Bluetooth HART® Modem (HM-BLE) User Manual

CE

RoHS ✔

Introduction

The Bluetooth HART Modem (HM-BLE) provides the physical connection required for Apple iOS devices (iPAD, iPhone) to communicate with wired HART devices/networks.

As such iPADs and iPhones using iOS operating system can communicate with wired HART devices/networks via wireless Bluetooth technology. For devices using Windows OS you will instead need our HM-BT-BAT-ER Bluetooth HART Modem.

Once the HART side is connected, our DevCom.iOS HART Configuration software can then configure / monitor / document / etc. HART devices from up to 83 meters away.

Contents

Installation

Step 1) Turn on the HM-BLE Bluetooth HART Modem

Press the power button on the Bluetooth HART Modem, the green "Power" LED will illuminate if there is sufficient charge in the battery. If the "Power" LED does not illuminate, see the section on recharging the modem. The modem does not need to be connected to the HART device/network at this stage.

Step 2) Open the DevCom.iOS app

Launch the DevCom.iOS App on your iPAD/iPhone. The App will scan for available HM-BLE Bluetooth HART Modems, simply select the desired modem in the list. The scan name is "HART BLE Modem".

Multiple HM-BLE Modems

When several modems are in the same area, it may require trial and error to determine which modem is connected to the desired HART network, alternatively you can turn off the other modems so only the powered modem is visible.

Step 3) Connect the leads of the Bluetooth HART Modem to a HART device/network

The modem can be connected in one of two ways: across the loop load resistor (A – B) or across the HART transmitter terminals (C – D). See the relevant Figure 1a, 1b or 1c below.
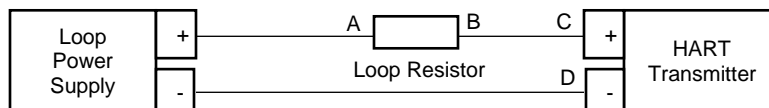
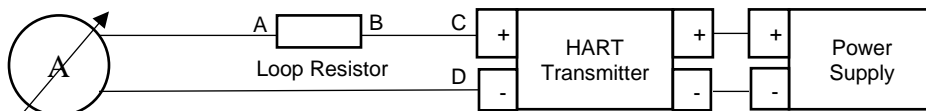Figure 1a. Loop Powered HART Transmitter Connection
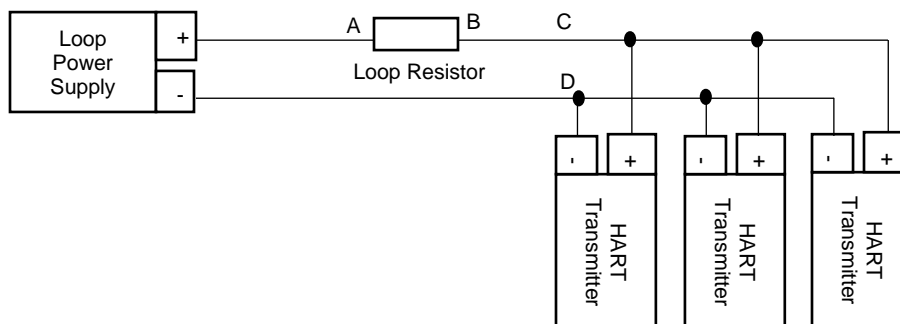
Figure 1b. 4-Wire HART Transmitter Connection

Figure 1c. Multi-drop HART Transmitter Connection

Step 4) Power your HART device/network

No external power sources are required for the HART Modem (HM-BLE) as it is powered from its internal rechargeable Li-ion battery. As shown in Figures 1a, 1b and 1c (above) the HART device should be powered as per the manufacturer's instructions.

Recharging the Modem

The modem uses a built in rechargeable Lithium Ion battery. When needed it can be recharged by connecting the modem to a powered USB port using a micro USB to USB cable (one is included for you). The time it takes to recharge will depend on the maximum power output of the USB port it is connected to, however approximately 1 hour is typical.

While actively charging the "Charge On" LED will illuminate, when completely charged the LED will turn off. When the battery is almost full the "Charge On" LED may blink. If the "Charge Error" LED illuminates, disconnect the Bluetooth modem and allow it to cool down. The normal cause for "Charge Error" is an excessively hot battery. If when you connect the modem the "Charge On" led blinks once and then stays off, your modem is already fully charged.

Rechargeable Lithium Ion batteries are very reliable so long as they are not abused. They maintain charge very well, after 1 year of storage they typically have 75% of the charge remaining. Hence you can use and recharge them without worries associated with many other battery technologies, e.g. Lithium Ion batteries do not suffer from battery memory. As an engineer you may be interested in how to optimise battery life/performance, if so all the normal recommendations for lithium batteries (Li-Ion, Li-Po) apply:

1) Do not expose to flames or excessive heat (>85 deg.c)
2) Do not charge by any method other than that described above
3) Lithium Batteries do not have a "memory" therefore they can be partially used and partially charged at any time, in fact they prefer partial charge/discharge. Unlike NiCad batteries, you do not need to fully discharge and then fully charge Lithium based rechargeables. **Lithium batteries have a longer life if you only partially discharge them.**
4) Do not leave Lithium batteries permanently plugged in on a trickle or standby charge. Once they are charged disconnect them from the power source.
5) Store away from heat sources. A cool room (10 – 20 deg.c) is ideal, but do not store Lithium batteries at fridge or freezer temperatures!
6) Do not leave lithium batteries fully discharged for long periods of time (weeks/months). If they are fully discharged they should be recharged as soon as possible.

Troubleshooting

Problem: Cannot not communicate
Verify the following:
1. Loop power supply is on
2. Loop resistance is between 250 ohms and 1Kohms
3. Loop current is within HART limits
4. If multi drop configuration, all transmitters in loop have unique addresses
5. HM-BLE connections are across loop resistor or across transmitter terminals (see step 3)
6. HM-BLE Battery is charged
7. Modem power switch is on and "Power" LED is illuminated
8. Perform the "Discovery" procedure again (Step 2) and verify a connection can be made

Problem: Communication is unreliable

Verify the following:

1. You are within radio range of the master transmitter, for Class 1 devices = 83 meters unobstructed, for Class 2 devices = 10 meters unobstructed. HM-BLE is a Class 1 Bluetooth device, check what class your iPAD / iPhone is. For 83m both devices must be Class 1

2. Vary the orientation of the master transmitter or the HM-BLE to improve radio link strength

3. Battery is charged

4. HART connections made before power turned on

5. HART Transmitter is not in Burst mode. Communications can occur in Burst mode, but more retries will be necessary for success

6. In some applications, a connection can be lost, which looks like a communication lock-up.

Warranty

The HM-BLE is warranted for 1 year for materials and workmanship. Contact HART Expert Ltd (UK) or ProComSol Ltd (USA) if having trouble. In the unlikely event that you will need to return a modem for a repair/replacement, an RMA (Return Material Authorization) number from HART Expert or ProComSol is required before returning the item.

Notice of FCC Compliance

This product contains a radio module that has been tested and found to comply with the FCC Part15 Rules. These limits are designed to provide reasonable protection against harmful interference in approved installations. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Modifications or changes to this equipment not expressly approved by ProComSol, Ltd may void the user's authority to operate this equipment.

Contains Transmitter Module FCC ID: ZAT26M1

Specifications:

Enclosure & Cables

Material	High strength ABS Plastic
Dimensions	50mm x 70mm x 20mm
Total Unit Weight	170 g
HART Cable Length	1.2 m
HART Cable Connectors	Mini-Grabber

HART

Interface	Capacitive coupling
Output	600 mVpp
Leakage	< 10 uA
Connections	Across loop resistor or HART field device
Specifications	HART 4, HART 5, HART 6, HART 7, Physical Layer Spec HCF_SPEC-54

Computer/Tablet/Smart-Phone

Operating System	Apple iOS (iPAD, iPhone) is supported. For Windows devices you instead need to use our HM-BT-BAT-ER Bluetooth HART Modem.
Bluetooth	Bluetooth v4 compatible
Class	Class 1 (up to 83.8 meters), or Class 2 (up to 10 meters)*

* To be able to achieve the full Bluetooth range (83m) your iPAD / iPhone must also be Class 1 (most are). If it is a Class 2 Bluetooth device the range will be up to 10m.

Battery

Type	Rechargeable Li-Ion
Life	19 hours continuous use (perfect conditions), 14 hours typical

Environmental

Operating Temperature	0 deg.C to 50 deg.C
Storage Temperature	-40 deg.C to 85 deg.C
Humidity	0% to 99% (non-condensing)

Compliances

CE Certification	EN 61326 (EMC), Directive 2011/65/EU (RoHS)

Contact Information

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