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Read First

WARNING

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Do not install, maintain or operate this equipment without reading, understanding and following the proper factory supplied instructions and manuals otherwise injury or damage may result.

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1.0 Mobility DHH800-MFC Configurator Overview

The Mobility DHH800-MFC Configurator is the latest handheld in the ABB family of HART Configuration devices. All HART field devices can be configured, polled, and trimmed using the Mobility MFC with HART communications. The Mobility MFC is a full function Configurator supporting HART Universal, Common Practice and Device Specific commands for commissioning, configuration and maintenance operations.

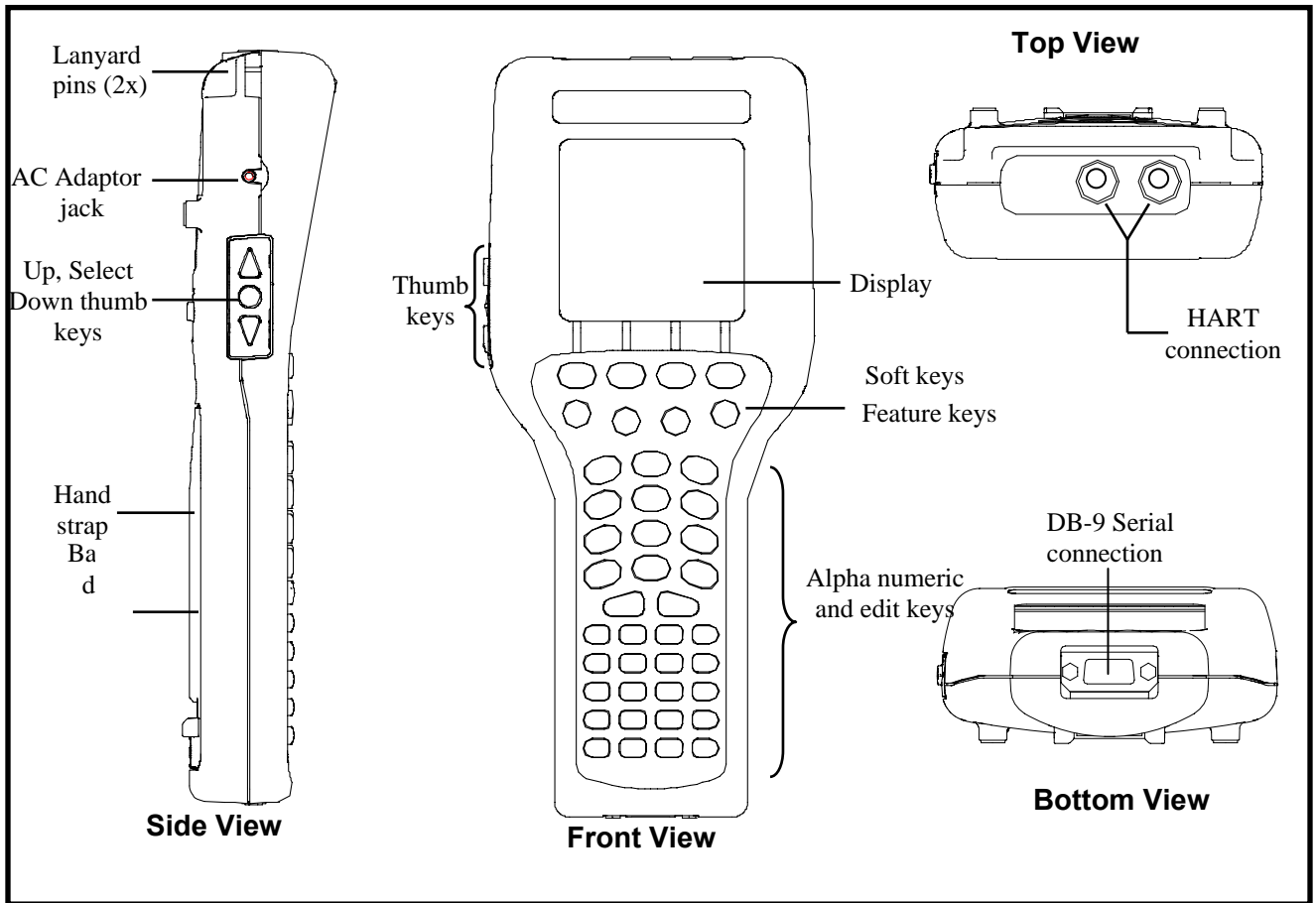


Figure 1-1 Mobility MFC with HART Communications

Note: For Intrinsically Safe Mobility MFC models, consult the Hazardous Area Use section of this manual for specific details on use of approved Mobility MFCs and applicable restrictions

2.0 Display Overview

The display of the Mobility DHH800-MFC is a 128 x 128 pixel graphic display with backlight. Viewable area is 2.6" x 2.6" for 13 viewable message lines. The display provides three types of information: 1) header information including display titles, HART communication status indicator, SHIFT indicator, alpha or numeric entry mode indicator and battery gauge, 2) main data display section for display of Mobility MFC operating menus, HART menus, and device information, and 3) footer information defining the display's soft key functionality.

The following photo depicts the Mobility MFC Offline menu and Soft keys:


2.1 Header Line Symbols


♥ heart symbol indicates active HART

↑ up arrow indicates SHIFT key is on

number sign indicates numeric / symbol entry is the present entry mode for all dual functions keys

A letter indicates alpha entry is the present entry mode for all dual function keys

 battery symbol indicates Mobility MFC under battery power; filled portion indicates remaining battery

 electrical plug symbol indicates the AC adapter is connecting and powering the MFC

BUSY text box replaces either power symbol when the microprocessor is busy executing a previously requested task. Do not press keys when this status symbol is displayed.

2.2 Keypad Overview

The Mobility MFC keypad has three basic key types: single function keys, dual-function keys, and soft keys with changing definitions.

Single function keys control a dedicated Mobility MFC function.

Dual-function keys, through the use of the Alpha Lock or Shift keys, toggle between two separate functions as needed to facilitate data entry.

Soft key functions change depending on the present operating mode. Soft key definitions are displayed at the bottom of the LCD, just above their respective gray soft keys.

The left hand thumb keys can be used to scroll up, scroll down, and to select menu items



Figure 2.1 Mobility Hand-Held

2.3 Keypad Symbols



On/Off

Pressing the 0 (Off) / 1 (On) key powers up or turns off the Mobility MFC. As the unit powers up, an internal diagnostic check is performed. Any abnormalities are posted on the display. The unit will briefly display the Mobility MFC model number and then check for a HART device with address of zero. If a device with zero address is found, the Mobility MFC immediately goes into online status and displays information about the device. If no device is found, the Mobility MFC enters the Mobility MFC Main navigation screen. To turn the Mobility MFC off, press and hold the ON/OFF key for approximately .5 seconds. Unit will power down provided a critical HART operation is not in process.



Quick Menu

The Quick Menu key initiates HART communications and then displays ten (10) HART menu choices for the connected device. These menus are used to short cut the traditional HART menus to enable the user to arrive quickly at the desired functions. Typical Quick Menu options include: Main Menu, Config Menu, Rerange, Basic Info, Construction Materials, Display, Sensors, Signal Conditioning, Self Test. Quick Menu is disabled while critical HART operations are in process.



Home

The key sequence **SHIFT, Home** returns the user to the initial or "home" HART menu for the connected device. The Home function is disabled while critical HART operations are in process.



Document

This key provides rapid access to HART communication Save/Send Configs options, List/Edit Configs, and Create Configs functions for all Mobility MFC models. This key also provides documenting functions used with the ABB Device Management System software. Access to this key is disabled while critical HART communications are in process.



Display Contrast

This key allows the user to adjust the contrast of the LCD display for ambient lighting and user preferences at any time and in any operating mode. Pressing and holding this key cycles through all available contrast settings. If the display is faded or blacked out, simply depress the key until the display returns to an acceptable level. After adjusting Display Contrast, wait at least five (5) seconds before turning unit off to insure storage of new contrast setting. Ambient temperature compensation is included in the Mobility DHH800-MFC.



Back Light

This key provides a backlight to illuminate the display in poor light conditions. Battery life is impacted by long-term use of the backlight feature. An automatic shut off timer is available to the user under the Main Menu's **Mobility MFC** soft key.



Alphanumeric / Symbol Entry

The alphanumeric keys have the heaviest population on the keyboard and are the method of entering data into the Mobility MFC. Each Mobility MFC display has a default alpha or numeric / symbol entry mode based on the most likely used mode for the display's function. This reduces user workload to a minimum. Pressing the ALPHA LOCK key activates the other entry mode at the user's convenience.



Pressing the SHIFT key converts the next keystroke to the inactive entry mode and then automatically reverts back to the default mode. The letter "A" in the display header line indicates the alpha input default is active while a # sign in the display header indicates the numeric / symbol input is the default.



Shift

The SHIFT key is used to activate the secondary functions of the Mobility MFC's dual-function keys for the next keystroke only. When the SHIFT key is active, an up arrow ↑ is displayed at the top of the display to the left of the battery power (or AC wall plug) symbol. SHIFT is also used to activate the Page Up and Page Down soft key functions while viewing lists of information (installed DOFs, stored configs, etc...).



Alpha Lock

This key changes the keypads dual function keys from numeric/symbol entry mode to alpha character entry mode and back. The present entry mode is indicated in the display header line next to the power supply indicator on the upper right of the screen. The letter "A" in the display header line indicates that alpha entry is active while a # sign in the display header indicates that numeric / symbol entry is active.



Left / Right Arrow keys

These keys support cursor movement forward and backward for text / numeric editing needs. The default edit mode is "overwrite." For navigating functions, the left arrow emulates the **Back** soft key and the right arrow emulates the **Select** soft key.



Delete

This editing key will delete the character located above the cursor in a text / numeric string.



Insert

Pressing the Shift, INS key sequence activates the Insert text edit function. Once activated, the next alpha or numeric / symbol keystroke will be inserted into the open text field. The "overwrite" default mode is restored upon completion of the insert operation.

Soft Keys

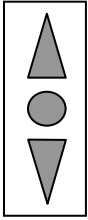


The four light blue keys located immediately below the display are Soft Keys. The specific functions of these keys change depending on the operating mode of the Mobility MFC. Present definitions are displayed at the bottom of the Mobility MFC display. The following are examples of Soft Key definitions and their uses:

- Up** – moves indicator arrow up one line in a menu list
- Down** – moves indicator arrow down one line in a menu list
- Select** – selects the indicated menu item
- MFC** – provides access to Mobility MFC configuration settings (Lockout, Backlight timer, Off timer Clock Edit, PC Comm Mode, and Model Info)
- Back** – returns to prior display
- Inc** – Increment the value shown above the cursor
- Dec** – Decrement the value shown above the cursor
- Next / Prev** – these keys move to Next or Previous item within the list function accessed. Next and Prev are for navigation only.
- Done** – Ends data entry session and proceeds with the selected operation
- Edit** – activate edit function for displayed parameter
- Abort** – aborts present operation without affecting prior settings or values
- Save** – saves the present value
- Store** – stores the present value
- Yes** – affirmative response to question presented
- No** – negative response to question presented
- Trim** – executes the trim function called for by the HART menu option selected

Thumb operated keys

Up, Select, and Down side keys provide convenient alternate methods of menu navigation. Use these in addition to Soft keys and numbered HART menu lines to make menu navigation fast and easy.



- ▲ = Up = Prev
- = Select, Edit
- ▼ = Down = Next

Do not use these keys when the BUSY symbol is displayed.

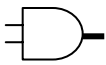
3.0 General Operation

3.1 Power options

The Mobility DHH800-MFC can be powered for portable operation by two each 9-volt alkaline, Lithium or NiMH batteries. Alkaline batteries are standard with the Mobility MFC shipment. ABB offers NiMH batteries and charger cradles (external charge only) as an option. For bench top operations and download operations, an AC adapter (P/N 3KXD311800L0036) with a barrel style connector is recommended. Previous DHH800-MFC hardware used a pin style AC adapter connector (P/N 3KXD311800L0034).



Located in the upper right corner of the display, this icon displays the remaining battery power. Fresh batteries produce a full black cell body. As the power drains, the black segment retreats indicating remaining power.



When the Mobility MFC is used with the optional AC adapter (P/N 3KXD311800L0036), the battery circuit is bypassed and a wall plug icon replaces the battery icon on the display header. The AC adapter jack is located on the left side of the Mobility MFC.

NOTE: Power icons may temporarily disappear during certain HART Communication operations

3.2 Navigating Menus

Several methods of navigating through the Mobility MFC menus are available to the user for maximum convenience and utility.

1. **Soft keys:** Use **Up** and **Down** Soft Keys to move cursor arrow to the desired menu option. Then use the **Select** soft key to accept the indicated choice. Soft key navigating tools are found throughout the Mobility MFC Main displays and HART communication displays.
2. **Side keys:** **Up**, **Down** and **Select** keys are also provided on the left hand side of the Mobility MFC. These keys are thumb operated and provide a convenient alternative to the Soft Key navigation buttons. Side key functionality is not always available in the HART communication displays.
3. **Multi-page lists:** Multi-page lists have a \triangle and/or ∇ symbol along the right hand side of the display indicating the existence of information on the previous or next page(s). Several pages of information may need to be viewed when reviewing lists of installed DOFs, stored configuration files or finding a specific device in Offline Mode to create a configuration for. While in these list areas, pressing the SHIFT key changes soft key definitions **Select** and **Back** to **PgUp** and **PgDn**, respectively. To quickly advance to the next page of a list, press **SHIFT** and then the **PgDn** soft key. To retreat to the prior page, press **SHIFT** and then **PgUp**. After **SHIFT** is pressed the **PgUp** and **PgDn** soft keys remain active until the **Up** or **Down** soft key is used or until **SHIFT** is pressed again.
4. **Numbered HART menus:** All HART displays have numbered menu lines when needed. This gives fast access directly to the desired menu line. Mobility MFC displays also have numbered menus with the exception of multi-page list screens and the Mobility MFC Configuration screen.
5. **HART menu HOME key:** To quickly retreat from any location in the HART menu to the initial HART menu screen for a device, press the **SHIFT, HOME** key sequence. This will return the display to the initial HART screen. The Home function will be disallowed if a critical HART task is in process.
6. **Left / Right Arrow keys:** Emulate **Back** and **Select** soft keys, respectively

3.3 Turning on the Mobility MFC

Use the dedicated **ON/OFF** key to power up the Mobility MFC. A brief diagnostic runs while the “Powered by Meriam and ABB” logo, Mobility MFC model number, and Mobility MFC firmware version are displayed. A message is displayed indicating the Mobility MFC is scanning for a HART device at address zero. The following scenarios are possible.

1. If the Mobility MFC is connected to a HART device with address zero (and there is sufficient loop resistance), the Mobility MFC immediately establishes HART communication with the device. A display similar to the example at right appears. The numbered menus and Soft Keys are then used to commission, re-configure, or maintain the connected device.

2. If no HART device is connected, a HART device with address $\neq 0$ is connected, or a connected device is not found due to wiring or loop resistance problem, the Mobility MFC will enter the Mobility MFC Main navigation display depicted at right.
 - 2.1 Select **Online Setup** once a HART device is connected or once the wiring problem is resolved. A proper connection will be indicated when line two changes to “**Device 0 *Online***”.

 - 2.2 Select **Online Setup** if properly connected HART device is setup for Multi-drop loop or Burst Mode operation (device address $\neq 0$). The Mobility MFC will immediately initiate a multi-drop poll to find all non-zero addresses on the loop.

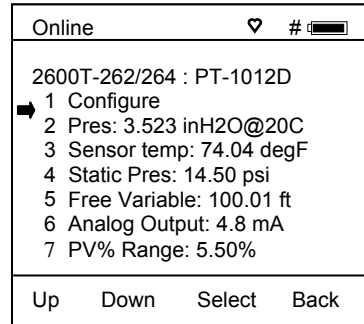


Figure 3-1 If connected to HART Device

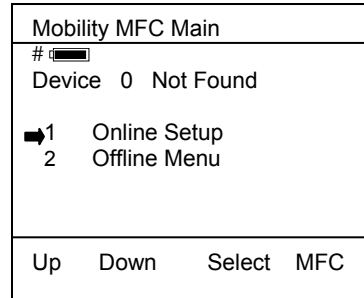


Figure 3-2 If not connected to HART Device

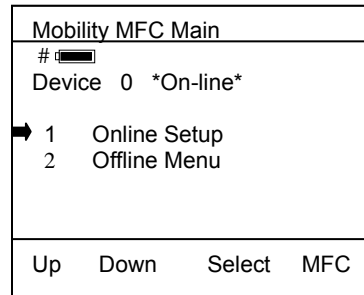


Figure 3-3 Main Display

3.4 Mobility MFC Main Display

The Mobility MFC Main display (Figure 3-3) provides access to Online Setup, Offline Menus and to Mobility MFC configuration settings via the right hand Soft Key.

1. **Online Setup** is described above in Turning On the Mobility MFC.

2. **Offline Menu** is selected to provide access to Offline Utilities such as List / Show DOFs, List / Edit Configurations, and Create Configurations. The number of DOFs installed (HART device profiles) and the number of device Configurations stored are also available on Offline Utilities screen.

3. **MFC Soft Key** is selected to configure Mobility MFC settings and view Mobility MFC information such as Model, Serial, and Firmware numbers, DOFs installed and Configurations stored.

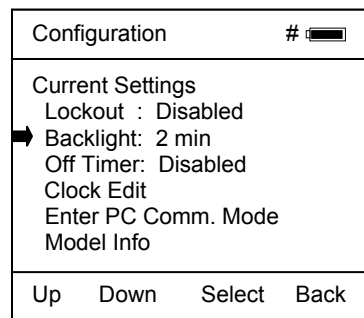


Figure 3-4 Offline Menu

3.5 Mobility MFC Configurations Settings

3.5.1 Lockout Feature

The Mobility MFC HART Communicator can be programmed to lock out certain standard functions that a supervisor may wish to control. The functions included are used to set up the Mobility MFC for normal use, change online HART device configurations, create offline HART device configurations, update the installed DOFs list (HART device profiles), or to update the Mobility MFC's operating firmware. For example, locking out the Configs feature turns the Mobility MFC into a read only HART communicator while locking out DOFs and Firmware prevents unauthorized updates. The lock out can be limited to individual Lockout Details items or all Lockout Details items can be locked out at one time.

To enable the lockout feature, move the selection cursor **➡** to the **Lockout** menu option on the Configuration screen (see above). Choose the **Lockout** selection by pressing the **Select** soft key. The Mobility MFC will enter the **Lockout Enable / Disable Screen**. The current status is shown and three choices are provided:

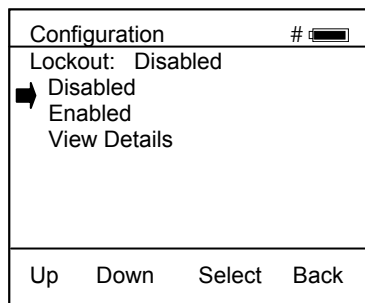


Figure 3-5 Lockout Enable/Disable Screen

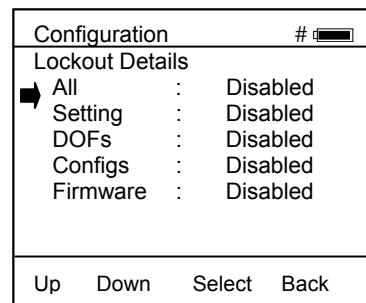


Figure 3-6 Lockout View Details Screen

Disabled: All lockout features are disabled and all options on the menu are accessible for reconfiguration.



Enabled: Enables the lockout selections that are set in the **Lockout Details** screen (above left).

View Details: This option takes the user to the **Lockout Details** screen listing all Mobility MFC parameters that can be protected by lockout (see above left). Individual functions can be locked or, if preferred, the lockout can be set to deny unauthorized access to all parameters.

To enable the lockout option, select **Enabled** on **Lockout Enable / Disable Screen** by scrolling **Down** and pressing **Select**. The screen will switch back to the original **Settings** screen that now shows the lockout status as Enabled.

Scroll **Down** to **View Details**, and press **Select**. This screen allows the user to choose which parameters to lockout. Use the **Up** and **Down** keys to scroll through the selections and press **Select** to choose the desired setting(s). The screen will change and prompt you to **Enable** or **Disable** lockout for that function. Scroll **Down** to **Enable** and press **Select**.

Lockout Code

At this point the user will be prompted to enter a 3-digit lockout code. This code will be required to gain access and change any parameter previously locked out. Use the Increment, Decrement and Next Soft Keys to input a lockout code value. Alternatively you may use the   light blue keys for Increment and Decrement functions. When you are satisfied with the lockout code value, press Store.

IMPORTANT: After the code is entered, the user must cycle the power to activate the lockout mechanism! BE SURE TO SAVE THIS CODE IN A SAFE PLACE IN THE EVENT YOU FORGET THE NUMBER. ACCESS TO LOCKED-OUT FEATURES WILL BE DENIED WITHOUT THE PROPER CODE.

To Disable Lockout

When you wish to use a function or edit a value that is protected by the lockout code, enter the three digit Lockout code when prompted and press **Save**. You will now be able to use the function or edit the setting as normal. Entering an incorrect code will display the message "Incorrect Code" and allow you to try again.

Changing the Lockout Code

To change the lockout code, disable the lockout function for all the parameters selected, shut the unit off, and follow the procedures outlined above.

3.5.2 Backlight (off timer)

To conserve battery life, the Mobility DHH800-MFC series allows the user to set the backlight to shut off after a certain period of keypad inactivity. To change the backlight off timer on the unit, scroll **Down** to **Backlight** and press **Select**. Scroll **Up** or **Down** to the auto shut-off time desired. Press **Save** to select the new value.

The shutoff timer can be disabled or set to shut off after time periods of from 1 minute up to 30 minutes.

NOTE: The Backlight Off Timer is disabled when the optional AC Adapter (P/N 3KXD311800L0032) is powering the Mobility MFC.

3.5.3 Off Timer

To conserve battery life, the Mobility DHH800-MFC series allows the user to set the unit to shut off after a certain period of keypad inactivity. To change the off timer on the unit, scroll **Down** to **Off Timer** and press **Select**. Scroll **Up** or **Down** to the auto shut-off time desired. Press **Save** to select the new value. The shutoff timer can be disabled or set to shut off after time periods of from 1 minute up to 2 hours.

NOTE: The Off Timer is disabled when the optional AC Adapter (P/N 3KXD311800L0036) is powering the Mobility MFC.

3.5.4 Clock Edit

The Clock Edit option allows the user to correct the date and time of the Mobility MFC's internal clock. To select the **Clock Edit** feature, make sure the pointer arrow is pointed to this selection. If not, scroll the arrow **Down** using the soft keys. Choose **Clock Edit** by pressing the **Select** soft key.

Choose a clock or date option to adjust by scrolling **Up** or **Down**. Press **Select** to choose that option. Enter the correct value using the numeric keypad and text edit key if needed. When complete, press **Done**. You will be asked if you wish to save the new data. Press **Yes** to accept the new value. Pressing **No** will take you back to the **Clock Edit** without making any changes to the Mobility MFC clock.

NOTE: When replacing the batteries, the date and time will remain active. An internal, 10-year life back-up battery continuously powers date & time information. This battery is not serviceable by the user.

3.5.5 Enter PC Comm. Mode

When the Mobility MFC is connected to a PC for updates via DPC Manager (see DPC Manager section in this manual), a DB-9 serial cable is used. Occasionally a DB-9 Serial cable is encountered that does not have a DTR line. The DTR line is important to the update process because it is used to initiate and confirm communication between the two machines. If a DB-9 cable without a DTR line is used, the Mobility MFC must be manually placed in the **Enter PC Comm. Mode**. Go to the Mobility MFC Main display and select **Mobility MFC**. Scroll down to the **Enter PC Comm. Mode** menu option and press **Select**. Proceed with update and cycle Mobility MFC power when the update is complete. It is recommended to use fresh batteries or an AC adaptor during update procedures. This mode will automatically time-out after approx. 2 minutes of inactivity and return to the main display.

4.0 Battery Installation & Removal

The Mobility MFC monitors battery condition and displays a “REPLACE BATTERY” notice when the batteries get low. The Mobility MFC will function for a short period of time after the notice is posted.

To install or remove the batteries, remove any soft case or protective boot and turn the Mobility MFC face down on a work surface. Use a flat screwdriver to loosen the captive screw holding the battery door closed and remove door. Replace batteries and make sure all connections are firmly secured. Replace door, tighten screw and replace the soft case or boot.

Note: Replace both 9-volt batteries at once with all alkaline, all lithium or all NiMH cells. Do not mix alkaline, lithium or NiMH batteries with each other or with other battery types. Battery replacement is recommended when the “Replace Batteries” notice is posted on the display; however, the Mobility MFC will function for a time after the notice is posted.

Note: For Intrinsically Safe Mobility MFC models, replace batteries only in Non-Hazardous Areas. Replace batteries with approved types only. See the Mobility MFC Intrinsic Safety Control Document in the Appendix of this manual for approved battery details.

5.0 External Connections to Mobility MFC

1. AC Adapter – The Mobility DHH800-MFC can be powered by external AC Adapter connected to the jack located on the left side of the Mobility MFC. P/N 3KXD311800L0036 bypasses the battery circuit to power the unit. The battery symbol in the display header is replaced by a wall plug symbol.

WARNING: *Serious injury or death may result from explosions. Do not make connection to the AC adapter jack in a hazardous area. Use the AC adapter only in non-hazardous areas.*

2. HART lead set – All Mobility MFC models are equipped with a standard size banana jack on 0.75" center. The lead set supplied with the Mobility MFC has a standard banana plug on one end and mini-grabbers on the other for convenient connections.

Note: *For Intrinsically Safe Mobility MFC models, verify the instruments in the loop are installed in accordance with intrinsically safe field wiring practices before making connection from the field device to the Mobility MFC's HART jack. See Hazardous Area Use Section of this manual for Intrinsically Safe guidelines / restrictions.*

3. DB-9 Connection Port – All Mobility MFC models are equipped with a standard DB-9 connection for RS-232 communications located on the Mobility MFC's bottom end. The DB-9 provides the hardware interface to facilitate download / upload operations from a host PC. This connection port facilitates download of Mobility MFC firmware improvements, HART[®] Device Object Files (DOFs) and documenting operations. All Mobility MFC upgrades are available via the DPC Manager Download Site (refer to the DOF/Firmware Download Site section in this manual). The Mobility MFC does not need to be returned to ABB for firmware updates or for the addition of DOF files.

Note: Do not use the DB-9 connection port in Hazardous Areas. Use in non-hazardous areas only. See Intrinsic Safety Control Document in the Appendix for more details on I. S. Mobility MFC units.

6.0 Hazardous Area Use

6.1 Intrinsically Safe Certification

The Mobility DHH800-MFC Configurator with HART Communications are available with Intrinsically Safe Certification for use in Class I, Division I, Groups A, B, C, and D, T5 hazardous areas. Refer to the Intrinsically Safe Control Document in the Appendix of this instruction manual for more details. The certification is to CAN /CSA-22.2 No.1010.1 & 157-92 and UL913 Fifth Edition Rev 2/21/97.

The following table identifies Mobility MFC model numbers and Areas of acceptable use.

Model Number	Non-hazardous Area	Hazardous Area
Mobility DHH800-MFC-xxx-00	√	NO
Mobility DHH800-MFC-xxx-01	√	√

Mobility MFCs with Intrinsically Safe certification can be identified by model number (see table above or the Intrinsically Safe Control Document in the Appendix) or by a special label on the unit. A sample of the label is shown below.



WARNING: Serious injury or death may result from explosions. Do not make connection to the DB – 9 connection port or to the AC adapter jack while in a hazardous area.

WARNING: Serious injury or death may result from explosions. Before making electrical connections to an Intrinsically Safe Mobility MFC at the HART jacks, verify the instruments in the loop are installed in accordance with intrinsically safe field wiring practices.

Note: Restrictions apply to the use of Intrinsically Safe Mobility MFC units in hazardous areas. Refer to the Intrinsically Safe Control Document in the Appendix for exact details. ABB reserves the right to revise the Control Document without notice. Contact ABB (see page I, Assistance for contact information) for the current Intrinsically Safe Control Document.

For Intrinsically Safe Mobility MFC models, consult the Hazardous Area Use section of this manual for restrictions, for special instructions in use, and for electrical connections.

7.0 HART® Communications with the Mobility DHH800-MFC

7.1 Overview

The Mobility DHH800-MFC Configurator with HART communications provides device specific HART communication functions that allow the user to poll, configure and maintain supported HART field device. The Mobility DHH800-MFC uses Universal, Common Practice and Device Specific commands to facilitate communication with a HART field device. Use the Mobility MFC to commission devices, operational re-configuration needs, or maintain devices through analog and sensor trim adjustments and many other features.

The Mobility DHH800-MFC communicates with any HART device through Universal and Common Practice Commands using the standard Generic DOF (Device Object File) but must have the DOF for a specific HART device installed before it can execute Device Specific Commands. Consult the large and growing list of available DOFs for an up to date list of HART devices with device specific support. Refer to the Available DOF Website section of this document for information on accessing this list. When HART device support for new devices becomes available, the Mobility MFC can be easily field updated via Internet downloads.

7.2 HART® Commands

Three HART command types are used by the Mobility DHH800-MFC to communicate with HART field devices. First, *Universal Commands* are primarily used to identify a field device by its model number and tag number and to read process data from the device. This communication is referred to as “polling”. The Mobility DHH800-MFC can poll any Hart Device. Second, *Common Practice Commands* are used for calibration and maintenance functions that are common to many devices. An example of this would be trims or adjustments for the devices’ analog outputs. Third, *Device Specific Commands* are used to handle functions that are unique to a particular device or manufacturer. Examples of these commands include sensor zero, sensor trim, calibration curve characterization, density inputs required for calculations made by the HART device or other configuration functions unique to the specific device.

7.3 HART® Connections

HART connections are made using two standard banana jacks (3/4” center) located at the top end of the Mobility DHH800-MFC. Refer to the following diagram. Polarity is not a concern for HART connections so both jack collars are black. ABB supplies a HART lead kit (P/N 3KXD311800L0011) complete with mini-grabber connections and a 250 Ω load resistor with each model Mobility DHH800-MFC.

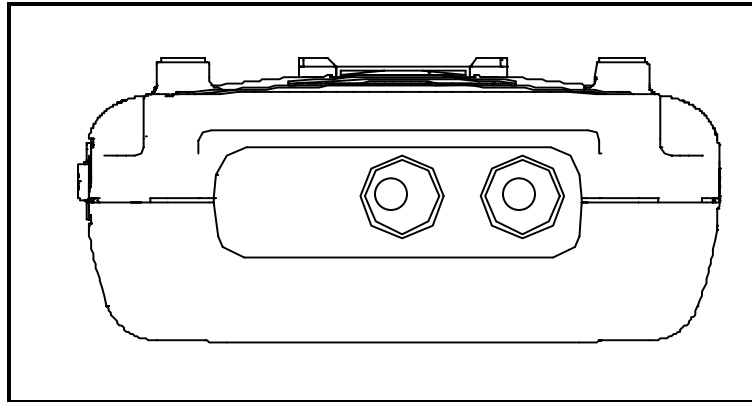


Figure 7.1 Mobility DHH800-MFC with HART®
HART® connections are standard banana jacks (3/4” center)

For low load loops (less than 250 Ω), a 250 Ω resistor will need to be added to the loop to insure reliable HART communications. ABB supplies a 250 Ω load resistor in the form of a standard adaptor (P/N 3KXD311800L0012). Refer to Figure 7-2 for connection details.

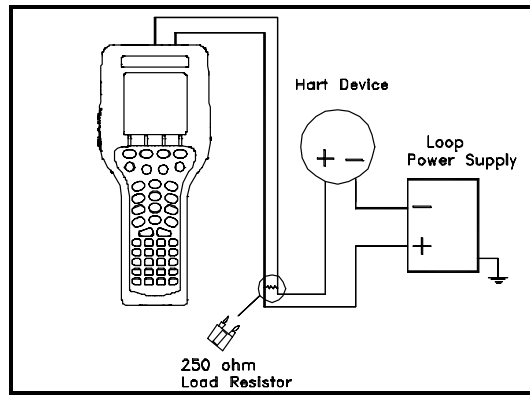


Figure 7-2 Low-Load Loops

When connecting the Mobility DHH800-MFC to a loop with a resistive load greater than 250 Ωs, the HART jacks may be connected across the loop + and – or to the HART device communication terminals. Refer to Figure 7-3 for connecting across the loop + and -.

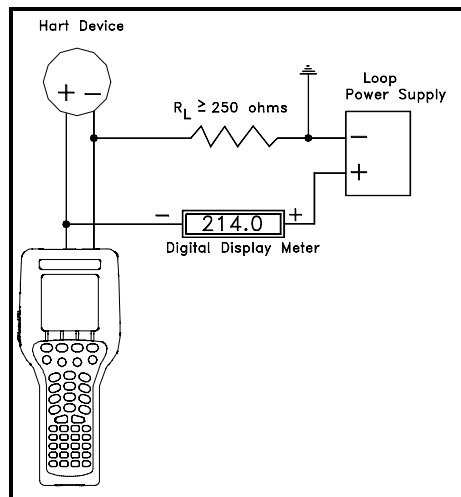


Figure 7.3 Connecting to the Mobility MFC communication terminals, R Loop > 250 OHMS

7.4 HART® Communications

7.4.1 Initial Screens / Online Mode

Upon power up the Mobility MFC automatically detects if a field device is connect and attempts to establish HART communications. When a device with address zero is found, the Mobility MFC provides feedback to the user and starts the initial HART display for the connected device. See an example of Online Mode in Figure 7-4.

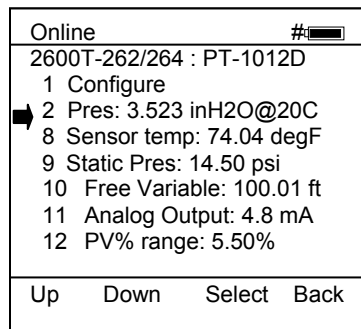


Figure 7-4 Online HART Screen

When no device connection is detected or a device with non-zero (Multi-drop or Burst Mode) address is found, the message **Device 0 Not Found** is displayed and the Mobility MFC enters the **Mobility MFC Main** navigation screen. The **Mobility MFC Main** screen allows the user to launch a multi-drop poll to find all devices with non-zero addresses on the loop, to manually start an Online poll, or to enter Offline Mode.

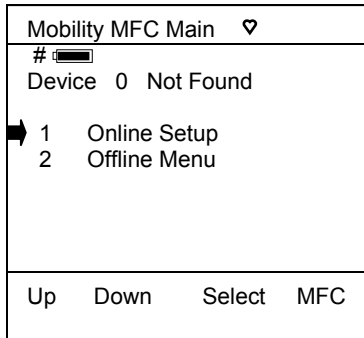


Figure 7-5 Mobility MFC Main Navigation Screen
No device or Non-zero address found

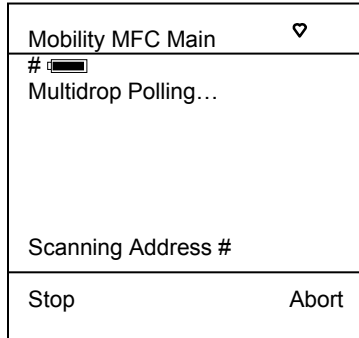


Figure 7-6 Multi-drop Polling Screen
Multi-drop & Burst Mode Support

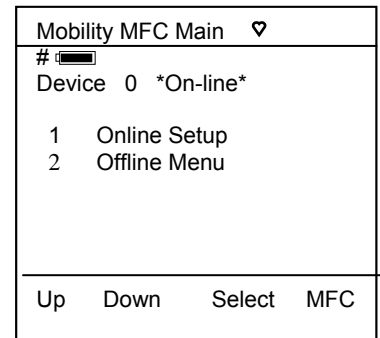


Figure 7-7 Mobility MFC Main Navigation Screen
Manually launch polling on Device 0

7.4.2 Multi-drop Poll

To initiate a Multi-drop Poll, select the **Online Setup** option from the **Mobility MFC Main** screen when the **Device 0 Not Found** message is displayed. This function polls for all non-zero addresses (1 – 15). Located addresses are listed on the display as the remaining addresses are checked. When polling is complete, or upon pressing **Stop** after the address of interest is found, use the soft key controls to select the address of interest. The initial HART menu for the device selected will then be displayed for use.

7.4.3 Manual Launch of Device 0 Poll

When the message **Device 0 *On-line*** is displayed on the Mobility MFC Main navigation screen, selecting **Online Setup** will launch HART communication with the device. The message indicates that a HART device with address 0 has been detected at the HART connection and the Mobility MFC is standing by to initiate communications. The **Device 0 *On-line*** message is shown 1) if a physical connection is made to a HART device after the Mobility MFC power is turned on or 2) if the user exits from a HART communication session using the soft key controls provided.

7.4.4 Offline Menu Mode

The **Offline Menu** gives the user access to lists and functions that can be viewed or performed in Offline Mode at the user's convenience for the purposes of reviewing the Mobility MFC's DOF list, reviewing stored device configurations or creating HART configurations. Stored configurations can be also be edited and then applied later to a connected HART device. When the **Offline Menu** is selected from the **Mobility MFC Main** navigation screen, the following display is shown.

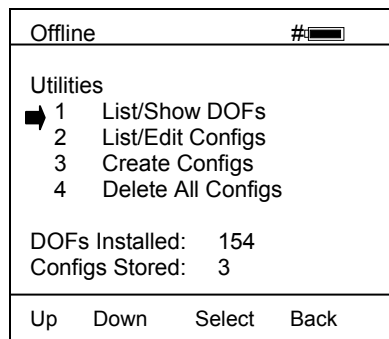


Figure 7-8 Hart Offline Menu Screen

List / Show DOFs:

Provides a list of installed DOFs (Device Object Files) used by the Mobility MFC to communicate with HART devices. Lists can be view by Manufacturer, by Device Name or by stepping through all Devices one at a time. Use the soft key controls to move through the list. Pressing the SHIFT key changes soft key definitions **Down** and **Up** to **PgUp** and **PgDn**. To quickly advance to the next page of a list, press **SHIFT** and then the **PgDn** soft key. To retreat to the prior page, press **SHIFT** and then **PgUp**. Once engaged, the **PgUp** and **PgDn** soft keys remain active until the **Up** or **Down** soft keys or **SHIFT** is pressed again.

List / Edit Configs:

This screen lists all stored HART configurations by Tag Number. The configurations stored enable fast commissioning of replacement devices, cloning of existing systems, or re-configuring for changes in process conditions or batch runs. Any configuration in the list can be sent to another HART device of the same manufacture and model. The display can show 20 character tag numbers. Truncated tags are listed if more than 20 characters are used. Moving the cursor down to the tag of interest and pressing the **Select** soft key will provide a detailed information screen, including full tag number up to 28 characters, for the tag of interest (see example below, right).

The editing function allows review of all HART parameters in a configuration and modification of editable parameter. The edit function can be locked out if desired (see the **Lockout** section of this manual for more information). To view detailed information of a stored configuration, Move the cursor to the desired tag number and press the Select soft key. The Config Detail screen (see example at right) provides information to help the user confirm the identity, origin, and save date/time of the configuration. Pressing Select again opens the configuration for review or offline editing.

New configurations saved are added to the bottom of the List / Edit Config list. If multiple entries for one device are shown, the most recently saved configuration is always shown at the bottom.

Entries in the List / Edit Config list may have been saved or created from various sources. Possible sources include the save command from a connected HART device, created in the Mobility MFC using the **Create Configs** function, copied from another configuration and renamed, or created by editing an existing file. A Mobility MFC will also list configurations downloaded from the separately available Device Management System software from ABB that includes the DPC option. Tag numbers, date / time of save, type of configuration stored, and other information are displayed under **List/Edit Configs**.

Configuration types are:

- Complete Config = saved from connected device in Online mode, or a complete configuration that was downloaded from DMS
- Default Config = created by Mobility MFC in Offline mode, or created in DMS and downloaded to Mobility MFC
- Edit Vars Only = created by editing an existing configuration and includes only the edited parameters
- MVar Primary Cfg = for multivariable devices – Primary Variable configuration
- MVar Sub Config = for multivariable devices – Sub-configuration (secondary, tertiary, fourth, etc. variables)

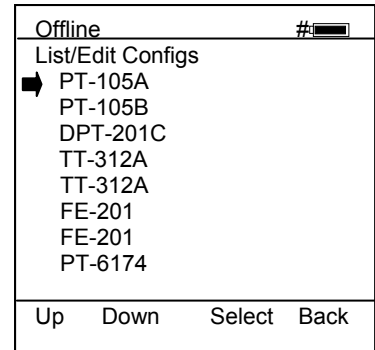


Figure 7-9 Offline List / Edit Configs Screen

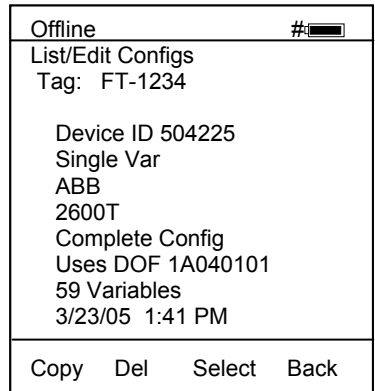


Figure 7-10 Offline List / Edit Configs Detail Screen

Create Configs:

The **Create Configs** function allows the user to configure a HART device file in Offline Mode for sending to the intended device later when connected in the Online Mode. Use the soft key controls to move through the list and select the device model number required. The menus prompt the user to make the necessary configuration selections, tag the file for later retrieval and use, and edit configuration lines as required. This function can be locked out. See the Lockout Section of this manual for more information.

Delete All Configs:

The **Delete All Configs** function clears all configurations from memory (including active and hidden configs). When this menu option is selected, the Mobility MFC will ask “Delete ALL Configs... ARE YOU SURE???” Select **Yes** to clear all stored configurations from memory.

Delete Configs / Clearing Configuration Memory:

Individual stored Configurations may be deleted with Mobility MFC **Del** soft key functions (see example at right). A delete confirmation screen is provided to prevent unintended deletions. The **Del** key only hides the record from the Mobility MFC screen; it does not clear memory space. The editing function can be locked out. See the Lockout Section of this manual for more information.

(To clear all configurations from memory (including active and hidden configs), enter the **HART Offline Menu Screen** and select the **Delete All Configs** option. The Mobility MFC will ask “Delete ALL Configs... ARE YOU SURE???” Select **Yes** to clear all stored configurations from memory.)

7.4.5 Online Setup (or Config) Mode

Online Setup or Config is the normal HART communication mode for the Mobility MFC. This mode enables communication with HART field devices at the Universal, Common Practice and Device Specific Command levels for full device setup and functionality.

Menus displayed for the connected device follow the HART device manufacturer’s menu structure for the connected device. Consult the device manual for menu structure details.

Mobility MFC features two unique online features for added convenience to the user.

1. **Live HART connection monitor:** Mobility MFC display lets you know from the Main navigation screen when a device is * **On-line** * and ready for communication.
2. **Review/Edit:** this menu option allows the user to review configurations line-by-line. Mobility MFC supports editing of the configuration once the line of interest is located.

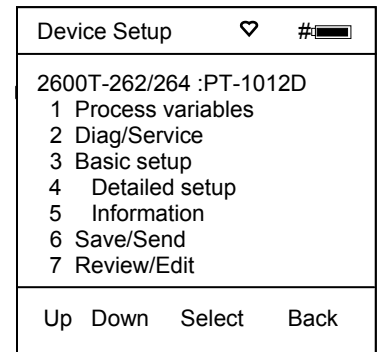


Figure 7-11 Online Device Setup Screen

7.4.6 Communications Trouble Shooting

If an operating HART device is connected to the Mobility MFC but the “Device 0 Not Found” notification is received, a Multidrop Poll may be executed to determine if the connected device has a non-zero address. Select **Online Setup** from the Mobility MFC Main navigation screen to initiate the multi-drop poll. If the “No Devices Found” message is received, then the loop connections to the Mobility MFC should be carefully checked.

If an operating HART device with address zero (0) is connected to the Mobility MFC but the “Device 0 Not Found” notification is received, the loop connections to the Mobility MFC should be carefully checked.

Make sure all connections are correct and secure. Check for shorts, open circuits and multiple grounds.

Determine if the loop resistance is greater than 250Ω and less than 1100Ωs. If less than 250Ω then use the supplied 250Ω load resistor in series with the loop (see diagram HART Connections section).

If communication is still not established, check the **List / Show DOFs** menu under **Offline Menu**. Check the list for the presence of the “Generic” DOF under the manufacturer name “Meriam.” If “Generic” is found, then HART communication is possible when the device is properly wired and connected to the Mobility MFC (see connection troubleshooting details above).

When the message “Generic” is displayed after connecting to a HART device there are two possible causes:

- 1) No device specific DOF for that device is currently installed in Mobility MFC memory. Check the ABB Download Site for availability of the DOF as described in the Available DOF Website paragraph of this manual. To download available DOFs, see the DOF Download Site Information section of this manual.
- 2) The DOF “Device Library” is missing or has become corrupted. Without this DOF, the Mobility MFC may not recognize a connected device. Check the **List / Show DOFs** menu option of **Offline Menu**


7.4.7 More Status Message

HART device events (diagnostic flags) cause the Mobility MFC to display a “More Status Message” at the bottom of the display. This message is a notice to the user that one or more diagnostic warnings are available in the Review Status menu option of the connected device. Upon receipt of this message, enter the **HART** mode and select Detailed Setup / Diagnostics – Service / Test – Status / View Status to retrieve the diagnostic information.

7.4.8 Save / Send Configuration Functions

HART device configurations may be saved to Mobility MFC memory or sent from Mobility MFC memory to a HART device in all Mobility MFC model numbers. These functions are useful for cloning a device configuration for use in another transmitter of the same configuration, for recording as-found and as-left configurations for later review, for returning HART devices to previously used configurations, etc...

The Save / Send function may be accessed in one of two ways:

1. Press the Document key  on the Mobility MFC for the screen shown at right. Then select the “Save/Send Configs” menu option to launch a HART communication poll and use the Save / Send options.
2. Use the Save / Send menu option within the HART device’s standard menu. The Mobility MFC would be in Online mode in this case. Save / Send is normally found under the “Device Setup” menu option on the initial HART display for the device.

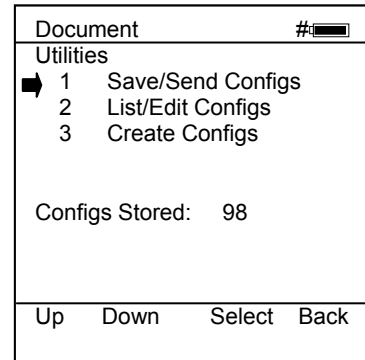


Figure 7-12 Document Key Menu Screen

8.0 Documenting HART Configurations with Mobility DMS


The ABB Device Management System (DMS) software allows stored configurations in the Mobility DHH800-MFC models to be documented. DMS is a database product for complete device management services including calibration with the ABB DHH810-MFT multifunction calibrator and HART configuration documentation with the Mobility DHH800-MFC. Complete device histories are maintained in the database. For HART devices these histories can include as-found and as-left HART configuration data to complete this important part of a device's history.

Document	#
Utilities	
1	Save/Send Configs
2	List/Edit Configs
3	Create Configs
Config Stored: 98	

Figure 8-1 Document Key Menu Screen



Figure 8-2 Mobility MFC with Device Management System

The Document key  on the Mobility MFC saves configurations in as-found or as-left categories as selected by the user. These configuration files can be uploaded later to DMS. When the **Save/Send Configs** menu option is selected the Mobility MFC automatically polls an online device for subsequent user selections.

DMS can also be used as a configuration repository ready to download stored device configurations for batch runs or changes in operating requirements. New configurations can be downloaded to Mobility MFC memory for later recall and use in the field.

9.0 Mobility MFC Device Specific & Generic HART® Connection

ABB supports a large and growing number of Device Specific DOFs (Device Object Files). Refer to the Available DOF Website section of this document for accessing a current listing of HART® devices with full Device Specific communication support. Information found there can be sorted by manufacturer name or model number.

To facilitate communication with HART devices that are not yet supported with Device Specific DOF files or that do not require DOF files, the Mobility DHH800-MFC includes Generic HART Communication capability. This allows the user to communicate with any HART device using Universal and Common Practice commands to poll, configure, and maintain HART devices. Specific functions supported include most polling, tagging, device configuration and trim operations for analog outputs. Generic communications do not support Device Specific commands for higher order HART functions (see the **HART® Commands** section of this manual or the instruction manual for the HART device of interest for more information on the three command levels).

9.1 Using Generic HART Communication

The Mobility DHH800-MFC's Generic HART Communication mode starts automatically when HART communication is initiated with a device for which no Device Specific DOF (device object file) is found to match the connected HART device name. When this occurs, line two of the display will indicate "Generic" and the device tag number.

In general, the Generic HART mode operates similarly to its device specific DOF counterpart (see HART Communication section of this manual for more details). However, the Mobility MFC does not display Device Specific related communication menus or options when in the Generic communication mode. For example, the Zero and Sensor trim menu options (normally executed by Device Specific commands) are not displayed for pressure transmitters without DOF support. Please see the **Download Site** section of this manual for information on downloading the latest Device Specific DOF files to your Mobility MFC.

10.0 DOF / Firmware Download Site

10.1 Overview

One of the unique features of the Mobility DHH800-MFC Series is the built-in ability to have firmware upgrades installed by the user at their location. The Download Site is accessible over the Internet and provides for the convenient download of new or revised firmware and DOF's (Device Object Files) for HART communication. Mobility MFC units already in service in the field do not need to be returned to the factory for firmware upgrades or improvements. The user can simply download the files to a PC having Internet access and upgrade the Mobility MFC firmware and DOFs using the Documenting Process Communicator (DPC) Manager software. The Download Site enables users to stay current as new DOF's or revisions of existing ones are made available.

10.2 Who has access to the Download Site?

All Mobility MFC purchasers have unlimited access to the Download Site for three years from date of shipment. These customers may download all published files from the site to their Mobility MFC upon proper registration of the MFC using the DPC Manager software. After the initial three-year period, the Download Site is available with paid annual subscription fee. Contact an ABB representative for more information and to purchase annual subscriptions.

10.3 PC Requirements for Download Operations

ABB recommends IBM compatible Pentium I PCs or higher for download operations. The PC should have an available RS-232 port, minimum modem speed of 28K and access to Internet service.

10.4 Preparing the Mobility MFC

All Mobility MFC models come ready to connect to an IBM compatible PC using the DB-9 socket located at the bottom of the Mobility MFC enclosure. A six-foot male DB-9 to female DB-9 cable (P/N 3KXD311800L0013) is included with every MFC. Similar cables are acceptable. For PCs that only have USB connections, a USB to DB9 serial port adapter from Keyspan can be obtained (Keyspan part number USA-19HS can be purchased at www.keyspan.com). Connect the Mobility MFC to the PC and power up the Mobility MFC using fresh internal batteries or the optional AC Adapter (P/N 3KXD311800L0036). The Mobility MFC is ready for download operations.

10.5 Keeping Your MFC Up to Date

The operating system firmware and device object files (DOFs) can be updated using flashing software that is part of the DPC Manager software. DPC Manager is shipped with your handheld and also can be obtained from your ABB representative (see page I, contacting ABB Instrumentation, for information on contacting ABB).

10.5.1 Prerequisites:

- A. DPC Manager is installed on a computer that has Internet Access.
- B. The latest version of DPC Manager is installed and the correct COM Port has been configured.
- C. A standard RS-232 Cable is connected to the DPC and the DPC is turned on. Note: The DPC cannot communicate HART while simultaneously communicating through the RS-232 connection.
- D. It is highly recommended that the power adapter be used while performing any RS-232 communications. This includes updating the DPC and uploading / downloading between DMS and the DPC.

10.5.2 Register MFC

Launch DPC Manager and click on the Register DPC button. A screen will appear displaying the Model Number, Serial Number, Expiration Date and Firmware version of your MFC. If the expiration date and firmware version of your MFC is blank, then press Check Subscription. You will not be able to download DOFs to the handheld until the MFC is registered as indicated by a filled in expiration date and firmware version. This step must be performed prior to checking for updates.

10.5.3 Check For Updates

Click on Check for Updates icon/button and DPC Manager will automatically update your computer from the Internet. The latest firmware and DOFs will be downloaded from the Internet onto your computer.

10.5.4 Update Handhelds

Click on the Update Handhelds icon/button and DPC Manager will automatically update your MFC from the computer. The latest firmware and DOFs will be downloaded from the computer to your handheld. This happens in two steps. First the MFC firmware will be updated (if necessary), and then the device object files (DOFs) will be updated.

10.5.5 MFC Listing

The DPC Listing is a list of all MFC's and MFT's that have been registered with the DPC Manager that is installed on the computer you are using.

To report any difficulties with downloading operations, please contact ABB (see page I, contacting ABB Instrumentation, for information on contacting ABB).

11.0 Upgrading DHH800-MFC22 to Support All HART Devices

The MFC Model DHH800-MFC22 only communicates with ABB HART Devices with HART Device Specific commands and all other devices with Universal and Common Practice commands. This unit can be upgraded to support All HART devices with Device Specific Commands on a trial basis or permanently.

11.1 7 Day Trial

To turn on a temporary license that enables communications with all HART devices, go to the following menu options:

Select Soft Key "Cfg" and go to **Applications\Upgrade Base Unit**

A prompt with "Enter Code:" is shown.

For the trial version, enter 22000 and then push the Soft Key "Done".

The Trial Version will last for 7 Days. If the user attempts to change the Date on the base unit, the trial date will be TERMINATED. Each unit has three (3) Trials for the life of the unit.

11.2 Permanent Upgrade

To turn on a license that enables support for All HART Devices permanently, proceed as follows:

Contact your ABB Manufacturer's Representative or direct salesperson to obtain pricing and purchase the upgrade license with P/N 3KXD311800L0042. You will need to provide the serial number of your handheld to get the upgrade license.

The S/N of your handheld can be found by going to the following menu options: Select Soft Key "Cfg" and go to **Other\Model Info\Serial #:**

After purchasing your upgrade license, you will be given a key code that is based on your handheld's serial number. Once licensed, your unit will permanently support all HART Devices with Device Specific commands.

12.0 Available DOF Website

After ensuring the PC has Internet access, establish a connection to the Available DOF website by going to www.abb.com/instrumentation and making the following selections:

"Device Management and Fieldbus" from the main page

"Hand Held Configuration Tools" from the main page

"DHH800-MFC" from the main page

"Mobility Hand Held Supported Devices" under Links in the right hand column.

A list of currently available DOF's for HART device communication is presented.

In addition to listing the Available DOFs, the website also provides access to the **Current Release Notes** screen that lists and describes the most recent firmware releases posted and the posting date. Individual files can be downloaded from the detailed description page of each DOF or firmware file listed. The screen describes the most recent firmware releases available and dates posted. Five (5) columns are shown on this page: Date, Title, Description, Manufacturer, and Model. These categories will assist the user in finding the release descriptions of the DOF, Mobility MFC Installer or Mobility MFC Firmware releases of interest. Each column can be sorted to assist searches of the release database. Also available on this screen is a navigation button to go back to the **Available DOFs** screen.

13.0 DPC Manager Utility

The DPC Manager software should be loaded onto the host PC from the Mobility Interface Software CD (included with Mobility MFC shipment). The DPC Manager coordinates the download operations from the host PC to the Mobility MFC. Periodic improvements may be incorporated into this software. Therefore, ABB recommends periodic comparison of the DPC Manager version installed on the host PC to the latest available version on the Available DOF Website to insure use of the up-to-date software. Later versions of the DPC Manager can be obtained by purchase of a new Mobility Interface Software CD or it can be downloaded by making the following selections from www.abb.com/Instrumentation

- “Device Management and Fieldbus” from the main page
- “Hand Held Configuration Tools” from the main page
- “DHH810-MFC” from the main page
- “Downloads” from the upper tab of the main page
- “DHH800/810 Software Download DPC Manager, Version x.y”

Note that the DPC Manager software is >13 MB and phone modem downloads can be lengthy. Directions for using DPC Manager are found under the Help Tool Bar selection.

13.1 DPC Manager Option

In addition to supporting Internet downloads of a new DOFs, DPC Manager also provides a licensable option for storing, displaying, and printing configuration results uploaded from the DHH810-MFC handhelds. Contact your ABB Manufacturer’s Representative to obtain pricing and purchase the licensable option with P/N 3KXD311820L0001.

14.0 Returning the Mobility MFC for Repair

In the event that a Mobility MFC requires service and must be returned to the factory for repair, please contact your local ABB Representative (see page I, contacting ABB Instrumentation, for information on contacting ABB).

Please do not send any unit in for repair without first contacting an ABB Representative or ABB Factory for a Return Material Authorization (RMA) number. This number will be provided by the ABB Repair Department when you call, fax or e-mail your information. An RMA number must accompany all incoming packages to insure proper tracking, processing and repair work.

To assist us in processing your repair request, please have the Model & Serial Number of the unit available when you call. This information is located on the Mobility MFC label. This information can also be obtained directly from the Mobility MFC display by pressing the **Mobility MFC** Soft Key from the **Mobility MFC Main** display. See the **Mobility MFC Main display** section in this manual for more details.

15.0 Appendix

15.1 Specifications

Base Unit: 10" (25 cm)L x 4.25" (11 cm)W x 1.65" (4 cm)D ABS plastic case with optional shock absorbing boot, 19ozs. (539 g) including batteries

Display: 128 x 128 pixel graphic display, 2.6" x 2.6" (6.6 x 6.6 cm) viewable area, backlight

Power: two (2) 9-volt alkaline batteries, two (2) 9-volt Lithium batteries, two (2) 9-volt NiMH batteries or optional 100 – 240 Vac power adapter (P/N 3KXD311800L0036)

Temperature Specifications:

Storage: -40° F to 140° F (-40° C to 60° C)

Operating: 23° F to 122° F (-5° C to 50° C)

Connections: HART: Standard banana jacks (1/2" center)
PC Data transfer: DB-9 serial connector
Power: AC Adapter jack

Auto Shut-Off - occurs after user-selected period of keypad inactivity or can be disabled, both Mobility MFC and backlight

Diagnostics – Mobility DHH800-MFC self-tests upon power up. Advisories are posted on the display.

Approvals: Class I, Div I, Groups A, B, C, D, T5 certified by MET Laboratories, Inc per UL3111-1, CAN/CSA-22.2 No. 1010.1 & 157-92 and UL913, Fifth Edition, Rev. 2/21/97

Contrast – direct adjustment of display contrast in any mode; automatic compensation for ambient temperature changes

Security Lockout – Mobility DHH800-MFC Settings can be locked out entirely or by specific feature.

CE CE compliance

Memory – separate, dedicated, non-volatile flash memory for Mobility MFC firmware, DOFs, and Configurations

DOF Memory: 600 HART devices (based on average DOF size)

Configuration Memory: 200 HART devices (based on average configuration size)

15.2 Ordering Information

Ordering information																										
Mobility DHH-MFC with HART [®] Communications	Variant digit No.	1 - 7	8 - 10	11	12	13	14	15	16	17	18	19	20	21												
DHH800-MFC	Catalog No.	DHH800-																								
Configurator with HART[®] Communications - Includes CE Mark, HART leads Kit, RS-232 Serial Cable, Paper User's Manual and 3-year download subscription			MFC																							
Model Type - Includes Batteries, Universal Power Adapter All Supported HART devices (ABB and non-ABB) Only Supported ABB HART Devices					1	2																				
Documenting Options Standard - As-found & as-left function requires DHH820-DMS database software sold separately Support for 21 CFR Part 11 - documenting for FDA electronic signature compliance requires DHH820-DMS database software sold separately						1																				
Certification CE Mark (Standard on all units) CE Mark, Intrinsic Safety certification by MET Laboratories per CSA C22.2 No. 1010.1-92, C22.2 No. 157, and UL913, Fifth Edition Rev. 2/21/97 for Class I, Div I, Groups A, B, C and D.							0	0																		
Carrying Case and Strap Options Rear Hand Strap with protective boot (Standard on all units) Rear Hand Strap with protective boot and Adjustable Hanging Strap Rear Hand Strap with protective boot and Soft Carrying Case Rear Hand Strap with protective boot, Soft Carrying Case and adjustable hanging strap									0	1	2	3														
User's Manual Language Options English										0	1															
Reserved Always one																						1				
Firmware Language English																								0	1	
Selection of the DHH800-MFC12 model is required for support of ABB and third party devices while selection of the DHH800-MFC22 model provides support for ABB devices only. The upgrade from DHH800-MFC22 to DHH800-MFC12 does not require the return of the handheld and can be done over the Internet after purchase of the upgrade with part number 3KXD311800L0042.																										

15.3 Accessories

Carrying Accessories		
Gray protective boot provides degree of protection against drop related damage; slip on	(A37136) 1)	3KXD311800L0001
MFC carrying case - custom soft case with adjustable shoulder strap and HART lead compartment	(A36875)	3KXD311800L0002
Adjustable, detachable hanging strap - clips directly to MFC attach points	(A36937)	3KXD311800L0003
Communication Accessories		
HART Test Lead Kit - standard banana plugs, mini-grabbers, 250 ohm resistor	(A900529-00014) 1)	3KXD311800L0011
Standard size 250 Ω shunt resistor - required for HART low resistance loops	(A36821)	3KXD311800L0012
DB-9 cable, Male x Female, 6 ft (1.83 meter) length	(A900447-00052) 1)	3KXD311800L0013
Power Accessories		
9 Volt Alkaline Battery (2 required)	(A900614-00006) 1)	3KXD311800L0021
9 Volt Lithium Battery (2 required)	(A900614-00009)	3KXD311800L0022
9 Volt NiMH Batteries (2 required) rechargeable	(A900614-00015)	3KXD311800L0023
NiMH battery charger (9 Volt)	(A36888)	3KXD311800L0031
Power adapter, with pin connector 100/240 Vac, 50-60 Hz	(A37160)	3KXD311800L0034
Universal plug adapter kit for 3KXD311800L0034 power adapter	(A37159)	3KXD311800L0035
Power adapter, with barrel connector 100/240 Vac, 50-60 Hz and universal plug adapter	(9B000007)	3KXD311800L0036
Media Accessories		
Mobility Interface Software CD set, latest version	(698B277U01) 1)	3KXD311800L0041
Upgrade from "ABB Only" to "ABB + non-ABB" Mobility MFC	(DPCLICUPG-22)	3KXD311800L0042
Mobility MFC Operations Manual, printed hard copy - one copy supplied with order at no charge and pdf instructions included on CD	(694A198U01) 1)	3KXD311800R4301
DPC Manager for Configuration Management	(DPCMAN-CFG)	3KXD311820L0001
DPC Manager for Calibration and Configuration Management	(DPCMAN-ALL)	3KXD311820L0003
Upgrade DPC Manager for Configuration Management and Calibration Management	(DPCMAN-ALL-UPGRD)	3KXD311820L0004
<i>Note: 1) Included with base order DHH800-MFC</i>		

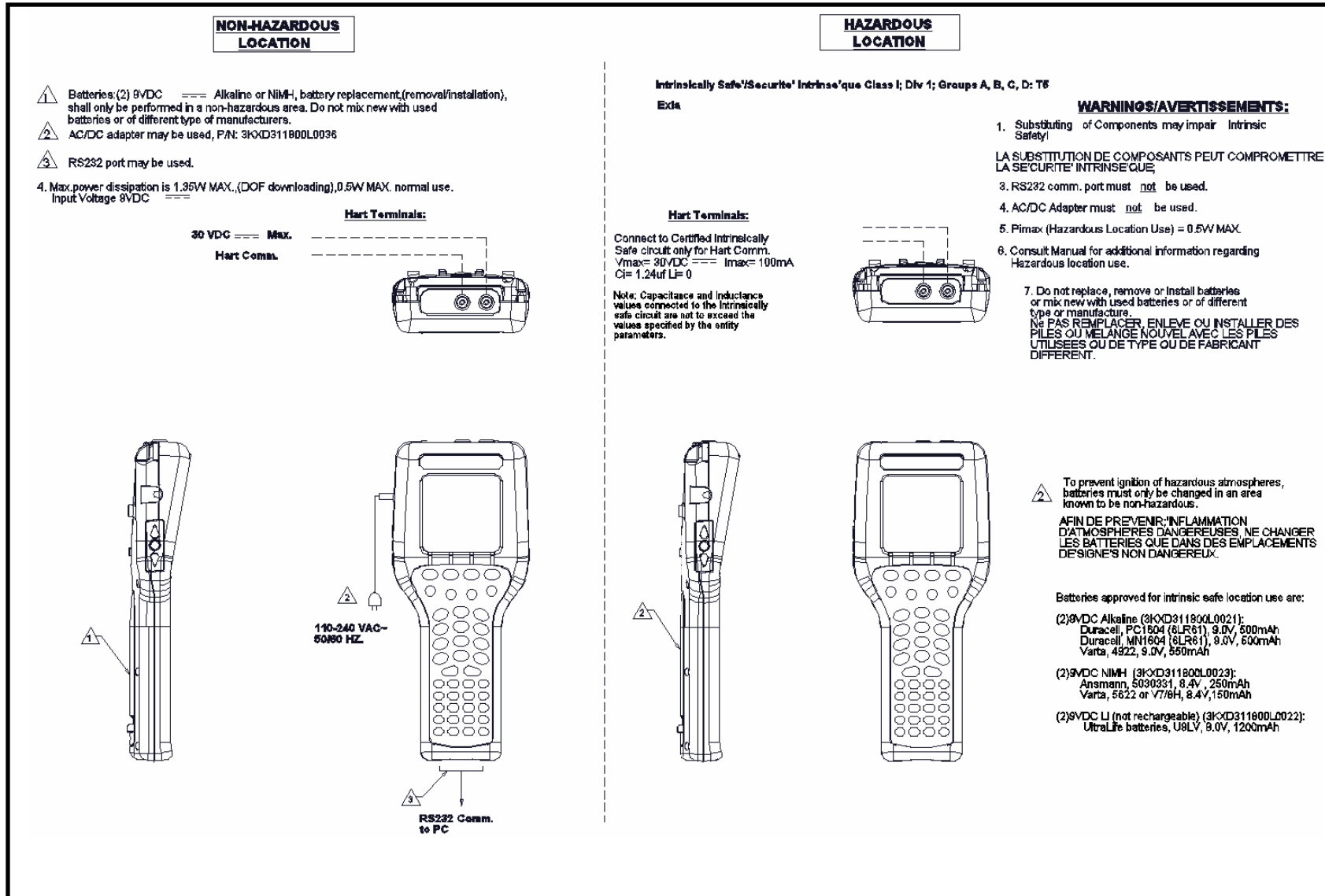
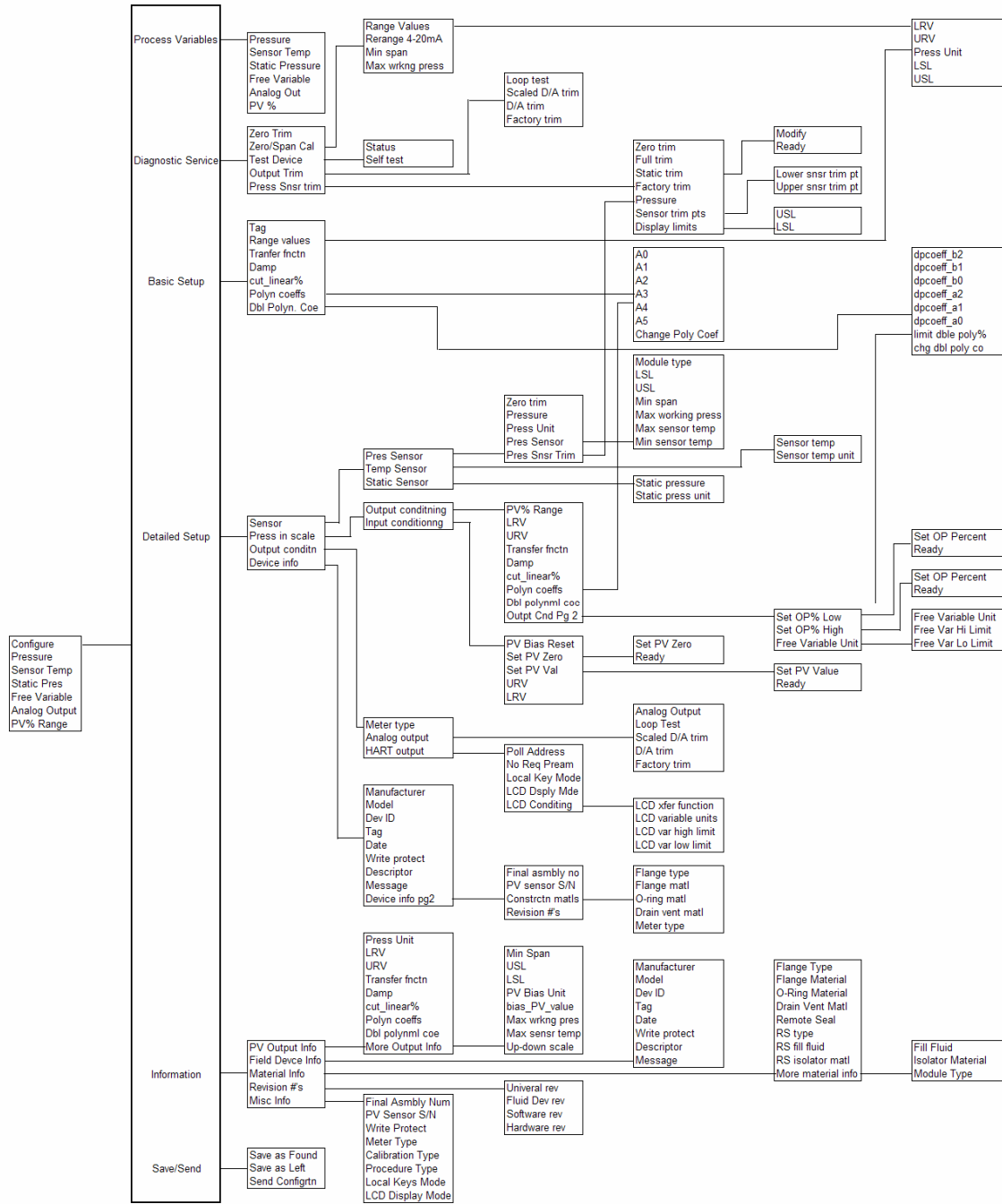


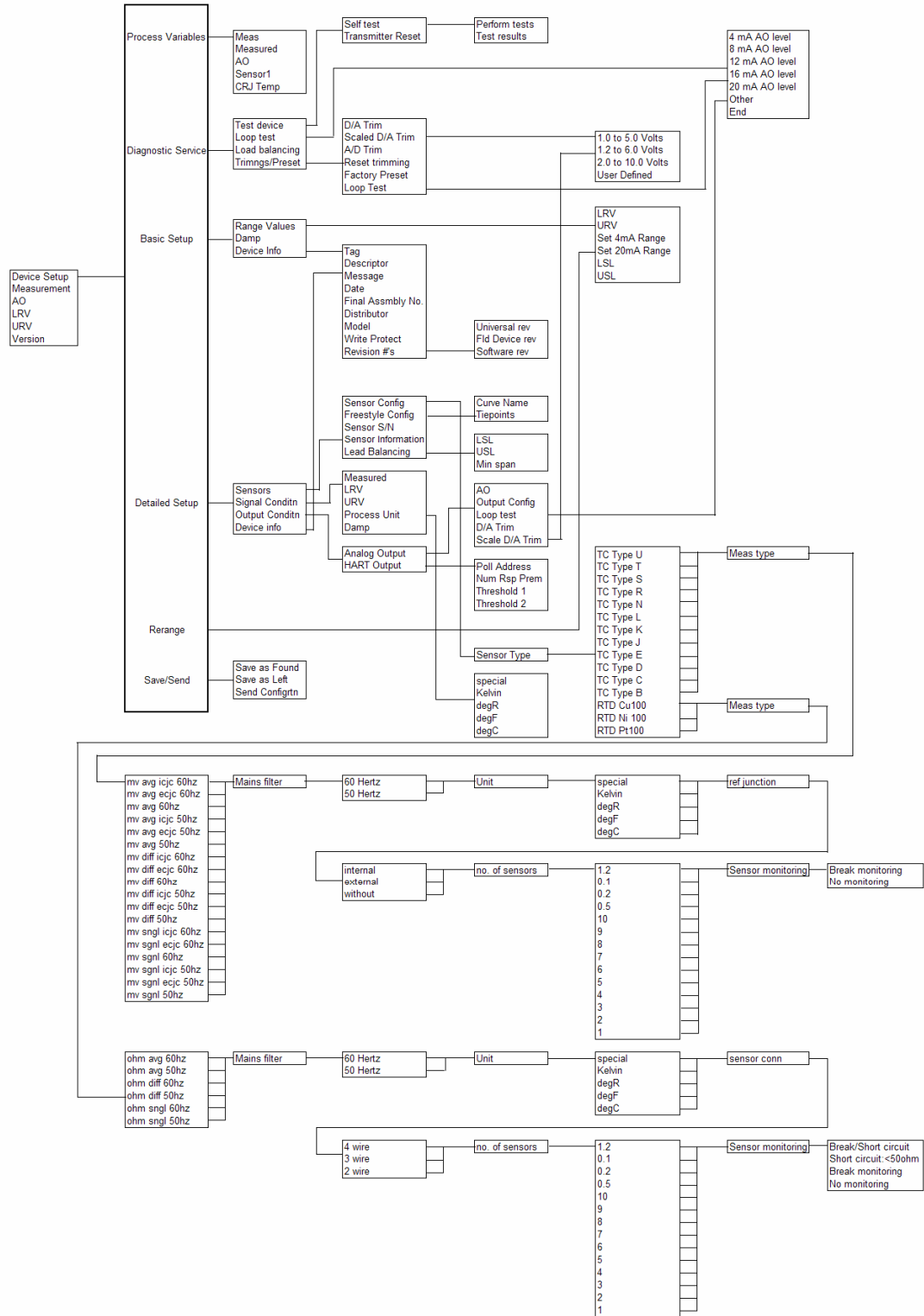
Figure 16-1 MFC Series Intrinsic Safety Control Drawing

17.0 HART® Command Structure Menu Tree

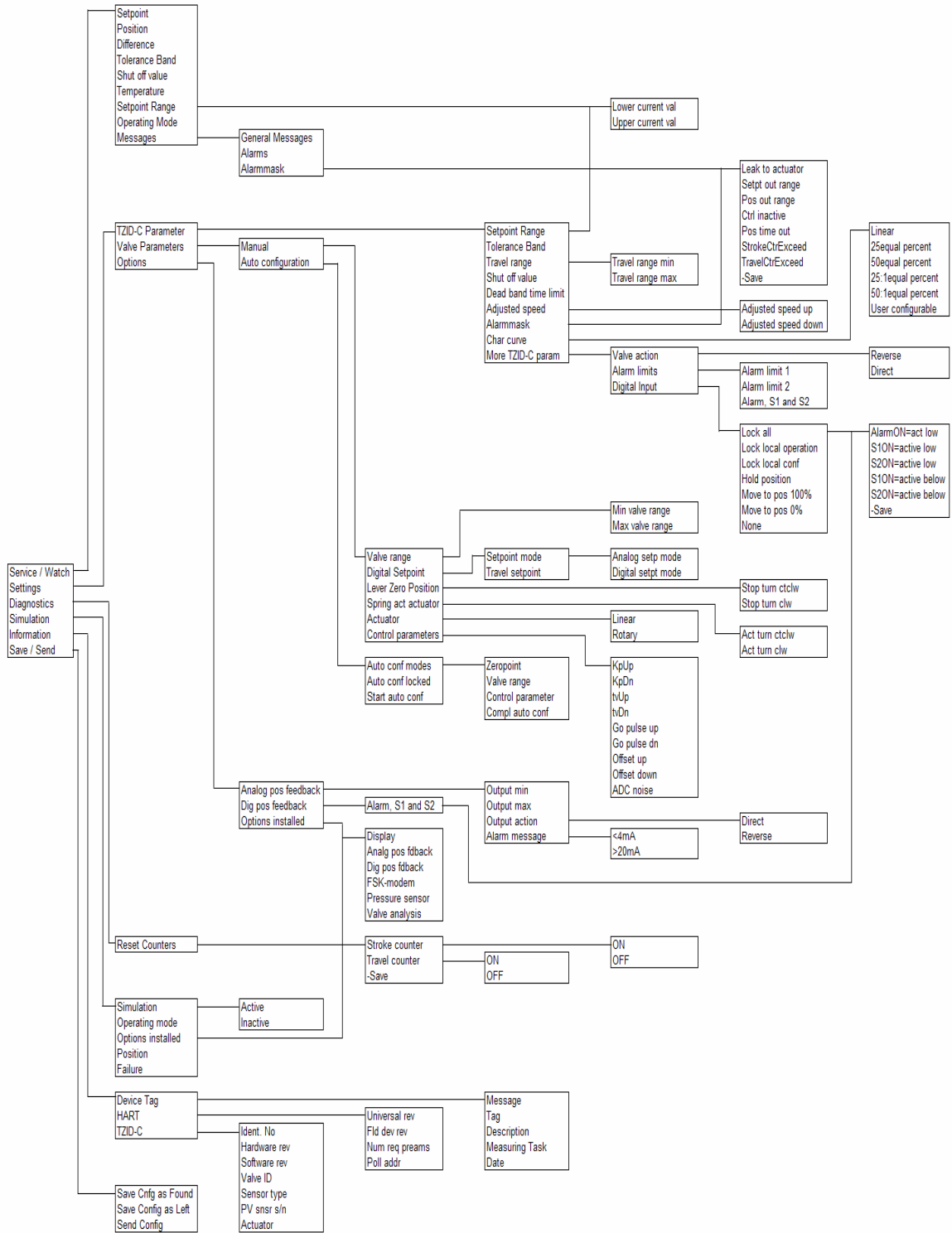
17.1 2600T-262/264 Rev. 1 Menu Tree



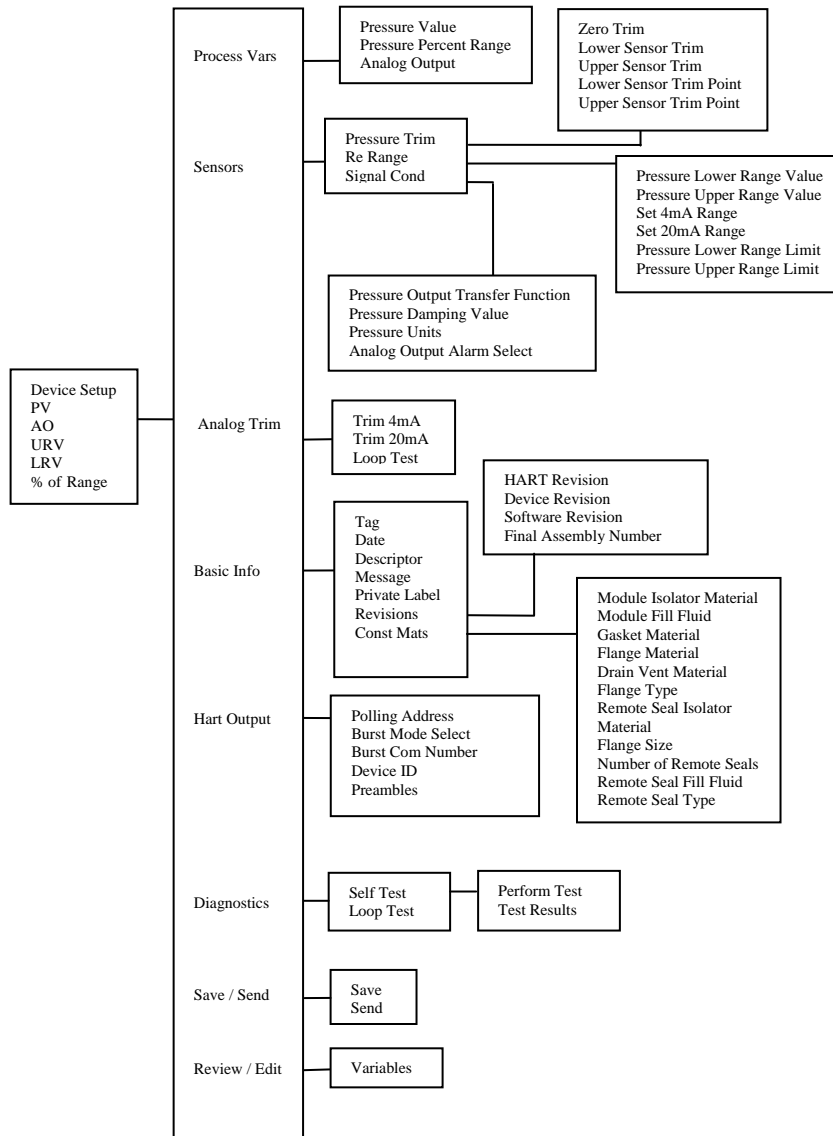
17.2 THx02 Rev. 1 Menu Tree



17.3 TZID-C Rev 2 Menu Tree



17.4 1151 Rev. 5 Menu Tree



17.5 3051 Rev.2 Menu Tree

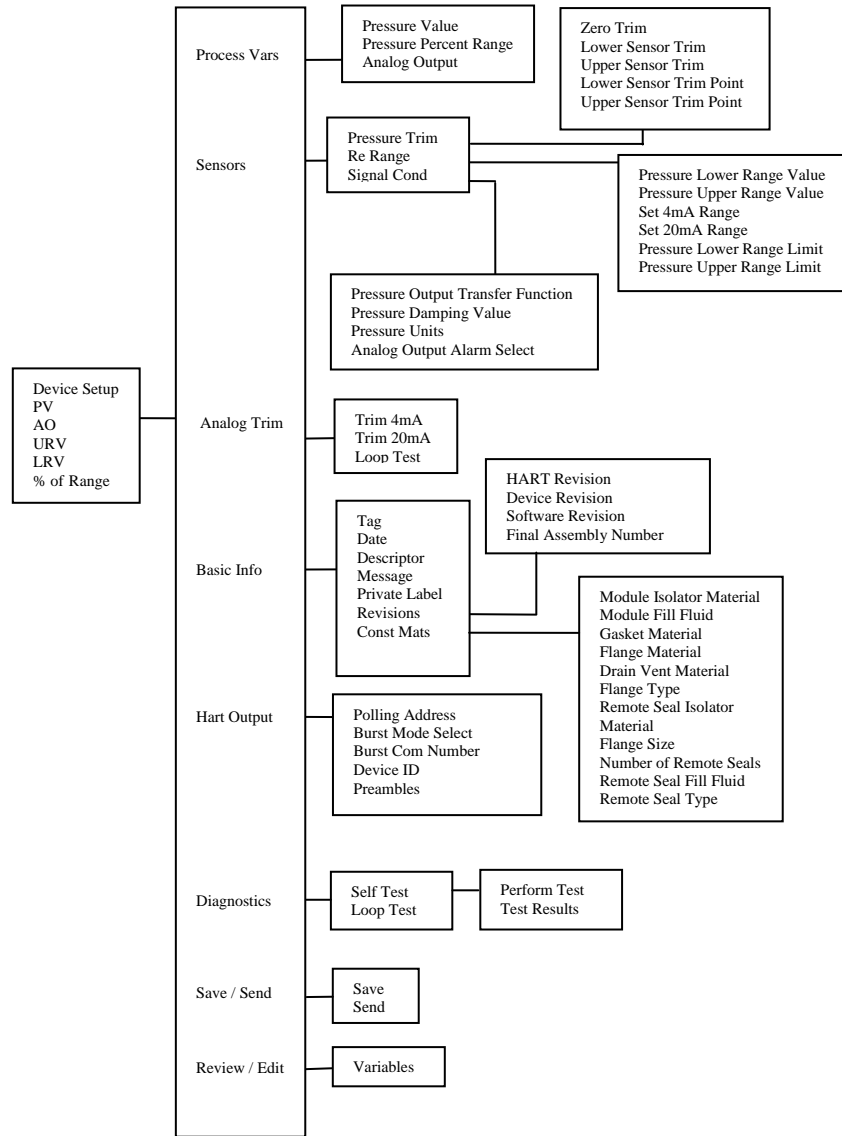


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