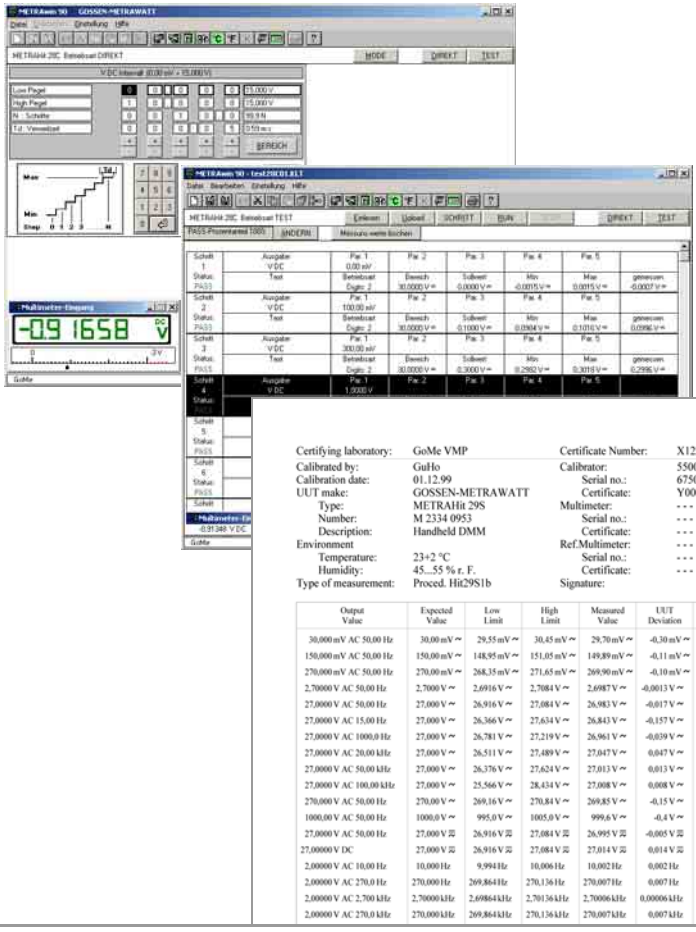
GOSSEN METRAWATT

METRAwin®90

Calibration Software

3-348-717-02
6/4.07



Certifying laboratory: GoMe VMP
Calibrated by: GuHo
Calibration date: 01.12.99
UUT make: GOSSEN-METRAWATT
Type: METRAHit 29S
Number: M 2334 0953
Description: Handheld DMM
Environment
Temperature: 23+2 °C
Humidity: 45...55 % r. F.
Type of measurement: Proced. Hit29S1b

Certificate Number: X1234-Y5678
Calibrator: 5500A
Serial no.: 6750013
Certificate: Y0006 DKD-K19701 02-
Multimeter: - - -
Serial no.: - - -
Certificate: - - -
Ref.Multimeter: - - -
Serial no.: - - -
Certificate: - - -
Signature:

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	30,000 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
27,0000 V AC 15,00 Hz	27,000 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
1000,00 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
27,00000 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	---

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Trademark

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Exclusion of Liability

The texts and illustrations included herein have been compiled with the greatest of care. Despite all of these efforts, errors can never be entirely prevented. For this reason, no guarantee can be made for the correctness of the contents of this document. We assume no legal responsibility or liability of any sort for incorrect entries or their consequences. We appreciate your suggestions for improvement, as well as any information regarding errors.
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 and corrections 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. Use the Windows Notepad to read this file.

Subject to change without notice.

Preface

Contents of the Installation Instructions

This document provides information regarding the purpose and range of applications, as well as the most significant features and system requirements of METRAwin®90 calibration software. It describes the necessary procedures for software installation and initial start-up of the calibration system.
Note: Information regarding use of the software can be accessed by means of the integrated online help function. Online help can be displayed via the help menu, and printed out if necessary. Detailed information regarding device-specific functions and their use is included in the operating instructions for the respective devices.

Target Group

These instructions are intended for users of the software, as well as the system administrator if the software is not installed by the user himself. The software is designed for use with the Microsoft Windows® graphic user interface. Users must be familiar with basic Windows® functions.

Scope of Validity

These instructions are valid for METRAwin®90 as of version 3.00.
Note: The version number is specified on the included floppy disk/CD-ROM. It is also displayed when program installation is initialized, and appears in the initial window when the installed program is started as well.

Support

If you have any questions regarding use of this software, please contact your GMC-I Gossen-Metrawatt GmbH sales representative, or refer to the contact address which can be accessed under “About” in the Help menu:

GMC-I Gossen-Metrawatt GmbH
Product Support Hotline
Phone: +49 911 8602-112
Fax: +49 911 8602-709
E-Mail support@gossenmetrawatt.com

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1 Use and Features

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 METRA*Hit* 18C, METRA HIT 28C and METRA HIT | 28c *light* Process Calibrators**

  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 METRA HIT 28C is also equipped with a TRMS multimeter (V, mA, W, F, Hz, °C and °F) and a milliohmmeter, plus a memory module for calibration procedures and measured values. Thanks to inclusion of these multimeter functions, or by incorporating a separate METRA Hit 18S, 28S, 29S or 30M 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 or sequence-controlled setup of the calibrator from the PC via an RS 232 or USB interface (with the help of the BD232, the SI232-II or the USB-Hit interface adapter), automatic analysis of measured values entered manually or read in from the multimeter via the interface, 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. 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 METRA HIT 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, clip-on ammeters, panel-mount measuring instruments etc., and include the various electrical quantities required to this end. By incorporating a separate METRA Hit 18S, 28S, 29S or 30M 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 or sequence-controlled setup of the calibrator from the PC via an IEEE 488 interface, automatic analysis of measured values entered manually or read in from the multimeter via an RS 232 interface, 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 and 5520A, 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.

The most important features of METRAwin®90 software:

- Convenient, interactive control of the calibrator from the PC with direct data entry as individual value
- Uncomplicated, 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 interface
- 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 interface
- 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

2 System Requirements

2.1 Hardware

METRAwin®90 can be run on IBM compatible PCs which fulfill the following minimum requirements:

- 200 MHz Pentium processor
- 64 MB RAM
- Hard disk with at least 40 MB available memory
- SVGA monitor with a resolution of at least 800 x 600 pixels
- 3½" floppy disk drive or CD-ROM drive
- Microsoft compatible mouse or other pointing device

For reading in measured values from METRA Hit multimeters and for controlling METRA Hit 18C, 28C or 28C *light* process calibrators with METRAwin®90-2:

- At least 1 free RS 232 serial port (COM1 ... COM4) for connecting the BD232 or SI232-II interface adapter

or

- 1 USB interface for connecting USB-Hit

For controlling FLUKE multifunction calibrators with METRAwin®90-F/-FJ:

- 1 installed or external GPIB controller interface (IEEE 488) with National Instruments™ compatible protocol,
  e.g. National Instruments PCI-GPIB NI-488.2
  e.g. National Instruments GPIB-USB-B NI-488.2

For printing reports:

- Local or network printer which is supported by Windows

2.2 Operating System and Software

METRAwin®90 can be used with the following operating systems:
Microsoft®Windows 95, 98, ME, NT 4.0, 2000 and XP.

The following is also required for the creation of individualized calibration reports with company logo and/or modified report layouts:

Microsoft® Word™ 95, 97 or 2000 / 2003
or
Microsoft® Excel™ 95, 97 or 2000 / 2003

3 Installation

3.1 Installing METRAwin®90 (all variants)

A *SETUP.EXE* file is included on disk 1 or on CD-ROM. The program is installed with the help of several dialog boxes when this file is executed (select the file with the **Run** function in the **Start** menu or double click the file in the Windows Explorer). The program directory and the name of the start menu group can be freely selected as desired.

METRAwin®90 software is available in several variants for different calibrators. The different software variants can be installed to the same directory, as long as only the last digit of the respective version numbers vary from each other (e.g. 3.10 and 3.12). However, the version with the highest number must be installed last. The version number is specified on the included floppy disk. It is also displayed when program installation is initialized, and appears in the initial window when the installed program is started as well.

If a variant with the same number has already been installed to the destination directory, an appropriate prompt appears asking whether or not installation should nevertheless be continued. The prompt can be acknowledged with **Yes** in order to continue, or installation can be aborted by clicking **No**, followed by **Back** in order to select a different destination directory. If installed to a different destination directory, a different name should also be assigned to the start menu group in order to assure clear-cut identification.

If a newer version has already been installed to the destination directory, a warning is displayed which can be acknowledged by clicking **OK**. **Back** can then be clicked in order to select a different destination directory. If installed to a different destination directory, a different name should also be assigned to the start menu group in order to assure clear-cut identification.

Two subdirectories, namely “Procedure” and “Protocol”, are set up within the selected program directory during installation. Procedure templates can be saved to the “Procedure” directory (without calibration results, *KLF* file type), and report files can be saved to the “Protocol” directory (with results, *KLT* file type). Additional subdirectories can be added to these if required, for example according to calibration-object type or manufacturer.

After installation, a program group with the selected designation appears under **Programs** in the Windows **Start** menu (standard designation: **MWIN90**). Start the program by clicking the **Calib** icon in the **MWIN90** program group.

3.2 Installing METRAwin®90-F/-FJ

Calibration procedures for a variety of multimeters from our current and previous product spectrum, as well as for adjusting METRA Hit 22S/M, 23S, 24S, 25S, 26S/M 28S and 29S multimeters (with METRAwin®90-FJ only) are included on disk 2 or on CD-ROM in the directory “Procedure”. Copy these files into the appropriate “Procedure” directory.

3.3 Registering and Enabling METRAwin®90-F/-FJ

The above mentioned METRAwin®90 variants must be registered in order to enable all included functions. Proceed as follows in order to register the software:

1. Connect your multifunction calibrator to the PC via the IEEE 488 interface and switch both devices on. The IEEE 488 interface and its respective driver must already be properly installed and functional (see also chapter 4.3).
2. Start METRAwin®90-F/-FJ and select the appropriate calibrator from **Device Type** in the **Setup** menu.
3. Open the **Port Setup** dialog box from the **Setup** menu, select the port used for the IEEE 488 interface from the **IEC Bus Card** field (**GPIB0** or **GPIB1**) and enter the calibrator's device address (**1 to 32**) to the **Calibrator Address** field.
4. After closing the dialog box by acknowledging with **OK**, the program initializes communication with the calibrator and displays its ID message (designation and serial number).
5. If METRAwin®90 has not yet been registered for the interconnected calibrator, an appropriate message appears prompting the user to register, so that the required password can be issued. The registration dialog box is accessed by acknowledging with **Yes**. Enter the required information to the entry fields in this window.
6. Entered data are transferred to a **Registration Form** after clicking the **Print a fax form** button, and the registration form is opened at your word processing program.
7. Fax a printed copy of this form, or e-mail a copy of the file to the address shown in the form. You'll receive your password promptly, which will allow you to enable software control of the interconnected calibrator.
8. If necessary, repeat steps 1 through 5 in order to enable the software, and then click the **Use a key code** button.
9. Enter the password to the window which now appears and acknowledge your entry by clicking the **OK** button.
10. The program is now linked to the calibrator, and is fully functional.

Notes

If the program has not been enabled, the interconnected calibrator cannot be controlled with the PC!

The assigned password depends upon the entered company name, as well as the calibrator's serial number. For this reason, registration must be repeated for each calibrator to be controlled with the PC. Registration is only possible for a single company with one software license, although any desired number of calibrators or installations can be enabled.

Save the returned registration form with the password in case reinstallation should become necessary!

3.4 Uninstalling the Software

If desired, the program can be uninstalled by selecting **Programs** from the **Start** menu and clicking the **Uninstall** function in the **MWIN90** program group.

4 Calibration System Setup and Start-Up

4.1 Calibration System: METRAwin®90-2 and METRA*Hit* 18C Process Calibrator

- Mount the devices as shown above and secure all mechanical connections (adapters, cables) with the mounting screws. Connection of a second multimeter with memory adapter for use as a reference multimeter for the measurement of calibration signals which are not generated by the calibrator (in the TEST program function) is optional.
- Enter the following settings to the devices (refer to the operating instructions for the respective devices for details concerning device operation):

  18C Calibrator Simultaneously press the ⌂ and **ON** keys when switching the device on. "REMOTE" appears at the display (remote control).

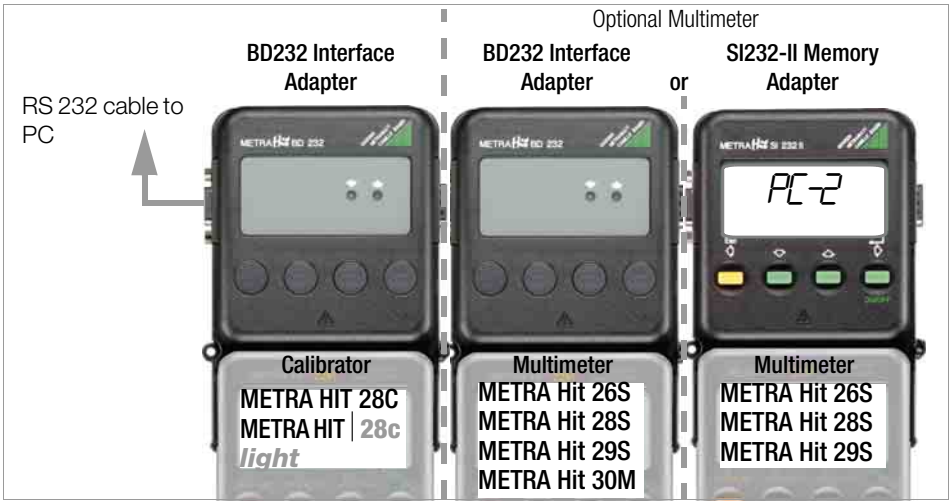
  18S Multimeter Simultaneously press the **DATA** and **ON** keys when switching the device on. The ⚠ symbol blinks at the display (transmission mode on).

  2xS Multimeter Switch the device on as usual with the **ON** key.
  Enter the following parameter configurations to the SEt menu:
  ➲ rAtE 0. 1
  ➲ Addr 0 1 ➲ AdAPtEr S 1232 on li nE ➲ ModEM no
  Now activate transmission mode operation with the SEnd on menu.
  The ⚠ symbol blinks at the display.

  Memory Adapter Switch the adapter on with the **ON** key.
  Enter the following parameter configurations to the SEt menu:
  SI232: ➲ bAud 9600 ➲ Addr 1 (at optional reference multimeter: 2)
  SI232-II: ➲ bd-1 n 8 192 ➲ bd-ou 9600
  ➲ Addr 1 (at optional reference multimeter: 2) ➲ ModEM no
  Now activate transmission mode operation with the on li nE menu.
  "on- 1" appears at the display and "DATA" blinks.

- Start METRAwin®90 at the computer as described in chapter 5, and select the required parameters from the **Port Setup** dialog box. The system is ready for use after closing the dialog box by clicking the **OK** button.

4.2 Calibration System: METRAwin®90-2 and METRA HIT 28C Process Calibrator



➪ Connect the METRA HIT 28C/METRA HIT | **28c *light*** Calibrator to a vacant COM port at the PC with an RS 232 cable via a BD232 Interface Adapter.

The calibrator's device address is irrelevant in this case, and the system is thus already functional.

An additional METRA Hit multimeter of the specified type can be optionally integrated into the calibration system with an additional BD232 or SI232-II adapter.

If *Addr 1* is assigned to this multimeter as well as the SI232-II adapter, it is used for acquiring measured values at the device under test instead of at the multimeter integrated into the METRA HIT 28C.

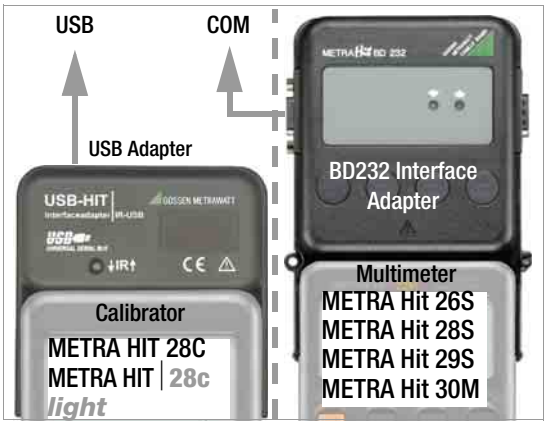
If *Addr 2* is assigned to this multimeter as well as the SI232-II adapter, it is used as an additional reference multimeter by the program's TEST function for the measurement of calibration signals, which are not generated by the calibrator.

The devices are switched on automatically by the program via their infrared interfaces as described in chapter 5.

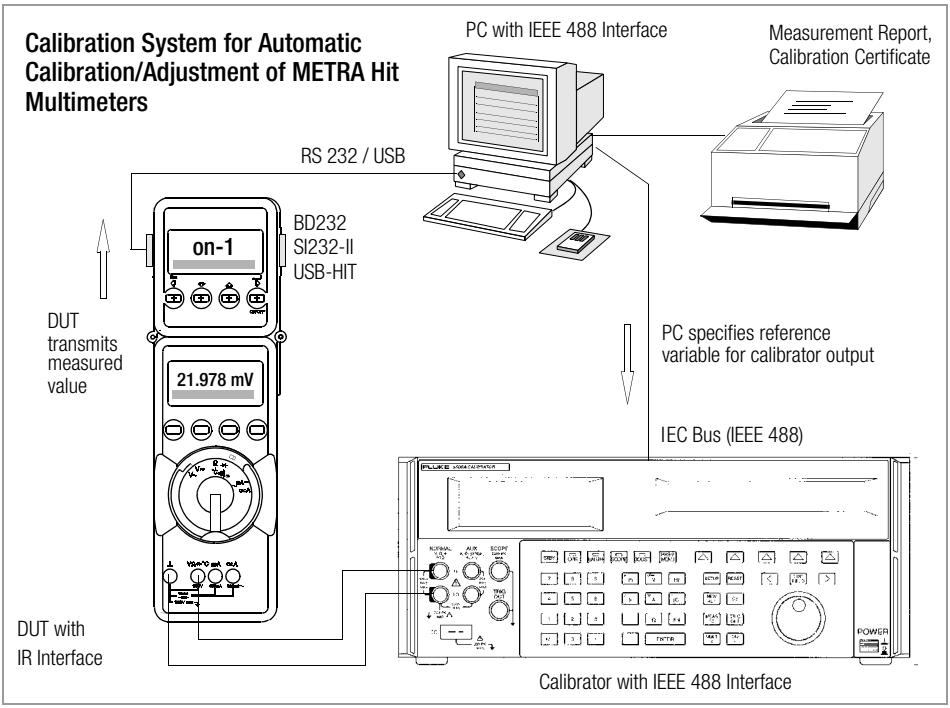
System with USB Adapter

Alternatively, the METRA HIT 28C/ METRA HIT | **28c *light*** can be connected to a USB port at the PC via a USB-Hit adapter. A virtual COM port is assigned to the adapter by its driver software.

Any optionally utilized multimeter must still be connected to a vacant COM port at the PC. Otherwise, the above listed instructions remain unchanged.



4.3 Calibration System: METRAwin®90-F/-FJ and FLUKE Multifunction Calibrators



Connect your multifunction calibrator to the PC via the IEEE 488 interface and switch both devices on. The IEEE 488 interface and its respective driver must already be properly installed and functional.

If the system will be used for automatic calibration/adjustment of METRA Hit multimeters, the multimeter must be connected to a vacant COM port at the PC via a BD232 or SI232-II adapter. Alternatively, the USB-Hit adapter can be used for connection to a vacant USB port at the PC. Depending upon the type of multimeter, the following settings are required for error-free communication:

METRAHit 1x (12 ... 18S/A)

Multimeter

➪ Simultaneously press the **DATA** and **ON** keys when switching the device on.

The ⏚ symbol blinks at the display (transmission mode on).

SI232-II Memory Adapter

➪ Switch the adapter on with the **ON** key.

➪ Enter the following parameter configurations to the *SEt* menu:
  ➲ *bd-n 8 192* ➲ *bd-ou 9600*
  ➲ *Addr 1* ➲ *ModEN no*

➪ Now activate transmission mode operation with the *on li nE* menu.

"*on- l*" appears at the display and "DATA" blinks.

METRAwin®90

➪ Enter the following Port settings:
  Multimeter: COMx (utilized COM port)
  Activate the **Memory Adapter** option field if the SI232-II is used.
  Deactivate the **Memory Adapter** option field if the BD232 is used.
  Deactivate the **METRA Hit 2x** option field.

METRA Hit 2x (22 ... 29S/M)

2xS Multimeter

➪ Switch the device on as usual with the **ON** key.

➪ Enter the following parameter configurations to the *SEt* menu:
  ➲ *rAtE 0. 1*
  ➲ *Addr 0 1* ➲ *AdAPtEr bd232* ➲ *ModEN no*

Transmission mode is **not** activated.

SI232-II Memory Adapter

➪ Switch the adapter on with the **ON** key.

➪ Enter the following parameter configurations to the *SEt* menu:
  ➲ *bd-n 9600* ➲ *bd-ou 9600*
  ➲ *Addr 1* ➲ *ModEN no*

➪ Now activate transmission mode operation with the *onL nE* menu.

"*PC*" appears at the display, and „Data" blinks.

METRAwin®90

➪ Enter the following interface settings:
  Multimeter: COMx (utilized COM port)
  The **Memory Adapter** option field is irrelevant.
  Activate the **METRA Hit 2x** option field.
  Activate the **Auto-setup** option field.

5 Starting METRAwin®90

If the USB-Hit Interface Adapter and/or the IEEE 488 interface is used, it must be assured that the required drivers have been installed and correctly configured before starting METRAwin®90.

- ⇨ METRAwin®90 can be started via the Windows **Start** menu by clicking the **Calib** icon in the **MWIN90** program group, or by double clicking the KALIB.EXE file in the program directory selected during installation after opening the Windows Explorer.
- ⇨ Enter the following program settings after starting METRAwin®90:
  1. The user interface language (English or German) can be selected under menu **Setup**/ **Language.**
  2. Select the calibrator model with the **Device Type** function in the **Setup** menu.
  3. Select COM ports with the **Port Setup** function in the **Setup** menu.

When the **Port Setup** window is closed by acknowledging with the **OK** button, the program tries to communicate with the devices via the selected ports. If a METRA Hit 2x multimeter or calibrator is connected via a bidirectional adapter (BD232, SI232-II or USB-Hit), it is switched on automatically via its infrared interface. All other devices must already be switched on and configured as described in chapter 4.

If communication cannot be established, the **Port Setup** dialog box is automatically reopened so that the necessary corrections can be made.

After communication has been successfully established, the calibration system is ready for use and either the “DIRECT” or the “TEST” mode can be selected.

In the “DIRECT” mode, individual setting values are sent to the calibrator (interactive control).

The “TEST” mode allows for the creation and execution of calibration procedures using the calibrator as a source and a multimeter as a device under test, or as a measuring instrument for output quantities from other devices under test.

Please refer to the integrated online help function for further details regarding the program operation.

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