



SmartDiagnostics[®] Application Note The SmartDiagnostics[®] Wireless Network

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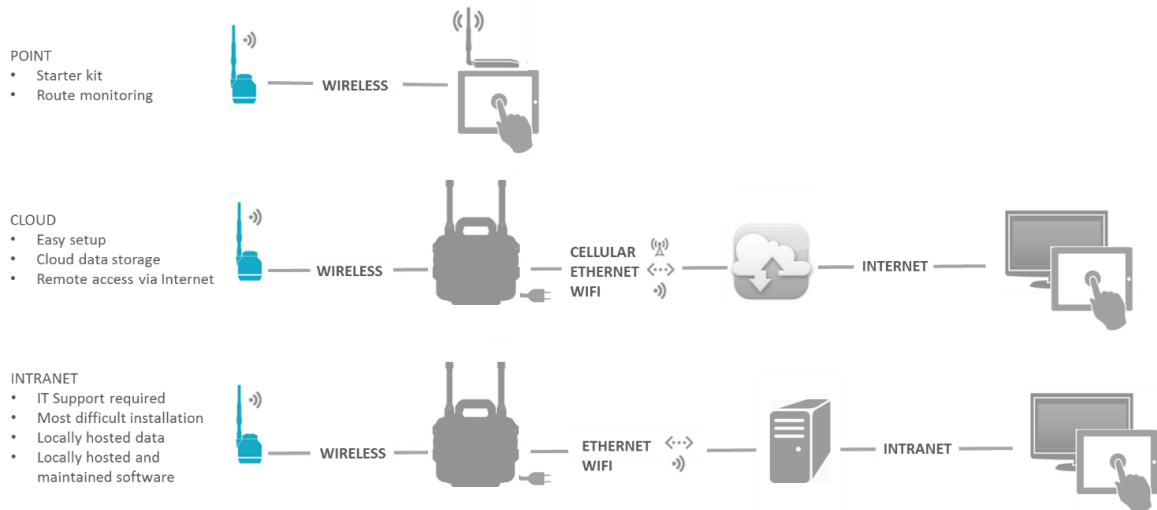
Overview

The SmartDiagnostics[®] wireless network is an easy-to-install, end-to-end machine health monitoring solution. The network enables quick setup, low cost installation, flexibility to reconfigure and expand the network, and the ability to locate nodes in difficult-to-access areas. This guide helps customers understand the network architecture and how it can be deployed in their facility.






The SmartDiagnostics® network can be setup in a number of different ways depending on the customer requirements. The “Point” installation is mainly used for route-based monitoring, temporary installations, or for doing a Site Survey. The “Cloud” installation is the most common installation, covering a wide range of applications and being straightforward to implement. Data is sent directly from each collection point in the facility to the SmartDiagnostics® Cloud using a cellular or customer network. The data is processed, archived, and viewed by the users via a web browser. The “Intranet” installation relies on a local network (Intranet) and sends data to a local server that is maintained by the facility owner. The software is hosted and maintained by the facility owner.

Note: The Point installation is a standalone implementation and data collected and stored on the tablet cannot be transferred to a Cloud or Intranet implementation.



The SmartDiagnostics® network consists of Nodes, Repeaters, Base Stations, and a Data Server. Sensor nodes will automatically connect to any Repeater or Base Station in a customer’s account. Nodes are generally located at monitoring points on equipment. Base Stations are the central data aggregation point for collecting wireless data from Nodes and uploading it to the storage database. Base Stations can be connected to the database using local network connections such as Ethernet or Wi-Fi, or through a cellular modem. The database is either locally hosted in facility servers or cloud hosted by SmartDiagnostics®. Repeaters act as relay stations for Nodes that are out of direct wireless range of the Base station. An example network configuration is shown below.







-  Base Station
-  Repeater
-  Sensor

Nodes communicate to Repeaters or Base Stations over SmartDiagnostics® proprietary DARTwireless™ protocol. This protocol offers up to a factor of 8 lower energy consumption and 8 times the throughput of IEEE802.15.4 networks such as Zigbee. This enables long battery life, frequent data transmission, and low interference with other wireless systems.

Adding several Repeaters to a facility creates a more robust network and allows multiple paths for Node data to reach a Base Station for increased data reliability. This approach enables interference and multipath mitigation known as “antenna diversity” and “frequency agility”. In this case, Nodes are allowed to automatically change their communication path to different Repeater or Base Station on an as-needed basis to find the optimal communication path that maximizes the transmission reliability and battery life. This simplifies operation and reduces imbalanced network loading of certain nodes, thereby dramatically improving communication throughput.



<p>Node</p> 	<p>Magnetic or stud mount</p>
<p>DARTwireless™ Network</p> <p>800 foot range in open field line of sight</p> <p>200 foot range in typical industrial environment</p>	
<p>Repeater</p> 	<p>50 nodes per Repeater or Base Station (depends on the data acquisition interval)</p> <p>Environmental enclosure</p> <p>120V AC Power*</p> <p>No interaction with customer Network / IT</p>
<p>DARTwireless™ Network</p> <p>2400 foot range in open field line of sight</p> <p>600 foot range in typical industrial environment</p>	
<p>Base Station</p> 	<p>Up to 4 Repeaters per Base Station</p> <p>Environmental enclosure</p> <p>120V AC Power*</p>
<p>Wi-Fi Connection (Local or Cloud Server)</p> <p>Ethernet (Local or Cloud Server)</p> <p>Cellular (Cloud Server)</p>	
<p>Database</p> 	<p>Unlimited Collection Servers per account</p> <p>Windows operating system can be used for hosting local installations</p> <p>Web browser user interface for either local or cloud implementations</p>

*24V DC power supply for Base Station and Repeater is also possible – ask KCF for more details