



Pushing Performance

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Remote Radio Head Connector Technology (RRH)

New challenges for outdoor connectors in WiMAX and LTE applications

There is an ever increasing demand for bandwidth in wireless networks due to multimedia-based applications today, and there is no end in sight at present in respect of this trend. New standards like WiMAX mobile (Worldwide interoperability for Mobile Access) and LTE (Long Term Evolution), which will also allow mobile, digital television, set new standards for design and mounting of outdoor antenna units. The outdoor units that will be used in the future will, in turn, bring along new challenges, especially as regards the connector technology.

The outdoor units, also referred to as Remote Radio Heads (RRH), allow an outdoor mounting of cost-optimised units that also require less energy compared to previous system architectures. Owing to the fact that the unit is mounted outdoors, the RRH must also withstand extreme climatic conditions. This naturally applies to interconnection technology as well. Besides WiMAX and LTE, these applications are widely used by now for mobile phone standards such as UMTS (WCDMA), TD-SCDMA and CDMA 2000. An important aspect is the savings potential as regards long coaxial copper cables as are used from the base station to the antenna.

Remote radio heads are transmitter and receiver components (so-called transceivers), which are mounted on antenna masts, roofs or building walls, in the vicinity of the antenna and complete with integrated final amplifier and duplex filter. Owing to the proximity between antenna and remote radio head, a shorter coaxial connection to the antenna requires a reduced transmitting power, which results in a considerable increase in efficiency. In addition it is possible to position the transmitter mast up to several kilometres away from the base station (node B or base transceiver stations).

High-capacity data and power supply

Connectors are required on the outside interfaces of the RRG for both data and power supply. The pitch connectors are available in different versions, e.g. RJ 45 and fiber optic connectors, which are based on LC duplex, for example. In case of optical interfaces, there is a difference made between CPRI (Common Public Radio Interface)/OBSAI (Open Basestation Architecture Initiative) and proprietary implementations. However, these differences are not relevant as far as passive pitch

connectors are concerned. It is absolutely possible that one RRH unit requires several of these connectors. Typical components of one unit are: a power connector for the power supply, two RJ 45 interfaces for installation and software updates and two optic fiber connections to the base station and to the following RRH.

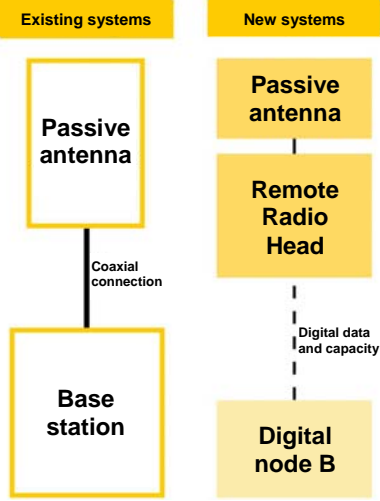


Fig. 1: Comparison development of technology and RRH

Reliability, an easy handling and resistance against environmental influences are the most important quality characteristics that connectors have to fulfil in this respect. The HARTING Technology group has developed customized solutions → market oriented to meet these requirements, which are successfully in use. Based on the Han® 3A and PushPull housing models, HARTING covers the entire range of data and power connectors.

Reliability

Telecom outdoor applications require a life cycle of at least 15 years for all components used. During this entire time period, they have to withstand the high mechanical and climatic loads in the most different regions all over the world. The HARTING PushPull and Han® housings are predestined for these tasks.

Easy handling

In particular the installation on the RRH that should be an easy task to save installation time – i.e. possible with only one hand and without any need for speciality tools. Besides an easy handling, the aspect of safety is also of prime importance. It must be ensured that assemblers will definitely recognize or hear whether the connector has locked completely and safely in place. Rectangular connectors with PushPull technology or shackle lock are especially suitable to ensure this.

Working with standardised cable lengths provides another advantage. Assembled cables can then be connected with one another with an adapter in order to realize the desired total length – PushPull extension adapters are number one choice when it comes to fiber optic connections. This reduces costs of stock keeping for cabling.



Fig. 2: PushPull adapter for LC duplex fiber optic cable

Resistance against environmental influences

Connectors which are used outdoors must run through intensive testing and have to meet the special demands made on outdoor equipment. For this reason, connectors used for outdoor applications require protection classes IP 65 and IP 67 (according to IEC 60529), which ensure tightness against dirt and water.

Ozone, UV-radiation and harmful gases like sulphur dioxide are further influencing environmental factors that connectors are exposed to – and in spite of which they have to function flawlessly. The choice of suitable surfaces and plastics for the connector housings and sealing materials therefore constitutes a special challenge. The HARTING Technology Group has an accredited laboratory of their own, where these demanding tests and analyses of material are carried out.

Hybrid wiring

In order to realize the connections between RRH and base station/Node B/eNode, it is possible for the user to make use of separate lines or hybrid wiring. In case of hybrid wiring, the power supply can be combined with a data line, i.e. the fiber optic cable or twisted pairs with supply cores are integrated in one cable. The advantage of hybrid technology is the combination of components in one cable/connector. What is more complex in this case, however, is a separation of power and data in the base station area in cases where power supply and data source are located with a considerable distance between them.

A separate wiring with PushPull connectors offers the additional advantage of standardised connector interfaces (IEC 61076-3-106 for the PushPull RJ 45, in the future IEC 61754-20-11 for the PushPull LC duplex) and the use of the same housing cut-out for data and power.



Fig. 3: HARTING outdoor solutions

Conclusion

The HARTING product range for RRH applications covers all of the described applications. Die Han[®] 3A and PushPull housing series are available in plastics and in metal versions. The variants available for glass fibre optics can be used for multi or single mode fibres. Hybrid connectors with RJ 45 + power or LC duplex + power complete the portfolio with a 2 x LC duplex variant for daisy chaining applications.

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