

Solutions for Private Mobile Networks

Private LTE and CBRS Components





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Meet HUBER+SUHNER

Enterprises are building private mobile networks for a variety of reasons, including enhanced data security, total control of service quality and devices, wide area coverage, low latency and more. Whatever your reasons may be, you know you need a private mobile network, but you may be asking yourself, "where do I start?"

At HUBER+SUHNER, we can help you build your private mobile network quickly and easily. We offer a select portfolio of passive components to help bring high-performance mobile connectivity effectively in any environments—no matter the size of the area or coverage needed. We take the guess work out of choosing the right products to build an effective private mobile network.

How we facilitate setting up a private mobile network

Our goal is to provide you private mobile network solutions that are easy and efficient to install so that you can get online quickly. We know how important it is for you to recoup your investment, so our select portfolio of products require no certified training to install. Many of our products boast features like one-click installation that are proven to reduce installation time.

We have a rich history of partnerships with top-tier mobile network operators in providing them solutions to expand the capacity and coverage of their networks. Based off our experience in working with mobile network operators, our engineering experts at HUBER+SUHNER have developed a private mobile network portfolio of pre-selected products and our sales team is ready to counsel you on choosing the best package to fit your needs.

Key Benefits of our Offering



Save time, save money
Our products are designed for quick and easy installation, saving you time and, ultimately money. As your network evolves, we enable you to boost your bandwidth instantly, without adding more fiber. And our upgradeable cabling solutions provide compatibility with next-generation active equipment.



Expertise and know-how
We have a long history in the market providing mobile network solutions for tier-one mobile network operators. We can use this experience to help you build your private mobile network partnering with you for the long term, engaged from the very beginning of engineering and supporting you across the entire life cycle.



Return on Investment
We understand the investment you made when purchasing the spectrum license. Time is ticking to reap the rewards of your investment. We offer reliable solutions that ready your private mobile network for the future and reduce total cost of ownership (TCO) across the entire life cycle of your cell sites.

Guesswork removed

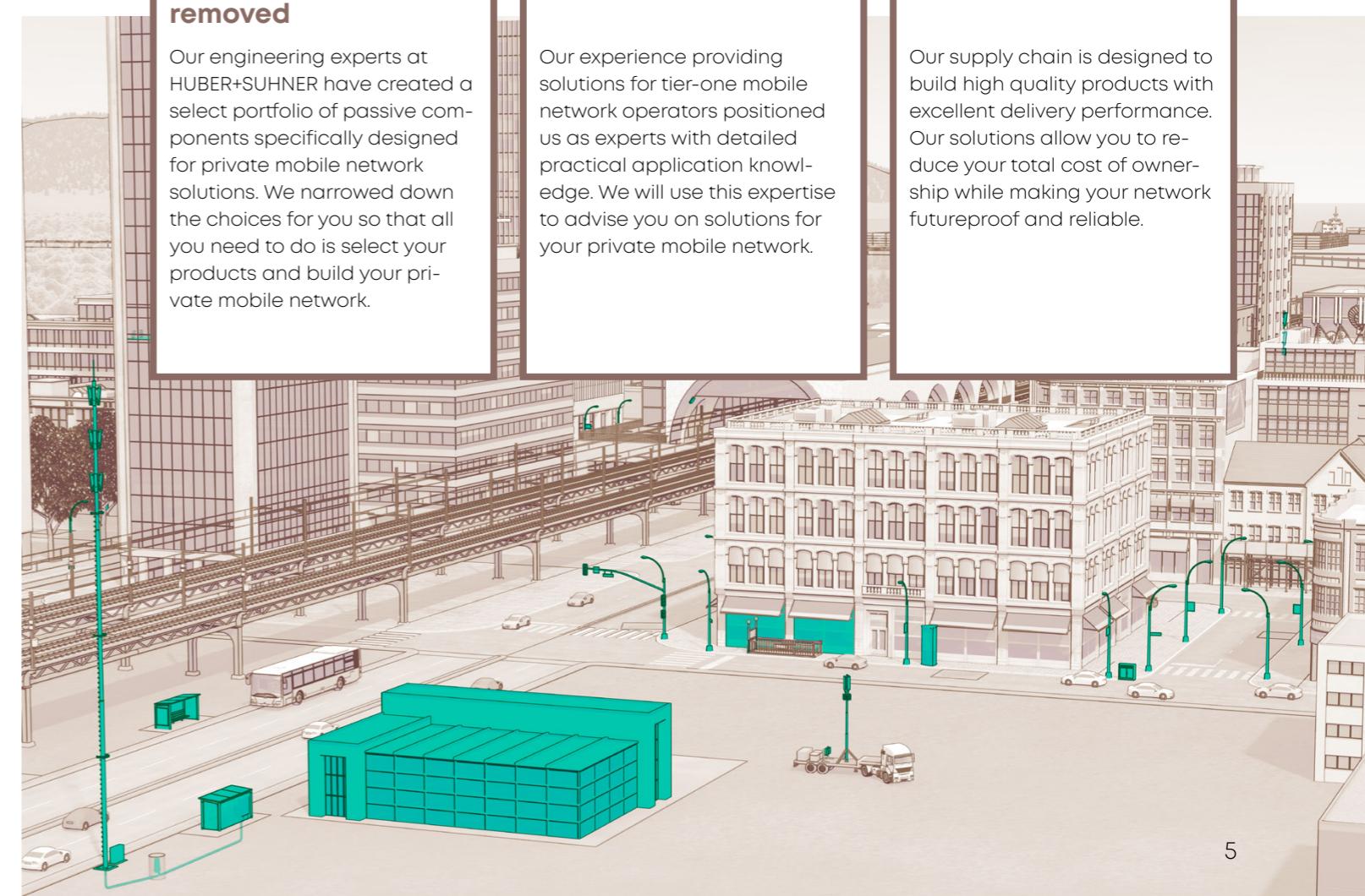
Our engineering experts at HUBER+SUHNER have created a select portfolio of passive components specifically designed for private mobile network solutions. We narrowed down the choices for you so that all you need to do is select your products and build your private mobile network.

Expertise

Our experience providing solutions for tier-one mobile network operators positioned us as experts with detailed practical application knowledge. We will use this expertise to advise you on solutions for your private mobile network.

Rest assured

Our supply chain is designed to build high quality products with excellent delivery performance. Our solutions allow you to reduce your total cost of ownership while making your network futureproof and reliable.



Our areas of expertise

We support you with flexible products designed for maximized capacity and efficient coverage in your mobile network.

Harsh environment cabling

Simplify installation with cabling that withstands harsh conditions and remains compatible with future generations of active equipment.

Our modular and flexible products demonstrate high resilience against harsh ambient conditions, including animal damage. Our cabling solutions offer high compatibility with all vendors and support quick upgrades.

Antennas

Maximize performance, simplify installation and make each cell site blend in with its surroundings with our customer-specific antenna solutions.

Our antenna solutions range from macrocell to small cell applications and boast a low-profile footprint through their compact and adaptable design.

Bandwidth expansion

Boost bandwidth at the edge of the optical network without adding new fiber.

Our easily integrated WDM solutions offer rapid bandwidth expansion deployment into the existing network. They optimally satisfy specific requirements through a customer-tailored product portfolio.

1 Cables

MASTERLINE cabling systems and boxes for:

- Fiber
- Power
- Hybrid

Jumpers for:

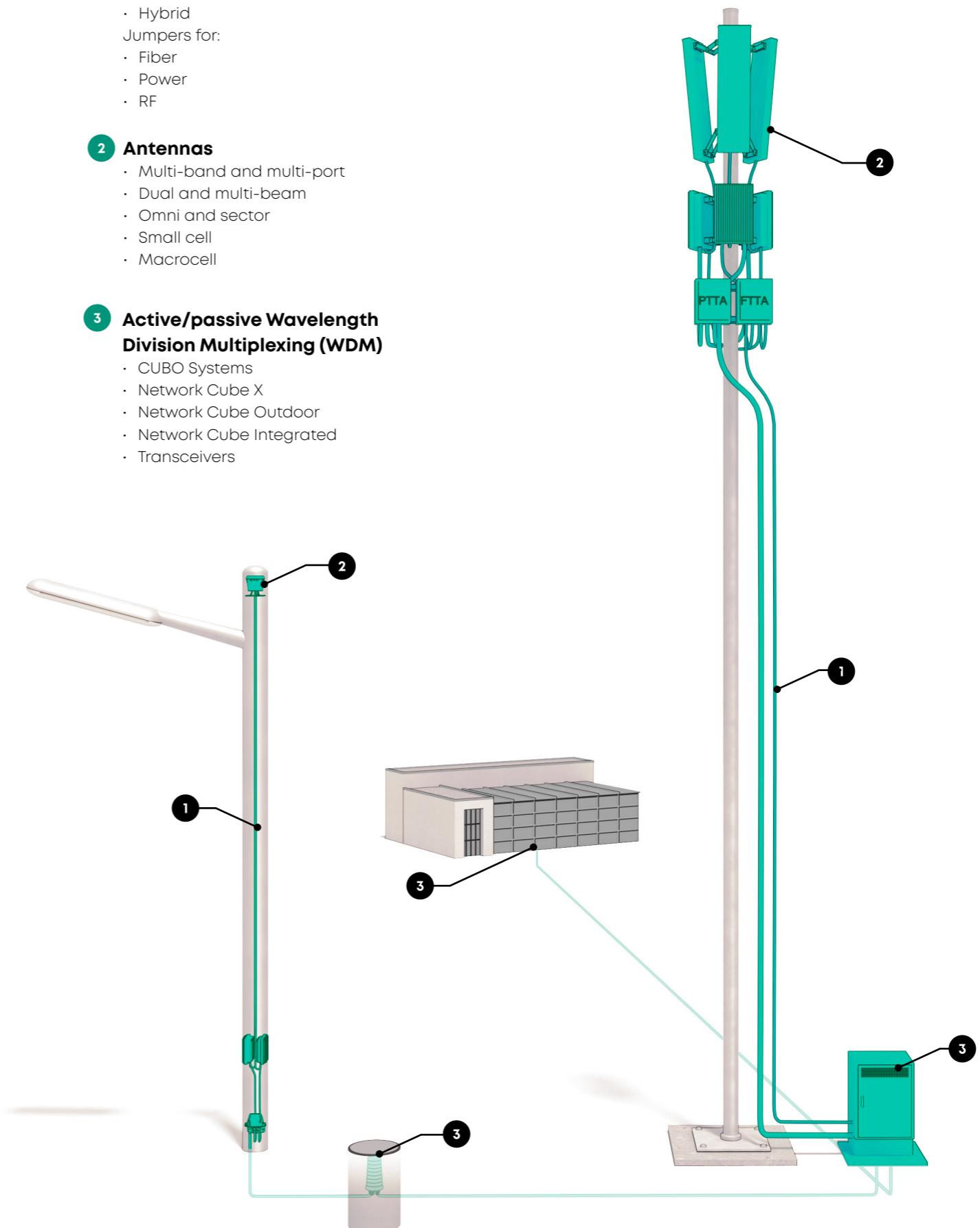
- Fiber
- Power
- RF

2 Antennas

- Multi-band and multi-port
- Dual and multi-beam
- Omni and sector
- Small cell
- Macrocell

3 Active/passive Wavelength Division Multiplexing (WDM)

- CUBO Systems
- Network Cube X
- Network Cube Outdoor
- Network Cube Integrated
- Transceivers



Product portfolio at-a-glance

HUBER+SUHNER has an expansive array of products for mobile network applications, and our engineers have evaluated and selected this portfolio of passive components specifically for private mobile networks and CBRS applications. Our portfolio consists of four categories of products, each addressing different segments of a private mobile network design, including cable systems, jumpers, antennas, and hardware.



Cable systems

The purpose of a cable system is to bring fiber and/or power to the remote radio head. We have a comprehensive offering of cable systems, which are compatible with all vendor products and will endure future generations of active equipment. We narrowed down the choices and recommend the following cable systems from our MASTERLINE portfolio:

- MASTERLINE Ultimate Hybrid (MLUH)
- MASTERLINE Ultimate Micro (MLUM)
- MASTERLINE Ultimate Power (MLUP)
- MASTERLINE Ultimate (MLU)



Jumpers

There are three types of jumpers, including, FO, power and RF. The FO jumper's purpose brings the FO signal from the base band unit to the remote radio head. Whereas the power jumper brings power from the base band to the remote radio head. And finally, the RF jumper brings the antenna signal from the remote radio head to the antenna. We have broad portfolio of jumpers from which we recommend the following for private mobile network solutions

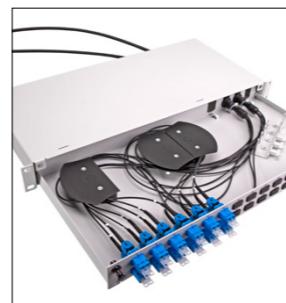
- Power jumpers
- FO jumpers
- RF jumpers



Antennas

The purpose of an antenna is to send and receive signals to your smart devices. HUBER+SUHNER develops and produces an extensive portfolio of directional and omnidirectional antennas for a wide range of indoor and outdoor wireless connections. We narrowed down the choices for you and suggest the following for your private mobile network needs:

- Small cell antennas
- Macrocell antennas



Hardware

From grounding kits to brackets to tools, we have pre-selected the physical equipment you will need to adhere the products to a wall or pole.

Cable Systems

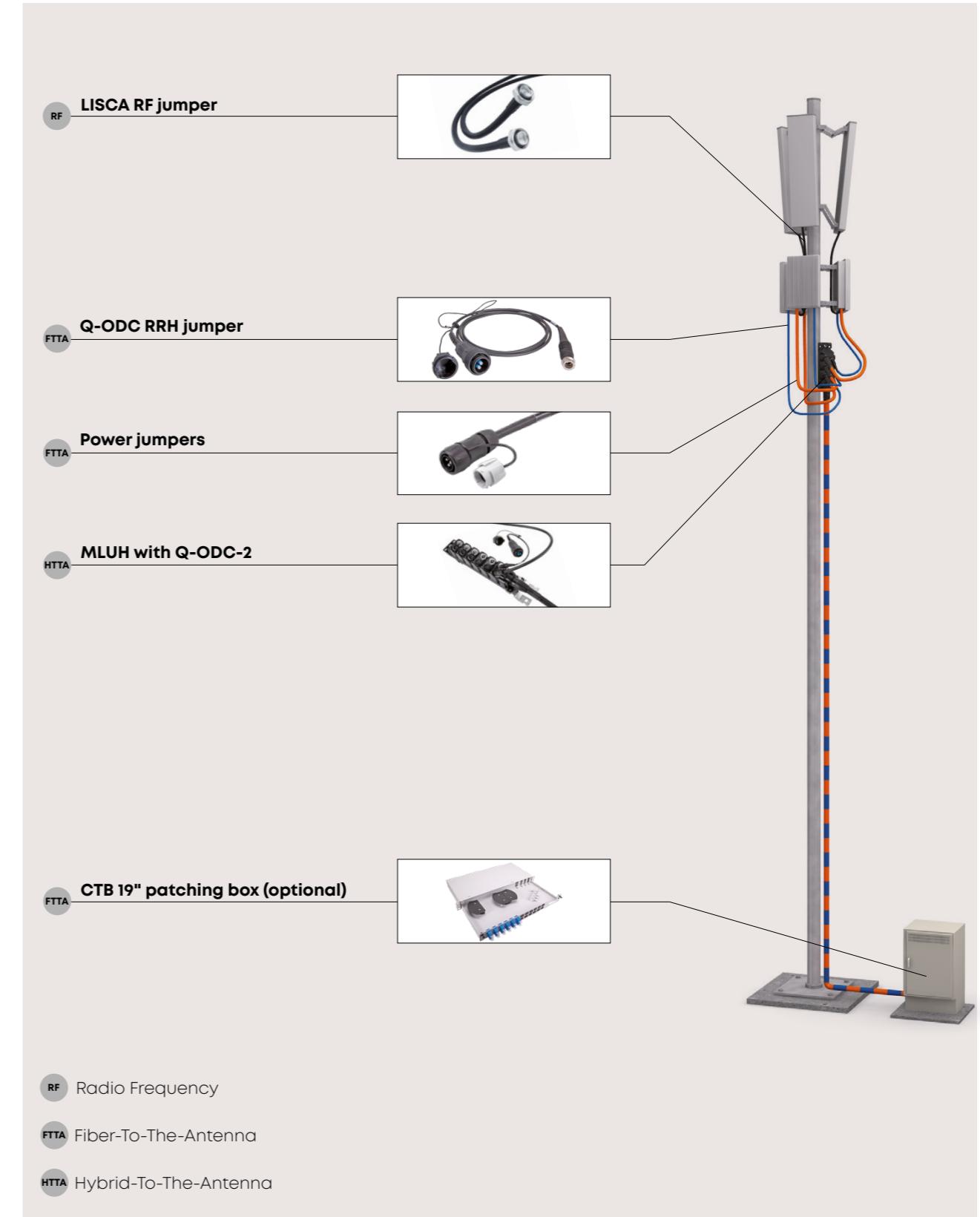


MASTERLINE Ultimate Hybrid (MLUH)



Hybrid-riser cable with compact connector head

The most innovative hybrid cabling system from HUBER+SUHNER for remote radio installation: MASTERLINE Ultimate Hybrid. The pre-connectorised factory-sealed hybrid systems supports up to 6 RRHs and connects the remote radios with easy-to-install Q-ODC fiber optic and power jumpers. A pre-laced hosting grip below the robust connector head allow for easy cable lifting. The encapsulated connector head can be directly attached to the mast at a pre-mounted bracket. These unique features make MASTERLINE Ultimate Hybrid the best-in-class product in terms of ease of mast-top installation, installation robustness and efficiency.





Hybrid cables of HUBER+SUHNER combine optical fiber and DC power, are highly flexible and easy-to-route. Two rip cords between the shielding and the jacket allows a quick stripping of the jacket. The shielding, a copper foil under the jacket and the drain wire maintain contact throughout the cable run and allow potential equalisation and a safe installation with regard to lightning strikes.

Features

- re-connectorised factory-sealed hybrid cable system for 3 RRHs
- Modular "plug & play" system compatible with Q-ODC-2 and power jumpers
- Highly flexible 6-core hybrid cable up to AWG 8
- Encapsulated IP67 sealed connector head housing
- Hoisting grip for cable lifting
- Space-efficient, low wind-load
- Mounting bracket for easy mast-, pole-, and wall-installation
- Integral earth point which can be connected to an earth lead with M8 ring terminal

Specifications

	Large
Number of rugged circular power sockets	6
Number of Q-ODC-2 sockets	6 (2 fibers per socket)
Dimensions L x W x H	477 x 90 x 97 mm
Housing material	high-performance polycarbonate
UV resistance, ISO 4892-3 (methode A/cylce 1)	1000 h
Maximum current rating	up to 42A per power socket (depending on the hybrid cable)
Ambient temperature range	in service: -40 to +75 °C installation: -10 to +50 °C
Ingress protection (IEC 60529)	IP67
Impact resistance (IEC 62262)	IK10
Material flammability rating	UL94-V0

Hybrid cable specifications

UL listed hybrid cable, US market	
Jacket material	PVC
Standard	UL 1277, TC-OF-ER
Rated voltage	0.6 kV/1 kV (1.2 kV)
Min. bending	during installation: 12 x cable Ø in service: 10 x cable Ø
Cable shielding	copper foil 100 % coverage (contacted with drain wire)
Conductor type	class C THHN/THWN-2
Halogen-free	no
Flame retardant	UL 1685 (UL 1581) vertical tray flame test
CPR compliant	no
Conductor cross section	AWG 8
Resistance	2.13 Ω/km
Maximum current rating	23 A
Outer diameter	30.0 mm (1.18")
Weight	1.64 kg/m
Drain wire cross section	AWG 6
Fiber optic	5 mm loose tube cable with 6 fibers single-mode E9/125 A2

* limitation trough power connector maximum current rating 42 A (IEC) and 44 A (UL)

Ordering information

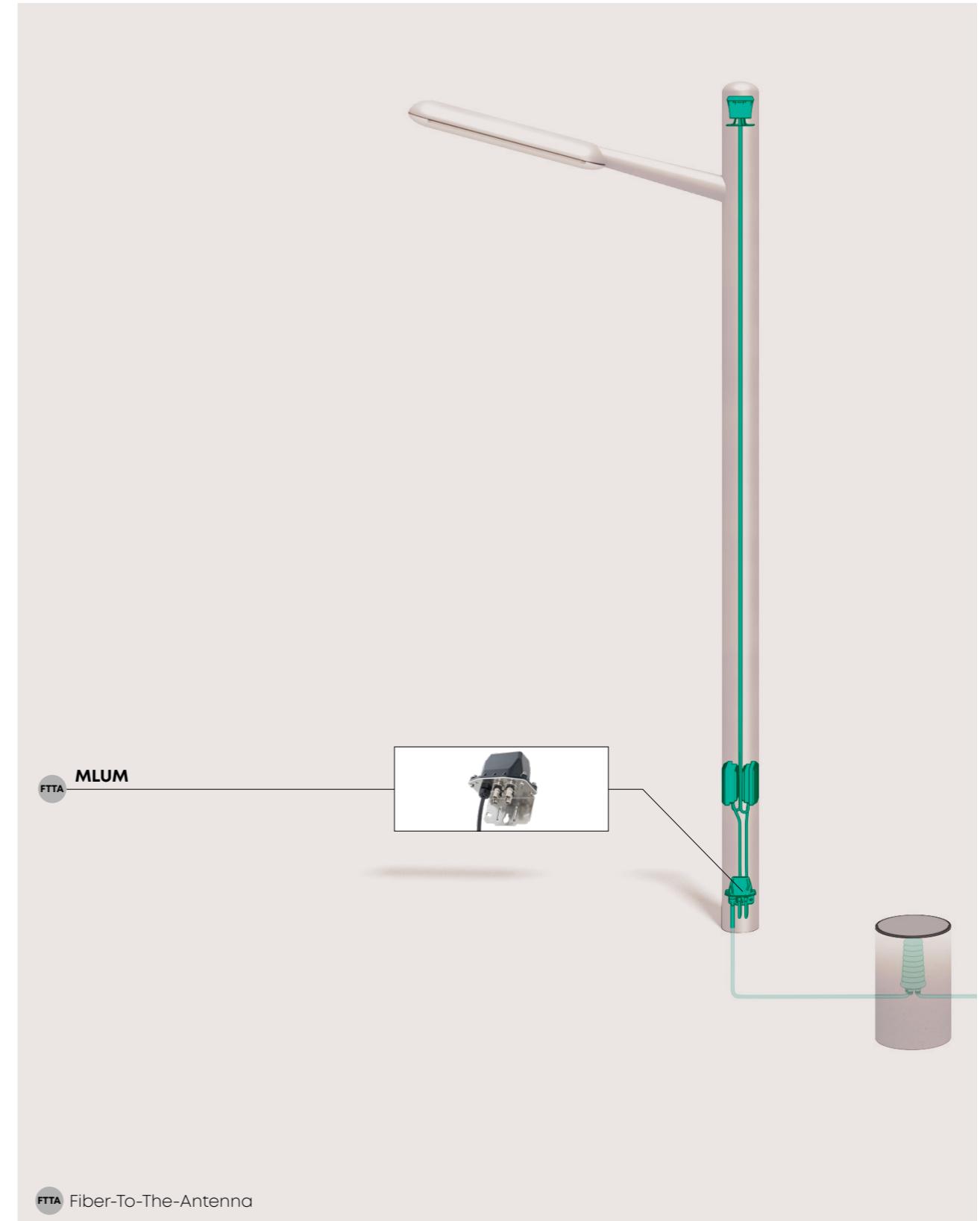
Length	Description	Item no.
50 ft	MLUH36-08A-0-10QF-008R-050ftSS	85208156
80 ft	MLUH36-08A-0-10QF-008R-080ftSS	85208157
100 f	MLUH36-08A-0-10QF-008R-100ftSS	85208158
150 ft	MLUH36-08A-0-10QF-008R-150ftSS	85208159
1200 f	MLUH36-08A-0-10QF-008R-200ftSS	85208160
1250 f	MLUH36-08A-0-10QF-008R-250ftSS	85208161
300 ft	MLUH36-08A-0-10QF-008R-300ftSS	85208162

MASTERLINE Ultimate Micro (MLUM)



Compact distribution box

MASTERLINE Ultimate Micro is a compact distribution box which has been specially developed for use in very space-limited locations while still ensuring a high number of connections. With up to 6 remote radio units, it offers unparalleled space efficiency and environmentally hardened sealing and can be placed anywhere.



MLUM



Key features

- Compact design allowing for various installation locations (e.g. wall and pole)
- Up to 4 x Q-ODC-2
- Rugged design to withstand harshest environments (e.g. submersible)

Technical data

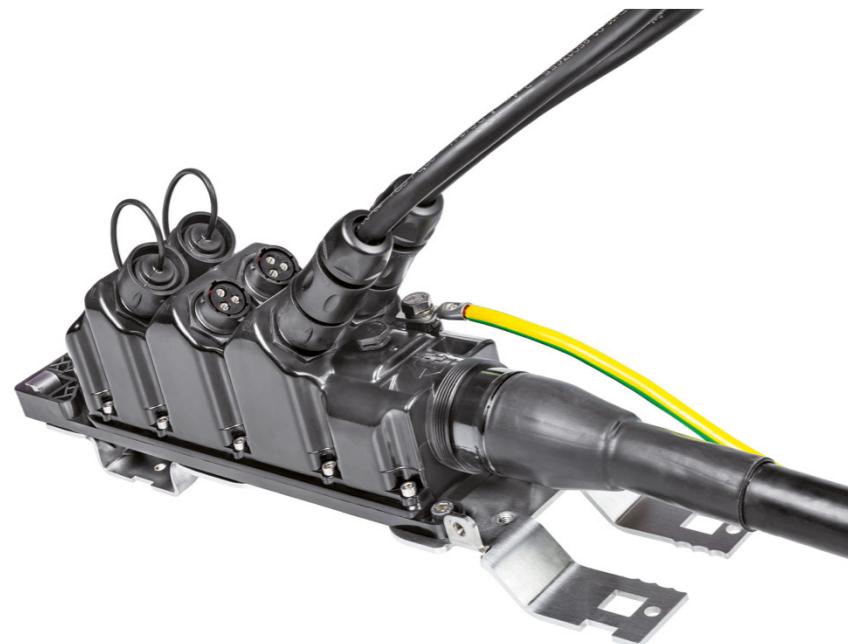
Dimensions W x H x D	116 x 117 x 77 mm	
Weight (without cable)	0.3 kg	
Material	UV stable polycarbonate (cover), stainless steel (bracket)	
Number of ports sockets (output) up to	4 x Q-ODC-2 (other sockets on request)	
Environmental data	Temperature range during installation	-10 °C up to +50 °C
	Temperature range in service	-40 °C up to +75 °C
	Ingress protection	IP68
	Impact resistance	IK 07
	Flammability class	UL94-V0
	UV resistance	1000 h (ISO 4892-2)
	Halogen-free	Yes (IEC 60754-2)

Ordering information

Length	Description	Item no.
MLUM exit: 3 x Q-ODC-2 entry: gland with 3 x LCD		
6 m	MLUM-J-10-06-0-LCUDGLND-3QOU1-006-SS	85157929
8 m	MLUM-J-10-06-0-LCUDGLND-3QOU1-008-SS	85157933
10 m	MLUM-J-10-06-0-LCUDGLND-3QOU1-010-SS	85157930
12 m	MLUM-J-10-06-0-LCUDGLND-3QOU1-012-SS	85157936
16 m	MLUM-J-10-06-0-LCUDGLND-3QOU1-016-SS	85157935
20 m	MLUM-J-10-06-0-LCUDGLND-3QOU1-020-SS	85157934
MLUM exit: 4 x Q-ODC-2 entry: gland with 4 x LCD		
6 m	MLUM-J-10-08-0-LCUDGLND-4QOU1-006-SS	85157941
8 m	MLUM-J-10-08-0-LCUDGLND-4QOU1-008-SS	85157940
10 m	MLUM-J-10-08-0-LCUDGLND-4QOU1-010-SS	85157928
12 m	MLUM-J-10-08-0-LCUDGLND-4QOU1-012-SS	85157939
16 m	MLUM-J-10-08-0-LCUDGLND-4QOU1-016-SS	85157938
20 m	MLUM-J-10-08-0-LCUDGLND-4QOU1-020-SS	85157937



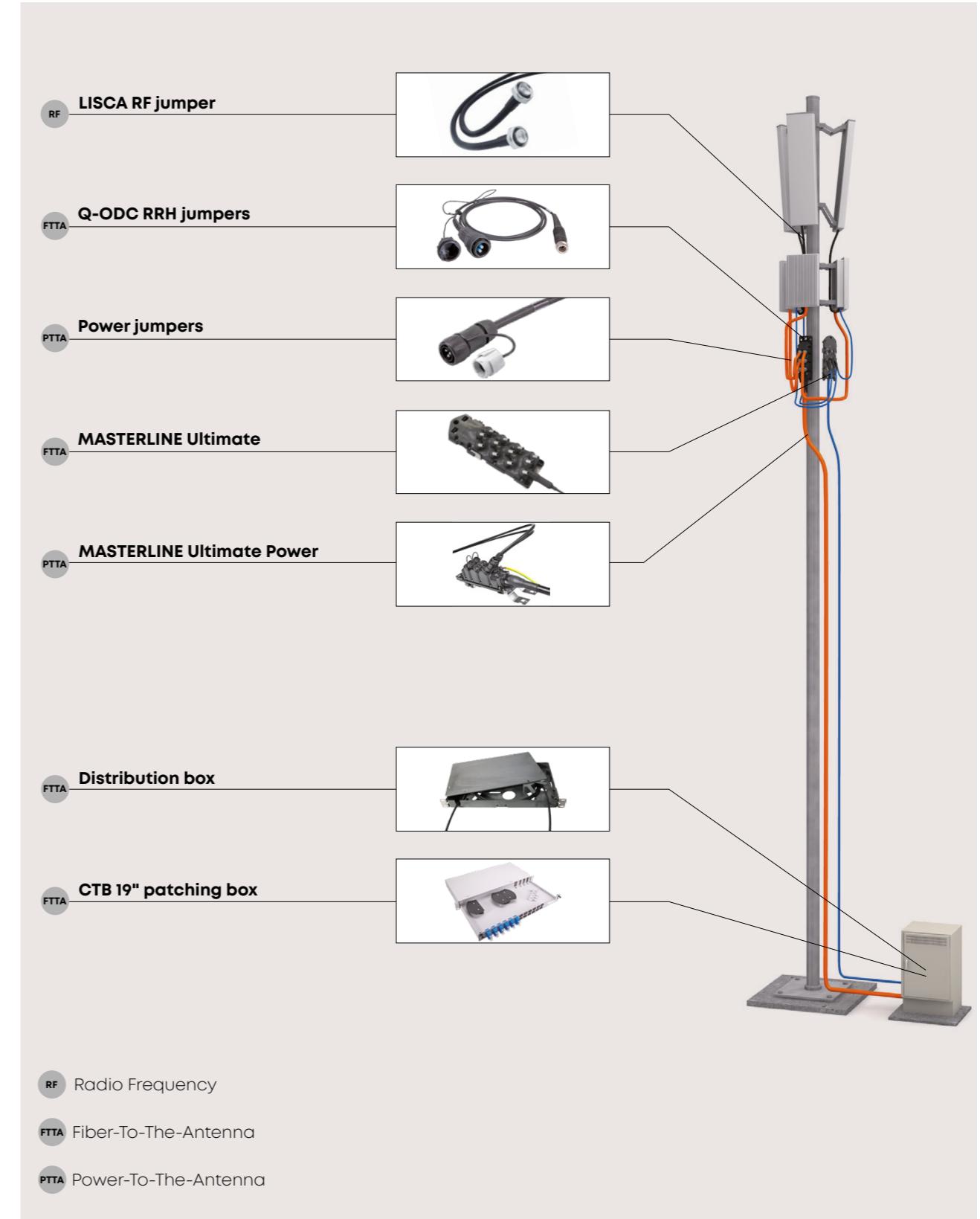
MASTERLINE Ultimate Power (MLUP)



Multi-wire power cable with compact connector head

MASTERLINE Ultimate Power enables a power supply installation with only one power cable, instead of 6 individual power cables. The compact pre-connectorised head supplies -48 Vdc for up to 6 RRHs.

Power jumpers, available in different lengths, connect the RRHs with -48 Vdc. A pre-laced hoisting grip below the robust connector head allows for easy cable lifting. The encapsulated connector head can be directly attached to the mast at a pre-mounted adaptor plate.



MLUP



Features

- Pre-connectorised factory-sealed power cabling system for up to 6 RRHs
- Modular “plug & play” system with 6 power connectors
- Highly flexible 12-core power cable AWG 8
- Mounting bracket for easy mast-, pole-, and wall-installation
- Space-efficient, low wind-load
- Integral earth point which can be connected to an earth lead with M8 ring terminal

Connector head specifications

Number of power connector (rugged circular plastic socket)	6
Maximum current rating	up to 42 A per power socket (depending on the conductor cross section selected)
Dimensions L x W x H	310 x 90 x 97 mm
Ambient temperature range	during installation: -10 up to +50 °C in service: -40 up to +75 °C
Ingress protection (IEC 60529)	IP67
Impact resistance (IEC 62262)	IK 10
Material housing	high-performance polycarbonate
UV resistance, ISO 4892-3 (methode A/cylce 1)	1000 h
Material flammability rating	UL94-V0

Power cable specifications

UL listed power cable, US market	
Jacket material	PVC
Rated voltage	0.6 kV/1 kV (1.2 kV)
Conductor type	class C THHN/THWN-2
Cable shielding	copper foil
Number of conductor	12
Conductor cross section	AWG 8
Resistance	2.13 Ω/km
Maximum current rating	23 A
Outer diameter	29.5 mm (1.16")
Weight	1.64 kg/m
Shielding/drain wire cross section	AWG 6

* limitation through power connector maximum current rating 44A (UL)

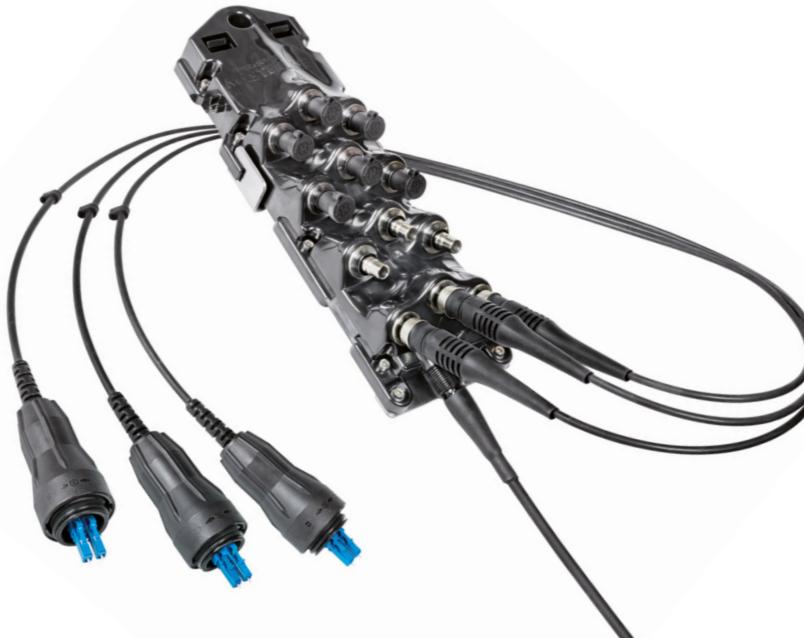
Ordering information



RRH side	BTS side
6 rugged circular plastic sockets	6 pairs of wires blunt cut wire cross section AWG 8

Length	Description	Item no.
50 ft	MLUP60-08A-0-1000-0000-050ft00	85208163
80 ft	MLUP60-08A-0-1000-0000-080ft00	85208164
100 ft	MLUP60-08A-0-1000-0000-100ft00	85208165
150 ft	MLUP60-08A-0-1000-0000-150ft00	85208166
200 ft	MLUP60-08A-0-1000-0000-200ft00	85208167
250 ft	MLUP60-08A-0-1000-0000-250ft00	85208168
300 ft	MLUP60-08A-0-1000-0000-300ft00	85208169

MASTERLINE Ultimate (MLU)

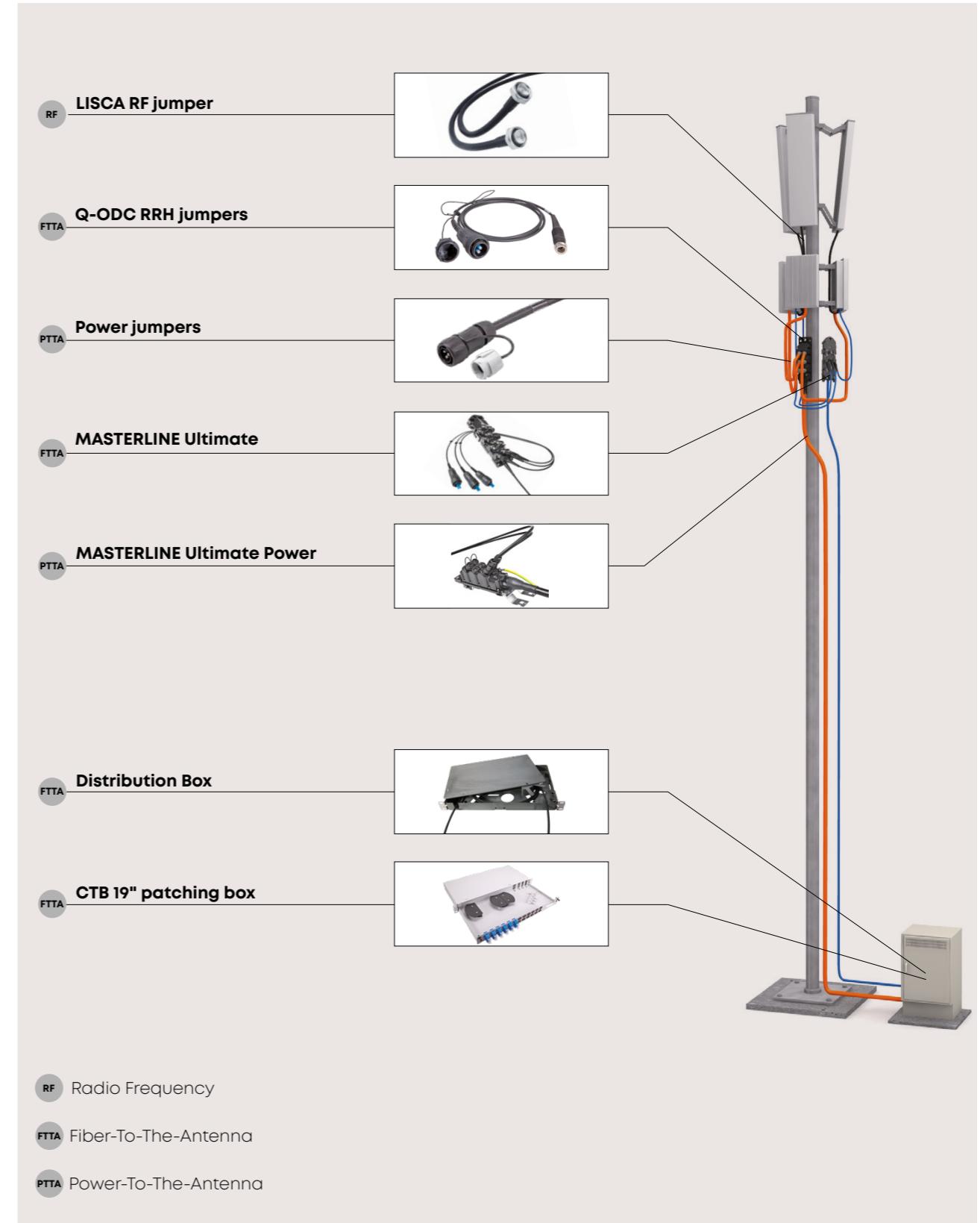


Multi-riser cable with compact connector head

MASTERLINE Ultimate is the most innovative fiber optic cabling system of HUBER+SUHNER for remote radio installations. The pre-connectorised factory-sealed fiber optic systems support up to 6 RRHs and connect the remote radios with easy-to-install Q-ODC fiber optic jumpers.

The robust connector head with an integrated pulling eye allows easy cable lifting without the need for hoisting grips. The encapsulated connector head can be directly attached to the mast with a single „click“ at a pre-mounted adaptor plate.

These unique features make MASTERLINE Ultimate the best-in-class product in terms of ease of mast-top installation, installation robustness and efficiency.



MLU



Features

- Pre-connectorised factory-sealed “plug & play” fiber optic cabling system for up to 12 RRHs
- Robust connector head with 12 Q-ODC sockets
- Connects the RRH with easy-to-install Q-ODC fiber optic jumpers
- Integrated pulling eye for easy cable lifting
- Loose tube cables with 24 fibers, rodent protected and UV resistant and UL compliant
- Connectors numbered for easy channel identification
- Easy and time-saving installation

Specifications

Number of Q-ODC connector socket	12
Dimensions L × W × H	
enclosure without cover	293 × 110 × 46 mm
enclosure with cover	460 × 160 × 110 mm
Temperature range	
during installation	-10 up to +50 °C
in service	-40 up to +75 °C
Ingress protection	IP67
Impact resistance	IK 07
UV resistant for outdoor use	ISO 4892-3
Cable type	glass-armoured multifiber loose tube cable
Jacket material	PVC and black
Cable diameter	7.0 mm
Minimum bending radius	
during installation	110 mm
in service	70 mm
Protection tube BTS side	outer diameter
	36 mm

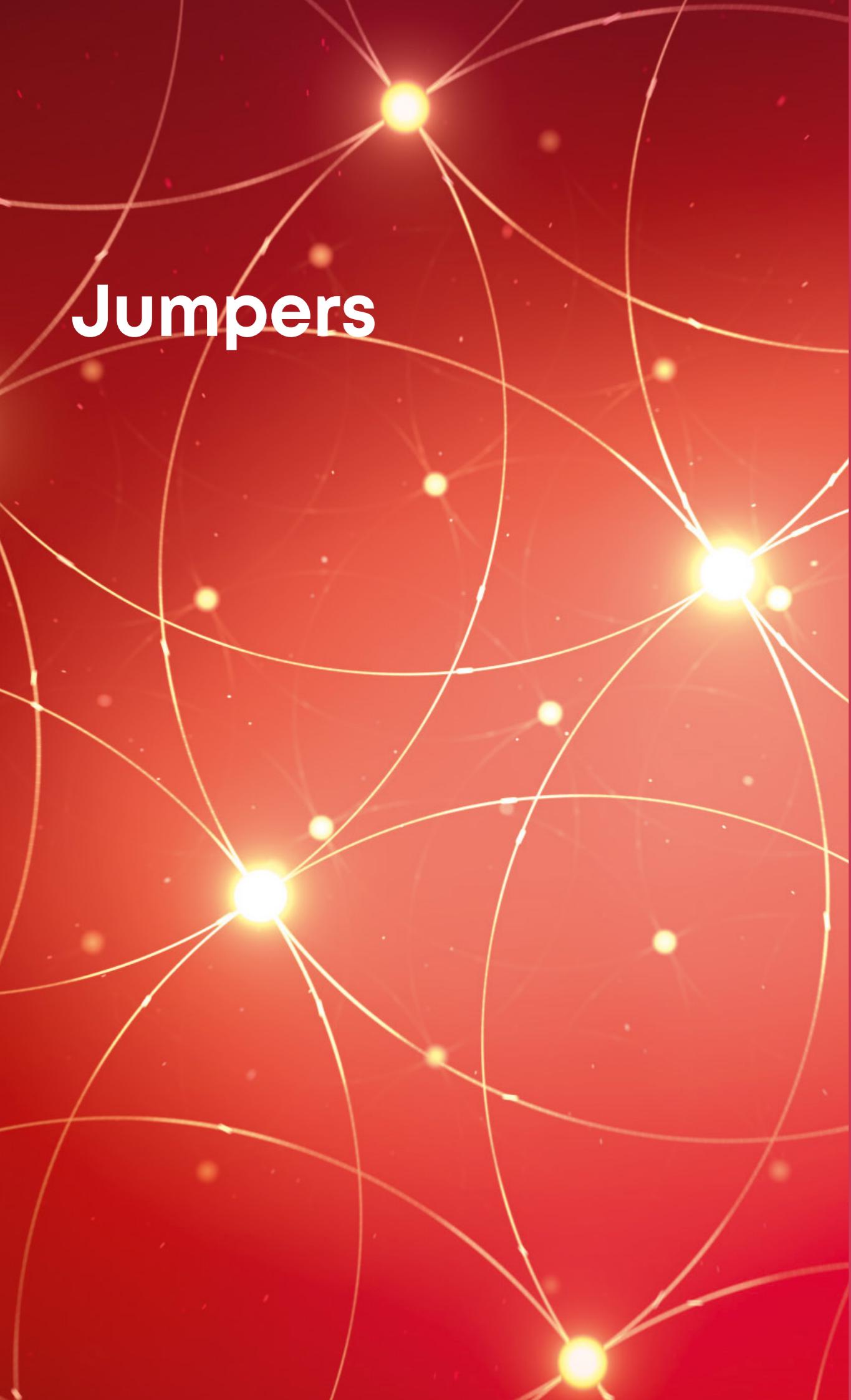


Protective cover for connector is optional available

Ordering information

MASTERLINE Ultimate with Q-ODC sockets and LC uniboot connectors

Length	Description	Item no.
20 m	MLU_06-000-0-00QK-008U-020_S	85183908
30 m	MLU_06-000-0-00QK-008U-030_S	85183909
40 m	MLU_06-000-0-00QK-008U-040_S	85183910
50 m	MLU_06-000-0-00QK-008U-050_S	85183911
60 m	MLU_06-000-0-00QK-008U-060_S	85183912
70 m	MLU_06-000-0-00QK-008U-070_S	85183913
80 m	MLU_06-000-0-00QK-008U-080_S	85183914
90 m	MLU_06-000-0-00QK-008U-090_S	85183015
100 m	MLU_06-000-0-00QK-008U-100_S	85183016

A red-tinted abstract visualization of a network graph. It features several bright yellow circular nodes of varying sizes, each connected by a web of thin white lines to other nodes. The overall effect is a glowing, interconnected web of data or information flow.

Jumpers



FO Jumpers

Q-ODC RRH jumpers



Features

- Ruggedised and robust RRH jumper cable – easy and reliable to install
- Available for all types of RRH
- Cable diameter 4.8 mm
- Standard lengths of 2, 5 and 10 m
- Ingress protection IP67 (Q-ODC)
- Tensile load 450 N (Q-ODC)

Our jumpers are available in different interfaces and diameters.

Please contact your H+S representative for more information.

Ordering information

Q-ODC plug to LC duplex with moulded divider and ruggedised break-out, Ø 4.8 mm cable



Length	Item no. single-mode E9/125 A2 (G.657.A2)
	UL listed OFNR
2 m	85032280
5 m	85032282
10 m	85032283

Q-ODC plug to FullAXS, with ruggedised break-out, Ø 4.8 mm cable



Length	Item no. single-mode E9/125 A2 (G.657.A2)
	UL listed OFNR
2 m	85006042
5 m	85006043
10 m	85006044

Q-ODC-2 plug LC Flexi-boot with ruggedised break-out, Ø 4.8 mm cable



Length	Item no. single-mode E9/125 A2 (G.657.A2)
	UL listed OFNR
2 m	85069805
5 m	85069806
10 m	85069807

Power Jumpers

Power jumpers



Features

- Compatible with MLUP, MLUH and MLUH
- Terminated with a rugged circular plastic plug connector and blunt cut on the RRH side
- 2 wire shielded copper cable with a cross section of and AWG 10 to AWG 8
- Standard length 2, 5 and 10 m

Specifications

UL listed US market		
Jacket material	PVC, flame retardant	
Conductor type	THHN/THWN-2, class C	
Insulation colour	black, white	
Cable shielding	braided screen of copper wires, coverage 65 to 85 %	
Rated voltage	0.6/1.0 kV	
Number of conductor	2	
Conductor cross section	AWG 10	AWG 8
Resistance	1.04 Ω/kft	0.64 Ω/kft
Maximum power current	33 A	44 * A
Cable diameter	0.47" (11.8 mm)	0.524" (13.3 mm)
Cross section shielding	AWG 12	AWG 10

* limitation through power connector maximum current rating 42 A (IEC)/44 A (UL)

Ordering information

Length	Item no.	
	AWG 10	AWG 8
2 m	85086894	85142464
5 m	85086895	85142465
10 m	85086896	85142466

LISCA – RF jumpers

LISCA – RF jumpers



Features

- Excellent RF performance
- High RF shielding efficiency
- Low attenuation
- Moisture protection IP68
- High flexibility and small bending radius
- Low, stable intermodulation products
- Improved return loss values
 - Example: better -28 dB at 2.2 GHz with straight N, 4.3-10
- 100 % factory tested products for intermodulation
 - Example: max. -155 dBc at 1.8 GHz with 2×20 W carriers
- Factory tested products on phase length/tolerance and delay time
- Specified for frequencies up to 6 GHz

Ordering information

Connector	Cable Type	Performance code	Length	Description	Item no.
4.3-10	Sucofeed_1/2	52	2 m	LIS-C12-11431X-11431X-02000-52	85095919
			3 m	LIS-C12-11431X-11431X-03000-52	85095921
			5 m	LIS-C12-11431X-11431X-05000-52	85087089
	Sucofeed_3/8_HF	52	1.8 m	LIS-C7-11431X-11431X-01829-52	85098911
			3 m	LIS-C7-11431X-11431X-03000-52	85124914
			4.8 m	LIS-C7-11431X-11431X-04877-52	85098916
	Sucofeed_1/4_HF	71	2 m	LIS-C5-11431X-11431X-02000-71	85072505
			3 m	LIS-C5-11431X-11431X-03000-71	85076338
			6 m	LIS-C5-11431X-11431X-06000-71	85097643
Next 10	Sucofeed_1/2	52	2 m	LIS-C12-11431X-11431X-02000-52	
			3 m	LIS-C12-11431X-11431X-03000-52	
			5 m	LIS-C12-11431X-11431X-05000-52	
	Sucofeed_3/8_HF	52	1.8 m	LIS-C7-11431X-11431X-01829-52	
			3 m	LIS-C7-11431X-11431X-03000-52	
			4.8 m	LIS-C7-11431X-11431X-04877-52	
	Sucofeed_1/4_HF	71	2 m	LIS-C5-11431X-11431X-02000-71	
			3 m	LIS-C5-11431X-11431X-03000-71	
			6 m	LIS-C5-11431X-11431X-06000-71	

Assembly performance

Performance code	LIS...-52	LIS...-71	
Description	LTE*	USA ¹⁾	
Impedance	50Ω	50Ω	
Frequency (max. operating)	6 GHz	6 GHz	
Length of assemblies	≤ 5 m	≤ 12 m	
Return loss	DC to 1.0 GHz ≥ 29 dB ≥ 27 dB ≥ 25 dB ≥ 22 dB –	≥ 26 dB ≥ 24 dB ≥ 22 dB ≥ 20 dB –	≥ 28 dB ≥ 26 dB – ≥ 22 dB –
Intermodulation	IM3 (2×20 W) –160 dBc –163 dBc (typical)	–160 dBc	
RF power	see cable specification		
Attenuation	see cable specification		

LTE = Long Term Evolution

¹⁾ special marking on cable

Antennas



SENCITY® Urban 100 small cell



Features:

- Outdoor MIMO 2x2 omnidirectional antenna for 4G and 5G frequency bands
- 2500-2690, 3300-3800, 3800-4200MHz
- Compact solution with very high isolation between ports to maximize MIMO performances
- Very low PIM

Specifications

Electrical data			
Frequency (MHz)	2500 to 2690	3300 to 3800	3800 to 4200
VSWR	2.0	2.0	2.0
Gain (dBi)	2	2.5	2.5
3 dB beamwidth (v) (°)	65	55	55
Isolation	30	30	30

General data	
Nominal impedance (Ω)	50
IMD level (dBc)	-150 at 2 x 43 dBm
Polarisation	port 1: vertical, port 2: horizontal

Mechanical data	
Dimensions (height x diameter)	96 x 117 mm (3.78 x 4.6 in)
Weight	0.45 kg (0.99 lbs)

Environmental data	
Environment	outdoor
Operation temperature (°C)	-40 to 70
RoHS 2011/65/EU	compliant

Material data	
Radome colour	RAL 7035 (light-grey)

Ordering information

Description	Item no.	Version
1399.32.0004	85113723	Nex10 connectors

SENCITY® Urban 100 small cell



Features:

- Outdoor MIMO 2x2 directional antenna for 4G and 5G frequency bands
- 2500-2690, 3300-3800, 3800-4200 MHz
- Dual slant polarization.
- Very low PIM

Specifications

Electrical data			
Frequency (MHz)	2500 to 2690	3300 to 3800	3800 to 4200
VSWR	2.0	2.0	2.0
Gain (dBi)	4	7	7.5
3 dB beamwidth (h) (°)	65	65	55
3 dB beamwidth (v) (°)	65	65	58
Front to back ration (dB)	8	13	14
Isolation	20	20	20

General data	
Nominal impedance (Ω)	50
IMD level (dBc)	-150, at 2 x 43 dBm
Polarisation	± 45 ° dual slant

Mechanical data	
Dimensions (height x diameter)	96 x 117 mm (3.78 x 4.6 in)
Weight	0.45 kg (0.99 lbs)

Environmental data	
Environment	outdoor
Operation temperature (°C)	-40 to 70
IP rating	IP66
RoHS 2011/65/EU	compliant

Material data	
Radome colour	RAL 7035 (light-grey)

Ordering information

Description	Item no.	Version
1399.32.0003	85121225	Nex10 connectors

SENCITY® Urban 200 small cell



Specifications

Electrical data					
Frequency (MHz)	1695 to 1920	1920 to 2180	2300 to 2690	3300 to 3800	3800 to 4200
VSWR	2.0	2.0	2.0	2.0	2.0
Gain (dBi)	5.7	4.8	5.0	5.9	4.9
3 dB beamwidth (h) (°)	100	120	100	110	120
3 dB beamwidth (v) (°)	105	120	95	95	85
Isolation	20	20	18	20	20
Composite power max. (W)	125	125	110	95	90
Front to back ratio (dB)	10	11	11	15	12
Co/crosspolar ratio	27	22	14	15	19

General data	
Nominal impedance (Ω)	50
IMD level (dBc)	-150 at 2 × 43 dBm
Polarisation	±45° dual slant

Mechanical data	
Dimensions (height × width × depth)	184.8 × 164.6 × 84.2 mm (7.27 × 6.48 × 3.3 in)
Weight	0.5 kg (1.1 lbs)

Environmental data	
Environment	indoor/outdoor
Operation temperature (°C)	-40 to 70
RoHS 2011/65/EU	compliant
IP rating	IP66

Material data	
Radome colour	RAL 7035 (light-grey)
Radome material	PC (Polycarbonate)

Ordering information		
Description	Item no.	Version
1399.32.0002	85117565	Nex10 connectors

4P65HS-17 Macrocell

Features:

- Outdoor MIMO 2x2 directional antenna (1695-2690 and 3300-4200MHz) with:
H-HPBW
110° (1.7-2.7 GHz)
110° (3.3-4.2 GHz)
- Low PIM

Specifications

Connector	P1-P2 Connector 1-4	
Frequency Band	MHz	3300-3600 3600-4000
Polarization		±45°
Gain at mid Tilt	dBi	17.0 17.2
Gain over all tilts	dBi	17.0±0.5 17.1±0.6
VSWR		1.5
Return Loss	dB	14
Cross Polar Isolation	dB	27
Port to Port Isolation	dB	27(P1/P2)
Passive Intermodulation, 2 × 43dBm Carrier	dBc	-150
Max. Effective Power per Port	W	200
Impedance	Ω	50

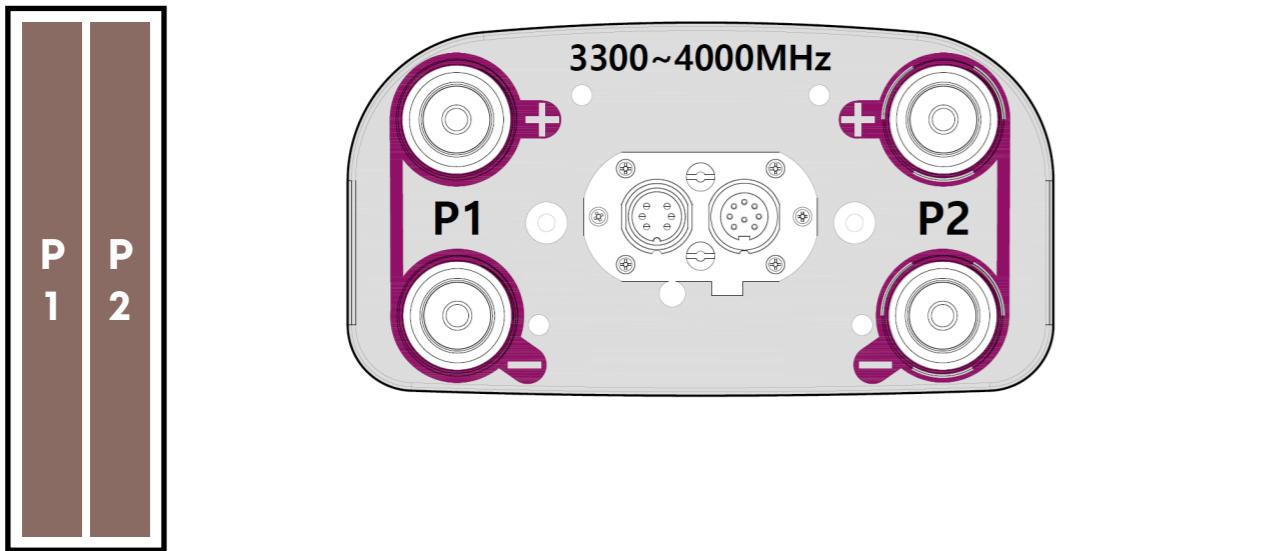
Horizontal Pattern		
Azimuth Beamwidth	°	64±6
Front to Back Ratio, Copolar, ±30°	db	25
Cross Polar Discrimination at Boresight	dB	18
Cross Polar Discrimination over Sector	dB	8

Vertical Pattern		
Elevation Beamwidth	°	6.50±0.6 6.2±0.6
Electrical Downtilt continuously adjustable	°	0-10
First Upper Sidelobe Suppression	dB	17

Values based on NGMN P BASTA requirement

Connector	Quantity	EA	4 × 4.3-10 Female
	Location		Bottom
Dimensions	Antenna	inches	39.17" H × 6.22" W × 3.07" D
	Antenna	Lbs	8.8
Weight	Clamp	Lbs	5.5
	Packing	Lbs	17.6
Radome	Material		ASA
	Color		Gray
Wind Load (at 150km/h wind velocity)	Frontal	N	204.6
	Lateral	N	101.0
	Rear	N	204.6
Max. Wind Velocity	Km/h		216
Operational Temperature	°C/°F		-40~70/-40~158
Adjustment Mechanism			Internal RET(ICH)
Mast Diameter Supported	inches		1.57"~4.53"

8P65HS-17A Macrocell



Antenna Model	Connector	CH	RET Serial
4P65HS_P1_P2	P1, P2	RET1	HSXXXXXXXXYYWW00000

Remark : YY – Year, WW – Week, 00000 – Serial Number

Ordering information

Description	Item no.
4P65HS-17	85208644

Features:

- Multi Band 8 Port TDD Smart Antenna
- 4 x 3300~4000MHz
- 65°/90° Horizontal Beam Width

Specifications

Connector	P1-P4 Connector 1-8	
Frequency Band	MHz	3300-3600 3600-4000
Polarization		±45°
Electrical Down tilt	°	2-12
Coupling degree from calibration port to each unit port	dB	-26±2
The maximum amplitude deviation between the calibration port and each unit port	dB	≤0.9
Maximum phase deviation between calibration port and each	°	≤7
Impedance	Ω	50
VSWR		1.5
Return loss		14
Co-Polar Isolation	dB	20
Cross Polar Isolation	dB	25

Unit Beam (Single Column)			
Gain	dB	15.5±0.9	15.8±0.9
Azimuth Beamwidth	°	86±16	84±14
Elevation Beamwidth	°	6.5±0.5	6.2±0.6

Broadcast Beam 65°			
Gain	dBi	16.6	16.8
Azimuth Beamwidth	°	66	64
Front to Back Ratio, Copolar, ±30°	°	23	

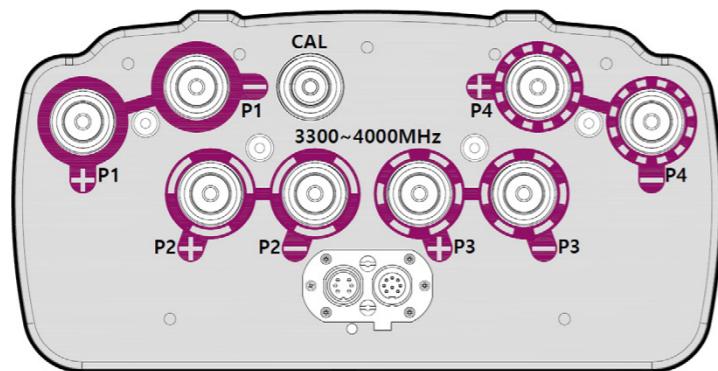
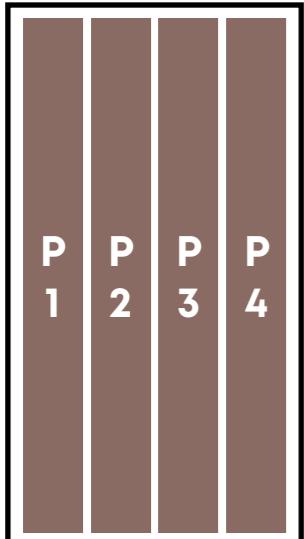
Service Beam 0°			
Gain	dBi	20.8	21.2
Azimuth Beamwidth	°	25	22
Front to Back Ratio, Copolar, ±30°	°	30	
Cross Polar Discrimination at Boresight	dB	18	

Service Beam 24° - Dual Beam			
Gain	dBi	19.9	20.2
Azimuth Beamwidth	°	30	27
Front to Back Ratio, Copolar, ±30°	°	28	

Values based on NGMN P BASTA requirement

Timing solutions – GPS over Fiber

Connector	Quantity	EA	8 x 4.3-10 Female
	Location		Bottom
Calibration Connector	Quantity	EA	1 x 4.3-10 Female
	Location		Bottom
Dimensions	Antenna	inches	35" H x 11.61" W x 5.71" D
	Packing	inches	38.82" H x 14.21" W x 11.22" D
Weight	Antenna	Lbs	17.64
	Clamp	Lbs	12.79
	Packing	Lbs	33.73
Radome	Material		ASA
	Color		Gray
Wind Load (at 150km/h wind velocity)	Frontal	N	341.8
	Lateral	N	168.0
	Rear	N	341.8
Max. Wind Velocity	Km/h	216	
Operational Temperature	°C/°F	-40~70/-40~158	
Adjustment Mechanism			Internal RET(ICH)
Mast Diameter Supported	inches	1.57"~4.53"	



Antenna Model	Connector	CH	RET Serial
8P65HS_P1_P4	P1, P2, P3, P4	RET1	HSXXXP1-P4YYWW00000
Remark : YY – Year, WW – Week, 00000 – Serial Number			

Ordering information

Description	Item no.
8P65HS-17A	85208645



Features

- Uses fiber optic cable to distribute both power and signal.
- Allows for greater distance of up to 7 km between antenna and receiver system.
- Less hardware due to the antenna integrated GPS-over-Fiber transmitter in addition to a portfolio of various expansion and receiver modules allows futureproof scalability of timing infrastructure and eliminates the need for multiple GPS antennas on the roof.
- NEBS Level 3 carrier grade

Electrical Data

Parameters		Value			Remarks	
		min.	typ.	max.		
GNSS band			L1			
Equivalent active antenna preamplifier gain	dB		25		optical path loss not included	
Gain flatness	dB		< 2			
Noise figure	dB		6.5			
VSWR (RF output)			< 1.8			
Time delay ¹	ns		45		optical path delay not included	
Supply voltage	receiver	VDC	+8	+12	+48	1.2 A typ. at 12V
Temperature range	operating	°C	-5	+55		antenna: - 20 .. +70 °C
	storage	°C	-40	+75		
Module weight	kg	2.5			receiver (indoor unit)	
Module dimensions – transmitter	mm	160 height, 120 diameter				
Module dimensions – receiver	mm	482.6 x 286 x 43.65			19" 1RU	
RF connector (output)		8x SMA female				

¹ Total link time delay calculation Total delay [ns] = time delay TX [ns] + time delay RX [ns] + Time delay single mode fiber 1310nm [ns/m] * link length [m]. Example 100m link delay = 45ns + 100m * 4.9 ns/m = 535 ns

Optical Data

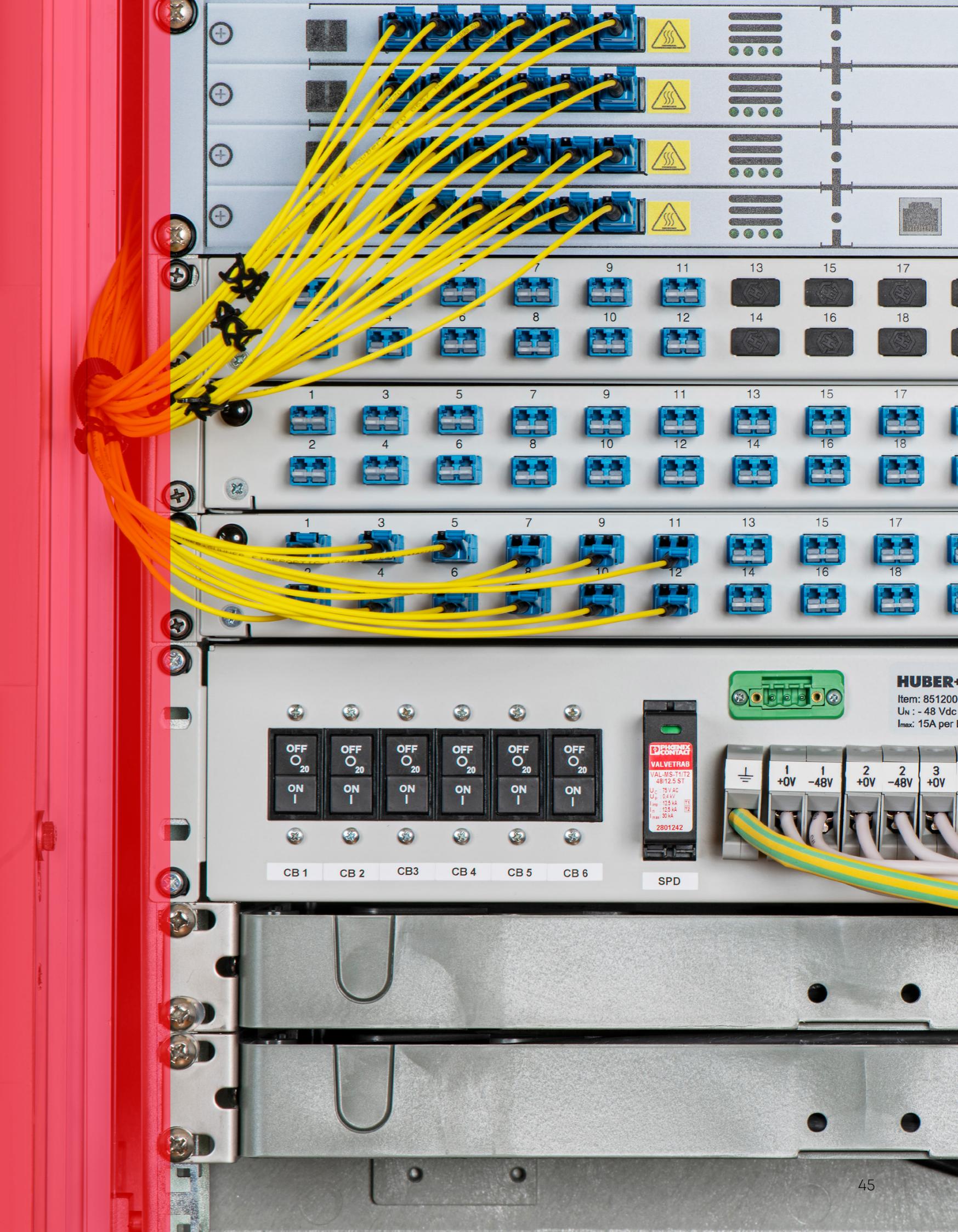
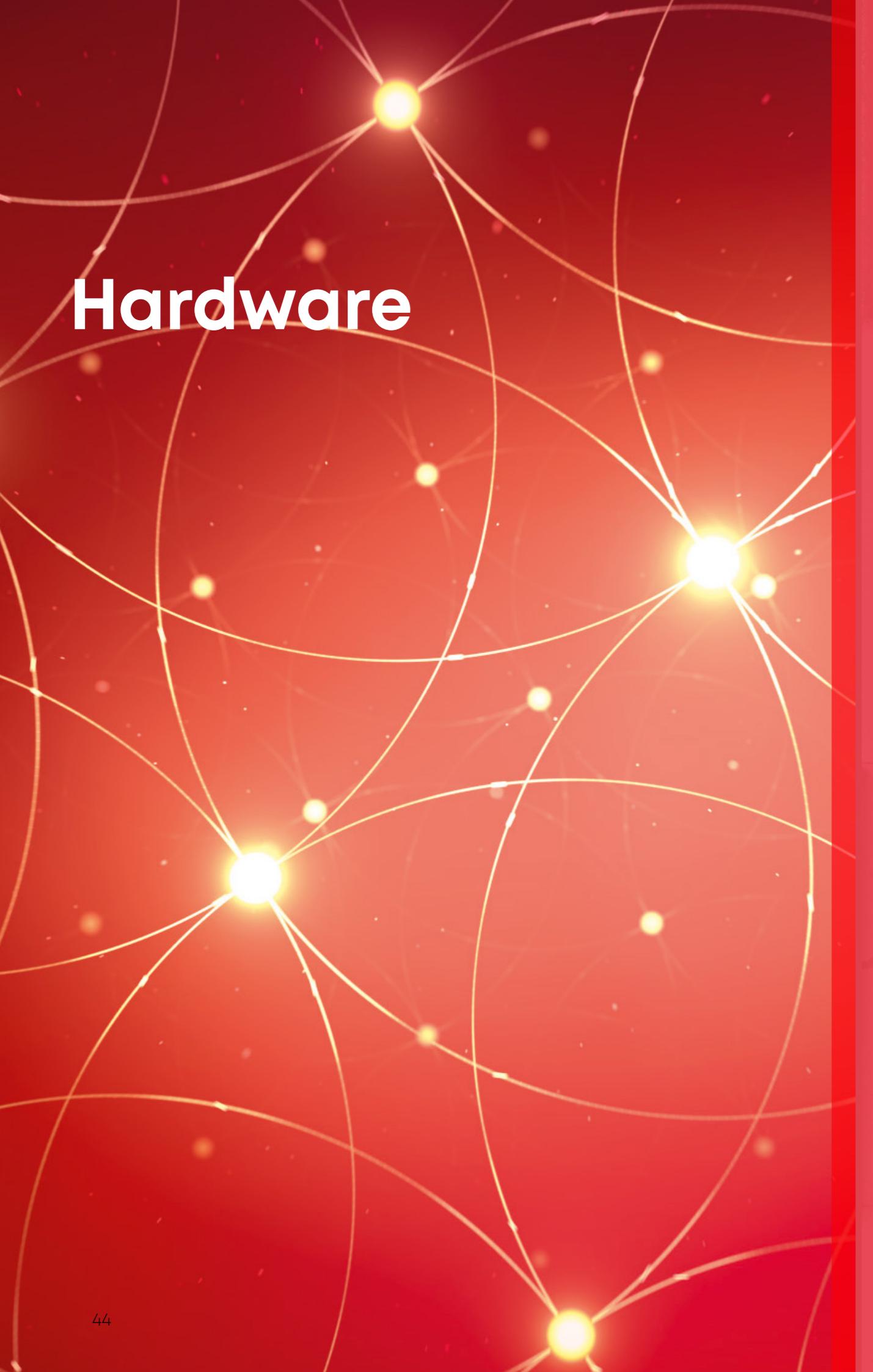
Parameters		Value			Remarks
All specifications at 25 °C case temperature unless otherwise specified		min.	typ.	max.	
Laser class		4			
Fiber optic connector (input)		Q-ODC-12			
Fiber optic connector (output)		LC/UPC			
Fiber		standard single mode 9/125 um			
Optical power in fiber – signal	mW	2			
Optical power in fiber – power	mW	500			
Side mode suppression ratio	dB	30	40		

Ordering information

Direct GPS-over-Fiber Receiver (RX) Modules (O/E Conversion)

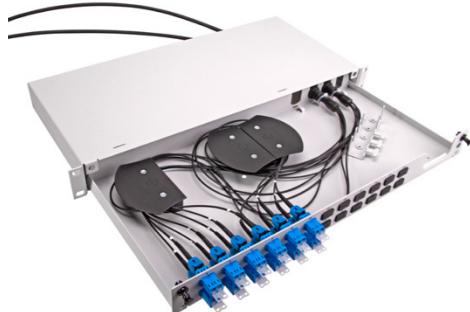
Item-No	Product Description	# of RF Inputs	# FO Inputs	# FO outputs	Form factor
85128283	Direct GPSoF - MAC8-1 (RX)	QODC12	8 SMA	1 LC/UPC	19" 1RU

Hardware



Hardware

19" CTB patching box



Features

- Space saving 19" rack installation
- Cable entry from the front and back for up to 3 MASTERLINE cable systems
- Pullout tray for easy access
- Fitted with 6 or 12 LC duplex adapter
- 3 mandrels for overlength management of the MASTERLINE cable system
- Optional patchcord guide available

Specifications

Dimensions (W x D x H)	482 x 209 x 43.5 mm (1 unit)
Connectivity	6 or 12 LC duplex adapter blue
Cable entry front or back	3 x MASTERLINE Classic 12 fiber or 24 fiber (small divider) 1 x MASTERLINE Classic 36 fiber (medium divider)
Material	powder coated steel
Weight	3 kg
Colour	RAL 7035 light grey

Ordering information

Description	Item no.	Picture
19" patching box 6 LC duplex adapter blue 18 blind caps extendible to 24 LC duplex adapter	85028405	
19" patching box 12 LC duplex adapter blue 12 blind caps extendible to 24 LC duplex adapter	85028406	
Patchcord guide Including 3 screws and nuts for mounting with the 19" CTB patching box	84125960	

Other options available on request.

Hardware

Grounding kit for hybrid cables



Features

- Universal grounding kit for hybrid cables
- Cable diameter range 16 mm to 40 mm
- 0.5 m long grounding wire 16 mm²
- Tin plated copper lug for M8 screw

The universal grounding kit is specially designed to accommodate the range of HUBER+SUHNER hybrid cable sizes. The tinned copper strap and associated hardware facilitates a proper attachment to the braided screen or copper foil. The 16 mm² (AWG 6), stranded copper wire with a one-hole lug (Ø 8.5 mm) provides a low inductance transfer of lightning induced current from the hybrid cable to the system ground. Installation of grounding kits is recommended at the top and bottom of each vertical run, at 20 m (66 ft) increments and just prior to building entry.

Specifications

Typical contact transition resistance	1 mΩ
Current handling capability (10/350 µs)	25 kA
Ingress protection	IP67
Ambient temperature range	-40 to 75 °C

Installation features

List of components

- Tinned copper strap assembly with 0.5 m grounding wire and one-hole lug (Ø 8.5 mm)
- 50.8 mm x 6.1 m (2" x 20") roll electrical tape (PVC)
- 63.5 mm x 0.4 m (2-1/2" x 15") roll butyl mastic
- Coiling tool
- Installation manual



The ground strap is wrapped around the exposed screen. The end of the strap has to be pulled through the slot at the strap. With the attached coiling tool the strap has to be tightened. There is an expansion joint at the strap which provides a visual indication if the strap is tightened enough. Note: H+S recommend to use the adjustable heavy-duty cable stripping tool with H+S item no. 85029959.



Butyl mastic is placed around the clamp and acts as a filler. The vinyl electrical tape is wrapped around the hole ground strap to make it waterproof.



Ordering information

Description	Item no.
Universal grounding kit for hybrid cables	85015070

Hardware

Heavy-duty cable stripping tool for power and hybrid cable

Adjustable heavy-duty cable stripping tool Wire size: 4.5 to 40 mm/0.18" to 1.57" Stripping dimensions adjustable up to 4.5 mm/0.18" insulation thickness	85029959	
Spare blade for adjustable heavy-duty cable stripping tool (85029959)	85032058	

Quick hose clamp



Specifications

Material	stainless steel 304
Material thickness	0.65 mm
Dimension width	14.2 mm
Dimension range	30 to 155 mm/60 to 500 mm

Ordering information

Description		Item no.
Quick hose clamp	diameter range 30 to 155 mm	84076411
One set including 2 pieces	diameter range 60 to 500 mm	84076412

Distribution box



Specifications

Dimensions without mounting bracket	477 x 280 x 43.8 mm (1 unit)
Mandrel radius	60 mm
Material	glass-filled polycarbonate, halogen-free, UV resistant
Flammability	UL 94 V0
Operating temperature	-40 to 75 °C
Cable excess length capacity	cable Ø 4.8 mm cable Ø 7.0 mm
	30 m 20 m

Ordering information

Description	Item no.
Overlength box	84103325

Hardware

UWP – Universal Weather Protection



Features

- Multi cable brand and size compatible (1/2" and 1/2" flex)
- Fast and easy installation
- No tools or lubricants required
- Reusable
- Waterproof IP68
- UV resistant

Specifications

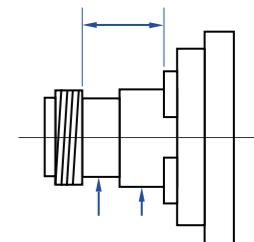
Environmental data	
Operating temperature (°C)	-65 to +85
Installation temperature (°C)	-25 to +60
Storage temperature (°C)	-70 to +85
Waterproof degree	IP68 (1 m, 24 hrs, 20 °C)
2011/65/EU (RoHS)	compliant
UV resistance	yes
Flame resistance	UL94- HB

Material data

Material	Silicon/black
Number of operations	20 matings of boot 2 installations over the connector through back end of boot

Order information

Part number*	Connector type	Min. neck length "A" (mm)	Min.-Max. diameter "B" (mm)	Min.-Max. diameter "C" (mm)	Weight (g)
62_4310-U0-0-6	4.3-10	14	17 to 19	19 to 21	50.5





HUBER+SUHNER INC.
8530 Steele Creek Place Drive, Suite H
Charlotte, NC 28273
USA
hubersuhner.com

05/2023

HUBER+SUHNER is certified to ISO 9001, ISO 14001, ISO 45001, EN/AS 9100, IATF 16949 and ISO/TS 22163-IRIS.

Waiver

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