# SNAP **SIGNAL**

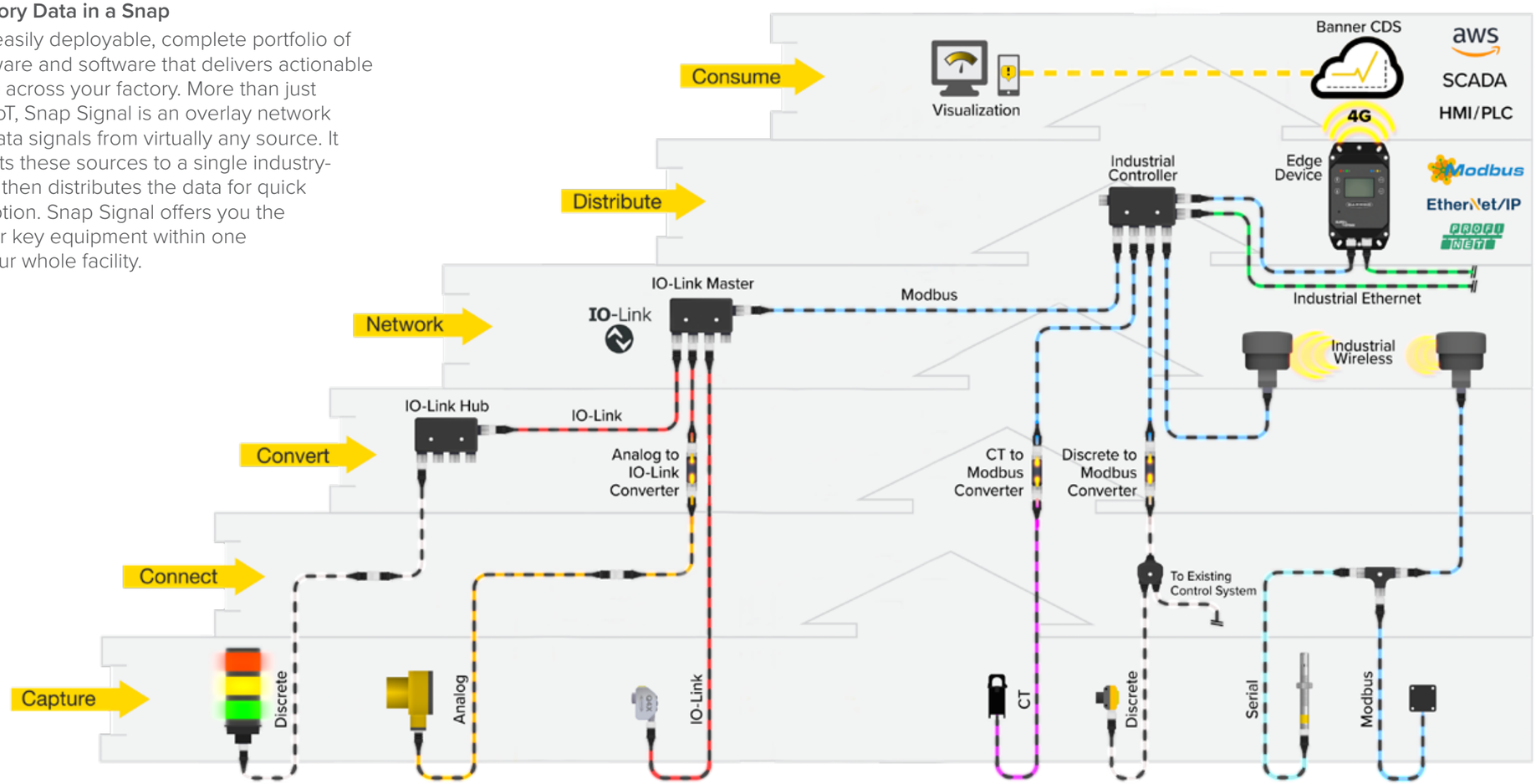
## IIoT Made Easy

BANNER®

more sensors, more solutions

### Monitor Your Factory Data in a Snap

Snap Signal is an easily deployable, complete portfolio of modular IIoT hardware and software that delivers actionable machine data from across your factory. More than just another flavor of IIoT, Snap Signal is an overlay network that can capture data signals from virtually any source. It seamlessly converts these sources to a single industry-standard protocol, then distributes the data for quick and easy consumption. Snap Signal offers you the flexibility to monitor key equipment within one area or monitor your whole facility.




# SNAP SIGNAL CAPTURE

## Capture Actionable Data

The devices that outfit automated production lines—sensors, tower lights, motor drives, valves, and other components—transmit electronic signals as part of their basic functionality. For example, whenever a sensor detects an item moving along a conveyor, or activates an indication light, or identifies that a motor is running hot, there is a pulse of activity. By adding a system to monitor these signals, you can unlock a wealth of valuable information.

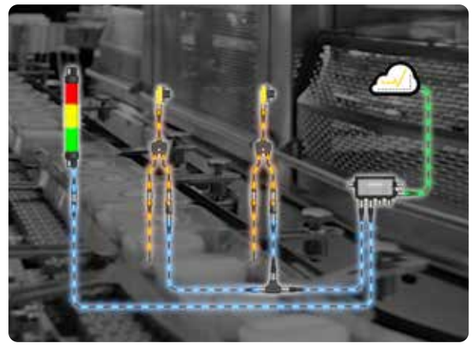
By monitoring a single sensor, you begin to understand cycle time, throughput, and uptime. If you had multiple machines with identical sensing points, you could monitor each one and compare their performance. Or this data could be used for improving efficiencies, reducing downtime, and lowering costs. It could even be used for predictive equipment maintenance.

It all starts with capturing the data that will be beneficial to your operation. Snap Signal is designed to be brand agnostic, modular, and scalable, so you can capture data from your existing devices (or add new ones), visualize that information, and make insight-driven decisions.



### Maximize Throughput and Reduce Downtime by Harnessing Sensor Data from Your Equipment

- Monitor production throughput and performance using existing sensors and Snap Signal converters
- Calculate OEE metrics, such as availability, performance, and quality, locally on the DXMR90 industrial controller
- Send actionable data to the cloud directly from the DXMR90

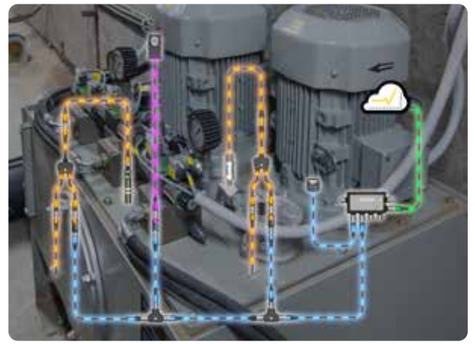


### Provide Real-Time Tank Level Monitoring Data to Efficiently Manage Inventory

- Connect existing ultrasonic or radar tank-level sensors
- Monitor tank volume and make decisions at the sensor level with the DXMR90
- Send actionable tank-level data and alerts to Banner CDS

### Keep Hydraulic Power Units Running at Peak Performance

- Add Snap Signal converters to sensors measuring any machine condition, such as pressure, current, oil temperature, and vibration
- Send data from hydraulic machinery to the DXMR90 for real-time condition monitoring
- Set alerts locally or in the cloud to respond to potential failures quickly



Learn more at bannerengineering.com

## Connect Your Devices

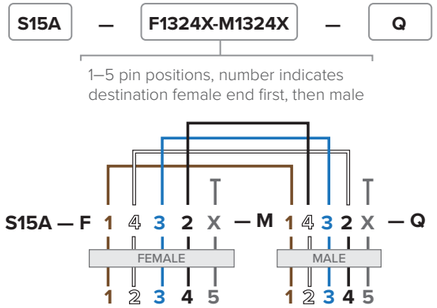
Snap Signal products are designed to be part of a plug-and-play solution. Snap Signal incorporates M12 connectors, which are the industry standard for joining devices together. This makes it possible to deliver the benefits of Snap Signal as an "overlay network," which consists of using splitter cables to connect to existing devices.

This overlay network is unique. Nothing is disabled from, or interferes with, the existing control system; instead, the attached monitoring connections simply "listen in" to the signals. The overlay network also speeds up the process of monitoring devices on your machine, because it connects quickly and does not require previous cable runs to be rerouted. Any device that does not already have an M12 connector can be easily converted using field-wirable M12 connectors.

## S15A Wiring Adapter

- Adapters reroute wiring to match specific application requirements
- Match outputs to inputs and isolate select signals
- Rugged over-molded design meets IP65, IP67, and IP68 standards
- Simple M12 connection for easy installation wherever needed in the circuit
- Custom options are available

| Function Description | Model |
|---|---|
| Pin 2 goes to Pin 4 in both directions | **S15A-F14325-M14325-Q** |
| Female Pin 4 goes to Male Pin 5 | **S15A-F1235X-M123X4-Q** |
| Female Pin 2 goes to Male Pin 5 | **S15A-F1534X-M1X342-Q** |
| Pin 1 is open; all others pass through | **S15A-FX2345-MX2345-Q** |
| Pin 2 is open; all others pass through | **S15A-F1X345-M1X345-Q** |

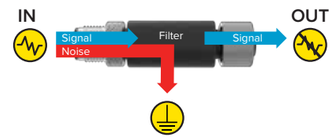



S15A — F1324X-M1324X — Q

1–5 pin positions, number indicates destination female end first, then male

## S15F In-Line Filter

- Protect devices from electrical noise and transients
- Rugged over-molded design meets IP65, IP67, and IP68 standards
- Simple M12 connection for easy installation wherever needed in the circuit
- Improve signal integrity and reduce troubleshooting time, and install wiring more quickly




| Function Description | Model |
|---|---|
| Filter; High impedance, rated to 500mA | **S15F-H-500-Q** |
| Filter; Low impedance, rated to 4000mA | **S15F-L-4000-Q** |
| Suppressor; Rated to 30 V dc | **S15F-30V-Q** |

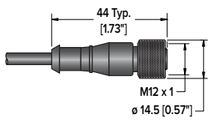
S15F — 30V — Q

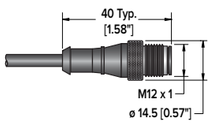
**30V** = 30 V dc Voltage Suppressor
**H-500** = Hi-Impedence Filter 500 mA Max
**L-4000** = Low-Impedence Filter 4000 mA Max

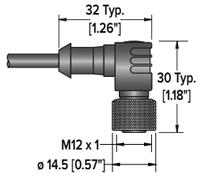
**Cable:** PVC jacket, PUR (polyurethane) connector body, nickel-plated brass coupling nut

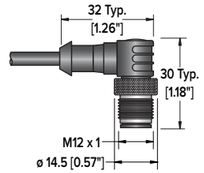
**Conductors:** 22 AWG or 24 AWG (open shield only) high-flex stranded, gold-plated contacts

**Temperature:** -40° to +90° C




## 4-Pin M12 Cordsets (Voltage: 250 V dc/ac, Current: 4 A)

| | Length | Straight | Right-Angle | Pinout | |
|---|---|---|---|---|---|
| 4-Pin Female QD to Flying Leads | 1 m | MQDC-403 | — | Female | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black |
| | 2 m | MQDC-406 | MQDC-406RA | | |
| | 5 m | MQDC-415 | MQDC-415RA | | |
| | 9 m | MQDC-430 | MQDC-430RA | | |
| | 15 m | MQDC-450 | MQDC-450RA | | |
| | 18 m | MQDC-460 | MQDC-460RA | | |
| | 21 m | MQDC-470 | MQDC-470RA | | |
| | 30 m | MQDC-4100 | MQDC-4100RA | 22 AWG | Cable ø – 5.21 mm |

| | | | | | |
|---|---|---|---|---|---|
| 4-Pin Male QD to Flying Leads | 2 m | MQDMC-406 | MQDMC-406RA | Male | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black |
| | 5 m | MQDMC-415 | MQDMC-415RA | | |
| | 9 m | MQDMC-430 | MQDMC-430RA | 22 AWG | Cable ø – 5.21 mm |

| | Length | Straight/Straight (female/male) | Straight/Right-Angle (female/male) | Pinout | |
|---|---|---|---|---|---|
| 4-Pin Double-Ended | 0.3 m | MQDEC-401SS | MQDEC-401SR | Female | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black |
| | 0.6 m | MQDEC-402SS | — | | |
| | 0.9 m | MQDEC-403SS | MQDEC-403SR | | |
| | 1.8 m | MQDEC-406SS | MQDEC-406SR | | |
| | 3.0 m | MQDEC-410SS | — | | |
| | 3.6 m | MQDEC-412SS | MQDEC-412SR | Male | |
| | 4.5 m | MQDEC-415SS | MQDEC-415SR | | |
| | 6.1 m | MQDEC-420SS | MQDEC-420SR | | |
| | 9.2 m | MQDEC-430SS | MQDEC-430SR | | |
| | 15.2 m | MQDEC-450SS | MQDEC-450SR | 22 AWG | Cable ø – 5.21 mm |

Note: Not all models are shown. Please contact Banner for other available double-ended styles.

## 5-Pin M12 Cordsets (Voltage: 60 V dc/ac, Current: 4 A)

| | Length | Straight | Right-Angle | Pinout | |
|---|---|---|---|---|---|
| 5-Pin Female QD to Flying Leads | 0.9 m | MQDC1-503 | — | Female | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black<br>**5** = Gray |
| | 2 m | MQDC1-506 | MQDC1-506RA | | |
| | 5 m | MQDC1-515 | MQDC1-515RA | | |
| | 9 m | MQDC1-530 | MQDC1-530RA | | |
| | 19 m | MQDC1-560 | — | | |
| | 30 m | MQDC1-5100 | — | 22 AWG | Cable ø – 5.21 mm |
| 5-Pin Male QD to Flying Leads | 2 m | MQDMC-506 | MQDMC-506RA | Male | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black<br>**5** = Gray |
| | 5 m | MQDMC-515 | MQDMC-515RA | | |
| | 9 m | MQDMC-530 | MQDMC-530RA | 22 AWG | Cable ø – 5.21 mm |

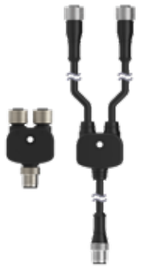
| | Length | Straight/Straight (female/male) | Straight/Right-Angle | Pinout | |
|---|---|---|---|---|---|
| 5-Pin Double-Ended | 0.3 m | MQDEC-501SS | — | Female | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black<br>**5** = Gray |
| | 1 m | MQDEC-503SS | — | | |
| | 2 m | MQDEC-506SS | — | Male | |
| | 5 m | MQDEC-515SS | — | | |
| | | | | 22 AWG | Cable ø – 5.21 mm |

Note: Not all models are shown. Please contact Banner for other available double-ended styles.

## M12 Coiled Cordsets

| | Length | Straight | Pinout | |
|---|---|---|---|---|
| 4-Pin Coiled Cordsets | 0.8 to 1.7 m | MQDC-401.7M-PUR-C | Female | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black |
| | 1.0 to 2.6 m | MQDC-402.6M-PUR-C | | |
| | 1.2 to 3.3 m | MQDC-403.3M-PUR-C | | |
| 4-Pin Coiled Double-Ended Cordsets | 0.8 to 1.7 m | MQDEC-401.7M-PUR-C | Female | **1** = Brown<br>**2** = White<br>**3** = Blue<br>**4** = Black |
| | 1.0 to 2.6 m | MQDEC-403.3M-PUR-C | Male | |

## M12 Splitters and Tees



| | Models | Cable Lengths | | Pinout |
|---|---|---|---|---|
| | | **Branches** (Female) | **Trunk** (Male) | |
| 4-Pin | **CSB-M1240M1240** | No Branch | No Trunk | Female: 1 = Brown, 2 = White, 3 = Blue, 4 = Black; Male: 1 = Brown, 2 = White, 3 = Blue, 4 = Black |
| | **CSB-M1240M1241** | 2 x 0.3 m | No Trunk | |
| | **CSB-M1241M1241** | 2 x 0.3 m | 0.3 m | |
| | **CSB-M1243M1243** | 2 x 1 m | 1 m | |
| | **CSB-M1243M1246** | 2 x 2 m | 1 m | |
| | **CSB-M1248M1241** | 2 x 0.3 m | 2.4 m | |
| | **CSB-M12415M1241** | 2 x 0.3 m | 4.6 m | |
| | **CSB-UNT425M1241** | 2 x 0.3 m | 7.6 m Unterminated | **22 AWG** — **Cable ø – 6.0 mm** |

| | Models | Cable Lengths | | Pinout |
|---|---|---|---|---|
| | | **Branches** (Male) | **Trunk** (Female) | |
| 5-Pin | **CSB-M1251FM1251M** | 2 x 0.3 m | 0.3 m | Male: 1 = Brown, 2 = White, 3 = Blue, 4 = Black, 5 = Gray; Female: 1 = Brown, 2 = White, 3 = Blue, 4 = Black, 5 = Gray |

**22 AWG** — **Cable ø – 5.5 mm**

| | Models | Cable Lengths | | Pinout |
|---|---|---|---|---|
| | | **Branches** (Female) | **Trunk** (Male) | |
| 5-Pin | **CSB4-M1251M1250** | 4 x No Branch | 0.3 m | Female: 1 = Brown, 2 = White, 3 = Blue, 4 = Black; Male: 1 = Brown, 2 = White, 3 = Blue, 4 = Black |

**4 x 22 AWG** — **Cable ø – 5.6 mm**

| | Models | Cable Lengths | | Pinout |
|---|---|---|---|---|
| | | **Branches** (Female) | **Trunk** (Male) | |
| 5-Pin | **CSB-M1250M1250-T** | No Branch | No Trunk | Female: 1 = Brown, 2 = White, 3 = Blue, 4 = Black, 5 = Gray; Male: 1 = Brown, 2 = White, 3 = Blue, 4 = Black, 5 = Gray |
| | **CSB-M1250M1250-A** | No Branch | No Trunk | |

## M12 Field Wireables

| | Male/Female | Straight | Pinout |
|---|---|---|---|
| **4-Pin M12 Field Wireable** | Male | **FIC-M12M4** | Male: 1 = Brown, 2 = White, 3 = Blue, 4 = Black |
| | Female | **FIC-M12F4** | Female |

| | Male/Female | Straight | Pinout |
|---|---|---|---|
| **5-Pin M12 Field Wireable** | Male | **FIC-M12M5** | Male: 1 = Brown, 2 = White, 3 = Blue, 4 = Black, 5 = Gray |
| | Female | **FIC-M12F5** | Female |

## Ethernet Cordsets

| | Length | Straight | Pinout |
|---|---|---|---|
| **4-Pin Male M12 to RJ45** | 2 m | **STP-M12D-406** | Male: 1 = Brown, 2 = White, 3 = Blue, 4 = Black |
| | 5 m | **STP-M12D-415** | |
| | 9 m | **STP-M12D-430** | **2 x 24 Pair AWG** — **Cable ø – 6.2 mm UTP Stranded** |

## Accessories

**LMBM12MAG**
Attaches to M12 cordset end (magnetic)

**LMBM12SP**
Attaches to M12 cordset end

**ACC-CAP M12-10**
Protective end cap

**LMBS15MAG**
Attaches to S15C.. (magnetic)

**LMBS15SP**
Attaches to S15C..

# SNAP SIGNAL CONVERT

## Convert to a Unified Protocol

After the physical connections are made to the devices on your machine or automation system, we need to get everything speaking the same language. Some devices might send discrete PNP or NPN signals, others might use analog 0–10 V dc signals, and you might plan to add other types of devices in the future, such as current transducers. All of these signals need to be quickly and easily converted to a unified protocol. This enables you to build a serial network.

Most Snap Signal converters are only the size of a single AA battery, and they begin converting signals as soon as they are installed.



## S15C Converter

Break free from protocol limitations with S15C in-line converters. S15C converters take various types of signals such as discrete, analog, and others and convert these signals to smart protocols like IO-Link or Modbus. This makes it easy to incorporate existing legacy sensors into standard protocols to enable process monitoring. They are designed to connect directly to a sensor, indicator, or other device and begin operating immediately, fitting seamlessly into your factory applications.

- Allows previously incompatible devices to be connected to a smart system
- Compact form factor
- Rugged over-molded design meets IP65, IP67, and IP68 standards
- Simple M12 connection for easy installation wherever needed in the circuit

### S15C Converter IO-Link®

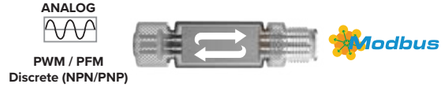
Easily converts signals like 4–20 mA analog to IO-Link without any setup required


**S15C** – **I** – **KQ**

**I** = 4–20 mA
**U** = 0–10 V dc
**B21** = Discrete Input/Output
**MGN** = Modbus
**MGP** = Modbus GPS
**MVT**= Modbus V/T Sensor
**MEZ** = EZ-ARRAY
**MTH** = Modbus T/H Sensor
**MUL** = Modbus Ultrasonic Sensor

### S15C Converter Modbus

Easily converts signals like discrete, analog, and more to Modbus which makes it easy to monitor and send data to the cloud




**S15C** – **I** – **MQ**

**I** = 4–20 mA
**U** = 0–10 V dc
**B22** = Discrete Inputs (NPN/PNP)
**CT** = Current Transformer
**TMS** = Thermistor
**BBTG** = T-Gage

## S15CM Converter

Compact converter that connects to a Modbus® device and outputs the value as a pulsed signal, either PFM or PWM


**S15CM** – **PP** – **M** **Q**

**PP** = PFM/PWM output
**M** = Modbus

# SNAP SIGNAL CONVERT

## R45C IO-Link to Analog Out Converter

- Compact analog to IO-Link device converter that outputs an analog value, voltage or current, as presented by the IO-Link Master
- Rugged over-molded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use

| Housing | Function | | Male | | Female 1 | Connector |
|---|---|---|---|---|---|---|
| **R45** | **C** | – | **K** | – | **I** | **Q** |
| | **C** = Converter | | **K** = IO-Link | | **I** = Analog current out<br>**U** = Analog voltage out | **Q** = Integral M12 quick disconnect |

## R45C IO-Link to Analog In and Out Converter

- Compact analog to IO-Link device converter that outputs an analog value, voltage or current, as presented by the IO-Link Master
- The converter also connects to an analog source, voltage or current, and outputs the value to the IO-Link master
- Rugged over-molded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use

| Housing | Function | | Male | | Female 1 | | Female 2 | Connector |
|---|---|---|---|---|---|---|---|---|
| **R45** | **C** | – | **K** | – | **I** | – | **I** | **Q** |
| | **C** = Converter | | **K** = IO-Link | | **I** = Analog current out<br>**U** = Analog voltage out | | **I** = Analog current in<br>**U** = Analog voltage in | **Q** = Integral M12 quick disconnect |

## R45C IO-Link to Analog In or Out Converter

- Compact analog to IO-Link device converter that outputs an analog value, voltage or current, as presented by the IO-Link Master
- The converter also connects to an analog source, voltage or current, and outputs the value to the IO-Link master
- Rugged over-molded design meets IP65, IP67, and IP68
- Connects directly to a sensor or anywhere in-line for ease of use

| Housing | Function | | Male | | Female 1 | Connector |
|---|---|---|---|---|---|---|
| **R45** | **C** | – | **K** | – | **II** | **Q** |
| | **C** = Converter | | **K** = IO-Link | | **II** = Analog current in/out<br>**UU** = Analog voltage in/out | **Q** = Integral M12 quick disconnect |

## R90C IO-Link Hub

The R90C IO-Link Hub connects two discrete signals to each of the four unique ports, providing access to monitoring and configuring those ports with an IO-Link master. Host mirroring is available where a selected port input/output discrete signal can be routed to Pin 2 (male) on the PLC/Host connection.


| Housing | Function | | Converter | | Control | Connector |
|---|---|---|---|---|---|---|
| **R90** | **C** | – | **4B21** | – | **K** | **Q** |
| **ISD Connect** | **C** = Converter | | **4B21** = 4-port, bimodal, 2 inputs, 1 output | | **K** = IO-Link | **Q** = M12 Integral Quick Disconnect |

## Accessories

**SMBR90S**
Mounting Bracket
(use multiples to stack)

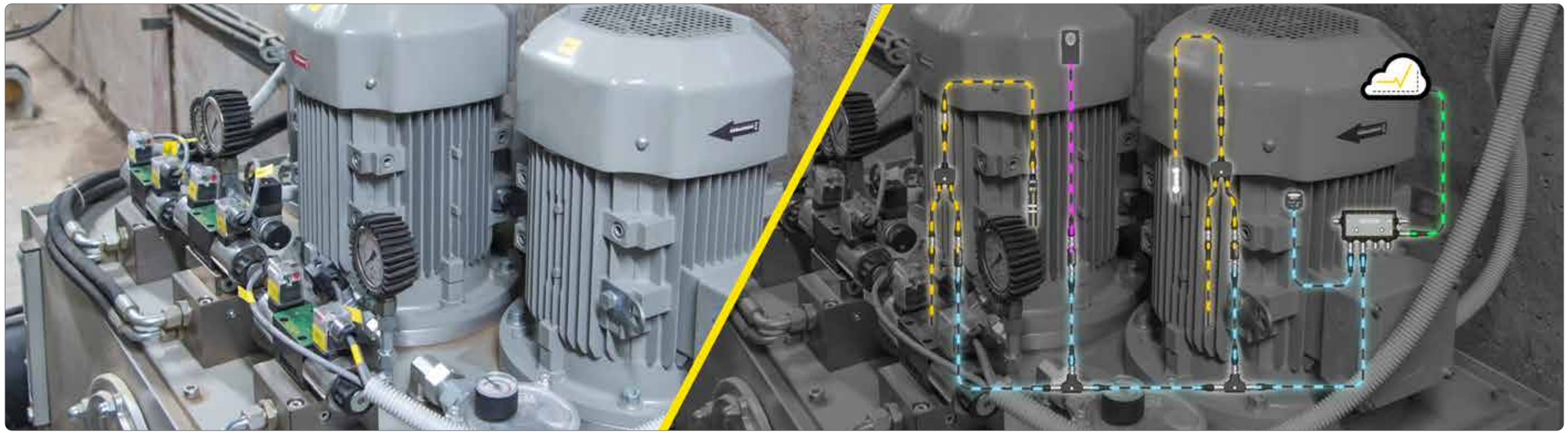
**LMBM12MAG**
Attaches to
M12 cordset end
(magnetic)

**LMBM12SP**
Attaches to
M12 cordset end

**ACC-CAP M12-10**
Protective
end cap

**LMBS15MAG**
Attaches to
S15C..
(magnetic)

**LMBS15SP**
Attaches to
S15C..




# Keep Hydraulic Power Units at Peak Performance

## Challenge

Monitor the pressure, current, oil temperature, and motor vibration/ temperature of hydraulic power units and other hydraulic machinery.

## Solution

Condition monitoring makes it possible to ensure that all equipment is working at optimal efficiency, and to detect and address potential maintenance issues before they lead to costly production downtime.

The Snap Signal system is designed to be a brand-agnostic, overlay-architecture technology, meaning that there's no need to replace existing hydraulic systems or even older sensors. Snap Signal converters, adapters, or filters can be installed to branch off from existing sensors and send Modbus signals to a Banner DXMR90 Industrial Controller device. This controller combines multiple Modbus signals—potentially from an entire production environment—into a single data stream that can be processed in cloud networks, including Banner's own Cloud Data Services. Then, users can monitor equipment performance data from anywhere with online visualization tools, and receive 24/7 notifications about any hydraulic component operating below customizable thresholds. Additionally, monitored machine health can be displayed on site using connected indicators, such as Banner tower lights.

### S15C Converter

The S15C converter takes various types of signals including discrete, analog, and RTD, transforming them to smart protocols like IO-Link or Modbus.

### R45C Converter

The R45C compact in-line converter enables communication between IO-Link devices and equipment that only responds to analog signals.

### R90C Hub

The R90C Hub converts and consolidates discrete signals from legacy devices into an IO-Link data stream compatible with other devices including Banner's new IO-Link Master.

# SNAP SIGNAL **NETWORK**

## Build Your Network

With signals now on unified protocols, it is time to build networks of devices. IO-Link devices and anything that was translated to IO-Link using Snap Signal converters should be connected to an IO-Link Master. Multiple IO-Link Masters can be used, depending on the size and complexity of the system.

The network stage of the Snap Signal process also supports serial protocols and wireless cable replacement products such as the R70 Serial Data Radio. These radios excel in scenarios where running long lengths of cable is not practical or economical.

IO-Link Masters and wireless radios can send collected signals from your entire production system to a device that interprets Modbus data, such as the Banner DXMR90 Industrial Controller.



## R45C IO-Link Master Modbus Converter

- Connects two IO-Link devices and provides access via Modbus RTU interface
- Rugged design; easy installation with no assembly or individual wiring required
- 5-pin M12 male quick disconnect connector
- Two 4-pin M12 female quick disconnect connectors
- Built-in indication for two IO-Link master ports
- Built-in indication for Modbus RTU connection status
- Rugged over-molded design meets IP65, IP67, and IP68

| Housing | Function | | Converter | | Connection | Connector |
|---|---|---|---|---|---|---|
| **R45** | **C** | – | **2K** | – | **M** | **Q** |
| | **C** = Converter | | **2K** = 2-port IO-Link Master (female) | | **M** = Modbus Slave Connection (male) | **Q** = M12 Integral QD |

## R90C IO-Link Master Modbus Converter

The R90C 4-Port IO-Link Master connects to four IO-Link devices and provides access to IO-Link data and functionality via a Modbus RTU connection. Modbus registers allow for access to both IO-Link devices and their functions:

- Process Data In
- Process Data Out
- Connected device information
- ISDU data
- Discrete I/O configuration
- IO-Link events
- Data storage
- SIO mode


| Housing | Function | Converter | Connection | Connector |
|---|---|---|---|---|
| **R90** | **C** | **4K** | **M** | **Q** |
| | **C** = Converter | **4K** = 4-port IO-Link Master (female) | **M** = Modbus Slave Connection (male) | **Q** = M12 Integral Quick Disconnect (female) |

## R70SR Serial Data Radio

R70SR Serial Data Radios are compact, industrial, low-power wireless communications devices used to extend the range of serial communications networks. The Serial Data Radios are available in two frequencies, 900 MHz and 2.4 GHz, and are fitted with M12 quick disconnect connectors for fast deployment.

- RS-485 serial communication
- Star or tree network topology configuration
- DIP switches select operational modes
- Frequency Hopping Spread Spectrum (FHSS) technology ensures reliable data delivery
- Self-healing, auto-routing radio frequency network with multiple hops to extend the network's range

| Model | Frequency | Transmit Power |
|---|---|---|
| **R70SR9MQ** | 900 MHz ISM Band | 1 Watt |
| **R70SR2MQ** | 2.4 GHz ISM Band | 65 mW (100 mW EIRP) |

### Tees

| | Models | Cable Lengths | | Pinout |
|---|---|---|---|---|
| | | **Branches** (Female) | **Trunk** (Male) | |
| 5-Pin | **CSB-M1250M1250-T** | No Branch | No Trunk | Female: 1, 2, 3, 4, 5 |
| | **CSB-M1250M1250-A** | No Branch | No Trunk | Male: 3, 2, 1, 4, 5 |

**1** = Brown
**2** = White
**3** = Blue
**4** = Black
**5** = Gray

### Accessories

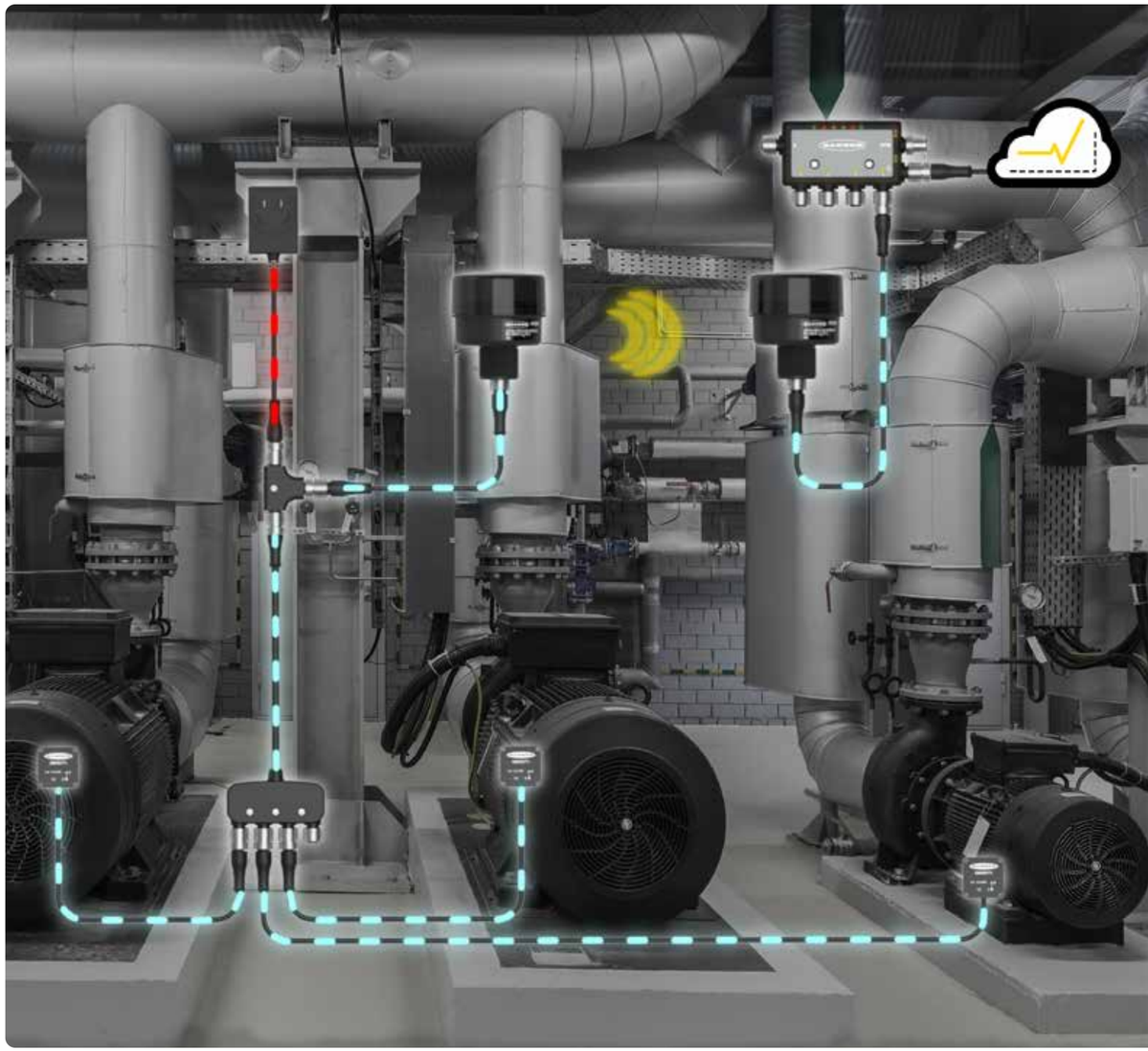
**LMB30LP**
Mounting Bracket

**PSW-24-1**
Power Supply

**SPS30***
In-Line
AC/DC Converter

*Contact Banner for model numbers

## Flexibly Combine Wired and Wireless Technology for Condition Monitoring



CHALLENGE

SOLUTION

# Monitor Tank Level Remotely

## Challenge

Provide real-time tank level monitoring data to efficiently manage inventory.

## Solution

Tap into existing devices like sensors and lights, or add new ones. Snap Signal products connect sensors of all signal types to bring tank level data onto your industrial network or to the cloud. Configure and deploy with plug-and-play converters and cables. Quickly send data to the cloud with our IoT edge gateways. Banner's cloud provides visualizations and storage.

To monitor existing tank level sensors, you can add a tee or splitter cable to harvest discrete or analog signals that are already installed on this equipment. This allows you to monitor these sensors without disrupting the existing control system. If you need to add the ability to measure level, temperature, and humidity, simply add in the corresponding sensors from Banner Engineering. Snap Signal Converters are used to convert each of these signals to a smart serial protocol so they can all communicate on a common network. Our DXMR90 Industrial Controller is added to collect the information in one place and send it wherever you need it; options include a SCADA system, PLC, or the cloud. If you do not have a cloud platform, check out Banner CDS, which is a turn-key platform for monitoring all your assets in one place and sending notifications when alarms occur.

### R90C IO-Link Master

The R90C IO-Link Master collects signals from IO-Link devices to a Snap Signal IIoT system, or other control systems on the market through four dedicated IO-Link ports.

### R45C IO-Link Master

The R45C IO-Link Master collects signals from IO-Link devices to a Snap Signal IIoT system, or other control systems on the market through two dedicated IO-Link ports.

### R70SR Serial Data Radio

The R70SR MultiHop Serial Data Radio extends the range of serial communication networks.

# SNAP **SIGNAL** **DISTRIBUTE**

## Distribute Your Data

At this stage, the unified protocols are brought together, so that all of the collected signal data from the entire system can be sent to a cloud platform, PLC, or SCADA. Banner's central control unit for Snap Signal data distribution is the DXMR90, which features a D-Code Ethernet port to transmit collected data. It is also possible to connect the controller to a DXM1200 device, which uses a cellular modem to transmit data wirelessly.


## DXMR90

The DXMR90 is a central component of Banner's Snap Signal system for device monitoring. This smart controller houses a processor that receives signals from sensors and other connected devices, through four dedicated Modbus ports. As a centralized hub, the R90x combines all of these signals into one unified stream of insightful diagnostic data, which can be exported out through industrial Ethernet protocols.


| Ethernet Connection | Modbus Master Connections | Other Connections | Model |
|---|---|---|---|
| One female M12 D-Code Ethernet Connector | Four female M12 connections for Modbus master connections | One male M12 (Port 0) for incoming power and Modbus RS-485, one female M12 for daisy chaining Port 0 signals. | **DXMR90-X1** |

On-board Programming and Scripting – MicroPython, ScriptBasic

Industrial Ethernet – Ethernet/IP, Profinet, Modbus TCP

Logic and Math operations

Serial Communications

Cloud Connectivity – Banner CDS, AWS IoT Core

## Accessories

**SMBR90S**
Mounting Bracket
(use multiples to stack)

**PSW-24-1**
Power Supply

**STP-M12D-406**
Ethernet Cordset


# Know When to Add Raw Materials to Increase Machine Uptime

## Challenge

Your machines need a constant supply of materials to keep production going. Knowing when they're running low is critical.

## Solution

Let your machines tell you when they're low on materials. Snap Signal provides this data and makes it available for viewing anywhere it's needed.

Snap Signal lets you keep your current communications network in place. Simply tee into existing analog sensors that measure roll diameter. The sensor data is converted to a unified serial protocol via Snap Signal converters and sent to a DXMR90 Industrial Controller, which can bring this valuable data to Banner Cloud Data Services (CDS) via an ethernet connection. The information may be visualized anywhere in the world on a dashboard, and call-for-parts messages can be sent automatically to people in the plant via SMS and email. At the machine level, an LED light, like the Banner WLS15 Pro, can also be used to indicate material level.

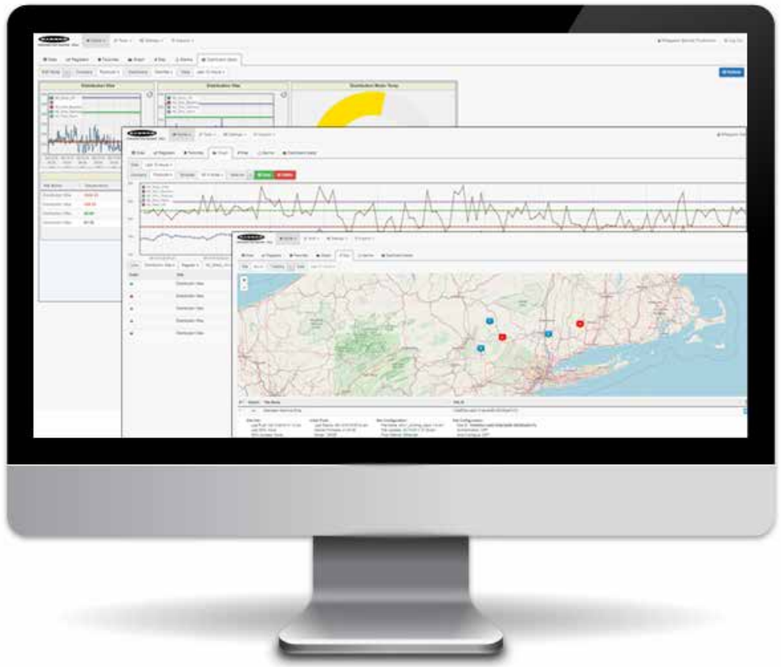

### DXMR90 Industrial Controller

The DXMR90 industrial controller works with a wide range of serial devices. Actionable data is sent to the cloud directly from the DXMR90. Alerts can be set locally or in the cloud to respond to potential failures quickly.

## Consume Data to Optimize Productivity

The data gathered from the system needs to be displayed so that machine operators, maintenance staff, and plant managers can make data-driven decisions. The data may be consumed via HMIs, PLCs, SCADA, or cloud platforms including Banner's Cloud Data Services (CDS), offering customizable dashboards for simultaneous and comprehensive online monitoring of devices in Snap Signal systems.

Ultimately, the goal of Snap Signal is to make data available to the people who need it, so that they can make informed decisions about improving processes or troubleshooting problems, thereby improving production throughput, quality, and uptime.



## Monitor Your Equipment from Anywhere

The Cloud Data Services software is a web-based platform that allows users to access, store, protect, and export critical data collected by Banner Snap Signal solutions. The software complements the Snap Signal portfolio and provides customers with complete end-to-end IIoT solutions to solve the Industrial market's most pressing problems.

**Banner CDS**

- The CDS platform is more than a dashboard. With analytics and visualization tools, the software delivers actionable insights that allow you to solve real challenges on the factory floor.
- You can remotely access data anytime and anywhere using an internet-connected device. In addition, you can define parameters to control when to receive notifications via email or SMS message. On-demand visibility and real-time alerts allow you to remotely monitor and diagnose systems quickly, saving time and costs.
- Predictive maintenance is a key capability of Banner's IIoT solutions. The software platform helps you use device data to predict machine maintenance requirements, which reduces unplanned downtime, increases mean time between failure (MTBF), and reduces maintenance costs.
- Data transmissions from your controller are secured via several layers of protection including a proprietary communication protocol and generic data transfer. In addition, data transmissions from the controller to the cloud are securely encrypted.

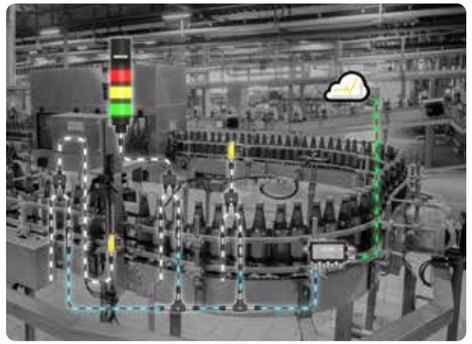
**HMI, SCADA, PLC, or Other Monitoring Platforms**

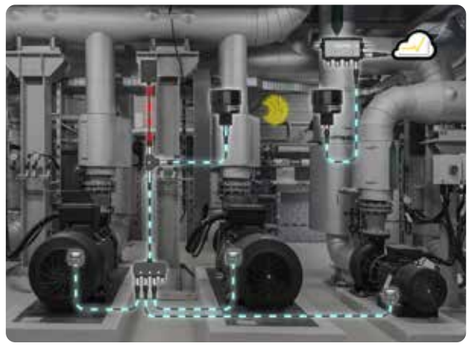
- Snap Signal's unique open architecture allows you to send data where you need it.
- The DXMR90 supports Ethernet/IP®, Modbus/TCP, Profinet, and Modbus RTU so that data can be interfaced with virtually any industrial system.
- The DXMR90 also supports Internet protocols including MQTT, RESTful, and APIs.

Visit **bannercds.com** for more information

## Monitor Your Conveyor System Optimally and Set Alerts in Banner CDS

- Identify and correct the source of reduced output in one or multiple production lines with Snap Signal
- Use existing legacy sensors that are already installed to offer valuable insights on process states and error conditions
- Monitor machine performance and help optimize throughput via sensor data sent to Banner Cloud Data Services (CDS)



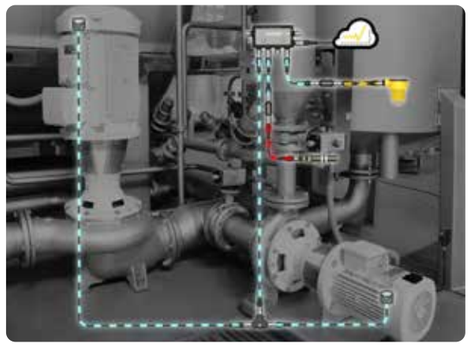


## Flexibly Combine Wired and Wireless Technology for Condition Monitoring

- Deploy R70 Serial Radios to send vibration data of machines across your factory to the DXMR90
- Monitor vibration to detect potential failures before downtime occurs
- Send actionable vibration data and alerts to Banner CDS

## Monitor Vibration, Tank Level, and Temperature of Existing Equipment

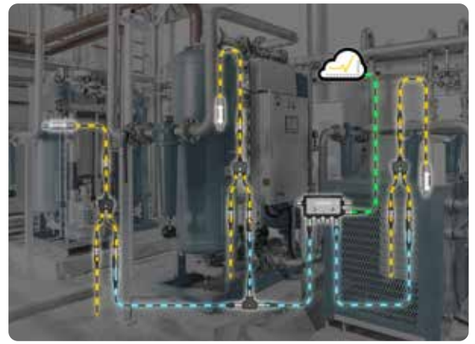
- Add Snap Signal converters and sensors that can measure machine conditions, such as vibration, tank level, and temperature
- Send data to the DXMR90 for real-time condition monitoring
- Set alerts locally or in the cloud to respond to potential failures quickly and keep your equipment running

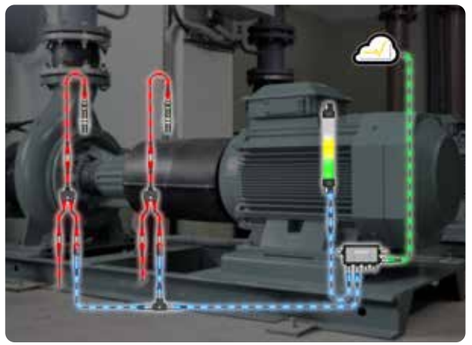




## Tap into Pressure Sensor Data for Immediate Insights

- Monitor system pressure at various locations in real-time
- Use active monitoring to quickly identify potential failures or leaks
- Combine incoming pressure sensor information for a comprehensive data stream to the cloud





## Monitor System Temperature and Set Alerts in Banner CDS

- Bring legacy sensor signals to the cloud for better insights about your machine's health
- Monitor surface temperature and forewarning of overheating parts and gather via a network of cordsets and the DXMR90 Controller
- Create an overlay architecture with easy to implement splitters and M12 cordsets
- Send data to the cloud for consumption, data dashboarding, and setting up email and text alerts

## Condition Monitoring of Dust Collection System

- Snap Signal converters provide monitoring data so users can spot small performance changes
- Problems that can be fixed early and fully with preventive maintenance
- Snap Signal converters offer easy, quick-connect setup at all key system points, monitoring vibration and temperature, boiler temperatures, level, and differential pressure
- Start with key equipment with one area or monitor your whole facility with ease and speed

Banner Engineering manufactures industrial automation products that include sensors, LED lights and indicators, machine safety components, industrial wireless devices, barcode scanners, vision sensors, industrial networks and smart i/o devices, and connectivity products. These products help produce the cars we drive, the food we eat, the medicine we take, and many of the things we touch every day. Headquartered in Minneapolis since 1966, Banner is an industry leader with over 30,000 active products, operations on six continents, and a global footprint of over 5,500 employees, factory and field representatives, and application engineers. Every 3.5 seconds a Banner product is installed somewhere in the world. From adding new capabilities to our existing products or introducing brand-new IIoT technology for smart manufacturing, Banner is your trusted partner for durable, dependable solutions.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