MOORE INDUSTRIES WORLDWIDE

BULLET®

*Wireless*HART® Adapter
for Use with Wired HART® Field Devices

February 2018

Description

The BULLET *Wireless*HART Adapter enables new and existing wired smart HART field devices, non-smart analog field devices and remote HART I/O from any supplier to communicate with host applications using *Wireless*HART technology.

Handles All Registered Smart HART "Digital" Devices—Using the industry-standard HART protocol, the BULLET can be used to transmit the primary, secondary, third and fourth variable process data from smart HART devices, valves and I/O, as well as HART instrument diagnostics, alarm data and custom commands.

Just one or up to eight* HART (multidropped) devices connect to a single BULLET making it an economical choice for sending multiple HART signals on a single wireless data link. The BULLET can be connected directly to a HART device or anywhere along the HART 4-20mA loop at a junction box. It supports both HART MESH and STAR network configurations.

Non-Smart "Analog" Devices Too—The BULLET accepts an analog (i.e., 4-20mA) signal and provides a proportional digital value in scaled engineering units at the opposite end of the data link through a *Wireless*HART gateway and, ultimately, to a host system. This is ideal for converting non-HART legacy analog instruments to wireless devices.

Loop- or DC/Battery-Powered—The BULLET can use existing loop-power (scavenging), or can be powered directly by a DC power supply, or by an external battery/solar system. When loop-powered, the BULLET saves on the long-term cost of battery maintenance, replacement and disposal programs. With external battery power, the BULLET provides battery power management by cycling the HART capable field device power, and taking and transmitting periodic process readings, and diagnostic and alarm data.

**Using Moore Industries' TCM Temperature Concentrator Module, up to 16 HART digital signals incorporating PV (Temperature) and SV (Reference Junction Compensation) variables and diagnostics and alarm data can be transmitted in a WirelessHART network. See page 4 for additional information. Consult the factory for details.*

Certifications**

FM APPROVED

IECEx

CE

**See Page 6 for Details

HART COMMUNICATION PROTOCOL

The BULLET WirelessHART Adapter can be installed directly to one smart HART or non-smart analog field device or can multidrop up to eight HART devices in a WirelessHART network.*

Features

- **Works with All HART Devices.** The BULLET is ideal for use with Moore Industries' HART field devices and HART I/O, as well as other third-party HART (v.5, 6 and 7) transmitters, valves, distributed I/O and HART 7 compliant *Wireless*HART Gateways.
- **Save Time and Money.** Use our TCM Temperature Concentrator Module to monitor up to 16 HART digital signals. The TCM accepts RTD, T/C, mV, ohms and potentiometer inputs.
- **Industry-first, Patented StepVolt™ Technology.** Sets insertion voltage in steps from 1 to 2.5 volts to optimize the tradeoff between available loop power and wireless communication bandwidth.
- **"Plug-and Play" Installation and Operation.** Sets up using a standard HART DD/EDD, or using free DTM (Device Type Manager) device-specific software designed to operate within a frame program such as PACTware™. The BULLET can also be factory-configured by Moore Industries personnel to user specifications.
- **Installs in Rugged Field and Hazardous Areas.** Featuring a rugged internal antenna design, the BULLET is available in General Purpose, Intrinsically-Safe, Non-Incendive, Non-Sparking and Explosion-proof/Flameproof models.

700-710-113 D

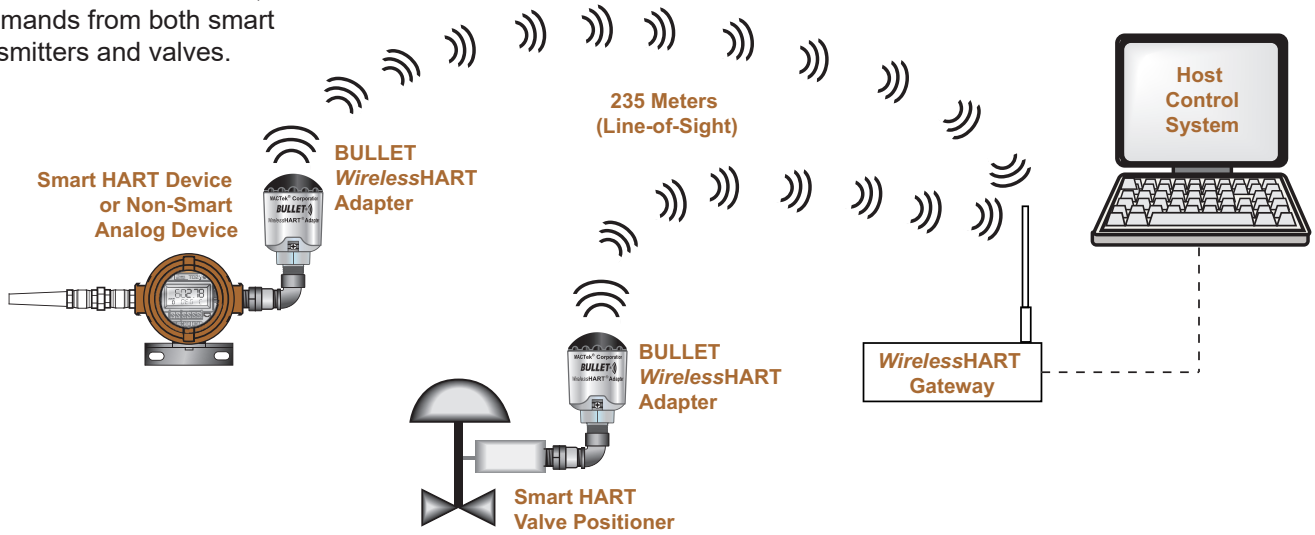
BULLET®

*Wireless*HART® Adapter
for Use with Wired HART® Field Devices

Single-Device *Wireless*HART Networks

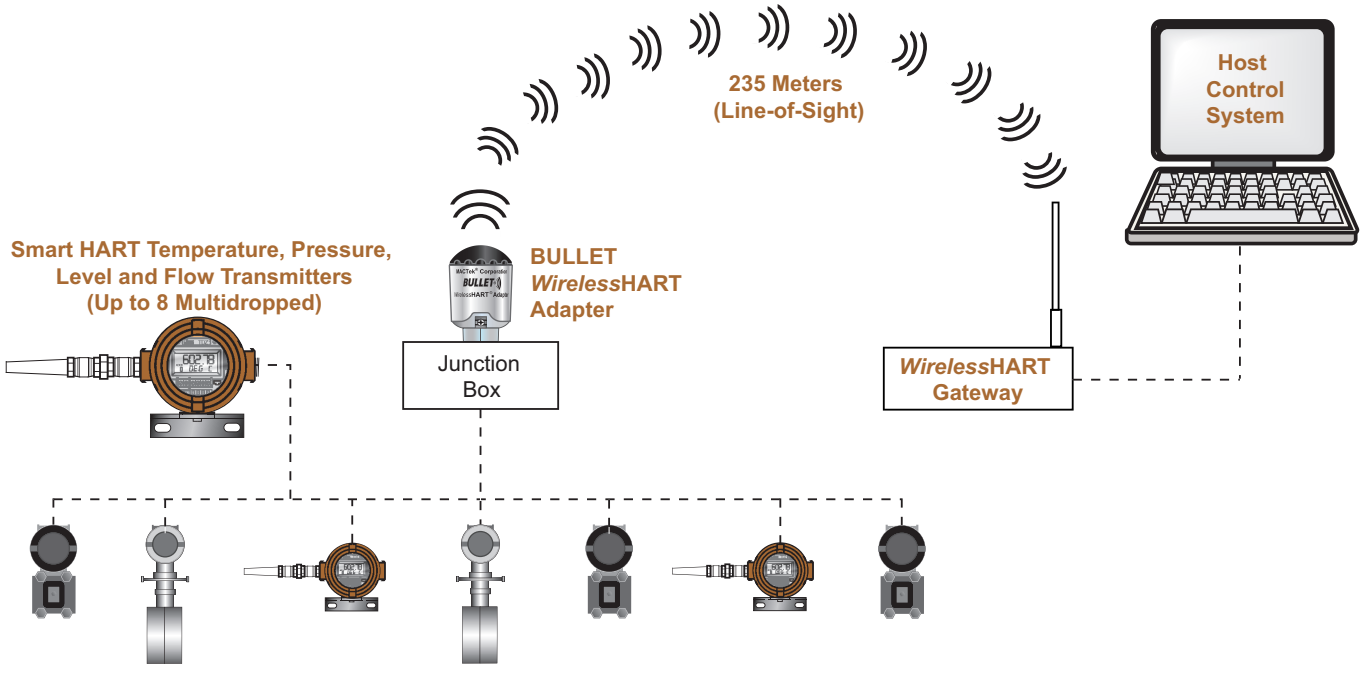
The BULLET *Wireless*HART Adapter can be used to send process signals from a smart HART field transmitter or valve, or from a non-smart analog (4-20mA) transmitter. This includes primary, secondary, third and fourth variables from smart HART transmitters, and valve position, travel and valve output pressure from smart HART valves. It also includes diagnostic and alarm data, and custom commands from both smart transmitters and valves.

Devices may include Moore Industries' THZ[3]/TDZ[3] Smart HART Temperature Transmitters, our HTZ Smart HART Humidity and Temperature Transmitter or any one of our non-smart analog signal transmitters, isolators and converters.



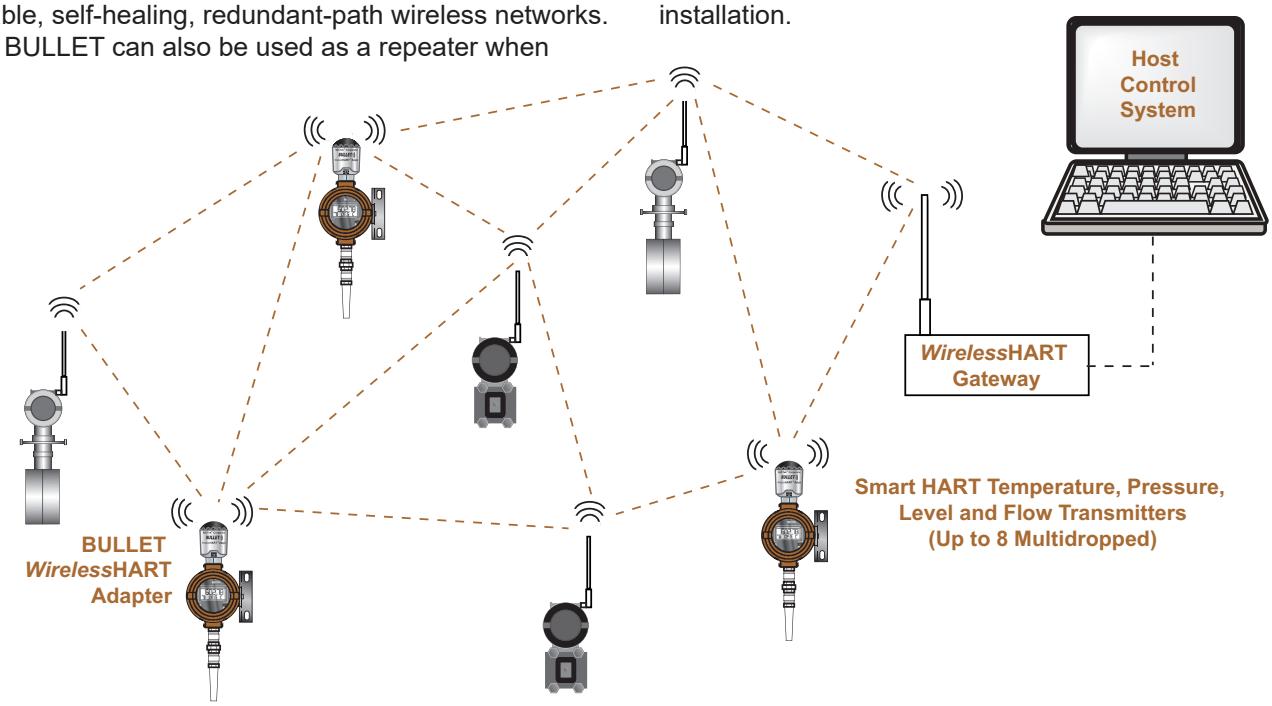
Multi-Device (Multidrop) *Wireless*HART Networks

The BULLET can be used in multi-device applications to multidrop signals from up to eight smart HART transmitters. This includes process signals (primary, secondary, third and fourth variables), custom diagnostic and alarm data, and custom commands.



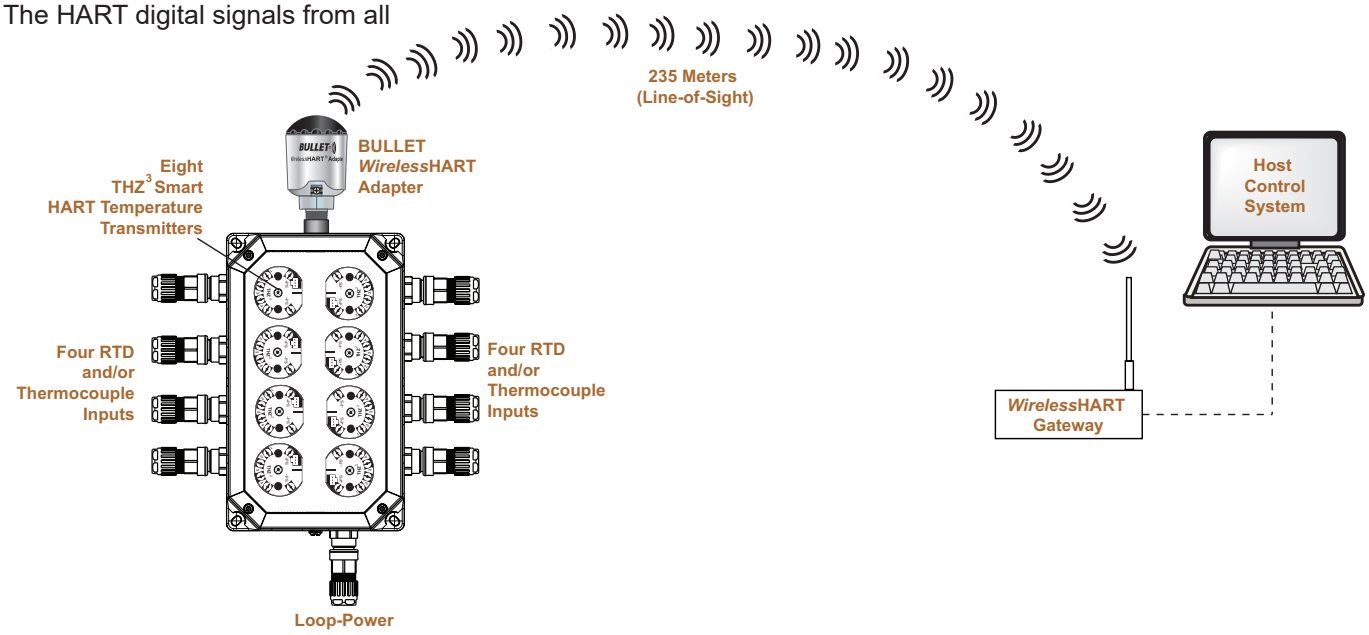
Supports *Wireless*HART Mesh Topology

Mesh networks using BULLET Adapters and any other combination of *Wireless*HART devices deliver highly-reliable, self-healing, redundant-path wireless networks. The BULLET can also be used as a repeater when longer transmission distances are required or physical barriers prohibit "Line-of-Sight" installation.



Ready-to-Install Moore Industries Multi-Temperature (Multidrop) *Wireless*HART Networks

To facilitate specification and installation, Moore Industries can pre-package up to eight of our compact THZ[3] Smart HART Temperature Transmitters into our rugged aluminum (solid or clear cover) instrument enclosure ready to install in your application. The HART digital signals from all eight multidropped transmitters, which include primary (process) and secondary (RJC) variables as well as diagnostic and alarm data can be transported over a BULLET wireless data link to a *Wireless*HART Gateway connected to a host control system.

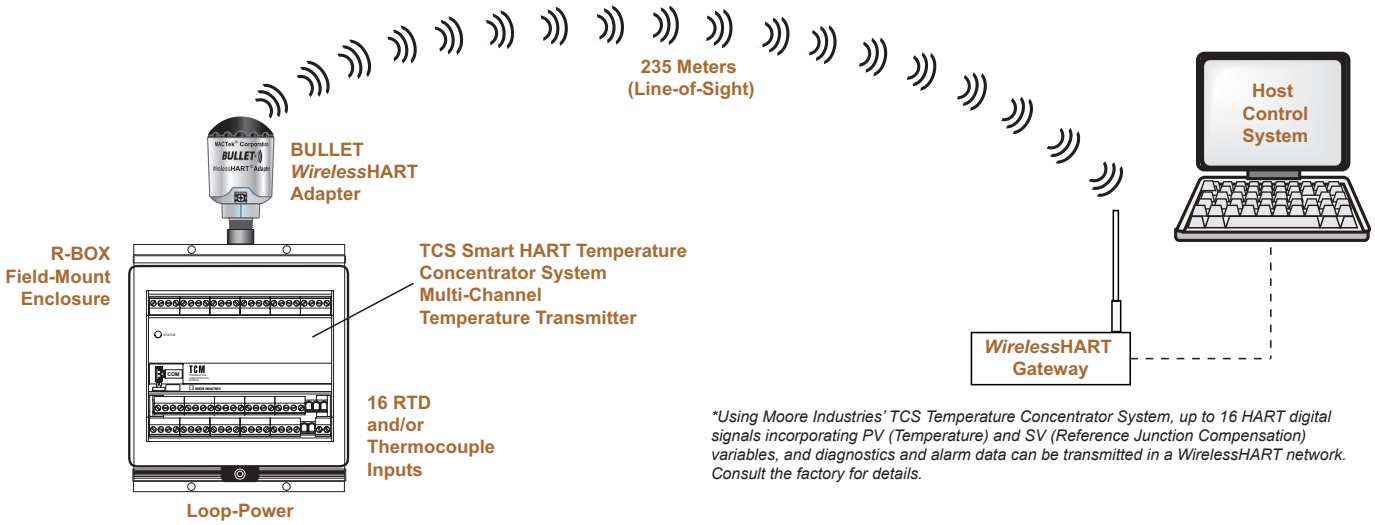


BULLET®

*Wireless*HART® Adapter
for Use with Wired HART® Field Devices

Economical Field-Mount Multi-Device *Wireless*HART Applications Using Moore Industries TCS Smart HART Temperature Concentrator System™

To further save device costs, Moore Industries' TCS Multi-Channel Smart HART Temperature Transmitter prepackaged in our R-BOX Field-Mount Enclosure can be used to send up to 16* temperature measurements, and HART diagnostic and alarm information over one BULLET wireless data link.



**Using Moore Industries' TCS Temperature Concentrator System, up to 16 HART digital signals incorporating PV (Temperature) and SV (Reference Junction Compensation) variables, and diagnostics and alarm data can be transmitted in a WirelessHART network. Consult the factory for details.*

Specifications

System

Platform: *Wireless*HART capable network
Compliance*: Fully compliant HART 7.1 device, complies with HART 7.1 Wireless Adapter device type; Backward compatible to HART 5 devices
HART Sub-Devices: Supports up to 8 wired HART sub-devices (max. number depends on installation)

RF

Range: 235 meters outdoors, open air (nominal)
Operating Frequency: 2.4Ghz
RF Output Power: 10dBm

Electrical

Series Loop Voltage Drop: 1.0Vdc - 2.5Vdc (user-selectable in 0.5Vdc steps)
Series Loop Operating Current: 3.2mA to 25mA DC operating; Protected against over-voltage, over-current and reverse connections

Electrical (continued)

External Power Operating Voltage: +7Vdc to +32Vdc; Reverse voltage protection
External Power Operating Current: Typical <1mA; Maximum, 25mA
HART Output Level: Fully HART compliant trapezoidal wave @ 1200/2200Hz
Multidrop (Direct Power): 32mA DC maximum, 8 devices at 4mA DC
Multidrop (Loop Power): 24mA DC maximum, 6 devices at 4mA DC
Loop Current Monitoring: 3.2mA to 22mA DC, 1% accuracy

Environmental

Operating Temperature (Hazardous Location): Temperature Class T5: -40°C to +85°C (-40°F to +185°F)
Temperature Class T6: -40°C to +75°C (-40°F to +167°F)
Operating Temperature (General Purpose): -40°C to +85°C (-40°F to 185°F)
Storage Temperature: -40°C to +85°C (-40°F to 185°F)
Relative Humidity: 100%

Materials

Body: Aluminum alloy, RoHS corrosion coating, polyurethane enamel paint
Dome: Proprietary resin

Connections

One, Male 1/2-inch NPT with internal poured seal
Field Termination: 5 lead wires x 600mm (24-inch) long, exiting from male 1/2-inch NPT Opening
Ground: External earth grounding screw

Enclosure

Dimensions:
Height: 100mm (3.9 in.)
Diameter: 60.8mm (2.4 in.)
Weight: 0.46kg (1 lb.)

Factory Configuration

To facilitate Bullet *Wireless*HART Adapter commissioning, Moore Industries can factory-configure the BULLET with all operating parameters. Consult your local Moore Industries Interface Solution Center for details.

*** Communication standard: WirelessHART acc. To IEC 62591**

Ordering Information

Model	Description
110100-80M0	General Purpose - Ordinary Location BULLET *Wireless*HART Adapter (supports up to eight mutidropped HART devices or one analog device)
110101-80M0	Intrinsically-Safe, Non-Incendive, Non-Sparking BULLET *Wireless*HART Adapter (supports up to eight mutidropped HART devices or one analog device)
110102-80M0	Explosion-Proof/Flameproof BULLET *Wireless*HART Adapter (supports up to eight multidropped HART devices or one analog device)
110100-P0M0	General Purpose - Ordinary Location BULLET *Wireless*HART Adapter (supports 16 Channel TCM - Temperature Concentrator Module)
110101-P0M0	Intrinsically-Safe, Non-Incendive, Non-Sparking BULLET *Wireless*HART Adapter (supports 16 Channel TCM - Temperature Concentrator Module)
110102-P0M0	Explosion-Proof/Flameproof BULLET *Wireless*HART Adapter (supports 16 Channel TCM - Temperature Concentrator Module)

Certifications *(see the "Ordering Information" table for applicable models)*

Factory Mutual (US/Canada):
Intrinsically-Safe
Class I, II & III, Division 1, Groups A-G
Class 1 Zone 0 II 1 G AEx ia IIC;
Zone 20 II 1 D AEx iaD IP68 T95°C;

Non-Incendive
Class I, Division 2, Groups A-D, T5, T6
Suitable for use in Class II & III, Division 2, Groups E-G, T5, T6
Class I, Zone 2 II 3 G AEx nA nC IIC T5, T6

Explosion-Proof & Dust Ignition-Proof
Class I, Division 1, Groups A-G
Class II & III, Division 1, Groups E-G
Flameproof
Class 1 Zone 1 II 2 G AEx d IIC Gb T5, T6
Class 1 Zone 1 II 2 D AEx tb IIIC Db T95°C

Temperature Codes:
T5: -40°C to +85°C
T6: -40°C to +75°C

ATEX Directive 2014/34/EU:
Intrinsically-Safe
II 1 G Ex ia IIC Ga T5,T6;
II 1 D Ex iaD 20 IP68 T95°C;

Type "n"
II 3 G Ex nA nC IIC Gc T5, T6

Flameproof
II 2 G Ex d IIC Gb T5, T6
II 2 D Ex tb IIIC T95C Db

Temperature Codes:
T5: -40C° to +85C°, T6: -40C° to +75C°

IECEx:
Intrinsically-Safe
Ex ia IIC Ga T5, T6
Ex iaD A20 IP68 T95°C

Type "n"
Ex nA nC IIC Gc T5, T6

Flameproof
II 2 G Ex d IIC Gb T5, T6 IP68
II 2 D Ex tb IIIC T95C Db IP68

Temperature Codes:
T5: -40°C to +85°C
T6: -40°C to +75°C

CE Conformant: RE 2014/53/EU
ROHS 2011/65/EU

Enclosure Rating: IP67 and Type 6P