KROHNE

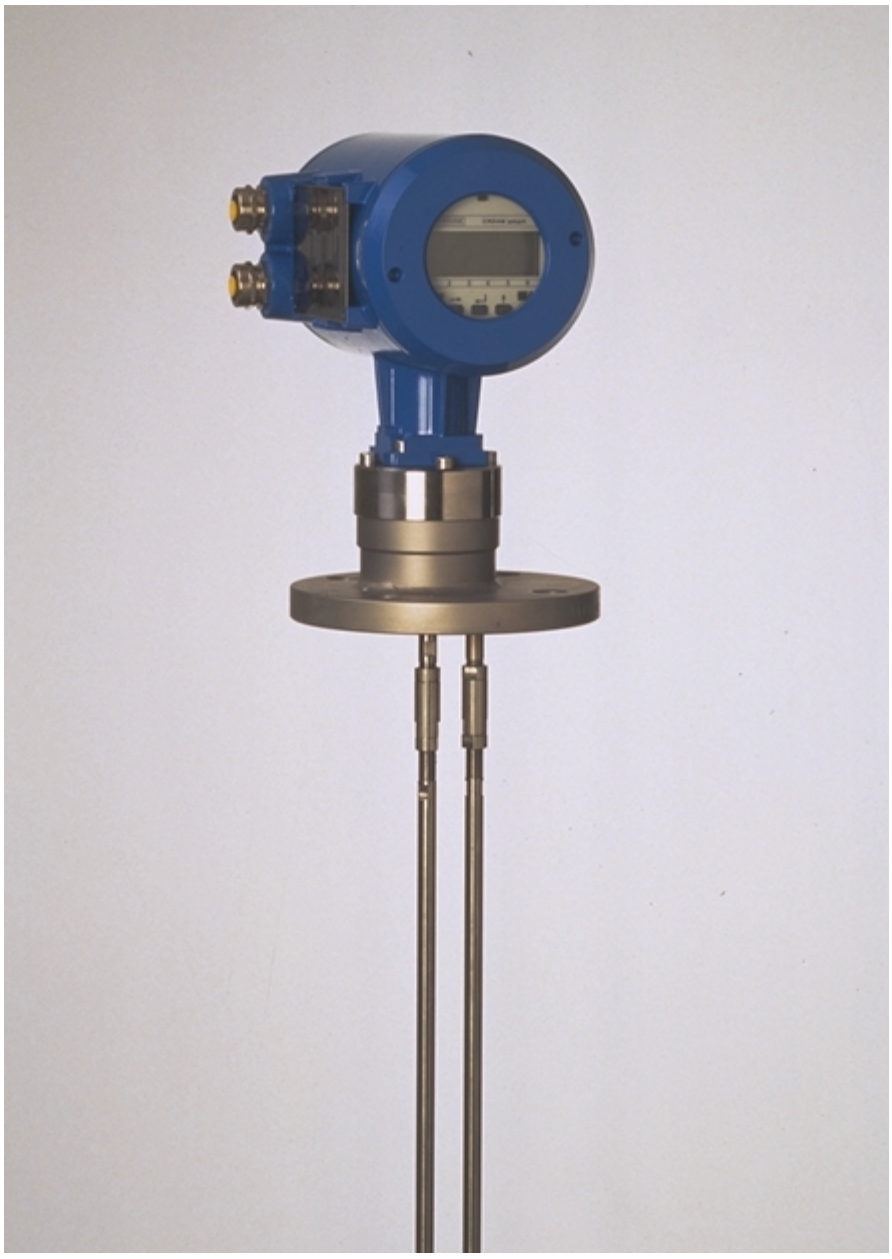
03/00

System Technology

Remote Operation Instructions

HART Communicator 275
Asset Management Solutions (AMS)

BM100



CONTENTS

1 GENERAL INFORMATION 3

1.1 Configuring Instruments for Multidrop 3

1.2 Device Unique HART® Address 3

2 HART® TRANSMITTER REVISIONS AND INSTRUMENT FIRMWARE 3

2.1 Device Revisions 3

2.2 DD Revisions 3

3 HART® COMMUNICATOR 275 (HC275) 4

3.1 Installation 4

3.2 Operating 4

3.3 Known HC275 (4.6) Shortcomings 4

4 ASSET MANAGEMENT SOLUTIONS (AMS) 5

4.1 Installation 5

4.2 Operating 5

4.3 Known AMS (1.4.x) Shortcomings 6

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1 General Information

The BM100 is a two-wire transmitter with 4..20mA current output and HART® capability.

General characteristics of the BM100 HART® interface:

- Multidrop Mode is supported.
- Burst Mode is not supported.

Electrical connection (point-to-point or multidrop): refer to section *Installation➪Wiring* of the *„Installation and Maintenance Manual. Reflex-Radar BM100“* and *„Service Manual. Reflex-Radar BM100”* (section 11, *Communication Connection*).

1.1 Configuring Instruments for Multidrop

There are differences in configuring instruments for multidrop mode from remote or via device local keypad.

- If the instrument is entering multidrop via HART® interface (any application can be used), i.e. its bus address is changed from ‘0’ to any allowed, then all the necessary operations with the instrument current output are done automatically (by the HART® transmitter).
- If the instrument local keypad is used, the user must manually carry out the three assignments:
  1. Set the desirable bus address (Fct. 1.6.2),
  2. Set the first current output (primary current) range to “4 – 20 mA” (Fct. 1.3.2),
  3. Switch the first current output function to “Off” (Fct. 1.3.1) and store configuration.

1.2 Device Unique HART® Address

It is worth noting that the Device Identification Number (defining the three low significant bytes of the long frame device address) is derived from the ‘French Command Number’ parameter (Fct. 1.4.6, Ser. 3.4), but not from the device ‘Serial Number’ (Fct.1.4.5, Ser.3.3)!

2 HART® Transmitter Revisions and Instrument Firmware

2.1 Device Revisions

The BM100 HART® transmitter at a moment has only one revision: *Device revision 1.* It is worth noting that the contents of this document corresponds to the instrument *Firmware version 2.01+* - for all the previous firmware versions the HART® interface support had just an intermediate (development) state and could be delivered solely due to customer insistence.

2.2 DD Revisions

At a moment BM100 has the 3 *DD revisions.*

- The first one (having number ‘1’) corresponds to *Firmware version 2.00*, was prepared under HC275 Toolkit 3.5 and had just preliminary nature.
- The second (‘2’) was produced under HC275 Toolkit 4.2. Changes within the DDL were caused solely by the differences between tokenizers and are all around the DEFAULT-clause location within enumerators’ lists.
- The third (‘3’) is capable to work both with AMS and HC275, being the first version that is prepared for official release. Registration at HCF pending.

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3 HART® Communicator 275 (HC275)

3.1 Installation

The HC275 has to be programmed with the BM100 HART® Device Description (DD). Otherwise the HC275 user will work with the instrument as with a generic one thus loosing opportunity for entire instrument control.

3.2 Operating

Refer to the BM100 Menu Tree HC275 (Attachment A).
The BM100 operation via HC275 is made quite close to the manual instrument control via keypad. The differences follows:

- The instrument write protection (parameters “Entry Code 1”, “Code 1”, menu items 1.4.2, 1.4.3 of the *„Installation and Maintenance Manual. Reflex-Radar BM100”*) is changed via invocation of “Entry Code” method (item 3 ➪ 1 of the HC275 Menu Tree).
- To “open” service functionality the user has to register as specialist. To do this, one should invoke the “Service Code” method (item 3 ➪ 2 of the HC275 Menu Tree) and enter the correct service password. After the HC275 is switched off (or the same method is invoked with improper service password) specialist authorization is lost, and all service parameters/functions again become inaccessible.
- The two functions that are not accessible via instrument keypad but can be activated remotely (recently – only by *PC-Star* application), namely “Measure Pulses” and “Linearity Calibration”, are placed into “Configuration/Test” submenu (items 2 ➪ 1 ➪ 8 and 2 ➪ 3 ➪ 4 correspondingly).
- The BM100 HART® transmitter makes it possible for the user to open a temporal session with SMART protocol (say, to configure instrument via *PC-Star*). The protocol switch is undertaken after invocation of “Switch to PC-Star” method (item 2 ➪ 1 ➪ 6 ➪ 3 of the HC275 Menu Tree). After timeout (45 min) is expired or power on reset is performed, the instrument is turned back to HART®.
- For additional details refer to the *„HART® Smart Communications Protocol. BM100 Reflex-Radar. Transmitter-Specific Command Specification“*.

3.3 Known HC275 (4.6) Shortcomings

When the “Save” operation is activated with the “Full (for PC)” data type chosen, HC275 loops forever attempting to retrieve instrument Service Data. The loop can be avoided if the user has registered as specialist in advance. With alternative data type (“Standard”) such preliminary registration is not necessary.

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4 Asset Management Solutions (AMS)

4.1 Installation

- Refer to the *"AMS Installation Guide"* (Fisher Rosemount): *"Installing Modems"* (section 5) and *"Wiring Diagrams"* (appendix B).
- AMS Configuration:
  If the BM100 Device Description is not already installed on the AMS System an „*BM100 Device Installation Kit*" (on floppy disk / CD-ROM from KROHNE) is needed.
  For installing the DD with the Installation Kit refer:
  AMS 1.3: to the *"AMS Installation Guide"* (Fisher Rosemount), section 3 ➪ *"Installing Device Descriptions for Field Devices"* ➪ *"Manually Installing Device Types"* ;
  AMS 1.4: to the *"AMS User's Guide"* (Fisher Rosemount), section 4 ➪ *"Adding New Device Types to AMS"* ➪ *"Install Device Types Manually"* .

4.2 Operating

Refer to the BM100 Menu Tree AMS (Attachment B).
Some additional comments follow:

- To "open" service functionality the user has to register as specialist. To do this, one should invoke the *"Service Code"* method from the *Device Context Menu* and enter the correct service password. Note, that after the *Device Connection View* is reopen (or the same method is invoked with improper service password) specialist authorization is lost, and all service parameters/functions (*D/A trim, Linearity calibration, Reset user EEPROM, Reset factory EEPROM*) again become inaccessible.
- As opposed to the HC275, handling of the Strap Table within AMS can be carried out in two ways: besides the old scheme (*Strap table input, Strap table suppress* methods) it can be controlled directly, from the three configuration displays. Due to transmitter implementation peculiarities some steps should be sequentially undertaken to create or change the table from configuration displays. The matter is that all the changes in table elements are initially accumulated in instrument RAM. The trigger event that launches the table's burning into EEPROM, is Command #143 (Write Conversion Table Point Number) that deals with a single parameter, being the '*Number of points*' variable (configuration display "*Strap Table, 1-20*"). Just this command initiates the check of complete table and in case 'twas successful – activates the burning procedure. Worth noting that as soon as every table point depends on the '*Number of points*' variable (in terms of VALIDITY clause), the latter is always written to instrument before the points' set. Hence while augmenting table the user will always be prompted "Error 'Table not monotonous' happened writing 'Number of points'". Only after this response the table (changed elements) is copied to the instrument RAM. To burn it into EEPROM one have to "change" again the number (say, 10 to 10, or 4 to 4) and press 'Apply' again. All the commentaries above can be summarized as follows:
  1. If the number of points is changed (with or without changes of the table contents), the user should ignore the first possible error response after pressing 'Apply' ('Table not monotonous' happened writing 'Number of points'), "change" the number of points again to desirable one (i.e. reenter exactly the same value) and again press 'Apply'.
  2. If the number of points is preserved but some table items are changed, the user should press 'Apply' (thus transferring changed items to device), then reenter the number of points (as above) and press 'Apply' again - otherwise the updated point(s) will be "in play" until the first power reset.

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- As compared with HC275 or *PC-Star* configuration tools, the BM100/AMS application has one additional function, being the HART® Common-Practice *Apply values* method. The latter assigns to the PV Upper/Lower Range Values the magnitude of the applied process.
- Adjustment of the thresholds/gains (instrument's functions 1.5.1, 1.5.4, Ser. 1.2.2) in the online mode is possible only from methods (*Level threshold/gain, Interface level threshold/gain, Reference threshold/gain*). Such solution was caused by the two reasons: the threshold values are involved into bus transactions in internal instrument units (not engineering ones) and data types; the threshold value that is advised for the user (i.e. should appear in the edit control) depends both on the instrument's dynamic and static data. To preserve for the user the possibility to control these variables in the offline mode, the reconcile displays' set is augmented (as compared with configuration ones) by one tab, having the *"Application"* label. Correspondingly, the *"Service"* reconcile tab is augmented by reference-related thresholds/gains.

  CAUTION: While changing thresholds' values in the offline mode, refer to the online help for every variable.

4.3 Known AMS (1.4.x) Shortcomings

There are several problems found during trials with AMS. They are all reported to FRSI and will probably have gone since the AMS release 1.5.

- *User Configurations View*. When the user configuration is created (via drag & drop technology) from either connected instrument or the *Plant Database*, not all configuration parameters (even of the maintenance class) are transferred. The variables that cannot be obtained in the user configuration, are the so-called conditional enumerators, if they depend on the instrument identification data (delivered with Universal Command #0).

  Say, allowed settings for 'Range I 1' and 'Range I 2' variables (enumerators) depend on the instrument hardware version. As result, selection lists for both these variables will be empty in the user *„Configuration Properties"* tabs.
- Losing of the "Service Code". If after registration as specialist (refer to section 4.2), the user does not open the *"Configuration Properties"* or *"Process Variables"* window, AMS will lose soon access to service functionality (i.e. the correct service code), and the user will have to undertake the same actions (4.2) to re-establish access rights. In case if any window is already open before the *"Service Code"* method is invoked, such loss doesn't happen.

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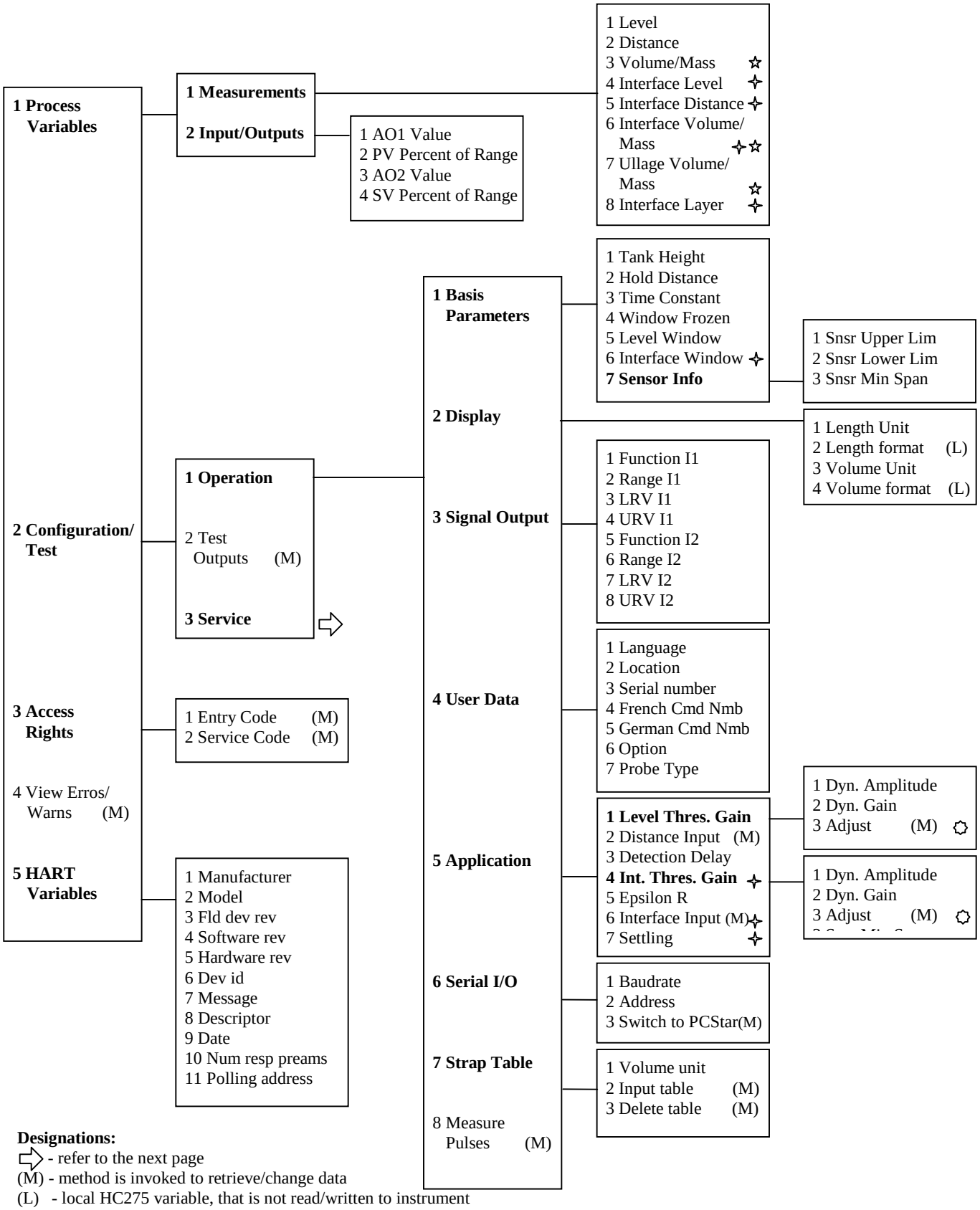
Attachment A

BM100 Menu Tree HC275



Designations:

⇨ - refer to the next page
(M) - method is invoked to retrieve/change data
(L) - local HC275 variable, that is not read/written to instrument
☆ - subsists and is displayed only when the Strap Table exists
✧ - not applicable if 'Interface Option' is disabled
✡ - method's label and code depend on 'Measurement Mode' variable

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Attachment A
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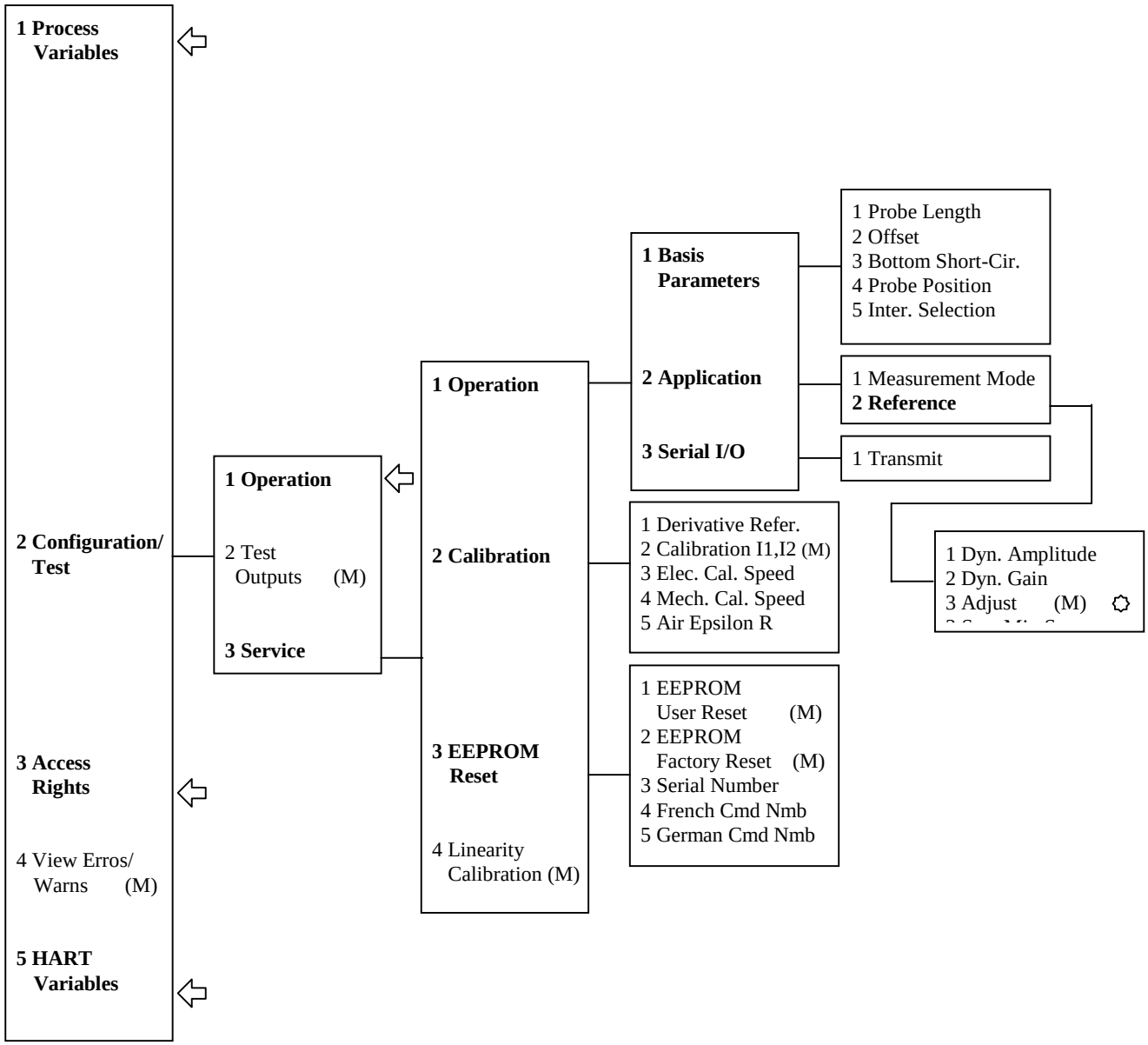
BM100 Menu Tree HC275



Designations:
⇦ - refer to the previous page
(M) - method is invoked to retrieve/change data
☼ - method's label and code depend on 'Measurement Mode' variable

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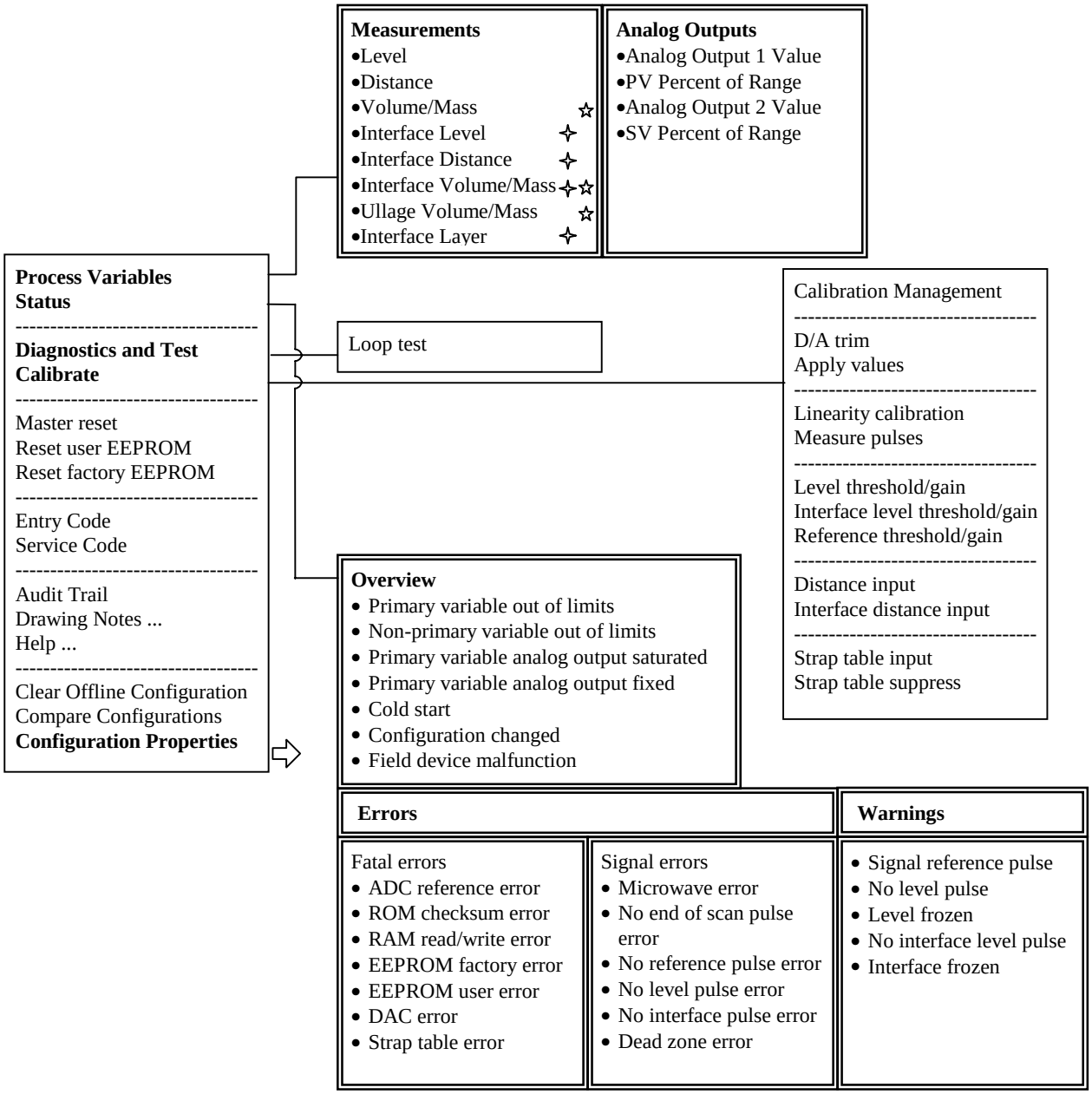
Attachment B

BM100 Menu Tree AMS



Designations:

☆ - subsists and is displayed only when the Strap Table exists
✧ - subsists and is displayed only when 'Interface Option' is enabled
⇨ - refer to the next page

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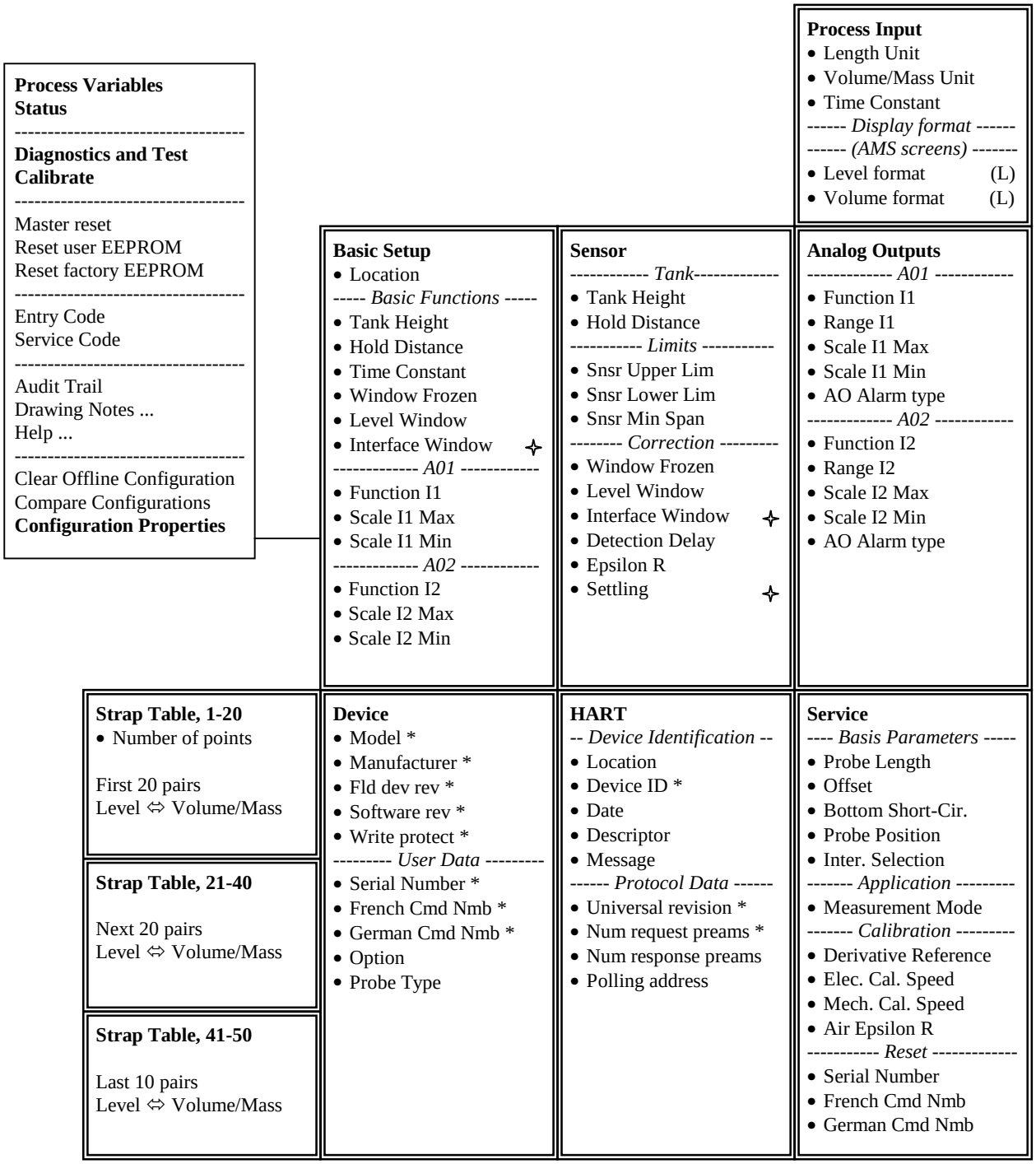
Attachment B
(continued from the previous page)

BM100 Menu Tree AMS

Designations:
✧ - not applicable if 'Interface Option' is disabled
(L) - Local AMS variable, that is not read/written to instrument
* - Read-only variable



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