patch panels 6 x RJ 45 ports + 1 cascade LC type optic port at the front Power supply via transformer provided

Pack	Cat.Nos	Copper/fibre optic converter units
1	0 335 06	For simply and fast copper to fibre conversion and vice versa Clip directly onto the patch panels Fitted with an SC type fibre optic connector 10/100 base T to 10/100 base FX type SC
1	0 335 07	1000 base T to 1000 base SX type SC
1	0 335 11	<b>Fibre optic cassette for patch panel</b> Ensures fibre coiling (from 2 to 12 fibres) Takes a fibre optic unit Cat.Nos 0 335 12/13/16/17/18/19 Used for linking copper and fibre optic units on the same LCS <sup>2</sup> patch panel
10	0 335 91	<b>Blanking plate for 19" panel</b> Black
1	0 329 07	<b>Cassette for pigtails</b> 12-fibre capacity
1	0 326 72	24-fibre capacity

## Legrand cabling system LCS<sup>2</sup> fibre optic

### 19" high density fibre optic drawer



0 325 69 (not equipped)

Pack	Cat.Nos	19" high density fibre optic drawer
1	0 325 69	Modular fibre optic drawer Slide-in and modular drawer Maximum capacity: - 36 ST and SC connectors - 72 LC connectors Depth 220 mm, height 1 U Supplied with screws and wiring accessories Receives up to 3 fibre optic units below
		<b>Fibre optic units</b> Clip directly onto the optic drawer Cat.No 0 325 69
		<b>Singlemode fibre units (9/125 µm)</b>
1	0 325 73	LC duplex unit for 12 singlemode fibres - blue
1	0 325 74	LC quadriplex unit for 24 singlemode fibres - blue
1	0 325 70	ST duplex unit for 12 singlemode fibres - blue
1	0 325 71	SC duplex unit for 12 singlemode fibres - blue
1	0 325 72	MPO unit type A for 6 x 12 singlemode fibres - blue
		<b>Multimode fibre units (62.5 and 50/125 µm)</b>
1	0 325 78	LC duplex unit for 12 multimode fibres - beige
1	0 325 79	LC quadriplex unit for 24 multimode fibres - beige
1	0 325 75	ST duplex unit for 12 multimode fibres - beige
1	0 325 76	SC duplex unit for 12 multimode fibres - beige
1	0 325 77	MPO unit type A for 6 x 12 multimode fibres - beige
		<b>Accessory</b>
1	0 335 93	Blanking plate
		<b>Accessories common to 2 fibre optic drawers</b>
		<b>Cassettes for pigtails</b>
1	0 329 07	12 fibre capacity
1	0 326 72	24-fibre capacity
		<b>Bend limiting clip</b>
8	0 335 94	Fibre management bend limiting clip

## LCS<sup>2</sup> ZONE DISTRIBUTION BOXES

# Consolidation and redistribution made easy

Complete flexibility with the LCS<sup>2</sup> zone boxes:  
centralisation of connections close to the workstation,  
copper and fibre optics can be used together.



- Flexible installation with lines in reserve  
meet future requirements quickly.
- Guaranteed performance across the whole  
LCS<sup>2</sup> system.
- Fast, reliable connection to the LCS<sup>2</sup> zone  
box with sockets with copper and fibre optic  
feedthrough and RJ 45/RJ 45 cords.

**N** Available in cat. 6A



## Legrand cabling system LCS<sup>2</sup> fibre optic fibre sockets



0 786 16



0 786 17



0 786 18

Pack	Cat.Nos	Fibre optic sockets
1	0 786 16	<b>Fitted with duplex feedthrough 2 inlets 2 outlets</b> Used for connecting 2 fibres (fitted with their connector) Supplied with protective caps Fitted with transparent marker holder 2 modules <b>Socket with fibre optic feedthrough 2 x ST</b> Bayonet connection (STII compatible) ○ White
1	0 786 17	<b>Socket with fibre optic feedthrough 2 x SC</b> Push-pull connection ○ White
1	0 786 18	<b>Socket with fibre optic feedthrough 2 x LC</b> Push-pull connection ○ White
1	0 786 14	<b>Socket with fibre optic feedthrough</b> <b>Socket with fibre optic feedthrough 2 x SC/APC</b> Push-pull connection With shutters ○ White

## Legrand cabling system LCS<sup>2</sup> fibre optic zone distribution boxes



0 335 40



0 335 20 fibre optic  
accessory

Pack	Cat.Nos	Zone distribution boxe
1	0 335 40	For ELV distribution in a zone fitted with 1 to 12 RJ 45 sockets Centralise connections to guarantee flexibility and adaptability of the installation Installed on false ceiling or false floor Connect to the patch panel or the floor cabinet Conform to standards UTE C 15-900, NF C 15-100, NF C 20-730, EN 50-174.2, CEI 60950, ISO/IEC 11801 Ed. 2.0, EN 50173-2 and TIA/EIA 568 Colour code and wiring schemes T 568 A and T 568 B Cords and cables: ISO 11801 Ed.2.0, EN 50173-1, TIA/EIA 568 Technical characteristics: - polycarbonate PC hood - polypropylene PP base - RAL 7035 - hold connector units in place in the box: 100 N - Cables anchored on support using Colring cable ties <b>Self-assembly zone distribution box</b> Used for fitting fibre optic accessory units
1	0 335 20	<b>Fibre optic accessory</b> Used for fitting fibre optic units (see p. 108) and the fibre coil in the zone distribution box
1	0 786 16	<b>Sockets with fibre optic feedthrough</b> Fitted with duplex feedthrough 2 inlets/2 outlets Used for connecting 2 fibres (fitted with their connector) Supplied with protective caps Fitted with transparent marker holder 2 modules <b>Socket with fibre optic feedthrough 2 x ST</b> Bayonet connection (STII compatible) ○ White
1	0 786 17	<b>Socket with fibre optic feedthrough 2 x SC</b> Push-pull connection ○ White
1	0 786 18	<b>Socket with fibre optic feedthrough 2 x LC</b> Push-pull connection ○ White



## Legrand cabling system LCS<sup>2</sup> fibre optic

FTTO (Fiber To The Office) - Full IP



0 779 05



0 326 80

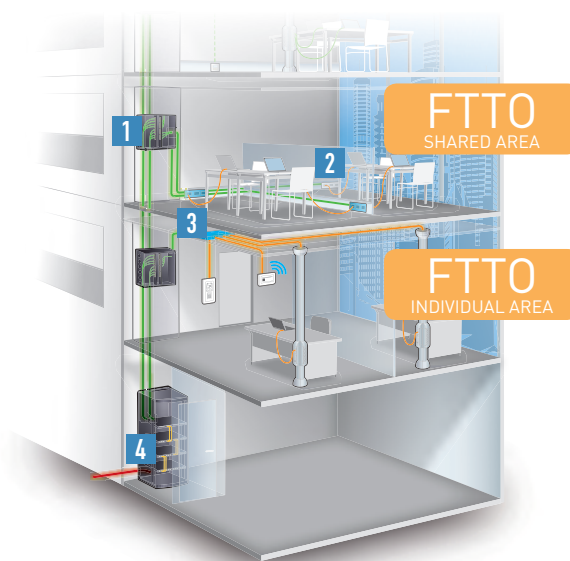
Conforming to IEEE 802.3 (Ethernet), POE 802.3af, PoE+ 802.3at, 802.1x (authentication via port), and 802.1q VLAN trunking standards. Compatible with SNMP, IPv6, QoS level 2 (802.1p) and level 3 (DiffServ), VLAN, Rapid Spanning Tree, and IGMPv3 snooping

Pack	Cat.Nos	Shared working areas
1	0 779 05	<b>Fibre optic/copper switch</b> For converting and distributing the optical signal to four 10/100/1000 RJ 45 ports with auto-MDI/X and PoE/PoE+ auto-negotiation on the front One 10/100/1000 RJ 45 port with auto-MDI/X and auto-negotiation on the side for network extension Fully manageable, without fan One SFP 1000 base SX fibre optic port included, LC connector Labelling of each port with label-holder For integration in all 4-module supports, depth 50 mm minimum Supplied with its own power supply Cat.Nos 0 779 06, max. power 60 W. 4 modules - White
1	0 779 06	<b>Power supply for fibre optic/copper switch</b> Power supply for fibre optic/copper switch Cat.Nos 0 779 05 For installation in trunking only
<b>Individual working areas</b>		
1	0 326 80	<b>Active zone box</b> For converting and distributing the optical signal to five 10/100/1000 RJ 45 ports For powering IP devices via the four RJ 45 ports via PoE or PoE+ One SFP 1000 base SX fibre optic port included, LC connector Labelling of each port with label-holder For installation in false ceilings or raised access floors using supports Cat.Nos 0 326 81/82 Power supply 230 V~
1	0 326 81	<b>Supports</b> Integral fibre optic coiling cassette with quadriplex LC feedthrough For installing the active zone box Cat.Nos 0 326 80 in a false ceiling Access to the zone box via a pivoting flap Support for spare cords
1	0 326 82	For installing the active zone box Cat.Nos 0 326 80 in a raised access floor
1	0 326 83	<b>Auxiliary contact</b> For active zone box Cat.Nos 0 326 80 For feeding back volt-free data to the IP network For integration directly in the active zone box (automatic connection)
1	0 326 84	<b>Battery</b> For active zone box Cat.Nos 0 326 80 Provides continuity of operation of the active zone box in the event of a power cut. 52 V - 800 mAh Integrated directly in the active zone box (automatic connection)
<b>OM3 multimode fibre optic cables (50/125 µm)</b>		
2000	900 µm Tight buffer 0 325 10	For 50/125 µm multimode installations (OM3) Green jacket 10 Gigabit Ethernet compliant Indoor/outdoor (universal) 6 fibres
2000	0 325 52	Indoor/outdoor (universal) 24 fibres

## FIBRE OPTIC SOLUTIONS

# LCS<sup>2</sup>: your concentrated digital infrastructure

Recommended for areas which require rigorous hygiene.



**1 Fibre optic floor distribution cabinet**  
Takes up to 4 fibre optic units.



**2 Copper/fibre optic converter switch**  
For converting and distributing the optical signal to four RJ 45 ports.



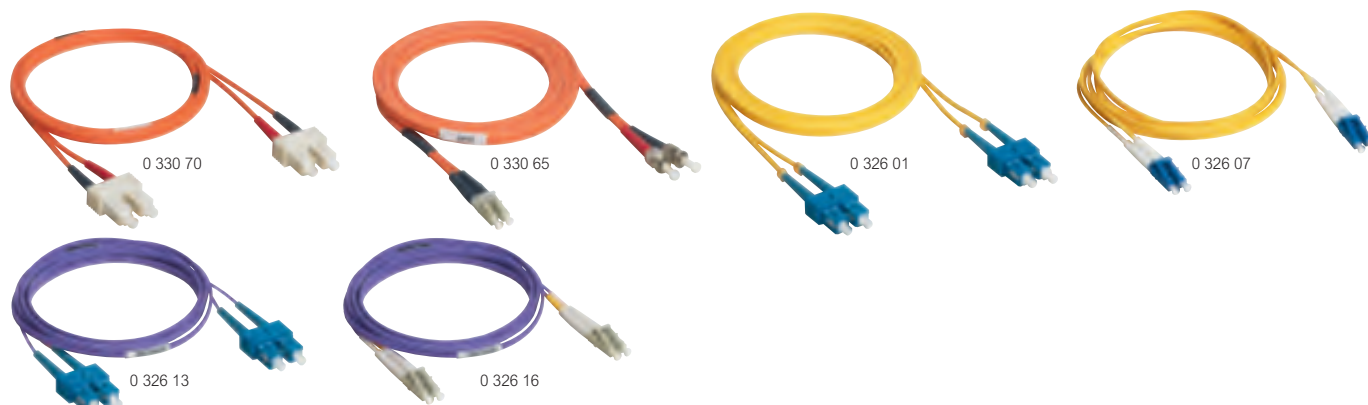
**3 Active zone distribution box**  
For converting the optical signal to five RJ 45 ports.



**4 19" fibre optic drawer fitted with 4 SC units**  
Modular sliding drawer.

# Legrand cabling system LCS<sup>2</sup> fibre optic

## patch cords



Technical characteristics **p. 158**

Fitted with 2 connectors with ceramic ferrule at either end  
Packed and tested singly (report supplied)  
Zipcord LSZH sleeve

Pack	Cat.Nos	<b>OM2 (UPC) multimode fibre optic cords (50/125 µm)</b>
		Max. optical losses: 0.3 dB For 50/125 µm multimode installations, OM2 type Orange sheaths
		<b>ST/ST duplex cords</b>
3	0 330 80	Length: 1 m
3	0 330 81	Length: 2 m
3	0 330 82	Length: 3 m
		<b>SC/SC duplex cords</b>
3	0 330 69	Length: 1 m
3	0 330 70	Length: 2 m
3	0 330 71	Length: 3 m
		<b>ST/SC duplex cords</b>
3	0 330 72	Length: 2 m
3	0 330 73	Length: 3 m
		<b>LC/LC duplex cord</b>
3	0 330 61	Length: 2 m
		<b>SC/LC duplex cords</b>
3	0 330 75	Length: 1 m
3	0 330 63	Length: 2 m
3	0 330 76	Length: 3 m
		<b>LC/ST duplex cord</b>
3	0 330 65	Length: 2 m
		<b>OM4 multimode fibre optic cords (50/125 µm)</b>
		10 Gigabit Ethernet compliant Max. optical losses: 0.3 dB For 50/125 µm multimode installations, OM4 type Blue sheaths
		<b>SC/SC duplex cords</b>
3	0 326 30	Length: 1 m
3	0 326 31	Length: 2 m
3	0 326 32	Length: 3 m
		<b>LC/LC duplex cords</b>
3	0 326 33	Length: 0.5 m
3	0 326 34	Length: 1 m
3	0 326 35	Length: 2 m
3	0 326 36	Length: 3 m
3	0 326 37	Length: 5 m

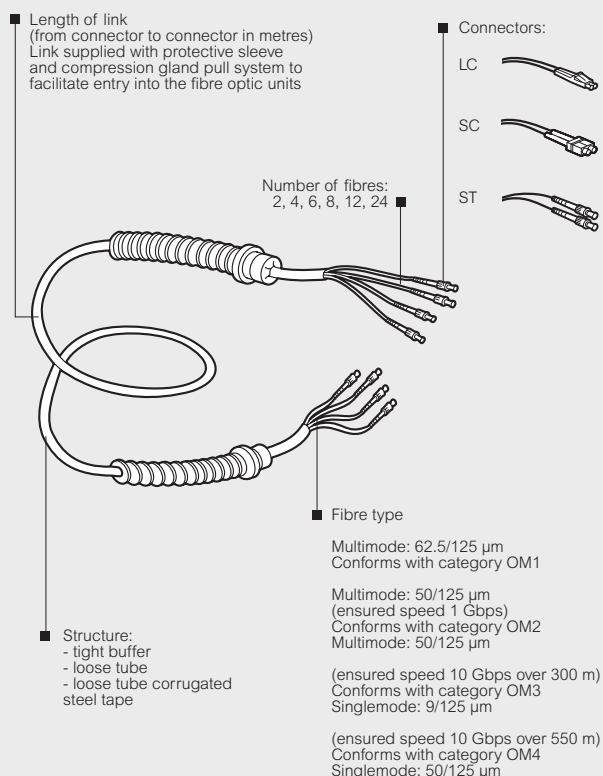
Pack	Cat.Nos	<b>OS1/OS2 (UPC) singlemode fibre optic cords</b>
		Max. optical losses: 0.3 dB For OS1 9/125 µm singlemode installations, OS2 à OS1 type Yellow sheaths
		<b>SC/SC duplex cords</b>
3	0 326 00	Length: 1 m
3	0 326 01	Length: 2 m
3	0 326 02	Length: 3 m
		<b>SC/LC duplex cords</b>
3	0 326 03	Length: 1 m
3	0 326 04	Length: 2 m
3	0 326 05	Length: 3 m
		<b>LC/LC duplex cords</b>
3	0 326 28	Length: 0.5 m
3	0 326 06	Length: 1 m
3	0 326 07	Length: 2 m
3	0 326 08	Length: 3 m
3	0 326 29	Length: 5 m
		<b>OM3 (PC) multimode fibre optic cords (50/125 µm)</b>
		Suitable for 10 Gb Ethernet network Max. optical losses: 0.3 dB For 50/125 µm multimode installations, OM3 type Purple sheaths
		<b>SC/SC duplex cords</b>
3	0 326 09	Length: 1 m
3	0 326 10	Length: 2 m
3	0 326 11	Length: 3 m
		<b>SC/LC duplex cords</b>
3	0 326 12	Length: 1 m
3	0 326 13	Length: 2 m
3	0 326 14	Length: 3 m
		<b>LC/LC duplex cords</b>
3	0 326 15	Length: 1 m
3	0 326 16	Length: 2 m
3	0 326 17	Length: 3 m

## Customised solutions

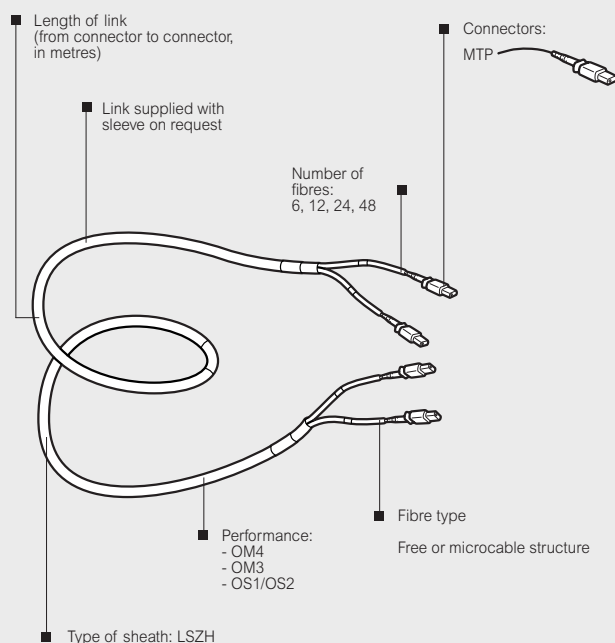
fibres preterminated with connectors



### ↓ FIBRES PRETERMINATED WITH CONNECTORS

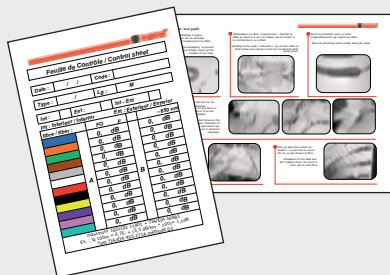


### ↓ FIBRES PRETERMINATED WITH CONNECTORS



### ↓ DOCUMENTS

Each link is supplied with a test report (fibre by fibre) and illustrated operating instructions



### ↓ PACKAGING

According to length of link:

- packed on a reel
- packed on a ring

Connector protection by tube



Reel

## OUR COMMITMENT

Request a quotation from our technical team

## Legrand cabling system LCS<sup>2</sup> cabinets

### LCS<sup>2</sup> 19" cabling freestanding cabinets



0 463 41



0 463 34 + 1 cabinet 0 463 18  
+ 1 extension cabinet 0 463 30

#### Technical characteristics p. 147 to 149

IP 20 - IK 08 baying cabinets with single or double curved front door made of screen-printed safety glass. Side and rear removable panels. Panels with automatic equipotential connection. Lock with 2433 A key for locking of the 4 sides. Top and bottom cable entries (19" cut-out format) receive 19" plates with brushes, fans, etc. Equipped with 4 x 19" uprights with U marking and depth adjusting aid. Option of cable and patch cord management in cabling unit. Cat.Nos 0 463 34/35. Cabinets can be dismantled completely where access is difficult. Levelling feet adjustable from the inside. Loading capacity: 420 Kg. Anthracite grey RAL 7016

Pack	Cat.Nos	<b>LCS<sup>2</sup> 19" cabling cabinets</b>			
		<b>Single front door</b>			
		Reversible door			
		Capacity	Height (mm)	Width (mm)	Depth (mm)
1	0 463 00	24 U	1226	600	600
1	0 463 06	29 U	1448	600	600
1	0 463 12	33 U	1626	600	600
1	0 463 18	42 U	2026	600	600
1	0 463 19	42 U	2026	600	800
1	0 463 21	42 U	2026	800	600
1	0 463 22	42 U	2026	800	800
1	0 463 23	42 U	2026	800	1000
1	0 463 28	47 U	2248	800	800
1	0 463 29	47 U	2248	800	1000
		<b>Double front door</b>			
		Door opening suitable for small spaces			
		Capacity	Height (mm)	Width (mm)	Depth (mm)
1	0 463 41	42 U	2026	800	600
1	0 463 42	42 U	2026	800	800
1	0 463 43	42 U	2026	800	1000

Pack	Cat.Nos	<b>LCS<sup>2</sup> 19" extension cabinets</b>			
		Single front door. No side panels Supplied with baying kit			
		Capacity	Height (mm)	Width (mm)	Depth (mm)
1	0 463 30	42 U	2026	600	600
1	0 463 33	42 U	2026	800	800

Pack	Cat.Nos	<b>LCS<sup>2</sup> baying kits</b>			
		For direct linking of 2 LCS <sup>2</sup> cabinets For cabinet depth (mm):			
		600	800	1000	
1	0 463 37				
1	0 463 38				
1	0 463 39				

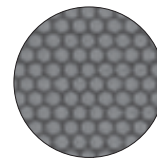
Pack	Cat.Nos	<b>LCS<sup>2</sup> cabling units</b>			
		Can be attached between 2 LCS <sup>2</sup> 42 U cabinets Easier cable and patch cord management Width 250 mm Supplied with earthing kit Anthracite grey RAL 7016 For cabinet depth (mm):			
		600	800		
1	0 463 34				
1	0 463 35				

## Legrand cabling system LCS<sup>2</sup> cabinets

### LCS<sup>2</sup> 19" freestanding server cabinets and equipment



0 463 85



#### Technical characteristics p. 147 to 149

IP 20 - IK 08  
Baying cabinets with front and rear metal microperforated door (80%), reversibles, can be opened without key. Front door can be fitted with a European DIN cylinder (30 + 10 mm), with option of fitting a handle Cat.No 0 347 71/72 (see Legrand general catalogue). Rear door can be fitted with a key cylinder Cat.Nos 0 368 22/23/24/25/26/27 (see Legrand general catalogue). Removable side panels. Top cable entries in 19" cut-out format, capable of taking 19" plates with brushes, fans, etc. Open bottom cable entries. Equipped with 4 x 19" uprights with depth adjusting aid. Levelling feet adjustable from the inside. Cabinets can be dismantled completely where access is difficult. Supplied with earthing kit. Loading capacity: 630 Kg. Anthracite grey RAL 7016

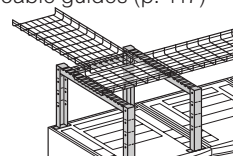
Pack	Cat.Nos	<b>LCS<sup>2</sup> 19" server cabinets</b>			
		Capacity	Height (mm)	Width (mm)	Depth (mm)
1	0 463 85	42 U	2026	600	1000
1	0 463 86	42 U	2026	800	1000

Pack	Cat.Nos	<b>LCS<sup>2</sup> baying kit</b>			
		For direct linking 2 LCS <sup>2</sup> cabinets For cabinets depth (mm):			
		1000			
1	0 463 39				

#### **Accessories for LCS<sup>2</sup> 19" server cabinets**

**Set of 4 caster wheels**  
Set of 4 pivoting casters, 2 of which have brakes  
Load on the 4 wheels: 500 kg

**Cable guides support**  
Fast screw-free assembly of cable guides (p. 117)  
Fitted between 2 supports  
Cat.No 0 464 79  
For depth 1000 mm  
Pre-cut every 100 mm for height 500 to 200 mm



Plinths, cable entry plates, thermal management, cable management and other accessories,  
**p. 116 to 119**

LCS<sup>2</sup> 19" equipment  
**p. 118**

1200 mm deep LCS<sup>2</sup> server cabinet  
**please consult us**

## Customised solutions

### LCS<sup>2</sup> 19" freestanding cabinets

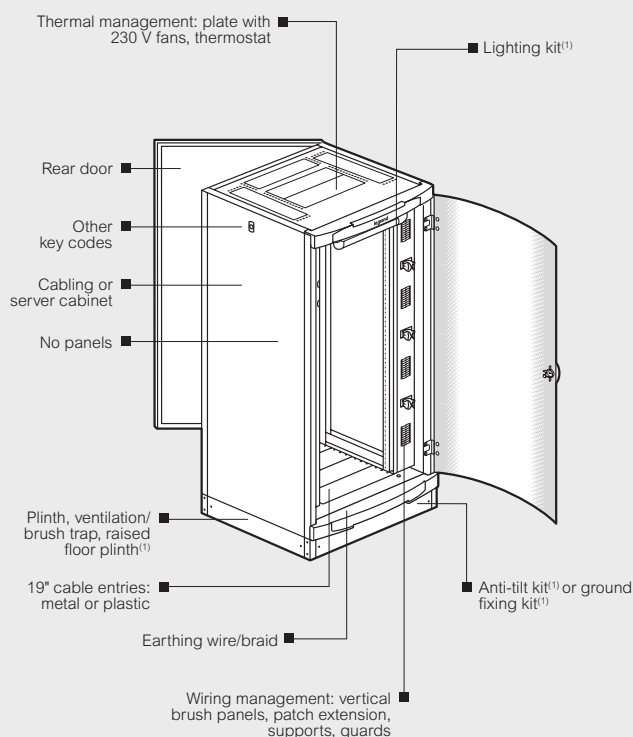


#### ↓ LCS<sup>2</sup> 19" FREESTANDING CABINETS

##### 40 SIZES

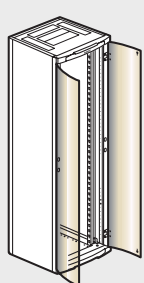
Capacity	24 U	29 U	33 U	42 U	47 U
Width	600 or 800 mm				
Depth	600, 800, 1000 or 1200 mm				

##### CABINET DEFINITION

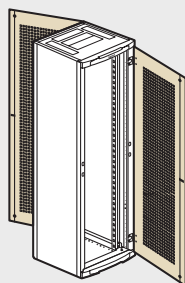


1: Supplied ready for assembly

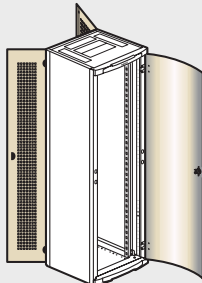
Option of solid or microperforated metal doors, screen-printed glass doors, double doors or no doors



Cabinet fitted with screen-printed glass double door at the front (42 U/47 U; width 800 mm)



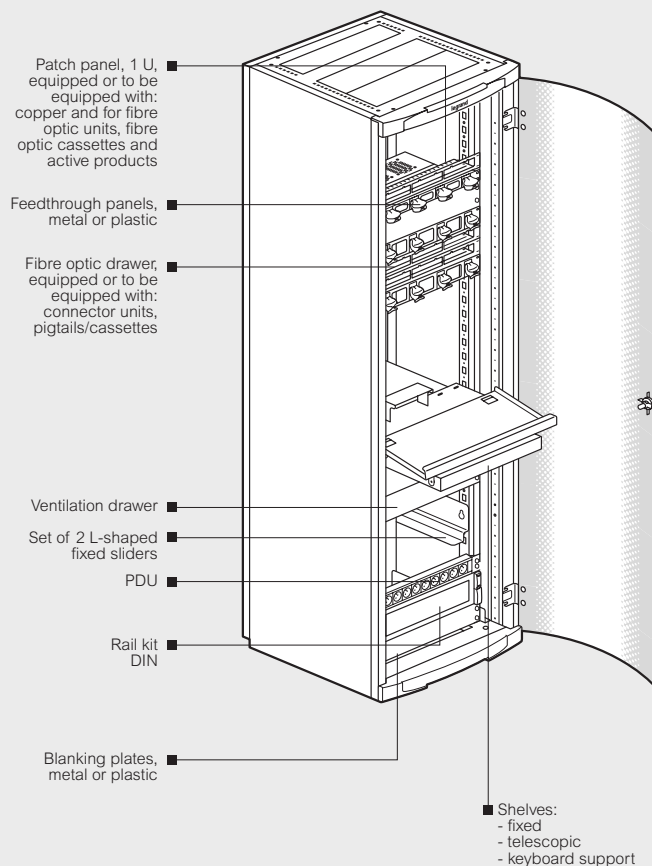
Cabinet fitted with microperforated metal doors at the front and rear (opening to the left)



Cabinet fitted with microperforated metal double rear door and screen-printed glass front door

#### ↓ LCS<sup>2</sup> 19" FREESTANDING CABINETS (CONTINUED)

##### 19" EQUIPMENT ASSEMBLY



#### ↓ COLOURS



180 RAL colours available.  
Optional touch-up brush in the selected RAL

## OUR COMMITMENT

Request a quotation from our technical team



# LCS<sup>2</sup> 19" cabinets and server cabinets

## plinths and adjustable height plinths



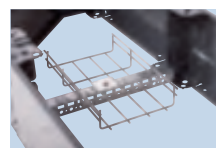
Kit 0 464 52 comprising 4 corner blocks and solid traps at front/rear



0 464 61



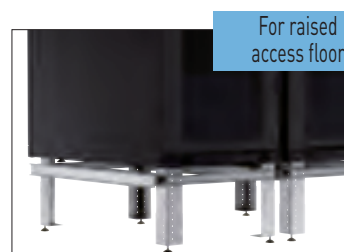
0 464 63



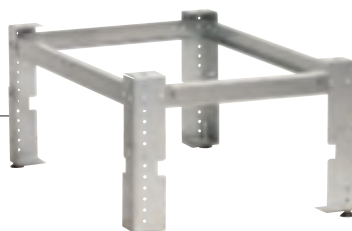
Cross Bar 0 476 93 with cable guide



0 464 66



For raised access floor



0 464 32

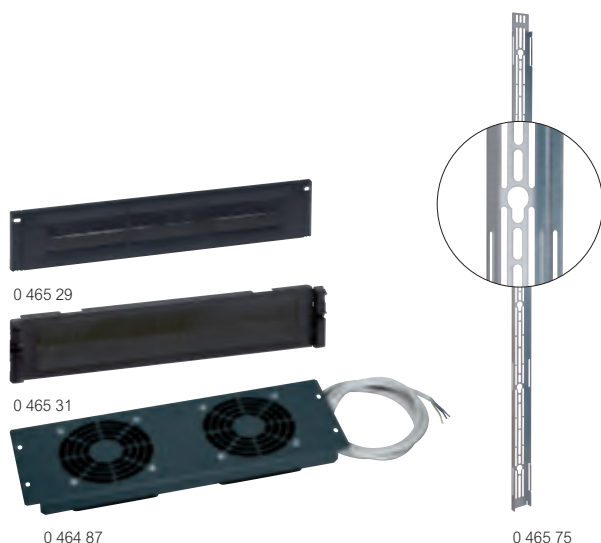
## Technical characteristics p. 148-149

Pack	Cat.Nos	Plinths for cabinets
		Metal. Open on 4 sides Anthracite grey RAL 7016
		<b>Plinth kits</b> Consisting of 4 corner blocks and solid front/rear traps height 100 mm Side traps to be ordered separately For cabinet width (mm):
1	Height 100 0 464 50	600
1	Height 200 0 464 51   0 464 52 0 464 53	800
		<b>Sets of 2 solid side traps</b> Trap height 100 mm Order 2 sets for a plinth height of 200 mm (Cat.No 0 464 52/53) For cabinet depth (mm):
1	0 464 54	600
1	0 464 56	800
1	0 464 58	1000
		<b>Ventilated traps</b> 1 trap height 100 mm For cabinet width/depth (mm):
1	0 464 60	600
1	0 464 61	800
		<b>Traps with brushes</b> 1 trap height 100 mm For cabinet width/depth (mm):
1	0 464 62	600
1	0 464 63	800
		<b>Plinth for cabling units</b>
1	0 464 64	For mounting between the plinths of the associated cabinets Trap height 100 mm Double the number of traps for a height of 200 mm Anthracite grey RAL 7016
		<b>Cross bars</b>
1	0 476 93	Fixed between 2 cabinet plinth corner blocks For clamping cables between associated cabinets and fixing a cable guide (p. 117) For cabinet depth (mm):
1	0 476 94	600
1	0 476 95	800
		1000

Pack	Cat.Nos	Linking interface
		Make junction between cabinet plinth and cable tray to protect cables Supplied with weatherproof brush Reversible cover with cut-outs providing a high-quality finish Height 200 mm. Anthracite grey RAL 7016 For cabinet depth 600 mm
1	0 464 66	
		<b>Adjustable height plinths for raised access floors</b>
		Transfer the load of the cabinet directly to the ground Height adjustable from 200 to 350 mm in 25 mm steps to adapt to different floor heights Levelling feet for fine adjustment For floor tiles 30 or 38 mm thick Permissible load: 1000 kg
		<b>Adjustable height plinths</b> Front and rear floor tile supports included For cabinet width/depth (mm):
1	0 464 30	600 x 600
1	0 464 31	600 x 800
1	0 464 32	600 x 1000
1	0 464 34	800 x 600
1	0 464 35	800 x 800
1	0 464 36	800 x 1000
		<b>Set of 2 tile support brackets</b> Fix onto adjustable height plinths to support the side tiles For plinths depth (mm):
1	0 464 38	600
1	0 464 39	800
1	0 464 40	1000

## LCS<sup>2</sup> 19" cabinets and server cabinets

cable entries, thermal management and PDU supports



Technical characteristics p. 149

Pack	Cat.Nos	19" cable entry plates	
		Black RAL 9005	
		<b>Plastic plates with brushes, snap on</b>	
1	0 465 28	1 U	
1	0 465 29	2 U	
		<b>Metal plates with brush</b>	
1	0 465 30	1 U	
1	0 465 31	2 U	
		<b>Thermal management</b>	
		<b>Plates with fans 3 U</b>	
		Fix onto the 19" cable entries	
		2.5 m power supply cable. 230 V~	
		Anthracite grey RAL 7016	
1	0 464 87	2 fans	
1	0 464 88	3 fans	
		<b>1 U ventilation drawers</b>	
		For internal air circulation. Fix on 2 x 19" uprights	
		ON/OFF switch. Supplied with power supply cord	
		230 V~. Black RAL 9005	
1	0 464 89	Drawer with 2 fans	
		Depth 150 mm	
1	0 464 90	Drawer with 4 fans	
		Depth 300 mm	
		<b>Thermostat</b>	
1	0 348 48	Adjustable from 5 to 60°C, 230 V~, 50/60 Hz	
		NC contact (5 A) and NO contact (10 A)	
		Magnetic mounting	
		<b>PDU supports</b>	
		Vertical support for fixing to the rear of 19" LCS <sup>2</sup>	
		cabinets and server cabinets (see p. 150). For	
		mounting 19" PDU vertically and vertical PDU	
1	0 465 75	For 42 U cabinets	
1	0 465 76	For 47 U cabinets	
		<b>Accessories</b>	
		<b>Anti-tilt kit</b>	
1	0 464 84	Stabilises a cabinet when heavy items	
		installed on telescopic equipment are	
		being removed	
		<b>Floor fixing kit</b>	
1	0 464 86	Used for permanently fixing	
		a cabinet to the ground by locking the	
		levelling feet	
		<b>Castors</b>	
1	0 464 83	Set of 4 pivoting castors	
		Total permissible load on the 4 castors: 380 kg	

## LCS<sup>2</sup> 19" cabinets and server cabinets

cable management, patch extension



Technical characteristics p. 150

Pack	Cat.Nos	Cable and cord management	
		<b>Set of 3 cable management supports</b>	
		Fix on structure	
		Quick, screw-free mounting of cable guides	
1	0 464 72	For cabinets width/depth 600 mm	
1	0 464 73	For cabinets width/depth 800 mm	
1	0 464 74	For cabinets depth 1000 mm	
		<b>Flat cable guides</b>	
		Quick, screw-free mounting on cable	
		management supports	
		Width 250 mm	
1	0 464 76	For 33 U cabinet	
1	0 464 77	For 42 U cabinets	
		<b>U-shaped cable guides</b>	
		For creating a cable tray	
		Used with cross bars	
		Cat. No 0 476 93/94/95 in a 200 mm high plinth on	
		associated cabinets, and 0 464 78/79	
		supports on server cabinets	
		Height 54 mm - Length 3 m	
1	0 464 69	Width 200 mm	
1	0 464 70	Width 400 mm	
		<b>Vertical cable management grille</b>	
		For 42 U cabinets - width 800 mm	
		Fixes onto 19" uprights	
1	0 331 35	Grille with articulated bolts	
		1560 x 100 x 150 mm	
		<b>Vertical cable manager</b>	
		For 42 U cabinets - width 800 mm	
		Fixes onto 19" uprights	
1	0 464 80	Set of 2 vertical panels with brush feedthroughs	
		Supplied with 10 cable guide rings Cat.No 0 465 42,	
		3 cable ties Cat.No 0 331 94, 3 cable ties	
		Cat.No 0 331 95 and 3 cable ties Cat.No 0 331 96	
		Black RAL 9005	
		<b>Patch extension</b>	
		For 42 U cabinets - width 800 mm	
		Fixes onto 19" uprights	
1	0 464 81	Set of 2 uprights for increasing the capacity of	
		the cabinet by 12 U, for mounting 19" equipment	
		vertically (feedthrough panels, 19" PDU, etc.)	
		Supplied with 8 cable guide rings Cat.No 0 465 42	
		Black RAL 9005	

Cable ties, document holders  
p. 123

# Legrand cabling system

## LCS<sup>2</sup> 19" equipment



0 465 01



0 465 22



0 465 23



0 465 06



465 29



0 465 32



Technical characteristics p. 149

Pack	Cat.Nos	Fixed shelves
		For cabinets and server cabinets Quick, screw-free mounting. Black RAL 9005
		<b>Projecting mounting on 2 x 19" uprights</b> Height 2 U. Max. load: 15 kg
1	0 465 00	Depth 115 mm
1	0 465 01	Depth 200 mm
1	0 465 02	Depth 360 mm
		<b>Fixing on 4 x 19" uprights</b> Height 1 U. Max. load: 50 kg
1	0 465 05	Shelf depth 425 mm For depth 600 mm
1	0 465 06	Shelf depth 625 mm For depth 800 mm
1	0 465 07	Shelf depth 825 mm For depth 1000 mm
		<b>Telescopic shelves</b> For cabinets and server cabinets Quick fixing on 4 x 19" uprights Height 1 U. Max. load: 50 kg. Black RAL 9005
1	0 465 08	Shelf depth 425 mm For depth 600 mm
1	0 465 09	Shelf depth 625 mm For depth 800 mm
1	0 465 10	Shelf depth 625 mm For depth 1000 mm
		<b>Shelves for heavy items</b> Max. load: 100 kg For cabinets depth 1000 mm (server cabinet only for telescopic shelf) Screw fixing on 4 x 19" uprights. Black RAL 9005
1	0 465 17	Fixed shelf depth 820 mm, 1 U
1	0 465 18	Telescopic shelf depth 820 mm, 2 U
		<b>Keyboard support shelf</b> For cabinets and server cabinets For depth 800 mm and 1000 mm Screw fixing on 4 x 19" uprights Max. load: 50 kg. Black RAL 9005
1	0 465 19	Can take: - a computer screen - a keyboard on the retractable support - a mouse on a sliding shelf with integrated mat Area for mouse or CD
		<b>Sets of 2 fixed sliders</b> For cabinets and server cabinets Fixing on 4 x 19" uprights Max. load: 50 kg
1	0 465 11	For depth 600 mm
1	0 465 12	For depth 800 mm
1	0 465 13	For depth ≥ 1000 mm

Pack	Cat.Nos	19" management panels
		For organisation and circulation of patch cords Black RAL 9005
		<b>Metal 2 axes, quick-fixing</b> Horizontal and through run. Fitted with plastic cable guide rings radiating out for optimum protection of the cords (compliance with the bending radius) Quick, screw-free fixing
1	0 465 22 <sup>1</sup>	1 U
1	0 465 23 <sup>1</sup>	2 U
		<b>Plastic with brushes, snap on</b>
1	0 465 28 <sup>2</sup>	1 U
1	0 465 29 <sup>2</sup>	2 U
		<b>Metal with brushes, quick-fixing</b> Quick, screw-free fixing
1	0 465 30 <sup>1</sup>	1 U
1	0 465 31 <sup>1</sup>	2 U
		<b>19" blanking plates</b> Black RAL 9005
		<b>Plastic, snap on</b>
1	0 465 32 <sup>2</sup>	1 U
1	0 465 33 <sup>2</sup>	2 U
		<b>Metal, quick-fixing</b> Quick, screw-free fixing
1	0 465 38 <sup>1</sup>	1 U
1	0 465 39 <sup>1</sup>	2 U
1	0 465 40 <sup>1</sup>	3 U
		<b>19" lighting kit</b> 19" metal panel with a lighting kit with switch Quick, screw-free fixing Supplied with 230 V~ - 8 W fluorescent tube
1	0 464 85 <sup>1</sup>	1 U
		<b>Fixing screws</b> Set of 50 cage nuts, 50 plastic washers and 50 x M6 screws
1	0 364 53	With 8.5 mm cage nuts
1	0 364 54	With 9.5 mm cage nuts

1: Can be mounted on 19" racks with screws Cat.No 0 464 23 (p. 119)  
2: Not for mounting on 19" racks



LCS<sup>2</sup> 19" freestanding cabinets p. 114

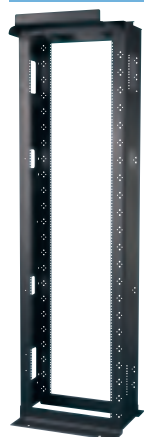
LCS<sup>2</sup> 19" wall-mounting cabinets p. 120

Cable ties p. 123

# Legrand cabling system

## 19" racks and accessories

19" screw fixing  
in tapped holes



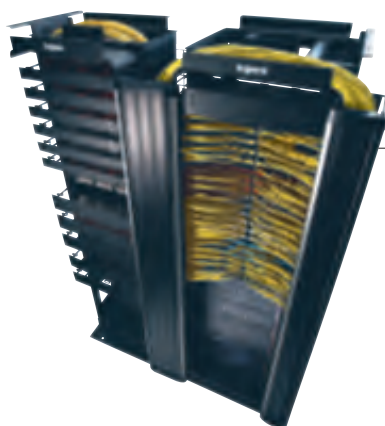
0 464 06



0 464 25



0 464 27



0 464 06 + 0 464 27 + 0 464 26 + 0 464 18 + 0 465 70  
with LCS<sup>2</sup> patch panels and cords



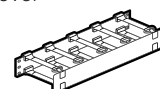
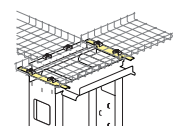
Technical characteristics p. 150-151

Pack	Cat.Nos	19" racks
		Racks for high-density cabling (e.g. data centers, SANs, main distributors, etc) Channel type 19" uprights for guiding and fixing cables, with U marking and tapped holes for fixing 19" equipment Roofing for right-left cord routing that complies with the bending radiuses Receive 19" LCS <sup>2</sup> metal management panels, 19" power distribution units and the LCS <sup>2</sup> 19" DIN rail kit fastened by screws Cat.No 0 464 23 (1 set of 50 supplied with the rack) Supplied with straps with hook and loop type closure Aluminium structure to be assembled Racks joined using grids Cat.Nos 0 464 25/26/27 Black
1	0 464 06	Capacity 45 U   Height (mm) 2185   Width (mm) 604   Depth (mm) 521   Permissible load (kg) 675   Depth of uprights (mm) 267
1	0 464 07	Capacity 45 U   Height (mm) 2185   Width (mm) 604   Depth (mm) 667   Permissible load (kg) 675   Depth of uprights (mm) 413

Pack	Cat.Nos	Cord management grids
		To be mounted between 2 joined racks or on an isolated rack The grid creates a 63 mm space between 2 joined racks for running cables and cords to the front and rear Capacity: 200 cat. 6 cords Black
1	0 464 25	Grid with hinged closing latches 1965 mm x 153 mm x 156 mm

Pack	Cat.Nos	Cord management grids with door
		Easily removable door that opens in both directions To be mounted between 2 joined racks or on an isolated rack (Cat.No 0 464 26 only) The grids create a space between 2 joined racks (63 mm for Cat.No 0 464 26, 165 mm for Cat.No 0 464 27) for running of cables and cords to the front and rear Side cord channels every 1 U Capacity: 200 cat. 6 cords for Cat.No 0 464 26, 580 cords for Cat.No 0 464 27 Supplied with 12 bend limiting clips and 4 coiling supports Black
1	0 464 26	1970 mm x 165 mm x 204 mm
1	0 464 27	1970 mm x 267 mm x 331 mm

Pack	Cat.Nos	Cable tray supports
		To be fitted in the depth of the rack to support a high cable tray (Cat.No 0 464 69/70 p. 117) For rack Cat.No 0 464 06 For rack Cat.No 0 464 07
1 1	0 464 18 0 464 19	
		Lower finishing plates
		Metal plates provide the finishing of the lower part of the rack and protection against dust The sides of the plates can be folded easily for direct insertion of cables in the 19" upright channel
1 1	0 464 15 0 464 16	For rack Cat.No 0 464 06 For rack Cat.No 0 464 07
		19" cord management panels
		1 axis closed panels with pivoting cover Depth 172 mm Black
1 1	0 465 70 0 465 71	1 U 2 U
		19" equipment screws
1	0 464 23	Set of 50 special screws for 19" racks and 25 earthing claws



# Legrand cabling system LCS<sup>2</sup> cabinets

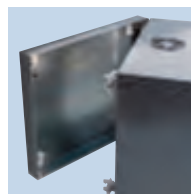
## LCS<sup>2</sup> 19" wall-mounting cabinets and accessories



0 462 01



0 462 11



Pivoting cabinet 0 462 11



0 465 01



Technical characteristics p. 152 to 153

IP 20 - IK 08

With reversible curved print screen glass safety door

Pivoting side panels, tool-free removal from inside

Lock closure with key 2433 A

Equipped with 2 x 19" uprights with depth adjusting aid

Supplied with earthing kit

Top and bottom grilles for natural ventilation, capable of taking a fan in the top part

Anthracite grey RAL 7016

Pack	Cat.Nos	Fixed LCS <sup>2</sup> 19" cabinets
		Easier cable management: ability to fix cable guide connecting rings Cat.Nos 0 465 41/42 and cable ties (p. 123) DLP format cable entries at the top and bottom, bendable, with ability to attach cables using cable ties Rear pre-cut cable entries
		<b>Cabinet depth 400 mm</b>
		Capacity   Width (mm)   Height (mm)   Load capacity (kg)
1	0 462 00	6 U   600   350   18
1	0 462 01	9 U   600   500   27
1	0 462 02	12 U   600   600   36
1	0 462 03	16 U   600   800   48
		<b>Cabinet depth 580 mm</b>
1	0 462 06	9 U   600   500   27
1	0 462 07	12 U   600   600   36
1	0 462 08	16 U   600   800   48
1	0 462 09	21 U   600   1000   63

Pack	Cat.Nos	Pivoting LCS <sup>2</sup> 19" cabinets
		Cabinets composed of: - base (wall-fixing) - pivoting body allowing free access to the rear of the cabinet to facilitate installation and maintenance Reversible pivoting direction Full cable entry plate at top and bottom, a brush plate can be fitted Cat.No 0 462 55
		<b>Cabinet depth 600 mm</b>
		Capacity   Width (mm)   Height (mm)   Load capacity (kg)
1	0 462 11	9 U   600   500   27
1	0 462 12	12 U   600   600   36
1	0 462 13	16 U   600   800   48
1	0 462 14	21 U   600   1000   63

Pack	Cat.Nos	Fixed shelves
		Quick fixing without screws Height 2 U Max. load 15 kg Black RAL 9005
		<b>Quick fixing on 2 x 19" uprights</b>
1	0 465 00	Depth 115 mm. For cabinets depth 400, 580 and 600 mm
1	0 465 01	Depth 200 mm. For cabinets depth 400, 580 and 600 mm
1	0 465 02	Depth 360 mm. For cabinets depth 580 and 600 mm
		<b>Thermal management</b>
		<b>Fan</b>
1	0 462 60	2.5 m power supply cable 230 V~ fan
1	0 348 48	<b>Thermostat</b> Adjustable from 5 to 60°C, 230 V~, 50/60 Hz NO contact (10A) and NC contact (5 A) Fixed by magnet
		<b>Cable entry</b>
1	0 462 55	Cable entry plate with brush For pivoting cabinets
		<b>Cable management rings</b>
		Direct clipping onto front structural uprights of 9 U to 21 U fixed cabinets (Cat.No 0 465 41 only) and on central upright of 580 mm depth cabinets
4	0 465 41	1 U, plastic Usable section 1890 mm <sup>2</sup>
4	0 465 42	2 U, plastic Usable section 4070 mm <sup>2</sup>
		<b>Accessories</b>
1	0 462 64	Set of 4 caster wheels for assembly on pivoting cabinets Total load permissible on the 4 casters: 120 kg



19" Power Distribution Units  
p. 122



LCS<sup>2</sup> 19" management panels  
p. 118





## Legrand cabling system LCS<sup>2</sup> cabinets

### LCS<sup>2</sup> 10" wall-mounting cabinet for small businesses



0 462 20



0 335 92



0 462 23

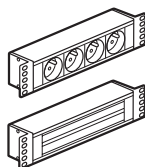
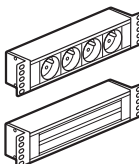


0 462 24



Technical characteristics p. 152 to 153

Pack	Cat.Nos	<b>LCS<sup>2</sup> 10" cabinet</b>								
		<b>300 mm depth cabinet</b> Compact cabinet suitable for small business applications up to 36 RJ 45 sockets IP 20 – IK 08 Equipped with: -1 reversible curved door made of safety glass -2 side panels removable from inside -key locking No 2433A -2 depth-adjustable uprights -top and bottom cable entries to DLP trunking system format -pre-cut back cable entry -top and bottom perforations for natural ventilation Anthracite grey RAL 7016								
1	0 462 20	<table><tr><th>Capacity</th><th>Width (mm)</th><th>Height (mm)</th><th>Load capacity (kg)</th></tr><tr><td>6 U</td><td>314</td><td>352</td><td>12</td></tr></table>	Capacity	Width (mm)	Height (mm)	Load capacity (kg)	6 U	314	352	12
Capacity	Width (mm)	Height (mm)	Load capacity (kg)							
6 U	314	352	12							
		<b>10" equipment</b> Supplied with screws and cage nuts								
1	0 335 92	<b>Modular empty panel</b> 10" panel - 1 U For up to 2 connector units or 2 fibre optic units (p. 89 and 108)								
1	0 462 23	<b>Fixed shelf 1 U</b> Depth 120 mm Max. load. 10 kg Black RAL 9005								
		<b>PDU</b> 230 V~ Need 2 U space Supplied with screws and cage-nuts Black								
1	0 462 24	4 x 2P+E French standard sockets								
1	0 462 26	4 x 2P+E German standard sockets								
1	0 462 25	To be equipped with Mosaic 2P+E sockets Capacity: 8 modules								



## Customised solutions

### LCS<sup>2</sup> 19" wall-mounting cabinets



↓

LCS<sup>2</sup> 19" WALL-MOUNTING CABINETS

1: Pivoting cabinets

■ Cable entry plate with brushes<sup>(1)</sup>

■ Thermal management (fan, thermostat)

■ Other colour, 180 RAL

■ Solid metal door, opening to the left, no door

■ No side panels

■ Fixed or pivoting

■ Earthing wire

■ Other key codes

■ Power supply unit

■ Fixed shelves, modular patch panel 1 U and feedthrough, blanking plates, DIN rail kit, fibre optic drawer

## OUR COMMITMENT

Request a quotation from our technical team

## Energy distribution

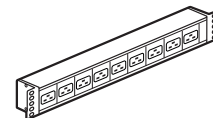
### Power Distribution Units (PDU) and DIN rail kit



Technical characteristics p. 154

Pack	Cat.Nos	Vertical Power Distribution Units (PDU)
		PDU with protection of each circuit by 16 A circuit breaker (equipped with cover for protection against accidental breaks) Mounting in LCS <sup>2</sup> cabling and server cabinet with PDU support Cat.Nos 0 465 75/76 (p. 117) Mounting in Varicon-L server cabinet with 2 fixing crosspieces Cat.Nos 6 466 55/57 (p. 127) Fixing centres: 1697 mm min - 1703 mm max. H 1720 x W 55 x D 51/88 mm <sup>(2)</sup> Supplied with screws
		<b>Single phase</b> 230 V 50/60 Hz power supply PDU comprising 2 circuits The total number of sockets is distributed equally between the 2 circuits Each circuit is identified by colour-coding
1	0 465 81	24 x C13 sockets Connection on 4/6 mm <sup>2</sup> terminal block
1	0 465 84	16 x C13 sockets + 6 x C19 sockets 3 m power supply cord with IEC 60309 2P+E plug 16 A
1	0 465 80	24 x 2P+E sockets - French standard Connection on 4/6 mm <sup>2</sup> terminal block
1	0 465 88	24 x 2P+E sockets - German standard Connection on 4/6 mm <sup>2</sup> terminal block
1	0 465 89	22 x 2P+E sockets - British standard Connection on 4/6 mm <sup>2</sup> terminal block
		<b>3-phase</b> 380 V 50/60 Hz three-phase power supply 1 circuit per phase, each with 8 IEC 60320 C13 sockets and 1 IEC 60320 C19 socket
1	0 465 85	24 x C13 sockets + 3 x C19 sockets 3 m power supply cord with IEC 60309 2P+N+E plug 32 A

Pack	Cat.Nos	19" Power Distribution Units (PDU)
		230 V - 50/60 Hz power supply For fixing on 19" fixing centres 180° reversible end piece Connection via 2.5 mm <sup>2</sup> terminal block Provide a 2 U space Supplied with screws
		<b>PDU</b>
1	0 465 51 <sup>1</sup>	12 x IEC 60320 C13 sockets
1	0 465 52 <sup>1</sup>	9 x IEC 60320 C19 sockets
1	0 465 50 <sup>1</sup>	9 x 2P+E black sockets French standard
1	0 465 54 <sup>1</sup>	6 x 2P+E black sockets - French standard
1	0 332 88 <sup>1</sup>	6 x 2P+E white sockets - French standard With switch with indicator
1	0 332 37 <sup>1</sup>	6 x 2P+E white sockets - French standard With 16 A circuit breaker
1	0 332 87 <sup>1</sup>	6 x 2P+E tamperproof sockets for uninterruptible power supply (UPS) - French standard
1	0 465 60 <sup>1</sup>	9 x 2P+E black sockets - German standard
1	0 465 62 <sup>1</sup>	6 x 2P+E black sockets - German standard
1	0 332 38 <sup>1</sup>	6 x 2P+E white sockets - German standard With 16 A circuit breaker
1	0 465 65 <sup>1</sup>	6 x 2P+E black sockets - British standard
1	6 339 00 <sup>1</sup>	5 x 2P+E white switch sockets - British standard



1: Can be mounted on 19" racks with screw Cat.No 0 464 23 (p. 119)  
2: Overall depth at the circuit breaker slot

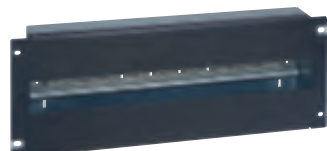


## Energy distribution

### Power Distribution Units (PDU) and DIN rail kit (continued)



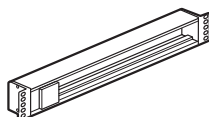
0 332 78



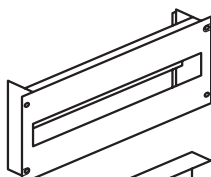
Kit 0 465 46 + 0 465 47

#### Pack Cat.Nos 19" Power Distribution Units (PDU) (continued)

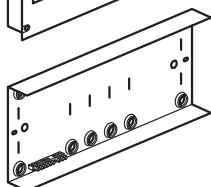
1	0 332 78 <sup>1</sup>	230 V - 50/60 Hz power supply For fixing on 19" fixing centres 180° reversible end piece Connection via 2.5 mm <sup>2</sup> terminal block Provide a 2 U space Supplied with screws  <b>PDU with voltage surge protector unit</b> 6 x 2P+E white sockets - French standard Provides protection against mains overvoltages while keeping sockets energised A red indicator indicates that the protection must be replaced by the surge protector module Cat.No 0 775 41 With switch with indicator
1	0 332 79 <sup>1</sup>	<b>PDU to be equipped</b> Takes 16 Mosaic modules



1	0 465 46 <sup>1</sup>	<b>Multi-application DIN rail kit</b> For mounting modular devices (circuit breakers, Legrand multimedia network components, etc) Capacity: 24 modules Height 4 U Screw fixing on 19" uprights DIN profile rail with front panel Supplied with blanking plates 24 modules Black RAL 9005
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1	0 465 47	Rear cover Used with Cat.No 0 465 46 To be used for high current applications (greater than 50 V) Ensures IP XXB Supplied with terminal block (8 + 1 connections)
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1: Can be mounted on 19" racks with screw Cat.No 0 464 23 (p. 119)

## Cable ties and document holders



0 331 94



0 331 95



0 331 96



0 331 85



0 331 87

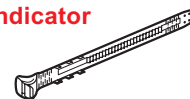


0 320 68

For grouping together and organising audio, computer, VDI, etc, cables  
Re-usable (cables can be added)

#### Pack Cat.Nos Cable ties with tightening indicator

50	0 331 94	Wide cable ties with patented warning system to prevent overtightening cables Release by pinching the head of the cable tie Strap held in place after tightening
50	0 331 95	
50	0 331 96	



Width (mm)	Length (mm)	max.	min.
15	180	35	15
15	225	50	35
15	320	80	50

#### Self-locking cable ties

Repositionable cable ties  
Double-sided textile with "loops" on one side and "hooks" on the other  
Do not damage cables

Colour	Width (mm)	Length (mm)	Tightening Ø max. (mm)
Black	16	150	35
Red	16	150	35
Green	16	150	35
Black	16	300	80
Red	16	300	80
Green	16	300	80

#### Self adhesive base

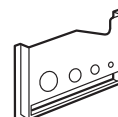
For cable ties max. width 20 mm  
Black - 38 x 38 x 9.4 mm  
Possible central fixing with screw Ø4 mm



#### Self-adhesive document holders

##### Open - RAL 7035

		Ext. dimensions		Int. dimensions		
		Height (mm)	Width (mm)	Height (mm)	Width (mm)	Depth (mm)
20	0 365 80	235	340	200	310	18
20	0 365 81	165	260	130	230	18



##### Closed - RAL 7035

Rigid plastic - IP 50  
Int. dimensions: 324 x 120 x 18 mm

##### Transparent

Soft plastic, A4 - 305 x 220 mm

# Performance and reliability at the heart of the server room

Legrand provides a comprehensive range of products and solutions dedicated to server room applications

**Smart patching for fibre and copper**

p. 132 

**LCS<sup>2</sup> cat. 6<sub>A</sub> cables, patch cords and patch panels**

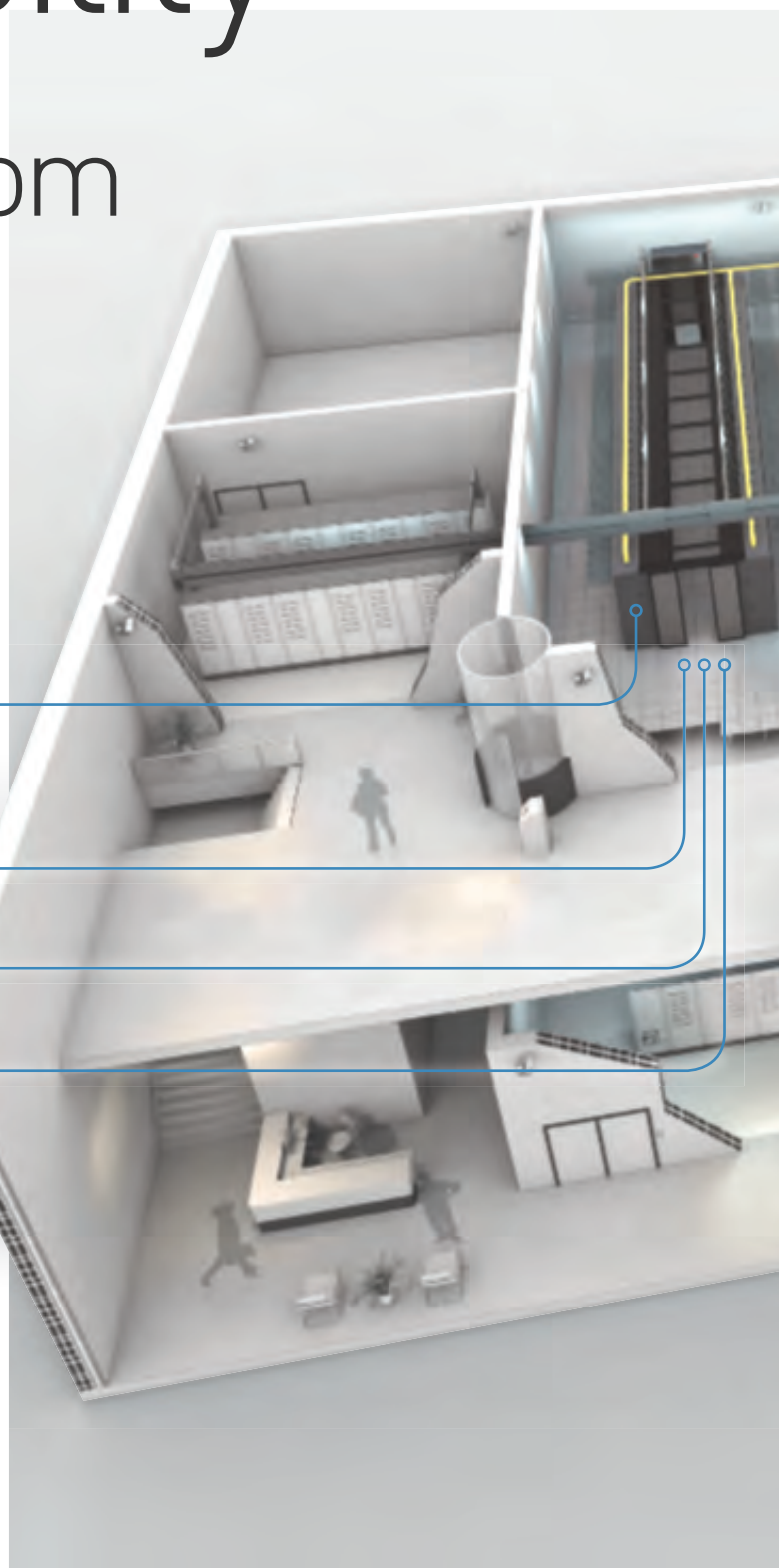
p. 134 

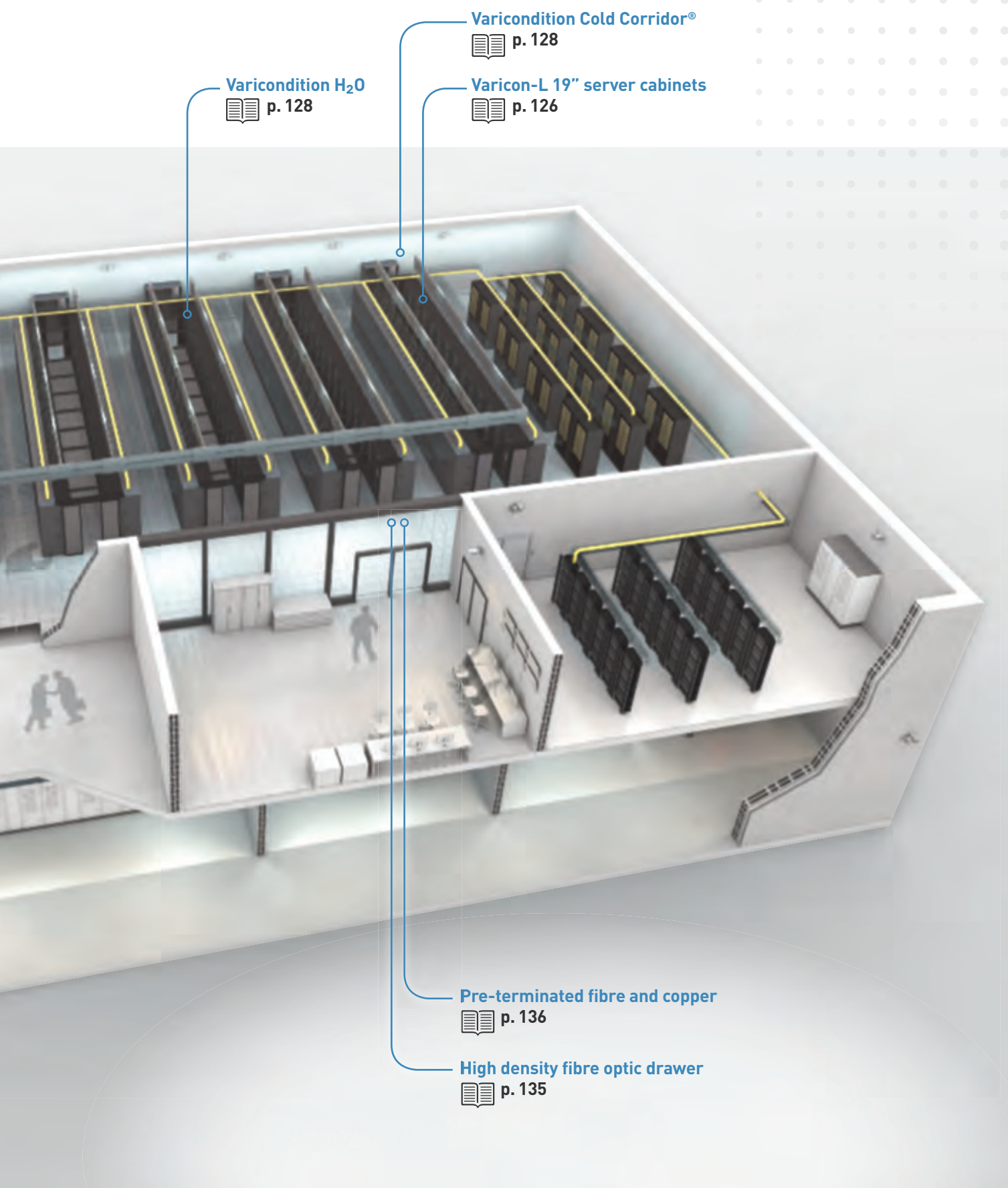
**Metered and smart PDU**

p. 130 

**LCS<sup>2</sup> fibre optic cables and patch cords**

p. 137 









6 466 21



6 466 68



6 466 69



6 466 61



Technical characteristics **p. 156**

Pack	Cat.Nos	<b>Varicon-L 19" server cabinets</b>			
		Baying server cabinets, IK08 Permissible load 1000 kg Front and rear reversible microperforated metal doors (80%), with 2-point locking handles Removable side panels 4 sides locked with 2233 key lock Cable entries at the top: 1 rear entry with brushes and 2 entries fitted with solid plates (3 when width 800 mm) Open cable entry at the bottom Equipped with 4 x 19" uprights with U marking and adjustable in depth Levelling feet adjustable from the inside Supplied with earthing kit Cabinets depth 1200 mm take LCS <sup>2</sup> shelves for depth 1000 mm Black RAL 9011			
		<b>Cabinets</b>			
		Capacity	Height (mm)	Width (mm)	Depth (mm)
1	6 466 10	41 U	2000	600	1000
1	6 466 12	41 U	2000	600	1200
1	6 466 13	41 U	2000	800	1000
1	6 466 15	41 U	2000	800	1200
1	6 466 16	46 U	2200	600	1000
1	6 466 18	46 U	2200	600	1200
1	6 466 19	46 U	2200	800	1000
1	6 466 21	46 U	2200	800	1200
		<b>Extension cabinets</b>			
		Without side panels Supplied with joining kit			
		Capacity	Height (mm)	Width (mm)	Depth (mm)
1	6 466 30	41 U	2000	600	1000
1	6 466 32	41 U	2000	600	1200
1	6 466 33	41 U	2000	800	1000
1	6 466 35	41 U	2000	800	1200
1	6 466 36	46 U	2200	600	1000
1	6 466 38	46 U	2200	600	1200
1	6 466 39	46 U	2200	800	1000
1	6 466 41	46 U	2200	800	1200



Technical characteristics **p. 157**

Pack	Cat.Nos	<b>Cable management</b>			
		<b>Vertical cable managers</b> Fix on 19" uprights to manage copper or fibre optic cords (see technical page, p. 157) Supplied with 10 plastic cable guides that can be positioned without any tools over the whole height Supplied with screws			
1	6 466 65	Vertical cable manager for 41 U cabinet			
1	6 466 66	Vertical cable manager for 46 U cabinet			
		<b>Cable guide rings</b> Fix on structural uprights and 19" uprights Metal Supplied with screws			
1	6 466 68	Ring for vertical management. 35 x 65 mm			
1	6 466 69	Ring for horizontal management. 30 x 85 mm			
		<b>Cable guides</b> For holding cables in the cabinet Direct rear or side fixing on the structure Width 300 mm Supplied with screws			
1	6 466 61	Cable guide for 41 U cabinet			
1	6 466 62	Cable guide for 46 U cabinet			
		<b>Cable entry with brushes</b> For mounting on the top cable entry Set of brushes			
1	6 466 85				

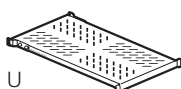
# Legrand Server System

equipment for Varicon-L 19" server cabinets

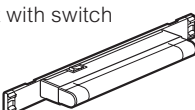
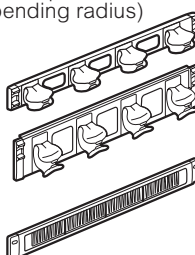
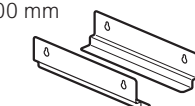
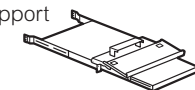


Technical characteristics p. 157

Pack	Cat.Nos	Equipment supports
1	6 466 55	<b>Fixing crosspieces</b> For fixing equipment depthwise in cabinets Fix on structural uprights in 25 mm steps over the whole height of the cabinet Supplied without screws
	6 466 57	Crosspiece for cabinet depth 1000 mm
	6 466 57	Crosspiece for cabinet depth 1200 mm
1	6 466 59	<b>Set of 4 universal fixing brackets</b> For fixing equipment. Numerous attachment points (see technical page, p. 157) Fix on structural uprights and 19" uprights Supplied with screws
	6 466 59	Set of 4 universal fixing brackets
1	6 466 81	<b>Air flow management</b> <b>Front vertical covers</b> For cabinet width 800 mm. Keep the cold air at the front of the servers. Fix on the 19" uprights and cover the space on the front between the structure and the 19" uprights. Each cover has three 2 U cut-outs to be fitted with 19" LCS <sup>2</sup> blanking plates or plastic plates with brushes Black RAL 9011
	6 466 82	Set of 2 front covers for 41 U cabinets
	6 466 82	Set of 2 front covers for 46 U cabinets
1	6 466 88	<b>Side vertical covers</b> For cabinet width 800 mm. Used with front vertical covers. Cover the sides of the space between the structure and the front covers. Depth 270 mm Black RAL 9011
	6 466 89	Set of 2 side covers for 41 U cabinets
	6 466 89	Set of 2 side covers for 46 U cabinets
1	0 465 32	<b>19" LCS<sup>2</sup> blanking plates</b> Plastic, snap on, black
	0 465 33	1 U
	0 465 33	2 U
1	0 465 28	<b>19" LCS<sup>2</sup> feedthrough panels</b> Plastic with brushes, snap on, black
	0 465 29	1 U
	0 465 29	2 U
1	0 465 17	<b>Shelves for heavy items</b> Max. load: 100 kg For cabinets depth 1000 and 1200 mm Screw fixing on 4 x 19" uprights (max. fixing centre: 825 mm) Black RAL 9005
	0 465 18	Fixed shelf, depth 820 mm, 1 U
	0 465 18	Telescopic shelf, depth 820 mm, 2 U



Pack	Cat.Nos	Keyboard support shelves
1	0 465 19	For cabinets depth 1000 and 1200 mm Screw fixing on 4 x 19" uprights (max. fixing centre: 825 mm) Max. load: 50 kg Black RAL 9005 Can take: - a computer screen - a keyboard on the retractable support - a mouse on a sliding shelf with integrated mat Area for mouse or CD
1	0 465 13	<b>Sets of 2 fixed sliders</b> For cabinets depth 1000 and 1200 mm Fixing on 4 x 19" uprights (fixing centre: 740 mm) Max. load: 50 kg For depth ≥ 1000 mm
1	0 465 22	<b>19" management panels</b> For organisation and circulation of patch cords Black RAL 9005 <b>Metal 2 axes, quick-fixing</b> Horizontal and through run. Fitted with plastic cable guide rings radiating out for optimum protection of the cords (compliance with the bending radius) Quick, screw-free fixing
1	0 465 23	1 U
1	0 465 23	2 U
1	0 465 28	<b>Plastic with brushes, snap on</b>
1	0 465 29	1 U
1	0 465 29	2 U
1	0 464 85	<b>19" lighting kit</b> 19" metal panel with a lighting kit with switch Quick, screw-free fixing Supplied with 230 V~ 8 W fluorescent tube



Other equipment and accessories  
**Customised solutions, p. 129**

For other shelves and management panels  
**p. 118**

# Legrand Server System

Varicondition Cold Corridor® and Varicondition H<sub>2</sub>O



6 466 12 + 6 467 10 + 6 467 28 + 6 467 20 + 6 467 22 + 6 467 24



6 467 40



Technical characteristics p. 157

Pack	Cat.Nos	Varicondition Cold Corridor®
		Solution to contain the cold air in the corridor formed by 2 rows of cabinets Minimises the cold air production needed for cooling the servers
		<b>Double sliding doors</b> To close off a 1200 mm wide corridor Sliding doors with window made of safety glass Opened and closed manually Supplied with the necessary fixing accessories (attachment to the cabinets and to the ground) Provide a double door at each end of the corridor Black RAL 9011
1	6 467 10	For corridor consisting of cabinets height 41 U
1	6 467 12	For corridor consisting of cabinets height 46 U
		<b>Roof modules</b> To cover a 1200 mm wide corridor The roof modules are placed on the rail Cat.No 6 467 28 600 mm wide module consisting of a metal frame and a glass window 100 and 200 mm wide modules solid metal Match the number and sizes of the modules to the length of the rows of cabinets Always place a 100 or 200 mm solid module at each end of the corridor and between each 600 mm module Black RAL 9011
1	6 467 20	Module, width 600 mm
1	6 467 22	Module, width 200 mm
1	6 467 24	Module, width 100 mm
		<b>Roof profile</b> Takes the roof modules Positioned on the roofs of the cabinets Enables the cabinets to be moved without having to dismantle the corridor roof
1	6 467 28	Rail, length 2 m

Pack	Cat.Nos	Varicondition - H <sub>2</sub> O
		Cooling unit for integration in the rows of cabinets for precise air conditioning as close as possible to the servers Deals with hot spots
		Water-based cooling unit for connection to a chiller Cooling capacity up to 24 kW Cold air production controlled by the control unit: - control of the water inlet valve - control of the speed of the 6 fans distributed in 3 areas Control screen on the front Front and rear panels 80% microperforated for open loop operation: air drawn in at the rear of the unit and discharged at the front into the corridor after being cooled The control unit and fans can be maintained without stopping the cooling unit
		For use with 19" Varicon-L server cabinets 41 U depth 1200 mm Height 2000 mm Width 300 mm Depth 1200 mm Black RAL 9011
1	6 467 40	Cooling unit 24 kW



Customised solutions for Data centers p. 129

## Customised solutions

19" Varicon-L server cabinets, Varicondition Cold Corridor® and H<sub>2</sub>O



### ↓ 19" VARICON-L SERVER CABINETS

Up to 384 possible combinations to meet all your configuration requirements

Height	Width	Depth	Front door	Rear door	Side panels
41 U	600 mm	1000 mm	single, microperforated	single, microperforated	without
46 U	800 mm	1200 mm	single, glazed	single, glazed	with
			double, microperforated	single, solid metal	
			double, glazed	double, microperforated	
				double, glazed	
				double, solid metal	



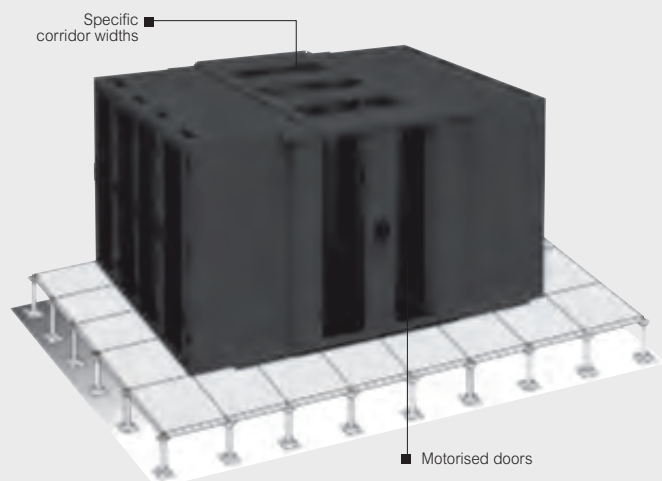
- Secure access to sensitive equipment:
  - Locked with key
  - Locked using a code
  - Locked using a card reader



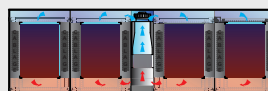
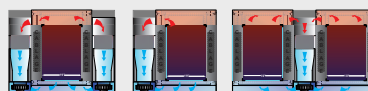
- Plinth
  - Casters
  - Floor fixing kit
  - Cable entry plate
  - Ventilation
  - Etc.

### Optimisation of the energy use and servers cooling by appropriate organisation of the rows of cabinets:

Cold Corridor® (width 1200 mm) with raised access floor



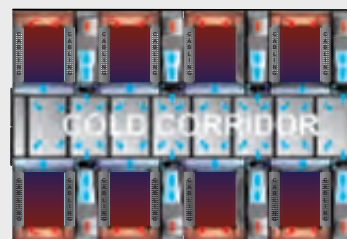
Study of integrating cooling units in the rows



Closed loop



Open loop



Hybrid loop



# A customized offer for **Smart PDU** and **Environmental Monitoring System**

Smart PDU and Environmental Monitoring System provide local and remote power monitoring and environmental monitoring via IP in server cabinets



■ Measure energy

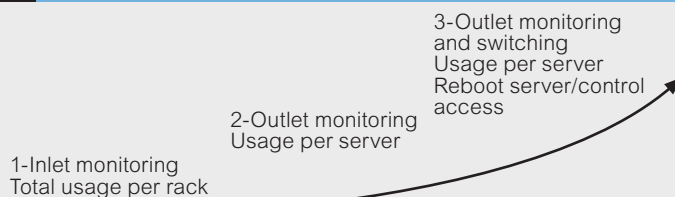
■ Measure environmental parameters

**COST SAVINGS  
SECURING UPTIME**

■ Be informed remotely

■ Intervene remotely

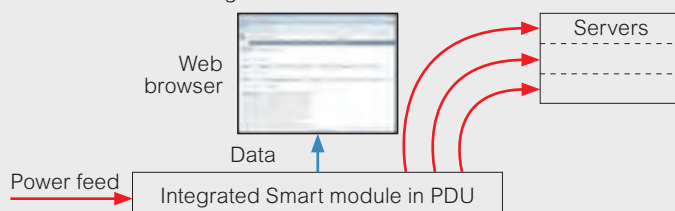
## MONITORING LEVELS ON PDU



## ARCHITECTURE FRAMEWORKS

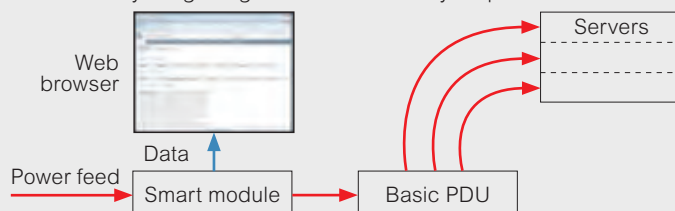
### Integrated "smart module" to the PDU main frame

All in one. Features integrated in the PDU



### External "smart module" (with or without display) from PDU main frame

For existing installation equipped with basic PDU, upgrade installation by integrating "smart module" on your power feed



(The "smart module" will powered the Basic PDU)

### Independent "smart module" (with or without display) from PDU main frame

For new project, bring flexibility thanks to smart module in parallel to basic. PDU Service and repair without interrupting, spread or postponed investments

(The "smart module" is powered the Basic PDU)

## FEATURES

### Energy measured values

Power (kW) and power consumption (kWh), Voltage (V), Current (A), apparent power (VA), power factor +/- 1% accuracy

### Communication

IP connection through Ethernet port. Local display and Web browser interface. SNMP protocol. Possible local configuration with RS232 port

### Physical

Power: single or Three phase, 16 or 32 Amps  
Inlet: choose your connector type and cord length  
Outlet socket types: C13, C19, local standards  
Protection: without, with fuse, with circuit breaker  
Format: 19" or vertical

### Environmental

Temperature. Humidity. Water detection. Door cabinet status

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## Energy distribution

metered PDU



0 465 95

Technical characteristics p. 154-155

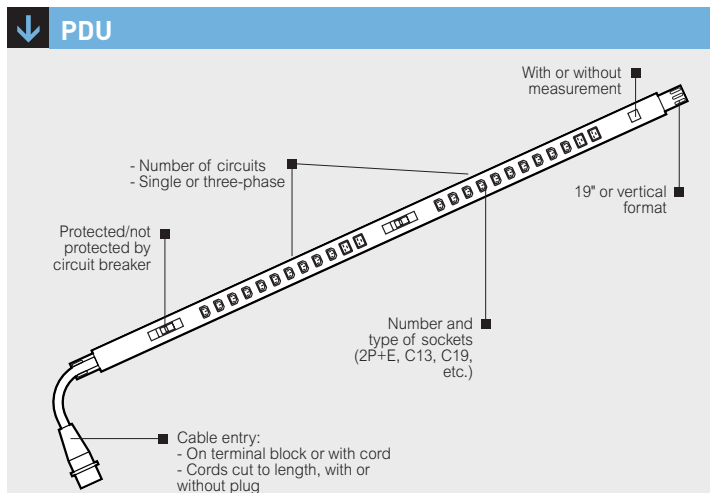
PDU equipped with a digital display ammeter  
For supplying power to active products in 19" cabinets  
Measure consumption to provide better installation management:  
balancing circuits, displaying available capacity, preventing overloads  
and power failures  
Measure total PDU current for single-phase version and current per  
phase for three-phase version

Pack	Cat. Nos	19" PDU
1	0 465 90	For fixing on 19" fixing centres Connection on terminal block Height 1U Supplied with screws 6 x C13 sockets
		<b>Vertical PDU</b>
		Protection of each circuit by circuit breaker with a cover providing protection against accidental breaks - Mounting in LCS <sup>2</sup> cabling and server cabinet with mounting bracket Cat.Nos 0 465 75/76 (p. 117) - Mounting in 19" Varicon-L server cabinets with 2 crosspieces Cat.Nos 6 466 55/57 (p. 127) Supplied with screws
		<b>Single phase</b>
		Measurement of the total PDU current 230 V 50/60 Hz power supply PDU comprising 2 circuits with 10 IEC 60320 C13 sockets + 2 IEC 60320 C19 sockets Fixing centre: 1700 mm min. - 1735 mm max. H 1750 x W 62 x D 50/85 <sup>(1)</sup> mm
1	0 465 93	20 x C13 sockets + 4 x C19 sockets Connection on 2.5 - 6 mm <sup>2</sup> terminal block
1	0 465 94	20 x C13 sockets + 4 x C19 sockets 3 m power supply cord with 32 A IEC 60309 2P+E plug
1	0 465 95	20 x C13 sockets + 4 x C19 sockets 3 m power supply cord with IEC 60320 C20 plug
		<b>Three-phase</b>
		Measurement per phase 380 V 50/60 Hz three-phase power supply 1 circuit per phase, each with 5 IEC 60320 C13 sockets + 1 IEC 60320 C19 socket Fixing centre: 1738 mm min. - 1772 mm max. H 1787 x W 62 x D 45/85 <sup>(1)</sup> mm
1	0 465 96	15 x C13 sockets + 3 x C19 sockets 3 m power supply cord with 32 A IEC 60309 3P+N+E plug

1: Overall depth at the circuit breaker slot

## Customised solutions

PDU



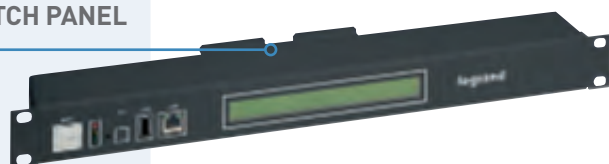
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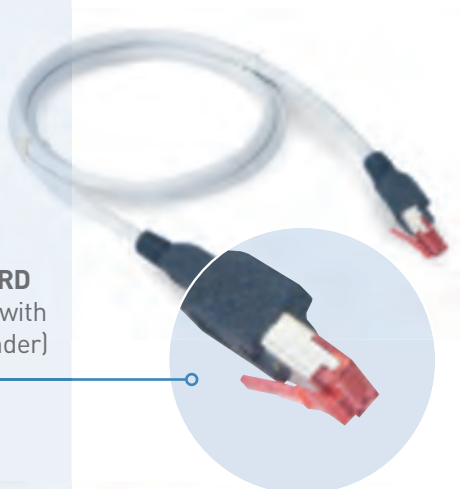
# Smart patching for fibre and copper

Provides an intelligent and efficient patch management system for complex networks and data centers

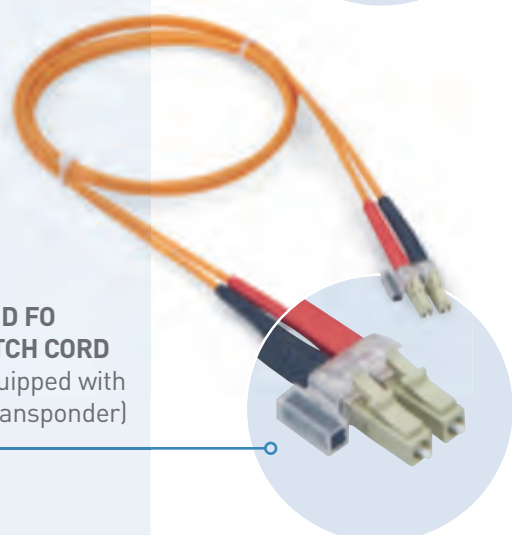
## ANALYSER FOR RFID PATCH PANEL



## RFID PATCH CORD (equipped with a transponder)



## RFID FO PATCH CORD (equipped with a transponder)



3 343 15



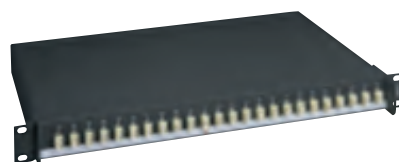
3 343 03



3 343 00



3 343 17



3 343 40



3 343 44

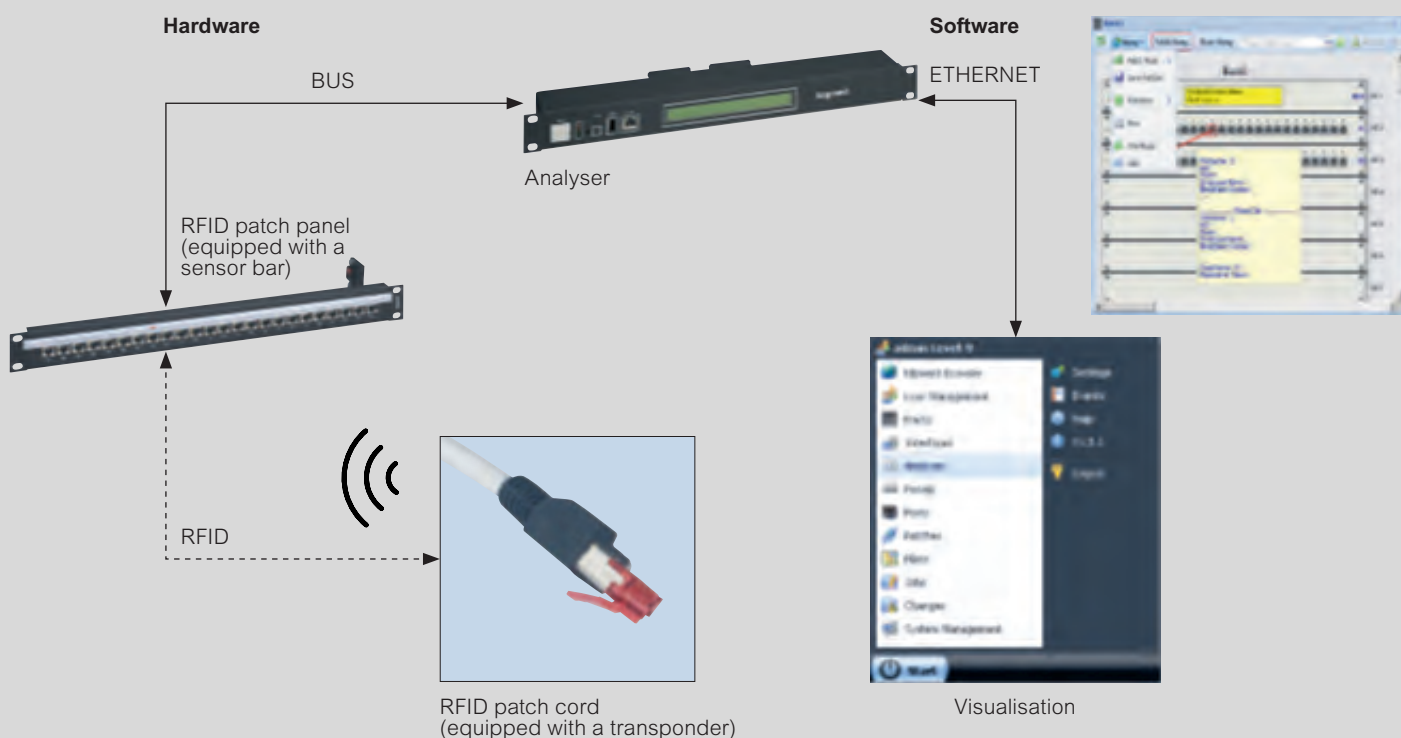
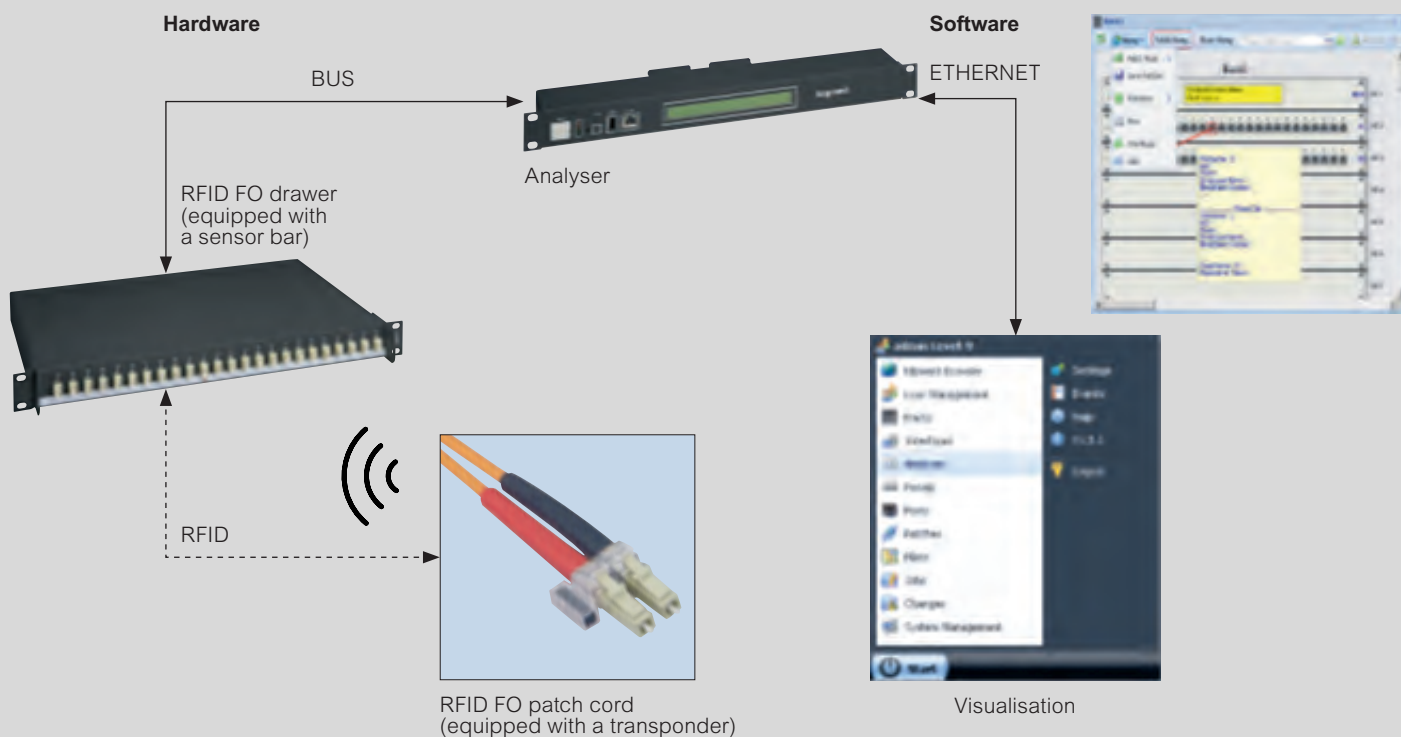
Pack	Cat.Nos	Analysers
1	3 343 15	The Analyser acts as an intelligent communications interface between the patch panel/FO drawer and the management system Analyser for RFID patch panels 1 for 30 RFID patch panels
1	3 343 00	<b>Patch panel</b> The patch panel is equipped with a sensor bar which reads the RFID information from patch cords and displays, by means of LEDs, ports involved in changes or jobs RFID patch panel 24 RJ 45 cat. 6 <sub>A</sub> STP
1	3 343 40	<b>Fibre optic drawer</b> The drawer is equipped with a sensor bar which reads the RFID information from patch cords and displays, by means of LEDs, ports involved in changes or jobs RFID drawer fibre optic OM4 24 LC to be equipped
1	3 343 03	<b>RJ 45-RJ 45 cords</b> Patch cords (copper) are fitted with RFID transponders at both ends
1	3 343 04	RFID patch cord cat. 6 <sub>A</sub> S/FTP LSZH 1 m
1	3 343 05	RFID patch cord cat. 6 <sub>A</sub> S/FTP LSZH 2 m
1	3 343 06	RFID patch cord cat. 6 <sub>A</sub> S/FTP LSZH 3 m
1	3 343 07	RFID patch cord cat. 6 <sub>A</sub> S/FTP LSZH 5 m
1	3 343 17	RFID server patch cord cat. 6 <sub>A</sub> S/FTP LSZH 1 m
1	3 343 18	RFID server patch cord cat. 6 <sub>A</sub> S/FTP LSZH 2 m
1	3 343 19	RFID server patch cord cat. 6 <sub>A</sub> S/FTP LSZH 3 m
1	3 343 44	<b>Fibre optic cords</b> Patch cords (fibre optic) are fitted with RFID transponders at both ends
1	3 343 45	RFID patch cord fibre optic OM4 LC/LC 1 m
1	3 343 46	RFID patch cord fibre optic OM4 LC/LC 2 m
1	3 343 47	RFID patch cord fibre optic OM4 LC/LC 3 m
1	3 343 48	RFID server patch cord fibre optic OM4 LC/LC 1 m
1	3 343 49	RFID server patch cord fibre optic OM4 LC/LC 2 m
1	3 343 49	RFID server patch cord fibre optic OM4 LC/LC 3 m
1	3 343 30	<b>BUS connection accessories</b> BUS cable 25 m
1	3 343 31	BUS connector
1	3 343 32	BUS termination
1	3 343 33	BUS connector crimping tool

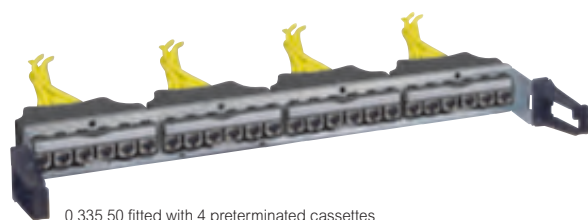
# Legrand cabling system LCS<sup>2</sup>

smart patching for fibre and copper

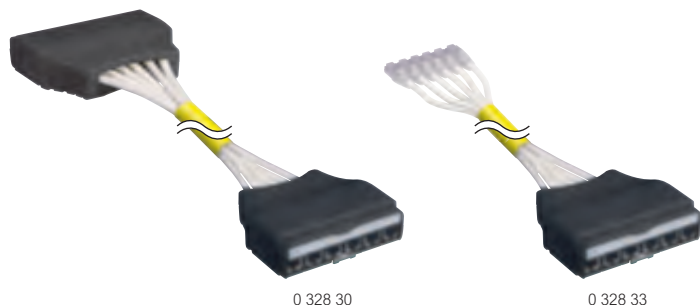


## Schematic explanation





0 335 50 fitted with 4 preterminated cassettes



0 328 30

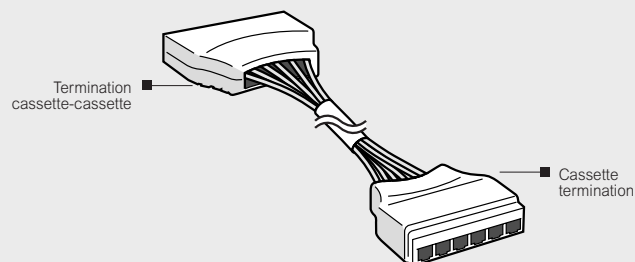
0 328 33

Pack	Cat.Nos	Modular high density panel
1	0 335 50	Panel specifically for using preterminated cassettes (maximum 4) Fitted with: - a side cord management accessory (does not require the use of feedthrough panels) - soluclip for automatic fixing (no screws) on the cabinet uprights 19" panel - 1 U
<b>Preterminated cassettes</b>		
Clip directly onto panels Cat.No 0 335 50 Links factory tested with test report provided		
1	0 328 30	<b>Cassette-cassette termination</b> Cat. 6A S/FTP copper band 6 links (trunk) Length 6 m
1	0 328 31	Length 9 m
1	0 328 32	Length 12 m
1	0 328 33	<b>Cassette-RJ 45 cord termination</b> Cat. 6A S/FTP copper band 6 links (trunk) Length 6 m
1	0 328 34	Length 9 m
1	0 328 35	Length 12 m

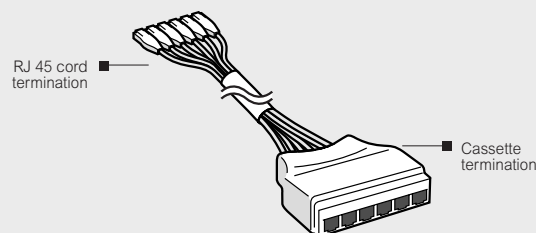
## CHOOSING THE TERMINATION AND THE CORD LENGTH

### Choose the termination

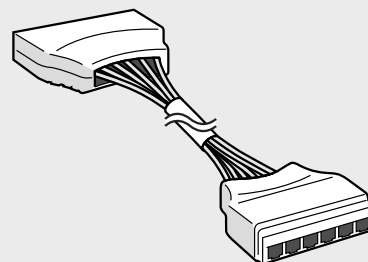
#### Cassette-cassette termination



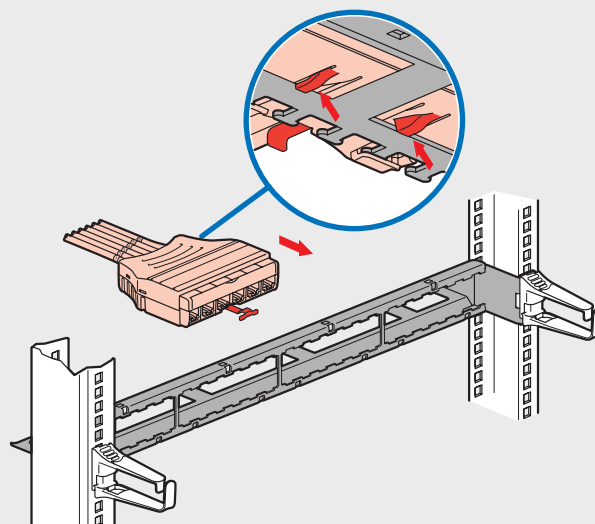
#### Cassette-RJ 45 cord termination



### Choose the cord length: 1 to 70 m



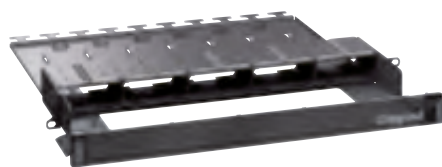
### Mount the cassette for the snap on system on the panel



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## Legrand cabling system LCS<sup>2</sup> fibre optic - 19" high density fibre optic drawer



0 326 40



0 326 42



0 326 45



0 326 46

Pack	Cat.Nos	High density, modular fibre optic drawer
1	0 326 40	<b>Fibre optic drawers with cord management at the front and rear</b> Modular fibre optic drawer Fixed modular frame to take the cassettes below Maximum capacity 2 U (takes up to 12 cassettes) - 288 LC connectors - 144 SC connectors Maximum capacity 1 U (takes up to 5 cassettes) - 120 LC connectors - 60 SC connectors Depth: 500 mm
1	0 326 42	1 U
1	0 326 42	2 U
1	0 326 41	<b>Fibre optic drawers without cord management</b> Modular fibre optic drawer Fixed modular frame to take the cassettes below Maximum capacity 1 U (takes up to 5 cassettes) - 120 LC connectors - 60 SC connectors Depth: 340 mm

Pack	Cat.Nos	High Density cassettes <sup>(1)</sup>
1	0 326 45	Clip directly into fibre optic drawers Cat.No 0 326 40/41/42 Cassettes slide into the above frame Remove cassettes from the front using the metal tab provided MTP Elite <sup>®</sup> high performance cassettes Low insertion loss < 0.35 dB A/C polarity
1	0 326 46	<b>OM4 multimode cassettes (50/125 µm)</b> For 10 Gigabit Ethernet network For 50/125 µm multimode installations, OM4 type MTP Elite <sup>®</sup> cassette (MPO compatible) 24 x LC fibres OM4 Type A/C
1	0 326 47	<b>OS1/OS2 cassettes (9/125 µm)</b> For 9/125 µm singlemode installations, OS1/OS2 type MTP Elite <sup>®</sup> cassette (MPO compatible) 24 x LC fibres OS1/OS2 Type A/C
1	0 326 48	MTP Elite <sup>®</sup> cassette (MPO compatible) 12 x SC fibres OS1/OS2 Type A/C
1	0 326 49	<b>Cover</b> Blanking cassette

1: MTP Elite<sup>®</sup> is a registered trademark of the US Conec Ltd

## Legrand cabling system LCS<sup>2</sup> fibre optic - OM4 cables and cords



### MTP connectors

#### Specifications

	Multimode Elite <sup>®</sup>	Singlemode Elite <sup>®</sup>
<b>Insertion loss</b>	0.1 dB Typical (all fibres) 0.35 dB Maximum (single fibre) <sup>(2)(3)</sup>	0.1 dB Typical (all fibres) 0.35 dB Maximum (single fibre) <sup>(1)(4)</sup>
<b>Optical return Loss</b>	N/A	> 60 dB (8° Angle Polish)

1: As tested per ANSI/EIA-455-171 Method D3

2: As tested per ANSI/EIA-455-171 Method D1

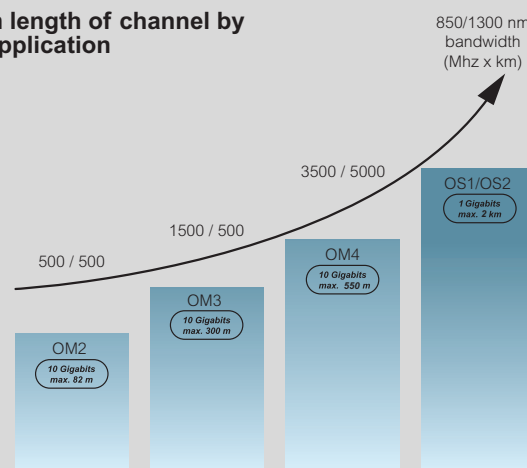
3: As tested with proposed encircled flux launch condition on 50 µm fiber and 850nm per IEC 61280-4-1

4: Compliant with proposed IEC 61755-3-31/GRADE B

### Cassette connectors

Optical performance	Singlemode	Multimode
<b>IL MAX/Master (acceptance)</b>	0.15 dB	0.15 dB
<b>IL MAX/Random</b>	0.30 dB	0.25 dB
<b>Ave/Master</b>	0.12 dB	0.08 dB
<b>Ave/Random</b>	0.12 dB	0.10 dB
<b>Return Loss</b>	55/65 dB	-

### Maximum length of channel by fibre optic application



Applications	Multimode			Singlemode
	OM2	OM3	OM4	OS1/OS2
<b>10 Gigabits Ethernet (S/R base)</b>	82 m	300 m	550 m <sup>(1)</sup>	NA
<b>Giga Ethernet (LX base)</b>	550 m	550 m	550 m	2 km
<b>Giga Ethernet (SX base)</b>	550 m	550 m	1100 m	NA

■ TIA 568

□ Applications IEEE 802.3

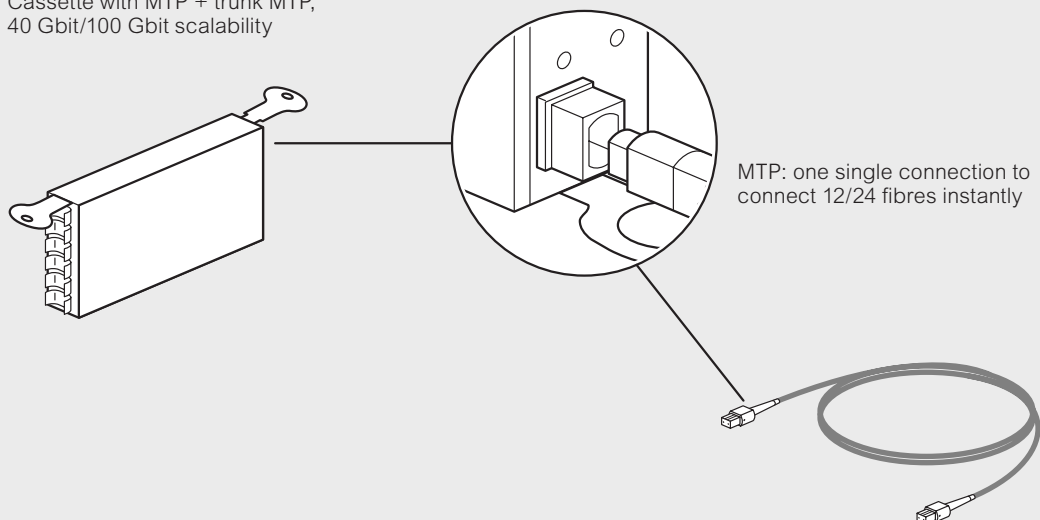
1: Engineered solution using a max. cabled fibre attenuation of 3.0 dB/km. If not distance is of 400 m





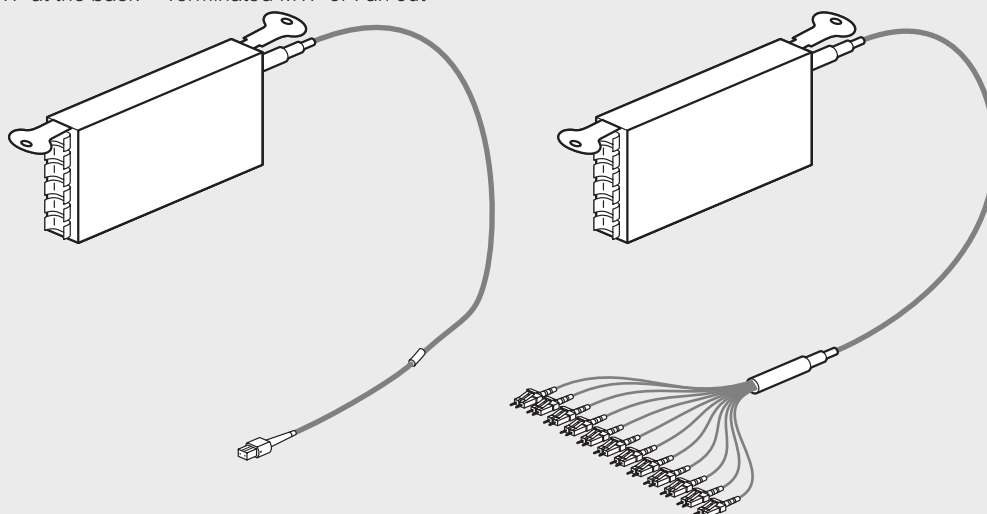
## ↓ CASSETTE WITH MTP SOLUTION

Cassette with MTP + trunk MTP,  
40 Gbit/100 Gbit scalability



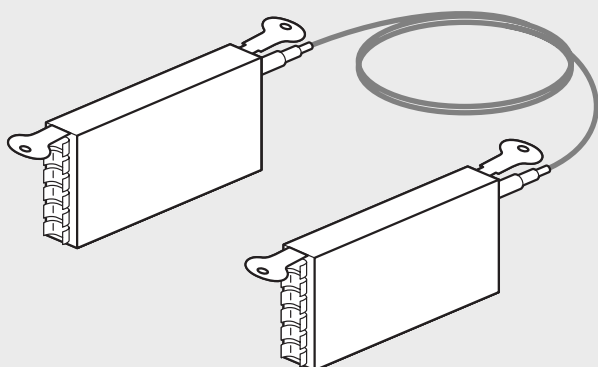
## ↓ CASSETTE WITHOUT MTP SOLUTION

Cassette without MTP at the back + Terminated MTP or Fan out



## ↓ 2 CASSETTES WITHOUT MTP SOLUTION

2 cassettes without MTP at the back terminated together



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## Legrand cabling system LCS<sup>2</sup> fibre optic - OM4 cables and cords

Data Center



0 325 15



0 326 01



0 326 07

Pack	Cat.Nos		
			<b>OM4 multimode fibre optic cables (50/125 µm)</b>
	Tight buffer 900 µm		For 50/125 µm multimode installations, type OM4. Blue sheaths 10 Gigabit Ethernet compliant
500	0 326 65		Indoor/outdoor (glass strands) 6 fibres - 500 m
1000	0 326 66		Indoor/outdoor (glass strands) 6 fibres - 1000 m
1000	0 326 67		Indoor/outdoor (glass strands) 12 fibres - 1000 m
1000	0 326 68		Indoor/outdoor (glass strands) 24 fibres - 1000 m
			<b>OS1/OS2 singlemode fibre optic cables (9/125 µm)</b>
	Loose tube 900 µm Tight buffer		For 9/125 µm singlemode installations (OS1) Yellow jacket
2000 <sup>1</sup>	0 325 12 -		Indoor/outdoor (universal) 6 fibres
2000 <sup>1</sup>	0 325 13 -		Outdoor, corrugated steel tape 6 fibres
2000 <sup>1</sup>	0 325 14 0 325 50		Indoor/outdoor (universal) 12 fibres
2000 <sup>1</sup>	0 325 15 -		Outdoor, corrugated steel tape 12 fibres
2000 <sup>1</sup>	0 325 51 -		Indoor/outdoor (universal) 24 fibres
			<b>OM4 multimode optical cords (50/125 µm)</b>
			10 Gigabit Ethernet compliant Max. optical losses: 0.3 dB For 50/125 µm multimode installations, OM4 type. Blue sheaths
			<b>SC/SC duplex cords</b>
3	0 326 30		Length: 1 m
3	0 326 31		Length: 2 m
3	0 326 32		Length: 3 m
			<b>LC/LC duplex cords</b>
3	0 326 33		Length: 0.5 m
3	0 326 34		Length: 1 m
3	0 326 35		Length: 2 m
3	0 326 36		Length: 3 m
3	0 326 37		Length: 5 m
			<b>OS1/OS2 (UPC) Singlemode fibre optic cords</b>
			Max. optical losses: 0.3 dB For OS1 9/125 µm singlemode installations, OS2 to OS1 type. Yellow sheaths
			<b>SC/SC duplex cords</b>
3	0 326 00		Length: 1 m
3	0 326 01		Length: 2 m
3	0 326 02		Length: 3 m
			<b>SC/LC duplex cords</b>
3	0 326 03		Length: 1 m
3	0 326 04		Length: 2 m
3	0 326 05		Length: 3 m
			<b>LC/LC duplex cords</b>
3	0 326 28		Length: 0.5 m
3	0 326 06		Length: 1 m
3	0 326 07		Length: 2 m
3	0 326 08		Length: 3 m
3	0 326 29		Length: 5 m

## LCS<sup>2</sup> EQUIPMENT

# A/C polarity for high density cassettes

The polarity of Legrand cassettes is compatible with methods A and C defined in standard ANSI/TIA - C.O. - Annex B



## ADVANTAGES

- The cassettes are identical at each end of the link
- Can be used with singlemode and multimode
- 1 single type of patch cord for each end of the link (method C polarity)

# The right system to meet your needs

A wide range of technologies (HD15, HDMI, DISPLAY PORT, RCA, JACK) to suit the location and the user requirements

## INSTALLATION EXAMPLE WITH HD15 PRETERMINATED SOCKET AND VIDEO PROJECTOR SWITCH

**1** Quick  
installation

**2** Easy  
connection

**3** Optimum  
performance



**1** Infrared ON/STANDBY control  
for video projector associated  
with a pushbutton  
Cat.No 0 787 99/5 720 89

**2 3** Preterminated HD15 sockets  
Cat.No 0 787 77/5 720 97

**4** 10 m male/male HD15 cords  
Cat.No 0 517 23

**5 6** Male/male HD 15 cords

# Audio/video system

## audio/video sockets



Pack	Cat.Nos		Female HD15 sockets
	Mosaic	Arteor	
1	0 787 77	5 720 97	<b>Preterminated sockets - 1 module</b> Equipped with cord, length 15 cm <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> <li>● Magnesium</li> </ul>
1	0 793 77	-	
1	-	5 725 97	
1	0 787 57	5 722 82	<b>Screw-type female HD15 sockets - 2 modules</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> <li>● Magnesium</li> </ul>
1	0 792 57	-	
1	-	5 727 82	
1	0 787 74	5 722 88	<b>Screw-type female HD15 sockets 2 modules + 3.5 mm Jack</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
1	-	5 727 88	
1	0 787 72	5 722 79	<b>Solder-type female HD15 sockets 1 module</b> 15 pin <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
1	-	5 727 79	
1	-	5 727 79	

Pack	Cat.Nos		HDMI type A sockets
	Mosaic	Arteor	
1	0 787 78	5 720 96	<b>Preterminated sockets HDMI 1.4 - 1 module</b> Equipped with cord, length 15 cm <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> <li>● Magnesium</li> </ul>
1	0 793 78	-	
1	-	5 725 96	
1	0 787 68	5 722 81	<b>Screw-type sockets HDMI 1.3 - 2 modules</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> <li>● Magnesium</li> </ul>
1	0 792 75	-	
1	-	5 727 81	

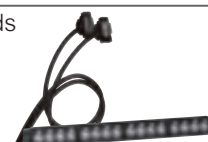
Pack	Cat.Nos		Jack sockets 3.5 mm
	Mosaic	Arteor	
1	0 787 79	5 720 91	<b>Preterminated sockets - 1 module</b> Equipped with cord, length 15 cm <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> <li>● Magnesium</li> </ul>
1	0 793 79	-	
1	-	5 725 91	
1	0 787 64	5 722 74	<b>4 screw-type female 3.5 mm Jack socket - 1 module</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Aluminium</li> <li>● Magnesium</li> </ul>
1	0 792 64	-	
1	-	5 727 74	
1	0 787 73	5 722 78	<b>Solder-type female 3.5 mm Jack socket - 1 module</b> <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
1	-	5 727 78	
1	-	5 727 78	

Pack	Cat.Nos		HD15 + 3.5 mm Jack amplifier
	Mosaic	Arteor	
1	0 787 70	5 723 70	Used to connect audio/video terminals more than 20 m apart up to 100 m The video link is via an HD15 connector (resolution up to UXGA) The stereo audio link is via a 3.5 mm Jack The kit includes: - one 4-module transmitter equipped with an HD15 connector and a 3.5 mm Jack - one 4-module receiver equipped with an HD15 connector and a 3.5 mm Jack - one 4-module power supply to be connected on the mains then linked to the receiver or transmitter The link between the transmitter and receiver is via a network cord RJ 45/RJ 45 <ul style="list-style-type: none"> <li>○ White</li> </ul>

Pack	Cat.Nos		Infrared ON/STANDBY control
	Mosaic	Arteor	
1	0 787 99	5 720 89	Universal remote switch for turning a video projector on or setting it to STANDBY mode Works with all video projectors or TVs through IR learning process Installed close to the room's light switches, it replaces the manufacturer's remote and is used to switch the video projector on and off, therefore reducing energy consumption and extending the bulb's lifetime <ul style="list-style-type: none"> <li>○ White</li> </ul>

Pack	Cat.Nos		Display port sockets
	Mosaic	Arteor	
1	0 787 91	5 720 90	Used to transmit high-definition digital audio/video streams between a source (laptop, computer, etc) and a compatible receiver (video projector, TV, etc) <b>Preterminated socket - 1 module</b> Equipped with cord, length 15 cm <ul style="list-style-type: none"> <li>○ White</li> <li>● Magnesium</li> </ul>
1	-	5 725 90	
1	-	5 725 90	

Patch panels, cables and cords  
See p. 141



## Audio/video system

### audio/video sockets (continued)



Pack	Cat.Nos		
1	Mosaic 0 787 52	Arteor -	<b>Female 1 RCA sockets</b> Provides the composite video link for any peripheral device such as a DVD drive, camera, video recorder, etc 1 module ○ White
1	Mosaic 0 787 47	Arteor 5 720 92	<b>Female 2 RCA socket</b> Provide the stereo audio link for any peripheral device such as a DVD drive, camera, video recorder 1 module <b>Preterminated</b> Equipped with a 15 cm cord ○ White ● Magnesium
1	0 787 53	5 722 72	<b>Connection via screw terminals</b> ○ White ● Magnesium
1	-	5 725 92	
1	0 787 54	5 722 73	<b>Female 3 RCA socket</b> Provide the composite video and stereo audio links for any peripheral device such as a DVD drive, camera, video recorder, videoconferencing, etc 1 module <b>Preterminated</b> Equipped with a 15 cm cord ○ White ● Magnesium
1	0 792 54	-	<b>Connection via screw terminals</b> ○ White ● Aluminium ● Magnesium
1	-	5 727 73	
1	Mosaic 0 787 71	Arteor -	<b>Other audio and video sockets</b> <b>DVI-I socket - 2 modules</b> Used to transmit high-definition digital video streams between a source (computer) and a compatible receiver (TV, Video projector, etc) ○ White <b>Female BNC 75 socket - 1 module</b> Provides the composite video link for any peripheral device such as a DVD drive, camera, video recorder, etc ○ White ● Magnesium
1	0 787 58	5 722 76	
1	-	5 727 76	

Pack	Cat.Nos		
1	Mosaic 0 787 55	Arteor 5 722 83	<b>Audio sockets</b> <b>XLR 3-pin - 2 modules</b> Provides the stereo link for microphone, amplifier, mixing console, etc Recommended cable: 1 audio pair 0.14 mm <sup>2</sup> to 0.5 mm <sup>2</sup> shielded Max. cable length: 50 m (without amplifier) ○ White - Fast screw connection female ● Aluminium - Fast screw connection female ● Magnesium - Fast screw connection female ○ White - Fast screw connection male ● Magnesium - Fast screw connection male
1	0 792 55	-	
1	-	5 727 83	
1	0 787 56	5 722 77	
1	-	5 727 77	
1	0 787 60	-	<b>4-pole Speakon - 2 modules</b> Used to connect power enclosures Recommended cable: 2 audio pairs 4 mm <sup>2</sup> max. Max. cable length: 50 m (without amplifier) ○ White
10	0 787 51	5 722 80	<b>Loudspeakers sockets</b> Terminal 4 mm <sup>2</sup> ○ White - 2 modules ● Magnesium - 2 modules
10	-	5 727 80	
10	0 787 50	5 722 70	○ White - 1 module ● Aluminium - 1 module ● Magnesium - 1 module
10	0 792 50	-	
10	-	5 727 70	
1	0 787 76	5 722 84	<b>100 V Line Volume Attenuators - 2 modules</b> Used to adjust power and volume of a 100 V loudspeaker line ○ White - 100 V - 25 W ● Magnesium - 100 V - 25 W
1	-	5 727 84	



## Audio/video system

### audio/video patch panels, cords and cables



0 335 98



0 335 97



0 335 96



0 335 99



0 517 23



0 517 24

Pack	Cat.Nos	19" patch panels
1	0 335 98	Used to distribute the audio/video signal Equipped with marked connectors 19" female 1 U metal panels
1	0 335 97	HD15 19" panel - 12 connectors
1	0 335 96	HDMI 19" panel - 16 connectors
1	0 335 99	XLR 19" panel - 16 connectors
1	0 335 99	SUBD9 19" panel - 12 connectors

Pack	Cat.Nos	Cables
1	0 327 81	For connecting 2 sockets a long distance apart <b>VGA cables</b> Length 20 m For full pin connection of HD15 sockets over distances of up to 20 m
1	0 327 80	<b>HDMI cables</b> Length 20 m For connecting HDMI sockets over distances of up to 10 m

Pack	Cat.Nos	Cords
1	0 517 23	For connecting a socket to a terminal <b>HD15 cord</b> Length 10 m. For connecting an HD15 socket to a video terminal (PC, video projector, etc)
1	0 517 22	<b>HD15 cord + 3.5 mm Jack</b> Length 2 m For connecting an HD15 video socket and a 3.5 mm audio Jack to a terminal (PC, video projector)
1	0 517 26	<b>HDMI 1.4 cord</b> For connecting an HDMI socket to an audio/video terminal (plasma screen, DVD player, home cinema, games console, etc)
1	0 517 27	For use over a distance of more than 10 m, use the HDMI booster Cat.No 0 779 30
1	0 517 20	Length 1.5 m
1	0 517 27	Length 5 m
1	0 517 20	Length 10 m
1	0 779 30	<b>HDMI booster</b> Used to extend an HDMI connection. Consists of 2 female connectors and used as an addition to the HDMI cord (for example cord Cat.No 0 517 20) Does not need external power supply
1	0 517 24	<b>XLR cord</b> Length 10 m. For connecting an XLR socket to an audio peripheral (microphone, amplifier, etc)
1	0 517 25	<b>9-way SUB-D cord</b> Length 10 m. For RS 232 serial connection (printer, machine screen, etc)

Pack	Cat.Nos	Cables
1	0 327 81	For connecting 2 sockets a long distance apart <b>VGA cables</b> Length 20 m For full pin connection of HD15 sockets over distances of up to 20 m
1	0 327 80	<b>HDMI cables</b> Length 20 m For connecting HDMI sockets over distances of up to 10 m

Freestanding cabinets  
See p. 114



## Audio/video system

### kits



0 789 09



0 789 10

Pack	Cat.Nos	Media Hub
1		Used to connect several kinds of audio/video devices (computer, camera, video recorder, mp3 player, smartphone, etc) to a specific product and to display and/or listen to these media files on the TV screen. Connection via one HDMI cable to a TV. Particularly suitable for remote TV connection when it is wall-mounted. Inputs: HD15+Jack, HDMI, 3RCA, Bluetooth audio connection. Output: HDMI. 4 modules. ○ White ● Magnesium
1		
		<b>JUNE 2014</b>
	Mosaic	Arteor
	-	5 720 68
	-	5 725 68

Pack	Cat.Nos	HD15 video kit
1		Up to 15 m. Ideal for classrooms and small meeting rooms. Used to transmit analogue video streams (VGA, XGA, UXGA depending on graphic card) between a source (computer) and a compatible receiver (video projector, TV) over a length of 15 m. The video link is via an HD15 connector. The kit includes: - 2 female HD15 preterminated sockets 1 module - 1 HD15 cord Length 15 m - 1 video projector switch (2 modules) and 1 push-button (2 modules) with supports and plates ○ White
1		
		<b>JUNE 2014</b>
	Mosaic	Arteor
	0 787 97	5 720 24

Pack	Cat.Nos	Audio/video HD15+3.5 mm Jack amplifier kit
1		Up to 100 m. Ideal for large meeting rooms. Used to transmit audio and analogue video streams (VGA, XGA, UXGA depending on graphic card) between a source (computer) and a compatible receiver (video projector, TV) over a length (up to 100 m). The video link is via an HD15 connector and the stereo audio link is via a 3.5 mm Jack. The link between the transmitter and receiver is via RJ 45 patch cord (not included). The kit includes: - 1 transmitter HD15+3.5 mm Jack - 4 modules - 1 receiver HD15+3.5 mm Jack - 4 modules - 1 power supply- 4 modules - 2 HD15+3.5 mm cord length 2 m - 1 video projector switch (2 modules) and 1 push-button (2 modules) with supports and plates ○ White
1		
		<b>JUNE 2014</b>
	Mosaic	Arteor
	0 787 98	5 720 25

Pack	Cat.Nos	Audio/video multi-participant transmitter HD15+3.5 mm Jack
1		Allows the different participants in a meeting room to broadcast a presentation on their PC by pressing the shutter button control without disconnecting the cable from the projector. Must be associated with other transmitters and one receiver. Can be installed in pop-up, desktop multi-outlet extensions and DLP trunking. The video link is via an HD15 connector and the stereo audio link is via a 3.5 mm Jack HD15+3.5 mm Jack cord length 2 m included for connection to a PC. Transmitters are connected by RJ 45 patch cord (not included). ○ White - 4 modules
1		
		<b>JUNE 2014</b>
	Mosaic	Arteor
	0 789 09	5 720 26

Pack	Cat.Nos	Audio/video multi-participant receiver HD15+3.5 mm Jack
1		Receives commands from the audio/video multi-participant transmitter. Can be installed in pop-up, desktop multi-outlet extensions and DLP trunking. The video link is via an HD15 connector and the stereo audio link is via 3.5 mm Jack HD15 + 3.5 mm Jack cord length 2 m included for connection to a video projector. Must be associated with the first transmitter by a RJ 45 patch cord (not included). ○ White - 2 x 4 modules
1		
		<b>JUNE 2014</b>
	Mosaic	Arteor
	0 789 10	5 720 27

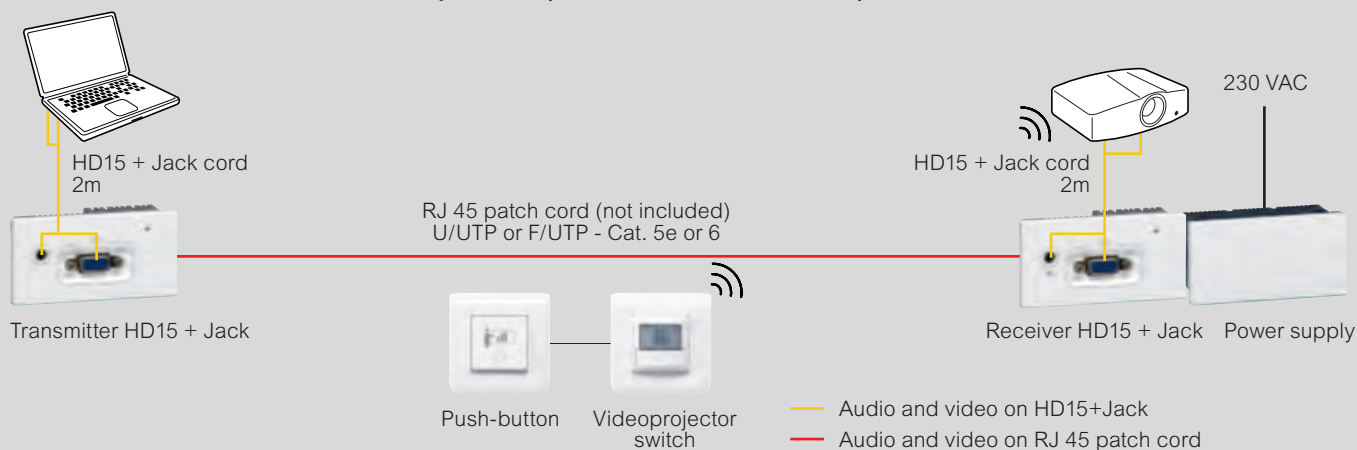
# Audio/video system

## kits

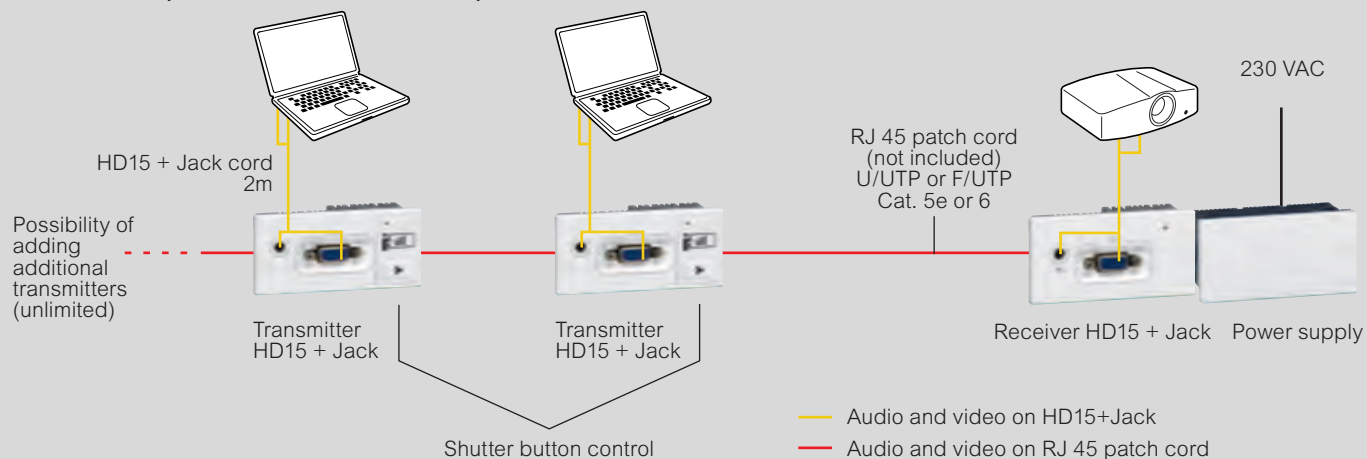
### HD15 video kit (Cat.Nos 0 787 97 / 5 720 24)



### Audio/video HD15+3.5 mm Jack amplifier kit (Cat.Nos 0 787 98 / 5 720 25)



### Audio/video HD15+3.5 mm Jack multiparticipant transmitter (Cat.Nos 0 789 09 / 5 72 026) and receiver (Cat.Nos 0 789 10 / 5 720 27)



# Legrand cabling system LCS<sup>2</sup>

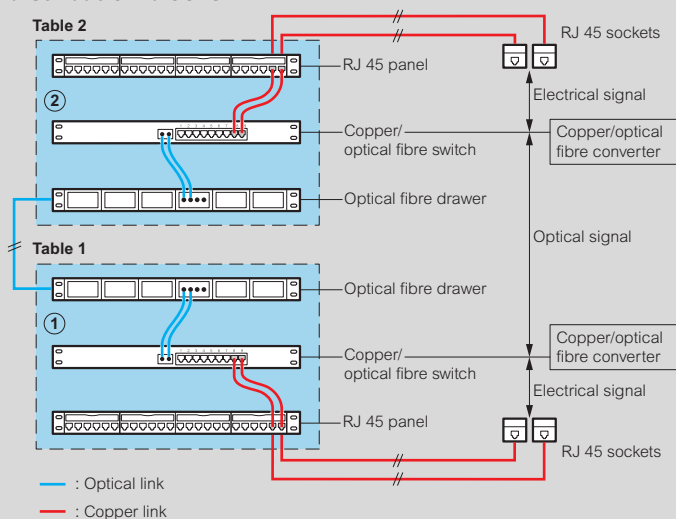
standards and certification

## New fibre optic classes ISO 11801 2nd Ed.

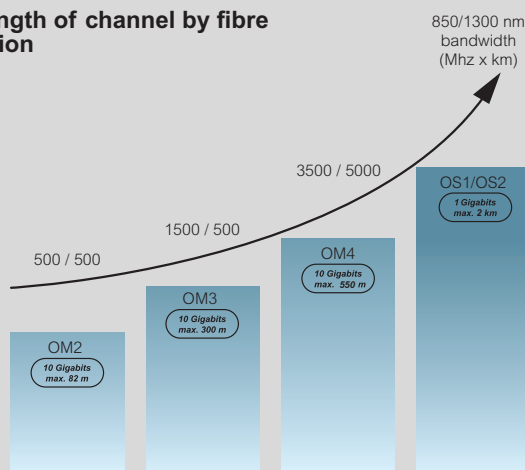
Parameters of the fibre optic link (ISO 11801/EN 50173)

Parameter	Multimode		Singlemode	
	850 nm	1300 nm	1310 nm	1550 nm
Fibre attenuation dB/km	3.5 max.	1.5 max.	1.0	1.0
Bandwidth MHz.km	200 min.	500 min.	n/a	n/a
Connector attenuation dB	0.75 max.	0.75 max.	0.75 max.	0.75 max.
Return loss dB	20 min.	20 min.	26 min.	26 min.

## Typical layout of a fibre optic link between 2 distribution blocks



## Maximal length of channel by fibre optic application



Applications	Multimode			Singlemode
	OM2	OM3	OM4	OS1/OS2
10 Gigabits Ethernet (S/R base)	82 m	300 m	550 m <sup>(1)</sup>	NA
Giga Ethernet (LX base)	550 m	550 m	550 m	2 km
Giga Ethernet (SX base)	550 m	550 m	1100 m	NA

■ TIA 568

□ IEEE 802.3 applications

1: Engineered solution using a max. cabled fibre attenuation of 3.0 dB/km. If not distance is 400 m

## Compliance of LCS<sup>2</sup> systems with standards and certifications

LCS<sup>2</sup> systems and components (de-embedded) conform to the following standards:

- TIA/EIA 568C
- EN 50173-1 and EN 50173-2
- ISO/IEC 11801 version 2

The LCS<sup>2</sup> system supports 10GBase-T applications up to 100 m in a transmission channel. Conforms with standards ISO/IEC 24750, TIA TSB 155 and IEEE 802.3

The EA link class of the LCS<sup>2</sup> system also conforms with amendment 1 (04/2008) of standard ISO 11801 and its components conform with amendment 2

LCS<sup>2</sup> systems are certified by expert independent laboratory 3P



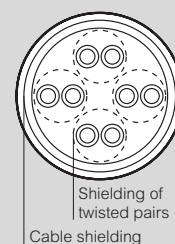
## Main characteristics of LCS<sup>2</sup> systems

	LCS <sup>2</sup> 6A		LCS <sup>2</sup> 6		LCS <sup>2</sup> 5e
Frequency	500 Mhz		250 MHz		100 Mhz
Speed	10 Gbps		1 Gbps		1 Gbps
Wiring	Copper	FO	Copper	FO	Copper
Connectors	RJ 45	SC-LC...	RJ 45	SC-LC...	RJ 45
Max. cable length	100 m	variable	100 m	variable	100 m

## New names for LAN cables (according to ISO 11801-2)

They correspond to: "type of cable shield" / "type of twisted pair shield" TP monitoring (for twisted pairs)

Type of cable		Cable shielding	Twisted pair shielding
old name	new name		
SSTP	S/FTP	S: screen made up	F: screen formed a metal braid of an aluminium and polyester ribbon
SFTP	SF/UTP	SF: combination of ribbon + braid	U: no screen
STP	U/FTP	U: no screen	F: screen formed of an aluminium and polyester ribbon
FTP	F/UTP	F: screen formed of an aluminium and polyester ribbon	U: no screen
UTP	U/UTP	U: no screen	U: no screen



## Zone distribution boxes

### Compliance with standards:

Zone distribution box: TIA/EIA 568  
UTE C 15-900  
NF C 15-100 - NF C 20-730  
EN 50-174.2  
ISO 11801  
EN 50173  
IEC 60950

Cords and cables: ISO 11801 id.2.0, EN 50173-1, TIA/EIA 568

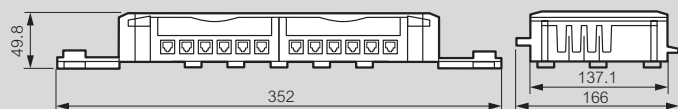
### General characteristics:

- 6 or 12 incoming ports (depending on Cat.No)
- RJ 45 wiring
- 4, 8 or 12 outgoing ports (depending on Cat.No) maximum
- Connection of mixed cords via RJ 45 connector (RJ 45/stripped)
- UTP and FTP versions
- Cat. 5e, 6 and 6<sub>A</sub>
- for computer applications; telephone, access control, etc

### Technical characteristics:

- Material: Polycarbonate PC hood  
Polypropylene PP base
- Colour: RAL 7035
- Weatherproofing protection index: IP 21
- Mechanical impact protection index: IK 07
- Holding strength of connector units in the box: 100 N
- Cables anchored on support using Colring cable ties

### Dimensions



### Performance

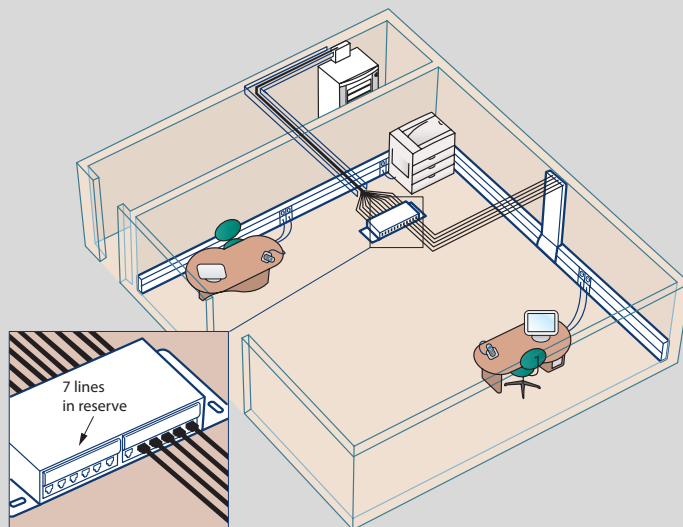
Maximum recommended lengths of links to ensure high performance of the systems with the use of RJ 45 sockets with copper feedthroughs and/or RJ 45 sockets

	Associated lengths (m)		
	Cords	Cables	Links
Cat. 6 <sub>A</sub>	8	70	78
	15	60	75
	20	55	75
Cat. 6	8	70	78
	15	60	75
	20	55	75
Cat. 5e	8	75	83
	15	65	80
	20	60	80

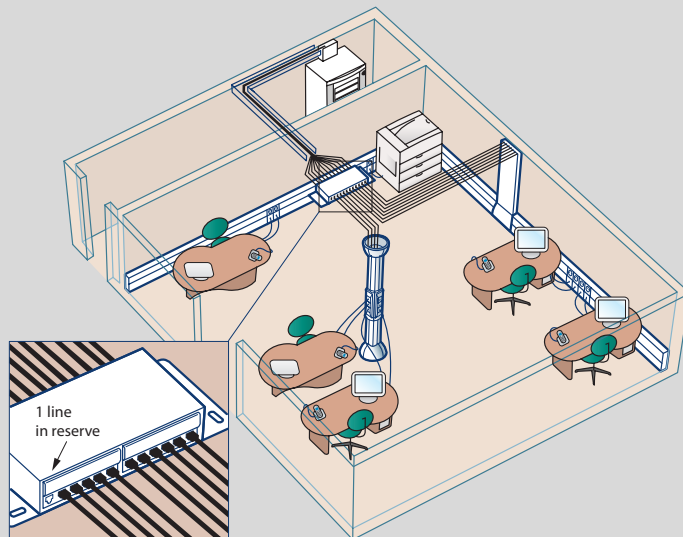
We recommend selecting the shortest wiring lengths for more flexibility regarding cord length in the event of reconfiguration

### Application example

A zone distribution box is installed to connect the RJ 45 sockets and meet the future requirements of the installation



Connection to additional RJ 45 sockets is done by adding RJ 45 - RJ 45 cords between the unit and the RJ 45 sockets with copper feedthrough





# Legrand cabling system LCS<sup>2</sup>

## standards and certification

### Flush-mounting 10/100 Base-T Ethernet switches

	0 779 00	0 779 01
Power supply	230 V	PoE
Speed	100 Mbps	
Standards	802.3/802.3u	802.3u 802.3 af
Common technical characteristics	<ul style="list-style-type: none"> <li>Operating temperature: from 0°C to +40°C</li> <li>Max. permissible humidity level: 95%</li> <li>Auto MDI-X (takes crossed and straight cords)</li> <li>Orange LED: - on: speed of 100 Mbps</li> <li>- off: speed 10 Mbps</li> <li>Green LED on: traffic</li> </ul>	

### Mosaic Wi-Fi access points

#### An 802.11 a and b/g/n solution

Radio communication standard	802.11 b/g	802.11 a	802.11 b/g/n or 802.11 a/n
Power supply standard Power over Ethernet	802.3 af		
Frequency band	between 2.40 and 2.48 GHz	5 GHz	2.4 GHz or 5 GHz
Number of available channels	13	8	40 MHz or 20 MHz
Max. gross speed	54 Mbps	54 Mbps	300 Mbps

### Benefits of a Legrand Wi-Fi access point

- Possibility of simultaneous operation on 2 frequencies, a and b/g
- New products: invited access: used to allocate a network dedicated to visitors
- Provides a max. gross speed of up to 2 x 54 Mbps in simultaneous mode
- Very high security level: WPA2 encryption (802.11i) and authentication (802.1x)
- Possibility of roaming (moving from one access point to another without breaking the link)
- Quality of service (priority automatically given to voice, then video and finally data)
- Easy to configure and make secure: using the CD supplied with the access point

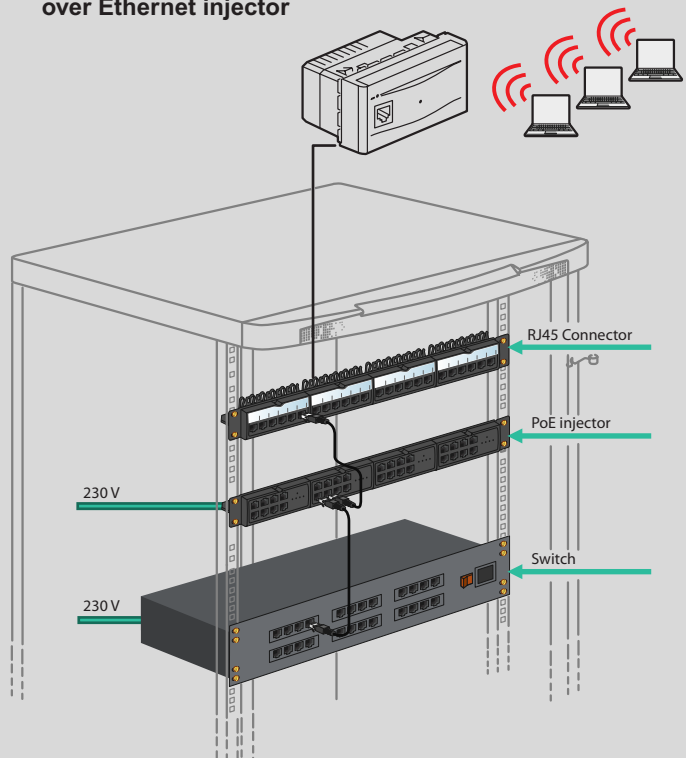
### Installation

In all supports able to take a Mosaic mechanism (trunking, columns, flush-mounting boxes, floor boxes, etc)  
Do not place access points behind anything that could limit the antenna's range  
Access points are connected tool-free via an RJ 45 connector

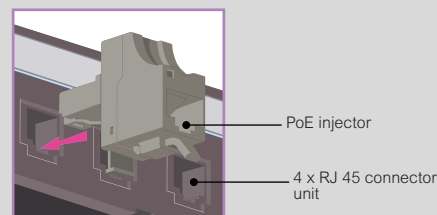
### Sizing

- Provide 1 access point for 1 localised requirement (in entrance hall)
- Provide 1 access point per 100 m<sup>2</sup> for overall coverage and a maximum gross speed
- Provide 1 access point with an RJ 45 socket for a desk used by visitors

### Installation principle for a Wi-Fi access point with Power over Ethernet injector

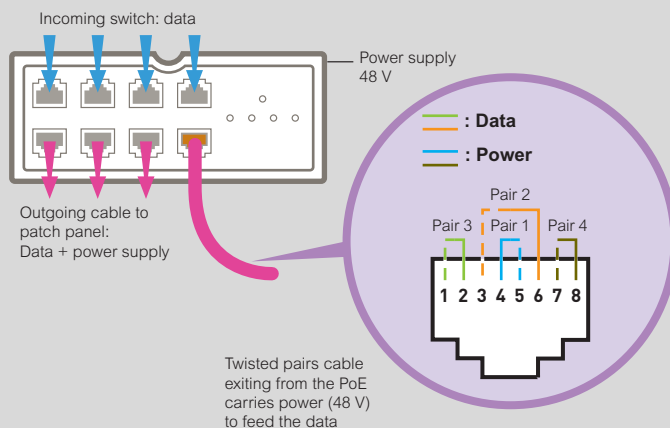


Particular case of the 1 port PoE: Clips directly onto a port on any patch panel A single cord is necessary to connect it to a port on the switch



### Operation of PoE injector

A PoE injector has one input and one output per access point to be supplied



### Legrand services

The Relations Pro<sup>(1)</sup> service will work with you and guide you in setting up your VDI sites, offering:

- help with sizing the installation
- on-site assistance for integrating products and making important installations secure

Advisors are also available to answer all your technical questions

1: 0810 48 48 48 (local call rate) Monday to Friday 8am to 6pm

# Legrand cabling system LCS<sup>2</sup>

## LCS<sup>2</sup> 19" cabling and server freestanding cabinets

### General characteristics

Extendable metallic cabinets. RAL 7016 textured polyester coating providing excellent resistance to corrosion and scratching  
Front door made of safety glass, front and rear microperforated metal doors for server cabinets  
Protection index (weatherproof) against solid objects and liquids: IP 20.  
Protection index against mechanical impact: IK 08  
Perforations in 19" uprights: 9.5 x 9.5 mm  
Loading capacity: 420 kg for cabling cabinet  
630 kg for server cabinet

### Compliance with standards

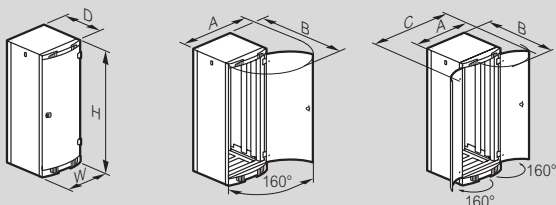
LCS<sup>2</sup> cabinets comply with the following standards:

<b>IEC 60529</b> <b>EN 60529</b>	(NF C 20-010) Degrees of protection provided by enclosures (IP code)
<b>IEC 62262</b> <b>EN 62262</b>	(EN 50102, NF C 20-015) Degree of protection provided by enclosures of electrical equipment against external mechanical impacts (IK code)
<b>IEC 60950-1</b> <b>EN 60950-1</b> <b>C 77-210-1</b>	Safety of data processing equipment
<b>EIA-310-E</b>	Cabinets, enclosures, panels and associated equipment (ANSI/EIA/310-E-2005)
<b>IEC 60297-3-100</b> <b>DIN 41414-7</b>	(NF C 20-150, NF C 20-151) Sizes of mechanical structures of the 482.6 mm (19 in) series

LCS<sup>2</sup> cabinets can be integrated into installations complying with the following standards:

<b>EN 50173-1</b>	Information technology - Generic cabling systems
<b>EN 50174-1 and 2</b> <b>C 90-480-1 and 2</b>	Information technology - Cabling installation
<b>ISO IEC 11801</b>	Information technology - Generic cabling for customer premises
<b>NF C 15-100</b> <b>Part 4-41</b>	Low voltage electrical installations - Recommendations
<b>IEC 60364-4-41</b>	Low voltage electrical installations - Protection for safety - Protection against electric shock

### Overall dimensions (mm)



#### Single front door cabinets

Cat.Nos	Capacity	H <sup>(1)</sup>	W	D	A	B
0 463 00	24 U	1226	610	659	1138	1208
0 463 06	29 U	1448				
0 463 12	33 U	1626				
0 463 18/30	42 U	2026	810	859	1525	1408
0 463 19				657		
0 463 21				857		
0 463 22/33	47 U	2248	810	1057	1525	1608
0 463 23				857		1808
0 463 28				1057		1808

#### Double front door cabinets

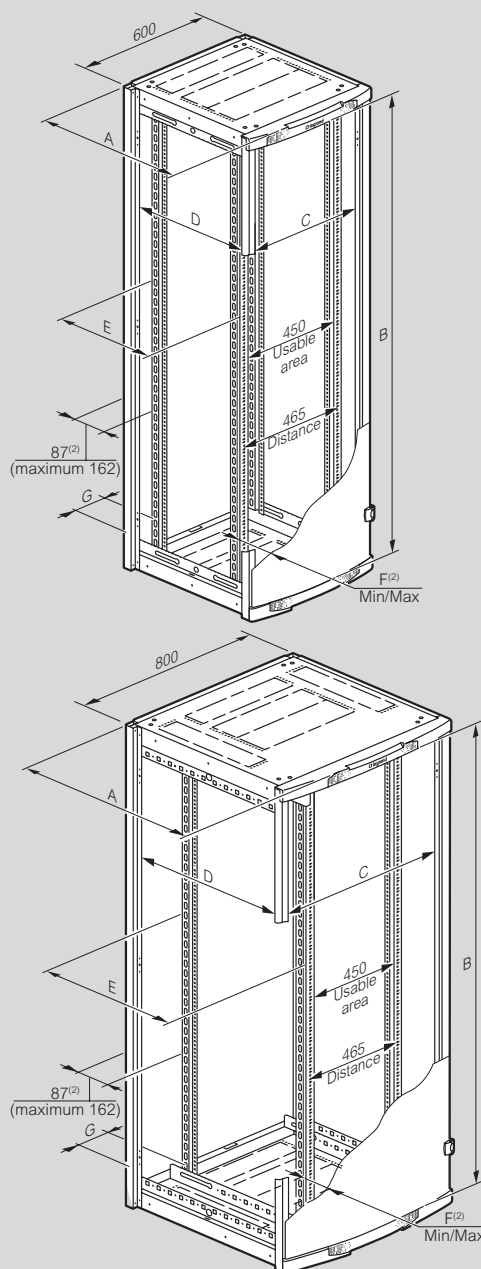
Cat.Nos	Capacity	H <sup>(1)</sup>	W	D	A	B	C
0 463 41	42 U	2026	810	657	1165	815	1535
0 463 42				857		1015	
0 463 43				1057		1215	

#### Server cabinets

Cat.Nos	Capacity	H <sup>(1)</sup>	W	D	A	B
0 463 85	42 U	2026	610	1086	1160	1655
0 463 86	42 U	2026	810	1096	1550	1858

1: Without adjustment levelling feet (+ 15 to 45 mm with feet)

### Usable dimensions



#### Single front door cabinets

Cat.Nos	Capacity	A	Usable area			E	F <sup>(2)</sup>		G
			B	C	D		Min.	Max.	
0 463 00	24 U	659	1086	490	490	425	118	193	41
0 463 06	29 U		1308						
0 463 12	33 U		1486						
0 463 18/30	42 U	859	1886	690	625	625	122	197	141
0 463 19									
0 463 21									
0 463 22/33	47 U	1057	2108	690	825	825	122	197	141
0 463 23									
0 463 28									

#### Double front door cabinets

Cat.Nos	Capacity	A	Usable area			E	F <sup>(2)</sup>		G
			B	C	D		Min.	Max.	
0 463 41	42 U	657	1886	690	490	425	122	197	141
0 463 42		857			690	625			
0 463 43		1057			890	825			

#### Server cabinets

Cat.Nos	Capacity	A	Usable area			E	F <sup>(2)</sup>		G
			B	C	D		Min.	Max.	
0 463 85	42 U	1086	1886	490	890	825	75	150	41
0 463 86		1096		690	890	825			141

2: Continuous adjustment with adjustments in widths of 12.5 mm

# Legrand cabling system LCS<sup>2</sup>

LCS<sup>2</sup> 19" cabling and server freestanding cabinets and accessories

## LCS<sup>2</sup> cabling cabinet cable entries (mm)

Pre-cut at the top and bottom in 19" format (usable area 451 mm)

	Width 600	Width 800
Depth 600		
Depth 800		
Depth 1000	-	

## LCS<sup>2</sup> server cabinet cable entries (mm)

Pre-cut at the top in 19" format (usable area 451 mm)  
Bottom central cut (805 x 450 mm)

	Top	Bottom
Width 600		
Width 800		

## Weight of cabling cabinets (kg)

Weights shown correspond to net weight (without packaging)

Cat.Nos	Weight Cabinet	Weight Extension cabinet
0 463 00	69	-
0 463 06	77	-
0 463 12	84	-
0 463 18/30 (ext)	99	72
0 463 19	110	-
0 463 21	114	-
0 463 22/33 (ext)	127	90
0 463 23	151	-
0 463 28	138	-
0 463 29	163	-
0 463 41	114	-
0 463 42	127	-
0 463 43	151	-

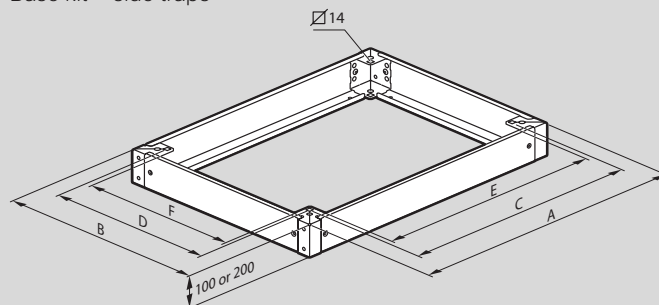
## Weight of server cabinets (kg)

Weights shown correspond to net weight (without packaging)

Cat.Nos	Weight Cabinet
0 463 85	155
0 463 86	166

## Cabinet plinths (mm)

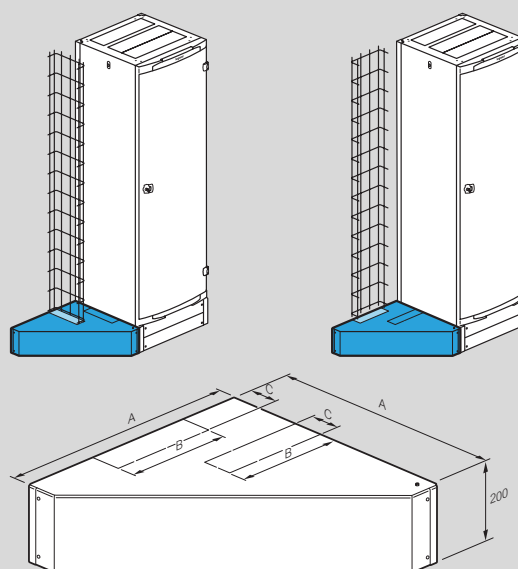
Base kit + side traps



Cabinet dim. Width x Depth	Overall		Mounting		Usable area	
	A	B	C	D	E	F
600 x 600	599	599	478	478	449	449
600 x 800	599	799	478	678	449	649
800 x 600	799	599	678	478	649	449
800 x 800	799	799	678	678	649	649
600 x 1000	599	999	478	878	449	849
800 x 1000	799	999	678	878	649	849

## Linking interface (mm)

Left or right assembly of a cabinet fitted with a 200 mm high base  
Reversible interface cover

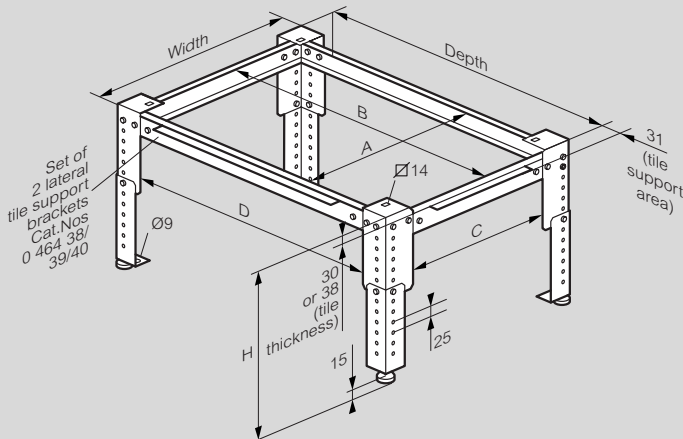
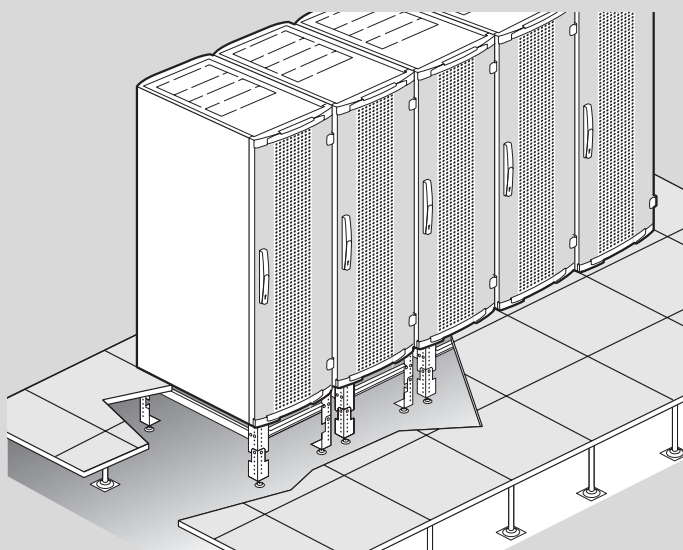


Cabinet dim. Depth	A	B	C
600	595	435	120

# Legrand cabling system LCS<sup>2</sup>

LCS<sup>2</sup> cabling and server cabinet accessories

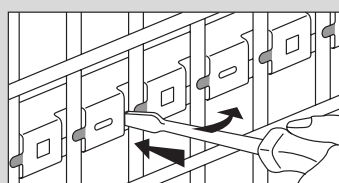
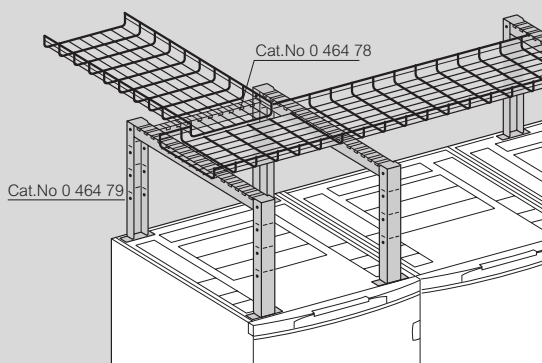
## Adjustable height plinths



Cat.Nos	Width x Depth	H <sup>(1)</sup>		Usable area				Distance (width x depth)	
		Min.	Max.	A	B	C	D	With cabinet	To the ground
0 464 30	600 x 600	200	350	530	530	435	435	478 x 478	520 x 520
0 464 31	600 x 800				730		635	478 x 678	520 x 720
0 464 32	600 x 1000				930		835	478 x 878	520 x 920
0 464 33	800 x 600			730	530	635	435	678 x 478	720 x 520
0 464 34	800 x 800				730		635	678 x 678	720 x 720
0 464 35	800 x 1000				930		835	678 x 878	720 x 920

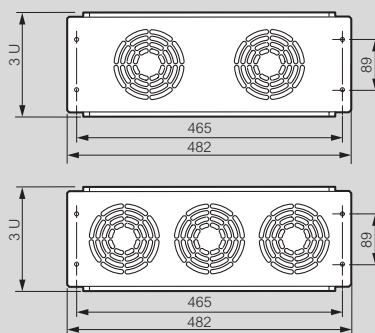
1: Adjustable in steps of 25 mm + fine tuning

## Supports for cable guides on server cabinets



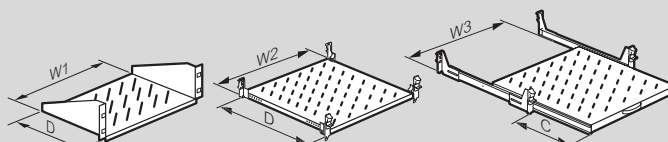
Cable guides can be installed quickly on the supports Cat.Nos 0 464 72/73/74/78/79

## 19" plates with fans (mm)



Cat.Nos	Ventilation zone	
	Number of fans	Output (m³/h)
0 464 87	2	180
0 464 88	3	270

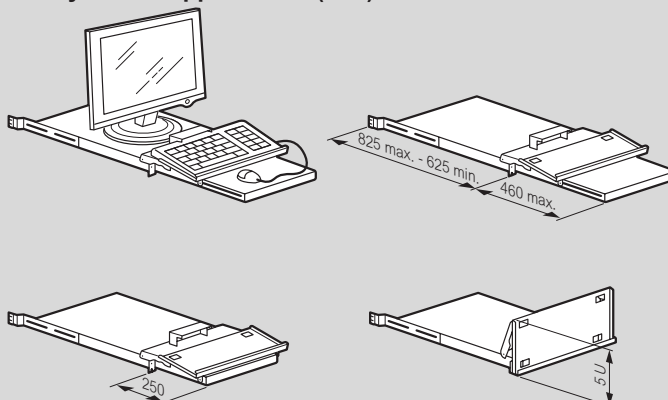
## Shelves (mm)



Cat.Nos	D	Usable width			C
		W1	W2	W3	
0 462 23 <sup>(1)</sup>	120	216			
0 465 00	115	435			
0 465 01	200	435			
0 465 02	360	435			
0 465 05	425		440		
0 465 06	625		440		
0 465 07	825		440		
0 465 08	425			425	320
0 465 09	625			425	420
0 465 10	625			425	420
0 465 17	820		425		
0 465 18	820			380	650

1: Fixing centre 236.5 mm

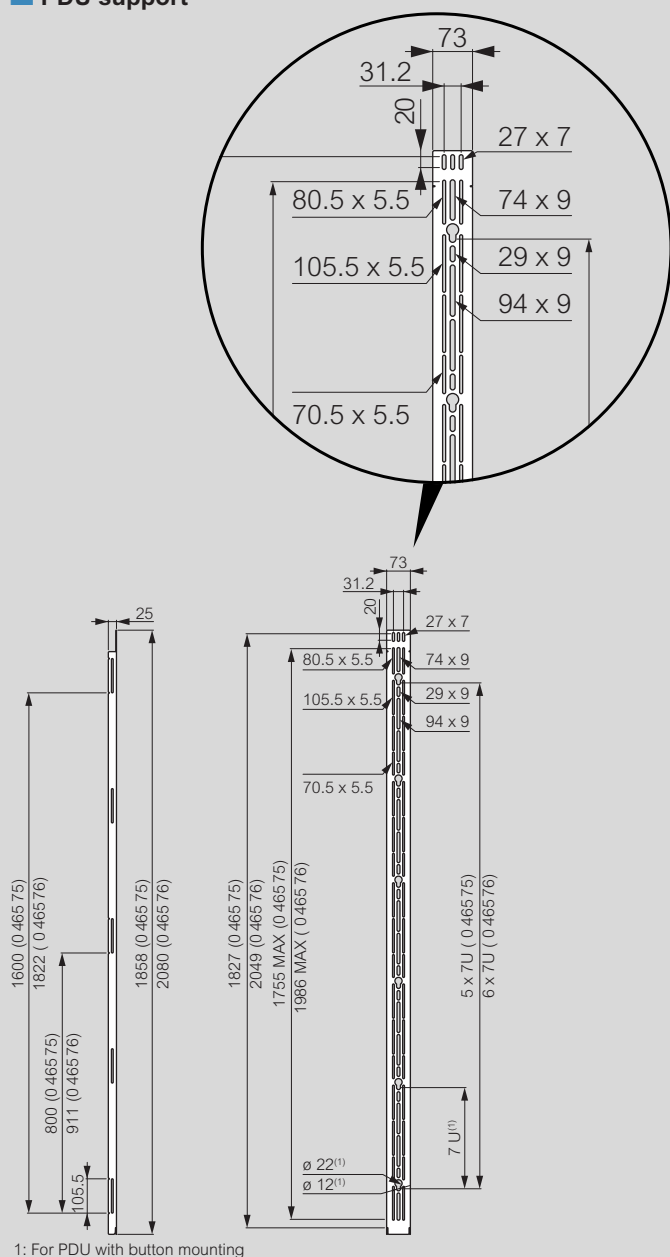
## Keyboard support shelf (mm)



# Legrand cabling system

## 19" racks and accessories

### PDU support

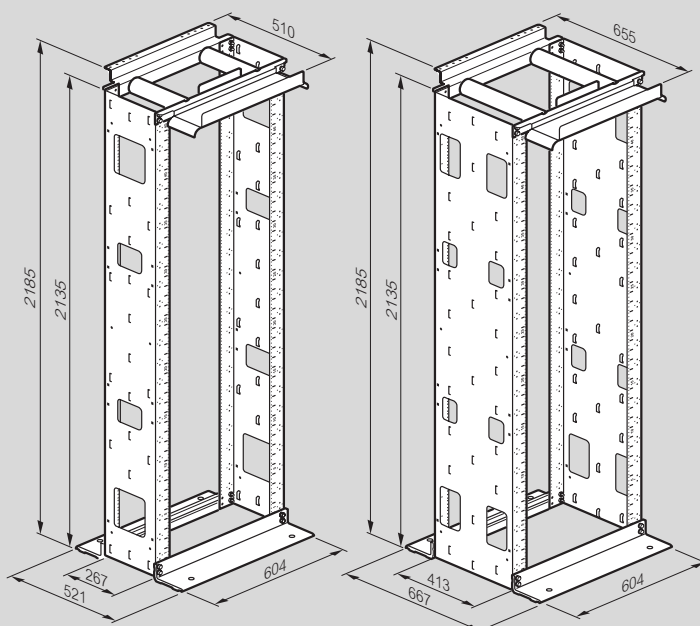


### 19" Racks

Permissible load: 15 kg/U

0 464 06

0 464 07

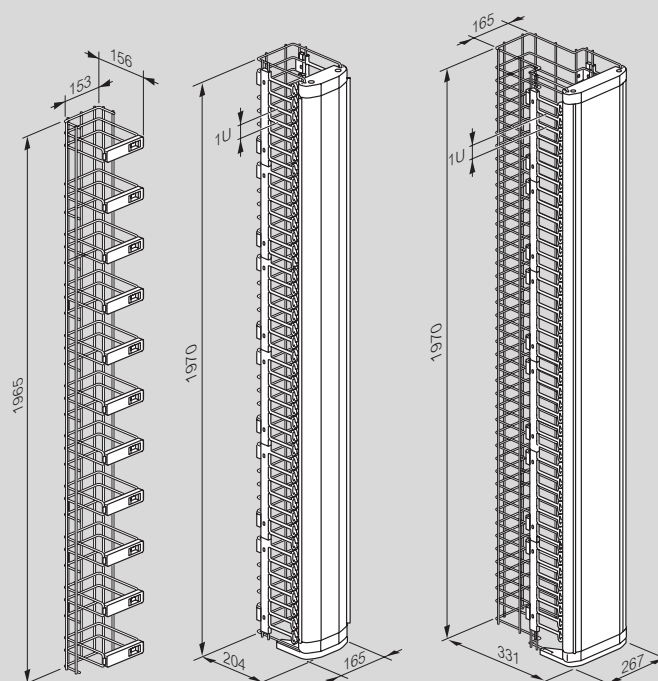


### Cord management grids

0 464 25

0 464 26

0 464 27





### 0 464 25

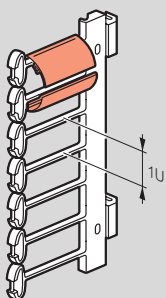
#### Swing latch replacement installation

Installation can be either right or left hand swing out

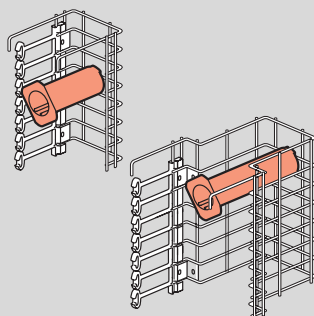


### 0 464 26/27

#### Bend limiting clips

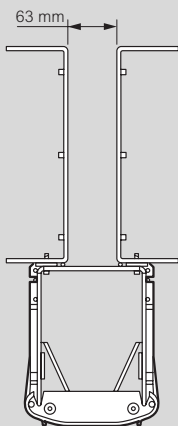


#### Cord coiling support

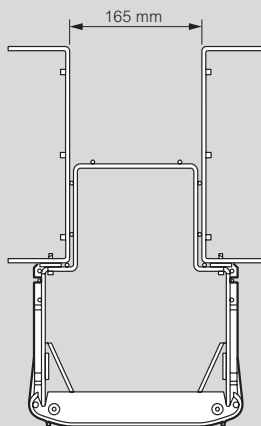


### Joining racks with grid

#### 0 464 25/26

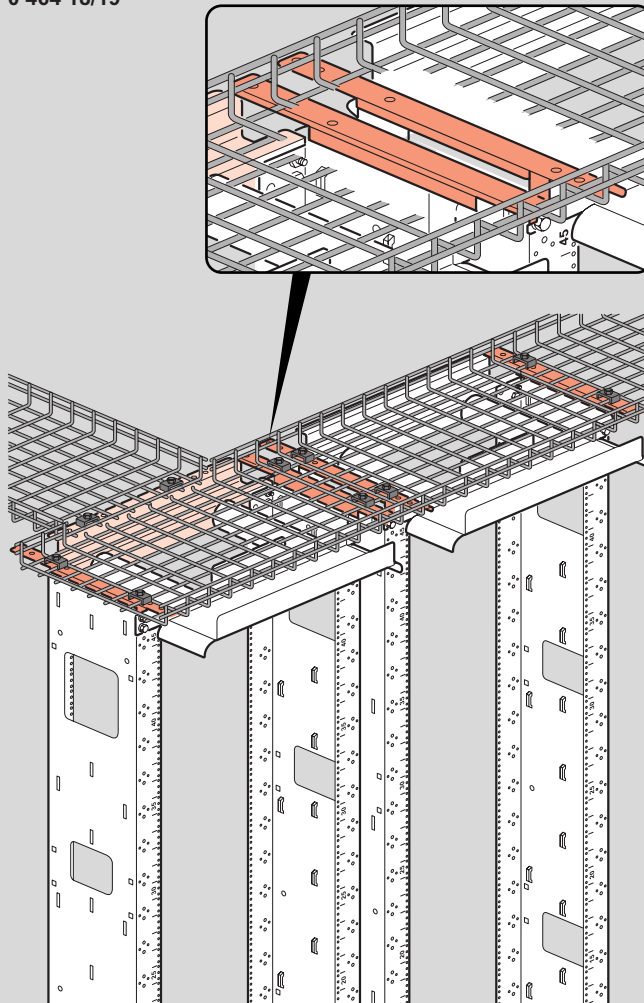


#### 0 464 27



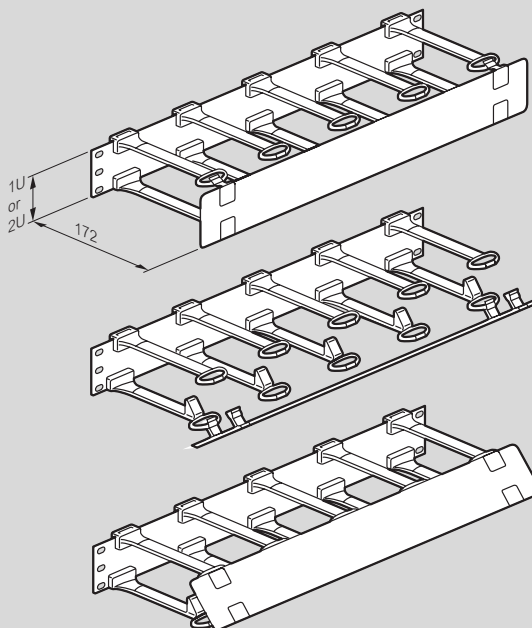
### Cable tray support

#### 0 464 18/19



### 19" cord management panels

#### 0 465 70/71



# Legrand cabling system LCS<sup>2</sup>

## 19" and 10" LCS<sup>2</sup> wall-mounting cabinets

### General characteristics

Metallic wall-mounting cabinets  
RAL 7016 textured polyester coating providing excellent resistance to corrosion and scratching  
Front door made of safety glass  
Protection index (weatherproof) against solid objects and liquids: IP 20  
Protection index against mechanical impact: IK 08  
Perforations in uprights: 9.5 x 9.5 mm  
Permissible load: 3 kg/U (or 48 kg for a 19" cabinet 16 U)  
12 kg for the 10" cabinet 6 U

### Compliance with standards

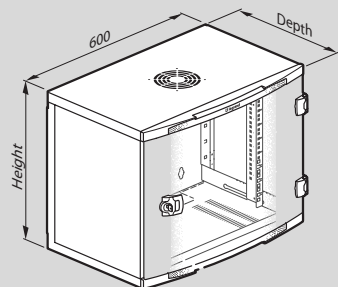
LCS<sup>2</sup> cabinets comply with the following standards:

<b>IEC 60529</b> <b>EN 60529</b>	(NF C 20-010) Degrees of protection provided by enclosures (IP code).
<b>IEC 62262</b> <b>EN 62262</b>	(EN 50102, NF C 20-015) Degrees of protection provided by enclosures of electrical equipment against external mechanical impacts (IK code).
<b>IEC 60950-1</b> <b>EN 60950-1</b> <b>C 77-210-1</b>	Safety of data processing equipment.
<b>EIA-310-E</b>	Cabinets, enclosures, panels and associated equipment (ANSI/EIA/310-E-2005).
<b>IEC 60297-3-100</b> <b>DIN 41414-7</b>	(NF C 20-150, NF C 20-151) Sizes of mechanical structures of the 482.6 mm (19 in) series

LCS<sup>2</sup> cabinets can be integrated into installations complying with the following standards:

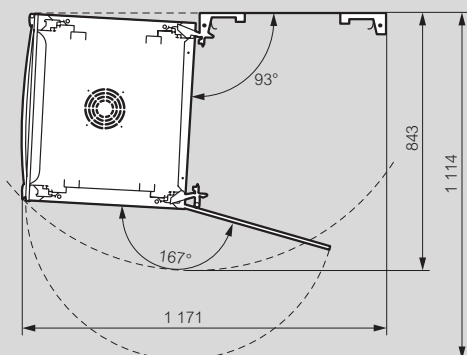
<b>EN 50173-1</b>	Information technology - Generic cabling systems.
<b>EN 50174-1 and 2</b> <b>C 90-480-1 and 2</b>	Information technology - Cabling installation.
<b>ISO IEC 11801</b>	Information technology - Generic cabling for customer premises
<b>NF C 15-100</b> <b>Part 4-41</b>	Low voltage electrical installations - Recommendations.
<b>UTE C90-483</b>	Residential cabling for communication networks
<b>IEC 60364-4-41</b>	Low voltage electrical installations - Protection for safety - Protection against electric shock

### Overall dimensions (mm)

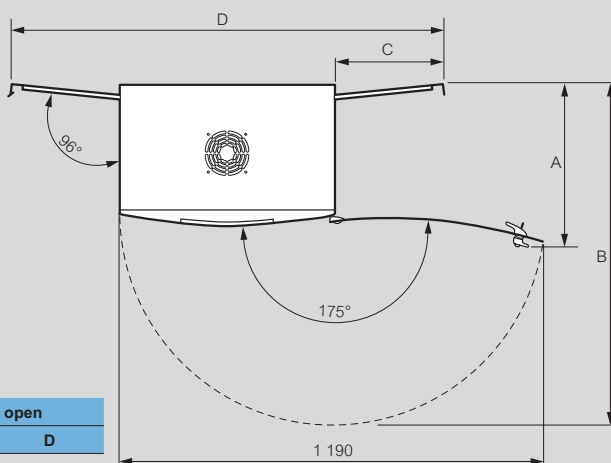


	Cat.Nos	Capacity	Height	Width	Depth
19" fixed cabinets	0 462 00	6 U	350	600	400
	0 462 01	9 U	500		
	0 462 02	12 U	600		
	0 462 03	16 U	800		580
	0 462 06	9 U	500		
	0 462 07	12 U	600		
	0 462 08	16 U	800		
19" pivoting cabinets	0 462 09	21 U	1000	600	615
	0 462 11	9 U	500		
	0 462 12	12 U	600		
	0 462 13	16 U	800		
10" cabinet	0 462 20	6 U	352	314	300

### Pivoting bottom opening

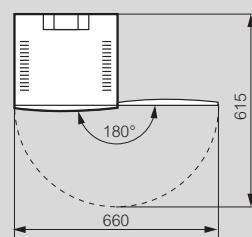


### Front door and side panel opening



	Cat.Nos	Doors open		Panels open	
		A	B	C	D
19" fixed cabinets	0 462 00	400	962	305	1205
	0 462 01				
	0 462 02				
	0 462 03	580	1140	482.5	1565
	0 462 06				
	0 462 07				
	0 462 08				
19" pivoting cabinets	0 462 09	600	1179	482.5	1565
	0 462 11				
	0 462 12				
	0 462 13				
	0 462 14				

### 10" cabinet door opening Cat.No 0 462 20

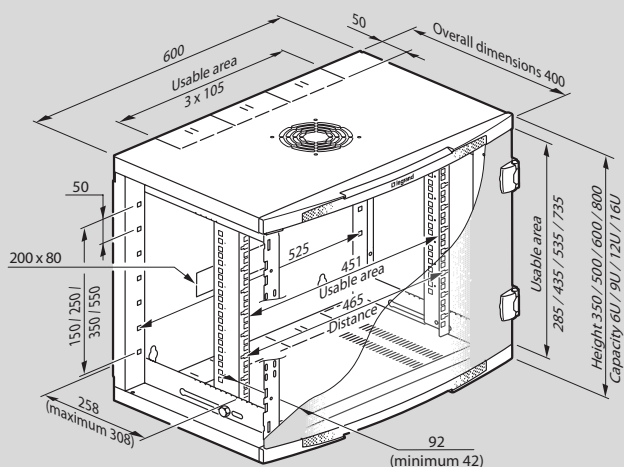


# Legrand cabling system LCS<sup>2</sup>

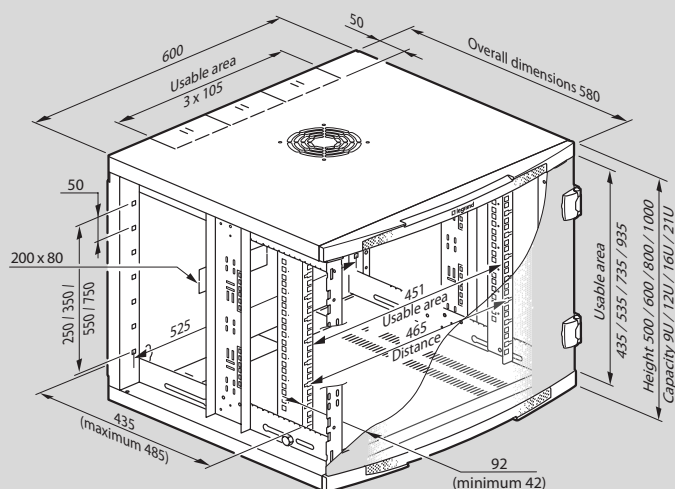
## 19" and 10" LCS<sup>2</sup> wall-mounting cabinets

### Usable dimensions (mm)

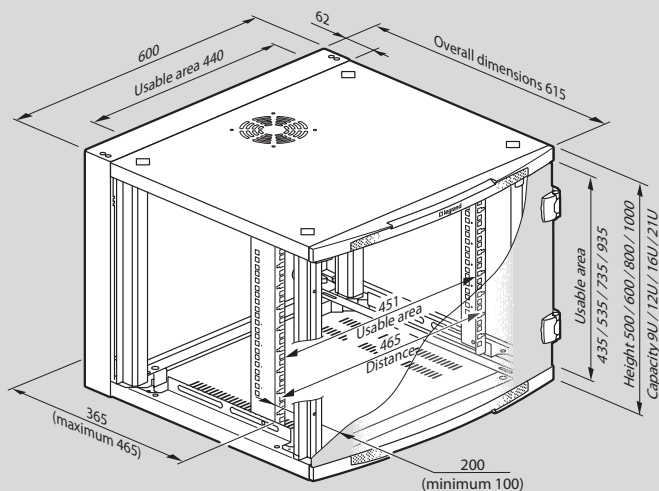
#### 19" LCS<sup>2</sup> fixed cabinets depth 400 mm



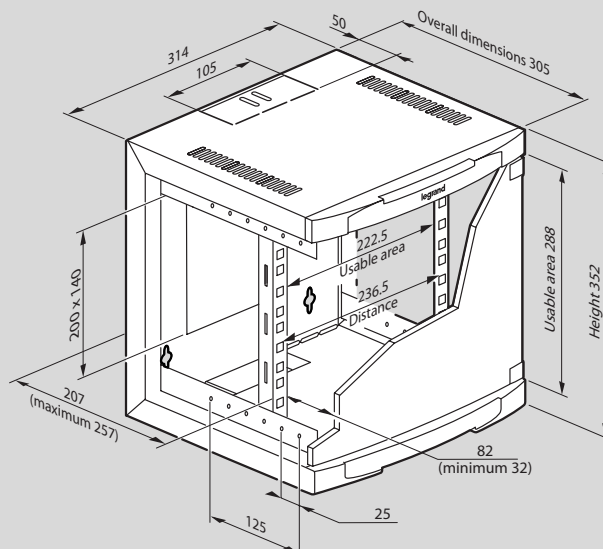
#### 19" LCS<sup>2</sup> fixed cabinets depth 580 mm



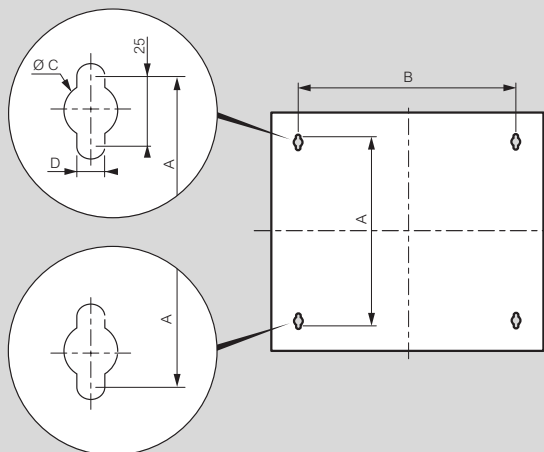
#### 19" LCS<sup>2</sup> pivoting cabinets depth 600 mm



#### 10" LCS<sup>2</sup> cabinet depth 300 mm



### Fixing of cabinets (mm)



	Capacity	A	B	C	D
19" fixed cabinets	6 U	275			
	9 U	425			
	12 U	525	408	20	11
	16 U	725			
	21 U	925			
19" pivoting cabinets	9 U	425			
	12 U	525	500	18	9
	16 U	725			
	21 U	925			
10" cabinets	6 U	275	250	15	6.5

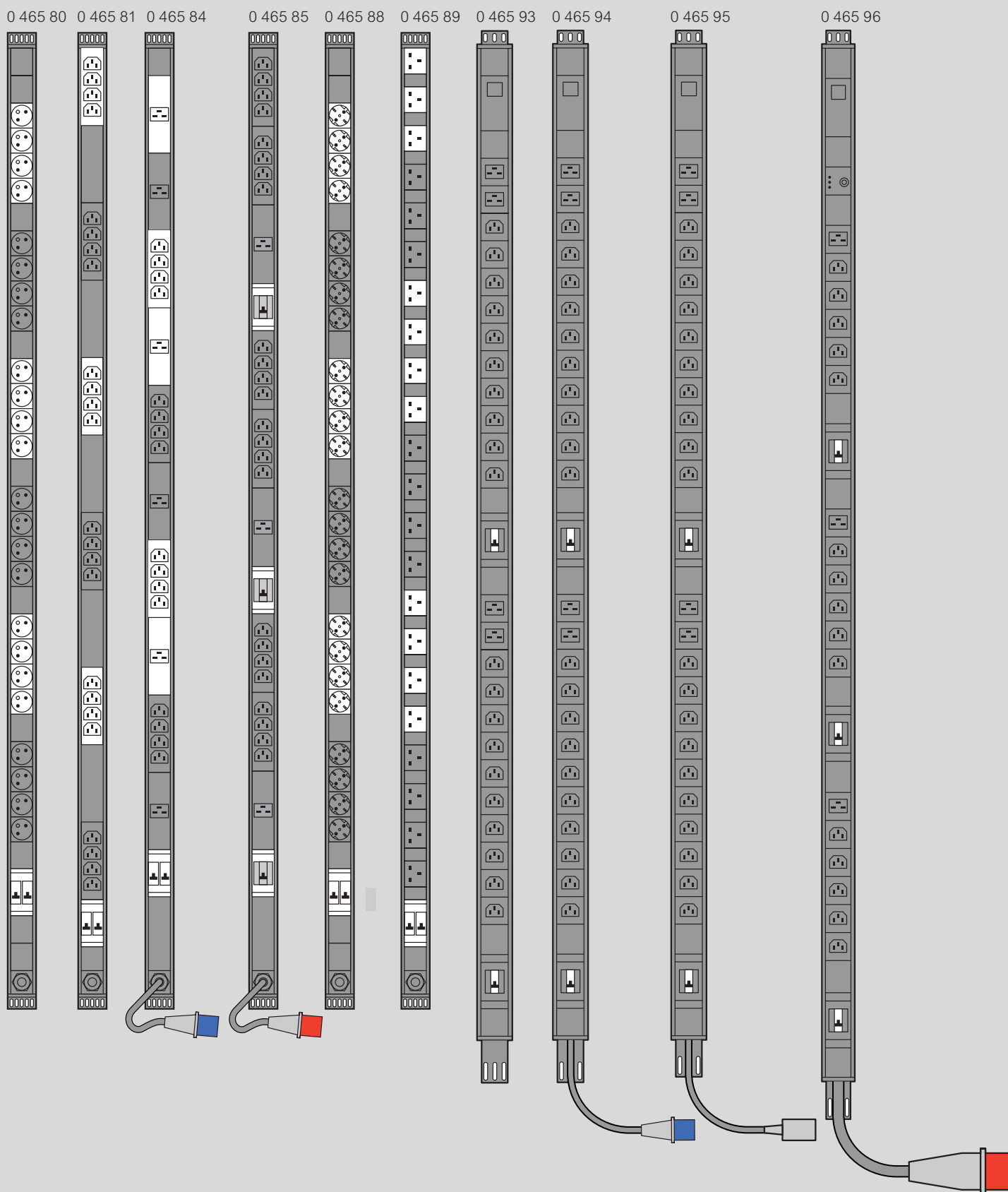
### Weight (kg)

	Cat.Nos	Weight
19" fixed cabinets	0 462 00	16.7
	0 462 01	20.4
	0 462 02	22.8
	0 462 03	26
	0 462 06	25.7
	0 462 07	32.7
	0 462 08	41.5
	0 462 09	52.5
	0 462 11	31.8
19" pivoting cabinets	0 462 12	40
	0 462 13	47.3
	0 462 14	59
10" cabinet	0 462 20	8

# Energy distribution

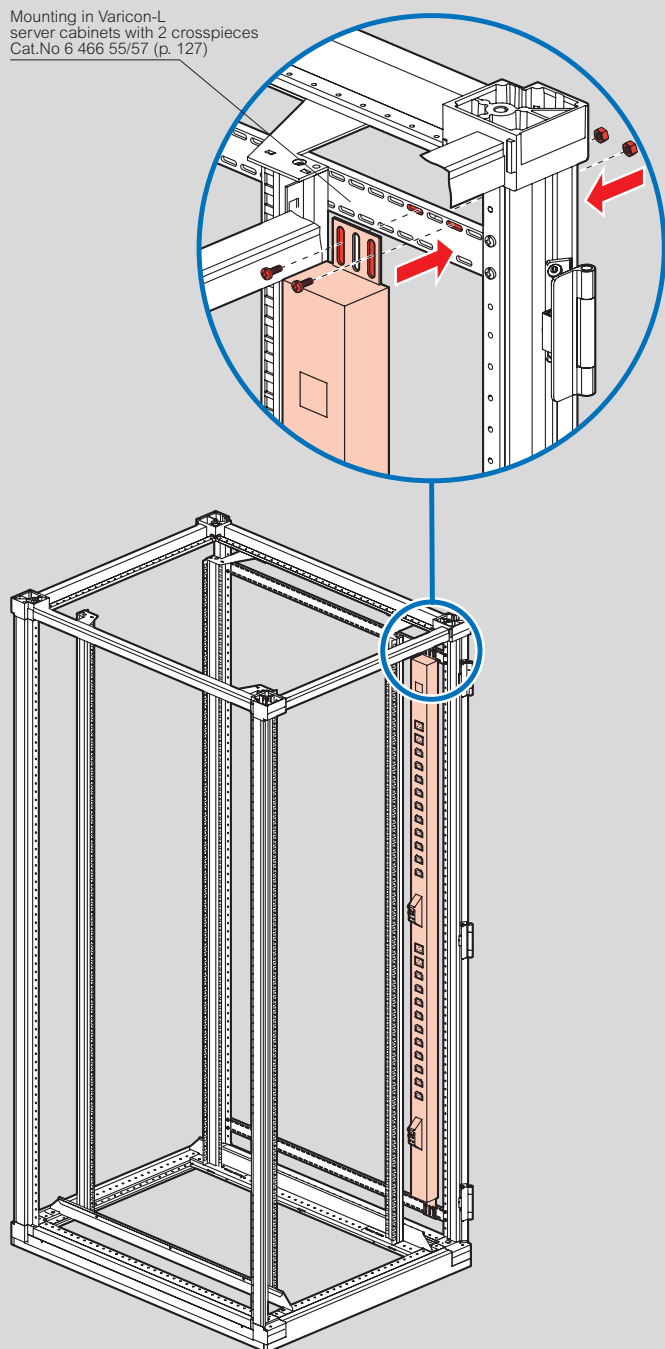
## Vertical Power Distribution Units (PDUs)

### Vertical Power Distribution Units configuration

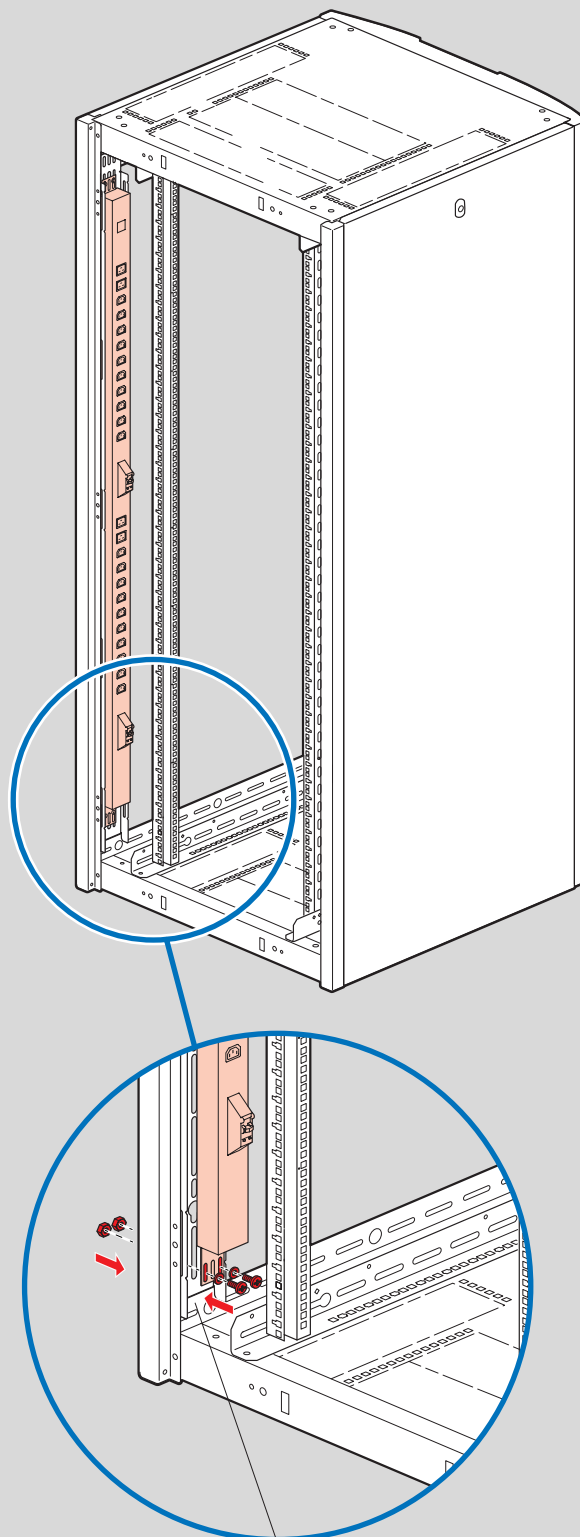


## ■ Mounting in Varicon-L server cabinets

Mounting in Varicon-L server cabinets with 2 crosspieces  
Cat.No 6 466 55/57 (p. 127)



## ■ Mounting in LCS<sup>2</sup> cabling and server cabinets



Mounting in LCS<sup>2</sup> cabinets and server cabinets  
with a PDU support Cat.No 0 465 75/76 (p. 117)



# Legrand Server System

## 19" Varicon-L server cabinets and accessories

### General characteristics

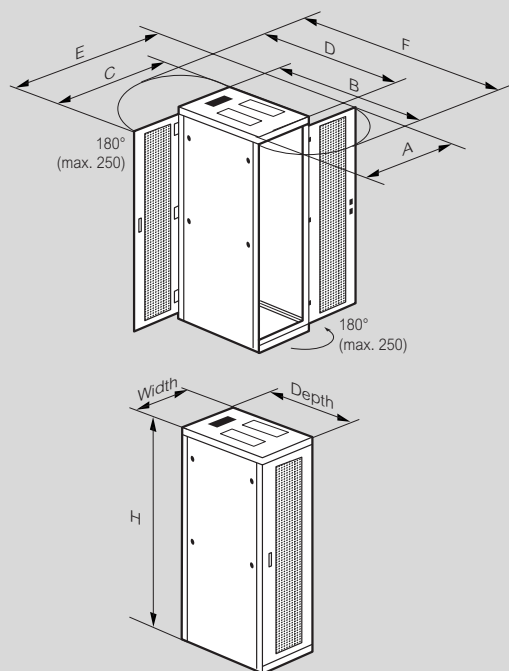
Extendable metallic cabinets. RAL 9011 textured paint providing excellent resistance to corrosion and scratching  
Front and rear 80% microperforated metal doors  
Protection index against mechanical impact: IK 08  
Perforation in 19" uprights: 9.5 x 9.5 mm  
Loading capacity: 1000 kg

### Compliance with standards

Varicon-L 19" server cabinets comply with the following standards:

<b>IEC 62262 EN 62262</b>	(EN 50102, NF C 20-015) Degree of protection provided by enclosures of electrical equipment against external mechanical impacts (IK code)
<b>EIA-310-E</b>	Cabinets, enclosures, panels and associated equipment (ANSI/EIA-310-E-2005)
<b>IEC 60297-3-100 DIN 41414-7</b>	(NF C 20-150, NF C 20-151) Sizes of mechanical structures of the 482.6 mm (19 in) series

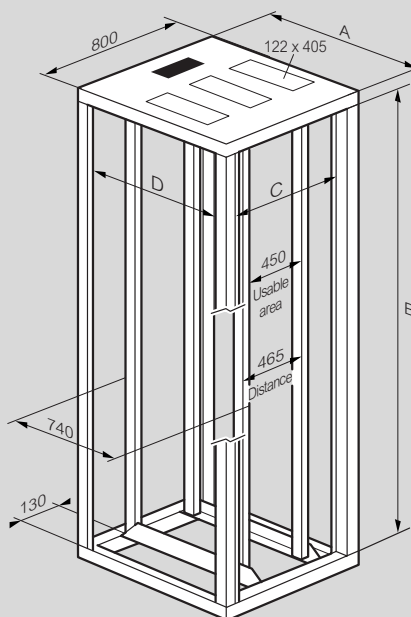
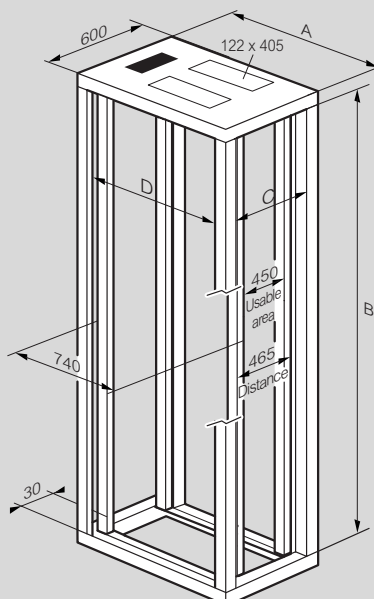
### Dimensions (mm)



Cat.No	Capacity	H <sup>(1)</sup>	Width	Depth	Front door open		Rear door open		Front and rear doors open	
					A	B	C	D	E	F
<b>6 466 10/30</b>	41 U	2004	600	1040	1178	1615	1178	1615	1760	2189
<b>6 466 12/32</b>				1240						
<b>6 466 13/33</b>			800	1040	1580	1815	1580	1815	2360	2589
<b>6 466 15/35</b>				1240						
<b>6 466 16/36</b>	46 U	2204	600	1040	1178	1615	1178	1615	1760	2189
<b>6 466 18/38</b>				1240						
<b>6 466 19/39</b>			800	1040	1580	1815	1580	1815	2360	2589
<b>6 466 21/41</b>				1240						

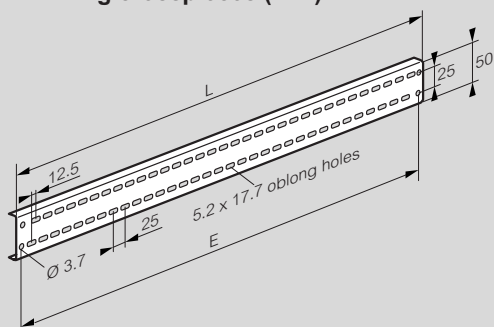
1: With levelling feet at min. adjustment (Max. adjustment of feet: + 26 mm)

### Usable dimensions



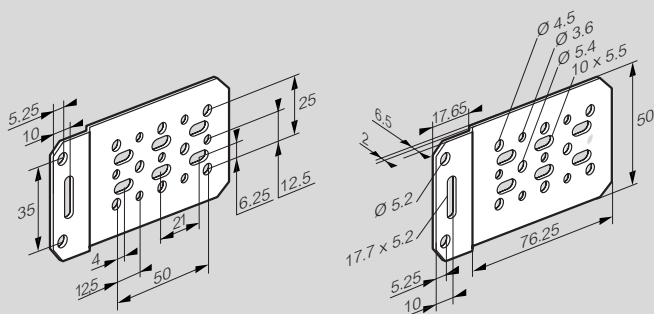
Cat.No	Capacity	A	Usable space		
			B	C	D
<b>6 466 10/30</b>	41 U	1040	1850	536	835
<b>6 466 12/32</b>		1240			1035
<b>6 466 13/33</b>		1040		736	835
<b>6 466 15/35</b>		1240			1035
<b>6 466 16/36</b>	46 U	1040	2050	536	835
<b>6 466 18/38</b>		1240			1035
<b>6 466 19/39</b>		1040		736	835
<b>6 466 21/41</b>		1240			1035

## Fixing crosspieces (mm)

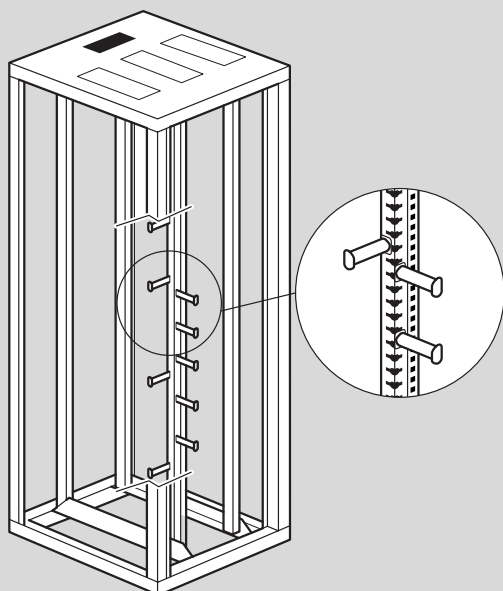


Cat.No.	L	E
6 466 55	865	850
6 466 57	1065	1050

## Universal fixing bracket (mm)

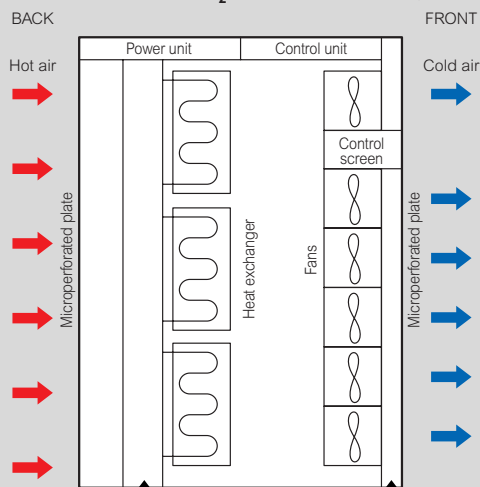


## Vertical feedthrough



Fixing of the vertical cable managers on 19" upright  
Cable guides can be mounted at the front, and at the side (only for 800 mm wide cabinets)  
UL94 V0 halogen free cable guide

## Varicondition H<sub>2</sub>O air conditioning unit



Cooling capacity	Electrical connections
24 kW*	230 VAC - 700 Watts - 1.1 kVA

\* With a  $\Delta T$  of 25°C (on the servers)

Max. water flow rate	65 l/min
Recommended water flow rate for 24 kW	54 l/min
Water inlet temperature	8 to 20°C
Maximum working pressure	5 bar
Water hose connection (at bottom)	1 inch DN25, PN30
Condens drain connection (at bottom)	20.32 inches (5/4 inch)
Max. air flow rate	5000 m <sup>3</sup> /h
Air inlet temperature IT equipment	20 to 25°C**
Max. allowable local humidity	5.5 ADP - 60% RH

\* Recommended water temperature for 24 kW, other inlet temperatures possible. Do not hesitate to contact us for advice on your specific situation  
\*\* ASHRAE, Class 1, 2

Type of valve	2-channel proportional control valve
Pressure drop valve	27 kPa*
Pressure loss coil assembly	66 kPa*
Water valve Kvs	6.3 m <sup>3</sup> /h

\* At the recommended rate of 54 l/min

# Legrand cabling system LCS<sup>2</sup> fibre optic

## fibre optic connectors

### Technical characteristics

- Connection of connectors on 900 µm fibre
- Maximum attenuation: 0.3 dB
- Ideal for high-speed systems: 10 gigabit Ethernet
- Operating temperature: 0 to 65°C
- Shallow connectors

### Advantages:

- High quality finish
  - Can be reused 5 times
  - Shallow connector, depth less than 40 mm
  - Connector factory pre-polished and does not require any glue
  - No special tools, easy to transport
  - Speed of installation: simple connection process, quick training
- It takes less than five seconds to fit the connector

### The basic steps

#### Preparation of the fibre:

Stripping



Cleaving



Inspection



### Connection:

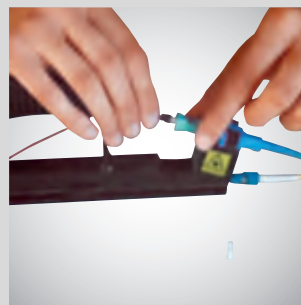
1/ Insert the fibre into the connector



2/ Slide the switch on the connector - the splice is done



3/ Slide the boot onto the connector



Finally, the visual fault locator is used to check the connection.

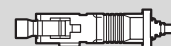
### Rapid crimping connectors with tool case Cat.No 0 326 90

#### Types of connector

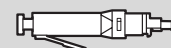
- ST connector: Helical shape locked by "push and turn" bayonet type connector



- SC connector: Rectangular shape "push-pull" latch type locking Suitable for a large number of active devices Recommended in the generic standards ISO/IEC 11801 and EN 50173



- LC connector: Rectangular shape tab locking Half the size of a conventional connector



Numeric index

Cat.Nos	Page No	Pack
0 097 00		
0 097 99	123	10
0 320 00		
0 320 68	123	50
0 325 00		
0 325 04	106	2000
05	-	2000
06	-	2000
07	-	2000
08	-	2000
09	-	2000
10	-	2000
11	-	2000
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76	-	1
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0 326 00		
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37	-	3
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Cat.Nos	Page No	Pack
0 326 46	135	1
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72	108	1
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82	-	1
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Cat.Nos	Page No	Pack
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Cat.Nos	Page No	Pack
0 462 60	120	1
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87	-	1/4
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69	-	5/100
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80	-	10
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41	101	5
42	-	5
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52	-	10
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Cat.Nos	Page No	Pack
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22	128	1
24	128	1
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