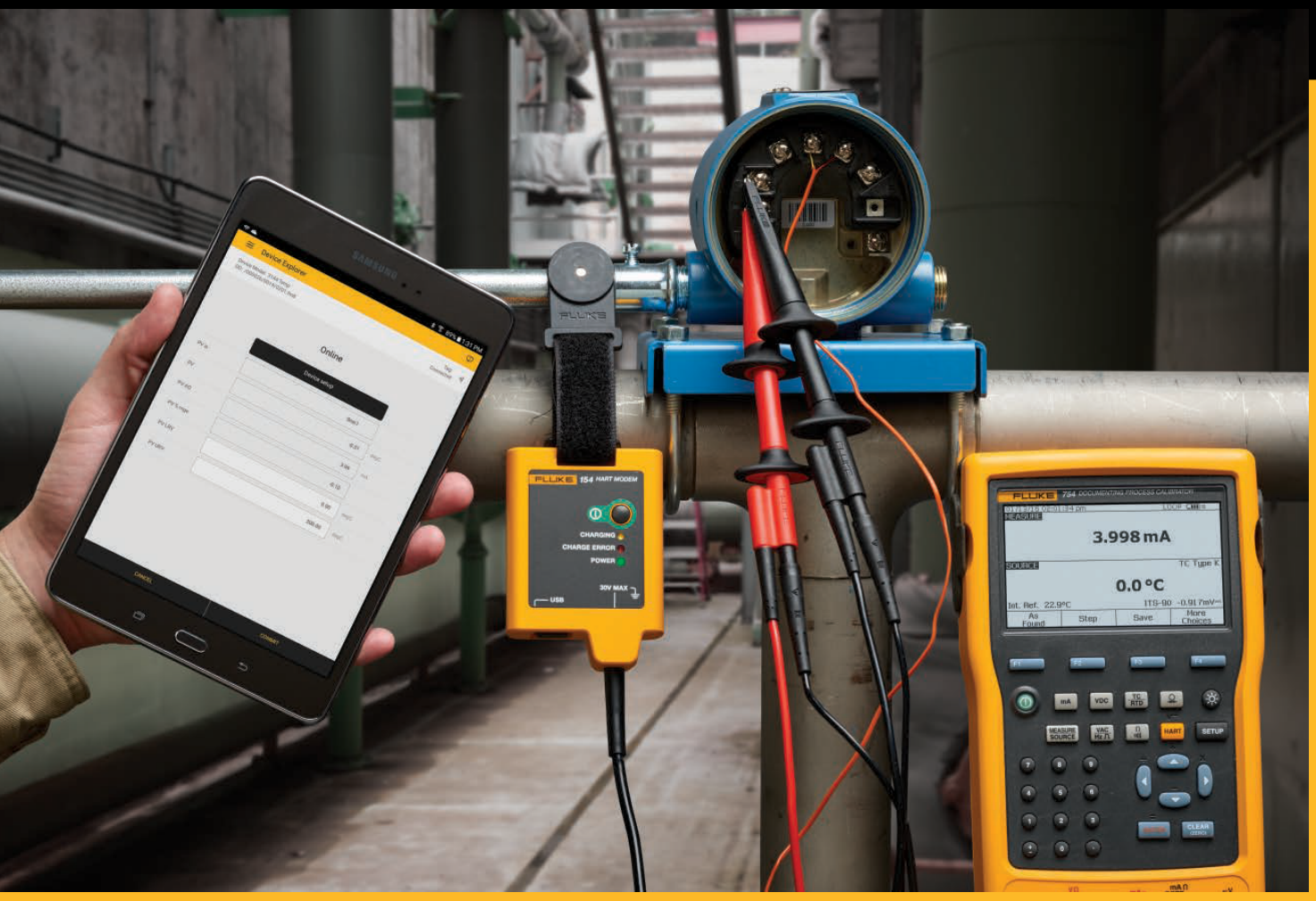
FLUKE®

HART® Calibration Assistant



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Users Manual

February 2016 Rev. 1, 12/16
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HART® Calibration Assistant

Introduction

The Fluke 154 HART® Calibration Assistant (the Product) consists of the HART® Modem (the Modem) and the Tablet with FlukeHART (the App). Wireless technology connects the Modem to the Tablet and App. Wires connect the Modem to a HART field device (the Device). Use the App to configure and calibrate the Device.

The intended user is familiar with the basic functions of wireless devices and mobile technology.

Safety Information

A **Warning** identifies hazardous conditions and actions that could cause bodily harm or death. A **Caution** identifies conditions and actions that could damage the Meter, the equipment under test, or cause permanent loss of data.

⚠⚠Warning

To prevent possible electrical shock, fire, or personal injury:

- **Read all safety information before you use the Product.**
- **Carefully read all instructions.**
- **Do not alter the Product and use only as specified, or the protection supplied by the Product can be compromised.**
- **Do not Tap voltages >30 V ac rms, 42 V ac peak, or 60 V dc.**
- **Do not use the Product around explosive gas, vapor, or in damp or wet environments.**
- **Do not use the Product if it operates incorrectly.**
- **Do not use the Product if it is altered or damaged.**
- **Disable the Product if it is damaged.**
- **Do not apply more than the rated voltage, between the terminals or between each terminal and earth ground.**
- **Use only Fluke approved power adapters to charge the battery.**
- **Disconnect the battery charger and move the Product or battery to a cool, non-flammable location if the rechargeable battery becomes hot (>50 °C) during the charge period.**
- **Do not disassemble or crush battery cells and battery packs.**
- **Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.**
- **Have an approved technician repair the Product.**

Symbols

Table 1 is a list of symbols used on the Product or in this document.

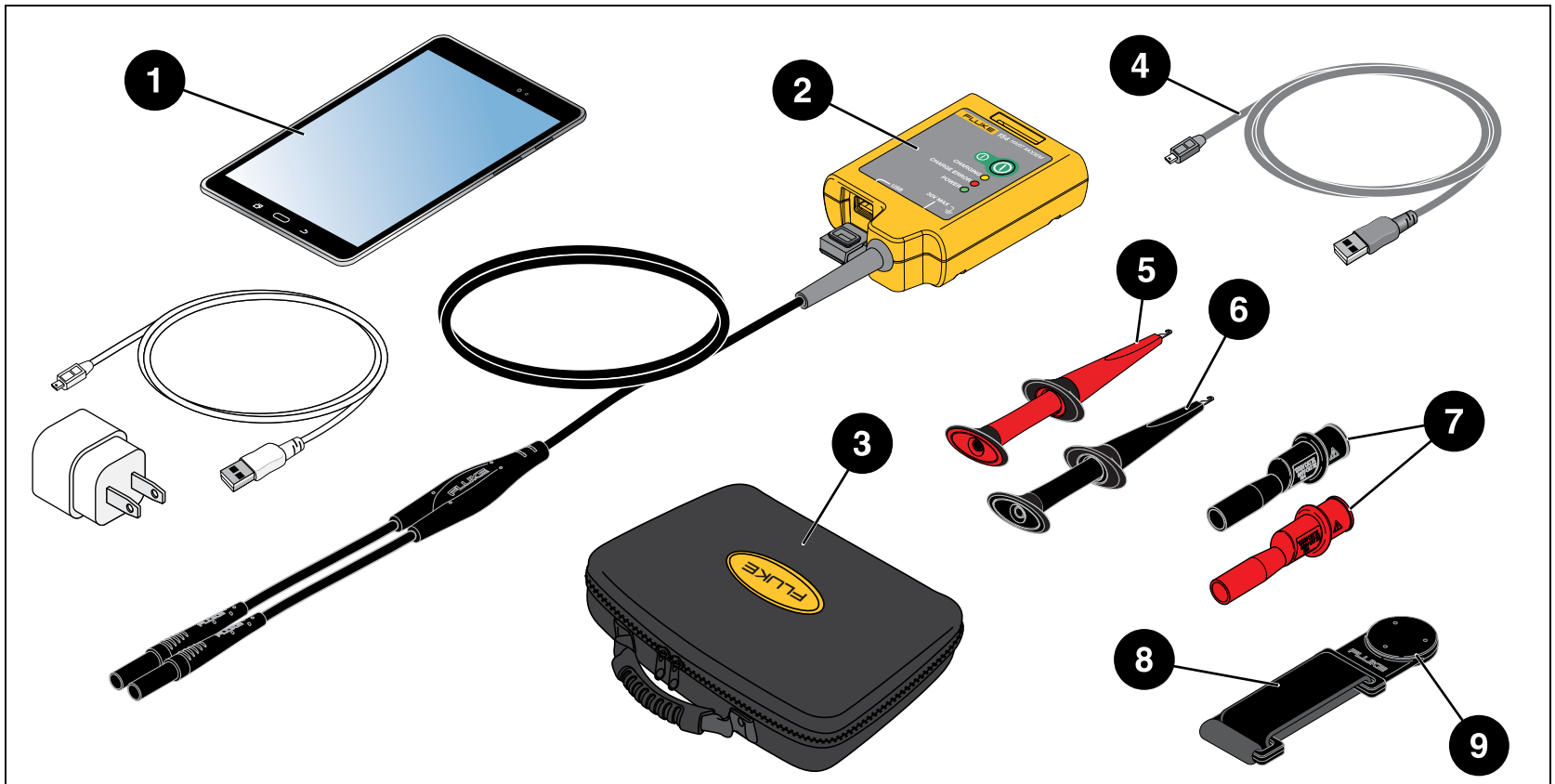
Table 1. Symbols

Symbol	Description
	Consult user documentation.
	WARNING. HAZARDOUS VOLTAGE. Risk of electric shock.
	WARNING. RISK OF DANGER.
Li-ion	Spent Lithium batteries should be disposed of by a qualified recycler or hazardous materials handler per local regulations. Contact your authorized Fluke Service Center for recycling information.
	Certified by CSA Group to North American safety standards.
	Conforms to European Union directives.
	Conforms to relevant Australian EMC standards.
	Conforms to relevant South Korean EMC standards.
	This product complies with the WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/ electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste.

Unpack the Product

Carefully unpack all items from the box and make sure that you have the items listed in Table 2. After you unpack and inspect the Product, fully charge the Modem and Tablet before use. See *Batteries*.

Table 2. Standard Accessories



Item	Description	PN
1	Tablet and Accessories	Varies by country
2	HART Modem	4766133
3	Carrying Case	4757850
4	USB Cable for charging Modem	3563901
5	AC280 Sure Grip Hook Clip, Red	1613782
6	AC280 Sure Grip Hook Clip, Black	2063165
7	Fluke-754, Alligator Clip Set, Extended Tooth	3765923
8	TPAK80 Strap	669960
9	Magnet	669952
--	Quick Reference Guide, not pictured	4766015
--	Safety Information, not pictured	4766026
--	Fluke 154 Users Manual, stored on Tablet, not pictured.	--

Turn on the Product

To turn on the Tablet, push the power button on the side of the Tablet.

To register the App:

1. Connect the Tablet to the internet.

   The information in this step is for a Samsung Galaxy. The steps can be different based on the Tablet used. For more information, see the manual of the Tablet manufacturer.

   a. Tap **Apps**.

   b. Tap **Settings**.

      If it is not on the main Apps screen, swipe to the side through the Apps screens until **Settings** is visible.

   c. On the left side of the screen, select **Wi-Fi**.

   d. On the right side of the screen, select the Internet to connect to.

   e. Push (Home) located below the screen on the Tablet.

   f. Open the Tablet browser to verify the Tablet is connected to the Internet.

   g. Push .

2. Tap .
3. Tap **I Accept** on the FlukeHART End User License Agreement (EULA) screen.
4. On the Registration screen:

   a. Delete the default email address and company name.

   b. Enter your email address and company name.

   c. Select the box to get emails when updates are available.

   d. Review the legal notices.

5. Tap **Update Registration**.

App Familiarization

This section explains how to use the App menu.

FlukeHART Menu

Use the App menu to view the Device or Modem that is connected to the App, connect to a new Device or Modem, save the Device configurations, change App settings, show App registration information, and more. To use the App menu, the Device connectivity indicator must be visible. See *Device Explorer* number 6.

To open the App Menu, Tap ≡.

To exit App submenus:

1. Tap ≡.
2. Select **Device Explorer**.

The App submenus are explained in the next sections.

New Device

1. Select **New Device** to connect to a new device.
2. Select **Done** in the message box that opens.

   The App automatically identifies and communicates with the new Device, and the status of the communication shows on the status bar.
3. Exit the App submenu.

Device Explorer

Select **Device Explorer** to exit the App menu and view Device menus.

Figure 1 and Table 3 show a sample menu and how to use it.

Note

The sample menu below will not show on the screen until after you connect the Product. See Use the Product.

Figure 1. Sample Menu

Table 3. Sample Menu Navigation

Item	Description
1	App menu button Select to connect to a new device or modem, document device configuration, etc.
2	App submenu title
3	Device model and DD Visible when a Device is connected. *Note* *May not be visible while a Method runs.*
4	Device Status icon Visible on Device Explorer menu. Select to view Device Status menu.
5	Device tag Visible when a Device is connected.
6	Device connectivity indicator Visible when a Device is connected to the App.
7	Modem connectivity indicator **Connected** means the App and Modem are paired and online. **Not Connected** means the App and Modem are not paired and online.
8	Status bar Shows the status of communication between the App and the Device.
9	Back arrow Select to go back to the previous screen.
10	Device menu or Device submenu title Visible when a Device is connected.
11	Variable label Select to view more information about the variable.

Table 3. Sample Menu Navigation (cont.)

Item	Description
12	Unit of Measure
13	Read-only variable value
14	Drop down box variable selection 1. Tap to open a list of available variable values. 2. Select the value to change to that value. 3. Tap **COMMIT** or **CANCEL**. See item descriptions below.
15	Read-write variable value 1. Tap to open a keyboard. 2. Change the value. 3. Tap **Done** to close the keyboard. 4. Tap **COMMIT** or **CANCEL**. See item descriptions below.
16	Function buttons Black buttons open submenus. Tap to navigate to required submenu to view or change data. Blue buttons run a script called a Method. 1. Tap to calibrate the Device, troubleshoot the Device, or run other available Methods. 2. In necessary, follow the instructions on the screens that open.
17	**COMMIT** When font is yellow, tap to send changes to the Device.
18	**CANCEL** When font is yellow, tap to cancel changes and keep original values.

Settings

1. Select **Settings** to view or change the App settings listed in Table 4.
2. To save changes, tap **Save Settings**.
3. Exit the App submenu.

Table 4. App Settings

Setting	Description
Default Modem	Shows the default modem. Select **Reset** to remove the default modem. To set a new default modem, see *Wireless Devices*.
HART Master	Select the appropriate box to set the Primary Master or Secondary Master for Multi-master systems.
Polling Address	Select to change the Polling Address to look for Devices on Multi-drop networks. The default address is Polling Address 0. If there are more addresses than can fit in the window, scroll to see the complete list of Polling Addresses.
DD Language	Select to change the language of the DD data.The default language is English. If the selected language is not available in the DD, English is used.

Wireless Devices

You can view available wireless devices, view the Modem that is connected, or connect to a new Modem.

To connect to another Modem:

1. Turn on the new Modem.
2. Tap **Wireless Devices** to view a list of available wireless devices.
3. If the Modem is not on the list of available devices, tap **SCAN**.

   A list of available devices shows.
4. If the Modem is on the list of available devices, select the new Modem.

Note

When more than one modem is in the same area, multiple HART Modems are listed. It may require trial and error to determine which modem is connected.

5. If prompted for a pairing code, enter **1234**.
6. Exit the App submenu.

Document Device

You can save Device configurations as a comma delimited text file and a formatted PDF file.

1. Tap **Document Device** to save the Device configuration to a file.
2. If required, edit the fields: File location, Technician, Notes, Header, Footer.

Note

The file location is needed to view the file on the Tablet and to transfer the file to a PC. See Save Files to PC.

3. Tap **Save Configuration**.
4. If the file already exists, tap **Yes** to overwrite the file or **No** to enter a new file name.
5. Tap **OK**.

The App saves the configuration file to download to another device or for later use on the same device.

Download Configuration

You can set up a device with the same configurations as another device.

To download a saved configuration to a device:

1. Tap **Download Configuration**.
2. Tap a configuration to download.
3. Tap **Download**.
4. Tap **Yes** to download configuration.

5. Tap **Ok** to disconnect the device from the control system.
6. Tap **Ok** to finish the download.

DD Library

You can view the DD Library Location, view the Device Descriptions in the library, and add a new file to the DD Library.

To view the DD Library Location or Device Descriptions:

1. Tap **DD Library** to view the DD Library Location.
2. Tap **Library Contents** to view the Device Descriptions installed in the library.
3. Tap on a Device Description to view the file.

To add a new file to the DD Library:

1. Download a DD file to the tablet and note the location of the saved file. DD files are usually available from the HART Foundation.
2. Tap **DD Library**.
3. Tap **Add New DD Library File** to open a file manager folder.
4. Go to the location of the saved file.
5. Tap on the file.
6. Tap **Add Selected File**.

The App adds the DD file to the DD Library.

Registration

Select to view or update the App registration information.

About

Select to view information about the App and the DD Library.

Exit

Select to close the App.

Use the Product

The Modem and App come paired to each other. To use a different modem, pair the new Modem to the App. See *Wireless Devices*.

The Device manufacturer develops Device Descriptions (DD) for their products and stores them in a DD Library. The latest DD Library is installed on the Tablet. The menus, data, status, and configurations will be different based on the Device DD.

When updates to the App or DD Library are available, Fluke emails a link to the email address used to register the Product. To make sure you receive the update emails, verify the email address in the App Registration submenu is correct.

⚠⚠Warning

The Tablet and Modem are not rated for intrinsic safety and should only be connected in a safe area.

Note

Connect the Modem, Device, and Loop Power Supply before you turn on the Modem to improve initial communication reliability.

1. Turn off the Tablet and the Modem.
2. Attach the clips to the wires of the Modem.
3. Connect the clips to the Device across the 4 to 20 mA connection on the Device.

   Although the communication signal is available anywhere along the 4 mA to 20 mA wire, it is often easiest to connect the Modem to the terminals of the Device. Figure 2 shows the System Diagram with a Fluke 754, with an internal 250 Ω resister, as the Loop Power Supply.

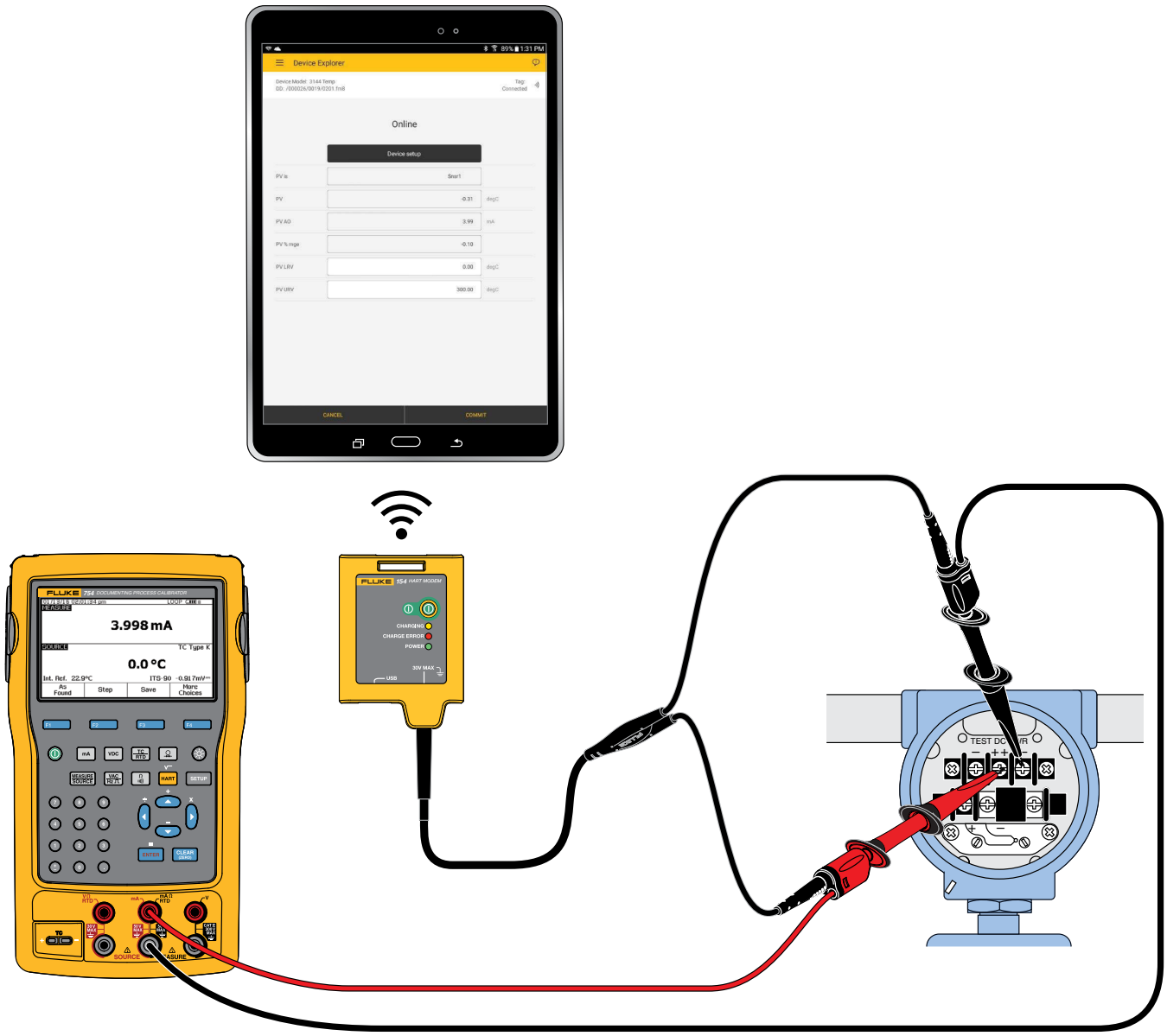


Figure 2. System Diagram with Fluke 754 as Loop Power Supply

If a suitable load resistance is not available, place a 250 Ω resistor in series with the Device power supply. Connect the Modem across the loop load resistor (A-B) or across the Device terminals (C-D). See Figure 3.

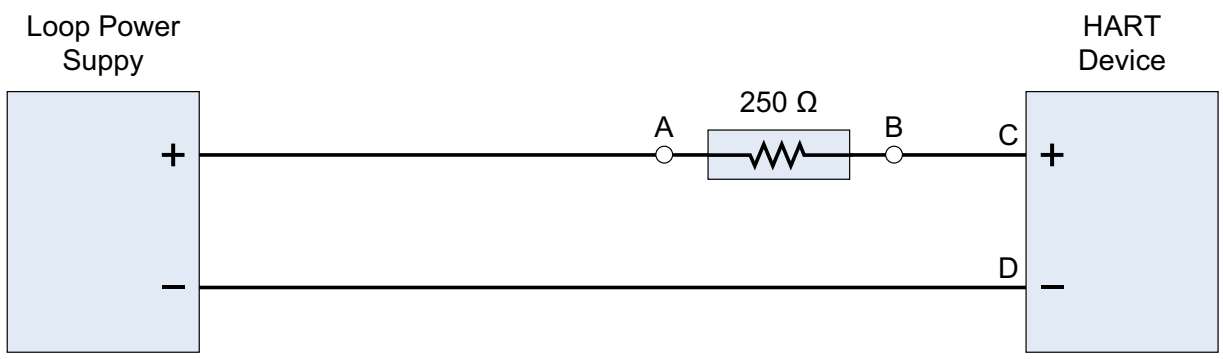


Figure 3. Resistor System Diagram

4. Push the power button on the side of the Tablet to turn on the Tablet.
5. Push ⏻ to turn on the Modem.

   The **POWER** LED illuminates when the unit is on.

6. Select FLUKE HART on the Tablet.

The App automatically identifies and communicates with the Device, and the Root Menu of the Device DD shows on the Tablet in the Device Explorer screen. If the App does not open to the Device Explorer screen, see *Troubleshoot the Product*.

Save Files to PC

Device configuration files can be transferred from the Tablet to a PC with a Windows operating system. See *Specifications* for compatible Windows versions.

To save files to a PC:

1. Connect the Tablet to the computer with the USB cord included with the Tablet.
2. Use Windows Explorer on the computer to locate the configuration file on the Tablet. See *Document Device*.
3. Copy and paste the file to the desired directory on the computer.

Troubleshoot the Product

If the App fails to connect to the Device or the connection is unreliable, try the steps in Table 5.

Table 5. Troubleshoot the Product

Problem	Make sure...
Device is not connected	The loop power supply is on.
	The loop resistance is between 250 Ω and 1 KΩ.
	The loop current is within HART limits.
	For multi-drop configurations, all transmitters in loop have unique addresses.
	The Modem is connected across the loop resistor or the transmitter terminals.
	The Modem battery is charged.
	The Modem power switch is on and the **POWER** LED is illuminated.
	The Modem can connect to the App. Try to pair the Modem with the App.
	The App functions as expected. 1. Close the App. 2. Restart the App.
	The Tablet functions as expected. Restart the Tablet.

Table 5. Troubleshoot the Product (cont.)

Problem	Make sure...
Connection is unreliable.	The Tablet is within 76.2 m (250 ft) of the Device.
	The orientation of the Device to the Modem is adjusted for good radio link strength.
	The Modem battery is charged.
	The Modem is connected to the Device before the Modem is turned on.
	The Device is not in Burst mode. The Modem can connect while in Burst mode, but it may take more attempts to connect.
	The Modem can connect to the App. Try to pair the modem with the App.
	The App functions as expected. 1. Close the App. 2. Restart the App.
	The Tablet functions as expected. Restart the Tablet.

Maintenance

Clean the Product

Clean the Product occasionally with a damp cloth and mild detergent. Do not let moisture get into the Product.

Batteries

Charge the Modem Battery

Connect the USB cable to the USB Port on the Modem and the PC USB Port or AC USB plug adapter. The yellow **CHARGING LED** illuminates. The **CHARGING LED** blinks when the battery is almost fully charged.

The red **CHARGE ERROR LED** illuminates when an error is detected.

1. Remove the USB cable from the Modem.
2. Turn the Modem off.
3. Put the Modem in a cool location for 30 minutes.
4. Connect the USB cable again and charge the battery.

If the condition continues, contact Fluke. See *How to Contact Fluke*.

Turn the Modem off when not in use to extend the battery life.

Charge the Tablet Battery

See the instructions from the manufacturer.

Specifications

Modem

Battery	
Type	Rechargeable Li-Ion
Life	19 hours continuous use
Charging Temperature	0 °C to 40 °C (32 °F to 104 °F)
Max Voltage	30 V
Temperature	
Operating	0 °C to 50 °C (32 °F to 122 °F)
Storage	≤1 month: -10 °C to 45 °C (14 °F to 113 °F) >6 months: 20 °C ±5 °C
Humidity	0 % to 90 % (non-condensing)
Size	50 mm x 70 mm x 20 mm (2.0 in. x 2.75 in. x 0.8 in.)

Weight ..... 170 g (6 oz)
IP Rating..... 52
Safety ..... IEC 61010-1: Pollution Degree 2,
IEC 62133

Wireless Radio
Frequency..... 2412 MHz to 2462 MHz
Output Power ..... <100 mW

Software Requirements
FlukeHART..... Android 5.0
To save files to PC..... Windows 7 or newer

Electromagnetic Compatibility (EMC)
International ..... IEC 61326-1: Portable, IEC 61326-2-2
CISPR 11: Group 1, Class A

Group 1: Equipment has intentionally generated and/or uses conductively-coupled radio frequency energy that is necessary for the internal function of the equipment itself.

Class A: Equipment is suitable for use in all establishments other than domestic and those directly connected to a low-voltage power supply network that supplies buildings used for domestic purposes. There may be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted and radiated disturbances.

Caution: This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

Korea (KCC)..... Class A Equipment (Industrial Broadcasting & Communication Equipment)

Class A: Equipment meets requirements for industrial electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and not to be used in homes.

Tablet

See specifications from the manufacturer.