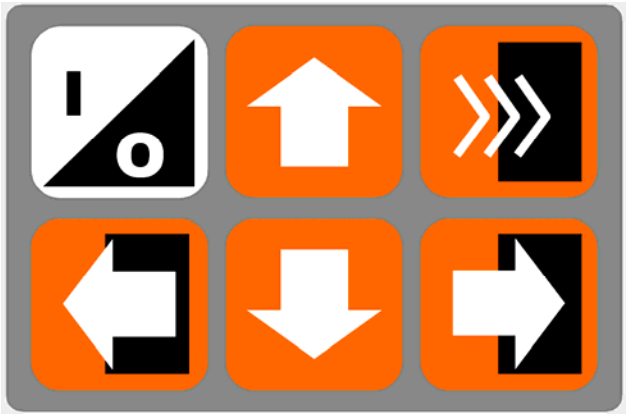
HK-H375A HART

Hand Held Communicator

Manual



Beijing Huakong Technology Co., Ltd

NOTICE

NOTE 1: Please read this manual before working with this product. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before using this product or calling for service.

NOTE 2: The service lifetime of the LCD display will be shortened if the device is insolated in the sun!

NOTE 3: If the device will not be used for a long period of time, please make sure that the batteries be removed from the device in order to avoid the damage of battery leakage.

Beijing Huakong Technology Co., Ltd

Huakong Tower, No. 1 Shangdidonglu, Haidian District, Beijing 100085 China
Tel: +86-10-58859884
Fax: +86-10-58859889
Email: market@huakong.com.cn
Http://www.huakong.com.cn

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Section 1 Operation Instruction

1.1 Brief Introduction

HK-H375A HART Hand Held Communicator is a hand held interface based on HART protocol, which could perform configuration, management, maintenance and adjustment to all HART compatible instruments (Figure 1).

Figure 1 HK-H375A HART Hand Held Communicator

HK-H375A HART Hand Held Communicator can be easily connected into 4~20mA loop, to achieve the configuration of instrument parameters (upper limit and lower limit etc.), the reading of instrument variables, as well as the diagnosis and maintenance of the instrument. This Communicator could support not only the HART main device (HART multiplexer etc.), but also the peer-to-peer and multidrop HART communication modes.

1.2 Communicator Connections

This HART Communicator can interface with an instrument from the control room, the instrument site, or any wiring termination point in the loop through the clips and cable (which are the accessory of the communicator) (Figure 2).

Figure 2 Clips and Cable

This HART Communicator could be connected in parallel with HART instrument, or with load resistor. All connections are non-polarized (Figure 3).

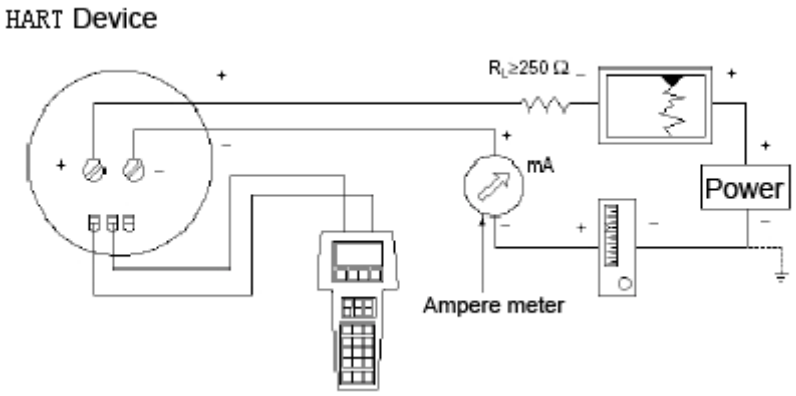

Figure 3 Communicator Connections

NOTE: For the HART Communicator to function properly, a minimum of 250 ohms resistance must be present in the loop. The HART Communicator does not measure loop current directly.

1.3 Power up

First make sure that batteries have been installed appropriately in the Communicator. Then press the On/Off Key to power up the Communicator（once again for shut down）. Then for about 5 seconds after the startup, the Communicator will automatically poll the HART device (polling address 0) in the 4~20mA loop. If a device is not found, the Communicator will display the message “No device found at address 0, Poll?” If a device is found, the Communicator will display the Online Menu (Figure 4).

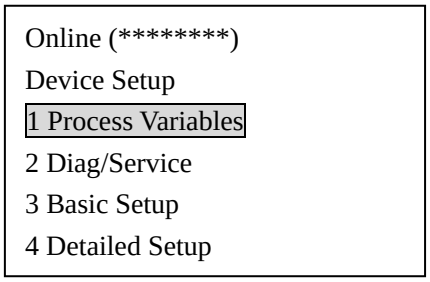

Figure 4 Online Menu

1.4 Quick Startup

1.4.1 Process Variables

When online, follow the menu operation sequence shown below to access Process Variables:

Online Menu→1 Process Variables.

1.4.2 PV Unit

When online, follow the menu operation sequence shown below to access PV Unit:

Online Menu→4 Detailed Setup→2 Signal Condition→1 PV Unit.

1.4.3 Upper Range Value (URV)

When online, follow the menu operation sequence shown below to access Upper Range Value:

Online Menu→4 Detailed Setup→2 Signal condition→2 PV URV.

1.4.4 Lower Range Value (LRV)

When online, follow the menu operation sequence shown below to access Lower Range Value:

Online Menu→4 Detailed Setup→2 Signal condition→3 PV LRV.

1.4.5 PV Damping

When online, follow the menu operation sequence shown below to access PV Damping:

Online Menu→4 Detailed Setup→2 Signal condition→4 PV Damp.

1.4.6 D/A Trim

When online, follow the menu operation sequence shown below to access D/A Trim:

Online Menu→2 Diag/Service→3 Calibration→2 D/A Trim

NOTE: D/A Trim is usually done before the HART instruments leave factory or in the periodic inspection of the instrument. Only authorized person could be designated to do this work, otherwise any inappropriate operation may increase the output error of the HART instruments.

1.4.7 Zero Trim

When online, follow the menu operation sequence shown below to access Zero Trim:

Online Menu→2 Diag/Service→3 Calibration→3 Sensor Trim→1 Zero Trim

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NOTE: Zero Trim can calibrate the zero error of the instrument output caused by installation method. Generally speaking, it is usually done at the first installation of the HART instrument or when the periodic inspection of the instrument. Only authorized person could be designated to do this work, otherwise any inappropriate operation may increase the output error of the HART instrument.

Section 2 Technical Specifications

2.1 Dimension

HK-H375A: 228mm x 98mm x 60mm
(Clips and cable not included)

2.2 HART® Connector

a) In conformity with HART Protocol (HCF);
b) Operating mode: intercommunication semiduplex 1200bit/s
c) Receivable voltage: ±40V
d) Leakage current less than 1uA at 20°C
e) Communication distance less than 1500m
f) Isolation mode: isolation between HART communication connector and power supply
g) Rating isolation voltage: $500V_{rms}$

2.3 PC Connector

This connector is used for software update. Please contact with us for the detailed information on software update.

2.4 Power Supply

Power Supply: 4.5V DC;
Power Consumption: 91.3mA (Typical value under working state)
1uA (Typical value under power-off state)

2.5 Battery

Power Supply: Three AA 1.5V alkaline batteries or rechargeable NiCad/NiMH batteries.
Battery Life: 100 hours (AA Alkaline Batteries)
80 hours (1000mA Rechargeable Batteries)

NOTE: If no operation in 10 minutes, the Communicator will shut down automatically to save battery life!

2.6 Temperature Limit

Operating Temperature: 0°C ~+50°C
Storage Temperature: -20°C~+55°C

Note: The service lifetime of the LCD display will be shortened if the device is insolated in the sun!

2.7 Liquid Crystal Display (LCD)

The LCD is an 8-line by 21 characters display that provides human-machine interface (HMI). When the communicator is connected to a HART compatible device, the top line of each Online Menu displays the model name and the tag of the device.

It is normal phenomenon when the ambient temperature is too low, the response time of the LCD will be longer. In order to meet your requirements for different environments, temperature compensation circuit is embedded, which makes the LCD display in good contrast even in higher ambient temperature.

Section 3 Keypad Instruction

3.1 On/Off Key

Use this key to power up and power off the HART Communicator. To avoid misoperation, press this key for at least 2 second, and then it will work.

3.2 Up Arrow Key

Use this key to move the cursor up through a menu or list of options.

3.3 Down Arrow Key

Use this key to move the cursor down through a menu or list of options.

3.4 Left Arrow/Previous Menu Key

Use this dual-function key to move the cursor to focus the left option or back to the previous menu.

3.5 Right Arrow/Select Key

Use this dual-function to move the cursor to focus the right option or to select a menu option.

3.6 Confirmation Key

Use this key to confirm the cursor-focused option.

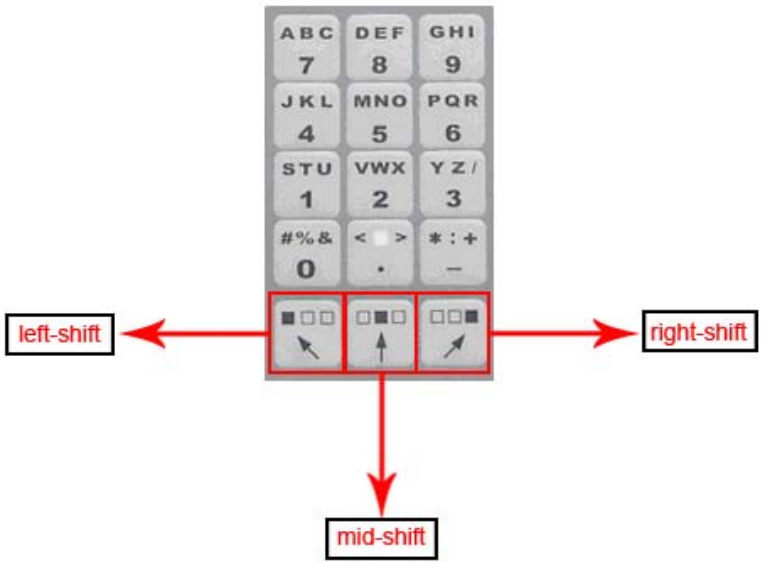


Figure 5 Alphanumeric and Shift Keys

3.7 Alphanumeric & Shift Keys

Use Alphanumeric Keys to input data (Figure 5).

3.8 Using Shift Keys for Data Entry

Some menu requires data entry. Use the Up and Down Arrow Keys when available, or use the Alphanumeric and Shift Keys to enter the alphanumeric information into the HART Communicator.

If you press only the Alphanumeric Key with an edit menu, only the character in the center of each key will be entered. These characters include digits from zero (0) to nine (9), the decimal point (.), and the dash symbol (-). To enter the other characters on the keys, first press and release the Shift Key corresponding to the position of the desired character on the key and then press the Alphanumeric Key. Do not press the keys simultaneously. For example, to enter the letter “R”, press the following key sequence:

Press the Shift Key again to deactivate the shift function.

Section 4 Common Tasks

If the Communicator is powered up when it is not connected to a device, the Communicator will display the message “No device found at address 0, Poll?” Select “No”, and then the Main Menu (Figure 6) appears.

If a device is found, the Communicator will skip the Main Menu, display the Online Menu directly (Figure 7). You can access the Main Menu by pressing the previous menu key (left key).

4.1 Main Menu

There are four functions in the Main Menu:
1. To access Online Menu;
2. To download software;
3. To read the battery capacity;
4. Polling.

You can finally access this Main Menu by pressing the previous menu key several times whatever instrument you are configuring.

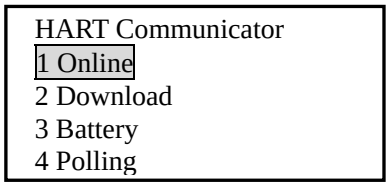


Figure 6 Main Menu

4.2 Online Menu

If the Communicator is connected to a HART instrument, you can access the Online Menu from the Main Menu.

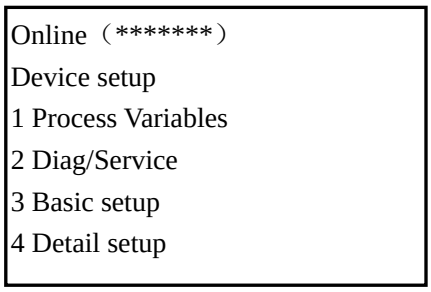


Figure 7 Online Menu

4.3 Process Variables

When online, follow the menu operation sequence shown below to access Process Variables:
Online Menu→1 Process Variables.

All process variables (PV, AO, PV%) are listed in the menu and updated at real time.

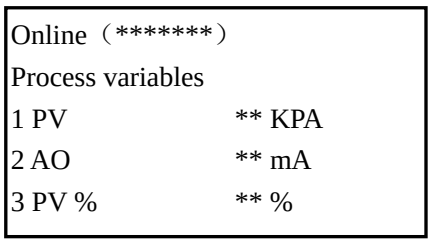


Figure 8 Process Variables

4.4 Diag/Service

When online, follow the menu operation sequence shown below to access Process Variables:
Online Menu→2 Diag/Service.

In Diag/Service Menu, there are three items: Test Device, Loop Test and Calibration.

Test Device can initiate a diagnostic routine on the device and report the result.

Loop Test can fix the transmitter output at a specified analogue value, in order to confirm the integrity of the loop.

Calibration can perform sensor trim or analog output trim.

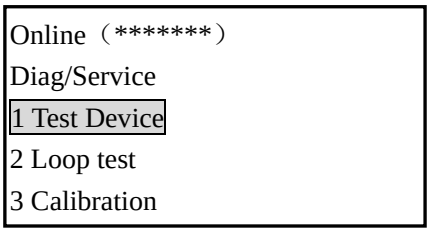


Figure 9 Diag/Service Menu

4.5 Basic Setup

When online, follow the menu operation sequence shown below to access Basic Setup:
Online Menu→3 Basic Setup.

This menu provides quick access to a number of configurable parameters. The parameters available here are the most fundamental tasks that can be simply performed with a given device. These tasks are a subset of the parameters available under the Detailed Setup menu.

There are three types of menu item in this menu: firstly, submenu, you can access to the subordinate menu by pressing the Right Arrow Key; secondly, variable display, some are read-only variables and some are writable variables; thirdly, special functions, you can execute a series of operation here to achieve a specific function, by just following the instructions on LCD.

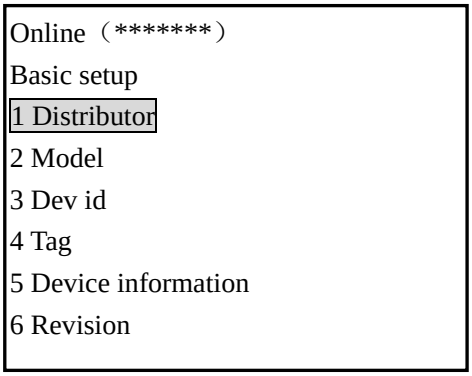


Figure 10 Basic Setup

4.6 Detailed Setup

When online, follow the menu operation sequence shown below to access Detailed Setup: Online Menu→4 Detailed Setup.

This menu provides access to every editable device parameter and all device functions. The Detailed Setup menu varies widely from one HART compatible device to another.

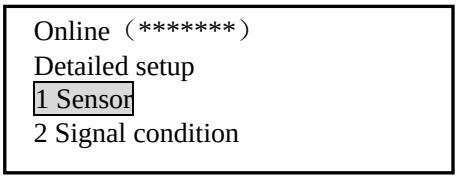


Figure 11 Detailed Setup

The Online Menu displays the name of the device on the top line of the LCD. You have complete functionality for a specific device only when that device description (DD) is preloaded in the HART Communicator.

The Online Menu can be different depending on the connected device. Please refer to the device-specific menu tree in the Appendix for the detailed information. When communicate with a device without DD preloaded, the HART Communicator will display a common menu tree（Figure 12）. This menu tree could deal with all generic functions of all HART compatible instruments.

Please refer to the device-specific menu tree in the Appendix for its special functions.

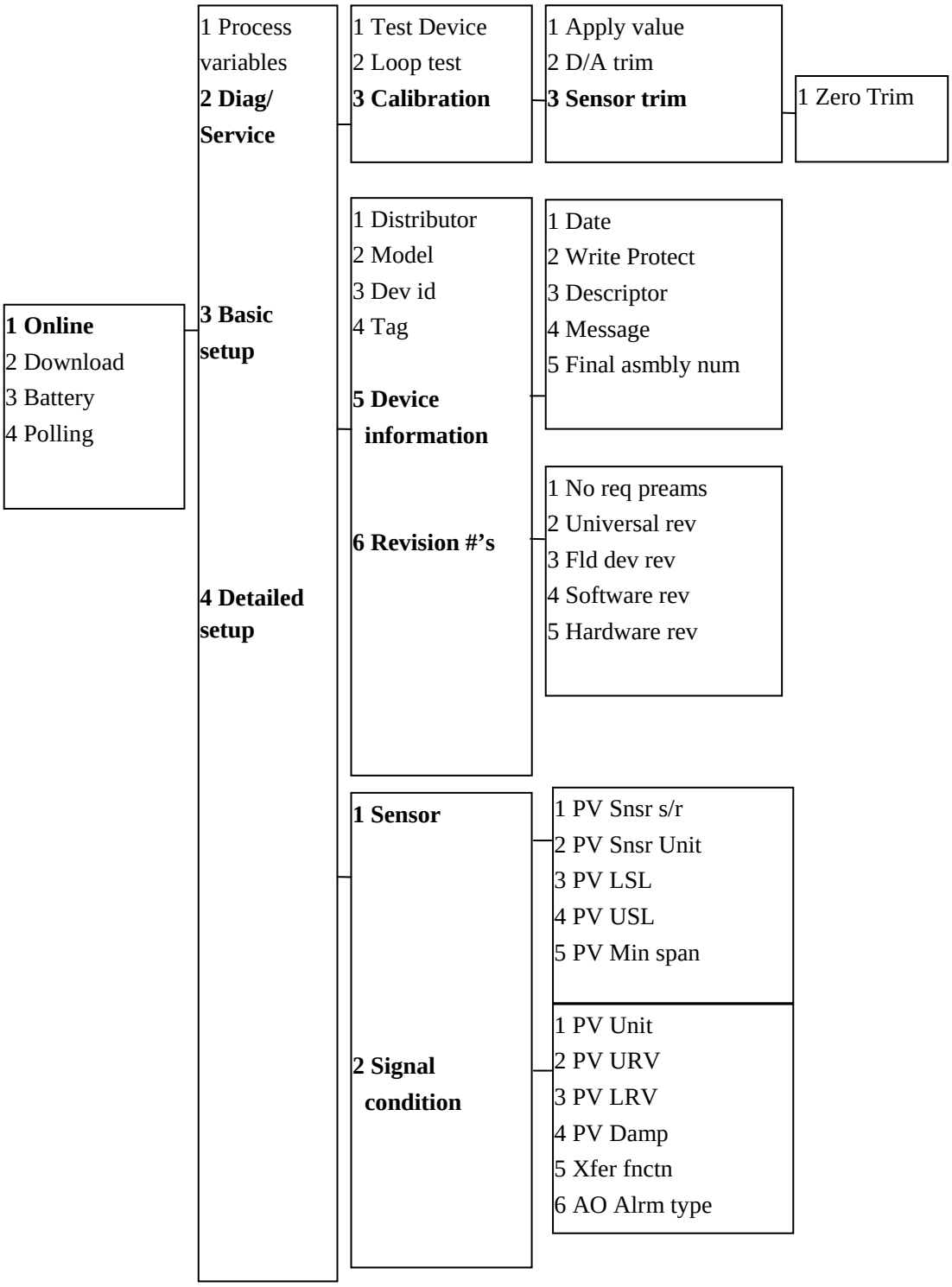


Figure 12 Generic Online Menu Tree

4.7 Other Tasks

4.7.1 Automatic Polling

When online, HK-H375A Hand Held Communicator will poll automatically the online devices at address 0. If not connected to a device, the Communicator will display the message “No device found at address 0, Poll?” Select “YES”, then the Communicator will

poll automatically all the devices connected from address1 to address 15.

When several devices are connected in the same loop, each device must be assigned a unique address. If two devices share the same address, Communicator will not be able to find the devices of this address, and then you will have to connect the device separately to correct the polling address. HART Protocol defines the communication mode of connecting several devices in the same loop as multidrop mode. Under multidrop mode, the current in the loop will not be current signal of 4~20mA standard, but the sum of the output current from all the devices.

4.7.2 Download

Follow the menu operation sequence shown below to access Download:
Main Menu→2 Download.

This function is designed for customers to easily update the DD in the HART Communicator. We will update the DD periodically. Please do not hesitate to contact with us for the relevant technical support.

This function is associated with the special PC software, downloading the target file into the HART Communicator at the default baud rate 38400bit/s.

When the interface displays “Download target file”, select “OK”, then the download starts and the Communicator will display “Please wait moment...” When the download finished, it will go back to the Main Menu.

Note: Please do not use this function without proper PC software and guidance from manufacture,

4.7.3 Battery

Follow the menu operation sequence shown below to access Battery:
Main Menu→3 Battery.

This function will check the remaining battery capacity and display it in the unit of percent (%). When the battery capacity is too low, please change battery at once to avoid influence on the normal use of the Communicator.

4.7.4 Polling

Follow the menu operation sequence shown below to access Polling:
Main Menu→4 Polling.

When several devices are connected in the same loop (multidrop), you can achieve the communication with the required device by polling (Figure 13).

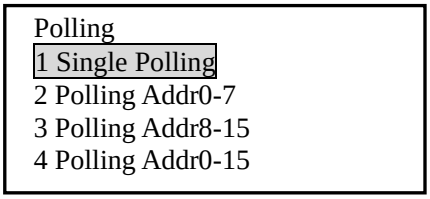


Figure 13 Polling Menu

Item 1 is Single Polling, you can select any address between 0 and 15 to communicate；

Item 2, item 3 and item 4 is group polling; address 0~15 has been divided into three group.

When a device is found by polling, the Online Menu displays; or go back to the original interface, and you should have to select the polling address once again.

You could only communicate with the first device found (smallest address) by group polling. To communicate with the other devices found (bigger address) by group polling, you should have to perform Single Polling.

Section 5 Troubleshooting Communication Problems

5.1 No Communication With Field Device

① Check if the resistance in the loop is sufficient; loop resistance should be between 250 ohm and 500 ohm.
② Check if the connection between the Communicator and the device is correct.
③ Check if the power supply of the device is correct.
④ Check if the device address is “0”; if not, select “YES” when it prompts “No device found at address 0, Poll?” to poll all addresses and find online device.

5.2 Communicator Power up Failure

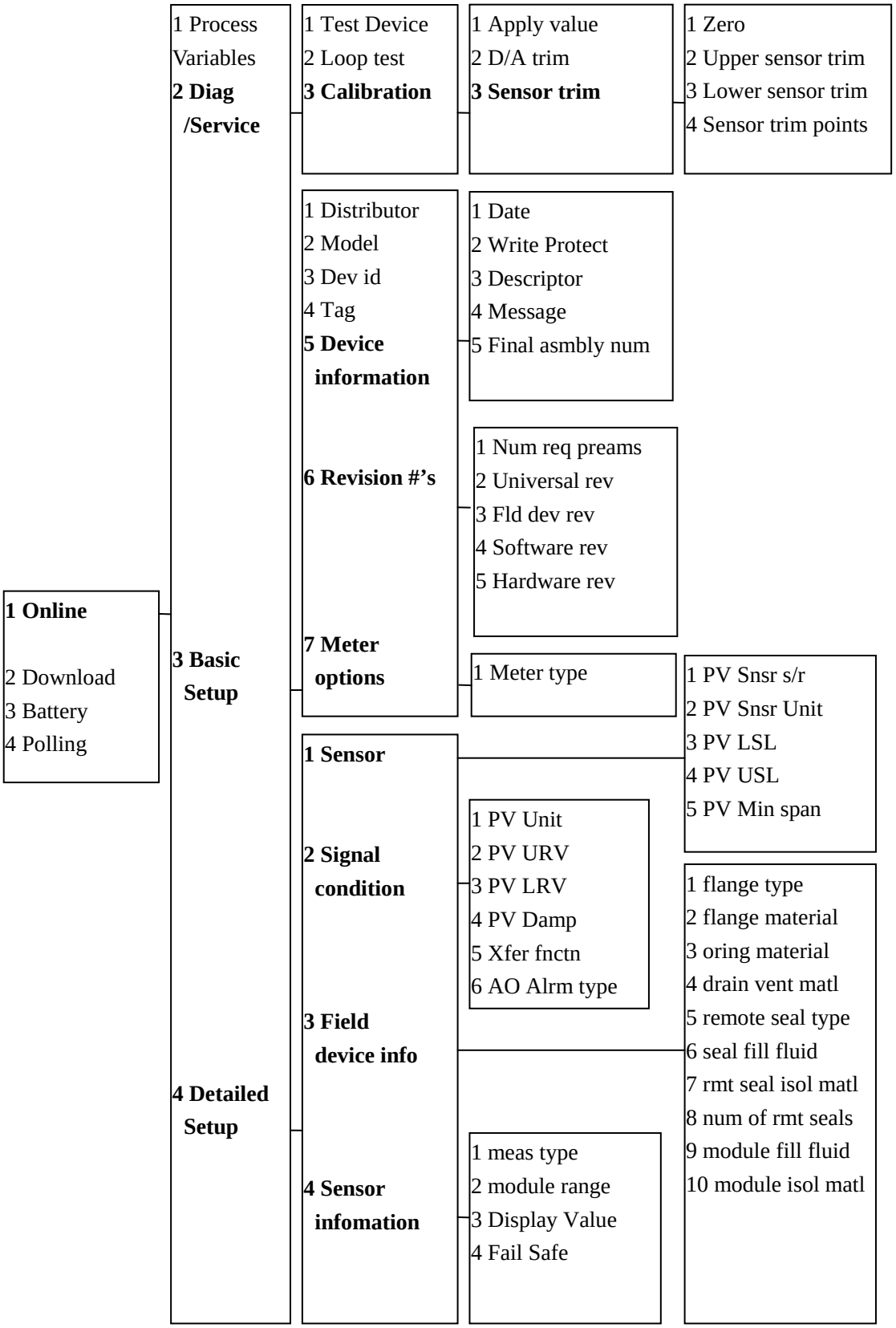
① Check if the Communicator has been installed with battery.
② Check if the battery installation of the Communicator is correct.
③ Check if the battery capacity has been used up.

5.3 Special Function Application Failure

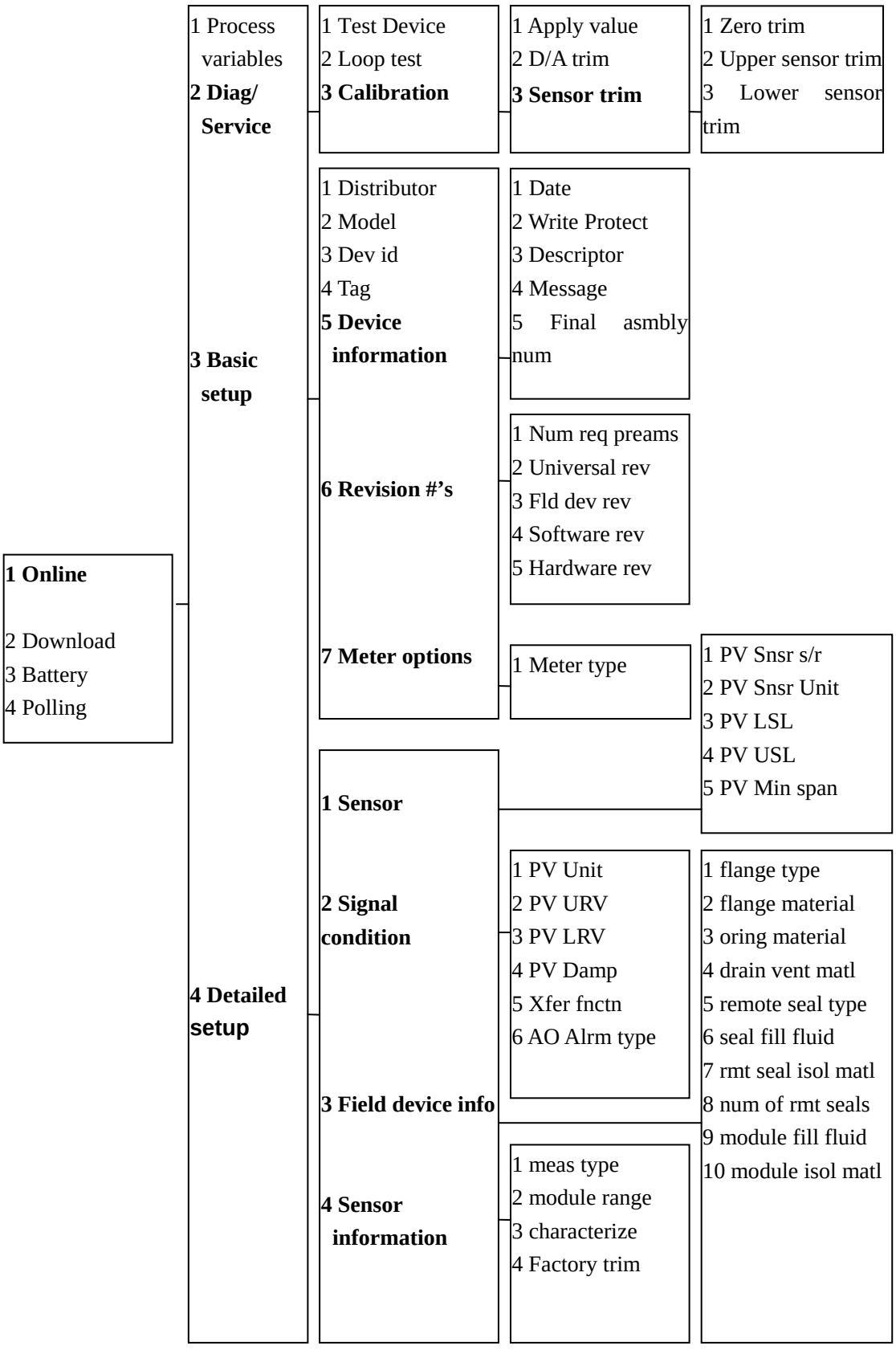
You have complete functionality for a specific device only when that device description is preloaded in the HART Communicator. If the DD is not preloaded in the HART Communicator, please do not hesitate to contact with us for the relevant technical support.

Appendix

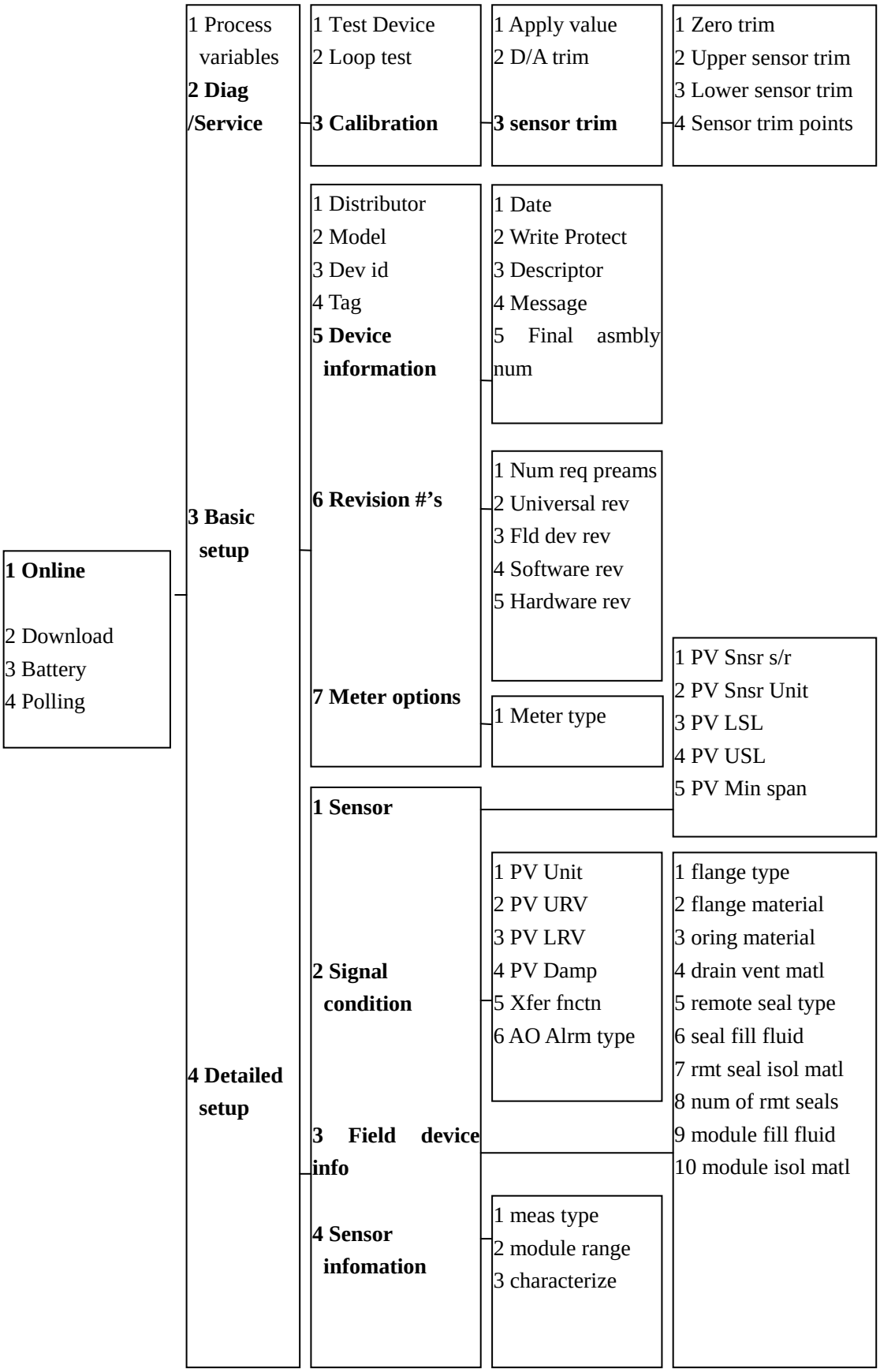
Appendix 1 HK-H3151 Menu Tree



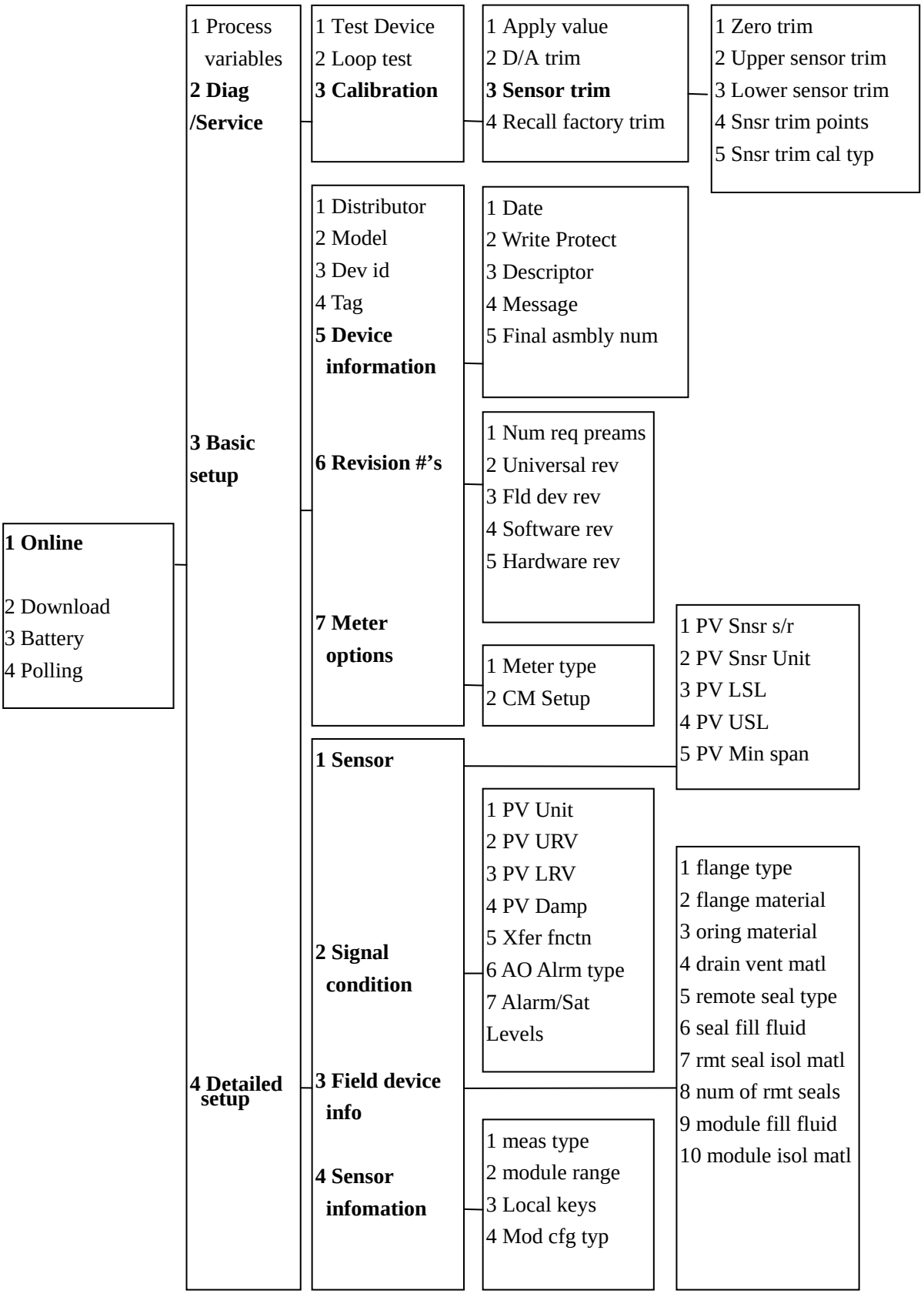
Appendix 2 HK-H1151 Menu Tree



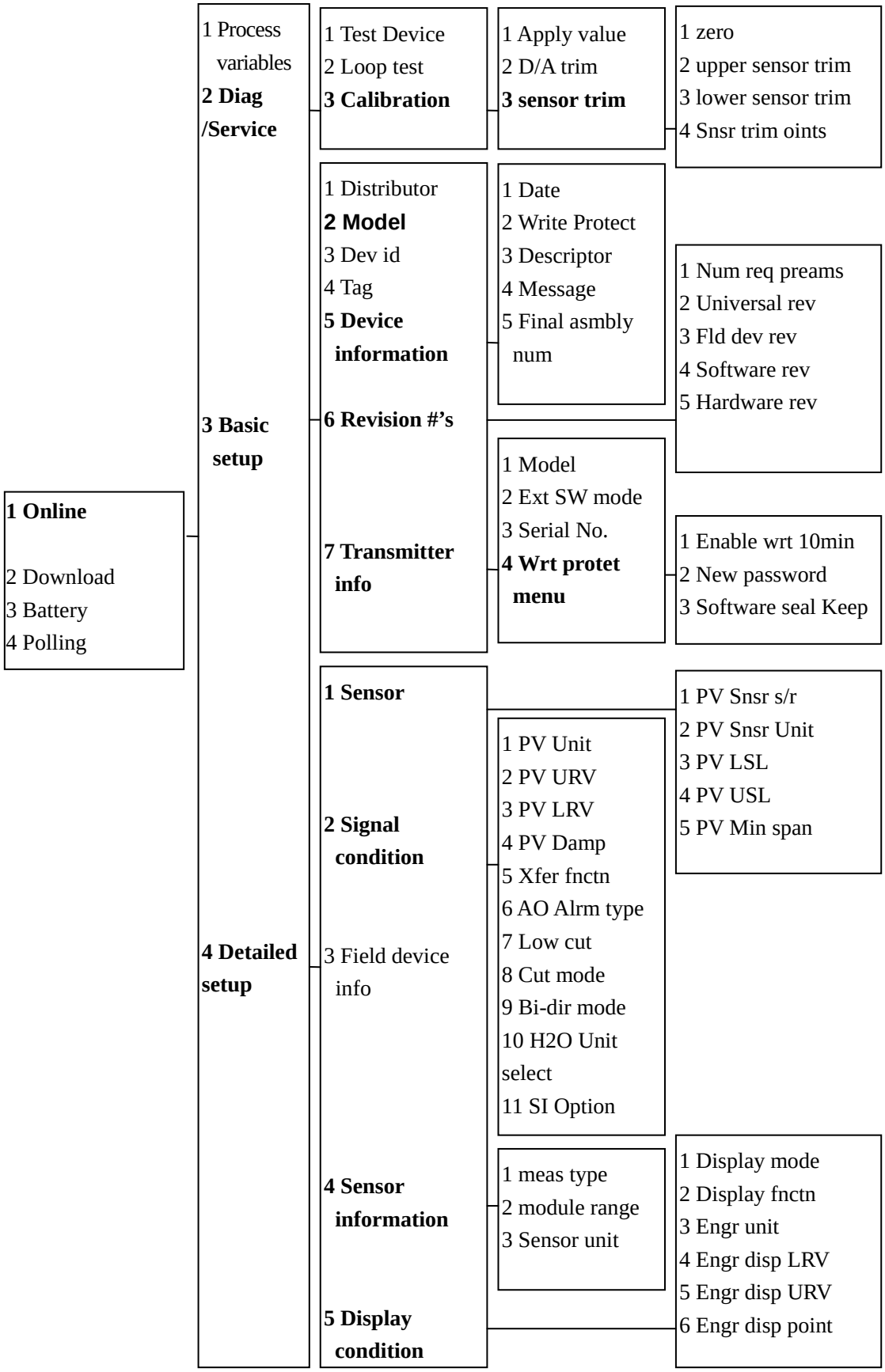
Appendix 3 ROSEMOUNT 1151 Menu Tree



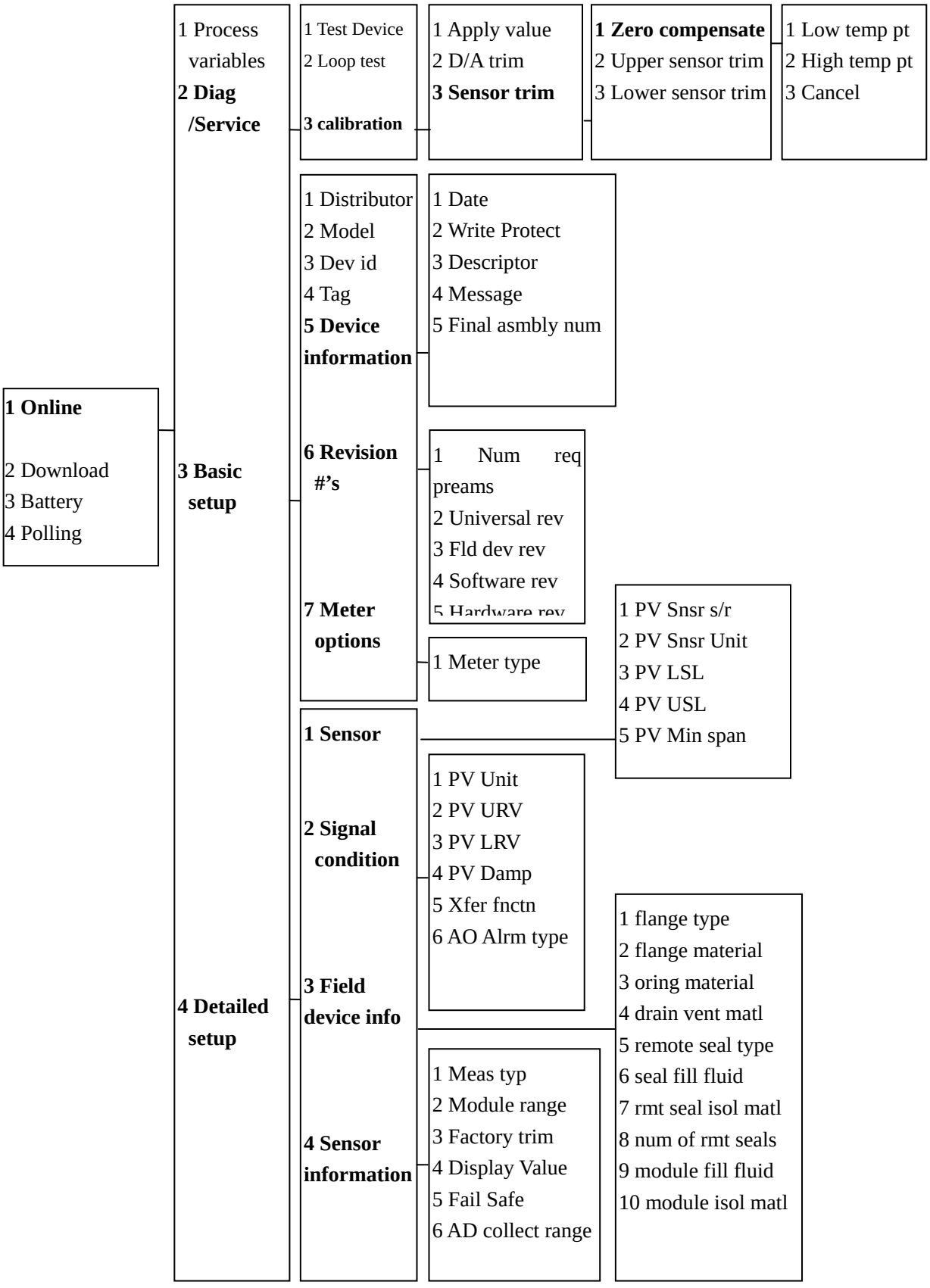
Appendix 4 ROSEMOUNT 3051 Menu Tree



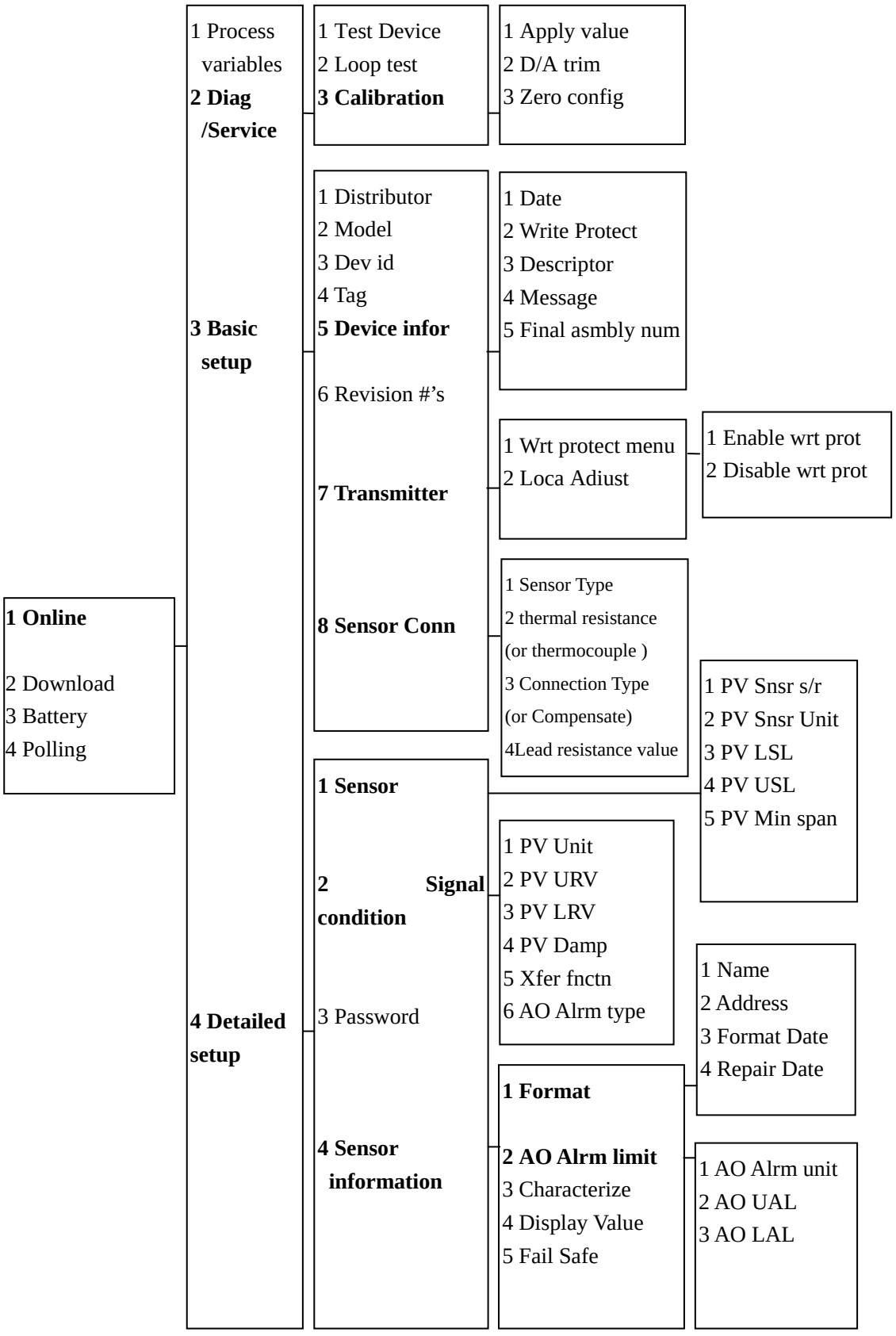
Appendix 5 YOKOGAWA EJA Menu Tree



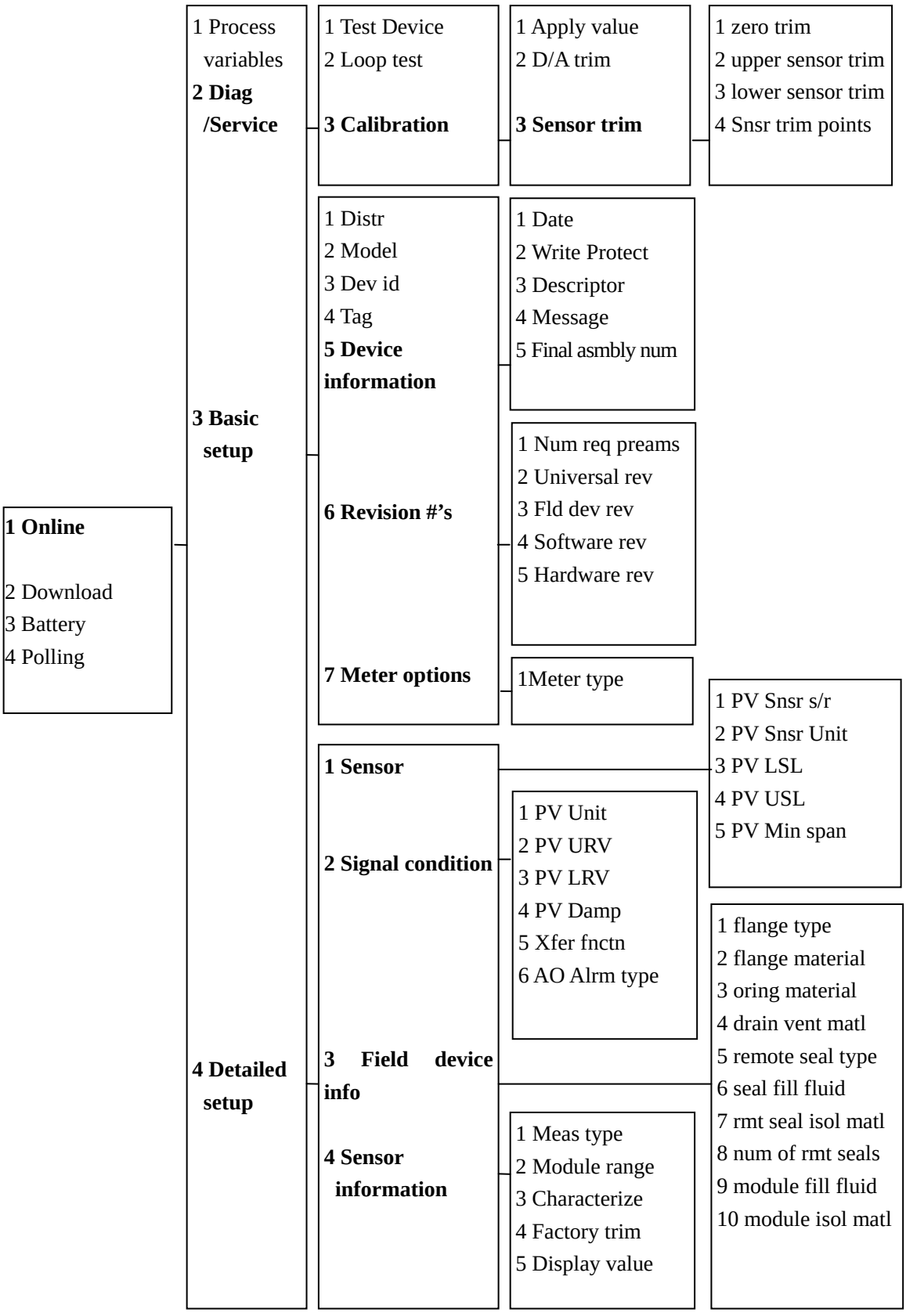
Appendix 6 HK-H990 Menu Tree



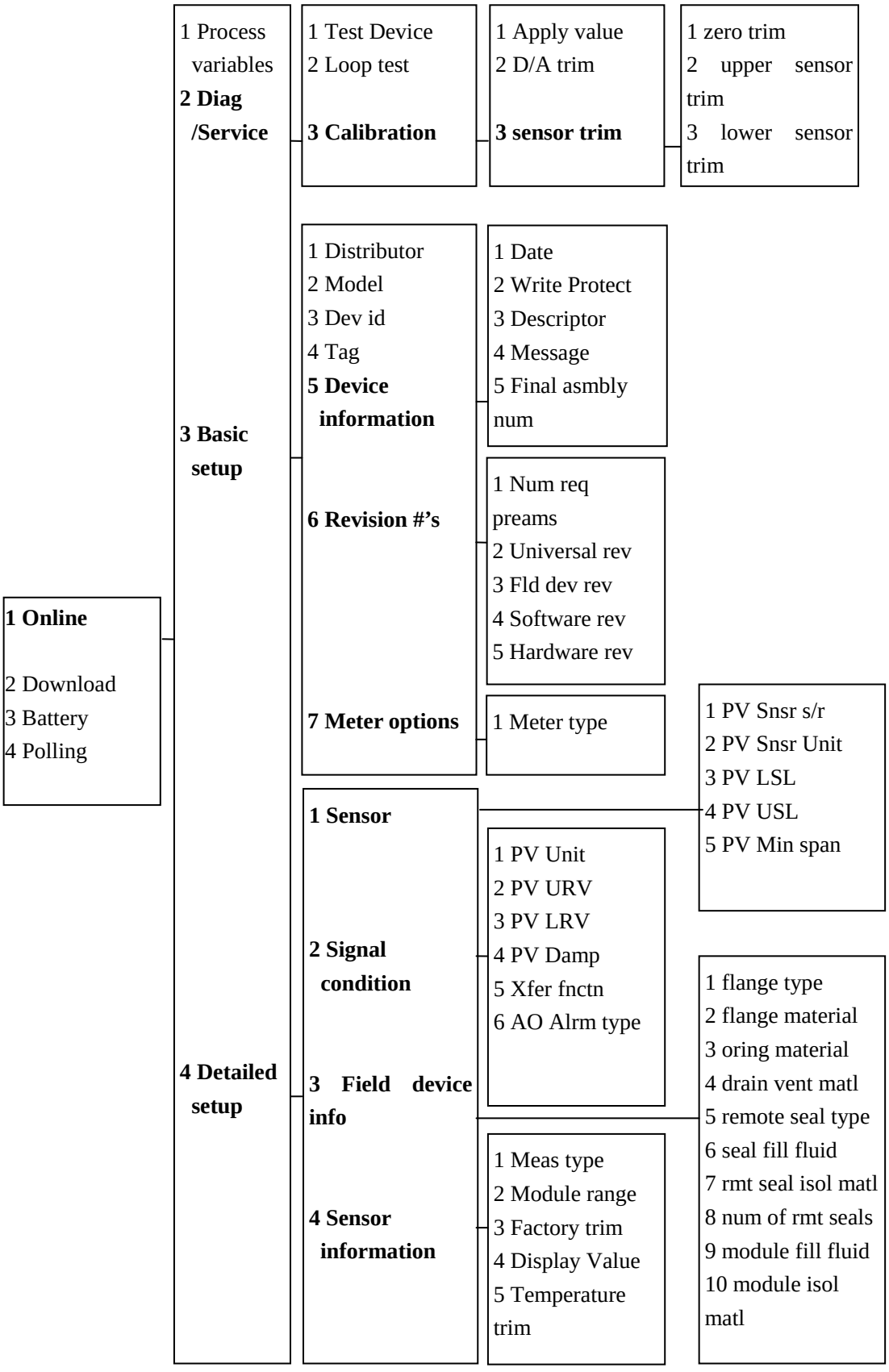
Appendix 7 HK-H610 Menu Tree



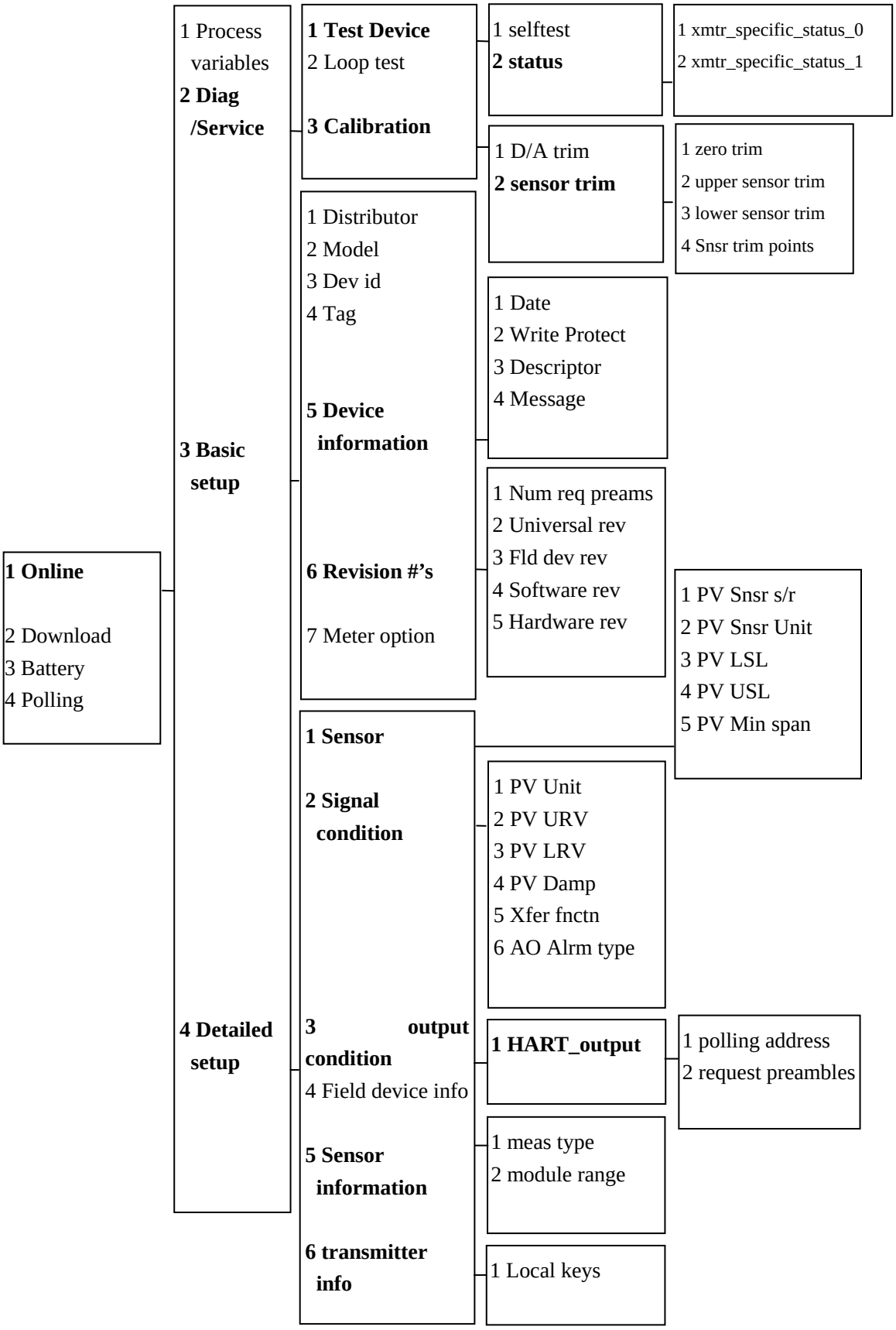
Appendix 8 HK-HCT1-007 Menu Tree



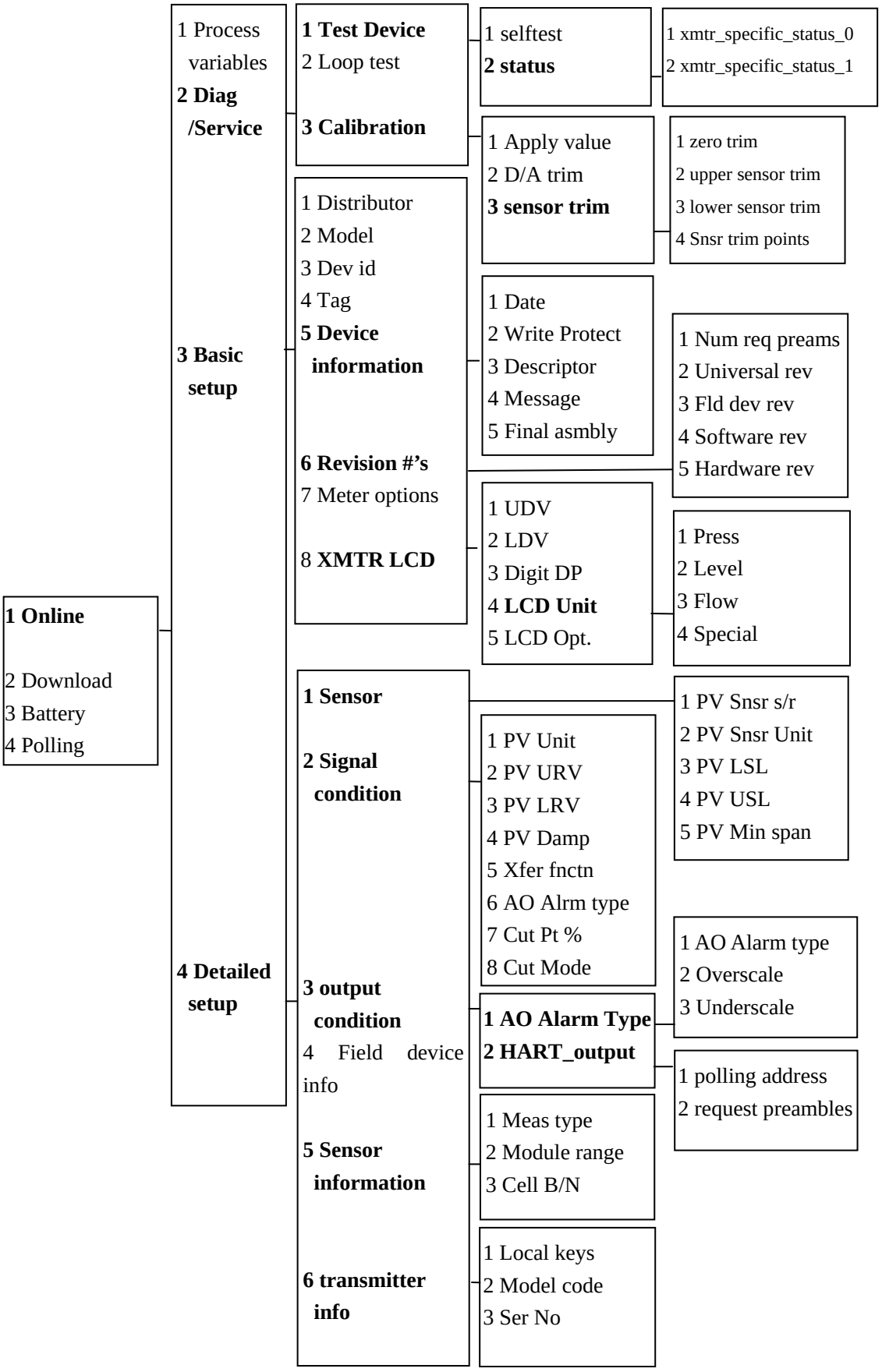
Appendix 9 HK-HCT3-015 Menu Tree



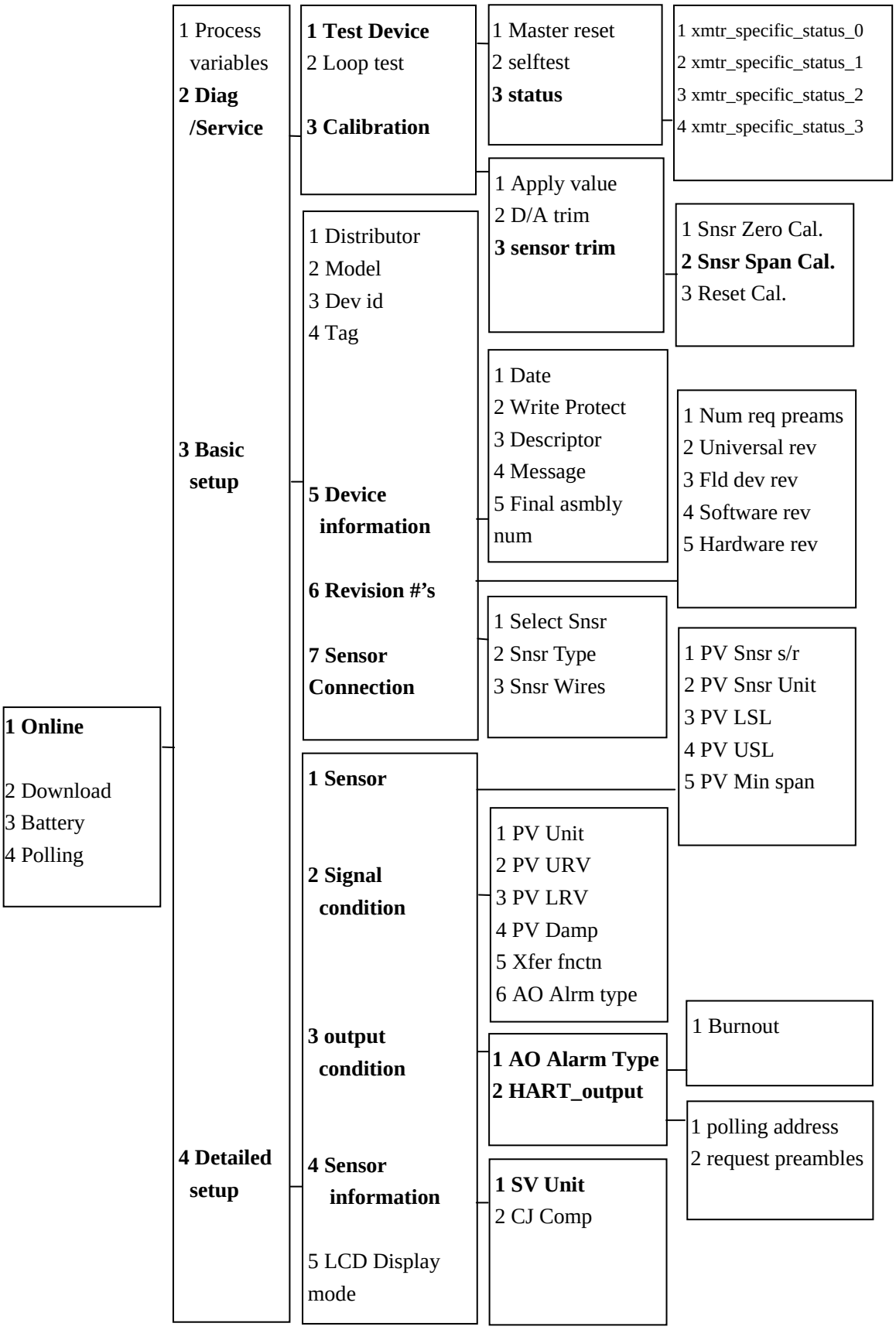
Appendix 10 FUJI FCX-A/C Menu Tree



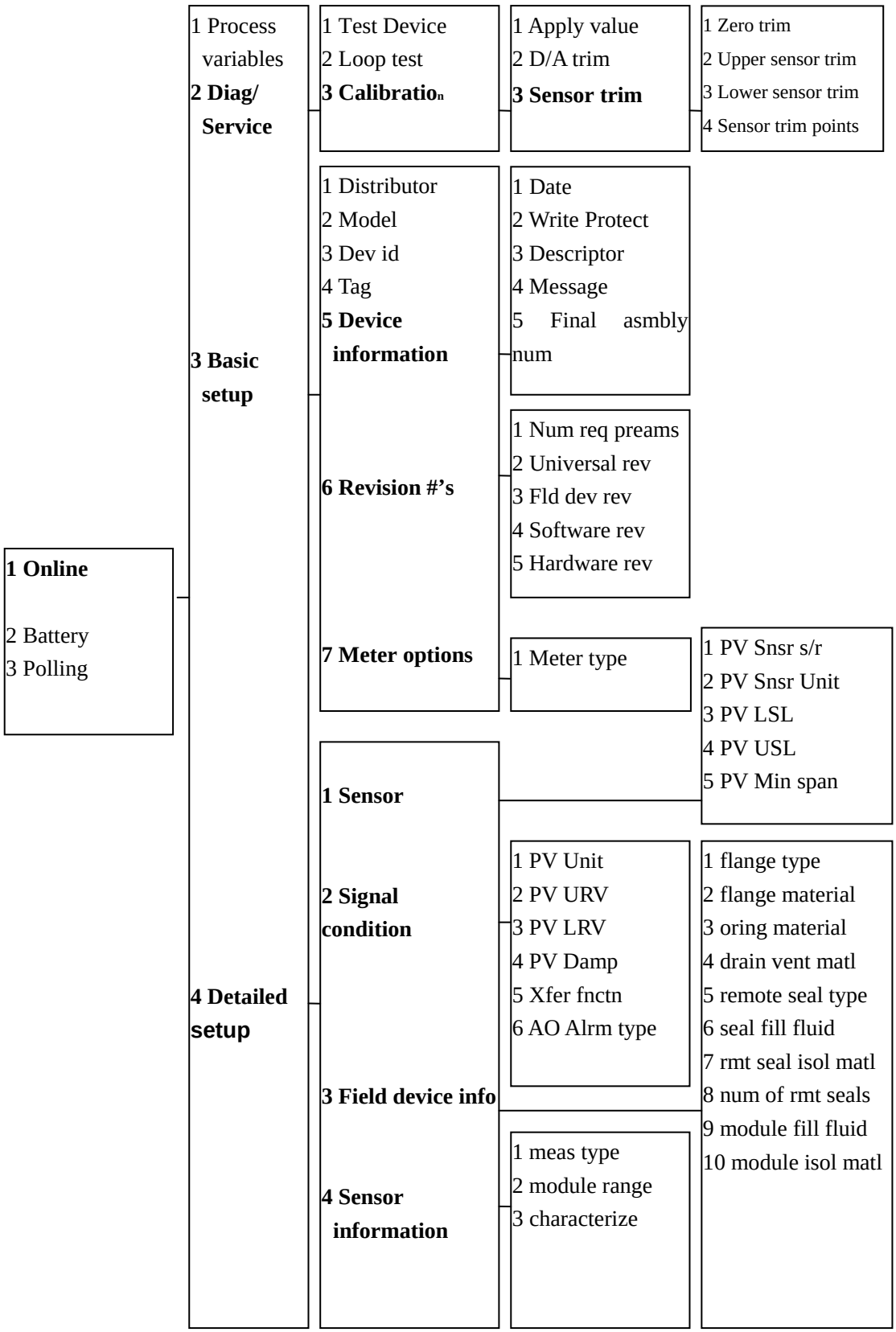
Appendix 11 FUJI FCX-A2 Menu Tree



Appendix 12 FUJI FRC Menu Tree



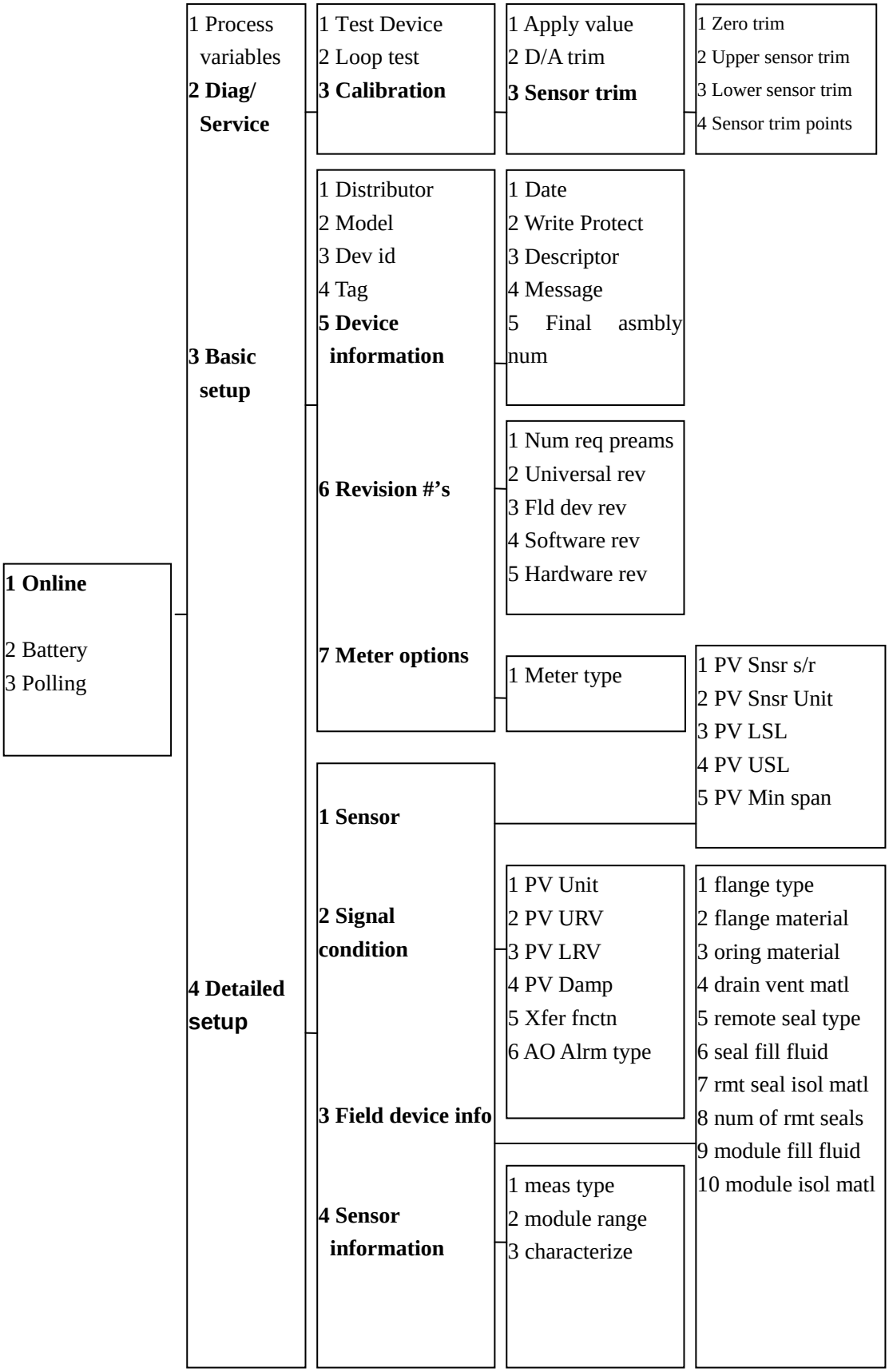
Appendix 13 HK-H990M Menu Tree



Appendix 14 HK-H990M Shortcut Key

Function	Shortcut Key
Upper sensor trim	2 , 3 , 3 , 2
Lower sensor trim	2 , 3 , 3 , 3
Meter type	3 , 7 , 1
Field device info	4 , 3
meas type	4 , 4 , 1
module range	4 , 4 , 2
characterize	4 , 4 , 3

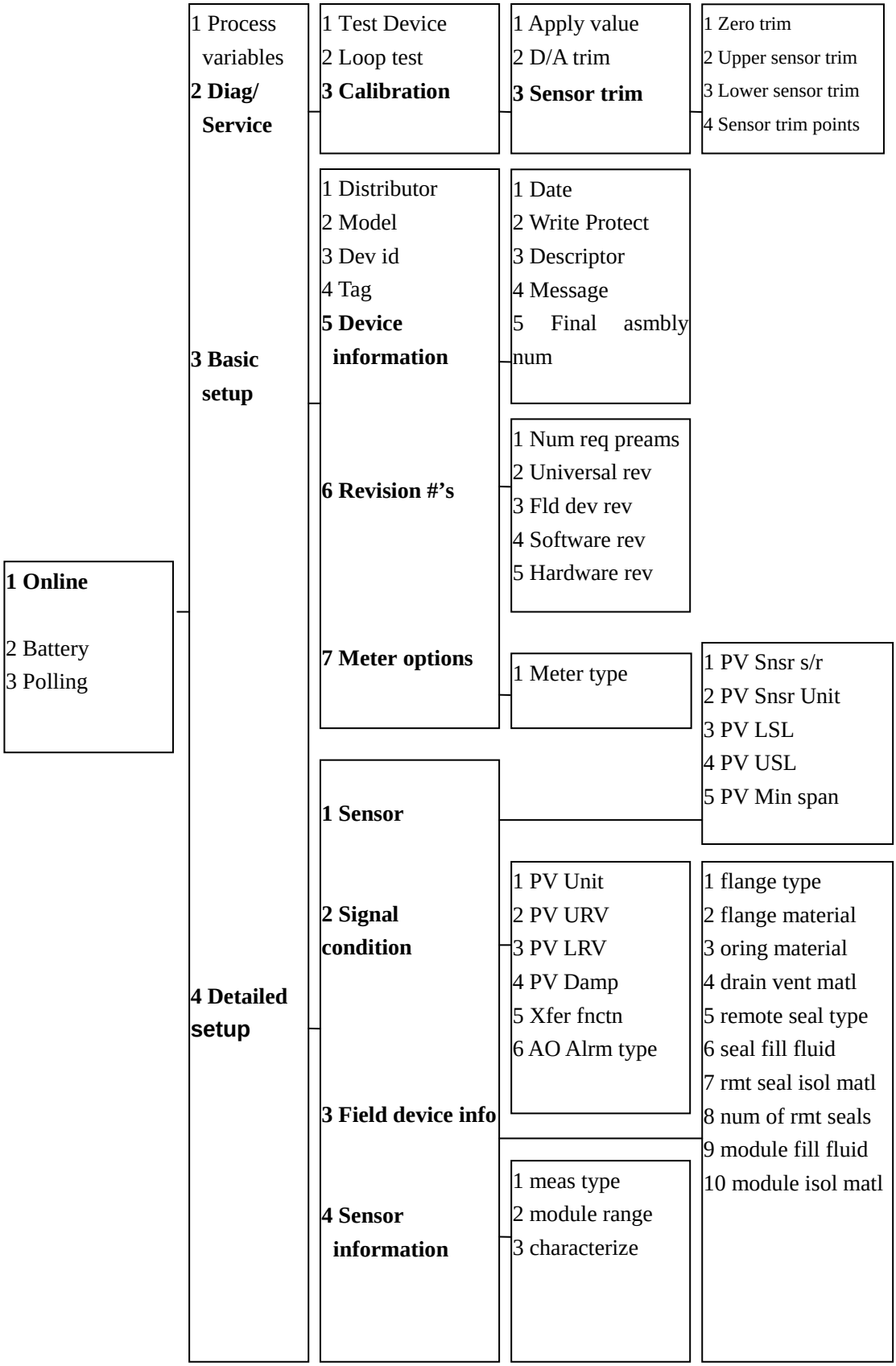
Appendix 15 HK-H991M Menu Tree



Appendix 16 HK-H991M Shortcut Key

Function	Shortcut Key
Upper sensor trim	2 , 3 , 3 , 2
Lower sensor trim	2 , 3 , 3 , 3
Meter type	3 , 7 , 1
Field device info	4 , 3
meas type	4 , 4 , 1
module range	4 , 4 , 2
characterize	4 , 4 , 3

Appendix 17 HK-H3351M Menu Tree



Appendix 18 HK-H3351M Shortcut Key

Function	Shortcut Key
Upper sensor trim	2 , 3 , 3 , 2
Lower sensor trim	2 , 3 , 3 , 3
Meter type	3 , 7 , 1
Field device info	4 , 3
meas type	4 , 4 , 1
module range	4 , 4 , 2
characterize	4 , 4 , 3