HOTTINGER BALDWIN MESSTECHNIK
HBM Mess- und Systemtechnik GmbH

Electrical
measurement
of mechanical
quantities

Operating Manual

HBM software

MGC*plus* Assistant

B 32.MGCPA.20 e

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Software Registration

Device: ❏ DMCplus ❏ DMC9012A ❏ SPIDER8 ❏ UPM60 / UGR60
❏ MGC ❏ AED ❏ SCOUT ❏ UPM100 / UGR100
❏ MGCplus ❏ PME ❏ other: . . . . . .

Interface: ❏ RS232C ❏ RS485 ❏ IEEE488−Bus
❏ CAN ❏ Profibus-DP

Program: . . . . . License-No.: . . . . . Purchase date: . . . . . .

Address

Name: . . . . . Titel: . . . . .
Company: . . . . . Department: . . . . .
Street address: . . . . . P/O Box: . . . . .
Phone: . . . . . Fax: . . . . .
Postal code: . . . . . City: . . . . .

❏ Our company agrees that HBM uses the company's name as a reference **without** details like company's address or type of application.

Date: . . . . . Signature: . . . . .

Why register ?

We can only inform you about updates and new versions, keeping you abreast of the latest software developments, if you are registered with us. So take the earliest opportunity to fill in the registration form and send it or simply fax it directly to us. The form fits into a window envelope for easy posting.

Thank you for taking the time

If, as a registered user, you have a question regarding the software you have acquired, we would be happy answer it.

General supply and licence conditions for software

I. Contract agreement, scope of supply and granting of licence

1. Our offers are subject to alteration without notice. Our written acknowledgement of order is the significant factor regarding the scope of our supplied items. Provided our quote is definitely accepted within the time-limit and we have not yet acknowledged the order, our quote is the significant factor relating to the sup plied items. Supplementary agreements and modifications must be confirmed by us in writing.

2. The coming into effect of the agreement with regard to those sup plied parts covered by state export regulations is subject to us being granted the required approval.

3. The subject of the agreement is the right to use the program recorded on the data medium (diskette), the program description, operating manual and other associated written material (designated as "software" in the following).

II. Rights of the orderer to the software products

1. We grant the orderer a non-exclusive and non-transferrable right to use the HBM software on a single computer and at only one place.

2. The licence holder is not permitted:
a) to pass on or otherwise make the software or associated mate rial accessible to third parties without prior written agreement from HBM.
b) to modify the software without prior written consent from HBM.
c) to create works derived from the software or to duplicate the written material.
d) to translate or modify it or to create works derived from the written material.

3. The right of use is dependent on the orderer's observance of these general conditions of supply.

III. Payment, settlement dates, value added tax

1. The payment is reimbursement for the use of the software products. It is due in full 30 days after the invoicing date.

2. In addition the relevant legal value added tax is billed together with all payments.

3. The retention of payment or payment reductions due to possible claims made against us by the orderer are not permitted.

4. For payment by cheque the payment is only valid when the cheque has been finally redeemed. Until then our reservation of ownership to the supplied data medium is retained.

IV. Term of delivery default of delivery

1. The term of delivery begins with the sending of our order acknowledgement and not before the receipt of an agreed payment instalment.

2. The term of delivery is extended appropriately for actions taken within the scope of employment conflicts, in particular during strikes and lock-outs. The same applies where unavoidable obstacles arise at our factory. This includes modifications to the items supplied which are necessary due to not obtaining state approvals or other disturbances to the factory operation which can be shown to affect the production or delivery of the supplied article. We also cannot be held accountable for the previously described circumstances when they arise during an already prevailing delay. In significant cases we will inform the orderer as soon as possible about the start and finish of this type of obstacle.

3. Maintenance of the term of delivery assumes the fulfillment of the orderer's contractual obligations.

4. If the orderer incurs a loss due to a delivery delay that is account able to us, then he can claim compensation for it. After the expiry of a waiting period of 30 days from receipt of the claim, this amount is a maximum of 0.5 percent for each full week of further delay, in total a maximum of 5 percent of the value of those soft ware products which, as a result of the delay, cannot be used punctually or cannot be used according to the agreement.

5. The orderer then only has the right of withdrawal if, with a delay in delivery and after the expiry of a 10-week period beginning with the receipt of the written claim according to the above para graph 4 he has set a reasonable additional period of time with the expressed declaration that he will cancel acceptance of the delivery after the expiry of the notice and we have not delivered in the additional period of time. The same applies in the case of a partial delay, assuming that the orderer can show that the partial delivery serves him no purpose.

6. More far-reaching claims due to delay or partial delay are excluded according to section VIII.

V. Impossibility of performance, partial impossibility

1. The orderer can withdraw from the agreement if it is conclusively found that we cannot fulfil our contractual obligations due to reasons for which we are accountable. In the case of partial impossibility, the right of withdrawal only exists if the partial fulfillment of the obligations can be shown to serve no purpose for the orderer. Otherwise he can demand a reasonable reduction in the purchase price.

3. If the impossible circumstances occur during a delay in acceptance or due to the orderer's fault, then he is still liable for payment.

2. If neither of the parties to the contract can be held accountable for the impossibility, then we have a claim to payment appropriate to the part of the work already carried out.
4. More far-reaching claims due to impossible circumstances causing non-fulfillment or partial non-fulfillment of our contractual obligations are excluded according to Section VIII.

VI. Guarantee

The licensor guarantees that the purchased programs possess the functional and performance features that were contained in the product description valid at the time of the contract agreement or that were separately agreed. The right to guarantee claims terminates six months after the day of transfer of the programs to the customer, provided other arrangements are not agreed.
If errors in the programs occur during this period, which are not just inconsiderably detrimental to their value and serviceability, the licensor will rectify these errors without delay and without charge after receipt of information about the error.
A prerequisite for the error rectification is that the error effects are reproducible, they have been adequately described by the customer and the licensor has been immediately informed about the error. The guarantee work is carried out by making improvements, which, depending on the licensor's choice, may take the form of supplying a new, free-of-charge program version or a temporary error correction until a new program version can be supplied.
If the licensor has through his own fault let an additional period of time allowed for the rectification pass without result, the customer can demand cancellation of the contract. This right also exists in other cases where the improvement is not effective.

VII. Liability for the infringement of patent rights

1. We vouch for the fact that the software products are free from third-party patent rights in the Federal Republic of Germany which would exclude or restrict their usage we declare that at the time of the contractual agreement we know of no third-party patent rights which exclude or restrict the use of the products.
2. If a software product infringes the patent rights of a third party, then we will depending on our choice, replace or change the software product at our cost according to the rules in Section VI, so that the infringement of the patent rights is rectified or we will procure a licence of use for the orderer. .
3. The orderer has the right of withdrawal according to Section VI, Subparagraph 6 if we do not procure a licence of use for the orderer and the patent right infringement cannot be rectified by replacement or modification of the software product. If this sort of measure is not possible with reasonable expenditure, then either of the parties to the agreement can cancel the sales agreement without notice. In this case the licensor is liable for the losses incurred by the customer due to the cancellation and the level of liability for the losses is limited to one year's usage fee or to the once-only licence fee for the subject article of the contract. For losses extending beyond this Section VII applies.
The licensor's liability is waived if the third party claims are based on the fact that the program sold has been modified by the customer acting on his own authority or it has been used under application conditions other than those specified.

VIII. General limitation of liability

1. The orderer is entitled only to the claims expressly conceded in these conditions of supply. Claims beyond this, in particular any type of claim for compensation - including claims arising from tort, through fault during the contract agreement and positive violation of contractual duty - against us and our staff are excluded. This particularly applies to losses which do not occur with the supplied article itself. This limit of liability does not apply where the claims are based on willful or gross negligence of our directors or managers. Our liability is also not restricted for losses for which we are liable due to the product liability regulations.
2. As far as we are liable according to item 1 for the destruction of documentation, in particular of data, our liability is restricted to the expenditure that would be necessary for its reconstruction if the documentation or data had been properly secured by the order.

IX. Copyright, orderer's obligations, duplication

1. The copyright on the software products supplied by us, on the documentation and on the modifications that we have carried out are retained by us. The orderer will use and keep the software products and documentation in a manner such that they are reasonably secure against usage, duplication and misappropriation which contravene the agreement.
2. The licensee is only allowed to make a reserve copy for back-up purposes. The licensee is obliged to fit proof of HBM's copyright claim to the reserve copy or to accommodate this proof within it. If a copyright notice and/or a registration number is present in the software, it must not be removed.

X. Duration of the agreement, return of the program

The licence agreement runs for an unspecified period. It can for important reasons be terminated without notice. After the termination of the right of use, the licensee is obliged to destroy the original diskette, all copies of the software and the written material with proof of this being carried out or to return to them to HBM. This also applies if the software has been replaced or partially replaced under guarantee or because of infringement of third party patent rights.

XI. Miscellaneous
All taxes, fees and duty payments in conjunction with delivery out side the Federal Republic of Germany are at the orderer's expense. If we are charged by the orderer's authorities for taxes fees or other duties in fulfilling this delivery, then the orderer will reimburse us for these costs.

XII. Written form, place of jurisdiction
1. Changes to these conditions must be made in writing.
2. If peremptory right prevents the application of individual conditions, this does not affect the validity of the remaining conditions.
3. The place of jurisdiction for any conflict is Darmstadt. We how ever reserve the right to also file a complaint where the orderer has his place of legal jurisdiction.
4. The law of the Federal Republic of Germany applies to the exclusion of the Convention relating to a Uniform Law on the International Sale of Goods.

MGC*plus* Assistant

Contents

1 Introduction

1.1 Typographical conventions

We use the following conventions in this manual for the sake of clarity and legibility:

⚠ **Important:** Important paragraphs are marked with this warning symbol.

Italics are used if we want to pick out a particular section of text or word.

☞ This symbol stands for **Note** and indicates a hint or interesting feature.

ESC for key tops on the keyboard, in this case the ESCAPE key.

I/O channels for names of dialogue boxes

Edit for menus and menu commands, in this case Edit menu, sub-menu Paste.

<Set> for buttons, e. g.  and objects (also elements, box headings etc.) in dialogue boxes.

1.2 About this manual

This manual deals with the basic principles of operating the MGC*plus* Assistant program and gives you an overview of how functions work and how to use MGC*plus* Assistant. You will learn to find your way around MGC*plus* Assistant, in other words how you can use MGC*plus* Assistant for maximum productivity.

Also covered are special chapters, such as for example the *“CP32 hard disk subsystem”* or data acquisition with the *”MultiScope”*. However, the MGC*plus* system itself is not described in detail.

If you want details of the amplifier parameters, please use the MGC*plus* documentation *“MGC*plus *Operating manual”* and *“ MGC*plus *Operaing manual – Operation with computer or terminal”* .

☞ If you use MGC*plus* Assistant with HBM's catman V2.x software, you will find further information on using the MGC*plus* Assistant in the "*catman V2.x Operating manual*"

1.3 System requirements

In order to operate MGC*plus* Assistant in Version 1.2, you will need a PC with the following minimum specification:

- MS Windows 95 or Windows NT Version 4.0 or higher
- 486 processor
- 8 MByte RAM
- approx. 20 MByte free space on your hard disk after installation
- Microsoft or 100% compatible mouse
- RS-232 interface for the serial connection of measuring devices
- a standard printer for analysis purposes
- the following fonts installed: MS Sans Serif, Arial (TT), Courier, Small Fonts, Times New Roman (TT) and Wingdings

We recommend using a Pentium PC if you want fast data acquisition. If you also have access to a fast hard disk and graphics card, you can carry out calculations at high data transfer rates and produce faster displays. You should also have further space on your hard disk for saving measured data.

☞ You can connect the MGC*plus* to your PC via an Ethernet connection (TCP/IP). To do this you need an ethernet card for your MGC*plus* (optional) and your PC.

☞ You can also connect the MGC*plus* to your PC via a GPIB (IEEE488) interface. To do this you need the following additional components which are **not** included as part of the supply with the basic device:

- PCMCIA-GPIB card for the CP32 PCMCIA slot from National Instruments
- GPIB plug-in card for your PC from National Instruments (PCII-A, GPIB-AT/TNT, GPIB-AT/TNT-PnP, GPIB-PCI)

1.4 Installation

In this section, we describe how to install, start up and uninstall the MGC*plus* Assistant software. You will receive MGC*plus* Assistant together with MGC*plus* operating manual and other information on the MGC*plus* system CD.

⚠ **Important**: Before you start the installation procedure, please read the latest hints in the *"README.TXT"* and *"RELEASE.DOC"* files. You will find this on the MGC*plus* system CD.

This is how you install MGC*plus* Assistant from the diskette

1. Re-start Windows, but do not start any other applications. Please also note the settings in the ***Autostart*** group (**Program** → **Autostart** → **....**).
2. Insert the MGC*plus* system CD in your CD drive.
3. The installation starts automatically

   or

   you select the command <Run...> in the Windows Startup menu and enter *D:\LAUNCH.EXE*, if *D:* is your CD drive and click on <OK>.
4. In the opening window you select the language for the MGC*plus* system CD.
5. In the following window you select <Install MGC*plus* Assistant>
6. The installation program starts. Please follow the instructions in the Setup program.

☞ You can also starts the setup program if you select the command <Run...> in the Windows Startup menu and enter *D:\Disk1\SETUP.EXE* and click on <OK>.

7. If the setup program recognises older system file versions, a message box appears. If you click on <OK> at this point, the newer system files are copied to your system directory and your computer is rebooted. Carry out the setup program again.
8. Follow the instructions in the setup program. In the course of installation, you may specify in which directory MGC*plus* Assistant is to be installed. Enter the required directory path. If necessary, the setup program creates the directory you have nominated for MGC*plus* Assistant and copies all the files to it.

Fig. 1. Selection window for setting up the installation directory

⚠ **Important**: If you are already using the HBM software catman V2.x, enter the catman directory as the path. MGC*plus* Assistant will be automatically integrated into your catman V2.x system.

9. Click on <OK> to end the installation.

☞ You can stop the installation at any time with <Cancel>.

This is how you uninstall MGC*plus* Assistant

1. Open the ***Software settings*** menu (**Start** → **Settings**→ **Control panel** → **Software**) .
2. Select *MGCplus* from the list and click on <Insert/Remove...>. Follow the instructions.

⚠ **Important**: If you have installed MGC*plus* Assistant with the catman V2.x software, you can only uninstall catman completely. To do this, select catman from the list.

1.5 Technical support

If your installation does not run smoothly, or if you have a problem with MGC*plus* Assistant, you can contact our hotline in Darmstadt.

HBM Hotline:

14.00 – 16.00 hours (Central European Time) on working days only

06151 – 803 – 373 (Germany)

+49 6151 803 373 (international)

Fax support:

06151 – 803 – 624 (Germany)

+49 6151 803 624 (international).

HBM E-mail:

Software@HBM.de

HBM on the World Wide Web:

www.hbm.de

2 General information on MGC*plus* Assistant

This program was developed for controlling the MGC*plus* HBM universal measuring amplifier system. The user interface, which has an intuitive feel, makes a whole range of functions available:

- Assigning parameters to amplifier channels, for example Sensors, Supply, Filters, Tare, Zero, Scal/Lin.points, Unit, Limit and Peak Values, Remote contacts, Analog outputs, Calibration, Shunt, etc. .
- Saving the settings for a channel or the complete device (all channels) to a file on a PC.
- Retrieving the settings for a channel or the complete device (all channels) from a file on your PC.
- Saving the settings for a channel to one of the internal EEPROM parameter sets on the amplifier.
- Retrieving the settings for a channel from one of the internal EEPROM parameter sets on the amplifier.
- Managing channel and device settings on your PC using names in plain text from a structured list.
- Managing the *CP32 hard disk subsystem*: file management, transferring measured data to local computers, starting up *"Stand alone"* measurements.
- Simple data acquisition and graphic display of measured values using the *MultiScope.*
- Mult-channel sample display for all channels.
- Channel overview table.

2.1 Starting up and exiting MGC*plus* Assistant

This is how you start up MGC*plus* Assistant without catman V2.x.

In the Windows start menu, click on ***MGCplus Assistant*** (**Start-up** → **Program** → **MGCplus Assistant** → **MGCplus Assistant**). The start-up window appears, see Chapter 2.2 *"The MGC*plus *Assistant start-up window"*.

☞ If you have installed MGC*plus* Assistant together with catman V2.x, find MGC*plus* Assistant in the catman V2.x program group (e. g. **Start-up → Program → catman V2.x → MGCplus Assistant**).

This is how you start up MGC*plus* Assistant under catman V2.x

1. Open catman V2.x: **Start-up → Program → catman V2.x → catman**.
2. Select I/O channels from the Worksheet menu: **Worksheet → I/O Channels**. This opens the ***Set up I/O channels*** window.
3. Select MGC*plus* from the <Type> List box and allocate a name in the <Name> box.
4. Select the interface and click on <Add...>. The device appears in a list alongside. You can find more information in 3.4 *"Interface configuration.*
5. Select your MGC*plus* from the list and click on <Set up device.> to open MGC*plus* Assistant.
6. The MGC*plus* Assistant start-up window is displayed, see chapter 2.2 *"The MGC*plus *Assistant start-up window"*.

Exiting MGC*plus* Assistant

You exit MGC*plus* Assistant using the command **Exit setup** from the **System** menu in MGC*plus* Assistant or with the <Close window> button in the ***MGC*plus *Assistant*** window*.*

MGC*plus* Assistant asks you if you want to save any changes made to your settings.

2.2 The MGC*plus* Assistant start-up window

After you have started up MGC*plus* Assistant, the MGC*plus* Assistant start-up window opens with the ***Menu bar***, ***System Configuration*** window and the ***Setup Manager*** window.

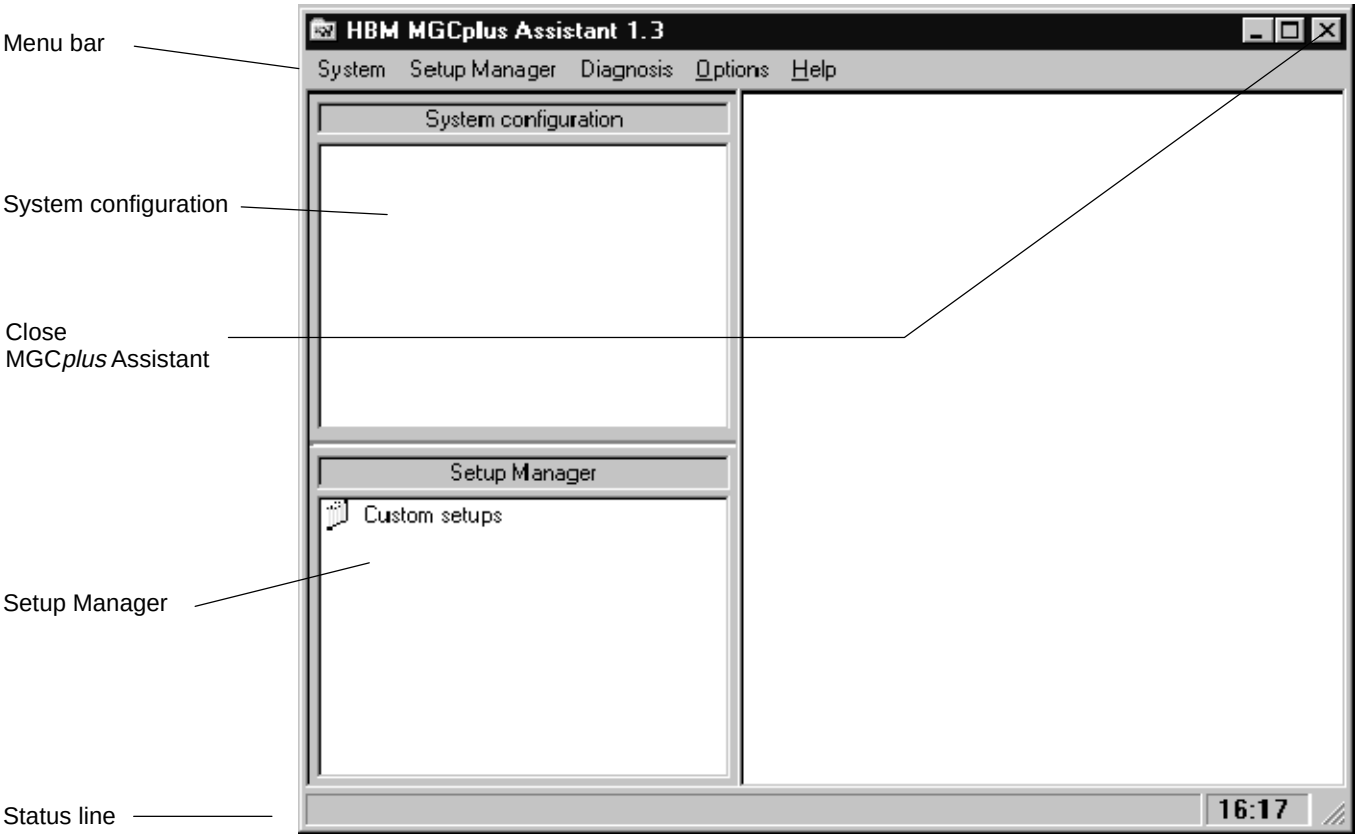
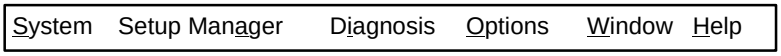
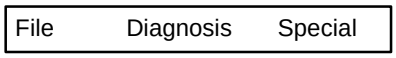


Fig. 2. MGC*plus* Assistant start-up window

Menu bar



The menu bar contains various menus for configuring and managing your MGC*plus* Assistant program and the MGC*plus* amplifier systems which are connected. The **Window** menu entry is only displayed if you have configured a device. If you open the terminal (**Diagnosis** → **Terminal**)), the menu bar changes to



For more information, please read Chapter 3.1. *"The menu bar".*

After you have configured a device, a *Symbol bar* with additional functions is displayed under the menu bar.

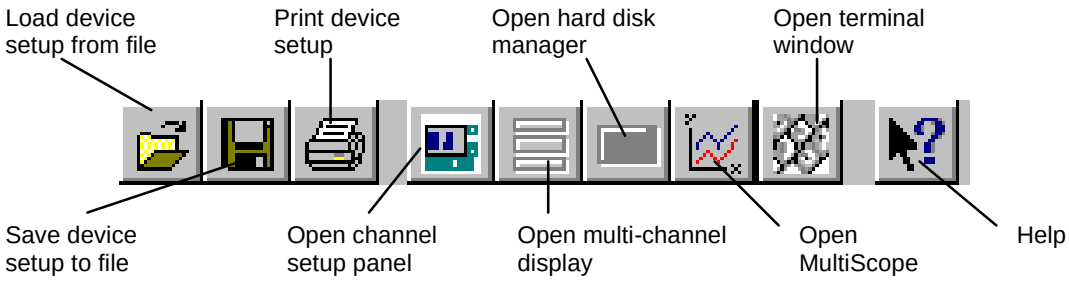


Fig. 3. MGC*plus* Assistant symbol bar

Important: Open and select the various menus, pull-down menus and functions as you would normally in Windows, using either the mouse or the keyboard.

System configuration window

The ***System configuration*** window displays all the devices opened, along with their amplifier channels and any further subsystems. For instance, it makes it a simple matter to name the devices you are using, modify settings and transfer them to other devices. For more information, please read Chapter 3.2 *"System configuration window".*

Setup Manager window

In the ***Setup Manager*** window, your setup files are managed in the form of plain text names. You have the option of saving device system configurations to setup files or transferring them to a device. In addition, you can create users and applications for different groups. In the Chapter 3.3 *"Setup Manager window"*, you will find more information about the wide range of options offered by the Setup Manager.

2.3 The MGC*plus* Assistant online help

If you have any queries about various functions when working with MGC*plus* Assistant, the extensive *Online help* offers you further assistance. The *Online help* consists of two parts, the Guide and the Interactive Help, which can be called up from the program user interface for each object.

The Guide sets out the basic principles of working with the program and assigning parameters to devices. Also dealt with are special chapters, such as, for example, the *"CP32 hard disk subsystem"* or data acquisition with the *"MultiScope"*. However, the MGC*plus* system itself is not described in detail. You will find explanations about this in the MGC*plus* documentation *"MGC*plus User manual" and *"MGC*plus – *Operation with computer or terminal"*. Open the Guide by clicking on **Help menu** → **Guide** in the menu bar.

To call up the *Interactive* Help on an object in the program user interface, first click on the small  icon in the window in which the object is located or on the  icon in the symbol bar. The mouse pointer then looks like this:  . Now click on the required object, e.g. a button or a selection list. The relevant help is displayed in a pop-up window. Another click with the mouse closes the window and you switch back to normal operating mode.

2.4 Setting up a connection with the MGC*plus*

This chapter explains step-by-step how to set up a connection with the MGC*plus* universal amplifier:

1. Connect the MGC*plus* to your computer. Please select a cable (part of the standard supply for RS-232 and printer port) appropriate to the interface you are using. You can find more information about making connections in the documentation *"MGC*plus – *Operation with computer or terminal".*

☞ In order to operate the MGC*plus* via a GPIB (IEEE 488) interface, you also need the following additional components: PCMCIA-GPIB card for the CP32 PCMCIA slot (National Instruments) and at the computer end a GPIB plug-in board (type GPIB PCII-A, GPIB-AT/TNT, GPIB-AT/TNT-PnP, GPIB-PCI from National Instruments), which do not form part of the standard supply with the basic version of the device. In addition, the driver software for the board at the computer end (included with the board) must be installed correctly on your computer. If necessary, you can obtain both of the required GPIB boards from HBM.

☞ In order to operate the MGC*plus* via an Ethernet interface, you also need the following additional components: Ethernet card for the CP32 communication processor and the computer, which do not form part of the standard supply with the basic version of the device. In addition, the driver software for the card at the computer end (included with the card) must be installed correctly on your computer.

2. Start up MGC*plus* Assistant. (**Start-up** → **Program** → **MGC*plus* Assistant** → **MGCplus Assistant**)
3. Switch on the MGC*plus* .
4. In the **System** menu, select the option **Open device...**.
5. In the dialogue box that follows – ***Open new device*** – select the port through which you have connected the device to your computer (e.g. LPT1) and set up your system configuration accordingly. You can find detailed explanations of interface parameters in the documentation *"MGC*plus – *Operation with computer or terminal"* and instructions on the interface cards used.

☞ If a GPIB (IEEE 488) interface is being used, the **address** of the device must also be specified. By default, the GPIB address of the PCMCIA board on the device is automatically set to 4 by the *CP32 control unit*.

⚠ **Important**: You can only change this address via the *AB22A* operator unit on the MGC*plus*.

6. Click on <Open>. The program now accepts the connection to the device and reads the amplifier parameters for all channels. This procedure can take a few seconds, depending on the number of channels. The status line at the bottom edge of the screen tells you how the procedure is progressing.
7. Once device initialisation has been completed, all the components in the MGC*plus* system *(amplifier channels*, *CP32 hard disk sub-system, system configuration list*) are displayed in the ***System Configuration*** window. Here the names of the channels consist of the type designation (e.g. ML55) and the symbolic name (comment) stored in the amplifier. This can be modified by editing the channel texts.
8. 4-7 for each additional device you want to connect to your computer.
9. By double clicking on the amplifier channel, you open the ***Setup panel*** for this channel. Here you can configure channel parameters and read off current values, see Chapter 4 *"The setup panel"*

☞ **Note for users of the HBM catman software package:**

If you have called up MGC*plus* Assistant from catman worksheet ***Set up I/O channels***, (**Worksheet → I/O channels**), steps 4–7 are not required. In this case, device initialisation is carried out automatically and you can only edit the device selected in catman – in this instance, you are unable to open other devices.

☞ **Note to users of the Ethernet interface:**

If you use an Ethernet interface, you can find more information in the chapter 3.4.1 "Ethernet interface".

3 MGC*plus* Assistant menus and functions

The functions and menus of MGC*plus* Assistant are described in the following chapter.

3.1 The Menu bar

The MGC*plus* Assistant menu bar consists of different menus which enable you not only to configure your MGC*plus* and handle setup files for devices and channels, but also to carry out and analyse measurements. The menu bar is adapted to suit the appropriate editing window.

By clicking with the lefthand mouse-button on the relevant menu, you open a pull-down menu with further options and functions. To select a function, click on it with the lefthand mouse-button.

3.1.1 System menu

Open device...

Open device... sets up the link to an MGC*plus*. The ***Open new device*** dialogue box appears for setting up the interface, see Chapter 2.4 *"Setting up a connection with the MGC*plus*"* and Chapter 3.4 *"Configuring interfaces"*.

Print channel setup from file...

With **Print channel setup from file...** you have the option of printing out any stored channel settings (*.MLX). Select the file from the selection dialogue.

Firmware download...

This function opens the ***Firmware Download*** Assistant and is only available if no device is open. The Assistant enables you to update MGC*plus*-internal software components, e. g. CP32, AB22 and amplifier firmware. Follow the Assistant instructions.

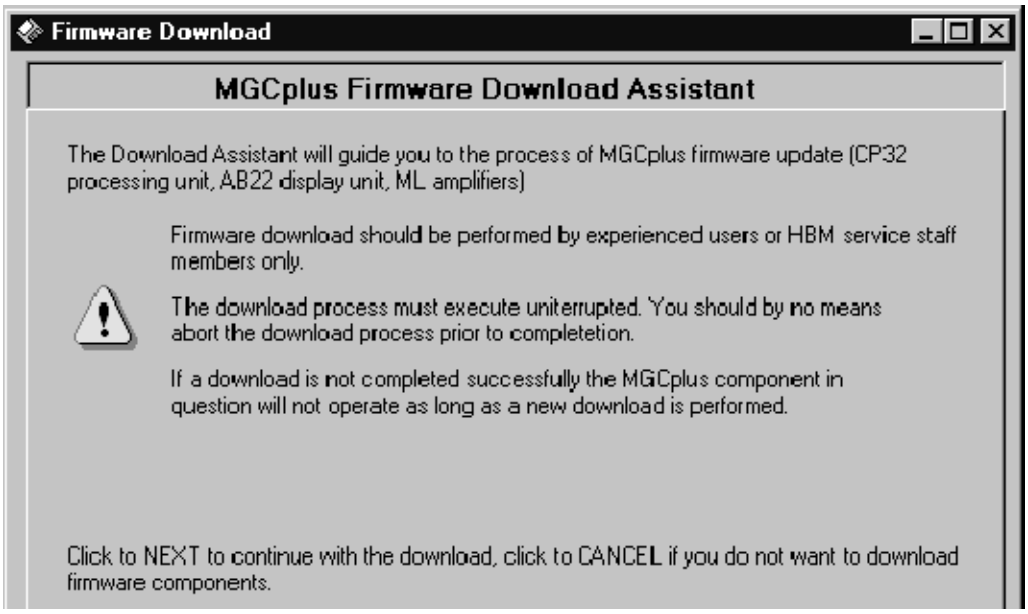


Fig. 4. Firmware Download Assistant

Important: The ***Firmware Download*** Assistant is executed by an external program which is **not** part of the supply of the MGC*plus* Assistant. You can download the current Firmware version of your MGC*plus* unit at any time from the INTERNET, see Chapter 1.5 *"Technical support".*

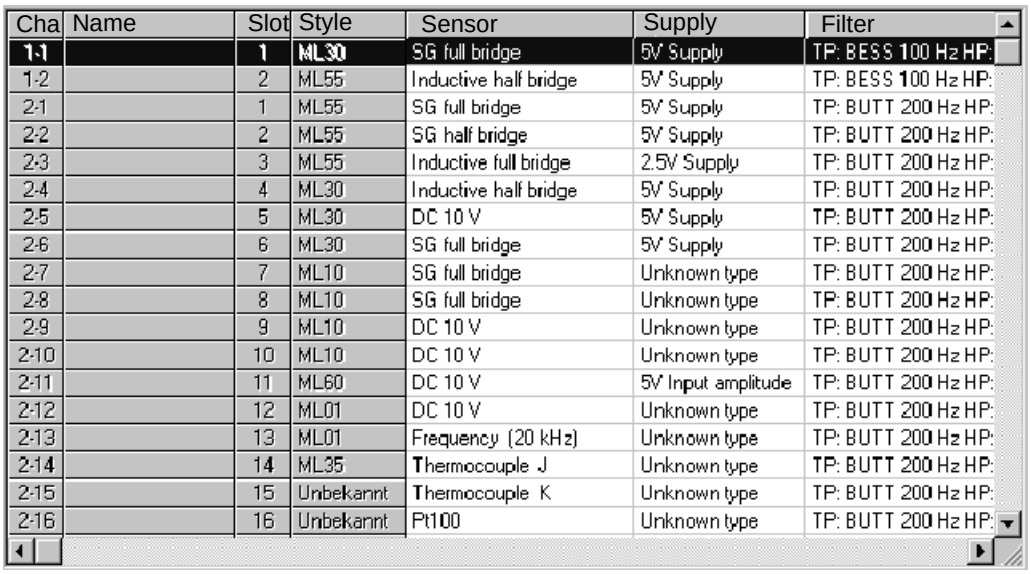
Important: **Downloading firmware for MGC*plus* system components should only be undertaken by experienced users or HBM service personnel.**

Exit setup

Use **Exit setup** to exit MGC*plus* Assistant. If you started up MGC*plus* Assistant from catman V2.x, you will be returned to catman V2.x.

Channel statistics...

Click on **Channel statistics...** and you get a list of channels in table form, along with the most important parameters and settings at a glance:



Cha	Name	Slot	Style	Sensor	Supply	Filter
1-1		1	ML30	SG full bridge	5V Supply	TP: BESS 100 Hz HP:
1-2		2	ML55	Inductive half bridge	5V Supply	TP: BESS 100 Hz HP:
2-1		1	ML55	SG full bridge	5V Supply	TP: BUTT 200 Hz HP:
2-2		2	ML55	SG half bridge	5V Supply	TP: BUTT 200 Hz HP:
2-3		3	ML55	Inductive full bridge	2.5V Supply	TP: BUTT 200 Hz HP:
2-4		4	ML30	Inductive half bridge	5V Supply	TP: BUTT 200 Hz HP:
2-5		5	ML30	DC 10 V	5V Supply	TP: BUTT 200 Hz HP:
2-6		6	ML30	SG full bridge	5V Supply	TP: BUTT 200 Hz HP:
2-7		7	ML10	SG full bridge	Unknown type	TP: BUTT 200 Hz HP:
2-8		8	ML10	SG full bridge	Unknown type	TP: BUTT 200 Hz HP:
2-9		9	ML10	DC 10 V	Unknown type	TP: BUTT 200 Hz HP:
2-10		10	ML10	DC 10 V	Unknown type	TP: BUTT 200 Hz HP:
2-11		11	ML60	DC 10 V	5V Input amplitude	TP: BUTT 200 Hz HP:
2-12		12	ML01	DC 10 V	Unknown type	TP: BUTT 200 Hz HP:
2-13		13	ML01	Frequency (20 kHz)	Unknown type	TP: BUTT 200 Hz HP:
2-14		14	ML35	Thermocouple J	Unknown type	TP: BUTT 200 Hz HP:
2-15		15	Unbekannt	Thermocouple K	Unknown type	TP: BUTT 200 Hz HP:
2-16		16	Unbekannt	Pt100	Unknown type	TP: BUTT 200 Hz HP:

Fig. 5. Channel overview

You are free to modify the column width of the table required – to do this, press the lefthand mouse-button over the column dividing line of the header and the mouse pointer changes into a double-arrow pointer; then drag the column to the required width.

Each channel is uniquely described by a consecutive number, made up of the device number and the consecutive channel number for this device. So for example, the number 1-4 in the <Channel> column describes the fourth channel in the first device opened. The consecutive channel number is not to be confused with the number of the plug-in unit in the MGC*plus* housing – this is displayed in the column labelled <Slot>.

The overview table shows the most frequently needed setup parameters. By double-clicking on a channel in the overview or by calling the pop-up auxiliary menu with the righthand mouse-button over the table, the setup panel for the channel can be opened. In contrast to the setup panel, which is opened from the system configuration list, this panel is a ”modal” window – i.e. you must first close this panel before you can continue working with the rest of the Assistant components.

Not all parameters are displayed in the overview. The following are not displayed:

- Limit settings
- Peak value store settings
- Remote contact assignment
- Zero reference
- AB22 Settings
- Printer settings

You must call this and set it up via the setup panel from the ***System configuration*** window.

Important: As long as the overview table is open, no setup panels can be opened from the ***System configuration*** window. When you call the overview, all open panels are automatically closed.

You can print out the overview table by clicking on the printer symbol . The printout corresponds to the section of the table that can be seen on the screen – because of the complexity of some channel settings, it is usually not possible to fit a complete channel row into one printed line. By moving the table section with the horizontal scroll bar, the table can, however, be printed out ”in stages”. As the columns are always shown with channel number and name, clear allocation of rows is ensured on every page.

AB22 Configuration

You can use the function **Save to file...** in order to save the current settings of the AB22 / AB32 operating panel to a file (*.ABX) on the PC. You can use **Load from file...** to transfer a stored AB22 / AB32 operating panel setting to the MGC*plus*.

Load device setup..., Save device setup...

MGC*plus* Assistant gives you the option of saving device settings to any file with **Save device setup...** (file extension *.MGC) and recalling them at any time with **Load device setup...** → **from file....**. If you use the option **Factory settings (all channels)**, the factory settings are selected. You can find more information on transferring device setups in Chapter 3.3 *“The setup manager”*.

CP32 Auto Setup...

With **CP32 Auto Setup...** you can save the MGC*plus* amplifier settings for an automatic configuration on startup and a freeform recording comment list for the MGC*plus* in special files to the CP32 hard disk or a local hard disk. You can download the saved files from the local hard disk to the CP32 hard disk. For more information see the chapter 5.3 "*CP32 Auto Setup Configuration"*.

Save channel setup, Load channel setup

The functions **Save channel setup and Load channel setup** let you save or recall the settings for individual channels. They let you choose between a file, parameter sets 1-8 of the built-in EEPROM in the MGC*plus* plug-in unit or an external EEPROM (XM001 module only). If you use the option **Factory settings**, the channel's factory settings are selected. You can find more information on transferring channel setups in Chapter 3.3 *"The setup manager"*.

Save channel setup as text..., Print channel setup,

With **Print channel setup,** you can print out the settings for the selected channel. A print preview is displayed which can be printed on the default printer by clicking on <Print>.

Save channel setup as text... is currently not supported. In this respect, please read the information in the file RELEASE.DOC in your MGC*plus* Assistant directory.

3.1.2 Setup Manager menu

Accept device setup file..., Accept channel setup file...

If you use **Accept device setup file...** and **Accept channel setup file...**, you can accept any device setup files (*.MGC) or channel setup files (*.MLX) into your setup manager. You can select setup files via the ***Find*** window and save them to the current setup manager folder.

Create new group

MGC*plus* Assistant provides you with a well-designed facility for managing various channel and device setup files for different applications and/or users.

With **Create new group**, you can create an appropriate folder in the ***Setup Manager*** window. You can label this as you wish by overwriting the *"New group"* text. The newly created folder is added to the group currently selected.

Remove setup , Remove group

These two functions remove the selected group or setup file from your setup manager.

Info...

If a setup file is selected, click on the **Info...** function and a directory path and the relevant file name will be displayed. The plain text from the ***Setup manager*** window is displayed in the description box. This can be changed as required.

3.1.3 Diagnosis menu

MGC*plus* Assistant provides the experienced user with a series of diagnostic tools which you can access via the **Diagnosis** menu.

Terminal

This function opens the MGC*plus* terminal, see Chapter 3.5 *"Terminal"*.

Log communications

In the event of communication problems or if the MGCplus Assistant is apparently not behaving correctly, the communication with the device can be recorded in a log file COMLOG.LOG. You will find this log file in your MGCplus Assistant or catman V2.x directory. If you have selected the option **Log communications**, a ✓ is displayed in the pulldown menu.

Log Low Level communication

This option extends the scope of the communication log and should be used for diagnostic purposes only. If you have selected the option **Log Low Level communication**, a ✓ is displayed in the pulldown menu.

Display communications log

With **Display communications log**, you can examine the communications log file COMLOG.LOG in the terminal window. You can save the COMLOG.LOG file at any time with **File → Save as terminal script...** and view it later with any text editor, print it out or distribute it further.

To edit the COMLOG.LOG with the editor, click on **File → Save as terminal script...** and mark the file. Next, click with the righthand mouse-button on the marked file and select **Open** from the pull-down menu. This opens the ***Editor*** window.

In the pull-down menu, you will also find the functions to print and send the COMLOG.LOG file.

Delete log file

⚠ **Important**: As the log file is written by appending sequentially, we recommend occasionally deleting the COMLOG.LOG file with the menu option **Diagnosis → Delete log file**.

Display error log

If an error occurs, MGC*plus* Assistant automatically compiles an error log in the file ERRLOG.LOG, along with a description of the error which has arisen. With **Display error log**, the ERRLOG.LOG file is displayed in the ***Terminal*** window. You have the option of editing the ERRLOG.LOG with an editor - in this respect please see *"Display communications log"* above in this section.

Link test

With **Link test**, the digital high speed link is tested in the MGC*plus*. The test result is displayed in a text window. If errors occur, you should switch the MGC*plus* off and change the relevant plug-in amplifier.

The function is only available with CP32.

Reactivate signal timer

When working with the MGC*plus*, there are situations in which a timeout may occur, e.g. no measured value on the setup panel. It is then possible for you to start up the signal timer with **Activate signal timer**.

3.1.4 Options menu

By using the **Options** menu from the main menu bar you access a dialogue box in which user-specific default settings can be defined. These are saved permanently and will be applied to all future program sessions. On the ***Display*** tab you will find the following options:

Update signal display every [xx] ms

If this option is enabled, the measured value display will be refreshed every **xx** ms in the setup panel. If the option is deactivated there will be no display of measured values.

Display commands executed

If this option is active, communications between the device and the MGC*plus* are logged in the status bar of the MGC*plus* Assistant.

Keep same AB22 display (channel, signal)

If this option is active, on changing channels in MGC*plus* Assistant (either by clicking in the ***System configuration*** window or by activating its ***Setup panel****) the AB22A* display unit of the MGC*plus* is switched to the same channel. In the same way, if the signal is changed in the ***Setup panel*** of a channel (e.g. *NET signal*), the signal shown on the *AB22A* display unit is also moved. If the option is deactivated, the *AB22A* display unit is disconnected from the MGC*plus* Assistant displays.

Select colour for signal display

Use <...> to open a ***Select colour*** menu, and use this to specify the foreground and background colours of the measured values displayed in the ***Setup panel***.

Scope

On the ***Scope*** tab, you can set up the **Numerical format for data export**, e.g. 0.0, 0.00, 0.000. When you click on the option **Confirm deletion of Scope curves**, you are asked to confirm that you really want to delete Scope curves in the *"MultiScope"*.

3.1.5 Window menu

Define the arrangement of individual editing windows on the monitor in the **Window** menu. You can choose between **Arrange horizontally**, **Arrange vertically** and **Cascade**.

This function is only available if at least one device is open.

3.1.6 Help menu

With **Guide** from the **Help** menu you open the online help of MGC*plus* Assistant and with **Program info** you get information on the program version in use.

3.2 System configuration window

A list in the ***System configuration*** window displays all the devices opened, along with their amplifier channels and any further subsystems (e.g. *CP32-PCMCIA hard disk*)), which can be easily edited and set up using pull-down menus or drag & drop functions. Here the names of the channels consist of the type designation (e.g. ML55) and the comments stored in the amplifier. You can edit or modify this by clicking twice on the channel text.

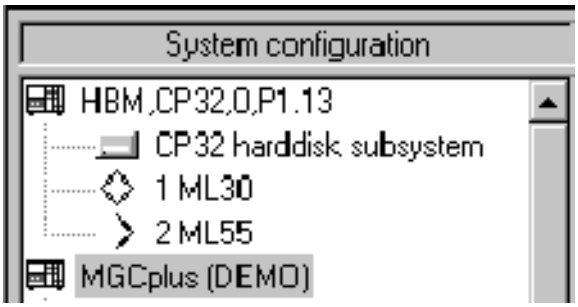


Fig. 6. System configuration window

Important: If you start up MGC*plus* Assistant from catman V2.x, this list will include the device already selected in catman V2.x. If you are just operating the program for yourself, you can open up to 16 devices via the **System → Open device...** menu item.

☞ If you click with the righthand mouse-button on a symbol in the ***System configuration*** window, a pull-down menu opens with the functions for editing devices and channels. Select functions by clicking on them individually with the lefthand mouse-button.

☞ You can find out more about system configuration in Chapter 3.1.1 *"System menu"*.

3.2.1 Device settings

By clicking with the righthand mouse-button on the device symbol , you open the pull-down menu for setting up the device you have selected.

The function **Factory settings all channels** sets all channels selected on the MGC*plus* to the default factory settings. If you use **Info...**, you receive information on the communications processor (firmware version, PCMCIA hard disk, PCMCIA GPIB board, PCMCIA Ethernet adapter).

When you use **Multi-channel display**, this opens the ***Multi-channel display*** giving you an overview of all the channels on the device. You can find more information on this subject in Chapter 6 *"Multi-channel display"*. You can also open the *Multi-channel display* by double-clicking on the device or clicking the symbol in the symbol bar.

Using the symbols in the symbol bar, you can save or retrieve the setup files for a selected device. To do this, either select the relevant file in the dialogue box or enter its name.

3.2.2 Channel settings

By clicking with the righthand mouse-button on a channel, you open a pull-down menu with the following functions:

Setup panel...

When you use **Setup panel...**, the ***Setup panel*** window opens. See Chapter 4 *"The Setup panel".* It is easier just to double-click on the channel symbol or on the symbol in the symbol bar.

Copy setup, Accept setup

To copy the settings for a channel, select them in the ***System configuration*** window, open the pull-down menu and click on **Copy setup**. Then select the channel to which you want to transfer the settings and click on **Accept setup from...** in the pull-down menu. The *Source* of the copy is displayed in the pull-down menu.

☞ It is easier if you drag the *source channel* to the *target channel* in the ***system configuration*** window with the lefthand mouse-button held down.

Important: You can only transfer settings to channels of the same type as the source channel. This is displayed with a diskette symbol. Otherwise an 'invalid' symbol is displayed, as well as a window with a note.

Save setup to file..., Load setup from file...

To save channel settings to a file, click on **Save setup to file...** in the pull-down menu. This opens a window in which you can specify the directory and file name. By default, channel setup files are saved in the sub-directory *Instr* with the extension .MLX.

To transfer channel settings from a file to a channel, select them and click on **Load setup from file...**. This opens a window from which you can select the appropriate file. If the parameter assignments between channel and file do not match, you receive an error message.

Save setup to EEPROM, Load setup from EEPROM

With these two functions, you can save channel settings to the channel EEPROM or load them from it. You have a choice of 8 parameter sets.

Load factory settings

This function resets the channel to the factory settings.

Print setup, Info...

You can print out the current channel settings using **Print settings** or the  symbol in the symbol bar. After selecting the function, a preview opens which you can output to the default printer using the <Print> option.

You may use **Info...** to enter comments in the ***Channel information*** window which is displayed. You are also given information about the firmware version and serial number of the channel.

3.2.3 AB22 / AB32 operator panel

You can use the function **Save configuration to file...** in order to save the current settings of the AB22 / AB32 operating panel to a file (*.ABX) on the PC. You can use **Load configuration from file...** to transfer a stored AB22 / AB32 operating panel setting to the MGC*plus*.

3.2.4 CP32 hard disk sub-system

This function is only available in connection with a PCMCIA-Hard-Disk connected to the slot 0 of CP32 in MGC*plus*. You can save, copy and print the settings of the *"CP32 hard disk subsystem"*. Double-clicking on the *"CP32 hard disk subsystem"* opens the ***Setup panel*** for the CP32 hard disk and data acquisition. Information on these functions can be found in Chapter 3.2.2 *"Channel settings"* and Chapter 5 *" CP32 hard disk subsystem".*

If you use **Info...**, you receive information on the communications processor (firmware version, PCMCIA hard disk, PCMCIA GPIB board, PCMCIA Ethernet adapter).

3.3 The setup manager

The ***Setup Manager*** allows you to manage setup files (device, operator panel or channel settings) in the form of a structured list of plain text descriptions. You can set up groups individually as required for devices, channels, applications or users.

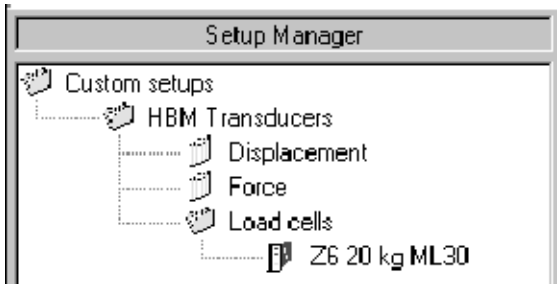


Fig. 7. Setup window

A device setup file includes the setup for all the channels on a device. This list is saved in the file SETUP.INI. If you want to make your setups accessible to another user, you can copy this file, as well as all the associated setup files to his/her computer in the MGC*plus* Assistant or catman V2.x program directory.

A click with the righthand mouse-button in the ***Setup Manager*** window or on the **Setup Manager** menu opens a pop-up menu with different functions.

You have the option of retrieving any MGC*plus* device, operator panel or channel setup files (*.MGC, *.MLX, *.ABX) into existing groups (**Adddevice setup file...**, **Add channel setup file...**) or to create **new groups** (**Create new group**).

The edited entries are deleted with **Remove setup** and **Remove group** . But the setup files are still held in the directory. Use the function **Info...** to find out about the directory holding the selected file. Plain text entries can be modified any time simply by editing with the lefthand mouse-button (click twice one after another on group or setup names; *do not* double-click). You can find more information on these functions in Chapter 3.1.2 *"Setup manager menu".*

This is how you retrieve device setup files into the Setup Manager:

1. Select the device in the ***System configuration*** window.
2. Save the channel settings to a file: **System → Save device setup → to file...** from the **System** menu or symbol in the symbol bar. Specify the name and directory.
3. Select a group or the uppermost level of the Setup Manager marked *"User setup"*. The individual hierarchy levels of the Setup Manager can be opened or closed by double-clicking on the list entry symbols.
4. Select the **Add device setup file...** from the **Setup manager** menu or the pop-up menu. In the following file selection dialogue, select the file saved in Step 2. This file is first of all retrieved into the Manager under the name *New device setup* and marked with the symbol
5. By clicking twice on the name (not double-clicking), you can edit it and give it a name.

How to add operating panel settings in Setup Manager:

1. Hold down the lefthand mouse–button and drag the symbol from the ***System configuration*** window to a group in ***Setup Manager***. This opens the ***Save current AB22 configuration to file*** dialogue.
2. Specify the name and directory.
3. Click on <Save>**.** The symbol is displayed.
4. Specify a plain text name for the set-up file in the text box which is now displayed.

This is how you accept channel settings into the setup manager:

1. Select the channel in the ***System configuration*** window or click on its ***Setup panel*** if it is opened.
2. Save the channel settings to a file: **System → Save channel setup → to file...** from the system menu, **Save setup to file...** from the pull-down menu or symbol in the ***Setup panel***. Specify the name and directory.
3. Select a group or the uppermost level of the Setup Manager marked *"Custom setup"*. The individual hierarchy levels of the Setup Manager can be opened or closed by double-clicking on the list entry symbols.
4. Select the **Accept channel setup file...** option from the **Setup manager** menu or pop-up menu. In the following file selection dialogue, select the file saved in Step 2. This file is first of all retrieved into the Manager under the name *New channel setup* and marked with the symbol
5. By clicking twice on the name (not double-clicking), you can edit it and give it a name.

☞ If you hold down the lefthand mouse-button and drag a channel setup file from the ***System configuration*** window to a group in the ***Setup Manager***, points 1 - 4 are greatly simplified.

This is how you transfer channel, operator panel and device setups to a device:

1. Select the device, operator panel or channel setup file in the ***Setup Manager*** window.
2. Hold down the lefthand mouse-button and drag the device, operator panel or channel setup file from the ***Setup Manager*** to a device or a channel in the ***System configuration*** window to save the setup.

The mouse pointer takes on the form of a diskette or an 'invalid' symbol. If you allocate a setup file to incorrect device or channel configurations, this is indicated in a pop-up window.

3.4 Interface configuration

If you set up a new device with **System → Open device...**, the ***Open new device*** window opens first of all. Here you need to specify the interface to which the device is connected. The following interfaces are available:

- COM1 / COM2
- COM1 (RS485) / COM2 (RS485)
- LPT1 / LPT2
- GPIB (IEEE 488) optional, see Chapter 1.3 *"System requirements"*
- Ethernet TCP/IP optional
- Offline

Depending on the interface selected, you can set up the appropriate interface parameters on the various tabs: RS232, enhanced RS232, GPIB (IEEE 488), printer port, TCP/IP, Offline. For more information on setting up interfaces, please see the documentation *"MGC*plus – *Operation with computer or terminal"* and the instructions on the interface cards used.

☞ If a GPIB (IEEE 488) interface is being used, the **address** of the device must also be specified. As standard, the GPIB address of the PCMCIA board on the device is automatically set to 4 by the *CP32 control unit*.

3.4.1 Ethernet interface

If using an Ethernet interface, you have to specify the IP address of the corresponding MGC*plus* device in the ***Open New Device*** dialogue. You may obtain the IP address over the MGC*plus* AB22A / AB32 operating panel (System → Interface → Ethernet...).

The IP address must also be entered in the "**HOSTS**" file on your PC. You will find the "**HOSTS**" file in the Windows System directory, for instance

...\Windows NT\System 32\Drivers\etc\hosts for Windows NT™

or

...\Windows 95\hosts for Windows 95™.

Open the "**HOSTS**" file with a text editor and enter the IP address on a line.

If connecting several devices to the PC over the Ethernet interface, you **must** specify the IP address of each individual device on a separate line.

3.4.2 Offline mode

In offline mode you can configure an MGC*plus* without a device, save the settings and transfer them to a device later. You can use <Save...> and <Load...> to manage various device configurations on your PC.

This is how to configure an MGC*plus* in offline mode:

1. Click with the righthand mouse-button on a <Channel> in the ***Define plug-in amplifier boards box.*** *This* opens a pop-up list of the available amplifier types.
2. Click on the required amplifier. The selected amplifier is displayed in the <Amplifier> column.
3. Click with the righthand mouse-Button in the <Connection board> column to change it. This opens a pop-up list with the available types. If your connection board is not listed, use the <Standard> setting.
4. Click on the required communications processor.
5. Click on <Save...> in order to save the configuration.
6. If you click on <Open>, your configuration is displayed in the ***System configuration*** window.
7. Configure the channels, see chapter 4 *" The setup panel"*.
8. Store the device settings in your ***Setup Manager,*** see chapter 3.3 *"Setup Manager"*.
9. Exit MGC*plus* Assistant.

   You can also set up and store data recording runs offline with the CP32 communications processor; see chapter 5 *"CP32 hard disk subsystem".*

Settings that you have stored in this way can be called later with Setup Manager and transferred to the MGC*plus* devices.

3.5 Terminal

The terminal window provides you with commands to facilitate direct communication with the device. You can find the commands in your MGC*plus* documentation *"MGC*plus – *Operation with computer or terminal"*. Open the window with the aid of the menu **Diagnosis → Terminal** or use the  symbol in the symbol bar.

Important: Please note that the device must be opened beforehand (**System → Open device...**)! You can also open the interface with **Open port** from the **Special** menu in the *Terminal menu bar*. The device is selected again with **Close port**.

The **Special** menu contains the start command for transmitting **Send <CTRL-R>** and the command for stopping the transmission of **Send <DCL>**.

To send a command to the device, type it into your terminal window and then press RETURN. MGC*plus* Assistant will send the command to the device and display the incoming response in the terminal window. If you use the option **Save as terminal script...** from the **File** menu in the *Terminal menu bar* , the contents of the ***Terminal*** window can be saved to a text file. You can open and edit script files with **Load terminal script...** in the ***Terminal*** window.

The incoming response is in general expected to be an ASCII text. If required, binary files can be read in as well – they are displayed in hexcode. To do this, before sending the command activate the **Read binary** option and specify the number of characters to be read. Deactivate the option again to receive ASCII text responses.

Important: Direct command entry assumes precise knowledge of the effects of MGC*plus* Interpreter commands and is primarily considered to be the domain of service engineers. Incorrect commands can lead to unpredictable behaviour by the MGC*plus* Assistant program.

By using **View communications log file** and **View error log** in the **Diagnosis** menu from the *Terminal menu bar* , you can call the communications file COMLOG.LOG and the error file ERRLOG.LOG. **Delete communications log file** deletes the communications log.

4 The setup panel

4.1 Assigning parameters to amplifiers

In order to assign parameters to an amplifier channel, use the ***setup panel*** for the channel concerned. Open the ***setup panel*** by double-clicking on the channel in the *system configuration list* or select a channel and click on the symbol in the symbol bar.

Display section

Parameter settings

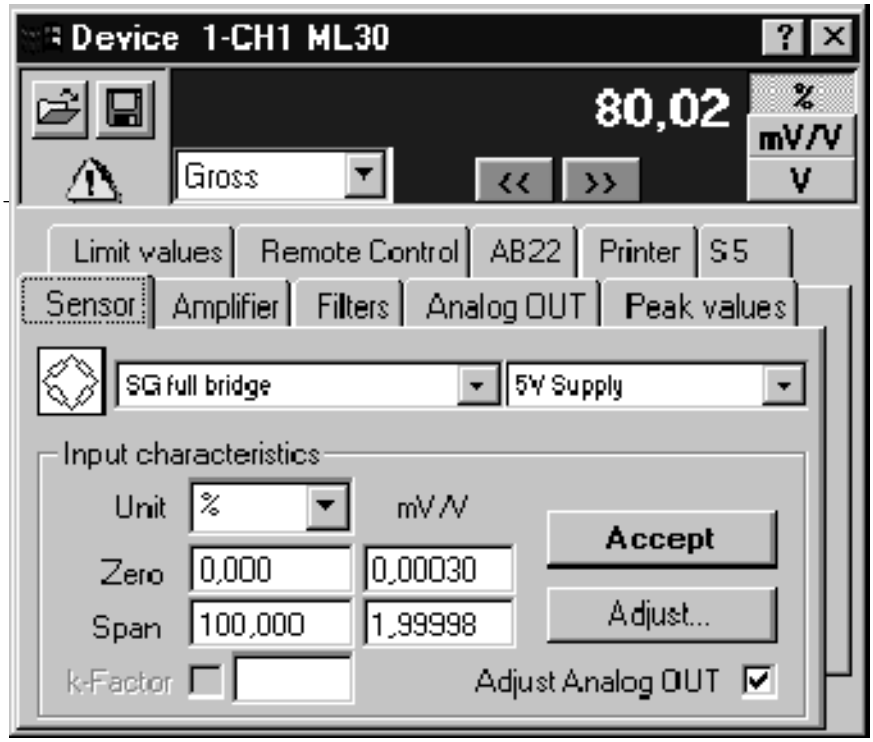


Fig.8. Setup panel dialogue box

The ***setup panel*** includes the same functions as are available on the displays and AB22A operating panel of the MGC*plus* .

To call up a function group in the ***setup panel*** , simply click on the tab of the appropriate index card.

4.1.1 Display section

Channel settings

A click on the  symbol in the ***setup panel*** opens a pull-down menu for loading the settings for the selected channel. You can specify a file, one of the 8 EEPROM parameter sets or the external EEPROM as a source. If you select <Factory settings>, the channel is reset to these and a **W** appears in the display section.

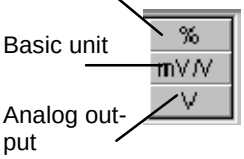
If you load the setup from an EEPROM parameter set, the number of the EEPROM parameter set is displayed (**1-8**) in the display section. If this is changed, a appears.

Clicking on the  symbol opens a pull-down menu to save the current settings for the channel selected. You can specify a file, one of the 8 EEPROM parameter sets or the external EEPROM as a target.

☞ The external EEPROM is only available if the XM001 module is connected to the channel.

Signal display

Displayed permanently in this window is the current signal from the amplifier. You can use the  buttons to set the number of decimal places from 0 to 6.



The unit that is displayed can be switched between the physical unit of the user (e.g. kg), the basic physical unit of the sensor (e.g. mV/V) and the voltage at the analog output (e.g. V). Use the buttons on the right next to the signal display to switch the units displayed. To do this, click on the appropriate button.

Important: Both the unit displayed and the number of decimal places will be transferred to the device display. In the case of data acquisition with catman V2.x – MGC*plus*, the signal is always transferred in the current display units. Later on it is not possible to change the display unit with catman V2.x without calling MGC*plus* Assistent.

Basic amplifier unit of measurement

The possible basic units depend on the amplifier type, connection board and operating mode selected (tab **Sensor** → <Unit>) – please see *"MGC*plus *Operating Manual".*

Physical unit

The physical unit is basically any text you care to select, which is used for labelling the signal transformed by the *input characteristics*, see Chapter 4.2 *"Input and output characteristics"*. Just allocating a unit does not result in an input characteristic, i.e. conversion specification (exception: temperature units °F, K).

After an amplifier reset (*Factory setting*) the physical unit is always "%".

☞ The temperature operating modes in the case of ML01 (thermocouples) and ML35 (Pt10/100/1000) represent a special case: in these modes, you are not free to allocate a physical unit. The only 3 units available to you are "°C", "°F" (Fahrenheit) and "K" (Kelvin). If you select "°F" or "K", the input characteristic of the amplifier will be modified automatically. In these operating modes, any input of characteristic data by the user is blocked.

☞ You are not able to select the basic unit of the amplifier (except for °C) as a physical unit.

Analog output unit

Switching to this unit always shows or transfers the signal applied at the analog output Vo1 in volts. Select this signal with the lowest button in the unit bar.

Signal check

An amplifier overload (e.g. if the transducer is connected incorrectly or not connected at all) is indicated by a OV symbol, and a calibration error is indicated by a CAL symbol. As long as the overload persists, the value displayed will remain "stuck" at its overload value.

Select signal

Using the menu in the display section, you can specify which signal you want to display, e. g. <Gross>, <Net>, <SP1>, <SP2>, <ZERO> and <CAL>. You will find more information about display options in the *"MGC*plus*"Operating Manual*.

4.1.2 Sensor

The tab ***Sensor*** corresponds in functional terms to the transducer Setup menu of the AB22A. Here, the amplifier channel is matched to the transducer that is connected and the connection board (APxx) being used.

Depending on the type of transducer (sensor) connected, you should select an appropriate ***operating mode*** for the amplifier and, in the case of passive transducers, an ***excitation voltage*** (e. g. <SG full bridge>, <5V excitation>). You can select the operating mode from the list with plain text descriptions or click on the appropriate icon. After selecting an operating mode, you usually have to adjust the *input characteristic*.

Typical operating modes are, for example:

- Force transducers or load cells (e. g. Z6 from HBM): SG full bridge, 5V, input characteristic 0 =0mV/V, nominal value (span) = 2mV/V
- Displacement transducer: inductive half bridge, 2.5V, input characteristics 0 = 0mV/V, nominal value (span) = 80mV/V

You can find more information on adapting input characteristics in Chapter 4.2 *"Input and output characteristics"*.

☞ MGC*plus* Assistant only offers permissible operating modes for the particular combination of amplifier type (ML xx) and connection board (AP xx). If the operating mode selected does not match the transducer connected, this usually leads to a calibration error CAL or an overload .

Depending on the operating mode, further parameters can be necessary under certain circumstances which are given in a second list, just to the right of the selection of operating modes.

- SG and inductive transducer: excitation voltage
- Frequency, pulse(ML60): input amplitude
- Charge amplifier (AP08): discharge times
- Resistance measurements and Pt100 (ML35): 3–wire/4–wire
- Piezoresistive transducer (AP18): 2–20 mA (fixed!)

Important: A change of operating mode can possibly change other parameters, e.g. input characteristics, units, filter. When you use <Adapt analog output>, the analog output is automatically matched to the changes made to the input characteristics.

You can find more information on operating modes in the *"MGC*plus *Operating Manual".*

k-Factor

When measuring with strain gauges, the K-factor used for converting change of resistance in the strain can be specified. For this purpose, activate the option <k-factor> and enter the required value in the text box alongside. Please note that if the k-factor is activated, the basic unit automatically changes to μm/m. If a physical unit other than μm/m is to be used, the input characteristics must be adapted.

4.1.3 Amplifier

The MGC*plus* has two value buffers, the contents of which are subtracted from the digitalised input signal. The first buffer is called ***Zero offset*** (also "Zero"), and the second is called ***Tare***.

By clicking on the <[>0<]> or <[>T<]> buttons, the current input signal is retrieved into the particular buffer. Alternatively the MGC*plus* buffers can also accept manual value entries followed by <Set>. After input of the values for zero offset and tare, the value zero should appear in the NET display.

⚠ **Important**: The effect of taring is only visible in the signals marked NET. GROSS signals always show the value without taking the tare buffer into account, but they **do** take into account the zero offset buffer.

A zero offset is normally only carried out for displaying in the user unit and for displaying the analog output. If you enable the <Abs> option, the native unit, such as mV/V, °C or µm/m, is also set to zero.

With some measurements it makes sense to specify a fixed value for the display of zero point of the transducer, e.g. in the case of displacement measurements. This reference value can be specified in the **Reference** input box and transferred to the device with <Set>. In the event of zeroing or taring, the MGC*plus* automatically makes the appropriate buffer value corrections. A change to the zero reference value automatically changes the characteristic curve of the analog output, so that 0V at the analog output corresponds to the set zero reference value if zeroing **and** taring are carried out.

☞ When values have been changed but not yet adopted, they have a **red** background.

So that you can check the function of a channel, it is possible to apply reference signals to the channel input and to select <Input> from the list box.

If you set the <Autocalibration> option, the channel is automatically calibrated approx. every 5 minutes. During the <Autocalibration> cycle (2–3s) the channel does not measure!You can also perform a manual calibration with the <CAL> button. In the case of <Shunt calibration>, the shunt resistor(s) of the XM001 or AP14 are activated.

You can find out more about amplifier set-up in the *"MGC*plus *Operating Manual".*

4.1.4 Filters

You configure the digital filters of the channel with the help of the ***Filter*** tab. You can select either <Butterworth> or <Bessel>. Depending on the filter characteristics different frequencies are available. Only permitted values are displayed.

The low-pass filter is always active, a high-pass filter can be switched in if required. Both filters are effective on the analog outputs before signal output, i.e. the analog input signal is not passed on to the analog outputs unfiltered. The signal flow is :

Input signal → Gain → Digital filter → Tare/Zero → CP32 digital output and analog output

You can find out more about amplifier set-up in the *"MGC*plus *Operating Manual".*

4.1.5 Analog OUT

You can set up the output characteristics of a channel on the ***Analog OUT*** tab. Use <Setup...> to access the ***Setup output characteristics...*** window for setting up the characteristics. You can find out more about the functions of the individual input boxes in Chapter 4.2 *“Input and output characteristics”.*

In list boxes **Source V1** and **Source V2** you can specify which signal is to be output at the connectors. The appropriate connector assignments are shown in the operational diagrams.

4.1.6 Peak values

Each amplifier channel has two individually configurable peak value buffers (ST1 and ST2) which, if required, can be shown in the display section instead of the gross or net signal, or can be used as a source for analog outputs and limit value monitoring.

Each peak value buffer can display either the maximum gross/net signal or minimum gross/net signal. If required, an envelope curve function  with optional decay time (in sec.) can be activated. With <Clear buffer> , the contents of the peak value buffer are deleted.

Important: Decay times must be entered **before** the envelope curve function is activated. Both peak value buffers are updated at 38.4 kHz.

Both peak value buffers can be combined to a third *”combined peak value”* signal source, see also chapter 4.1.11.

Important: The combined peak value S5 is **no**t output by the system’s fast digital interface (Link). Therefore it cannot be captured using catman V2.x. It is available exclusively for purposes internal to the device, e.g. *AB22A* display and limit value monitoring.

These peak value buffers can also be handled externally using remote control contacts, see also Chapter 4.1.8 *“Remote control contacts”*:

- Freeze peak values : Remote function <PV Run/Hold>, status HOLD
- Enable peak value: Remote function <PV Run/Hold>, status RUN
- Peak value monitoring not operating, i.e. peak value=measured value: remote function <PV Peak/Current>, status CURRENT
- Switch on peak value monitoring: Remote function <PV Peak/Current>, status PEAK
- Start/stop mean–value calculation (INT line)

You can find more information on peak values in the *“MGC*plus *Operating Manual”.*

4.1.7 Limit values

Each amplifier channel has 4 limit value switches which, depending on the signal, change the status of a digital output at the linked connection board. Limit value switches can be parameterised individually.

For a channel to take part in limit value monitoring, it must be switched to <Active>. Enter the limit value in the <Level> box.

Specify with this button whether a limit value switch is to modify the status of a signalling line in the event of falling below or exceeding the level.

- If triggered by falling below the level, the limit value switch is only turned off again if the signal is ***over*** the level by the amount specified in the <Hysteresis> box.
- In the event of triggering by exceeding the level, switching off takes place if the signal is ***under*** the level by the amount specified in the <Hysteresis> box.

Level and hysteresis values are always interpreted as physical units.

In addition to the direction of level monitoring, a feature known as *circuit logic* can be specified:

Signalling line moves to HIGH (basic setting) if the limit value switch is triggered.

Signalling line moves to LOW if the limit value switch is triggered.

The output levels assigned to the internal high and low states depend on the connection plate (APxx) of the channel.

Select the signal used for level monitoring from the list marked <Source>: <Gross>, <Net>, <ST1>, <ST2> or combined peak value <S5>.

Important: Level monitoring is carried out at 1.2kHz with a low-pass filter >= 5Hz, i.e. the reaction time of the switch is about 1 ms.

In addition to level monitoring, each channel can also monitor one logical combination of several states and assign these to just ***one*** limit value switch. The status of the three remaining limit value switches and the status of the 4 lowest remote contacts may be used as input for the combination; see Chapter 4.1.8 *“Remote control contacts”*. To access the dialogue for defining combinations, use the <Combination...>button.

In the ***Set up limit switch combination*** window, you can apply up to 4 input signals with logic operators to one limit value switch. Select the input signals and limit switches from a list box.

Such a monitoring session could look like this, for example:

Limit switch No. 4 should trigger precisely when limit switch No.1 triggers, limit switch No. 3 has not triggered and remote control contact No. 2 is set. The dialogue for this purpose should be configured as follows:

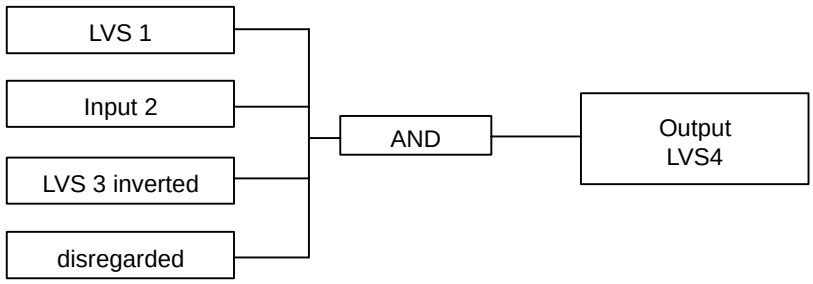


Fig.9. Example of a limit value combination

Important: Please note that it is not possible to combine inputs with different logic operators. The selected operator always combines ***all*** inputs.

The following operators are available: <AND> (AND), <OR> (inclusive OR), <EXOR> (exclusive OR, i.e. *"either or"*),), <NAND> (negative AND), <NOR> (negative, inclusive OR) and <NEXOR> (negative, exclusive OR).

Response delay for limit value switches

In the set-up menu ***Response delay for limit switches*** you can specify **a common** delay period for particular limit value switches. The selected limit value switches will not respond until the signal to be monitored has exceeded the limit value by longer than the specified time. To do this activate the appropriate limit switch and specify the time in the input box <Delay time>.

You will find more information about limit values in the *"MGCplus Operating Manual".*

4.1.8 Remote control contacts

Each amplifier channel has 8 *"remote control contacts"*, which enable the user to control certain actions on the MGC*plus* externally with the aid of digital connections (such as, for example PLC I/Os, switches, etc.). Remote contacts are logical states which can be transferred to the amplifier channel via the relevant inputs on the connection board.

In order for the states of the *"remote contacts"* to be taken into account, the <Enable remote contacts> option must be activated. To assign a specific function to a contact, click on the appropriate contact and select the required function using the list box. The following remote functions are currently available:

- <No function>: the status of the line remains disregarded,
- <Autocal ON/OFF>: cyclic autocalibration is switched on or off,
- <Tare>: Taring is carried out,
- <PV1 Peak/Current value>: peak value buffer 1 records peak values or the current measuring signal (equivalent of clearing the buffer),

- <PV1 Run/Hold>:

  RUN: peak value buffer 1 is updated,

  HOLD: the buffer is frozen,

- <PV2 Peak/Current value>: peak value buffer 2 records peak values or the current measuring signal (equivalent of clearing the buffer),
- <PV2 Run/Hold>:

  RUN: peak value buffer 2 is updated,

  HOLD: the buffer is frozen,

- <Zeroing>: the current measuring signal is reset to zero,
- <Switch on shunt>: the shunt, if present, is switched on,
- <Print>: Selection circuit for print task. Only channels with active print inputs are taken into account in the event of a print task, see also Chapter 4.1.10 *“Printer”*,
- <Calibration signal>: the input is switched to the internal calibration source, calibration is carried out,
- <Zero signal>: the input is set to the internal zero signal,
- <Operating sign change>: the polarity is switched (only in the case of ML60),
- <Parameter set Bit 1>, <Parameter set Bit 2>, <Parameter set Bit 3>: a change on these lines leads to the loading of the EEPROM parameter set specified by the bit combination for the three lines.

Warning: As the pin assignment of remote contacts is itself a component of a parameter set, the newly retrieved parameter set may have a different pin assignment. Under certain circumstances it is no longer possible to load back the original parameter set via the remote contacts.

- <Remote Local>: activates/deactivates the remote contacts.
- <Mean-value calculation>: Activate the maen-value calculation of signal **S5.**

Important: Assigning parameters to remote contacts requires a basic knowledge of the MGC*plus* system. Detailed information on the switching of remote contacts can be found in the documentation, *“MGC*plus *Operating Manual”.*

4.1.9 ABxx

On the *“ABxx”* tab, use <Display format:> and <Digit step> to set up the appearance of the display.

4.1.10 Printer

With the *“Print”* tab, you specify which printer interface <Port> of the CP32 you want to use and which signal is to be printed out. Use the <Printer test> button to check the printer connection between MGC*plus* and the chosen printer.

4.1.11 S5

In addition to the standard signals (gross, net, peak value buffer 1, peak value buffer 2), MGC*plus* has one more signal – **S5**. This signal is a calculatory signal and is only available at the analog output or in the AB22A display units of the MGC*plus* amplifier plug–in unit. In the drop-down list box you can define which calculation is to be performed:

- none
- peak-to-peak: peak value buffer 1 – peak value buffer 2 (PV1–PV2)
- average value of PV1 and PV2
- average value of gross signal
- average value of net signal

The average value is formed over the current measurement.You can start/stop the calculation of the signal with the AB22 / AB32 control unit, using the F–key, or with the INT remote control contact . In order for the signal to be present at the analog output, select <S5 connected> as the source in the tab ***Analog OUT***.

4.2 Input and output characteristics

The input signal is converted in the amplifier from the so-called *"basic unit"* (e.g. mV/V) into a physical user unit (e.g. kg) by means of a straight-line relationship. We refer to this relationship as an *input characteristic*. In addition, the signal which has been converted into a physical unit, filtered and tared, is then converted using a second straight-line relationship, the *output characteristic*, into a voltage value (V) for the analog output. Both characteristics are closely interrelated – in particular, the ±10V range of the analog output specifies the signal span that can be plotted.

Important: To set the input characteristics of the ML85/1 amplifier please read the chapter 8.1.1 *"Input characteristics adaptation"*. In the case of this amplifier, the analog output cannot be specified by separate characteristics.

Input characteristics

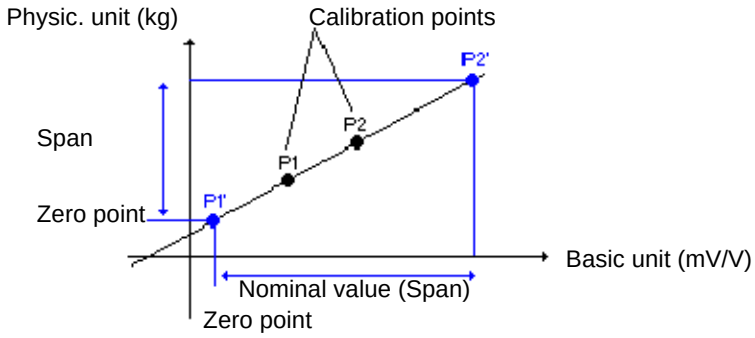


Fig.10. Input characteristics

The input characteristics (straight line) can be defined in MGC*plus* Assistant in two different ways.

1. Input of <Zero point> (e.g. 0kg = 0mV/V) and < Span>, (e.g. 10kg = 2.4mV/V) on ***Sensor*** tab of the ***Setup panel***. You select the <Unit> from the list box. Use <Accept> to transfer the settings to the selected channel on the MGC*plus*. Until this is done, they are displayed in red.

   In the above figure this corresponds to points P1' and P2', where *P2' = Zero point + span*.

You frequently find just the nominal value (span) printed out at a sensor (e. g. 100kg = 2mV/V). In this case, enter the zero point as 0.0 and then balance the signal with no load on the sensor.

2. However, if you only know the values for the zero point and span in physical units, but not the associated values in the basic unit (or not precisely enough), MGC*plus* Assistant offers you the option of defining the straight lines with the help of two *calibration points* P1 and P2; <Calibrate...> on the ***Sensor*** tab of the ***setup panel***.

   The physical values for zero point and nominal value (span) are retained and the associated values are automatically calculated in the basic unit using the newly defined straight lines. The following example explains the background to this method:

Example: A load cell has a zero point of 0 kg and a nominal value of 100 kg. The associated values of the basic unit are not known, therefore the characteristic curve should be measured. However, only a test weight of 10 kg is available for the measurement. To do this, proceed as follows:

1. Input the physical values of the zero point and nominal value (0 and 100 kg)
2. Roughly define the characteristic from any values for zero point and span in the basic unit (e. g. 0 and 2mV/V)
3. <Accept>
4. <Calibrate... >. The ***Set up characteristics*** window is displayed.
5. Enter a value of 0 in the kg box of the calibration point 1 and unload balance.
6. Accept the current signal by clicking on <Measure> in the mV/V box for calibration point 1.
7. Enter a value of 10 in the kg box of calibration point 2 and load the balance with the test weight.
8. Accept the current signal by clicking on <Measure> in the mV/V box for calibration point 2.
9. <OK... >.

Important: Please note here that the calibration procedure only redefines the straight line – it does not modify the physical values of the zero point and nominal value. However, their values are recalculated in the basic unit using the new straight lines and displayed in the setup panel.

☞ You can also enter calibration points manually or use the mouse in the graph window. Simply click on the cross-hair pointer (white lines) and drag it to the required position. If the cross is not visible, you can scale the graph window using the scaling function. To do this, enter the <Min.> and <Max.> values and click on <Scale>.

⚠ **Important**: MGC*plus* Assistant gives you the option of entering any values for the zero point and span. You should be careful here not to exceed the input ranges of the amplifier and transducer. You will find information on amplifier and transducer input ranges in the documentation *"MGC*plus *Operating Manual"* or *"Technical data – MGC*plus*"* amplifier system.

⚠ **Warning:** **If you exceed the limit values of the transducer or amplifier, you risk damaging them.**

Output characteristics

If the input characteristics are modified, then under certain circumstances you must also redefine the output characteristics for the analog output. To guarantee that the range defined by the zero point and span can be measured, the analog output must be matched to this range:

0V = Zero point and 10V = zero point + span

With the option <Adapt analog output> on the ***Sensor*** tab of the ***Setup panel*** MGC*plus* Assistant achieves this automatically when an input characteristic is entered again. It is, however, entirely possible to map only a section of the span at the analog output.

In this case, though, under some circumstances the range defined by the zero point and span can no longer be measured in full – an overload symbol is displayed if the measuring signal would result in an analog output value >10 V.

⚠ **Important**: Specification of a new zero reference value (see Chapter 4.1.3 *"Amplifier"*) leads to automatic adaptation of the analog output characteristics:

0V = zero reference and

10V = current span – last zero reference + new zero reference

Example: If, for example, the current setup of the output characteristic 0V = 0mm and 10V = 100mm, and if a new zero reference value of 1000 is specified (target value for zeroing), then the output characteristic is modified to 0V = 1000mm and 10V = 1100mm.

5 CP32 hard disk subsystem

As an option, the CP32 can be equipped with a PCMCIA hard disk (type III in slot 0) on which measured values can be saved in *"stand-alone"* operation.

MGC*plus* Assistant lists any hard disks that may be present in the *System configuration list* for the device. Double-clicking on this entry opens the hard disk management window ***CP32 hard disk subsystem device ...***.

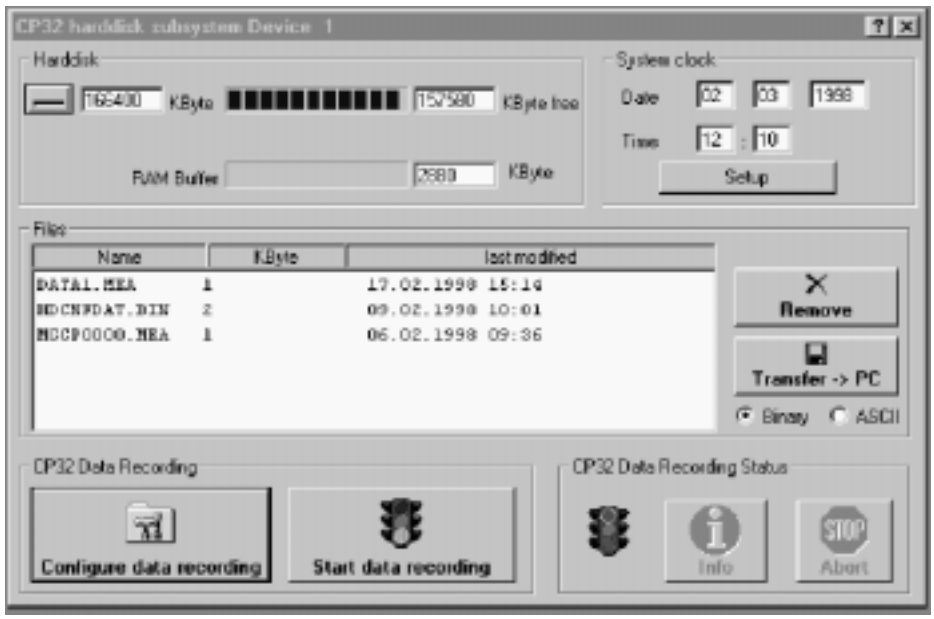


Fig. 11. The setup panel for the *CP32 hard disk subsystem* only appears if there is a hard disk present in the MGC*plus*.

In the ***hard disk*** setup section you are given information about the size and free space on the hard disk selected and about the size of the RAM buffer.

In the ***system time*** set-up range you can set the date and time. Use <Setup> to copy the settings to MGC*plus*.

The ***files*** setup section lets you manage files on the CP32 hard disk. You can copy files to the hard disk on your computer, or delete them.

In the setup sections ***CP32 data recording*** and ***Status of CP32 data recording***, you can set up and monitor a *"stand-alone"* measurement session.

5.1 Managing files on the CP32

A file selected from the list is deleted with the <Remove> key after confirmation, or copied to the local hard disk on your computer with the <Transfer –> CP32> key.

You can copy in binary format <Binary> (can be read by HBM catman with its data import function) or in ASCII format (e.g. into MS Excel). Please note that copying in ASCII format can take several minutes, depending on the size of the file. Binary files can be read by HBM catman inclusive of header information (e.g. unit, channel no.). ASCII copies contain only the measurement data and the time information (Channel = column, columns separated by TAB, time is last column).

☞ You can find more information on the file format in the Online Help in Section *"The CP32 file format".*

⚠ **Important**: The format (number of decimal places) of the ASCII output is set up in accordance with the format set for data export in the *"MultiScope"* (**Options menu)**).

5.2 "Stand-alone" measurement (data recording without computer)

With MGC*plus* Assistant, you have the option of configuring several data recording programs and saving them on the internal hard disk of the MGC*plus* device (up to 16 data recording programs) or on the local hard disk of your computer. Data recording programs stored in the MGC*plus* can be started up at any time later without a computer.

5.2.1 Set up data recording program

To set up a data recording program, click on the <Configure data recording> button. This opens the ***Configure CP32 Harddisk Recording*** dialogue.

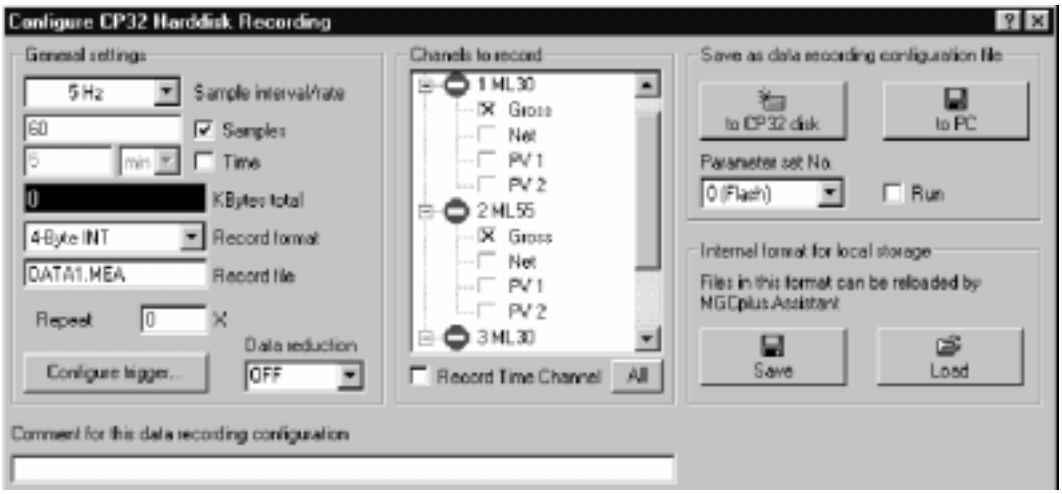


Fig. 12. “Configure CP32 data recording” dialogue

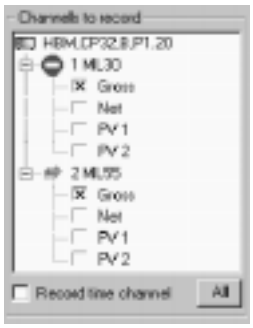
For your measurement session, specify the sample rate or a sampling interval for slow recording in the <Sampling interval / Sample rate> box, and the number of values to be measured per channel in the <No. of samples> box. Alternatively, you can also preset the duration of the measurement in the <Time> box (s, min, h, d). To do this, enter a value in the entry box and choose an appropriate unit of time from the list box.

The recording format depends on the further processing of the values. You can select 3 different formats from the <Recording format> list box: 4 Byte INT, 2 Byte INT and 4 Byte FLOAT.

Important: HBM software packages such as MGC*plus* Assistant and catman can automatically identify all three formats and scale values accordingly. If an accuracy of 32767 parts (i.e. measuring range divided up into 32767 parts) is adequate, we recommend the <2 Byte INT> format, as it only needs half the memory space of the other two formats.

Use the option <Repeat> to specify how often the measurement is to be performed. 1x for example means that the measurement cycle is performed a total of two times.

The number of samples and the device settings are stored in the appropriate format on the CP32 hard disk under the name specified in the <Record file> field. Restarting the measurement program does not overwrite the file; instead it increments the counter in the file name (the first four letters are retained, the last four are incremented). If a text is entered in the <Comment for this data recording configuration> field, it is saved along with the other details. These are visible at top left in the MGC*plus* display when the type is ”Data acquisition”, and can also be retrieved by catman® along with the measurement data.



The measurement includes all the activated device channels in the channel list for the dialogue. Clicking on the channel in the list activates ( ) or deactivates ( ) this. The list opens after double-clicking on the device symbol . You can define which signals (<Gross>, <Net>, <PV1>, <PV2>) are measured for each channel. To display the selection list click on the symbol. If required, an additional time channel can also be recorded. Use <All> to activate or deactivate all channels; the signal selection is retained. The memory size needed by the record file is shown in the display field <kBytes total>.

Important: As soon as two or more signals are recorded on one channel, the maximum sample rate is reduced to 2400Hz.

If you activate <Data reduction>, an additional data set with the file extension *.STO is created on the PCMCIA hard disk during data acquisition. This data set does not store all measured values, but only the extreme values (Min/Max) recorded at specified intervals. The interval is determined by the reduction factor in relation to the measuring rate used. You may choose the reduction factor from the pulldown list box. An example of data reduction can be found in the Operating Manual: ”Amplifier system MGC*plus* with display and control panel AB22A/AB32”.

☞ A reduced data set can only be created if only one signal is being acquired per channel.

If your system has the option ONLINE RAINFLOW CLASSIFICATION the classification parameters of a channel can also be set in this dialogue. If this option is not available the corresponding dialogue section will remain hidden!

Trigger

By using the ***Configure Trigger Machine for device ...*** setup dialogue, you can specify whether standalone measurement is to start immediately after recording starts or weather aparticular event is to start measurement. Access the setup dialogue with the <Setup trigger...> key in the ***Configure CP32 data recording*** setup dialogue.

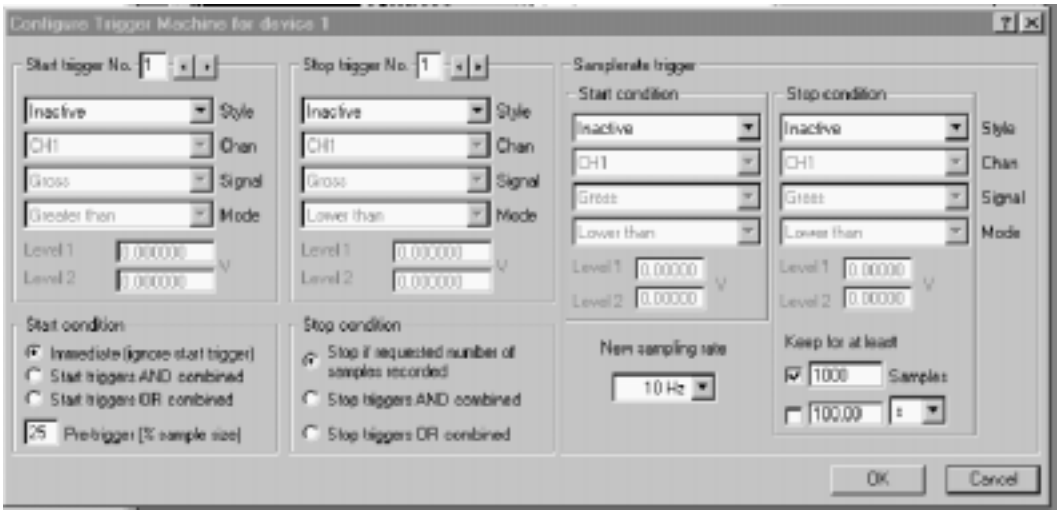


Fig. 14. Configure Trigger Machine

You can set up up to four different start and stop triggers and a *"sampling rate trigger"*. The sampling rate trigger changes the sampling rate when the trigger event occurs. To configure the start and stop conditions, select a condition with the

buttons and set this up in the list boxes below.

Type

- < inactive>
- <Measured value level> : the trigger is activated by the measuring signal when the <level value> is exceeded.
- <Measured value band> : the trigger is activated by the measuring signal when the window limit is exceeded. The window is between <lower level> and <upper level>.
- <LVS1> – <LVS4> : the trigger is activated by a limit value.
- <External> : the trigger is activated by an external signal (remote control contact 7).

Channel

- <CH1 >... : select the channel to be monitored.

Signal

- <Gross>, <Net>, <PVB1> : select the signal to be monitored. (<Measured value level> and <Measured value band> only).

Mode

- <higher> : the trigger is activated as soon as the measuring signal is greater than the <level value>.
- <lower> : the trigger is activated as soon as the measuring signal is smaller than the <level value>.
- <lower –> higher> : the trigger is activated as soon as the measuring signal exceeds the <level value>.
- <higher –> lower> : the trigger is activated as soon as the measuring signal falls below the <level value>.
- <inside> : the trigger is activated as soon as the measuring signal lies within the specified window.
- <outside> : the trigger is activated as soon as the measuring signal lies outside of the specified window.
- <outside –> inside> : the trigger is activated as soon as the measuring signal exceeds the <lower level> value or falls below the <upper level> value.
- <inside –> outside> : the trigger is activated as soon as the measuring signal falls below the <lower level> value or exceeds the <upper level> value.
- <high> : the trigger is activated as soon as the limit value switch is high.
- <low> : the trigger is activated as soon as the limit value switch is low.
- <low –> high> : the trigger is activated as soon as the limit value switch changed from low to high.
- <high –> low> : the trigger is activated as soon as the limit value switch changed from high to low.
- <New sampling rate/sampling interval>: selection of the sampling rate or sampling interval for measurement after the trigger event.
- <Retained for> : information on the duration of the measurement, either a fixed number of samples or a fixed time.

The interaction of the Trigger is set up with the following option boxes:

- <Immediate (ignore start trigger)>: no start trigger activated. Measurement will begin immediately after the start.
- <Start triggers AND linked>: all active start triggers are AND linked.
- <Start triggers OR linked>: all active start triggers are OR linked.
- <Stop when desired number of measured values recorded>: measurement will stop when the specified number of measured values is reached or the time set has elapsed.
- <Stop triggers AND linked>: all active stop triggers are AND linked.
- <Stop triggers OR linked>: all active stop triggers are OR linked.

In the input box <Pre-trigger (% total value)> you define how many measurement samples are recorded before the trigger event. The statement relates to the input box <Number of measurement samples> in the ***Set up CP32 measurement samples*** setup dialogue.

Once the settings have been made, click on <OK>. <Cancel> takes you back to the ***Configure CP32 data recording*** setup dialogue.

5.2.2 Save and store data recording program

When you have assigned parameters to a data acquisition program, you can save them as a parameter set (1-16) on the CP32 hard disk (<to CP32 disk>) or on the PC (<to PC>).

You can assign parameters to as many as 16 consecutive data acquisition programs. To do this, select the required parameter set from the <parameter set no.> field. If you also enable the <Run> option, the data acquisition program starts as soon as the parameter set is loaded in the MGC*plus* (use F-key START_MES and specify the program no.).

☞ The name of the data acquisition parameter file on the CP32 hard disk is **hdcnfdat.bin** and it can be found in directory **MGCPDATA**. If you save the file to the local hard disk on the PC, you may give it a name of your choice. If you download this file to CP32 hard disk later, the file must be renamed. It is even easier to use the function <Transfer to CP32 >>> > in the ***CP32 Auto setup Configuration*** setup dialog box. For more information see also chapter 5.3.3 "*Downloading files to the CP32 hard disk*".

The Parsdameter set No. 0 (flash)

If you store a data acquisition program in parameter set 0, it will be loaded when the MGC*plus* is powered up. If the parameter set was saved with the <Run> option enabled, data acquisition starts at once.

Saving data recording configurations in MGC*plus* Assistant

If you should wish to change the data acquisition parameters in any way later on, they should be stored on the PC in an internal MGC*plus* Assistant format (*.MPR) using the <Save> command. You can then use the <Load> command whenever you wish in order to open them for editing.

☞ You cannot download these files directly to the CP32 hard disk in the way that you can with a data acquisition parameter file.

5.2.3 Starting “Stand-alone measurement”

In order for you to be able to carry out a “Stand-alone measurement”, the data recording program must either be stored in the CP32 control unit of the MGC*plus* or connected to a computer.

If the data recording program is stored in the CP32 control unit, call it with the AB22A / AB32 control unit, using the F-key START_MES and specify the parameter set number.

If you want to start up a data recording program with the Assistant, open the corresponding ***CP32 hard disk subsystem*** setup dialogue, set up the data recording program and confirm with <O.K.>. Next, click on the <Start data recording> to start up the program. Data recording will start at once if no triggers are set, otherwise the system will wait for the relevant trigger condition to take place.

⚠ **Important**: During continuous data acquisition, the channels are locked in the system configuration – it is impossible to assign parameters to an amplifier when in this status.

By using the <Info> key, you can open a window which gives information on the current state of data recording (number of values recorded, hard disk space, measurement time elapsed, channels activated, etc.).

☞ After data recording has started, you can exit MGC*plus* Assistant and disconnect the MGC*plus* from the computer without disturbing data acquisition on the CP32 hard disk.

⚠ **Important**: Under no circumstances must the MGC*plus* be switched off.

If MGC*plus* Assistant makes contact with a device still in recording status, all the channels in the system configuration will be locked. The recording status can be displayed with <Info>.

You can stop continuous recording at any time by using <Stop>. After this you can transfer the measurement file to the hard disk on your computer.

☞ It is, however, quite possible to carry out the transfer during continuous data acquisition without disturbing it. This feature allows, for example, unsupervised data recording over a period of days or weeks with regular interim checks on the measurement file.

5.3 CP32 Auto Setup Configuration

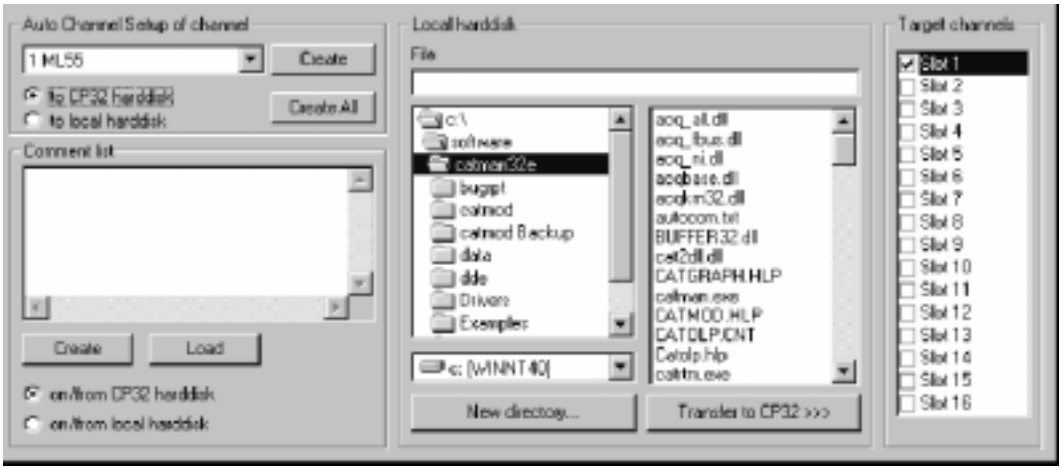


Fig. 14. CP32 Auto Setup Configuration

You can use the setup dialog box to

- download the MGC*plus* amplifier settings to the CP32 hard disk for an automatic configuration on startup.
- create and maintain a freeform recording comment list for the MGC*plus*.
- download the data acquisition parameter file from the local hard disk to the CP32 hard disk.

Access to the setup dialog box is via menu item **System -> CP32 Auto setup...** on the menu line.

5.3.1 Create amplifier settings for automatic configuration

If you are using a CP32, you can automatically configure the channels on the MGC*plus* when you start. A prerequisite for this is that the files for setting up the channels should be resident on the CP32 hard disk.

☞ The files have the name **hdcnfdat.x**, where x stands for the channel number in the MGC*plus* . They have a special format and are not to be confused with the channel setup files (*.MLX).

You may download amplifier settings to the local or CP32 hard disk either singly or in online mode for the total device.

You may activate automatic configuration of the MGC*plus* by means of menu items **System -> Save/Load -> Load...** in the MGC*plus*.

This is how to save amplifier settings to the CP32 hard disk

1. From the ***Auto Channel Setup of channel*** setup section, choose the option <to CP32 hard disk>.
2. From the pulldown list, select the MGC*plus* channel for which you wish to save the amplifier settings.
3. From the ***Target channels*** setup section, choose the channels (slot) which you wish to receive the amplifier settings of the chosen channel in the event of an automatic configuration. The default selection is the slot for the chosen channel.

4. With the lefthand mouse button, click on <Create> in the ***Auto Channel Setup of channel*** setup section in order to save the settings. Files will be named automatically, for example **hdcnfdat.1** .

☞ If you click on <Create all>, then all the amplifier settings on the MGC*plus* will be saved to the CP32 hard disk. The ***Target channels*** correspond to the channels of the amplifiers in the MGC*plus*.

This is how to save amplifier settings to the local hard disk

1. From the ***Auto Channel Setup of channel*** setup section, choose the option <to local hard disk>.
2. From the pulldown list, select the MGC*plus* channel for which you wish to save the amplifier settings.
3. In the ***Local hard disk*** setup section, enter a file name of your choosing and select a directory. You may also create a new directory.
4. With the lefthand mouse button, click on <Create> in the ***Auto Channel Setup of channel*** setup section in order to save the amplifier settings.

☞ If you save the settings to directory **MGCPDATA** on a PCMCIA hard disk using the appropriate file names (**hdcnfdat.x**, where x stands for the channel), you may use the PCMCIA hard disk to automatically configure an MGC*plus*.

5.3.2 The recording comment list

If you are using a CP32 with hard disk, you may create and edit any comment list for the data acquisition comment in the MGC*plus* . The list will be saved to the CP32 hard disk in a text file with the name **comments.txt** or to a local PC hard disk in a file with a name of your choice. You can then load the list whenever you wish in order to edit it.

This is how to edit a comment list on the CP32 hard disk

1. From the ***Comment list*** setup section, choose the option <on/from CP32 hard disk>.
2. Enter each comment onto a line of its own in the pulldown list.
3. With the lefthand mouse button, click on <Create> in the ***Comment list*** setup section in order to save the settings. The file is given the name **comments.txt**.

☞ If you click on <Load>, the current recording comment list for the MGC*plus* is loaded from the CP32 hard disk. You can then edit this and use the <Create> command to update it on the CP32 hard disk.

This is how to edit a comment list on the local hard disk

1. From the Comment list setup section, choose the option <on/from local hard disk>.
2. Enter each comment onto a line of its own in the pulldown list.
3. In the ***Local hard disk*** setup section, enter a file name of your choosing and select a directory. You may also create a new directory.
4. With the lefthand mouse button, click on <Create> in the ***Comment list*** setup section in order to save the settings.

☞ You may use the <Load> command to open and edit the recording comment list. To save the changes, click on <Create>.

5.3.3 Downloading files to the CP32 hard disk

When you are in the ***CP32 Auto setup Configuration setup*** dialog box, you can download the files for automatic amplifier configuration and a recording comment file, from a local hard disk on the computer to the CP32 hard disk on the MGC*plus*.

This is how to download amplifier settings files to the CP32

1. Select the amplifier settings file from the ***Local hard disk setup*** section.
2. From the ***Target channels*** setup section, choose the channels which you wish to accept the amplifier settings in the event of an automatic configuration.
3. Click on <Transfer to CP32>>> > in order to download the file for each channel selected.

Important: During transfer, the program checks whether the file has the right format. If it is found that the format does not match, you may download the file as a text comment file (**comments.txt**). However, be aware that if you do this, an existing recording comment list will be overwritten.

This is how to download a data acquisition parameter file to the CP32

1. Choose the file containing data acquisition parameters from the ***Local hard disk*** setup section.
2. Click on <Transfer to CP32 >>> > in order to download the file.

Important: During transfer, the program checks whether the file has the right format. However, be aware that if you do this, an existing data acquisition parameter file will be overwritten.

This is how to download a recording comment list to the CP32

1. Choose the file containing data acquisition comments from the ***Local hard disk*** setup section.
2. Click on <Transfer to CP32 >>> > in order to download the file.

Important: During transfer, the program checks whether the file has the right format. However, be aware that if you do this, an existing recording comment list will be overwritten.

6 Multi channel display

You can display up to 16 channels at once in one window with ”*Multi channel display*”. In addition to the signals, the states of limit value switches <GW 1–4> or remote control contacts <Pin 1–8> are also displayed. A red dot means limit value switch / remote control contact activated, green means deactivated.

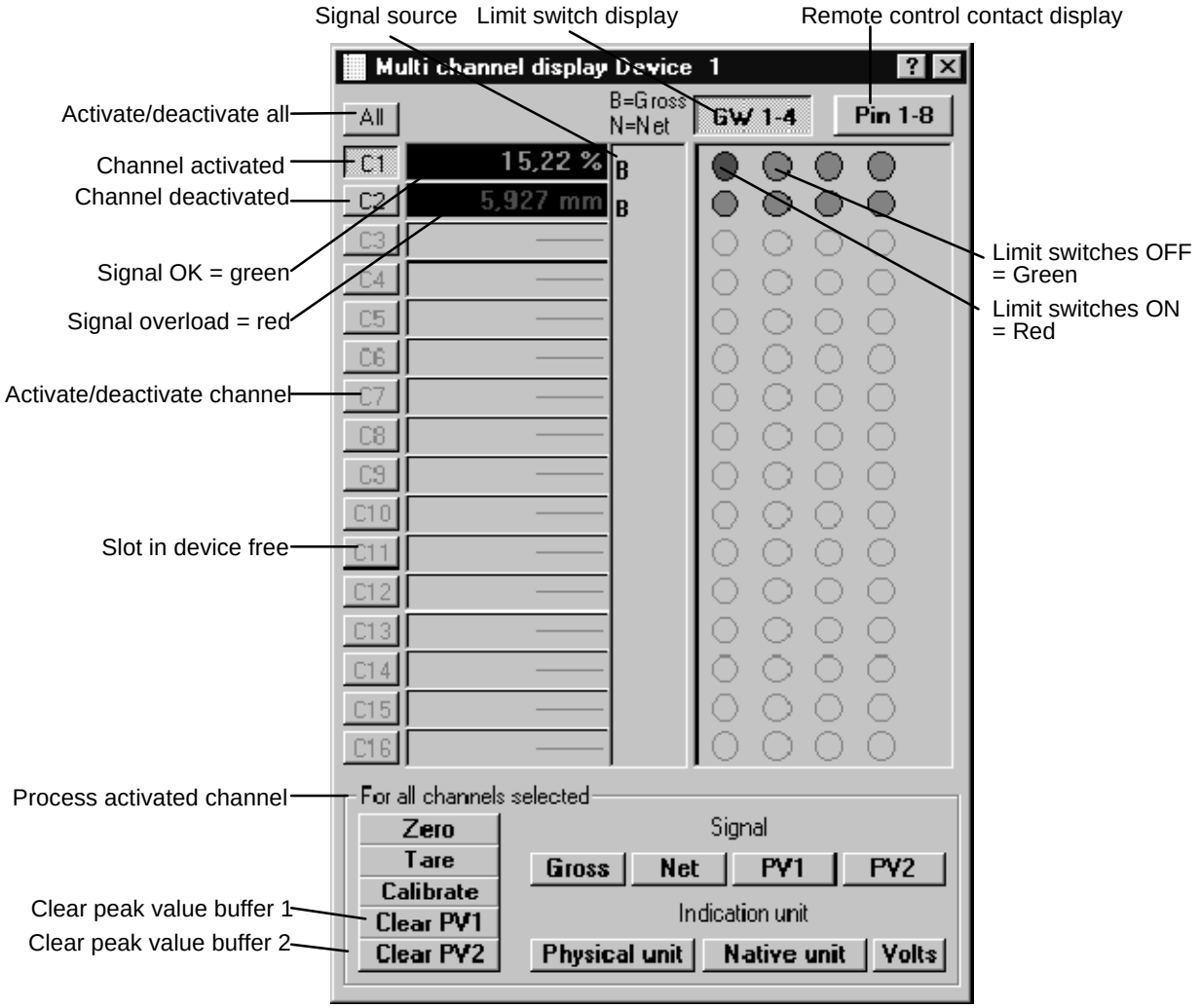


Fig. 15. Multi channel display

To display the channels, press the relevant <Cx> keys or <All> for all channels. The signal display colour shows you whether the channel is overloaded (red) or OK (green).

You can carry out various functions with the keys below, and these affect all activated channels. You can <Zero>, <Tare>, <Calibrate> the activated channels or clear the peak value buffer <CPVx>. By using the signal selection buttons, you can select the signal source and an appropriate note appears in the middle column. You can change the display units by using the display unit buttons.

7 Data acquisition with the MultiScope

MGC*plus* Assistant allows you to record and display measured values using a *virtual instrument*, the *MultiScope*. Click on the button in the symbol bar to open the MultiScope. The MultiScope consists of a graphic display, legend box, text bar, toolbar and wastepaper basket.

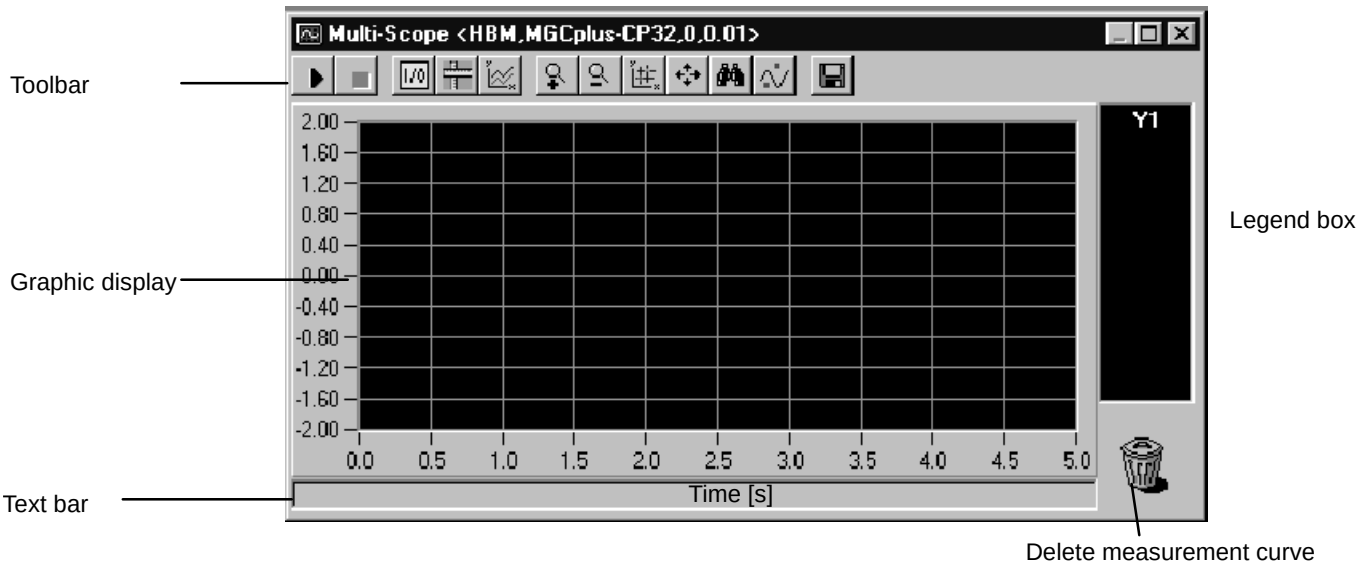


Fig. 16. MGC*plus* MultiScope

To edit and set up the MultiScope, use the symbol bar or click with the right-hand mouse button on the graphic display and select the appropriate function from the pull-down menu. To access the pull-down menu, click with the right-hand mouse button in the graph area of the MultiScope.

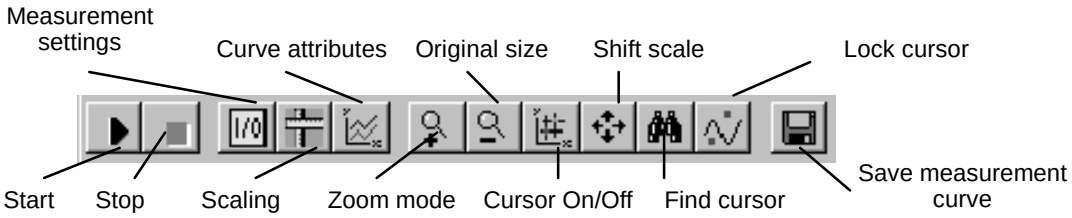


Fig. 17. MultiScope symbol bar

7.1 Defining measurement channels and display mode (Y(t) or Y(X))

To set up channels for measurement on the MultiScope, hold down the mouse-button and drag the selected channel from the *System configuration list* to the graphic display or legend box on the MultiScope. When you release the mouse-button, the channel is displayed in the legend.

☞ By means of the  symbol, the mouse pointer tells you whether you are in a valid area. If you try to make an assignment which is not valid, either a disallowing symbol or a pop-up window will appear.

To remove a measurement channel again, hold down the mouse-button and drag the channel from the legend box over to the wastepaper basket icon. You can also use the **Remove measurement curve CHx** command from the pull-down menu.

By default, the MultiScope will display the measurement channels selected over the time Y(t). In the text bar below the graph, *Time [s]* is displayed. The time increment necessary for this purpose is automatically specified by the sampling rate selected.

On the other hand, if a *measurement channel* is to provide the X values of the display Y(X), e.g. in a force over displacement graph, then hold down the mouse-button and drag this channel from the *system configuration list* to the text bar below the graph. The text *Time [s]* is replaced by the channel name and channel unit. To switch the display back to Y(t), simply drag the X channel from the text bar into the wastepaper basket.

You can use the commands **Remove measurement curve CHx** and **Insert measurement curve CHx** to remove or insert the curve you have selected.

7.2 Setting up for measurement

Click on the  icon to open the dialogue box for setting up a Scope measurement session. You can also click with the righthand mouse-button on the graph area and select **Configure Scope...** from the pull-down menu. This opens the ***Configure multiscope data aquisition*** window.

The MultiScope can either work in continuous measuring mode (plotter: <Continuous>) discrete single shot operation (<Single shot>).

Continuous measuring mode

In continuous operating mode, values are recorded and displayed after the start  of measurement until the Stop button is pressed. In Y(t) mode, the time scale is continuously extended.

☞ Please note here that you can only see as many values at a time as are specified in the <Scope buffer size> input box. Old values are lost. For this reason, the maximum amount of data you may subsequently export cannot exceed the number of values specified in the Scope buffer.

However, the buffer size can be considerably greater than the number of points visible on the graph at any one time. This is dependent on the sampling rate and scaling. The mouse can therefore be used for scrolling. Activate the scrolling function with the  button in the toolbar.

Single shot operation

In single shot operating mode (*Single shot*) the Scope records the exact number of values prespecified in the <Single shot samples> box. Data transfer takes place in single blocks, with each block also being displayed immediately it arrives. The sequence can therefore be monitored whilst measurement is in progress.

You can only work in single shot mode with a *Trigger*, i.e. you can make the start of measurement dependent on a specific signal level of a measurement channel (Input boxes <Channel> and <Level>). If required, a specific number of measured values can still be recorded before the trigger event. You can set the total number of values as a % in the <Pre-Trigger> box. If the trigger condition selected does not occur, the MultiScope automatically interrupts the measurement procedure after the time (in ms) specified in the <Timeout> box. If you want to work with a trigger, then you must select the <Immediate> option from the list of trigger conditions.

7.3 Setting up the Scope display and the curve attributes

You can use the button in the MultiScope toolbar or **Configure customs scale...** from the pull-down menu to access the dialogue for setting up scaling of the MultiScope.

This dialogue lets you define the scaling of the X and the two Y axes with <Minimum> and <Maximum>. If you select <Automatic>, the scaling will be adapted to the measuring range. If required, the second Y axis can be hidden; <Visible>.

In addition the axis division, grid, log. scaling, colour and number format can be specified: <Ticks>, <Grid>, <Log>, <Format>.Use the color selection menu if you wish to change the background color.

You can use the ***Configure plot attributes*** dialogue box to set up the measurement curves of the scope, which you access via the button in the Scope toolbar or with the command **Configure plot attributes...** in the pull-down menu.

You can set up the style of curve, the marker symbol, the line thickness and the allocation to the Y axes. Adjust the colour of the measurement curve with the righthand colour box and the colour fill of the marker symbols with the lefthand colour box.

☞ You can also modify curve attributes, even after measurement is finished.

7.4 Starting measurement

To start measurement use the button in the Scope toolbar. Use the button in the Scope toolbar if you want to end a continuous measurement session yourself. A discrete series of measurements is automatically ended after a preset number of values. When starting measurement, the scaling of the MultiScope is reset to its original state, as specified in the setup dialogue of the Scope – i.e. any zoom operations are cancelled and the X axis starts again on *Minimum*.

7.5 Postprocessing of measured values

1. Data export

By using  when measurement has finished, all values in the *Scope Buffer* can be saved to an ASCII file.

In the case of a discrete series of measurements, this means ***all*** values; however, in the case of continuous recording, it means the last *n=Scope buffer size* values. In this file the first channel (column) contains either the timestamps of the measurement (Y(t) display) or the values of the X measurement channel (Y(x) display), and this is followed by columns containing the Y measurement channels. Columns are separated by a TAB symbol. Each line ends with “<CR><LF>”.

☞ The number of decimal places in the ASCII output depends on the format selected in the **Options** → **Scope** menu.

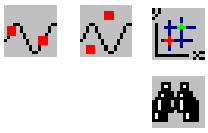
2. Zoom

You can zoom in and out of the graph which is plotted on the Scope display at will. Activate zoom mode by clicking on the  symbol in the Scope toolbar, then hold the left mouse button down and drag the *”Zoom rectangle”* around the required graph section. When you release the mouse-button, this area will expand to fill the display. Clicking once more on the zoom symbol switches zoom mode off again; clicking on the  Zoom Reset symbol restores the original scaling of the graph.

3. Shifting the scale (Panning)

Clicking on the  symbol switches the graph into ”Panning Mode”. In this mode, you can move the scaling of the graph in all directions by holding down the left mouse-button – this gives the impression that the measurement curves are being scrolled through the graphic display. This mode is particularly suitable for investigating curves, after zooming out of a small area. Click on the symbol again to end ”panning mode”.

4. Cursor analysis



Clicking on the symbol switches the graph into *"Cursor Mode"*. In this mode, you are provided with two cursors which can be moved with the mouse, and their coordinates are displayed in the text box below the graph. These cursors can be switched between *"Freely movable"* ( ) and *"Lock to data point"* ( ) by using a button in the toolbar. Clicking on the symbol (e.g. after a zoom operation) brings the cursors into the visible graph area.

7.6 The popup utility menu in MultiScope

Clicking with the righthand mouse-button on the graph area or the legend opens a utility menu containing several auxiliary functions. In addition to access to functions which can also be reached via the toolbar (e.g. **Configure custom scale...**) the menu provides some curve-related functions (**Remove plot**, **Hide plot**, **Show plot**). To select the measurement curve click the righthand mouse-button on the channel symbol in the legend field or directly on the measurement curve in the graph area. Only once a curve has been able to be correctly identified will the appropriate menu options be enabled!

8 MGC*press* press-fit controller *ML85*

The MGC*press* press-fit controller was specially developed for the supervision of fitting processes, with the aim of securing quality even during the production process.

It monitors the physical quantities of force and displacement and their relationship with each other. The two measured quantities can also be plotted as a function of time (force/time diagram or displacement/time diagram).

The MGC*plus* Assistant supports all the features of the ML85 press-fit module. It allows you to monitor the press-fit tasks online on the PC and to perform additional evaluations such as simple measurement of any curve points offline. You also have the option of saving and managing your setup on the PC.

The force/displacement diagrams are evaluated in what are known as ”tolerance windows”. The size and position of these window can be modified (see also chapter 8.2).

Detailed information on the MGC*press* press-fit controller and examples of the individual evaluation methods may be found in the user manual *“Press-fit control supervision with the MGCplus system – MGC*press, ML85*”*.

A press-fit module is made up of three amplifier plug-in units with corresponding connection boards:

Channel	**Amplifier**	**Connection board**	**Note**
force	ML85/1	AP85F	port for force transducer
displacement	ML85/2	AP85s	port for displacement transducer (in the program ML85/1)
evaluation	ML85/3	AP85	inputs and outputs for control and evaluation

You can use several press-fit modules with different amplifiers from the MGC*plus* system, e.g. the ML55 universal amplifier, in one device.

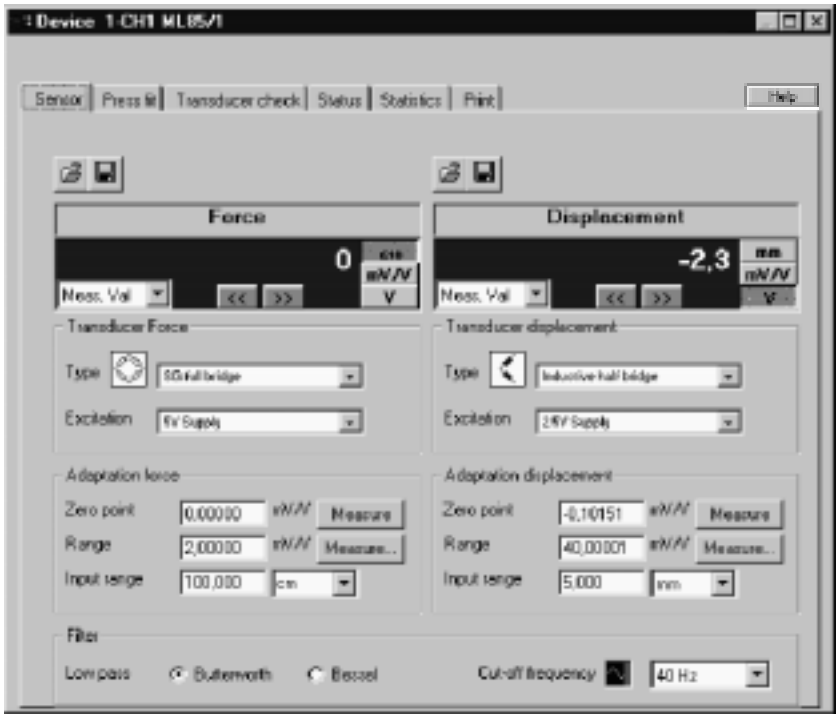
Unlike the other MGC*plus* amplifier plug-in units, with the MGC*press* the individual amplifier plug-in units for the press-fit controller are set-up in a setup window.

The setup window contains various tabs for setting up, testing and supervision of the press-fit modules and the press-fit task. The setup options in the individual tabs are explained in the following sections.

To open the setup window, double-click on an ML85/x amplifier plug-in unit.

8.1 Sensor

In the ***Sensor*** tab you select the force and displacement transducers connected to the ML85/1 amplifier plug-in units and stipulate the corresponding input characteristics. Information on setting up the input characteristics may be found in Chapter 8.1.1 *"Input characteristics adaptation"*.



In the indication range you select from the pulldown list either the **current** signal, the ”calibration signal” (1mV/V) or the ”zero signal” (0 mV/V), where you can choose between <User Unit>, <Basic Unit> and <Analog Output>. In the event of an overload or a calibration error CAL, the appropriate symbol is displayed.

You can select the Physical Unit, e.g. kg or mm, from the pulldown list box after the <Input Range>.

In the ***Transducer...*** field, select the transducer type and the excitation voltage from the pulldown list boxes.

In the ***Filter*** area, specify the <Cut-off frequency> and the filter type.

You can save ( ) and later recall ( ) your setup for the force or displacement channel (ML85/1) in a file (*.MLX), in an EEPROM parameter set in the module, or in the external EEPROM. The source is shown in the symbol, where an X stands for a file, the numbers 1–8 stand for the parameter sets, and W stands for the factory setting

More information on the indication range may be found in the chapter 4.1.1 *”Assigning parameters to amplifiers – Display section”*.

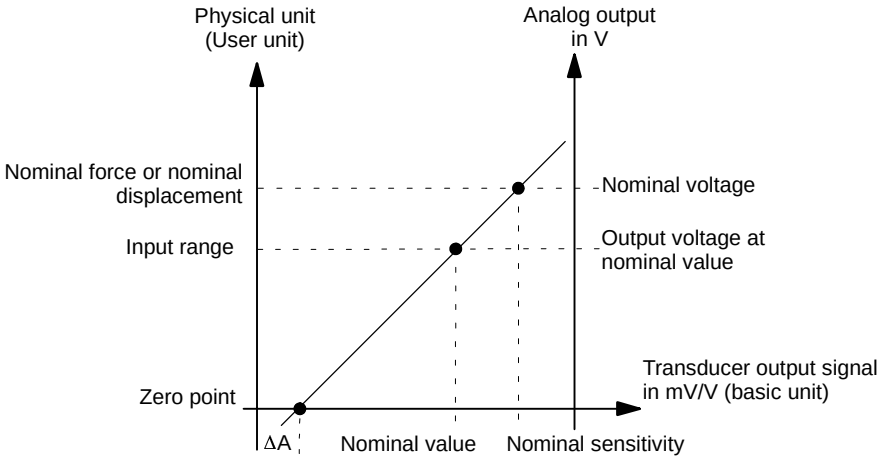
8.1.1 Input characteristics adaptation

☞ Setting up the input characteristics of the ML85/1 amplifier plug-in units differs from the other amplifier plug-in units of the MGC*plus* system. The output characteristics cannot be set separately.

In the case of the ML85/1 amplifier plug-in units, the input characteristics are adapted by entering the transducer output signal for the zero point and the end value. The nominal voltage (10V) of the amplifier is then present at the analog output on achieving the input range.

⚠ **Important**: If the <Indication range> input does not correspond to the actual indication range when the end of the input range is reached, the measured values will be incorrectly displayed in the physical unit.

Clicking the <Measure> button will result in a zero balance.



Entry of the input characteristics

In the <Zero point> input box you enter the output signal of the transducer in the idle state. You can also retrieve the current measured values using <Measure>. As an <Input range> you enter the nominal force or the nominal displacement and as a <Range> the nominal sensitivity of the transducer.

If the input range does not correspond to the nominal force or the nominal displacement or if the analog output voltage does not correspond to the nominal voltage, you must calculate the <Indication range> from the following formula:

$$\frac{\text{Input range in unit}}{\text{Nominal force in unit}} * \frac{\text{Nominal voltage in V}}{\text{Output voltage at nominal value in V}} * \text{Nominal sensitivity in mV/V} = \text{Nominal value in mV/V}$$

Example:

A WSF displacement transducer (nominal displacement 0 – 20 mm, nominal sensitivity 10 mV/V) should be used to measure up to 12 mm (input range). The output voltage of the ML85/1 amplifier (nominal voltage ±10V) should then be 8V. The nominal value to be input is 7.5 mV/V.

$$\frac{12\text{mm}}{20\text{mm}} * \frac{10\text{V}}{8\text{V}} * 10\text{mV/V} = 7,5\text{mV/V}$$

Measurement of the input characteristics

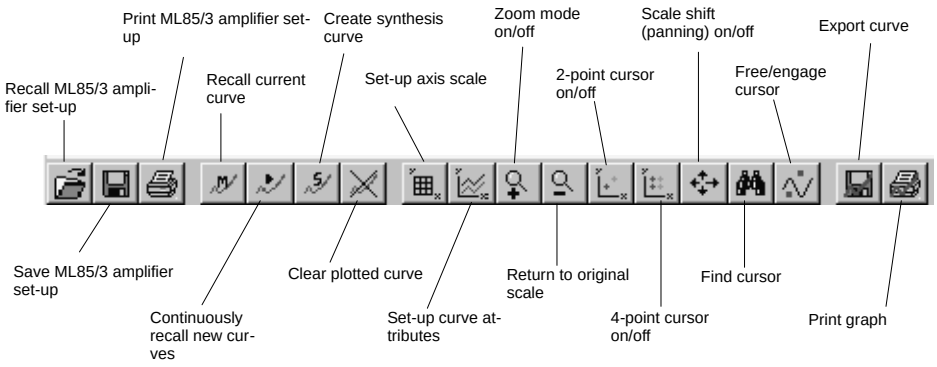
You open the ***Set up characteristics*** dialog via the <Measure...> button. You can measure the input characteristics here. Information on this dialog may be found in the chapter 4.2 *"Input and output characteristics"*.

⚠ **Important**: Please note that the input measurement process changes the <Input range>. It is replaced by <Calibration point 2> of the ***Set up characteristics*** dialog.

8.2 Press fit

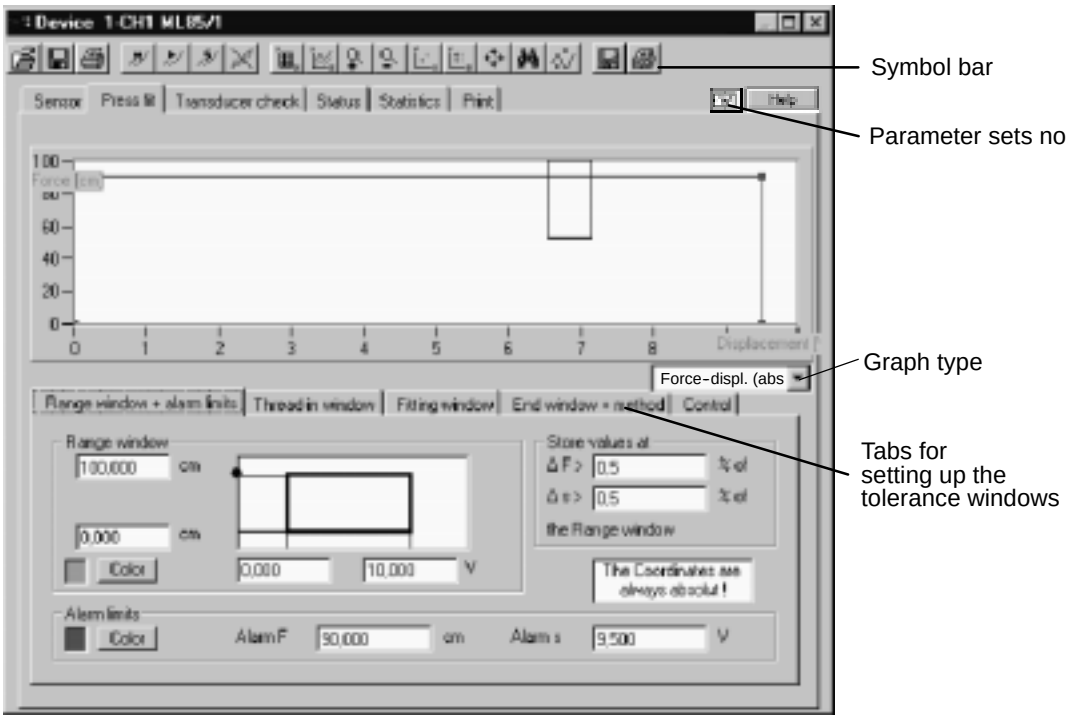
In the ***Press fit*** tab you set the various "tolerance windows" for evaluating the measurement curves, choose the supervision method and start or terminate a control measurement.

If you open the ***Press fit*** tab, a symbol bar is displayed with functions for saving, recalling and processing the measurement curves or the current setup of the ML85/3 module.



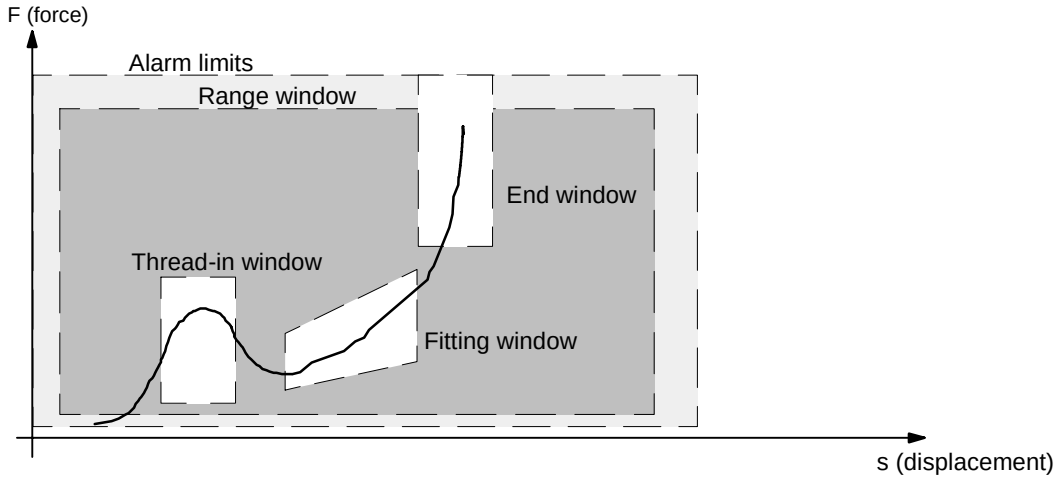
The symbol bar also offers functions for processing the graph, e.g. axis scale and curve attributes, and for updating the measurement curve. See also section 8.2.1.

In order for a measurement curve to be plotted in the graph you must first read it in from the MGC*plus* using *or* .



The measurement curve is plotted in the graph **after** a measurement run, and here you can choose from the following graph types: <Force–displ. (absolute)>, <Force–displ. (relative)>, <Displ.–time> and <Force–time>. If you select the force – displacement graphs, the evaluation windows set will also be plotted.

Use the tabs in the lower part of the ***Press fit*** tab to set-up the tolerance windows and take check measurements. The various range windows are shown in the following diagram.



Force – displacement graph with tolerance windows

Only the setup options in the tabs are described below. For information on the ”tolerance window process” please refer to the user manual *”Press-fit supervision with the MGC*plus *system – MGC*press*, ML85”*.

☞ Confirm the inputs with the RETURN key. Use the <Color> button to open a dialog for setting the color of the corresponding object.

8.2.1 Symbol bar

The first group on the symbol bar for the ***Press fit*** tab contains functions for saving, recalling and printing the ML85/3 amplifier set-up. You can save ( ) and later recall ( ) the setup for the evaluation channel (ML85/3) in a file (*.MLX), in an EEPROM parameter set in the module, or in the external EEPROM. The source is shown in the symbol, where an X stands for a file, the numbers 1–8 stand for the parameter sets, and W stands for the factory setting.

You use the symbols in the second group to define how the MGC*plus* Assistant updates the measurement curve plotted:

- updates the measurement curve and the status information when you click the symbol
- updates the measurement curve and the status information after each measurement. Use to terminate automatic recall
- this button generates a specimen curve
- clicking this button clears the curve plotted

With the first of the two symbols you open a dialog menu for scaling the axes in the graph. The range window is displayed by default. With the second symbol you specify the curve attributes in the ***Configure plot attributes*** dialog.

Clicking opens zoom mode. To zoom you then select a box around the range to be shown with the lefthand mouse-button pressed. To deactivate zoom mode click the symbol again. The current setting will be retained. To return to the original presentation, click .

You can use the 2-point or 4-point cursor to measure the measurement curve. The current coordinates and their difference are displayed in an information line. You can accept the cursor coordinates set using the button in the window setup dialogs.

To shift the measurement curve, click on . Then move the curve with the lefthand mouse-button pressed. To return to the original presentation, click .

If you lose the cursor, click on . The cursor is then displayed in the visible area. links the cursor with the measurement curve displayed.

saves the measurement curve as a file (*.dat) on the PC and prints the measurement curve plotted.

8.2.2 Range window + alarm limits

In the ***Range window + alarm limits*** tab you define the range window and the alarm window. The coordinates entered for the two windows are absolute!

Important: The alarm limits are monitored online, i.e. irrespective of whether a measurement is running.

In the field ***Save values at*** you specify at what displacement or force change (relative to the range window) a new measured value is recorded.

8.2.3 Thread-in window

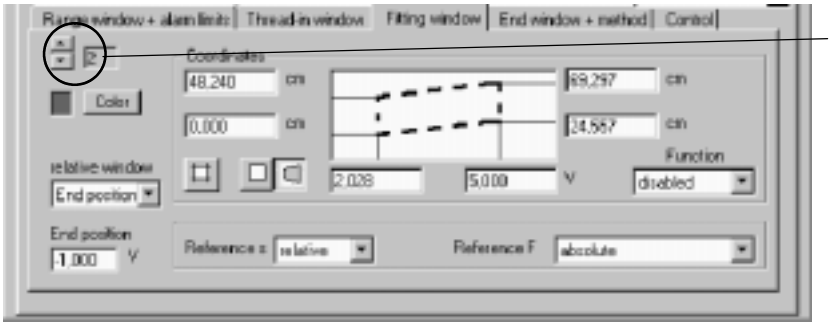
In the ***Thread-in window*** tab you define the thread-in window. You can enter the coordinates direct or accept the current cursor coordinates using the button.

Important: The thread-in window and the end window must not overlap! The thread-in window is monitored online, i.e. during measurement.

Click on <enable> to activate the thread-in window. The coordinates always relate to the absolute coordinate system.

8.2.4 Fitting windows

In the ***Fitting window*** tab you define the fitting windows. You can set-up a max. of 6 fitting windows. You select the corresponding fitting window using the Up/Down buttons at the left margin.



Select the fitting window

Use the buttons to select the window type: rectangular window with four coordinates or trapezium window with six coordinates. You can enter the coordinates direct or accept the current cursor coordinates using the button.

⚠ **Important**: When entering the coordinates please note the settings for the reference point (<Reference s> and <Reference F>) and the graph types selected.

In the <Function> pulldown list box you specify how the measurement curve should be evaluated:

- <disabled>: the fitting window will not be evaluated
- <Curve evaluation>: the complete curve progression will be evaluated
- <F_{min}>, <F_{max}>: the minimum or maximum force will be evaluated
- <Mean >: the mean value of the force in the fitting window will be evaluated

In the <relative window> pulldown list box, select the reference point for the *"relative"* presentation and enter the corresponding starting or final value.

In the case of fitting windows 3 – 7 you can also evaluate the force relative to the force max. or force min. of the second fitting window.

8.2.5 End window + method

In the ***End window + method*** tab you define the end window und determine the supervision method.

You can enter the coordinates for the end window direct or accept the current cursor coordinates using the button. The coordinates entered are absolute!

In the <Total time> input box you enter the time after which the measurement run will be automatically terminated by the measurement system.

Use the <Method> pulldown list box to specify the supervision method:

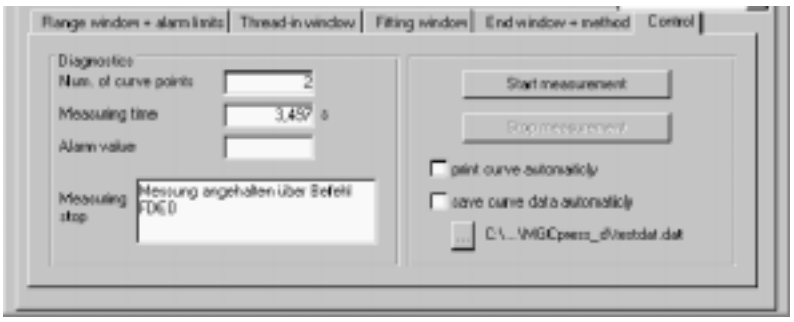
- <Block + settling time>: on reaching the <Block force> F_B measurement will be stopped at the end of the <Settling time>
- <Standstill recognition>: the standstill is recognized if the displacement change for the specified time is less than the specified displacement
- <External stop signal>: the end of measurement is recognized by an external signal
- <Target pos.+settling time>: on reaching the target displacement s_{tgt} (<s left>) wird , measurement is stopped at the end of the <Settling time>
- on reaching the <Block force> F_B, measurement is stopped at the end of the <Settling time>

Important: The thread-in window and the end window must not overlap!

8.2.6 Control

In the ***Control*** tab you can start or stop a measurement independently of the press fit process.

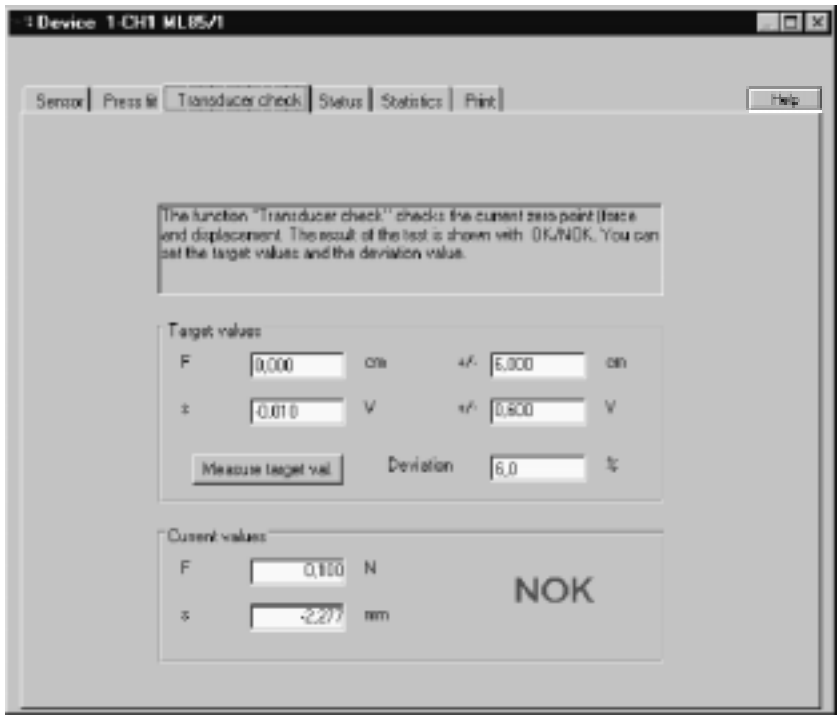
If you activate the <print curve automatically> box, the measurement curve is printed automatically at the end of the press-fit task. <save curve automatically> saves the measurement curve to a file. Click on <...> to specify the path and name of the file.



In the ***Diagnostics*** area you will find information on the measurement carried out, e.g. the number of measurement samples, the measurement duration and the alarm value. In the <Measuring stop> text box you will find information on why measurement was stopped.

8.3 Transducer check

The ***Transducer check*** tab is used for checking the transducer connected. To do this you compare the current actual values of the transducer with defined target values.

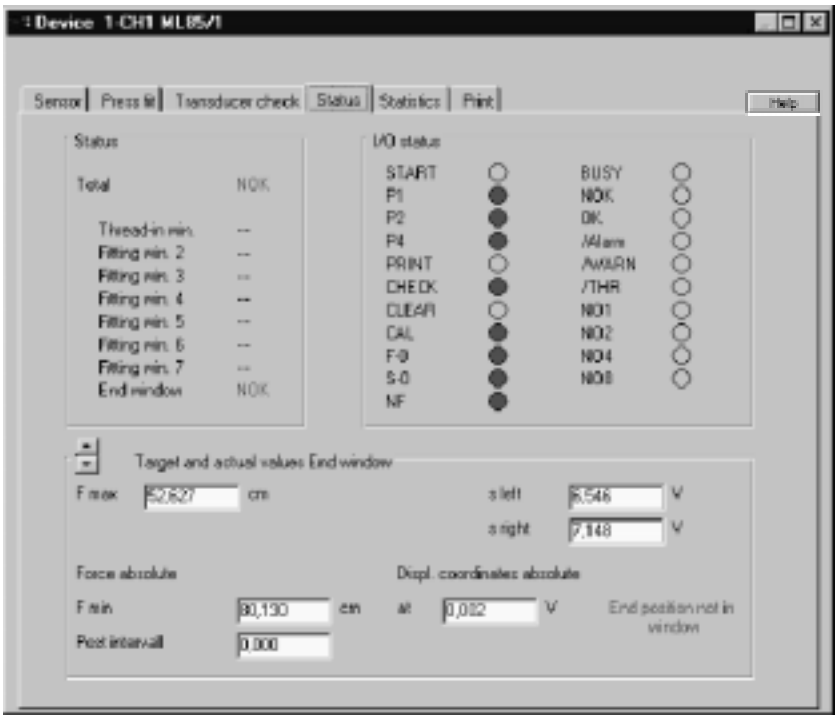


The target values for the force and displacement transducer can be input manually or captured using the <Measure target val.> button. In the <Deviation> box you can specify a tolerance in %. The absolute values are displayed in fields above.

The target values are stored in MGC*press* and can be compared with the actual values later. If these are within the tolerance a green <OK> is displayed. If outside, a red <NOK> is displayed.

8.4 Status

In the ***Status*** tab you will find information on the status of the inputs and outputs, the current status of the individual windows and on the actual values of the tolerance windows.

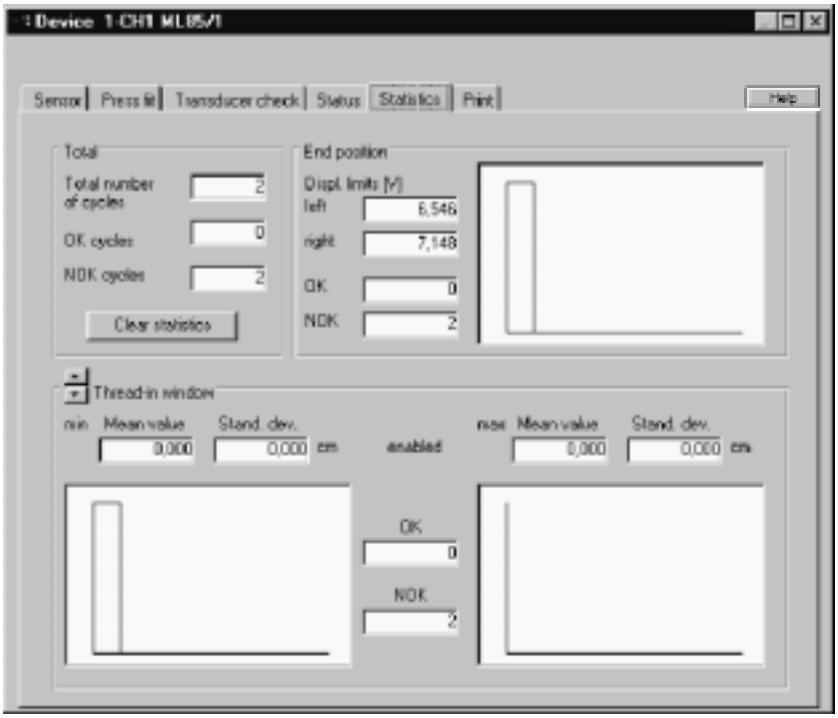


A yellow dot in the ***I/O status*** area means that this input or output has a HIGH level. A red <NOK> in the ***Status*** field signals a tolerance error in the corresponding window. If an error occurs in one of the tolerance windows, the <Total> status is set to NOK.

In the ***Target and actual values End window area*** you can request the actual values of the individual windows, e.g. minimum or maximum force. The status of the window (IO, NIO) is also displayed. You can select the appropriate window using the Up/Down buttons.

8.5 Statistics

The statistics function allows you to judge the quality of your fitting processes. Histograms of the minimum and maximum forces occurring are kept for each window and the mean value and standard deviation calculated continuously. You can select the appropriate window using the Up/Down buttons.



In the ***Total*** area you will find an evaluation of all the fitting processes and in the ***End position*** area an evaluation of all end positions.

☞ You can record a max. of 65,000 fitting tasks statistically. If the number of fitting tasks exceeds this value, the statistics buffer is cleared and reinitialised. You can also clear the buffer using the <Clear statistics> button.

8.6 Print

In the ***Print*** tab you define which information on the MGC*plus* is to be printed. To do this, specify the appropriate printer port on the MGC*plus*.

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