Connector, Weatherproofing & Jumper
Technology Overview

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contacting the mobile world
Traditional Connectors Fall Short

3 Key Areas

Moisture Sealing
- O-ring seal on outer conductor combined with butyl tape or heat shrink leaks causing diversity alarms, outages, slow data rates and dropped calls

Complexity/Craft Variability
- Multiple preparation techniques and multi-piece designs result in installation variation, moisture ingress, loose connections, increased PIM levels, open circuits, and RL degradation

Mechanical Stability
- Spring finger type contacts, torqued back nuts & poor strain relief are inadequate for optimal stability which can lead to increased PIM levels, intermit contact and open circuit conditions
Traditional Connectors

- **Inadequate Moisture Sealing**
- **Complex Installation**
- **Non-active inner & outer conductor seizure.**

**Poor Strain Relief**
Cable jacket is removed weakening the assembly and creating a high stress concentration at the rear of the connection.

**2 pc. Threaded Body**
Susceptible to over/under-torquing and can loosen over time.

**Static Rear O-ring**
May leak during varying temperatures or movement.

**Manually Formed Outer Conductor**
A single thickness of copper must be cut at the peak and formed out during prep by hand.

**Spring Finger Inner & Outer Conductor**
Fatigue and fail under dynamic conditions creating PIM.
Robust/Easy to Install Design

Unmatched Mechanical Stability

Redundant Moisture Sealing

Compression Seal
Radial compression seal prevents moisture from entering connection while providing strain relief.

Outer Conductor Flared During Compression
2X thickness of copper is folded and then flared with automated gun providing twice the strength.

Universal Fit
One sku fits most common cables for simple selection, installation and inventory management.

Redundant Sealing
Prevents moisture from entering connection in any conditions.

360° Inner & Outer Conductor Seizure
Active seizure contact design ensures RF stability over time. 100% PIM-optimized.

JMA Advantage
Traditional Tape & Butyl

- **10 Minute Installation** – Complex tape installations require cutting, measuring, and special wrapping techniques to properly install.
- **Not Reusable** – Once the tape is applied it must be cut off and discarded upon service. Due to its sticky nature, this process can take longer than 15 minutes and risks damaging the cable.
- **0° to +85°C Operation** – The materials used in the tape must be installed above freezing.

JMA Wireless  WPS

- **1 Minute Installation** – The WPS weatherproofing system is installed in less than 1 minute.
- **Infinitely Reusable** – The 100% silicone rubber used to make the WPS is UV stable and remains pliable for the life of the installation, allowing for repeat uses.
- **−40° to +85°C Operation** – The WPS product can be installed and serviced in virtually all temperature conditions.
JMA Compression Technology

JMA® UXP™ ½" Annular Connector
4.3-10 Interface
Explained

Connecting the mobile world
4.3-10 Interface Features & Benefits

Industry Perspective
• **New Mating Configuration** – Less sensitive to under-torquing due to separation of electrical & mechanical planes.
• **Compactness** – 40% smaller than 7-16 designs to support high density configurations (i.e. hex & octoport).
• **Robust Design** – N type sized package maintains DIN style strength.
• **Low Weight** – Up to a 60% reduction in mass as compared to larger RF interfaces.

JMA Perspective
• 4.3-10 is a improved interface that offers acceptable dynamic PIM performance while temporarily left un-torqued for testing.
• This interface eliminates the need for torquing during the testing phase of site construction reducing overall test time.
• The 4.3-10 interface does not address any issues associated with cable attachment. Using the 4.3-10 interface paired with JMA compression technology is the only way to ensure a stable, PIM free connection over time.
• JMA Wireless always recommends properly torquing **ALL** interfaces regardless of type after site testing is complete. This prevents PIM causing premature wear of the interfaces in dynamic environments (i.e. wind, temperature change, vibration, etc.)
Maximum performance of the 4.3-10 interface can only be achieved with compression or laser technology.

Interface
- IEC Standard ensures compatibility amongst all equipment manufacturers
- Used to mate to equipment & other cables. (i.e. – jumper to antenna)
- Commercially available interfaces include 7-16 (DIN), N-type, 4.1-9.5 (DIN) & 4.3-10

Cable Attachment
- Where the cable is joined to the connector.
- Both the center-conductor and outer-conductor must be joined using compression or laser technology for the best possible performance.

Every connector has two parts:
1) interface
2) cable attachment.

Although both are important, most failures are due to improper joining of the cable to the connector (cable attachment)

Stable and robust connections are required at both the interface and cable attachment for a reliable, high performance interconnect.
Traditional interfaces perform poorly when not properly torqued.

Properly Torqued

1) Proper nut torque required to create axial force between outer-conductors.
2) Center-conductors are engaged.
3) Interface seal engaged/moisture-proof while torqued.

Traditional Interface

Shared mechanical & electrical plane between male & female
PIM performance is reliant on adequate pressure between interfaces (nut torque).
Proper sealing is dependent on nut torque as well.

Un-torqued (1/2 turn)

1) Lack of nut torque reduces/eliminates axial force between outer-conductors
2) Center-conductors become dis-engaged
3) Interface seal dis-engaged allowing moisture to penetrate

*JMA Wireless always recommends properly torqueing ALL interfaces regardless of type after site testing is complete.

GOOD PIM

POOR PIM

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4.3-10 has improved performance independent of torque

Properly Torqued

1) Contact basket provides radial contact, as opposed to axial.
2) Center-conductors are engaged
3) Interface seal engaged radially/moisture-proof

4.3-10 Interface

Separate mechanical & electrical planes
Acceptable PIM can be achieved when not fully torqued
Interface remains sealed when not fully torqued

*JMA Wireless always recommends properly torquing ALL interfaces regardless of type after site testing is complete.

Un-torqued (1/2 turn)

1) Contact basket maintains radial contact even when nut is loosened
2) Center-conductors remain engaged
3) Interface seal remains engaged when nut is loosened, no moisture penetration

GOOD PIM

GOOD PIM

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4.3-10: Required Tools

**Torque Wrench**

JMA P/N: TQ-F8-78  
(same as Mini DIN)

**Insert for ½” Frameset**

JMA P/N: HCG-INSERTC-1/2
Interfaces Compared

“N” Type

4.1-9.5 DIN (mini)

4.3-10 (NEW)

7-16 DIN Type

“N” Type (2.5 ft.lb Torque)
• Small size fits in congested spaces
• Outer conductor wall is too thin (weak) to allow adequate torque
• Sensitive to buckling during torque
• Loosens under vibration or movement

4.1-9.5 DIN (8 ft.lb Torque)
• Small size fits in congested spaces
• Outer conductor wall is about as thick as 7-16 DIN
• 5X stronger than “N”
• Will not buckle when torque applied

4.3-10 (8 ft.lb Torque)
• Small size fits in congested spaces
• Electrical contact is made from radial forces
• Mechanical stop separate from electrical contact
• Will not buckle when torque applied

7-16 DIN (18 ft.lb Torque)
• Large size doesn’t fit in congested spaces
• Outer conductor wall is thick and robust
• 8X stronger than “N”
• Will not buckle when torque applied
Traditional Jumpers Fall Short

3 Key Areas

Moisture Sealing

- Heat shrink tubing & over-molded seals are not a robust or consistent sealing solution for the back of the connector leading to moisture migration.

Production Variability

- Blind soldering is a variable process due to the inability to inspect the joint after heating, this can also lead to the unwanted melting of dielectric causing poor PIM & RL performance.

Mechanical Stability

- Soldered junctions are susceptible to cracked or cold joints, porosity and/or contamination due to out-gassing during manufacture, this can lead to failures over time.
Traditional Solder

Typical failure modes of solder

- Blind soldering of dis-similar metals
- Inconsistent solder coverage results in failure
- Temperatures required to melt solder actually burn the coax dielectric

* Solder melts at about 350° - 420° C, yet the foam dielectric melts at only 200° - 260° C
JMA Laser Welded Jumper

- Vision system used for accurate and consistent fusion of the outer conductor
- Same 2X fold & flare technology used in UXP
- Welding permanently joins copper ring with copper outer conductor making one piece
- Laser uses a very focused beam to eliminate any chance of melting the dielectric due to excessive heat
- Passes ALL Enhanced Testing including: Moisture, Vibration, Thermal Shock and Dynamic PIM
- Available with JMA Weather Protection System