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.

## 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

## SPECIFICATIONS

Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6

### Electrical

| Ports | 4 x Low Band Ports for 698-896 MHz | | 8 x 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[1] (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 (2x20W) (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 |

*[1]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 specificatons are subject to change without notice.*

SPECIFICATIONS

## Multi-band Bi-Sector™ Array

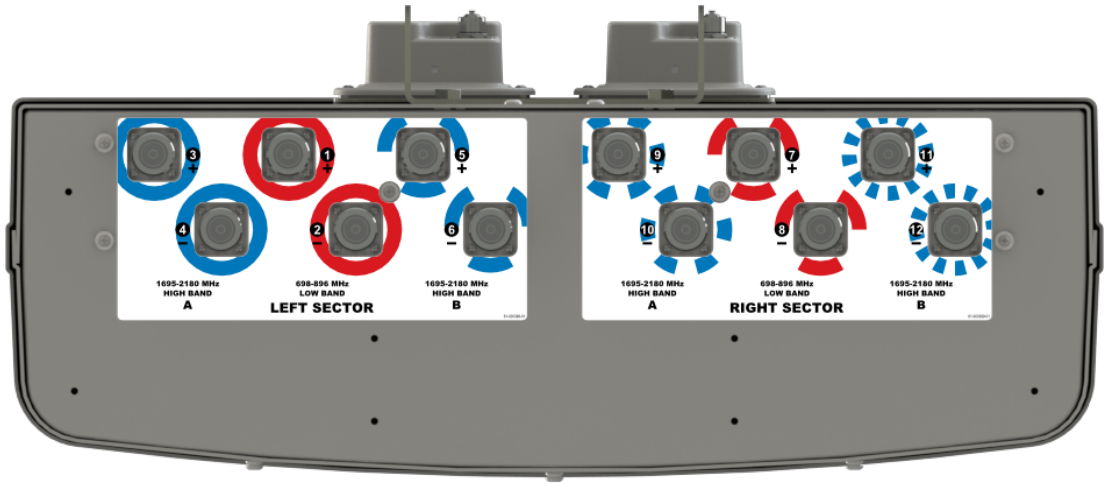
BSAM65R-BWW-H6

### Mechanical

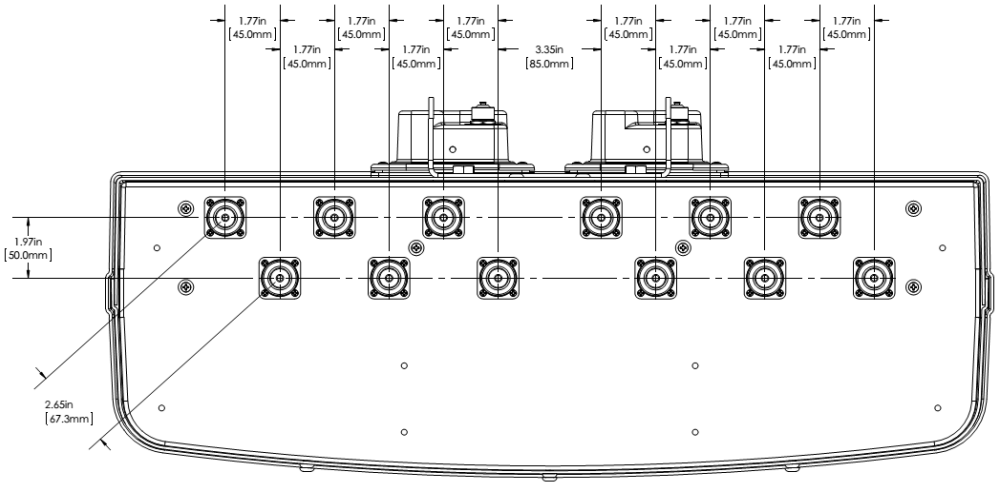
| | |
|---|---|
| Dimensions (LxWxD) | 72.0x28.5x9.7 in (1828x723x245 mm) |
| Survival Wind Speed | > 150 mph (> 240 kph) |
| Front Wind Load | 438 lbs (1947 N) @ 100 mph (161 kph) |
| Side Wind Load | 175 lbs (778 N) @ 100 mph (161 kph) |
| Equivalent Flat Plate Area | 17.1 $ft^2$ (1.6 $m^2$) |
| Weight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

** Weight excludes mounting*

*Bottom View*




*Connector Spacing*

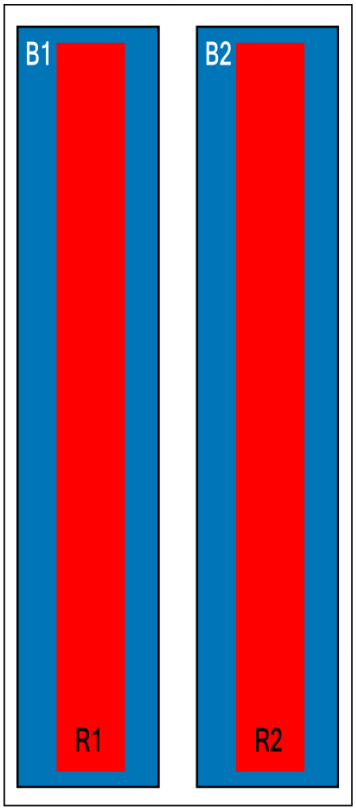


*RET to Element Configuration*

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

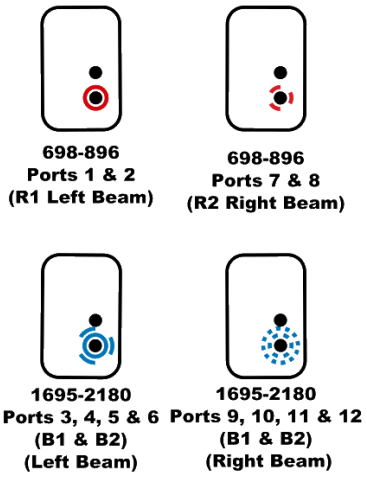
# (Type 1 RET Configuration Only)

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




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

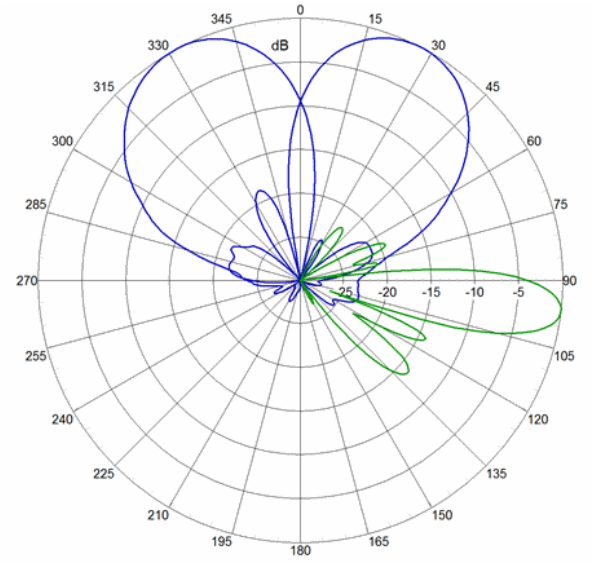
**Top of antenna**



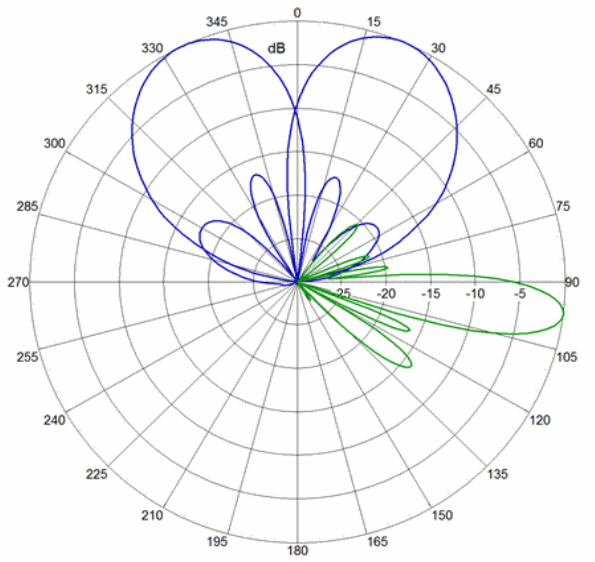

| Array | Ports | Freq (MHz) | Ports controlled by common RET | Array Beam |
|---|---|---|---|---|
| R1 | 1, 2 | 698-896 | 1, 2 | Left Beam |
| R2 | 7, 8 | 698-896 | 7, 8 | Right Beam |
| B1 | 3, 4 | 1695-2180 | 3, 4, 5, 6 | Left Beams |
| B2 | 5, 6 | 1695-2180 | | |
| B2 | 9, 10 | 1695-2180 | 9, 10,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

## Typical Antenna Patterns

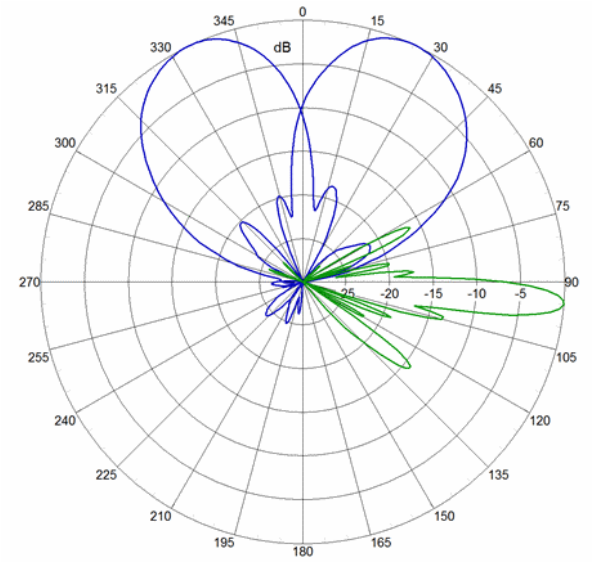
For detailed information on additional antenna patterns, contact customer support at support@cciproducts.com




761 MHz Azimuth Elevation 7°




849 MHz Azimuth Elevation 7°




1940 MHz Azimuth Elevation 4°

ORDERING

## Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6

### Parts & Accessories

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

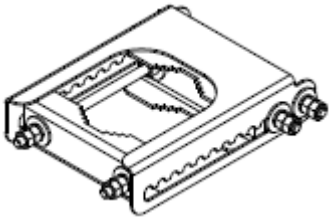
ACCESSORIES

# Mounting Bracket Kit

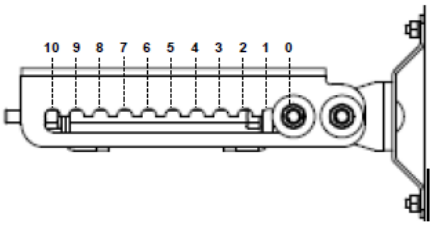
MBK-01

## Mechanical

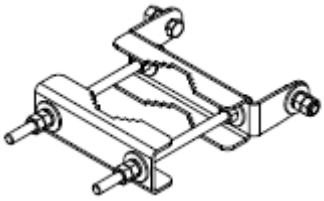
| | |
|---|---|
| Weight | 12.6 lbs (5.7 kg) |
| Hinge Pitch | 47.25 in (1200 mm) |
| Mounting Pole Dimension | 2 to 5 in (5 to 12 cm) |
| Fastener Size | M12 |
| Installation Torque | 40 ft·lb (54 N·m) |
| Mechanical Tilt Adjustment | 0° - 10° |



MBK-01 Top Adjustable Bracket




MBK-01 Top Adjustable Bracket Side View



MBK-01 Bottom Fixed Bracket

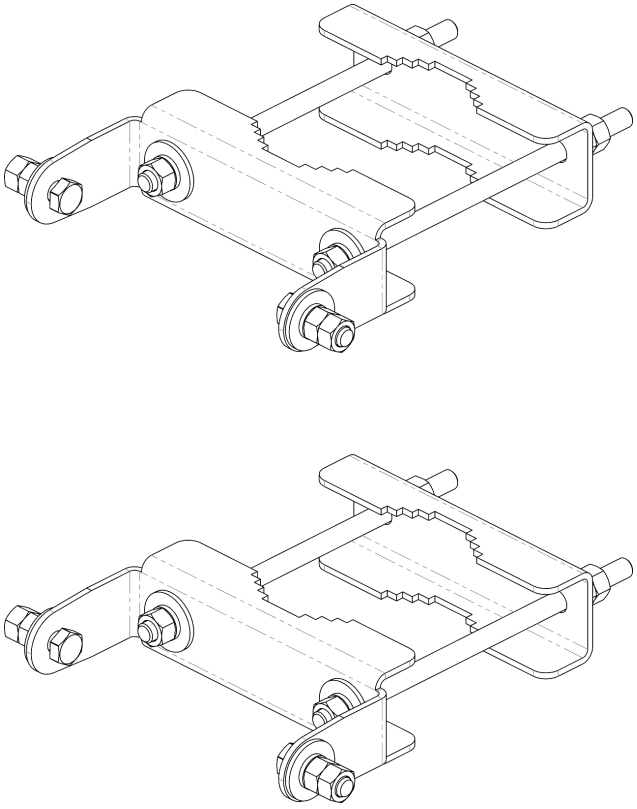
ACCESSORIES

# Mounting Bracket Kit

MBK-16

## Mechanical

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



MBK-16 Top and Bottom Bracket

# 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 |

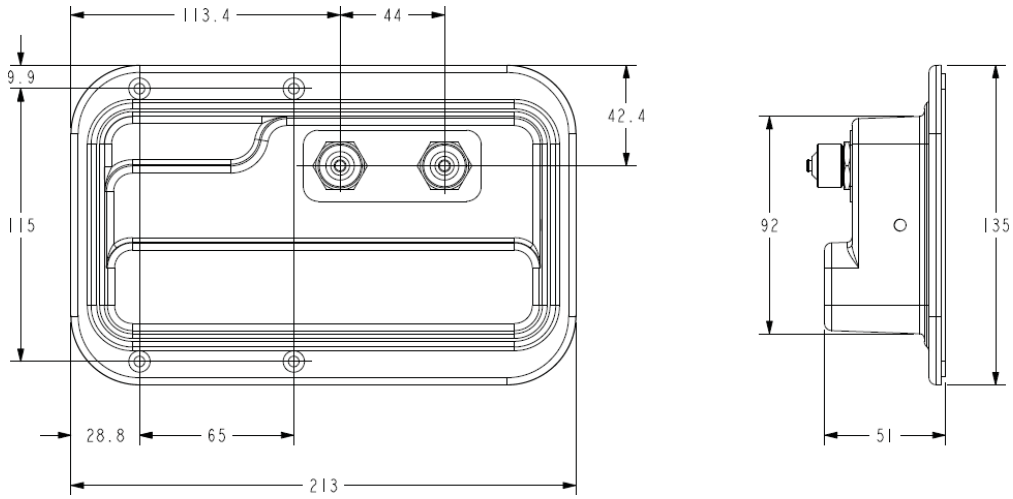
## Electrical

| | |
|---|---|
| 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 x 8 pin Daisy Chain |
| Output Connector | Female 1 x 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=Acrylanitrile Butadiene Styrene*



# AISG Cable Kit

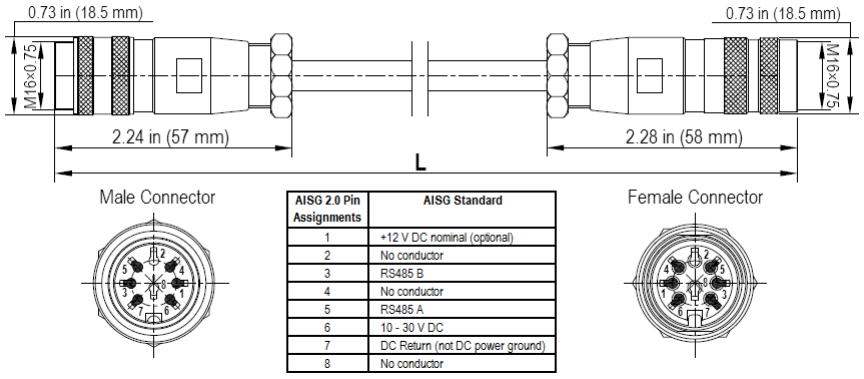
OPA-CBK-AG-RRU

## Electrical Specifications

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

## Mechanical Specifications

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




| AISG 2.0 Pin Assignments | AISG Standard |
|---|---|
| 1 | +12 V DC nominal (optional) |
| 2 | No conductor |
| 3 | RS485 B |
| 4 | No conductor |
| 5 | RS485 A |
| 6 | 10 - 30 V DC |
| 7 | DC Return (not DC power ground) |
| 8 | No conductor |

AISG-Male to AISG-Female Jumper Cable

## Environmental Specifications

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

# AISG Cable Kit

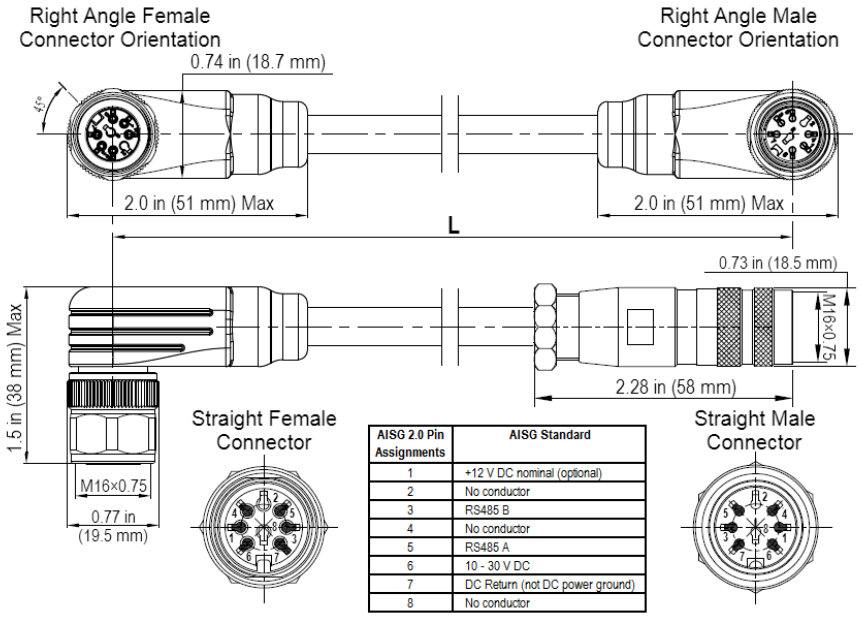
OPA-CBK-RA-AG-RRU

## Electrical Specifications

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

## Mechanical Specifications

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




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

ACCESSORIES

## AISG Cable Kit

OPA-CBK-RA-AG-RRU

### Environmental Specifications

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

STANDARDS & CERTIFICATIONS

## Multi-band Bi-Sector™ Array

BSAM65R-BWW-H6

### Standards & Compliance

| | |
|---|---|
| Safety | EN 60950-1, UL 60950-1 |
| Emission | EN 55022 |
| Immunity | EN 55024 |
| Environmental | 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