Korea Optic Technology is certified
according to TL 9000 and ISO 14000

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FTTA INFRASTRUCTURE NETWORK SOLUTIONS

for Remote Radio Head and Cell sites

http://www.koteck.com

KOT
KOREA OPTIC TECHNOLOGY

Korea Optic Technology is proud to carry total FTTX solution products arranged from network Core, RAS, Media Gateways, G-PON, E-PON, Switching Router, IT Security, IP/VPN Service System, NG SDH/SONET to Home networks solutions.
With a long history of serving customers in the industry worldwide, we have been bring the total solutions and services to the world by integrating data, voice and video to build the most innovative and reliable networks for world`s Telco Carriers, ISPs Government and enterprise market. With outstanding performance and value-added services, we are confident in creating the best networking solutions to meet customers` maximum benefits and to foster and guarantee a better quality of service

With the fast development on information and networks infrastructure, broadband applications such as high definition television (HDTV), video on demand (VOD) and etc are getting popular.
Compared with other communication media, optical fiber obviously has superiority because of its high bandwidth and tremendously low data loss.
Due to these advantageous features, it has been rapidly developed and gradually replacing with copper wire-based transmission system. At present, the WAN and MAN markets have been saturated with optical fiber and now the LAN has also been slowly developed towards the optical fiber transmission.
Only the network access speeds between MAN and LAN markets are still slow, which is commonly called the “Last Mile Bottleneck”.
To solve the problem, optical fiber has increasingly penetrated to the customer premises.
Today, everyone knows that optical fiber is a better solution for increasing network bandwidth

Thus, now we`re going to propose these value added FTTH solutions to help to achieve your prospective last mile solution.

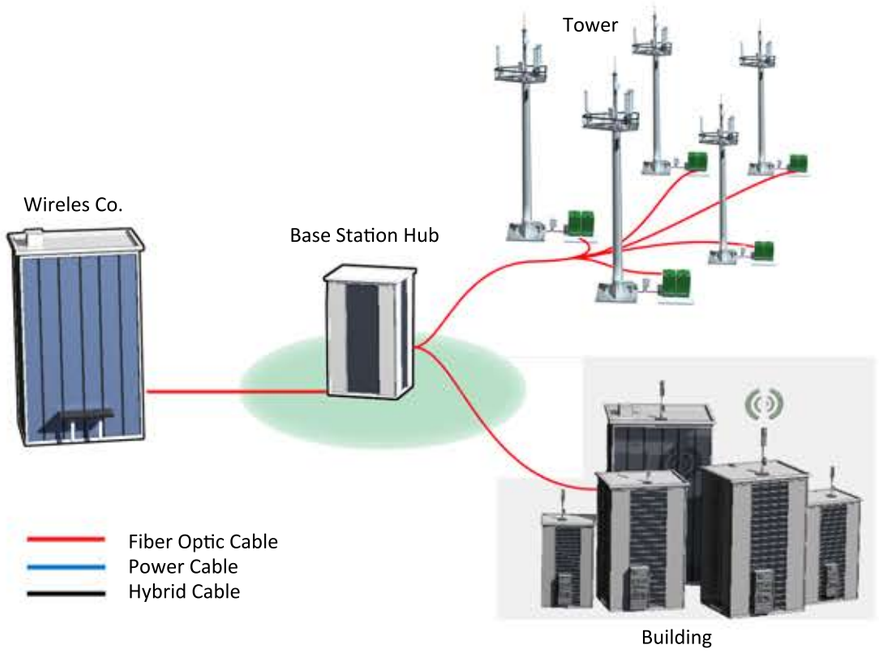
In this product literature, we introduce the turn-key solutions from supply, installation to maintenance of the FTTH/FTTB equipment and other elements of networking that is necessary to enable the FTTH network

We aim to create a advance solution for our customers

Korea Optic Technology Co.,Ltd

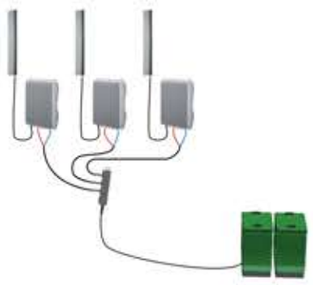
Contents

FTTA Radio Access Network



Remote Radio Head Cabling

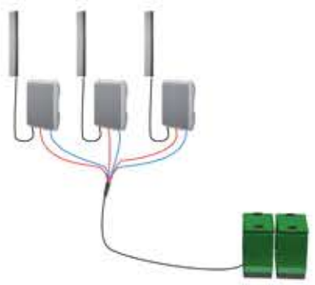
Hybrid Terminal Plug&play Cabling



Suitable:
- Easiest installation
- Plug&play for installtion time
- Hybrid Jumper can be easily changed to accommodate different RRHs
- Normal 3, 4 RRHs per cable

Material Cost: $$$
Installation Cost:$
Future updates: Excellent

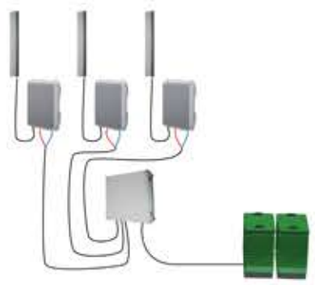
Hybrid Canister Plug&play Cabling



Suitable:
- Easy installation
- Plug&play for installtion time
- Only Fiber Jumper can be easily changed to accommodate different RRHs
- 3, 4, 6, 9 RRHs per cable

Material Cost: $$
Installation Cost: $S
Future updates: Excellent

Hybrid Junction Box Cabling



Suitable:
- Standard installation
- High flexibility
- Junction boxes may command additonal leasing cost
- Normal 3, 4, 6 RRHs per cable

Material Cost: $$
Installation Cost: $$$
Future updates: Good

Tower Cabling

Hybrid Terminal Cabling

The Hybrid Terminal Cabling supports multiple RRHs at tower top and conected RRH to terminal by Hybrid connector jumper cable
Also Hybrid feeder cable with terminal pre-assembled in factory.
This solution gives the flelxibility of one or two fiber and Power pair through terminal per RRH.
Deploying provides the fiber needed for today plus spare fiber for future growth.

- Combined fiber and Power feeder cable for three to four RRHs through terminal

- Hybrid Feeder Cable
  - Outdoor type
  - Corrugated copper or aluminium Armor
  - Pre-assembled terminal in factory
  - Supports up to terminal covered 3 or 4 RRHs
  - Wellmantel corrugeted armored aluminium
  - 4,6,8,10,12 AWG with Conductor pair depending on the power consumption of RRH and the associated voltage drop

- Hybrid connector Jumper Cable
  - Hybrid connector designed Plug&play system
  - Combined fiber and power in a single construction
  - Factory terminated connectors
  - RRU CPRI interface vendor specified connector
  - Fiber one or two pairs and conductor one pair
  - Power 8,10,12 AWG 1 Pair
  - Corrugeted armored aluminium

Tower Cabling

Hybrid Canister Cabling

The Hybrid Terminal Cabling supports multiple RRHs at tower top and direct conected RRH to canister by pigtail fiber and power cable.
Also Hybrid feeder cable with canister pre-assembled in factory.
This solution gives the flelxibility of one or two fiber and Power pair through canister per RRH.
Deploying provides the fiber needed for today plus spare fiber for future growth.

- Combined fiber and Power feeder cable for up to 9 RRHs through Canister

- Hybrid Feeder Cable
  - Outdoor type
  - Corrugated copper or aluminium Armor
  - Pre-assembled canister in factory
  - Supports up to canister covered up to 9 RRHs
  - Wellmantel corrugeted armored aluminium
  - 4,6,8,10,12 AWG with Conductor pair depending on the power consumption of RRH and the associated voltage drop

- Fiber optic Jumper Cable
  - Fiber optic connector designed Plug&play system
  - Only Fiber Jumper can be easily changed to accommodate different RRHs
  - Factory terminated connectors
  - Oudtoor Fiber optic connector
  - RRU CPRI interface vendor specified connector
  - Fiber one or two pairs and conductor one pair

Tower Cabling

Hybrid Junction Box Cabling

The Hybrid Junction box Cabling supports multiple RRHs at tower top and conected RRH to junction box by Hybrid jumper cable
Also main feeder cable is hybrid cable as a single unit for both Fiber optic and copper.
This solution gives the flelxibility of one or two fiber and Power pair through junction box per RRH.
Deploying provides the fiber needed for today plus spare fiber for future growth.

- Combined fiber and Power feeder cable for three to four RRHs through junction box

- Hybrid Feeder Cable
  - Outdoor type
  - Corrugated copper or aluminium Armor
  - Top or bottom junction box
  - Fiber optic pre-terminated connections
  - 4,6,8,10,12 AWG with Conductor pair depending on the power consumption of RRH and the associated voltage drop
  - Power Non Connector

- Hybrid Jumper Cable
  - Jumper of Single trunk Fiber and Power connect to RRH
  - Fiber Optic 1 to 2 pairs LC connector or vendor specified connector
  - Power 8,10,12 AWG 1 Pair Non Connector or RRH vendor specified connector

Fiber Optic Cable
Power Cable
Hybrid Cable

Tower Cabling

CWDM Wireless RU to DU Cabling

CWDM apply the use of a single fiber to transmit up to 40km between the RU and DU, utilizing different wave-lengths for transmission over a single fiber. This reduces the need to lay extra fiber cables in the field, which can be labor and material intensive.

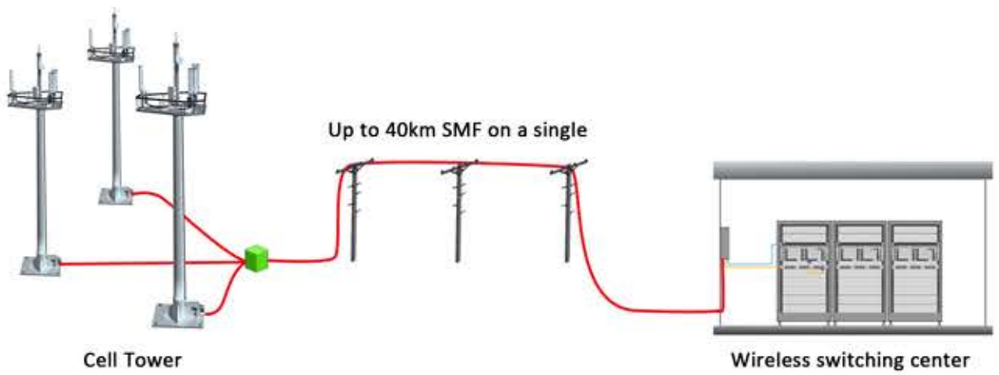
- Current radio systems mount the active RRH on the mast in order to save energy
- Reduction in high cost and labor intensive installation for coaxial cable
- Allows for quick fault finding and upgrading RRH

- CWDM MUX + Junction Box
  - 1270nm to 1610nm Tx & Rx transmission
  - CWDM MUX in outdoor junction box
  - Up to 18channels available on CWDM
  - Front plate with mounted LC adaptor interface
  - Provides water proof protection to connection
  - Suitable for mounting on poles, walls and towers

- CWDM MUX + Shelf
  - 1270nm to 1610nm Tx & Rx transmission
  - CWDM MUX in 19” Shelf
  - Easy installation and removal type
  - Up to 18channels available on CWDM
  - Front plate with mounted LC adaptor
  - Material powder coated aluminium

CWDM MUX + Junction Box

CWDM MUX + Shelf



Rooftop Cabling

Discrete Junction Box Cabling

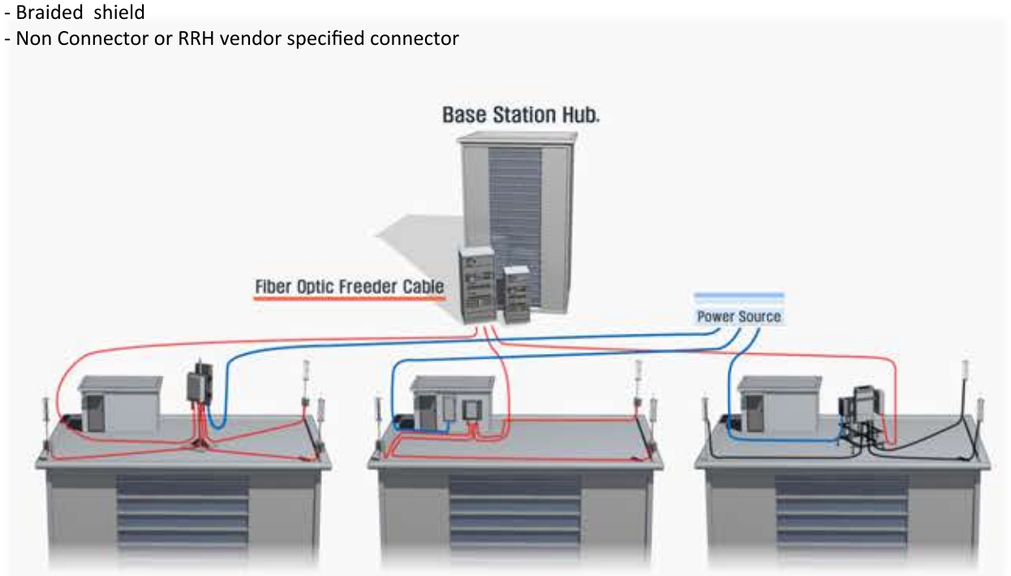
Rooftop deployments promise much shorter cable runs. However, it is often necessary to place the cabinets indoors on a separate floor for easy access(elevators often do not go to the roof and a crane would otherwise be required to place large equipment on the rooftop).
Three cross polarized antennas located at three corners of the roof, each placed on non-penetrating mounts(that do not penetrate the rooftop and hence do not threaten to cause a leak in the roof).
Electrical Power is supplied by power panel of self-building.

- Individual fiber and Power feeder cable for RRH

- Fiber Optic Feeder Cable
  - Outdoor type
  - Corrugated Steel Armored or Non Armored
  - LC connector or RRH vendor specified connector

- Fiber Optic & Power Jumper Cable
  - Hybrid trunk terminate in distribution box
  - Individual Fiber and Power Jumpers connect to RRH
  - Fiber Optic 1 to 2 pairs
    LC connector or vendor specified connector
  - Power 8,10,12 AWG 1 Pair
    Non Connector or RRH vendor specified connector

- Power Feeder Cable
  - 4,6,8,10,12 AWG with 2 Conductors depending on the power consumption of RRH and the associated voltage drop
  - Braided shield
  - Non Connector or RRH vendor specified connector



Pole Mount Type

Wall Mount Type

Ground Standing Type

RRH Fiber Optic Jumper Installation Method

RRH, also known as a Remote Radio Unit(RRU), incorporates much of the same functionality as a TRDU(Transmiter-Receiver Duplexer Unit). However, the RRH is a pole-mountable, weatherized, self-contained module that uses natural convection cooling. In a typical installation, the RRH is installed close to the antennas at the top of the tower with minimal RF cabling. RRH with two transmitters and four receivers. the interface to the baseband processing unit is a high-speed optical interface(CPRI interface). The interface board in the Figure incorporates some of the control function such as antenna control functions such as antenna control(AISG) and alarming

Option 1

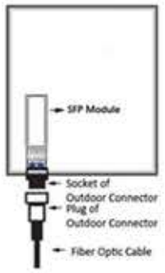
- Plug through socket into SFP module

ONC Series

Industrial Connector Series

Compact PushPull Series

Option 2



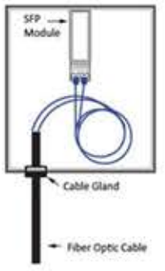
- Plug directly into SFP module

FullAXS Series

FullAXS adapter Series

NSN Series

Option 3



- LC Connector directly into SFP module

LC Simplex 2.0

LC Simplex 0.9

LC Duplex 2.0

Hybrid Trunk Feeder Cable for Junction Box Cabling

Hybrid Junction box trunk cables apply to Cell tower, can not be cut to length in the field and terminated with Junction box. Fiber optic cables are bending radius sensitive, factory terminated, connectorized, and delivered at predefined lengths. Copper cable can be cut and clamped in the field, need to be shielded and grounded.

Applications

Multi-purpose Outdoor
For conection between Termination box and BBU
Deployment in Remote Radio Head cell tower applications
One Cable per 3 to 9 RRHs

Features

Factory terminated LC Connections
Capacity 2 to 36 Fibers
AWG of Power conductor 4,6,8,10,12
Insulation of Power Cable THHN/THWN
Corrugated armored Copper or Aluminium
Outer Sheath of UV resistant
Temperature Range -40℃to +80℃

Ordering Information

- Number of Fibers 6 to 36
- Singlemode or Multimode: SM, MM(50)
- AWG of Wire 6,8,10,12
- Number of Conductors 3 to 9 Pairs
- Cable Length

Hybrid Trunk Feeder Cable for Terminal Cabling

Hybrid terminal trunk cables apply to Cell tower, offers you the flexibiliy for future expansion, based on the ease of installing jumper cables when additional RRHs are deployed. Plug and play connectivity structure allows the jumper cables to connect via the terminal.
Water proof hybrid IP connectors on the terminal and insensitive fiber in outdoor harsh environments

Applications

Multi-purpose Outdoor
For conection between Terminal and BBU
Deployment in Remote Radio Head cell tower applications
One Cable per 3 to 4 RRHs

Features

Factory terminated Connections
Terminal packing IP68 grade
AWG of Power conductor 6,8,10,12
Insulation of Power Cable THHN/THWN
Corrugated armored Copper or Aluminium
Outer Sheath of UV resistant
Temperature Range -40℃to +80℃

Ordering Information

- Number of fibers 6 to 16
- Singlemode or Multimode: SM, MM(50)
- AWG of Wire 6,8,10,12
- Number of Conductors 3,4 Pairs
- AWG Size of RRH Power interface
- Cable Length

Hybrid Trunk Feeder Cable for Canister Cabling

Hybrid Canister trunk cables apply to Cell tower, offers you the most efficient and easiest-to-install solution with plug and play. the jumper cables are pre-connectorized in the canister enclosure. Fiber optic jumper can be easily changed to accommdate different RRHs. Power conductor connected Direct to RRHs
We can optimize signal transmission by eliminating risk of splicing loss, since optical fiber are connected to the RRH from DU without any splicing or termination.

Applications

Multi-purpose Outdoor
For conection between Canister and BBU
Deployment in Remote Radio Head cell tower applications
One Cable per 3 to 9 RRHs

Features

Factory terminated LC Connections
Capacity 2 to 36 Fibers
AWG of Power conductor 4,6,8,10,12
Insulation of Power Cable THHN/THWN
Corrugated armored Copper or Aluminium
Outer Sheath of UV resistant
Temperature Range -40℃to +80℃

Ordering Information

- Number of Fibers 6 to 36
- Singlemode or Multimode: SM, MM(50)
- AWG of Wire 6,8,10,12
- Number of Conductors 3 to 9 Pairs
- Cable Length

Hybrid Jumper Cord

Hybrid Jumper Cable combined fiber and Power in a single construction.
Normally connected RRH to Junction box and Terminal at tower top.

Applications
- Multi-purpose Outdoor
- For connection between Junction box and Terminal to RRH
- Deployment in Remote Radio Head cell tower applications
- One Cable per RRH

Features
- Factory terminated Connections
- Capacity Fiber 1 to 2 pairs
  LC connector or vendor specified connector
- AWG of Power conductor 8,10,12 1pair
  Non Connector or RHH vendor specified connector
- Insulation of Power Cable THHN/THWN
- Corrugated armored Copper or Aluminium
- Outer Sheath of UV resistant
- Temperature Range -40℃to +80℃

Ordering Information
- Number of Fibers 1 to 2 pairs
- Singlemode or Multimode: SM, MM(50)
- AWG of Wire 8,10,12
- Number of Conductors 1 Pair
- Cable Length
- RRH vendor specified connector

Hybrid Jumper Cord for NSN Vendor

Hybrid Connector Jumper Cord

Hybrid Jumper Cord for Ericsson Vendor

Hybrid Jumper Cord for Huawei Vendor

Fiber Optic Jumper Cord

Fiber Optic Jumper Cable is a fiber single unit.
Normally connected RRH to distribution box at top tower and BBU to distribution box at bottom tower.

Applications
- Multi-purpose Outdoor
- For conection between distribution box to RRH&BBU
- Deployment in Remote Radio Head cell tower applications
- One Cable per RRH

Features
- Factory terminated Connections
- Capacity Fiber 1 to 3 pairs
  LC connector or vendor specified connector
- Insulation of Power Cable THHN/THWN
- Corrugated Steel armor or Non armor
- Outer Sheath of UV resistant
- Temperature Range -40℃to +80℃

Ordering Information
- Number of Fibers 2 to 6F
- Singlemode or Multimode: SM, MM(50), MM(62.5)
- Cable Length
- RRH vendor specified connector

Fiber Optic Multiplex Jumper Cord

Fiber Optic IP Jumper Cord

Fiber Optic Jumper Cord for NSN

Fiber Optic Jumper Cord for Ericsson

Power Jumper Cord

Power Jumper Cord is only conductor single unit
Normally connected RRH to distribution box at top tower and PSU(Power source) to distribution box at bottom tower.

Applications
- Multi-purpose Outdoor
- For conection between Junction box to RRH&PSU(Power source)
- Deployment in Remote Radio Head cell tower applications
- One Cable per RRH

Features
- Factory terminated Connections
- Capacity Conductor 1 pairs
- AWG of Power conductor 6,8,10,12
  Non Connector or RHH vendor specified connector
- 600V Power Cable
- Insulation of Power Cable THHN/THWN
- Braid shielded or unshielded
- Outer Sheath of UV resistant
- Temperature Range -40℃to +80℃

Ordering Information
- AWG of Wire 6,8,10,12
- Number of Conductors 1 Pair
- Cable Length
- RRH vendor specified connector or Non-connector

RRH DC Power Connector
of NSN Vendor

RRH DC Power Connector
of ERICSSON & SAMSUNG Vendor

CPRI Connector & Power Interface

Connectorization is done in the factory(optical measurement on every pre-assembled cable).
Fiber Optic Connectors will be used according to vendor equipment requirement.
The majority of fiber optic connections to the BBU wil be done by LC connectors as environmental protection is no issue in the Shelter or building.
Also Power Connectors will be used according to customer`s requirement.
Most probably screw-type terminals will be used to contact to the Power Supply Unit.

RRH Interface CPRI Connector
of NSN Vendor

RRH Interface CPRI Connector of
SAMSUNG Vendor

RRH Interface CPRI Connector
of ERICSSON Vendor

RRH Interface CPRI Connector
of Huawei Vendor

RRH Interface CPRI Connector
of ALCATEL LUCENT Vendor

Power Interface
of NSN Vendor

Power Interface
of ERICSSON Vendor

Power Interface
of ALCATEL LUCENT Vendor

Junction Box

Hybrid Junction Box

Features
- Material: Polycarbonate, UV resistant
- Dimensions: 300(W)x300(H)x150(D)mm
  300(W)x400(H)x150(D)mm
- Outdoor type
- Poly mount/ Wall mount type
- Pipe 3”(76.2mm) to 6”(152.4mm)
- Color: Gray
- Screw terminal Block:
  isolated 4P & non-isolated 4P(Option)
- Circuit Breaker 20A 4pcs(Option)
- Ground earth bar
- LC Adaptor Panel:
  LC Duplex 8pcs(Option)
- Cable Entry:
  Option A: Hybrid feeder 1 / Hybrid Jumper 4 / Ground 1(Option)
  Option B: Hybrid feeder 1 / Fiber Jumper 4/ Power Jumper 4 / Ground 1(Option)

Ordering Information
- Hybrid feeder cable O.D Size
- RRHs per Distribution box: 3,4,6 RRHs
- Including Circuit Breaker or not
- Fiber Optic core Q`ty
- Hybrid Jumper or Individual Jumper

Power Junction Box

Features
- Material: Polycarbonate, UV resistant
- Dimensions: 280(W)x280(H)x130(D)mm
- Outdoor/Indoor type
- Poly mount/ Wall mount type
- Pipe 3”(76.2mm) to 6”(152.4mm)
- Color: Gray
- Screw terminal Block:
  isolated 4P & non-isolated 4P(Option)
- Circuit Breaker 20A 4pcs(Option)
- Ground earth bar
- Cable Entry:
  Power feeder 1 / Power Jumper 4 / Ground 1(Option)

Ordering Information
- Power feeder cable O.D Size
- RRHs per Distribution box: 3,4,6 RRHs
- Including Circuit Breaker or not

Fiber Optic Junction Box

Features
- Material: Polycarbonate, UV resistant
- Dimensions: 280(W)x280(H)x130(D)mm
- Outdoor/Indoor type
- Poly mount/ Wall mount type
- Pipe 3”(76.2mm) to 6”(152.4mm)
- Color: Gray
- LC Adaptor Panel:
  LC Duplex 8pcs(Option)
- Cable Entry:
  Fiber Optic feeder 1 / Fiber Optic Jumper 4

Ordering Information
- Fiber optic feeder cable O.D Size
- RRHs per Distribution box: 3,4,6 RRHs
- Fiber Optic core Q`ty

Enclosures

Patch Panel

Patch panel is high density fiber optic shelf that can be used in storaging fiber building cable or outside plant cable. Shelf Includes integrated Front cable management of patch guide panel

Features
- Material: SPCC or Aluminum
- Dimensions: 433(W)x270(D)x44(H)mm
- 19” Rack type
- Color: Gray(Option)
- Shelf Movement : Sliding Drawer type
- Front faceplate shelf
- LC Adaptor Panel:
  LC Duplex 24pcs (Option)
- Patch Guide Panel

Ordering Information
- Fan-out length of Fiber Optic feed cable
- Fiber Optic core Q`ty
- Cabinet depth
- 19” or 21”

Excess Cable Enclosure

Excess Cable Enclosure is designed for on-site storage of excess fiber cable when Pre-connecterized trunk cable are utilized.

Features
- Outdoor and indoor installation
- Dimensions: 433(W)x270(D)x44(H)mm
- 19” Rack type or wall mount
- Color: Unpainted Steel
- Suppled with fixing brackets, screw, loop cable ties
- Capacity: 20 or 30 meters of 10mm cable(Option)

Ordering Information
- Excess feeder Cable O.D size
- 20m or 30m
- Rack type or Mount type

Fiber Optic Patch Cord

LC Patch cord

Pre-terminated for patching equipment

Features
- Guaranteed performance specifications
- Various connector type available
- Low insertion loss and reture loss
- IEC 61754-20, TIA 604-10-A
- Fiber type:
  SM G.657A, MM(62.5 OM1),
  MM(50 OM2), MM(50 OM3), MM(OM4)
- Simplex or Duplex
- IEC 60874,61300, 61753-*** test
- Telcordia GR-326 approval test

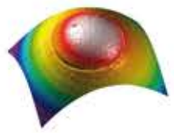
Ordering Information
- Fiber type
- Simplex or Duplex
- Connector boot type
- Cable O.D size
- Polishing UPC or APC

LC Boot Length

Standard
28.3mm

Bellcore
26.5mm

Short
17.0m



Endface geometry
Tight endface geometry tolerances guarantees the customer a reliable and reproducibe quality and long term performance. Interferometric ferrule endface inspection is mandatory for controlled and matered manufacturing processes. Upon request a Quality Cotrol Report can be issued for easch assembled
connector

LC Adaptor

Features
- Guaranteed performance specifications
- Alignment Sleeve Zirconia
- Durability 1000 mating cycles
- Housing Color UPC(Blue), APC(Green), MM(Beige), OM3(Aqua)
- IEC 61274-*** test

Ordering Information
- Housing Color
- Adaptor type

Accessories

Cable Clamp

Feeder Cable Clamp

Features
- Material: PP & SUS304
- Match Cable: 3/8",1/2",7/8",
  1-1/4",1-5/8"
- Clamp Stack: 1 to 4 ways

Jumper Cable Clamp

Features
- Material: PP & SUS304
- Match Cable: 5.5 to 14mm
- Clamp Stack: 1 to 3 ways
- Fiber Optic Jumper: Gray hole
- Power Jumper: Black hole

Ordering Information
- Cable O.D Size
- Clamp Q`ty Stack

Grounding Kits

Standard type

Clip-on kit

Framework type

Gemel type

Ordering Information
- Cable O.D Size
- Grounding wire length

Hoisting Grip for Cable

Features
- Closed syle allows simplified
  installation
- Use at top of cable before
  attaching connector
- Match Cable: 3/8",1/2",7/8",
  1-1/4",1-5/8", 2-1/4”

Ordering Information
- Cable O.D Size