

Operating Manual

English



ML78B

Hottinger Baldwin Messtechnik GmbH
Im Tiefen See 45
D-64293 Darmstadt
Tel. +49 6151 803-0
Fax +49 6151 803-9100
info@hbm.com
www.hbm.com

Mat.: 7-2002.0578
DVS: A00830_02_E00_01 HBM: public
06.2018

© Hottinger Baldwin Messtechnik GmbH.

Subject to modifications.
All product descriptions are for general information only.
They are not to be understood as a guarantee of quality or
durability.

1	Safety instructions	4
2	Markings used	6
2.1	The markings used in this document	6
2.2	Symbols on the product	6
3	Introduction	7
4	Connections	10
4.1	Connection board AP78	10
4.2	Connection board AP75	11
5	ML78B front panel	12
6	Measuring mode	13
6.1	Display in measuring mode	13
7	Analogue outputs set-up mode	15
7.1	Select signal	15
7.2	Scaling	19
7.3	Filter	20
8	Digital inputs and outputs set-up mode	21
8.1	LEDs	21
8.2	Digital inputs	22
8.3	Digital outputs	24
8.4	Version	27
9	Menu structure	28

1 Safety instructions

Appropriate use

The ML78B Multi-channel I/O module is to be used for measurement tasks and directly related control tasks exclusively. Any other use is considered to be not in accordance with the regulations.

To ensure safe operation the device may only be used as described in the operating manual. In addition, the legal and safety regulations for the respective application have to be observed. The same applies for the use of accessories.

General dangers of failing to follow the safety instructions

The ML78B Multi-channel I/O module complies with the state of the art and is fail-safe. The instrument can give rise to remaining dangers if it is inappropriately installed or operated by untrained personnel.

Everyone involved with the installing, putting into operation, maintaining or repairing of the device must have read and understood the operating manual and, in particular, the safety instructions.

Remaining dangers

The ML78B's performance and scope of supply cover only part of the field of measurement technology. Equipment planners, installers, and operators in addition must plan, implement and respond to safety engineering considerations of measurement technology in such a way as to minimise remaining dangers. Prevailing regulations have to be complied with at any time. Remaining dangers connected with measurement technology must be indicated explicitly.

Working safely

Error messages may only be acknowledged if the cause of the error has been removed and no further danger exists.

The device complies with the safety requirements of DIN EN 61010-part 1 (VDE 0411-part 1); protection class I.

To ensure adequate immunity from interference, use *Greenline* shielded ducting only (see HBM offprint "*Greenline* shielding design, EMC-compliant measuring cable"; G36.Green.0e).

Conversions and modifications

The ML78B must not be modified from the design or safety engineering point without our express agreement. Any modification shall exclude any liability on our part for any damage resulting therefrom.

In particular, any repair or soldering work on motherboards is prohibited. When replacing complete subassemblies, do only use original HBM parts.

Qualified personnel

This instrument is to be installed and used by qualified personnel only, strictly in accordance with the specifications and with the safety instructions. In addition, the legal and safety regulations for the respective application have to be observed. The same applies for the use of accessories.





Qualified personnel means persons familiar with the installing, assembling, putting into service, and operating of the product, and adequately qualified for their task.

Maintenance and repair work on an open device with the power on must only be carried out by trained personnel who are aware of the dangers involved.

2 Markings used

2.1 The markings used in this document

Important instructions for your safety are specifically identified. It is essential to follow these instructions in order to prevent accidents and damage to property.

Symbol	Significance
	This marking draws your attention to a situation in which failure to comply with safety requirements <i>can</i> lead to damage to property.
 Important	This marking draws your attention to <i>important</i> information about the product or about handling the product.
 Tip	This marking indicates application tips or other information that is useful to you.
 Information	This marking draws your attention to information about the product or about handling the product.
<i>Emphasis</i> <i>See....</i>	Italics are used to emphasize and highlight text and references to other chapters and external documents.

2.2 Symbols on the product

CE mark



The CE mark enables the manufacturer to guarantee that the product complies with the requirements of the relevant EC directives (the declaration of conformity is available at <http://www.hbm.com/HBMdoc>).

3 Introduction

ML78B multi-channel I/O modules can be operated in MGC*plus* system devices with the aid of AP75 and AP78 connection boards.

When used with an AP78 connection board, an ML78B module converts up to ten digital signals into freely scalable analogue voltages (± 10 V). Two signals can be filtered (VO1, VO2). Outputs A03 . . . A010 are electrically isolated.

An AP75 connection board has 8 digital inputs and outputs. Limit value information can be output for individual channels or logical combinations of up to 120 channels. Remote control functions can also be triggered for single or multiple channels. One input only ever triggers one function.

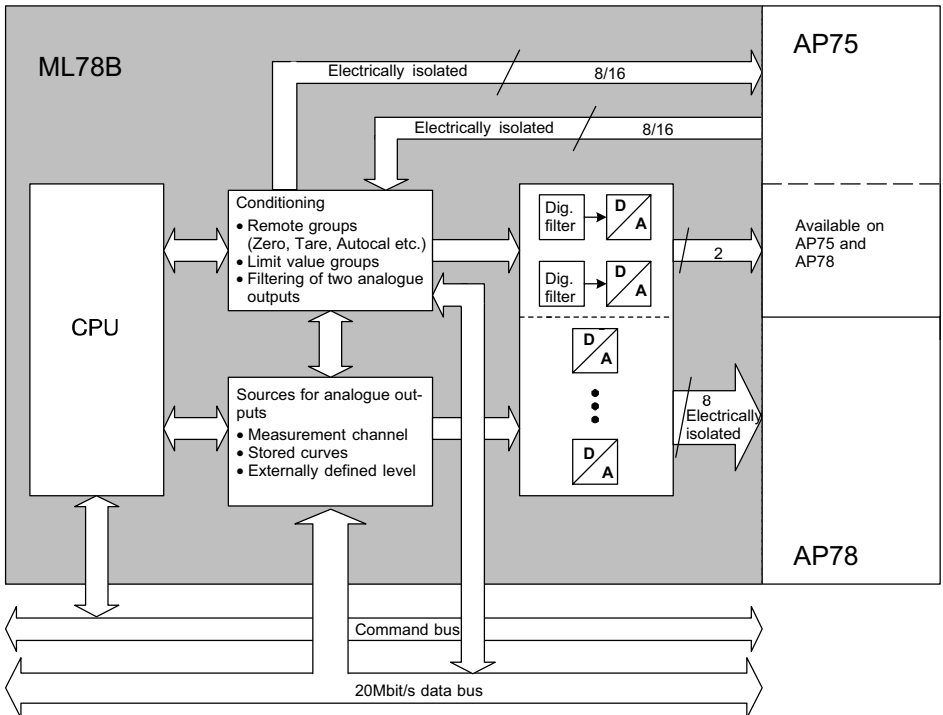


Fig. 3.1 Block diagram ML78B

AP75/AP78 connection boards can be plugged in directly behind the amplifier module or alongside it to the right (seen from above).



Information

Only the connection board fitted behind the ML78B module has analogue output voltages VO1 and VO2!

The outputs from the AP78 connection board are tagged with AO (Analogue Output) in the set-up menus.

If the AP75 connection board is fitted directly behind the module, the I/Os are tagged with *A.* both in the set-up menus and in the display. If it is fitted on the right, the I/O numbers are prefixed with *B.*

The following I/O module connection board combinations are possible in the system device:

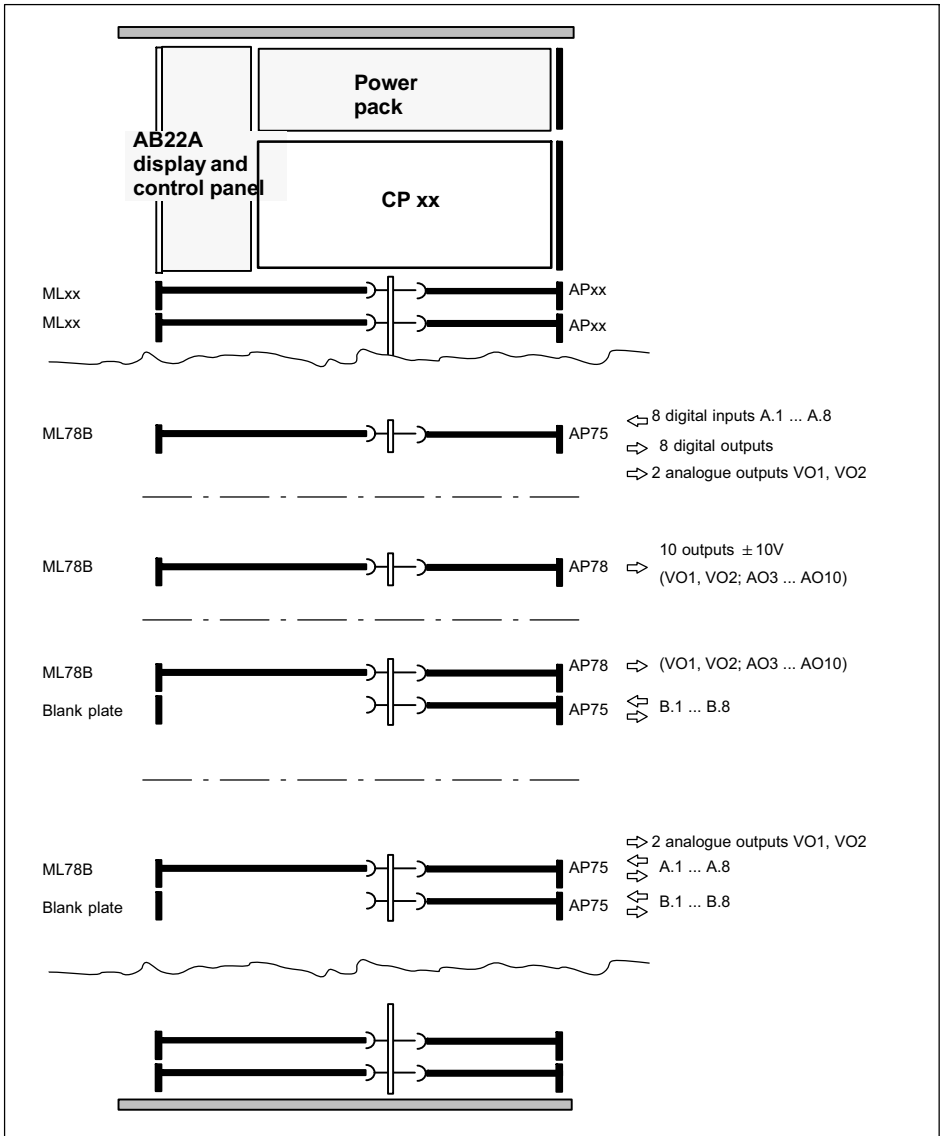
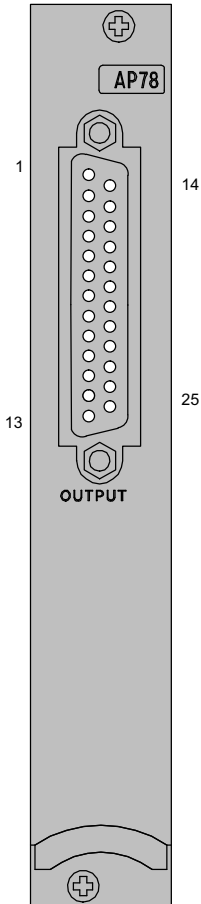


Fig. 3.2 Connection board combinations in the system device (top view)

4 Connections

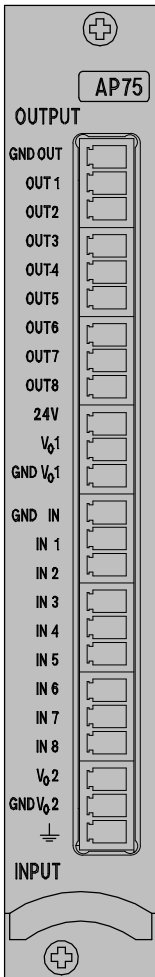
4.1 Connection board AP78



The AP78 connection board has a total of ten analogue outputs, two of which are looped through from the ML78B amplifier (VO1 and VO2).

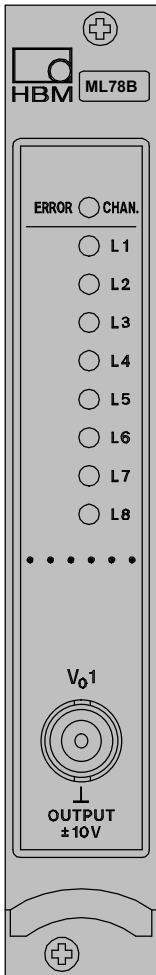
Pin	Function
1	Connection board analogue output AO3
2	Connection board analogue output AO4
3	Connection board analogue output AO5
4	Connection board analogue output AO6
5	Connection board analogue output AO7
6	Connection board analogue output AO8
7	Connection board analogue output AO9
8	Connection board analogue output AO10
9	-
10	-
11	Amplifier analogue output VO1
12	Amplifier analogue output VO2
13	-
14	GND to AO3
15	GND to AO4
16	GND to AO5
17	GND to AO6
18	GND to AO7
19	GND to AO8
20	GND to AO9
21	GND to AO10
22	-
23	-
24	GND to VO1
25	GND to VO2

4.2 Connection board AP75



An AP75 connection board has eight digital inputs and eight digital outputs. Inputs and outputs are electrically isolated and have their own grounding system (GND OUT: ground for outputs; GND IN: ground for inputs). The functions of the outputs from the connection board are freely programmable (see *Chapter 8*).

5 ML78B front panel



On the front panel of the ML78B multi-channel I/O module are nine LEDs, eight of which are programmable (L1...L8).

LED caption	Colour	Meaning
ERROR/CHAN.	Red/yellow	Error/channel selected
L1	Red/yellow	As per programming
L2	Red/yellow	As per programming
L3	Red/yellow	As per programming
L4	Red/yellow	As per programming
L5	Red/yellow	As per programming
L6	Red/yellow	As per programming
L7	Red/yellow	As per programming
L8	Red/yellow	As per programming

LEDs L1 . . . L8 can display the following status situations:

- Overflow on analogue outputs VO1, VO2; AO3 ... AO10
- Status of digital inputs A.1 ... A.8 (A.1...B.8 if two AP75s are present)
- Status of digital outputs A.1 ... A.8 (A.1...B.8 if two AP75s are present)

The colour of the LEDs is individually definable (see *Page 21*).

6 Measuring mode

6.1 Display in measuring mode

The standard display on the AB22A is described in Chapter D of the *MGCplus* manual. The following section deals only with features specific to the ML78B.

In measuring mode the ML78B displays the status of the ten subchannels. Subchannels x.1 and x.2 are analogue outputs VO1 and VO2 from the ML78B. Subchannels x.3 ... x.10 are the analogue outputs from connection board AP78.



CHANNEL



You may select the subchannels with the aid of channel selection keys, and the inputs and outputs status display with the aid of cursor keys.



You can select various status displays:

- If an AP75 connection board is present in addition to an AP78 connection board:
 - The present output voltage on the selected analogue output
 - The present status of the digital inputs
 - The present status of the digital outputs
- If two AP75 connection boards are present:
 - The present output voltage on analogue outputs VO1 or VO2
 - The present status of digital inputs In A.1 ... In A.8
 - The present status of digital inputs In B.1 ... In B.8
 - The present status of digital outputs Out A.1 ... Out A.8
 - The present status of digital outputs Out B.1 ... Out B.8

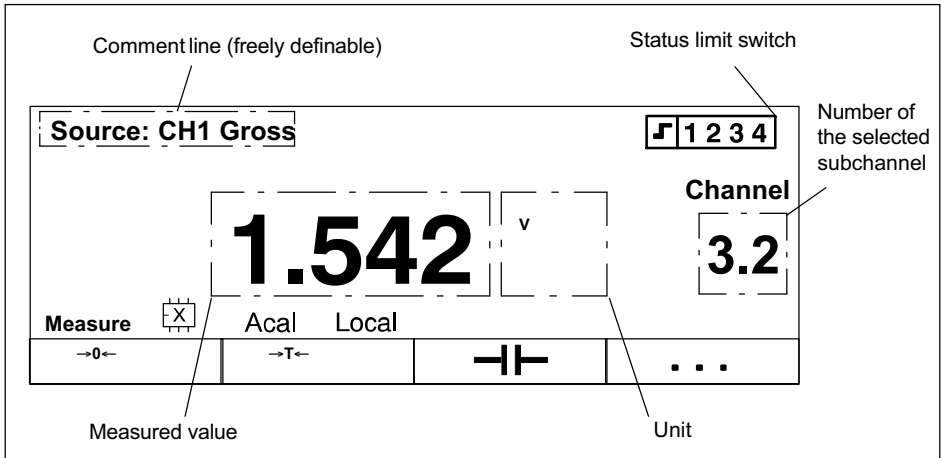


Fig. 6.1 Display of analogue outputs (AP78 connection board)

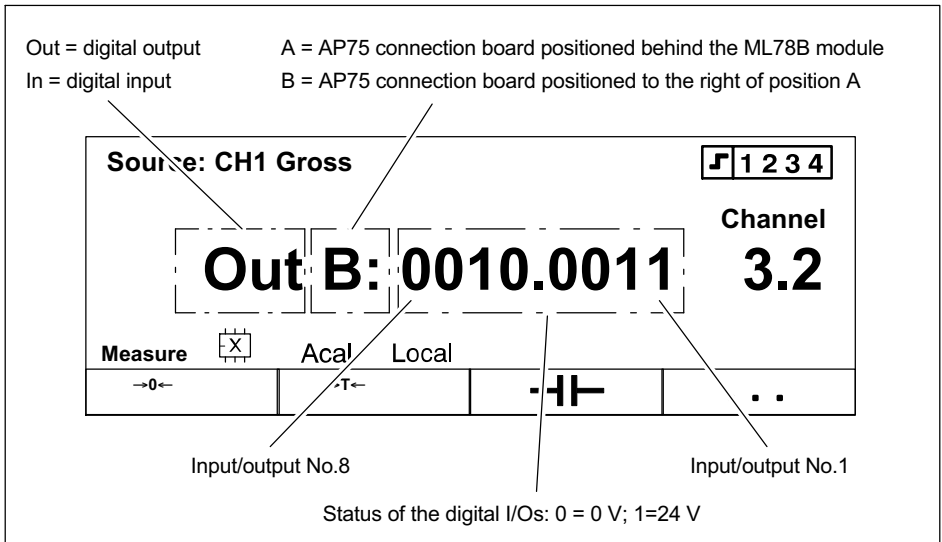
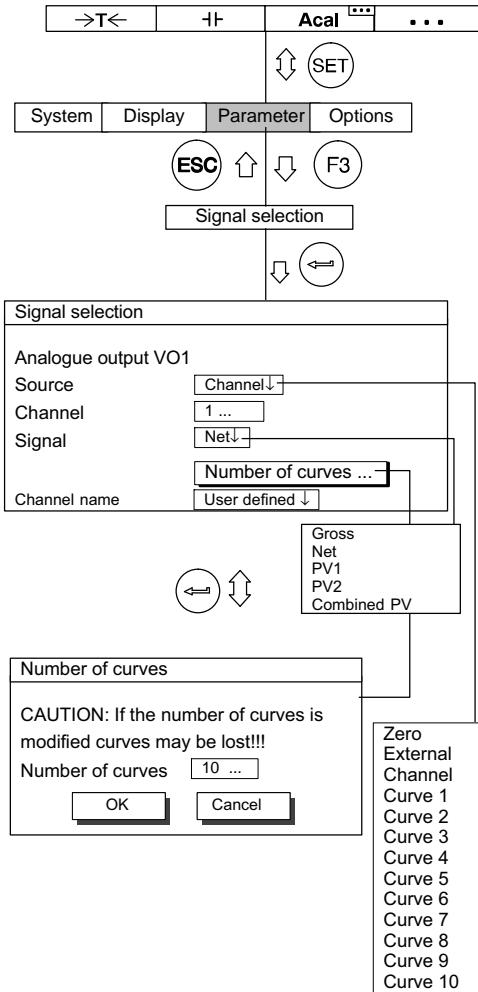


Fig. 6.2 Display of digital inputs/outputs (AP75 connection board)

The status display for I/Os is numbered upwards from left to right, that is, the first figure shows the status of inputs/outputs No.8.

7 Analogue outputs set-up mode

7.1 Select signal



Analogue output

Displays the currently selected analogue output (VO1, VO2, AO3 ... AO10).

Source

For selecting the signal source for the analogue output.

Zero: 0 volt (internal zero point; factory settings)

Channel: Selects a device channel on the MGCplus.

External: Sets a voltage by means of an external software command.

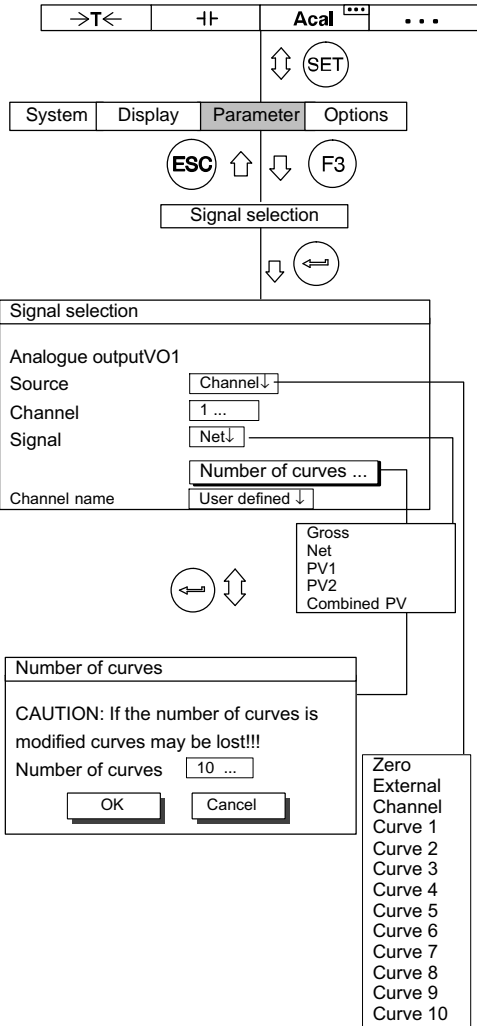
Curve 1 . . . 10: selects a stored curve.

Channel

Text box for the required channel number.

Signal

Selects the required signal (Gross, Net, Peak Value 1, Peak Value 2, Combined Peak Value).



Number of curves

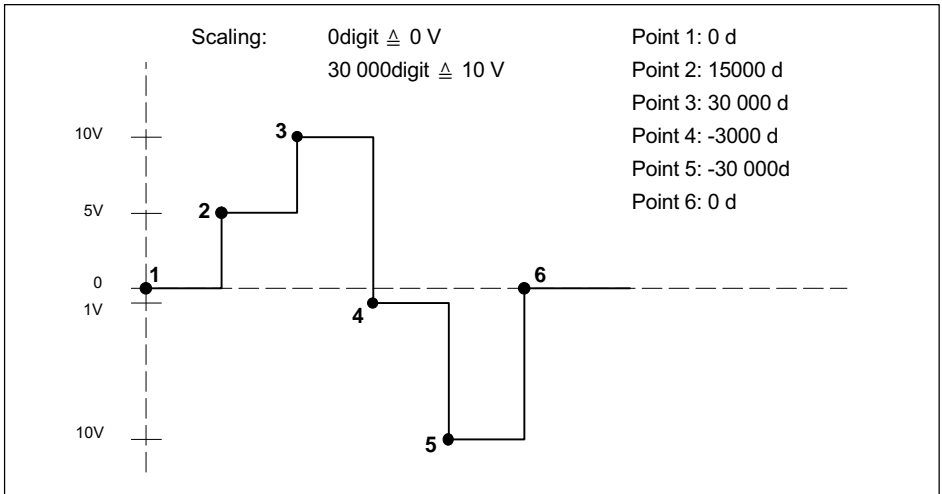
Number of curves you want the ML78B to manage. It can handle a maximum of 10 curves with a total of 128 000 points. The number of points will be divided equally between curves.

Example 1:

Number of curves 10 ⇒ 12 800 points per curve

Number of curves 5 ⇒ 25 600 points per curve

Example 2: Curve with 6 points

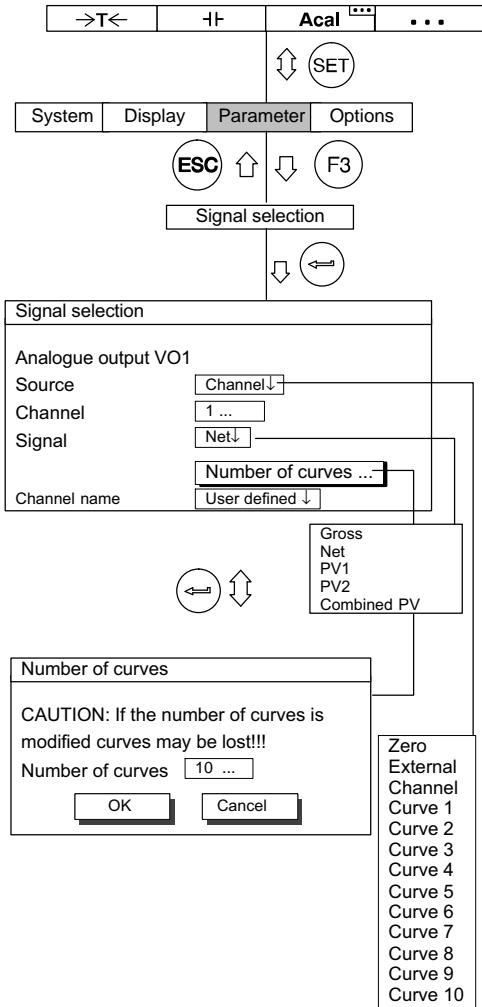


The HBM program "MGCplus Assistant" will load a user-defined curve over the computer interface (ASCII file using comma, semicolon or tab character as values separator). Further information can be found in the documentation on the MGCplus system CD.

Factory settings for curves 1...10:

Curve No.	Curve
1	Sine, 480 points
2	Square, 480 points
3	Triangle, 480 points
4	Sawtooth, falling, 480 points
5	Sawtooth, rising, 480 points
6	Sine, 48 points
7	Square, 48 points
8	Triangle, 48 points
9	Sawtooth, falling, 48 points
10	Sawtooth, rising, 48 points

Range of values of curves 1 . . . 10: ±10 V default settings.



Channel name

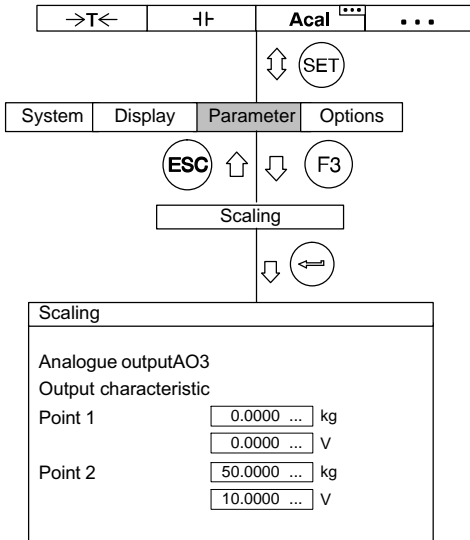
Source signal: The selected source is displayed in the comment line (if a user comment is present it will be overwritten - factory setting).

User defined: Sources are not displayed (if a user comment is present it will be displayed).

Output rate (only available for selection when "Curve..." has been chosen as the source)

Selects the output rate for the curve. The output rate is the frequency with which the individual points on the curve are output (factory setting 2400 Hz).

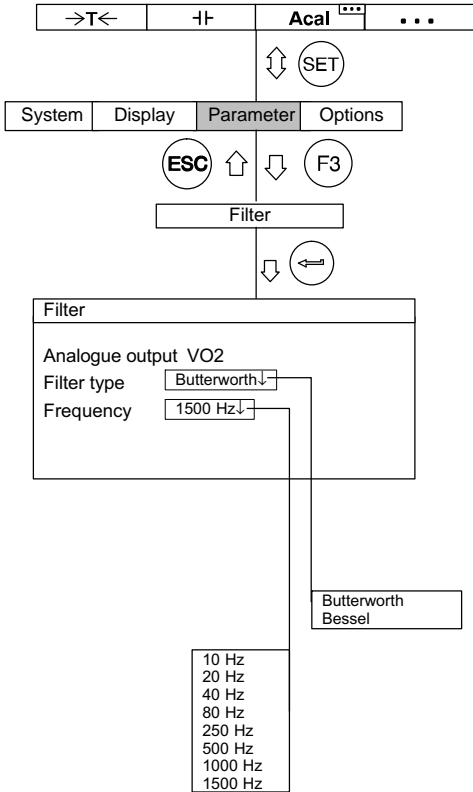
7.2 Scaling



Each analogue output can be separately scaled through two points. Scaling can be carried out in the user-specified unit (e.g. kg, first line) and in the unit of the analogue output (V, second line).

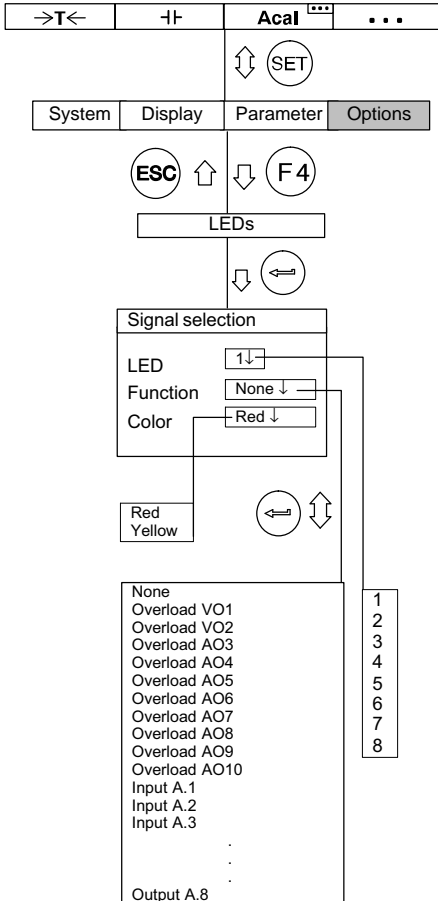
7.3 Filter

The signals from analogue outputs VO1 and VO2 can be filtered (factory setting: Butterworth, 250 Hz).



8 Digital inputs and outputs set-up mode

8.1 LEDs



LED

Number of the LED on the ML78B module front panel.

Function

Select the function for the LED:

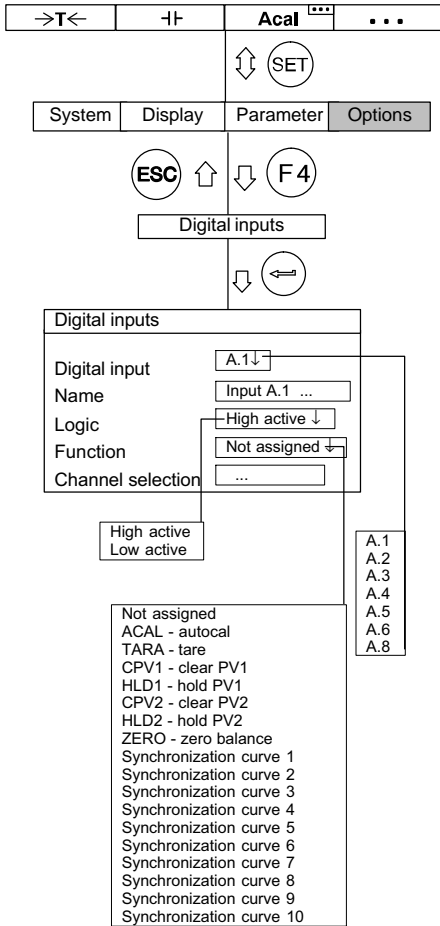
- Display analogue outputs overflow
- Display status of digital inputs
- Display status of digital outputs

The LED lights when the digital I/O is active. Select the logic under "Options/Digital Outputs/Logic".

Color

Select the colour of the chosen LED (red or yellow).

8.2 Digital inputs



Digital input

Selects the required input (depending whether the connection board position is A.x or B.x).

Name

You can use this edit field to input a name of your choice for the selected digital input (factory setting: input x.x).

Logic

Selects the required logic (factory setting: High active).

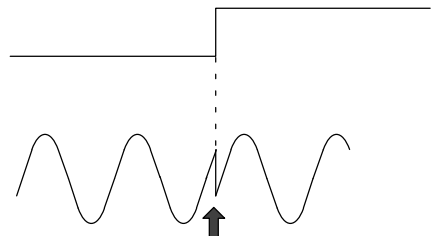
Function

Selects the required function for the input (factory setting: Not assigned).

Function “Synchronization Curve x”

Selecting this function starts the output of curve x.

Example: Logic High active



The curve is restarted on a rising edge.

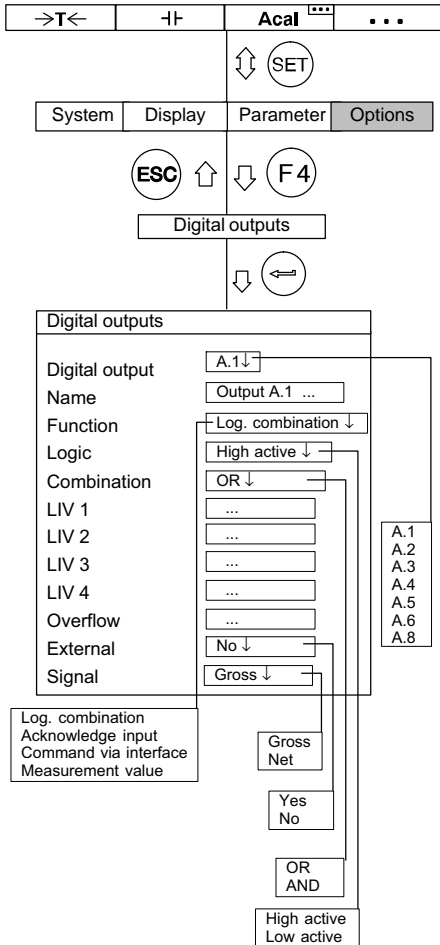
Channel selection (not with the "Synchronization" function)

In this edit field enter the channels for which you want the selected function to be carried out. When entering your input you should separate each channel or channel group with a semicolon. For group ranges enter a dash.

Example: 1;3.5;6.2-6.5

The selected function will be carried out for channel 1, subchannel 3.5 and subchannel group 6.2 to 6.5.

8.3 Digital outputs



Digital output

Selects the required output (depending whether the connection board position is A.x or B.x).

Name

You can use this edit field to input a name of your choice for the selected digital output (factory setting: output x.x). This name will also be displayed in MGCplus Assistant.

Function

Logical combination

The output produces the selected logic operation (AND/OR).

Acknowledge input

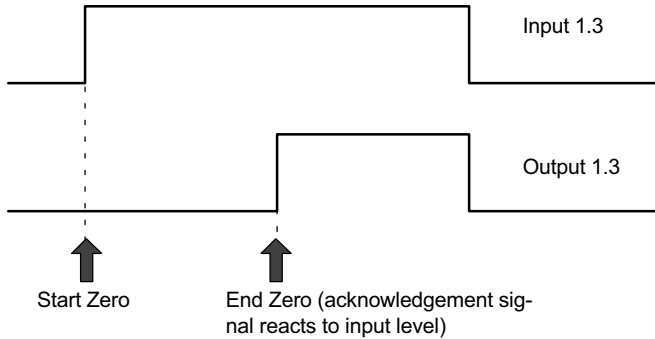
The output produces an acknowledgement signal for the corresponding input (e.g. output 1.3 acknowledges input 1.3). The acknowledgement signal reacts to the level of the input.

Command via interface

The output is set to the selected logic level by an external instruction received over an interface (SOP).

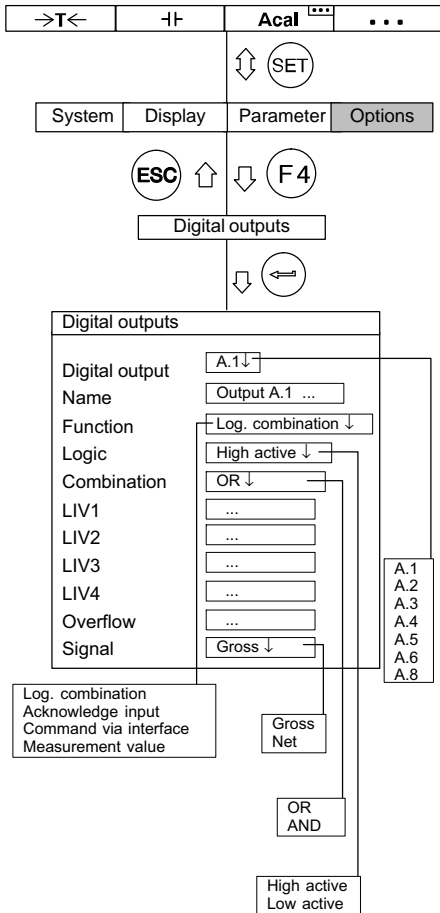
Example:

Input 1.3 having the "Zero" function and output 1.3 having the "Acknowledge input" function.



Logic

Selects the required logic (factory setting: High active).



Combination

Selects the required combination (factory setting: AND).

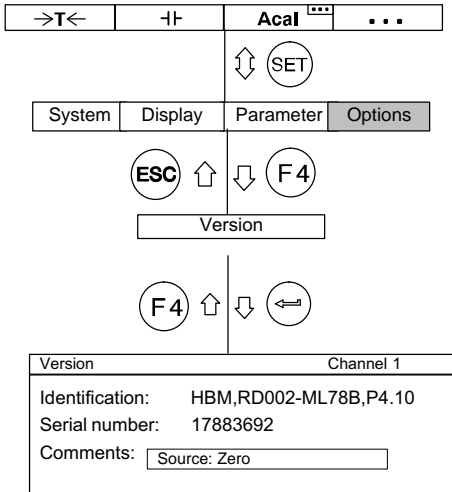
LIV 1 ... 4, Overflow, (not with function "Acknowledge input")

In these edit fields enter the channels which you want to be included in the combination. When entering your input you should separate each channel or channel group with a semicolon. For group ranges enter a dash.

Example: 1;3.5;6.2-6.5

Channel 1, subchannel 3.5 and subchannel group 6.2 to 6.5 will be included in the combination.

8.4 Version



Identification

Displays the component devices and their firmware versions.

Serial number

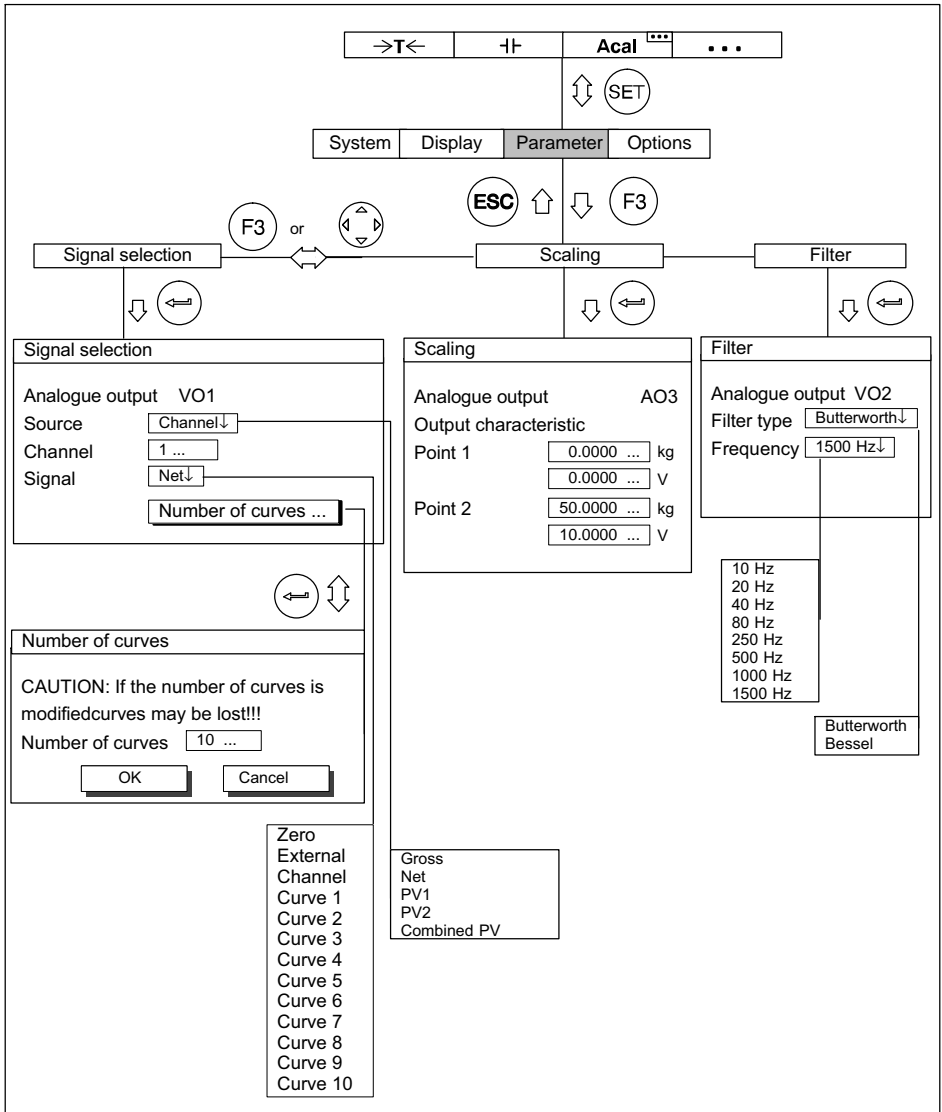
In the event of claims or queries, please specify the serial numbers shown here.

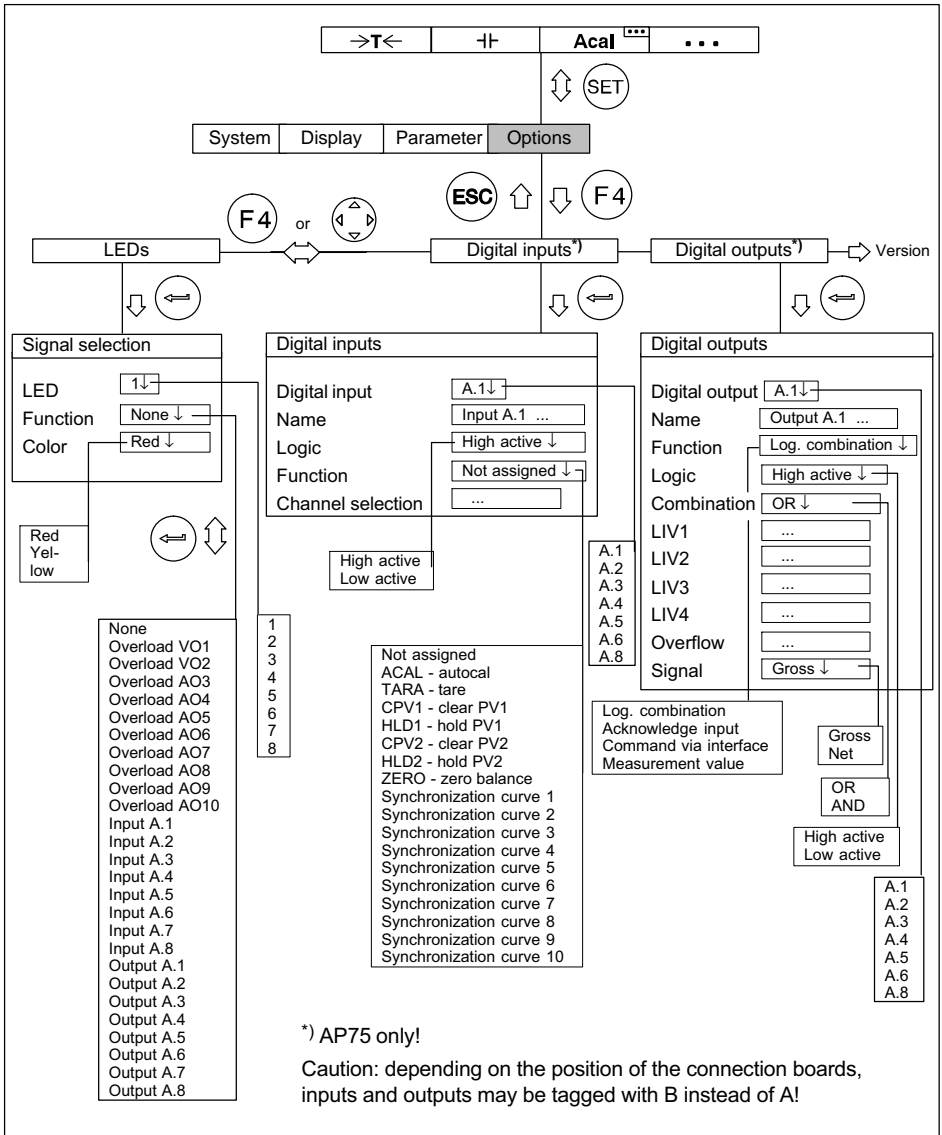
Comment

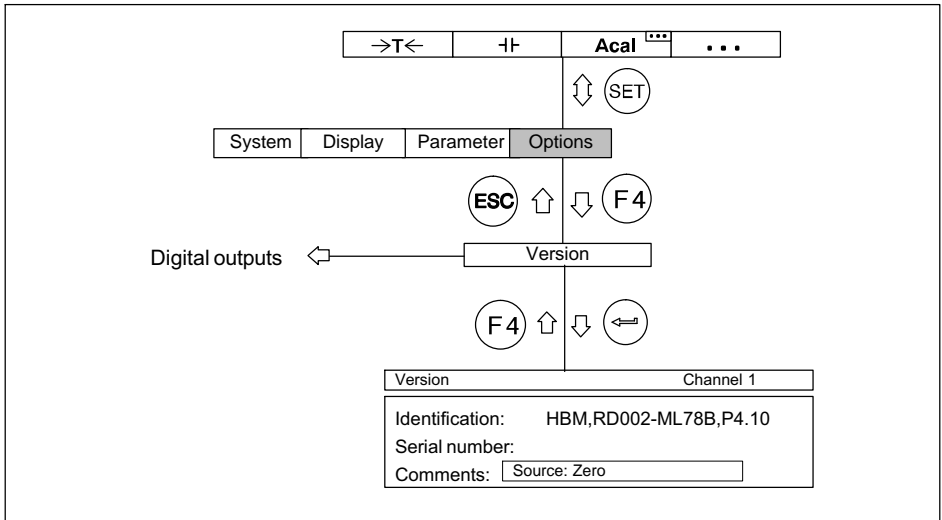
The comment entered here appears upper left in the display during measuring mode. You can input a maximum of 45 characters, though these are only displayed in full in the *MGCplus* Assistant. A maximum of 19 characters will be displayed in the AB22A display and control panel.

(Factory setting: Source: Zero)

9 Menu structure







HBM Test and Measurement

Tel. +49 6151 803-0

Fax +49 6151 803-9100

info@hbm.com

measure and predict with confidence



A00830_02_E00_01 7-2002.0578 HBM: public

www.hbm.com