KROHNE

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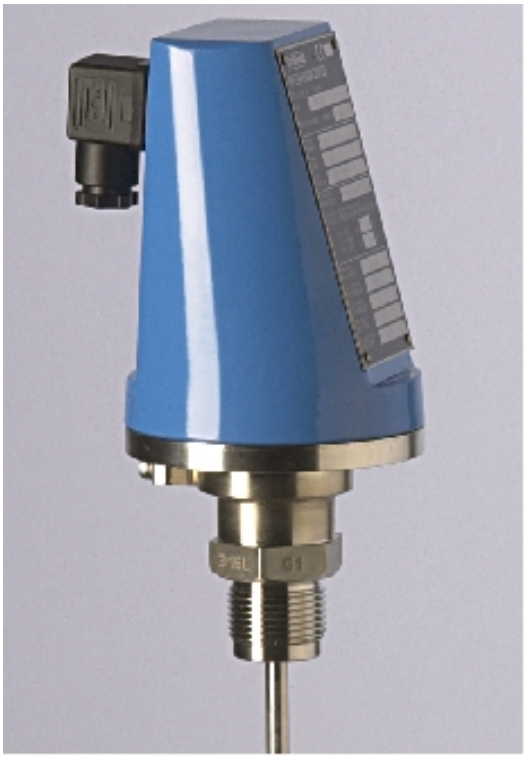
System Technology

Remote Operation Instructions

HART® Communicator 275
Asset Management Solutions (AMS)

BM102



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1 General Information

The BM102 is a two-wire transmitter with 4..20mA current output and HART® capability.

General characteristics of the BM102 HART® interface:

- Multidrop Mode is supported.
- Burst Mode is not supported.
- The digital process value which is modulated on to the analog output signal as well as the analog value itself are low-pass filtered.

Electrical connection (point-to-point or multidrop): refer to sections *HART® Communication* and *Electrical connection* of the *„Installation and Operating Instructions Manual. MicroFlex BM102“*.

2 HART® Transmitter Revisions and Instrument Firmware

2.1 Device Revision

The BM102 HART® transmitter has only one revision: *Device revision 1*.

2.2 DD Revision

MicroFlex BM102 has the *DD revision 1*.

- It is capable to work both with AMS (1.4, 1.4.1, 5.0) and HC275.

3 HART® Communicator 275 (HC275)

3.1 Installation

The HC275 has to be programmed with the BM102 HART® Device Description (DD). Otherwise the HC275 user can only use the generic commands of the HC275 without being able to access the entire instrument control.

3.2 Operating

Refer to the BM102 Menu Tree HC275 (Attachment A).
The BM102 operating concept is based on the HART® DD for generic devices with the following differences :

- There are additional specific parameters such as Probe length, Tank height, Dead zone, Thresholds…
- There are additional specific commands for the device calibration:
  Offset calibration, Automatic probe length calculation…
- Display format dependent on measuring range
- BM102 specific status messages can be displayed
- To "open" service functionality the user has to log in as specialist. To do this, one should invoke the "Service Code" command (item 3 ➪ 2 of the HC275 Menu Tree) and enter the correct service password. After the HC275 is switched off (or the same command is invoked with a wrong service password) specialist authorization is lost, and all service parameters/functions again become inaccessible.

Without the BM102 HART® DD, we can only modify the current output configuration. This is the reason why it is difficult to install and configure the device without the specific DD.

3.3 Offline mode

Offline parameters:
Unit Name, Unit Factor,
Length Unit, Volume Unit,
Tank height, Probe Length, Dead Zone, Detection Delay, Time Constant,
PV, SV, TV, QV,
Function I, Range I, Error Delay, Scale I min, Scale I max,
Tag, Message, Descriptor, Date.

Restriction:
If *PV* and *Function I* are not equals, error messages could appear during configuration transfers.
Attention: *Scale I min, Scale I max* are linked to *Function I* and *PV* .

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 BM102 Device Description is not already installed on the AMS System an *"BM102 Device Installation Kit"* (on floppy disk / CD-ROM from KROHNE) is required.
  When installing the DD with the Installation Kit refer to:
  AMS 1.4: *"AMS User's Guide"* (Fisher Rosemount), section 4 ➪ *"Adding New Device Types to AMS"* ➪ *"Install Device Types Manually"* .
  AMS 5.0: *"AMS User's Guide"* (Fisher Rosemount) ➪ *"Adding New Device Types to AMS"* ➪ *"Install Device Types Manually"* .

4.2 Operating

Refer to the BM102 Menu Tree AMS (Attachment B).
Some additional comments:

- To "open" service functionality, the user has to log in 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 a wrong service password) specialist authorization is lost, and all service parameters/functions (*D/A trim, Reset user EEPROM, Reset factory EEPROM…*) again become inaccessible.
- Compared with HC275 or *PC-Star2* configuration tools, the BM102/AMS application has one additional function, which is the HART® Common-Practice *Apply values* method. The latter assigns to the PV Upper/Lower Range magnitude value of the applied process.
- In contrary to the HC275, handling of the Strap Table within AMS can be carried out in two ways:
  - 1. The old scheme (*Strap table input, Strap table suppress* methods).
  - 2. Controlled directly from the configuration displays. Due to transmitter implementation, some steps should be sequentially undertaken to create or change the table from configuration displays. The matter is that all the changes in table of elements are initially accumulated in the instrument memory. The trigger event, that permits the settling of the strapping table in the EEPROM, is the Command #143 (Conversion Table Number). It is a single parameter command with the '*Number of points*' as variable (configuration display "*Strap Table*"). It is the only command that initiates the strap table and in case it was plausible, it activates the settling of the EEPROM. As every point of the strap table relies on the variable "number of points" (in term of acceptance), and considering that this number of points has been set before, the user could see on the display:"error table non monotonous". Subsequently, the strapping table (every item) is written in RAM. For EEPROM records (non volatile memory) you need to transmit to the device the number of table points. That means by reentering the number (say, 10 to 10, or 4 to 4) and press "Apply" again.

  All comment's above can be summarised as following:

  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 the desired amount (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 active only until the first power reset.

- Attention: While executing function “Re-Start BM102”, error messages could appear (“error reading xxx: field device did not respond”). This is due to the fact that AMS tries to refresh its values while the BM102 is not able to answer (initial self test : about 30 seconds).
  ➔ After having executed this function, just close all AMS screens concerning the field device (Process variable screens, Configuration properties screens,…) and reopen the desired AMS screens.
- While changing the threshold value, a pre-edit action is executed in order to refresh the distance value.
- Calibration Management functions are not supported.

4.3 Shortcomings

- With AMS 5.0, when we create or erase a volume table, the window “Process Variable“ could not be refreshed (bargraphs of volume measurements are not displayed or removed). We must close the window and open a new one to solve the problem.
- When we import a configuration from the HART® communicator (data type = Standard) to AMS (import offline configuration), the values of 2 parameters are asked:
  Function I and the *Number of point* of the volume table.
  Function I items could not be available. First enter the number of point (0), after that click on the window (anywhere). The *Function I* items should now be available.
- If we use the “Full (for PC)” data type, there is no problem when saving the configuration on the HART Communicator and transferring it to AMS (and vice versa). In case do not login as specialist, specialist parameters will not be saved. Moreover when sending data to the device, 3 errors messages could appear when we want to write the “Gain”, the “Release number” and the “Electronic offset”. These messages appear because there is no write-command for these parameters. We can not modify them directly (their values are calculated automatically by the device). This is the reason why we can not transfer the value of these parameters from one device to an other. Don’t worry about these messages.
- With AMS, in Offline Configuration, when we get a configuration from the history and when we transfer it to the device, we could have the following 2 errors:

- Error writing Lev,
- Table not monotonous.

The second message can appear even if there is no volume table (number of point = 0). Don’t worry about these messages.

5 Status Meaning

- Meaning of General Status Messages:

Status Message	Meaning
Configuration Changed	Appears whenever a configuration parameter is changed.
More Status Available	Set when there is more information to read. HC275 : Execute function “Watch Status” AMS : Go to the “Status” window
Primary Variable Analog Output Fixed	Set when: • Device is set to Multidrop Mode (Polling Address ≠ 0) • Fixed Current Mode is entered (during Loop Test and DAC Trim)
Analog Output Saturated	During normal operation the maximum value for analog output is 20mA. In case the Process Value (PV) reaches the upper sensor limit the analog output and its digital value is saturated at 20mA and the flag is set.

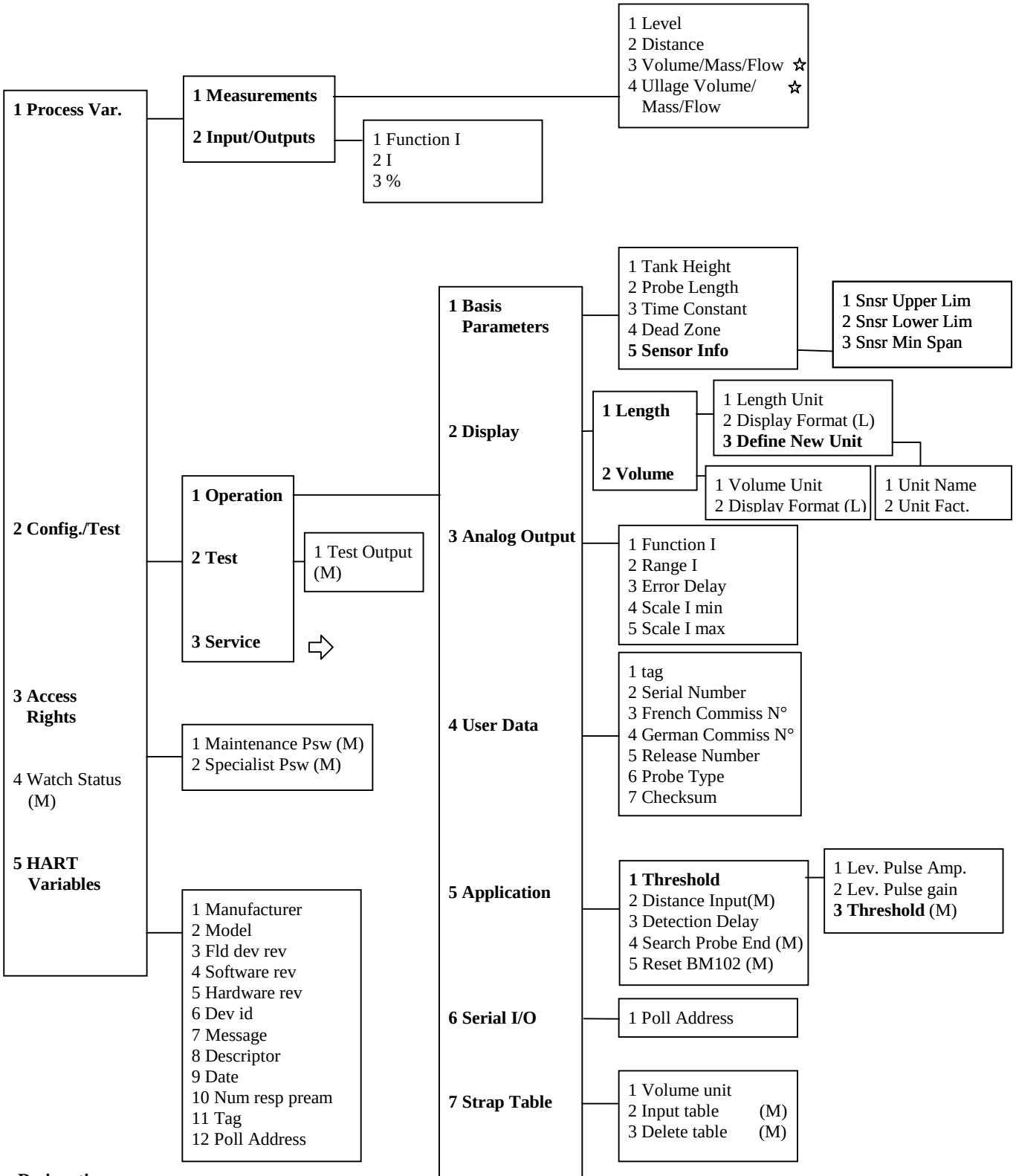
- Meaning of Transmitter Specific Status Messages:

Status Message	Meaning
Invalid selection	You have chosen a non valid item
Passed parameter too large	Value too large for the parameter
Passed parameter too small	Value too small for the parameter
Too few data bytes	There are not enough bytes transmitted
In write protect mode	Protection against writing
Update failure	The BM102 is not able to measure.
Lower range value too high	The value of the range is incorrect
Applied process too high	Message appears when the PV range values are incorrect (method Apply values)
Not in proper current mode	Appear if the current output is not fixed while we execute the method DAC Trim
Can not change active password	Appears if the passed password is incorrect
Table non monotonous	Appears if the volume table is not monotonous
Lower range value too low	The value of the range is incorrect
Applied process too low	Message appears when the PV range values are incorrect (method Apply values)
Upper range value too high	The value of the range is incorrect
Multidrop mode	Appears if we are in multidrop mode and we want to fixe a value on the current output
Illegal password symbol	The characters of the passed password are incorrect. They must be ‘E’, ‘R’ or ‘U’
Upper range value too low	The value of the range is incorrect
Invalid units code	The unit is not supported by the BM102
Invalid function	The result of the function is incorrect.
Invalid password	Can not enter Specialist menu because the password is incorrect.
Access restricted	When the customer password is set, this message appears if we want to modify a parameter.
Invalid range units code	Appears if the unit of the range is incorrect
Device busy	Appears when the device is busy. Normally it appears when the

	device is in search mode or if it is executing a function.
Not implemented	Appears if the command sent to the device is not implemented in the device.
First Parameter too high (first member of the couple too high) First Parameter too low (first member of the couple too low) Second Parameter too high (second member of the couple too high) Second Parameter too low (second member of the couple too low)	Some parameters are handled in couples. When a member of a couple is written, the other member is also written. When one of this message occurs, one of the member of the couple is incorrect. These couples are : Tank height / Probe length Dead zone / Detection delay Threshold value / Threshold distance Optional unit name / Optional unit factor Offset of measure / Period of measure Electronics Calspeed / mechanical calspeed Epsilon R / “Set value” of Electronic offset

6 Attachment A

BM102 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

Attachment A
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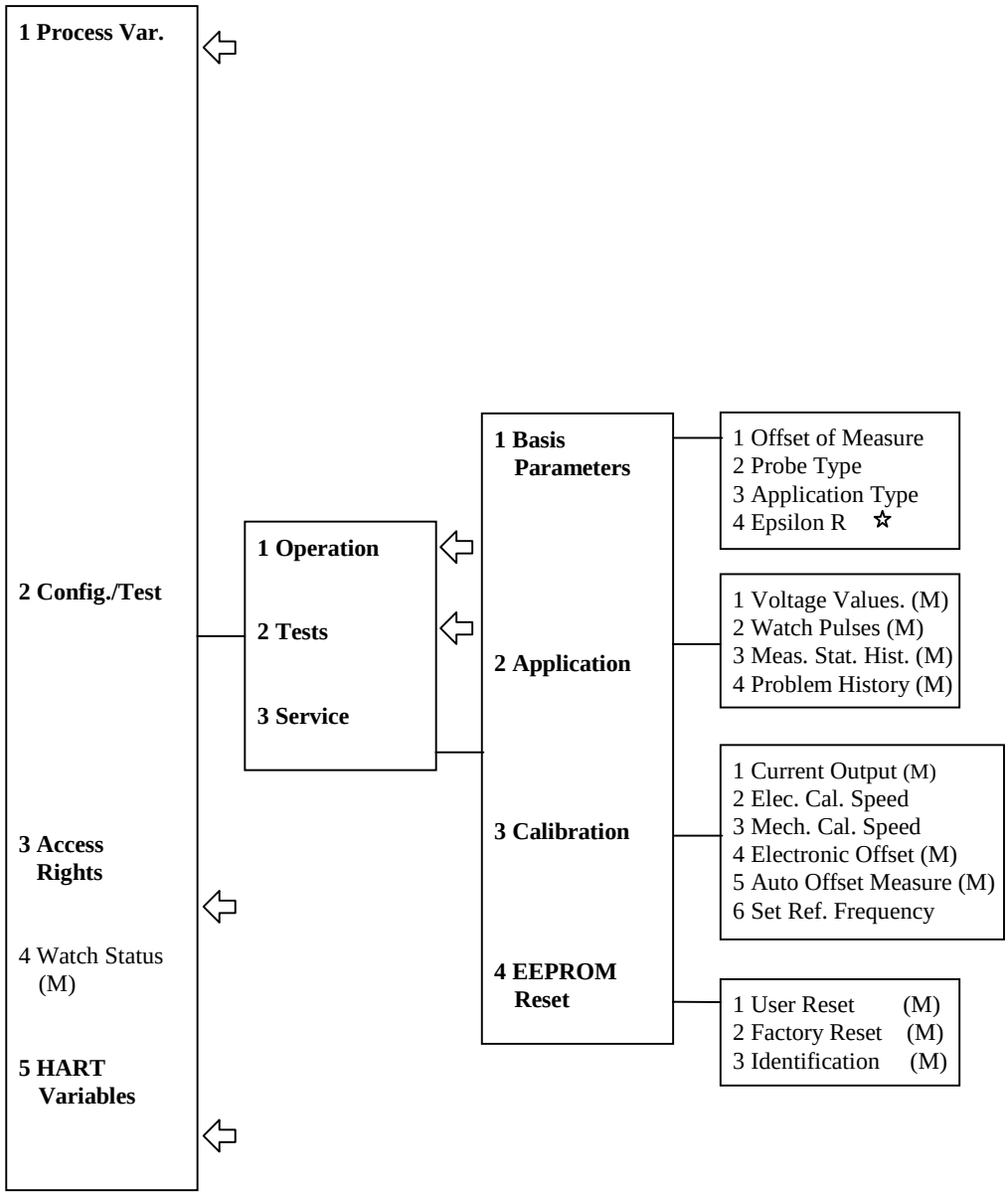
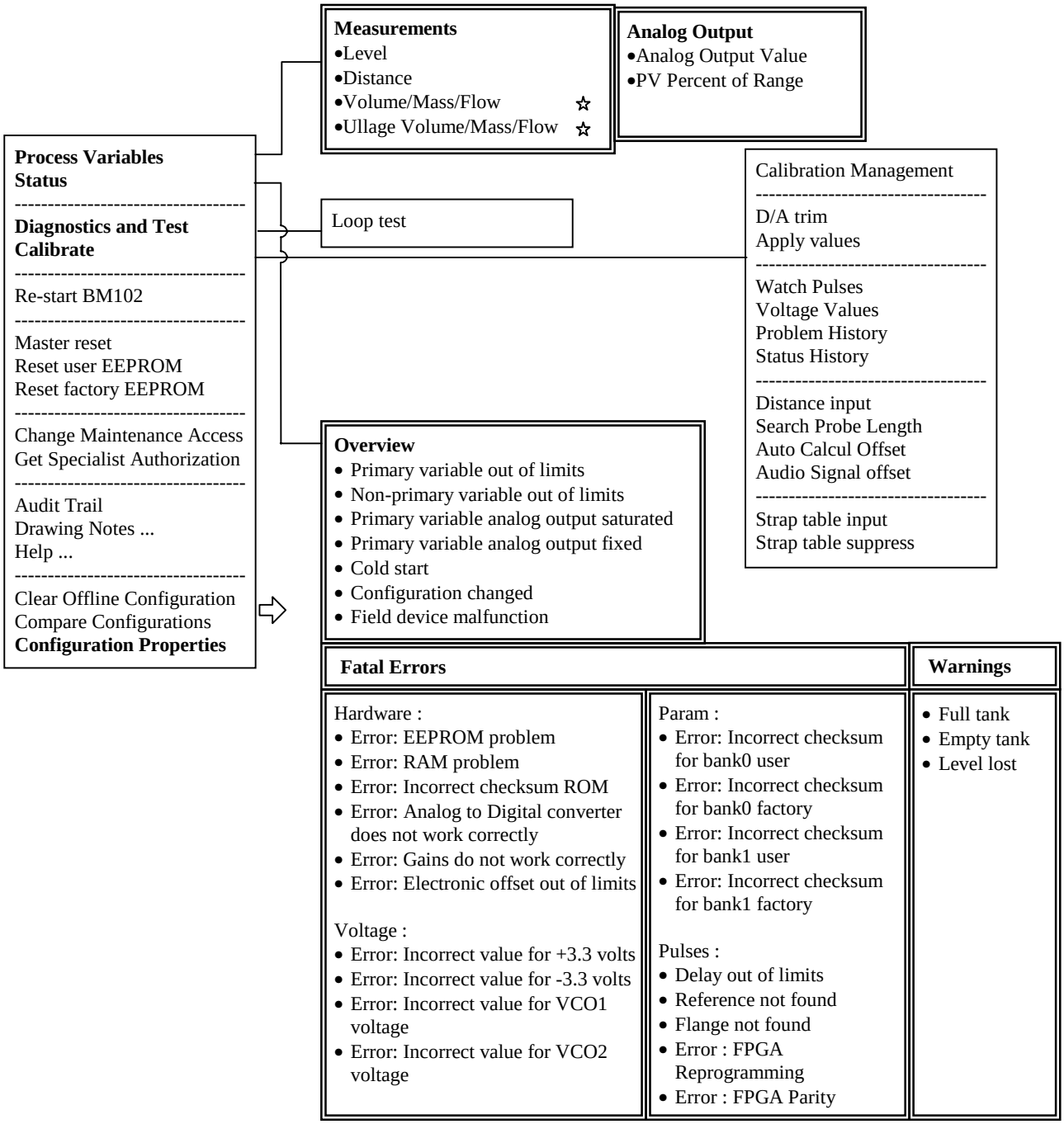
BM102 Menu Tree HC275



Designations:
⇦ - refer to the previous page
(M) - method is invoked to retrieve/change data
☆ - subsists and is displayed only when "Application Type"= "2 Products – 1 Level"

7 Attachment B

BM102 Menu Tree AMS



Designations:

☆ - subsists and is displayed only when the Strap Table exists

⇨ - refer to the next page

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Attachment B
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BM102 Menu Tree AMS

Designations:
(L) - Local AMS variable, that is not read/written to instrument
* - Read-only variable