

# METRAwin 90

## Calibration Software

3-349-929-03  
Version 2/06.16

The screenshot displays the METRAwin 90 software interface. At the top, there are menu options: 'Datei', 'Bearbeiten', 'Einstellung', and 'Hilfe'. Below this, the 'MODE' is set to 'DIREKT'. The 'V DC Interval' is configured as '0,00 mV ~ 15,000 V'. A table of settings for 'Low Pegel', 'High Pegel', 'N : Schritte', and 'Td : Verweilzeit' is visible. A digital multimeter display shows '-0.9 1658 DC V'. The main window shows 'METRAwin 90 - test28C01.KLT' with a 'Command String' field and buttons for 'Read', 'Upload', 'STEP', 'BUN', 'STOP', 'DIRECT', and 'TEST'. A table of test results is shown below, with columns for Step, Output VDC, Mode, Range, Expected, Min, Max, and Measured. The table lists 7 steps with various output ranges and measured values.

Step	Output VDC	Mode	Range	Expected	Min	Max	Measured
Step 1	0,00 mV	Text	30,000 V ~	0,0000 V ~	-0,0015 V ~	0,0015 V ~	-0,0007 V ~
Step 2	100,00 mV	Text	30,000 V ~	0,1000 V ~	0,0984 V ~	0,1016 V ~	0,0996 V ~
Step 3	300,00 mV	Text	30,000 V ~	0,3000 V ~	0,2982 V ~	0,3018 V ~	0,2996 V ~
Step 4	1,0000 V	Text	30,000 V ~	1,0000 V ~	0,9973 V ~	1,0027 V ~	0,9997 V ~
Step 5	3,0000 V	Text	30,000 V ~	3,0000 V ~	2,9953 V ~	3,0047 V ~	2,9996 V ~
Step 6	5,000 V	Text	30,000 V ~	5,0000 V ~	4,9915 V ~	5,0085 V ~	4,9999 V ~
Step 7	8,000 V	Text	30,000 V ~	8,0000 V ~	7,9970 V ~	8,0030 V ~	7,9997 V ~

Additional information on the right side of the screenshot includes: '234-Y5678', '0A', '0013', and '006 DKD-K19701 02-'. Below the table, there is a section for 'Description: Handheld DMM', 'Environment: 23+2 °C', 'Humidity: 45...55 % r. F.', and 'Type of measurement: Proc. Hit29S1b'. A 'Certificate:' field is also present.

Output Value	Expected Value	Low Limit	High Limit	Measured Value	UUT Deviation	% error of spec.	Pass	Uncert. ratio
30,000 mV AC 50,00 Hz	30,00 mV ~	29,55 mV ~	30,45 mV ~	29,70 mV ~	-0,30 mV ~	67%	PASS	6,92
150,000 mV AC 50,00 Hz	150,00 mV ~	148,95 mV ~	151,05 mV ~	149,89 mV ~	-0,11 mV ~	10%	PASS	11,1
270,000 mV AC 50,00 Hz	270,00 mV ~	268,35 mV ~	271,65 mV ~	269,90 mV ~	-0,10 mV ~	6%	PASS	10,6
2,70000 V AC 50,00 Hz	2,7000 V ~	2,6916 V ~	2,7084 V ~	2,6987 V ~	-0,0013 V ~	15%	PASS	9,66
27,0000 V AC 50,00 Hz	27,000 V ~	26,916 V ~	27,084 V ~	26,983 V ~	-0,017 V ~	20%	PASS	7,37
270,000 V AC 15,00 Hz	270,00 V ~	26,366 V ~	27,634 V ~	26,843 V ~	-0,157 V ~	25%	PASS	14,7
27,0000 V AC 1000,0 Hz	27,000 V ~	26,781 V ~	27,219 V ~	26,961 V ~	-0,039 V ~	18%	PASS	19,2
27,0000 V AC 20,00 kHz	27,000 V ~	26,511 V ~	27,489 V ~	27,047 V ~	0,047 V ~	10%	PASS	20,2
27,0000 V AC 50,00 kHz	27,000 V ~	26,376 V ~	27,624 V ~	27,013 V ~	0,013 V ~	2%	PASS	11,1
27,0000 V AC 100,00 kHz	27,000 V ~	25,566 V ~	28,434 V ~	27,008 V ~	0,008 V ~	1%	PASS	17,5
270,000 V AC 50,00 Hz	270,00 V ~	269,16 V ~	270,84 V ~	269,85 V ~	-0,15 V ~	18%	PASS	4,98
1000,0 V AC 50,00 Hz	1000,0 V ~	995,0 V ~	1005,0 V ~	999,6 V ~	-0,4 V ~	8%	PASS	5,68
27,0000 V AC 50,00 Hz	27,000 V ~	26,916 V ~	27,084 V ~	26,995 V ~	-0,005 V ~	6%	PASS	7,37
27,0000 V DC	27,000 V ~	26,916 V ~	27,084 V ~	27,014 V ~	0,014 V ~	17%	PASS	60,0
2,00000 V AC 10,00 Hz	10,000 Hz	9,994 Hz	10,006 Hz	10,002 Hz	0,002 Hz	33%	PASS	---
2,00000 V AC 270,0 Hz	270,000 Hz	269,864 Hz	270,136 Hz	270,007 Hz	0,007 Hz	5%	PASS	---
2,00000 V AC 2,700 kHz	2,70000 kHz	2,69864 kHz	2,70136 kHz	2,70006 kHz	0,00006 kHz	4%	PASS	---
2,00000 V AC 270,0 kHz	270,000 kHz	269,864 kHz	270,136 kHz	270,007 kHz	0,007 kHz	5%	PASS	---
0,0000 mV DC	0,000 mV ~	-0,020 mV ~	0,020 mV ~	0,002 mV ~	0,002 mV ~	10%	PASS	6,67
30,0000 mV DC	30,000 mV ~	29,974 mV ~	30,026 mV ~	30,006 mV ~	0,006 mV ~	23%	PASS	5,42
150,0000 mV DC	150,000 mV ~	149,950 mV ~	150,050 mV ~	150,008 mV ~	0,008 mV ~	16%	PASS	4,17
270,0000 mV DC	270,000 mV ~	269,926 mV ~	270,074 mV ~	270,005 mV ~	0,005 mV ~	7%	PASS	3,85
2,700000 V DC	2,70000 V ~	2,69926 V ~	2,70074 V ~	2,70000 V ~	0,00000 V ~	0%	PASS	5,29
-2,700000 V DC	-2,70000 V ~	-2,70074 V ~	-2,69926 V ~	-2,70006 V ~	-0,00006 V ~	8%	PASS	5,29
27,000000 V DC	27,00000 V ~	26,9926 V ~	27,0074 V ~	26,99999 V ~	-0,00001 V ~	1%	PASS	5,29
270,0000 V DC	270,000 V ~	269,926 V ~	270,074 V ~	269,9997 V ~	-0,0003 V ~	4%	PASS	4,82
1000,000 V DC	1000,00 V ~	999,70 V ~	1000,30 V ~	999,91 V ~	-0,09 V ~	10%	PASS	5,11

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We make every effort to keep these instructions up-to-date in accordance with the latest software version. It is nevertheless possible that differences may exist between the software and the instructions. Further information may be provided in a "README.TXT" file included on the provided data storage medium, or in the program directory after the software has been installed.

Subject to change without notice.

## Preface

Purpose of the Program	METRAwin 90 calibration software is a Windows program for controlling various calibrators for electrical quantities with the help of a PC, and for documenting calibration results.
Contents of these Operating Instructions	<p>This document describes the use of the general program functions provided by the software.</p> <p>The program's device-specific functions are described in separate documents which can be accessed, depending on the currently selected device type, by clicking <b>Device Functions</b> in the <b>Help</b> menu.</p> <p>Further information regarding device-specific functions is included in the operating instructions for the respective devices.</p>
Target Group	<p>These instructions are intended for users of the software.</p> <p>The software is designed for use with the Microsoft Windows® graphic user interface. Users must be familiar with basic Windows® functions.</p>
Scope of Validity	These instructions are valid for METRAwin 90 as of version 4.00.



### Note

The version number can be displayed by clicking **About** in the **Help** menu.

## Support

If you have any questions about using this software, please contact:

- Your GOSSEN METRAWATT sales partner
- The address which can be accessed by clicking **About** in the **Help** menu  
GMC-I Messtechnik GmbH  
Product Support Hotline  
Phone : +49 911 8602-0  
e-mail: support@gossenmetrawatt.com

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# 1 Product Description

## 1.1 Variants and Their Use

METRAwin®90 calibration software is a multilingual Windows program for controlling various calibrators for electrical quantities with the help of a PC, and for documenting calibration results.

The program is available in the following variants:

### METRAwin® 90-2

Calibration Software for the Following GOSSEN METRAWATT Process Calibrators:  
METRACAL MC, METRAHIT CAL, METRAHIT 28C, METRAHIT 28C light and METRAHit 18C

These calibrators are used primarily for testing and calibrating electrical measuring instruments and equipment in the field of process measuring and control technology. They include the following functions: direct voltage simulator, current source and sink, as well as simulation of resistors and temperature sensors (thermocouples and PTCs). The METRACAL MC and METRAHIT 28C versions also include a TRMS multimeter (V, mA,  $\Omega$ , F, Hz, °C/°F). Thanks to inclusion of these multimeter functions, or by incorporating a separate METRAHit (in some cases written METRAHIT) 18S, 28S, 29S, 30M, X-TRA, EXTRA or ENERGY precision multimeter with infrared interface into the calibration system, automated calibration of buffer amplifiers, temperature measuring transducers and the like can be performed.

The software executes interactive (**DIRECT operating mode**) or sequence-controlled (**TEST operating mode**) setup of the calibrator from the PC via an RS 232 port (with the help of the BD232 or SI232-II interface adapter) or a USB port (with the help of the USB-HIT or USB-XTRA interface adapter), automatic analysis of measured values entered manually or read in from the multimeter via the port, and documentation and archiving of calibration results in a calibration report.

Calibration procedures for each respective calibration object can be generated and tested with the program in an uncomplicated fashion. In the case of the METRAHIT 18C and 28C, procedures can also be transferred to the calibrator's memory module, from which they can be executed autonomously (without PC). Measured values (V, mA) acquired by the METRAHIT 28C can be saved to memory automatically and subsequently read out and displayed at a PC, and inserted into a calibration report.

### METRAwin® 90-F

Calibration Software for FLUKE D9100, 5100B, 5500A, 5520A and 5700A Multifunction Calibrators

The above mentioned calibrators are used primarily for the calibration of indicating measuring instruments such as multimeters, laboratory recorders, current clamps, panel-mount measuring instruments etc., and include the various electrical quantities required to this end. By incorporating a separate METRAHit (in some cases written METRAHIT) 18S, 28S, 29S, 30M, X-TRA, EXTRA or ENERGY precision multimeter with infrared interface into the calibration system, automated calibration of buffer amplifiers, isolating transformers, measuring transducers and the like can be performed.

The software executes interactive (**DIREKT operating mode**) or sequence-controlled (**TEST operating mode**) setup of the calibrator from the PC via an IEEE488 interface, automatic analysis of measured values entered manually or read in from the multimeter via an RS 232 port, and documentation and archiving of calibration results in a calibration report. The program calculates the test uncertainty ratio (TUR) for each calibration point based upon the calibrators' accuracy specifications which are integrated into the software, or overall measuring uncertainty in accordance with directive DKD-3 (WECC 19-1990).

A calibration procedure for the respective calibration object can be generated and tested in an uncomplicated fashion. Tested calibration procedures for numerous multimeters from our current and previous product spectrum are included with the software.

METRAwin® 90-FJ

Calibration and Adjusting Software for FLUKE D9100, 5100B, 5500A, 5520A and 5700A Multifunction Calibrators

Above and beyond this, METRA*Hit* 22-29S/M handheld multimeters can be automatically adjusted via their infrared interface with the METRAwin®90-FJ version (suitable calibrators: 5500A and 5520A). Type and function-specific adjusting procedures required to this end are included with the software.

## 1.2 Common Features

- Convenient, interactive control of the calibrator which is connected to the PC with direct data entry as an individual value
- Uncomplicated and fast generation, testing and execution of calibration procedures
- Simple operation: even semiskilled workers can execute qualified calibration tasks.
- Display of procedural instructions which have been generated automatically or defined by the user before execution of the respective procedure step
- With interconnected multimeter: display and continuous refreshing of the measured value read in via the port
- Outstanding flexibility with calibration signal correction (for analog measured value indicators, recorders etc.) by entering a displayed measured value with the keyboard, or by querying the measured value from the multimeter via the port
- ISO-9000 compliant calibration documentation as a standardized or user configured report with all necessary entries regarding the calibration object and the calibration system, as well as a tabular list of calibration values and associated evaluations for each calibration point
- Dynamic data transfer to report templates created by the user with Microsoft® Excel™ or Microsoft® Word™ (e.g. with company logo)
- Secure archiving of procedures to an external data storage medium

## 1.3 System Requirements

Operating System	METRAwin®90 can be run with Microsoft® Windows XP, Vista and 7 (32 or 64-bit).
Hardware Requirements	<p>METRAwin®90 can be used on PCs which fulfil the minimum requirements of the respective operating system:</p> <ul style="list-style-type: none"><li>• CD ROM drive</li><li>• Microsoft compatible mouse or other pointing device</li></ul> <p>For controlling METRAHit 18C, 28C or 28C light process calibrators and for reading in measured values from METRAHIT 2X multimeters with METRAwin®90-2:</p> <ul style="list-style-type: none"><li>• A least 1 free serial RS 232 COM port for the connection of 1 to 3 BD232 interface adapters or SI232-II memory adapters</li><li>• Or USB port(s) for the connection of 1 to 3 USB-HIT interface adapters</li></ul> <p>For controlling METRAHit CAL or METRACAL MC process calibrators and for reading in measured values from METRAHIT Starline multimeters with METRAwin®90-2:</p> <ul style="list-style-type: none"><li>• USB port(s) for the connection of 1 to 3 USB-XTRA interface adapters</li></ul> <p>For controlling FLUKE multifunction calibrators with METRAwin®90-F/-FJ:</p> <ul style="list-style-type: none"><li>• 1 installed or external GPIB controller interface (IEEE488) with National Instruments™ compatible protocol and drivers suitable for the Windows system, for example: National Instruments PCI-GPIB NI-488.2 or National Instruments GPIB-USB-B NI-488.2</li></ul> <p>For printing reports:</p> <ul style="list-style-type: none"><li>• Local or network printer which is supported by Windows</li></ul>
Other Required Software	<p>For registering the software:</p> <ul style="list-style-type: none"><li>• Microsoft® Word 97, 2000, 2003, 2007 or 2010 or another word processing program for the automatic creation of a fax form in RTF file format (rich text format)</li><li>• Or Microsoft® Outlook or another e-mail program for the automatic creation of an e-mail with registration data</li></ul> <p>For the creation of individualized calibration reports with company logo and/or modified report layouts:</p> <ul style="list-style-type: none"><li>• Microsoft® Word 97, 2000, 2003, 2007 or 2010</li><li>• Or Microsoft® Excel 97, 2000, 2003, 2007 or 2010</li></ul> <p>For viewing and/or printing out the integrated help files in PDF format:</p> <ul style="list-style-type: none"><li>• Adobe® Acrobat™ Reader – available free of charge from <a href="http://www.adobe.com/acrobat">www.adobe.com/acrobat</a></li></ul>

## 2 Installing, Registering and Uninstalling the Program

### 2.1 Installation

A *Setup.exe* file is included on the supplied CD ROM. The program is installed in dialog with the user by executing this file. The installation directory and the program file folder can be selected as desired.



**Note**

METRAwin 90 software is available in a variety of versions for various calibrators. These software variants can be installed to the same directory, as long as only the last digits of the respective version numbers vary from each other (e.g. 4.04 and 4.01). However, the version with the highest number must be installed last. The version number can be displayed by clicking **About** in the **Help** menu.

### 2.2 Registration

The software can be tested for 30 days without a license key. In order to be able to use the software with its full scope of functions after this trial period a license must be purchased, the software must be registered with the licensor and it must be permanently enabled by entering the license key (password).

The assigned password depends on the entered company name and the type of calibrator. Registration must thus be repeated for each type of calibrator.

Setup Menu: Opens the dialog box for entering the registration data:

Registration

- ▶ Enter your address information to the corresponding fields. Be certain to enter the company name correctly because the registration code is generated from it, as well as other factors.
- ▶ Enter the serial number which appears on the included program CD under “*CD Serial*”. If you’ve received the software as a download or by e-mail and don’t have a CD serial number, you’ll have to submit proof of purchase along with your registration (copy of the invoice or delivery note as a PDF or image file).

The license key can be requested by fax or e-mail.

- ▶ Click the corresponding button: **[Create Fax]** or **[Create Mail]**.
- ▶ Select the device type(s) for which the software will be registered in the dialog box which then appears and acknowledge with **[OK]**. The selection option depends on the purchased software variant.



- ▶ Send the fax form or e-mail which then appears to the specified address.
  - ⇒ You'll receive the password with which the program can be permanently enabled for the specified device type(s) without delay.
- ▶ Open the dialog box for entering the registration information once again to this end, enter the password to the corresponding field and click the **[Register]** button.
  - ⇒ The program is then permanently enabled. You can check this in the registration information field. Your company name is displayed in the title bar of the program window after the program has been restarted.

<b>i</b>	<p><b>Note 1</b></p> <p>Registration is only possible for a single company, but for any desired number of installations, with a single software license (branch office license). Detailed information regarding licensing can be viewed by clicking <b>Show License Agreement</b> in the <b>Help</b> menu.</p>
<b>i</b>	<p><b>Note 2</b></p> <p>Save the returned e-mail with the password in case reinstallation should become necessary!</p>

## 2.3 Uninstalling the Software

If desired, the program can be uninstalled by selecting **Programs** from the **Start** menu and then clicking **Gossen-Metrawatt / METRAwin / Uninstall**.



## 3 Operation

### 3.1 Starting and Exiting the Program

#### Starting the Program

In order to start the program:

- ▶ Double click the METRAwin 90 icon on the Windows desktop.

or

- ▶ Select the program from the Windows start menu:  
**Start / Programs / METRAwin 90 / METRAwin 90**

⇒ The program is started.

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#### Exiting the Program

In order to exit the program:

- ▶ Select **Close** in the **File** menu.

or

- ▶ Simultaneously press the **Alt+F4** keys.

or

- ▶ Click the **Close** icon  at the upper right-hand corner of the title bar.

⇒ The program is exited.



#### **Note**

When the program is exited the selected language and other software setting parameters (device type, temperature unit of measure, communication parameters etc.) are saved automatically. When the program is restarted, the last used settings are still valid.

### 3.2 Structure of the User Interface

The METRAWin 90 program window is subdivided into seven segments:

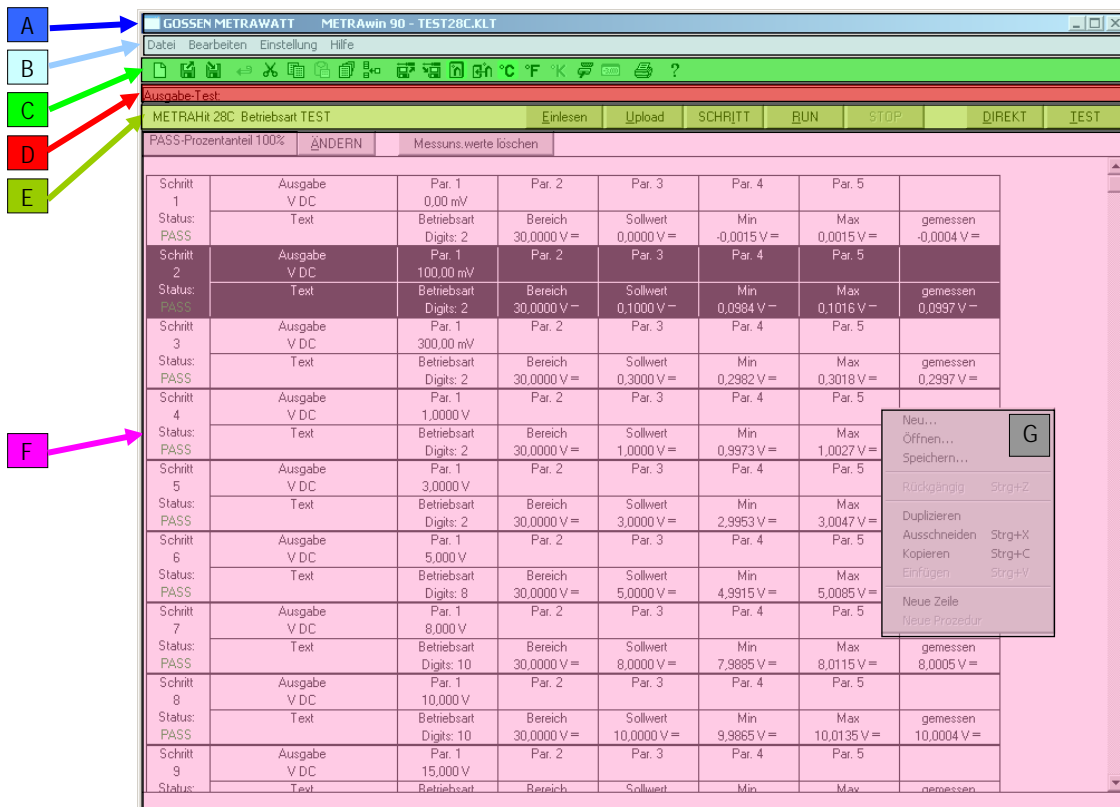


Figure 3.2: Segments of the Program Window

**A) Title Bar**

The horizontal bar at the top of the program window shows the program name and registration information, as well as the file name of the currently open procedure. It also includes the system menu at the left which can be opened via the program icon, and buttons ( [ ] X ) for **minimizing**, **maximizing** and **closing** the program window at the right.

**B) Menu Bar**

The menu bar includes the names of the main menus from which the various menu functions and submenus can be accessed.

**C) Toolbar**

The smart icons in the toolbar allow for quick access to frequently used commands and functions. The function of any given icon can be displayed by moving the mouse pointer to it, and is executed by clicking the icon. After clicking **Toolbar** in the **Setup** menu, the toolbar can be hidden or shown.

**D) Command Line**

Commands transmitted to the calibrator appear in this line for double checking. After clicking **Command Line** in the **Setup** menu, the command line can be hidden or shown.

**E) Control Bar**

Program operating modes are selected, and sequential control of the test procedures is made possible using the buttons in the control bar. The type designation of the currently controlled calibrator is displayed at the far left, which has been selected via the **Device Type** setting in the **Setup** menu.














**F) Workspace**

A calibrator control panel appears in this area in the **DIRECT** operating mode, or a table is shown in the **TEST** operating mode which lists the parameters of the test procedure steps. Various dialog boxes can be opened here as well.

**G) Context Menu**

A context menu appears after clicking the right mouse button with the mouse pointer in the workspace. Just like the toolbar, it allows for quick access to frequently required functions.

### 3.3 Overview of Menu Functions

File Menu		
	<a href="#">New</a>	Data associated with any previously loaded test calibration procedure are deleted after confirming the security prompt.
	<a href="#">Open</a>	Opens a calibration procedure file with/without results (*.KLT/*.KLF) in the TEST operating mode.
	<a href="#">Save</a>	Saves a calibration procedure file with/without results (*.KLT/*.KLF) in the TEST operating mode.
	<a href="#">Print test report</a>	Prints out a standard calibration report with a predefined structure.
	<a href="#">Printer settings</a>	Selects and configures an installed printer for report printing.
	<a href="#">Export test data</a>	Exports the calibration data to an individually laid out Word/Excel report template (available after running the KLT2DOC.DOT or KLT2XLS.XLM macro).
[Alt+F4]	<a href="#">Exit</a>	Exit the Program
Edit Menu (only available in the TEST/PROCEDURE mode)		
 [Ctrl+Z]	<b>Undo</b>	Undoes the last editing step. The following can be undone: changes to the parameters in a procedure line, cut and paste operations, the "Repeat" operation.
 [Ctrl+X]	<b>Cut</b>	Cuts the selected TEST/PROCEDURE line.
 [CTRL+C]	<b>Copy</b>	Copies the selected TEST/PROCEDURE line to the clipboard.
 [Ctrl+V]	<b>Paste</b>	The TEST/PROCEDURE line which has been copied to the clipboard is inserted into the selected line.
	<b>Duplicate</b>	Duplicates the selected TEST/PROCEDURE line.
	<b>Insert line</b>	Adds a new TEST/PROCEDURE line after the selected line.
	<b>Insert procedure</b>	
Setup Menu		
	<a href="#">Language</a>	Changes the program menus, commands and descriptions to a different language.
	<a href="#">Registration</a>	Registers the software for permanent use via e-mail or fax.
	<a href="#">Device type</a>	Sets the program to work with another device type.
	<a href="#">Port settings</a>	Selects the port(s) for communication between the PC and the device and configure the port parameters.
	<a href="#">Multimeter display on</a>	Shows or hides the multimeter display.
	<a href="#">Command line</a>	Shows or hides the command line.
	<a href="#">Toolbar</a>	Shows or hides the toolbar.
	<a href="#">Cold junction</a>	Selects a thermocouple cold junction (internal/external) for the calibrator.
	<a href="#">°C/°F°K/</a>	Selects the temperature unit of measure.
Help Menu		
[F1]	<a href="#">Program functions</a>	Opens a PDF file with a description of general program functions.
	<a href="#">Device functions</a>	Opens a PDF file with a description of device-specific program functions.
	<a href="#">Online support</a>	Opens a website with information regarding technical support via the Internet.
	<a href="#">Show license agreement</a>	Opens a TXT file with a description of the license agreement.
	<a href="#">About</a>	Displays information regarding program version and contact address.

### 3.3.1 File Menu Functions

**File:** Deletion of the data associated with a calibration procedure in the TEST operating mode

**New** All of the steps of any previously created or loaded test calibration procedure are deleted after confirming the security prompt.



**File:** Open a calibration procedure file with/without results in the TEST operating mode.

**Open** ▶ A previously saved calibration procedure file can be selected and loaded to temporary memory after clicking **Open** in the **File** menu while in the TEST operating mode.



⇒ The **Open** dialog box which then appears prompts you to select or enter the **filename** of the file to be opened. As a default function, the last saved or opened file is suggested.

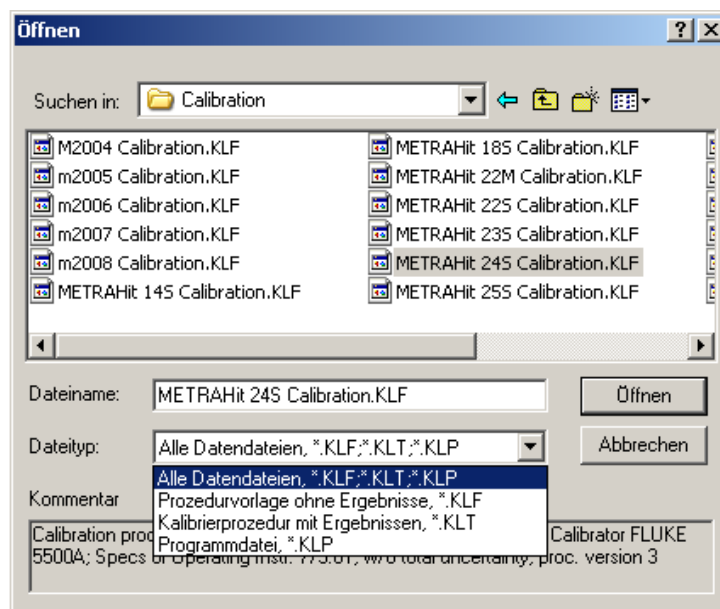
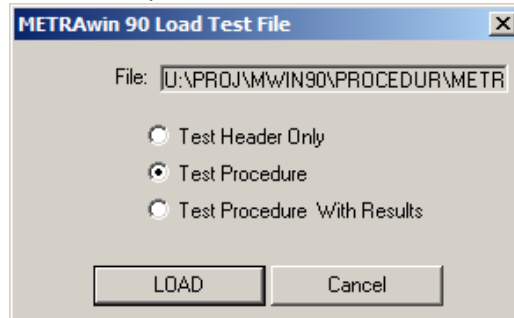


Figure 3.3.1-a: Dialog Box for Opening a Calibration Procedure File

Calibrating procedure filenames end with **.KLT** (procedure with results) or **.KLF** (procedure template without results). Program files which can be loaded to the METRAHit 18C calibrator have a filename ending with **.KLP**.

- ▶ Files located on local drives, or on network drives to which a connection has been established, can be opened. Select the directory path to the desired file in the **Look in** dialog box.
- ▶ By clicking a file in the file list, it's selected as the measurement data file to be opened. If a comment text was entered when the selected file was saved, the text appears in the **Comment** field. Click [**Open**] in order to open the selected file.

► Additional options can be selected via a further dialog box:



- **Test Header Only** loads only the test report header parameters of the selected file for a previously opened/created calibration procedure.
- **Test Procedure** loads the calibrating procedure only without results.
- **Test Procedure With Results** loads the calibration procedure along with the included calibration results.



**Note 1**

When a file is opened which contains data from a calibrator other the one currently selected under **Device Type** in the **Setup** menu, the program switches to the current device type after acknowledgement of the prompt which appears in this case. If this program variant is not available, i.e. if the required device-specific program module has not been installed or enabled, the following message appears “*Device is not installed - <device type designation>*”.



**Note 2**

It's not possible to open more than one calibration procedure file at a time.



**Note 3**

Further Information regarding elements in this dialog box can be accessed via the direct help function: First click **?** in the title bar of the window, and then click the element for which help is required. A popup window with an appropriate explanation appears. This explanation can also be displayed by clicking the element with the right mouse button and then clicking **Direct help** in the menu which then appears.

File:

After clicking **Save** in the file menu, temporary procedure data are permanently saved to a data storage medium so that they're still available later on.

Save

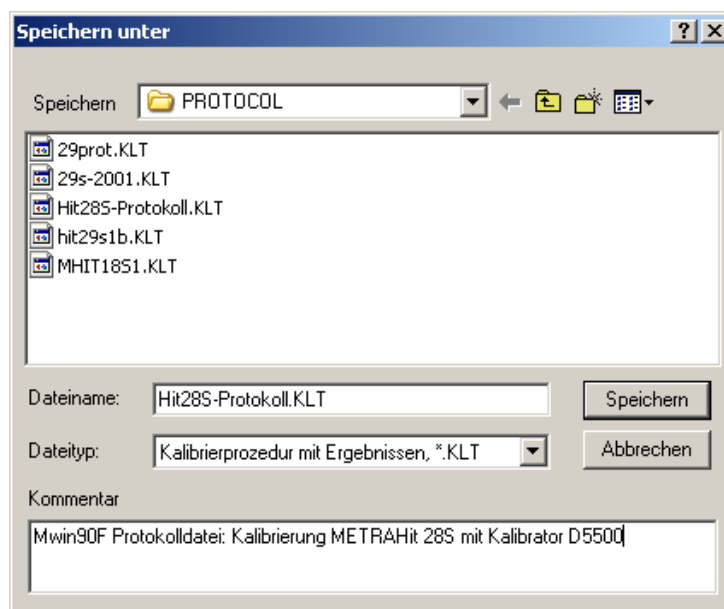


Figure 3.3.1-b: Dialog Box for Saving Procedure Files

- ⇒ You're prompted to enter a **filename** in the **Save as ...** dialog box which then appears. The KLF **file type** is used for procedure files without results, and the KLT file type for procedure files with results.
- ▶ A text with up to 130 characters including 2 lines can be entered to the **Comment** field as a description of the data included in the file. This comment appears in the **Open** dialog box before a measurement data file is opened after the file has been selected from the list.
- ▶ Files can be saved to local drives, or to network drives to which a connection has been established. Select the desired directory path to which the file will be saved in the **Save** dialog box.
- ▶ The file is saved to the selected directory using the desired filename by clicking the **[OK]** button.
- ▶ Saving the file can be aborted by clicking the **[Cancel]** button or by pressing the "ESC" key.



**Note 1**

If the name of an already existing file is entered, a security prompt appears which asks the user if he wants to overwrite the respective file.



**Note 2**

Further Information regarding elements in this dialog box can be accessed via the direct help function: First click **?** in the title bar of the window, and then click the element for which help is required. A popup window with an appropriate explanation appears. This explanation can also be displayed by clicking the element with the right mouse button and then clicking **Direct help** in the context menu which then appears.

File:

Print out a standard calibration report with a predefined structure.

Print test report

⇒ The **Test Protocol Header** dialog box appears first with numerous entry fields:



Figure 3.3.1-c: The Test Protocol Header Dialog Box

- ▶ Enter information regarding the device to be calibrated (DUT) and the calibration conditions to the entry fields in the left-hand column.
- ▶ Information regarding the utilized calibration equipment can be entered to the fields in the right-hand column.
- ▶ Alternatively, these data can be read in from a previously saved test procedure file (\*.KLT/\*.KLF). Click the **[Load]** button to this end and select the file from which the

test report header data will be loaded from the [Open](#) dialog box which then appears.

- The test procedure can be saved to the data storage medium with or without results by clicking **[Save]** (see [Save](#) in the File menu).

If the test procedure includes results in at least one line, the desired printer can be selected and the standard calibration report can be printed out after clicking the **[Print]** button. This report is laid out as shown below:

Certifying laboratory:	GoMe PS	Certificate Number:	XXX-yyy-999999
Calibrated by:	GuHo	Calibrator:	METRACAL MC
Calibration date:	11.05.2015	Serial no.:	UE1130
UUT make:	Camille Bauer	Certificate:	DAkkS CC133
Type:	V624	Multimeter:	METRACAL MC
Number:	0815	Serial no.:	UE1130
Description:	Temp. Transmitter	Certificate:	DAkkS CC133
Environment		Ref. Multimeter:	---
Temperature:	23±2°C	Serial no.:	---
Humidity:	45-65% r.h.	Certificate:	---
Type of measurement:	Mwin90-Prozedur	Signature:	

Output Value	Expected Value	Low Limit	High Limit	Measured Value	UUT Deviation	% error of spec.	Pass	Uncert. ratio
0,0 °C RTD LO Cur.	0,0 °C	-2,0 °C	2,0 °C	0,3 °C	0,3 °C	15%	PASS	—
20,0 °C RTD LO Cur.	20,0 °C	18,0 °C	22,0 °C	20,8 °C	0,8 °C	40%	PASS	—
40,0 °C RTD LO Cur.	40,0 °C	38,0 °C	42,0 °C	41,0 °C	1,0 °C	50%	PASS	—
60,0 °C RTD LO Cur.	60,0 °C	58,0 °C	62,0 °C	61 °C	1 °C	50%	PASS	—
80,0 °C RTD LO Cur.	80,0 °C	78,0 °C	82,0 °C	81,2 °C	1,2 °C	60%	PASS	—
100,0 °C RTD LO Cur.	100,0 °C	98,0 °C	102,0 °C	100,5 °C	0,5 °C	25%	PASS	—
120,0 °C RTD LO Cur.	120,0 °C	118,0 °C	122,0 °C	120,0 °C	0,0 °C	0%	PASS	—
140,0 °C RTD LO Cur.	140,0 °C	138,0 °C	142,0 °C	139,5 °C	-0,5 °C	25%	PASS	—
160,0 °C RTD LO Cur.	160,0 °C	158,0 °C	162,0 °C	158,0 °C	-2,0 °C	100%	LIMIT	—
180,0 °C RTD LO Cur.	180,0 °C	178,0 °C	182,0 °C	177,8 °C	-2,2 °C	>100%	FAIL	—
200,0 °C RTD LO Cur.	200,0 °C	198,0 °C	202,0 °C	199,2 °C	-0,8 °C	40%	PASS	—

Summary: Measurements = 11	Pass (0...85%) = 9	Limit (85...100%) = 1	Fail (>100%) = 1
----------------------------	--------------------	-----------------------	------------------

Figure 3.3.1-d: Example of a Standard Calibration Report

Alternatively, a calibration report with individualized layout and content can be created with the help of the [Export Test Data](#) menu function.

File: Select and configure an installed printer for report printing.

Printer settings: This command opens the standard Windows dialog box for printer configuration, in which the printer to be used for printing out the calibration report can be selected and configured.



File: Export the calibration data to an individually laid out Word/Excel report template.

Export test data: If the standard calibration report doesn't contain the desired calibration parameters or if you want it to include, for example, a company logo, the calibration and report header data can be exported to an individually laid out Word or Excel report

template. Corresponding report templates with integrated macros can be found in the program directory to this end.

Editing the Microsoft® Word report template included with the program

- ▶ Start Microsoft® Word and open the Word template with macro (KLT2DOC.DOT) located in the program directory.

The included macro (AutoNew.MAIN) can import the following parameters from the open test procedure with results based on the variable names:

**Report Header Parameters**

Variable Name	Parameter
#lab	Issuing laboratory
#calby	Calibrated by
#caldate	Calibration date
#nextdate	Next calibration date (= calibration date + 12 months)
#uutmake	Manufacturer of the device under test
#uutype	Type designation of the device under test
#uutnumb	Serial number of the device under test
#uutdsc	Object (type of device under test)
#envtemp	Ambient temperature
#envhmdt	Relative humidity
#meatype	Type of measurement
#certnum	Certificate number
#caldev	Type designation of the calibrator
#calno	Serial number of the calibrator
#calcert	Calibrator certificate number
#muldev	Type designation of the multimeter
#mulno	Serial number of the multimeter
#mulcert	Multimeter certificate number
#refdev	Type designation of the reference multimeter
#refno	Serial number of the reference multimeter
#refcert	Reference multimeter certificate number

**Procedure Step Parameters**

Variable Name	Parameter
#fun	(Measuring) function ("V DC", "RTD" ...)
#mrange	Measuring range ("3.0000 V DC")
#tpoint	Test point
#outval	Output value and unit of measure ("2.50000 V DC", "100 °C Pt100" ...)
#param	Additional parameter ("1.00 kHz" for V AC, "Pt100" for temperature)
#adig	Permissible deviation in digits
#expval	Expected value
#fexpval	Expected value with measuring function (ACDC)
#minval	Lower limit value
#fminval	Lower limit value with measuring function
#maxval	Upper limit value
#fmaxval	Upper limit value with measuring function



#regval	Measured value
#fregval	Measured value with measuring function
#rdev	Measured difference (absolute value)
#frdev	Measured difference with measuring function
#rdig	Measured difference in digits
#rprc	Measured difference as percentage of the specification
#result	Assessment: pass/limit/fail/---
#text	Comment regarding the test step
#udig	Measuring uncertainty in digits
#uval	Measuring uncertainty (absolute value)
#urat	Measuring uncertainty ratio

**General Parameters**

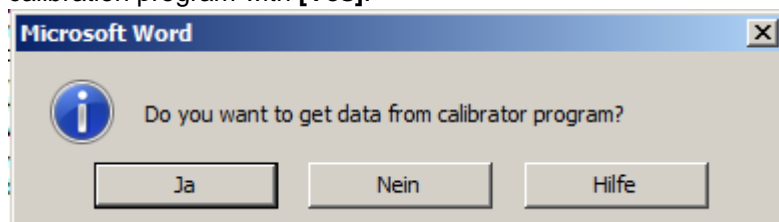
Variable Name	Parameter
#passprc	Pass percentage for limit value
#measured	Number of measured steps
#passed	Number of passed steps
#limit	Number of limit steps (between limit value and failure)
#fail	Number of failed steps

- ▶ Adapt structure and column content in accordance with your needs and save the edited file as a Word 97 or 2003 template (\*.DOT), or as Word template with macros (\*.DOTM) with a new name.

Running the Word macro and transferring the calibration data to the Word report template

- ▶ Start Microsoft® Word and open the desired Word template with macro.
- ▶ Start the included AutoNew.MAIN macro by clicking **Macros** and then **View Macros** in the **View** menu.

⇒ Respond to the prompt asking whether or not you want to receive data from the calibration program with **[Yes]**:



- ⇒ In the window which then appears, you're prompted to open a test procedure file. If this file has already been opened, click **[Cancel]**.
- ⇒ Now you're prompted to start calibration (if you haven't already done so) and then to select the **export test data** menu command.
- ⇒ The data are transferred to the Word file and completion is acknowledged with a ready message.

Calibration data can be transferred to Excel in a similar way. However, the macro and the report templates are located in separate files in the program directory in this case.

- ▶ Start Microsoft® Excel and open the KLT2DOC.XLM Excel macro file.
- ⇒ Two icons now appear underneath the add-ins with the designations *KLT:Get calibrator data* and *KLT:Close*.
- ▶ Click the *KLT:Get calibrator data* icon and select the report template file (KLT2XLSx.XLT) to be opened in the window which then appears.

### 3.3.2 Help Menu

Program Functions	<p>Opens a PDF file with a description of general program functions.</p> <p>This menu command starts Adobe® Reader™ in a new window, and opens a PDF file which includes descriptions of general program functions.</p>
Device Functions	<p>Opens a PDF file with a description of device-specific program functions.</p> <p>This menu command starts Adobe® Reader™ in a new window and opens a PDF document which includes descriptions of specific program functions and characteristics with reference to the measuring instrument which is currently selected under <b>Device Type</b> in the <b>Setup</b> menu.</p>
Online Support	<p>Opens a website with information regarding technical support via the Internet.</p> <p>This menu command starts your Internet browser and opens a website with information on how our technical support team can provide you with support via the Internet.</p>
Display License Agreement	<p>Opens a TXT file with a description of the license agreement.</p> <p>This menu command starts your text editor and displays the license agreement in a new window.</p>
Info	<p>Displays information regarding program version and contact address.</p> <p>This menu command opens a window which displays information regarding the revision level of the utilized program version, as well as the contact address for technical support.</p>

## 3.4 Basic Program Settings

### 3.4.1 Changing the User Interface Language

When the program is started for the first time, the language which was selected during installation is used for the user interface. This language can be changed by selecting **English / Deutsch / ...** in the **Setup** menu. The program always starts up with the last selected language.

### 3.4.2 Selecting the Type of Calibrator to be Controlled

Select the type of calibrator to be controlled under **Device Type** in the **Setup** menu. The various calibrators which are available for selection depend on which version of the program you purchased and which device(s) you chose during installation.

An image of the selected calibrator appears as an initial window in the workspace after the device type has been changed. Depending on the device type, a PDF file with specific connection and operating instructions can be opened by clicking **Device Functions** in the **Help** menu.



METRAHit 18C



METRAHit 28C/28C light



METRAHit Cal/Multical



METRAtop 90C/D9000/D9100



FLUKE 5100A/5500A/5520A/5700A

### 3.4.3 Port Settings



The corresponding dialog box appears after clicking **Port Setup** in the **Setup** menu. Its content depends on which [type of calibrator](#) is currently selected to be controlled.

Device-specific port settings are described in a separate document. This document can be accessed after clicking **Device Functions** in the **Help** menu.

- a) For METRAtop 90C / FLUKE D9000, D9100, 5100A, 5500A, 5520A and 5700A multifunction calibrators

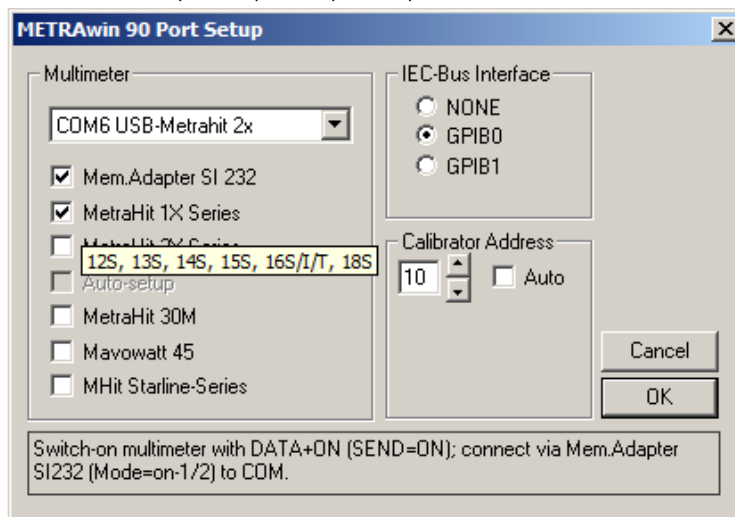


Figure 3.4.3-a: Port Settings for FLUKE 5XXXA with METRAHit 1XS and SI232 Adapter

- b) For METRAHit CAL and METRACAL MC process calibrators

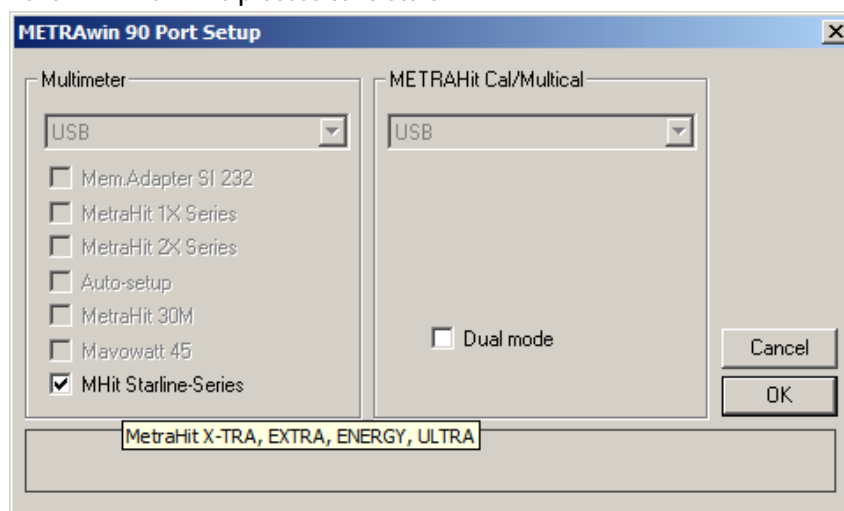


Figure 3.4.3-b: Port Settings for METRAHIT CAL and USB X-TRA with METRAHit X-TRA and USB X-TRA

c) For METRAHit 28C and 28C light process calibrators

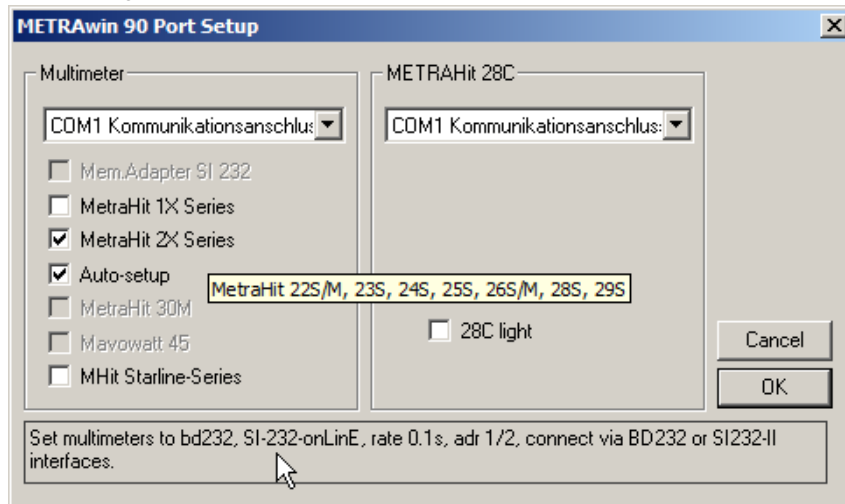


Figure 3.4.3-c: Port Settings for METRAHit 28C and BD232 with METRAHit 28S and BD232

d) For METRAHit 18C process calibrator

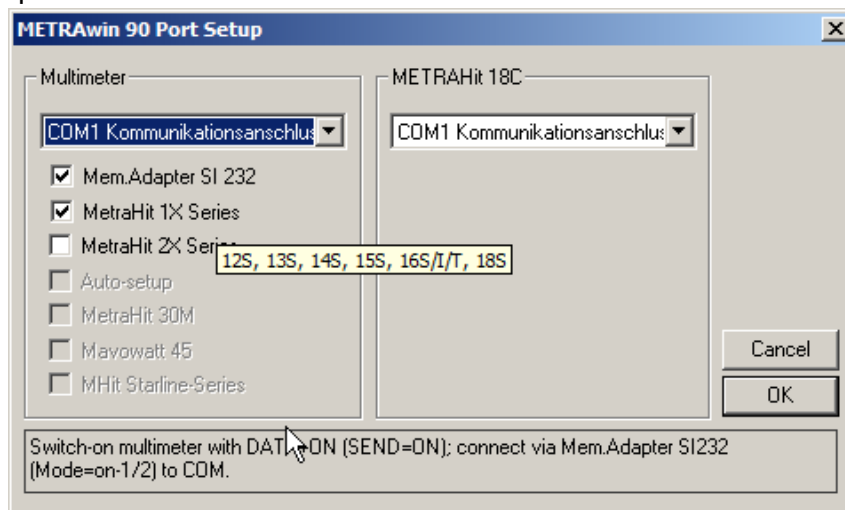



Figure 3.4.3-d: Port Settings for METRAHit 18C and BD232 with METRAHit 18S SI232

### 3.4.4 Showing and Hiding the Multimeter Display



After clicking **Multimeter Display On** in the **Setup** menu, a window can be viewed in the workspace in which the current measured values of the connected multimeter are displayed in analog and digital format. This makes it unnecessary to continuously look back and forth between the monitor screen and the multimeter.

After clicking the minimize icon  in the multimeter input window, the graphic display of the measured value is hidden and the measured value appears as a numeric value.

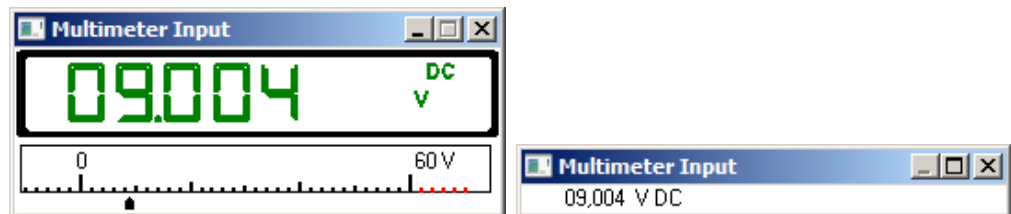


Figure 3.4.4-a: Multimeter Display in Normal and Minimized Format

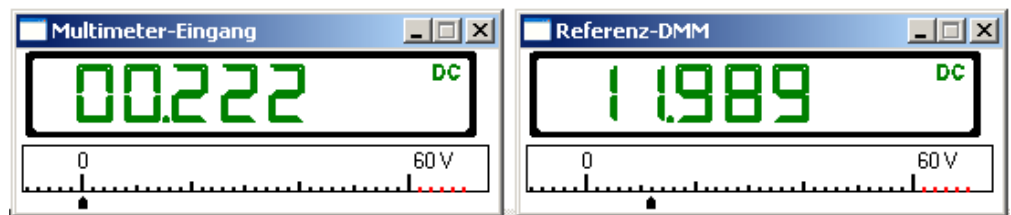


Figure 3.4.4-b: Multimeter Displays of the Calibrator-Multimeter and an Additional Reference Multimeter

### 3.4.5 Showing and Hiding the Command Line

The command line can be shown or hidden with the help of the **Command Line** function in the **Setup** menu.

```
Befehlsstring: SOUR:VOLT:RANG 0.3E+1,VAL 0.2E+1
```

Commands transmitted to the calibrator appear in this line for double checking.

### 3.4.6 Showing and Hiding the Toolbar

The toolbar can be shown or hidden with the help of the **Toolbar** function in the **Setup** menu.



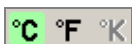
The toolbar contains buttons which can be used to quickly execute commands without accessing the menus. The functions assigned to the buttons appear in the form of so-called “**quick-info**” when the mouse is positioned at the respective button.



**Note**

Just like the tool bar, the [context menu](#) also permits quick access to frequently required functions.

### 3.4.7 Specifying the Temperature Unit of Measure



You can specify whether degrees Celsius, Fahrenheit or Kelvin will be used for temperature measurement and simulation after clicking **°C / °F / °K** in the **Setup** menu.



**Note 1**

Only those units of measure are available which are supported by the currently utilized calibrator.



**Note 2**

Temperature is generally saved in °C in the test procedures.

3.4.8 Specifying the Thermocouple Cold Junction



The **Internal/External Cold Junction** function in the **Setup** menu makes it possible to specify whether the *internally* measured temperature inside the calibrator or the *externally* measured temperature will be used as the cold junction for thermocouple simulation with the calibrator.

If *external* cold junction temperature is selected, a dialog box appears which can be used to manually enter the measured cold junction temperature (the temperature at the connection for the simulated thermocouple sensor). If the METRAHit multimeter with temperature sensor connected to the PC is used for this temperature measurement, the temperature can be read in online by clicking the **Get from multimeter** button. If the **Link Calibrator with Multimeter** checkbox has been activated, the temperature is continuously monitored by the multimeter, forwarded to the calibrator via the port and taken into account by the calibrator.

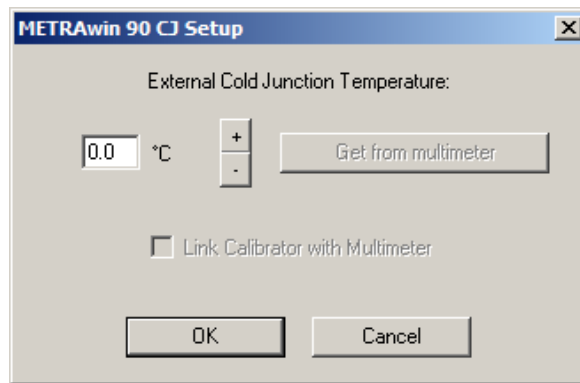
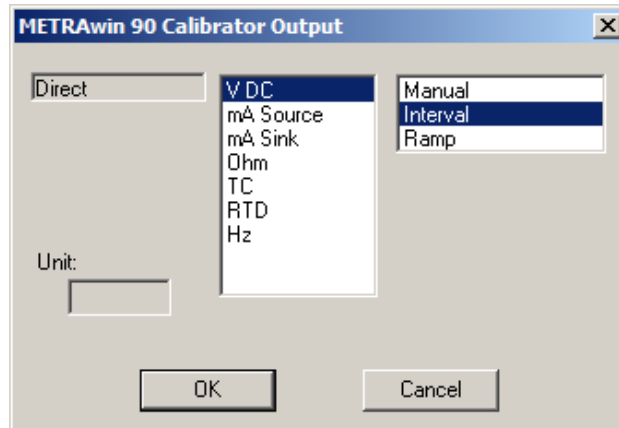


Figure 3.4.8-a: Dialog Box for Setting the External Cold Junction Temperature

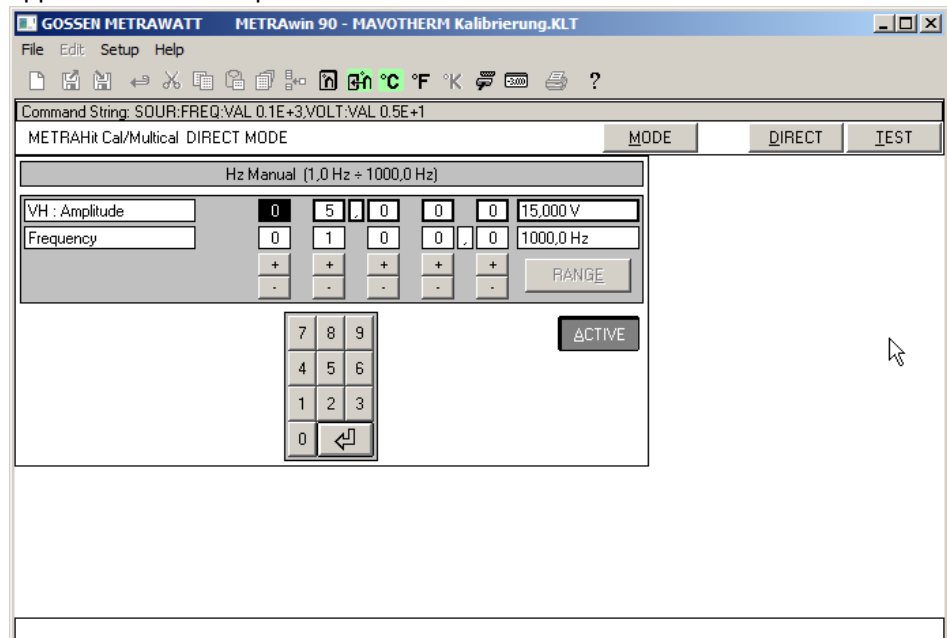
### 3.5 DIRECT Operating Mode for Interactive Calibrator Operation

In this operating mode, the calibrator is interactively controlled by the PC via the selected port. This is especially helpful during adjustment and balancing of amplifiers, measuring transducers, analog components and multimeters.

- ▶ Click the **[DIRECT]** button in the control bar.
- ▶ Then click the **[MODE]** button in the control bar in order to select the desired simulation function at the calibrator:



- ▶ Select the desired output function and operating mode and acknowledge by clicking the **[OK]** button.
- ⇒ A control panel for configuring the parameters of the selected function then appears in the workspace:



- ▶ Select the parameters to be configured and enter the setpoint value either numerically or by adjusting the displayed value at the corresponding decimal place with the **[+]** and **[-]** keys.
- ▶ After clicking **[ACTIVE]**, the parameter values are transmitted to the calibrator which is then correspondingly configured. If the active state has already been initialized, the changes are implemented immediately.

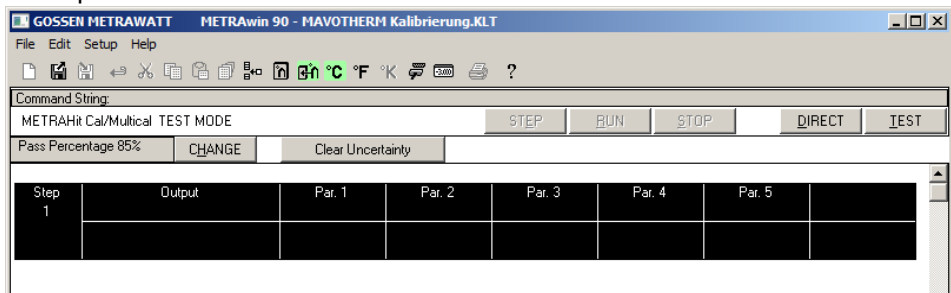
The entry of erroneous calibration values is prevented.

The multimeter's display value can be viewed at the monitor screen at the same time by clicking [Multimeter Display On](#) in the **Setup** menu.

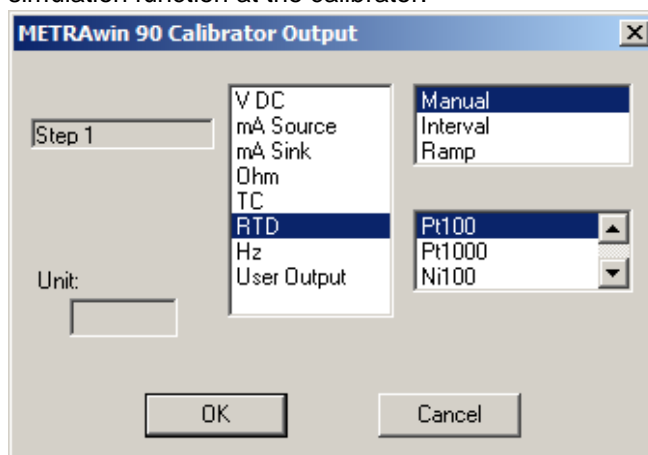
### 3.6 TEST Operating Mode

#### 3.6.1 Creating a Calibration Procedure

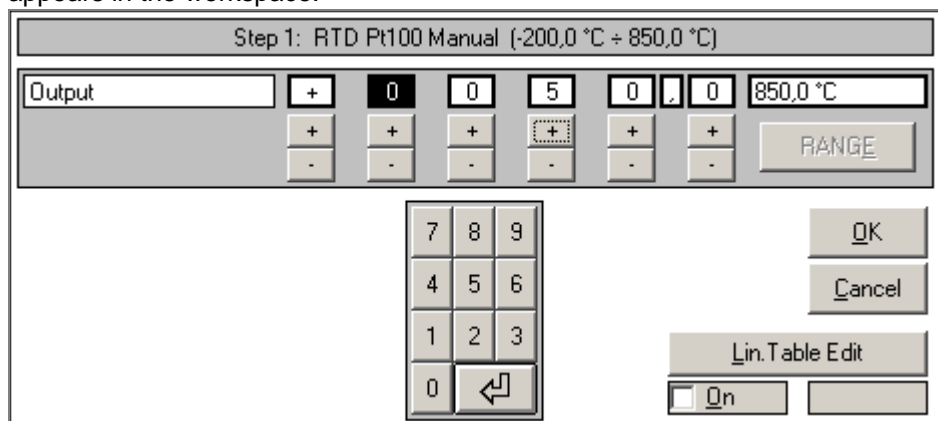
- ▶ Click the **[TEST]** button in the control bar.
- ⇒ The first procedure line appears in the workspace which consists of an upper “output line” for programming the calibration signal and a lower “input line” for the expected results at the device to be calibrated and the allowable tolerances.



- ▶ Double click into the procedure line’s **Step** field in order to select the desired simulation function at the calibrator.

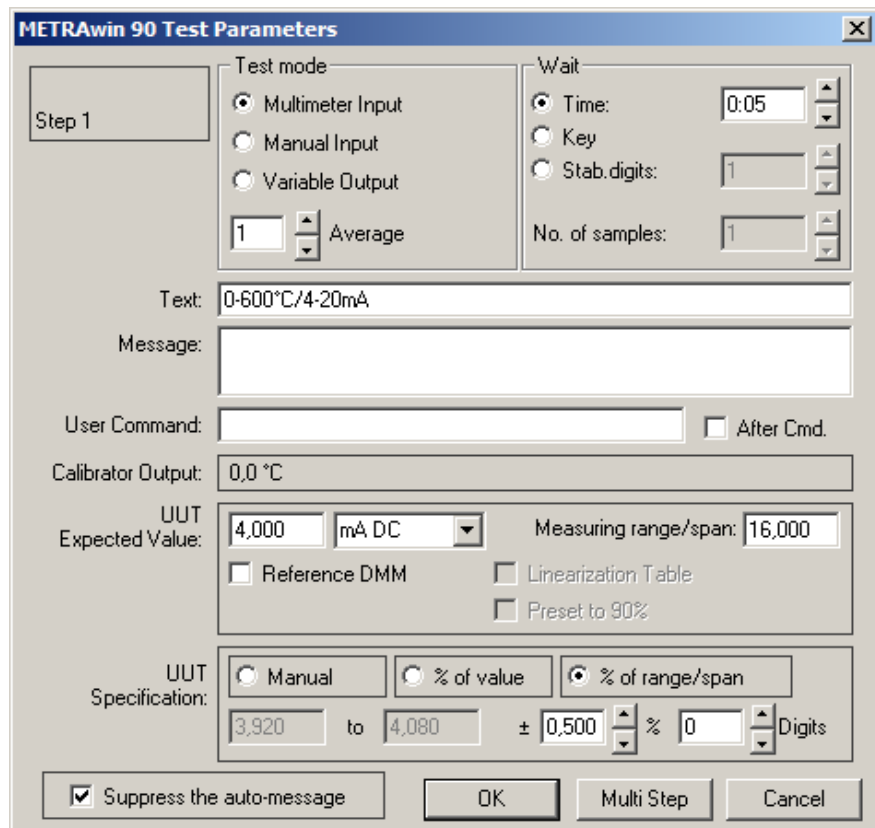


- ▶ Select the desired output function and operating mode, and acknowledge by clicking the **[OK]** button.
- ⇒ A control panel for configuring the parameters of the selected function then appears in the workspace:



- ▶ Select the parameters to be configured and enter the setpoint value either numerically or by adjusting the displayed value at the corresponding decimal place with the **[+]** and **[-]** keys. Acknowledge your entry with **[OK]**.
- ⇒ The **Test Parameters** dialog box appears.





► Enter or select:

- How the measured value will be entered to the program:

*Multimeter Input*

The measured value is read in from the multimeter via the PC's serial port with the help of an adapter.

*Manual Input*

The displayed actual value for the device to be calibrated is read and entered using the PC's keyboard.

*Variable Output*

The calibration signal is continuously changed at the monitor or the calibrator by means of manual tracking with a decade device until the display at the measuring or recording instrument coincides with the specified setpoint.

- When the measured value read in via the port is valid (**Wait**)
- Which measured value is expected from the device under test (**UUT Expected Value**) and how accurate the value should be (**UUT Specification**)
- Whether or not an **auto-message** will appear at the monitor screen
- Whether or not an individual message will be read out to the user before executing a procedure step

After this step has been completed, the next procedure line appears automatically which is filled out in the same way using the mouse, or is created with the help of standard Windows tools (copy and paste, or repeat with subsequent modification).

This process is repeated for all of the calibration points until the procedure has been completed. Suggestions regarding tolerance specifications in any given procedure step appear automatically in the next step.

### 3.6.2 Executing a Calibration Procedure

- ▶ Click the **[RUN]** button in the control bar if you want to execute the procedure beginning with the selected step, or click the **[STEP]** button if you only want to execute the selected step.

The screenshot shows the METRAWin 90 software interface. At the top, there is a menu bar (File, Edit, Setup, Help) and a toolbar with various icons. Below the toolbar is a 'Command String' field containing 'METRAHR 28C TEST MODE'. To the right of this field are buttons for 'Read', 'Upload', 'STEP', 'RUN', 'STOP', 'DIRECT', and 'TEST'. Below the command string is a 'Pass Percentage 80%' indicator and a 'CHANGE' button. A 'Clear Uncertainty' button is also visible. The main part of the interface is a table with the following columns: Step, Output, RTD Pt100, Par. 1, Par. 2, Par. 3, Par. 4, Par. 5, and Measured. The table contains 7 steps, each with a 'Status' row and a 'Text' row. The 'Text' rows contain values like '0.500 C/A 20mA'. The 'Par. 1' column contains temperature values (0.0 °C, 60.0 °C, 120.0 °C, 180.0 °C, 240.0 °C, 300.0 °C, 360.0 °C). The 'Par. 2' column contains 'Range' values (16,0000 mA =). The 'Par. 3' column contains 'Expected' values (4,0000 mA =, 5,6000 mA =, 7,2000 mA =, 8,8000 mA =, 10,4000 mA =, 12,0000 mA =, 13,6000 mA =). The 'Par. 4' column contains 'Min' values (3,9680 mA =, 5,5680 mA =, 7,1680 mA =, 8,7680 mA =, 10,3680 mA =, 11,9680 mA =, 13,5680 mA =). The 'Par. 5' column contains 'Max' values (4,0320 mA =, 5,6320 mA =, 7,2320 mA =, 8,8320 mA =, 10,4320 mA =, 12,0320 mA =, 13,6320 mA =). The 'Measured' column contains '...' for all steps.

Step	Output	RTD Pt100	Par. 1	Par. 2	Par. 3	Par. 4	Par. 5	Measured
Step 1	Text	RTD Pt100	0,0 °C	Range	Expected	Min	Max	Measured
...	0.500 C/A 20mA		Mode Digits: 10	16,0000 mA =	4,0000 mA =	3,9680 mA =	4,0320 mA =	...
Step 2	Text	RTD Pt100	60,0 °C	Range	Expected	Min	Max	Measured
...	0.500 C/A 20mA		Mode Digits: 10	16,0000 mA =	5,6000 mA =	5,5680 mA =	5,6320 mA =	...
Step 3	Text	RTD Pt100	120,0 °C	Range	Expected	Min	Max	Measured
...	0.500 C/A 20mA		Mode Digits: 10	16,0000 mA =	7,2000 mA =	7,1680 mA =	7,2320 mA =	...
Step 4	Text	RTD Pt100	180,0 °C	Range	Expected	Min	Max	Measured
...	0.500 C/A 20mA		Mode Digits: 10	16,0000 mA =	8,8000 mA =	8,7680 mA =	8,8320 mA =	...
Step 5	Text	RTD Pt100	240,0 °C	Range	Expected	Min	Max	Measured
...	0.500 C/A 20mA		Mode Digits: 10	16,0000 mA =	10,4000 mA =	10,3680 mA =	10,4320 mA =	...
Step 6	Text	RTD Pt100	300,0 °C	Range	Expected	Min	Max	Measured
...	0.500 C/A 20mA		Mode Digits: 10	16,0000 mA =	12,0000 mA =	11,9680 mA =	12,0320 mA =	...
Step 7	Text	RTD Pt100	360,0 °C	Range	Expected	Min	Max	Measured
...	0.500 C/A 20mA		Mode Digits: 10	16,0000 mA =	13,6000 mA =	13,5680 mA =	13,6320 mA =	...
Step	Output		Par. 1	Par. 2	Par. 3	Par. 4	Par. 5	