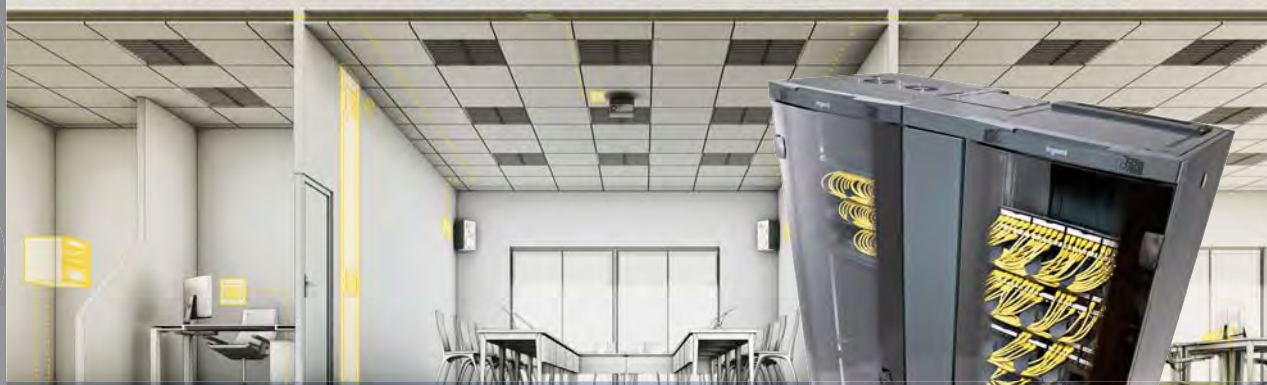# COMMUNICATION NETWORK
BUILDINGS
DIGITAL INFRASTRUCTURES

GUIDE

→ CATALOGUE PAGES INSIDE

THE GLOBAL SPECIALIST IN ELECTRICAL AND
DIGITAL BUILDING INFRASTRUCTURES

Lʒlegrand®

NETWORK
INFRASTRUCTURES

CONTENTS

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

LCS²
complete systems with a 25-year guarantee

LCS² cat. 6_A (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.

These systems are suitable for fibre optic cables as well as copper cables. Measurements of LCS² components and links are validated by independent laboratories 3P Third Party Testing and ETL.

LCS² category 6_A
designed to exceed all application requirements

With LCS² category 6_A, Legrand guarantees installed channel performance exceeding all category 6_A crosstalk requirements by **5dB /TIA*** or **3dB /ISO*** and exceeding all category 6_A 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_A amendment 2

LCS² Cat. 6_A channel components

- LCS² category 6_A F/UTP cables Cat.No 0 327 78
- LCS² category 6_A RJ 45 sockets
- LCS² category 6_A patch panels
- LCS² category 6_A patch cords

100 metre horizontal channel

The LCS² category 6_A channel is designed to offer flexibility. Legrand LCS² solutions have been designed to optimise application performance by using all standardised channel lengths and configurations.

With Legrand LCS² category 6_A solutions, it is no longer necessary to determine specific installation specifications or particular patch cable width limits.

WIRING PRINCIPLE

LCS² cat. 6_A patch panels

A LCS² cat. 6_A F/UTP cable

D LCS² cat. 6_A patch cords

LCS² cat. 6_A zone distribution boxes

B LCS² cat. 6_A F/UTP cable

C LCS² cat. 6_A patch cords

LCS² cat. 6_A patch panels

E LCS² cat. 6_A patch cords

LCS² cat. 6_A modular jacks/sockets

A+B = 90 m, C+D+E = 10 m
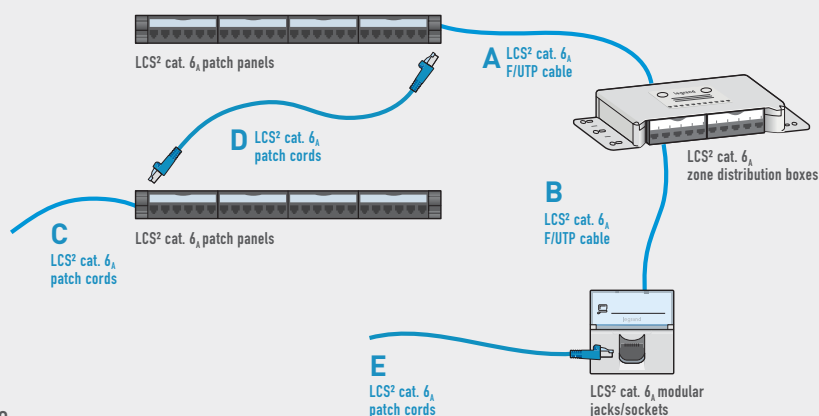
LCS² category 6$_A$ performance

The results of independent trials shown below allow comparison of worst performance obtained from a 100-metre LCS² channel with 4 connectors conforming with ISO standard category 6$_A$ specifications.
The significant margins shown for each measured parameter demonstrate the technical superiority of the LCS² category 6$_A$ solution.
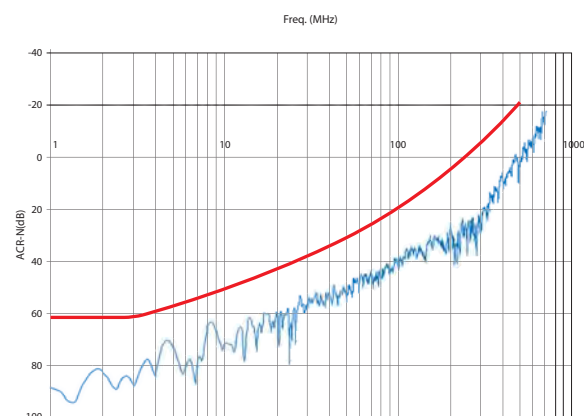These performance margins are consistent across the ISO/TIA standard tested frequency range and even beyond.
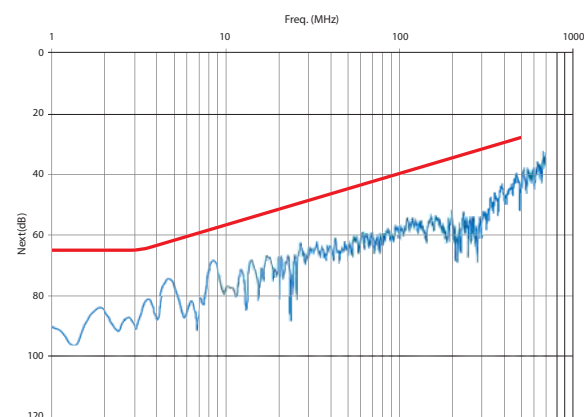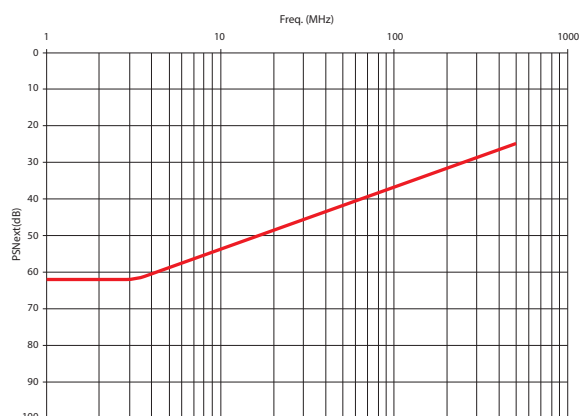

NEXT
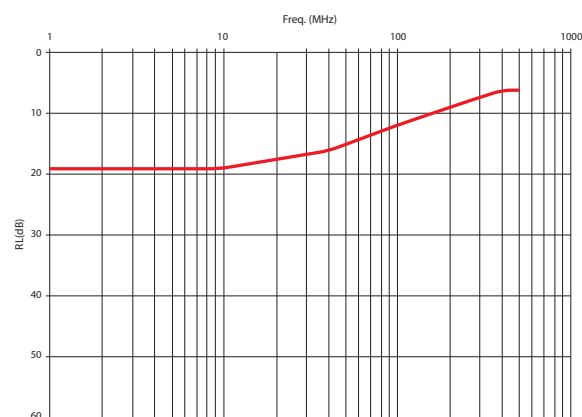
RETURN LOSS

ACR-N

PS NEXT

Frequency (MHz)	NEXT (dB) ISO11801 Channel Class E$_A$	NEXT (dB) LCS² Channel Class E$_A$	ACR-N (dB) ISO11801 Channel Class E$_A$	ACR-N (dB) LCS² Channel Class E$_A$	RL (dB) ISO11801 Channel Class E$_A$	RL (dB) LCS² Channel Class E$_A$	PS NEXT (dB) ISO11801 Channel Class E$_A$	PS NEXT (dB) LCS² Channel Class E$_A$	PS ACR-N (dB) ISO11801 Channel Class E$_A$	PS ACR-N (dB) LCS² Channel Class E$_A$	ACR-F (dB) ISO11801 Channel Class E$_A$	ACR-F (dB) LCS² Channel Class E$_A$	PS ACR-F (dB) ISO11801 Channel Class E$_A$	PS ACR-F (dB) LCS² Channel Class E$_A$
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

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LCS² fibre optic
high density system

LCS² high density fibre optic drawers are easy to install and maintain, offering complete accessibility and built-in coiling accessories.

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

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

LCS² FTTO/FTTD solutions will satisfy the needs of users with its enhanced performance in terms of speed, energy saving and modularity over increasing distances.

FTTO switch for trunking (p. 111)

FTTO switch for false celling/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: Varicondition H_2O 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 closed 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.

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.

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

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.

ONVIF
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.

Modular door controller
Cat.No 0 767 04

Zone distribution box

Modular door controller
Cat.No 0 767 04

LCS² cabling cabinet
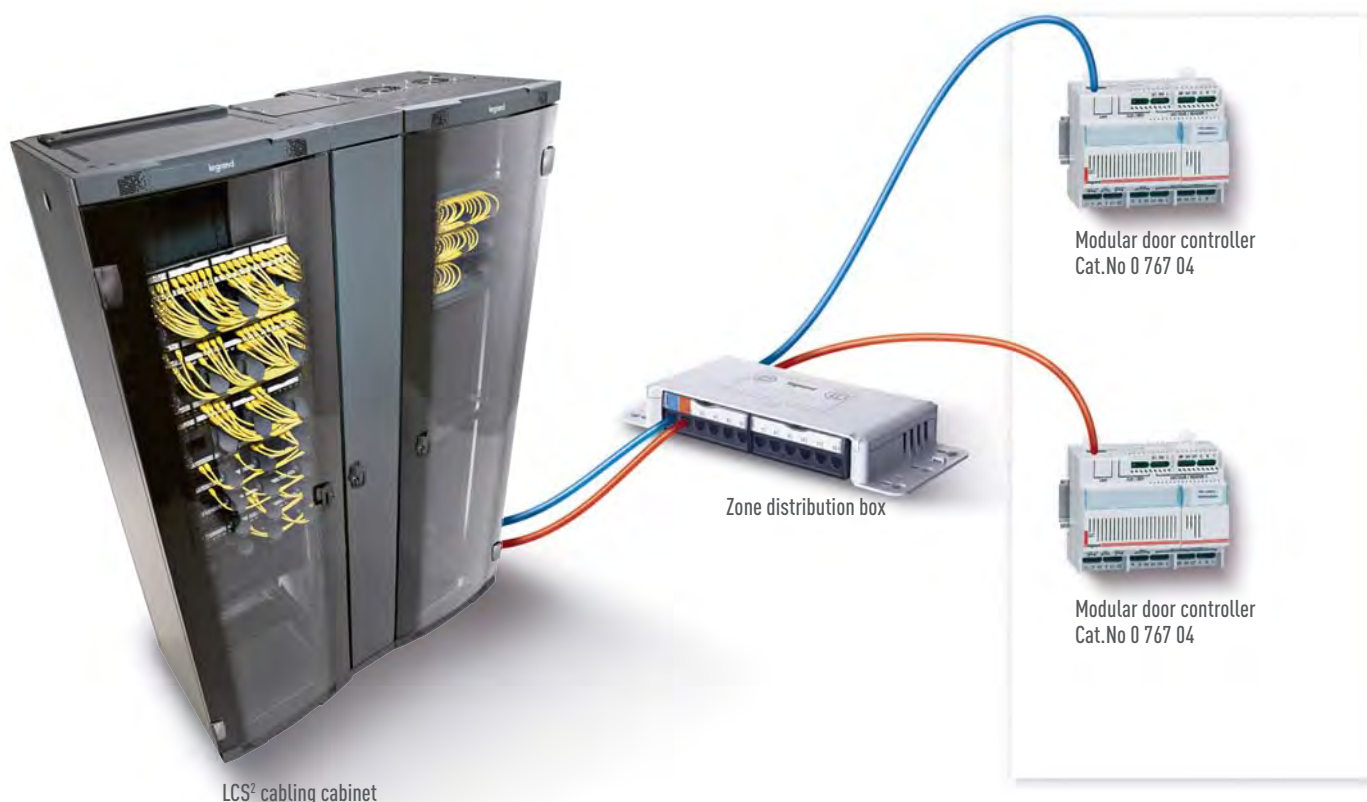
3 main current technologies for readers to be used on their own or in combination

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.
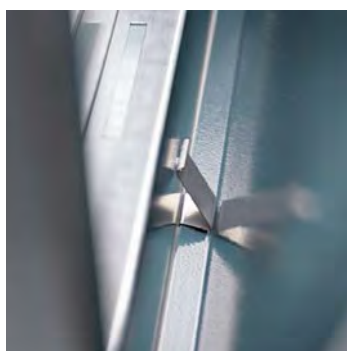
Automatic earthing clip earths the side and rear panels.

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 0FT cable management solutions for fibre optic cables

Specially designed to meet the requirements of data center, the P31 0FT 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 0FT 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
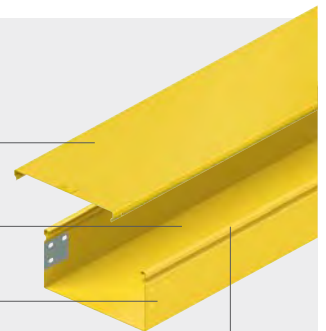
LCS² Cabinets
ensure evolution and maintenance

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

LCS² 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.

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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.
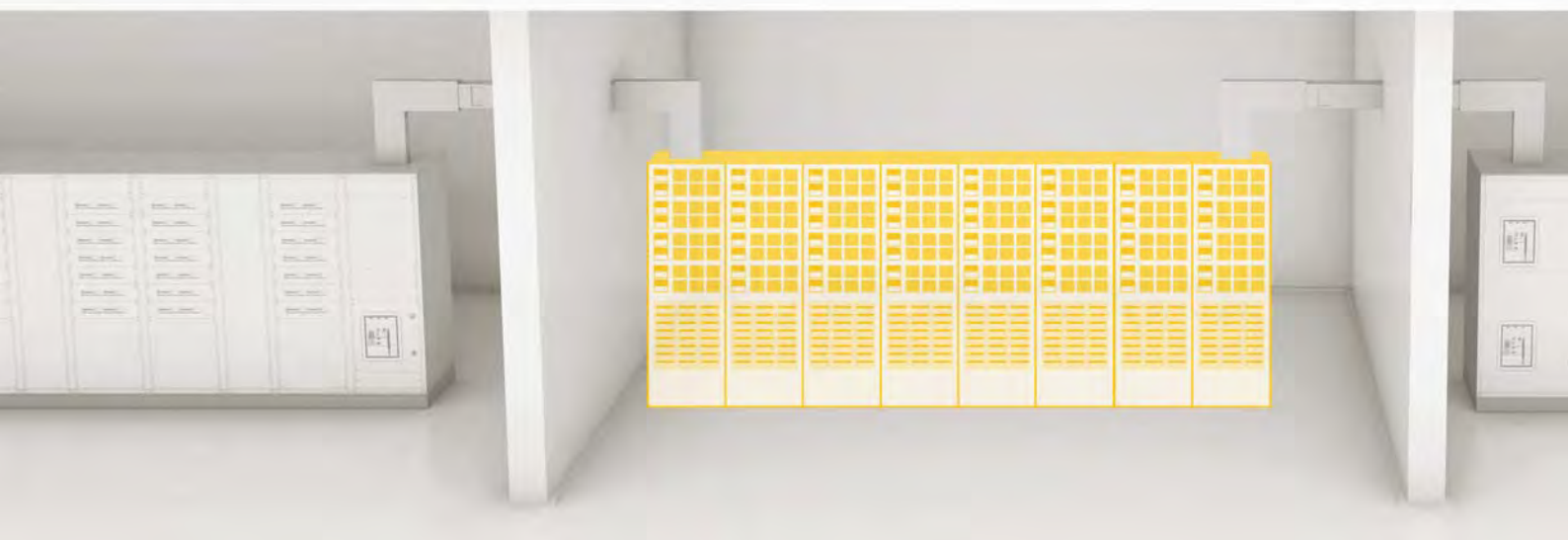
Varicondition Cold Corridor® (p. 128)

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
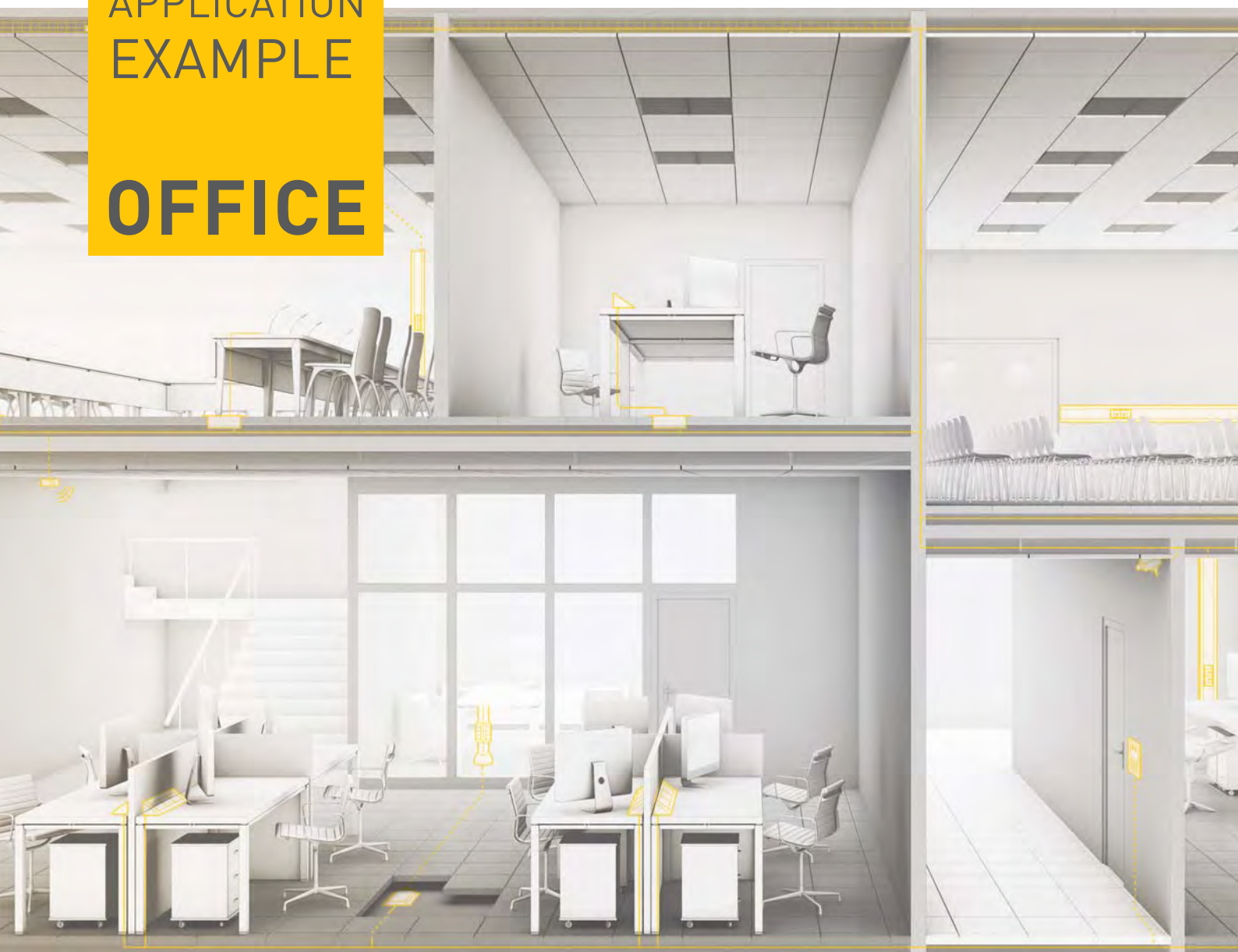
Active zone distribution box (p. 111)
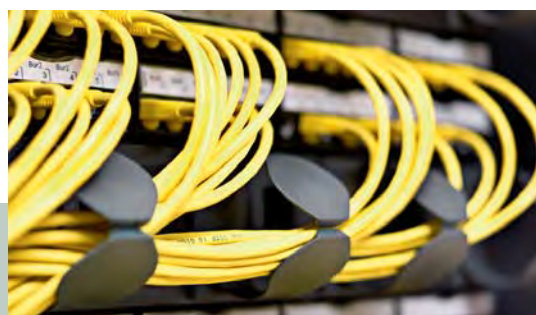
Patch panel (p. 88)

Flexible
cabling systems
Minimise
upgrade costs

RJ 45 socket (p. 91)

LCS^2 cabinet (p. 114)

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

HYPER-MARKET

Cablofil wire mesh

Fibre optic socket (p. 110)

Safety of property and people and **well-being** of customers
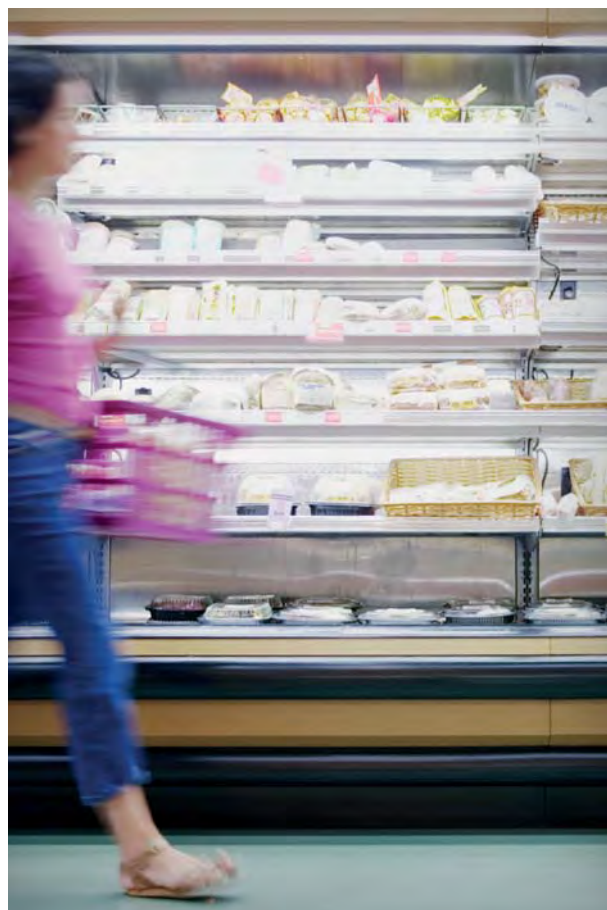
Dome IP camera

Ethernet switch (p. 102)

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

Antimicrobial RJ 45 socket

Zone distribution box (p. 90)

Security
of people
and
their data
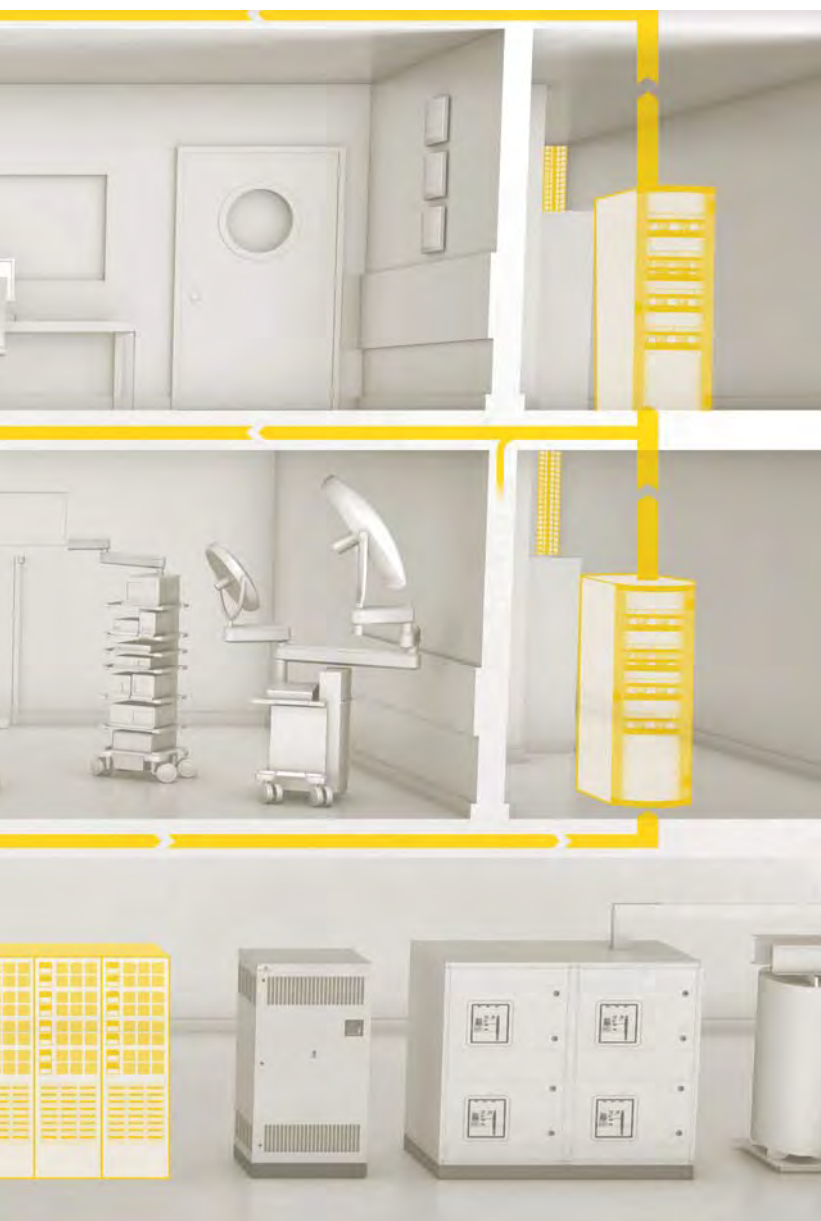
Access control
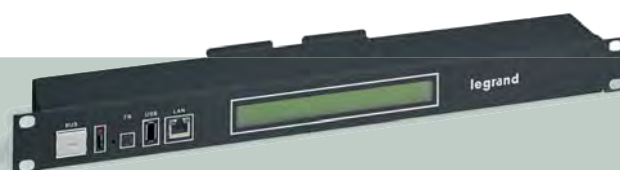
Analyser for RFID patch panels (p. 132)

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

APPLICATION
EXAMPLE

CAMPUS

AVS socket (p. 139)

DLP trunking system

![Legrand logo]

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...
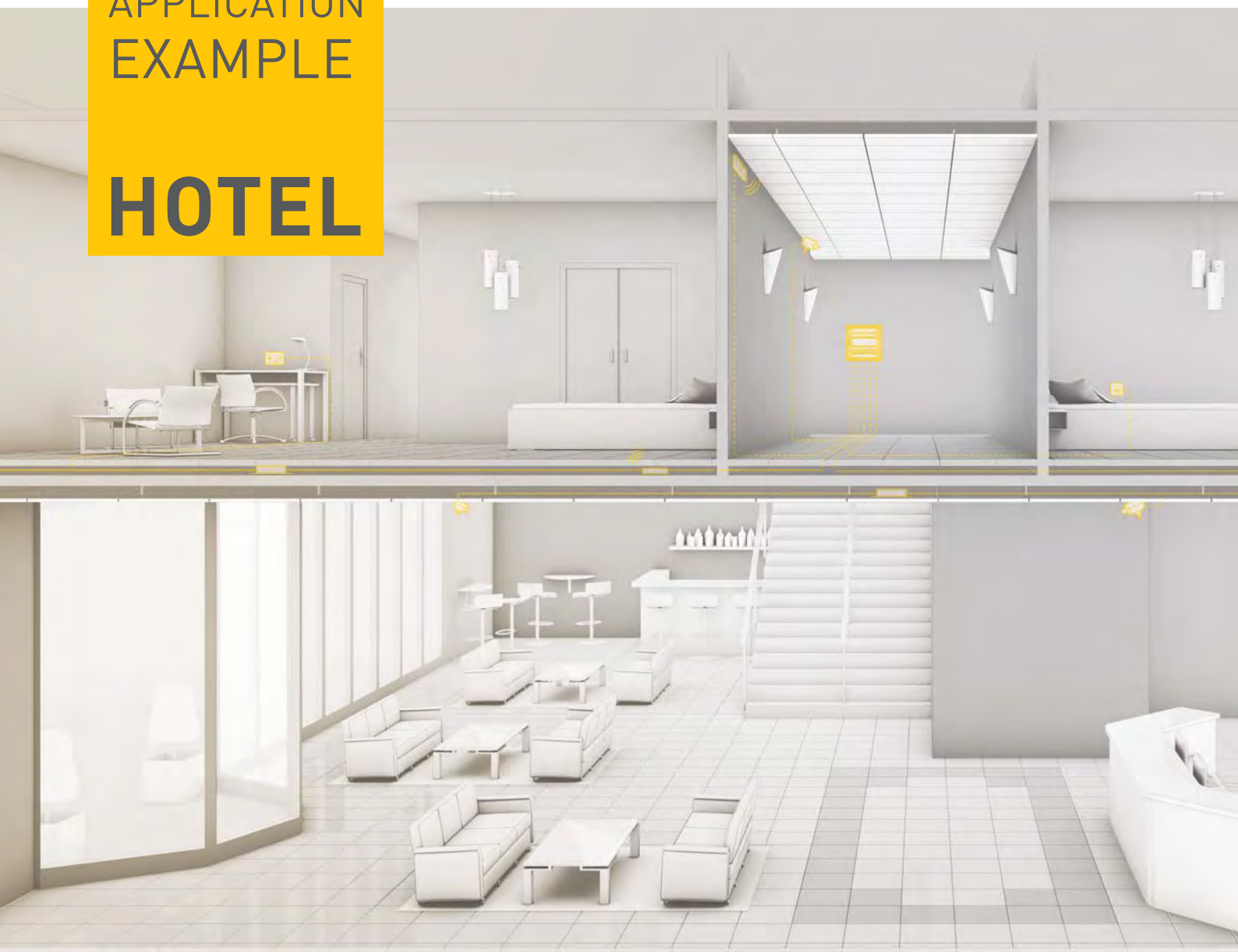
RJ 45 sockets 45°

19'' wall-mounting cabinet (p. 120)

Availability and efficiency for the best service

Retractable RJ 45 socket (p. 96)
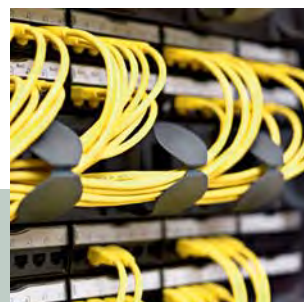
Patch cord (p. 88)

▶ 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
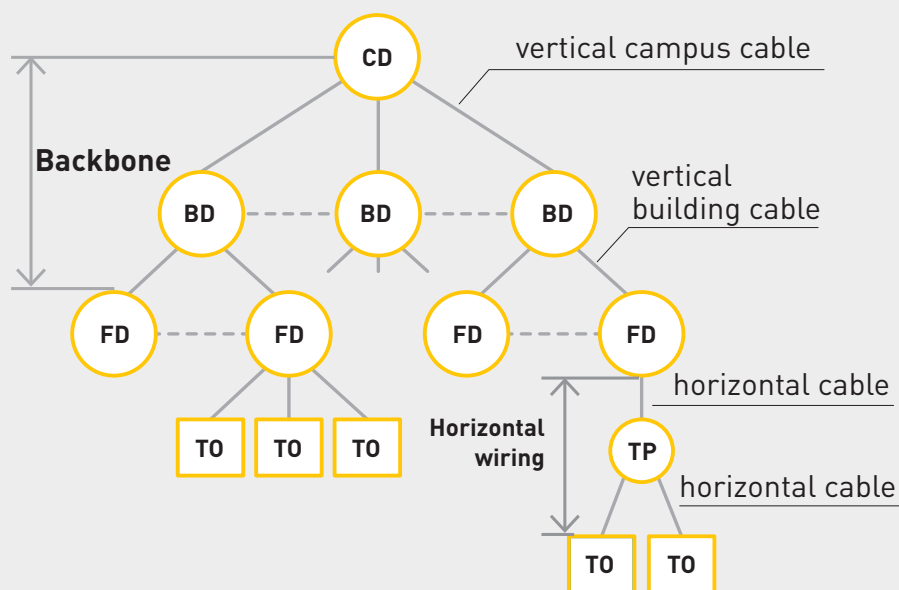
1.2.2 – Patching

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

INTERCONNECTION METHOD

Active device

Device cable

Horizontal wiring

Workstation

CROSS-CONNECTION METHOD

Active device

Device cable

Patch cord

Horizontal wiring

Workstation
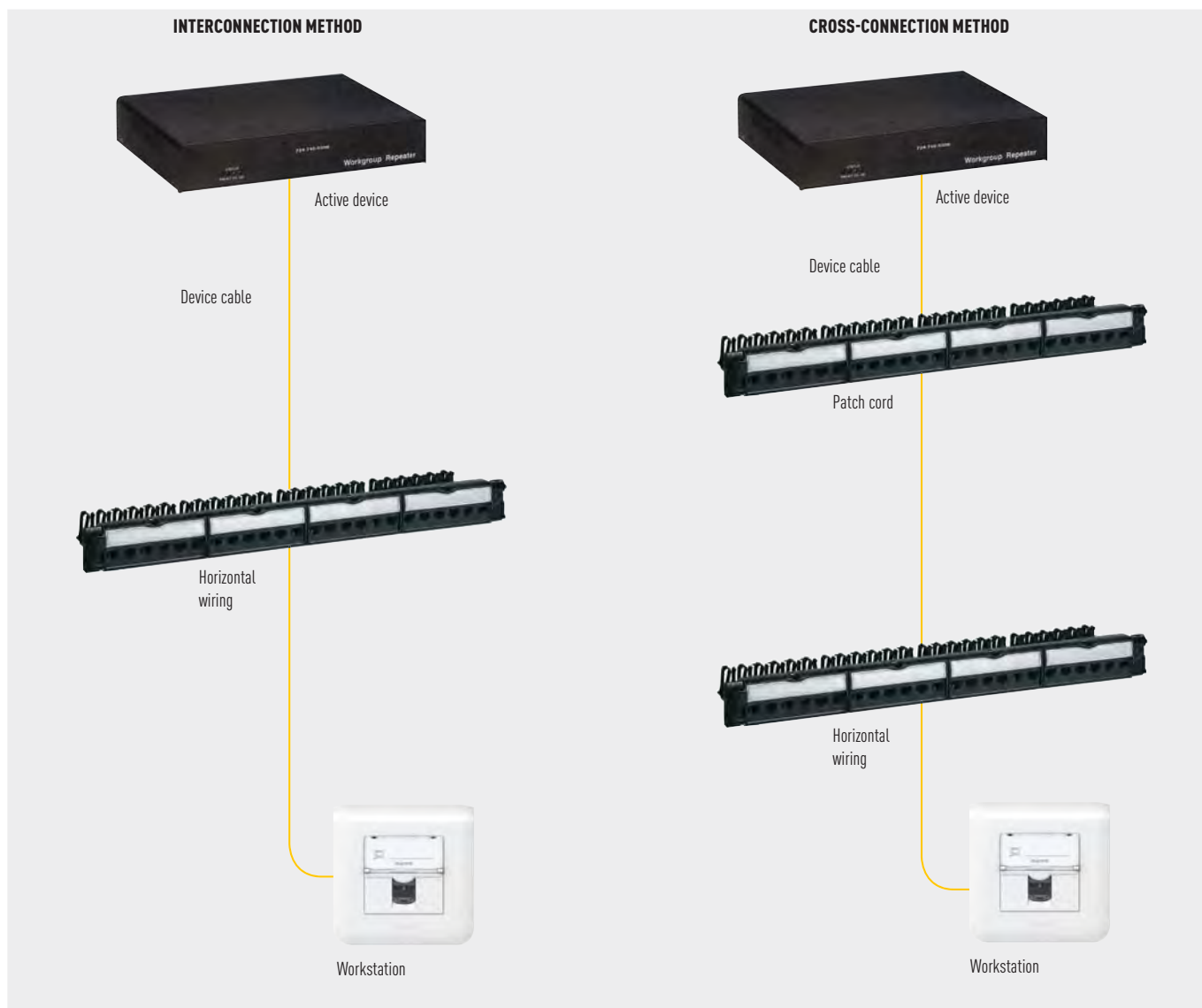
1.2.3 – Working area

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 to 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
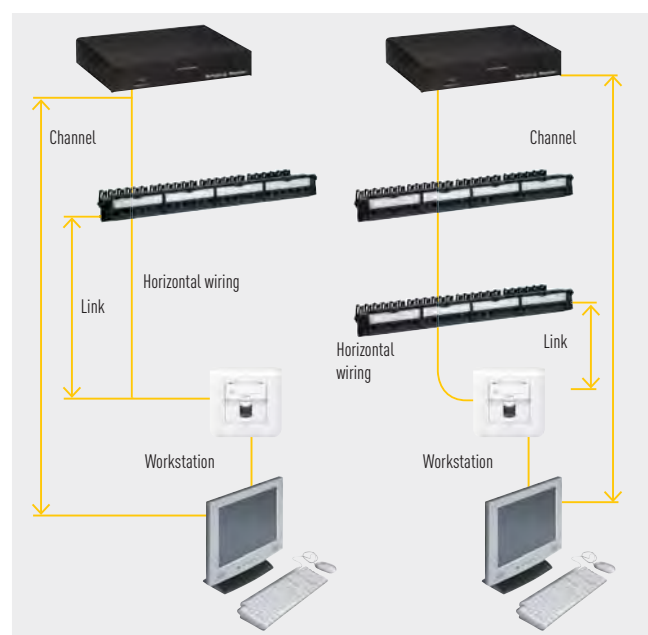
Class	Category	Speed*	Bandwidth	Applications
A	1		100 KHz	no longer used
B	2		1 MHz	no longer used
	3		10 MHz	no longer used
C	3		16 MHz	no longer used
D	5	1 Gbps	100 MHz	data
E	6	1 Gbps	250 MHz	broadband data
EA	6_A	10 Gbps	500 MHz	broadband data
F	7	10 Gbps	600 MHz	broadband data
FA	7_A	10 Gbps	1000 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[1]
- 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)

TIA/EIA 568-C[1]   IEC EN 50173

ISO/IEC 11801
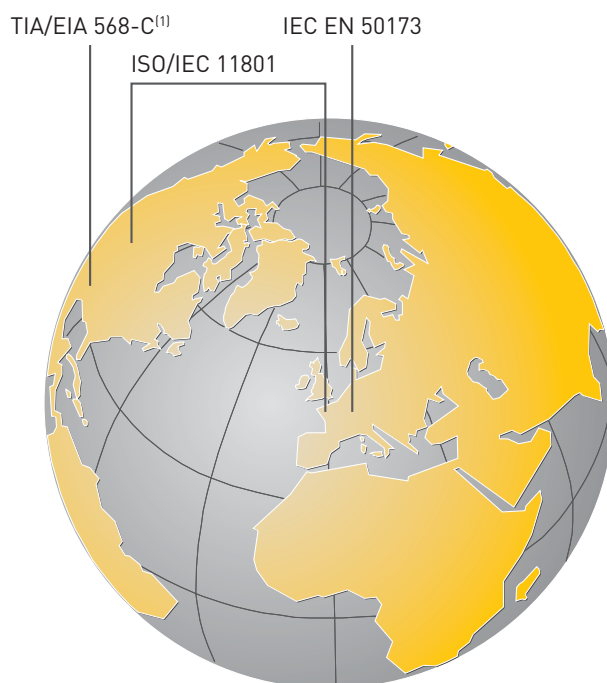
[1] The TIA/EIA 568-C series supersedes the previous TIA-EIA 568-A and 568-B series. The contents of the previous series are however kept and incorporated with new requirements. References to the previous series A and B that can be found in the technical literature, although not stringent, must however 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_A	6_A	500	IEC 61156-5	Shielded
E_A	6_A	500	IEC 61156-5	Unshielded
F	7	600	IEC 61156-5	Shielded*
F_A	7_A	1000	IEC 61156-5	Shielded*

* Categories 7 and 7_A 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_A	6_A	500	IEC 61156-6	Shielded
E_A	6_A	500	IEC 61156-6	Unshielded
F	7	600	IEC 61156-6	Shielded*
F_A	7_A	1000	IEC 61156-6	Shielded*

* Categories 7 and 7_A 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 m², 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_A which is designated category 6_A 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_A/category 6_A 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
D	5	100	EN 50288-2-1	Shielded
D	5	100	EN 50288-3-1	Unshielded
E	6	250	EN 50288-5-1	Shielded
E	6	250	EN 50288-6-1	Unshielded
E_A	6_A	500	(TIA/EIA 568-C.2); EN 50288-10-1	Shielded
E_A	6_A	500	(TIA/EIA 568-C.2); EN 50288-11-1	Unshielded
F	7	600	EN 50288-4-1	Shielded*
F_A	7_A	1000	EN 50288-9-1	Shielded*

* Categories 7 and 7_A shielded cable only, with pairs shielded individually

Copper cords

Wiring class	Cable category	Maximum frequency (MHz)	Cable standard	Type of cable
D	5	100	EN 50288-2-2	Shielded
D	5	100	EN 50288-3-2	Unshielded
E	6	250	EN 50288-5-2	Shielded
E	6	250	EN 50288-6-2	Unshielded
E_A	6_A	500	(TIA/EIA 568-C.2); EN 50288-10-2	Shielded
E_A	6_A	500	(TIA/EIA 568-C.2); EN50288-11-2	Unshielded
F	7	600	EN 50288-4-2	Shielded*
F_A	7_A	1000	EN 50288-9-2	Shielded*

* Categories 7 and 7_A 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
OF-25	M/650;	OP1	EN 60793-2-40 (A4a.2)
OF-50	M/650; M/850; M/1300	OP1; OP2	EN 60793-2-40 (A4a.2; A4g)
OF-100	M/650; M/850; M/1300	OP1; OP2	EN 60793-2-40 (A4a.2; A4g)
OF-100	M/850	OH1	EN 50793-2-30 (A3c)
OF-100	M/850; M/1300	OM1	EN 60793-2-10 (A1a) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-100	M/850; M/1300	OM2	EN 60793-2-10 (A1b) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-100	M/850; M/1300	OM3	EN 60793-2-10 (A1a.2) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-100	M/850; M/1300	OM4	EN 60793-2-10 (A1a.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-200	M/650; M/850; M/1300	OP2	EN 60793-2-40 (A4f)
OF-200	M/850	OH1	EN 50793-2-30 (A3c)
OF-300	M/850; M/1300; S/1310; S/1550	OM1	EN 60793-2-10 (A1a) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-300	M/850; M/1300; S/1310; S/1550	OM2	EN 60793-2-10 (A1b) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-300	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
OF-300	M/850; M/1300; S/1310; S/1550	OM4	EN 60793-2-10 (A1a.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-300	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.)
OF-300	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.)
OF-2000	M/850; M/1300; S/1310; S/1550	OM1	EN 60793-2-10 (A1a) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-2000	M/850; M/1300; S/1310; S/1550	OM2	EN 60793-2-10 (A1b) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-2000	M/850; M/1300; S/1310; S/1550	OM3	EN 60793-2-10 (A1a.2) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-2000	M/850; M/1300; S/1310; S/1550	OM4	EN 60793-2-10 (A1a.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-2000	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.)
OF-2000	M/850; M/1300; S/1310; S/1550	OS2	EN 50793-2-50 (B1.3, B.6a) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-5000	S/1310; S/1550	OS2	EN 50793-2-50 (B1.3) + EN 60794-2 (ind.), EN 60794-3 (out.)
OF-10000	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
5/unshielded	EN 60603-7-2
5/shielded	EN 60603-7-3
6/unshielded	EN 60603-7-4
6/shielded	EN 60603-7-5
6_A/unshielded	EN 60603-7-41
6_A/shielded	EN 60603-7-51
7 (shielded only)	EN 60603-7-7; EN 61076-3-104
7_A (shielded only)	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

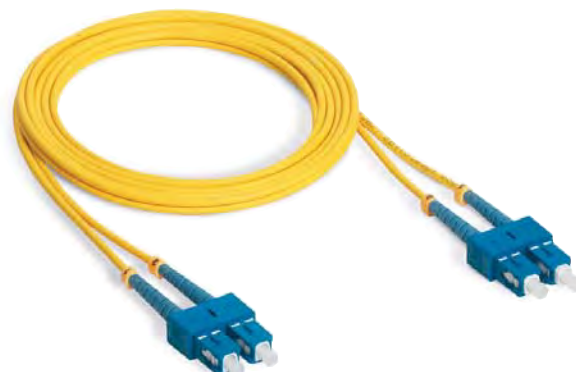

Clip locking

SC

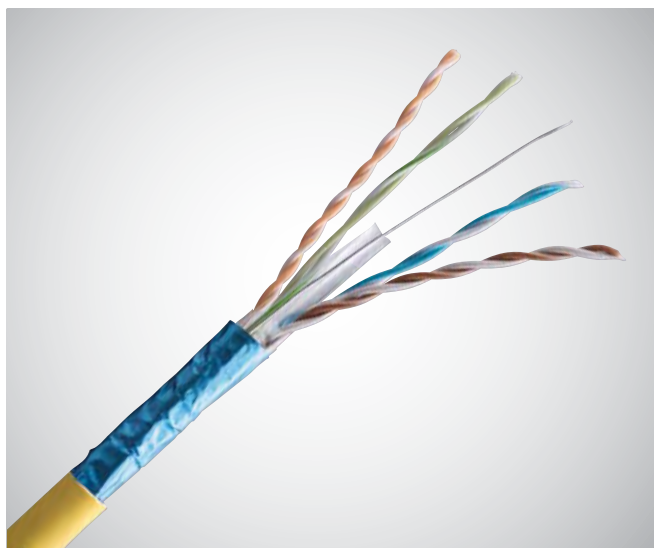Push-pull locking

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_A (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
Cat. 6$_A$ F/UTP 100 Ω	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
Cat. 6 U/UTP 100 Ω	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
Cat. 6 F/UTP 100 Ω	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
Cat. 5e U/UTP 100 Ω	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

UTP cable

White/green
Green
White/blue
Blue
Brown
White/brown
Orange
White/orange
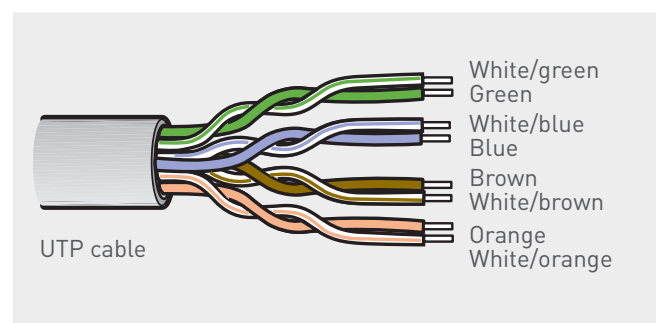
AWG cable conversion table

AWG	Ø (mm)	Cross-section (mm)	AWG	Ø (mm)	Cross-section (mm)
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
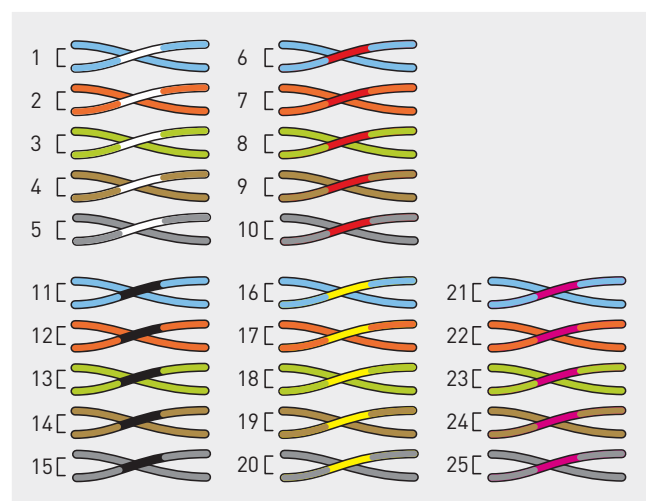
3.2 - Connectors for workstations

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_A 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^2 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
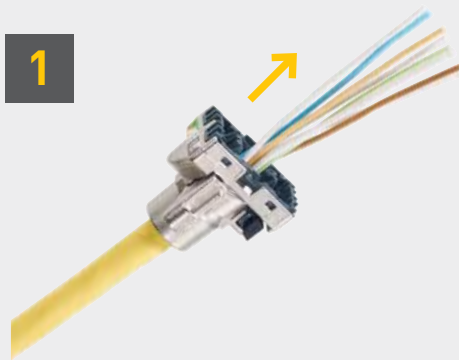
Insert the cable in the connection module.

2
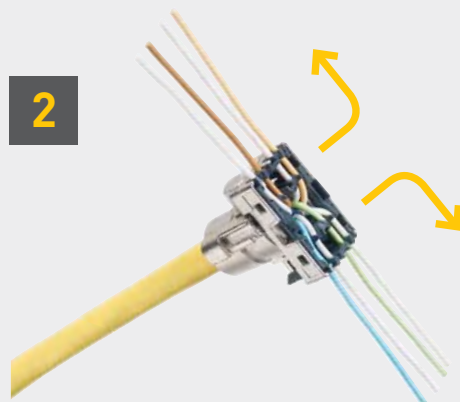
Separate the pairs and insert them in the corresponding locations, complying with the colour code. The module automatically ensures compliance with 13 mm, the cut in the centre and the splitting of the pairs.

3
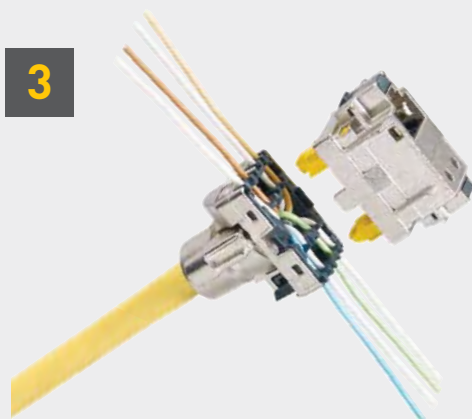
Clip the connector onto the module. The connector helps to ensure correct assembly.

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_A, blue cat. 6, grey cat. 5e.

No tool

6_A

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.
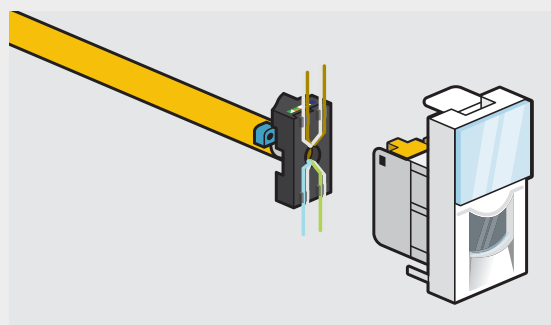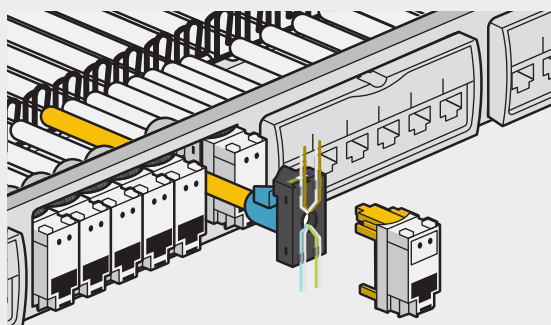
3.2.2 – Type 110 connection

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

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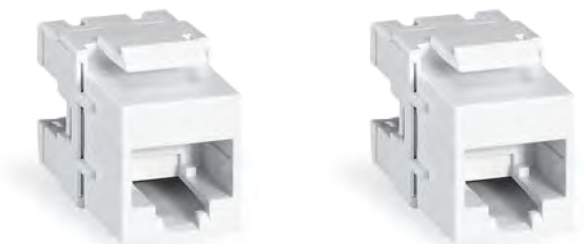
RJ 45 Keystone socket, cat. 6 UTP and 5e UTP

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.

T568A AND T568B PIN CONFIGURATIONS

g = green
w/g = white/green
o = orange
w/o = white/orange

b = blue
w/b = white/blue
br = brown
w/br = brown/white
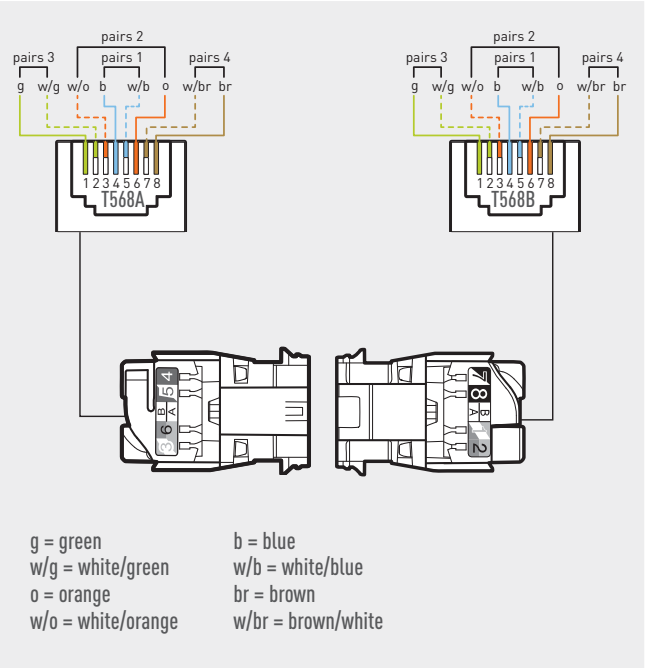
3.3 - Patch panels

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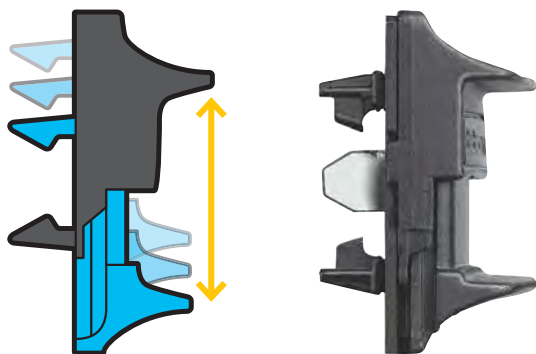
Detail of the mechanical spring for fixing to the upright, with stabiliser

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 it 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

Active devices

Cable for devices

Horizontal wiring

Patch cord

Horizontal wiring

Workstation

Workstation
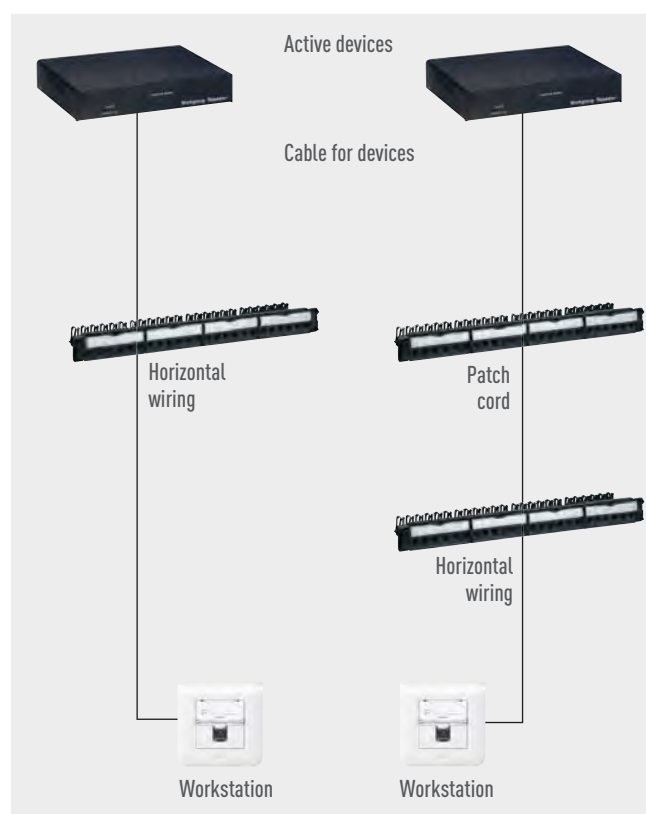
3.3.2 - TOOLLESS patch panels

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

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_A UTP and STP.

Measurement of LCS[2] components and links are validated by independent laboratories 3P Third Party Testing and ETL.

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 µm. Multimode fibres allow several propagation modes, and the diameter of their cores is 50 µm or 62.5 µm (the latter is now hardly ever used).
The diameter of the cladding is generally 125 µm. 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

Low smoke zero halogen jacket
E-glass non-metallic strength members
900 um tight buffered fibre
12 fibre internal distribution cable with 900 um tight buffered fibre

Multimode fibre optic

Diameter of the core: 50-62.5 µm
Diameter of the cladding: 125 µm

Singlemode fibre optic

Diameter of the core: 8 to 10 µm
Diameter of the cladding: 125 µm
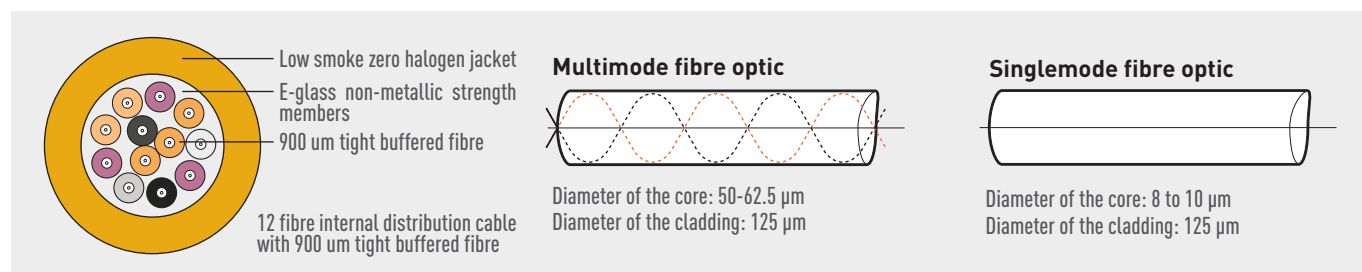
4.1.1 - Advantages

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

epoxy acrylate
silicone
cladding
kevlar
nylon
core
50 microns
125 microns
250 microns
900 microns
PVC 2,4
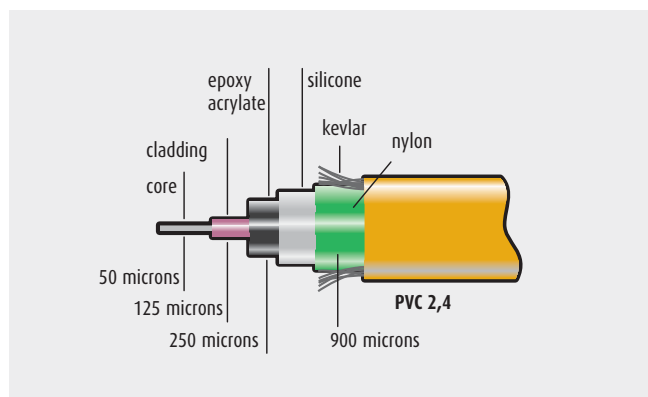
4.1.2 - Characteristics

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 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

Tool case for fibre optic connection

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[2] 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.

1

Remove the sheath from the fibre

2

Cut the fibre

3

Check that the cut is correct

no

yes

no

Examples of cuts on fibre optics

4
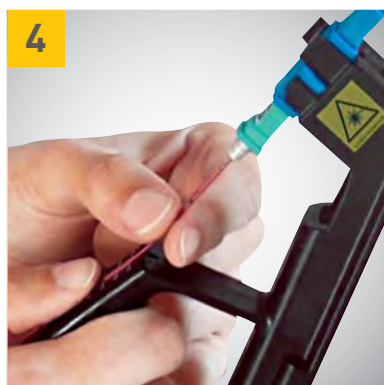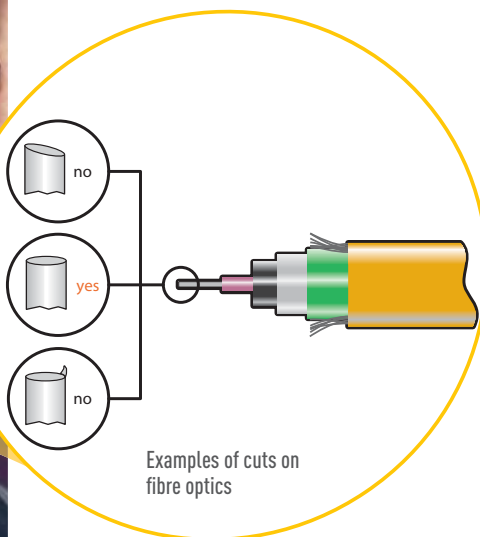
Insert the fibre in the connector

5

Slide the microswitch on the connector to make the connection

6
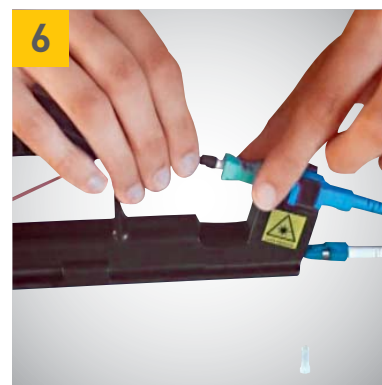
Slide the dust cover into the connector

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.

0 786 16   0 786 17   0 786 18

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^2 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 µm and singlemode OS1/OS2 9/125 µm, with combinations of SC, ST and LC connectors.

Multimode patch cord OM2 50/125 µm

4.7 – Connection kit

This is essential for connecting loose structure cables with individual fibres covered by a 250 µm diameter sheath to connectors.

Core + cladding
(125 µm)

Buffer
(250 µm)

Sheath
(900 µm)

Loose tube type
construction
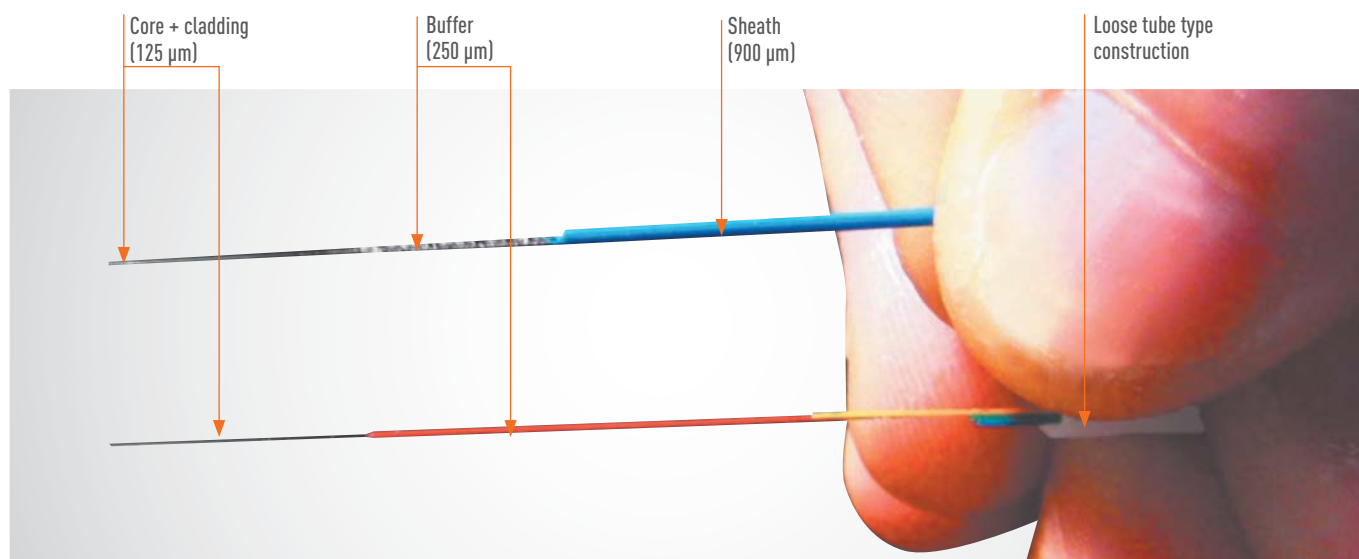
5 Wi-Fi
TRANSMISSION MEDIUM

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

Wireless terminal

Wireless terminal

Access point

IEEE 802.11

Ethernet LAN

Wireless terminal
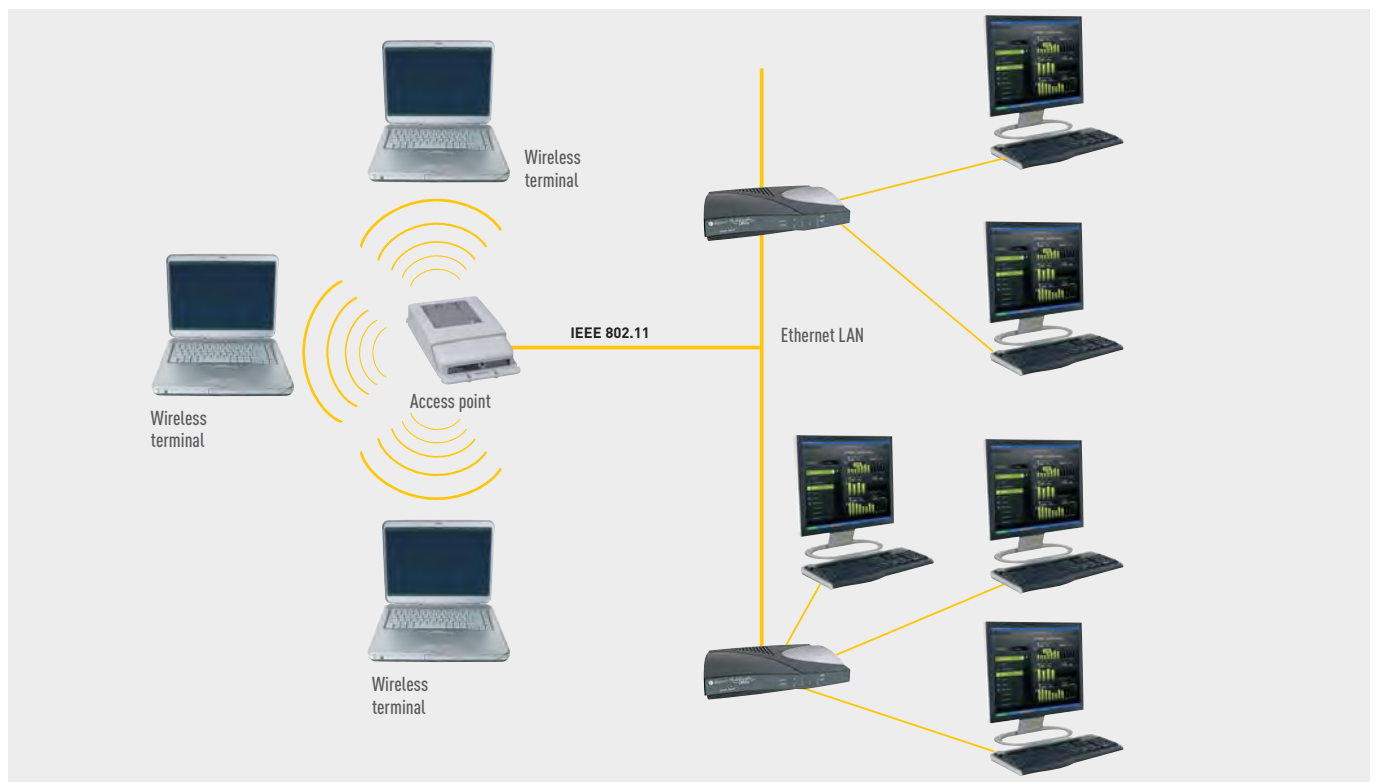
5.2 - Components for wireless networks

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.
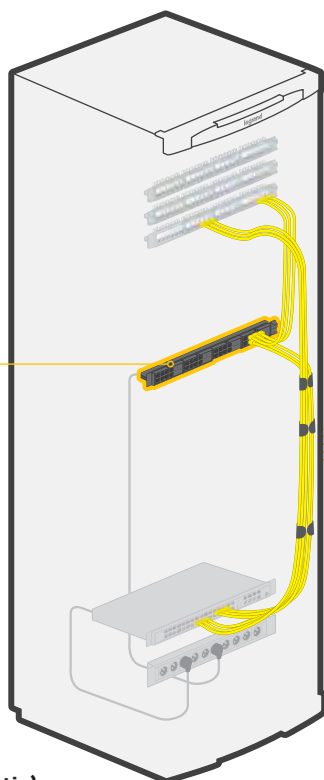
Wi-Fi access points installed in false ceilings or wall-mounted, and controlled remotely (802.11n)
This enables the network to be extended up to 600 m² free space. Can be installed in the false ceiling or in the wall.
Provides a maximum theoretical speed of 300 Mbps. The network administrator can use 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 the 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 m2, 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. 6_A, cat. 6 and cat. 5e.

**The LCS² offer
(copper and fibre optic)**
This comprises:
■ Cabinets and panels
■ Devices (patching and reels, etc.)
■ Sockets: cat. 6_A, cat. 6 and cat. 5e
■ Cables and cords: U/UTP, F/UTP, SF/UTP

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:

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

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

LCS² 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

LCS² 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

1450 mm
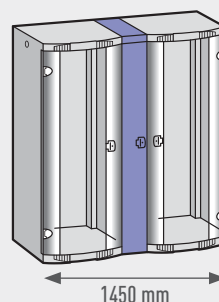
Two 600 mm wide cabinets with a cabling unit

1600 mm
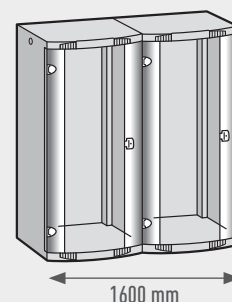
Two 800 mm wide cabinets side by side

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

1 A B A

2 CLAC
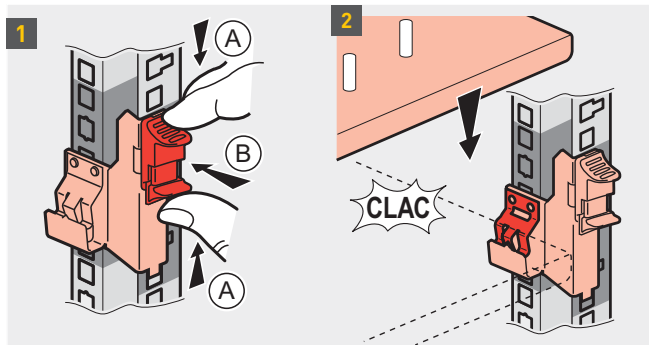
6.1.2 - Server cabinets

General characteristics

LCS² 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

LCS² 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)
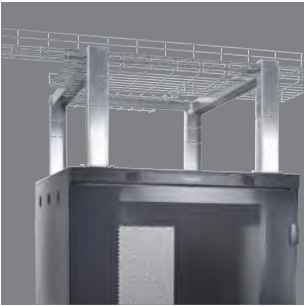
Cable trays
Support with screwless tray fixing - Cablofil

6.1.3 - Racks

General characteristics

LCS² 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

LCS² 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, LCS² cable management systems provide flexibility from the system design stage through to any future extensions.
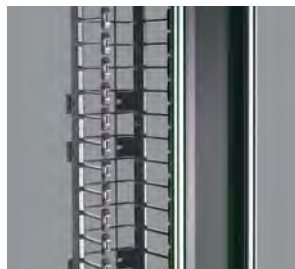
Innovative cord management grids
With individual conduit for each rack unit and door which opens in both directions.

Cord management panels with cover
With conduits for vertical and horizontal cord organization.
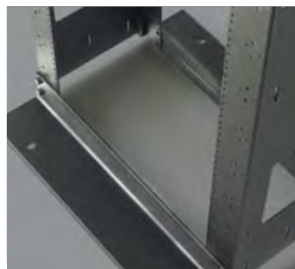
Light stainless steel aluminium construction
With black powder finish, resistant to marks and scratches.

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

FITTING CABLE TRAY SUPPORTS TO THE RACKS
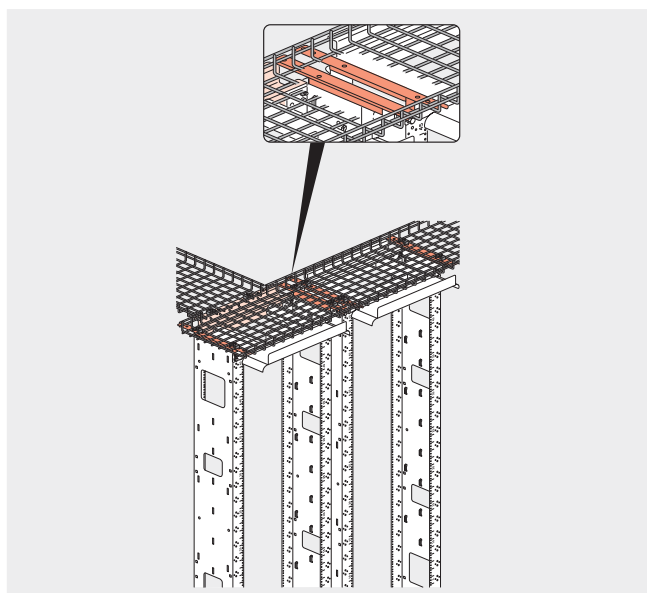
6.1.4 - Wall-mounting cabinets

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

LCS² 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.
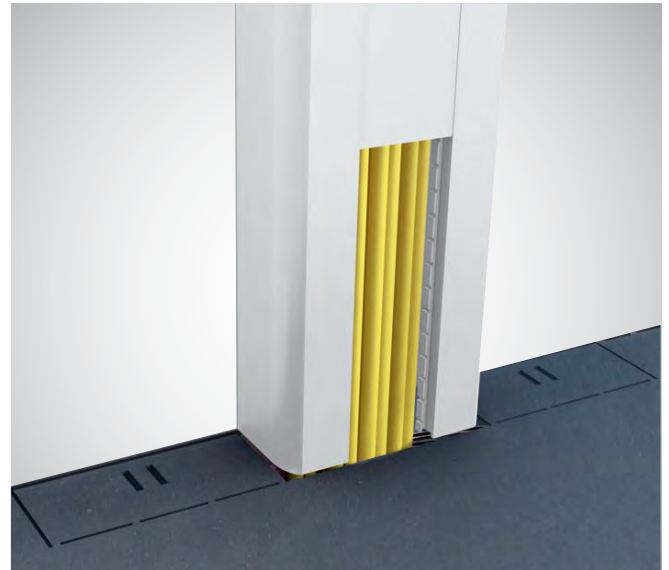
Flexible cable entries
DLP format cable entries at the top and bottom, bandable, with ability to attach cables using cable ties

Full accessibility for cable management and maintenance
Removable side panels on all LCS² 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
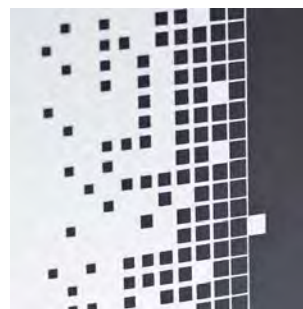
High-quality finish. A unique design: curved door, screen-printed glass.

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 LCS² 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.

Interior
- 19-inch profiles with U marking
- Support spacer for 800 mm wide cabinet

Top
- Cable entries

Frame
- Aluminium
- 1000 kg loading capacity

Cable management
- Vertical cable managers
- Cable guide rings
- Cable guides
- 19'' management panels

Accessories
- Fixing crosspieces
- Mounting brackets
- Shelves

Airflow optimisation
- 19'' blanking panels
- Side skirts for 800 mm wide cabinet

Side
- Removable side panels
- Locked with 2233 key

Base
- Adjustable levelling feet
- Open base

Front and rear
- 80% microperforated doors
- Reversible
- Swivel handle
- Locked with 2233 key

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.
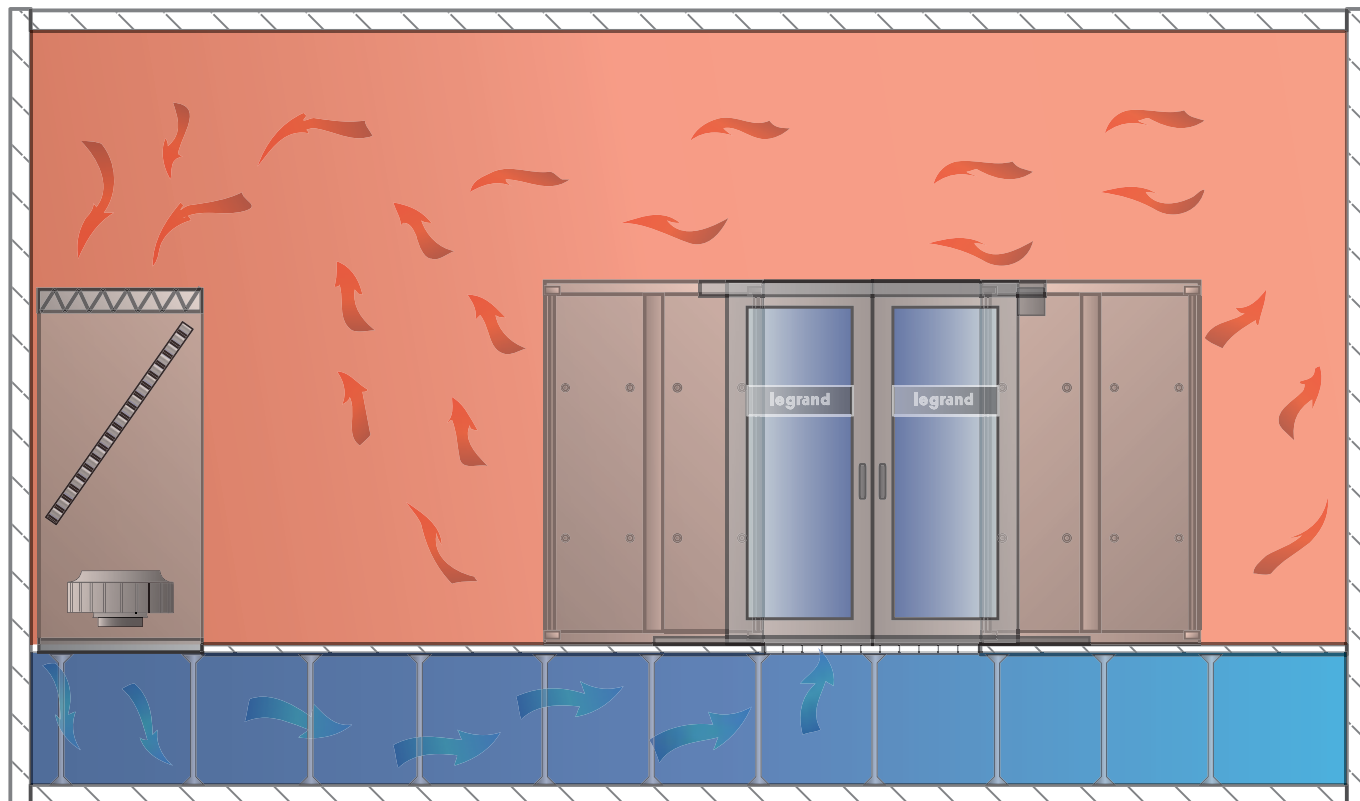
The basic Cold Corridor® system comprises the following:
- Manual sliding double doors with window made of safety glass. Position a double door at each end of the corridor
- Roof modules: cover the 1200 mm wide corridor
- 3 available widths 100, 200 or 600 mm
- The 100 and 200 mm modules are solid metal. 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$_2$O row-based cooling unit

STUDY OF INTEGRATING AIR CONDITIONING UNITS IN ROWS

Closed loop

COLD CORRIDOR

Open loop

COLD CORRIDOR

Hybrid loop
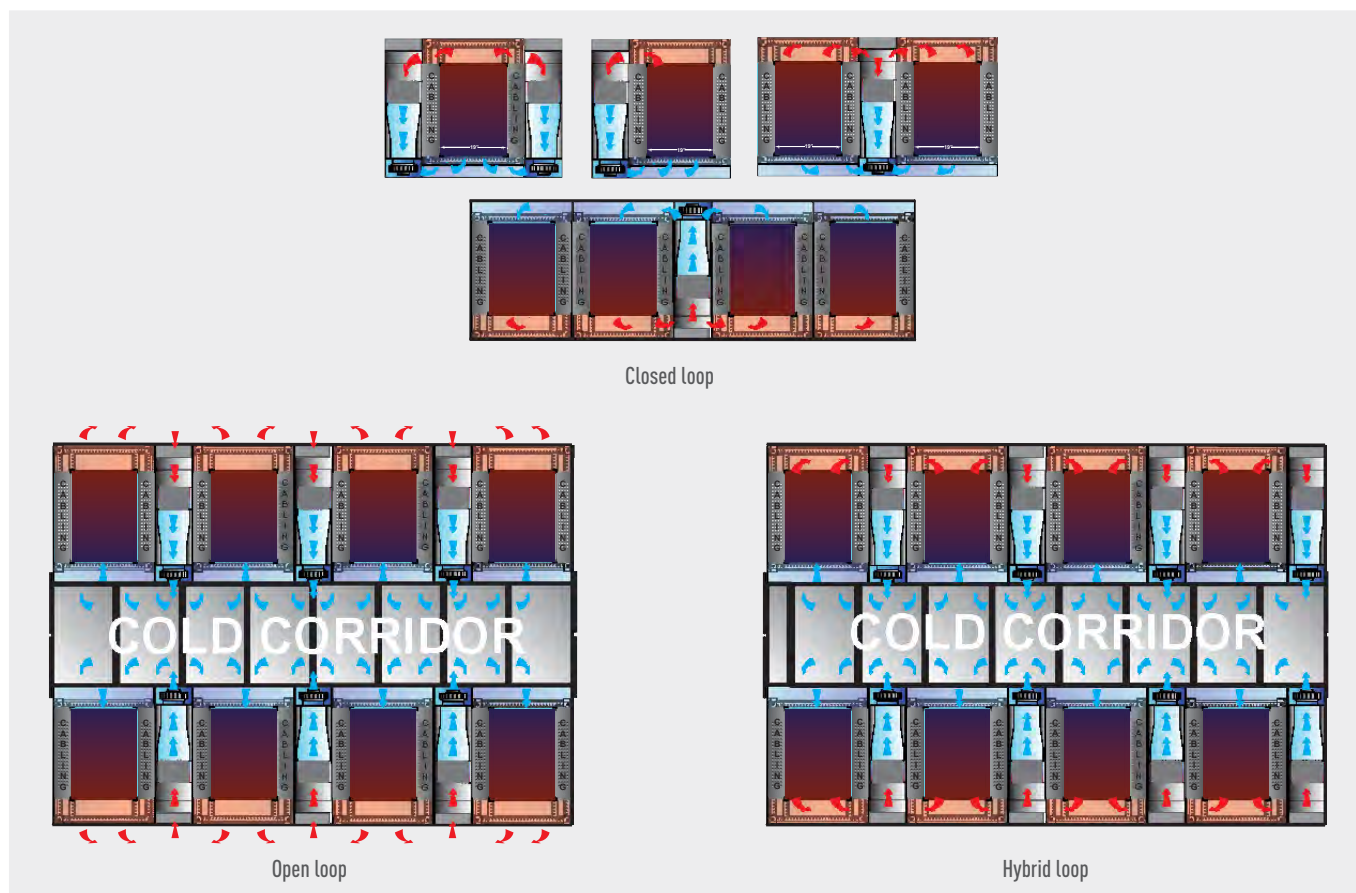
6.2.4 - Metered, Smart PDU and Environmental Monitoring system

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
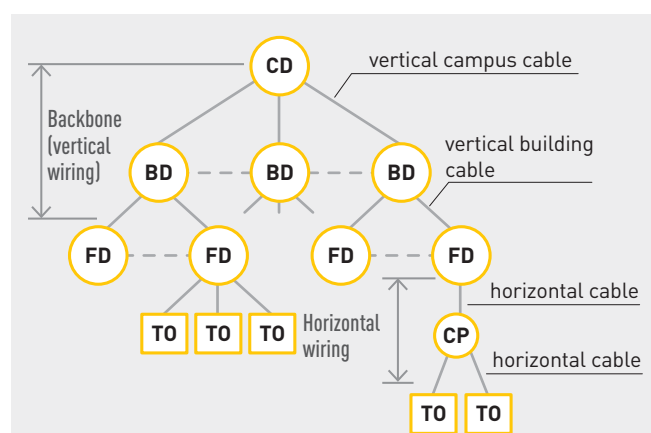
7.3 –Wiring subsystems

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^2 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^2, 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.

Vertical wiring

FD

BD

Vertical campus cable

Equipment room

CD

BD

Horizontal wiring

KEY

CD = campus distributor
BD = building distributor
FD = floor distributor
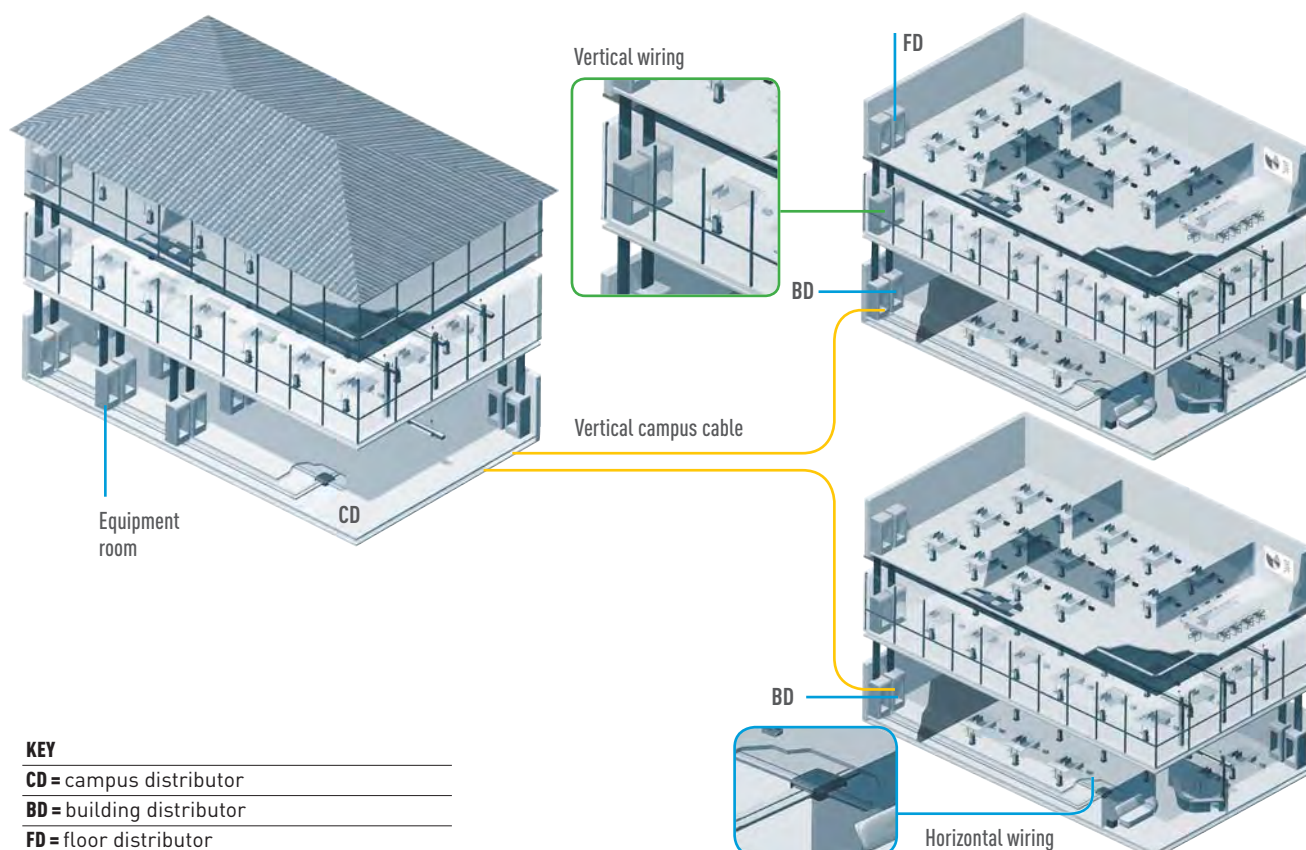
7.5 - Main components of structured cabling

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).

600 mm

1226 mm

Fibre optic system

(D) Building backbone

Patch panels

Active equipment

SWITCH
SWITCH

Power supply

(C) Floor distributor

(A) Workstation

(B) Horizontal wiring

(F) External entry line

(E) Equipment room/entry area
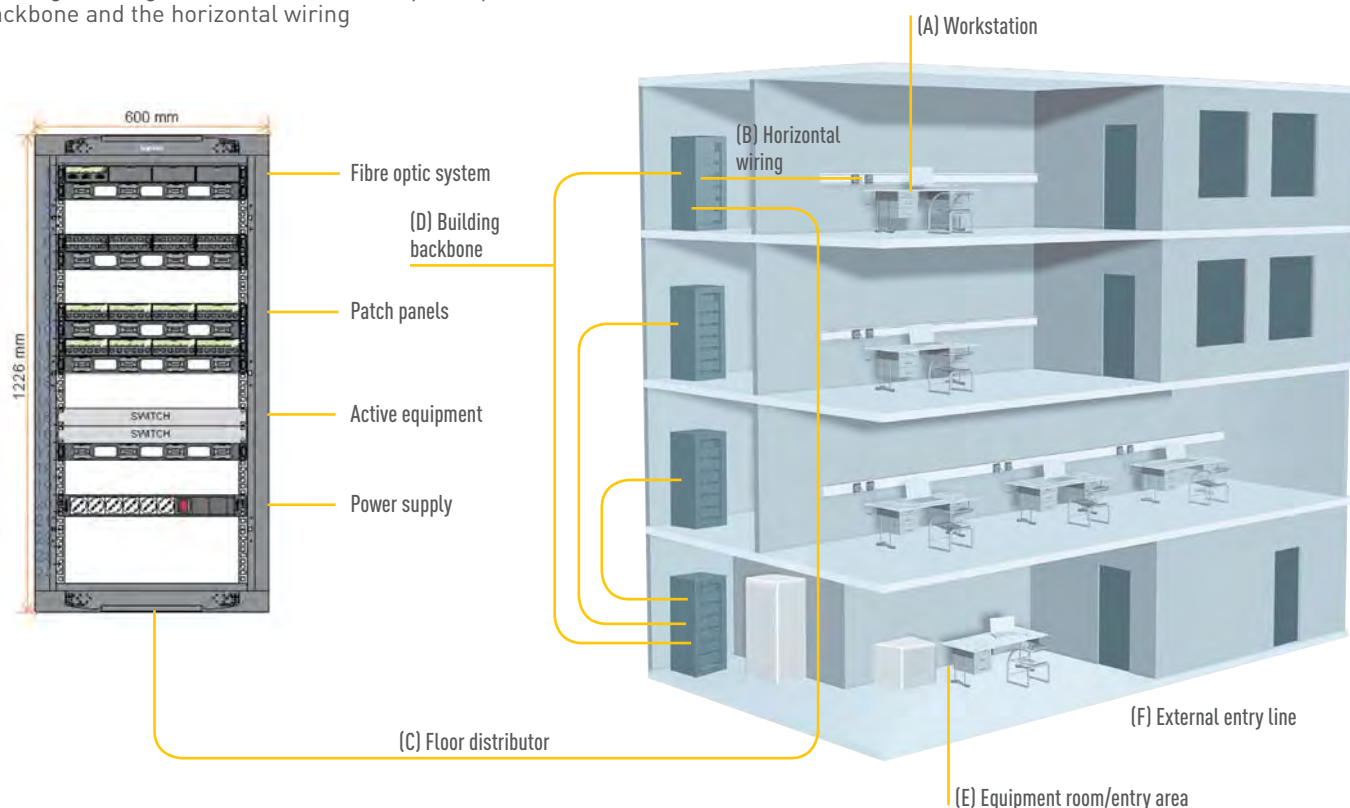
Fibre To The Office: digital infrastructure

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).

Active zone distribution box

Fibre Optic floor distribution cabinet

Access control

Fibre Optic cable for vertical distribution

Wi-Fi terminal

Copper cords to the workstation

Mosaic column

Copper cords for zone connections

Mosaic column

Mosaic RJ 45 outlet with copper crosspiece

Copper cords to the workstation
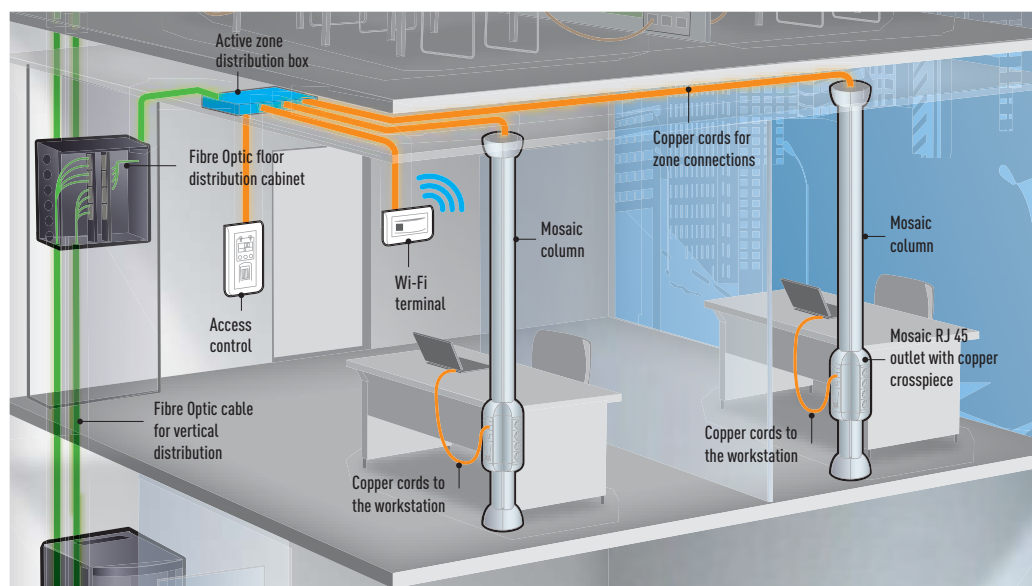
7.5.1 - Workstation

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 m², 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 FTTD (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
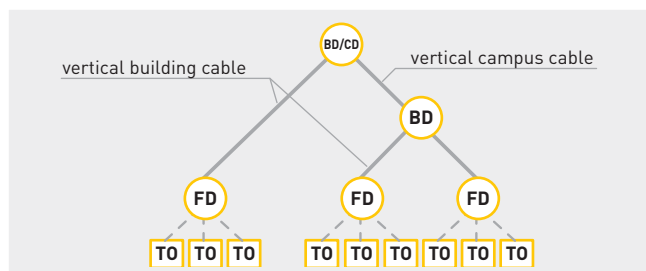
Length (m)	Type of connection
90	Horizontal wiring (between FD and TO)
5	Patch cord between the telecommunications outlet (TO) and the equipment
5	Connection jumpers inside the telecommunications room

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

Patch panel

Consolidation point

Telecommunications outlets

Workstation

Horizontal wiring, max. 90 m (permanent link)
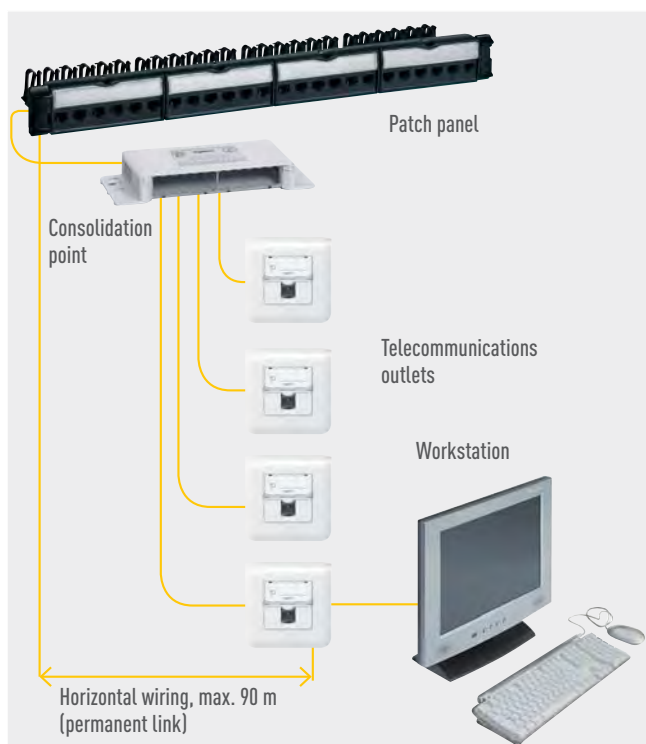
Main characteristics of the Consolidation Point (CP)

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
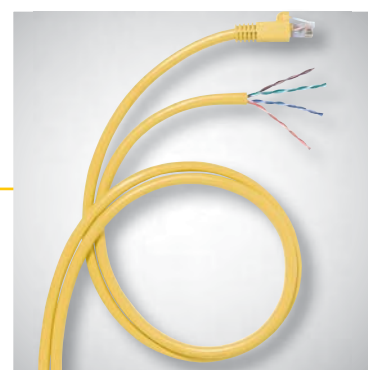
Patch cord, 5, 8 or 20 m

Spare lines
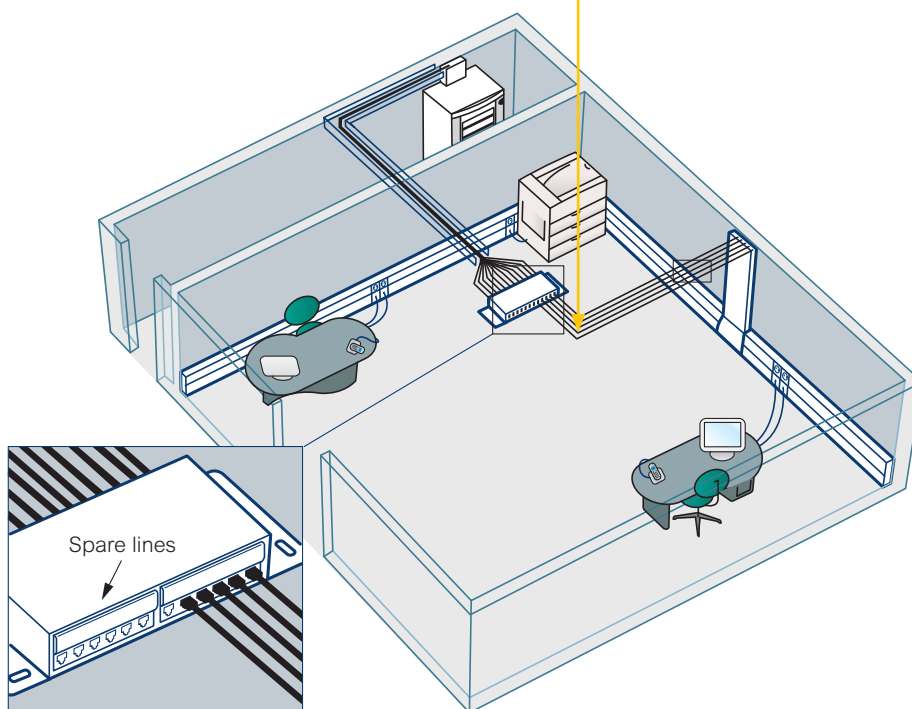
7.5.3 - Building backbone

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 contains 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
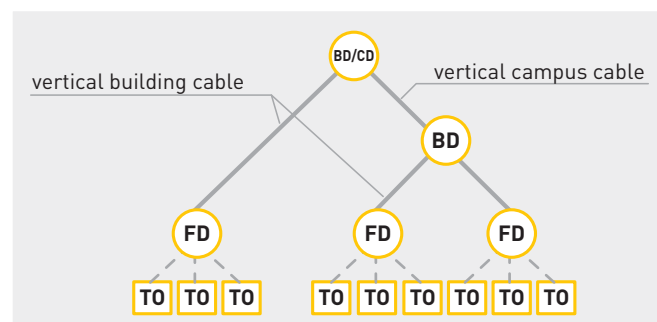
CD =	campus distributor
BD =	building distributor
FD =	floor distributor
TO =	telecommunications outlet

Sizing the technical rooms

Each 1000 m^2 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, 6$_A$ 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.
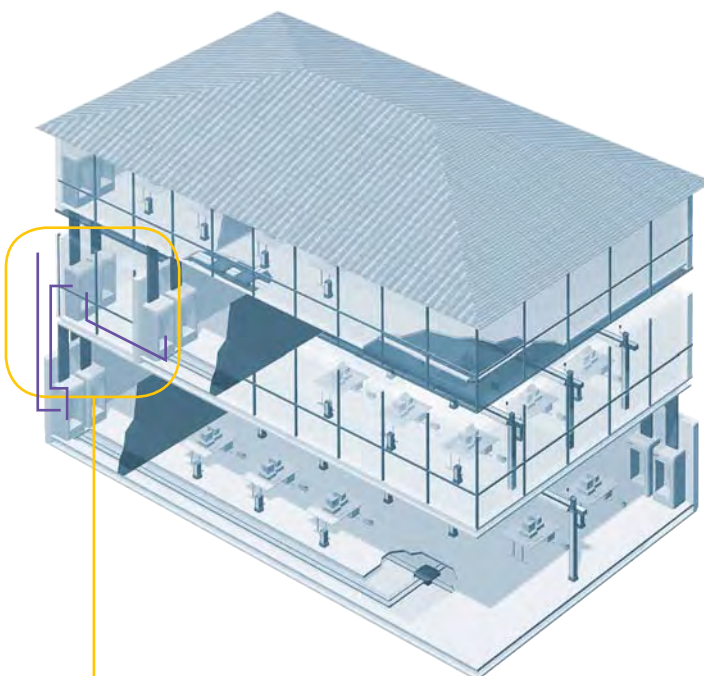
It is not possible to have more than 2 hierarchical patching levels

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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_A (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_A 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 it 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.

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.

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_A) 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_A link:
B = 105 - 3 - F . 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.

GENERAL DIAGRAM FOR CHECKING THE TRANSMISSION PARAMETERS

Patch panel   Consolidation point   Telecommunications outlet

Beginning of the permanent link   Permanent link adaptors   End of the permanent link

General diagram for testing the transmission parameters (source: Fluke Networks documentation)
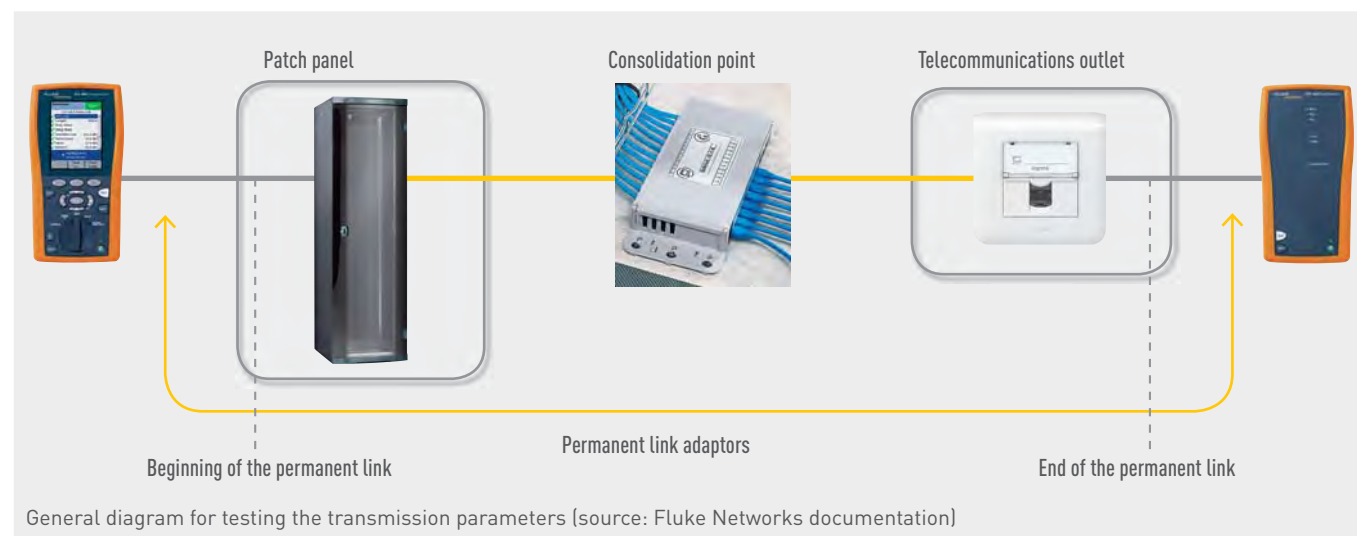
The final result of the test is a frequency distribution of a series of curves, the number of which varies according to the parameter.
All these curves must comply with a regulatory limit.

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_A). 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*4*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 Ω)
  - 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 Ω 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 μm).

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 ± 30 nm
   - 1300 nm ± 20 nm.
- Singlemode fibres:
   - 1310 nm ± 10 nm
   - 1550 nm ± 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.
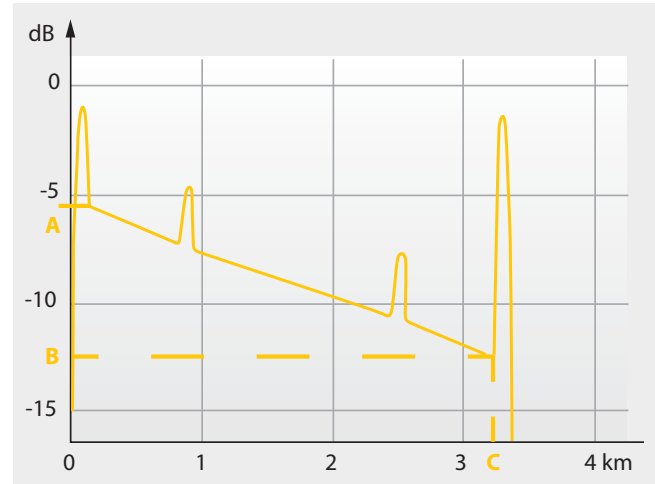
Example of reflectometry measurement: the decreasing trend is used to measure the attenuation (AB). The peaks correspond to Fresnel reflection situations, located at specific points where there are discontinuities inside the fibre, due to connections. At C, the attenuation after the peak falls to - ∞, a clear sign of a break.

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.

Examples of photometric certification instruments

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_A, 6, 5e or OM1, OM2, OM3, OM4, OS1 or OS2 LCS² 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 LCS² 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.

Sockets   Patch panel   Cables and cords
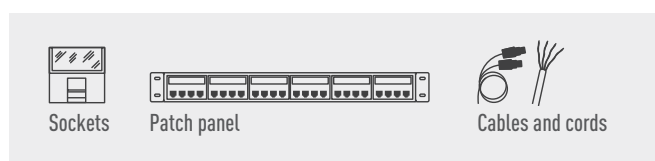
A channel is defined by the standards as being an assembly consisting of the following components:
■ Patch cord or jumper
■ Patch panel
■ Copper or fibre optic cable
■ RJ 45 socket
■ User cord
■ Zone distribution box
■ Fiber optic cassette and/or fiber optic drawer with feedthrough.
Performance is measured 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).

Patch panel   Sockets   Cables   Computer
Active product
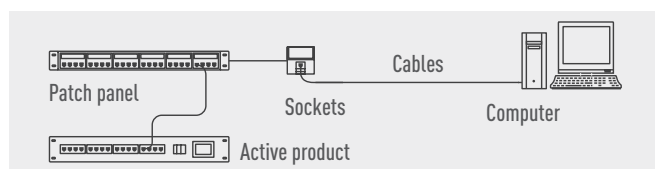
9.1.2 - 3-year guarantee extension

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_A or OM2, OM3, OM4, OS or OS2 components of LEGRAND LCS² 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 Pro² software: all the products you need for an LCS project

The new LCS Pro² software lets you select your products quickly and easily, view your cabinets and much more...
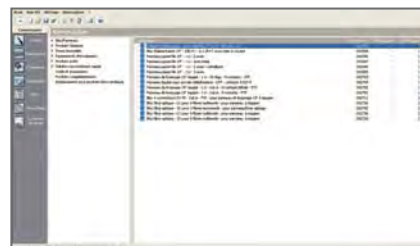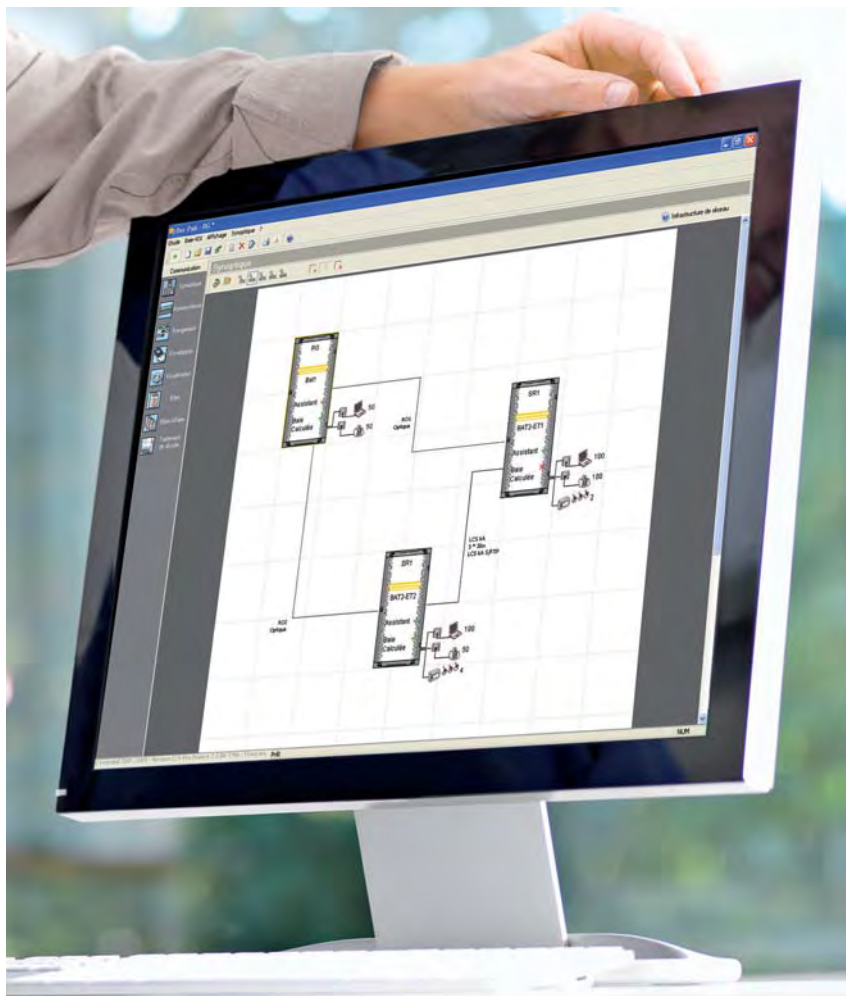
Automatic determination of catalogue numbers by selecting the features and options

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.
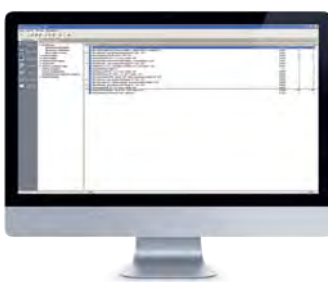
9.3 – Top-level training at Innoval

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[1]

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[1]

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.
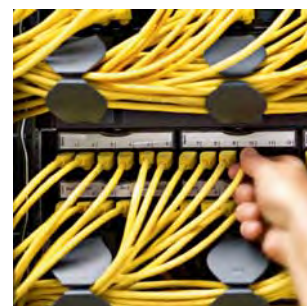
(1) To adapt for your country

DIGITAL INFRASTRUCTURES

SYSTEMS FOR COMMUNICATIONS NETWORKS IN COMMERCIAL BUILDINGS

Selection chart for equipment and cabinets

configure your LCS² system

LCS² PANELS AND CONNECTOR UNITS (see p. 89, 92, 98)

			LCS² cat. 6$_A$	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)

			LCS²
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$_A$	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

80
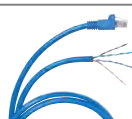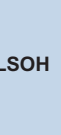
Selection chart for equipment and cabinets

configure your LCS² system (continued)
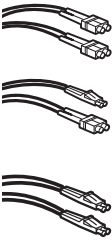
PLAIN MOSAIC RJ 45 SOCKETS (see p. 91, 96, 101)				LCS² cat. 6ₐ	LCS² cat. 6	LCS² cat.5e
	1 module		STP	0 765 73	0 765 63	-
			FTP	-	0 765 62	-
			UTP	0 765 71	0 765 61	0 765 51
	2 modules		STP	0 765 76	0 765 66	-
			FTP	-	0 765 65	-
			UTP	0 765 74	0 765 64	0 765 54
	2 x 45° modules		STP	0 765 08	0 765 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 LCS² system (continued)

RJ 45 PATCH CORDS AND USER CORDS (see p. 89, 93, 99)						LCS² cat. 6$_A$	LCS² cat. 6	LCS² cat. 5e
	PVC	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	-
	LSOH	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	-
				5 m	RAL 3020	-	0 518 57	-
					RAL 6026	-	0 518 53	-
		U/UTP	Impedance 100 ohms	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	-
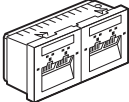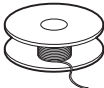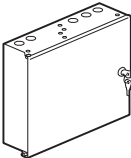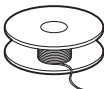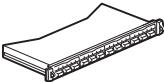
COPPER CABLES (305 OR 500 M REELS) (see p. 89, 93, 99)				LCS² cat. 6$_A$	LCS² cat. 6	LCS² cat. 5e
	S/FTP	4 pairs	500 m	0 327 77	-	-
	SF/UTP	4 pairs	500 m	-	0 327 57	-
		2 x 4 pairs	500 m	-	0 328 59	-
	F/UTP	4 pairs	305 m	-	0 328 56	0 327 52
			500 m	0 327 78	0 327 56	0 328 50
		2 x 4 pairs	500 m	0 328 78	0 327 76	0 327 74
	U/UTP	4 pairs	305 m	-	0 327 54	0 327 50
			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)			OS1/OS2 (UPC) singlemode 9/125 µm	OM4 multimode 50/125 µm	OM3 multimode 50/125 µm
	Indoor/Outdoor	6 fibres	0 325 12	0 326 65/66	0 325 10
		12 fibres — Loose tube	0 325 14		
		12 fibres — Tight buffer	0 325 50	0 326 67	0 325 11
		24 fibres — Loose tube	0 325 51	-	0 325 53
		24 fibres — Tight buffer	-	0 326 68	0 325 52
	Outdoor, reinforced steel, anti-rodent	6 fibres	0 325 13	-	-
		12 fibres	0 325 15	-	-

Fibre optic cords and cables
Customised solutions, p. 113
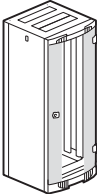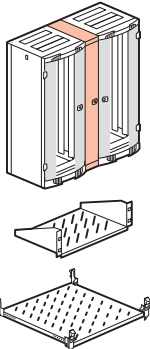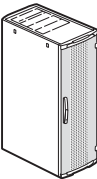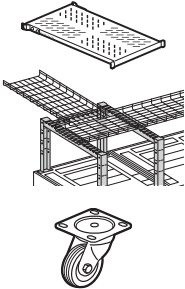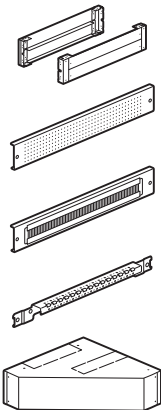
Selection chart for equipment and cabinets

for FTTO 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
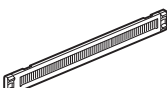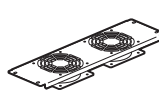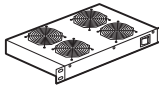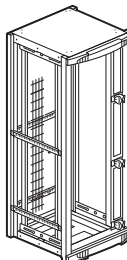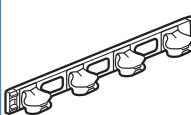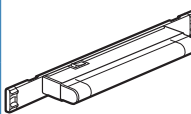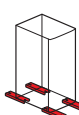
configure your LCS² system

LCS² 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[1]	Width 600 mm	0 463 30	-	-
			Width 800 mm	-	0 463 33	-
		47 U	Width 800 mm	-	0 463 28	0 463 29
	Double front door	42 U	Width 800 mm	0 463 41	0 463 42	0 463 43

EQUIPMENT FOR LCS² 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

LCS² 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 LCS² 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 slidders		0 465 13
	Cable guide support		0 464 79 (+ 0 464 78)
	Set of 4 casters, 500 kg max.		0 464 82

PLINTH FOR LCS² 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[2]
		For cabinet depth 800 mm	0 464 56[2]
		For cabinet depth 1000 mm	0 464 58[2]
	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[2]

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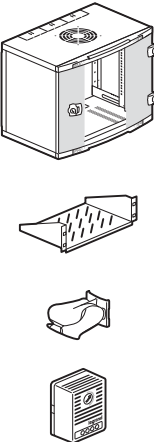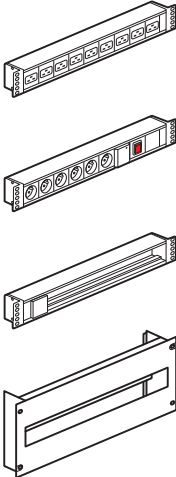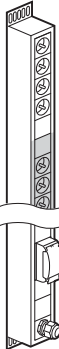
Selection chart for equipment and cabinets

configure your LCS² 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

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[1]	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 breacker	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[2]		
		German standard	0 465 88[2]		
		British standard	0 465 89[2]		
	24 x C13 sockets		0 465 81[2]		
	16 x C13 + 6 x C19 sockets Cord with IEC 60309 plug - 16 A		0 465 84[2]		
	24 x C13 + 3 x C19 sockets Cord with IEC 60309 plug - 32 A 3-phase supply		0 465 85[2]		

1. Except for 6 U cabinet
2: Mounting in LCS² 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

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 April 2014	0 517 20
	HDMI 1.4 cord - 5 m April 2014	0 517 27
	HDMI 1.4 cord - 1.5 m April 2014	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

Mosaic and Arteor audio/video sockets
p. 139

>>> **Legrand cabling system LCS²
category 6$_A$** - patch panels, connector units

Data Center

0 335 73

0 335 90

0 335 76

Connector cat. 6$_A$
shielded STP

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.
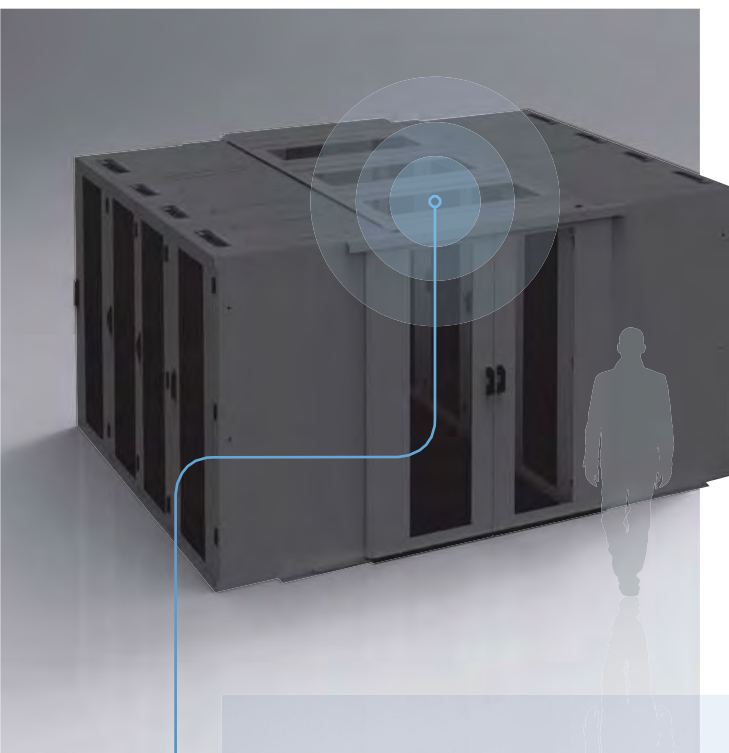
DEDICATED SOLUTIONS SUCH AS:

○ **Varicon-L 19" server cabinets**

○ **High density fibre optic drawer**

○ **Metered and smart PDU...**

Pack	Cat.Nos	
		Patch panel cat. 6$_A$ **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 LCS² RJ 45 cat. 6$_A$ 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
		Modular panel
		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 LCS² 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
1	0 335 90	19" panel - 1 U
		Units of 6 x RJ 45 connectors cat. 6$_A$
		Fitted with 6 x LCS² RJ 45 cat. 6$_A$ 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

0 327 77

0 517 82

0 518 90

Cables for cat. 6$_A$ LANs

Pack	Cat.Nos	
		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
	LSZH ●	**U/UTP - 4 pairs** Performance 500 MHz
500¹	0 327 87	Length 500 m Supplied on reel Weight 25 kg
		F/UTP - 4 pairs Performance 500 MHz
500¹	0 327 78	Length 500 m Supplied on reel Weight 25 kg
		F/UTP - 2x4 pairs Performance 500 MHz
500¹	0 328 78	Length 500 m Supplied on reel Weight 65 kg
		S/FTP - 4 pairs Performance 600 MHz
500¹	0 327 77	Length 500 m Supplied on reel Weight 30 kg

1: in metre(s)

RJ 45 cat. 6$_A$ patch cords and user cords

Pack	Cat.Nos	
		RJ 45 - RJ 45 right Conform to standards ISO/IEC 11801 Ed. 2.0, EN 50173-1 and TIA/EIA 568C
PVC ●		**U/UTP unscreened impedance 100 Ω**
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
LSZH ●		
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
PVC ●		**S/FTP shielded impedance 100 Ω**
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
LSZH ●		
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

Kit for identification

Pack	Cat.Nos	
1	0 518 90	Kit of 200 coloured rings (red, green, yellow and blue) for identifying RJ 45 cords Snap onto patch cords

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Legrand cabling system LCS² category 6$_A$
zone distribution boxes and cords specifically for zone distribution boxes

Data Center
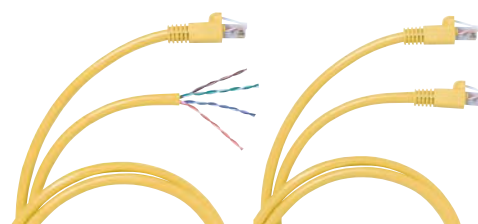
| 0 335 49 | 0 335 40 | 0 517 86 | 0 515 23 |

Pack	Cat.Nos	**Zone distribution boxes**
		For ELV distribution in a zone Fitted with 2 units of 6 x cat. 6$_A$ RJ 45 LCS² connectors and adaptability of the installation Installed on false ceiling or false floor Connect to the patch panel or the floor cabinet Connection to workstation for RJ 45 cords Can take switch Cat.No 0 335 02 or PoE injector Cat.No 0 335 01 or 6-connector units Cat.No 0 335 76 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 TIA/EIA 568 A and C 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
		Cat. 6$_A$ zone distribution boxes Fitted with 2 units of 6 x LCS² connectors RJ 45 cat. 6$_A$ and RJ 45 blanking plates Supplied with Colring cable ties
2	0 335 49	STP
		Self-assembly zone distribution box Used for mounting LCS² RJ 45 cat. 6$_A$ (p. 88), cat. 6 (p. 92) and cat. 5e (p. 98) connector units, fibre optic accessories or blanking plates
1	0 335 40	

Pack	Cat.Nos	**Cat. 6$_A$ cords - RJ 45/stripped**
		RJ 45 - straight stripped Clip into zone distribution boxes and connect to an RJ45 socket LCS² connector on the stripped side Cords prepared in factory, "ready for wiring" Conform to standards ISO/IEC 11801 Ed. 2.0 (2011), EN 50173-1 and EIA/TIA 568 C2
		S/FTP screened impedance 100 Ω
4	Yellow RAL 1018 0 517 86	Length 8 m
4	0 517 87	Length 15 m
4	0 517 88	Length 20 m

Pack	Cat.Nos	**Cat. 6$_A$ cords - RJ 45/RJ 45**
		For direct connection via RJ 45 male plug to the zone distribution box and to the RJ 45 socket with copper feedthrough, to ensure: - Safe connection - Speed and reliability of connection
		S/FTP screened impedance 100 Ω
4	Yellow RAL 1018 0 515 23	Length 8 m
4	0 515 24	Length 15 m
4	0 515 25	Length 20 m

Legrand cabling system LCS² category 6ₐ

RJ 45 sockets

| 0 765 73 | 0 765 76 | 0 794 76 | 0 765 24 | 0 765 25 | 0 765 99 | 0 673 46 + Titanium cover plate 0 685 51 |

Sockets with LCS² 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. 6ₐ
		STP - 1 module
		360° metal shielding
10	0 765 73	○ White
10	0 794 73	● Aluminium
		STP - 2 modules
		360° metal shielding
10	0 765 76	○ White
10	0 794 76	● Aluminium
10	0 765 24	○ White with green shutter
10	0 765 25	○ White with orange shutter
		STP 45° - 2 modules
10	0 765 08	○ White
		STP with controlled access - 2 modules
		360° metal shielding
		Supplied with 2 keys for 5 sockets
5	0 765 99	○ White with red shutter
		UTP - 1 module
10	0 765 71	○ White
10	0 794 71	● Aluminium
10	0 765 26	○ White with green shutter
10	0 765 27	○ White with orange shutter
		UTP - 2 modules
10	0 765 74	○ White
10	0 794 74	● Aluminium
		UTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	0 765 90	○ White with red shutter
		UTP 45° - 2 modules
10	0 765 09	○ White

Pack	Cat.Nos	
		Copper feedthrough sockets
		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
		Cat. 6ₐ STP
10	0 786 28	○ White
10	0 786 29	● Aluminium

Pack	Cat.Nos	
		Arteor RJ 45 socket cat. 6ₐ
		360° metal shielding
		STP - 1 module
10	5 723 06	○ White
10	5 728 06	● Magnesium
10	5 723 52	○ White with green shutter
10	5 728 52	● Magnesium with green shutter
10	5 723 51	○ White with orange shutter
10	5 728 51	● Magnesium with orange shutter
		STP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	5 723 50	○ White with red shutter
5	5 728 50	● Magnesium with red shutter
		UTP - 1 module
10	5 723 49	○ White
10	5 728 49	● Magnesium
10	5 723 59	○ White with green shutter
10	5 728 59	● Magnesium with green shutter
10	5 723 58	○ White with orange shutter
10	5 728 58	● Magnesium with orange shutter
		UTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	5 723 57	○ White with red shutter
5	5 728 57	● Magnesium with red shutter

Pack	Cat.Nos	
		Celiane RJ 45 socket cat. 6ₐ
		STP - 360° metal shielding
10	0 673 46	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)
		UTP
10	0 673 47	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)

Pack	Cat.Nos	
		Keystone RJ 45 socket cat. 6ₐ
10	0 331 54	STP socket - metal shielding 360° with quick-fixing crimp connectors
10	0 331 55	UTP socket - metal shielding 360° with quick-fixing crimp connectors
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 LCS² 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**
		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 LCS² 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
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°
		UTP through panel 24 x RJ 45 connectors
1	0 335 89	UTP through panel
		Patch panels cat. 6 **24 x RJ 45 connectors, 110 connection**
		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
1	0 335 82	UTP panel - 8 contacts Connection with 110 tool
1	0 335 83	UTP angle patch panel - 8 contacts Connection with 110 tool

Pack	Cat.Nos	
		Modular panels
		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 LCS² 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
1	0 335 90	19" panel - 1 U
		Units of 6 x RJ 45 connectors cat. 6
		Fitted with 6 x LCS² 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
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 LCS² category 6
cables

0 327 54

Legrand cabling system LCS² category 6
cords

0 517 62
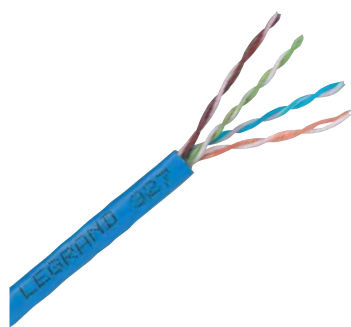
Cables for cat. 6 LANs

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

Pack	Cat.Nos		Description
	LSZH	PVC	
305¹	0 327 54		**U/UTP - 4 pairs** Length 305 m Supplied in cardboard box Weight 16 kg
500¹	0 328 61		Length 500 m Supplied on reel Weight 18 kg
305¹		0 327 55	Length 305m Supplied in cardboard box Weight 13 kg
500¹	0 328 63		**U/UTP - 2 x 4 pairs** Length 500 m Supplied in cardboard box Weight 38 kg
305¹	0 328 56		**F/UTP - 4 pairs** Length 305 m Supplied on reel Weight 17 kg
500¹	0 327 56		Length 500 m Supplied on reel Weight 25 kg
305¹		0 328 57	**F/UTP - 4 pairs** Length 305 m Supplied in cardboard box Weight 17 kg
50¹	0 327 76		**F/UTP - 2 x 4 pairs** Length 500 m Supplied on reel Weight 48 kg
500¹	0 327 57		**SF/UTP - 4 pairs** Length 500 m Supplied on reel Weight 29 kg
500¹		0 327 59	Length 500 m Supplied on reel Weight 30 kg
500¹	0 328 59		**SF/UTP - 2 x 4 pairs** Length 500 m Supplied on reel Weight 52 kg
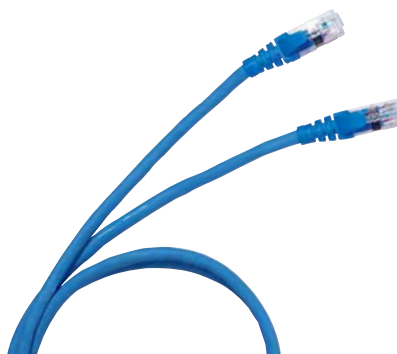
1: in metre(s)

RJ 45 cat. 6 patch cords and user cords

RJ 45 - RJ 45 right

U/UTP unscreened impedance 100 Ω

Pack	Cat.Nos		Description
	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

F/UTP screened impedance 100 Ω

Pack	Cat.Nos		Description
	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

SF/UTP shielded impedance 100 Ω

Pack	Cat.Nos	Description
	PVC	
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	Suface mounting box 1 or 2 ports For keystone connectors Provides solution for integration of keystone in surface mounting installations

legrand

Legrand cabling system LCS² category 6
zone distribution boxes

Legrand cabling system LCS² category 6
cords specifically for 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

0 517 57

0 515 13

RJ 45   RJ 45
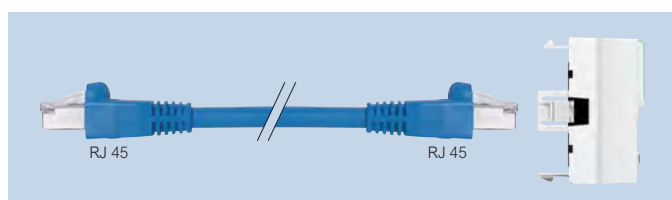
Connection principle

Pack	Cat.Nos	**Zone distribution boxes**
		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
		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
		IP 21 - IK 07
		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 TIA/EIA 568 A and C
		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
		Zone distribution boxes cat. 6
		Fitted with 2 x 6 LCS² connector units
		RJ 45 cat. 6 and RJ 45 blanking plates
		Supplied with Colring cable ties
1	0 335 44	UTP
1	0 335 45	FTP
1	0 335 46	STP
		Self-assembly zone distribution box
1	0 335 40	Used for mounting LCS² RJ 45 cat. 6 connector units (p. 92)

Pack	Cat.Nos	**Cords cat. 6 - RJ 45/stripped AWG 24**
		RJ 45 - straight stripped
		Clip on and off in the zone distribution boxes and connection via LCS² connector of an RJ 45 socket by 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
		Blue RAL 5015
		Wiring in T 568 B
		U/UTP unscreened impedance 100 Ω
4	0 517 57	Length 8 m
4	0 517 58	Length 15 m
4	0 517 59	Length 20 m
		F/UTP screened impedance 100 Ω
4	0 517 96	Length 8 m
1	0 517 97	Length 15 m
4	0 517 98	Length 20 m

Pack	Cat.Nos	**Cords cat. 6 - RJ 45/RJ 45**
		For direct connection via RJ 45 male plug to the zone distribution box and to the RJ 45 socket with copper feedthrough to ensure:
		- safe connection
		- speed and reliability of connection
		Blue RAL 5015
		U/UTP unscreened impedance 100 Ω
4	0 515 10	Length 8 m
4	0 515 11	Length 15 m
4	0 515 12	Length 20 m
		F/UTP screened impedance 100 Ω
4	0 515 13	Length 8 m
4	0 515 14	Length 15 m
4	0 515 15	Length 20 m

Legrand cabling system LCS² 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
	Mosaic	**Cat. 6 UTP Mosaic**
10	0 786 22	○ White
10	0 786 26	● Aluminium
		Cat. 6 FTP Mosaic
10	0 786 23	○ White
10	0 786 27	● Aluminium
	Arteor	**Cat. 6 UTP Arteor**
10	5 723 31	○ White
10	5 728 31	● Magnesium
		Cat. 6 FTP Arteor
10	5 723 33	○ White
10	5 728 33	● Magnesium

Your
LCS² 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
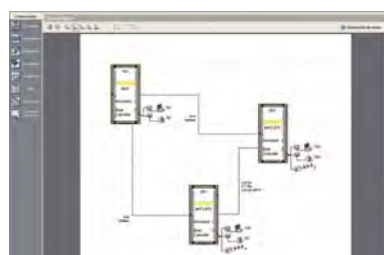
■ LCS Pro² allows you **to automatically find** Cat.Nos by selecting characteristics and options

■ LCS Pro² lets you **visualise the cabinet installation** and amend it if required

■ LCS Pro² allows you to **easily manage your projects:** technical summaries, purchase orders, document printing

In addition to LCS Pro², Chantier Chrono extends the selection to trunking, columns, floor and feeder boxes

Legrand cabling system LCS² category 6

RJ 45 sockets

0 765 63   0 765 96   0 794 65   0 794 33 + cover plate 0 790 14

Sockets with LCS² 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**
		UTP - 1 module
10	0 765 61	○ White
10	0 794 61	● Aluminium
10	0 786 06	○ White, connection with 110 tool
10	0 794 12	● Aluminium, connection with 110 tool
10	0 765 81	○ White antimicrobial
		UTP - 2 modules
10	0 765 64	○ White
10	0 794 64	● Aluminium
10	0 786 07	○ White, connection with 110 tool
10	0 794 13	● Aluminium, connection with 110 tool
		UTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	0 765 94	○ White with red shutter
		UTP 90° - 2 modules
		Vertical snap-on socket for column module
10	0 765 91	○ White
		UTP 45° - 2 modules
1	0 765 03	○ White
1	0 765 14	○ White, connection with 110 tool
		UTP 45° - 2 x RJ 45 - 2 modules
1	0 765 04	○ White
		UTP retractable RJ 45 socket - 4 modules
		With integrated retractable cord (0.9 m)
		Winds up automatically with a pushbutton
1	0 765 32	○ White
		UTP - 1 module
5	0 794 81	● Black
		UTP 2 x RJ 45 with quick-fixing accessory - 3 modules
		For snap-on mounting on DLP trunking with 45 mm cover
5	0 765 44	○ White
		FTP - 1 module
10	0 765 62	○ White
10	0 794 62	● Aluminium
10	0 765 82	○ White antimicrobial
		FTP - 2 modules
10	0 765 65	○ White
10	0 794 65	● Aluminium
10	0 765 22	○ White with green shutter
10	0 765 23	○ White with orange shutter

Pack	Cat.Nos	**Mosaic RJ 45 sockets cat. 6 (continued)**
		FTP 2 x RJ 45 with quick-fixing accessory - 3 modules
		For snap-on mounting on trunking with 45 mm cover
5	0 765 46	○ White
5	0 794 85	● Black
		FTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	0 765 95	○ White with red shutter
		FTP 45° - 2 modules
10	0 765 05	○ White
		FTP 2 x RJ 45 45° - 2 modules
5	0 765 06	○ White
		FTP retractable RJ 45 sockets - 4 modules
		With integrated retractable cord (0.9 m)
		Winds up automatically with a pushbutton
1/10	0 765 33	○ White
1/10	0 794 33	● Aluminium
		FTP 90° - 2 modules
		Vertical snap-on socket for column module
10	0 765 92	○ White
10	0 794 92	● Aluminium
		Shielded STP - 1 module
10	0 765 63	○ White
5	0 765 83	○ White antimicrobial
		Shielded STP - 2 modules
10	0 765 66	○ White
		STP - 2 modules
5	0 794 86	● Black
		Shielded STP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	0 765 96	○ White with red shutter
		STP 45° - 2 modules
		Vertical snap-on socket for column module
10	0 765 07	○ White
		Shielded STP 90° - 2 modules
		Vertical snap-on socket for column module
10	0 765 93	○ White

Legrand cabling system LCS² category 6

RJ 45 sockets (continued)

0 673 45 + titanium cover plate
0 685 51

0 778 91

0 695 69

0 904 67

Arteor RJ 45 socket cat. 6

Pack	Cat.Nos	
		UTP - 1 module
10	5 723 02	○ White
10	5 728 02	● Magnesium
10	5 723 25	○ White, connection with 110 tool
10	5 728 25	● Magnesium, connection with 110 tool
10	5 723 54	○ White with orange shutter
10	5 728 54	● Magnesium with orange shutter
10	5 723 55	○ White with green shutter
10	5 728 55	● Magnesium with green shutter
		UTP - 2 modules
10	5 723 14	○ White
10	5 728 14	● Magnesium
10	5 723 26	○ White, connection with 110 tool
10	5 728 26	● Magnesium, connection with 110 tool
		UTP - 2 modules - round
10	5 723 24	○ White
10	5 728 24	● Magnesium
		UTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	5 723 53	○ White with red shutter
5	5 728 53	● Magnesium with red shutter
		UTP retractable RJ 45 sockets - 4 modules
		With integrated retractable cord (0.9 m)
		Winds up automatically with a pushbutton
1	5 723 39	○ White
1	5 728 39	● Magnesium
		FTP - 1 module
10	5 723 22	○ White
10	5 728 22	● Magnesium
		FTP - 2 modules
10	5 723 16	○ White
10	5 728 16	● Magnesium
		Shielded STP - 1 module
10	5 723 23	○ White
10	5 728 23	● Magnesium
		Shielded STP - 2 modules
10	5 723 17	○ White
10	5 728 17	● Magnesium

Celiane RJ 45 sockets cat. 6

Pack	Cat.Nos	
		UTP socket
		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)
10	0 673 44	UTP socket

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

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

Celiane RJ 45 sockets cat. 6 (continued)

Pack	Cat.Nos	
		UTP retractable RJ 45 socket - 4 modules
		With integrated retractable cord (0.9 m)
		Winds up automatically with a pushbutton
10	0 673 54	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)
		FTP socket
		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)
10	0 673 45	FTP socket
		FTP retractable RJ 45 socket - 4 modules
		With integrated retractable cord (0.9 m)
		Winds up automatically with a pushbutton
10	0 673 55	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)
		STP socket
		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)
10	0 673 96	STP socket

Keystone RJ 45 sockets cat. 6

Pack	Cat.Nos	
10	0 331 81	UTP socket with fast connection
20	6 327 79	Surface mounting box
		1 or 2 ports
		For keystone connectors
		Provides solution for integration of keystone in surface mounting installations

Soliroc RJ 45 sockets cat. 6 - IK 10

Pack	Cat.Nos	
10	0 778 91	IP 20
		For at-risk areas or areas with no surveillance
		FTP socket

Plexo RJ 45 sockets cat. 6 - IP 55 closed flap IK 07

Pack	Cat.Nos	
		Protection against water, dust. For industrial sites
5/100	0 695 69	FTP socket ◐ Grey/white
1/20	0 695 61	UTP socket ◐ Grey/white
1	0 695 81	Adaptor for RJ 45 socket Weatherproofing ensured (IP 44) plug inserted ◐ Grey/white

Plexo 66 RJ 45 socket cat. 6 - IP 66 - IK 08

Pack	Cat.Nos	
		FTP socket
1	0 904 67	9 contacts Weatherproofing ensured (IP 66) with plug inserted Inclined 90° ● Grey RAL 7016/T029

Legrand cabling system LCS² 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**
		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 LCS² 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
		UTP panel
1	0 335 51	UTP panel - 8 contacts
1	0 335 82	UTP panel - 8 contacts - connection with 110 tool
		FTP panel
1	0 335 52	FTP panel - 9 contacts
		UTP through panel 24 RJ 45 connectors
1	0 335 88	UTP through panel

Pack	Cat.Nos	
		Patch panels cat. 5e **24 x RJ 45 connectors 110**
		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
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
		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 LCS² 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
1	0 335 90	19" panel - 1 U

Pack	Cat.Nos	
		Units of 6 x RJ 45 connectors cat. 5e
		Fitted with units of 6 x LCS² 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
2	0 335 54	UTP unit
2	0 335 55	FTP unit
10	0 335 91	Blanking plate for 19" panel - Black

![Legrand logo]

Legrand cabling system LCS² category 5e
cables

Legrand cabling system LCS² category 5e
cords

0 328 50

0 516 40

Cables for cat. 5e LANs

4 twisted pair cables 100 ohms
LSZH sleeve: no halogen
Grey RAL 7035
Colour code TIA/EIA

Pack	Cat.Nos		Description
	LSZH	PVC	**U/UTP - 4 pairs**
305[1]	0 327 50	-	Length 305 m Supplied in cardboard box Weight 10 kg
500[1]	0 328 53	-	Length 500 m Supplied on reel Weight 15 kg
305[1]	-	0 327 51	Length 305 m Supplied in cardboard box Weight 9 kg
			U/UTP - 2x4 pairs
500[1]	0 328 55	-	Length 500 m Supplied on reel Weight 34 kg
500[1]	-	0 327 73	Length 500 m Supplied on reel
			F/UTP - 4 pairs
305[1]	0 327 52	-	Length 305 m Supplied in cardboard box Weight 12 kg
500[1]	0 328 50	-	Length 500 m Supplied on reel Weight 21 kg
305[1]	-	0 327 53	Length 305 m Supplied by box Weight 11 kg
			F/UTP - 2x4 pairs
500[1]	0 327 74	-	Length 500 m Supplied on reel Weight 38 kg

1: in metre(s)

RJ 45 cat. 5e patch cords and user cords

RJ 45 - RJ 45

Pack	Cat.Nos	Description
	PVC	**U/UTP unscreened impedance 100 Ω**
		Grey
1	0 516 36	Length 1m
1	0 516 37	Length 2m
1	0 516 38	Length 3m
1	0 516 39	Length 5m
		F/UTP screened impedance 100 Ω
		Grey
1	0 516 40	Length 1 m
1	0 516 41	Length 2 m
1	0 516 42	Length 3 m
1	0 516 43	Length 5 m

Legrand cabling system LCS² category 5e
zone distribution boxes

Legrand cabling system LCS² category 5e
cords specifically for zone distribution boxes feedthrough sockets

0 335 40

0 335 40 fitted with SC fibre optic unit, accessory
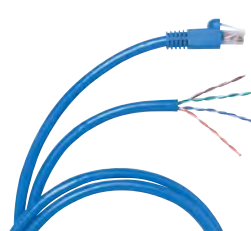Cat.No 335 20 and a 6 x RJ 45 connector unit
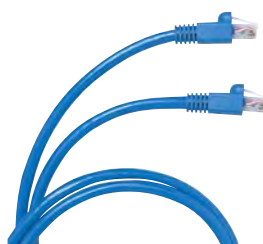
0 515 03   0 786 25

Connection principle

RJ 45   RJ 45

Pack	Cat.Nos	**Zone distribution boxes**
		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
		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
		IP 21 - IK 07
		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
		Self-assembly zone distribution box
1	0 335 40	Used for mounting LCS² RJ 45 cat. 5e connector units (p. 98)

Pack	Cat.Nos	**Cat. 5e cords - RJ 45/stripped**
		RJ 45 - straight stripped. Clip on and off in the zone distribution boxes and RJ 45 socket connection via LCS² 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
		Wiring in T 568 B
		U/UTP unscreened impedance 100 Ω
4	0 517 90	Length 8 m
4	0 517 91	Length 15 m
4	0 517 92	Length 20 m
		F/UTP screened impedance 100 Ω
4	0 517 93	Length 8 m
4	0 517 94	Length 15 m
4	0 517 95	Length 20 m

Pack	Cat.Nos	**Cat. 5e cords - RJ 45/RJ 45**
		For direct connection via RJ 45 male plug to the zone distribution box and to the RJ 45 socket with copper feedthrough to ensure:
		- safe connection
		- speed and reliability of connection
		Grey RAL 7035
		U/UTP unscreened impedance 100 Ω
4	0 515 00	Length 8 m
4	0 515 01	Length 15 m
4	0 515 02	Length 20 m
		F/UTP unscreened impedance 100 Ω
4	0 515 03	Length 8 m
4	0 515 04	Length 15 m
4	0 515 05	Length 20 m

Pack	Cat.Nos	**Sockets with copper feedthrough cat. 5e**
		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
	Mosaic	**Cat. 5e UTP**
10	0 786 20	○ White
10	0 786 24	● Aluminium
	Arteor	
10	5 723 30	○ White
10	5 728 30	● Magnesium
	Mosaic	**Cat. 5e FTP**
10	0 786 21	○ White
10	0 786 25	● Aluminium
	Arteor	
10	5 723 32	○ White
10	5 728 32	● Magnesium

Legrand cabling system LCS² category 5e

RJ 45 sockets

0 765 52   0 794 55   0 695 57

Sockets with LCS² 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
		UTP - 1 module
10	0 765 51	○ White
10	0 794 51	● Aluminium
10	0 786 05	○ White, connection with 110 tool
		UTP - 2 modules
10	0 765 54	○ White
10	0 794 54	● Aluminium
10	0 765 18	○ White, connection with 110 tool
		UTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	0 765 97	○ White with red shutter
		UTP - 2 x RJ 45 with quick-fixing accessory - 3 modules
		For snap-on mounting on DLP trunking with 45 mm cover
5	0 765 41	○ White
		UTP retractable RJ 45 socket - 4 modules
		With integrated retractable cord (0.9 m)
		Winds up automatically with a pushbutton
1	0 765 30	○ White
		UTP 45° - 2 modules
10	0 765 01	○ White
		2 x RJ 45 UTP 45° - 2 modules
5	0 765 02	○ White
		FTP - 1 module
10	0 765 52	○ White
10	0 794 52	● Aluminium
		FTP - 2 modules
10	0 765 55	○ White
10	0 794 55	● Aluminium
		FTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
10	0 765 98	○ White with red shutter
		FTP - 2 x RJ 45 with quick-fixing accessory - 3 modules
		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
		UTP - 1 module
10	5 723 03	○ White
10	5 728 03	● Magnesium
10	5 723 28	○ White, connection with 110 tool
10	5 728 28	● Magnesium, connection with 110 tool
		UTP - 2 modules
10	5 723 15	○ White
10	5 728 15	● Magnesium
10	5 723 29	○ White, connection with 110 tool
10	5 728 29	● Magnesium, connection with 110 tool
		FTP - 1 module
10	5 723 04	○ White
10	5 728 04	● Magnesium

Pack	Cat.Nos	Keystone RJ 45 socket cat. 5e
10	0 331 80	UTP socket with fast crimping connection
20	6 327 79	Surface mounting box
		1 or 2 ports
		For keystone connectors
		Provides solution for integration of keystone in surface mounting installations

Pack	Cat.Nos	Plexo RJ 45 sockets, cat. 5e - IP 55 closed flap IK 07
		Protection against water, dust
		For industrial sites
1/20	0 695 57	FTP socket ○ Grey/White
1/20	0 695 56	UTP socket ○ Grey/White
1	0 695 81	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 LCS²

LCS² system additional products cat. 6$_A$, LCS² cat. 6, LCS² 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

Modular panels

Pack	Cat.Nos	
		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
		Modular empty panels for up to 4 units
		Take the following equipment:
		- units of 6 x LCS² 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
1	0 335 90	19" panel - 1 U

Doubler units

Pack	Cat.Nos	
		Units of 6 x LCS² RJ 45 doubler connectors for fast tool-free connection. Used with doubler sockets (p. 103)
2	0 335 54	UTP unit
2	0 335 55	FTP unit
10	0 335 91	Blanking plate for 19" panel - Black
		Ethernet/Ethernet doublers 100 base T
1	0 335 39	FTP - 9 contacts
1	0 335 38	UTP - 8 contacts
		Telephone/Ethernet doublers 100 base T
1	0 335 37	FTP - 9 contacts
1	0 335 36	UTP - 8 contacts
		Telephone/telephone doubler
1	0 335 35	45 contacts

Video streaming unit

Pack	Cat.Nos	
1	0 335 34	Unit of 6 "F" connectors for video circuits

Fibre optic units

Pack	Cat.Nos	
		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)
		Singlemode fibre units (9/125 µm)
1	0 335 13	LC unit for 6 singlemode fibres
1	0 335 12	SC unit for 6 singlemode fibres
		Multimode fibre units (62.5 and 50/125 µm)
1	0 335 16	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

Blanking plates

Pack	Cat.Nos	
		Set of 12 blanking plugs for RJ 45 LCS² connector
10	0 517 40	White
10	0 517 41	Black
		Blanking plate for 19" panel
10	0 335 91	Black

Controlled access units

Pack	Cat.Nos	
		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 LCS² Legrand cabling system range, cat. 5e, cat. 6 and cat. 6$_A$
		Compatible with the cords in the LCS² Legrand cabling system range, cat. 5e, cat. 6 and cat. 6$_A$
		Controlled access units
		Unlocking tool not supplied
2	0 334 71	Black shutter
2	0 334 72	Blue shutter
2	0 334 73	Red shutter
2	0 334 74	Orange shutter
2	0 334 75	Green shutter
		Unlocking tool for controlled access units
5	0 334 70	Unlocking tool

Ethernet switches 100 Mbps

Pack	Cat.Nos	
		Mounted in the patch panel
		Conform with standards IEEE 802-3, EN 500 81-1 and EN 500 82-1 (Conformity with EMC requirements)
		Switch units for patch panel
		Clip directly onto the patch panels
1	0 335 02	7 RJ 45 ports at the front, 1 of which is a cascade port
		Power supply with transformer provided
1	0 335 05	6 RJ 45 ports + 1 LC type optic port with front-mounted cascade 100 base FX type LC
		Power supply via transformer provided
		Boxes to be installed on shelf
1	0 332 93	5 RJ 45 port switch
		Power supply via transformer provided
		Dimensions: 116 x 70 x 25
1	0 332 91	8 RJ 45 port switch
		Power supply via transformer provided
		Dimensions: 171 x 98 x 29

Copper/fibre optic converter units

Pack	Cat.Nos	
		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
1	0 335 06	10/100 base T to 10/100 base FX type SC
1	0 335 07	1000 base T to 1000 base SX type SC

Midspan Power over Ethernet (PoE) injectors

Pack	Cat.Nos	
1	0 335 01	4 inlets/outlets
		Used for supplying 4 Wi-Fi access points
		Clips directly onto a patch panel
1	0 327 37	1 inlet/outlet
		Used for supplying a Wi-Fi access point
		Direct connection to the patch panel

doubler sockets, adaptors and accessories

0 539 49

Reinforced protection

0 533 00 in position (no cord supplied)

0 533 01

0 327 60

0 517 09

Pack	Cat.Nos	**RJ 45 doubler sockets**
	Mosaic	**Ethernet/Ethernet**
10	0 765 39	FTP - 9 contacts
10	0 765 38	UTP - 8 contacts
	Mosaic	**Telephone/Ethernet**
10	0 765 37	FTP - 9 contacts
	Arteor	
10	5 723 36	FTP - 9 contacts ○ White
10	5 728 36	FTP - 9 contacts ● Magnesium
	Mosaic	
10	0 765 36	UTP - 8 contacts
	Arteor	
10	5 723 35	UTP - 8 contacts ○ White
10	5 728 35	UTP - 8 contacts ● Magnesium
	Mosaic	**Telephone/telephone**
10	0 765 35	45 contacts

Pack	Cat.Nos	**Mobile doublers**
		Clip into RJ 45 sockets to double applications
10	0 327 83	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

Pack	Cat.Nos	**Weatherproof adaptors**
		IP 55 - IK 07
		Allow all functions to be adapted
	Grey/White	2 Mosaic modules IP 55 operation
10	0 695 80	Adaptor with smoked flap
1	0 695 79	Adaptor with smoked flap lockable by special tool
1	0 695 81	Adaptor for RJ socket ensuring IP 44 waterproofness cable already connected
1	0 919 45	Locking tool (used for changing vandal-proof screws)
		Soliroc adaptor
		Used for adapting all functions
		2 Mosaic modules
		IK 10 - IP 55
1	0 778 80	Adaptor with flap
1	0 778 81	Adaptor without flap
		Hypra adaptor
5	0 539 49	IP 55 adaptor base

Pack	Cat.Nos	**Cable protection accessories**
		Plastic material
		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 00	**Plug** Integrated PE with sealing ring and clamping blades Tool-free assembly Ability to protect cables of category 5e
3	0 533 01	**Flush-mounting base** Locking base Supplied with RJ 45 female/female coupler cat. 5e
3	0 533 02	**Kit** Flush-mounting base + plug
3	0 533 03	**Protective flap** Fits on base Cat.No 0 533 01

Pack	Cat.Nos	**RJ plugs for round cables**
		Gold-coated contacts 1.2 µm
50	0 517 01	**RJ 11** 4 contacts, width 9.65 mm
50	0 517 02	**RJ 12** 6 contacts, width 9.65 mm
		RJ 45 cat. 5e
50	0 517 03	8 contacts, width 11.70 mm
50	0 517 04	9 contacts, width 11.70 mm
		RJ 45 sleeves
50	0 517 06	Black
50	0 517 07	White

Pack	Cat.Nos	**Stripping tool**
		Slits the sheath and releases the conductors by rotation
		For twisted pair cables
		Does not damage the conductors
1	0 332 62	**Stripper** For twisted pair and fibre optic cable
1	0 327 60	**Cutting pliers** Cut wires cleanly without damaging the copper

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

Pack	Cat.Nos	**110 tool**
1	0 332 60	110 tool
1	0 332 61	Replacement blade

0 787 46   0 787 31   0 335 79

Pack	Cat.Nos		SUB D sockets - 2 modules
	Mosaic	Arteor	
1	0 787 65	-	9 contacts - Screw terminals connection to link type RS 232 series
1	0 787 67	-	9 contacts - Soldering connection to link type RS 232 series
1	0 787 66	-	15 contacts - Soldering connection For example used for specialized line type X21 between 2 distant devices

Female USB DATA sockets - for data transfer

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

Preterminated
USB 3.0. Equipped with a 15 cm cord

Pack	Mosaic	Arteor	
1	0 787 46	5 720 94	○ White - square version
1	-	5 725 94	● Magnesium - square version

Connection via screw terminals
USB 2.0. Cross section - 1 mm²

1	0 787 61	5 722 75	○ White
1	0 792 84	-	○ Aluminium
1	-	5 727 75	● Magnesium

Female USB DATA amplifier - for data transfer

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

JUNE 2014			
1	0 787 48	5 720 23	○ White

Telephone sockets

RJ 11 and RJ 12 sockets
Equipped with a modular Jack connector with 1/4 turn terminal for fast connection Tap-off possible

	Mosaic	Arteor	
10	0 787 30	5 723 00	○ White - RJ 11, 4 contacts 1 module
10	0 792 31	-	○ Aluminium - RJ 11, 4 contacts - 1 module
10	-	5 728 00	● Magnesium - RJ 11, 4 contacts - 1 module
10	0 787 31	5 723 13	○ White - RJ 11, 4 contacts - 2 modules
10	-	5 728 13	● Magnesium - RJ 11, 4 contacts - 2 modules
10	0 787 32	5 723 12	○ White - RJ 12, 6 contacts - 2 modules
10	-	5 728 12	● Magnesium - RJ 12, 6 contacts - 2 modules

ISDN socket
Self-stripping 1/4 turn terminals for fast connection. Tap-off possible

10	0 787 34	-	○ White - 8 contacts, 2.5 mm² earth terminal

Pack	Cat.Nos		Telephone sockets (continued)
	Mosaic	Arteor	**Single master - 2 modules** With IDC connection Conform to British Telecom
10	-	5 723 10	○ White
10	-	5 728 10	● Magnesium
			Single secondary - 1 module With IDC connection Conform to British Telecom
5	-	5 723 01	○ White
5	-	5 728 01	● Magnesium

Patch panel telephone 50 ports 110 connect

1	0 335 79	19" panel - 1 U

Cables for telephone networks cat. 3

PVC sleeve
Colour white
Colour code TIA/EIA

		U/UTP - 50 pairs Length 500 m Supplied on reel
1	0 328 91	

		U/UTP - 100 pairs Length 500 m Supplied on reel
1	0 328 88	

Panels and units for incoming telephone

Panels assembled - 1 U
Fitted with 4 LCS² RJ 45 units of 12 ports with fast tool-free connection

1	0 335 31	3-6/4-5 contacts for digital telephone
1	0 335 30	4-5/7-8 contacts for analogue telephone

Incoming telephone units for self-assembly panels
Fitted with 12 LCS² RJ 45 ports with quick tool-free connection

2	0 335 33	3-6/4-5 contacts for digital telephone
2	0 335 32	4-5/7-8 contacts for analogue telephone

L1 legrand

0 779 00   0 332 80   0 779 14   0 779 13

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
	Mosaic	**Non-manageable**
1	0 779 01	PoE power supply (Power over Ethernet - standard 802.3 af)
1	0 779 00	230 V∿ power supply
	Arteor	
1	5 720 84	PoE power supply (Power over Ethernet - standard 802.3 af) ○ White
1	5 720 83	230 V∿ power supply ○ White
		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
		Manageable Wi-Fi access points 802.11n
		Coverage area: 600 m². 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 (LCS² 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/LCS² 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 (LCS² 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
	Mosaic	
1	0 779 14	With RJ 45 socket on front ○ White
1	0 779 13	With no RJ 45 socket ○ White
	Arteor	
1	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
	Celiane	
1	0 673 66	With RJ 45 socket on front
		Wi-Fi network management system
		Access point manager (disembedded) APs centralised configuration software
1	0 335 24	Access point manager
		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 LCS² fibre optic

fibre optic cables

0 325 15

0 325 10

0 325 06

0 325 08

Fibre optic cables:
• fibre colour code: FOTAG
• standard: EN 50173-2, ISO IEC 11801

Pack	Cat.Nos		
	Loose tube	900 µm Tight buffer	**OS1/OS2 singlemode fibre optic cables (9/125 µm)**
			For 9/125 µm singlemode installations (OS1)
2000[1]	0 325 12	-	Yellow jacket
2000[1]	0 325 13	-	Indoor/outdoor (universal) 6 fibres
2000[1]	0 325 14	0 325 50	Outdoor, corrugated steel tape 6 fibres
2000[1]	0 325 15	-	Indoor/outdoor (universal) 12 fibres
2000[1]	0 325 51	-	Outdoor, corrugated steel tape 12 fibres
			Indoor/outdoor (universal) 24 fibres

Pack	Cat.Nos		
	Loose tube	900 µm Tight buffer	**OM2 multimode fibre optic cables (50/125 µm)**
			For 50/125 µm multimode installations (OM2)
2000[1]	-	0 325 55	Orange jacket
2000[1]	0 325 04	0 325 08	Indoor/outdoor (universal) 4 fibres
2000[1]	0 325 05	-	Indoor/outdoor (universal) 6 fibres
2000[1]	0 325 06	0 325 09	Outdoor, corrugated steel tape 6 fibres
2000[1]	0 325 07	-	Indoor/outdoor (universal) 12 fibres
			Outdoor, corrugated steel tape 12 fibres

Pack	Cat.Nos		
	Loose tube	900 µm Tight buffer	**OM3 multimode fibre optic cables (50/125 µm)**
			For 50/125 µm multimode installations (OM3)
			Green jacket
			10 Gigabit Ethernet compliant
2000[1]	-	0 325 10	Indoor/outdoor (universal) 6 fibres
2000[1]	-	0 325 11	Indoor/outdoor (universal) 12 fibres
2000[1]	0 325 53	0 325 52	Indoor/outdoor (universal) 24 fibres

Pack	Cat.Nos	
	Tight buffer 900 µm	**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 LCS² fibre optic

optic connectors and pigtails

0 326 57

0 326 58

0 326 53

0 331 27

0 331 00

0 326 90

0 330 49

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.)
		Update kit for case Cat.No 0 331 93
1	0 326 91	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
		Fast-connection connectors
		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
		Multimode connectors
10	0 326 57	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
		Singlemode connectors
10	0 326 52	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 Gb - 50/125 µm - OM4
10	0 326 70	LC connectors
1	0 326 71	Kit of 12 pigtails LC connectors
		10 Gb - 50/125 µm - OM3
1	0 326 22	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
		9/125 µm - OS1/OS2
1	0 326 19	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
		Thermoretractable sleeve for pigtails
1	0 327 44	40 mm - pack of 50 sleeves
		Glue-on connectors 50/125 and 62.5/125 µm
		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
		Breakout kits
		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 LCS² fibre optic

19" fibre optic drawers

0 462 91

0 335 10 fitted with fibre optic units

"Tail-coat" rear
for easier cable entry

0 335 13

0 335 12

0 335 16

0 335 11 fitted with fibre
optic unit 335 17

Pack	Cat.Nos	**Floor distribution fibre optic cabinets**
		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
1	0 462 90	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**
		Limit switch stop with 45° slope
		Depth 220 mm, height 1 U
1	0 335 10	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**
		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
		Singlemode fibre units (9/125 µm)
1	0 335 13	LC unit for 6 singlemode fibres
1	0 335 12	SC unit for 6 singlemode fibres
		Multimode fibre units (62.5 and 50/125 µm)
1	0 335 16	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**
		Clips directly onto the patch panels
1	0 335 05	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**
		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
1	0 335 06	10/100 base T to 10/100 base FX type SC
1	0 335 07	1000 base T to 1000 base SX type SC

Pack	Cat.Nos	**Fibre optic cassette for patch panel**
1	0 335 11	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 LCS² patch panel

Pack	Cat.Nos	**Blanking plate for 19" panel**
10	0 335 91	Black

Pack	Cat.Nos	**Cassette for pigtails**
1	0 329 07	12-fibre capacity
1	0 326 72	24-fibre capacity

Legrand cabling system LCS² 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
		Fibre optic units Clip directly onto the optic drawer Cat.No 0 325 69
		Singlemode fibre units (9/125 µm)
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
		Multimode fibre units (62.5 and 50/125 µm)
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
		Accessory
1	0 335 93	Blanking plate
		Accessories common to 2 fibre optic drawers
		Cassettes for pigtails
1	0 329 07	12 fibre capacity
1	0 326 72	24-fibre capacity
		Bend limiting clip
8	0 335 94	Fibre management bend limiting clip

LCS² ZONE DISTRIBUTION BOXES

Consolidation and redistribution made easy

Complete flexibility with the LCS² 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 LCS² system.

- Fast, reliable connection to the LCS² zone box with sockets with copper and fibre optic feedthrough and RJ 45/RJ 45 cords.

N Available in cat. 6$_A$

Legrand cabling system LCS² fibre optic

fibre sockets

0 786 16   0 786 17   0 786 18

Pack	Cat.Nos	
		Fibre optic sockets
		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
		Socket with fibre optic feedthrough 2 x ST Bayonet connection (STII compatible)
1	0 786 16	○ White
		Socket with fibre optic feedthrough 2 x SC Push-pull connection
1	0 786 17	○ White
		Socket with fibre optic feedthrough 2 x LC Push-pull connection
1	0 786 18	○ White
		Socket with fibre optic feedthrough
		Socket with fibre optic feedthrough 2 x SC/APC Push-pull connection With shutters
1	0 786 14	○ White

Legrand cabling system LCS² fibre optic

zone distribution boxes

0 335 40   0 335 20 fibre optic accessory

Pack	Cat.Nos	
		Zone distribution boxe
		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
		Self-assembly zone distribution box
1	0 335 40	Used for fitting fibre optic accessory units
		Fibre optic accessory
1	0 335 20	Used for fitting fibre optic units (see p. 108) and the fibre coil in the zone distribution box
		Sockets with fibre optic feedthrough
		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
		Socket with fibre optic feedthrough 2 x ST Bayonet connection (STII compatible)
1	0 786 16	○ White
		Socket with fibre optic feedthrough 2 x SC Push-pull connection
1	0 786 17	○ White
		Socket with fibre optic feedthrough 2 x LC Push-pull connection
1	0 786 18	○ White

Legrand cabling system LCS² 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	**Fibre optic/copper switch** 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	**Power supply for fibre optic/copper switch** Power supply for fibre optic/copper switch Cat.Nos 0 779 05 For installation in trunking only
		Individual working areas
1	0 326 80	**Active zone box** 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∿
		Supports Integral fibre optic coiling cassette with quadriplex LC feedthrough
1	0 326 81	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
		Auxiliary contact
1	0 326 83	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)
		Battery
1	0 326 84	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)
		OM3 multimode fibre optic cables (50/125 μm)
		For 50/125 μm multimode installations (OM3) Green jacket 10 Gigabit Ethernet compliant Indoor/outdoor (universal)
2000	900 μm Tight buffer 0 325 10	6 fibres
2000	0 325 52	Indoor/outdoor (universal) 24 fibres

LCS²: your concentrated digital infrastructure

Recommended for areas which require rigorous hygiene.
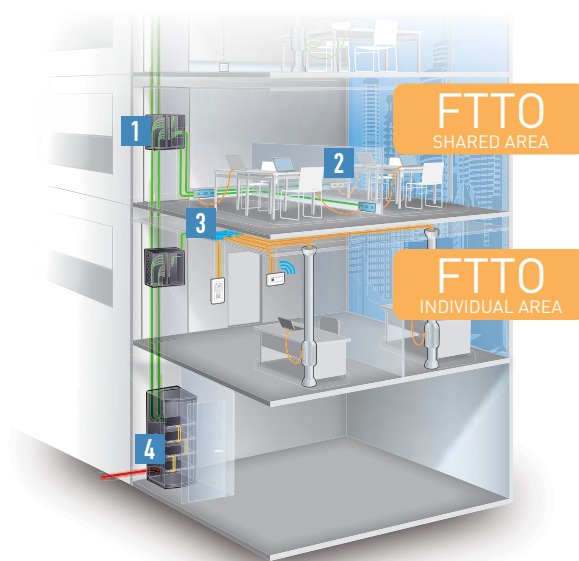
1 **Fibre optic floor distribution cabinet** Takes up to 4 fibre optic units.

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 LCS² fibre optic

patch cords

0 330 70

0 330 65

0 326 01

0 326 07

0 326 13

0 326 16
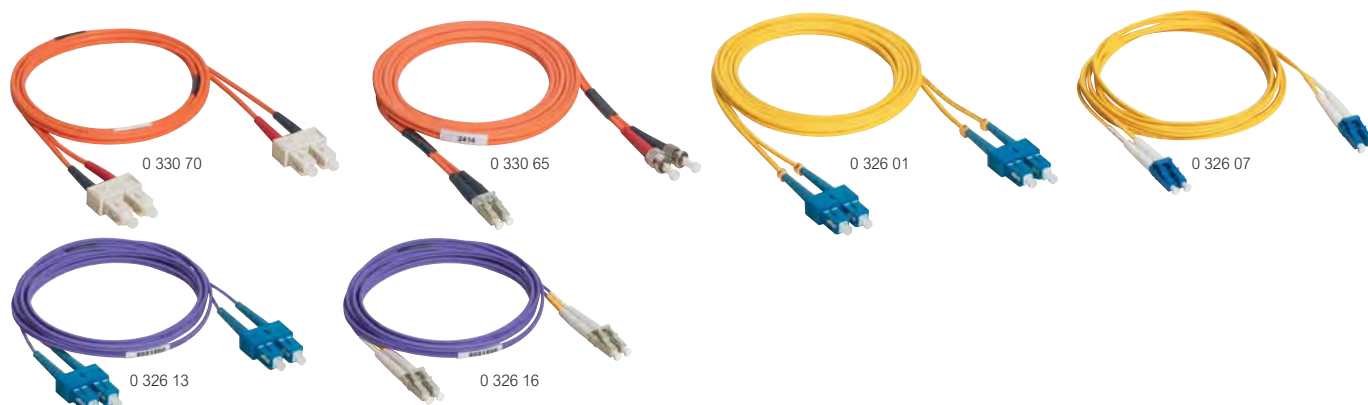
Technical characteristics **p. 158**

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

Pack	Cat.Nos	**OM2 (UPC) multimode fibre optic cords (50/125 µm)**
		Max. optical losses: 0.3 dB
		For 50/125 µm multimode installations, OM2 type
		Orange sheaths
		ST/ST duplex cords
3	0 330 80	Length: 1 m
3	0 330 81	Length: 2 m
3	0 330 82	Length: 3 m
		SC/SC duplex cords
3	0 330 69	Length: 1 m
3	0 330 70	Length: 2 m
3	0 330 71	Length: 3 m
		ST/SC duplex cords
3	0 330 72	Length: 2 m
3	0 330 73	Length: 3 m
		LC/LC duplex cord
3	0 330 61	Length: 2 m
		SC/LC duplex cords
3	0 330 75	Length: 1 m
3	0 330 63	Length: 2 m
3	0 330 76	Length: 3 m
		LC/ST duplex cord
3	0 330 65	Length: 2 m

Pack	Cat.Nos	**OM4 multimode fibre optic cords (50/125 µm)**
		10 Gigabit Ethernet compliant
		Max. optical losses: 0.3 dB
		For 50/125 µm multimode installations, OM4 type
		Blue sheaths
		SC/SC duplex cords
3	0 326 30	Length: 1 m
3	0 326 31	Length: 2 m
3	0 326 32	Length: 3 m
		LC/LC duplex cords
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	**OS1/OS2 (UPC) singlemode fibre optic cords**
		Max. optical losses: 0.3 dB
		For OS1 9/125 µm singlemode installations, OS2 à
		OS1 type
		Yellow sheaths
		SC/SC duplex cords
3	0 326 00	Length: 1 m
3	0 326 01	Length: 2 m
3	0 326 02	Length: 3 m
		SC/LC duplex cords
3	0 326 03	Length: 1 m
3	0 326 04	Length: 2 m
3	0 326 05	Length: 3 m
		LC/LC duplex cords
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

Pack	Cat.Nos	**OM3 (PC) multimode fibre optic cords (50/125 µm)**
		Suitable for 10 Gb Ethernet network
		Max. optical losses: 0.3 dB
		For 50/125 µm multimode installations, OM3 type
		Purple sheaths
		SC/SC duplex cords
3	0 326 09	Length: 1 m
3	0 326 10	Length: 2 m
3	0 326 11	Length: 3 m
		SC/LC duplex cords
3	0 326 12	Length: 1 m
3	0 326 13	Length: 2 m
3	0 326 14	Length: 3 m
		LC/LC duplex cords
3	0 326 15	Length: 1 m
3	0 326 16	Length: 2 m
3	0 326 17	Length: 3 m

Customised fibre optics
Customised solutions, p. 113

Customised solutions

fibres preterminated with connectors

Data Center

Length of link
(from connector to connector in metres)
Link supplied with protective sleeve
and compression gland pull system to
facilitate entry into the fibre optic units

Connectors:

LC

SC

ST

Number of fibres:
2, 4, 6, 8, 12, 24

Fibre type

Multimode: 62.5/125 µm
Conforms with category OM1

Multimode: 50/125 µm
(ensured speed 1 Gbps)
Conforms with category OM2
Multimode: 50/125 µm

(ensured speed 10 Gbps over 300 m)
Conforms with category OM3
Singlemode: 9/125 µm

(ensured speed 10 Gbps over 550 m)
Conforms with category OM4
Singlemode: 50/125 µm

Structure:
- tight buffer
- loose tube
- loose tube corrugated
  steel tape

Length of link
(from connector to connector,
in metres)

Link supplied with
sleeve on request

Connectors:

MTP

Number of
fibres:
6, 12, 24, 48

Performance:
- OM4
- OM3
- OS1/OS2

Fibre type

Free or microcable structure

Type of sheath: LSZH

↓ DOCUMENTS

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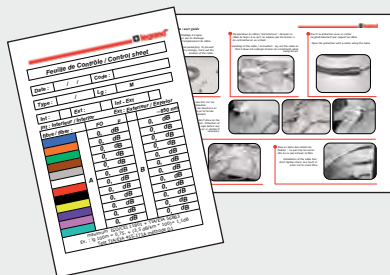
↓ PACKAGING

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

113

Legrand cabling system LCS² cabinets

LCS² 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

LCS² 19" cabling cabinets

Single front door
Reversible door

Pack	Cat.Nos	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

Double front door
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

LCS² 19" extension cabinets

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

LCS² baying kits

For direct linking of 2 LCS² cabinets
For cabinet depth (mm):

1	0 463 37	600
1	0 463 38	800
1	0 463 39	1000

LCS² cabling units

Can be attached between 2 LCS² 42 U cabinets
Easier cable and patch cord management
Width 250 mm
Supplied with earthing kit
Anthracite grey RAL 7016
For cabinet depth (mm):

1	0 463 34	600
1	0 463 35	800

Legrand cabling system LCS² cabinets

LCS² 19" freestanding server cabinets and equipment
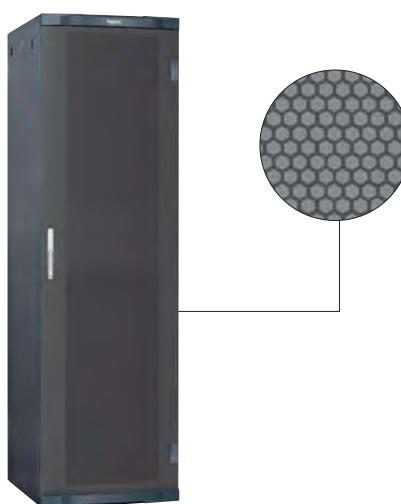
0 463 85

📇 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

LCS² 19" server cabinets

Pack	Cat.Nos	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

LCS² baying kit

For direct linking 2 LCS² cabinets
For cabinets depth (mm):

1	0 463 39	1000

Accessories for LCS² 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

1	0 464 82	

Cable guides support
Fast screw-free assembly of cable guides (p. 117)
For width 600/800 mm
Fitted between 2 supports
Cat.No 0 464 79
For depth 1000 mm
Pre-cut every 100 mm for height 500 to 200 mm

1	0 464 78	
1	0 464 79	
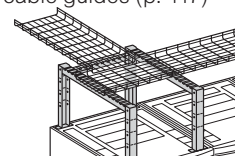
Plinths, cable entry plates, thermal management, cable management and other accessories,
p. 116 to 119

LCS² 19" equipment
p. 118

1200 mm deep LCS² server cabinet
please consult us

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

Thermal management: plate with 230 V fans, thermostat

Lighting kit[1]

Rear door

Other key codes

Cabling or server cabinet

No panels

Plinth, ventilation/brush trap, raised floor plinth[1]

19" cable entries: metal or plastic

Earthing wire/braid

Anti-tilt kit[1] or ground fixing kit[1]

Wiring management: vertical brush panels, patch extension, supports, guards
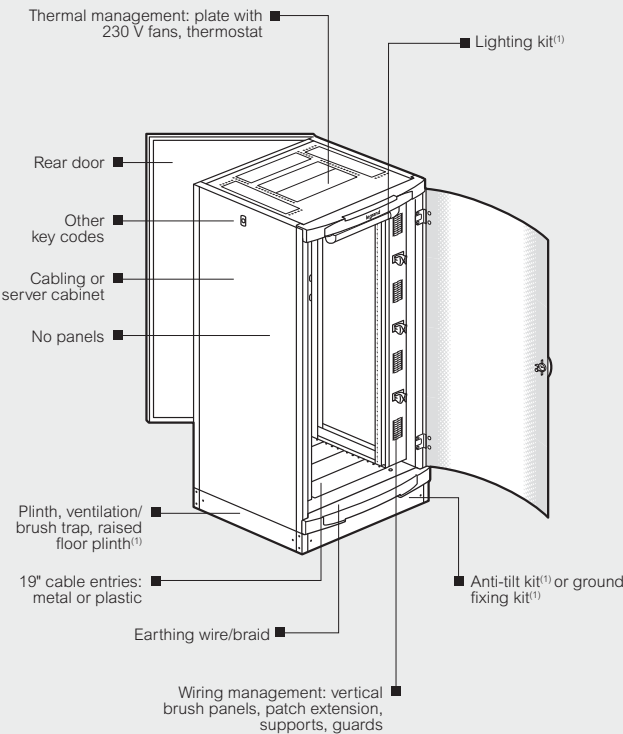
1: Supplied ready for assembly

Option of solid or microperforated metal doors, screen-printed glass doors, double doors or no doors
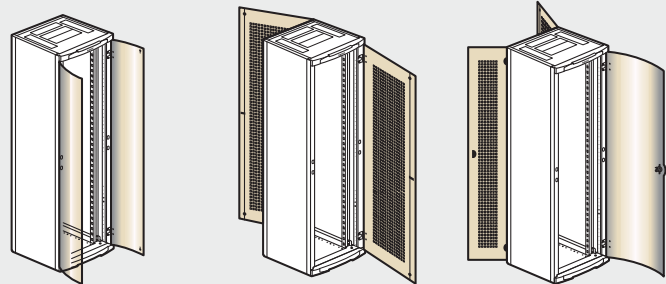
Cabinet fitted with screen-printed glass double door at the front (42 U/47 U; width 800 mm)

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

19" EQUIPMENT ASSEMBLY

Patch panel, 1 U, equipped or to be equipped with: copper and for fibre optic units, fibre optic cassettes and active products

Feedthrough panels, metal or plastic

Fibre optic drawer, equipped or to be equipped with: connector units, pigtails/cassettes

Ventilation drawer

Set of 2 L-shaped fixed sliders

PDU

Rail kit DIN

Blanking plates, metal or plastic

Shelves:
- fixed
- telescopic
- keyboard support

COLOURS

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

OUR COMMITMENT

Request a quotation from our technical team

LCS² 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
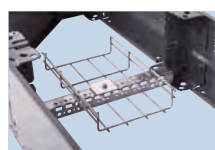
Cross Bar 0 476 93 with cable guide

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
			Plinth kits Consisting of 4 corner blocks and solid front/rear traps height 100 mm Side traps to be ordered separately For cabinet width (mm):
	Height 100	Height 200	
1	0 464 50	0 464 52	600
1	0 464 51	0 464 53	800
			Sets of 2 solid side traps 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
			Ventilated traps 1 trap height 100 mm For cabinet width/depth (mm):
1	0 464 60		600
1	0 464 61		800
			Traps with brushes 1 trap height 100 mm For cabinet width/depth (mm):
1	0 464 62		600
1	0 464 63		800

Pack	Cat.Nos	**Plinth for cabling units**
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

Pack	Cat.Nos	**Cross bars**
		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 93	600
1	0 476 94	800
1	0 476 95	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
1	0 464 66	For cabinet depth 600 mm

Adjustable height plinths for raised access floors

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

Pack	Cat.Nos	**Adjustable height plinths** 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

Pack	Cat.Nos	**Set of 2 tile support brackets** 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

💬 Adjustable height plinth, depth 1200 mm
please consult us

LCS² 19" cabinets and server cabinets

cable entries, thermal management and PDU supports

LCS² 19" cabinets and server cabinets

cable management, patch extension

0 465 29

0 465 31

0 464 87

0 465 75

0 331 35   0 464 80   0 464 81

Technical characteristics **p. 149**

Technical characteristics **p. 150**

Pack	Cat.Nos	**19" cable entry plates**
		Black RAL 9005
		Plastic plates with brushes, snap on
1	0 465 28	1 U
1	0 465 29	2 U
		Metal plates with brush
1	0 465 30	1 U
1	0 465 31	2 U
		Thermal management
		Plates with fans 3 U
		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
		1 U ventilation drawers
		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
		Thermostat
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
		PDU supports
		Vertical support for fixing to the rear of 19" LCS² 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
		Accessories
		Anti-tilt kit
1	0 464 84	Stabilises a cabinet when heavy items installed on telescopic equipment are being removed
		Floor fixing kit
1	0 464 86	Used for permanently fixing a cabinet to the ground by locking the levelling feet
		Casters
1	0 464 83	Set of 4 pivoting casters Total permissible load on the 4 casters: 380 kg

Pack	Cat.Nos	**Cable and cord management**
		Set of 3 cable management supports
		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
		Flat cable guides
		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
		U-shaped cable guides
		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
		Vertical cable management grille
		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
		Vertical cable manager
		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

Pack	Cat.Nos	**Patch extension**
		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

117

Legrand cabling system

LCS² 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
		Projecting mounting on 2 x 19" uprights 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
		Fixing on 4 x 19" uprights 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

Pack	Cat.Nos	**Telescopic shelves**
		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

Pack	Cat.Nos	**Shelves for heavy items**
		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

Pack	Cat.Nos	**Keyboard support shelf**
1	0 465 19	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 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

Pack	Cat.Nos	**Sets of 2 fixed sliders**
		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
		Metal 2 axes, quick-fixing 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	0 465 22¹	1 U
1	0 465 23¹	2 U
		Plastic with brushes, snap on
1	0 465 28²	1 U
1	0 465 29²	2 U
		Metal with brushes, quick-fixing Quick, screw-free fixing
1	0 465 30¹	1 U
1	0 465 31¹	2 U

Pack	Cat.Nos	**19" blanking plates**
		Black RAL 9005
		Plastic, snap on
1	0 465 32²	1 U
1	0 465 33²	2 U
		Metal, quick-fixing Quick, screw-free fixing
1	0 465 38¹	1 U
1	0 465 39¹	2 U
1	0 465 40¹	3 U

Pack	Cat.Nos	**19" lighting kit**
1	0 464 85¹	19" metal panel with a lighting kit with switch Quick, screw-free fixing Supplied with 230 V∿ - 8 W fluorescent tube 1 U

Pack	Cat.Nos	**Fixing screws**
		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

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 LCS² patch panels and cords

Technical characteristics **p. 150-151**

19" racks

Pack	Cat.Nos	

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" LCS² metal management panels, 19" power distribution units and the LCS² 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

Pack	Cat.Nos	Capacity	Height (mm)	Width (mm)	Depth (mm)	Permissible load (kg)	Depth of uprights (mm)
1	0 464 06	45 U	2185	604	521	675	267
1	0 464 07	45 U	2185	604	667	675	413

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
Grid with hinged closing latches
1965 mm x 153 mm x 156 mm

| 1 | 0 464 25 |

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 |

Cable tray supports

Pack	Cat.Nos	

To be fitted in the depth of the rack to support a high cable tray (Cat.No 0 464 69/70 p. 117)

| 1 | 0 464 18 | For rack Cat.No 0 464 06 |
| 1 | 0 464 19 | For rack Cat.No 0 464 07 |

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 | 0 464 15 | For rack Cat.No 0 464 06 |
| 1 | 0 464 16 | For rack Cat.No 0 464 07 |

19" cord management panels

1 axis closed panels with pivoting cover
Depth 172 mm
Black

| 1 | 0 465 70 | 1 U |
| 1 | 0 465 71 | 2 U |

19" equipment screws

| 1 | 0 464 23 | Set of 50 special screws for 19" racks and 25 earthing claws |
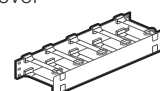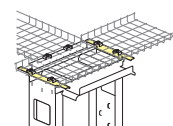
19" metal panels, Power Distribution Units, DIN rail kit
p. 118, 122, 123

Legrand cabling system LCS² cabinets

LCS² 19" wall-mounting cabinets and accessories

0 462 01

0 462 11

Pivoting cabiinet 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

Fixed LCS² 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

Cabinet depth 400 mm

Pack	Cat.Nos	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

Cabinet depth 580 mm

Pack	Cat.Nos	Capacity	Width (mm)	Height (mm)	Load capacity (kg)
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

Pivoting LCS² 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

Cabinet depth 600 mm

Pack	Cat.Nos	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

Fixed shelves

Quick fixing without screws
Height 2 U
Max. load 15 kg
Black RAL 9005

Quick fixing on 2 x 19" uprights

Pack	Cat.Nos	
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

Thermal management

Fan
2.5 m power supply cable

Pack	Cat.Nos	
1	0 462 60	230 V∿ fan
1	0 348 48	**Thermostat** Adjustable from 5 to 60°C, 230 V∿, 50/60 Hz NO contact (10A) and NC contact (5 A) Fixed by magnet

Cable entry

Pack	Cat.Nos	
1	0 462 55	Cable entry plate with brush For pivoting cabinets

Cable management rings

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

Pack	Cat.Nos	
4	0 465 41	1 U, plastic Usable section 1890 mm²
4	0 465 42	2 U, plastic Usable section 4070 mm²

Accessories

Pack	Cat.Nos	
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

LCS² 19" management panels
p. 118

legrand

0 335 92

0 462 23

0 462 24

0 462 20

Technical characteristics **p. 152 to 153**

Pack	Cat.Nos	LCS² 10" cabinet

300 mm depth cabinet
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

Pack	Cat.Nos	Capacity	Width (mm)	Height (mm)	Load capacity (kg)
1	0 462 20	6 U	314	352	12

10" equipment

Supplied with screws and cage nuts

Pack	Cat.Nos	
1	0 335 92	**Modular empty panel** 10" panel - 1 U For up to 2 connector units or 2 fibre optic units (p. 89 and 108)
1	0 462 23	**Fixed shelf 1 U** Depth 120 mm Max. load. 10 kg Black RAL 9005

PDU

230 V∿
Need 2 U space
Supplied with screws and cage-nuts
Black

Pack	Cat.Nos	
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
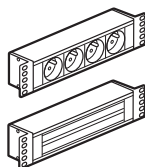
↓ LCS² 19" WALL-MOUNTING CABINETS

Cable entry plate with brushes(1)

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

Fixed shelves, modular patch panel 1 U and feedthrough, blanking plates, DIN rail kit, fibre optic drawer

Power supply unit
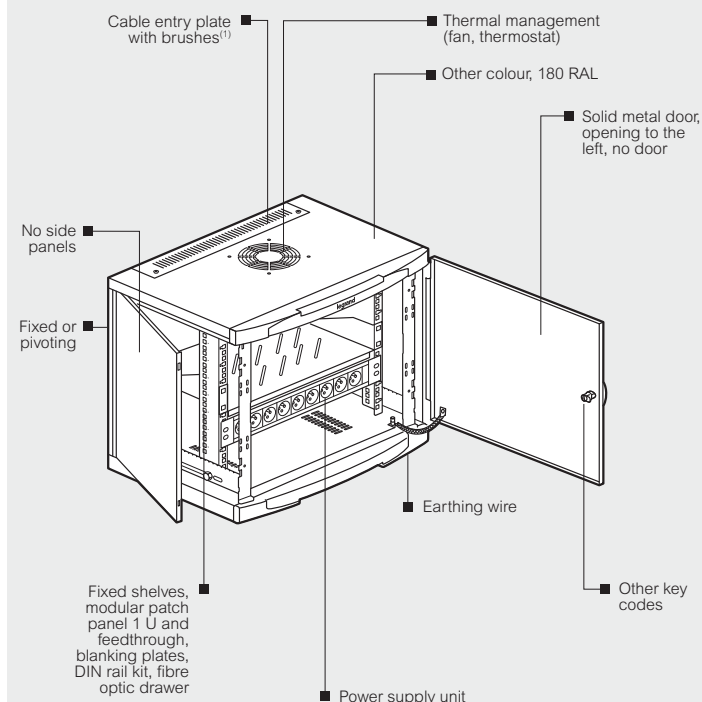
1: Pivoting cabinets

OUR COMMITMENT
Request a quotation from our technical team

Energy distribution

Power Distribution Units (PDU) and DIN rail kit

0 465 88   0 465 50   0 465 65

📱 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 LCS² 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[2] Supplied with screws
		Single phase 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 mm² 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 mm² terminal block
1	0 465 88	24 x 2P+E sockets - German standard Connection on 4/6 mm² terminal block
1	0 465 89	22 x 2P+E sockets - British standard Connection on 4/6 mm² terminal block
		3-phase 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 mm² terminal block Provide a 2 U space Supplied with screws **PDU**
1	0 465 51[1]	12 x IEC 60320 C13 sockets
1	0 465 52[1]	9 x IEC 60320 C19 sockets
1	0 465 50[1]	9 x 2P+E black sockets French standard
1	0 465 54[1]	6 x 2P+E black sockets - French standard
1	0 332 88[1]	6 x 2P+E white sockets - French standard With switch with indicator
1	0 332 37[1]	6 x 2P+E white sockets - French standard With 16 A circuit breaker
1	0 332 87[1]	6 x 2P+E tamperproof sockets for uninterruptible power supply (UPS) - French standard
1	0 465 60[1]	9 x 2P+E black sockets - German standard
1	0 465 62[1]	6 x 2P+E black sockets - German standard
1	0 332 38[1]	6 x 2P+E white sockets - German standard With 16 A circuit breaker
1	0 465 65[1]	6 x 2P+E black sockets - British standard
1	6 339 00[1]	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

Smart and metered PDU
p. 130, 131

Energy distribution

Power Distribution Units (PDU) and DIN rail kit (continued)

Cable ties and document holders

0 332 78

Kit 0 465 46 + 0 465 47

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	**19" Power Distribution Units (PDU) (continued)**
1	0 332 78¹	230 V - 50/60 Hz power supply For fixing on 19" fixing centres 180° reversible end piece Connection via 2.5 mm² terminal block Provide a 2 U space Supplied with screws **PDU with voltage surge protector unit** 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	0 332 79¹	**PDU to be equipped** Takes 16 Mosaic modules
1	0 465 46¹	**Multi-application DIN rail kit** 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
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)
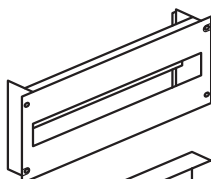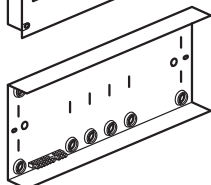
1: Can be mounted on 19" racks with screw Cat.No 0 464 23 (p. 119)

Cable ties with tightening indicator
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
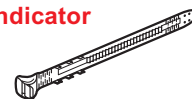
Pack	Cat.Nos	Width (mm)	Length (mm)	Tightening Ø max.	min.
50	0 331 94	15	180	35	15
50	0 331 95	15	225	50	35
50	0 331 96	15	320	80	50

Self-locking cable ties
Repositionable cable ties
Double-sided textile with "loops" on one side and "hooks" on the other
Do not damage cables

Pack	Cat.Nos	Colour	Width (mm)	Length (mm)	Tightening Ø max. (mm)
10	0 331 84	Black	16	150	35
10	0 331 85	Red	16	150	35
10	0 331 86	Green	16	150	35
10	0 331 87	Black	16	300	80
10	0 331 88	Red	16	300	80
10	0 331 89	Green	16	300	80

Self adhesive base
Pack	Cat.Nos	
50	0 320 68	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

Pack	Cat.Nos	Ext. Height (mm)	Ext. Width (mm)	Int. Height (mm)	Int. Width (mm)	Depth (mm)
20	0 365 80	235	340	200	310	18
20	0 365 81	165	260	130	230	18
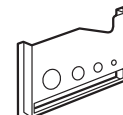
Closed - RAL 7035
1	0 365 82	Rigid plastic - IP 50 Int. dimensions: 324 x 120 x 18 mm

Transparent
10	0 097 99	Soft plastic, A4 - 305 x 220 mm

Smart and metered PDU
p. 130, 131

Performance
and reliability
at the heart
of the server room

Legrand provides a comprehensive range of
products and solutions dedicated to server
room applications

Varicondition Cold Corridor®
p. 128

Varicondition H₂O
p. 128

Varicon-L 19" server cabinets
p. 126

Pre-terminated fibre and copper
p. 136

High density fibre optic drawer
p. 135
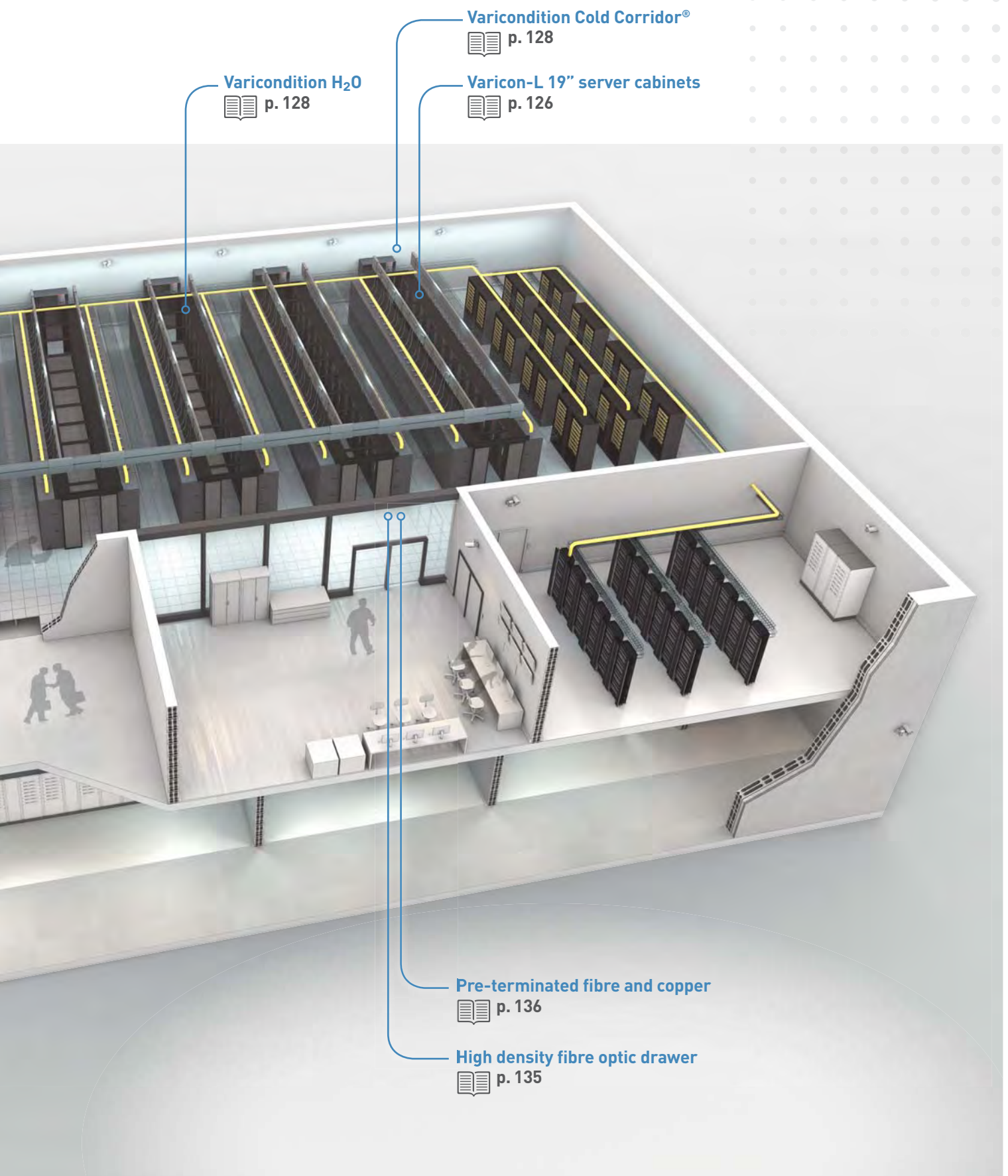
6 466 21

6 466 68   6 466 69   6 466 61

Technical characteristics **p. 156**

Technical characteristics **p. 157**

Pack	Cat.Nos	**Varicon-L 19" server cabinets**
		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^2 shelves for depth 1000 mm
		Black RAL 9011

Cabinets

Pack	Cat.Nos	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

Extension cabinets
Without side panels
Supplied with joining kit

Pack	Cat.Nos	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

Pack	Cat.Nos	**Cable management**
		Vertical cable managers
		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
		Cable guide rings
		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
		Cable guides
		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
		Cable entry with brushes
		For mounting on the top cable entry
1	6 466 85	Set of brushes

6 466 81   0 465 32   0 465 29   0 465 23   0 465 29

Technical characteristics **p. 157**

Pack	Cat.Nos	**Equipment supports**
		Fixing crosspieces For fixing equipment depthwise in cabinets Fix on structural uprights in 25 mm steps over the whole height of the cabinet Supplied without screws
1	6 466 55	Crosspiece for cabinet depth 1000 mm
1	6 466 57	Crosspiece for cabinet depth 1200 mm
		Set of 4 universal fixing brackets For fixing equipment. Numerous attachment points (see technical page, p. 157) Fix on structural uprights and 19" uprights Supplied with screws
1	6 466 59	Set of 4 universal fixing brackets
		Air flow management
		Front vertical covers 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" LCS² blanking plates or plastic plates with brushes Black RAL 9011
1	6 466 81	Set of 2 front covers for 41 U cabinets
1	6 466 82	Set of 2 front covers for 46 U cabinets
		Side vertical covers 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
1	6 466 88	Set of 2 side covers for 41 U cabinets
1	6 466 89	Set of 2 side covers for 46 U cabinets
		19" LCS² blanking plates Plastic, snap on, black
1	0 465 32	1 U
1	0 465 33	2 U
		19" LCS² feedthrough panels Plastic with brushes, snap on, black
1	0 465 28	1 U
1	0 465 29	2 U
		Shelves for heavy items 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
1	0 465 17	Fixed shelf, depth 820 mm, 1 U
1	0 465 18	Telescopic shelf, depth 820 mm, 2 U

Pack	Cat.Nos	**Keyboard support shelves**
		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 19	
		Sets of 2 fixed sliders 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 13	
		19" management panels For organisation and circulation of patch cords Black RAL 9005
		Metal 2 axes, quick-fixing 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	1 U
1	0 465 23	2 U
		Plastic with brushes, snap on
1	0 465 28	1 U
1	0 465 29	2 U
		19" lighting kit
		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	1 U
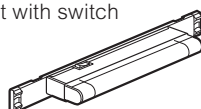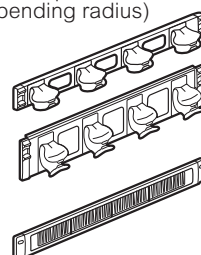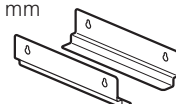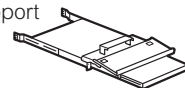
Other equipment and accessories
Customised solutions, p. 129

For other shelves and management panels
p. 118

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
		Double sliding doors 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
		Roof modules 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
		Roof profile 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 - H₂0**
		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**

L7 **legrand**

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

Specific corridor widths

Motorised doors
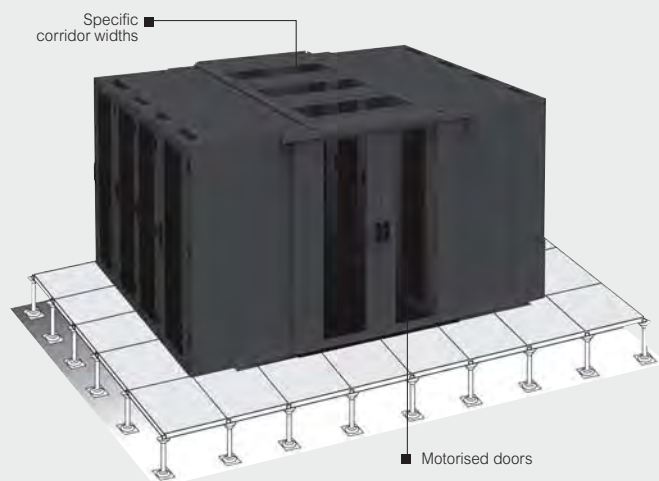
Study of integrating cooling units in the rows

Closed loop

COLD CORRIDOR

COLD CORRIDOR
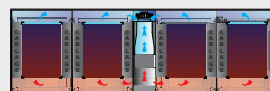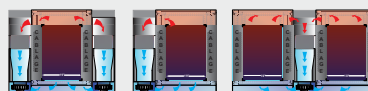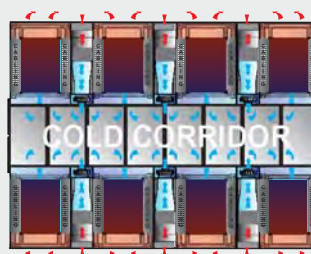
Open loop

Hybrid loop

ENERGY DISTRIBUTION

>>>|

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

- ■ Mesure energy
- Measure environmental parameters ■

COST SAVINGS SECURING UPTIME

- ■ Be informed remotely
- Intervene remotely ■

MONITORING LEVELS ON PDU

3-Outlet monitoring and switching
Usage per server
Reboot server/control access

2-Outlet monitoring
Usage per server

1-Inlet monitoring
Total usage per rack
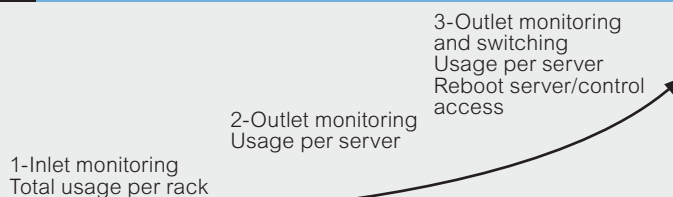
ARCHITECTURE FRAMEWORKS

Integrated "smart module" to the PDU main frame

All in one. Features integrated in the PDU

Web browser

Servers

Data

Power feed

Integrated Smart module in PDU
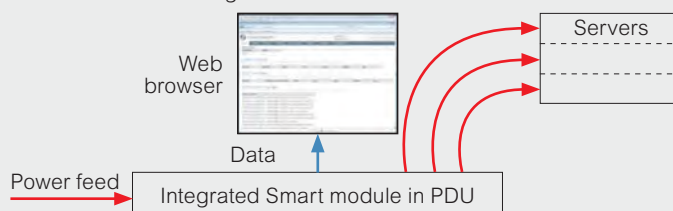
External "smart module" (with or without display) from PDU main frame

For existing installation equipped with basic PDU, upgrade installation by integrating "smart module" on your power feed

Web browser

Servers

Data

Power feed

Smart module → Basic PDU
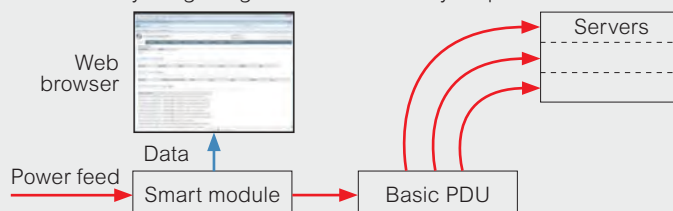
(The "smart module" will powered the Basic PDU)

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

OUR COMMITMENT

Request a quotation from our technical team

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
		Vertical PDU
		Protection of each circuit by circuit breaker with a cover providing protection against accidental breaks - Mounting in LCS² 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
		Single phase 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[1] mm
1	0 465 93	20 x C13 sockets + 4 x C19 sockets Connection on 2.5 - 6 mm² 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
		Three-phase 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[1] 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
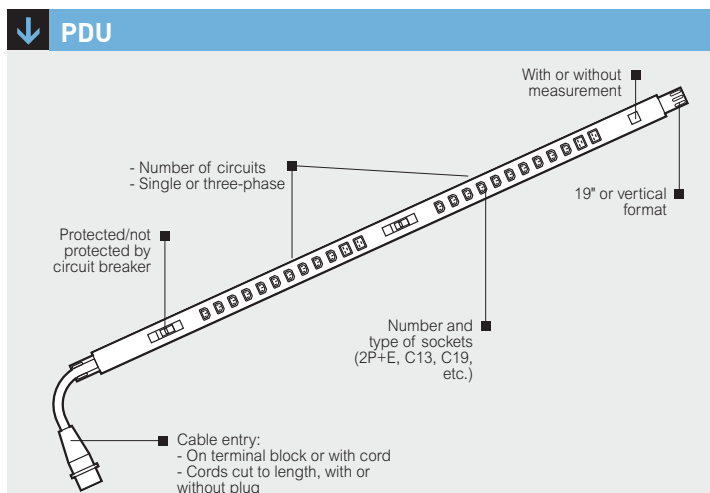
PDU

With or without measurement

- Number of circuits
- Single or three-phase

Protected/not
protected by
circuit breaker

19" or vertical
format

Number and
type of sockets
(2P+E, C13, C19,
etc.)

Cable entry:
- On terminal block or with cord
- Cords cut to length, with or
without plug

OUR COMMITMENT
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131

Smart patching
for fibre and copper

Provides an intelligent and efficient patch management system for complex networks and data centers

>>>

Legrand cabling system LCS²
smart patching for fibre and copper

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3 343 15

3 343 03

3 343 00

3 343 17

3 343 40

3 343 44

- **ANALYSER FOR RFID PATCH PANEL**

- **RFID PATCH CORD** (equipped with a transponder)

- **RFID FO PATCH CORD** (equipped with a transponder)

Pack	Cat.Nos	
		Analyser
		The Analyser acts as an intelligent communications interface between the patch panel/FO drawer and the management system
1	3 343 15	Analyser for RFID patch panels 1 for 30 RFID patch panels
		Patch panel
		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
1	3 343 00	RFID patch panel 24 RJ 45 cat. 6$_A$ STP
		Fibre optic drawer
		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
1	3 343 40	RFID drawer fibre optic OM4 24 LC to be equipped
		RJ 45-RJ 45 cords
		Patch cords (copper) are fitted with RFID transponders at both ends
1	3 343 03	RFID patch cord cat. 6$_A$ S/FTP LSZH 1 m
1	3 343 04	RFID patch cord cat. 6$_A$ S/FTP LSZH 2 m
1	3 343 05	RFID patch cord cat. 6$_A$ S/FTP LSZH 3 m
1	3 343 06	RFID patch cord cat. 6$_A$ S/FTP LSZH 5 m
1	3 343 17	RFID server patch cord cat. 6$_A$ S/FTP LSZH 1 m
1	3 343 18	RFID server patch cord cat. 6$_A$ S/FTP LSZH 2 m
1	3 343 19	RFID server patch cord cat. 6$_A$ S/FTP LSZH 3 m
		Fibre optic cords
		Patch cords (fibre optic) are fitted with RFID transponders at both ends
1	3 343 44	RFID patch cord fibre optic OM4 LC/LC 1 m
1	3 343 45	RFID patch cord fibre optic OM4 LC/LC 2 m
1	3 343 46	RFID patch cord fibre optic OM4 LC/LC 3 m
1	3 343 47	RFID server patch cord fibre optic OM4 LC/LC 1 m
1	3 343 48	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
		BUS connection accessories
1	3 343 30	BUS cable 25 m
1	3 343 31	BUS connector
1	3 343 32	BUS termination
1	3 343 33	BUS connector crimping tool

Visualisation
Consult us

Legrand cabling system LCS²

smart patching for fibre and copper

◼ Schematic explanation

Hardware

BUS

Software

ETHERNET

Analyser

RFID FO drawer
(equipped with
a sensor bar)

RFID

RFID FO patch cord
(equipped with a transponder)

Visualisation

Hardware

BUS

Software

ETHERNET

Analyser

RFID patch panel
(equipped with a
sensor bar)

RFID

RFID patch cord
(equipped with a transponder)

Visualisation
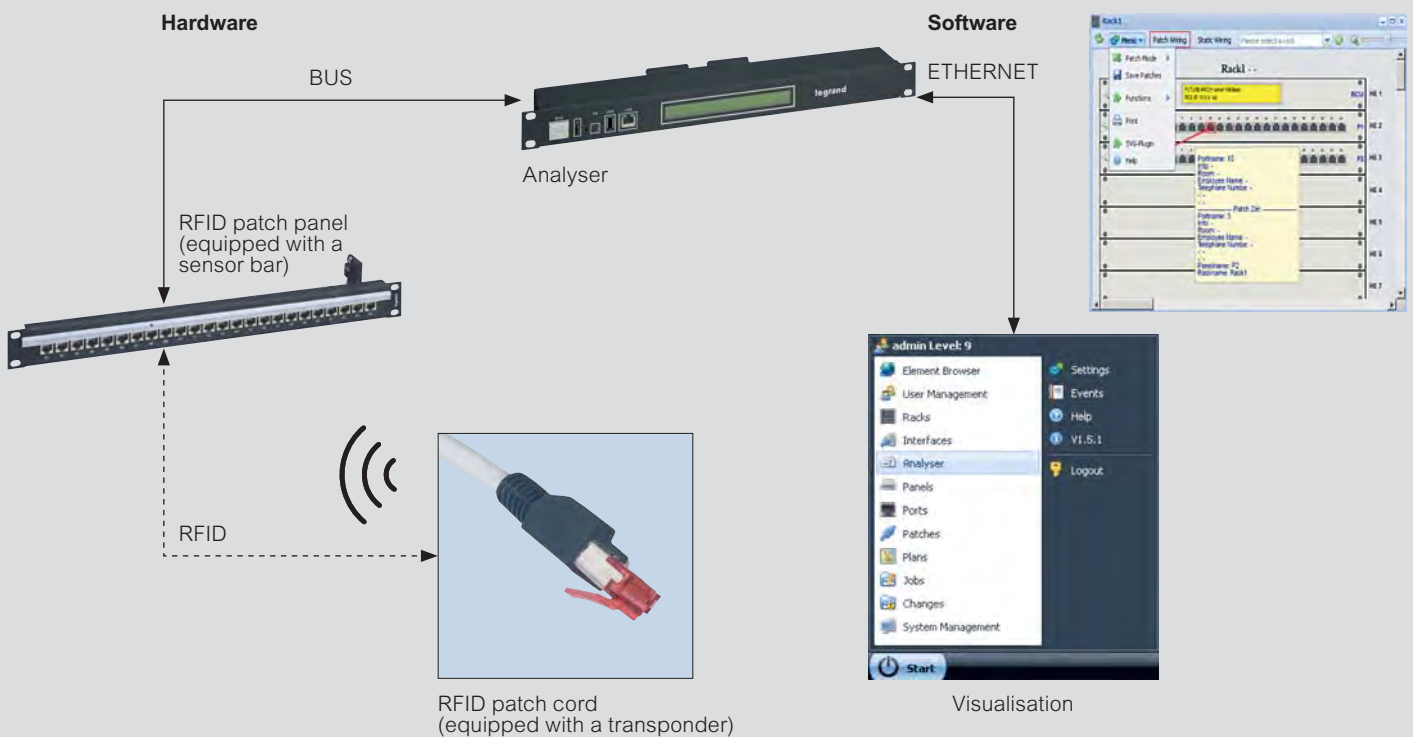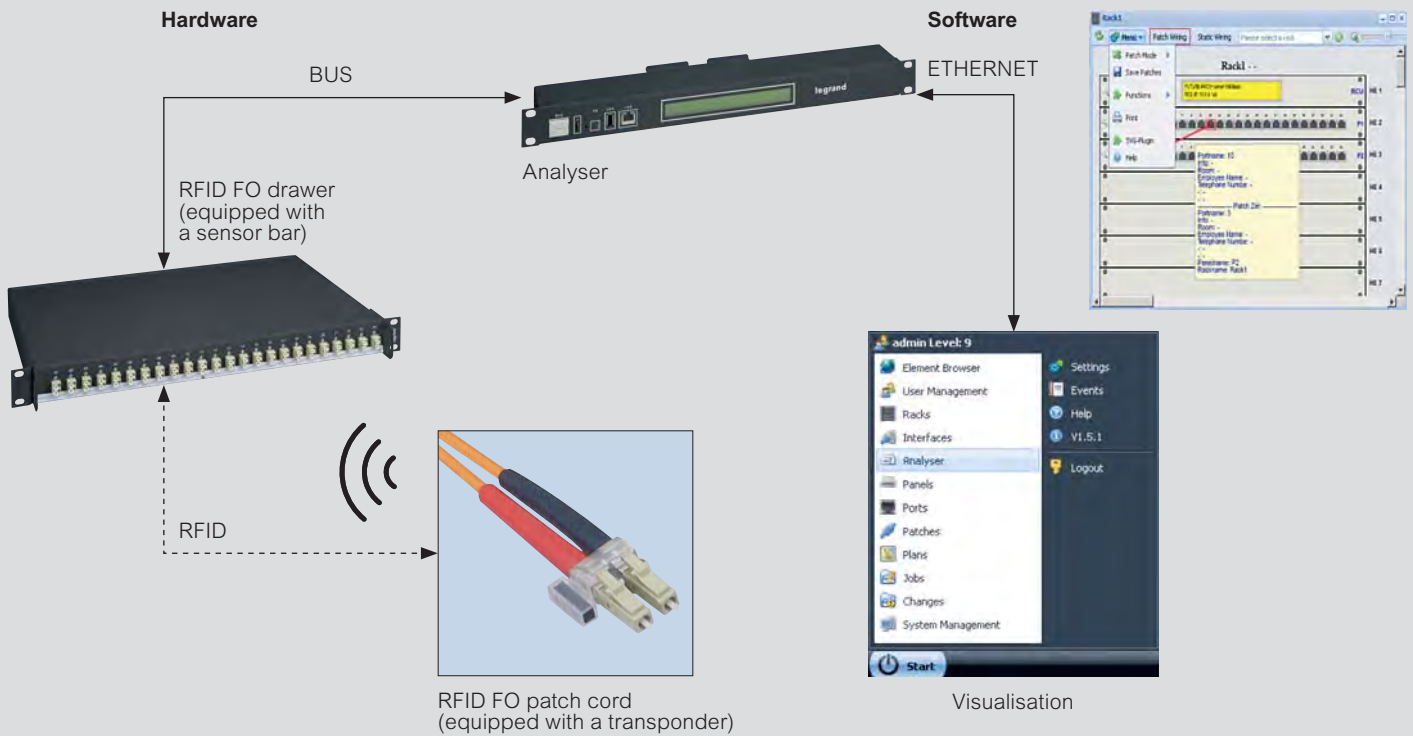
Legrand cabling system LCS²
solution preterminated copper

`Data Center`

Customised solutions
solution preterminated copper

`Data Center`

0 335 50 fitted with 4 preterminated cassettes

0 328 30   0 328 33
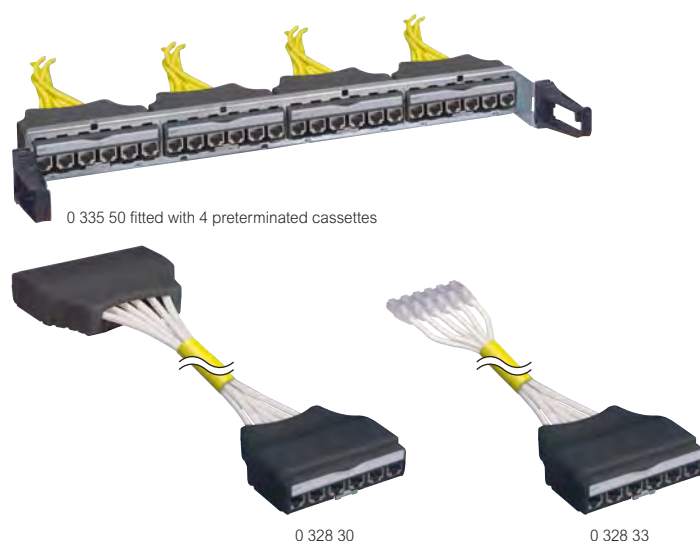
Pack	Cat.Nos	
		Modular high density panel
		Panel specifically for using preterminated cassettes (maximum 4) Fitted with: - a side cord management accessory (does not require the use of feedthrough panels) - soluclip for automatic fixing (no screws) on the cabinet uprights
1	0 335 50	19" panel - 1 U
		Preterminated cassettes
		Clip directly onto panels Cat.No 0 335 50 Links factory tested with test report provided
		Cassette-cassette termination Cat. 6A S/FTP copper band 6 links (trunk)
1	0 328 30	Length 6 m
1	0 328 31	Length 9 m
1	0 328 32	Length 12 m
		Cassette-RJ 45 cord termination Cat. 6A S/FTP copper band 6 links (trunk)
1	0 328 33	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

Termination cassette-cassette

Cassette termination

Cassette-RJ 45 cord termination
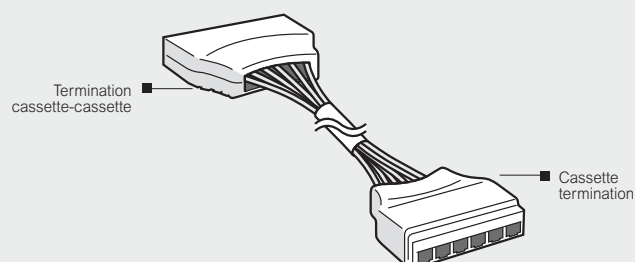
RJ 45 cord termination

Cassette termination
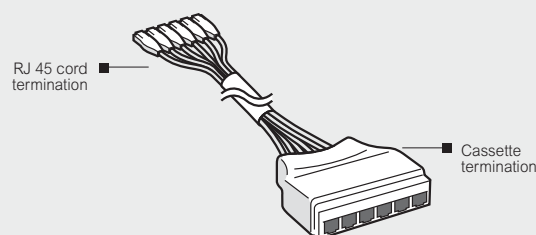
Choose the cord length: 1 to 70 m
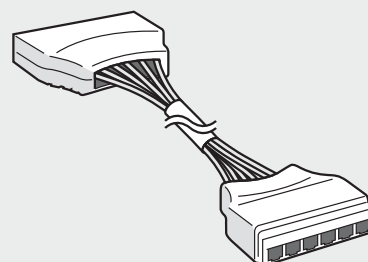
Mount the cassette for the snap on system on the panel
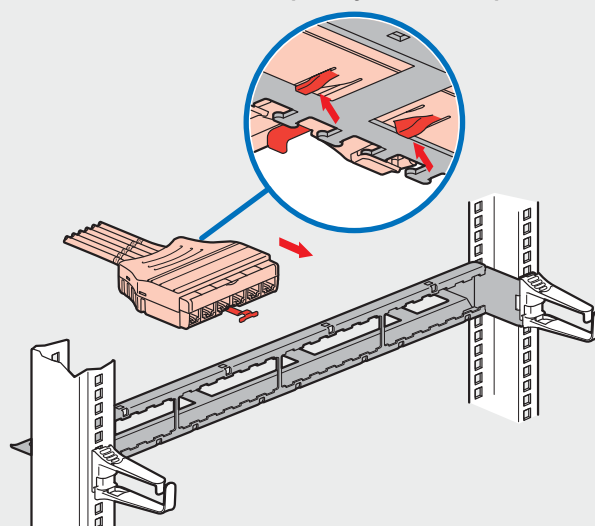
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Legrand cabling system LCS² fibre optic - 19" high density fibre optic drawer

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Legrand cabling system LCS² fibre optic - OM4 cables and cords

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0 326 40

0 326 42

0 326 45   0 326 46

Pack	Cat.Nos	**High density, modular fibre optic drawer**
		Fibre optic drawers with cord management at the front and rear
		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 40	1 U
1	0 326 42	2 U
		Fibre optic drawers without cord management
		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
1	0 326 41	1 U

High Density cassettes[1]

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® high performance cassettes
Low insertion loss < 0.35 dB
A/C polarity

Pack	Cat.Nos	
		OM4 multimode cassettes (50/125 μm)
		For 10 Gigabit Ethernet network
		For 50/125 μm multimode installations, OM4 type
1	0 326 45	MTP Elite® cassette (MPO compatible) 24 x LC fibres OM4 Type A/C
1	0 326 46	MTP Elite® cassette (MPO compatible) 12 x SC fibres OM4 Type A/C
		OS1/OS2 cassettes (9/125 μm)
		For 9/125 μm singlemode installations, OS1/OS2 type
1	0 326 47	MTP Elite® cassette (MPO compatible) 24 x LC fibres OS1/OS2 Type A/C
1	0 326 48	MTP Elite® cassette (MPO compatible) 12 x SC fibres OS1/OS2 Type A/C
		Cover
1	0 326 49	Blanking cassette

1: MTP Elite® is a registered trademark of the US Conec Ltd

MTP connectors

Specifications

	Multimode Elite®	**Singlemode Elite®**
Insertion loss	0.1 dB Typical (all fibres) 0.35 dB Maximum (single fibre)[2][3]	0.1 dB Typical (all fibres) 0.35 dB Maximum (single fibre)[1][4]
Optical return Loss	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
IL MAX/Master (acceptance)	0.15 dB	0.15 dB
IL MAX/Random	0.30 dB	0.25 dB
Ave/Master	0.12 dB	0.08 dB
Ave/Random	0.12 dB	0.10 dB
Return Loss	55/65 dB	-

Maximum length of channel by fibre optic application
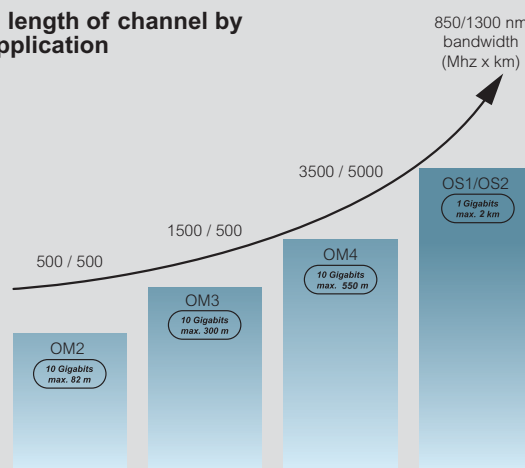
850/1300 nm bandwidth (Mhz x km)

OS1/OS2 — 1 Gigabits max. 2 km — 3500 / 5000
OM4 — 10 Gigabits max. 550 m — 1500 / 500
OM3 — 10 Gigabits max. 300 m — 500 / 500
OM2 — 10 Gigabits max. 82 m

Applications	Multimode			Singlemode
	OM2	OM3	OM4	OS1/OS2
10 Gigabits Ethernet (S/R base)	82 m	300 m	550 m[1]	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
▯ 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

MTP: one single connection to
connect 12/24 fibres instantly
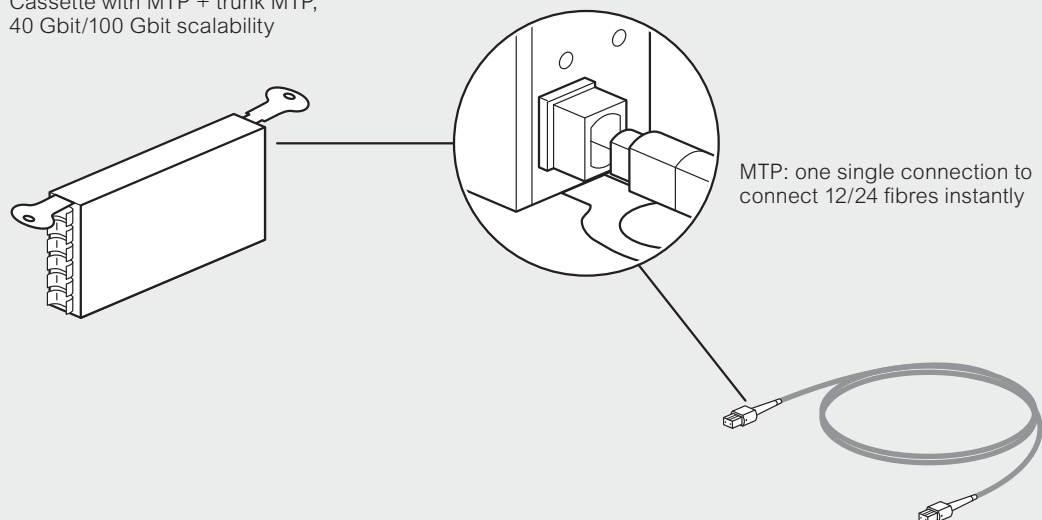
↓ CASSETTE WITHOUT MTP SOLUTION

Cassette without MTP at the back + Terminated MTP or Fan out
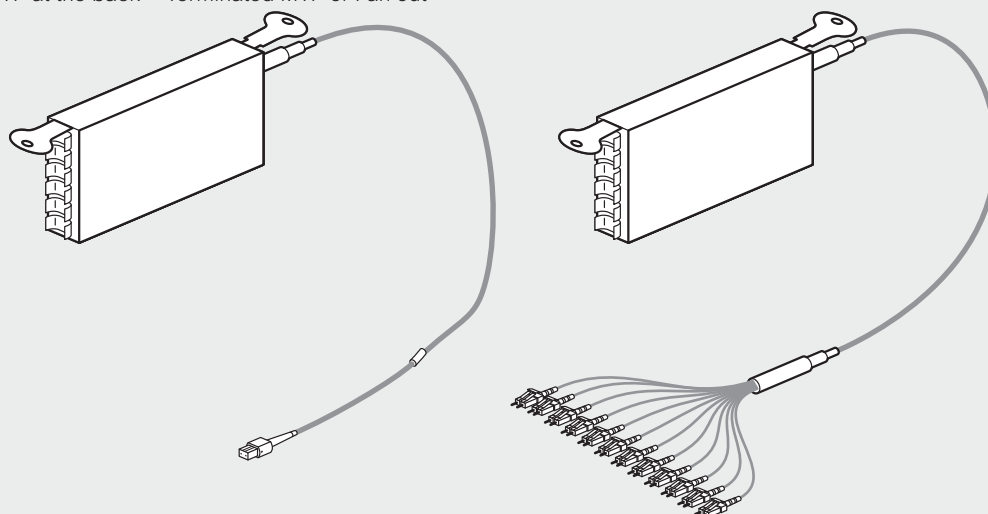
↓ 2 CASSETTES WITHOUT MTP SOLUTION

2 cassettes without MTP at the back terminated together
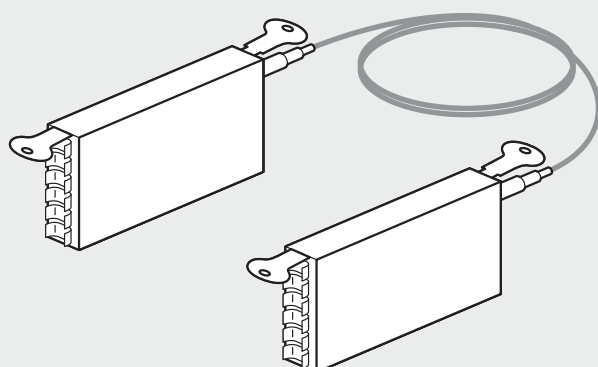
O U R   C O M M I T M E N T

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Legrand cabling system LCS² fibre optic - OM4 cables and cords

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0 325 15

0 326 01   0 326 07

Pack	Cat.Nos	
	Tight buffer 900 µm	**OM4 multimode fibre optic cables (50/125 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

Pack	Loose tube	900 µm Tight buffer	**OS1/OS2 singlemode fibre optic cables (9/125 µm)**
			For 9/125 µm singlemode installations (OS1) Yellow jacket
2000[1]	0 325 12	-	Indoor/outdoor (universal) 6 fibres
2000[1]	0 325 13	-	Outdoor, corrugated steel tape 6 fibres
2000[1]	0 325 14	0 325 50	Indoor/outdoor (universal) 12 fibres
2000[1]	0 325 15	-	Outdoor, corrugated steel tape 12 fibres
2000[1]	0 325 51	-	Indoor/outdoor (universal) 24 fibres

Pack	Cat.Nos	
		OM4 multimode optical cords (50/125 µm)
		10 Gigabit Ethernet compliant
		Max. optical losses: 0.3 dB
		For 50/125 µm multimode installations, OM4 type. Blue sheaths
		SC/SC duplex cords
3	0 326 30	Length: 1 m
3	0 326 31	Length: 2 m
3	0 326 32	Length: 3 m
		LC/LC duplex cords
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	
		OS1/OS2 (UPC) Singlemode fibre optic cords
		Max. optical losses: 0.3 dB
		For OS1 9/125 µm singlemode installations, OS2 to OS1 type. Yellow sheaths
		SC/SC duplex cords
3	0 326 00	Length: 1 m
3	0 326 01	Length: 2 m
3	0 326 02	Length: 3 m
		SC/LC duplex cords
3	0 326 03	Length: 1 m
3	0 326 04	Length: 2 m
3	0 326 05	Length: 3 m
		LC/LC duplex cords
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

LCS² 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

0 787 77

0 787 78

0 787 70

0 787 99

Female HD15 sockets

Used to transmit analogue video streams (VGA, XGA, UXGA depending on graphic card) between a source (computer) and a compatible receiver (video projector, TV, etc)

Preterminated sockets - 1 module
Equipped with cord, length 15 cm

Pack	Mosaic	Arteor	
1	0 787 77	5 720 97	○ White
1	0 793 77	-	◐ Aluminium
1	-	5 725 97	● Magnesium

Screw-type female HD15 sockets - 2 modules

Pack	Mosaic	Arteor	
1	0 787 57	5 722 82	○ White
1	0 792 57	-	◐ Aluminium
1	-	5 727 82	● Magnesium

Screw-type female HD15 sockets 2 modules + 3.5 mm Jack

Pack	Mosaic	Arteor	
1	0 787 74	5 722 88	○ White
1	-	5 727 88	● Magnesium

Solder-type female HD15 sockets 1 module
15 pin

Pack	Mosaic	Arteor	
1	0 787 72	5 722 79	○ White
1	-	5 727 79	● Magnesium

HDMI type A sockets

Used to transmit high-definition digital audio/video streams between a source (computer, HD-DVD drive, etc) and a compatible receiver (TV, video projector, etc)

Preterminated sockets HDMI 1.4 - 1 module
Equipped with cord, length 15 cm

Pack	Mosaic	Arteor	
1	0 787 78	5 720 96	○ White
1	0 793 78	-	◐ Aluminium
1	-	5 725 96	● Magnesium

Screw-type sockets HDMI 1.3 - 2 modules

Pack	Mosaic	Arteor	
1	0 787 68	5 722 81	○ White
1	0 792 75	-	◐ Aluminium
1	-	5 727 81	● Magnesium

Jack sockets 3.5 mm

3.5 mm Jack connectors can be used to create audio/video links

Preterminated sockets - 1 module
Equipped with cord, length 15 cm

Pack	Mosaic	Arteor	
1	0 787 79	5 720 91	○ White
1	0 793 79		◐ Aluminium
1	-	5 725 91	● Magnesium

4 screw-type female 3.5 mm Jack socket - 1 module

Pack	Mosaic	Arteor	
1	0 787 64	5 722 74	○ White
1	0 792 64	-	◐ Aluminium
1	-	5 727 74	● Magnesium

Solder-type female 3.5 mm Jack socket - 1 module

Pack	Mosaic	Arteor	
1	0 787 73	5 722 78	○ White
1	-	5 727 78	● Magnesium

HD15 + 3.5 mm Jack amplifier

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

Pack	Mosaic	Arteor	
1	0 787 70	5 723 70	○ White

Infrared ON/STANDBY control

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

Pack	Mosaic	Arteor	
1	0 787 99	5 720 89	○ White

Display port sockets

Used to transmit high-definition digital audio/video streams between a source (laptop, computer, etc) and a compatible receiver (video projector, TV, etc

Preterminated socket - 1 module
Equipped with cord, length 15 cm

Pack	Mosaic	Arteor	
1	0 787 91	5 720 90	○ White
	-	5 725 90	● Magnesium

Patch panels, cables and cords
See p. 141

0 787 52	0 787 71	0 792 55	0 787 60	0 787 50	0 787 76

Pack	Cat.Nos		Female 1 RCA sockets
	Mosaic	Arteor	Provides the composite video link for any peripheral device such as a DVD drive, camera, video recorder, etc 1 module
1	0 787 52	-	○ White

Female 2 RCA socket

Provide the stereo audio link for any peripheral device such as a DVD drive, camera, video recorder
1 module

Preterminated
Equipped with a 15 cm cord

Pack	Mosaic	Arteor	
1	0 787 47	5 720 92	○ White
1	-	5 725 92	● Magnesium

Connection via screw terminals

1	0 787 53	5 722 72	○ White
1	-	5 727 72	● Magnesium

Female 3 RCA socket

Provide the composite video and stereo audio links for any peripheral device such as a DVD drive, camera, video recorder, videoconferencing, etc
1 module

Preterminated
Equipped with a 15 cm cord

Pack	Mosaic	Arteor	
1	-	5 720 93	○ White
1	-	5 725 93	● Magnesium

Connection via screw terminals

1	0 787 54	5 722 73	○ White
1	0 792 54	-	● Aluminium
1	-	5 727 73	● Magnesium

Other audio and video sockets

DVI-I socket - 2 modules
Used to transmit high-definition digital video streams between a source (computer) and a compatible receiver (TV, Video projector, etc)

Pack	Mosaic	Arteor	
1	0 787 71	-	○ White

Female BNC 75 socket - 1 module
Provides the composite video link for any peripheral device such as a DVD drive, camera, video recorder, etc

1	0 787 58	5 722 76	○ White
1	-	5 727 76	● Magnesium

Pack	Cat.Nos		Audio sockets
	Mosaic	Arteor	

XLR 3-pin - 2 modules
Provides the stereo link for microphone, amplifier, mixing console, etc
Recommended cable: 1 audio pair 0.14 mm^2 to 0.5 mm^2 shielded
Max. cable length: 50 m (without amplifier)

1	0 787 55	5 722 83	○ White - Fast screw connection female
1	0 792 55	-	● Aluminium - Fast screw connection female
1	-	5 727 83	● Magnesium - Fast screw connection female
1	0 787 56	5 722 77	○ White - Fast screw connection male
1	-	5 727 77	● Magnesium - Fast screw connection male

4-pole Speakon - 2 modules
Used to connect power enclosures
Recommended cable: 2 audio pairs 4 mm^2 max.
Max. cable length: 50 m (without amplifier)

1	0 787 60	-	○ White

Loudspeakers sockets
Terminal 4 mm^2

10	0 787 51	5 722 80	○ White - 2 modules
10	-	5 727 80	● Magnesium - 2 modules
10	0 787 50	5 722 70	○ White - 1 module
10	0 792 50	-	● Aluminium - 1 module
10	-	5 727 70	● Magnesium - 1 module

100 V Line Volume Attenuators - 2 modules
Used to adjust power and volume of a 100 V loudspeaker line

1	0 787 76	5 722 84	○ White - 100 V - 25 W
1	-	5 727 84	● Magnesium - 100 V - 25 W

0 335 98

0 335 96

0 335 97

0 335 99

0 517 23

0 517 24

Pack	Cat.Nos	**19" patch panels**
		Used to distribute the audio/video signal
		Equipped with marked connectors
		19" female 1 U metal panels
1	0 335 98	HD15 19" panel - 12 connectors
1	0 335 97	HDMI 19" panel - 16 connectors
1	0 335 96	XLR 19" panel - 16 connectors
1	0 335 99	SUBD9 19" panel - 12 connectors
		Cords
		For connecting a socket to a terminal
1	0 517 23	**HD15 cord** Length 10 m. For connecting an HD15 socket to a video terminal (PC, video projector, etc)
1	0 517 22	**HD15 cord + 3.5 mm Jack** Length 2 m For connecting an HD15 video socket and a 3.5 mm audio Jack to a terminal (PC, video projector)
		HDMI 1.4 cord For connecting an HDMI socket to an audio/video terminal (plasma screen, DVD player, home cinema, games console, etc) For use over a distance of more than 10 m, use the HDMI booster Cat.No 0 779 30
1	0 517 26	Length 1.5 m
1	0 517 27	Length 5 m
1	0 517 20	Length 10 m
1	0 779 30	**HDMI booster** 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	**XLR cord** Length 10 m. For connecting an XLR socket to an audio peripheral (microphone, amplifier, etc)
1	0 517 25	**9-way SUB-D cord** Length 10 m. For RS 232 serial connection (printer, machine screen, etc)

APRIL 2014

Pack	Cat.Nos	**Cables**
		For connecting 2 sockets a long distance apart
1	0 327 81	**VGA cables** Length 20 m For full pin connection of HD15 sockets over distances of up to 20 m
1	0 327 80	**HDMI cables** Length 20 m For connecting HDMI sockets over distances of up to 10 m

0 789 09   0 789 10

Pack	Cat.Nos		

Media Hub

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

Pack	Mosaic	Arteor	
		JUNE 2014	
1	-	5 720 68	○ White
1	-	5 725 68	● Magnesium

HD15 video kit

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

Mosaic	Arteor
JUNE 2014	
0 787 97	5 720 24

1   ○ White

Audio/video HD15+3.5 mm Jack amplifier kit

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

Mosaic	Arteor
JUNE 2014	
0 787 98	5 720 25

1   ○ White

Pack	Cat.Nos		

Audio/video multi-participant transmitter HD15+3.5 mm Jack

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

Mosaic	Arteor
JUNE 2014	
0 789 09	5 720 26

1

Audio/video multi-participant receiver HD15+3.5 mm Jack

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

Mosaic	Arteor
JUNE 2014	
0 789 10	5 720 27

1

■ **HD15 video kit (Cat.Nos 0 787 97 / 5 720 24)**

HD15 cord
2m

HD15 cord
2m

HD15 cord male/male - 15 m

Female HD15
preconnected socket

Push-button

Videoprojector
switch

Female HD15
preconnected socket

— Video on HD15

■ **Audio/video HD15+3.5 mm Jack amplifier kit (Cat.Nos 0 787 98 / 5 720 25)**

HD15 + Jack cord
2m

230 VAC

HD15 + Jack cord
2m

RJ 45 patch cord (not included)
U/UTP or F/UTP - Cat. 5e or 6

Transmitter HD15 + Jack

Receiver HD15 + Jack   Power supply

Push-button

Videoprojector
switch

— Audio and video on HD15+Jack
— Audio and video on RJ 45 patch cord
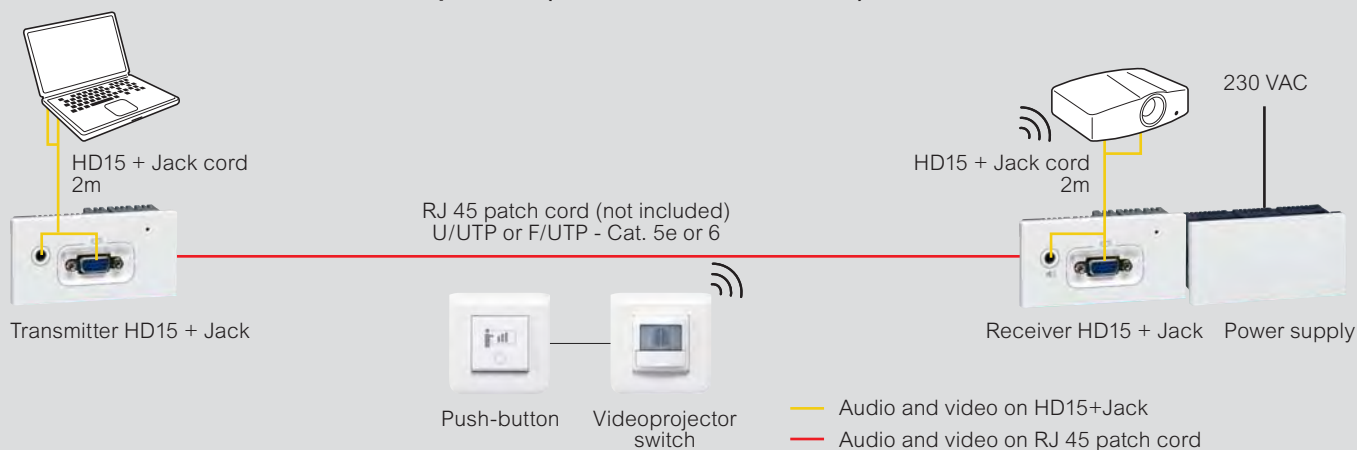
■ **Audio/video HD15+3.5 mm Jack multiparticipant transmitter (Cat.Nos 0 789 09 / 5 72 026) and receiver (Cat.Nos 0 789 10 / 5 720 27)**

230 VAC

HD15 + Jack cord
2m

RJ 45 patch cord
(not included)
U/UTP or F/UTP
Cat. 5e or 6

Possibility of
adding
additional
transmitters
(unlimited)

Transmitter
HD15 + Jack

Transmitter
HD15 + Jack

Receiver HD15 + Jack   Power supply

Shutter button control

— Audio and video on HD15+Jack
— Audio and video on RJ 45 patch cord
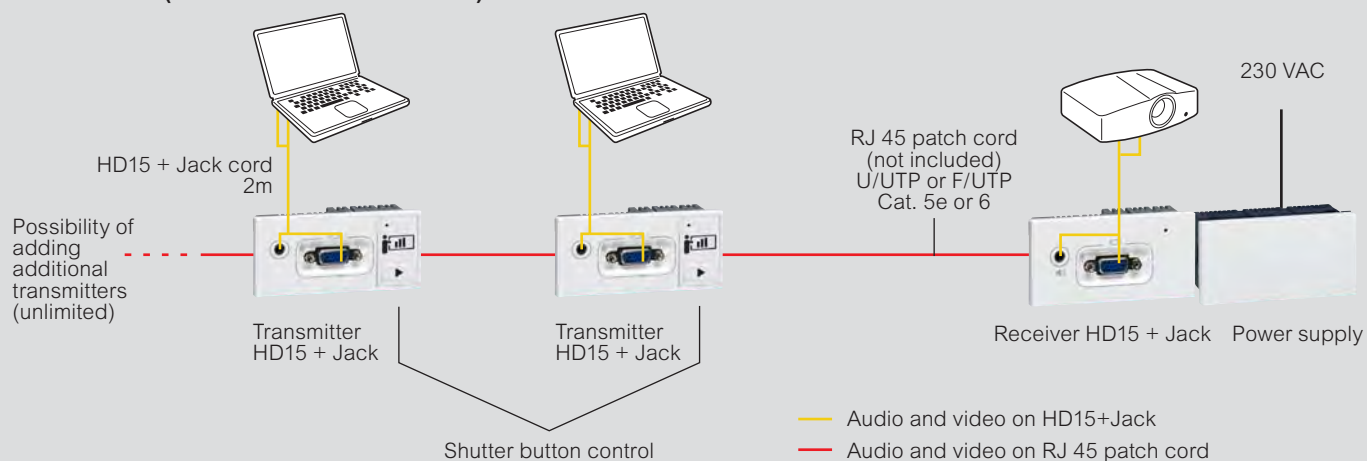
Legrand cabling system LCS²

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

Table 2
- RJ 45 panel
- Copper/optical fibre switch
- Optical fibre drawer

Table 1
- Optical fibre drawer
- Copper/optical fibre switch
- RJ 45 panel

RJ 45 sockets
Electrical signal
Copper/optical fibre converter
Optical signal
Copper/optical fibre converter
Electrical signal
RJ 45 sockets

— : Optical link
— : Copper link
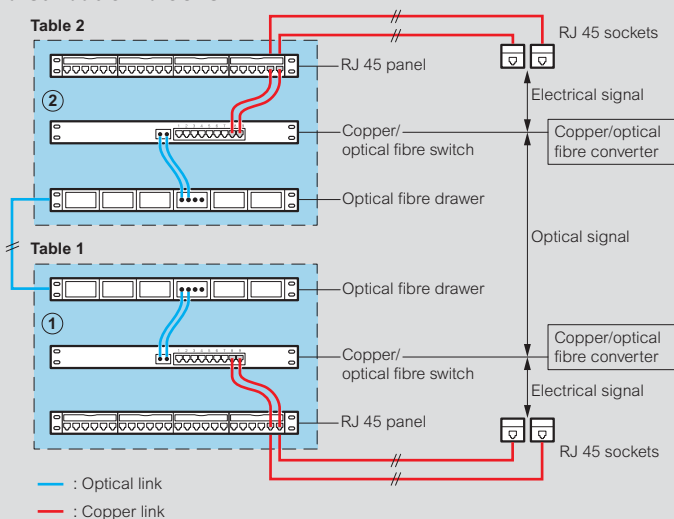
■ Maximal length of channel by fibre optic application
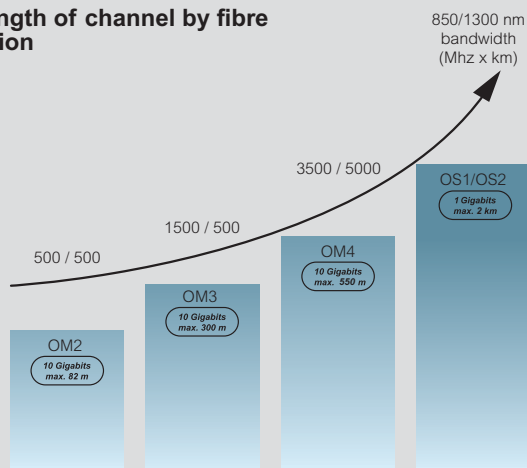
850/1300 nm bandwidth (Mhz x km)

OS1/OS2 — *1 Gigabits max. 2 km*
OM4 — *10 Gigabits max. 550 m*
OM3 — *10 Gigabits max. 300 m*
OM2 — *10 Gigabits max. 82 m*

3500 / 5000
1500 / 500
500 / 500

Applications	Multimode			Singlemode
	OM2	OM3	OM4	OS1/OS2
10 Gigabits Ethernet (S/R base)	82 m	300 m	550 m(1)	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 LCS² systems with standards and certifications

LCS² 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 LCS² 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 E$_A$ link class of the LCS² system also conforms with amendment 1 (04/2008) of standard ISO 11801 and its components conform with amendment 2
LCS² systems are certified by expert independent laboratory 3P

■ Main characteristics of LCS² systems

	LCS² 6$_A$		LCS² 6		LCS² 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

Shielding of twisted pairs
Cable shielding
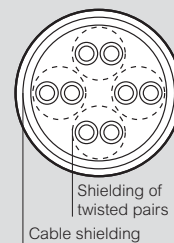
■ **Zone distribution boxes**

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_A
- 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

49.8 · 352 · 137.1 · 166
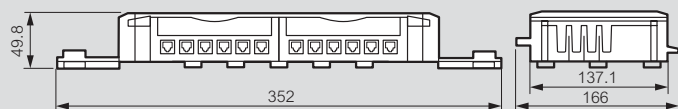
Performance
Maximum recommended lengths of links to ensure high performance of the systems with the use of RJ 45 sockets with copper feedthroughs and/or RJ 45 sockets

	Associated lengths (m)		
	Cords	**Cables**	**Links**
Cat. 6_A	8 15 20	70 60 55	78 75 75
Cat. 6	8 15 20	70 60 55	78 75 75
Cat. 5e	8 15 20	75 65 60	83 80 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

7 lines in reserve
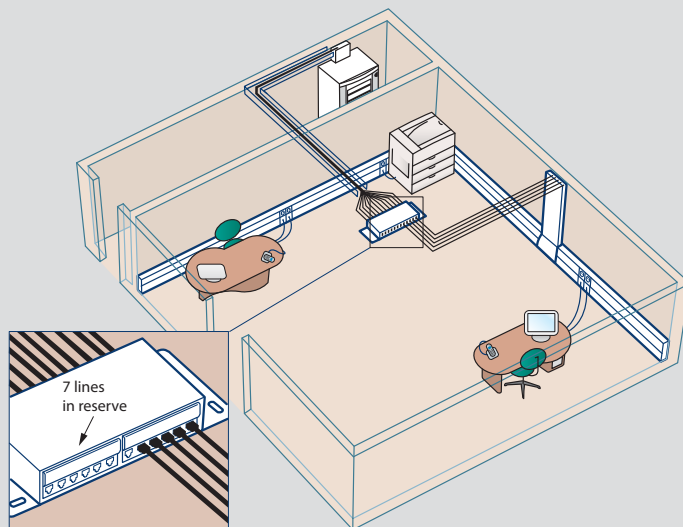
Connection to additional RJ 45 sockets is done by adding RJ 45 - RJ 45 cords between the unit and the RJ 45 sockets with copper feedthrough

1 line in reserve
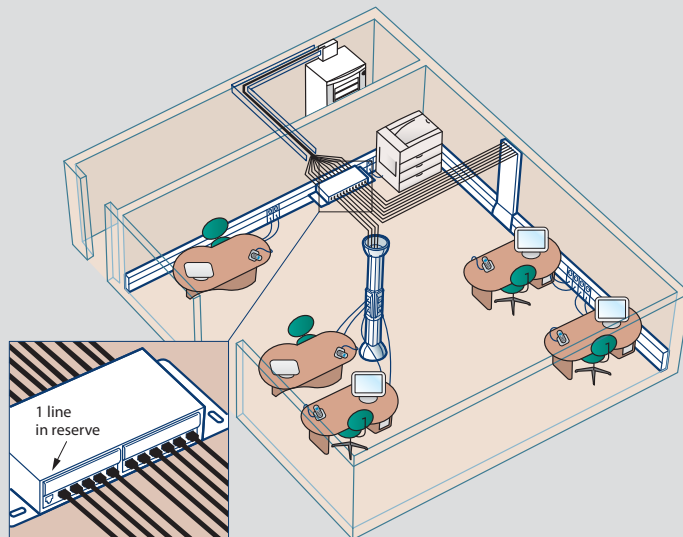
■ Flush-mounting 10/100 Base-T Ethernet switches

	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	• Operating temperature: from 0°C to +40°C • Max. permissible humidity level: 95% • Auto MDI-X (takes crossed and straight cords) • Orange LED: - on: speed of 100 Mbps - off: speed 10 Mbps • Green LED on: traffic	

■ 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 m² 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

RJ45 Connector

PoE injector

230 V

Switch

230 V
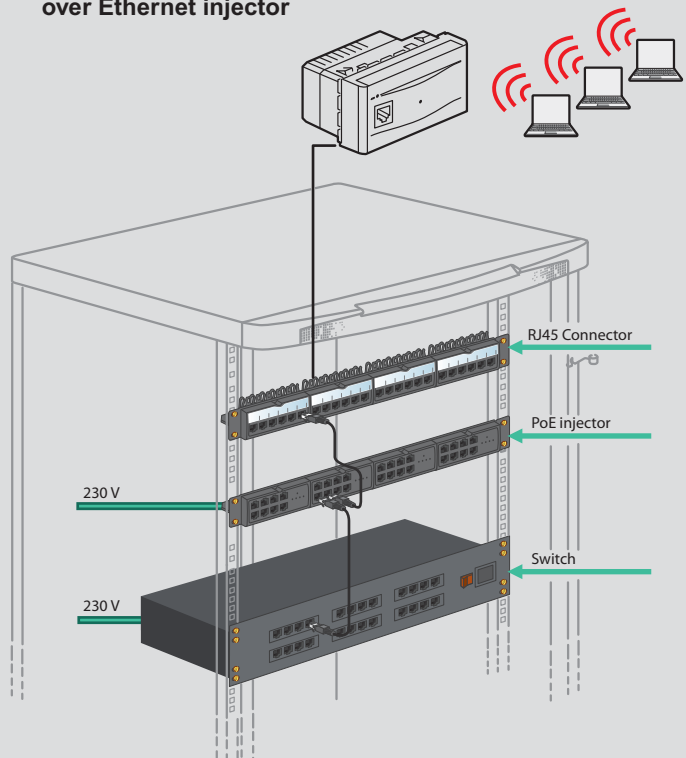
Particular case of the 1 port PoE: Clips directly onto a port on any patch panel A single cord is necessary to connect it to a port on the switch

PoE injector

4 x RJ 45 connector unit
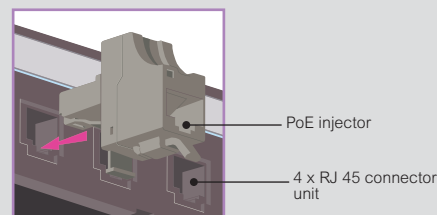
■ Operation of PoE injector

A PoE injector has one input and one output per access point to be supplied

Incoming switch: data

Power supply 48 V

Outgoing cable to patch panel: Data + power supply

⸺ : Data
⸺ : Power

Pair 2
Pair 3   Pair 1   Pair 4

1 2 3 4 5 6 7 8

Twisted pairs cable exiting from the PoE carries power (48 V) to feed the data
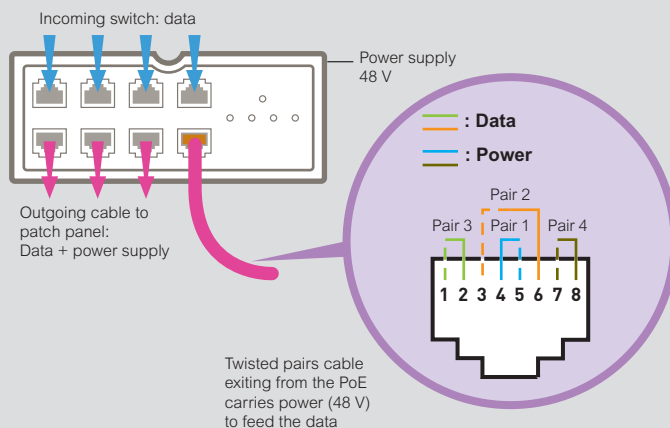
■ Legrand services

The Relations Pro[1] 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 LCS²

LCS² 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

LCS² cabinets comply with the following standards:

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

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

EN 50173-1	Information technology - Generic cabling systems
EN 50174-1 and 2 **C 90-480-1 and 2**	Information technology - Cabling installation
ISO IEC 11801	Information technology - Generic cabling for customer premises
NF C 15-100 **Part 4-41**	Low voltage electrical installations - Recommendations
IEC 60364-4-41	Low voltage electrical installations - Protection for safety - Protection against electric shock

■ Overall dimensions (mm)
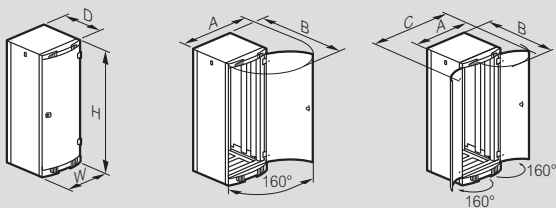
Single front door cabinets

Cat.Nos	Capacity	H(1)	W	D	A	B
0 463 00	24 U	1226				
0 463 06	29 U	1448		659	1138	1208
0 463 12	33 U	1626	610			
0 463 18/30						
0 463 19				859		1408
0 463 21	42 U	2026		657		
0 463 22/33			810	857	1525	1608
0 463 23				1057		1808
0 463 28	47 U	2248		857		1608
0 463 29				1057		1808

Double front door cabinets

Cat.Nos	Capacity	H(1)	W	D	A	B	C
0 463 41				657		815	
0 463 42	42 U	2026	810	857	1165	1015	1535
0 463 43				1057		1215	

Server cabinets

Cat.Nos	Capacity	H(1)	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
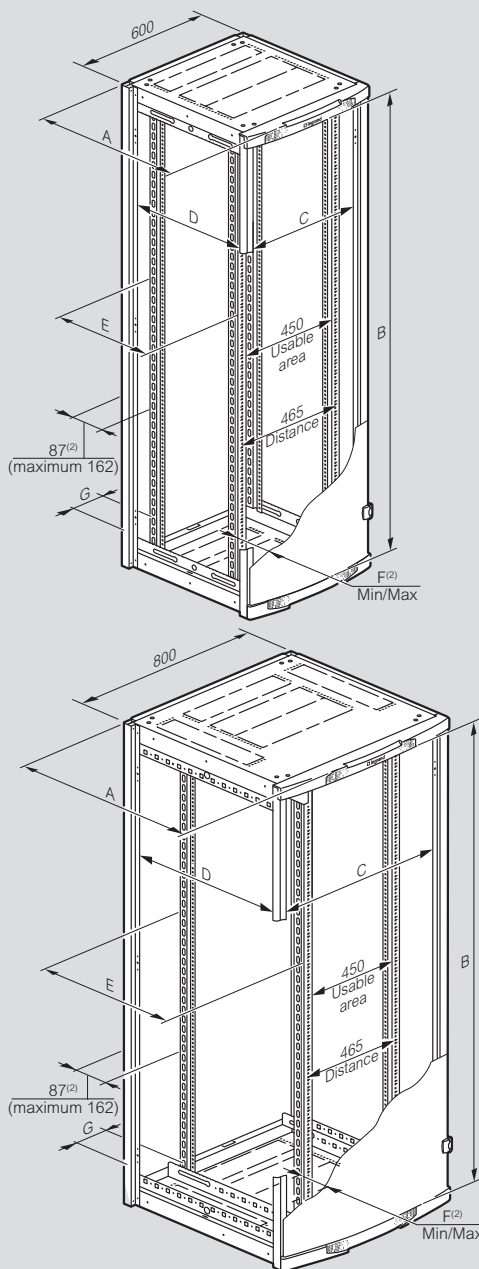
2: Continuous adjustment with adjustments in widths of 12.5 mm

Single front door cabinets

Cat.Nos	Capacity	A	Usable area			E	F(2)		G
			B	C	D		Min.	Max.	
0 463 00	24 U		1086						
0 463 06	29 U	659	1308	490	490	425	118	193	41
0 463 12	33 U		1486						
0 463 18/30									
0 463 19			859		690	625			
0 463 21	42 U		657	1886	490	425			
0 463 22/33			857		690	625	122	197	141
0 463 23			1057		890	825			
0 463 28	47 U		857	2108	690	625			
0 463 29			1057		890	825			

Double front door cabinets

Cat.Nos	Capacity	A	Usable area			E	F(2)		G
			B	C	D		Min.	Max.	
0 463 41		657			490	425			
0 463 42	42 U	857	1886	690	690	625	122	197	141
0 463 43		1057			890	825			

Server cabinets

Cat.Nos	Capacity	A	Usable area			E	F(2)		G
			B	C	D		Min.	Max.	
0 463 85	42 U	1086	1886	490	890	825	75	150	41
0 463 86		1096		690					141

■ LCS² 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	2 U / 3 U / 3 U	2 U / 3 U / 3 U
Depth 800	2 U / 3 U / 3 U	2 U / 3 U / 3 U
Depth 1000	-	2 U / 3 U / 3 U

■ LCS² 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	2 U / 3 U / 3 U / 3 U	
Width 800	2 U / 3 U / 3 U / 3 U	

■ 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
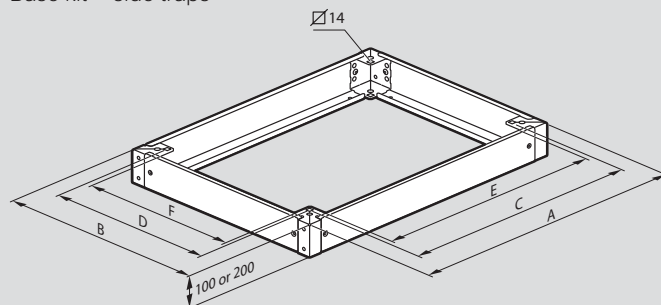
Cabinet dim. Width x Depth	Overall		Mounting		Usable area	
	A	**B**	**C**	**D**	**E**	**F**
600 x 600	599	599	478	478	449	449
600 x 800	599	799	478	678	449	649
800 x 600	799	599	678	478	649	449
800 x 800	799	799	678	678	649	649
600 x 1000	599	999	478	878	449	849
800 x 1000	799	999	678	878	649	849

■ Linking interface (mm)

Left or right assembly of a cabinet fitted with a 200 mm high base
Reversible interface cover
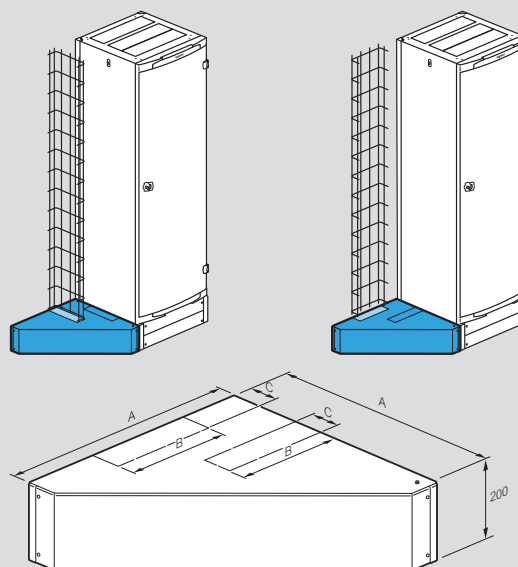
Cabinet dim. Depth	A	B	C
600	595	435	120

Legrand cabling system LCS²

LCS² cabling and server cabinet accessories

■ Adjustable height plinths

Set of
2 lateral
tile support
brackets
Cat.Nos
0 464 38/
39/40
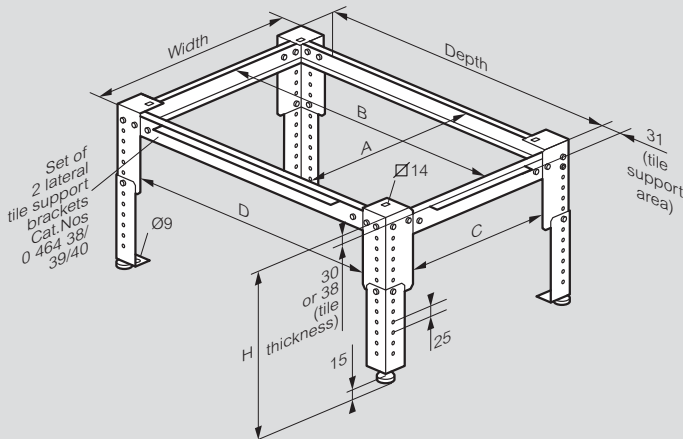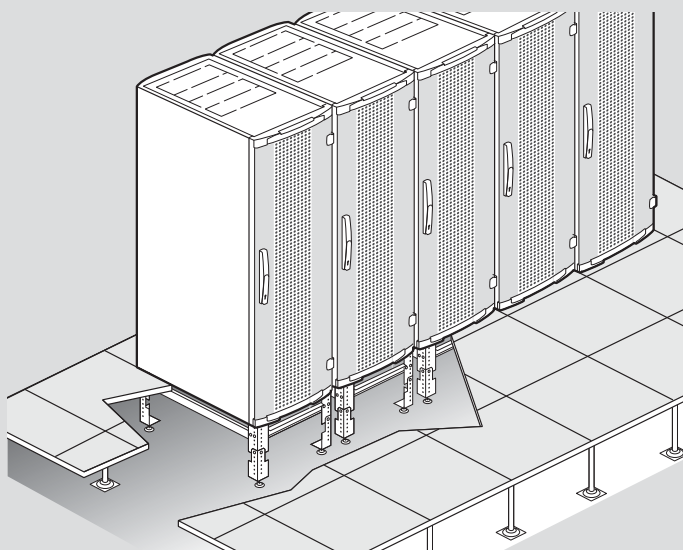
Cat.Nos	Width x Depth	H[1]		Usable area				Distance (width x depth)	
		Min.	Max.	A	B	C	D	With cabinet	To the ground
0 464 30	**600 x 600**	200	350	530	530	435	435	478 x 478	520 x 520
0 464 31	**600 x 800**				730		635	478 x 678	520 x 720
0 464 32	**600 x 1000**				930		835	478 x 878	520 x 920
0 464 33	**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

Cat.No 0 464 78

Cat.No 0 464 79
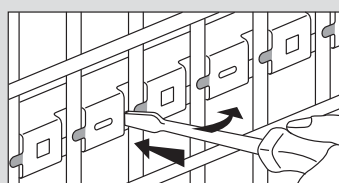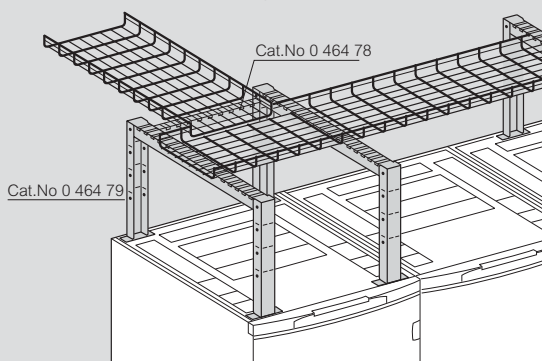
Cable guides can be installed
quickly on the supports
Cat.Nos 0 464 72/73/74/78/79

■ 19" plates with fans (mm)
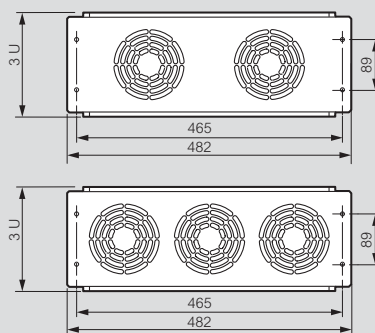
Cat.Nos	Ventilation zone	
	Number of fans	Output (m³/h)
0 464 87	2	180
0 464 88	3	270

■ Shelves (mm)
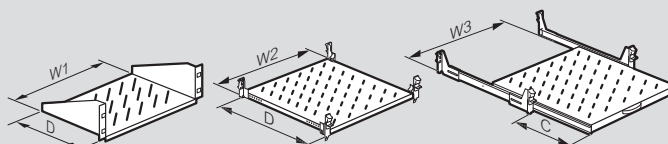
Cat.Nos	D	Usable width			C
		W1	W2	W3	
0 462 23[1]	120	216			
0 465 00	115	435			
0 465 01	200	435			
0 465 02	360	435			
0 465 05	425		440		
0 465 06	625		440		
0 465 07	825		440		
0 465 08	425			425	320
0 465 09	625			425	420
0 465 10	625			425	420
0 465 17	820		425		
0 465 18	820			380	650

1: Fixing centre 236.5 mm

■ Keyboard support shelf (mm)

■ PDU support

1: For PDU with button mounting
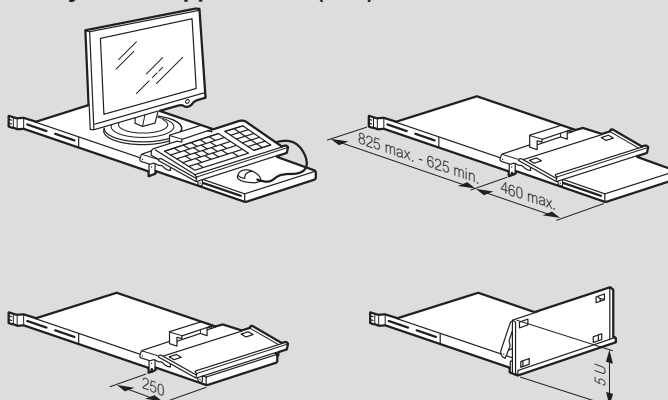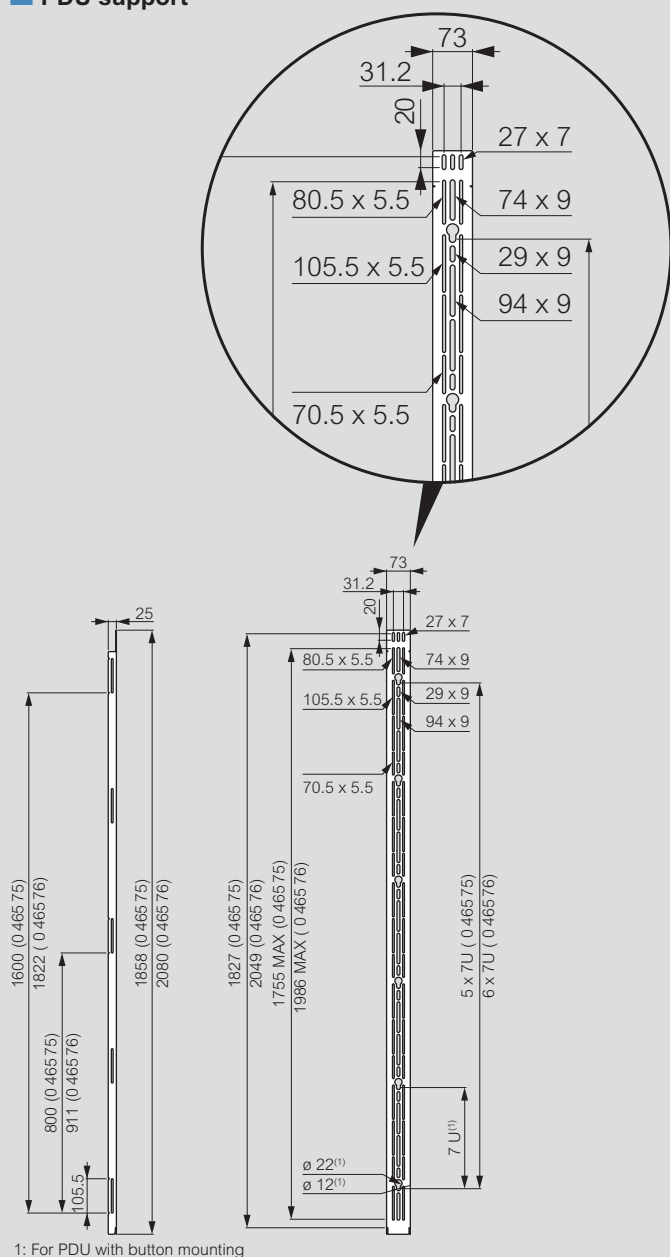
■ 19" Racks

Permissible load: 15 kg/U

0 464 06

0 464 07
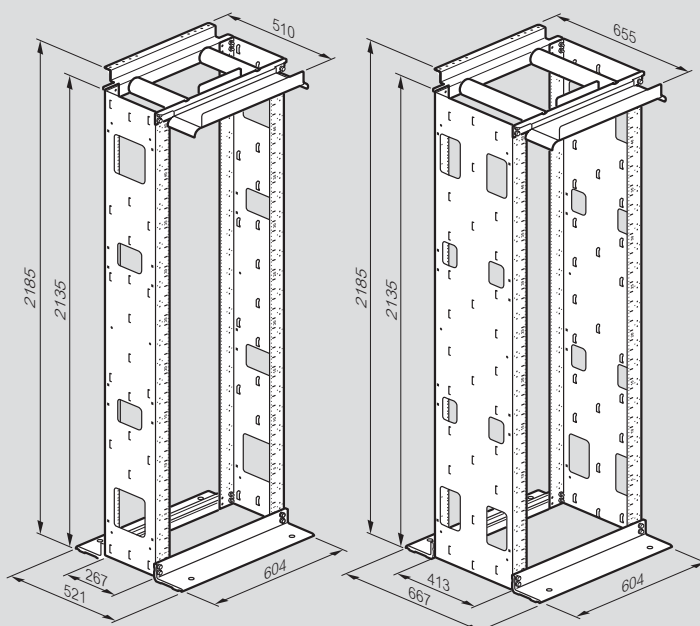
■ Cord management grids

0 464 25 **0 464 26** **0 464 27**
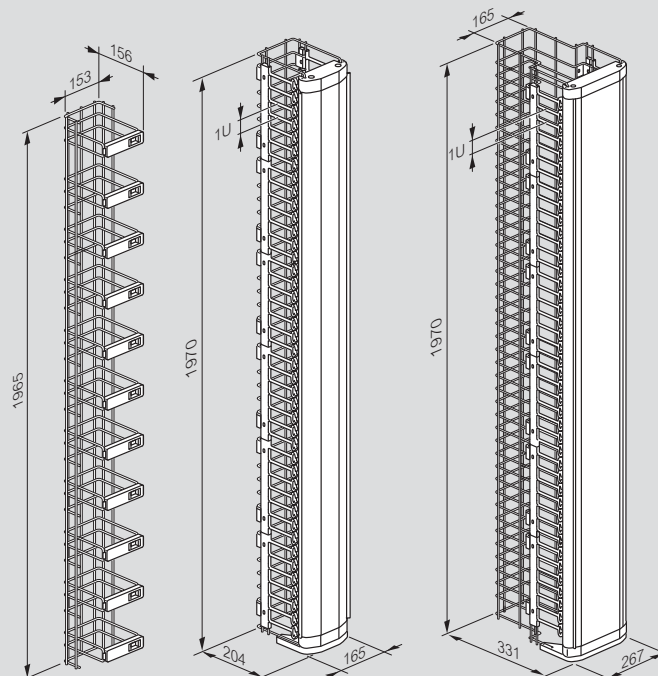
◾ 0 464 25

Swing latch replacement installation

Installation can be either right or left hand swing out

◾ 0 464 26/27

Bend limiting clips

1U
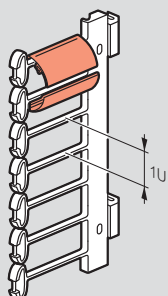
Cord coiling support
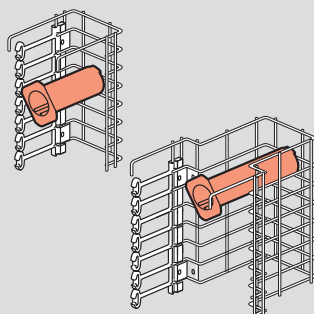
◾ Joining racks with grid

0 464 25/26

63 mm

0 464 27

165 mm
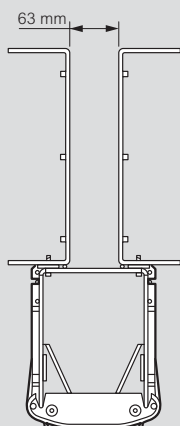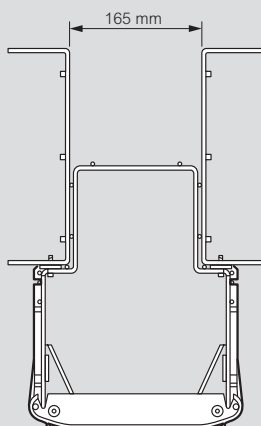
◾ Cable tray support
0 464 18/19

45
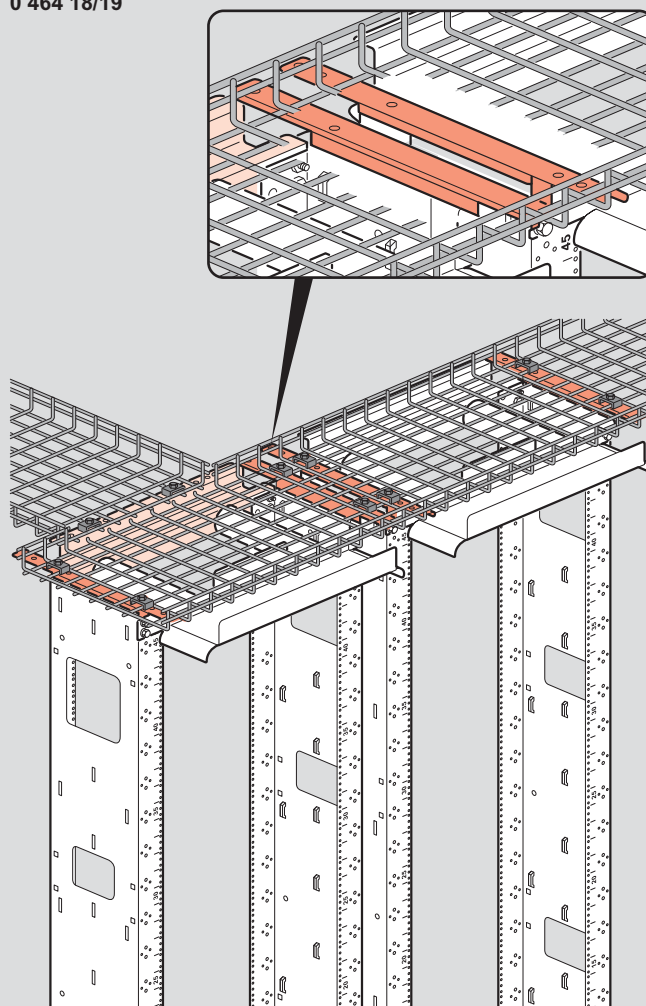
◾ 19" cord management panels
0 465 70/71
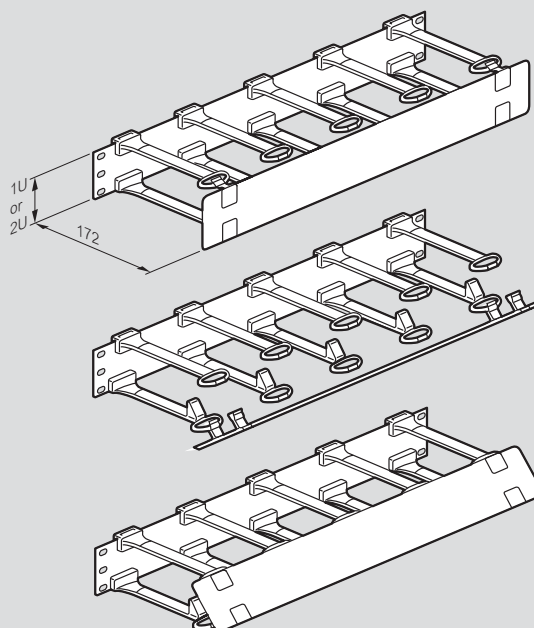
1U
or
2U

172

Legrand cabling system LCS²

19" and 10" LCS² 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

LCS² cabinets comply with the following standards:

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

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

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

■ Overall dimensions (mm)
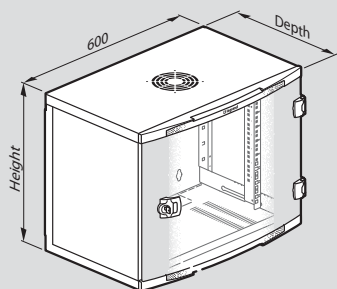
	Cat.Nos	Capacity	Height	Width	Depth
19" fixed cabinets	0 462 00	6 U	350		
	0 462 01	9 U	500		400
	0 462 02	12 U	600		
	0 462 03	16 U	800	600	
	0 462 06	9 U	500		
	0 462 07	12 U	600		580
	0 462 08	16 U	800		
	0 462 09	21 U	1000		
19" pivoting cabinets	0 462 11	9 U	500		
	0 462 12	12 U	600	600	615
	0 462 13	16 U	800		
	0 462 14	21 U	1000		
10" cabinet	0 462 20	6 U	352	314	300

Pivoting bottom opening
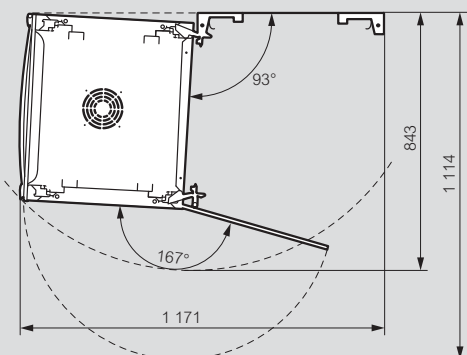
Front door and side panel opening
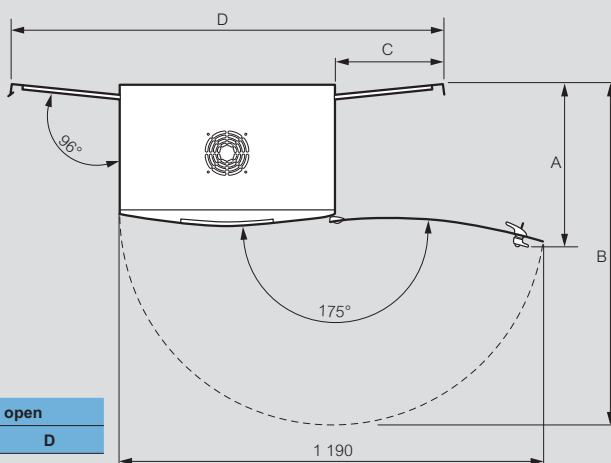
	Cat.Nos	Doors open		Panels open	
		A	B	C	D
19" fixed cabinets	0 462 00				
	0 462 01	400	962	305	1205
	0 462 02				
	0 462 03				
	0 462 06				
	0 462 07	580	1140	482.5	1565
	0 462 08				
	0 462 09				
19" pivoting cabinets	0 462 11				
	0 462 12	600	1179	482.5	1565
	0 462 13				
	0 462 14				

10" cabinet door opening Cat.No 0 462 20
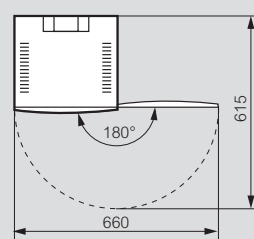
Legrand cabling system LCS²

19" and 10" LCS² wall–mounting cabinets

■ Usable dimensions (mm)

19" LCS² fixed cabinets depth 400 mm
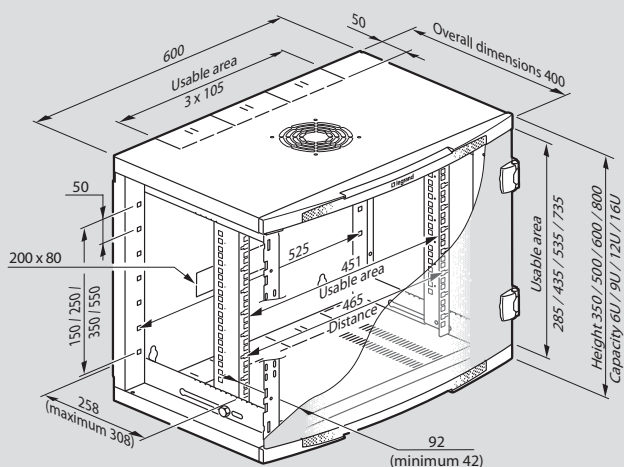
19" LCS² fixed cabinets depth 580 mm
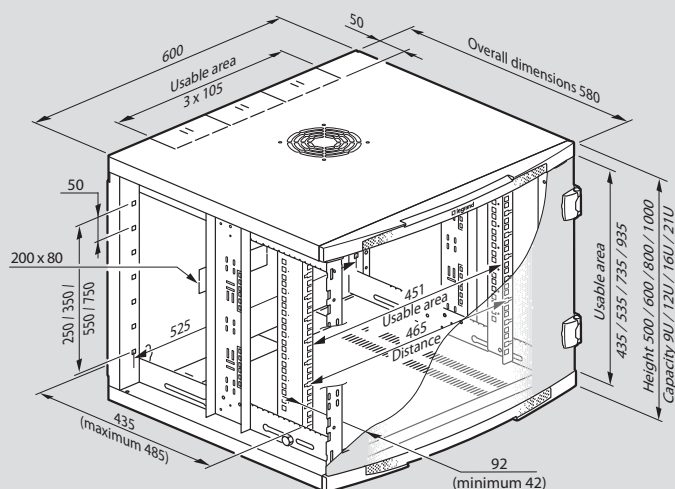
19" LCS² pivoting cabinets depth 600 mm
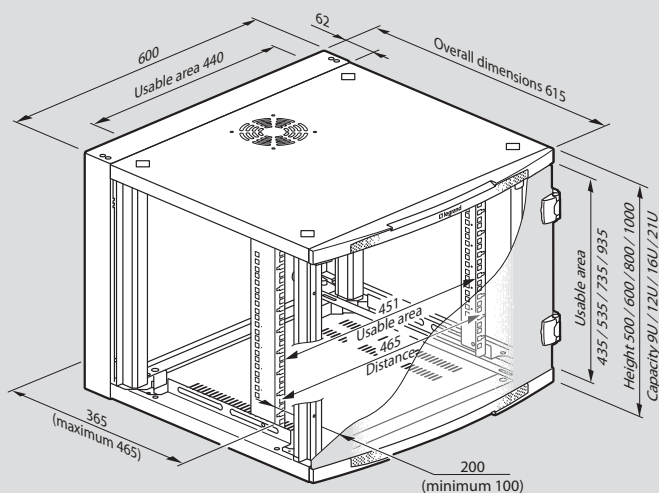
10" LCS² cabinet depth 300 mm
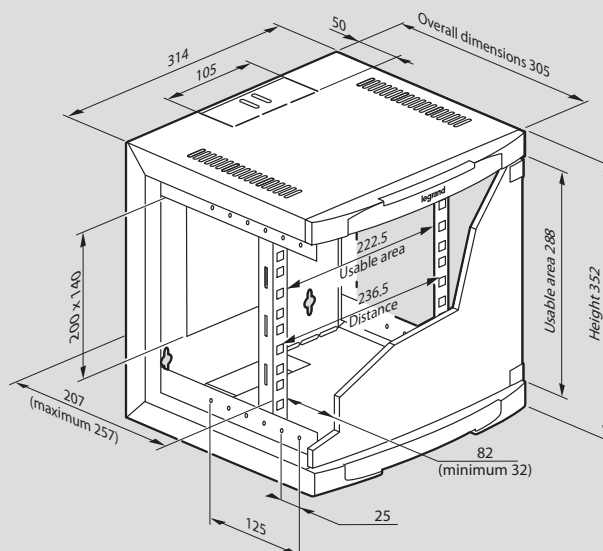
■ Fixing of cabinets (mm)
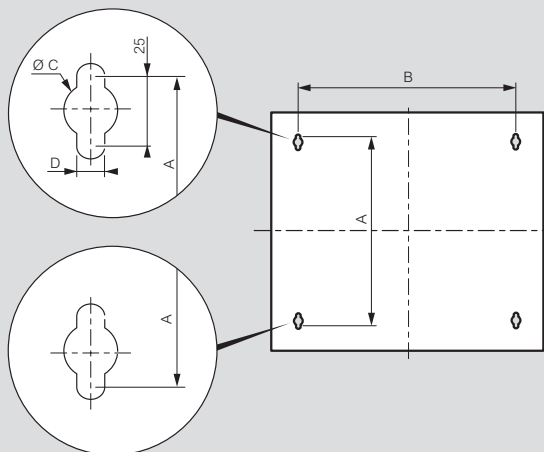
	Capacity	A	B	C	D
19" fixed cabinets	6 U	275			
	9 U	425			
	12 U	525	408	20	11
	16 U	725			
	21 U	925			
19" pivoting cabinets	9 U	425			
	12 U	525	500	18	9
	16 U	725			
	21 U	925			
10" cabinets	6 U	275	250	15	6.5

■ 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
19" pivoting cabinets	0 462 11	31.8
	0 462 12	40
	0 462 13	47.3
	0 462 14	59
10" cabinet	0 462 20	8

■ Vertical Power Distribution Units configuration

0 465 80	0 465 81	0 465 84	0 465 85	0 465 88	0 465 89	0 465 93	0 465 94	0 465 95	0 465 96
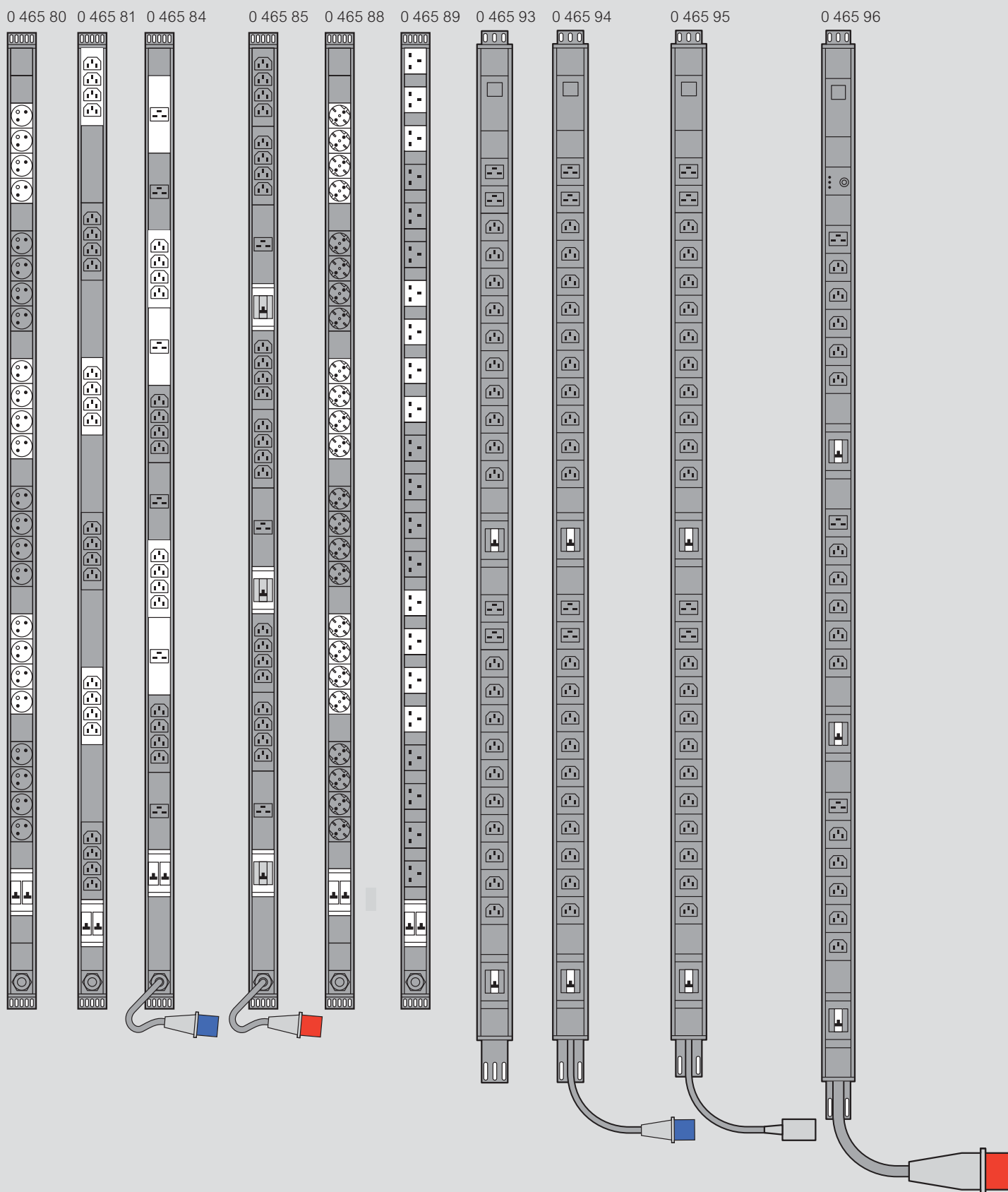
■ **Mounting in Varicon-L server cabinets**

Mounting in Varicon-L
server cabinets with 2 crosspieces
Cat.No 6 466 55/57 (p. 127)
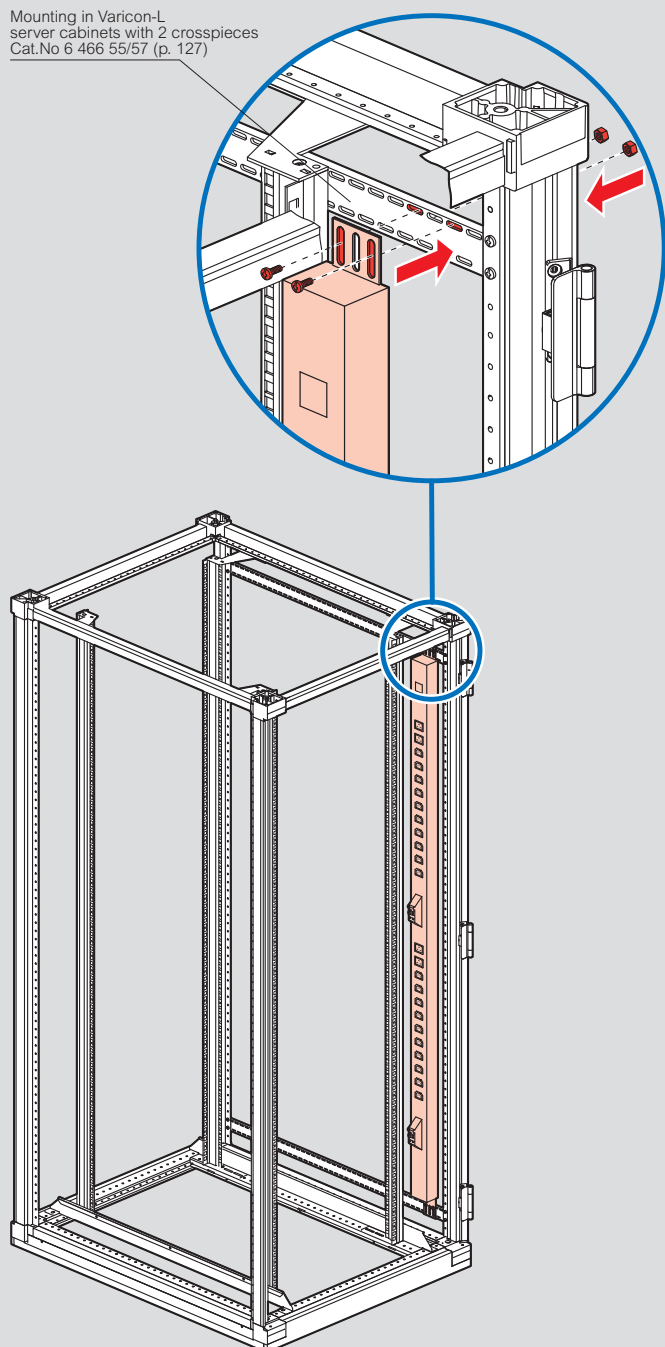
■ **Mounting in LCS² cabling and server cabinets**
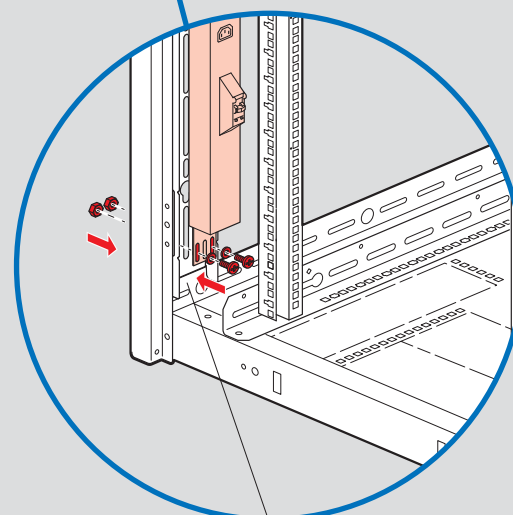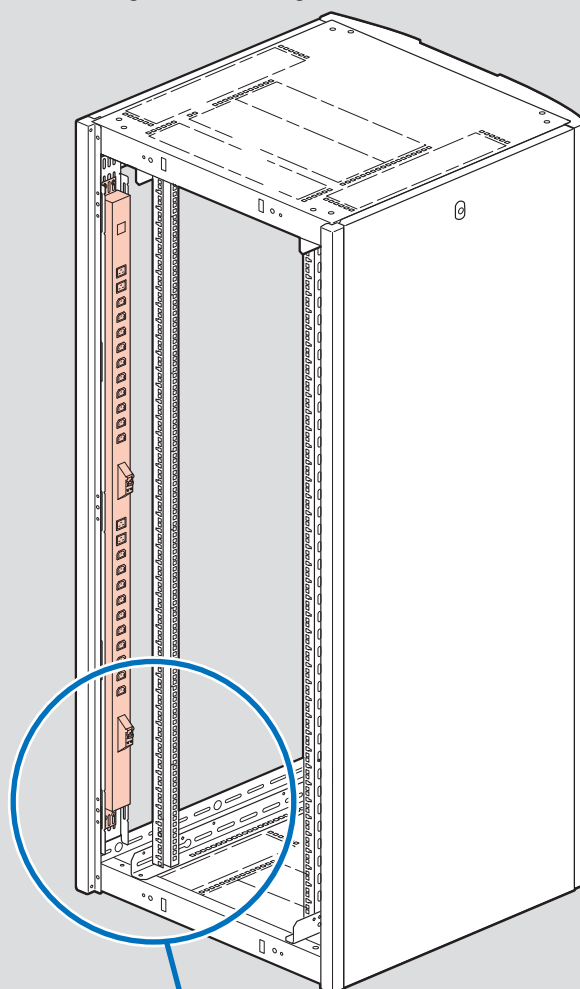
Mounting in LCS² cabinets and server cabinets
with a PDU support Cat.No 0 465 75/76 (p. 117)

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:

IEC 62262 EN 62262	(EN 50102, NF C 20-015) Degree of protection provided by enclosures of electrical equipment against external mechanical impacts (IK code)
EIA-310-E	Cabinets, enclosures, panels and associated equipment (ANSI/EIA/310-E-2005)
IEC 60297-3-100 DIN 41414-7	(NF C 20-150, NF C 20-151) Sizes of mechanical structures of the 482.6 mm (19 in) series

■ Dimensions (mm)

■ Usable dimensions
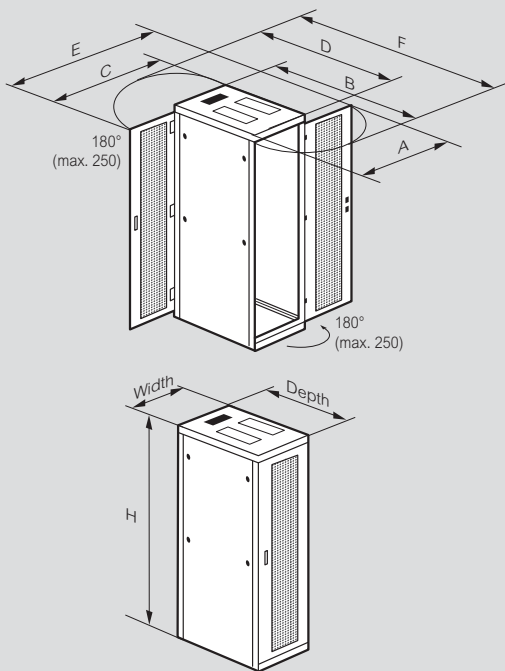
Cat.No	Capacity	H[1]	Width	Depth	Front door open		Rear door open		Front and rear doors open	
					A	B	C	D	E	F
6 466 10/30	41 U	2004	600	1040	1178	1615	1178	1615	1760	2189
6 466 12/32				1240		1815		1815		2389
6 466 13/33			800	1040	1580	1815	1580	1815	2360	2589
6 466 15/35				1240		2015		2015		2789
6 466 16/36	46 U	2204	600	1040	1178	1615	1178	1615	1760	2189
6 466 18/38				1240		1815		1815		2389
6 466 19/39			800	1040	1580	1815	1580	1815	2360	2589
6 466 21/41				1240		2015		2015		2789

1: With levelling feet at min. adjustment (Max. adjustment of feet: + 26 mm)
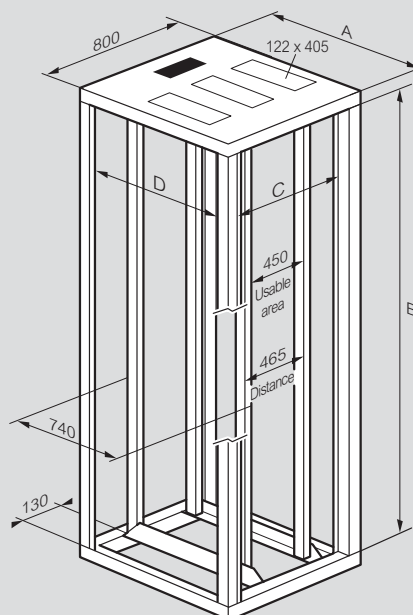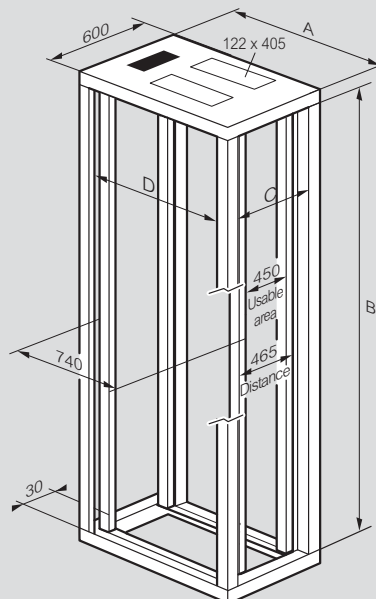
Cat.No	Capacity	A	Usable space		
			B	C	D
6 466 10/30	41 U	1040	1850	536	835
6 466 12/32		1240			1035
6 466 13/33		1040		736	835
6 466 15/35		1240			1035
6 466 16/36	46 U	1040	2050	536	835
6 466 18/38		1240			1035
6 466 19/39		1040		736	835
6 466 21/41		1240			1035

Fixing crosspieces (mm)

12.5
25
5.2 × 17.7 oblong holes
Ø 3.7
L
E
25
50
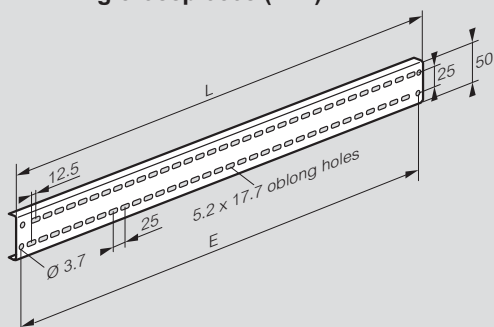
Cat.No.	L	E
6 466 55	865	850
6 466 57	1065	1050

Universal fixing bracket (mm)

Ø 4.5
Ø 3.6
Ø 5.4
10 × 5.5
5.25
10
35
4
125
50
21
6.25
12.5
25

6.5
17.65
2
Ø 5.2
17.7 × 5.2
5.25
10
76.25
50
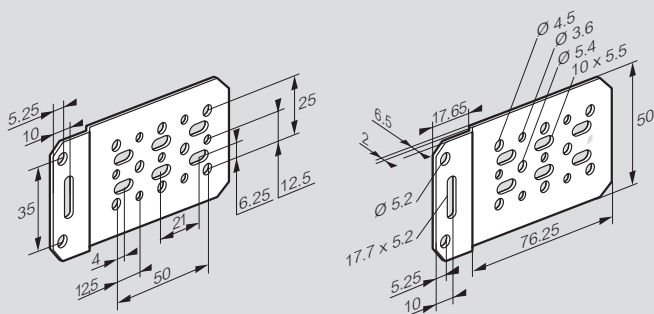
Vertical feedthrough
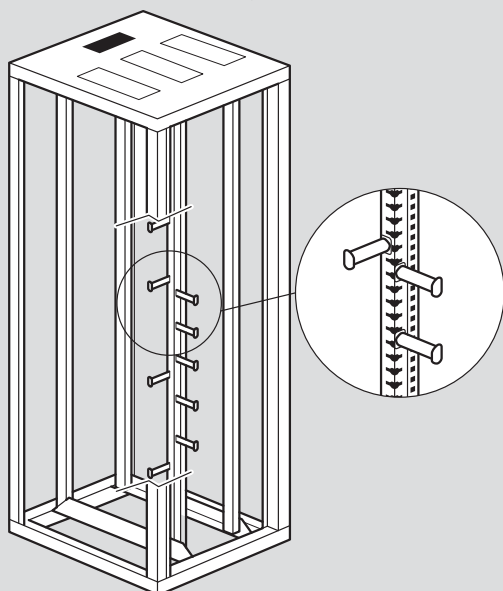
Fixing of the vertical cable managers on 19" upright
Cable guides can be mounted at the front, and at the side (only for 800 mm wide cabinets)
UL94 V0 halogen free cable guide

Varicondition H$_2$0 air conditioning unit

BACK   FRONT
Hot air   Cold air

Power unit | Control unit
Control screen
Microperforated plate
Heat exchanger
Fans
Microperforated plate
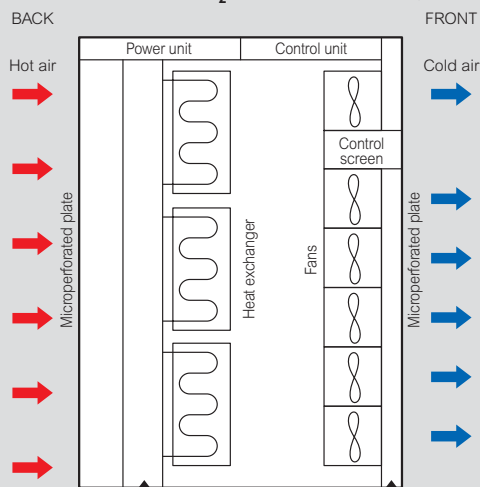
Cooling capacity	Electrical connections
24 kW*	230 VAC - 700 Watts - 1.1 kVA

* With a ∆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^3/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^3/h

* At the recommended rate of 54 l/min

Legrand cabling system LCS² 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
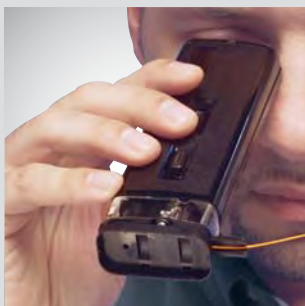
Connection:

1/ Insert the fibre into the connector

2/ Slide the switch on the connector -
the splice is done
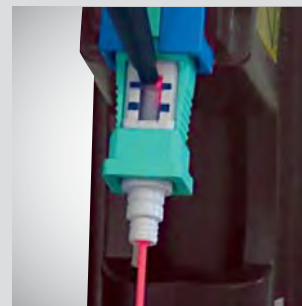
3/ Slide the boot onto the connector
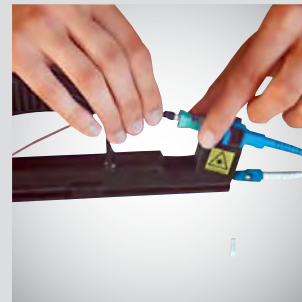
Finally, the visual fault locator is used
to check the connection.

■ 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
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0 515 00

Cat.Nos	Page No	Pack
0 515 00	100	4
01	-	4
02	-	4
03	-	4
04	-	4
05	-	4
10	94	4
11	-	4
12	-	4
13	-	4
14	-	4
15	-	4
23	90	1/4
24	-	1/4
25	-	1/4

0 516 00

Cat.Nos	Page No	Pack
0 516 36	99	1
37	-	1
38	-	1
39	-	1
40	-	1
41	-	1
42	-	1
43	-	1

0 517 00

Cat.Nos	Page No	Pack
0 517 01	103	50
02	-	50
03	-	50
04	-	50
06	-	50
07	-	50
09	-	1
20	141	1
22	-	1
23	-	1
24	-	1
25	-	1
26	-	1
27	-	1
40	102	10
41	-	10
52	93	5
53	-	5
54	-	5
55	-	5
57	94	4
58	-	4
59	-	4
62	93	1
63	-	1
64	-	1
65	-	5
72	-	1
73	-	1
74	-	1
75	-	1
80	89	5
81	-	5
82	-	5
83	-	5
86	90	1/4
87	-	1/4
88	-	1/4
90	100	4
91	-	4
92	-	4
93	-	4
94	-	4
95	-	4
96	94	4
97	-	1
98	-	4

0 518 00

Cat.Nos	Page No	Pack
0 518 50	93	1
51	-	1
52	-	1
53	-	1
54	-	1
55	-	1
56	-	1
57	-	1
58	-	1
59	-	1
60	-	1
61	-	1
62	-	1
63	-	1
64	-	1
65	-	1
66	89	5
67	-	5
68	-	5
69	-	5
70	-	5
71	-	5
72	-	5
73	-	5
74	-	5
75	-	5
76	-	5
77	-	5
78	-	5
79	-	5
80	-	5
81	-	5
82	-	5
0 518 83	89	5
84	-	5
85	-	5
90	-	1

0 533 00

Cat.Nos	Page No	Pack
0 533 00	103	3
01	-	3
02	-	3
03	-	3

0 539 00

Cat.Nos	Page No	Pack
0 539 49	103	5

0 673 00

Cat.Nos	Page No	Pack
0 673 44	97	10
45	-	10
46	91	10
47	-	10
54	97	10
55	-	10
66	105	1
96	97	10

0 695 00

Cat.Nos	Page No	Pack
0 695 56	101	1/20
57	-	1/20
61	97	1/20
69	-	5/100
79	103	1
80	-	10
81	97	1

0 765 00

Cat.Nos	Page No	Pack
0 765 01	101	10
02	-	5
03	96	1
04	-	1
05	-	10
06	-	5
07	-	10
08	91	10
09	-	10
14	96	1
18	101	10
22	96	10
23	-	10
24	91	10
25	-	10
26	-	10
27	-	10
30	101	1
32	96	1
33	-	1/10
35	103	10
36	-	10
37	-	10
38	-	10
39	-	10
41	101	5
42	-	5
44	96	5
46	-	5
51	101	10
52	-	10
54	-	10
55	-	10
61	96	10
62	-	10
63	-	10
64	-	10
65	-	10
66	-	10
71	91	10
73	-	10
74	-	10
76	-	10
81	96	10
82	-	10
83	-	5
90	91	5
91	96	10
92	-	10
93	-	10
94	-	5

Cat.Nos	Page No	Pack
0 765 95	96	5
96	-	5
97	101	5
98	-	10
99	91	5

0 778 00

Cat.Nos	Page No	Pack
0 778 80	103	1
81	-	1
91	97	10

0 779 00

Cat.Nos	Page No	Pack
0 779 00	105	1
01	-	1
05	111	1
06	-	1
13	105	1
14	-	1
30	141	1

0 786 00

Cat.Nos	Page No	Pack
0 786 05	101	10
06	96	10
07	-	10
14	110	1
16	-	1
17	-	1
18	-	1
20	100	10
21	-	10
22	95	10
23	-	10
24	100	10
25	-	10
26	95	10
27	-	10
28	91	10
29	-	10

0 787 00

Cat.Nos	Page No	Pack
0 787 30	104	10
31	-	10
32	-	10
34	-	10
46	-	1
47	140	1
48	104	1
50	140	10
51	-	10
52	-	1
53	-	1
54	-	1
55	-	1
56	-	1
57	139	1
58	140	1
60	-	1
61	104	1
64	139	1
65	104	1
66	-	1
67	-	1
68	139	1
70	-	1
71	140	1
72	139	1
73	-	1
74	-	1
76	140	1
77	139	1
78	-	1
79	-	1
91	-	1
97	142	1
98	-	1
99	139	1

0 789 00

Cat.Nos	Page No	Pack
0 789 09	142	1
10	-	1

0 792 00

Cat.Nos	Page No	Pack
0 792 31	104	10
50	140	10
54	-	1

Cat.Nos	Page No	Pack
0 792 55	140	1
57	139	1
64	-	1
75	-	1
84	104	1

0 793 00

Cat.Nos	Page No	Pack
0 793 77	139	1
78	-	1
79	-	1

0 794 00

Cat.Nos	Page No	Pack
0 794 12	96	10
13	-	10
33	-	1/10
51	101	10
52	-	10
54	-	10
55	-	10
61	96	10
62	-	10
64	-	10
65	-	10
71	91	10
73	-	10
74	-	10
76	-	10
81	96	5
85	-	5
86	-	5
92	-	10

0 904 00

Cat.Nos	Page No	Pack
0 904 67	97	1

0 919 00

Cat.Nos	Page No	Pack
0 919 45	103	1

3 343 00

Cat.Nos	Page No	Pack
3 343 00	132	1
03	-	1
04	-	1
05	-	1
06	-	1
15	-	1
17	-	1
18	-	1
19	-	1
30	-	1
31	-	1
32	-	1
33	-	1
40	-	1
44	-	1
45	-	1
46	-	1
47	-	1
48	-	1
49	-	1

5 720 00

Cat.Nos	Page No	Pack
5 720 23	104	1
24	142	1
25	-	1
26	-	1
27	-	1
68	-	1
83	105	1
84	-	1
89	139	1
90	-	1
91	139	1
92	140	1
93	-	1
94	104	1
96	139	1
97	-	1

5 722 00

Cat.Nos	Page No	Pack
5 722 70	140	10
72	-	1
73	-	1
74	139	1
75	104	1

Cat.Nos	Page No	Pack
5 722 76	140	1
77	-	1
78	139	1
79	-	1
80	140	10
81	139	1
82	-	1
83	140	1
84	-	1
88	139	1

5 723 00

Cat.Nos	Page No	Pack
5 723 00	104	10
01	-	5
02	97	10
03	101	10
04	-	10
06	91	10
10	104	10
12	-	10
13	-	10
14	97	10
15	101	10
16	97	10
17	-	10
22	-	10
23	-	10
24	-	10
25	-	10
26	-	10
28	101	10
29	-	10
30	100	10
31	95	10
32	100	10
33	95	10
35	103	10
36	-	10
39	97	10
49	91	10
50	-	5
51	-	10
52	-	10
53	97	5
54	-	10
55	-	10
57	91	5
58	-	10
59	-	10
70	139	1
76	105	1
77	-	1

5 725 00

Cat.Nos	Page No	Pack
5 725 68	142	1
90	139	1
91	-	1
92	140	1
93	-	1
94	104	1
96	139	1
97	-	1

5 727 00

Cat.Nos	Page No	Pack
5 727 70	140	10
72	-	1
73	-	1
74	139	1
75	104	1
76	140	1
77	-	1
78	139	1
79	-	1
80	140	10
81	139	1
82	-	1
83	140	1
84	-	1
88	139	1

5 728 00

Cat.Nos	Page No	Pack
5 728 00	104	10
01	-	5
02	97	10

Cat.Nos	Page No	Pack
5 728 03	101	10
04	-	10
06	91	10
10	104	10
12	104	10
13	104	10
14	97	10
15	101	10
16	97	10
17	97	10
22	97	10
23	97	10
24	97	10
25	97	10
26	97	10
28	101	10
29	101	10
30	100	10
31	95	10
32	100	10
33	95	10
35	103	10
36	103	10
39	97	1
49	91	10
50	91	5
51	91	10
52	91	10
53	97	5
54	97	10
55	97	10
57	91	5
58	91	10
59	91	10
76	105	1
77	105	1

6 327 00

Cat.Nos	Page No	Pack
6 327 79	91	20

6 339 00

Cat.Nos	Page No	Pack
6 339 00	122	1

6 466 00

Cat.Nos	Page No	Pack
6 466 10	126	1
12	126	1
13	126	1
15	126	1
16	126	1
18	126	1
19	126	1
21	126	1
30	126	1
32	126	1
33	126	1
35	126	1
36	126	1
38	126	1
39	126	1
41	126	1
55	127	1
57	127	1
59	127	1
61	126	1
62	126	1
65	126	1
66	126	1
68	126	1
69	126	1
81	127	1
82	127	1
85	126	1
88	127	1
89	127	1

6 467 00

Cat.Nos	Page No	Pack
6 467 10	128	1
12	128	1
20	128	1
22	128	1
24	128	1
28	128	1
40	128	1

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