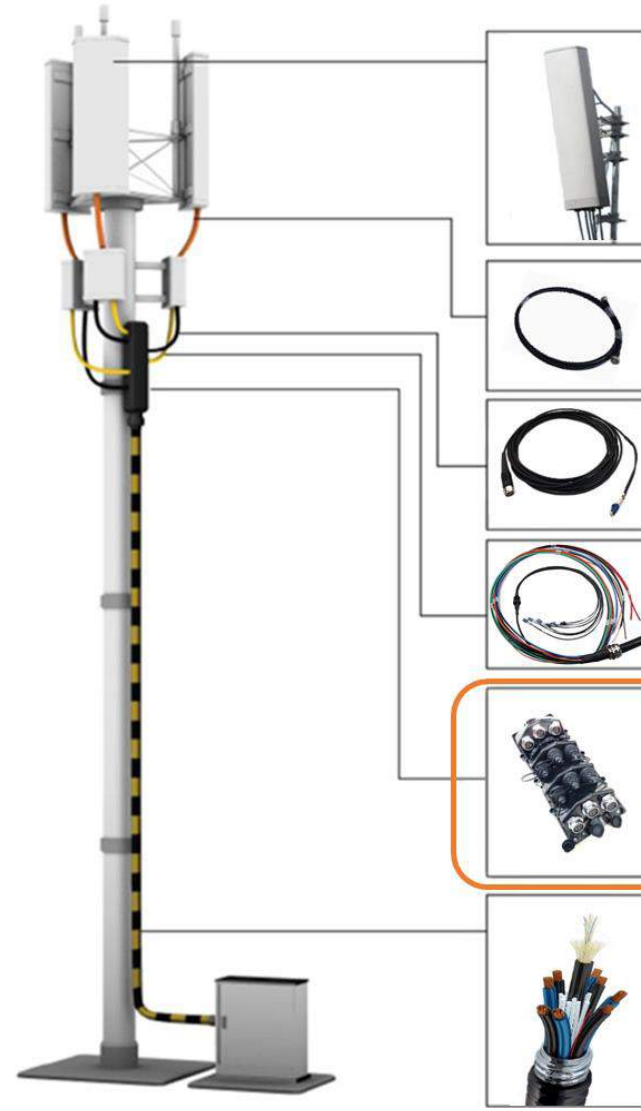


# 5G Tower Cabling Solution – A

## Hybrid Terminal Cabling

- Combined Fiber and Power feeder cable for 3 to 4 RRHs through terminal
- **Hybrid Feeder Cable**
  - Outdoor type
  - Corrugated copper or aluminum Armored
  - Pre-assembled terminal in factory
  - Supports up to terminal covered 3 or 4 RRHs
  - Well mantel corrugated armored aluminum
  - 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 vender specified connector
  - Fiber 1 or 2 pairs and conductor 1 pair
  - Power 8, 10, 12 AWG 1 pair
  - Corrugated armored aluminum



### Antenna

- Single & Broad Band Sector Antenna
- Urban, suburban coverage

### RF Jumper Cable

- Sized of 3/8", 1/2" with any length
- Connection between RRHs and Antennas

### Fiber Optic Jumper Cable

- Customized design & Length
- Fiber type: G.657

### Hybrid Jumper Cable

- Customized design & Length

### Hybrid Terminal Cable

- Pre-connected Hybrid Cable System
- Space-efficient

### Hybrid Cable

- Power Cable + Fiber Optic Cable
- Rodent & termite proof

TOWER CABLING

TOWER CABLING

## Hybrid Terminal Cable

### Features

- Pre-connectorised factory-sealed hybrid cable system for 3 and 6 RRHs.
- Modular plug & Play system compatible with fiber optic jumper and power jumpers
- Encapsulated IP 67 sealed connector head housing
- Robust pulling eye for cable lifting, no hoisting grips required, high cable strain relieve
- Space-efficient, low wind-load
- Easy mounting with adaptor plate, mast-pole, and wall mounting
- Optional protection cover for cable exits available



Parameter	LSFH™ hybrid cable (Global market)	UL listed hybrid cable (US market)
Jacket material	Thermoplastic, low smoke free of halogen	PVC
Standard	IEC 60502-1: 2004-04	UL 1277
Temperature range	-40°C to +75°C	
Operating voltage	48 Vdc	
Rated voltage	0.6 kv/ 1kv (1.2kv)	
Conductors	Stranded copper class 2 IEC 60228: 2004	Stranded copper Class C
Drain wire	Stranded copper class 2 IEC 60228: 2004	Stranded copper Class B
Cable shielding	Copper foil 100% coverage (with drain wire)	
Fiber optic	5mm loose tube cable with up to 36 fibers single mode	
Halogen free	Yes	No
Flame retardant	IEC 60332-1-2: 2004	UL 1685 (UL 1581) vertical tray flame test (70000 BTU/hr)
UV resistant	IEC 68-2-5	UL 1581



## Hybrid Jumper Cable

(1pair, 2pairs RRH-Cost Effective Ver)

Cable divider	Glued heat shrink	
Ingress protection	Connectors, cable and divider	IP 68
Cable head connectors (Radio end)	Fiber	RRH connector
	Power	Open end or Connectorised
Cable head connectors (Base station)	Fiber	LC duplex
	Power	Open ended
Breakout cables	Fiber	4.8mm
	Power	Shielded copper cables
Copper cross section	2x4mm <sup>2</sup> , 2x6mm <sup>2</sup> , or 2x10mm <sup>2</sup>	
Cable diameter	Hybrid	15~20mm (depending cross section)
Temperature range	Service	-25°C to +75°C
	Installation	-40°C to +75°C
Tensile load	Fiber breakout cable	800 N
	Power breakout cable	1000 N
Salt mist	IEC 61300-2-26	96 h
Vibration	IEC 61300-2-1	10~500Hz/ 10g
shock	IEC 61300-2-9	100g



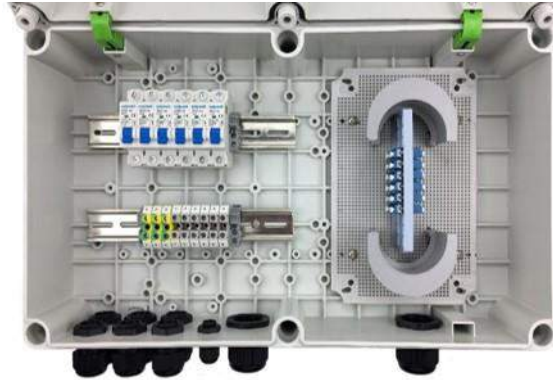
### Tips:

- Hybrid Connector can be replaced by PDLC , MPO, MTP etc..
- Hybrid cable diameter 1/2' , 7/8 1-5/8' ...

## Hybrid Junction Box

### Features

- Material: Polycarbonate. UV resistant
- Outdoor type
- Poly mount / Wall mount type
- Pipe: 3" to 6"
- Color : Gray
- Screw terminal Block:
  - Isolate 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)



## Power Junction Box

### Features

- Material: Polycarbonate. UV resistant
- Indoor / Outdoor type
- Poly mount / Wall mount type
- Pipe: 3" to 6"
- Color : Gray
- Screw terminal Block:
  - Isolate 4P & Non-isolated 4P (Option)
- Circuit Breaker 20A 4pcs (Option)
- Ground earth bar
- Cable Entry:
  - Power feeder 1 / Power Jumper 4 / Ground 1 (Option)



## Fiber Optic Junction Box

### Features

- Indoor / Outdoor type
- Pole / Wall mount type
- Loop through cable can be installed
- Color : Gray
- PLC Splitter can be installed
- Swing panel design for easy installation and maintenance
- Interrelated splice and fiber management
- Distribution cables can be pre-terminated or spliced to pigtails



## Plug & Play Cable – A Type (LC to LC)

### Features

- Pre-assembled “plug & Play” cabling system
- Ruggedized design with robust pulling tube
- Outdoor and indoor with high flame resistance
- Temperature range -40°C up to +75°C
- Ingress protection IP 67 when installed
- Loose tube cables with up to 24 fibers, rodent protected and UV resistant
- LC Uniboot connectors
- Breakouts numbered for easy channel identification
- Easy and time-saving installation
- Easy system factory tested
- Rodent resistant



### Assemblies Specifications

Number of fibers	Up to 1152
Divider	Small or medium or large
Build-in hole dimension	15.6~16.4mm

### Pulling tube with pulling eye

Outer diameter	36mm
Maximum tensile strength	1000 N
Crush resistance	250 N/cm
Ingress protection	IP 67

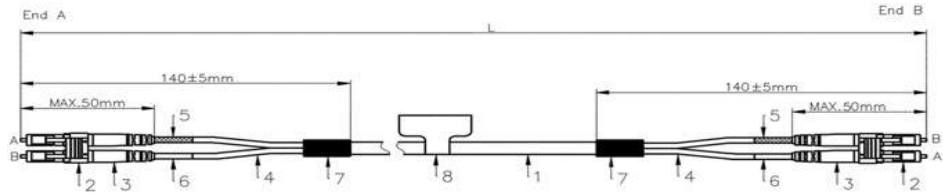
### Glass-armored loose-tube cable

Jacket material		LSFH™
Cable diameter		8.5mm
Tensile strength during installation in service		3000 N
		1500 N
Crush resistance	Short term	400 N/cm
	Long term	200 N/cm
Temperature range installation service		-25°C to +75°C
		-40°C to +75°C
Flame resistance	IEC 60332-1	Passed
	IEC 60332-3-24	

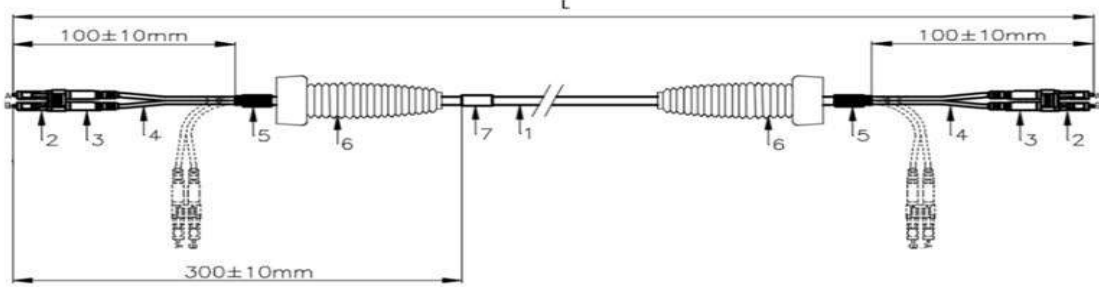
# Multi Vender Jumper for RRHs

## FTTA Fiber-To-The-Antenna

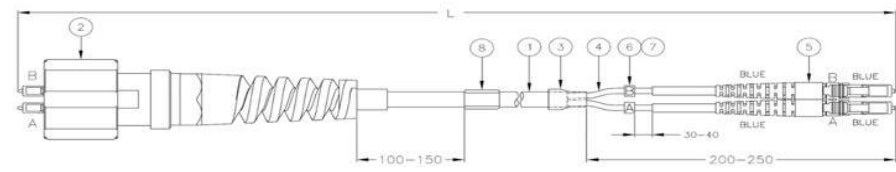
- LC Feeder with metal divider and ruggedized breakout, 4.8mm cable, Single mode bend insensitive fiber



- LC Feeder with 90° boot, 5mm cable, OFNR, Multi mode fiber



- PDLC Feeder with 7mm, Single mode bend insensitive fiber, PDSC, IP 67



DLC-DLC



FDLC-DLC



FDLC-FDLC



PDLC-DLC



NDLC-NDLC



Mini Hybrid  
ERIC-DLC

# RF Cabling and Connectivity Solution

## RF Jumper Cable

The lengths available on your request.

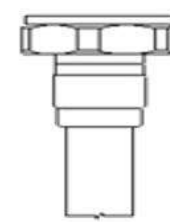
Size	Frequency	1.5 m	2.0 m	3.0 m	5.0 m
1/4"	450 MHz	0.14	0.19	0.28	0.47
	900 MHz	0.20	0.27	0.41	0.68
	1800 MHz	0.30	0.39	0.59	0.99
	2400 MHz	0.35	0.46	0.69	1.15
1/4" S	450 MHz	0.18	0.24	0.37	0.61
	900 MHz	0.26	0.35	0.53	0.88
	1800 MHz	0.39	0.51	0.77	1.29
	2400 MHz	0.45	0.60	0.90	1.50
3/8"	450 MHz	0.10	0.14	0.20	0.34
	900 MHz	0.15	0.20	0.29	0.49
	1800 MHz	0.21	0.29	0.43	0.71
	2400 MHz	0.25	0.33	0.50	0.84
3/8" S	450 MHz	0.14	0.18	0.27	0.46
	900 MHz	0.20	0.26	0.39	0.66
	1800 MHz	0.29	0.38	0.58	0.96
	2400 MHz	0.34	0.45	0.68	1.13
1/2"	450 MHz	0.07	0.09	0.14	0.24
	900 MHz	0.10	0.14	0.20	0.34
	1800 MHz	0.15	0.20	0.30	0.50
	2400 MHz	0.17	0.23	0.35	0.58
1/2" S	450 MHz	0.11	0.14	0.22	0.36
	900 MHz	0.16	0.21	0.32	0.53
	1800 MHz	0.23	0.31	0.47	0.78
	2400 MHz	0.27	0.36	0.54	0.91



4.3-10-M



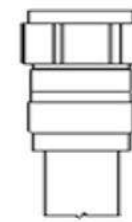
DIN-M



DIN-F



N-M



N-F



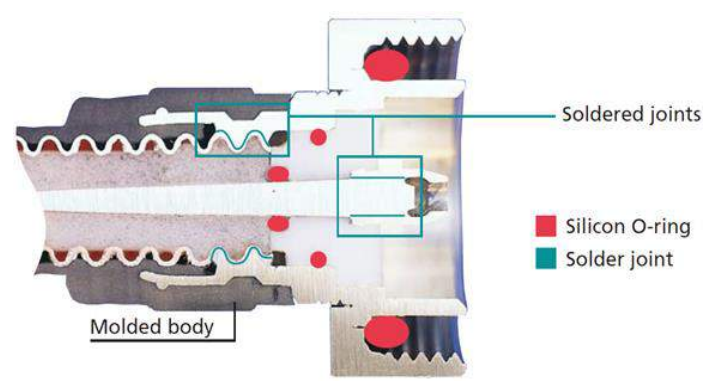


## RF Cabling and Connectivity Solution

### RF Connectors

Extremely robust and waterproof, typically used in mobile communication applications with demanding mechanical and electrical requirements.

Connectors have the following advantages: Low VSWR, Low Intermodulation, Easy Attachment and Water-proof.



#### Advantages:

1. Premium PIM
2. The Best Solid
3. Tight Waterproof
4. Longer Durability



Cable size		1/2"5	1/4"5	1/2"
Item	Characteristic impedance( $\Omega$ )	50	50	50
	Frequency range	1M~11GHz	0~18GHz	0~3GHz
	Dielectric strength(Min at sea level)(V)	2500	500	1500
	VSWR	$\leq 1.06(1M-3G)$ $\leq 1.08(3G-11G)$	$\leq 1.2(0-3G)$ $\leq 1.4(3-18G)$	$\leq 1.15(0-3G)$
Contact resistance	Inner conductor(m $\Omega$ )	$\leq 0.8$	$\leq 5$	$\leq 5$
	Outer conductor(m $\Omega$ )	$\leq 0.4$	$\leq 2.5$	$\leq 2.5$
	Insulated resistance(m $\Omega$ )	$\geq 5000$	$\geq 5000$	$\geq 5000$
	Insertion loss(dB)	$\leq 0.1$	$\leq 0.1$	$\leq 0.1$
	Center retentivity(N)	$> 0.6$	$> 0.28$	$> 0.57$
	Durability(cycles)	$\geq 500$	$\geq 500$	$\geq 500$



# RF Cabling and Connectivity Solution

## RF Connectivity

### Power Coupler



The entire frequency spectrum from PMR to 5G. As a result, DAS networks can now be completely assembled

### RF Clamps



Feeder clamps are made of stainless steel and Anti-UV rubber, adopting special technic of coating, widely used in the fix of RF cables. Applied in different operation Temperature

### Ground Kits



Various indoor & outdoor grounding kits are applied to the grounding protecting of various feeders, installation easily and performance reliable.

### Feeder Cable Cutter

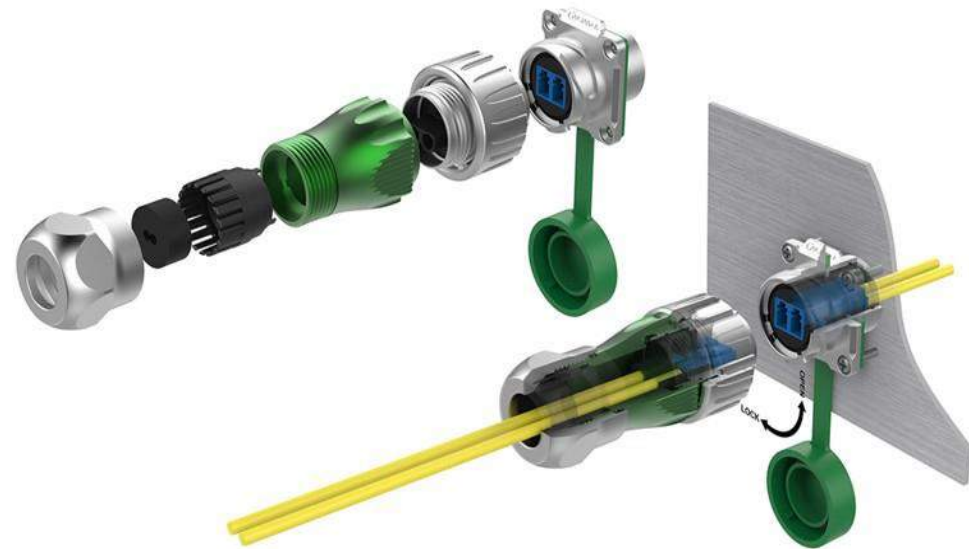


All stripping surfaces are manufactured to precise tolerances to assure clean, smooth strips

## Harsh Environment Connector (Bayonet Type) (VHEC24-BT)

### Features

- Connecting mode: ¼ bayonet connect
- Protection level: IP65/IP67
- Line diameter scope:  $\varnothing 5.5\text{mm} \sim \varnothing 7\text{mm}$
- Durability:  $\geq 500$  mating/Unmating Cycle
- **Temperature rating:  $-40 \sim 80^{\circ}\text{C}$**



## Harsh Environment Connector (Plug & Play Type) (VHEC24-PPT)

### Features

- Connecting mode: Plug/unplug
- Protection level: IP65/IP67
- Line diameter scope:  $\varnothing 5.5\text{mm} \sim \varnothing 7\text{mm}$
- Durability:  $\geq 500$  mating/Unmating Cycle
- **Temperature rating:  $-40 \sim 80^{\circ}\text{C}$**

