

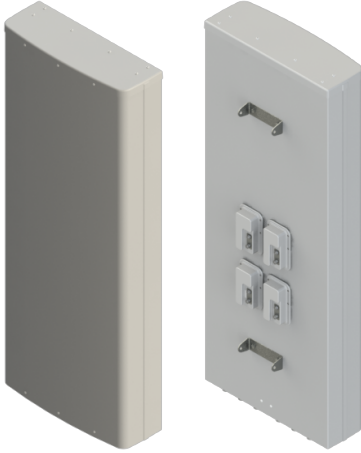


# Antennas

DATA SHEET

## Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6



- Six foot (1.8 m), twelve port, dual beam antenna with patented asymmetrical beam shapes optimized for LTE
- Two independent 33° beams to match existing 65° patterns, covering 698-896 MHz and 1695-2180 MHz
- Three pairs (one low band and two high band) of +45° and -45° cross-polarized ports for each beam
- Provides full 4x4 MIMO performance in high band
- Enhanced array spacing ensures optimal MIMO performance
- Slim and low weight single panel design supporting two beams in a single antenna
- Field replaceable, integrated AISG 2.0 compliant Remote Electrical Tilt (RET) system with independent tilt control for the high and low band in each 33° sector
- Dramatic increase in site capacity through higher order sectorization which offsets the need to build new sites
- Boosts data throughput by minimizing interference and optimizing coverage
- Sharp elevation beamwidth aides in network planning
- Optimal elevation sidelobe performance
- Exceeds minimum PIM performance requirements

### Overview

The CCI multi-band Twin HexPort Bi-Sector™ array is a dual beam antenna with full 700 MHz, SMR 800, Cellular, AWS and PCS band coverage. This six foot (1.8 m) antenna can be configured to deploy two asymmetric 33° beams each containing two low band ports covering 698-896 MHz and four high band ports covering 1695-2180 MHz in a single enclosure. With four high band ports in each sub-beam this antenna is ideally suited for implementation of 2x4 and 4x4 MIMO system configurations. The CCI multi-band Bi-Sector™ provides the capability to deploy two sectors of 4x4 Multiple-input Multiple-output (MIMO) in the high band. The Remote Electrical Tilt (RET) feature allows separate tilt control for the high and low band in each 33° beam, enabling maximum flexibility in network deployment.

CCI's unique patented bi-sector technology provides optimized overlap between the pairs of asymmetric beams, lowers soft handover losses in LTE, UMTS/HSPA+ and CDMA/EVDO systems, while minimizing interference between sectors. Fast roll-off of each of the outer beams and high front-to-back ratios ensure reduced interference. This patented approach enhances data transfer rates within LTE, UMTS and EVDO network sectors and addresses "hotspots" in mobile wireless operator networks.

The single panel design of the Bi-Sector™ Array offers the opportunity to reduce antenna count and directly replaces an existing 65° antenna without mount changes and avoids costly leasing and zoning changes. The enhanced coverage matches the existing sector footprint and minimizes the need for optimization and adjacent site changes, providing operators with significant CAPEX and OPEX cost savings.

CCI antennas are designed and produced to ISO 9001 certification standards for reliability and quality in our state-of-the-art manufacturing facilities.



# Antennas

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Multi-band Bi-Sector™ Array

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## Applications

- Delivers increased capacity and data-throughput for sites that are performance or capacity constrained
- Increase capacity without the need for new site builds or carrier adds and without using valuable spectrum resources
- Efficient use of spectrum make it ideally suited for spectrum clearing and refarming
- Two Sectors 4x4 MIMO for the high band and 2x2 MIMO for the low band



# Antennas

## SPECIFICATIONS

### Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6

#### Electrical

Ports	4 × Low Band Ports for 698-896 MHz		8 × High Band Ports for 1695-2180 MHz		
Frequency Range	698-806 MHz	824-896 MHz	1850-1990 MHz	1695-1755/2110-2180 MHz	
Gain (dBi)	16.4	17.3	18.0	17.2	18.7
Azimuth Beamwidth (-3dB) (°)	34	32	31	36	28
Elevation Beamwidth (-3dB) (°)	11.7	10.3	6.4	7.2	5.8
Electrical Downtilt (°)	2 to 12	2 to 12	0 to 9	0 to 9	0 to 9
Elevation Sidelobes (1st Upper) (dB)	< -18	< -18	< -18	< -18	< -17
Front-to-Back Ratio @180° (dB)	> 30	> 30	> 30	> 30	> 30
Cross-Polar Discrimination (at peak) (dB)	> 24	> 25	> 25	> 25	> 25
Cross-Polar Port-to-Port Isolation (dB)	> 25	> 25	> 25	> 25	> 25
Co-Polar Port-to-Port Isolation <sup>1</sup> (dB)	> 22*	> 19	> 24	> 24	> 24
Voltage Standing Wave Ratio(VSWR)	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2×20W) (dBc)	≤ -153	≤ -153	≤ -153	≤ -153	≤ -153
Input Power Continuous Wave (CW)	500 watts	500 watts	300 watts	300 watts	300 watts
Polarization	Dual Linear 45°	Dual Linear 45°	Dual Linear 45°	Dual Linear 45°	Dual Linear 45°
Input Impedance	50 ohms	50 ohms	50 ohms	50 ohms	50 ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

<sup>1</sup>Co-Pol Isolation within each low-band and high-band array.

\*>22 dB from 746-757 MHz; >16 dB elsewhere

BASTA Electrical Specifications*					
Frequency Range	698-806 MHz	824-896 MHz	1850-1990 MHz	1695-1755/2110-2180 MHz	
Gain over all Tilts (dBi)	16.4 dBi	17.3 dBi	18.0 dBi	17.2 dBi	18.7 dBi
Gain over all Tilts Tolerance (dB)	0.8 dB	0.7 dB	0.5 dB	0.7 dB	0.5 dB
Gain at Low-tilt (dBi)	16.5 dBi	17.5 dBi	18.0 dBi	17.2 dBi	18.6 dBi
Gain at Mid-tilt (dBi)	16.4 dBi	17.4 dBi	18.2 dBi	17.3 dBi	18.8 dBi
Gain at High-tilt (dBi)	16.2 dBi	17.0 dBi	17.9 dBi	17.1 dBi	18.2 dBi
Azimuth Beamwidth Tolerance (°)	1.8°	1.0°	2.5°	3.8°	1.7°
Elevation Beamwidth Tolerance (°)	0.9°	0.6°	0.3°	0.4°	0.2°
Electrical Downtilt Deviation (°)	0.9°	1.0°	0.4°	0.5°	0.4°
Front-to-Back Ratio over ± 20° (dB)	20.3 dB	28.3 dB	26.4 dB	24.2 dB	25.6 dB
First Upper Sidelobe Suppression (dB)	15.8 dB	14.9 dB	15.4 dB	15.8 dB	15.0 dB
Upper Sidelobe Suppression peak to 20°(dB)	17.5 dB	16.1 dB	15.5 dB	15.4 dB	14.3 dB

\*Electrical specifications follow document "Recommendation on Base Station Antenna Standards" (BASTA) V9.6.

All specifications are subject to change without notice.



# Antennas

## SPECIFICATIONS

### Multi-band Bi-Sector™ Array

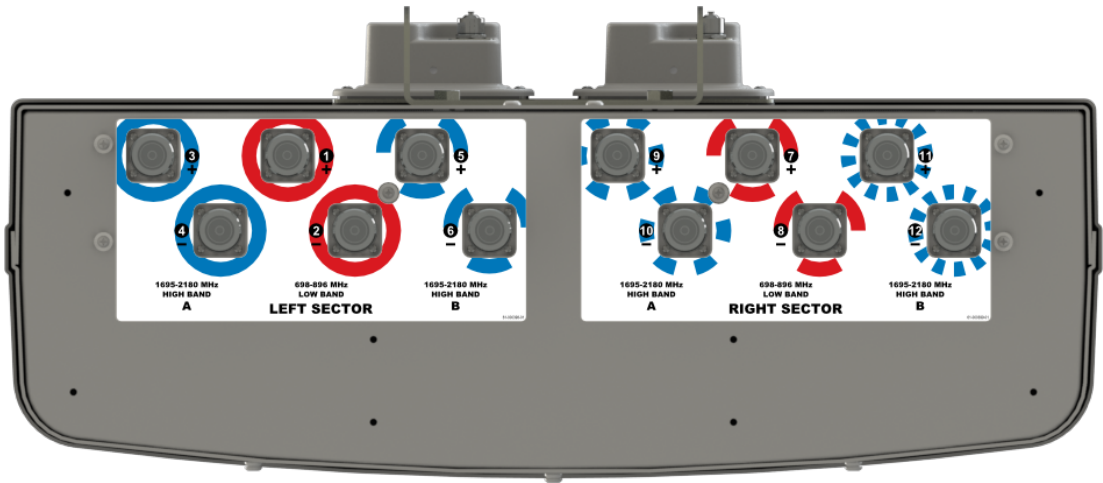
BSAM65R-BWW-H6

#### Mechanical

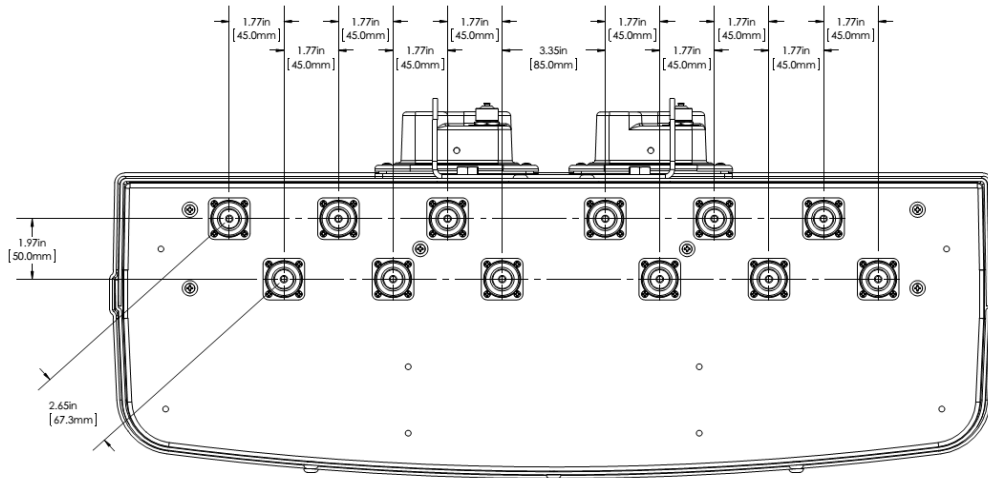
<b>Dimensions (LxWxD)</b>	72.0x28.5x9.7 in (1828x723x245 mm)
<b>Survival Wind Speed</b>	> 150 mph (> 240 kph)
<b>Front Wind Load</b>	438 lbs (1947 N) @ 100 mph (161 kph)
<b>Side Wind Load</b>	175 lbs (778 N) @ 100 mph (161 kph)
<b>Equivalent Flat Plate Area</b>	17.1 ft <sup>2</sup> (1.6 m <sup>2</sup> )
<b>Weight *</b>	108.7 lbs (49.3 kg)
<b>Connector</b>	12 x 7-16 DIN female long neck
<b>Mounting Pole</b>	2 to 5 in (5 to 12 cm)
<b>Package Dimensions (LxWxD)</b>	79.6x32.7x15.9 in (2023x830x405 mm)
<b>Package Weight</b>	160.9 lbs (73.0 kg)

\* Weight excludes mounting

Bottom View



Connector Spacing





# Antennas

## SPECIFICATIONS

Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6

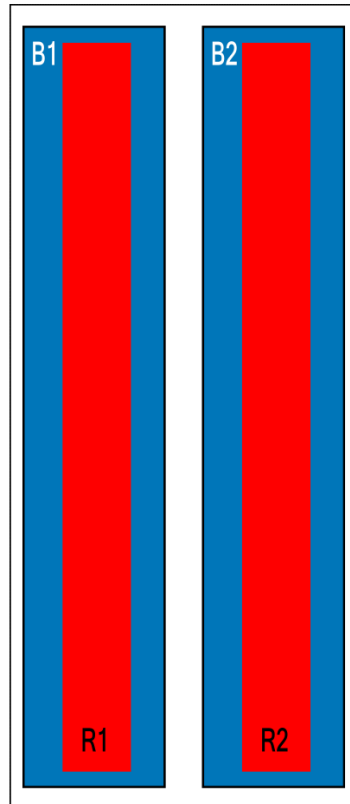
Mechanical

RET to Element Configuration

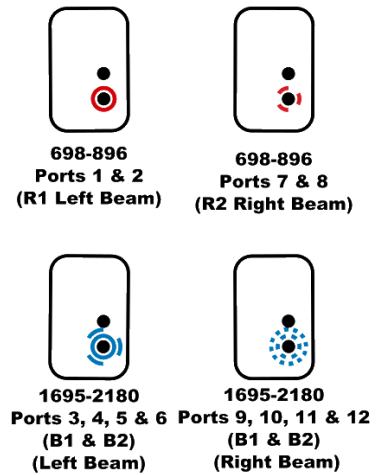
BSAM65R-BWW-H6 Element and RET configuration (Type 1 External RET)

## (Type 1 RET Configuration Only)

**Element arrays as viewed from rear of antenna**



**RET placement as viewed from rear of antenna**  
Top of antenna



Array	Ports	Freq (MHz)	Ports controlled by common RET	Array Beam
R1	1, 2	698-896	1, 2	Left Beam
R2	7, 8	698-896	7, 8	Right Beam
B1	3, 4	1695-2180	3, 4, 5, 6	Left Beams
B2	5, 6	1695-2180		
B2	9, 10	1695-2180	9, 10, 11, 12	Right Beams
B1	11, 12	1695-2180		



# Antennas

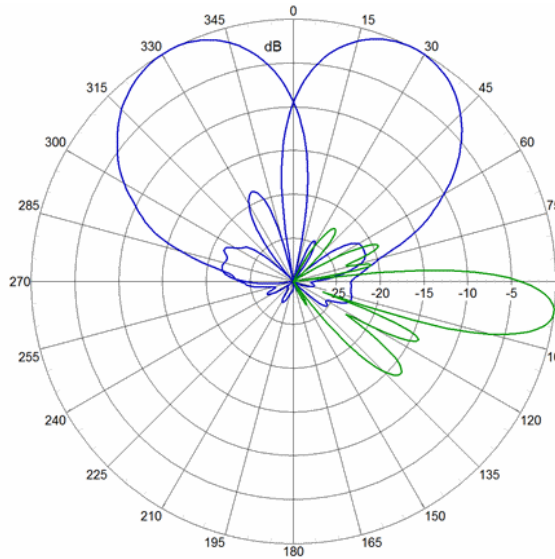
## SPECIFICATIONS

### Multi-band Bi-Sector™ Array

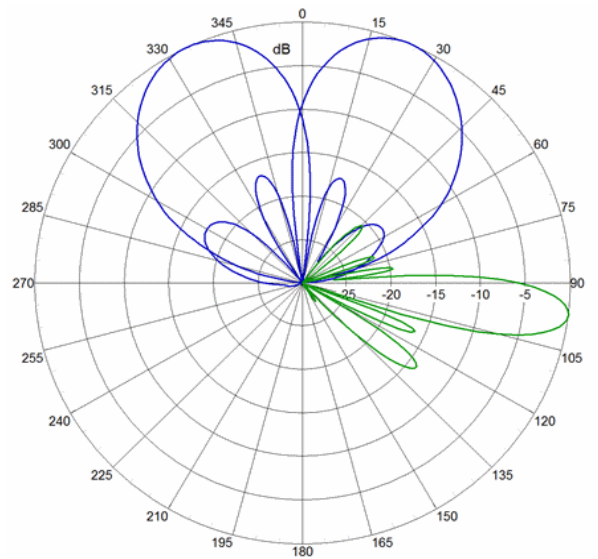
BSAM65R-BWW-H6

Typical Antenna Patterns

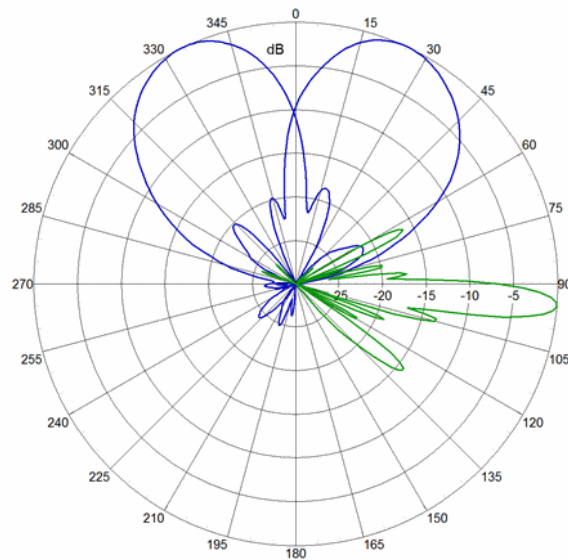
For detailed information on additional antenna patterns, contact customer support at [support@cciproducts.com](mailto:support@cciproducts.com)



761 MHz Azimuth Elevation 7°



849 MHz Azimuth Elevation 7°



1940 MHz Azimuth Elevation 4°



# Antennas

ORDERING

## Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6

### Parts & Accessories

<b>BSAM65R-BWW-H6</b>	Six foot (1.8m) Bi-Sector™ array, Multi-band Antenna and 4 factory installed BSA-RET200 RET actuators
<b>BSAM65R-BWW-H6-K</b>	Six foot (1.8m) Bi-Sector™ array, Multi-band Antenna, 4 factory installed BSA-RET200 RET actuators and MBK-01 Mounting bracket kit
<b>MBK-01</b>	Mounting bracket kit (top and bottom) with 0° to 10° mechanical tilt adjustment
<b>MBK-16</b>	Mounting bracket kit (top and bottom) with fixed 0° mechanical tilt
<b>BSA-RET200</b>	Remote electrical tilt actuator
<b>OPA-CBK-AG-RRU</b>	OctoPort antenna to RRU AISG cable kit
<b>OPA-CBK-RA-AG-RRU</b>	OctoPort antenna to RRU AISG right angle cable kit



# Antennas

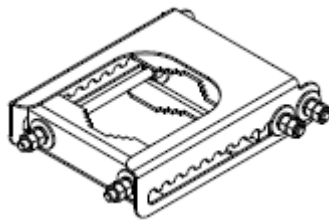
ACCESSORIES

## Mounting Bracket Kit

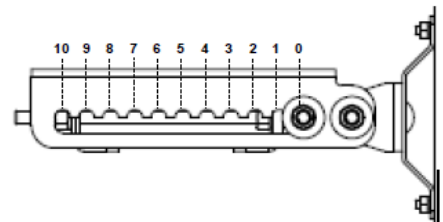
MBK-01

Mechanical

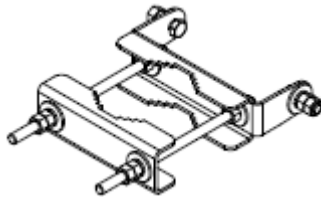
<b>Weight</b>	12.6 lbs (5.7 kg)
<b>Hinge Pitch</b>	47.25 in (1200 mm)
<b>Mounting Pole Dimension</b>	2 to 5 in (5 to 12 cm)
<b>Fastener Size</b>	M12
<b>Installation Torque</b>	40 ft·lb (54 N·m)
<b>Mechanical Tilt Adjustment</b>	0° - 10°



MBK-01 Top Adjustable Bracket



MBK-01 Top Adjustable Bracket Side View



MBK-01 Bottom Fixed Bracket



# Antennas

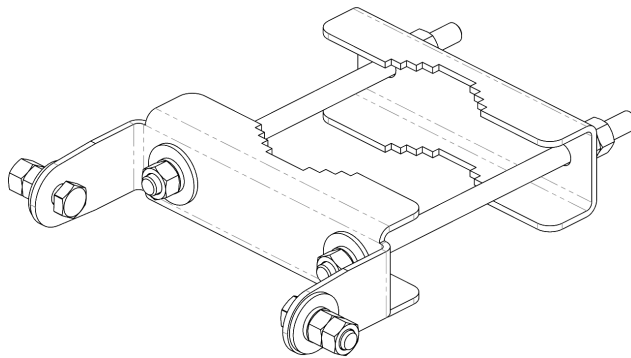
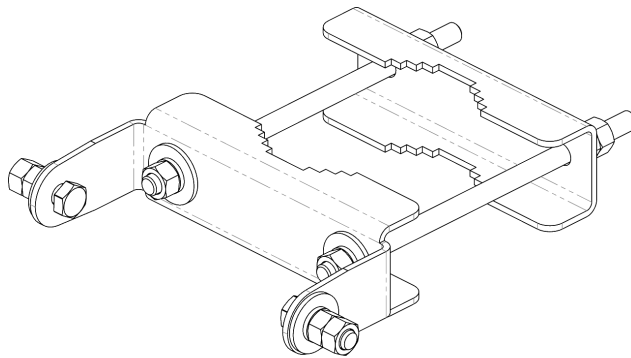
ACCESSORIES

## Mounting Bracket Kit

MBK-16

Mechanical

<b>Weight</b>	9.9 lbs (4.5 kg)
<b>Hinge Pitch</b>	47.25 in (1200 mm)
<b>Mounting Pole Dimension</b>	2 to 5 in (5 to 12 cm)
<b>Fastener Size</b>	M12
<b>Installation Torque</b>	40 ft·lbs (54 N·m)
<b>Mechanical Tilt</b>	0°



MBK-16 Top and Bottom Bracket



# Antennas

ACCESSORIES

## Remote Electrical Tilt Actuator (RET)

BSA-RET200

### General Specifications

Part Number	BSA-RET200
Protocols	AISG 2.0
RET Type	Type 1
Adjustment Cycles	>10,000 cycles
Tilt Accuracy	±0.1°
Temperature Range	-40° C to 70° C

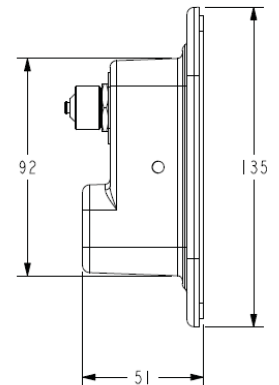
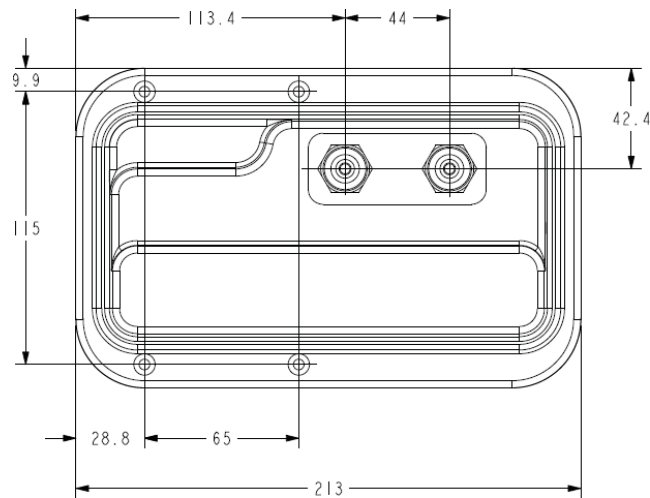
### Electrical

Data Interface Signal	DC
Input Voltage	10-30 Vdc
Current Consumption Tilt	120 mA at $V_{in}=24$
Current Consumption Idle	55 mA at $V_{in}=24$
Hardware Interface	AISG-RS 485 A/B
Input Connector	Male 1 × 8 pin Daisy Chain
Output Connector	Female 1 × 8 pin Daisy Chain

### Mechanical

Dimensions (LxWxD)	8.0x5.0x2.0 in. (213x135x51 mm)
Housing	ASA/ABS/Aluminum
Weight	1.7 lbs (0.75 kg)

ASA= Acrylic Styrene Acrylonitrile  
ABS=Acrylonitrile Butadiene Styrene





# Antennas

ACCESSORIES

AISG Cable Kit

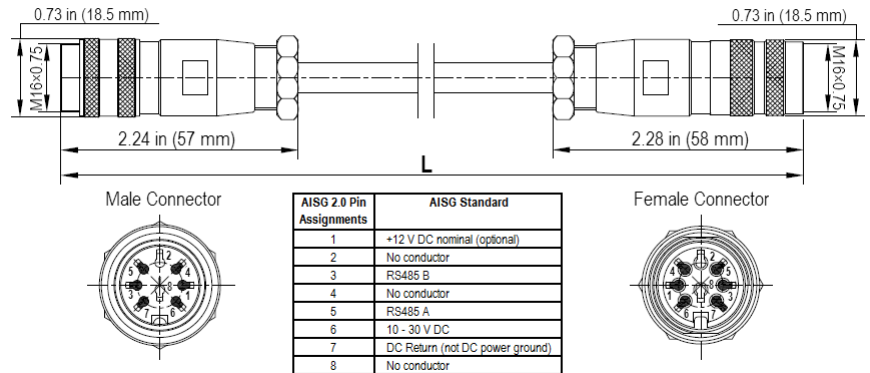
OPA-CBK-AG-RRU

## Electrical Specifications

<b>Individual Cable Part Number</b>	AISGC-M-F-18	AISGC-M-F-10FT
<b>Cable style</b>	UL2464	UL2464
<b>Protocol</b>	AISG 1.1 and AISG 2.0	AISG 1.1 and AISG 2.0
<b>Maximum voltage</b>	300 V	300 V
<b>Rated current</b>	5 A at 104° F (40° C)	5 A at 104° F (40° C)

## Mechanical Specifications

<b>Individual Cable Part Number</b>	AISGC-M-F-18	AISGC-M-F-10FT
<b>Cables per kit</b>	3	2
<b>Connectors</b>	2 x 8 pin IEC 60130-9 Straight male/straight female	2 x 8 pin IEC 60130-9 Straight male/straight female
<b>Tightening torque</b>	Hand tighten only ≈ 1.84 ft-lbs (2.5 N-m)	Hand tighten only ≈ 1.84 ft-lbs (2.5 N-m)
<b>Construction</b>	Shielded (Tinned Copper Braid)	Shielded (Tinned Copper Braid)
<b>Braid coverage</b>	85%	85%
<b>Jacket Material</b>	Matte Polyurethane (Black)	Matte Polyurethane (Black)
<b>Conductors</b>	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464
<b>Cable Diameter</b>	0.307 in (7.8 mm)	0.307 in (7.8 mm)
<b>Length</b>	18 - 20 in (457 - 508 mm)	120 in (3048 mm)
<b>Weight</b>	0.27 lbs (0.12 kg)	0.69 lbs (.31 kg)
<b>Minimum bend radius</b>	3.9 in (100 mm)	3.9 in (100 mm)



AISG-Male to AISG-Female Jumper Cable

## Environmental Specifications

<b>Individual Cable Part Number</b>	AISGC-M-F-18	AISGC-M-F-10FT
<b>Temperature Range</b>	-40° to 80° C	-40° to 80° C
<b>Flammability</b>	UL 1581 VW-1	UL 1581 VW-1
<b>Ingress Protection</b>	IEC 60529:2001, IP67	IEC 60529:2001, IP67



# Antennas

ACCESSORIES

AISG Cable Kit

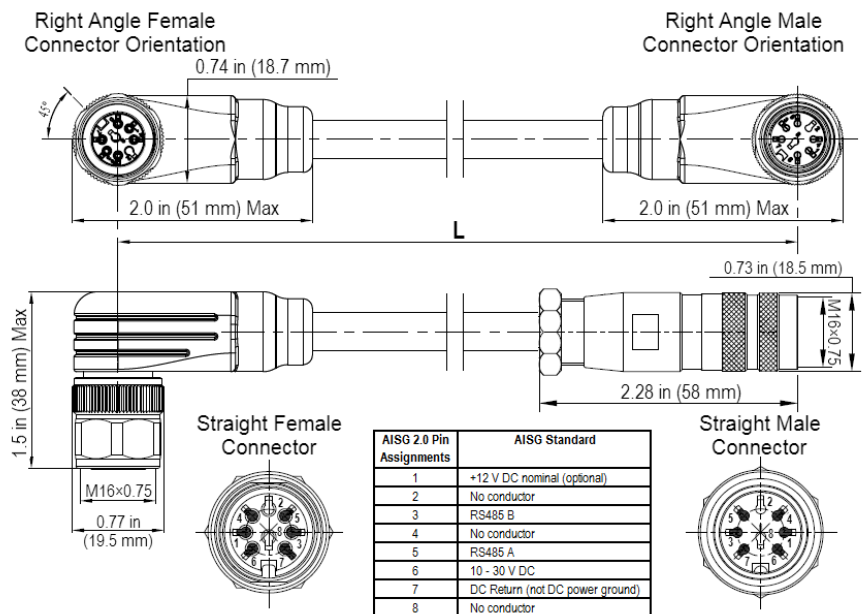
OPA-CBK-RA-AG-RRU

## Electrical Specifications

<b>Individual Cable Part Number</b>	AISGC-MRA-FRA-20	AISGC-M-FRA-10FT
<b>Cable style</b>	UL2464	UL2464
<b>Protocol</b>	AISG 1.1 and AISG 2.0	AISG 1.1 and AISG 2.0
<b>Maximum voltage</b>	300 V	300 V
<b>Rated current</b>	5 A at 104° F (40° C)	5 A at 104° F (40° C)

## Mechanical Specifications

<b>Individual Cable Part Number</b>	AISGC-MRA-FRA-20	AISGC-M-FRA-10FT
<b>Cables per kit</b>	3	2
<b>Connectors</b>	2 x 8 pin IEC 60130-9 Right angle male/right angle female	2 x 8 pin IEC 60130-9 Straight male/right angle female
<b>Tightening torque</b>	Hand tighten only $\approx$ 1.84 ft-lbs (2.5 N-m)	Hand tighten only $\approx$ 1.84 ft-lbs (2.5 N-m)
<b>Construction</b>	Shielded (Tinned Copper Braid)	Shielded (Tinned Copper Braid)
<b>Braid coverage</b>	85%	85%
<b>Jacket Material</b>	Matte Polyurethane (Black)	Matte Polyurethane (Black)
<b>Conductors</b>	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464	1 twisted pair - 24 AWG 3 conductors - 19 AWG AWM style 2464
<b>Cable Diameter</b>	0.307 in (7.8 mm)	0.307 in (7.8 mm)
<b>Length</b>	20 in (508 mm)	120 in (3048 mm)
<b>Weight</b>	0.23 lbs (0.10 kg)	0.77 lbs (0.35 kg)
<b>Minimum bend radius</b>	3.9 in (100 mm)	3.9 in (100 mm)



Right Angle to Right Angle and Right Angle to Straight Jumper Cable



# Antennas

ACCESSORIES

AISG Cable Kit

OPA-CBK-RA-AG-RRU

## Environmental Specifications

<b>Individual Cable Part Number</b>	AISGC-MRA-FRA-20	AISGC-M-FRA-10FT
<b>Temperature Range</b>	-40° to 80° C	-40° to 80° C
<b>Flammability</b>	UL 1581 VW-1	UL 1581 VW-1
<b>Ingress Protection</b>	IEC 60529:2001, IP67	IEC 60529:2001, IP67



# Antennas

## STANDARDS & CERTIFICATIONS

### Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6

#### Standards & Compliance

<b>Safety</b>	EN 60950-1, UL 60950-1
<b>Emission</b>	EN 55022
<b>Immunity</b>	EN 55024
<b>Environmental</b>	IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-5, IEC 60068-2-6, IEC-60068-2-11, IEC 60068-2-14, IEC 60068-2-18, IEC 60068-2-27, IEC 60068-2-29, IEC 60068-02-30, IEC 60068-2-52, IEC 60068-2-64, GR-63-CORE 4.3.1, EN 60529, IP 24

#### Certifications

Antenna Interface Standards Group (AISG), Federal Communication Commission (FCC) Part 15 Class B, CE, CSA US, ISO 9001



# CCI

## Communication Components Inc.

EXTENDING WIRELESS PERFORMANCE