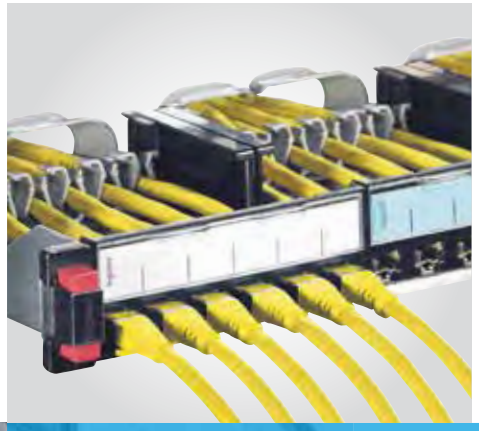
LCS 3



3 DIMENSIONS OF EXCELLENCE

PERFORMANCE · SCALABILITY · EFFICIENCY

DATA CENTER
LOCAL AREA NETWORK

CATALOGUE
PAGES
→INSIDE

THE GLOBAL SPECIALIST
IN ELECTRICAL AND DIGITAL BUILDING INFRASTRUCTURES

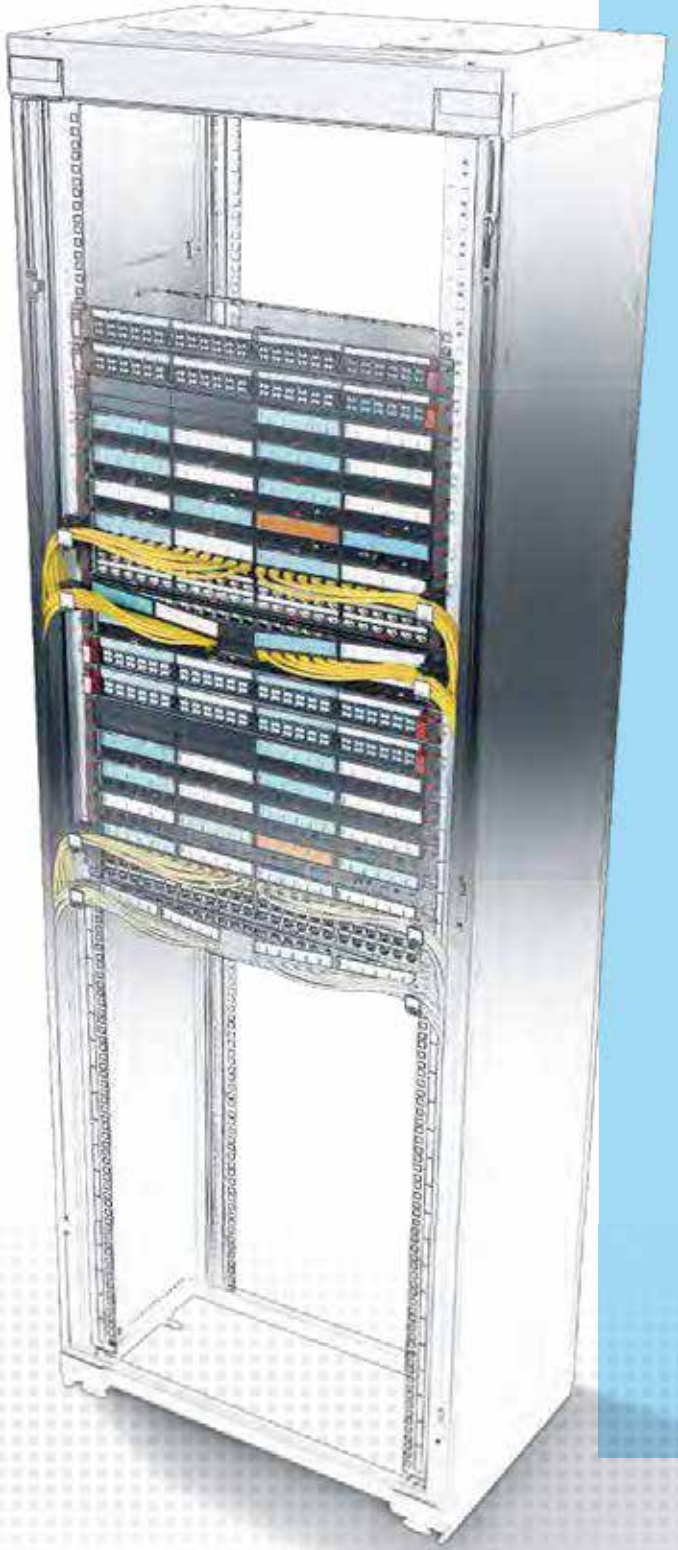
legrand®

LCS 3

3 DIMENSIONS OF EXCELLENCE

PERFORMANCE SCALABILITY EFFICIENCY

eliot™
PROGRAM BY LEGRAND



3 DIMENSIONS OF EXCELLENCE

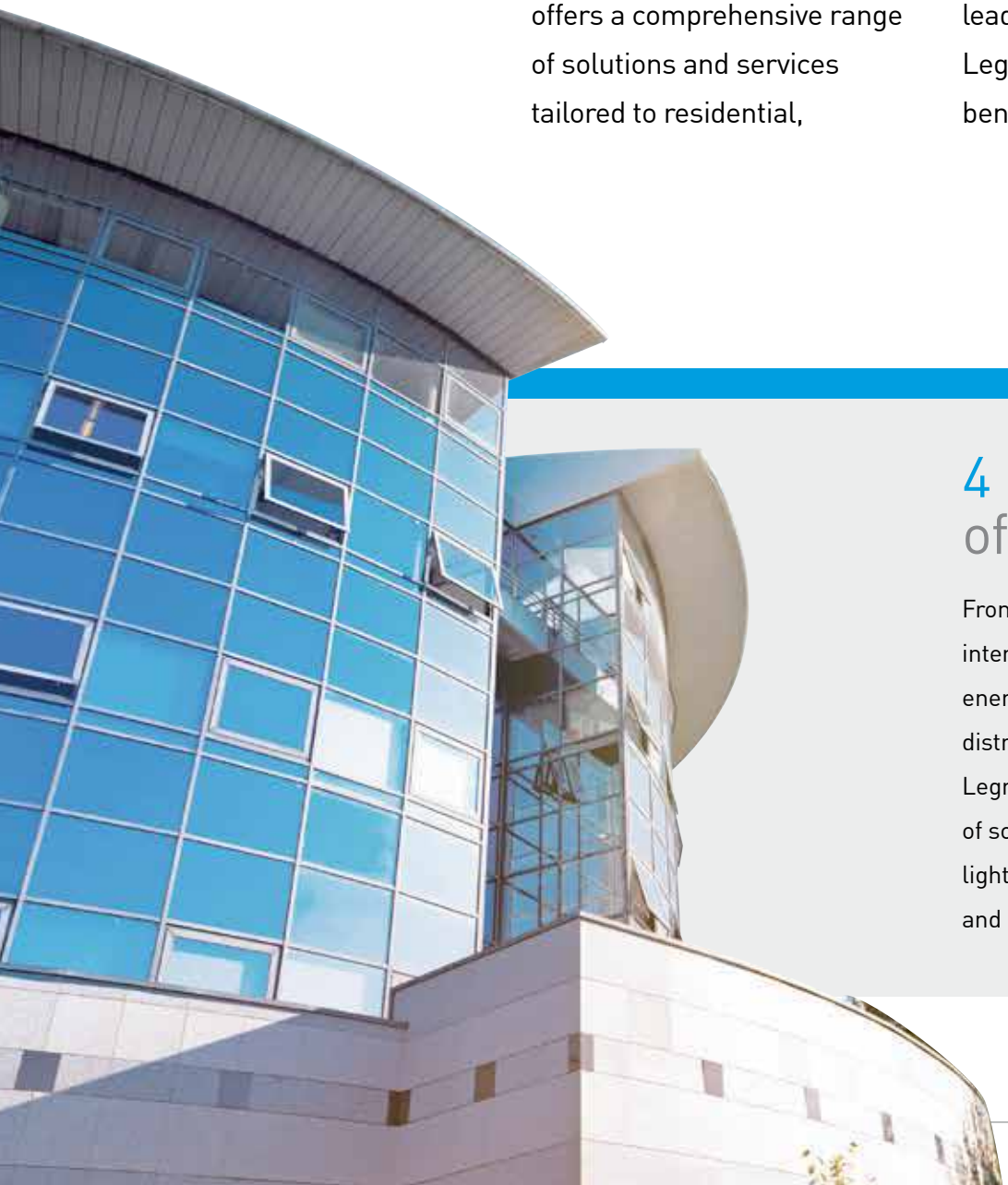
● PERFORMANCE ● SCALABILITY ● EFFICIENCY

CONTENTS

LCS 3
3 DIMENSIONS OF EXCELLENCE
PERFORMANCE SCALABILITY EFFICIENCY

Legrand
A global player

Legrand is the global specialist in electrical and digital building infrastructures. The Group offers a comprehensive range of solutions and services tailored to residential, commercial and industrial applications. The scope of its offering and its leading positions make Legrand a worldwide benchmark.



4 KEY AREAS of expertise

From control and connection interfaces to cable management, energy distribution and data distribution systems, Legrand provides a host of solutions designed to manage lighting, energy, networks and building access.

AN ACTIVE INTERNATIONAL PRESENCE

ESTABLISHED IN OVER 90 COUNTRIES

SALES IN CLOSE TO 180 COUNTRIES

TURNOVER €5 BILLION

OVER 36,000 EMPLOYEES

INNOVATION

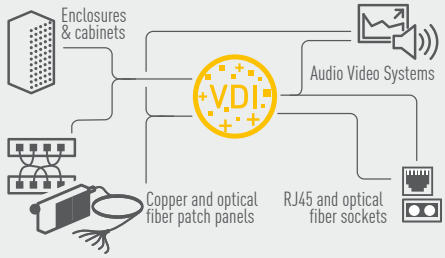
4.9% OF SALES INVESTED IN R&D

A WIDE CHOICE OF SOLUTIONS

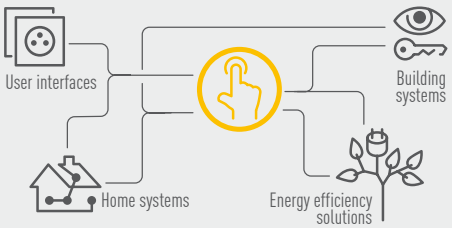
OVER 230,000 CATALOGUE ITEMS

80 PRODUCT FAMILIES

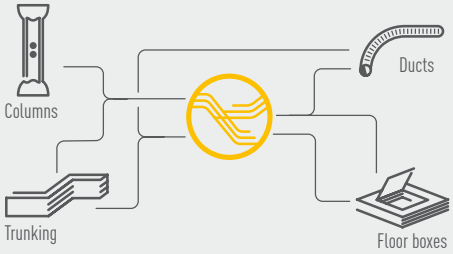
DIGITAL INFRASTRUCTURE



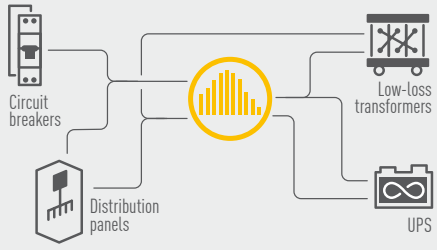
CONTROL AND COMMAND



CABLE MANAGEMENT



ENERGY DISTRIBUTION

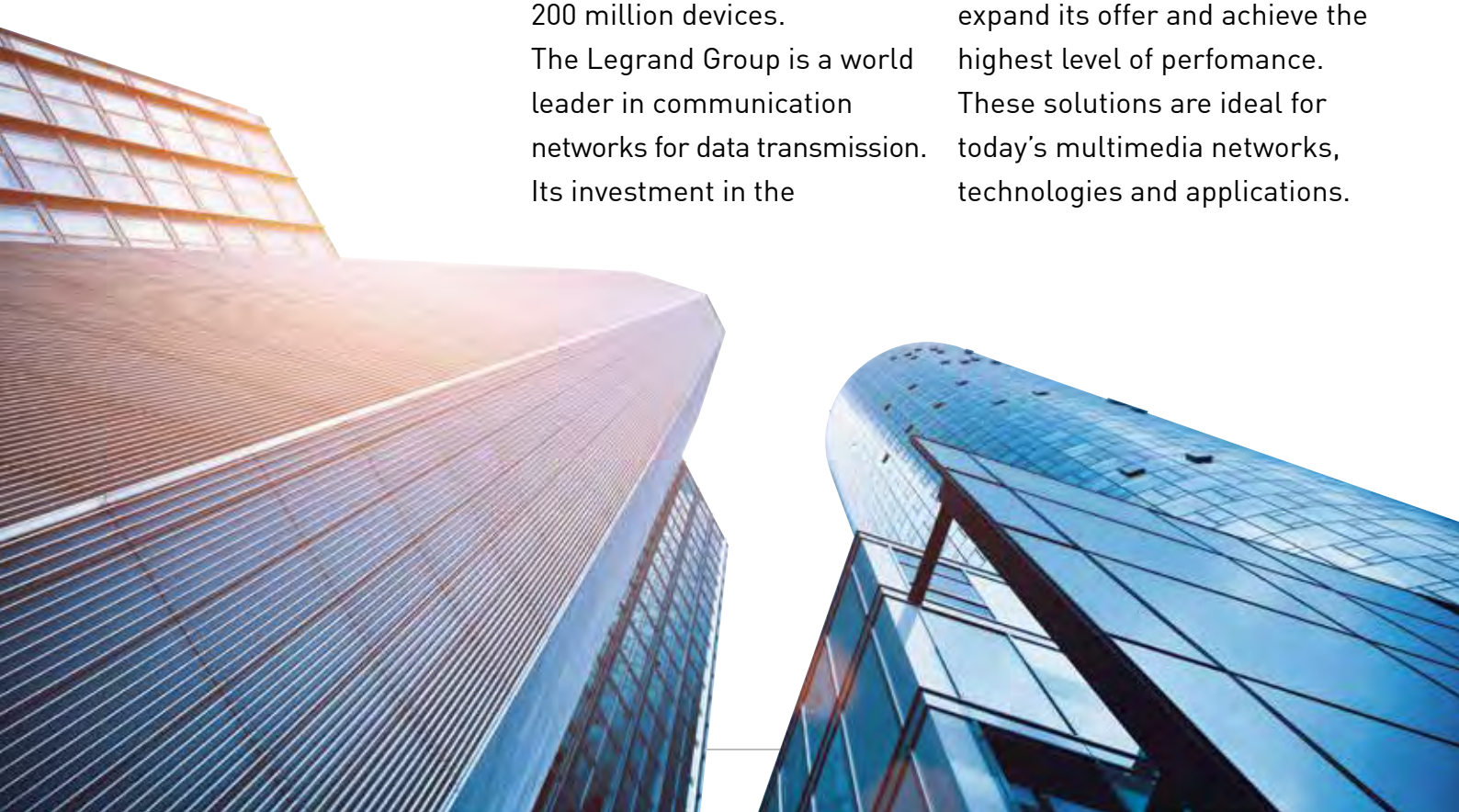


LCS 3
3 DIMENSIONS OF EXCELLENCE
PERFORMANCE SCALABILITY EFFICIENCY

Legrand Group

A leading company for all your IT networks

Legrand cabling systems currently provide high-quality connectivity to more than 200 million devices.
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 expand its offer and achieve the highest level of perfomance. These solutions are ideal for today's multimedia networks, technologies and applications.



GLOBAL PLAYERS
DATACOM IT

LEGRAND

Products and systems for digital building infrastructures.

A PORTFOLIO OF SPECIALIST BRANDS

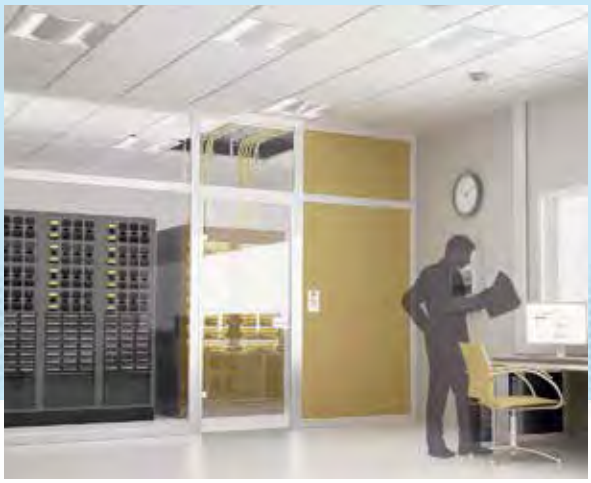
• C2G • Electrorack • Estap • Middle Atlantic
• Minkels • Quicktron • Raritan • SJ Manufacturing • Valrack

LCS 3
3 DIMENSIONS OF EXCELLENCE
PERFORMANCE SCALABILITY EFFICIENCY

Our digital infrastructure expertise

Legrand's complete global solutions for data communication perfectly address the key challenges for digital networks: performance, scalability and efficiency.

1 LOCAL AREA NETWORKS



SOLUTIONS FOR STRUCTURED CABLING

- **Housing solutions**
  (19" freestanding and wall-mounting cabinets, open racks, PDUs, micro data centers, etc.)
- **Copper solutions**
  (New Plug, controlled-access panel, controlled-access RJ45, etc.)
- **Fibre solutions**
  (Connectors, equipped & modular panels, bend-insensitive cables, etc.)

2 DATA CENTER & SERVER ROOM

SOLUTIONS FOR STRUCTURED CABLING IN SERVER ROOMS

- **Housing solutions**
  (Server cabinets, aisle containment, cooling units and cold corridor, open racks, PDUs, etc.)
- **Copper solutions**
  (Preterminated, etc.)
- **Fibre solutions**
  (Preterminated, intelligent patching, high-density fibre optic solutions, etc.)

3 AUDIO VIDEO SYSTEM

A WIDE RANGE OF TECHNOLOGIES TO SUIT THE LOCATION AND THE USER EQUIPMENT

- **Racks and enclosures**
- **Preterminated audio/video sockets**
  (HDMI, display port, HD15, USB, RCA, JACK, etc.)
- **Cords and adaptors**

HIGH Performance

Legrand's LCS^3 system offers you

1. 25 Gbps and 40 Gbps Ethernet applications
   COPPER SYSTEM
2. 40 Gbps and 100 Gbps Ethernet applications
   FIBRE OPTIC SYSTEM
3. MTP/MPO high density and up to Cat. 8 solutions
   FIBRE OPTIC & COPPER SYSTEMS

FIBRE OPTIC SYSTEM

MTP/MPO solution transmission up to 100 Gbps

High density connection with 12 or 24 fibres compliant with IEEE 802.3ba.

New MPO/MTP fibre optic drawers. Up to 96 LC on 1U. Easy access in order to move, add & change fibres.

Up to 144 LC on 1U. Available in 1U, 2U and 4U.

COPPER SYSTEM

Cat. 8 transmission up to 40 Gbps

Cable & connector compliant with ISO/IEC 11801 standards - third edition.

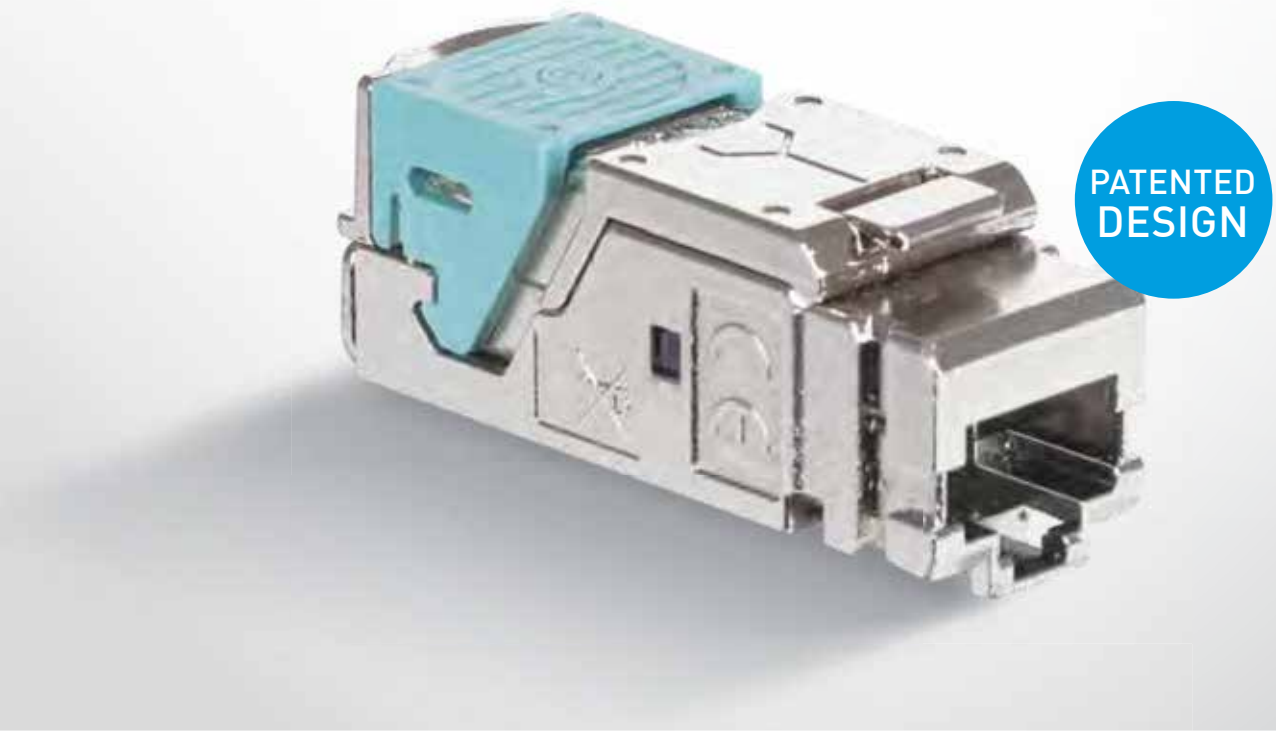
Cat. 8 toolless connector: up to 2500 connection/disconnection cycles

High Performance

LCS 3

COPPER SYSTEM

Optimum performance with Cat. 8



PATENTED DESIGN

THE NEW toolless Cat. 8 STP CONNECTORS with transmission speed (bit rate) from 25 Gbps to 40 Gbps, are integral to the performance of the new LCS³ system.

- In accordance with ISO/IEC 11801 standard - third edition
- Tested up to 2500 connection/disconnection cycles
- A perfect connection in just a few seconds

To maximise performance, combine the Legrand Cat. 8 connector together with the Legrand Cat. 8 cable supporting up to 40 Gbps over a single cable.
The Cat. 8 cable is terminated with an improved dedicated RJ45 connector which can support future performance.
The performance is 4 times better than that of a Cat. 6A cable with up to 2000 MHz bandwidth.

- Double screening to avoid interference and loss of data
- Dedicated to higher capacity in data centers and equipment rooms
- Compliant with ISO/IEC 11801 standard - third edition

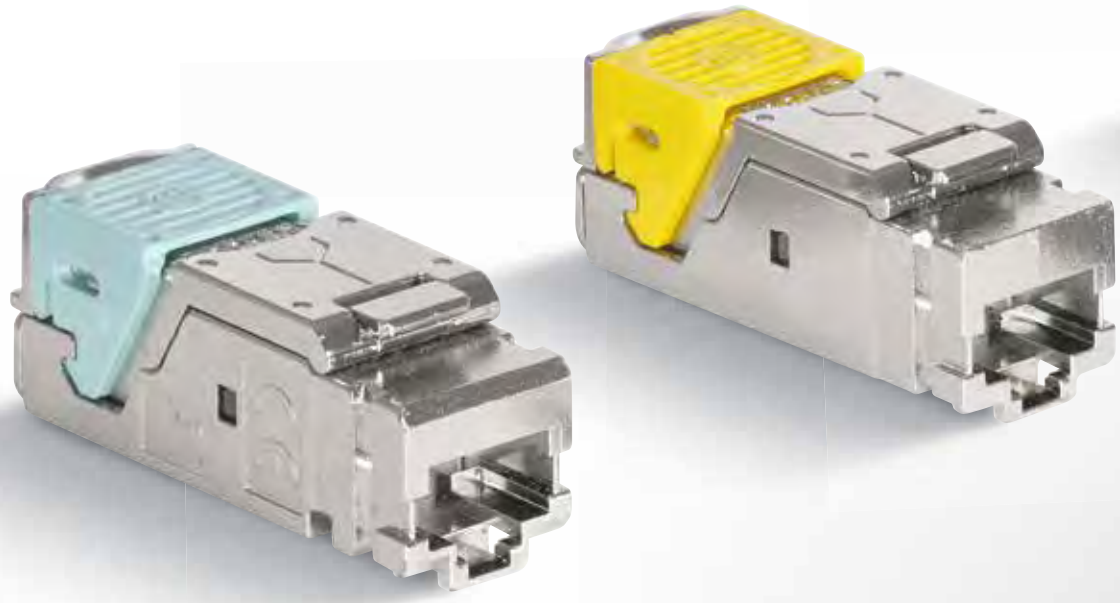
Legrand cable solutions

		COMPONENT SIZES				LINK SIZES (CHANNEL)			
	Supported network protocol	Cat. 8 STP	Cat. 6A STP	Cat. 6 UTP	Cat. 6 FTP	Class I	Class E_A		Class E
		2000 MHz	500 MHz	250 MHz	250 MHz	2000 MHz	500 MHz	250 MHz	250 MHz
		40 Giga	10 Giga	1 Giga	1 Giga	40 Giga	10 Giga	1 Giga	1 Giga
Attenuation (dB) Signal loss	LCS³ ISO 11801 Edition 3	1.5	0.13 0.45 max	0.06 0.32 max	0.09 0.32 max	32.7	35.4 42.1 max	24.1 29.9 max	25.7 30.7 max
Return loss (dB) Resistance to echo	LCS³ ISO 11801 Edition 3	12	17.05 14 min	26.59 20 min	29.8 16 min	8	16.4 8 min	22.1 10 min	38.8 10 min
Next (dB) Resistance to disturbance between pairs[1]	LCS³ ISO 11801 Edition 3	12.9	37.46 37 min	56.93 46 min	51.3 46 min	9.8	38.1 29.2 min	54 35.3 min	53.9 35.3 min

	LCS³ 8	LCS² 6_A		LCS2 6		LCS² 5_e
FREQUENCY	2000 MHz	500 MHz		250 MHz		100 MHz
DELIVERY	40 Gbps	10 Gbps		1 Gbps		1 Gbps
WIRING	Copper	Copper	FO	Copper	FO	Copper
CONNECTORS	RJ45	RJ45	SC-LC...	RJ45	SC-LC...	RJ45
MAX. CABLE LENGTH	30 m	100 m	variable	100 m	variable	100 m

COPPER SYSTEM

All the LCS³ connectors are PoE+ certified and ready for PoE++



Using PoE technology, devices such as Wi-Fi access points, cameras, etc. can be supplied with power by the Ethernet data cable. The cable combines data and power to supply all the PoE peripherals. Depending on the power available, there are three levels of PoE:

- **PoE compliant with IEEE 802.3af -2003**
- **PoE+ compliant with IEEE 802.3at -2007**
- **PoE++ compliant with IEEE 802.3bt -2018**

Due to the high power in PoE++ the choice of a high-quality connector is essential. While disconnecting, Legrand 's high-quality connectors prevent damage to the contacts due to the arc generated.

PoE++ 802.3bt

Trade name	IEEE standards	Voltage	Current drawn
PoE	802.3af-2003	44-57 V	350 mA
PoE+	802.3at-2009	50-57 V	600 mA
PoE++	pr 802.3bt(*)	50-57 V	600 mA

Trade name	Power injector	Available power	Number of pairs for power supply	Minimum cable category
PoE	15.4 W	12.95 W	2	Cat. 3
PoE+	30 W	25.5 W	2	Cat. 5e
PoE++	100 W	70 W (min)	4	Cat. 5e

FIBRE OPTIC SYSTEM

Legrand high-speed solution
MTP system

High-speed solution

With data centers, increased bandwidth has become a priority requirement. The IEEE has therefore introduced the 802.3ba standard for internet connections at 40 Gbps and 100 Gbps and beyond.
To answer this need Legrand has introduced the MTP (Multiple-Fibre Push-On/Pull-Off compatible MPO) fibre solution to the catalogue. It guarantees speed, resistance, high performance and high density.

40/100 Gigabit Ethernet connectivity and cable

With the need to support multiple transmission paths, the MPO-style connector is the connector identified by the IEEE 802.3 ba standard for 40G & 100G transmission (when not using WDM). The terms "MPO" and "MTP" are used interchangeably for this style of connector (MPO = generic name). MTP is an MPO-style connector and is considered to be a better performing connector with lower insertion loss.

Based on the aforementioned standards, all 40/100 Gigabit Ethernet options over multimode fibre use parallel transmission, requiring more than two fibres per channel.

MTP connector feature:

- a high-speed connection with 12 fibres (optionally with 24 fibres)
- precise and safe connection
- optimised cable management
- high-density fibres
- scalable system for future upgrades
- simple maintenance operations
- ease of extraction. No complex installation on site - plug and play
- the MTP is a 12-core connector. 1 cable = 1 connector

With standard active equipment, we need to convert the MTP to LC or SC

High performance

MTP/MPO high performance	Multimode high performance	Singlemode high performance
Insertion loss / Master IEC 61300-3-4	Up to 0.1 dB typical (all fibres) Up to 0.35 dB maximum (single fibre)	Up to 0.1 dB typical (all fibres) Up to 0.35 dB maximum (single fibre)
Optical return loss	Not applicable	> 60 dB (8° angle-polished)

The ultra high density connector in our offer is the MTP

LC® connector

	Multimode high performance	Singlemode high performance
IL Max/Master (Acceptance)	Up to 0.15 dB	Up to 0.15 dB
IL Max/Random	Up to 0.25 dB	Up to 0.30 dB
Ave/Master	0.08 dB	0.12 dB
Ave/Random	0.1 dB	0.12 dB
Return loss	Up to 35 dB	Up to 55 dB

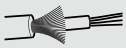
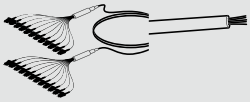
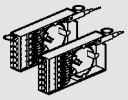
Common Data Center Approaches

Multimode fibre systems have been the most cost effective fibre solution to use in the data center because the transceivers are much less expensive than single-mode transceivers. Multimode transceivers use a vertical cavity surface emitting laser (VCSEL) light source, which is easy to manufacture and package. Multimode fibre systems have a shorter reach than single-mode systems, however most distances are less than 150 meters; surveys have shown that more than 80% of data centers links are equal to or less than 100 meters. Although single-mode cable is less expensive, factoring in the total system cost of multimode versus single-mode, multimode is still less expensive.

	10G	40G	100G (-SR10)	100G (-SR4)
Signalling	10 Gb	10 Gb x 4	10 Gb x 10	25 Gb x 4
Laser Type	VCSEL	VCSEL Array	VCSEL Array	VCSEL Array
Fibre Type	OM3/OM4	OM3/OM4	OM3/OM4	OM3/OM4
Connector	2 LCs 	12-fibre MPO/MTP 	(2) 12-fibre MPO/MTP or 24-fibre MPO/MTP 	12-fibre MPO/MTP 
Number of Fibres Needed	2 fibres	8 fibres	20 fibres	8 fibres
Maximum Distance	OM3: 300 m OM4: 550 m	OM3: 100+ m OM4: 150+ m[1]	OM3: 100+ m OM4: 150 m[1]	OM3: 70 m OM4: 100 m

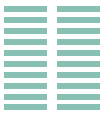
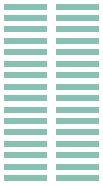
1. 150 metres on OM4 requires low-loss connectors. This is discussed in the channel insertion section.

High performance on all standard and on-demand preterminated systems

Connectivity	TYPES							
Trunks	Tight buffer	Loose tube	Loose tube corrugated steel tape	Break-out	Fan-out	Micro-cable 250 microns	Cassette	Cassette Fan-out
								
	TYPE OF FIBRE OS1/OS2, OM1, OM2, OM3, OM4, OM5, etc.		**NUMBER OF FIBRES** 2, 4, 6, 8, 12, 16, 24, On demand, etc.		**CHOICE OF TERMINATION** LC, SC, SC APC, MTP etc.		**PLEASE CONTACT US** for any specific requirements.	
Cabling	High density (HD)				Ultra high density (UHD)			
Panels & cassettes Splice panel	**MTP to LC or SC. Cassette to cassette without MTP**				**MTP to LC**			
								
Cables/Patch cords	OM2, OM3, OM4 & OS2 Microcable loose tube							

What's coming

IEEE has a number of ongoing projects for both copper and fibre optic applications.
The wideband multimode fibre optic (WMMF) TIA & 11801-1 standards were approved for publication in the middle of 2016. ISO/IEC 11801-1 assigned the OM5 designation for this type of fibre. The standard specifies high bandwidth 50 microns core diameter/125 microns cladding diameter, laser-optimised optical fibre that is optimised to enhance performance for single wavelength or multiwavelength transmission systems with wavelengths in the vicinity of 850 nm to 950 nm.

Transmission	40 GbE Tx Rx	100 GbE Tx Rx	400 GbE Tx Rx
10G parallel channels			Not applicable
25G parallel channels	Not applicable		
10G or 25G with WDM and/or parallel channels			

Note: Multiple lines represent parallel channels and with multiple colours represents WDM (multiple wavelength within the same channel).
WBMMF (OM5) is coming to be an option for reducing the number of fibres that need to be deployed (100G and 400G)

LCS 3

3 DIMENSIONS OF EXCELLENCE

PERFORMANCE SCALABILITY EFFICIENCY

1 SLIDING CASSETTE: EASIER MAINTENANCE

2 INNOVATIVE MODULAR CASSETTE SYSTEM

3 FAST PUSH-BUTTON EXTRACTION

Scalability & Maintenance

COPPER SYSTEM RJ 45 Connectors

The **NEW TOOLLESS CONNECTORS** with toolless fast connection are available in all categories for installation both on patch panels and in the workstation. A perfect connection can be obtained in a few seconds, guaranteeing optimum performance of the link from the patch panel to the workstation. They are colour-coded so their category can be safely identified:

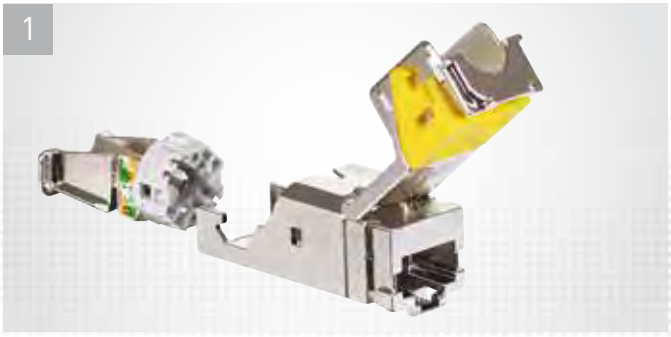
- Cat. 5e: grey
- Cat. 6: blue
- Cat. 6 A: yellow
- Cat. 8: aqua

PATENTED DESIGN

New systems to facilitate wiring and installation and increase the data transfer speed with both the copper solution and the fibre optic solution.

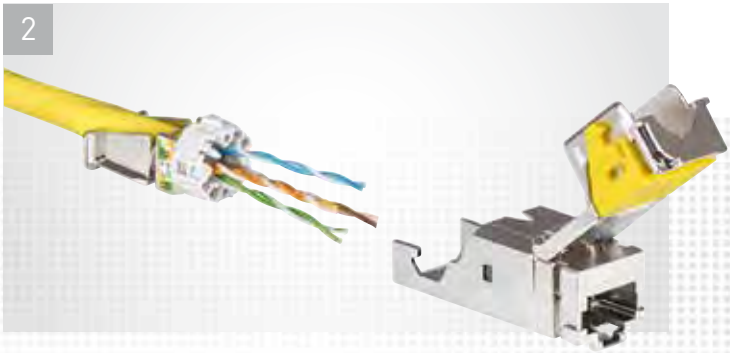
New Toolless connector connection phases

1



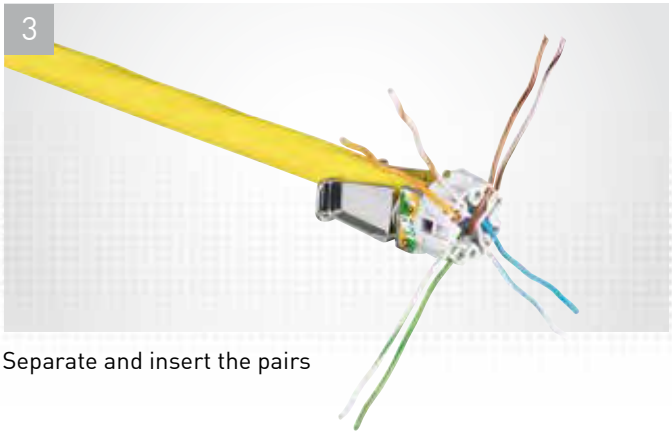
Take the wire housing

2



Pass the cable through the back of the wire housing

3



Separate and insert the pairs

4

Cut the pairs

5

Install the wire housing without pushing

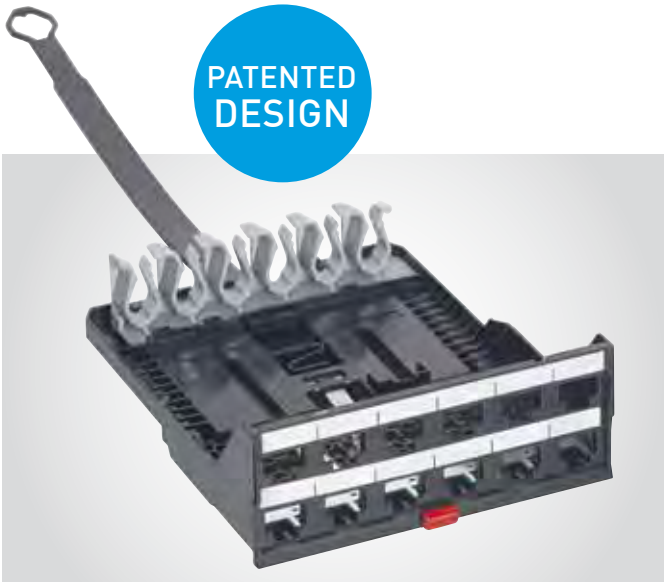
6

Push down the lever and lock the connector

LCS 3

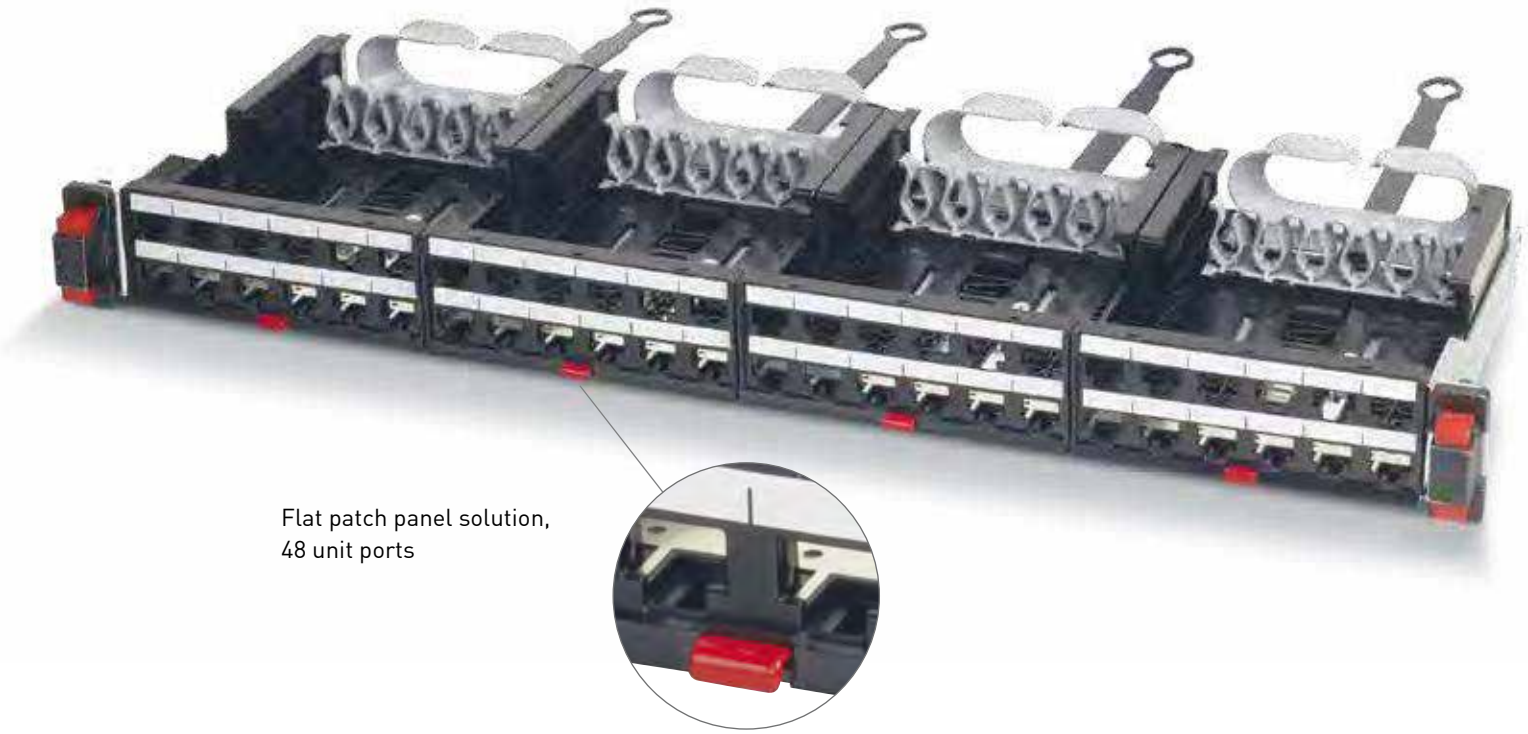
Patch Panels

The new patch panels have been designed and produced to optimise space, with up to 48 ports per unit and make maintenance and future upgrades easier.
They are available in both flat and angled versions.
They have a quick system for pulling out the unit and an innovative cable guiding system for tidy and easy cable management.



Block of 12 connectors for patch panel

- Sliding cassettes: easier maintenance
- Fast push-button extraction
- Innovative modular cassette system
- Easy maintenance: Remove connectors without disconnecting the cords
- **Easy to mix with Legrand fibre optic solutions**



Flat patch panel solution, 48 unit ports

New QUICK-FIX system

PATENTED DESIGN

Innovative new quick-fixing solution:
- Push and connect system
- Automatic earth connection
- In-rack cabling optimised
- New accessory for patch cords with rotating system for angle adjustment and label holder

Compatible with all panels (Flat, angled, HD)

Angled patch panel solution from 24 to 48 ports per unit

Patch panels with an angled design which allows the cable to run into each side of the rack, creating a correct cable radius of curvature. This avoids the need to manage the cables horizontally, and allows the patch cords to be carried directly in the vertical cavities.

Tidy cable management

Quick-fix system

Simple and efficient
Identification of the ports

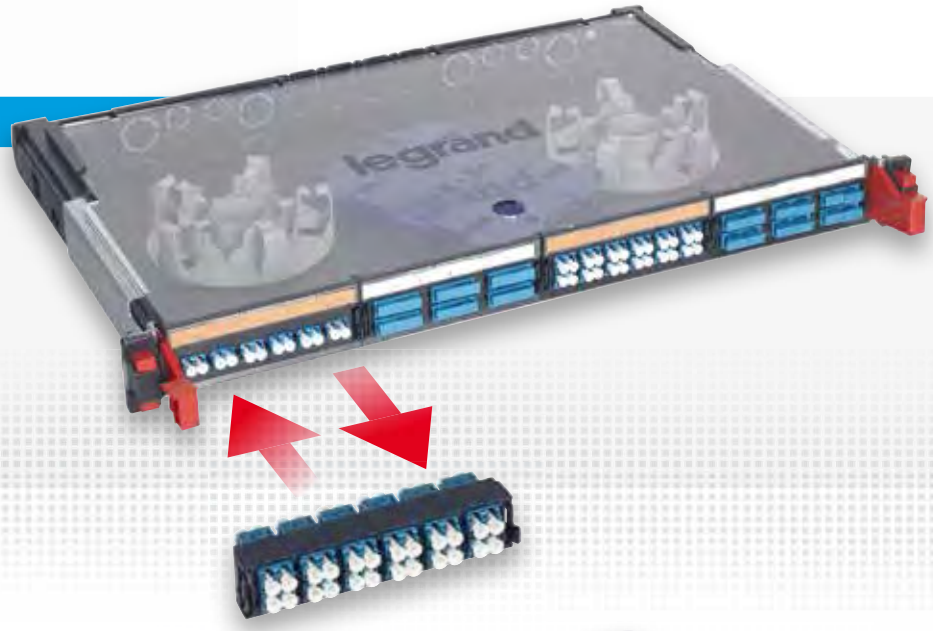
Also available
in the 24-port version

Fibre optic panels

Completely renovated and redesigned fibre optic panels & drawers in high and very high density versions from 96 connectors per unit to 144 connectors per unit. Panels with sliding drawers and fast push-button system to facilitate upgrade and maintenance operations.

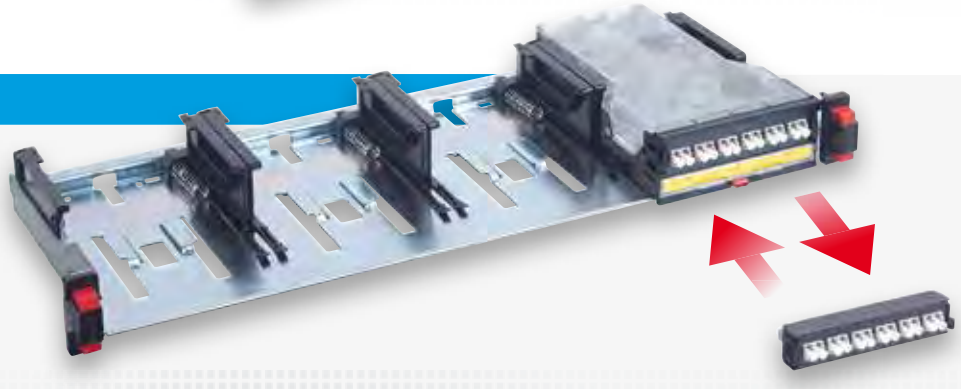
MODULAR PANELS

- Possible to change modular blocks, blank panel, MTP adaptor
- Splice trays to be added if necessary - up to 4 containing 96 LC fibres

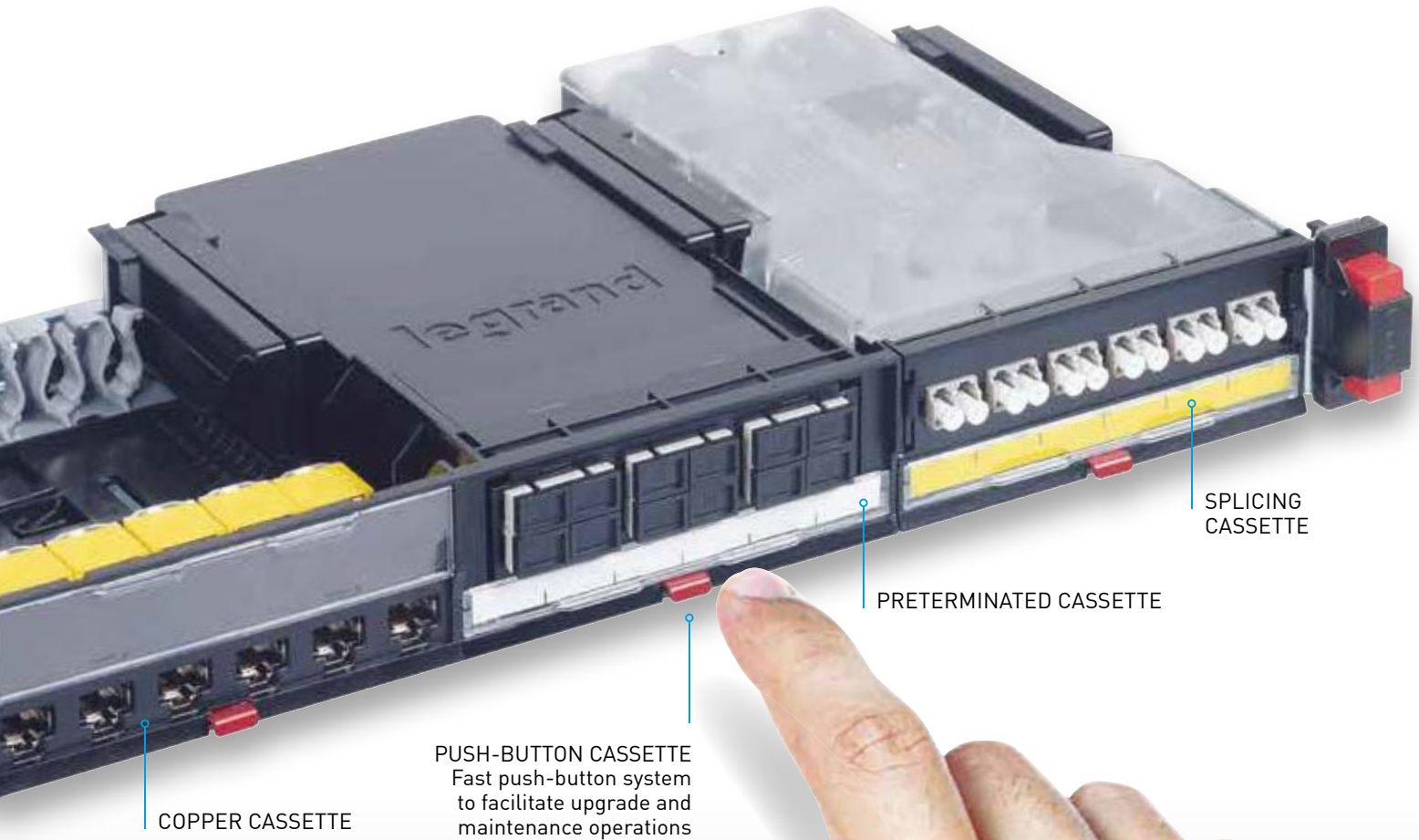


HD MODULAR PANELS

- Innovative new quick-fixing solution
- Possible to add splicing cassette with perfectly adapted coiling space
- Mixture of fibre/copper on modular panel in drawer

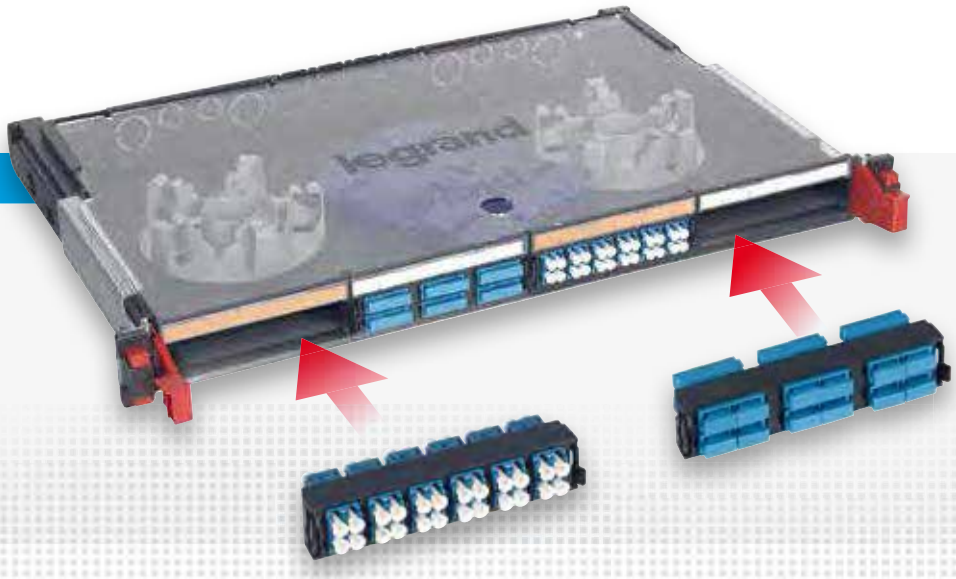


Fibre optic panels



MODULAR PANELS

- Innovative new quick-fixing solution
- Modular blocks to adapt to modular panel or drawer: LC, SC, ST, LC, APC, SC APC
- Possible to add modular blocks, blank panel, MTP adaptor



HD MODULAR PANELS

- Cassettes slide in from front & rear
- Fast push-button on cassette
- Splicing cassette which takes all modular blocks
- Mixture of fibre/copper on cassette panel
- Trunk & cord management system

EFFICIENCY

High density

1. 48 ports per Unit for high density
COPPER SYSTEM

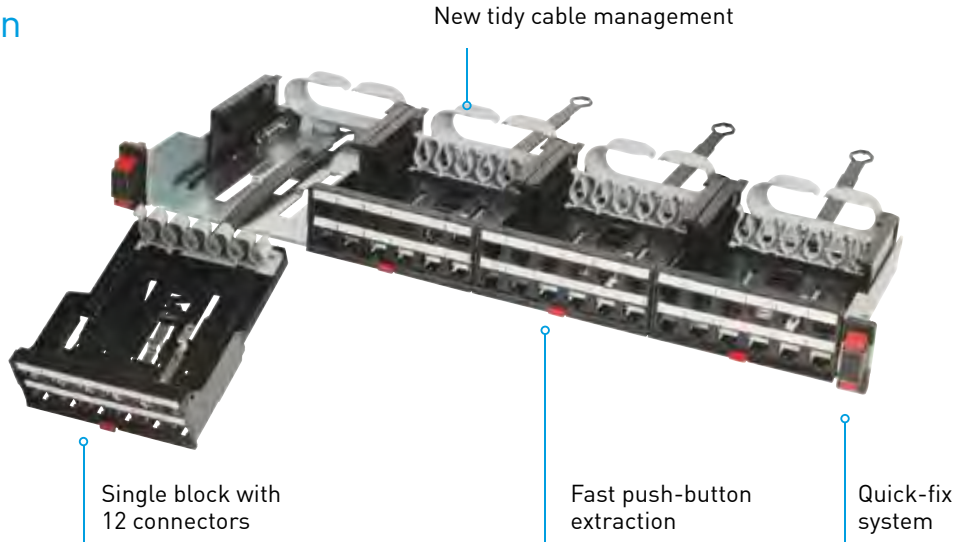
2. 96 LC per Unit for high density
FIBRE OPTIC SYSTEM

3. 144 LC per Unit for ultra-high density
FIBRE OPTIC SYSTEM

COPPER SYSTEM

Patch panel HD solution up to 48 ports per unit

High-density patch panel. It has changed from 24 to 48 ports, guaranteeing a reduction in space occupied and making future upgrades easier. Designed to house 4 blocks of 12 connectors each.



FIBRE OPTIC SYSTEM

Very High density up to 144 LC/1U

Since different network architectures such as top-of-rack, end-of-row and middle-of-row require different cabling densities, passive equipment needs to adapt perfectly to the active network. The LCS³ HD cassette panel provides a mixed-media structured cabling system to support any configuration. Legrand LCS³ offers an innovative UHD patch panel designed to house up to 144 connections in 1 U distributed between 6 individual modules of 24 fibres each.

Each module accepts incoming fibres both from MTP® trunk cables and via predetermined components. Predetermined cables are available both as breakout cables and as distribution cables.

ULTRA HIGH DENSITY UHD

- Up to 144 LC/1U
- 1U, 2U, 4U
- Microcable preterms

HIGH DENSITY HD

- Up to 96 LC/1U
- Mixture of fibre & copper
- Microcable preterms

Preterminated: The fibre optic cable termination is the addition of connectors to each optical fibre in a cable. The connectors are assembled in our factories

LCS 3
3 DIMENSIONS OF EXCELLENCE
PERFORMANCE SCALABILITY EFFICIENCY

Easy installation

Legrand has launched an innovative connection system to make simple, affordable fibre connections.

PATENTED DESIGN

1 PREPARE THE FIBRE

SMART SPLICER

- Easy to handle: one of the smallest tools in the market
- Easy to use: simple program with easy intuitive feedback
- Low cost: quick return on investment
- Best-in-class connection with 25-year warranty
- Legrand-coded pigtail connectors
- Pigtails: OM2, OM3, OM4, OS2, LC, SC, LC APC, SC APC

2 CLEAVE THE FIBRE

3 SPLICE THE FIBRE

4 PROTECT THE FIBRE (heat)

INSERTION LOSS LED

- GREEN: < 0.1 dB
- ORANGE: 0.1 dB < x < 0.2 dB
- RED: > 0.2 dB

LCS³ DATA CENTER
Enclosure & aisle containment

Performance, scalable & efficient solutions

Legrand LCS³ has an extensive portfolio of enclosures and aisle containment systems for your data center and/or server room. The Legrand LCS³ is ideal for the installation of (blade) servers, switches, patch panels, routers and storage equipment. Modularity and flexibility are always key in the design of our products.

LCS^3 server-and-network rack

The server-and-network racks are versatile and modularly constructed. Which type of rack is most suitable depends ultimately on its application.
The server-and-network racks are available in varying heights, widths and depths.

The 600 mm wide rack is a compact rack with a high carrying capacity on a small surface.
The 800 mm wide rack is ideal for to patching, network and server equipment with enough space for power and network cabling.

Airflow optimisation
Data centers are increasingly using energy-efficient cooling techniques such as free cooling and fresh air cooling. The first step in this process is separating the warm and cold air using aisle containment solutions. The next step is airflow optimisation in the rack. This step, however, is often not fully or effectively implemented, although it is the next step in energy-efficient data centers. Airflow optimisation is also important for the server, network and storage equipment to work properly, for temperature control and for the general stability of a data center.

Using airflow optimisation you can achieve the highest levels of airtightness. The side sealing plate and the side sealing panel are covered with foil. Every assembly opening in the side sealing panel is still usable, but all unused openings are sealed with foil to prevent air leakage. The base and roof plates have an identical level of airtightness. Special foam pieces are even placed around the rails on the base.

Cable brush

Cable entry foam

Cable entry plate

Top-of-rack cabling system

From building to cabinet
LEGRAND LCS^3 cable trays can be used for optimum guidance of cables to the cabinet. Cable trays are flexible, modular, easily installable and can be integrated seamlessly in the cabinet. Because this cable system is fixed directly onto the cabinets, it becomes independent of its surroundings. Thus, if the data center expands, the cable management can expand with it without requiring any changes to the construction of the building, unlike ceiling anchoring systems.

From rack row to rack row
Cable bridges can be used for crossing a cold or warm corridor. The cable bridge can be used for both small and wide cable trays. These can also be used in combination with aisle containment. Because cable bridges are telescopic, no sawing is required in the data center. This helps avoid outages of critical equipment.

From rack to rack
Cable trays can also be used for cabling from rack to rack. In this case cables do not run horizontally through the racks but are guided over the top, across the roof towards the neighbouring racks.

Cable management

Management solutions within your rack. Structured cabling is important for the reliability and optimum performance of your data center or server room. Flexibility and accessibility in the case of troubleshooting or expansion is also essential.

Reliability
Good cable management ensures the equipment's air intake points are kept as clear as possible. This allows sufficient air to pass through to the equipment so that it is cooled well. Proper cooling helps avoid equipment failures and results in longer equipment lifespans.

Optimum performance
Good cable management ensures that cables do not become damaged or break and that they have the correct radius of curvature. An incorrect radius of curvature reduces the performance of the cable. The radius of curvature must never be less than what has been recommended by the supplier.

Flexibility and accessibility
Cabling should have a neat and structured appearance. This makes it easy to move or add cables.

3

Aisle Containment

Performance, efficiency & scalability

Energy bill savings

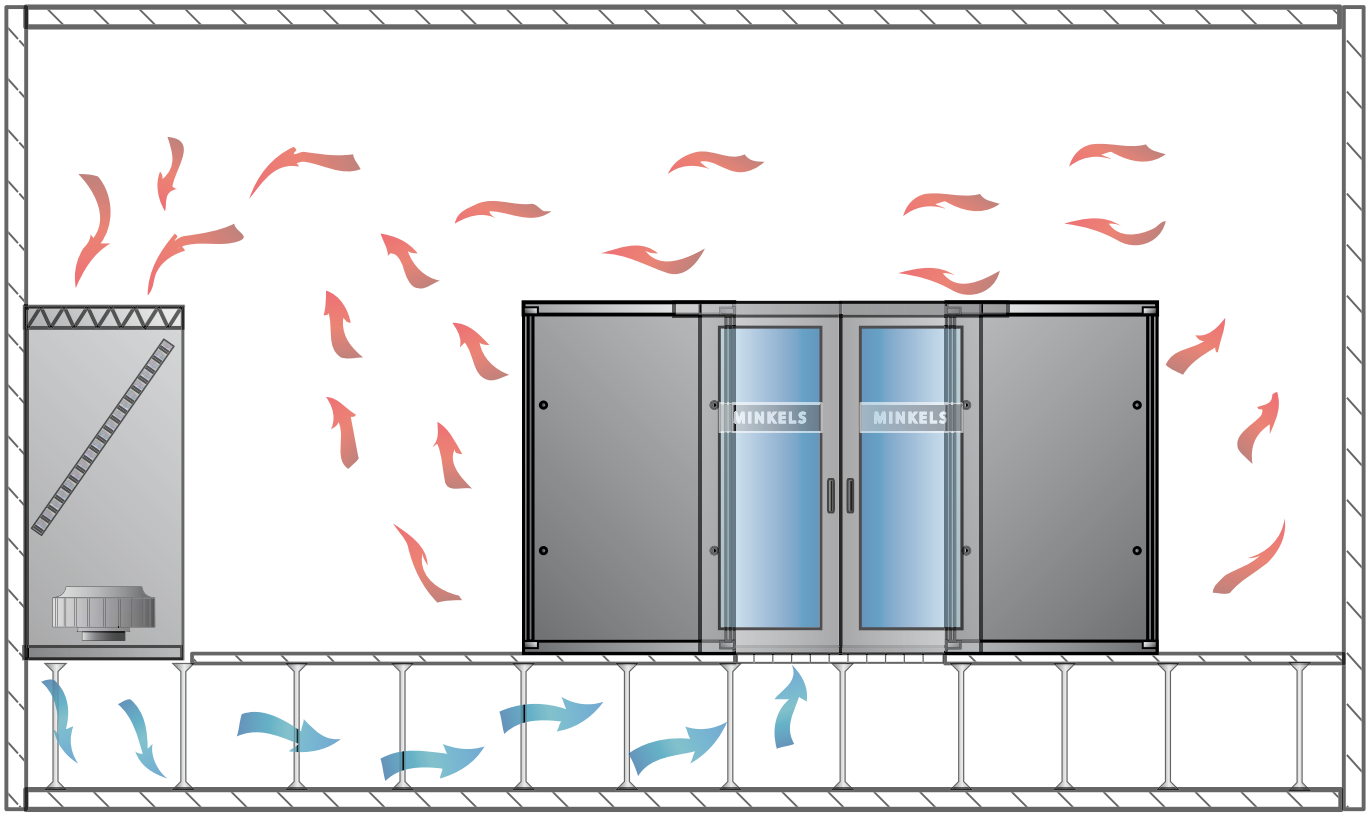
By cooling your data center in the right manner, you can significantly reduce your energy spending. Minkels has developed an extensive range of energy-efficient cooling solutions.

AISLE CONTAINMENT

Aisle containment is the solution to the challenges data centers have faced since day one: the optimisation of cooling and energy efficiency through the separation of hot and cold airflows.

However, this is not the only challenge which data center managers and owners have been confronted with. Because IT equipment has a shorter life cycle, data center managers and owners encounter a higher rate of change in the data center. Traditional aisle containment does not offer the flexibility and modularity needed to deal with this dynamic. In addition, data center managers and owners are increasingly confronted with systems – such as storage equipment - which do not come in a standard housing and are therefore hard to fit into a traditional aisle containment system. Furthermore, traditional systems do not offer enough options for optimum integration of sensors and so on. The challenges outlined call for aisle containment solutions offering greater flexibility and modularity and better integration options.

With the Next Generation Corridor we offer data center managers and owners 'future-proof' solutions which offer the flexibility and modularity needed in order to anticipate the dynamic of the modern data center.



NEXT GENERATION CORRIDORS (rack-dependent)

Minkels was the first data center supplier in Europe to introduce the Corridor solutions commercially. Since then, these solutions have been used to separate the airflows of many a data center in an energy-efficient manner. Next Generation Corridor is the ultimate answer to the ever-increasing demand for flexible and modular solutions. The Next Generation Corridor takes modular thinking and energy-efficient data center design to a higher level.

Important features of the Next Generation Corridor are:

MODULARITY
Through the highly modular concept of the Next Generation Corridor, Minkels offers extensive ways to implement a Corridor solution in a phased and thus cost-efficient manner.

FLEXIBILITY
Because of its modular design, the Next Generation Corridor is flexible and thus can be adapted to fit the specific building environment.

EASE OF INSTALLATION
Modularity in the construction details ensures that the solution is easily and cost-efficiently installed.

ENERGY EFFICIENCY
With the Next Generation Corridor, Minkels offers a solution which is more energy-efficient than other aisle containment models on the market.

OPTIMUM INTEGRATION
The Next Generation Corridor can be integrated with row-based cooling systems which bring cooling close to the heat source, but also with more traditional forms of cooling which require a raised floor. In addition, this concept offers plug & play integration with e.g. fire detection and suppression systems, monitoring sensors and access control.

FROST & SULLIVAN
2013 BEST PRACTICES AWARD
EUROPEAN RACKS & CABINETS ENTREPRENEURIAL COMPANY OF THE YEAR AWARD

Micro data center

The MiniCube

Professionalising the IT infrastructure
With the adoption of cloud computing, many companies are now looking to reduce the size of their server rooms and save energy costs. Do you have fewer applications running from your in-house server room than before? Do you only want to house your business critical information on site? Then the time has come to deploy an efficient, turnkey micro data center. Whether you want to access data more quickly - low latency - or you want to optimise your server room, the MiniCube is the ideal solution. The MiniCube has everything you need for a full data center: housing, power supply, monitoring and cooling, all in a compact system. The MiniCube is fully preconfigured and truly plug-and-play.

Advantages
- Reliable and efficient solution for server rooms
- No dependency on the building, easy to deploy
- Efficient cabinets or racks for your IT infrastructure
- Use of proven technologies
- Turnkey solution, including installation and start-up

One Catalogue number, one solution

Local Area Network

LCS³ CONNECTIVITY RACK

Mighty Mo 20 4-post racks provide greater flexibility and optimum efficiency in any data center. The fixed racks provide an economical mounting platform for switches and servers while the adjustable rack allows all 4 mounting rails to be adjusted even after the rack has been fastened to the floor.

Front and rear waterfalls allow for equipment patching and server patching. All styles of Mighty Mo 20 vertical manager can be mounted front or rear, and airflow baffles can be mounted to manage the airflow of side-breathing equipment.

LCS³ CABLING RACK

Given how quickly IT technology evolves, a flexible, future-proof concept is essential. The LCS³ cabling rack is specifically designed to meet these needs and stands out due to its versatility, ease of installation and ease of use.

The LCS³ cabling rack is a multifunctional system, specifically designed for ease of installation. The system is ultimately suitable for housing UTP patch panels, glass drawers, telephone panels, switches, routers and other IT equipment. Of course it is also possible to include a small number of servers.

LCS³ WALL ENCLOSURE

The basic frame is made up of a wall-mounting plate with integrated strain relief bar, four depth rails, two cable-entry plates (base and top) and a set of 19-inch rails. The assembly consists of two equal top and base panels with ventilation slots to the rear, two equal side panels and a safety glass door with an EK-333 cylinder lock with grip.

PDUs

Solutions for any configuration

A wide universal range

This new PDU offer combines Legrand's quality and innovation with a wide range of applications. A standalone solution, this range integrates seamlessly into any installation and ensures compliance with applicable standards.

GENERAL CHARACTERISTICS

- Anodised aluminium body:
  Lightweight rigid high-end material
- Modular design:
  Expandable outlet and function modules

SAFETY

- High electrical safety rating
- High-quality connection
- Outlets equipped with safety shutter
- **Cord Locking System**

CORD LOCKING SYSTEM

POWER SUPPLY

- 16 A to 32 A single-phase or three-phase
- PDUs integrate local and international outlet types

STANDARDS

IEC 60950 - Information technology equipment – Safety
IEC 60297-3 - Dimensions of mechanical structures of the 482.6 mm (19 in) series
IEC 60320-2-2 - Interconnection couplers (C13 and C19) for household and similar equipment
IEC 60884-1 - Plugs and socket outlets for household and similar purposes (France, Belgium and Germany)
BS 1363-2 - British standard plugs and socket outlets
IEC 60309 - Plugs, socket outlets and couplers for industrial purposes

Certification: CE, TSE, CCC

Environmentally-friendly products
Eco-friendly design

RoHS

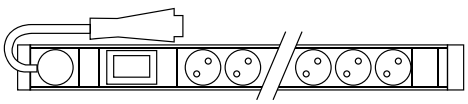
ZERO-U PDUs

FOR DATA CENTERS/SERVER ROOMS
Used in server cabinets where:
- there is a high density of active equipment
- electrical distribution quality is crucial

12 CATALOGUE NUMBERS

FOR VERTICAL INSTALLATION

ZERO-U



19" **1-U PDUs**

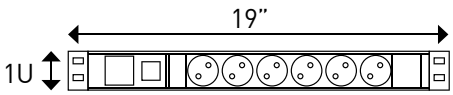
FOR DATA CENTERS/SERVER ROOMS AND COMPUTER ROOMS

Used in server and cabling cabinets where:

- there is a low density of active equipment to be powered
- ease of installation is an advantage

26 CATALOGUE NUMBERS

FOR VERTICAL OR HORIZONTAL INSTALLATION



10" **1-U PDUs**

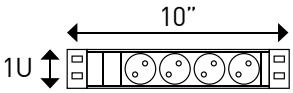
FOR SMALL IT ENVIRONMENTS

Mainly used in small-scale commercial applications where there is a limited number of IT points and a 10" cabinet is sufficient:

- Small businesses, freelance professions, administrative services, etc.

3 CATALOGUE NUMBERS

HORIZONTAL PDU



Cord Locking System

Innovation at the heart of PDUs

For C13 & C19 sockets

A major addition to the range and exclusive to Legrand, C13 and C19 outlets have a power supply cord locking system which prevents accidental disconnection and guarantees absolute safety.

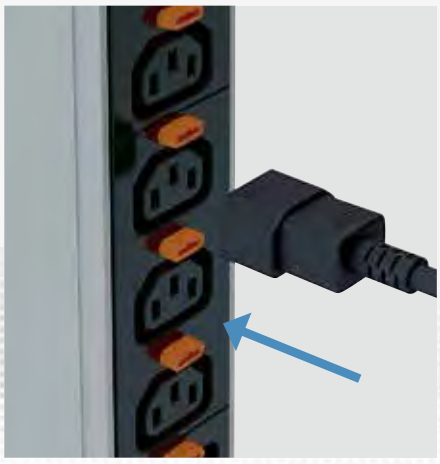
AN INNOVATIVE TECHNICAL SOLUTION

CORD LOCKING SYSTEM

Very easy to identify thanks to the orange buttons next to each outlet

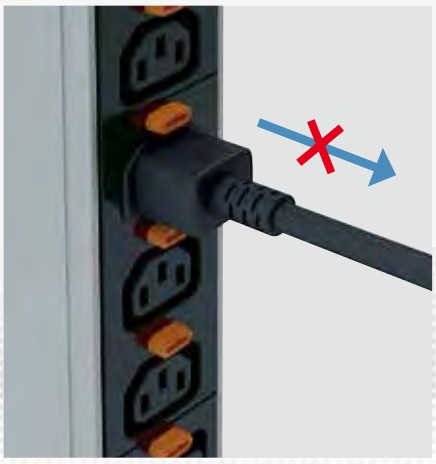
CORD LOCKING SYSTEM

1 CONNECTION



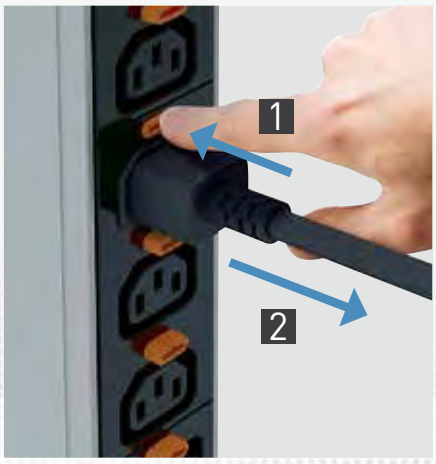
CORD CONNECTION
The cord is connected to the outlet naturally in one smooth action

2 AUTO LOCKING



CORD HELD IN PLACE
Once the power supply cord is connected, it locks automatically and cannot be removed

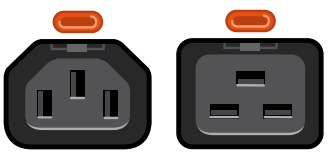
3 UNLOCKING



EASY REMOVAL
Simply pressing the unlock button releases the cord from the outlet

UNIVERSAL SYSTEM

Takes all cords for standard C13 and C19 outlets

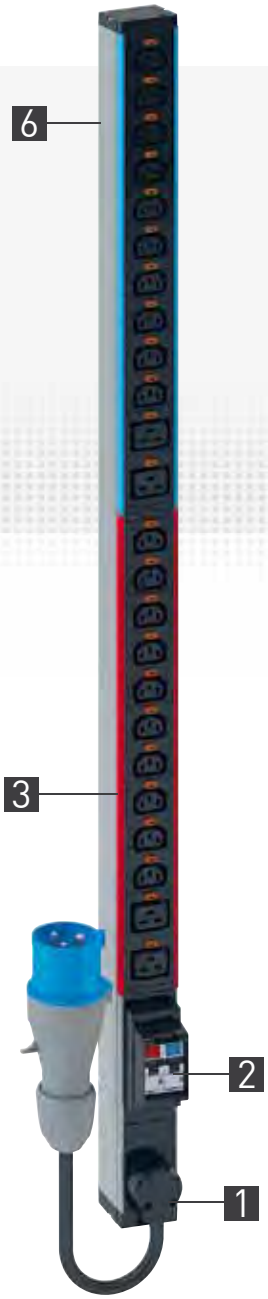


EXCLUSIVE TO LEGRAND

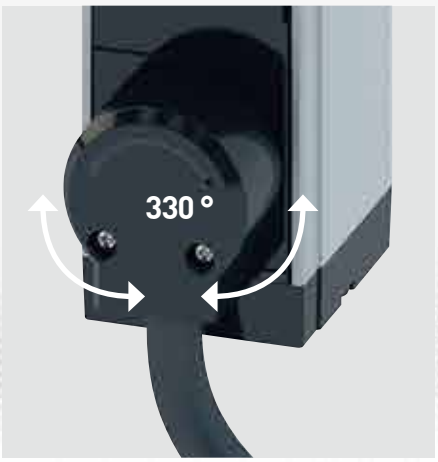
ZERO-U PDUs
Innovation & performance

Exclusive innovations

Every detail matters! Legrand's unique and novel innovations, which include safety features, simplified setup and integration, and consumption indicators, help ensure optimum performance for the Zero-U range of PDUs.



1 CABLE ENTRY



CABLE ORIENTATION
330° rotating cable entry for perfect cable orientation without needing to access the cabinet.

VERTICAL INSTALLATION

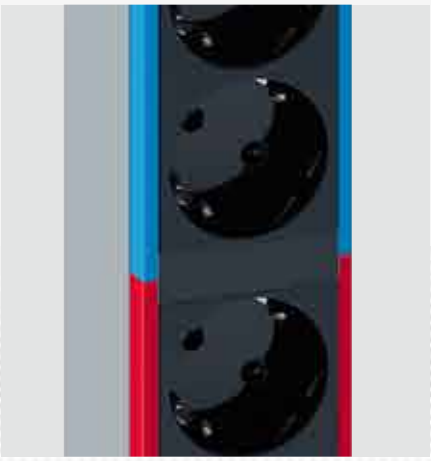
CORD LOCKING SYSTEM

2 MCB HOLDER

ENHANCED PROTECTION

Circuits protected by MCB.
Holder with projecting edges to avoid unintended operation (a cover can be added on request).

3 IDENTIFICATION



COLOUR-CODED CIRCUITS

Each circuit is colour-coded, with the colour clearly visible on the front panel and along the edges of a module.

The colour corresponds to the specific MCB protecting the circuit.

4 AMMETER

CONSUMPTION INDICATOR

Consumption is measured to ensure better installation management:

- Balancing circuits
- Display of available capacity
- Power features and overload prevention

5 POWER SUPPLY

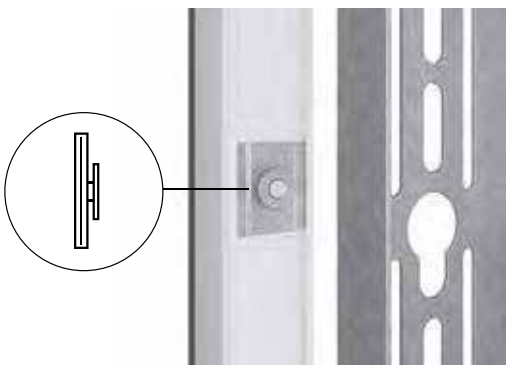
There are multiple solutions depending on power supply requirements

16/32 A single-phase

16/32 A three-phase

6 SCREWLESS MOUNTING

Zero-U PDUs simply clip vertically into slots on the mounting frame without the need for any screws.



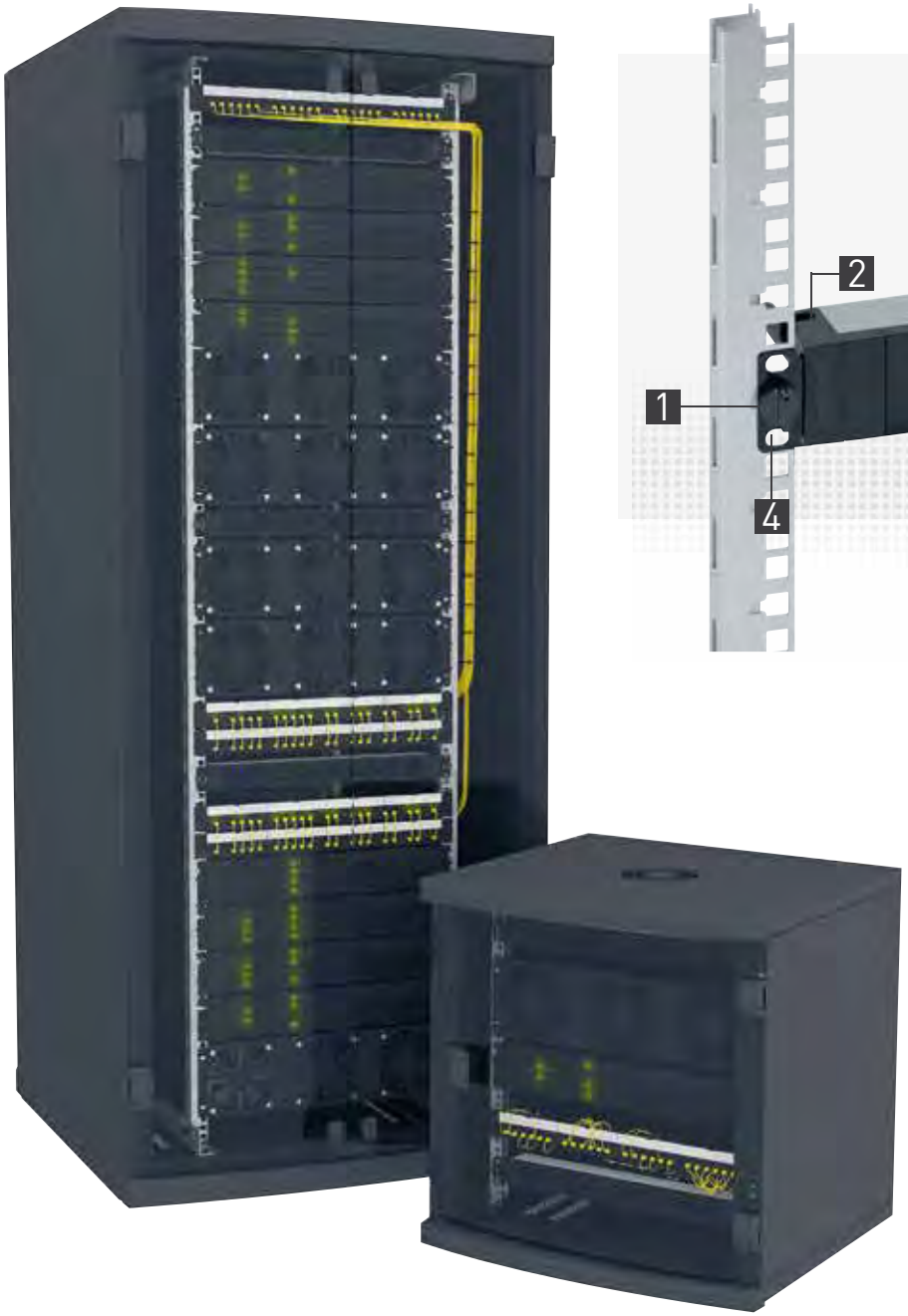
EXCLUSIVE TO LEGRAND

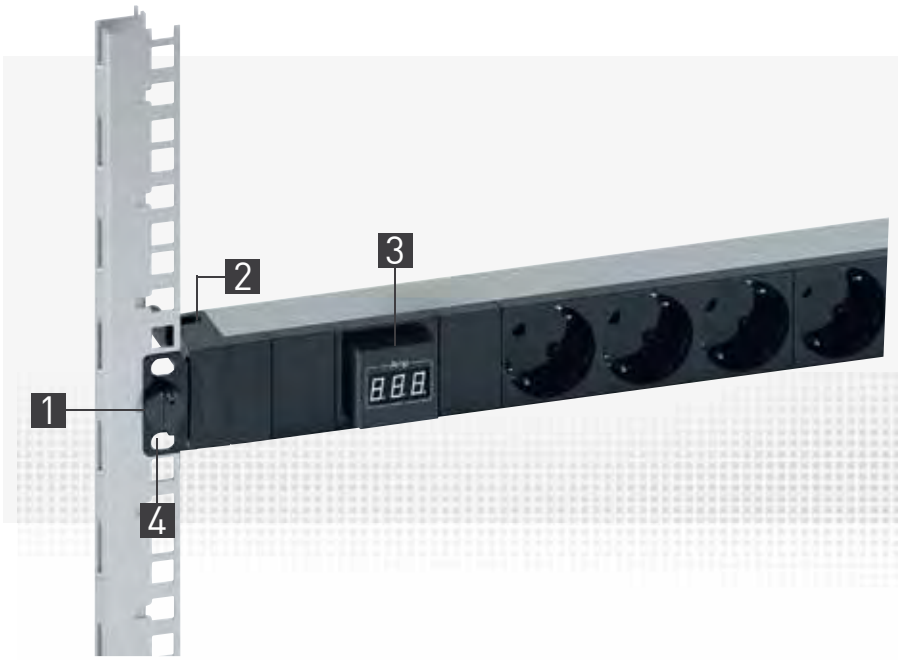
1U PDUs

Innovation & Convenience

Simple setup and integration

The 19" PDUs designed for installation in server and cabling cabinets also incorporate the latest innovations for facilitating integration and maintenance, with clever mounting and operating features.





10" 1U PDUs

Specially designed for local area networks, these PDUs feature the same innovations as the 19" range.

HORIZONTAL INSTALLATION

HORIZONTAL
OR VERTICAL
INSTALLATION

CORD LOCKING SYSTEM

1 QUICK FIXING

TOOLLESS INSTALLATION
Quick, toolless fixing
on the 19" uprights.
No screws or nuts required.

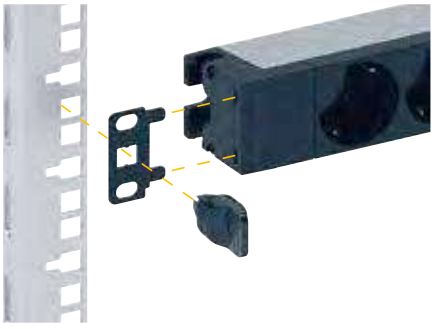
2 CABLE GUIDE

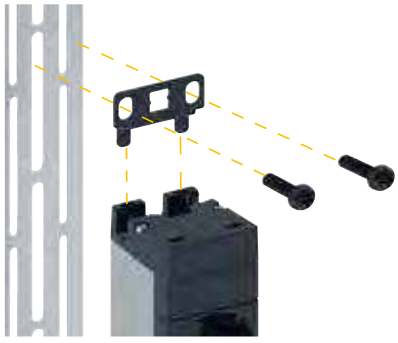
OPTIMISED SPACE
Cables are held firmly
in place by a cable guide.

3 AMMETER

CHANGE OF POSITION
The ammeter can be rotated 90°
to ensure easy reading regardless
of mounting position (horizontal
or vertical).

4 MOUNTING SUPPORTS





HORIZONTAL OR VERTICAL
Designed for horizontal toolless
mounting, 1U PDUs can also be
mounted vertically simply by rotating
the mounting brackets.
Vertical mounting requires a bolt
and nut to fix the PDU firmly to the
upright.

EXCLUSIVE TO LEGRAND

Protection accessories

Enhanced safety and control

Compatible with all the PDUs in the range, the complementary accessories allow you to control the power supply at the outlets and protect against overvoltages.

1 OUTLET LOCKING CAP

CONTROLLING ACCESS TO THE POWER SUPPLY

Locking caps are used to lock access to a socket. A special key is required to unlock it.

Locking caps available for the following standard socket outlets:
C13, C19, German, French-Belgian, British

2 SURGE PROTECTION DEVICE

UNINTERRUPTIBLE PROTECTION

The surge protection module protects equipment against overvoltages and incorporates hot swap technology. It can be used to replace a used module without interrupting the power supply to the other equipment connected to the PDU.

This is an essential accessory for business servers which need continuous protection. The module is equipped with a warning LED which indicates when it needs replacing.

EXCLUSIVE TO LEGRAND

Support
you can rely on

It takes more than just sophisticated technological solutions to manage international projects successfully. What is really needed is the comprehensive and expert support of an experienced partner: from project design and choice of the right solution through to on-site logistics, installation and configuration, including any subsequent troubleshooting and maintenance.

Legrand is ideally placed to offer this type of support, as all its products and solutions are developed and produced in close proximity to its customers. It also offers a wide range of special services and support tools which create genuine added value by making customers' day-to-day business significantly easier. This support is available at every stage of the project, whatever the customer touchpoint.

01 A diverse range of digital tools including websites, social media and news feeds so you can contact Legrand at any time and stay up to date with all essential news that is relevant to your projects.

02 Personal advice, technical support and documents, white papers, catalogues and e-catalogues, mobile apps, and software to help with product choice or drawing up bills of materials.

03 Training courses covering actual product expertise as well as the latest developments in technology, standards and regulations. Customised training courses available on request, either face to face or in virtual online classes.

04 Configurators, project software and AutoCAD libraries for project design, open for integration into existing software solutions wherever possible.

Evolution of standard 11801 Edition 3 - 2018

Introduction

Within customer premises, the importance of the cabling infrastructure is similar to that of other fundamental building utilities such as heating, lighting and mains power. As with other utilities, interruptions to service can have a serious impact. Poor quality of service due to lack of design foresight, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organisation's effectiveness.

Historically, the cabling within premises comprised both application-specific and multipurpose networks. The original edition of this standard enabled a controlled migration to generic cabling and the reduction in the use of application-specific cabling. The subsequent growth of generic cabling designed in accordance with ISO/IEC 11801 has:

a) contributed to the economy and growth of Information and Communications Technology (ICT)
b) supported the development of high data rate applications based upon a defined cabling model, and
c) initiated development of cabling with a performance surpassing the performance classes specified in ISO/IEC 11801:1995 and subsequent editions:

- ISO/IEC 11801:1995 (Ed. 1) - first edition
- ISO/IEC 11801:2000 (Ed. 1.1) - Edition 1, Amendment 1
- ISO/IEC 11801:2002 (Ed. 2) - second edition
- ISO/IEC 11801:2008 (Ed. 2.1) - Edition 2, Amendment 1
- ISO/IEC 11801:2010 (Ed. 2.2) - Edition 2, Amendment 2

The 3rd Edition of ISO/IEC 11801 is now a multipart standard with the structure shown below. It is at the Final Draft International Standard (FDIS) stage in 2017 , and is due to be published in early 2018:

ISO/IEC 11801 3rd Edition

General requirements (11801-1)
Specific requirements for premises:
- Offices & commercial buildings (11801-2)
- Industrial premises (11801-3)
- Homes (11801-4)
- Data centers (11801-5)
- Distributed building services (11801-6)

The International Standard ISO/IEC 11801-1 will specify requirements for balanced twisted-pair copper (Classes A, B, C, D, E, EA, F, FA, I and II), and fibre optic (OM1, OM2, OM3, OM4, OM5, OS1a, and OS2) cabling systems used in offices (ISO/IEC 11801-2), industrial buildings (ISO/IEC 11801-3), homes (ISO/IEC 11801-4), data centers (ISO/IEC 11801-5), and for the distribution of services in buildings (ISO/IEC 11801-6). This standard series will specify the structure and minimum configurations of generic cabling, performance requirements of channels, links, connecting hardware and cords, implementation requirements, compliance requirements and verification procedures, and interfaces. Requirements for cable performance are made via reference to applicable IEC standards.

Dealing with balanced twisted-pair cabling, new Classes I and II are specified with Category 8.1 (RJ45 connector) and Category 8.2 (proprietary connector) components respectively.

Balanced Twisted-Pair Class Specifications of ISO/IEC 11801-1:

- Class A is specified up to 100 kHz
- Class B is specified up to 1 MHz
- Class C is specified up to 16 MHz
- Class D is specified up to 100 MHz
- Class E is specified up to 250 MHz
- Class EA is specified up to 500 MHz
- Class F is specified up to 600 MHz
- Class FA is specified up to 1000 MHz
- Class I and Class II are specified up to 2000 MHz

Significant changes from the previous edition include:
Class I and II channel and link requirements have been added

- Category 8.1 and 8.2 connecting hardware and cord requirements have been added
- Cabled OM1, OM2, and OS1 optical fibre is no longer recommended for new installations
- Cabled wideband OM4 (OM5) and OS1a optical fibre requirements have been added

This International Standard provides:
a) users with an application-independent generic cabling system capable of supporting a wide range of applications
b) users with a flexible cabling scheme making modifications both easy and economical
c) building professionals (for example, architects) with guidance allowing the accommodation of cabling before specific requirements are known; that is, in the initial planning for either new construction or refurbishment
d) industry and application standardisation bodies with a cabling system which supports current products and provides a basis for future product development.

This International Standard specifies a multi-vendor cabling system which can be implemented with material from single and multiple sources, and is related to:
a) international standards for cabling components developed by committees of the IEC, for example copper cables and connectors as well as fibre optic cables and connectors (see Clause 2 and bibliography)
b) standards for the installation and operation of information technology cabling as well as for the testing of installed cabling (see Clause 2 and bibliography)
c) applications developed by technical committees of the IEC, by subcommittees of ISO/IEC JTC 1 and by study groups of IEEE 802 and ITU-T, for example for LANs and ISDN
d) planning and installation guides which take into account the needs of specific applications for the configuration and the use of cabling systems on customer premises (for example ISO/IEC 14709 series, ISO/IEC 14763 series, ISO/IEC 30129, and ISO/IEC 18598).

Physical layer requirements for the applications listed in Annex E have been analysed to determine their compatibility with the cabling classes specified in this standard. These application requirements, together with statistics concerning the topology of premises and the model described in ISO/IEC 11801-2 clause 8.2, have been used to develop the requirements for Classes A to FA and fibre optic cabling systems.

In offices, horizontal balanced cabling should now be designed to provide minimum Class E, and minimum Class EA is recommended to support applications with data rates exceeding 1 Gigabit/sec.

Scopes

Scope of ISO/IEC 11801-1: Generic cabling for customer premises – Part.1 General requirements

This International Standard specifies requirements that are common to the other parts of the ISO/IEC 11801 series. Cabling specified by this standard supports a wide range of services including voice, data, and video that may also incorporate the supply of power.
This International Standard specifies:

a) The fundamental structure and configuration of generic cabling requirements within the type 400 premises defined by the other standards in the ISO/IEC 11801 series
b) channel transmission and environmental performance requirements
c) link performance requirements
d) component performance requirements, referring to available International Standards for 404 components and test methods where appropriate
e) test procedures to verify compliance with the cabling transmission performance requirements 406 of the 11801 series documents.

Note: This International Standard does not contain specific compliance requirements. The cabling design documents supported by ISO/IEC 11801-1 incorporate the requirements of this standard as part of their individual compliance requirements.
In addition, ISO/IEC 11801-1 provides information regarding the applications supported by the cabling channels. ISO/IEC 11801-1 has taken into account requirements specified in the application standards listed in Annex E.

Scope of ISO/IEC 11801-2 – Generic cabling for customer premises – Part.2 Office premises

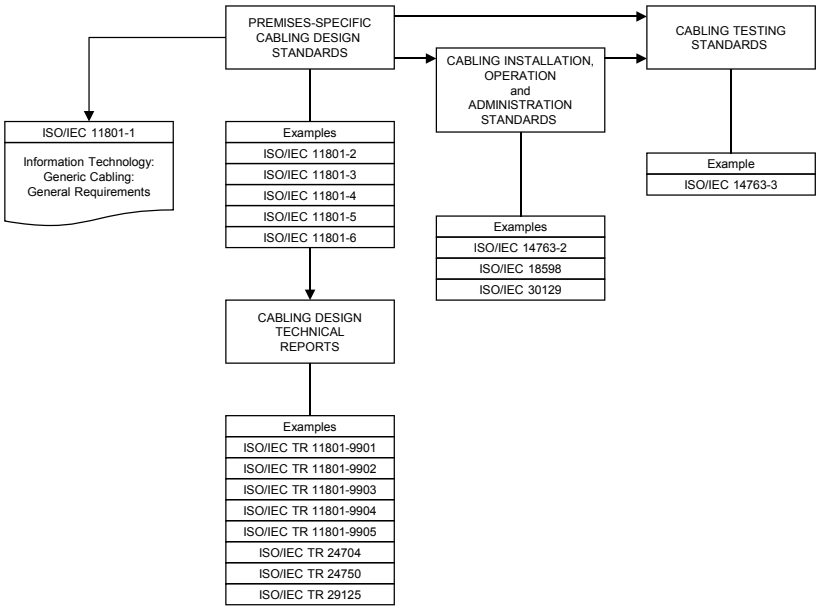
This International Standard specifies generic cabling for use within office premises, which may comprise single or multiple buildings on a campus. It covers balanced cabling and fibre optic cabling.
ISO/IEC 11801-2 is optimised for premises where the maximum distance over which telecommunications services can be distributed is 2000 m. The principles of this International Standard may be applied to larger installations.
Cabling specified by this standard supports a wide range of services including voice, data, and video that may also incorporate the supply of power.
This International Standard specifies directly or via reference to ISO/IEC 11801-1:

a) the structure and minimum configuration for generic cabling within office premises
b) the interfaces at the telecommunications outlet (TO)
c) the performance requirements for cabling links and channels
d) the implementation requirements and options
e) the performance requirements for cabling components
f) the compliance requirements and verification procedures.

ISO/IEC 11801-2 has taken account of the requirements specified in application standards listed in ISO/IEC 11801-1:201X, Annex E.

Safety (e.g. electrical safety and protection and fire) and Electromagnetic Compatibility (EMC) requirements are outside the scope of this International Standard, and are covered by other standards and by regulations. However, information given by this standard may be of assistance.

Scope of ISO/IEC 11801-6 – Generic cabling for customer premises – Part. 6 Distributed building services.



The information in this Figure is not automatically updated following the introduction, or removal, of international standards or Technical Reports

Source: ISO/IEC 11801-1 (2017)

The figure shows the schematic and contextual relationships between the standards relating to information technology cabling produced by ISO/IEC JTC 1/SC 25, namely the ISO/IEC 11801 series of standards for generic cabling design, standards for the installation, operation and administration of generic cabling and for testing of installed generic cabling.

The life expectancy of generic cabling systems can vary depending on environmental conditions, supporting applications, ageing of materials used in cables, and other factors, such as access to pathways (campus pathways are more difficult to access than building pathways). With appropriate choice of components, generic cabling systems meeting the requirements of this International Standard are expected to have a life expectancy of at least ten years.

CAT. 8 - Understanding the new performance category for balanced twisted pair cables

Introduction

Ethernet is now widely deployed as a preferred networking solution for many types of application ranging from small businesses to large enterprises. Increased network traffic, driven by server virtualization and converged networking, is driving the need for higher bandwidth server connections.

Ethernet BASE-T interfaces, using balanced twisted pair cabling, are prevalent. They are ideal for network environments with a mixed set of applications, equipment and networking port speeds. The ability to auto-negotiate between application speeds allows easy migration to higher operating speeds on an as-needed basis, while maintaining compatibility with existing equipment. This, along with its cost-effectiveness, makes balanced twisted pair cabling still a very popular medium for supporting Ethernet applications.

Category 6A performance was defined to support 10 Gigabit Ethernet (GbE) over balanced twisted pair cabling in a channel, up to 100 m. This standard was ratified in February 2008.

In 2010, the Institute of Electrical and Electronics Engineers (IEEE) ratified the 802.3ab standard defining 40 Gbps and 100 Gbps Ethernet transmission. There are many options for the physical medium dependent (PMD) sublayer that defines the transmission and reception details of the physical layer. The majority of the options are listed below. As you can see, most PMDs listed are for 40/100 Gbps transmission over fibre. There is a shielded copper cable option for both 40 and 100 GbE for up to 7 m, but the supported medium is twinax cable. There is no option for balanced twisted pair cable.

What initiated the development of Category 8?

The IEEE 802.3 NGBASE-T Call-for-Interest (CFI) led to the formation of a Study Group to investigate and possibly develop this technology. In March, 2013, IEEE approved the formation of the task group IEEE 802.3bq to develop the 40GBASE-T Ethernet Standard for supporting 40 GbE over cost-effective twisted pair cabling.

Some of the main objectives of the 802.3bq group are the following:

- Support full duplex operation only
- Preserve the 802.3 Ethernet frame format utilizing the 802.3 MAC
- Preserve the minimum and maximum frame size of the current 802.3 standard
- Support a Bit Error Rate (BER) better than or equal to 10-12
- Support auto-negotiation
- Support energy-efficient Ethernet
- Support local area networks using point-to-point links over structured cabling topologies, including directly connected link segments
- Do not preclude meeting FCC and CISPR EMC requirements
- Support a data rate of 40 Gbps
- Define a link segment based upon copper media specified by ISO/IEC JTC1/SC25/WG3 and TIA TR-42.7 meeting the following characteristics: – 4-pair, balanced twisted pair copper cabling
  – Up to two connectors
  – Up to at least 30 m
- Work in TIA 42.7 was initiated in 2013 to support this new PMD for 40GBASE-T.

Summary of Physical Layer Options for Supporting 40 and 100 GbE

PMD/INTERFACE	IEEE STANDARD	SUPPORTED MEDIA
40GBASE-SR4	802.3ab	OM3 multimode fibre (d 850 nm (4-channel) up to 100 m OM4 multimode fibre (d 850 nm (4-channel) up to 150 m
40GBASE-LR4	802.3ab	Singlemode fibre (d1310 nm (CWDM) up to 10 km
40GBASE-CR4	802.3ab	Twinax cable (4-channel) up to at least 7 m
40GBASE-KR4	802.3ab	Backplane (4-channel) up to 1 m
100GBASE-SR10	802.3ab	OM3 multimode fibre (d 850 nm (10-channel) up to 100 m OM4 multimode fibre (d 850 nm (10-channel) up to 150 m
100GBASE-LR4	802.3ab	Singlemode fibre (d 1310 nm (CWDM) up to 10 km
100GBASE-ER4	802.3ab	Singlemode fibre (d 1310 nm (CWDM) up to 40 km
100GBASE-CR10	802.3ab	Twinax cable (10-channel) up to at least 7 m

IEEE announced a Call-for-Interest (CFI) for a new application, NGBASE-T in July 2012. NGBASE-T stands for Next Generation BASE-T beyond 10 Gbps. "BASE-T" signifies that the medium will be balanced twisted pair cabling

TIA Category 8 specification

The TIA 42.7 Working Group completed the Category 8 performance specification standard in June, 2016. The Category 8 channel is a 2-connector model using foiled twisted pair (FTP) cable with a maximum permanent link length of 24 m, as shown in Figure 1 below. Category 8 transmission performance is specified from 1 MHz to 2000 MHz.

Category 8 Channel

The horizontal backbone cable will consist of four balanced twisted pairs with conductors ranging from 22 AWG to 24 AWG. The cord cable consists of four balanced twisted pairs with conductors ranging from 22 AWG to 26 AWG. Category 8 is a shielded solution with no specifications for bundled or hybrid cables. Category 8 uses the RJ45, an eight-position modular jack common to BASE-T applications, supported over structured cabling systems, defined within TIA. It will also support auto-negotiation for backwards compatibility since it still uses the 4-pair balanced twisted pair cable used by other cable categories.

The length of the channel can vary from 28 m to 32 m, depending on the length of cords (patch/equipment cords) allowed. This is because the patch cord length allowed depends on a derating factor. The derating factor is based on the wire gauge size (AWG) of the conductor used in the cordage. See Table 2 for the length of cordage allowed based on the de-rating factor.

Patch Cord Derating Factor Based on a 24-Metre Permanent Link

EQUIPMENT CORD DERATING FACTOR	CORD LENGTH ALLOWED (M)
0% (22/23 AWG)	8
20% (24 AWG)	6
50% (26 AWG)	4

Although this is a great departure from the traditional 100 m, 4-connector channel, Category 8 has to be backwards-compatible with existing cabling and equipment to allow auto-negotiation between 100 Mbps, 1 Gbps, 10 Gbps and 40 Gbps over balanced twisted pair cabling. The Category 8 specification is Addendum 1 of the TIA-568-C.2 standard (ANSI/TIA-568-C.2-1).

Currently, ISO has the following category and class specifications:

- **Category 5** components provide Class D balanced cabling performance (specified to 100 MHz)
- **Category 6** components provide Class E balanced cabling performance (specified to 250 MHz)
- **Category 6A** components provide Class EA balanced cabling performance (specified to 500 MHz)
- **Category 7** (shielded) components provide Class F balanced cabling performance (specified to 600 MHz)
- **Category 7A** (shielded) components provide Class FA balanced cabling performance (specified to 1000 MHz)

TIA performance specifications do not recognise Category 7 or 7A (shielded solutions). ISO has also been working on Category 8.1 and 8.2 component specifications to support a new Class I and II channel specification respectively. The existence of these ISO performance specifications is the reason TIA chose Category 8 as the next performance specification.

The Class I specification is similar to the current TIA Category 8 specification. Originally, the ISO Class I channel and 8.1 component performance was specified only to 1.6 GHz. ISO has extended the performance specification to 2 GHz, and like the TIA has not initiated any work similar to ISO's Class II and Category 8.2 specifications which extend performance and use connectors other than RJ45.

ISO/IEC Category 8 specification

ISO is the International Organization for Standardization. It creates standards for structured cabling similar to TIA, with participation from international organisations; the US also has a participating delegation. The ISO/IEC 11801 standard is similar to the ANSI/TIA-568 standard.

Both organisations are trying to harmonise the standards but there are some differences. For example, ISO specifies the channel performance specification as a "Class" and component performance specifications as a "Category". TIA has traditionally used "Category" to refer to the component, link and channel performance specifications.

ISO recognises several connector types for Category 8. These interfaces are shown in Table 3 below. Category 8.1/Class I uses an RJ45 interface. This is the same interface used in all TIA category specifications (TIA-568-C.2 standard), including the Category 8 specification. ISO recognizes three interfaces for Category 8.2/Class II; the TERA, GG45, and ARJ45. These are also recognised Category 7A interfaces in ISO. It remains uncertain whether TIA will adopt any of these connector interfaces if they create a Class II specification similar to ISO in the future.

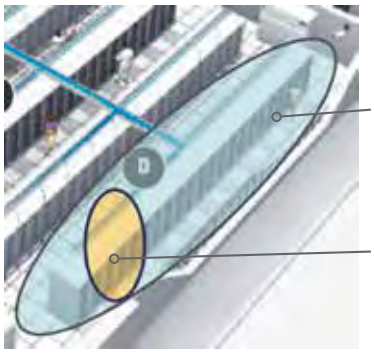
Connection Interfaces for Category 8 in ISO Standards

PMD/INTERFACE	SUPPORTED MEDIA	TYPE	DWG DESCRIPTION
Category 8.1/Class I	TIA 568-C.2 ISO/IEC 11801	RJ45	
Category 8.2/Class II	IEC 61076-3-104 (C7A Interface)	TERA[1]	
	IEC 60603-7-71 (C7A Interface)	GG45[2]	
	IEC 61076-3-110 (C7A Interface)	ARJ45[3]	

Notes: 1. TERA® is a registered trademark of The Siemon Company.
2. GG45® is a registered trademark of Nexans (France).
3. ARJ45® is a registered trademark of Bel Fuse Ltd (Hong Kong).

What is the application

Development of a Category 8 performance standard was driven by the need to support the next generation of NGBASE-T. The need for the next generation BASE-T standard was substantiated by a need to support Ethernet beyond 10GbE for server-to-switch connections. The existing 40 GbE over copper standard (ratified in 2010), 40GBASE-CR4, defines 40 Gbs over twinax cable for up to 7 m. This is sufficient for use within a rack or a neighbouring rack but not sufficient for supporting other architectures within a data center. Therefore, the initial application driving the development of NGBASE-T and Category 8 was support for server-to-switch connections within a row, such as end-of-row or middle-of-row architectures.



Next Gen BASE-T ideal for server-to-switch connections within the row

Distance covered by NGBASE-T
- Within the rack
- Neighbouring racks, stranded ports
- End of row

Distance covered by CR4
- Within the rack
- Neighbouring racks

Category 8 will allow support of 40 Gbps over balanced twisted pair cable for 28 to 32 m depending on the patch cord wire gauge (AWG) used. This distance works well for use within racks, neighbouring racks, and end-of-row racks. Switch fabrics, such as leaf and spine, are growing in popularity in the data center and may also provide an application for Category 8. Category 8 will use an RJ45 interface, which is backwards-compatible with previous TIA category standards and will support auto-negotiation, making transitions to faster data applications easy.

A document has also been produced in TIA that identifies opportunities for high-performance structured cabling (i.e. Category 8). The TIA TR-42.7 subcommittee approved a new Technical Service Bulletin, TIA TSB-5019, "High Performance Structured Cabling Use Cases for Data Centers and Other Premises" published at the April 2015 plenary meeting. This document is intended to provide details for deploying future Category 8 structured cabling in data centers and other premises to support 25GBASE-T and 40GBASE-T applications. The document identifies, analyses and recommends architectures such as switch fabric, end-of-row, middle-of-row and top-of-rack for high-performance structured cabling using next generation BASE-T standards with data rates above 10GBASE-T such as 25GBASE-T and 40GBASE-T. These examples can be used in data center or premise designs such as test labs or equipment rooms requiring high bandwidth solutions.

What are the challenges?

One of the biggest challenges has been defining the measurement technology required to assess and verify Category 8 component, link and channel performance. The frequency range has drastically increased from 500 MHz for Cat. 6A to 2000 MHz for Cat. 8. There are several task groups working on this.

Addendum 1 to the ANSI/TIA-1183: Measurement Methods and Test Fixtures for BalunLess Measurements of Balanced Components and Systems standard was completed in January 2016. This standard is intended to be used as an independent testing reference and describes methods and fixtures that support laboratory measurement of all differential mode, mixed mode, and common mode transmission parameters up to 1 GHz. Category 8 requires the frequency range to be extended to 2 GHz.

ANSI/TIA-1152-A, the requirements for field-testing balanced twisted pair cabling, including Category 8 performance, was approved for publication at the October plenary meeting.
This standard provides requirements for field test instruments, as well as measurement methods for comparing field instrument measurements against measurements obtained using laboratory equipment. The challenge was that the frequency range to be tested had to be increased from 500 MHz (Cat. 6A) to 2000 MHz for Cat. 8.
The table lists the field tester accuracy levels. TIA published the Category 8 standard in July 2016 and ISO should be published in the first quarter of **2017 IEC 61935-1**.

Field Tester Accuracy Levels

CABLING STANDARD	FREQUENCY RANGE (MHz)	ACCURACY LEVEL
CAT 5e	100	Level II
CAT 6	250	Level III
CAT 6A	500	Level IIIe
CAT 8	2000	Level 2G

ISO by IEC (and IEC 61935-1)

CABLING STANDARD	FREQUENCY RANGE (MHz)	ACCURACY LEVEL
CLASS F	600	Level IV
CLASS FA	1000	Level V (draft)

Summary and conclusions

Will Category 8 be widely adopted? That is the question being asked by many. A twisted-pair Ethernet (BASE-T) solution has advantages such as being one of the most widely adopted structured cabling technologies, low cost, using a common connector interface and auto-negotiation capabilities. The Category 8 standard does specify the RJ45 interface, making it compatible with all other TIA balanced twisted pair cabling standards.

The Category 8 channel length has been reduced from the historical 100-metre channel length and is a shielded solution, with the channel being limited to 2 connectors. Both the 30-metre channel length (can vary from 28-32 m depending on the cords) and 2-connector channel limitations must be included in designs intended to support future BASE-T applications.

How widely will Category 8 be adopted? Will fibre be less expensive? Time will tell, however, you should keep an eye on the active equipment manufacturers because they have a huge influence on what gets adopted.

TIA published the Category 8 standard in July 2016 and ISO should be published in the first quarter of 2018.

Fibre optic system - Transmission speed from 40 Gbps to 100 Gbps

IEEE and TIA ISO/IEC standards

IEEE 802.3 is a working group within the Institute of Electrical and Electronics Engineers (IEEE) professional organisation. It is also a collection of IEEE standards produced by the working group defining the physical layer and the media access control layer (MAC) of wired Ethernet. (There are other groups responsible for wireless, etc.) These standards define technology, generally specific to local area networks, with some wide area network applications. The standards define the physical connections between nodes and/or infrastructure devices like hubs, switches, routers, etc. and various types of copper or fibre optic cable.

The Telecommunications Industry Association (TIA) and the SC25 committee in ISO/IEC defines the performance for structured cabling at the component level, link level and channel level to support an application over the distance specified. Sometimes a new performance category needs to be defined to support a new application.

The purpose of standards is to provide the minimum requirements to guarantee applications will function properly with equipment from any manufacturer. Using TIA or ISO/IEC structured cabling assures interoperability between components from different manufacturers.

40/100 Gbps transmission

In 2010, the IEEE 802.3ba standard defining 40 Gbps and 100 Gbps Ethernet transmission primarily over optical fibre was ratified. This was based on the IEEE 802.3ae standard defining 10 GbE transmission ratified in 2002, which made development of the standard much easier and faster. IEEE did not develop a completely new transmission definition for 40G bps and 100 Gbps transmission over two fibres like 10 GbE. Both 40 GbE and 100 GbE were based on using parallel transmission paths transmitting 10 Gbps; 40 GbE requires four channels and 100 GbE requires ten channels for both transmission and reception. This was a departure from previous fibre optic systems.

In 2015, IEEE released a new standard, 802.3bm, which provides a new version of 100 GbE to reduce costs. This standard reduces the number of transmission channels from 10 to 4 by increasing the modulation rate from 10 Gbps to 25 Gbps in each channel. This will make it very easy to update the infrastructure from 40 GbE to 100 GbE because both use the same number of fibres for transmission.

Every application that IEEE802.3 defines has a Physical Medium Dependent (PMD) sublayer as part of the specification. The PMD sublayer defines details of transmission and reception of individual bits on a physical medium. Table 1 lists most of IEEE's 40 Gbps Ethernet PMDs, including the PMD name, type of medium and distance over which application is supported. PMD names are often used when naming transceivers.

Table 1: IEEE Objectives for 40-Gigabit Ethernet

Objective	Resulting PMD	Description of PMD
100m on OM3[1] MMF[2] (850nm) 150m on OM4[3] MMF[2] (850nm)	40GBASE-SR4	40 Gbps PHY using 40GBASE-R encoding over (4) lanes of multimode fiber with a reach up to at least 100m (can support at least 150m over OM4 MMF2)
10km on SMF[4] (1310nm)	40GBASE-LR4	40 Gbps PHY using 40GBASE-R encoding over (4) wavelength division multiplexing (WDM) lanes of single-mode fiber with a reach up to at least 10km
40km on SMF[4] (1310nm)	40GBASE-ER4	40 Gbps PHY using 40GBASE-R encoding over (4) wave-length division multiplexing (WDM) lanes of single-mode fiber with a reach up to at least 40km
7m over copper	40GBASE-CR4	40 Gbps PHY using 40GBASE-R encoding over (4) lanes of shielded balanced copper cabling[5] with a reach up to at least 7m
1m over backplane	40GBASE-KR4	40 Gbps PHY using 40GBASE-R encoding over (4) lanes of an electrical backplane with a reach up to at least 1m

1. OM3 is a 50 micron, laser-optimized multimode fiber
2. MMF stands for multimode fiber
3. OM4 is a 50 micron, laser-optimized multimode fiber with higher bandwidth than OM3
4. SMF stands for singlemode fiber
5. Twinax cabling is used

The initial goals were to support 40GbE for at least 100 m over multimode fibre, up to at least 10 km over singlemode and up to 7 m over shielded balanced copper (Twinax). With the release of OM4 (a 50-micron laser-optimised multimode fibre (LOMF) with higher bandwidth than OM3) the distance can be extended to 150 m. Another PMD was added in 2015 to support 40 GbE over singlemode up to at least 40 km. There is also a PMD defined for supporting 40 GbE for at least 1 m over an electrical backplane.

Table 2 lists the objectives for supporting 100 GbE over specific media.

Table 2: IEEE Objectives for 100 Gigabit Ethernet

Objective	Resulting PMD	Description of PMD
100m on OM3 MMF[1] (850nm) 150m on OM4 MMF[1] (850nm)	100GBASE-SR10	100 Gbps PHY using 100GBASE-R encoding over (10) lanes of multimode fiber with a reach up to at least 100m (can support at least 150m over OM4 MMF1)
70m on OM3 MMF[1] (850nm) 100m on OM4 MMF[1] (850nm)	100GBASE-SR4	100 Gbps PHY using 25 Gbps data rate over (4) lanes of multimode fiber with a reach up to at least 100m (can support at least 100m over OM4 MMF or 70m over OM3 MMF)
10km on SMF[2] (1310nm)	100GBASE-LR4	100 Gbps PHY using 100GBASE-R encoding over (4) wavelength division multiplexing (WDM) lanes on single-mode fiber with a reach up to at least 10km
40km on SMF[2] (1310nm)	100GBASE-ER4	100 Gbps PHY using 100GBASE-R encoding over (4) wavelength division multiplexing (WDM) lanes on single-mode fiber with a reach up to at least 40km
7m over copper	100GBASE-CR10	100 Gbps PHY using 100GBASE-R encoding over (10) lanes of shielded balanced copper cabling[3] with a reach up to at least 7m

1. MMF stands for multimode fiber
2. SMF stands for single-mode fiber
3. Twinax cabling is used

The objectives for both 40 and 100 GbE are the same; supporting the application over multimode fibre for at least 100 m, over singlemode fibre for at least 10 km and a longer option of 40 km, and over balanced copper cabling (Twinax) for up to at least 7 m. One thing to keep in mind is that 100GBASE-SR4 is supported for at least 100 m over multimode fibre when using OM4 but only 70 m over OM3.

The PMDs are summarised in table 3 for 40 GbE and table 4 for 100 GbE. The tables summarise the signalling, media and distance for both 40-Gigabit Ethernet and 100-Gigabit Ethernet.

Table 3: Signalling, Medium and Distance for 40-Gigabit Ethernet PMDs

40 Gigabit Ethernet				
PMD Name	40GBASE-SR4	40GBASE-LR4	40GBASE-ER4	40GBASE-CR4
Signaling	4 x 10 Gbps	4 x 10 Gbps	4 x 10 Gbps	4 x 10 Gbps
Media	Parallel MMF	Duplex SMF	Duplex SMF	Twinax
Distance	0.5 – 100m OM3 / 150m OM4	10km SMF	40km SMF	7m Twinax

Table 4: Signalling, Media and Distance for 100-Gigabit Ethernet PMDs

100 Gigabit Ethernet					
PMD	100GBASE-SR4	100GBASE-SR10	100GBASE-LR4	100GBASE-ER4	100GBASE-CR10
Signaling	4 x 25 Gbps	10 x 10 Gbps	4 x 25 Gbps	4 x 25 Gbps	10 x 10 Gbps
Media	Parallel MMF	Parallel MMF	Duplex SMF	Duplex SMF	Twinax
Distance	100m OM4/ 70m OM3	100m OM3 / 150m OM4	10km SMF	40km SMF	7m Twinax

Some key takeaways are that both 40 GbE and 100 GbE require more than two fibres for transmission over multimode fibre. 40 GbE requires four transmit and four receive multimode fibres, making a total of eight fibres per channel.

The newer 100 GbE PMD, 100GBASE-SR4, uses the same cable plant (eight fibres) as 40 GbE, providing a seamless migration path. The singlemode options for 40 GbE and 100 GbE also require multichannel transmission. 40-Gigabit Ethernet over singlemode uses four transmit channels and four receive channels, each transmitting at 10 Gbps. 100-Gigabit Ethernet over singlemode uses four transmit and four receive channels, each transmitting at 25 Gbps. IEEE 802.3ba, the 40 Gbps and 100 Gbps Ethernet transmission standard, specifies signalling over singlemode fibre using wavelength division multiplexing (WDM) transmission. This means that for 40 GbE and 100 GbE over singlemode fibre, each of the four channels is transmitted at a different wavelength.

40GBASE-LR4 transmission is defined by a center wavelength and wavelength range for each channel. The center wavelengths used for the four channel are members of the CWDM (Conventional/Course Wavelength Division Multiplexing) grid defined in the ITU-T G.694.2 standard. This standard defines a channel spacing grid using wavelengths from 1271 to 1611 nm, with channel spacing of 20 nm. Table 5 shows the center wavelength and wavelength range for each 40GBASE-LR4 transmission channel.

100GBASE-LR4 and 100GBASE-ER4 also define a wavelength range for each channel. The wavelength range is the same for both 100GBASE PMDs as shown in table 5. These ranges are based on center frequencies that are part of the frequency grid defined in the ITU-T G.694.1 standard. This standard defines a set of frequencies used to designate allowed central frequencies to support dense wavelength division multiplexing (DWDM) applications. This standard supports a variety of channel spacing ranging from 12.5 GHz to 100 GHz and wider, beginning at 193.1 THz. 100GBASE-LR4 and 100GBASE-ER4 channels use center frequencies from 229 THz to 231.4 THz and are spaced at 800 GHz.

Table 5 shows the center frequency, correlating center wavelength and wavelength range for each 100GBASE-LR4 and 100GBASE-ER4 channel.

Table 5: Wavelength-Division-Multiplexed Lane Assignments

	40GBASE-LR4		100GBASE-LR4 and 100GBASE-ER4		
Lane	Center Wavelength	Wavelength Range	Center Frequency	Center Wavelength	Wavelength Range
L_0	1271 nm	1264.5 to 1277.5 nm	231.4 THz	1295.56 nm	1294.53 to 1296.59 nm
L_1	1291 nm	1284.5 to 1297.5 nm	230.6 THz	1300.05 nm	1299.02 to 1301.09 nm
L_2	1311 nm	1304.5 to 1317.5 nm	229.8 THz	1304.58 nm	1303.54 to 1305.63 nm
L_3	1331 nm	1324.5 to 1337.5 nm	229 THz	1309.14 nm	1308.09 to 1310.19 nm

Since the different wavelengths do not interfere with each other when transmitted on a single fibre, all four can be transmitted over one fibre. If all four signal channels are transmitted at the same wavelength then four fibres are needed to separate the channels as in parallel transmission over multimode. The four receive channels also use WDM transmission so 40 GbE and 100 GbE channels over singlemode only require a total of two fibres; one transmit fibre and one receive fibre. These cables typically use LC connectors. There is no requirement to associate a particular electrical channel with a particular optical channel since the transceiver is capable of receiving channels in any order.

Both 40 GbE and 100 GbE have a copper option for up to 7 m using Twinaxial cable. 802.3ba does not define a twisted pair option.

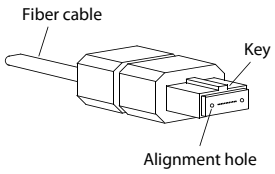
Notes: MTP® is a registered trademark of US Conec, Ltd.

40/100-Gigabit Ethernet connectivity and cable

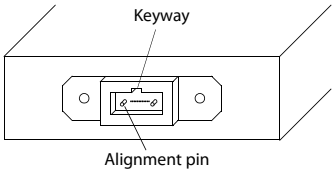
Based on the aforementioned standards, all 40/100-Gigabit Ethernet options over multimode fibre use parallel transmission, requiring more than two fibres per channel. Fibre connectivity must be able to terminate more than two fibres. This is a departure from connectivity used in systems supporting up to 10-Gigabit Ethernet, which only requires a total of two fibres per channel. The most common connector for transmission over two fibres is the LC. This is the only connector recommended for new installations requiring two fibres for transmission in the TIA data center standard, ANSI/TIA-942 and ISO/IEC 11801 3rd Edition and especially ISO/IEC 11801-5 for data centers. This connector is used for 10 GbE and below over multimode fibre, as well as the 40/100 GbE singlemode options reviewed previously.

With the need to support multiple transmission channels, the Media Dependent Interface (MDI) identified by the IEEE 802.3ba standard for 40 GbE and 100 GbE transmission (when not using WDM) is the MPO-style connector. The MPO connector is the connector recommended by the ANSI/TIA-942 data center standard ISO/IEC 11801 3rd Edition and especially ISO/IEC 11801-5 for data centers for applications requiring parallel fibre transmission. The terms "MPO" and "MTP®" are used interchangeably for this style of connector. MPO is the generic name for this Multi-Fibre Push On connector style. MTP is an MPO-style connector and a registered trademark of US Conec, Ltd. It is considered in the industry to be a better performing connector with lower insertion loss.

MPO Connector



MPO female plug connector flat interface



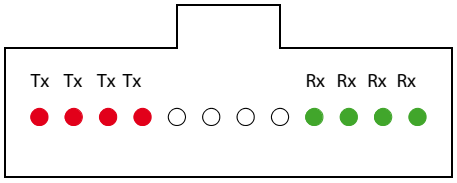
Male MDI as a PMD receptacle for mating with a female MPO plug connector.

MPO connectors are typically terminated onto 12 fibres. MPOs may also be terminated onto 24 fibres. There is a keyway for maintaining polarity. (Polarity is covered in more depth later in this paper in the section entitled, "Fibre Considerations when Migrating to 40/100-Gigabit Ethernet"). The connector has precision alignment pins or holes to ensure all fibres align properly with the mating connector. The component type (i.e. cassette, adaptor panel, trunk cable) usually dictates whether there are pins or holes; pins are usually on fixed components like cassettes. If not properly cleaned, alignment pins can collect debris around the pins, resulting in the two components not mating correctly.

IEEE 802.3ba identifies specific positions on an MPO connector to use for transmission and reception. The four transmit and four receive fibre optic channels of 40GBASE-SR4 (40 GbE over multimode) must occupy the positions shown in the figure below.

Looking at the end of the MPO, with the connector key on top, the transmit fibre optic channels occupy the four leftmost positions and the receive fibre optic channels occupy the four rightmost positions. There are eight active channels within twelve positions in total, with the four middle positions unused.

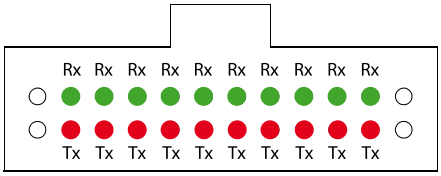
40G-BASE-SR4 Fibre Optic Channel Assignments



The 100GBASE-SR10 (100 GbE over multimode) requires a total of 20 fibres, 10 transmit and 10 receive. Position assignments are shown below. There are three options, the first being a single receptacle shown as Option A in figure below. Option A is recommended by IEEE. The two-receptacle options: Option B and Option C are alternatives.

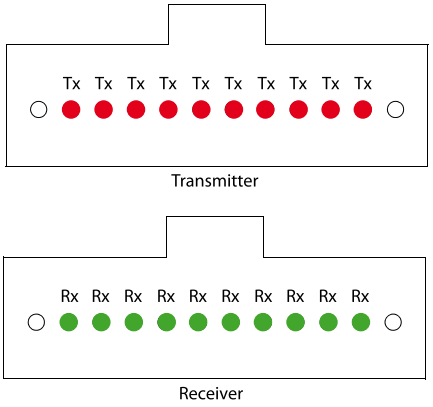
Option A uses a 24-position MPO connector with the top middle 10 positions allocated for reception and the bottom 10 middle positions allocated for transmission, as shown in the figure below.

100G-BASE-SR10 Fibre Optic Channel Assignments Option A: Single connector (recommended)



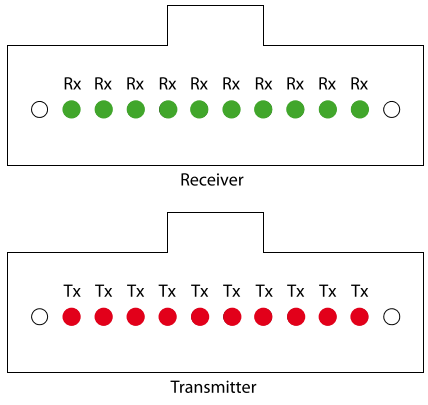
Option B and C use two 12-position MPO connectors. Option B, shown in the figure below, uses side-by-side interfaces. The 10 middle positions of the right-hand interface are used for reception and the 10 middle positions of the left-hand interface are used for transmission.

100G-BASE-SR10 Fibre Optic Channel Assignments Option B: Side by side (alternative)



Options C is similar to option B, but uses the stacked layout depicted in the figure below. The ten middle positions of the top connector are used for reception and ten middle positions of the bottom connector are used for transmission.

100G-BASE-SR10 Fibre Optic Channel Assignments Option B: Side by side (alternative)



Equipment manufacturers usually play a key role in driving the adoption of a particular MDI (Media Dependent Interface) option. For example, Option A, the single 24-position MPO has more connections in a smaller footprint, making it more complex and therefore more costly to manufacture. Option B, two 12-fibre side-by-side MPO connectors, requires twice the width of the other two options. Option C, two stacked 12-position MPO connectors, is single-width, but takes up more vertical space, where rack units could potentially be added

Fibre considerations when migrating to 40/100-Gigabit Ethernet

Multimode fibre systems have been the most cost-effective fibre solution to use in the data center because the transceivers are much less expensive than singlemode transceivers. Multimode transceivers use a vertical cavity surface emitting laser (VCSEL) light source, which is easy to manufacture and package. Multimode fibre systems have a shorter reach than singlemode systems, however most distances are less than 150 m; surveys have shown that more than 80% of data centers extend to 100 m or less. Although singlemode cable is less expensive, after factoring in the total system cost of multimode versus singlemode, multimode is still much less expensive.

Some common approaches used in data centers are summarised in Table 6 below. Each approach uses short-wavelength (850 nm) transmission over multimode fibre.

The fibre system should be designed around OM3 or OM4 MMF if there are plans to support applications beyond 10 Gbps. OM3 supports 10 GbE up to 300 m, but only supports 40 GbE up to 100 m. OM3 supports the 100GBASE-SR10 PMD up to 100 m but only supports 100GBASE-SR4 up to 70 m so that is another important consideration. OM4 supports 10 GbE up to 550 m, but only supports 40 GbE up to 150 meters. OM4 supports the 100GBASE-SR10 PMD up to 150 m but only supports 100GBASE-SR4 up to 100 m.

If planning to support 40 GbE and/or 100 GbE in the future, the channel cannot be designed for the maximum distances over which 10G can be supported. If the data center has distances exceeding 70 m it is a good idea to use OM4, since OM4 supports 10 GbE through 100 GbE for up to at least 100 m. Always design for the application that has the most stringent requirements (usually the fastest data rates) even if the application is a future installation.

In addition to selecting the type of fibre, OM3 or OM4, there are several other important considerations when selecting components for a fibre optic cabling system. These include channel insertion loss, polarity and alignment pins.

Table 6: Common Data Center Approaches Using Short Wavelength Transmission

	10G	40G	100G (-SR10)	100G (-SR4)
Signalling	10Gb	10Gb x 4	10Gb x 10	25 Gb x 4
Laser Type	VCSEL	VCSEL Array	VCSEL Array	VCSEL Array
Fibre Type	OM3/OM4	OM3/OM4	OM3/OM4	OM3/OM4
Connector	2 LCs	12-fibre MPO	(2) 12-fibre MPOs or 24-fibre MPO	12-fibre MPO
Number of Fibres Needed	2 fibres 	8 fibres 	20 fibres 	8 fibres 
Maximum Distance	OM3: 300 m OM4: 550 m	OM3: 100 m OM4: 150 m[1]	OM3: 100 m OM4: 150 m[1]	OM3: 70 m OM4: 100 m

1. 150 m over OM4 requires low-loss connectors. This is discussed in the channel insertion section.

Channel Insertion Loss/Loss Budget

The channel insertion loss is made up of the insertion loss (IL) of the cable, specified as decibels per kilometer (dB/km), the insertion loss of all mated connector pairs and the insertion loss of splices in that channel. As can be seen in the table below, as the data rate increases from 10 Gbps to 40/100 Gbps, the total channel insertion loss or loss budget decreases noticeably.

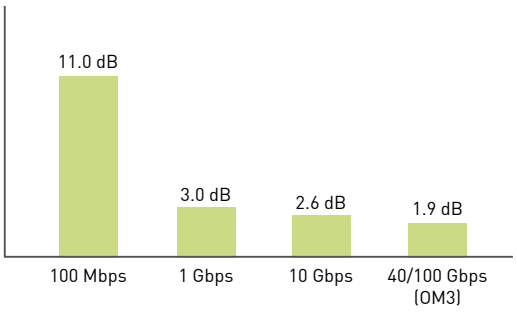
Table 7: Maximum Channel Insertion Loss

	PMD Name	Fibre Type	Total Number of Fibres	Max Link Length (m)	Max Channel Insertion Loss (dBs)
10 GbE	10GBASE-SR	OM3	2	300	2.6
40 GbE	40GBASE-SR4	OM3	8	100	1.9
40 GbE	40GBASE-SR4	OM4	8	150	1.5
100 GbE	100GBASE-SR4	OM3	8	70	1.9
100 GbE	100GBASE-SR4	OM4	8	100	1.9
100 GbE	100GBASE-SR10	OM3	20	100	1.9
100 GbE	100GBASE-SR10	OM4	20	150	1.5

Understanding the impact of each component in the channel loss budget is extremely important when selecting cables and connectors. Often, the cable attenuation performance and bandwidth drive the design of the channel. The impact that a connector can have on the total channel budget can be significant.

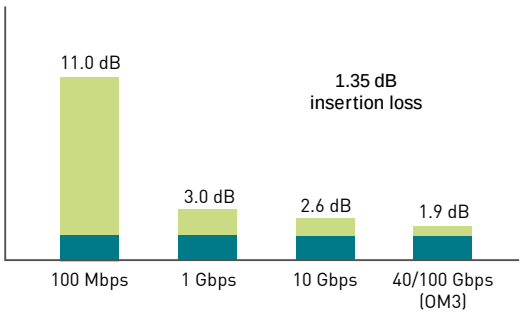
The figure below shows the total loss budgets for a 100 m channel at different data rates common to current Ethernet applications. As data rates progress from 100 Mbps Ethernet-based systems to today's 10 Gbps Ethernet-based systems, the fibre optic loss budgets have shrunk considerably from 11 dB to 2.6dB. 40/100 Gbps Ethernet systems have an even smaller budget of 1.9 dB when using OM3 or 1.5dB when using OM4.

Total Channel Insertion Loss by Application



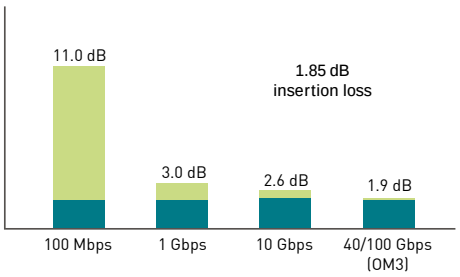
If we look at two channel insertion loss budget examples for 2 and 3 mated pairs, including the cable loss for a 100 m link at 850 nm, the importance of connector loss is apparent.
Using the standard loss for a multimode fibre cable (OM3/OM4, 850 nm) of 3 dB/km (ISO/IEC 11801 3rd Edition-Q2 2017) and an average of 0.50 dB loss per mated connector pair (TIA standards allow up to a maximum 0.75 dB loss and up to 4 connections), the calculated loss for a 100 m channel with 2 mated connector pairs is 1.35 dB ((3.5db/km * 0.1km) + (0.5 * 2)). Applied to the loss budgets, as shown in the figure below, this is not significant for 100 Mbps systems. However, the insertion loss takes up a little more than half of the 10G budget and almost three-quarters of the 40/100 Gbps budget.

Channel Insertion Loss In a 100 M Channel with 2 Mated Connector Pairs



If we look at a 3-connector-pair channel, the loss budget rises to 1.85 dB ((3.5db/km * 0.1km) + (0.5 * 3)), as shown in the figure below. This is more than 70% of the 10 Gbps budget and almost the entire 40/100 Gbps budget. This would exceed the loss budget using OM4 for 150 m, which is 1.5 dB because of the longer distance, proving the insertion loss of a connector is very important.

Channel Insertion Loss In a 100 M Channel with 3 Mated Connector Pairs



It is important to consider the trade-off. If the IL of one component can be reduced, there will be room for extra loss in another component. For example, if using OM4 at only 100 m instead of 150 m, the loss of the cable will be less because IL is directly related to distance (dB/km). This can make room for more mated connector pairs. However, all of the IL gain can easily be negated with inferior connector components.

Polarity

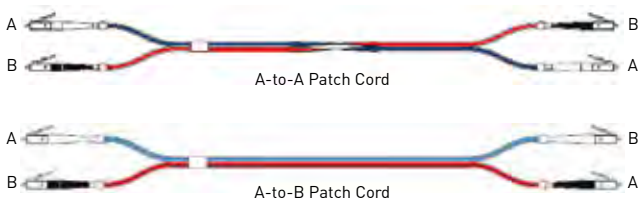
Don't forget to plan for the correct polarity. Maintaining correct polarity guarantees an optical path from the transmit port of one device to the receive port of another device, known as the polarity flip. There are several different methods to maintain polarity, but the different methods may not be interoperable.
There are three methods depicted in the TIA standards ISO/IEC 14763-2 "planning and installation"; methods A, B and C. There are other proprietary methods used by various manufacturers.

Each method requires a specific combination of components to maintain polarity. Assuming duplex signalling, using an MPO backbone cable, cassettes and patch cords, the following list shows the component options that are used in specific combinations for each of the polarity methods.

The options for components are:

- MPO-to-MPO backbone cables: Type A, B or C
- MPO-to-LC cassettes: Method A or Method B
- Patch cords: Type A-to-A or Type A-to-B

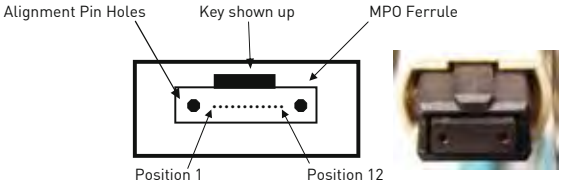
A-to-A and A-to-B Patch Cords



For example, with duplex signalling, a Method A polarity scheme uses a Method A cassette, Type A trunk cable and a type A-to-B patch cord on one end of the channel and a type A-to-A patch cord on the other end. The transmit to receive flip occurs in the patch cord at one end. Method B uses a Method B cassette and trunk cable and an A-to-B patch cord at each end because the flip occurs in the cassette and trunk cable. Method C uses a Method A cassette with a Type C trunk cable and A-to-B patch cords at each end. The flip occurs in the trunk cable only.

Polarity becomes more complicated when migrating to 40/100 GbE because parallel transmission replaces duplex transmission. Parallel fibre optic links integrate multiple transmitters in one transmitter module, multiple fibres in fibre array connectors and multiple receivers in one receiver module. Multiple transmitters and receivers may also be integrated together in a transceiver module.
The three methods, A,B and C, are expanded in the ANSI/TIA-568 ISO/IEC 14763-2 standard to include links that use parallel signalling in one row (24-fibre MPO). Array connectors are keyed to maintain polarity. A keyed MPO connector is shown in the figure below.

MPO Plug Fibre Positions Looking at the Ferrule End with Key Up



Alignment Pins

When mating connector plugs that use alignment pins, like the MPO connector, it is critical that one plug is pinned and the other plug is unpinned. Because all known transceivers that accept MPO plugs are pinned, they accept only unpinned plugs.

MPO Connector With Pins Installed

The pinned connector is typically located inside the panel to help protect the pins from being damaged (i.e. the fixed connector is pinned and the connector that is frequently removed and handled is unpinned). For example, cassettes are typically pinned and trunk cables are typically unpinned.

Consult the manufacturer since there may be exceptions required for your design.
If not properly cleaned, alignment pins can collect debris around the pins, resulting in the two components not mating correctly.

What's coming?

IEEE has a number of ongoing projects for both copper and fibre applications. A key fibre-application project underway is for 400 GbE. The goal is to provide physical layer specifications, supporting the following link distances:

At least 100 m over MMF
At least 500 m over SMF
At least 2 km over SMF
At least 10 km over SMF

The first phase of 400 GbE over MMF uses 16 channels for transmission in both directions (total of 32 channels), each transmitting at 25 Gbps. To support this, TIA published a standard for 16- and 32-fibre MPO-style array connectors, ANSI/TIA-604-18 (FOCUS 18) at the end of 2015.

To provide a cost and performance migration path to 400 GbE, IEEE added support for two-channel 100 Gbps and four-channel 200 Gbps sometimes called NGOATH (Next Generation One and Two Hundred). Both of these are based on 50 Gbps channel rates. As a result, IEEE is also defining a single-channel 50 Gbps PHY with supported distances of at least 100 m over multimode fibre along with 2 km and 10 km options over singlemode fibre.

This two-channel 100 GbE will be supported over multimode fibre up to at least 100 m and up to at least 500 m over singlemode fibre. 200 GbE will be supported over multimode fibre at least 100 m, also. There will be several singlemode options including supporting a distance of at least 500 m using 4-channel parallel singlemode fibre (four parallel fibres), supporting a distance of at least 2 km over duplex singlemode fibre and supporting a distance of at least 10 km over duplex singlemode fibre.

The wideband MMF TIA standard was approved for publication in the middle of 2016. The standard specifies high bandwidth 50 µm core diameter/125 µm cladding diameter, laser-optimised optical fibre that is optimised to enhance performance for single wavelength or multi-wavelength transmission systems with wavelengths in the vicinity of 850 nm to 950 nm. The actual operating band is from 850 nm to 953 nm. The effective modal

bandwidth (EMB) for this new fibre is specified at the lower and upper wavelengths: 4700 MHz•km at 850 nm and 2470 MHz•km at 953 nm. ISO/IEC has assigned the OM5 designation for this type of fibre.

This is a significant standard for multimode fibre because it makes wavelength division multiplexing (WDM) possible over multimode fibre. Since the fibre is optimised for short wavelengths, the wavelength division multiplexing used over multimode fibre is commonly called short wavelength division multiplexing (SWDM). Up until now, WDM has only been used with singlemode fibre. WDM is important because it is one of four ways to increase the data rate: WDM, parallel transmission with multiple fibres, increased modulation and using multi-level coding.

To show how this new standard can influence fibre optic plant for current and in-progress Ethernet standards refer to Table 8. The current 40 GbE (40GBASE-SR4) standard, using short wavelength over multimode fibre (MMF), uses a channel rate of 10 Gbps with eight fibres; four fibres for transmission and four fibres for reception. Using WBMMF that supports four wavelengths (in effect four channels) the four transmit fibres are reduced to one fibre, as are the receive fibres. The fibre optic cable plant is reduced from eight fibres to two. 100GbE is an even better example because the original standard released in 2010 (100GBASE-SR10) required a total of 20 fibres, 10 transmit and 10 receive, using a 10Gbps channel rate. A new 100GbE standard (100GBASE-SR4) was published in 2015 specifying a 25Gbps channel rate which allowed the fibre count to be reduced to a total of eight fibres; the same fibre count as 40GbE. This is an example of how increased modulation reduces the fibre count. Using SWDM with the new WBMMF will reduce the fibre optic plant to two fibres for 100 GbE using a 25 Gbps channel rate. Both 40 GbE and 100 GbE are reduced to duplex transmission.

As was mentioned, Phase I of the 400GbE (IEEE 802.3bs) standard will specify transmission over multimode using parallel transmission with a channel rate of 25 Gbps. This will require a total of 32 fibres. Employing SWDM over WBMMF reduces the fibre count to 8 fibres, 25% of the number of fibres required in Phase I.

There are also many developments within Fibre Channel, a high-speed network technology primarily used to connect computer data storage. 32G Fibre Channel (GFC) was published and transceivers have been trialled since the 3rd quarter of 2016. The target link distance is 100 m over OM4 and 70 m over OM3. 32 GFC still uses serial transmission with 2 fibres and will use the same external small form factor pluggable (SFP) transceiver modules with LC fibre optic connectors. This will be backwards-compatible with 8 GFC and 16 GFC. There is a new project looking at 128 GFC. Normally, Fibre Channel doubles in speed, 8 GFC, 16 GFC, 32 GFC, etc., but 128 GFC will be based on 32 GFC. 128 GFC will use 4 x 32 GFC. A port will be able to auto-negotiate 128 GFC back to 32 GFC and 16 GFC without user intervention.

There are ongoing discussions to combine both 64 GFC and 256 GFC. Having a SWDM MMF option, based on Wide Band MMF TIA-492AAAE, is also being considered. Requirements will include backwards compatibility with 32 GFC.

Conclusions

Before selecting a product for your data center design, establish the fastest application your structured cabling will need to support. Multimode fibre systems are more common than singlemode systems for short distances because they are more cost-effective. Select at least OM3, however OM4 will provide longer-distance support or more connections over shorter distances. Some newer applications are supported up to 100 m only by OM4, so be aware of the application and distance requirements.

Wideband multimode fibre will have a huge influence on the fibre optic cable plant. As long as transceivers are available, two fibres can support up to 100 GbE using duplex transmission. If a transceiver can support 50 Gbps per channel using SWDM over wideband fibre, even the new 200 GbE could use duplex transmission (2 fibres in total). Wideband multimode fibre requires 25% of the total number of OM4 fibres to support applications traditionally using parallel transmission (multiple transmit and multiple receive fibres).

The type of connector is determined by the transmission; LC for duplex transmission and MPO/MTP® for parallel transmission. Channel insertion loss is the foundation for design, so consider high-performance, low-loss components.

You will also need to consider the polarity method to be used and then select the correct components to support that method. If using array connectors for parallel transmission, consider which components require pins and which do not. The best option is to work with the manufacturer to make sure the correct components are selected.

Don't forget to put as much thought into designing your physical infrastructure as the structured cabling. The connection density in switches, servers and routers is increasing. This means more cable to manage and higher operating temperatures, making properly managed airflow extremely important. The correct infrastructure design is critical to extend the life of the network and protect your investment.

CPR – Construction Products Regulation

The aim of the CPR regulation is to guarantee the free circulation of products made in the European Union, adopting a harmonised technical language which can define the performance and essential features of all construction products.

Electrical cables are rarely the cause of a fire but when they are involved they may form a seriously hazardous component because of their large quantities and because they are found in all rooms of the building. With careful prevention and making state-of-the-art systems with safe and high-quality components in accordance with the CPR regulation, fire propagation, the lack of visibility in smoke-filled rooms and the diffusion of corrosive and toxic gases can be reduced or almost totally eliminated.

The CPR regulation (EU 305/2011) concerns all the products made to be permanently incorporated (installed/used) in buildings and other civil engineering works (e.g. homes, industrial and commercial buildings, offices, hospitals, schools, undergrounds, etc.). As part of the features considered important for the safety of constructions included in the CPR, the European Commission has decided to consider cables' Reaction to Fire and Resistance to Fire, recognising the importance of their behaviour and role in fire. The release of harmful substances is one of the performances considered important for cables, although at present no minimum levels of performance have been established because when used normally the cables do not release harmful substances.
All the cables installed permanently in constructions, to transport power or for telecommunications, of any voltage level and with copper or fibre optic conductors, must be classified on the basis of the classes of premises where they will be installed.

The cables are classified in 7 classes of Reaction to Fire: Aca, B1ca, B2ca, Cca, Dca, Eca and Fca identified by the subscript "ca" (cable) as a function of their decreasing performance. As well as this main classification, the European authorities have also regulated the use of the following additional parameters:

- **a** = acidity which defines the hazard of the fumes for people and the corrosiveness for things. Varies from a1 to a3
- **s** = opaqueness of the smoke. Varies from s1 to s3
- **d** = dropping of incandescent particles which could propagate fire. Varies from d0 to d2.

A more severe check (System 1+) is required for the classes from Aca to Cca. It lays down the initial check and continuous monitoring of the product and checks of the manufacturing control system, while for the classes from Dca to Eca the check only lays down the initial product check (System 3). Class F, however, is based on the manufacturer's self-declaration (System 4).

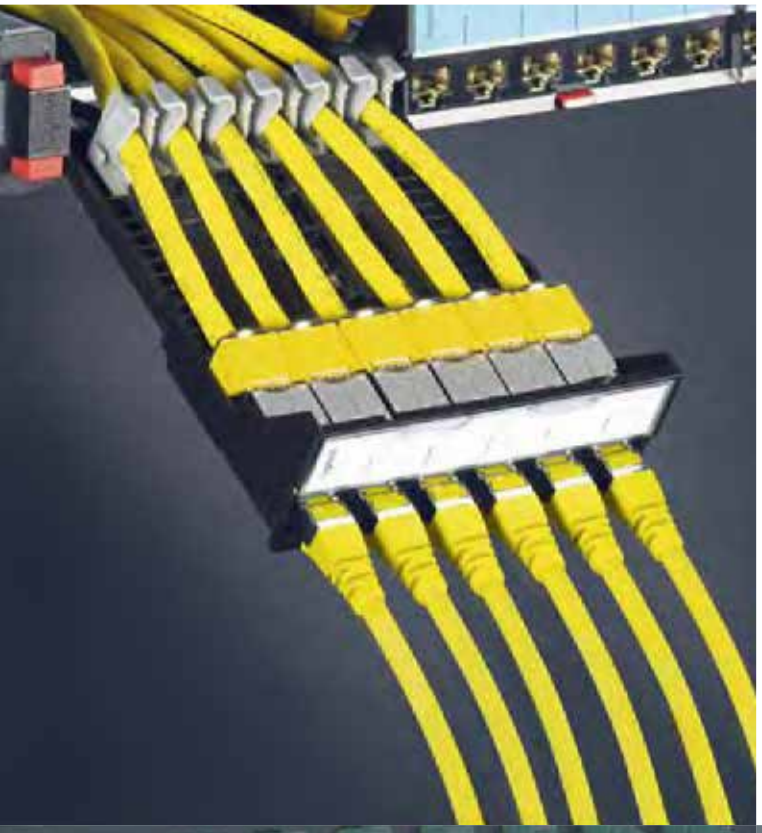
The table below contains the classification of cables according to the test requirements of the CPR Regulation and the correlation between the cable classification and the most representative installation rooms.

<table>
<tr><th></th><th>Euroclass</th><th>Classification criteria</th><th>Additional criteria</th><th>AVCP system
(Assessment and Verification of Consistency of Performance)</th></tr>
<tr><td>Non combustible
(e.g. mineral insulated)</td><td>A_{ca}</td><td>EN ISO 1716
Gross heat of combustion</td><td></td><td rowspan="4">"1+", including:
• initial type-testing and continuous surveillance
• Audit & testing of samples by 3rd-party certification body
Factory production controls by manufacturer</td></tr>
<tr><td rowspan="4">Low-Fire-Hazard
cables
(various levels)</td><td>B1_{ca}</td><td rowspan="4">EN 50399
Heat release
Flame spread

EN 60332-1-2
Flame propagation</td><td rowspan="4">Smoke production
(s1a, s1b, s2, s3)
EN50399/EN61034-2

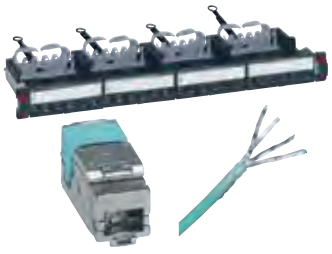
Acidity
(a1, a2, a3)
EN 50267-2-3

Flaming droplets
(d0, d1, d2)
EN 50399</td></tr>
<tr><td>B2_{ca}</td></tr>
<tr><td>C_{ca}</td></tr>
<tr><td>D_{ca}</td><td rowspan="2">"3", including:
• initial type-testing by 3rd-party laboratory
Factory production controls by manufacturer</td></tr>
<tr><td>Standard cables</td><td>E_{ca}</td><td>EN 60332-1-2
Flame propagation</td><td></td></tr>
<tr><td>No performance determined</td><td>F_{ca}</td><td>EN 60332-1-2
Flame propagation</td><td></td><td>"4"
initial type-testing and factory production controls by manufacturer</td></tr>
</table>



LCS³ STRUCTURED CABLING

NEW 2018



LCS³ copper system

patch panels, individual connectors, cat. 8, 6_A, 6 and 5e

LCS³ fibre optic system

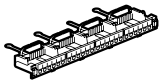
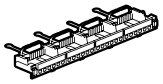
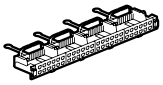
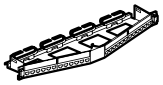
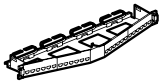
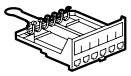
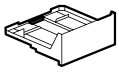
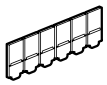
fibre optic drawers, pigtails, fibre optic case

LCS³ Enclosures

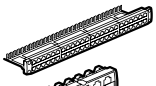
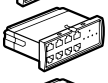
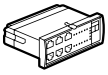
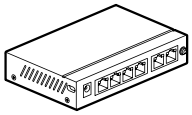
LCS³ Energy distribution

Connectivity and housing selection tables

configure your system (continued)

LCS³ AND LCS² PANELS AND CONNECTOR BLOCKS			LCS³ with new generation Quick-Fix			LCS² with Quick-Fix	
			Cat. 8	Cat. 6_A	Cat. 6	Cat. 6_A	Cat. 6
	1 U patch panels equipped with 24 connectors	STP	0 337 82(2)	0 337 72(2)	0 337 62(2)	0 335 73(1)	0 335 63(1)
		UTP	-	0 337 70(2)	0 337 60(2)	-	-
		FTP	-	-	0 337 61(2)	-	**0 335 62**(1)
	1 U patch panel to be equipped	With cassette	0 337 90(2)	0 337 90(2)	0 337 90(2)	-	-
		Without cassette	0 337 91(2)	0 337 91(2)	0 337 91(2)	-	-
			-	-	-	**0 335 90**(1)	**0 335 90**(1)
	High density 1 U patch panels to be equipped with 48 ports		-	0 337 93(2)	0 337 93(2)	-	-
	1 U angled patch panel to be equipped		0 337 92(2)	0 337 92(2)	0 337 92(2)	-	-
	1 U high density angled patch panel to be equipped		-	0 337 94(2)	0 337 94(2)	-	-
	RJ 45 connectors for flat and angled panel	STP	0 337 85	0 337 75	0 337 65	-	-
		UTP	-	0 337 73	0 337 63	-	-
		FTP	-	-	0 337 64	-	-
	Block of 6 RJ 45 connectors	STP	-	-	-	0 335 76	0 335 66
		FTP	-	-	-	-	**0 335 65**
	Cord guides		0 337 59	0 337 59	0 337 59	-	-
	Cassettes for flat panels to be equipped		0 337 55	0 337 55	0 337 55	-	-
	High density cassettes for flat panels to be equipped		-	0 337 95	0 337 95	-	-
	Blanking cassettes / blanking blocks		0 337 57	0 337 57	0 337 57	**0 335 91**	**0 335 91**
	Angled panel cover		0 337 58	0 337 58	0 337 58	-	-
	Port blanking modules		0 337 56	0 337 56	0 337 56	-	-

COMPLEMENTARY LCS² PANELS AND BLOCKS

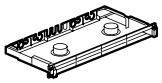
			LCS²
	1 U telephone panels equipped with 4 x 12 port blocks	3-6/4-5 contacts (digital)	0 335 31
		4-5/7-8 contacts (analogue)	0 335 30
	Telephone blocks equipped with 12 ports	3-6/4-5 contacts (digital)	0 335 33
		4-5/7-8 contacts (analogue)	0 335 32
	Splitter blocks	Ethernet/Ethernet FTP	0 335 39
		Telephone/Ethernet FTP	0 335 37
		Telephone/telephone	0 335 35
	Video broadcasting block	6 "F" connectors	0 335 34
	Switch blocks	7 RJ 45 ports	0 335 02
		6 RJ 45 ports + 1 LC type fibre optic port	0 335 05
	10/100 Mbits PoE switch	5 RJ 45 ports	0 335 03
	1 Gigabit PoE switch	5 RJ 45 ports	0 335 08
	Power over Ethernet (PoE) injector	4 ports	0 335 01
	Controlled access blocks		0 334 71/72/73/74/75

1: Equipped with Quick Fix
2: Equipped with new generation Quick Fix

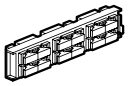
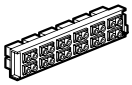
Connectivity and housing selection tables

configure your system (continued)

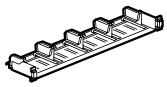
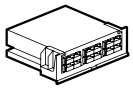
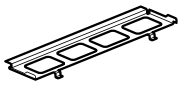
LCS³ FIBRE OPTIC DRAWERS

			Single-mode (9/125 µm)	Multimode (62.5 and 50/125 µm)
	19" sliding equipped fibre optic drawers	12 SC duplex (24 fibres)	0 321 64	0 321 61
		24 LC duplex (48 fibres)	0 321 65	0 321 62
		24 ST connectors	-	0 321 63
		12 SC APC duplex (24 fibres)	0 321 66	-
		24 LC APC duplex (48 fibres)	0 321 67	-
	19" rotating equipped fibre optic drawers	18 SC duplex (36 fibres)	0 321 74	0 321 72
		36 LC duplex (72 fibres)	0 321 73	0 321 71
	19" modular sliding equipped fibre optic drawers	12 SC duplex (24 fibres)	0 321 06	0 321 02
		24 LC duplex (48 fibres)	-	0 321 04
	19" modular sliding fibre optic drawers to be equipped with fibre optic blocks	Empty drawer	0 321 00	

LCS³ FIBRE OPTIC DRAWER BLOCKS

			Single-mode (9/125 µm)	Multimode (62.5 and 50/125 µm)
	Fibre optic blocks	SC duplex block for 6 fibre optics	0 321 10	0 321 20
		SC duplex high density block for 12 fibre optics	0 321 11	0 321 21
		SC APC duplex block for 6 fibre optics	0 321 12	-
		LC duplex block for 6 fibre optics	0 321 13	0 321 23
		LC duplex block for 12 fibre optics	0 321 14	0 321 24
		SC high density duplex block for 24 fibre optics	0 321 15	0 321 25
		LC APC duplex block for 12 fibre optics	0 321 16	-
		ST block for 6 fibre optics	0 321 17	0 321 27
		4 MTP(1) feedthrough adapter	0 321 33	0 321 34
	Copper block for fibre optic drawer		0 321 32	

1: MTP is a registered trademark of US Conec Ltd

LCS³ FIBRE OPTIC DRAWERS			
	Spark gap accessory for pre-connection		0 321 28
	Drawer blanking module		0 321 29
	24 fibre optic pigtail cassette		0 321 30
	Coiling kit		0 321 31
LCS³ MODULAR PANEL AND CASSETTES			
	19" modular panel to be equipped with cassettes		0 321 40
	Fibre optic splice cassette		0 321 41
	Copper cassette to be equipped		0 337 55
	High density copper cassette to be equipped		0 337 95
	Preterminated MTP(1) cassettes (MPO compatible) Front and back extraction	Multimode OM4 cassettes (50/125 µm) 24 LC OM4 Type A/C	0 321 42
		Multimode OM4 cassettes (50/125 µm) 12 SC OM4 Type A/C	0 321 43
		Single-mode OS2 cassettes (9/125 µm) type OS2 24 LC OS2 Type A/C	0 321 44
		Multimode OS2 cassettes (9/125 µm) 12 SC OS2 Type A/C	0 321 45
	Blanking cassette		0 337 57
	Rear cable management accessory		0 321 46
	Cord management kit		0 321 47
	Single-mode 4 MTP(1) adapter		0 321 33
	Multimode 4 MTP(1) adapter		0 321 34

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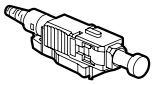
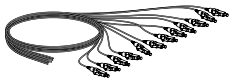
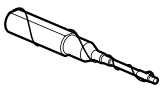
Connectivity and housing selection tables

configure your system (continued)

LCS³ QUICK-CONNECT CONNECTORS				
	Tool case for fibre optic quick-connect connectors		0 322 70	
	OM 3 / OM 4 Quick-connect connectors	LC PC 50/125 µm , 900/250 µm	0 322 71	
		SC PC 50/125 µm , 900/250 µm	0 322 72	
	OS2 Quick-connect connectors	LC UPC 9/125 µm , 900/250 µm	0 322 73	
		SC UPC 9/125 µm , 900/250 µm	0 322 74	
		SC APC 9/125 µm , 900/250 µm	0 322 75	
LCS³ PIGTAILS				
			1 m	2 m
	50/125 µm - OM2 (PC)	SC LSZH connectors	0 322 10	0 322 13
		LC LSZH connectors	0 322 11	0 322 14
		ST LSZH connectors	0 322 12	0 322 15
	50/125 µm - OM3 (PC)	SC LSZH connectors	0 322 20	0 322 23
		LC LSZH connectors	0 322 21	0 322 24
		ST LSZH connectors	0 322 22	-
	50/125 µm - OM4 (PC)	SC LSZH connectors	0 322 30	0 322 33
		LC LSZH connectors	0 322 31	0 322 34
		ST LSZH connectors	0 322 32	-
	9/125 µm - OS2 (APC or UPC)	SC-APC LSZH connectors	0 322 40	0 322 45
		SC-UPC LSZH connectors	0 322 41	0 322 46
		LC-APC LSZH connectors	0 322 42	0 322 48
		LC-UPC LSZH connectors	0 322 43	0 322 47
		ST-UPC LSZH connectors	0 322 44	0 322 49
	Kit of 12 LC pigtails	OS2 (UPC)	0 326 24	
		OM3 (PC)	0 326 26	
		OM4 (PC)	0 326 71	
	Pigtail sleeves		0 327 44	
	Fan-out units	6 fibre optics	0 330 48	
		12 fibre optics	0 330 49	
GLUE-ON CONNECTORS				
	ST connector		0 331 27	
	SC connector		0 331 47	
	LC connector		0 331 00	
FIBRE OPTIC CLEANING ACCESSORIES				
	Ferrule cleaner MPO/MTP[1]		0 322 83	
	Ferrule cleaner LC (PC/APC)		0 322 81	
	Ferrule cleaner SC (PC/APC)		0 322 82	
	LC replacement cartridge		0 322 84	
	SC replacement cartridge		0 322 85	

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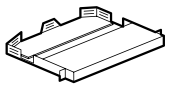
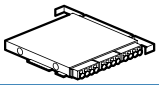
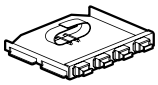
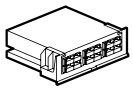
LCS³ MODULAR FIBRE OPTIC DRAWERS, VERY HIGH DENSITY, TO BE EQUIPPED			
	Fibre optic drawers with front and back facing cord management	1 U	0 321 50
		2 U	0 321 52
		4 U	0 321 53
	MPO 12 LC OM4 (50/125 µm) preterminated cassette		0 321 54
	MPO 12 LC OS2 (9/125 µm) preterminated cassette		0 321 55
	MTP(1) (MPO compatible) adapters	Multimode	0 321 56
		Singlemode	0 321 57
	12 LC multimode adapter		0 321 58
LCS³ HIGH DENSITY CASSETTES FOR VERY HIGH DENSITY MODULAR FIBRE OPTIC DRAWERS			
	MPO cassette - 12 LC OM4 Type A/C		0 321 54
	MPO cassette- 12 LC OS2 Type A/C		0 321 55
LCS³ EQUIPMENT			
	MTP(1) (MPO compatible) adapter	Multimode	0 321 56
		Singlemode	0 321 57
	12 LC multimode adapter		0 321 58
MODULAR PANEL AND CASSETTE			
	19" modular panel to be equipped with cassettes		0 321 40
LCS³ MTP(1) HIGH DENSITY CASSETTES (MPO COMPATIBLE) FOR MODULAR PANELS			
	OM4 multimode MTP(1) cassettes (50/125 µm)	24 LC	0 321 42
		12 LC	0 321 43
	OS2 single-mode MTP(1) cassettes (9/125 µm)	24 LC	0 321 44
		12 LC	0 321 45
	Fibre optic splice cassette		0 321 41
	Copper cassette to be equipped		0 337 55
	Blanking cassette		0 337 57
	MTP(1) adapters (for installation in splice cassettes)	Single-mode 4 MTP(1) adapter	0 321 33
		Multimode 4 MTP(1) adapter	0 321 34

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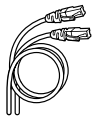
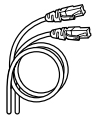
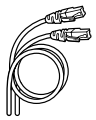
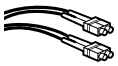
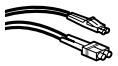
Connectivity and housing selection tables

configure your system (continued)

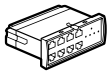
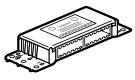
RJ 45 PATCH AND USER CORDS					LCS³		
					Cat. 8	Cat. 6$_A$	Cat. 6
	LSZH	S/FTP	Impedance 100 Ω	0.5 m	0 337 01	-	-
				1 m	0 337 02	-	-
				2 m	0 337 03	-	-
				3 m	0 337 04	-	-
				5 m	0 337 05	-	-
				8 m	0 337 06	-	-
				10 m	0 337 07	-	-
				0.5 m	0 337 21	-	-
					0 337 08	-	-
				1 m	0 337 22	-	-
					0 337 09	-	-
				2 m	0 337 23	-	-
					0 337 10	-	-
				3 m	0 337 24	-	-
					0 337 11	-	-
				5 m	0 337 25	-	-
					0 337 12	-	-
				8 m	0 337 26	-	-
					0 337 13	-	-
				10 m	0 337 27	-	-
					0 337 17	-	-
	LSOH	S/FTP	Impedance 100 Ω	1 m	-	0 518 70	-
					-	0 518 66	-
				2 m	-	0 518 71	-
					-	0 518 67	-
				3 m	-	0 518 72	-
					-	0 518 68	-
				5 m	-	0 518 73	-
					-	0 518 69	-
		F/UTP	Impedance 100 Ω	1 m	-	-	0 518 54
					-	-	0 518 50
				2 m	-	-	0 518 55
					-	-	0 518 51
				3 m	-	-	0 518 56
					-	-	0 518 52
				5 m	-	-	0 518 57
					-	-	0 518 53
		U/UTP	Impedance 100 Ω	1 m	-	-	0 518 62
					-	-	0 518 58
				2 m	-	-	0 518 63
					-	-	0 518 59
				3 m	-	-	0 518 64
					-	-	0 518 60
				5 m	-	-	0 518 65
					-	-	0 518 61

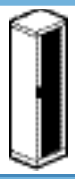
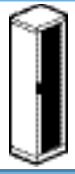
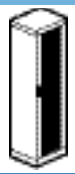
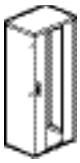
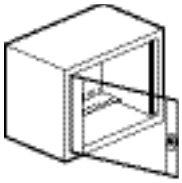
RJ 45 PATCH AND USER CORDS					LCS³		
					LCS³ cat. 8	LCS² cat. 6_A	LCS² cat. 6
	PVC	S/FTP	Impedance 100 Ω	0.5 m	-	0 518 16	-
				1 m	-	0 517 80	0 517 52
				2 m	-	0 517 81	0 517 53
				3 m	-	0 517 82	0 517 54
				5 m	-	0 517 83	0 517 55
		F/UTP	Impedance 100 Ω	0.5 m	-	-	0 518 15
				1 m	-	-	**0 517 62**
				2 m	-	-	**0 517 63**
				3 m	-	-	0 517 64
				5 m	-	-	0 517 65
		U/UTP	Impedance 100 Ω	0.5 m	-	-	0 518 18
				1 m	-	-	0 517 72
				2 m	-	-	0 517 73
				3 m	-	-	0 517 74
				5 m	-	-	0 517 75
COPPER CABLES (305 M OR 500 M DRUMS)							
	S/FTP		4 pairs	500 m	0 337 88	0 327 77	-
	SF/UTP		4 pairs	500 m	-	-	0 327 57
	F/UTP		4 pairs	305 m	-	-	0 328 56
				500 m	0 337 86	0 327 78	**0 327 56**
			2 x 4 pairs	500 m	-	0 328 78	**0 327 76**
	F/FTP		4 pairs	500 m	-	0 327 99	-
			2 x 4 pairs	500 m	-	0 327 98	-

LCS³ FIBRE OPTIC PATCH PANELS					OS 2 (UPC) single-mode 9/125 µm	OM 4 multimode 50/125 µm	OM 3 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	-
	LC/LC Uniboot duplex cords reversible polarity			1 m	0 326 86	0 326 95	-
				2 m	0 326 87	0 326 96	-
				3 m	0 326 88	0 326 97	-
				5 m	0 326 89	0 326 98	-
				10 m	0 326 92	0 326 99	-
LCS³ FIBRE OPTIC CABLES (DRUMS)							
	Interior/exterior			4 fibre	Loose	0 325 02	0 325 43	0 325 37
				8 fibre	Loose	0 325 03	0 325 44	0 325 38
				6 fibre	Loose	0 325 12	-	-
					Tightened	-	0 326 65/66	0 325 10
				12 fibre	Loose	0 325 14	0 325 45	0 325 39
					Tightened	0 325 50	0 326 67	0 325 11
				24 fibre	Loose	0 325 51	-	0 325 53
					Tightened	-	0 326 68	0 325 52
	Exterior, steel rodent guard, free			4 fibre optics		0 325 23	0 325 46	-
				8 fibre optics		0 325 24	0 325 47	0 325 40
				6 Loose fibre optics		0 325 13	-	-
				12 fibre optics		0 325 15	0 325 48	0 325 41
				24 fibre optics		0 325 25	-	0 325 42

Connectivity and housing selection table

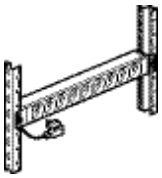
configure your system (continued)

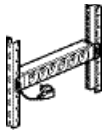
WHITE MOSAIC RANGE RJ 45 SOCKETS				Cat. 6_A	Cat. 6
	1 module	STP		0 765 73	0 765 63
		FTP		-	**0 765 62**
	2 modules	STP		0 765 76	0 765 66
		FTP		-	**0 765 65**
	2 x 45° tilted modules	STP		0 765 08	0 765 07
		FTP		-	0 765 05
	90° sockets	STP		-	0 765 93
		FTP		-	0 765 92
	Anti-microbial	STP		0 765 84	0 765 83
		FTP		-	0 765 82
	Controlled access	STP		0 765 99	0 765 96
		FTP		-	0 765 95
	Green flap	STP		0 765 24	-
		FTP		-	0 765 22
	Orange flap	STP		0 765 25	-
		FTP		-	0 765 23
	2 RJ 45 sockets	FTP		-	0 765 46
	Copper feedthrough	STP		0 786 28	-
		FTP		-	0 786 23
	Splitter sockets	Ethernet/Ethernet	FTP	0 765 39	0 765 39
		Telephone/Ethernet	FTP	0 765 37	0 765 37
		Telephone/telephone		0 765 35	0 765 35
PoE SWITCHES AND INJECTOR					
	1 Gigabit PoE switch	4 RJ45 outputs		0 335 08	
	10/100 Mbits PoE switch	4 RJ45 outputs		0 335 03	
	PoE injector	4 inputs/4 outputs		0 335 01	
		1 input/1 output		0 327 37	
ZONE DISTRIBUTION BOXES				Cat. 6_A	Cat. 6
	Zone distribution boxes Equipped with 12 RJ 45 connectors		STP	0 335 49	0 335 46
			FTP	-	0 335 45
			UTP	-	0 335 44
	Block of 6 RJ 45 connectors		STP	-	0 335 66
			FTP	-	**0 335 65**
			UTP	-	0 335 64
	Fibre optic accessory			0 335 20	0 335 20
	Zone distribution box To be equipped with 4 blocks			-	0 335 40

LCS³ 19" SERVER ENCLOSURES (WITHOUT SIDE PANELS) (p. 109)			Depth 1000 mm	Depth 1100 mm	Depth 1200 mm
	42 U	Width 600 mm	4 460 00	4 460 01	4 460 02
	42 U	Width 800 mm	4 460 03	4 460 04	4 460 05
	46 U	Width 600 mm	4 460 06	4 460 07	4 460 08
	46 U	Width 800 mm	4 460 09	4 460 10	4 460 11
LCS³ 19" SERVER ENCLOSURES (WITHOUT SIDE PANELS) - WITH AIRFLOW MANAGEMENT (p. 109)					
	42 U	Width 600 mm	4 460 12	4 460 13	4 460 14
	42 U	Width 800 mm	4 460 15	4 460 16	4 460 17
	46 U	Width 600 mm	4 460 18	4 460 19	4 460 20
	46 U	Width 800 mm	4 460 21	4 460 22	4 460 23
LCS³ 19" SIDE PANELS - SET OF 2 INCLUDED PLINTHS (p. 109)					
	42 U	-	4 460 24	4 460 25	4 460 26
	46 U	-	4 460 27	4 460 28	4 460 29
LCS³ 19" SERVER ENCLOSURES - FLAT PACK (WITH SIDE PANELS) (p. 109)					
	42 U	Width 600 mm	4 460 30	4 460 31	4 460 32
	42 U	Width 800 mm	4 460 33	4 460 34	4 460 35
	46 U	Width 600 mm	4 460 36	4 460 37	4 460 38
	46 U	Width 800 mm	4 460 39	4 460 40	4 460 41
LCS³ 19" CABLING CABINETS (p. 115)			**Depth 800 mm**	**Depth 1000 mm**	
	25 U	Width 800 mm	4 460 80	4 460 81	-
	37 U	Width 800 mm	4 460 82	4 460 83	-
	41 U	Width 800 mm	4 460 84	4 460 85	-
	46 U	Width 800 mm	4 460 86	4 460 87	-
LCS³ 19" WALL MOUNTED ENCLOSURES (p. 117)			**Depth 525 mm**	**Depth 625 mm**	
	6 U	Width 600 mm	4 461 80	-	-
	9 U	Width 600 mm	4 461 81	4 461 82	-
	12 U	Width 600 mm	4 461 83	4 461 84	-
	15 U	Width 600 mm	4 461 85	4 461 86	-
	21 U	Width 600 mm	-	4 461 87	-
LCS³ ZERO-U SINGLE PHASE VERTICAL PDU - POWER DISTRIBUTION UNITS (p. 120)			**Connection on 6 mm² terminal block**	**3m cord on 32A 2P+E plug**	**With Ammeter**
	24 outlets	German Standard	6 468 52	-	-
	24 outlets	German Standard	6 468 53	-	-
	24 outlets	British Standard	-	6 468 54	-
	24 outlets	French Standard	6 468 50	6 468 51	-
	24 outlets	C13 - IEC 60320	6 468 56	6 468 57	-
	20 outlets	C13 - IEC 60320	6 468 60	6 468 61	-
	20 C13 outlets	4 C19 outlets	-	-	6 468 65
LCS³ ZERO-U 3 PHASES VERTICAL PDU - POWER DISTRIBUTION UNITS (p. 121)					
	18 C13 outlets	6 C19 outlets	-	6 468 70	-
	20 C13 outlets	4 C19 outlets	-	-	6 468 75

Connectivity and housing selection tables

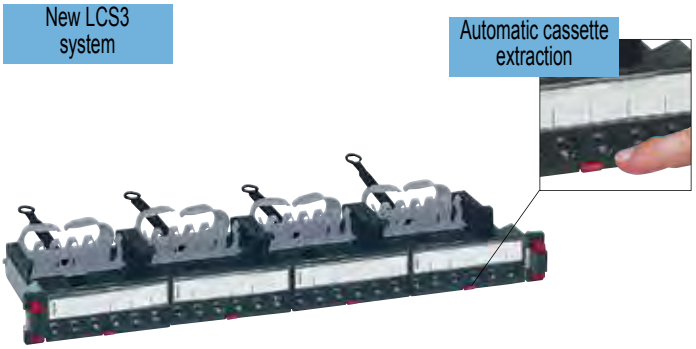
configure your system (continued)

LCS³ 1 U 19" SINGLE PHASE PDU - POWER DISTRIBUTION UNITS (p. 122)			Connection on 6 mm² terminal block	3 m cord on 16 A plug
	10 outlets	C13 - IEC 60320	6 468 14	-
	12 outlets	C13 - IEC 60320	-	6 468 15
	8 outlets	C13 (6) and C19 (2) - IEC 60320	6 468 09	-
	6 outlets	C13 - IEC 60320	6 468 07	-

LCS³ 1 U 19" SINGLE PHASE PDU - POWER DISTRIBUTION UNITS (p. 123)			With MCB	With 30 mA RCCB	With Surge protection	With Ammeter
	6 outlets	C13 (6) - On terminal block	-	-	-	6 468 43
	7 outlets	C13 (6) and C19 (1) - On terminal block	-	-	-	6 468 45
	6 outlets	C19 (6) - On terminal block	-	-	-	6 468 44

Legrand cabling system LCS³ cat. 8

flat equipped patch panel



0 337 82

Pack	Cat.Nos	Cat. 8 patch panel equipped with 24 RJ 45 connectors
		Complete with new generation Quick Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Equipped with 4 cassettes of 6 cat. 8 RJ 45 LCS³ quick connect connectors (no tools required), with 568 A/B mark ng Supplied with coloured labels Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards 19" patch panel - 1 U Automatic cassette removal by simple pressure Possibility of individual ex raction of each connector
1	0 337 82	**Flat panel** STP panel - Metal shielding

Legrand cabling system LCS³ cat. 8

flat patch panels to be equipped

0 337 90

Pack	Cat.Nos	Flat 24-connector patch panels - 1 U to be equipped
		Complete with new generation Quick Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure. The panels ensure automatic earthing of each connector. Equipped with rear cable guide to hold the cables during maintenance
		Flat panel with empty cassettes to be equipped with connectors Equipped with 4 automatic extraction cassette for cat. 5e to cat. 8 RJ 45 connectors
1	0 337 90	19" patch panel - 1 U
		Empty flat panel to be equipped with cassette It can accept a maximum of 4 automatic extraction cassettes: - copper - fibre optic
1	0 337 91	19" patch panel - 1 U

Legrand cabling system LCS³ cat. 8

angled patch panel to be equipped with connectors

0 337 92

0 337 85

Pack	Cat.Nos	Angled 24-connector patch panel - 1 U
1	0 337 92	Complete with new generation Quick Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance **Angled panel to be equipped with connectors** It can accept up to 24 cat. 5e to cat. 8 RJ 45 connectors 19" panel - 1 U
1	0 337 85	**Cat. 8 RJ 45 connectors for flat and angled STP panel** Quick-connect connection (no tools required), with 568 A/B marking Supplied with coloured labels Compliant with the following standards ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 Set of 6 RJ 45 connectors For installation in the cassettes of flat or angled panels

Legrand cabling system LCS³ cat. 8

equipment and accessories

0 337 56

0 337 59

0 337 55

0 337 57

0 337 58

Pack	Cat.Nos	Common accessories for flat and angled panels
10	0 337 56	**Port blanking modules** Divisible 6 port blank ng plate for sealing from 1 to 6 ports
1	0 337 59	**Cord management** 2 cord management for use with new generation Quick-Fix They provide side cord management
		Specific accessories for flat panels
1	0 337 55	**Cassette for flat panels to be equipped** Empty removable cassette to be equipped with connectors. It can accept 6 cat. 5e to cat. 8 connectors. Extraction by simple pressure of the cassette making installation and maintenance easier
1	0 337 57	**Blanking cassette** Used to blank the panel
		Specific accessories for angled panels
1	0 337 58	**Angled panel cover** For optimised management of the air flow inside the cabinet

Legrand cabling system LCS³ cat. 8

cables and cords

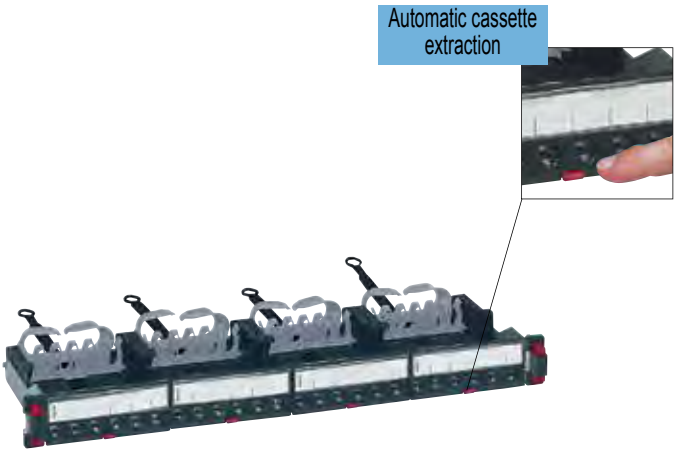
0 337 88

0 337 03

0 518 90

Legrand cabling system LCS³ cat. 6_A

flat equipped patch panels



0 337 72

Pack	Cat.Nos	Cat. 8 local network cables
		4 twisted pair cables, 100 Ω LSOH sheath: without halogens EIA/TIA colour code Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards
		F/UTP - 4 pairs Performance 2000 MHz
500[1]	0 337 86	Length 500 m supplied on drum. Weight 42 kg
		S/FTP - 4 pairs Performance 2000 MHz
500[1]	0 337 88	Length 500 m supplied on drum. Weight 45 kg
		Cat. 8 RJ 45 patch cords
		LSZH RJ 45/RJ 45 flat With special "easy grip" plug Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards
	RAL 6027	**S/FTP shielded, impedance 100 Ω**
	0 337 01	Length 0.5 m
	0 337 02	Length 1 m
	0 337 03	Length 2 m
	0 337 04	Length 3 m
	0 337 05	Length 5 m
	0 337 06	Length 8 m
	0 337 07	Length 10 m
	LSZH	
	RAL 3020 / RAL 6026	
1	0 337 21 / 0 337 08	Length 0.5 m
	0 337 22 / 0 337 09	Length 1 m
	0 337 23 / 0 337 10	Length 2 m
	0 337 24 / 0 337 11	Length 3 m
	0 337 25 / 0 337 12	Length 5 m
	0 337 26 / 0 337 13	Length 8 m
1	0 337 27 / 0 337 17	Length 10 m
		Marking kit
1	0 518 90	Kit of 200 coloured rings for mark ng RJ 45 cords Rings to be clipped to the patch cords

1: in metre(s)

Pack	Cat.Nos	Cat. 6_A patch panels equipped with 24 RJ 45 connectors
		Complete with new generation Quick Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panels ensure automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Equipped with 4 cassettes of 6 cat. 6_A RJ 45 LCS³ quick connect connectors (no tools required), with 568 A/B mark ng Supplied with coloured labels Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards 19" panel - 1 U Automatic cassette removal by simple pressure
		Flat panels 24 RJ 45 connectors - 1 U
1	0 337 70	UTP
1	0 337 72	STP

Legrand cabling system LCS³ cat. 6_A

flat patch panels to be equipped

0 337 90

0 337 93

Pack	Cat.Nos	Flat 24-connector patch panels - 1 U to be equipped
		Complete with new generation Quick Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panels ensure automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance **Flat panel with empty cassettes to be equipped with connectors** Equipped with 4 automatic extraction cassettes for cat. 5e to cat. 8 RJ 45 connectors
1	0 337 90	19" panel - 1 U
		Empty flat panel to be equipped with cassettes It can accept a maximum of 4 automatic extraction cassettes: - copper - fibre optic
1	0 337 91	19" panel - 1 U

Pack	Cat.Nos	Flat high density 48-connector patch panel - 1 U to be equipped
		Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Automatic cassette removal by simple pressure Possibility of removing each connector individually
1	0 337 93	19" panel - 1 U

Legrand cabling system LCS³ cat. 6_A

angled patch panels to be equipped with connectors

0 337 92

0 337 94

0 337 75

Pack	Cat.Nos	Angled 24-connector patch panel - 1 U
		Complete with new generation Quick Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance **Angled panel to be equipped with connectors** It can accept up to 24 cat. 5e to cat. 8 RJ 45 connectors
1	0 337 92	19" panel - 1 U

Pack	Cat.Nos	Angled high density 48-connector patch panel - 1 U to be equipped
		Complete with new generation Quick Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance **Angled panel to be equipped with connectors** It can accept up to 48 cat. 5e to cat. 6_A RJ 45 connectors
1	0 337 94	19" panel - 1 U

Pack	Cat.Nos	High density cat. 6_A RJ 45 connectors
		Cat. 6A RJ 45 connectors for flat and angled STP panels Quick connect connection (no tools required), with 568 A/B mark ng Supplied with coloured labels Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards For equipment to be installed in the cassettes of flat or angled panels Set of 6 cat. 6_A RJ 45 connectors
1	0 337 73	UTP
1	0 337 75	STP

0 337 56

0 337 59

0 337 55

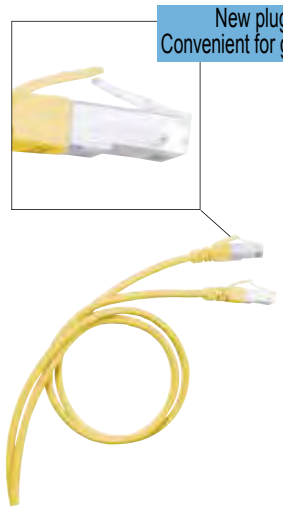
0 337 57

0 337 58

Pack	Cat.Nos	Common accessories for flat and angled panels
		Port blanking modules
10	0 337 56	Divisible 6 port blank ng plate For sealing from 1 to 6 ports
		Cord management
1	0 337 59	For use with new generation Quick Fix they provide side cord management
		Specific accessories for flat panels
		Cassette for flat panels to be equipped
1	0 337 55	Empty removable cassette to be equipped with connectors. It can accept 6 cat. 5e to cat. 8 connectors Extraction by simple pressure of the cassette making installation and maintenance easier Possibility of removing each connector individually
		High density cassette for flat panels to be equipped
1	0 337 95	Empty removable cassette to be equipped with connectors; it can accept 12 cat. 5e to cat. 6_A connectors Extraction by simple pressure of the cassette, making installation and maintenance easier
		Blanking cassette
1	0 337 57	Used to blank the panel

Pack	Cat.Nos	Specific accessories for angled panels
		Angled panel cover
1	0 337 58	For optimised management of the air flow inside the cabinet

0 327 77



0 517 82

Pack	Cat.Nos	Cables for local networks cat. 6A
		Cables 4 pairs or 2 x 4 twisted pairs 100 ohms LSZH sleeve: halogen-free 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**
500[1]	0 327 87	Performance 500 MHz Length 500 m Supplied on reel. Weight 25 kg
		F/UTP - 4 pairs
500[1]	0 327 78	Performance 500 MHz Length 500 m Supplied on reel. Weight 25 kg
		F/UTP - 2 x 4 pairs
500[1]	0 328 78	Performance 500 MHz Length 500 m Supplied on reel. Weight 65 kg
		S/FTP - 4 pairs
500[1]	0 327 77	Performance 600 MHz Length 500 m Supplied on reel. Weight 30 kg

1: in metre(s)

Pack	Cat.Nos	RJ 45 patch cords and user cords cat. 6A
		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**
1	0 518 82	Length 1 m
1	0 518 83	Length 2 m
1	0 518 84	Length 3 m
1	0 518 85	Length 5 m
	LSZH	
1	0 518 78	Length 1 m
1	0 518 79	Length 2 m
1	0 518 80	Length 3 m
1	0 518 81	Length 5 m
1	0 518 74	Length 1 m
1	0 518 75	Length 2 m
1	0 518 76	Length 3 m
1	0 518 77	Length 5 m
	PVC	**S/FTP shielded impedance 100 Ω**
1	0 518 16	Length 0.5 m
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	
1	0 518 70	Length 1 m
1	0 518 71	Length 2 m
1	0 518 72	Length 3 m
1	0 518 73	Length 5 m
1	0 518 66	Length 1 m
1	0 518 67	Length 2 m
1	0 518 68	Length 3 m
1	0 518 69	Length 5 m

RJ 45 sockets - Arteor


5 723 06


5 723 59


5 723 58


5 723 57

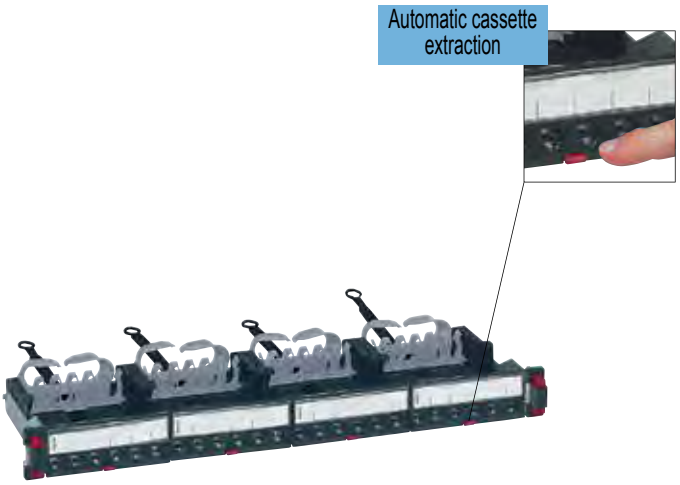

6 327 79

Can be integrated in all supports (see Legrand general catalog)
Mechanisms to be equipped with support frames (see Legrand general catalog) and plates (see Legrand general catalog)
With LCS³ connector with fast connection thanks to integrated crimping take AWG 22 single-core cables up to AWG 26 and AWG multicore cables
Contacts marked with dual colour code and wiring schemes T568 A and T 568 B
Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-1 and TIA/EIA 568 C

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	Keystone RJ 45 sockets cat. 6A
10	0 331 54	STP socket - metal shielding 360° with fast connection thanks to integrated crimping
10	0 331 55	UTP socket - with fast connection thanks to integrated crimping

Pack	Cat.Nos	Surface-mounting 1 or 2 ports box
1	6 327 79	For keystone connectors Provides a solution for the integration of a keystone in surface-mounting installations Can be fixed on table or in association with mini-trunking



0 337 61

Pack	Cat.Nos	Cat. 6 patch panels equipped with 24 RJ 45 connectors
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panels ensure automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Equipped with 4 cassettes of 6 cat. 6 RJ 45 LCS³ quick connect connectors (no tools required), with 568 A/B mark ng Supplied with numbered coloured labels Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards 19" panel - 1 U Automatic cassette removal by simple pressure
		Flat panels 24 RJ 45 connectors - 1 U
1	0 337 60	UTP
1	0 337 61	FTP
1	0 337 62	STP

0 337 90

0 337 93

Pack	Cat.Nos	Flat 24-connector patch panels - 1 U to be equipped
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure. The panels ensure automatic earthing of each connector. Equipped with rear cable guide to hold the cables during maintenance
		Flat panel with empty cassettes to be equipped with connectors Equipped with 4 automatic extraction cassettes for cat. 5e to cat. 8 RJ 45 connectors
1	0 337 90	19" panel - 1 U
		Empty flat panel to be equipped with cassettes It can accept a maximum of 4 automatic extraction cassettes: - copper - fibre optic
1	0 337 91	19" patch panel - 1 U

		Flat high density 48-connector patch panel - 1 U to be equipped
		Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Automatic cassette removal by simple pressure Possibility of removing each connector individually
1	0 337 93	19" panel - 1 U

Legrand cabling system LCS³ cat. 6

angled patch panels to be equipped with connectors

0 337 92

0 337 94

0 337 63

Legrand cabling system LCS³ cat. 6

equipment and accessories

0 337 56

0 337 59

0 337 55

0 337 57

0 337 58

Pack	Cat.Nos	Angled 24-connector patch panels - 1 U
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance
		Angled panel to be equipped with connectors It can accept up to 24 cat. 5e to cat. 8 RJ 45 connectors
1	0 337 92	19" panel - 1 U

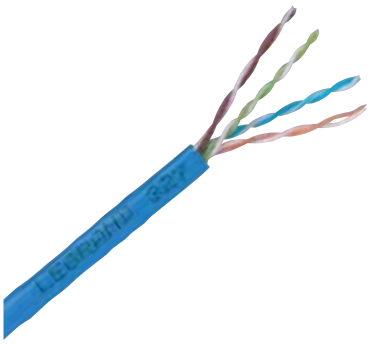
Pack	Cat.Nos	Angled high density 48-connector patch panel - 1 U to be equipped
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance
		Angled panel to be equipped with connectors It can accept up to 48 cat. 5e to cat. 6_A RJ 45 connectors
1	0 337 94	19" panel - 1 U

Pack	Cat.Nos	Cat. 6 high density RJ 45 connectors
		Cat. 6 RJ 45 connectors for flat and angled panels Quick connect connection (no tools required), with 568 A/B mark ng Supplied with coloured labels Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards For equipment to be installed in the cassettes of flat or angled panels Set of 6 cat. 6 RJ 45 connectors
1	0 337 63	UTP
1	0 337 64	FTP
1	0 337 65	STP

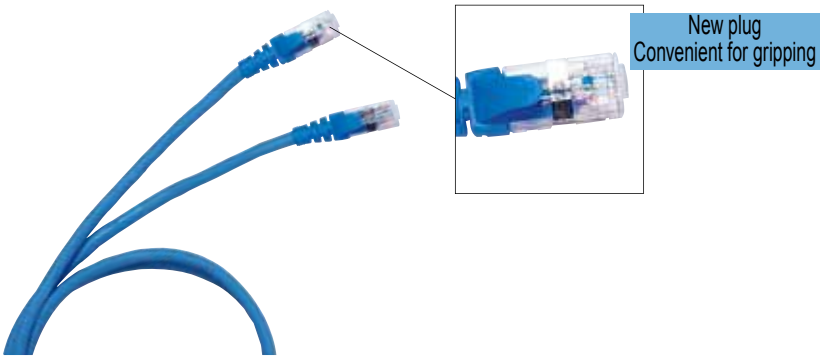
Pack	Cat.Nos	Common accessories for flat and angled panels
		Port blanking modules
10	0 337 56	Divisible 6 port blank ng plate For sealing from 1 to 6 ports
		Cord management
1	0 337 59	For use with new generation Quick-Fix; they provide side cord management

Pack	Cat.Nos	Specific accessories for flat panels
		Cassette for flat panels to be equipped
1	0 337 55	Empty removable cassette to be equipped with connectors. It can accept 6 cat. 5e to cat. 8 connectors Extraction by simple pressure of the cassette, making installation and maintenance easier
		High density cassette for flat panels to be equipped
1	0 337 95	Empty removable cassette to be equipped with connectors; it can accept 12 cat. 5e to cat. 6_A connectors Extraction by simple pressure of the cassette, making installation and maintenance easier Possibility of removing each connector individually
		Blanking cassette
1	0 337 57	Used to blank the panel

Pack	Cat.Nos	Specific accessories for angled panels
		Angled panel cover
1	0 337 58	For optimised management of the air flow inside the cabinet



0 327 54



0 517 62

Cables for local networks cat. 6

Pack	Cat.Nos		
			Cables 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 568C
	LSZH	PVC	**U/UTP - 4 pairs**
305¹	0 327 54		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
			F/UTP - 4 pairs
305¹	0 328 56		Length 305 m Supplied on reel. Weight 17 kg
500¹	0 327 56		Length 500 m Supplied on reel. Weight 25 kg
			F/UTP - 4 pairs
305¹		0 328 57	Length 305 m Supplied in cardboard box. Weight 17 kg
500¹		0 327 58	Length 500 m Supplied on reel. Weight 25 kg
			F/UTP - 2 x 4 pairs
500¹	0 327 76		Length 500 m Supplied on reel. Weight 48 kg
			SF/UTP - 4 pairs
500¹	0 327 57		Length 500 m Supplied on reel. Weight 29 kg
500¹		0 327 59	Length 500 m Supplied on reel. Weight 30 kg
	0 327 98		**F/FTP - 2 x 4 pairs** Length 500 m Weight 62 kg
	0 327 99		**F/FTP - 4 pairs** Length 500 m Weight 25,2 kg

1: in metre(s)

	PE	
	0 328 29	**U/UTP - 4 pairs** Length 500 m Supplied on reel Gel filled PE jacket

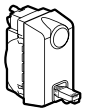
RJ 45 patch cords and user cords cat. 6

Pack	Cat.Nos		
			RJ 45 - RJ 45 right
	PVC		**U/UTP unscreened impedance 100 Ω**
1	0 518 18		Length 0.5 m
1	0 517 72		Length 1 m
1	0 517 73		Length 2 m
1	0 517 74		Length 3 m
1	0 517 75		Length 5 m
	LSZH		
1	0 518 62	0 518 58	Length 1 m
1	0 518 63	0 518 59	Length 2 m
1	0 518 64	0 518 60	Length 3 m
1	0 518 65	0 518 61	Length 5 m
	PVC		**F/UTP screened impedance 100 Ω**
1	0 518 15		Length 0.5 m
1	0 517 62		Length 1 m
1	0 517 63		Length 2 m
1	0 517 64		Length 3 m
1	0 517 65		Length 5 m
	LSZH		
1	0 518 54	0 518 50	Length 1 m
1	0 518 55	0 518 51	Length 2 m
1	0 518 56	0 518 52	Length 3 m
1	0 518 57	0 518 53	Length 5 m
	PVC		**SF/UTP shielded impedance 100 Ω**
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

5 728 02

5 728 14

Can be integrated in all supports (see Legrand general catalog)
Mechanisms to be equipped with support frames (see Legrand general catalog) and plates (see Legrand general catalog)
With LCS³ connector with fast connection thanks to integrated crimping take AWG 22 single-core cables up to AWG 26 and AWG multicore cables
Contacts marked with dual colour code and wiring schemes T568 A and T 568 B
Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-1 and TIA/EIA 568 C

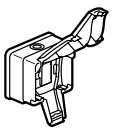
Pack	Cat.Nos	Arteor RJ 45 sockets cat. 6
		Mechanisms supplied with square rocker plates, to be equipped with support frames (see Legrand general catalog) and plates (see Legrand general catalog)
		UTP - 1 module
10	5 723 02	 ○ White
10	5 728 02	● Magnesium
10	5 723 54	○ White with orange blank
10	5 728 54	● Magnesium with orange blank
10	5 723 55	○ White with green blank
10	5 728 55	● Magnesium with green blank
		UTP - 2 modules
10	5 723 14	 ○ White - square version
10	5 728 14	● Magnesium - square version
		UTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	5 723 53	 ○ White with red blank
5	5 728 53	● Magnesium with red blank
		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


6 327 79


0 695 69


0 331 81

Can be integrated in all supports (see Legrand general catalog)
With LCS³ connector with fast connection thanks to integrated crimping take AWG 22 single-core cables up to AWG 26 and AWG multicore cables
Contacts marked with dual colour code and wiring schemes T568 A and T 568 B
Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-1 and TIA/EIA 568 C

Pack	Cat.Nos	Keystone RJ 45 socket cat. 6
10	0 331 81	UTP socket with fast connection - black
10	0 331 61	UTP socket with fast connection - white
30	6 327 05	UTP socket type 110 - white
1	6 327 79	**Surface-mounting 1 or 2 ports box** For keystone connectors Provides a solution for the integration of a keystone in surface-mounting installations Can be fixed on table or in association with mini-trunking
1	0 778 91	**Soliroc RJ 45 socket cat. 6 - IK 10** **FTP - 2 modules**  IP 20 - IK 10 For at-risk areas or areas with no surveillance
5	0 695 69	**Plexo RJ 45 sockets cat. 6 - IP 55 closed flap IK 07** **RJ 45 sockets** Protection against water, dust For industrial sites  ◐ Grey/white FTP socket
1	0 695 61	◐ Grey/white UTP socket
1	0 695 81	**Adaptor for RJ 45 socket**  RJ 45 to be ordered separately Weatherproofing ensured (IP 44) plug inserted ◐ Grey/white
1	0 904 67	**Plexo 66 RJ 45 socket cat. 6 - IP 66 - IK 08** **FTP socket**  9 contacts Weatherproofing ensured (IP 66) with plug inserted Inclined 90° ● Grey RAL 7016/T029
10	EMKEYSTONELWE	**Suits Legrand LCS2 tooless jacks**  ○ White
10	EMKEYSTONELUG	● Urban Grey
10	EMKEYSTONELBL	● Black

0 337 51

Pack	Cat.Nos	Cat. 5e patch panels equipped with 24 RJ 45 connectors
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panels ensure automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Equipped with 4 cassettes of 6 cat. 5e RJ 45 LCS³ quick connect connectors (no tools required), with 568 A/B mark ng Supplied with coloured labels Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards 19" panel - 1 U Automatic cassette removal by simple pressure Possibility of removing each connector individually
		Flat panel with empty cassettes to be equipped with connectors 24 RJ 45 connectors - 1 U
1	0 337 50	UTP
1	0 337 51	FTP

0 337 90

0 337 93

Pack	Cat.Nos	Flat 24-connector patch panels - 1 U to be equipped
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure. The panels ensure automatic earthing of each connector. Equipped with rear cable guide to hold the cables during maintenance
		Flat panel with empty cassettes to be equipped with connectors Equipped with 4 automatic extraction cassettes for cat. 5e to cat. 8 RJ 45 connectors
1	0 337 90	19" panel - 1 U
		Empty flat panel to be equipped with cassettes It can accept a maximum of 4 automatic extraction cassettes: - copper - fibre optic
1	0 337 91	19" panel - 1 U

		Flat high density 48-connector patch panel - 1 U to be equipped
		Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Automatic cassette removal by simple pressure
1	0 337 93	19" panel - 1 U

Legrand cabling system LCS³ cat. 5e

angled patch panels to be equipped with connectors

0 337 92

0 337 94

0 337 53

Pack	Cat.Nos	
		Angled 24-connector patch panel - 1 U
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance
		Angled panel to be equipped with connectors It can accept up to 24 cat. 5e to cat. 8 RJ 45 connectors
1	0 337 92	19" panel - 1 U
		Angled high density 48-connector patch panel - 1 U to be equipped
		Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Universal mounting on any cabinet or enclosure The panel ensures automatic earthing of each connector Equipped with rear cable guide to hold the cables during maintenance Angled panel to be equipped with connectors It can accept up to 48 cat. 5e to cat. 6_A RJ 45 connectors
1	0 337 94	19" panel - 1 U
		Cat. 5e High density RJ 45 connectors
		Cat. 5e RJ 45 connectors for flat and angled panel Quick connect connection (no tools required), with 568 A/B mark ng Supplied with coloured labels Compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards For equipment to be installed in the cassettes of flat or angled panels Set of 6 cat. 5e RJ 45 connectors
1	0 337 53	UTP
1	0 337 54	FTP

Legrand cabling system LCS³ cat. 5e

equipment and accessories

0 337 56

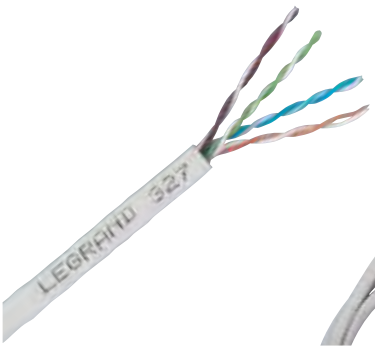
0 337 59

0 337 55

0 337 57

0 337 58

Pack	Cat.Nos	
		Common accessories for flat and angled panels
		Port blanking modules
10	0 337 56	Divisible 6 port blank ng plate for sealing from 1 to 6 ports
		Cord management
1	0 337 59	For use with new generation Quick-Fix They provide side cord management
		Specific accessories for flat panels
		Cassette for flat panels to be equipped
1	0 337 55	Empty removable cassette to be equipped with connectors. It can accept 6 cat. 5e to cat. 8 connectors. Extraction by simple pressure of the cassette, making installation and maintenance easier Possibility of removing each connector individually
		High density cassette for flat panels to be equipped
1	0 337 95	Empty removable cassette to be equipped with connectors; it can accept 12 cat. 5e to cat. 6_A connectors Extraction by simple pressure of the cassette, making installation and maintenance easier Possibility of removing each connector individually
		Blanking cassette
1	0 337 57	Used to blank the panel
		Specific accessories for angled panels
		Angled panel cover
1	0 337 58	For optimised management of the air flow inside the cabinet



0 328 50

0 516 40

Cables for local networks cat. 5e

Pack	Cat.Nos LSZH	Cat.Nos PVC	
			4 twisted pair cables 100 ohms LSZH sleeve: non-halogen Grey RAL 7035 Colour code TIA/EIA
305[1]	0 327 50		**U/UTP - 4 pairs** 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
			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

1: in metre(s)

RJ 45 patch cords and user cords cat. 5e

Pack	Cat.Nos PVC	
		RJ 45 - RJ 45 right
		U/UTP unscreened impedance 100 Ω
		Grey
1	0 518 17	Length 0.5 m
1	0 516 36	Length 1 m
1	0 516 37	Length 2 m
1	0 516 38	Length 3 m
1	0 516 39	Length 5 m
		F/UTP screened impedance 100 Ω
		Grey
1	0 518 14	Length 0.5 m
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 LCS³ category 5e

RJ 45 sockets - Mosaic™ Programme, Arteor and Plexo

0 765 52

0 695 57

Can be integrated in all supports (see Legrand general catalog)
With LCS³ connector with fast connection thanks to integrated crimping Take AWG 22 single-core cables up to AWG 26 and AWG multicore cables
Contacts marked with dual colour code and wiring schemes T568 A and T 568 B
Conform to standards ISO/IEC 11801 Ed. 2.0, amendment 2, EN 50173-1 and TIA/EIA 568 C

Pack	Cat.Nos	Mosaic Programme RJ 45 sockets cat. 5e
		Mechanisms to be equipped with support frames (see Legrand general catalog) and plates (see Legrand general catalog)
		UTP - 1 module
10	0 765 51	○ White
10	0 794 51	● Aluminium
		UTP - 2 modules
10	0 765 54	○ White
10	0 794 54	● Aluminium
		UTP with controlled access - 2 modules
		Supplied with 2 keys for 5 sockets
5	0 765 97	○ White with red blank
		UTP - 2 x RJ 45 with Quick-Fix 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
5	0 765 98	○ White with red blank
		FTP - 2 x RJ 45 with Quick-Fix 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 sockets cat. 5e
		Mechanisms supplied with square rocker plates, to be equipped with support frames (see Legrand general catalog) and plates (see Legrand general catalog)
		UTP - 1 module
10	5 723 03	○ White
10	5 728 03	● Aluminium
		UTP - 2 modules
10	5 723 15	○ White
10	5 728 15	● Aluminium
		FTP - 1 module
10	5 723 04	○ White
10	5 728 04	● Aluminium

Pack	Cat.Nos	Keystone RJ 45 socket cat. 5e
		UTP socket
10	0 331 60	UTP socket with fast connection - white
10	0 331 80	UTP socket with fast connection - black
10	6 327 03	UTP socket type 110 - white

Pack	Cat.Nos	Surface-mounting 1 or 2 ports box
1	6 327 79	For keystone connectors Provides a solution for the integration of a keystone in surface-mounting installations Can be fixed on table or in association with mini-trunking

Pack	Cat.Nos	Plexo RJ 45 sockets, cat. 5e - IP 55 closed flap IK 07
		RJ 45 sockets
		Protection against water, dust
		For industrial sites
1	0 695 57	◐ Grey/White FTP socket
1	0 695 56	◐ Grey/White UTP socket
		Adaptor for RJ 45 socket
1	0 695 81	RJ 45 to be ordered separately Weatherproofing ensured (IP 44) plug inserted ◐ Grey/white

0 539 49

Reinforced protection

0 533 00 in position (no cord supplied)

0 533 01

0 327 60

0 517 09

RJ 45 doubler sockets

Pack	Cat.Nos	
	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

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

Weatherproof adaptors

IP 55 - IK 07
Allow all functions to be adapted
2 Mosaic modules IP 55 operation

	Grey/White	
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

Cable protection accessories

Pack	Cat.Nos	
		Plastic material IP 66/67 guaranteed connection with the pair Cat.No 0 533 02 IP 55 with no connection for base with blank 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
		Plug
3	0 533 00	Integrated PE with sealing ring and clamping blades Tool-free assembly Ability to protect cables of category 5e
		Flush-mounting base
3	0 533 01	Locking base Supplied with RJ 45 female/female coupler cat. 5e
		Kit
3	0 533 02	Flush-mounting base + plug
		Protective flap
3	0 533 03	Fits on base Cat.No 0 533 01

RJ plugs for round cables

Gold-coated contacts 1.2 µm

		RJ 11
50	0 517 01	4 contacts, width 9.65 mm
		RJ 12
50	0 517 02	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

Stripping tool

Slits the sheath and releases the conductors by rotation
For twisted pair cables
Does not damage the conductors

		Stripper
1	0 332 62	For twisted pair and fibre optic cable
		Cutting pliers
1	0 327 60	Cut wires cleanly without damaging the copper

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

110 tool

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

5 723 13

0 335 79

Pack	Cat.Nos		Telephone sockets
	Mosaic	Arteor	
			RJ 11 and RJ 12 sockets Equipped with a modular Jack connector with 1/4 turn terminal for fast connection Tap-off possible
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
			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

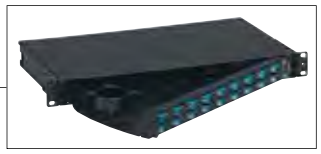
Pack	Cat.Nos	Patch panel telephone 50 ports 110 connect
1	0 335 79	19" panel - 1 U

Pack	Cat.Nos	Cables for telephone networks cat. 3
		PVC sleeve Colour white Colour code TIA/EIA
1	0 328 91	**U/UTP - 50 pairs** Length 500 m Supplied on reel
1	0 328 88	**U/UTP - 100 pairs** Length 500 m Supplied on reel

Pack	Cat.Nos	Panels and units for incoming telephone
		Panels assembled - 1 U Fitted with 4 LCS³ 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 LCS³ 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

New LCS3 system

0 321 62



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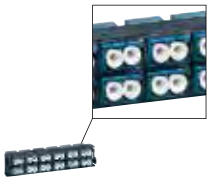
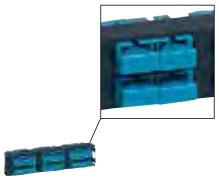


0 321 15

0 321 33



0 321 21

Pack	Cat.Nos	Equipped 19" optic drawers
		Metal equipped 19" optic drawers with 4 cable inputs, supplied with fastening kit, 1 PE Ø 13.5 mm, coiling system and pigtail duct Panel and optic port marking on dedicated marking areas
		Sliding End of travel stop with 30° tilting Maximum capacity either: - 24 ST and SC connectors - 48 LC connectors Depth 220 mm, height 1 U
1	0 321 61	12 SC duplex multi-mode connectors for 24 fibres
1	0 321 62	24 LC duplex multi-mode connectors for 48 fibres
1	0 321 63	24 ST multi-mode connectors for 48 fibres
1	0 321 64	12 SC duplex single-mode connectors for 24 fibres
1	0 321 65	24 LC duplex single-mode connectors for 48 fibres
1	0 321 66	12 SC APC duplex single-mode connectors for 24 fibres
1	0 321 67	24 LC APC duplex single-mode connectors for 48 fibres
		Rotating Delivered with reversible left or right opening Maximum capacity, either: - 72 LC connectors - 36 SC connectors Depth 260 mm, height 1 U
1	0 321 71	36 LC duplex multi-mode connectors for 72 fibres
1	0 321 72	18 SC duplex multi-mode connectors for 36 fibres
1	0 321 73	36 LC duplex single-mode connectors for 72 fibres
1	0 321 74	18 SC duplex single-mode connectors for 36 fibres

		19" modular optic drawers
		Metal modular 19" optic drawers with 8 cable inputs, supplied with fastening kit, 2 PE Ø 13.5 mm, coiling system and splice cassette Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Supplied with numbered labels End of travel stop with 30° tilting Maximum capacity either: - 96 LC connectors - 48 SC connectors - 24 ST connectors Depth 215 mm, height 1 U
		Sliding, equipped
1	0 321 02	12 SC duplex multi-mode connectors for 24 fibres
1	0 321 04	24 LC duplex multi-mode connectors for 48 fibres
1	0 321 06	12 SC duplex single-mode connectors for 24 fibres
		Sliding, to be equipped with fibre optic blocks It can accept all fibre optic blocks; 4 blocks maximum
1	0 321 00	Empty drawer

Pack	Cat.Nos	Fibre optic blocks
		They are clipped directly to the optic drawer to be equipped,Cat.No 0 321 00, or the fibre optic splice cassette, Cat.No 0 321 41
		Singlemode fibre optic blocks (9/125 µm)
1	0 321 17	ST block for 6 single-mode fibre optics
1	0 321 10	SC duplex block for 6 single-mode fibre optics
1	0 321 11	SC duplex high density block for 12 single-mode fibre optics
1	0 321 12	SC APC duplex block for 6 single-mode fibre optics
1	0 321 13	LC duplex block for 6 single-mode fibre optics
1	0 321 14	LC duplex block for 12 single-mode fibre optics
1	0 321 15	LC duplex high density block for 24 single-mode fibre optics
1	0 321 16	LC APC duplex block for 12 single-mode fibre optics
1	0 321 33	Single-mode 4 MTP[1] feedthrough adapter
		Multimode fibre optic blocks (62.5 and 50/125 µm)
1	0 321 27	ST block for 6 multimode fibre optics
1	0 321 20	SC duplex block for 6 multimode fibre optics
1	0 321 21	SC duplex high density block for 12 multimode fibre optics
1	0 321 23	LC duplex block for 6 multimode fibre optics
1	0 321 24	LC duplex block for 12 multimode fibre optics
1	0 321 25	LC duplex high density block for 24 multimode fibre optics
1	0 321 34	Multimode 4 MTP[1] feedthrough adapter

		Copper block for fibre optic drawer
1	0 321 32	It clippes directly to the optic drawer to be equipped, Cat.No 0 321 00 It gives the possibility of mixing fibre optic and copper

		Accessories for optic drawer to be equipped
		Accessory for receipt of a fan-out
1	0 321 28	It's clipped at the back of the drawer It enables the entry of preterminated Cat.Nos
		Blank
1	0 321 29	Blank block
		Pigtail cassette
1	0 321 30	Capacity 24 fibre optics
		Coiling kit
1	0 321 31	1 accessory

1: MTP is a registered trademark of US Conec Ltd

Legrand cabling system LCS³ fibre optic

19" fibre optic drawers and mini-splicer

New LCS3 system

0 321 40 + 0 321 41

Panel 0 321 40 to be equipped with 4 cassettes 0 321 43

0 321 41

0 321 43

0 321 46

0 322 00

Pack	Cat.Nos	Modular 19" panel to be equipped with cassettes
		To be equipped with maximum 4 automatic extraction cassette Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Maximum capacity, either: - 48 SC connectors - 24 ST connectors - 96 LC connectors
1	0 321 40	Depth 190 mm, height 1 U
		Optic drawer cassettes They are installed directly in the optic panel, Cat.No 0 321 40 Removable cassette Extraction by simple pressure of the cassette, making installation and maintenance easier
		Fibre optic splice cassette
1	0 321 41	It can accept all modular fibre optic blocks
		Copper cassette to be equipped
1	0 337 55	It can accept 6 cat. 5e, cat. 6 and cat. 6_A connectors
		MTP¹ preterminated cassette (MPO compatible) Front and rear extraction High performance cassette, low insertion loss <0.35 dB
1	0 321 42	Multimode OM4 cassette (50/125 µm) 24 filaments LC OM4 Type A/C
1	0 321 43	Multimode OM4 cassette (50/125 µm) 12 SC OM4 Type A/C
1	0 321 44	Single-mode OS2 cassette (9/125 µm) type OS2 24 LC OS2 Type A/C
1	0 321 45	Single-mode OS2 cassette (9/125 µm) 12 SC OS2 Type A/C
		Blanking cassette
1	0 337 57	Used to blank the panel
		Adapters
1	0 321 33	Single-mode 4 MTP¹ adapter (installation in cassette 0 321 41)
1	0 321 34	Multi-mode 4 MTP¹ adapter (installation in cassette 0 321 41)

Pack	Cat.Nos	Accessories for 19" panel to be equipped with cassettes
		Rear cable management accessory
1	0 321 46	For installation on panels Cat.No 0 321 40
		Cord management kit (guide/support/door)
1	0 321 47	For installation on panel Cat.No 0 321 40; 2 side cord management and front door with integrated mark ng to ensure correct front and side cord management Cord support to be installed on the cassette to mak side passages easier
		Smart splicer Compact and robust tool, excellent hand grip, easy to transport. Allows the fusion and protection of pigtails, state report of insertion losses (IL typical = 0,1 dB) by insertion led control (IL). USB port to download the IL datas. Composition: - 1 splicer Dim: 95x132x71 mm Weight: 550 gr IP: 50 - 1 precision cleaver - 1 adapter for different LC and SC standards - 1 lithium battery (autonomy: 80 splice and protection cycles) - Power cord - 2 fiber holders - 900 µm
1	0 322 00	1 splicer kit for pigtails
1	0 322 02	Fiber holder repla 900 microns
1	0 322 03	Fiber holder 250 microns
1	0 322 04	1 Cord LC-LC APC
1	0 322 05	1 Cord LC-LC
1	0 322 06	1 Cord LC-SC APC
1	0 322 07	1 Cord LC-SC
1	0 322 08	1 Adaptater LC-LC
1	0 322 09	1 Adaptater SC-SC
1	0 322 76	Fiber stripper
1	0 322 77	Wipes
1	0 322 78	Cleaning spray bottle

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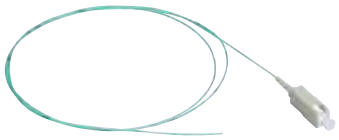


0 322 20

0 322 31

Pack	Cat.Nos	Pigtails
		They can be used for on-site connection of the fibre optic cable; quick, reliable and performing: - OM2/OM3/OM4 IL Typical/Master = 0.15 db - OS2 IL Typical/Master = 0.18 db Compatible with all the fusion splicers available on the market
		50/125 µm - OM2 (PC)
		Connectors
10	0 322 10	SC 1 m LSZH
10	0 322 11	LC 1 m LSZH
10	0 322 12	ST 1 m LSZH
10	0 322 13	SC 2 m LSZH
10	0 322 14	LC 2 m LSZH
10	0 322 15	ST 2 m LSZH
		50/125 µm - OM3 (PC)
		Connectors
	0 322 20	SC 1 m LSZH
10	0 322 21	LC 1 m LSZH
10	0 322 22	ST 1 m LSZH
10	0 322 23	SC 2 m LSZH
10	0 322 24	LC 2 m LSZH
		50/125 µm - OM4 (PC)
		Connectors
10	0 322 30	SC 1 m LSZH
10	0 322 31	LC 1 m LSZH
10	0 322 32	ST 1 m LSZH
10	0 322 33	SC 2 m LSZH
10	0 322 34	LC 2 m LSZH
		9/125 µm - OS2 (APC or UPC) - OS1 compatible
		Connectors
10	0 322 40	SC-APC OS2 1 m LSZH
10	0 322 41	SC-UPC OS2 1 m LSZH
10	0 322 42	LC-APC OS2 1 m LSZH
10	0 322 43	LC-UPC OS2 1 m LSZH
10	0 322 44	ST-UPC OS2 1 m LSZH
10	0 322 45	SC-APC OS2 2 m LSZH
10	0 322 46	SC-UPC OS2 2 m LSZH
10	0 322 47	LC-UPC OS2 2 m LSZH
10	0 322 48	LC-APC OS2 2 m LSZH
10	0 322 49	ST-UPC OS2 2 m LSZH

Set of 12 LC pigtails

1	0 326 24	OS2 12 pigtails LC-UPC
1	0 326 26	OM3 12 pigtails LC-PC
1	0 326 71	OM4 12 pigtails LC-PC

Pigtail sleeves

1	0 327 44	40 mm - bag of 50 sheaths

Glue-on connectors 50/125 and 62.5/125 µm

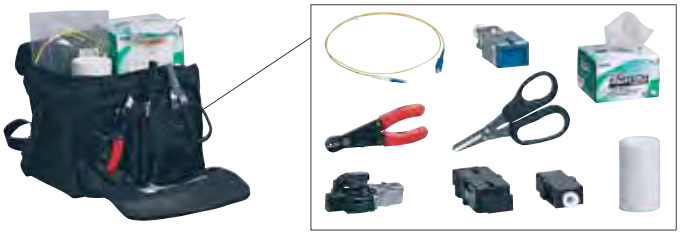
Supplied with 900 µm sleeve
Ceramic ferrule connector
Typical attenuation: 0.3 dB

		Connectors
10	0 331 27	ST
10	0 331 47	SC
10	0 331 00	LC

Fan-out units

It allows a 900 µm fibre optic gain
250 µm diameter fibre optics accepted

1	0 330 48	6 fibre optic fan-out unit
1	0 330 49	12 fibre optic fan-out unit



0 322 70

0 322 72

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0 322 83

0 322 81

0 322 85

Pack	Cat.Nos	Tool case for the preparation of the fibre optic for quick-connect connectors
1	0 322 70	It contains the tools required for the preparation of the fibre optic cable, for the completion of a first test to confirm the correct connection of the fibre optic to the connector, and the accessories for easy connection in all situations Consisting of: - Precision cleaver - Kevlar stripping and cutting tool - Visual defect detector - Installation details and video - Accessories (cleaners, marker, trash can...)

Quick-connect connectors

Preparation completed using the case, Cat.No 0 322 70
Easy to connect, reliable and reusable up to 5 times
They enable the locking of the fibre optic inside the connector
A LED is used to test the connection
No glue or polishing required
They can be installed on 900 µm fibre optics
For 250 µm fibre optic use dedicated tubes, delivered with the connector; typical IL multimode OM3/OM4 = 0.1 db, single mode OS2 = 0.2 db (PC) and 0.3 db (APC)

		OM3/OM4 multimode connectors
		Set of 12 connectors
1	0 322 71	LC PC 50/125 µm, 900/250 µm
1	0 322 72	SC PC 50/125 µm, 900/250 µm
		OS2 single-mode connectors
		Set of 12 connectors
1	0 322 73	LC UPC 9/125 µm, 900/250 µm
1	0 322 74	SC UPC 9/125 µm, 900/250 µm
1	0 322 75	SC APC 9/125 µm, 900/250 µm

Precision cleaver for the update of the case kit Cat.No 0 326 90

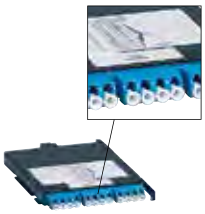
1	0 322 80	It's used in conjunction with the kit of the case Cat.No 0 326 90, to cut the fibre optic with precision, and fit the quick-connect connectors, Cat.No 0 322 71 to 0 322 75

Fibre optic cleaning accessories

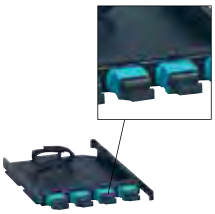
1	0 322 83	Ferrule cleaner MPO/MTP[1]
1	0 322 81	Ferrule cleaner LC (PC/APC)
1	0 322 82	Ferrule cleaner SC (PC/APC)
1	0 322 84	LC replacement cartridge
1	0 322 85	LC replacement cartridge

1: MTP is a registered trademark of US Conec Ltd

0 321 50



0 321 55



0 321 56

0 321 40

0 321 41

0 321 43

0 321 33

Pack	Cat.Nos	Modular fibre optic drawers, ultra high density to be equipped with cassettes
		Fixed and modular chassis for the reception of the drawers
		Fibre optic drawers with front facing cord management Maximum capacity 4 U (up to 48 cassette) - 576 LC connectors Maximum capacity 2 U (up to 24 cassette) - 288 LC connectors Maximum capacity 1 U (up to 12 cassette) - 144 LC connectors
1	0 321 50	1 U
1	0 321 52	2 U
1	0 321 53	4 U
1	0 321 51	UHD Panel to be equipped cassette without rear management 1 U
		Very high density cassettes
		They are clipped directly to the fibre optic drawers, Cat.Nos 0 321 50/51/52/53 Sliding cassette for the above chassis Front or rear cassette extraction MTP¹ high performance cassette Low insertion loss < 0,35 dB A/C polarity
		Multimode OM4 cassette (50/125 µm) For OM4 type 50/125 µm multimode installations
1	0 321 54	MPO cassette 12 LC OM4 Type A/C
		OS2 cassette (9/125 µm) For OS2 type 9/125 µm multimode installations
1	0 321 55	MPO cassette 12 LC OS2 Type A/C
		MTP¹ adapters (MPO compatible)
		They are clipped directly to the fibre optic drawers, Cat.Nos 0 321 50/51/52/53
1	0 321 56	Multimode 4 MTP¹ adapter
1	0 321 57	Single-mode 4 MTP¹ adapter
		LC adapter
		It's clipped directly to the fibre optic drawers, Cat.Nos 0 321 50/51/52/53
1	0 321 58	Adapter 12 LC multimode

Pack	Cat.Nos	Modular 19" panel to be equipped with cassettes
		To be equipped with a maximum of 4 automatic extraction cassettes Complete with new generation Quick-Fix for automatic mounting (no screws required) on the risers of cabinets or enclosures Maximum capacity, either: - 48 SC connectors - 24 ST connectors - 96 LC connectors
1	0 321 40	Depth 190 mm, height 1 U
		High density MTP¹ cassette (MPO compatible)
		They are installed in the modular panels, Cat.No 0 321 40 Sliding cassette that can be extracted by simple pressure, making installation and maintenance easier Front and rear extraction High performance MTP¹ cassette, low insertion loss <0.35 dB, A/C polarity
		Fibre optic splice cassette
1	0 321 41	It can accept all modular fibre optic blocks
		Copper cassette to be equipped
1	0 337 55	It can accept 6 cat. 5e, cat. 6 and cat. 6_A connectors
		Multimode OM4 cassettes (50/125 µm)
1	0 321 42	MTP¹ cassette (MPO compatible) 24 LC OM4 Type A/C
1	0 321 43	MTP¹ cassette (MPO compatible) 12 SC OM4 Type A/C
		Single-mode OS2 cassettes (9/125 µm) OS2 type
1	0 321 44	MTP¹ cassette (MPO compatible) 24 LC OS2 Type A/C
1	0 321 45	MTP¹ cassette (MPO compatible) 12 SC OS2 Type A/C
		Blanking cassette
1	0 337 57	Used to blank the panel
		MTP¹ adapters
		It's installed in splice cassettes, Cat.No 0 321 41 It enables MTP¹/MTP¹ feedthrough
1	0 321 33	Single-mode 4 MTP¹ adapter
1	0 321 34	Multimode 4 MTP¹ adapter
		Accessories for 19" panel to be equipped with cassette
		Rear cable management accessory
1	0 321 46	For installation on panels Cat.No 0 321 40
		Cord management kit (guide/support/door)
1	0 321 47	For installation on panel Cat.No 0 321 40; 2 side cord management and front door with integrated marking to ensure correct front and side cord management Cord support to be installed on the cassette to make side passages easier

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0 324 41

High density preterminated fibre optic links

Delivered on cardboard drums
Connection of high density drawer cassette
Low density micro-cable
Sheaths in LSZH, colour aqua (OM3) and yellow (OS2)
Supplied with test reports and unwinder
Fan-out - Fan-out: spark gap in anodised aluminium for optimum resistance
Low connector insertion loss LC < 0,15 dB/connector
MTP¹-MTP¹: low connector insertion loss
MTP¹ < 0.35 dB/connector
Other configurations on request

Micro cables OM3 Fan-out - Fan-out
Micro cables with spark gap, output 2 mm

Pack	Cat.Nos	Designation	Length (m)
1	0 324 01	6 LC Duplex - 6 LC Duplex	10
1	0 324 02	6 LC Duplex - 6 LC Duplex	20
1	0 324 03	6 LC Duplex - 6 LC Duplex	30
1	0 324 04	6 LC Duplex - 6 LC Duplex	40
1	0 324 05	6 LC Duplex - 6 LC Duplex	50
1	0 324 11	12 LC Duplex - 12 LC Duplex	10
1	0 324 12	12 LC Duplex - 12 LC Duplex	20
1	0 324 13	12 LC Duplex - 12 LC Duplex	30
1	0 324 14	12 LC Duplex - 12 LC Duplex	40
1	0 324 15	12 LC Duplex - 12 LC Duplex	50

Micro cables OS2 Fan-out - Fan-out
Micro cables with spark gap, output 2 mm

Pack	Cat.Nos	Designation	Length (m)
1	0 324 21	6 LC Duplex - 6 LC Duplex	10
1	0 324 22	6 LC Duplex - 6 LC Duplex	20
1	0 324 23	6 LC Duplex - 6 LC Duplex	30
1	0 324 24	6 LC Duplex - 6 LC Duplex	40
1	0 324 25	6 LC Duplex - 6 LC Duplex	50
1	0 324 31	12 LC Duplex - 12 LC Duplex	10
1	0 324 32	12 LC Duplex - 12 LC Duplex	20
1	0 324 33	12 LC Duplex - 12 LC Duplex	30
1	0 324 34	12 LC Duplex - 12 LC Duplex	40
1	0 324 35	12 LC Duplex - 12 LC Duplex	50

Micro cables OM3 MTP¹

Pack	Cat.Nos	Designation	Length (m)
1	0 324 41	12 fibre optics - MTP¹-MTP¹	10
1	0 324 42	12 fibre optics - MTP¹-MTP¹	20
1	0 324 43	12 fibre optics - MTP¹-MTP¹	30
1	0 324 44	12 fibre optics - MTP¹-MTP¹	40
1	0 324 45	12 fibre optics - MTP¹-MTP¹	50

Micro cables OS2 MTP¹

Pack	Cat.Nos	Designation	Length (m)
1	0 324 51	12 fibre optics - MTP¹-MTP¹	10
1	0 324 52	12 fibre optics - MTP¹-MTP¹	20
1	0 324 53	12 fibre optics - MTP¹-MTP¹	30
1	0 324 54	12 fibre optics - MTP¹-MTP¹	40
1	0 324 55	12 fibre optics - MTP¹-MTP¹	50

1: MTP is a registered trademark of US Conec Ltd

0 326 66

Technical characteristics **see e-catalogue**

LSOH sheath (except Cat.Nos 0 325 46 /47)
Colour code FOTAG
Compliance with the EN 50173-2, ISO IEC 11801 standard
Packing on drum
Tight structure: "easy strip"

OM 4 multimode fibre optic cables (50/125 µm)

"Bend insensitive"
For multimode installations 50/125 µm, type OM 4
Aqua sheaths
Suitable for 10 Giga Ethernet networks

Pack	Cat.Nos Loose tube	Cat.Nos Tight structure 900 µm	
2000	0 325 43		Indoor/outdoor (glass strands) 4 fibres - 2000 m
2000	0 325 44		Indoor/outdoor (glass strands) 8 fibres - 2000 m
2000	0 325 45		Indoor/outdoor (glass strands) 12 fibres - 2000 m
2000	0 325 46		Outdoor, corrugated steel tape 4 fibres - 2000 m
2000	0 325 47		Outdoor, corrugated steel tape 8 fibres - 2000 m
2000	0 325 48		Outdoor, corrugated steel tape 12 fibres - 2000 m
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
1000		0 326 67	Cable fibre OM4 12f t-buffer int/ext m-mode aqua (1000m)
1000		0 326 66	Cable fibre OM4 6f t-buffer int/ext m-mode aqua (1000m)
500		0 326 65	Cable fibre OM4 6f t-buffer int/ext m-mode aqua (500m)

Legrand cabling system LCS³ fibre optic

cables (continued)

0 325 30

0 325 33

Technical characteristics **see e-catalogue**

LSOH sheath (except Cat.Nos 0 325 13, 0 325 15, 0 325 23, 0 325 24, 0 325 25, 0 325 40, 0 325 41 and 0 325 42)
Colour code: FOTAG
Compliance with the EN 50173-2, ISO IEC 11801 standard
Pack ng on drum (2000 m)
Tight structure: "easy strip"

Pack	Cat.Nos		OS 2 single-mode fibre optic cables (9/125 µm) - (OS1 compatible)
	Loose tube	Tight structure 900 µm	For single-mode installations 9/125 µm, type OS 2 Yellow or black sheaths for outdoor, rodent guard...
1000		032534	Cable 12f OS2 t-buffer UV lszh in/out s-mode yellow (1000m)
1000		032535	Cable 24f OS2 t-buffer UV lszh in/out s-mode yellow (1000m)
1000		032533	Cable 6f OS2 t-buffer UV lszh in/out s-mode yellow (1000m)
2000	032514		Cable fibre OS1 12f l-tube int/out s-mode yellow (2000m)
2000	032512		Cable fibre OS1 6f l-tube inn/out s-mode yellow (2000m)
1000	032539		Cable 6f OS2 loose tube pe/ny s-mode blue (1000m)
1000	032541		Cable 24f OS2 loose tube pe/ny s-mode blue(1000m)
1000	032540		Cable 12f OS2 loose tube pe/ny s-mode blue(1000m)
2000		032550	Cable fibre OS1 12f t-buffer inn/out s-mode yellow (2000m)

Pack	Cat.Nos		OM 3 multimode fibre optic cables (50/125 µm)
	Loose tube	Tight structure 900 µm	"Bend insensitive" For multimode installations 50/125 µm, type OM 3 Aqua sheaths Suitable for 10 Giga Ethernet networks
1000	032537		Cable 12f OM3 loose tube pe/ny m-mode blue (1000m)
1000	032538		Cable 24f OM3 loose tube pe/ny m-mode blue (1000m)
2000		032552	Cable fibre OM3 24f t-buffer inn/out m-mode aqua (2000m)
1000		032531	Cable 12f OM3 t-buffer UV LSZH in/out m-mode aqua (1000m)
1000		032532	Cable 24f OM3 t-buffer UV LSZH in/out m-mode aqua (1000m)
1000	032536		Cable 6f OM3 loose tube pe/ny m-mode blue (1000m)
1000		032530	Cable 6f OM3 t-buffer UV LSZH in/out m-mode aqua (1000m)

Fitted with ceramic ferrule connectors on each end
Individually packed and tested (report supplied)
Zipcord LSZH sheath

Pack	Cat.Nos	OS 1/OS 2 (UPC) single-mode optical cords
		Optic losses max Master: 0.25 dB For single-mode installations 9/125 µm, type OS 1/ OS 2 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
		LC/LC Uniboot duplex cords Reversible polarity
3	0 326 86	Length: 1 m
3	0 326 87	Length: 2 m
3	0 326 88	Length: 3 m
3	0 326 89	Length: 5 m
3	0 326 92	Length: 10 m

		OM 4 multimode fibre optic cords (50/125 µm)
		Suitable for 10 Giga Ethernet networks Optic losses max Master: 0.15 dB for multimode installations 50/125 µm, type OM 4 Aqua 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
		LC/LC Uniboot duplex cords Reversible polarity
3	0 326 95	Length: 1 m
3	0 326 96	Length: 2 m
3	0 326 97	Length: 3 m
3	0 326 98	Length: 5 m
3	0 326 99	Length: 10 m

Pack	Cat.Nos	OM 3 multimode fibre optic cords (50/125 µm)
		Suitable for 10 Giga Ethernet networks Optic losses max Master: 0.25 dB For multimode installations 50/125 µm, type OM 3 Aqua 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

		OM 2 multimode fibre optic cords (50/125 µm)
		Optic losses max Master: 0.25 dB For multimode installations 50/125 µm, type OM2 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 cords
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 cords
3	0 330 65	Length: 2 m

		Fibre optic feedthrough sockets
		Equipped with 2 inputs / 2 outputs duplex feedthrough Enable the connection of two fibre optics (fitted with their connectors) Supplied with protection caps Equipped with a clear nameplate holder 2 modules
		2 x ST fibre optic feedthrough socket Bayonet mount (STII compatible)
1	0 786 16	○ White
		2 x SC fibre optic feedthrough socket "Push-pull" connection
1	0 786 17	○ White
		2 x LC fibre optic feedthrough socket "Push-pull" connection
1	0 786 18	○ White

Legrand cabling system LCS³ Enclosures

server cabinets and cable entries


4 460 00


4 460 45


4 460 46

Server cabinets
Legrand offers a wide range of server and network cabinets, with flexibility, sustainability and service as the keywords. The server and network cabinets are widely applicable and modular in structure.

Specifications
- Colour: RAL 9011 (black)
- Frame: Aluminium, demountable
- Load capacity: 1500 kg (static)
- Front door: 80% perforated front door. Door is fitted with a Fix-easy swivel handle with a snap-in blind plug for profile-cylinder
- Rear door: 80% perforated double rear doors. Door is fitted with a Fix-easy swivel handle with a snap-in blind plug for profile-cylinder
- Roof: 3 or 4 cut outs with 2 or 3 blind plates and 1 cable entry brush Depending on the frame size
- Interior: The cabinet is equipped with 4 x 19"-profiles including height (U) indication
The distance to the cabinet front is set to 80 mm, the pitch to 740 mm
- Cable Management: The cabinet is equipped with two cable trays for cable management. Special features include toolless mount key holes for mounting vertical PDU's and fixation points to mount Plastic Cable Rings (4 460 57)
- Accessories: The cabinets are supplied with 20 cage nuts and screws
- Server cabinets are delivered excluding side panels

Server cabinets with airflow management
Legrand can provide server cabinets that are 600 or 800 mm wide with an airflow management package. These packages keep the loss of air to a minimum, which improves energy efficiency. The rest of the specifications are the same as the standard server cabinets.

LCS³ 19" server cabinets

Pack	Cat.Nos	Capacity	Width (mm)	Depth (mm)
1	4 460 00	42 U	600	1000
1	4 460 01	42 U	600	1100
1	4 460 02	42 U	600	1200
1	4 460 03	42 U	800	1000
1	4 460 04	42 U	800	1100
1	4 460 05	42 U	800	1200
1	4 460 06	46 U	600	1000
1	4 460 07	46 U	600	1100
1	4 460 08	46 U	600	1200
1	4 460 09	46 U	800	1000
1	4 460 10	46 U	800	1100
1	4 460 11	46 U	800	1200

LCS³ 19" server cabinets with airflow management

Pack	Cat.Nos	Capacity	Width (mm)	Depth (mm)
1	4 460 12	42 U	600	1000
1	4 460 13	42 U	600	1100
1	4 460 14	42 U	600	1200
1	4 460 15	42 U	800	1000
1	4 460 16	42 U	800	1100
1	4 460 17	42 U	800	1200
1	4 460 18	46 U	600	1000
1	4 460 19	46 U	600	1100
1	4 460 20	46 U	600	1200
1	4 460 21	46 U	800	1000
1	4 460 22	46 U	800	1100
1	4 460 23	46 U	800	1200

LCS³ side panels for server cabinet, set of 2, including plinths

Pack	Cat.Nos	Capacity	Width (mm)	Depth (mm)
1	4 460 24	42 U	-	1000
1	4 460 25	42 U	-	1100
1	4 460 26	42 U	-	1200
1	4 460 27	46 U	-	1000
1	4 460 28	46 U	-	1100
1	4 460 29	46 U	-	1200

LCS³ Flatpack server cabinets, including side panels

Flatpack cabinets have the same configuration as 4 460 00 - 4 460 11 respectively

Pack	Cat.Nos	Capacity	Width (mm)	Depth (mm)
1	4 460 30	42 U	600	1000
1	4 460 31	42 U	600	1100
1	4 460 32	42 U	600	1200
1	4 460 33	42 U	800	1000
1	4 460 34	42 U	800	1100
1	4 460 35	42 U	800	1200
1	4 460 36	46 U	600	1000
1	4 460 37	46 U	600	1100
1	4 460 38	46 U	600	1200
1	4 460 39	46 U	800	1000
1	4 460 40	46 U	800	1100
1	4 460 41	46 U	800	1200

Cable entry brush (roof)

Insert modules
The roof and/or floor plate of the cabinet have cut-aways that can be filled using various inserts. Depending on your situation, you can choose between a blank cover plate or cable entry brushes

Pack	Cat.Nos		Max cross-section
1	4 460 45	Cable entry brushes (set)	405 x 115 mm

Cable entry blindplate (roof)

Insert modules
The roof and/or floor plate of the cabinet have cut-aways that can be filled using various inserts. Depending on your situation, you can choose between a blank cover plate or cable entry brushes

Pack	Cat.Nos		Max cross-section
1	4 460 46	Covering plate RAL 9011	153 x 427 mm


6 466 69


4 460 55


4 460 56


4 460 47


4 460 57


4 460 75

Pack	Cat.Nos	Vertical cable clip
1	6 466 68	This cable clip is used for finishing the assembly of cable bundles. The cable clip can be fitted to the 19" profiles Width: 45 mm Depth: 74 mm Delivery consists of: including assembly materials

Pack	Cat.Nos	Horizontal cable clip
1	6 466 69	This cable clip is used for finishing the assembly of cable bundles. The cable clip can be fitted to the 19" profiles Width: 40 mm Depth: 86 mm Delivery consists of: including assembly materials

Pack	Cat.Nos	Cable ducting, front to back, sliding
1	4 460 55	A telescopic cable duct can be used for guiding cables from the front to the back The ducting can be attached to the side of the 19" profile. Cable entry foam can be used together with side sealing plates to optimise the airflow. The cable ducting can be adjusted from 550 to 800 mm Cable duct material: Sheet metal Finish: Galvanised Cable guide material: Plastic (noryl; halogen-free) Colour: Blue Variable depth: 550 - 800 mm Delivery consists of: Cable duct including fitting materials

Pack	Cat.Nos	Mounting bracket (4x) for the cable cleat + 4x cable cleat
1	4 460 56	The cable cleats are used to make cabling as efficient as possible. Positioning the cable cleats alongside the 19" profile allows the cables to be guided in an optimum fashion The mounting brackets can be attached to the 19" profile at any height Material: Steel Finishing: Powder coated Unit: 1 U Mounting bracket (4x) for the cable cleat + 4x cable cleat What's in the box: 4 x 1 U mounting brackets and 4 x cable cleats with mounting materials

Pack	Cat.Nos	Transport caster, removible set of 4
1	4 460 47	Casters provide you the option of moving your rack more often, more quick y and more easily. The casters are demountable, which means they can be removed or placed later on.

Pack	Cat.Nos	Plastic cable clip
1	4 460 57	The plastic cable clip is an 'eye' which can be used for cable management. It can be attached without tools to the standard cable trunk ng Set of 10 Material: Polyamide Fire class: UL94-V0 Width: 40 mm Depth: 78 mm

Pack	Cat.Nos	Floor fixing set
1 1	4 460 76 4 460 75	The floor fixing set will secure the frame to several floor types. If a computer floor is being used, we recommend a direct attachment to a lower floor, this is possible by using a length of stud. The stud is not included in this set. Sock e height (mm) 100 25 What's in the box: 2 Z-profiles with integrated nuts, including mounting material

Legrand cabling system LCS³ Enclosures

cable ducts and accessories


4 460 60


4 460 60


4 460 62


4 460 70

Cable ducts are available to allow you to optimise the way cables are led to the cabinet. Cable ducts are flexible, modular and simple to install. They can be integrated seamlessly into the cabinet. Because this cabling system is attached directly to the cabinets, it is independent of its surroundings in which it is put to use. As the data center or server room grows, the cable management can easily grow with it, without having to make modifications to the structure of the building, such as anchoring to the ceiling
Two types of cable ducts are available: a narrow cable duct at the back of the cabinet or a wide cable duct along the middle of the cabinet

Wide cable ducts

The wide cable duct is placed by the central roof entry point and is suitable for guiding large amounts of cabling into the cabinet on the left and/or right, as is usual for patch cabinets. The wide cable duct has a partition so that e.g. fibre-optic and copper cables can be kept separate. This partition is movable
For large cabinets, both systems can be combined to achieve a triple compartmentalisation – the narrow cable duct plus the wide one with its separating partition. This approach allows the fibre-optic, copper data and power cables to be sufficiently separated.
The cable ducts have waterfalls to create the correct radius of curvature for the cables. This makes it easier to get the cables in place and supports the cable structure at the side of the cabinet, so that the equipment can still be accessed easily
Material: Steel
Finishing: Powder coating
Height: 120 mm
Depth: 600 mm
RAL 9011

Pack	Cat.Nos	Width of the rack
1	4 460 64	600 mm
1	4 460 65	800 mm

Narrow cable ducts

The narrow cable duct is placed by the cabinet's rear roof cable entry points and it can be used for small amounts of cabling, e.g. connecting up servers
Material: Steel
Finishing: Powder coating
Height: 120 mm
Depth: 200 mm
RAL 9011

Pack	Cat.Nos	Width of the rack
1	4 460 60	600 mm
1	4 460 61	800 mm
	Partition	
1	4 460 68	600 mm
1	4 460 69	800 mm

Covers and end plates for cable ducts

Covers can be fitted to cable ducts. They can be assembled directly onto the cable ducts. The covers keep content safely separated and provide protection against dust. The cable ducts can also be closed off at the end of the row using end plates. The covers and end plates do not require any cutting to size and in the colour RAL 9011
Material: Steel
Finishing: Powder coating
Depth of narrow cable duct: 200 mm
Depth of wide cable duct: 600 mm
RAL 9011

Pack	Narrow cable duct	Wide cable duct	
			Covers for cable ducts
1	4 460 62	4 460 66	Width of the rack 600 mm
1	4 460 63	4 460 67	Width of the rack 800 mm
	Narrow end plate	Wide end plate	**End plates for cable ducts**
1	4 460 70	4 460 71	Width of the rack 600, 800 and 1000 mm Delivery consists of: including assembly materials

4 460 72

4 460 73

4 460 48

Pack	Cat.Nos	Cable bridges
1	4 460 72	Where a hot or cold corridor has to be crossed, a cable bridge can be used. The cable bridge is suitable for a wide or narrow cable duct. It can also be combined with aisle containment. The bridges use a sliding system so that the distance between the cable ducts can be bridged at any spot without any sawing being necessary. The cable duct can be installed at various distances along the depth of the corridor. It can be used for instance to save on the number of branches in the main supply or for intra-connectivity within the aisle containment. You can choose to use several bridges depending on the capacity required, or to keep various cables separate Material: Steel Finishing: Powder coating Height: 120 mm. Width: 150 mm RAL 9011 Usable length: 990 to 1750 mm Delivery consists of: including assembly materials

Pack	Cat.Nos	Covers for cable bridges
1	4 460 73	Covers can be fitted to the cable bridges. They are assembled directly onto the cable bridges. The covers keep content safely separated and provide protection against dust. It is possible to have the covers overlap so that multiple covers can be used to ensure proper coverage of the cable bridge Material: Steel Finishing: Powder coating Capacity: 150 mm RAL 9011 Usable length: 1030 mm Delivery consists of: including assembly materials

Pack	Cat.Nos	Connecting sets
1	4 460 48	Connecting sets are needed to connect cabinets together. Various combinations are available of both internal connector tubes and external connector plates. The external connector plates can be screwed onto the outsides of the structural uprights and are invisible when the door is closed. Make at least 2 connections in the front and back planes. You need 2 sets for 25U or more Set of internal and external rack connectors Material: Steel Finishing: Powder coating Capacity: 150 mm RAL 9011 External connecting set of 6 pieces Delivery consists of: including fastening materials



Pack	Cat.Nos	Self-closing sliding door
		Mechanically self-closing sliding doors which provide an airtight enclosure for your aisle containment system The self-closing sliding door system is available in RAL 9011 The doors can be opened manually. After opening, the doors close by themselves. When the doors close, a soft closing mechanism ensures that the doors do not bang against each other unexpectedly. The door panels contain safety glass panels to guarantee the safety of your staff and to allow ambient light into the containment area, as well as making it possible to see into the corridors from outside
1	4 463 50	Automatic sliding door 1200 x 2000 (w x h)
1	4 463 51	Automatic sliding door 1200 x 2200 (w x h)
		Delivery consists of: Sliding door beam, set of doors and assembly materials

Pack	Cat.Nos	High Transparency Roof
		Your aisle containment solution can be fitted with a High Transparency Roof. These roof panels provide high translucency / light transmission – up to 83%. The roof panels are mounted on rails, separate from the server racks. The length is the overall length of the aisle containment, i.e. including the start and end panels
		High Transparency Roof
		Material: Steel
		Finishing: Powder coating
		RAL 9011
		If your corridor length is not mentionned please contact Legrand support for advice
		Length
1	4 460 73	4000 mm
1	4 463 53	6000 mm
1	4 463 54	8000 mm
1	4 463 55	9600 mm

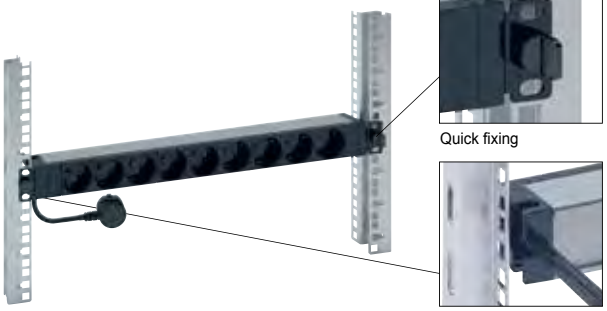
Pack	Cat.Nos	Drop Away Panels
		FM APPROVED
		Drop Away Panels panels provide seamless integration of aisle containment solutions with sprinkler or water mist systems. In the event of a fire in the data center, the plastic Drop Away Panels panels automatically soften and drop down so that they do not cause an obstruction when the sprinklers are activated
		FM Approved: The panels meet 'FM Global' insurance requirements. Products with the 'FM Approved' mark meet the highest standards for safety and property loss prevention
		Drop Away Panels
		Material: Steel
		Finishing: Powder coating
		RAL 9011
		If your corridor length is not mentionned please contact Legrand support for advice
		Length
1	4 463 56	4000 mm
1	4 463 57	6000 mm
1	4 463 58	8000 mm
1	4 463 59	9600 mm

Pack	Cat.Nos	LED lighting
		LED Tubes are extremely easy to install. The suspension points are easy to position, allowing LED lighting to be fitted in a corridor in very little time. Once assembled, the LED Tube is highly flexible. The rotation capability in the tubes allows the lighting to be targeted specifically at particular pieces of equipment. The high lighting intensity and the energy efficiency of LED Tubes are particularly effective in the aisles of Next Generation corridors. Particularly when black racks are used, these LED Tubes provide improved visibility. LED Tubes can be easily extended using extension cords that are hidden away behind small covers so that they appear as a single whole. Each LED Tube can be fitted with a motion sensor so that the lights turn off if no motion is detected for a period of time. This functionality again underlines the energy efficiency of this lighting solution for a data center.
1	4 463 70	LED light 120 cm wide
1	4 463 71	LED light 120 cm wide with PIR sensor
1	4 463 72	Power cable, 4 metres, C14 connector
1	4 463 73	Plastic cover + power cable (10 cm), male-female connector

Legrand cabling system LCS³ Enclosures

MiniCube

4 461 70



6 468 26

Quick fixing

End cap with cable holder shape

Professionalizing IT infrastructure
With the adoption of cloud computing, many companies now have a need to reduce the size of their server rooms and to save energy costs. Do you have fewer applications running from your in-house server room than before? Do you only want to house your business critical information on site? Then the time has come to deploy an efficient, turnkey micro data center. Even if you want to access data more quickly - low latency - or if you want to optimise your server room, the MiniCube is the ideal solution. The MiniCube has everything you need for a full data center: housing, power supply, monitoring and cooling, all in a compact system. The MiniCube is fully preconfigured and truly plug-and-play.

Advantages
- Reliable and efficient solution for server rooms
- No dependency on the building, easy to deploy
- Use of proven technologies
- Turn-key solution, including installation and start-up

Standardisation: high
Cooling: in-rack
Racks: 1
Power distribution: 1
UPS: 1
Redundancy: N
Plug & Play: Yes
Completeness: total solution
Monitoring: onsite/remote
Cost-efficiency: high
Target use cases: hybrid IT, SME

Pack	Cat.Nos	MiniCube configuration
		Rack suitable for installing IT-equipment. Cooling unit build on the top of the rack UPS system to ensure continuity. PDU, connected to the UPS - the IT-equipment can be fed from this PDU. Dimensions 800 x 1200 x 2280 mm Certification CE/ IEC60950 Description Indoor use only. Ambient conditions: 10 °C – 55 °C
1	4 461 70	Legrand basic PDU Available space: 33 U
1	4 461 71	Intelligent PDU + Monitoring Available space: 31 U
1	4 461 72	Intelligent PDU + Monitoring and Automatic door opening system Available space: 30 U

Pack	Cat.Nos	Accessories
	3 109 30	Micro Data Center Accessories - MiniCube SNMP and Modbus communication card for UPS
1	6 468 62	Micro Data Center Accessories - MiniCube Legrand Zero-U PDU, 1PH 16A CEE input, C13 (20x), C19 (4x) outputs
1	PXE-1493T-A6K1	Micro Data Center Accessories - MiniCube Raritan PXE-1493T-A6K1, 1F 32A, 5m CEE, MCB 16A(2x) , C13(20X), C19(4x) , Red
1	6 468 26	Micro Data Center Accessories - MiniCube Legrand 19" PDU, 1m C20 input, SCHUKO (9x) outputs
1	6 468 27	Micro Data Center Accessories - MiniCube Legrand 19" PDU, 1m C20 input, UTE (9x) outputs
1	6 468 28	Micro Data Center Accessories - MiniCube Legrand 19" PDU, 1m C20 input, BS1363 (7x) outputs
1	6 468 29	Micro Data Center Accessories - MiniCube Legrand 19" PDU, 1m C20 input, T23 (10x) outputs

Legrand cabling system LCS³ Enclosures

cabling cabinets and accessories

4 460 80

4 460 95 - 4 460 96

4 460 97

4 460 98

19" cabling cabinets – 800 mm wide

The 800 mm wide racks are extremely suitable for use with patching, network and server equipment. The stand-alone racks come with (removable) side panels
Specifications:
- Frame: Aluminium, demountable
- Including a 25 mm or 100 mm plinth
- Load Capacity 1500 kg (static)
- Base size 800 mm wide
- Doors (800 and 1000 mm racks) : (Clear) Glass front door, metal back door. Doors are right hinged and fitted with a Fix-easy swivel handle with an EK-333 cylinder lock
- Roof: 3 or 4 cut outs with 2 or 3 blind plates and 1 cable entry brush. Depending on the frame size
- Interior: The rack is equipped with 4 x 19"-profiles including height (U) indication. The distance to the rack front is set to 175 mm, the pitch to 740 mm. In case of 800 mm deep racks, the distance to the back is set to 87,5 mm (pitch is 537,5 mm in that case)
- Accessories: The racks are supplied with 20 cage nuts and screws

Pack	Cat.Nos	Capacity	Width (mm)	Depth (mm)	Height (mm)
1	4 460 80	25 U	800	800	1300
1	4 460 81	25 U	800	1000	1300
1	4 460 82	37 U	800	800	1800
1	4 460 83	37 U	800	1000	1800
1	4 460 84	41 U	800	800	2000
1	4 460 85	41 U	800	1000	2000
1	4 460 86	46 U	800	800	2200
1	4 460 87	46 U	800	1000	2200

LCS³ 19" Cabling Cabinet, Extended Plinth
The extended plinths will heighten the cabinet by 75mm to make room for airflow and/or cabling. The front and rear plinths are perforated to create a natural airflow in the cabinet.

Pack	Cat.Nos	Capacity	Width (mm)	Depth (mm)	Height (mm)
1	4 460 88	41 U	800	800	2075
1	4 460 89	41 U	800	1000	2075
1	4 460 90	46 U	800	800	2275
1	4 460 91	46 U	800	1000	2275

Cable trunking

Cable trunking is available in 2 heights. It is suitable for vertical cable management. Cables can be attached to the trunking using tie-wraps and/or Velcro. The trunking can easily be fitted from the inside (left or right) to the upper and lower frame
Material: Sheet steel
Finishing: Galvanised

Pack	Cat.Nos	Height	Width
1	4 460 95	41 U	200 mm
1	4 460 96	46 U	200 mm

Delivery consists of: 1 cable trunking element including fasteners

Triple fan unit with IEC connectors

The triple fan unit allows you to cool the rack. The flow with no load is 480 m³/h. Under normal loads it will be over 300 m³/h. The connection is made using IEC-320 C13 connectors. The fan units can be combined together using a cable with IEC-320 C13 / C14 connectors. As an additional option, this fan unit can be switched automatically using the 4 460 98 thermostat

Pack	Cat.Nos	Flow under normal load
1	4 460 97	310 m³/h

Delivery consists of: 1 fan unit, 1 power cable, 1 extender cable including fastenings

Thermostat for triple fan unit

The thermostat can be used together with the triple fan unit and a roof plate
The thermostat ensures that the fan switches on at a temperature you have selected
230VAC / 50Hz - 110mA - 23 dB - 12 watt

Pack	Cat.Nos
1	4 460 98

Delivery consists of: 1 fan unit including assembly materials

4 460 50

4 460 52

4 460 57

Assembly profiles including cable guides

The cable guides are ideal for achieving clearly ordered and arranged cabling. A cable guide is 87 mm long. It can be fitted and removed without machine tools. Cables can be laid per 1 U. The radius is particularly suitable for fibre-optic cables
There is room for 24 cables per 1 U. The assembly profile including cable guides cannot be used in a rack that is 600 mm wide
Halogen-free
Fire class: UL94-V0
Material: Polyamide
Colour: RAL 5015
10 cable guides front

Pack	Cat.Nos	Height	Capacity	Height (mm)
1	4 460 50	41 U	38 U	2000
1	4 460 51	46 U	43 U	2200
1	4 460 54	20 cable guides (without profile)		

Delivery consists of: assembly profile, cable guides including fasteners

Assembly profiles including high-volume cable guide on 19" profiles

The high-volume cable guides are ideal for rapid and effective cabling. This high-volume solution allows you to guide more cables than normal cable guides do
Material: Polyamide
Colour: Black

Pack	Cat.Nos	
1	4 460 99	6 U assembly profile
1	4 460 52	41 U assembly profile
1	4 460 53	46 U assembly profile

Delivery consists of: including assembly materials

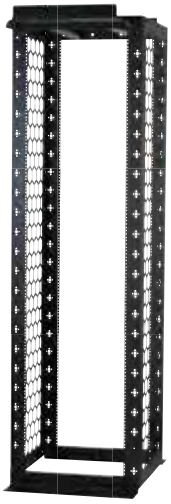
Plastic cable clip

The plastic cable clip is an ‘eye’ which can be used for cable management. It can be attached without tools to the standard cable trunking. Set of 10
Material: Polyamide
Fire class: UL94-V0

Pack	Cat.Nos	Width (mm)	Depth (mm)
1	4 460 57	40	78

Legrand cabling system LCS³ Enclosures

cabling openrack and accessories


4 461 50


4 461 52


4 461 54


4 461 57


4 461 55


4 461 58


4 461 56


4 461 59

Pack	Cat.Nos	Cabling openrack and accessories
1	4 461 50	Punched hole channel rack, 7ft x 24", black, 3/8" square hole
1	4 461 52	Cable duct with door
1	4 461 54	Hexanal cable throughs (set of 6)
1	4 461 55	Bend limiting clips (set of 12)
1	4 461 56	Cable management spools (set of 4)
1	4 461 57	Cable management rings
1	4 461 58	Cable duct mounting brackets (top of rack Cablofil)
1	4 461 60	Overhead Cable Pathway, 5 U, 19"
1	4 461 59	Horizontal cable manager
1	0 465 70	19'' cable manager with cover - 1 U
1	0 465 71	19'' cable manager with cover - 2 U
1	0 464 23	Screws

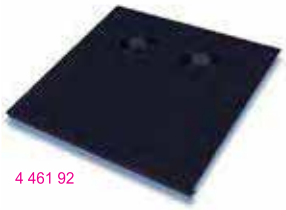
Legrand cabling system LCS³ Enclosures

wall mounting enclosures


4 461 80


4 461 90


4 461 91


4 461 92

Pack	Cat.Nos	Wall mounting enclosures with glass door				
		The basic frame consists of a wall element with an integrated strain relief profile, four bars running front to back, two cable entry plates (top and bottom) and a set (2 pcs) of 19" profiles. The depth of the 19" profiles can be adjusted in steps of 50 mm. The cable holes always fit because the installation engineer can change their size on the spot thanks to the handy bend-away fingers. The 19" profiles have a pattern of holes on the side to allow accessories to be fitted. The casing consists of two identical upper and lower panels with ventilation slots at the rear, two identical side panels and a Securit glass door with an EK-333 cylinder lock with a handle Width: 600 mm Colour: RAL 7047 Finishing: Powder coating Max. load: 100 kg Delivery consists of: 1 rear plate, 4 depthwise bars, 2 cable entry plates, 2 19" profiles, 2 roof and floor plates, 2 side panels, 1 glass door, 1 assembly set, including assembly guide				
		Capacity	Width (mm)	Depth (mm)	Height (mm)	
1	4 461 80	6 U	600	525	342	
1	4 461 81	9 U	600	525	476	
1	4 461 82	9 U	600	625	476	
1	4 461 83	12 U	600	525	609	
1	4 461 84	12 U	600	625	609	
1	4 461 85	15 U	600	525	742	
1	4 461 86	15 U	600	625	742	
1	4 461 87	21 U	600	625	1009	

Accessories

1	4 461 90	**Cable entry strip for wall enclosure** For dust-free cable entry, instead of the top and/or bottom cable entry plate. Suitable for wall enclosure Delivery consists of: 1 (360 mm) cable entry brush, including fastenings
1	4 461 91	**Corner guide set** The corner guide set supports heavy 19" equipment. The corners are fitted to the sides of the 19" profiles and therefore do not use up any height units in the front plane. Suitable for wall enclosure Material: Sheet steel Colour: Sendzimir Delivery consists of: 1 corner guide support (left), 1 corner guide support (right), including fastening materials
		Roof plate with integrated fan unit This fan unit can be added as an option to generate a forced flow of cooling air through the wall enclosure. To do that, the existing roof panel must be removed and replaced with this Cat.No. The 4 460 98 thermostat can be used in combination with this roof plate. Delivery consists of: 1 roof plate with 2 fan units, including assembly materials
1	4 461 92	525 mm (d)
1	4 461 93	625 mm (d)

0 465 22

0 465 23

0 465 29

0 465 32

Pack	Cat.Nos	19" cable feedthrough panels
		They ensure the correct arrangement and routing of the patch cords. RAL 9005 black
		Metal, 2 axes, Quick-Fix
		Horizontal feedthrough passage. With cable rings plastic cable guide with controlled radius for optimum cord protection (compliance with the bending radius) Quick installation without screws
1	0 465 22	1 U
1	0 465 23	2 U
1	6 465 20	Cable mgt feedthru panel 19" 1U metal screw fix black
1	6 465 21	Cable mgt feedthru panel 19" 2U metal screw fix black
		Plastic with brush, direct clipping
1	0 465 28	1 U
1	0 465 29	2 U
		Metal with brush, Quick-Fix
		Quick installation without screws
1	0 465 30	1 U
1	0 465 31	2 U
1	6 465 20	Cable patch cord management bar 1U metal screw fix black
1	6 465 21	Cable patch cord management bar 1U metal screw fix black
		1 U front panel
25	4 462 10	The plastic front panel serves to seal off the 19" area so that it is airtight. The front panel have been specially designed to make installation easy and to form an airtight 19" seal. The front panel is easy to mount between the 19" profiles. No materials are needed for securing the front panel. Air tight accessories enable energy savings by preventing air leakage Plastic RAL9005, 25 pieces
		19" blanking plates
		RAL 9005 black
		Plastic, direct clipping
1	0 465 32	1 U
1	0 465 33	2 U
		Metal, Quick-Fix
		Quick installation without screws
1	0 465 38	1 U
1	0 465 39	2 U
1	0 465 40	3 U
		19" lighting kit
		19" metal panel equipped with a lighting kit with switch Quick installation without screws Supplied with fluorescent tube 230 VA - 8 W
1	0 464 85	1 U

Legrand cabling system LCS³ Enclosures

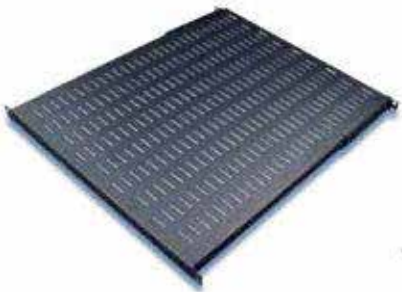
19" accessories (continued)


0 465 01


0 465 22

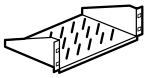

0 465 06

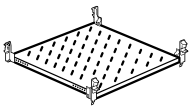

0 465 29


4 462 15

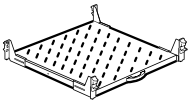

4 462 11

Pack	Cat.Nos	Fixed shelves
		For 19" cabinets and server cabinets, Bati racks and Altis cabinets Quick installation without screws. RAL 9005 black
		Suspended installation on 2 x 19" risers Height 2 U. Maximum load 15 kg
1	0 465 00	Depth 115 mm
1	0 465 01	Depth 200 mm
1	0 465 02	Depth 360 mm
		Installation on 4 x 19" risers Height 1 U. Maximum 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

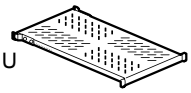




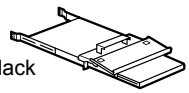
Pack	Cat.Nos	Telescopic shelves
		For 19" cabinets and server cabinets, Bati racks and Altis cabinets Quick installation on 4 x 19" risers Height 1 U. Maximum load: 50 kg . RAL 9005 black
1	0 465 08	Shelf depth 425 mm For depth 600 mm
1	0 465 09	Shelf depth 625 mm For depth 800 mm
1	0 465 10	Shelf depth 625 mm For depth 1000 mm



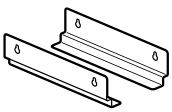
Pack	Cat.Nos	Heavy duty shelves
		Maximum load: 100 kg Fastening to the 4 x 19" risers using screws. RAL 9005 black
1	0 465 17	Fixed shelf, depth 820 mm, 1 U For cabinets with depth 1000 mm and server cabinets
1	0 465 18	Telescopic shelf, depth 820 mm, 2 U For server cabinets



Pack	Cat.Nos	Keyboard shelf
		For 19" cabinets and server cabinets, Bati racks and Altis cabinets For depth 800 mm and 1000 mm Fastening to the 4 x 19" risers using screws Maximum load: 50 kg . RAL 9005 black
1	0 465 19	It can accept: - a computer screen - a keyboard on retractable support - a mouse on a sliding shelf with built-in pad mouse or CD housing



Pack	Cat.Nos	Set of 2 fixed guide rails
		For 19" cabinets and server cabinets, racks and Altis cabinets Installation on 4 x 19" risers Maximum 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



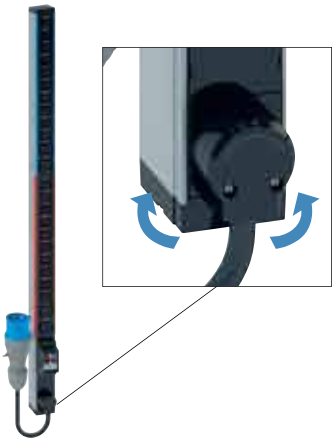
Pack	Cat.Nos	Fixed shelves
1	4 462 15	Shelf, variable 100kg - 19" x 700 x 25mm (w x d x h) - RAL9011
1	4 462 11	Cable entry plate - 19" x 1,5mm x 2 U (l x d x h) RAL 9011
1	4 462 12	Cable entry foam - 19" x 2 U RAL 9011

Pack	Cat.Nos	Temperature management
		1 U ventilation drawers For internal air circulation. Fix on 2 x 19" uprights ON/OFF switch. Supplied with power supply cord 230V~ 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 VA, 50/60 Hz NC contact (5 A) and NO contact (10 A) Magnet fastening

Pack	Cat.Nos	Fixing screws
		Set of 50 cage nuts, 50 plastic washers and 50 x M6 screws
1	0 364 54	With 9.5 mm cage nuts

Pack	Cat.Nos	Self-adhesive document holders					
		Open - RAL 7035	Ext. dimensions		Int. dimensions		
			Height (mm)	Width (mm)	Height (mm)	Width (mm)	Depth (mm)
1	0 365 80		235	340	200	310	18
1	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					
1	0 097 99	Soft plastic, A4 - 305 x 220 mm					

6 468 53



6 468 61

To provide A electric power for IT equipments in 19" enclosures
Single phase 230 V - 50/60 Hz power supply
Zero-U PDU for vertical mounting in the cabinet
PDU with 2 circuits protected by 16 A uni+neutral MCB in a support with projecting edges to avoid accidental breakdown
Each circuit is identified by color coding
The total number of outlets is distributed equally between the 2 circuits
330° rotating cable input for a perfect orientation of the cable and no interference in the cabinet
2P+E outlets:
- C13 and C19 standard outlets are equipped with cord locking system to avoid any accidental disconnection. Universal solution compatible with all the cords (C14 plugs for C13 and C20 plugs for C19)
- French, German and British standard outlets are equipped with blanks
- French and German standard outlets are inclined at 55°
Delivered with 2 sets of metallic mounting brackets:
- Button brackets. For quick fixing and variable pitch
- Standard brackets. For screw fixing
Black modules (outlets and functions). Aluminium profile
To provide A electric power for IT equipments in 19" enclosures
Three phase 380 V - 50/60 Hz power supply
Zero-U PDU for vertical mounting in the cabinet
Each circuit is protected by 16 A single pole MCB in a support with projecting edges to avoid accidental breakdown
1 circuit per phase, each with 6 IEC 60320 C13 outlets and 2 IEC 60320 C19 outlets
330° rotating cable input for a perfect orientation of the cable and no interference in the cabinet C13 and C19 standard outlets are equipped with cord locking system to avoid any accidental disconnection. Universal solution compatible with all the cords (C14 plugs for C13 and C20 plugs for C19)
Delivered with 2 sets of metallic mounting brackets:
- Button brackets. For quick fixing and variable pitch
- Standard brackets. For screw fixing
Black modules (outlets and functions)
Aluminium profile

Pack	Cat.Nos	Standard
		IEC 60320 standard
1	6 468 56	24 C13 outlets with cord locking system Connection on terminal block up to 6 mm²
1	6 468 57	24 C13 outlets with cord locking system 3 m power supply cord with IEC 60309 32 A 2P+E plug
1	6 468 60	20 C13 outlets + 4 C19 outlets with cord locking system. Connection on terminal block up to 6 mm2
1	6 468 61	20 C13 outlets + 4 C19 outlets with cord locking system. 3 m power supply cord with IEC 60309 32 A 2P+E plug

Pack	Cat.Nos	With ammeter
		Measure consumption to provide better installation management: balancing circuits, displaying available capacity, preventing overloads and power failures 1 ammeter per circuit Rotating display to ensure a perfect reading whatever the PDU mounting direction is (horizontal, vertical with top or bottom power supply input) CORD LOCKING SYSTEM
		IEC 60320 standard
1	6 468 65	20 C13 outlets + 4 C19 outlets with cord locking system. Connection on terminal block up to 6 mm²

PDUs

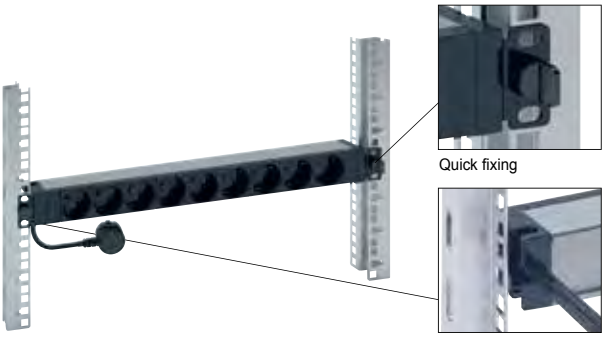
6 468 75

To provide A electric power for IT equipments in 19" enclosures
Single phase 230 V - 50/60 Hz power supply
Zero-U PDU for vertical mounting in the cabinet
PDU with 2 circuits protected by 16 A uni+neutral MCB in a support with projecting edges to avoid accidental breakdown
Each circuit is identified by color coding
The total number of outlets is distributed equally between the 2 circuits
330° rotating cable input for a perfect orientation of the cable and no interference in the cabinet
2P+E outlets:
- C13 and C19 standard outlets are equipped with cord locking system to avoid any accidental disconnection. Universal solution compatible with all the cords (C14 plugs for C13 and C20 plugs for C19)
- French, German and British standard outlets are equipped with blanks
- French and German standard outlets are inclined at 55°
Delivered with 2 sets of metallic mounting brackets:
- Button brackets. For quick fixing and variable pitch
- Standard brackets. For screw fixing
Black modules (outlets and functions). Aluminium profile
To provide A electric power for IT equipments in 19" enclosures
Three phase 380 V - 50/60 Hz power supply
Zero-U PDU for vertical mounting in the cabinet
Each circuit is protected by 16 A single pole MCB in a support with projecting edges to avoid accidental breakdown
1 circuit per phase, each with 6 IEC 60320 C13 outlets and 2 IEC 60320 C19 outlets
330° rotating cable input for a perfect orientation of the cable and no interference in the cabinet C13 and C19 standard outlets are equipped with cord locking system to avoid any accidental disconnection. Universal solution compatible with all the cords (C14 plugs for C13 and C20 plugs for C19)
Delivered with 2 sets of metallic mounting brackets:
- Button brackets. For quick fixing and variable pitch
- Standard brackets. For screw fixing
Black modules (outlets and functions)
Aluminium profile

Pack	Cat.Nos	Standard
1	6 468 70	**IEC 60320 standard** 18 C13 outlets + 6 C19 outlets with cord locking system. 3 m power supply cord with IEC 60309 32 A 3P+N+E plug
		With ammeter Measure consumption to provide better installation management: balancing circuits, displaying available capacity, preventing overloads and power failures 1 ammeter per circuit Rotating display to ensure a perfect reading whatever the PDU mounting direction is (horizontal, vertical with top or bottom power supply input)
1	6 468 75	**IEC 60320 standard** 18 C13 outlets + 6 C19 outlets with cord locking system. 3 m power supply cord with IEC 60309 32 A 3P+N+E plug

AN INNOVATIVE TECHNICAL SOLUTION: CORD LOCKING SYSTEM

Very easy to identify thanks to the orange buttons next to each outlet



To provide A electric power for IT equipments in enclosures. 230 V - 50/60 Hz power supply. 1U aluminium profile. End cap with metallic brackets and cable holder shape. Quick fixing (no screws) on 19" fixing centers. Can also be installed vertically by reverting the brackets (no screws).
2P+E outlets:
- C13 and C19 standard outlets are equipped with cord locking system to avoid any accidental disconnection. Universal solution compatible with all the cords (C14 plugs for C13 and C20 plugs for C19).
Black modules (outlets and functions)

Pack	Cat.Nos	19” - PDU standard
	CORD LOCKING SYSTEM	**IEC 60320 standard** Connection on terminal block (except Cat.No 6 468 15)
1	6 468 14	10 C13 outlets with cord locking system
1	6 468 15	12 C13 outlets with cord locking system 3 m power supply cord with 16 A IEC 60309 2P+E
1	6 468 09	6 C13 outlets + 2 C19 outlets with cord locking system
1	6 468 07	6 C19 outlets with cord locking system

6 468 43

To provide A electric power for IT equipments in enclosures. 230 V - 50/60 Hz power supply. 1U aluminium profile. End cap with metallic brackets and cable holder shape. Quick fixing (no screws) on 19" fixing centers. Can also be installed vertically by reverting the brackets (no screws).
2P+E outlets:
- C13 and C19 standard outlets are equipped with cord locking system to avoid any accidental disconnection. Universal solution compatible with all the cords (C14 plugs for C13 and C20 plugs for C19).
Black modules (outlets and functions)

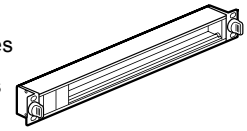
Pack	Cat.Nos	19” - PDU with ammeter
		Measure consumption to provide better installation management: balancing circuits, displaying available capacity, preventing overloads and power failures Measure total PDU current Rotating display to ensure a perfect reading whatever the PDU mounting direction is (horizontal, vertical with top or bottom power supply input)
		IEC 60320 standard With integrated universal plug locking system Connection on terminal block
1	6 468 43	6 C13 outlets with cord locking system
1	6 468 45	6 C13 outlets + 1 C19 outlet with cord locking system
1	6 468 44	6 C19 outlets with cord locking system

PDUs

6 468 90

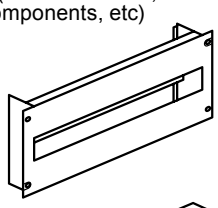
0 465 46 + 0 465 47

Pack	Cat.Nos	PDU to be equipped
		For self assembly with Mosaic wiring device modules Quick fixing (no screws) on 19" uprights Aluminium profile
1	6 468 99	PDU 19" Capacity: 16 Mosaic modules
1	6 468 98	PDU 10" Capacity: 8 Mosaic modules

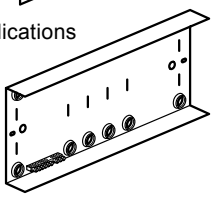


Pack	Cat.Nos	PDU accessories
		Locking caps To block the use of an outlet. A key is necessary to remove the cap and free the access Light grey
1	6 468 90	Set of 6 locking caps for French and German standard outlet + 1 key
1	6 468 92	Set of 6 locking caps for British standard outlet + 1 key
1	6 468 94	Set of 6 locking caps for C13 standard outlet + 1 key
1	6 468 95	Set of 6 locking caps for C19 standard outlet + 1 key
		Surge protection module To replace used module on PDU With light indicators: - one LED (white) gives information whether the PDU is supplied with power or not - one LED (green) indicates when surge protection module is efficient or must be replaced Hotswappable: replacement keeping the PDU and its outlets powered on
1	6 468 97	Surge protection replacement module

Pack	Cat.Nos	Multi-applications DIN rail
		For mounting modular devices (circuit breakers, Legrand multimedia network components, etc) Capacity: 24 modules Height 4 U Screw fixing on 19" uprights(1)
1	0 465 46	DIN profile rail with front panel Supplied with blanking plates 24 modules Black RAL 9005



1	0 465 47	Rear cover To be used for high current applications (greater than 50 V) Used with Cat.No 0 465 46 Ensures IP XXB Supplied with terminal block (8 + 1 connections)



Performance table

	Supported network protocol	SIZES OF COMPONENTS				LINK SIZES (CHANNEL)			
		Cat. 8 STP	Cat. 6_A STP	Cat. 6 UTP	Cat. 6 FTP	Class I	Class E_A		Class E
		2000 MHz	500 MHz	250 MHz	250 MHz	2000 MHz	500 MHz	250 MHz	250 MHz
		40 Giga	10 Giga	1 Giga	1 Giga	40 Giga	10 Giga	1 Giga	1 Giga
Attenuation (dB) Signal loss	LCS³ ISO 11801 edition 3	1.5	0.13 0.45 max	0.06 0.32 max	0.09 0.32 max	32.7	35.4 42.1 max	24.1 28.9 max	25.7 30.7 max
Return loss (dB) Resistance to echo	LCS³ ISO 11801 edition 3	1.2	17.05 14 min	26.59 20 min	29.8 16 min	8	16.4 8 min	22.1 10 min	38.8 10 min
Next (dB) Resistance to disturbances between pairs(1)	LCS³ ISO 11801 edition 3	12.9	37.46 37 min	56.93 46 min	51.3 46 min	9.8	38.1 29.2 min	54 35.3 min	53.9 35.3 min

PoE+ READY **Performance stability and long-lasting product capabilities guaranteed for a POE signal up to 100 W**

Compliance with LCS³ system standards and approvals

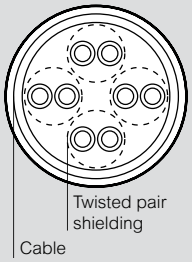
The LCS³ system and its components (de-embedded) comply with the current standards:
- EIA/TIA 568 B2.10
- EN 50173-1 and EN 50173-2
- ISO/IEC 11801 edition 3 (2017)

The LCS³ system supports 10 G applications
Base T up to 100 m in a transmission channel
in compliance with ISO/IEC 11801 edition 3.0 (2017)
and EIA/TIA 568 C2-1 standards
The class I link of the LCS³ system is also compliant with ISO/IEC 11801 edition 3.0 (2017) and EIA/TIA 568 C2-1 standards. LCS³ systems are certified by the independent lab 3P, a point of reference for the sector

New denominations of LAN cables (according to ISO 11801-2)

They indicate: "Type of cable shielding" / "type of twisted pair shielding" followed by TP (twisted pairs)

Cable type		Cable shielding	Twisted pair shielding
old denomination	new denomination		
SSTP	S/FTP	S: screen consisting of a copper braid	F: screen consisting of alu/ polyester ribbon
SFTP	SF/UTP	SF: ribbon + braid association	U: no screen
STP	U/FTP	U: no screen	F: screen consisting of alu/polyester ribbon
FTP	F/FTP	F: screen consisting of alu/polyester ribbon	F: screen consisting of alu/polyester ribbon
FTP	F/UTP	F: screen consisting of alu/polyester ribbon	U: no screen
UTP	U/UTP	U: no screen	U: no screen



The Innoval training center gives the possibility of obtaining LCS³ approval at **legrand.com**

25-year guarantee: Legrand guarantees the long term performance of the LCS³ system at **legrand.com**

Main characteristics of LCS³ systems

	LCS³ 8	LCS³ 6_A		LCS³ 6		LCS³ 5e
Frequency	2000 MHz	500 MHz		250 MHz		100 MHz
Delivery	40 Gbit/s	10 Gbit/s		1 Gbit/s		1 Gbit/s
Wiring	Copper	Copper	FO	Copper	FO	Copper
Connectors	RJ 45	RJ 45	SC-LC…	RJ 45	SC-LC…	RJ 45
Max. cable length	30 m	100 m	variable	100 m	variable	100 m

Maintenance performance

GARANTIE 25 ans PERFORMANCE legrand

Legrand guarantees the long-term performance of the LCS³ system by providing a 25-year performance guarantee

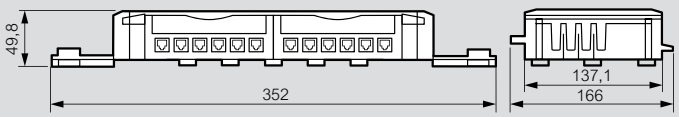
Performance in case of installation with zone distribution box (consolidation point)

Maximum recommended lengths for the connections, in order to guarantee system performance when using copper feedthrough RJ 45 sockets and/or RJ 45 sockets

	Associated length (m)		Connections
	Cords	Cables	
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

The use of cables as short as possible is recommended, in order to increase flexibility as far as cord lengths in case of reconfiguration

Dimensions (mm)



Technical characteristics

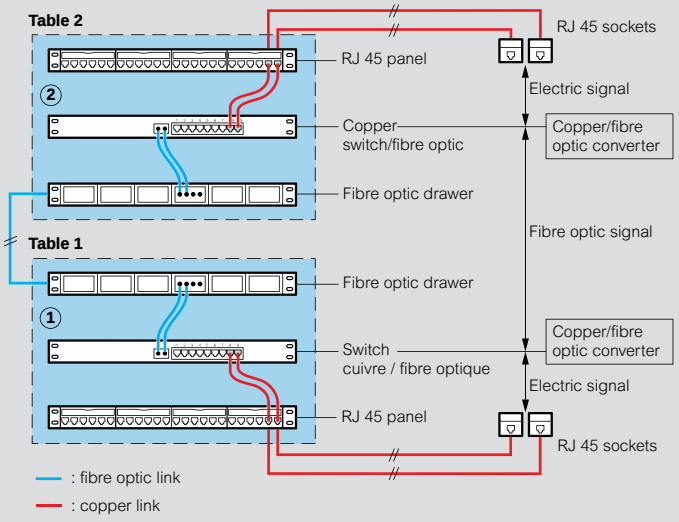
- Connectors connected using 900 µm and 250 µm fibre optics
- Maximum weakening 0.3 dB
- Perfectly suited for high delivery systems: 10 Gigabit Ethernet
- Operating temperature: from 0 to 65°C
- Shallow depth connectors

New optical classes according to ISO/IEC 11801 edition 3 (2017)

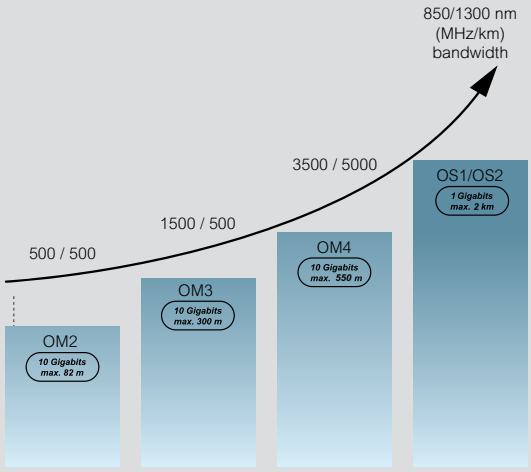
Optical connection parameters according to ISO 11801 / EN 50173

	Multimodes		Singlemode	
Parameter	**850 nm**	**1 300 nm**	**1 310 nm**	**1 550 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 diagram of a fibre optic connection between 2 distributors



Maximum length of a channel with the use of fibre optic



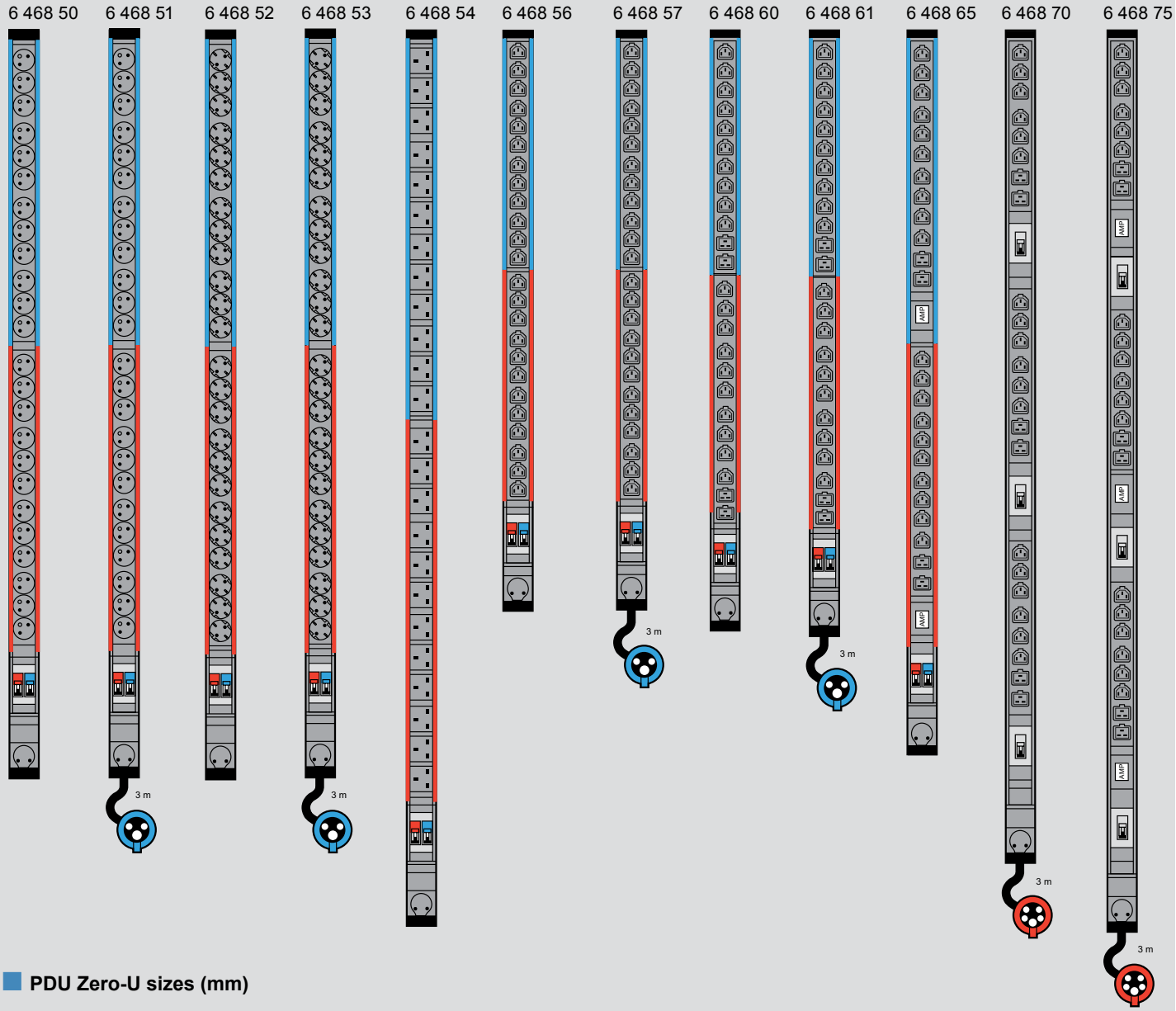
Protocols (max. length)	Multimodes			Singlemode
	OM2	OM3	OM4	OS1/OS2
10 Gigabit Ethernet (base S/R)	82 m	300 m	550 m(1)	NA
Giga Ethernet (base LX)	550 m	550 m	550 m	2 km
Giga Ethernet (base SX)	550 m	550 m	1100 m	NA

TIA 568

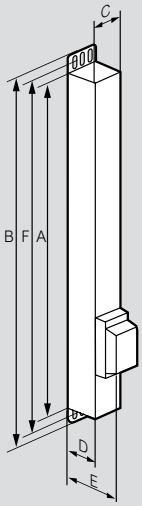
IEEE 802.3 applications

1: Technical solution using a fibre optic cable with maximum attenuation 3 dB/km and a wave length of 850 nm

PDU Zero-U



PDU Zero-U sizes (mm)



Cat.Nos	Height		Width	Depth		Fixing centers (mini-maxi)
	A	B(1)	C	D	E(2)	F(1)
6 468 50	1250	1294	52	52.5	87	1262-1292
6 468 51	1250	1294	52	52.5	87	1262-1292
6 468 52	1250	1294	52	52.5	87	1262-1292
6 468 53	1250	1294	52	52.5	87	1262-1292
6 468 54	1466	1510	52	52.5	87	1478-1508
6 468 56	1034	1078	52	52.5	87	1046-1076
6 468 57	1034	1078	52	52.5	87	1046-1076
6 468 60	1070	1114	52	52.5	87	1082-1112
6 468 61	1070	1114	52	52.5	87	1082-1112
6 468 65	1160	1204	52	52.5	87	1172-1202
6 468 70	1340	1384	52	52.5	87	1352-1382
6 468 75	1475	1519	52	52.5	87	1487-1517

1 : Overall height with standard brackets (screw fixing)
2 : Overall depth at the circuit breaker slot

NOTES

NOTES

NOTES

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