



Connectix
Cabling Systems™

Global Head Office:

500 Avenue West, Skyline 120, Braintree, Essex, CM77 7AA

Tel: + 44(0)1376 346600 Fax: +44(0)1376 346620 Web: www.connectixcabling.com

Specification Guide for Category 6 UTP and Optical Fibre Cabling System Architecture

2018v04

| Issue | Document Status | Date: | Prepared: | Checked: |
|-------|---|----------|-----------|----------|
| 4 | Cat 6 UTP, Optical Fibre and MER/SER Guidelines | 04/01/18 | JH | PM |



Connectix Cabling Systems™

Global Head Office:

500 Avenue West, Skyline 120, Braintree, Essex, CM77 7AA

Tel: + 44(0)1376 346600 Fax: +44(0)1376 346620 Web: www.connectixcablingsystems.com

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Introduction

How to Specify a Category 6-Class E Cabling System

There are three principal standards-writing groups in the world concerned with structured cabling. They are:

ISO - The International Standards Organisation, which writes for a global audience. The appropriate standard for cable system design here is ISO 11801 Amendment 2.

CENELEC - The electrical standards body for the countries of the European Union. CENELEC standards start with EN for *European Norm*. The appropriate standards here are EN 50173 and EN 50310. EN standards are normally adopted whole by British Standards and would be published, in the UK for example, as BS EN 50173.

EIA/TIA – The Telecomms Industry Association of North America. Whilst this should be recognised as an accepted Standards Body, the UK should be specifying to ISO and CENELEC standards unless directed otherwise.

Other Standards that should no be referred to as of 30th November 2017 are:

BS 6701:2016+A1:2017 Telecommunications equipment and telecommunications cabling. Specification for installation, operation and maintenance.

BS7671: IET Electrical Wiring Regulations – current 17th Edition:Amendment 3, and upcoming 18th Edition 2018



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1 Site details

| | |
|-----------------|--|
| Client name: | |
| Client address: | |
| Client contact: | |

1.1 Project overview

The SCS for [insert project reference here] will include the following horizontal, backbone and cabinets;

- Minimum of Category 6 U/UTP horizontal cabling
- Multicore OM3/OM4 and OS2 fibre optic backbone cabling between distribution locations
- Patch room to facilities (BMS, security, cameras as required by facility management)

1.2 Equipment Room Locations

The infrastructure design will include Main Equipment Rooms (MERs) and Secondary Equipment Rooms (SERs) where needed, determined by the client.

1.2.1 The MER shall contain;

- No. x Main Equipment Rack
- No. x Main Equipment Server Rack
- No. x Open Rack Patching Frame

1.2.2 The SER shall contain;

- No. x Main Equipment Rack
- No. x Open Rack Patching Frame

See section 7 for specification of each equipment or server rack defined for this IT infrastructure proposal.



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2.1 Scope of Works

The Structured Cabling Systems (SCS) Contractor works shall be completed to meet the requirements of the Main Contractors program.

2.2 Associated works by others

Horizontal and vertical containment 'Communications Containment' (i.e. cable trays, trunking, conduits), together with floor boxes, wall and ceiling mounted back boxes will be provided by the appointed Electrical Subcontractor.

Builder's work in connection with the SCS Contract, include removal and replacement of fire-stopping.

Patching of users.

2.3 Telecommunications grounding and bonding points

The SCS bonding infrastructure provides equalised potentials between metallic surfaces in the event of lightning, AC electrical system faults, electromagnetic induction or electrostatic discharge. SCS bonding practices are not designed to equalise any voltages when an event occurs. The SCS Contractor will obtain written approval from Main Contractor and the appointed Electrical subcontractor before any ground and bonding connections are made on site for use by the SCS Installation prior to commencement of his connections or works.

The SCS Contractor will ensure that all installed equipment and components are properly grounded and bonded throughout installation in accordance with EN50174, BS6701 and EN50310.

2.4 Interpretation & Comms Room Locations

The physical building design incorporates multiple-use units and administrative offices in a closed environment. The Telecommunication transport media or SCS provides the physical connectivity from the Entrance Facility (EF) to a centralised Main Equipment Room (MER), through to Secondary Equipment Rooms (SER) to the final telecommunications Telecommunication Outlet (location: to be confirmed).

Entrance Facility (EF) Defined as the point of demarcation and interface between site-based services and incoming services from the outside world. Space is allocated at this point for the installation of primary / secondary protection devices (location: to be confirmed).

MER (Main Equipment Room) Defined as host equipment room in which site based servers, LAN, WAN and call processing equipment are housed in a secure and protected environment.

SER (Secondary Equipment Room) Defined as a location where telecommunication, data equipment, connecting backbone cabling and horizontal sub-systems reside in a secure and protected environment on a floor by floor basis.

NOTE: 'ICT Closets' can be used as a term to describe drawings supporting other site services.



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2.5 General Specification and requirements of the SCS Contractor

The SCS Contractor shall apply the standards for installation in accordance with BS EN 50174, BS6701 and following the manufacturers Installation Guidelines these shall be used during all installation activities.

Local law, codes and regulations shall take precedent over standards where applicable.

The SCS Contractor will ensure all horizontal and backbone cabling is fully supported, contained and managed along its entire length. Cabling must be routed and secured, fixed or positioned upon designated 'Communication Containment' provided by the Electrical subcontractor.

The SCS Contractor shall ensure the containment system is suitable and adequate under the standards of this specification and apply any manufacture guidelines during installation of the cabling system.

2.6 Labelling

The SCS Contractor shall provide a schematic of the cabling infrastructure labelling scheme for each cable, patch panel, telecommunications outlet, wiring closets and termination frames. The labelling schedule should be in an agreed format with the Main Contractor prior to installation and within the BS 6701, EN 50174 standards.

- Typeface Labels shall have an agreed typeface size and font. Hand-written labels will not be accepted, except on a temporary basis during installation and will not be acceptable for cable plant testing purposes.
- All labels shall be permanently fixed. Legible, durable and robust.
- All labels shall be fixed horizontally on fixed equipment or longitudinally along the line of cables.
- Positions The following positions at which labels are fixed shall apply as a minimum;
 - Cable terminations shall be labelled at patch panel outlets.
 - Cable shall be labelled at telecommunications outlets.
 - Cables shall be labelled at the entry/exit points of rooms and buildings.
 - Cables shall be labelled at all access chambers, cable turning chambers and draw pits

2.7 Cabling Infrastructure Test Failures

Testing of all copper wiring shall be performed prior to system handover for Warranty Application. 100% of the horizontal cabling shall be tested to ISO11801 or EN50173 Category 6 Permanent Link. Testing shall be carried out with a minimum Level V Accuracy Tester, using the approved adapter and settings of the test set manufacturer. Test equipment shall be within calibration and a copy of a current calibration certificate from the manufacturer shall be submitted with all test results.

The SCS Contractor will note any failures during testing of the cabling infrastructure. The SCS Contractor shall rectify all faults and any damaged cabling shall be replaced with new cables in complete runs.



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2.8 Cabling Infrastructure Witness Testing

The Main Contractor reserves the right to attend site to witness cable plant tests and complete random sample testing upon completion of test. The Main Contractor is entitled to witness test up to 10% of the total no. of outlets, any further testing above this proportion will be charges at an agreed hourly rate prior to commencement. Witness and random sample testing will be agreed with the SCS contractor.

3 Documentation

For acceptance of the SCS cabling infrastructure the SCS Contractor shall complete the following;

- All installation of SCS Physical Infrastructure (to the correct standards)
- All labelling and documentation
- All cabling test results showing positive results (to the correct standards)

3.1 General

The SCS contractor will provide documentation for technical and commercial approval to the Main Contractor during bidding and upon completion of the cabling infrastructure installation. The operations and maintenance manual for the project will be compiled in accordance with BS EN50174 and BS 6701 and shall include but not limited to the following documents;

- Current Independent 3rd Party Compliance Certification, detailing SCS Manufacturer and component references, for all items installed and supplied
- SCS Manufacturer technical datasheets for products installed
- Uniquely number test certificates for copper and fibre optic (link and channel where appropriate) for the entire SCS cabling infrastructure
- Electronic records of all test results
- SCS Manufacturer 25-Year System Warranty Certificate
- Warranty against defective parts or workmanship for a minimum of 1 year after Practical Completion.

3.2 Drawings

The SCS Contractor shall provide an as-built installation drawing in AutoCAD, Visio or other format agreed with the Main Contractor in paper and electronic formats upon completion detailing the following information:

- Backbone cabling routes. Detailing the quantity, type and routes of backbone cabling (both copper and fibre optic)
- Layout of termination frames, panels and closets, clearly identifying the number of frames or panels used in each MER and SER
- Layout of Equipment Rooms throughout the entire project. Detailing the individual frames, panels and closets in each room
- Telecommunications Outlet distribution. These drawings shall indicate the location and unique identifier of telecommunications outlets throughout the entire infrastructure



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3.3 Training

The SCS Contractor is to provide training to the client's IT Staff where required in the correct method of patching and system administration. The SCS Contractor shall allow for a suitable amount of time for onsite training.

4 Manufacturer System specification and requirements

The horizontal structured cabling system selected is **Connectix Cabling Systems**. The SCS must be installed by a Certified **Connectix Cabling Systems Installer** complying with the manufacturer's instructions. A valid Connectix Cabling Systems Approved Installer Certificate shall be provided with all bids and prior to any works commencing.

The Horizontal structured cabling system shall provide in strict accordance to tender drawings. The system will be used to connect voice and data services, building management systems (BMS), WLAN, security and CCTV solutions and Access Control devices to the network.

The drawings showing telecommunications outlets shall be used to identify the precise quantity of MER/SERs to which each outlet must be connected to maintain cable length restrictions in the use of Category 6 cabling.

Horizontal telecommunications outlet requirements shall be taken from the following tender drawings:

[List drawing numbers here]

Structured Cabling System Minimum Performance Requirements

BS 6701: 2017 - Telecommunications equipment and telecommunications cabling – Specification for installation, operation and maintenance.

BS EN 50173-1: 2011 - Information technology – Generic cabling – General requirements.

BS EN 50173-2: 2007 - Information technology – Generic cabling – Office premises.

BS EN 50173-3: 2007 - Information technology – Generic cabling – Industrial premises.

BS EN 50173-4: 2007 - Information technology – Generic cabling – Homes premises.

BS EN 50173-5: 2007 - Information technology – Generic cabling – Data centres premises.

BS EN 50173-6: 2013 - Information technology – Generic cabling – Distributed Building Services

BS EN 50174-1:2009 - Information technology – Cabling installations – Specification and quality assurance

BS EN 50174-2: 2009

+A1:2011 - Information technology – Cabling installations – Installation and planning and practices inside buildings.

BS EN 50174-3:2013 - Information technology – Cabling installations – Installation and planning and practices outside buildings.

BS EN 50575: 2014

+A1:2016 – Power, Control and Communication Cables – Cables for general applications in construction works subject to reaction to fire

BS EN 50310: Application of equipotential bonding and earthing in buildings

BS EN 50346: Information technology – Cabling installations – Testing of installed cabling.

BS7671: IET Electrical Wiring Regulations – current version

Structured Cabling System Minimum Performance Requirements



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Structured Cabling System Minimum Performance Requirements Structured Cabling System Minimum Performance Requirements (continued)

The performance of the SCS Contractors Horizontal structured system being provided shall comply and be tested to the relevant standards. The system will perform to frequencies up to 250Mhz, supporting voice, data and video applications at data rates of up to 10Gbit/s to full 100m channel requirements.

The horizontal Category 6 compliant system must also be backwards compatible with ISO 11801:Ed2.2 and EN 50173-1:A2:2011

4.1 Manufacturer Components Specification

A complete end-to-end Connectix Cabling Systems solution, inclusive of all cabling and passive connectivity components, racks and enclosures, from a single manufacturer shall be provided, and shall be covered by a single 25-year warranty.

The SCS Contractor shall provide 'ongoing' independent compliance certification at both Channel and Component level from a trusted test establishment such as Delta. All cable supplied shall be **CE Marked** and compliant to a **Minimum EuroClass Cca-S1b,d2,a2 performance, and provided with a current Declaration of Performance**. One off 'Approvals' and 'Attestations of Conformance' will not be acceptable.

4.1.1 Horizontal Cabling

Acceptable construction of cable is as follows:

- The cable must be four-pair Category 6 with a low-flammability sheath (complying to IEC 60332-1-2 as a minimum)
- The cable must be of U/UTP Unscreened Twisted Pair
- The cables must be metre marked.
- The flammability performance must meet EuroClass Cca-S1b,d2,a2 as a minimum
- Must have current independent third party approval status at channel link level to a minimum of ISO/IEC 11801
- Must be supplied with a valid DoP (Declaration of Performance) Certificate

Connectix Part No: 001-003-005-60S

Connectix Category 6 U/UTP LSOH Violet – 305m box



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4.1 Manufacturer Components Specification (continued)

4.1.2 Connecting Hardware

All SCS Manufacturer patch panels;

- Must be 19" rack mounting, in exact multiples of 1U (44 mm) in height
- Cable termination must be Insulation Displacement Connectors (IDC)
- Front connectors to be RJ45 style IEC 60603-7-4/5
- Tool-less Termination or punch down
- Electrical performance to be Category 6
- Port ID labelling system
- 25 Year Product Warranty
- Black finish
- Must have current independent third party approval status at channel link level to a minimum of ISO/IEC 11801

The client preference for **Unshielded** High Density Patch Panels is:

Connectix Part No: 009-001-009-07

Connectix Cat 6 Elite 24 Way UTP Patch Panel Black

Connectix Part No: 009-001-009-30

Connectix Cat 6 Elite 48 Way UTP Patch Panel Black

Connectix Part No: 009-002-002-01

Connectix Cat 6 2020 24 Way UTP Patch Panel Black (right angled IDC)



009-001-009-07



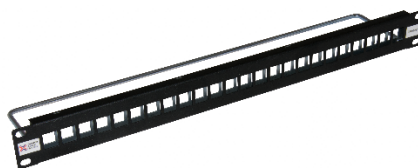
009-002-002-01

Connectix Part No: 009-010-010-05

Connectix Unloaded 24 Way Unshielded 1u Keystone Patch Panel Black – UTP

Connectix Part No: 009-010-010-10

Connectix Unloaded 48 Way Unshielded 1u Keystone Patch Panel Black – UTP



009-010-010-05



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4.2 Manufacturer Components Specification (continued)

4.1.3 Telecommunication Outlets

All SCS Manufacturer outlets must consist of;

- Cable termination must be Insulation Displacement Connectors (IDC)
- Connector style to be RJ45 style IEC 60603-7-4/5
- Tool-less Termination or punch down
- Lifetime Product Warranty
- Electrical performance to be Category 6
- Port ID labelling system
- 25 Year Product Warranty
- Must have current independent third party approval status at channel link level to a minimum of ISO/IEC 11801.

The form factor of the data outlet plate shall be from the **Connectix Office** or **Connectix Elite** range, and shall be made up of:

1 x **Connectix Part No: 008-001-003-52**

1 x **Connectix Part No: 008-001-003-70**

2 x **Connectix Part No: 008-000-001-20**

2 x **Connectix Part No: 008-000-001-30**

Connectix Single Gang Office Euro Faceplate

Connectix Single Gang Elite Euro Faceplate

2 x Connectix Cat 6 UTP Compact Euro Module

2 x Connectix Cat 6 FTP Compact Euro Module



008-001-003-52



008-001-003-70



008-000-001-20



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4.3 Manufacturer Components Specification (continued)

4.1.4 Horizontal Category 6 U/UTP Patch Leads

The SCS Contractor shall allow for the supply only of the following Connectix Magic Patch Category 6 U/UTP LSZH Channel Component Compliant Patch leads.

Each patch lead shall be complete with strain relief boot and RJ45 connector conforming to;

- Cable flammability performance must meet IEC 60332-1 as a minimum
- Connectors must be RJ45 style IEC 60603-7-4/5
- Electrical performance to be Category 6

The Clients standard dictates the following [example];

- Grey for general comms room patching
- Black for security

These items shall be available from stock within 1,2,3,5 and 10 metre lengths. Bespoke lengths and colours should be available, but it is understood they will be subject to a lead time for delivery.

The Client's standards shall be confirmed prior to tender response and shall include up to ten different colours.



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5 Manufacturer Components Specification (continued)

5.1.1 Backbone Optical Fibre Infrastructure

The selected Optical Fibre Cabling System is manufactured by **Connectix Cabling Systems**. Performance objectives of backbone fibre optic infrastructure shall be to support error free signal transmission between MER and SERs throughout the campus. The performance of the installed fibre optic cable plant shall support bandwidth-intensive applications including 1Gbit/s through 10Gbit/s and beyond as defined in IEEE 802.3z, 802.3ae, 802.3aq and 802.3ak Standards.

Designated media shall consist of multi core Multi-Mode/Singlemode cabling compliant with ISO 11801 standards.

ALL CONNECTOR END FACES SHALL BE INSPECTED FOR DAMAGE AND DEBRIS USING A VIDEO MICROSCOPE AND IF NECESSARY CLEANED BEFORE INSERTION INTO COUPLERS IN ACCORDANCE BS/ISO 14763-3

5.1.2 OS2, Optical Cable Performance levels:

| Wave Length (nm) | Max. Fibre Attenuation (dB/Km) | Typical Cabled Attenuation (dB/KM) |
|------------------|--------------------------------|------------------------------------|
| 1310 | 1.00 | 0.40 |
| 1550 | 0.50 | 0.25 |

5.1.3 OM4, Optical Cable Performance levels:

| Wave Length (nm) | Max. Fibre Attenuation (dB/Km) | Typical Cabled Attenuation (dB/KM) |
|------------------|--------------------------------|------------------------------------|
| 850 | 3.50 | 3.0 |
| 1300 | 1.5 | 1.0 |



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5 Manufacturer Components Specification (continued)

5.1.4 Backbone Optical Fibre Patch Panels:

- Suitable for mounting in 19" frames within termination closets. Fixed using securing bolts and captive nuts at either side
- With sufficient finger space around connectors to allow patch cables to be connected and disconnected and to allow individual connectors to be mounted and dismantled without disturbing other adjacent connectors
- In the case of panels housing terminations with maintenance access to rear, using sliding, tilting or other mechanism that does not strain the terminated cables or terminations
- Multiple Pre-Stamped Cable Entry points
- Includes 24 splice bridge, 2 x cable entry glands, cable tie bridges in base of draw

| | |
|--|--|
| Connectix Part No: 009-022-040-12 | Connectix Multimode OM3/OM4 Optical Fibre 12 Way LC Duplex Panel |
| Connectix Part No: 009-022-040-24 | Connectix Multimode OM3/OM4 Optical Fibre 24 Way LC Duplex Panel |
| Connectix Part No: 009-023-040-12 | Connectix Singlemode OS2 Optical Fibre 12 Way LC Duplex Panel |
| Connectix Part No: 009-023-040-24 | Connectix Singlemode OS2 Optical Fibre 24 Way LC Duplex Panel |

5.1.5 Backbone Optical Fibre Connectors and Patch Leads

Optical fibre cables shall be terminated LC-Duplex connectors that conform to EN 186000 Part 1, produced by fusion splicing using factory terminated pigtailed. The average loss for all connector pairs shall be less than 0.3dB, including the loss due to splicing.

| | |
|---|---|
| Connectix Part No: 005-634-010-22B | Connectix OM3 50/125 LC-LC Duplex LSZH Patch Lead Aqua- 1 metre |
| Connectix Part No: 005-634-020-22B | Connectix OM3 50/125 LC-LC Duplex LSZH Patch Lead Aqua- 2 metre |
| Connectix Part No: 005-668-010-01B | Connectix OM4 50/125 LC-LC Duplex LSZH Patch Lead Violet- 1 metre |
| Connectix Part No: 005-668-020-01B | Connectix OM4 50/125 LC-LC Duplex LSZH Patch Lead Violet- 2 metre |
| Connectix Part No: 005-924-010-01B | Connectix OS2 9/125 LC-LC Duplex LSZH Patch Lead Violet- 1 metre |
| Connectix Part No: 005-924-020-01B | Connectix OS2 9/125 LC-LC Duplex LSZH Patch Lead Violet- 2 metre |

5.1.6 Backbone Optical Fibre Splices

Splices shall be retained within a protective sleeve by either friction or adhesive bonds to the optical fibre and additional strain relief for the completed joint shall be provided. All splice, joints and their strain relief shall be fixed within the optical fibre management system of the enclosure. The insertion loss through any splice shall not be greater than 0.15dB.

5.1.7 Backbone Optical Fibre Pigtails

Fibre optic pigtailed shall be made from the same fibre type as the fixed cabling. Pigtails shall be kept slack when the cable is terminated.

| | |
|---------------------------|---|
| Connectix Part No: | 005-642-010-01B Connectix OM3 50/125 LC Pigtail- 1 metre |
| Connectix Part No: | 005-417-010-011 Connectix OM3 50/125 LC Pigtail- 1 metre |
| Connectix Part No: | 005-710-010-01B Connectix OS1 50/125 LC Pigtail- 1 metre |



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6 Backbone Optical Fibre Testing

Single and Multimode backbone links shall be tested at both wavelength and in both directions in accordance with BS/ISO/IEC 14763-3. Testing of the fibre optic cabling using the One Jumper Reference Method using Light Source and Power Meter with reference grade test cords and couplers. All Multimode links shall be tested using the “Encircled Flux” methodology with the relevant TRCs (Test Reference Cords).

All results should be capable of being stored within the test equipment for future submission electronically as part of the warranty application.

6.1 Backbone Optical Fibre OTDR Testing

Backbone, horizontal and centralized links shall be tested at the appropriate operating wavelengths for anomalies and to ensure uniformity of cable attenuation and connector insertion loss.

- Each fibre link and channel shall be tested in both directions wavelengths
- A launch cable shall be installed between the OTDR and the first link connection.
- A tail cable shall be installed after the last link connection.

6.1.2 Backbone Optical Fibre Length Measurement

- The length of each fibre shall be recorded.

6.1.3 Backbone Optical Fibre Polarity Testing

Paired duplex fibres in multi-fibre cables shall be tested to verify polarity. The polarity of the paired duplex fibres shall be verified using a Power source and light meter in accordance with BS/EN 50174-1.

The following information would be recorded from all tests:

- Name of personnel conducting the test
- Project Name
- Date test is being performed
- Optical source wavelength, spectral width, and CPR (for multimode tests only)
- Type of test equipment used (manufacturer, model, and serial number)
- Fibre identification
- End point locations
- Test direction
- Reference power measurement (when not using a power meter with a Relative Power Measurement Mode)
- Measured attenuation of the link segment
- Acceptable link attenuation
- Reference cord identification
- Calibration certification of any test equipment used. Specification & Requirements – SER Cabinets

Each cabinet must be laid out using the attached spreadsheet, the following image is an example of what the SCS contractor is expected to submit prior to final sign-off and installation.



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7 MER and SER Specifications – Horizontal Cabling Requirements

All Equipment, Server and Open Racks/Frames shall be **Connectix Cabling Systems S DCS** and **Connectix RackyRax** and covered under the Manufacturer's single warranty.

Main Equipment Room and Secondary Equipment Rooms will contain a quantity of Equipment and Server Racks as defined within the Summary of Works.

7.1 Server Rack

Server Cabinet shall be from the **Connectix Cabling Systems DCS Server Rack** range of racks and conform, as a minimum, to the following specification:

- Comply with ANSI/EIA-310-E, IEC60297-2, DIN41494 Part 1&7
- Fabricated from steel manufactured to BS EN 10130:1999 DC01
- Colour scheme: Powdercoated RAL 9005 black
- Overall height less than 2300mm
- Footprint of 800Wx1000mmD, or 800mm deep if appropriate
- Capacity 42U
- 4 x Adjustable 19" mounting profiles front and rear
- Internal equipment mounting depth minimum of 895mm front to rear
- 2 x lockable lift-off metal side panels with earthing straps
- Mesh front and rear doors complete with quick release hinges and earthing straps
- Minimum Load Capacity 1300Kg.
- Jacking Feet and Castors
- Baying Kit

Connectix Part No: 009-000-135-74
Cabinet Black

Connectix DCS 42U 800mm x 1000mm Floor Standing SR



Connectix DCS Server Room Cabinet



Connectix Cabling Systems™

Global Head Office:

500 Avenue West, Skyline 120, Braintree, Essex, CM77 7AA

Tel: + 44(0)1376 346600 Fax: +44(0)1376 346620 Web: www.connectixcabling.com

7 MER and SER Specifications – Horizontal Cabling Requirements (continued)

7.2 Equipment Rack

SER Enclosures shall be **Connectix Cabling Systems Equipment** series and conform, as a minimum, to the following specification:

- Comply with ANSI/EIA-310-E, IEC60297-2, DIN41494 Part 1&7
- Fabricated from steel
- Colour scheme: Powdercoated RAL 9004 black
- Overall height less than 2300mm
- Footprint of 800Wx1000mmD, or 800mm deep if appropriate
- Capacity 42U
- 4No. 19" Vertical mounting angles, each fully adjustable
- Internal equipment mounting depth minimum of 850mm front to rear
- Lockable quick release front and rear doors and metal side panels
- Lockable quick release perforated metal front door with 2 point swing handle CAM lock
- Minimum Load Capacity 800Kg
- Jacking Feet and Castors
- Baying Kit

Connectix Part No: RR-F6-42-M Connectix Cabling Systems Equipment Series 42U 800mm x 1000mm
Floor Standing SR Cabinet Black



Connectix Equipment Cabinet



Connectix Cabling Systems™

Global Head Office:

500 Avenue West, Skyline 120, Braintree, Essex, CM77 7AA

Tel: + 44(0)1376 346600 Fax: +44(0)1376 346620 Web: www.connectixcabling.com

7 MER and SER Specifications – Horizontal Cabling Requirements (continued)

7.3 Open Racks

The Two Post Patching frames shall be **Connectix Cabling Systems R-Series Patching Frames** and conform as a minimum with the following:

- Comply with IEC60297-2, DIN41494 Part 1&7, BS5850/3192
- 2 post welded steel construction
- 42,48 or 52U height
- 19" profiles marked with U height positions
- 500kg static load bearing
- High Density Cable Management
- Lockable double hinged doors on vertical management
- Horizontal and Vertical cable spools as required
- Black RAL 9005

| | |
|--|--|
| Connectix Part No: 009-000-111-42 | Connectix R-Series Frame 42U Single Sided |
| Connectix Part No: 009-000-112-42 | Connectix R-Series Frame 42U Double Sided |
| Connectix Part No: 009-000-113-42 | Connectix R-Series Vertical Management 42U Single Sided (6") |
| Connectix Part No: 009-000-114-42 | Connectix R-Series Vertical Management 42U Double Sided (6") |
| Connectix Part No: 009-000-XX1-42 | Connectix R-Series Vertical Management 42U Single Sided Front Door |
| Connectix Part No: 009-000-XX2-42 | Connectix R-Series Vertical Management 42U Double Sided Front Door |
| Connectix Part No: 009-000-XX3-42 | Connectix R-Series Advanced Patching Frame 42U End Panels |



Connectix R-Series Patching Frames



Connectix Cabling Systems™

Global Head Office:

500 Avenue West, Skyline 120, Braintree, Essex, CM77 7AA

Tel: + 44(0)1376 346600 Fax: +44(0)1376 346620 Web: www.connectixcablingsystems.com

7 MER and SER Specifications – Horizontal Cabling Requirements (continued)

7.4 Connectix RackyRax Power Distribution Units

It is the requirement of the client that **Connectix Cabling Systems** PDUs are to be installed within each Equipment Rack or Server Rack.

Select the appropriate **Connectix Cabling Systems** from the following list according to the size and load bearing requirements, and pay particular attention to the required equipment termination plugs.

| | |
|--|--|
| Connectix Part No: 009-000-005-07 | Connectix PDU 4 Way Vertical c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-08 | Connectix PDU 5 Way Vertical c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-09 | Connectix PDU 6 Way Vertical c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-10 | Connectix PDU 8 Way Vertical c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-11 | Connectix PDU 10 Way Vertical c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-12 | Connectix PDU 12 Way Vertical c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-24 | Connectix PDU 4 Way Horizontal c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-26 | Connectix PDU 6 Way Horizontal c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |
| Connectix Part No: 009-000-005-21 | Connectix PDU 8 Way Horizontal (2u) c/w 13AMP Plug, IEC C14/C20 or 16/32AMP Commando |

7.5 Mandatory Requirement of All Enclosure Styles

Each rack or cabinet shall have a proprietary earth bar kit (vertical and/or horizontal as required) connected directly to the main earth. The size of the cable shall be determined by the electrical sub-contractor, but shall not be less than 16mm².

All parts of the cabinet including doors, blank panels, gland plates, and any equipment that are provided with earth studs, shall be bonded individually to the cabinet earth bar by green/yellow copper conductor flexible tri-rated cables with minimum cross section 4mm².

A full height vertical earth bar shall be used for all floor mounted cabinets / racks and shall be sized to accommodate all earth connections as a single individual connection. There shall be no "double lugged" connections or "curls" of earth bonds.

Connections to the Earth Bar shall be by appropriately sized crimp lugs secured by brass nuts, bolts and shake proof washers.

A safety warning label "SAFETY ELECTRICAL EARTH DO NOT REMOVE" (or similar wording) shall be fitted to the main earth connection points (i.e. in the cabinet, connection at the room building earth point, MTGB, TGB(s) etc.).

All metal containment and tray work shall be earth bonded for safety and EMC. Sections of containment shall be securely earth bonded together by manufacturers' interleaves joints.

A labelling and administration system must be designed for each enclosure in line with EN 50174 or ISO 14763-2 or TIA/EIA-606. The system shall be approved by the Client before installation.



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Tel: + 44(0)1376 346600 Fax: +44(0)1376 346620 Web: www.connectixcablingsystems.com

8 Horizontal Infrastructure – Additional Restrictions and Requirements

The restrictions and requirements listed below are in addition to those stated in standards set with the scope of works.

Horizontal structured cabling shall emanate from the MER/SER terminated upon 19” rack mountable 24-Port, RJ45 patch panels. There will be 1U horizontal cable management panel installed for a maximum of every 3U of patch panels.

Rack mounted equipment passive or active in nature shall be bonded to a sub-TGB (Telecommunications Grounding Bar) positioned in each equipment rack which is in turn shall be bonded to the TR/ER room, TMGB/TGB.

Work area MER/SERs shall consist of an RJ45 socket presented as either a single or dual formation. MER/SERs faceplates must be in keeping with the environment they are being installed i.e. Suitable IP Rating, and have a finish appropriate to those areas which they have been installed i.e. Brass, Stainless or other.

In all structured cabling termination instances the ANSI/TIA/EIA568-B colour code will be used throughout Installation.

a. Equipment Room – Analogue Voice Cabling

There is a requirement for multi-pair voice cabling to be run through to certain parts of the building to handle the requirements of emergency lift phones and disabled refuge call points, the SCS subcontractor should allow provision within their tender response as a separate line item.

Further detail is given for typical layouts of wiring and equipment closets later in this document.

b. Horizontal Category 6 Infrastructure Testing

The SCS Contractor shall test 100% of the Category 6 horizontal cabling over the permanent link to confirm cable plant performance characteristics as stated in EN50173, ISO/IEC 11801 Class E PL2. Sample testing for ANEXT will not be required. The SCS Contractor must use a level IV Cable tester it should have a current calibration certificate issued by the manufacturer of the tester.

Computed test results that indicate that some part of the result is closer to the limit than the tolerance of the test equipment may be noted as ‘PASS*’ or ‘FAIL*’. A ‘FAIL*’ test result shall not be accepted and shall be treated in the same way as a ‘FAIL’.



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C. Horizontal Category 6 – Containment

Horizontal cabling must be fully supported, contained and managed along its entire length. Cabling must be routed and secured, fixed or positioned upon designated 'Communication Containment' provided by the Electrical subcontractor.

The SCS Contractor shall ensure the containment system is suitable and adequate under the standards of this specification and against those set by the manufacturer of the structured cabling system.

The use of non-metallic fixings/support of the containment shall not be employed in any areas considered to be an escape route. BS 7671:2011+A3:2015 (IET Wiring Regulations Seventeenth Edition), published in January 2015 includes a requirement that wiring systems in escape routes shall have fire-resisting supports. The requirement is included in a new regulation (Regulation 521.11.201): Wiring systems in escape routes shall be supported such that they will not be liable to premature collapse in the event of fire. The requirements of Regulation 422.2.1 shall also apply, irrespective of the classification of the conditions for evacuation in an emergency.

9 Installer Requirements

The SCS Contractor shall be qualified to Connectix Cabling Systems Approved Installers. Certification of this shall be provided with all bid documentation.

The SCS Contractor will preferably have a **CNIDP** (Certified Network Infrastructure Design Professional, or **RCDD**® (Registered Communications Distribution Designer) on staff that will be ultimately responsible for this section of the project.

The CNIDP or Project Engineer must have sufficient experience to be able to lend adequate technical support to the field forces during installation, during the warranty period, and during any extended warranty periods or maintenance contracts.

A CV of the responsible CNIDP/Project Engineer must be attached to The Vendor's response for evaluation by The Customer. Should the CNIDP/Project Engineer assigned to this project change during the installation, the new CNIDP/Project Engineer assigned must also submit a CV for review by The Client.

If, in the opinion of The Client, the CNIDP/Project Engineer does not possess adequate qualifications to support the project, they reserve the right to require the SCS Contractor to assign a CNIDP/Project Engineer who, in The Client's opinion, possesses the necessary skills and experience required of this project.

The SCS Contractor shall have engineers that have Completed the Connectix Approved Installer Training Courses, or possess equivalent acceptable credentials on staff and assign them to this project. The project shall be staffed at all times by Installers and Technicians who, in the role of lead crafts-persons, will be able to provide leadership and technical resources for the remaining crafts-persons on the project.

An example of engineer's qualifications must be submitted in the SCS Contractor's response to this tender.

The SCS Contractor shall additionally be an Accredited, Approved Designer and Installer for the chosen System Supplier.



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Installer Requirements (cont.)

The SCS Contractor shall apply the methodologies for installation in accordance with BS EN 50174 and following the Manufacturers Installation Guidelines these shall be used during all installation activities.

Should conflicts exist in local law, codes and regulations, then local law, codes and regulations shall take precedent.

The SCS Contractor for all Horizontal and Backbone cabling must ensure it is fully supported, contained and managed along its entire length. Cabling must be routed and secured, fixed or positioned upon designated 'Communication Containment' provided by the Electrical subcontractor.

The SCS Contractor shall ensure the containment system is suitable and adequate under the standards of this specification and against those set by the manufacture company of the cabling system.

Includes Equipment, materials, labour and services to provide The SCS Infrastructure including, but not limited to:

- Horizontal Infrastructure (Category 6 U/UTP).
- Backbone Infrastructure (Optical Fibre OS2 and/or OM4).
- Equipment cabinets, frames, racks and enclosures.
- Termination frames and panels.
- Multi-purpose Telecommunication Outlets.
- Supply of drop cables to connect horizontal cabling to connect network services.
- Generation of base line patching schedules.
- Documentation and submissions.

The SCS Contractor must also as part of his works properly ground and bond all installed apparatus, equipment and components to ensure equal potential is maintained through his installation in accordance with EN50174, BS6701 & EN50310

The SCS Contractor works shall be completed to suit the requirements of the Main Contractors programme.

The SCS Contractor must also obtain written approval from Main Contractor and the appointed Electrical subcontractor before any ground and bonding connections to be made on site for use by SCS Installation prior to commencement of his connections or works.

Associated works by others include:

- Horizontal and vertical containment 'Communications Containment' (i.e. cable trays, trunking, conduits), together with floor boxes, wall and ceiling mounted back boxes, provided by the appointed Electrical Subcontractor
- Telecommunications grounding and bonding points
- Builder's work in connection with the SCS Contract, include removal and replacement of fire-stopping
- Patching of users



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10 Drawings Schedule of Applicable Drawings

Drawings

The SCS Contractor shall provide an as-built installation drawing in AutoCAD, Visio or other format agreed with the Main Contractor in paper and electronic formats upon completion detailing the following information:

- Horizontal containment routes. Detailing the number of telecommunications outlets per floor, area or location.
- Backbone cabling routes. Detailing the quantity, type and routes of backbone cabling (both copper and fibre optic)
- Layout of termination frames, panels and closets, clearly identifying the number of frames or panels used in each MER and SER
- Layout of Equipment Rooms throughout the entire project. Detailing the individual frames, panels and closets in each room

The Electrical Sub-Contractor shall include for liaising with the specialist data company in order that works are carried out to suit the Main Contractor's programme



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11 SCS Infrastructure -Pricing Schedule

The SCS Contractor shall fully populate the following pricing schedule for each item listed. Any items listed with no pricing shown will be deemed to be zero rated all fully inclusive in the summary total price shown.

The SCS Contractor will be required to submit and full bill of material and schedule of rates to support the following price schedule upon request form the Main Contractor.

The SCS Contractor must consider and allow for all aspects, scope, requirements and specifications sighted in (SCS Infrastructure) duly before completing the pricing section below.

The SCS Contractors are reminded that any alternative manufacture pricing must be provided as an addendum to their tender response.

[insert scope of works pricing here]



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12 **Appendices**

Appendix A Cabinet Layout Spreadsheet



Connectix Cabling Systems™

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500 Avenue West, Skyline 120, Braintree, Essex, CM77 7AA

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12 Preferred Installer

The Electrical Contractor shall obtain a quotation for these works from the clients preferred installer(s):

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

The final decision on choice of domestic sub-contractor shall be the responsibility of the Electrical Contractor.

Materials

All SCS Materials shall be provided by the following Manufacturer:

Connectix Ltd
500 Avenue West
Braintree Essex
CM77 7AA

| | | |
|-----------|---|-----------------|
| Contacts: | Jason Holroyd, Jason.holroyd@connectix.co.uk | M: 07921-836904 |
| | Joe Cherry, joe.cherry@connectix.co.uk | M: 07738-125829 |
| | Paul Mathews, paul.mathews@connectix.co.uk | M: 07976 188727 |
| | Projects: Sales@connectix.co.uk | T: 01376-346600 |



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Global Head Office:

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13 Reference to Standards

| | |
|-----------------------------|--|
| BS 6701:2016+A1:2017 | Telecommunications Equipment and Telecommunications Cabling. Specification for Installation, Operation and Maintenance |
| BS 7671 | Requirements for Electrical Installations (IEE 17 th Ed). |
| BS 8300 | Design of Buildings and their Approaches to Meet the Needs of the Disabled. |
| EN 50173-1 | Information Technology, Generic Cabling Systems, Part 1: General requirements (2011) |
| EN 50174 | Information Technology, Cabling Installation. Parts 1, 2 and 3 |
| EN 50310 | Application of Equipotential Bonding and Earthing in Buildings with Information Technology Equipment, 2012 Edition |
| EN 50346 | Information Technology - Cabling Installation - Testing of Installed Cabling |
| EN 61000 | Electromagnetic Compatibility (EMC) Generic Standards - Emission Standard for Residential, Commercial and Light-Industrial Environments |
| ISO 11801:Ed2.2 | Information Technology – Generic Cabling for Customer Premises. |
| ISO 14763 | Information Technology – Implementation and Operation of Customer Premises Cabling. Part 1 – Administration. Part 2 - Planning and Installation. Part 3 - Testing of Optical Fibre Cabling |
| IEC 60332-1 | Flammability of a Single Vertical Cable |
| IEC 60603-7-5 | Detail Specification for Connectors, 8 way. Test Methods and Related Requirements for use at Frequencies up to 250 MHz |
| IEC 61935 | Generic Specification for Testing of Generic Cabling in Accordance with ISO/IEC 11801- Part 1 |
| IEC 60754-1 | Halogen Gas Emission |
| IEC 60754-2 | Smoke Corrosivity |
| IEC 61034 | Smoke Density and Evolution |
| ANSI/TIA 568-C | Commercial Building Telecommunications Cabling Standard |
| TIA-606 | Administration Standard for the Telecommunications Infrastructure of Commercial Buildings |