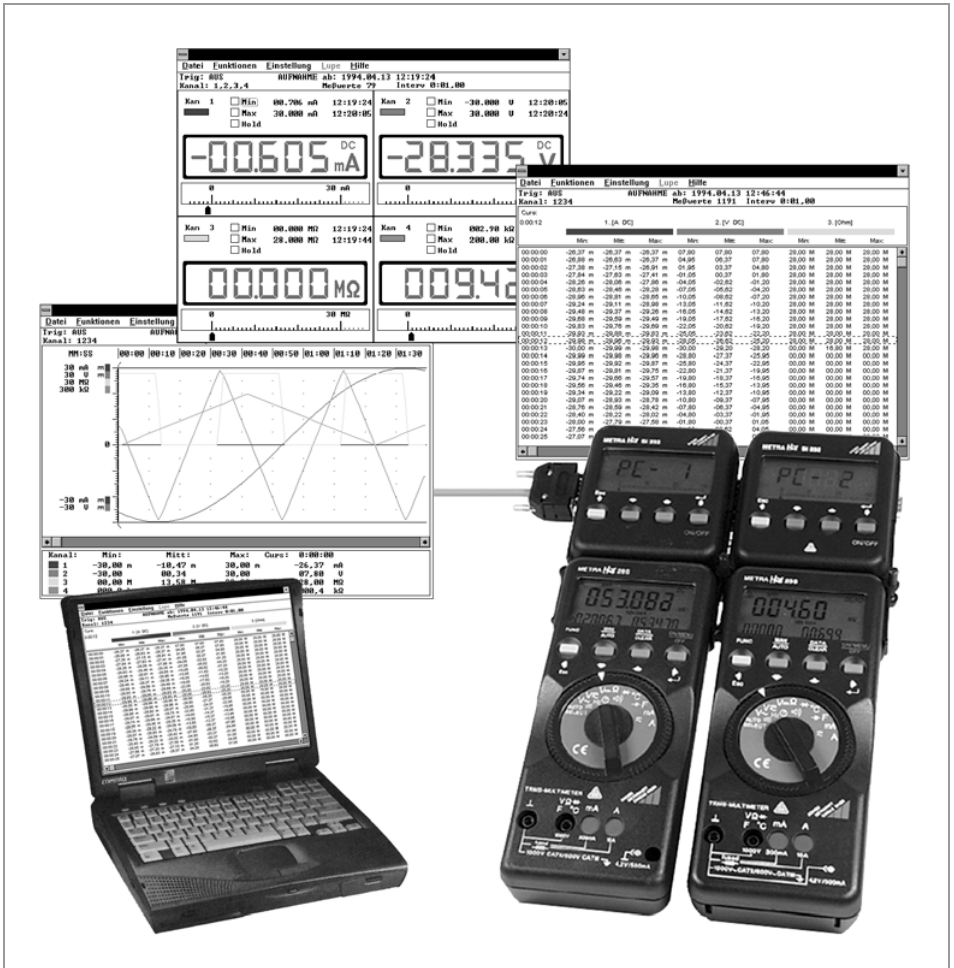


SI 232-II, BD 232 Interface Adapter with METRAWin 10 / METRAHit® Software for Measuring and Recording Systems with Multimeters

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1 Introduction

Interface Adapter

Whereas interface adapter BD232 allows for online transmission of measured values from multimeter to PC, memory adapter SI232/-II is additionally capable of saving multimeter data on-site without a PC. The values thus stored to memory can subsequently be transmitted to a PC.

PC-Analysis Software

METRAwin 10 is a high-performance analysis software for use with WINDOWS. It allows for user-friendly recording, storing, display and documentation of measurement data from up to 10 multimeters.

Data display is possible in multimeter, recorder or data logger format.

Measurement data are saved in ASCII format for further processing.

The required operating language can be selected for the software.

Upon request we can supply you with an interface description for our multimeters to enable programming of your own Windows applications.

If you would like to use our multimeters together with LabView software from National Instruments, the corresponding driver is available from our product support team, see chapter 11.

2 System Requirements as from software version 5.0 (32 Bit)

Software

- MS WINDOWS 95/98/ME, NT or 2000

Hardware

- IBM compatible WINDOWS PC, Pentium-CPU or better with 32 MB RAM
- VGA monitor
- Hard disk with at least 20 MB available memory
- 3½" floppy disk drive
- MICROSOFT compatible mouse
- a WINDOWS supported printer, if required
- 1 serial interface COM1 or COM2

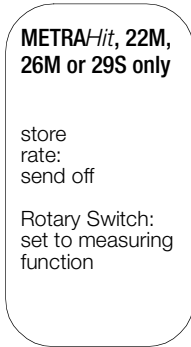
3 Multimeter, Adapter and METRAWin 10 Operating Modes

3.1 General Information

- The address for the adapter and its corresponding multimeter must be identical.
- The baud rates for the adapter and the multimeter must also be the same.
- The multimeter's sampling rate should be faster than the speed at which data are requested by the memory adapter or METRAWin 10 software.

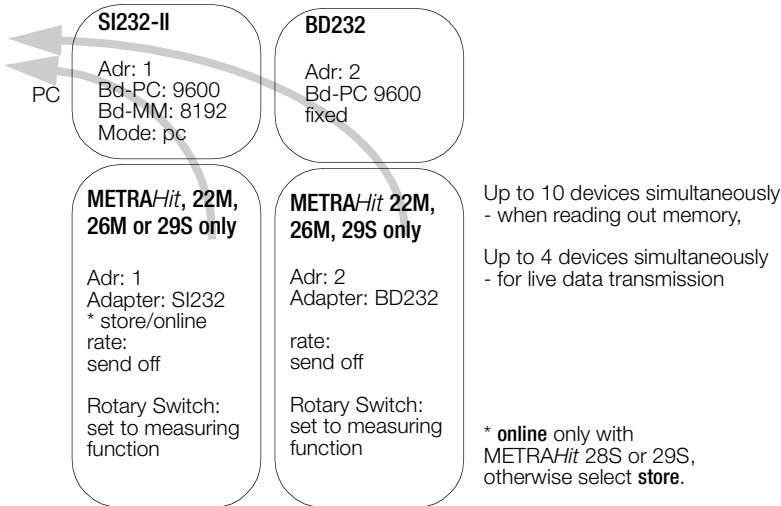
3.2 Saving Measurement Data to Memory in the Multimeter

– for METRAHit 22M, 26M and 29S only



3.3 Reading Out the Multimeter's Memory

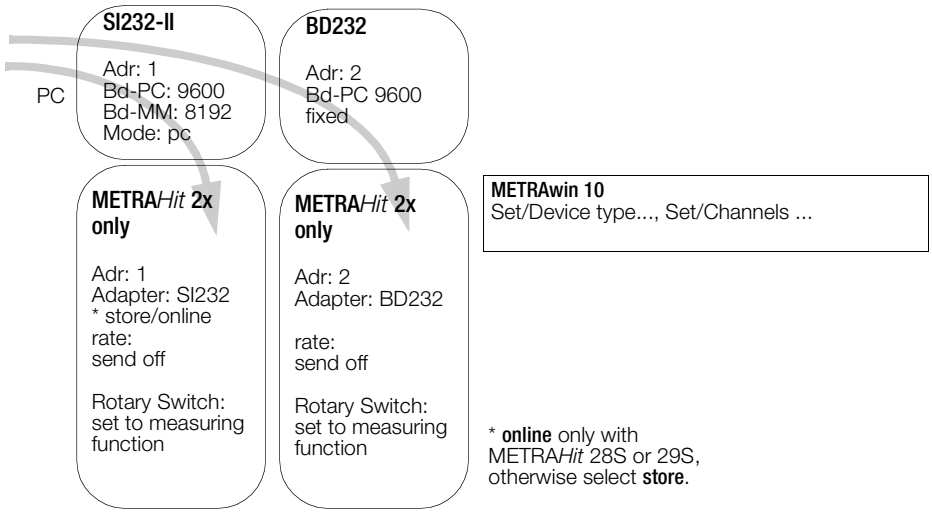
– for METRAHit 22M, 26M and 29S only, with SI232-II or BD232



METRAWin 10
Set/Device type ..., Set/Channels ...
File/Read memory

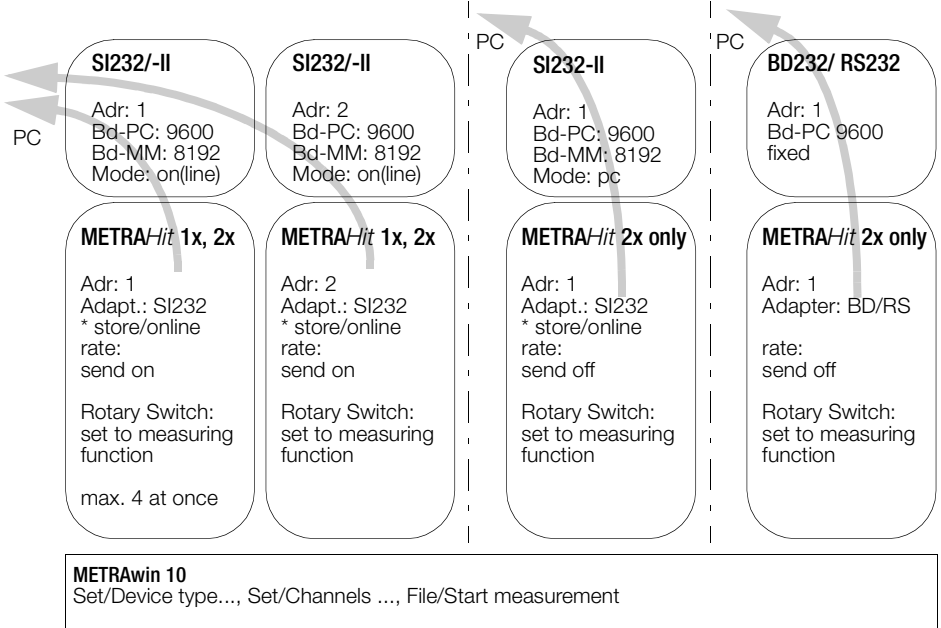
3.4 Configuring Multimeter Parameters

– for all METRAHit 2x with SI232-II or BD232



3.5 Receiving Live Measurement Data from the DMM

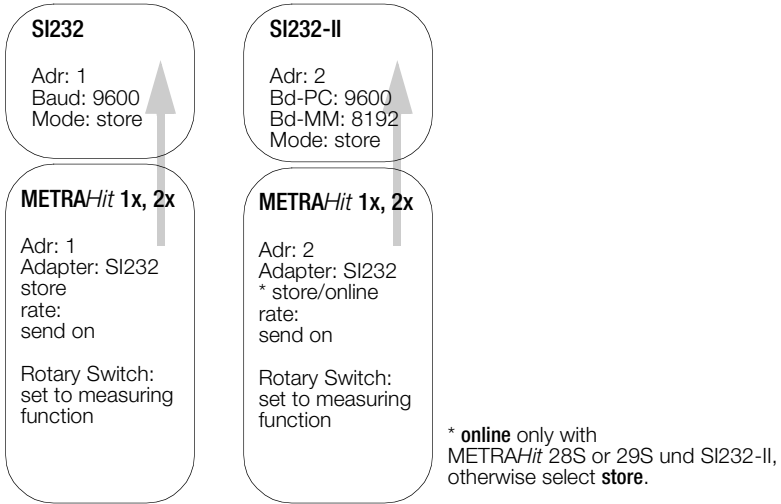
– via adapter, but without saving to memory in the adapter



SI and BD adapters can be mixed when using any METRAHit 2x. However, only SI adapters may be utilized if METRAHit 1x/2x are used in combination. If more than 4 adapters are used, set the baud rate to 19.2 kBd, or to 9.6 kBd for fewer than 4 adapters.

3.6 Saving Measurement Data to the SI232/-II Memory Adapter

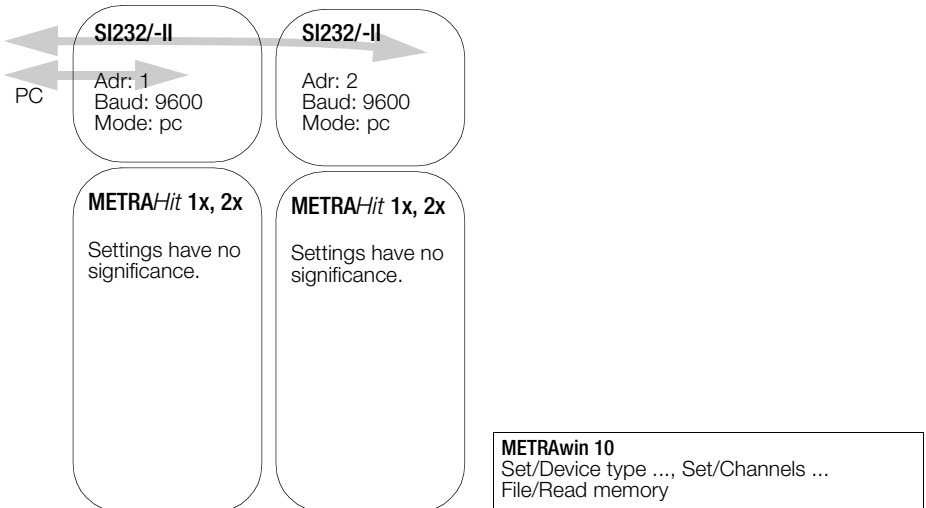
The memory adapter can be used with all multimeter versions.



Exception: Power and mains disturbance measurements (VAC + dropouts + peaks) with the 29Smultimeter can only be saved to internal multimeter memory.

Note: It is advisable to synchronize the clocks at the multimeter and the adapter before starting memory mode operation.

3.7 Reading Out Measurement Data from the SI232/-II/-II Memory Adapter and Configuring Adapter Parameters



4 Adapter Connection and Initial Start-Up

4.1 Connecting the Adapter

The screw connections between the stacked adapters serve exclusively to secure the connections at the serial interface plug connectors. Disconnect each individual adapter prior to transport in order to prevent them from being damaged.

- Connect the 9-pin subminiature socket at the connector cable to a vacant COM port at the PC.
- Plug the other end of the cable into the **left** side of the first adapter. Plug **additional** memory adapters into the **right** side.
- Secure the plug connections between the individual memory adapters by tightening the screws.
- Plug the multimeters into the adapters.



Caution

The memory adapter's housing is made from electrically conductive plastic. It may not be allowed to come into contact with voltage conducting components.

4.2 Initial Start-Up - SI232-II Memory Adapter

Before data can be transmitted to the PC, an **individual** address must be selected for each memory adapter, and the memory adapter must be set to transmission mode operation (PC or online) (see memory adapter operating instructions).

If several memory adapters are used, the same transmission speed must be selected for all devices.

If **more than 4** memory adapters are used in the **online mode**, a transmission speed of **19,200 baud** must be selected in order to assure interference-free data transfer.

- Set the required multimeters to data transmission before performing measurement by simultaneously pressing the DATA key and the ON key.
- Check the addresses for the interconnected memory adapters.
- Start the PC and METRAWin 10 software.
All interconnected memory adapters are addressed via the serial port and a connection with the PC is established automatically (see **PC** function, chapter 6.2, page 12 and chapter 7.10, page 22).
- Activate "Adapter" under menu item "Set/Channels" in the "Interface" field and select the appropriate port and transmission speed for your system.
- Check data transmission to the PC by clicking the "Test" button under menu item "Set/Channels".
- The memory adapters can be addressed and configured individually under menu item "Set/Memory adapter", and the clock and transmission speed can be selected.
- In order to perform a measurement, click "Operating mode: ONLINE" under menu item "Set/Memory adapter". All memory adapters connected to the interface are placed online and can be queried with their respective addresses.
- Save the selected configuration under menu item "Set/Save configuration".
This command saves all configurations which have been selected in the "Set" menu. Measurements can then be performed with the selected configuration.

- ⇒ After selecting the “File/Measure” menu item, the recorded measurement values are transmitted to the PC and are displayed at the monitor in accordance with the display mode selected in the “Set” menu.

4.3 Initial Start-Up – BD232 Interface Adapter

- ⇒ Set the multimeter to the data transmission mode before performing measurement by simultaneously pressing the DATA key and the ON key.
- ⇒ Start the PC and METRAWin 10 software.

A connection to the PC is established automatically and the LEDs at the interface adapter indicate that data transmission is in process.

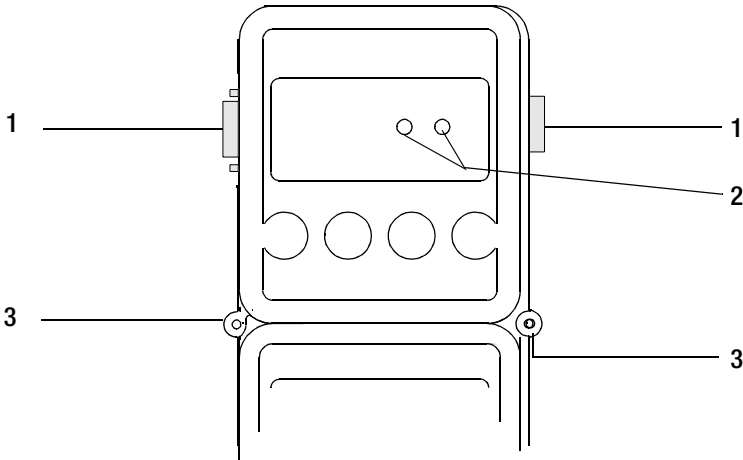


Figure 4.1 Memory Adapter Operating Elements

1 RS232 Interface

The RS232 data interface connects the adapters to one another, and to the PC.

2 LEDs

The LEDs indicate data transmission status. The red LED blinks when data are transmitted to the PC, and the green LED blinks when data is transferred from the PC to the multimeter.

3 Connection between two adapters with fastening screws



Note

Please note that chapter 5 and chapter 6 do not apply to this interface adapter because it does not include any operating elements.

5 Operating Elements, Switching the Adapter ON and OFF, Replacing the Batteries

5.1 Keypad, Interface

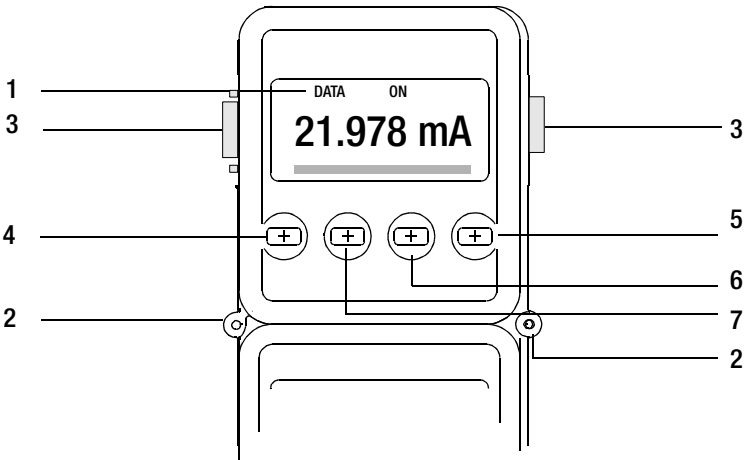


Figure 4.2 Memory Adapter Operating Elements

- 1 LCD**
Displays the respective menu item during manual operation of the memory adapter.
- 2 Connection between two adapters** with fastening screws
- 3 RS232 Interface**
The RS232 data interface connects the adapters to one another, and to the PC.
- 4 ESC Key**
The ESC key is used to exit the current menu level and return to the next highest level.
- 5 ON/OFF or ENTER Key**
Turns the adapter on and off and acknowledges the selected menu item.
- 6 Scroll UP Key**
This key is used to select individual menu items by scrolling up, and to increase values.
- 7 Scroll DOWN Key**
This key is used to select individual menu items by scrolling down, and to decrease values.



Note

Various functions can be selected with hot-key combinations (chapter 6.2, page 12 “Adapter Shortcut Functions”).

5.2 Display

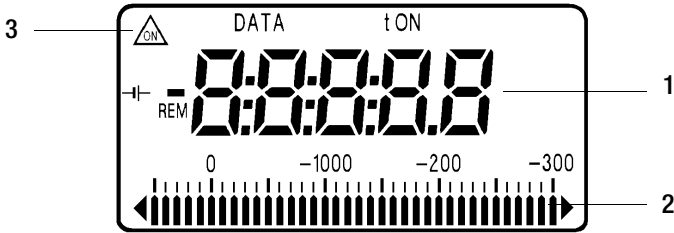


Figure 4.3 Memory Adapter LCD

1 Digital Display

The current menu item appears at the 7 segment liquid crystal display during manual operation of the memory adapter.

When stored data are viewed, measurement values appear at the display in digital format (menu item "reCALL", chapter •, page 21).

2 Analog Display

Available memory space can be estimated with the help of the analog display.

For example, the diagram in chapter 5.3, page 11, indicates that the memory is approximately 13/30 full.

When stored data are viewed, measurement values appear at the display in digital format (menu item "reCALL", chapter •, page 21).

3 Special Characters

The special characters which appear at the display have the following meanings:

- **DATA** blinks when data are being received from the multimeter.
- **REM** blinks when data are being received from the PC.
- The **ON triangle** (upper left) appears when data are being transferred from the multimeter to the memory adapter (with adapter in STORE mode).
- **ON** (top center) appears when the trigger condition has been fulfilled in the STORE mode. If no trigger threshold has been selected, ON appears as soon as data recording starts.
- The **left-hand overflow arrow** next to the analog display always blinks when data are being saved in the STORE mode.
- The **t symbol** appears when a time trigger is active in the STORE mode.
- The **battery symbol** appears when battery capacity has been approximately $\frac{2}{3}$ depleted. Remaining battery capacity (for alkaline batteries) is sufficient to continue storing measurement data for at least 96 hours, depending upon the selected sampling rate.

5.3 Switching the Memory Adapter ON and OFF

Briefly press the right-hand ON/OFF key in order to switch the memory adapter **ON**. The analog scale appears at the LCD along with a display of remaining memory capacity, above which the last selected operating status is displayed at the left-hand side. The memory adapter is ready for operation.

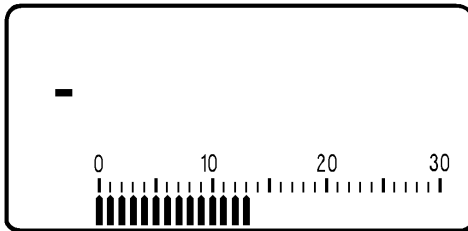


Figure 4.4 Initial Display

Press the yellow ESC key until the initial display appears in order to switch the memory adapter **OFF** (see above). Then press and hold the ON/OFF key for more than 1 second. The memory adapter switches itself off **automatically** after a period of 10 minutes (except for the time display) if none of its keys have been activated, and if no data have been recorded. However, the memory adapter is not switched off automatically in the PC, STORE and ONLINE operating modes. If no signals are received at the memory adapter from the PC or from the multimeter for a period of approximately 17 seconds, the memory adapter is switched to the “battery saving” mode.

5.4 Replacing the Batteries

The memory adapter is equipped with two 1.5 V mignon cells in accordance with IEC R 6. In order to replace the batteries, loosen the two screws at the memory adapter’s housing base. The batteries are in a holder close to the middle of the printed circuit board. Remove both depleted batteries and install two 1.5 V mignon cells. The plus and minus poles of the batteries must correspond to the symbols at the battery holder. Replace the housing base and retighten the two screws.



Attention: Connect the memory adapter to a PC and start METRAWin 10 software in order to prevent data loss from the memory adapter during battery replacement. In this way, the memory adapter is supplied with power from the RS232 interface during battery replacement.

6 Operating Instructions at a Glance

The memory adapter can be operated with the keypad on the device, or more conveniently with METRAWin 10 software. The most important functions from the operating menu can also be selected with hot-keys (shortcut function).

6.1 Menu Driven Operation

- The \leftarrow key acknowledges a menu item and opens the respective operating menu level. The same key with the \rightarrow symbol moves the cursor to the right, for example when entering the time.
- The \downarrow and \uparrow keys are used to select menu items by scrolling up or down, or to reduce or increase parameter values.
- The current menu level can be exited with the yellow ESC key and the display is returned to the next highest level. The same key with the \leftarrow symbol moves the cursor to the left, for example when entering the time.
- The \leftarrow and \rightarrow keys are used to select the desired character for numeric parameter settings such as trigger levels and time.

Note: If a menu item is exited, the LCD automatically returns to its initial display.

6.2 Adapter Shortcut Functions

Three important functions can be activated with double key combinations (hot-keys).

• Start / Stop Manual Data Recording – “StorE” Function

Hot-Keys: Start: Simultaneously press the yellow ESC key and the \leftarrow key.
Display: nn.n = memory occupancy as a percentage
Hot-Keys: Stop: Press the \leftarrow key twice.

• Read Out Data, Configure Parameters – “PC” Function

Hot-Keys: Press and hold the yellow ESC key and then press the \uparrow key as well.
Display: PC-nn (nn = selected memory adapter address)

Memory adapter parameters can be configured from the PC in this operating mode. Data can also be transferred from the PC to the multimeter, and back to the PC via the adapter. In addition to this, recorded measuring data can be uploaded to the PC.

• Live Transmission of Multimeter Measurement Data – “onlinE” Function

Hot-Keys: Press and hold the yellow ESC key and then press the \downarrow key as well.
Display: on-nn (nn = selected memory adapter address)
Hot-Keys: Stop: Press the yellow ESC key.

Data are transferred from the multimeter to the PC (SEND mode) in this operating mode, but only in one direction and without being activated from the PC.



Attention

A different address must be selected for each memory adapter (chapter 7.6, page 18).

6.3 Shortcuts at the Multimeter

- **Select Normal Operation**

- Switch the device off, and then back on.
- Or, if the device is in the measuring mode: press the FUNC and ON keys simultaneously.
- Or, if a selection menu is open: select STORE - STOP and acknowledge with ON.
- Or, if the device is in the SEND mode: select SEND - OFF in the SET menu.

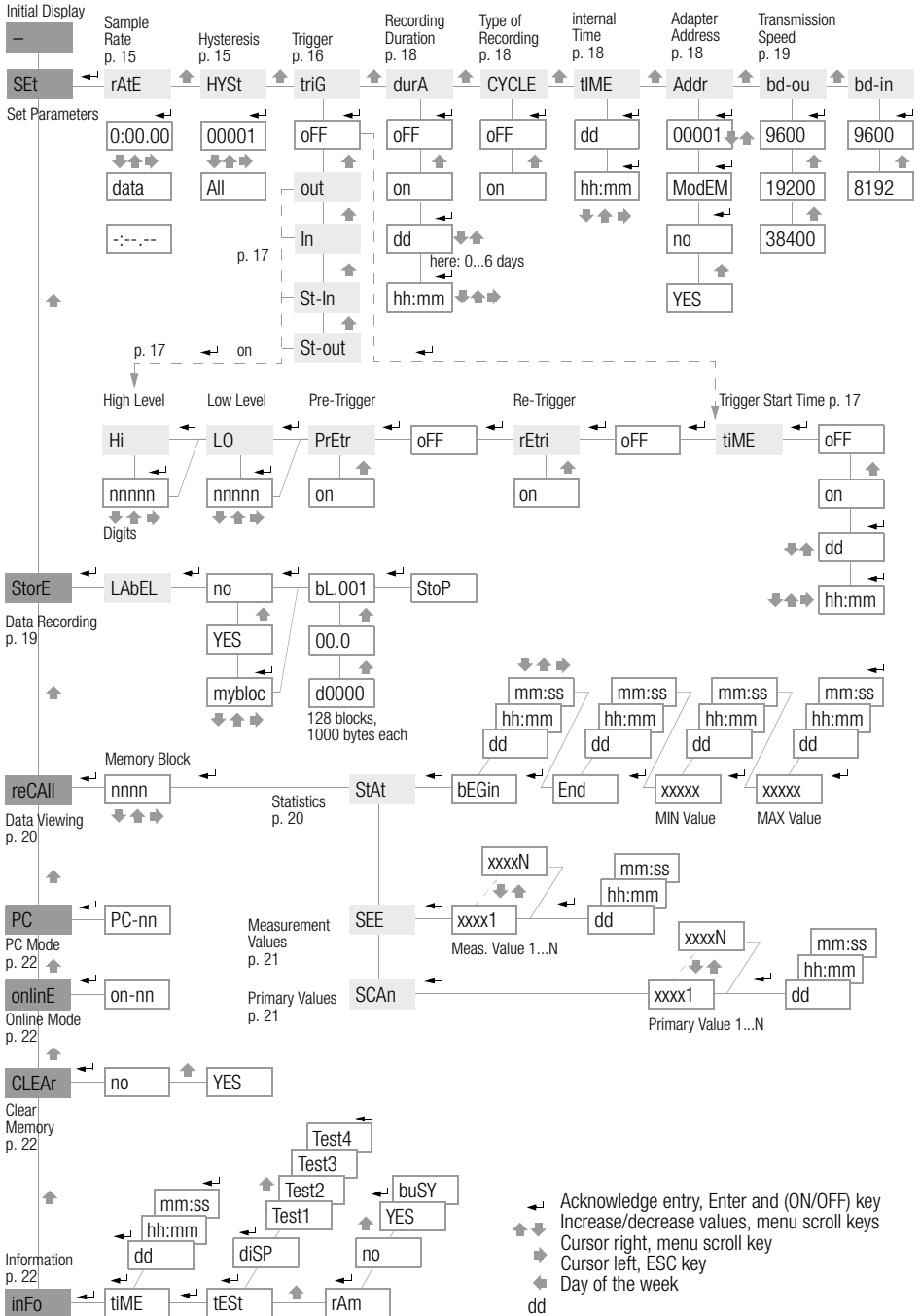
- **Transmit Measurement Data to the Adapter – SEND Mode**

- Switch the multimeter on by simultaneously pressing DATA and ON.
- Or, select SEND in the SET menu.

- **Store Measurement Data at the Multimeter – STORE Mode**

- Only applies to 22M, 26M and 29S multimeters
- Simultaneously press FUNC and ON with the multimeter switched on.

6.4 Menus Overview



7 Menu Item Descriptions

7.1 Set Sampling Rate – rAtE

Key Sequence: **Set** ← **rAtE** ← **m:ss.hh** ↕↕

Settings: m = minutes, ss = seconds, hh = hundredths of a second

The sampling rate determines the time resolution of the data recorded to the memory adapter.

The special interval -:--:-- is used to save only one measurement value after the STORE mode has been started. The next time the STORE mode is started, a single measurement value is stored once again. In this way, measurement values from 2x multimeters are stored to memory. The sampling rate for these multimeters must be set to DATA, and the corresponding function must be activated with the DATA key at the multimeter. With the multimeter in the SEND mode, only the value determined with this measuring function is transmitted to the adapter.

Note:

At the expense of time resolution, recording can be performed over longer periods of time if a long sampling interval is used than are possible with a short sampling interval. Since only differences are saved to memory, it is advisable to use a relatively short interval to assure optimum data display, and to select highest possible sensitivity (hysteresis).

7.2 Set Hysteresis – HYSt

Key Sequence: **Set** ← **rAtE** ↕ **HYSt** ← nnnnn ↕↕

Settings: nnnnn = hysteresis in digits

The hysteresis setting allows for efficient use of memory capacity. As long as the measurement values remain within the hysteresis range, no data are recorded to the adapter. If hysteresis ALL or 0 has been selected, all measurement values are stored to the adapter.

Display	ALL	0	1	4	9	19	00005	00010	00020	00050	00100	00200	00500	01000
5 digit DMM	ALL	00000	00001	00004	00009	00019	00050	00100	00200	00500	01000	02000	05000	10000
6 digit DMM	ALL	000000	000001	000004	000009	000019	000050	000100	000200	000500	001000	002000	005000	010000

The left-hand hysteresis digits (nnnnn) correspond to the left-hand measurement value digits (for each measuring range). For example, a value of 00010 entered at the adapter corresponds to 00100 at the 5 digit DMM. Consequently, this would correspond to an hysteresis of 0.01 V in the 3.0000 V range.

5 Digit Multimeter	Adapter Settings	01000	00100	00010
	Effective Value	10000	01000	00100
	Measuring Range	Effective Hysteresis		
	300 mV	100 mV	010.0 mV	001.00 mV
	3.0000 V	1.0000 V	0.1000 V	0.0100 V
6 Digit Multimeter	Adapter Settings	01000	00100	00010
	Effective Value	010000	001000	000100
	Measuring Range	Effective Hysteresis		
	3.00000 V	0.10000 V	0.01000 V	0.00100 V
	30.0000 V	01.0000 V	00.1000 V	00.0100 V

Note:

Hysteresis is independent of measuring range. If the anticipated span of measurement values is known, it is advisable to set the multimeter to the corresponding range. This also prevents data loss due to the automatic range selection function.

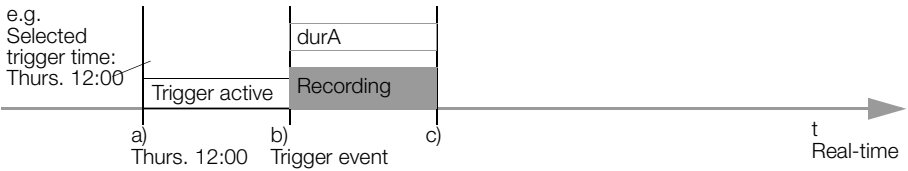
7.3 Trigger Settings – triG

The trigger setting determines **which** multimeter measurement values will be stored **to the adapter**. Beyond this, storage to memory can be started by means of various trigger types (st-ou, st-in, out, in). A trigger event occurs when high level is exceeded, or if low level is fallen short of. Recording may take place before or after the trigger event.

Recording duration depends upon the sampling rate, the hysteresis setting, available memory capacity and the desired recording duration (durA).

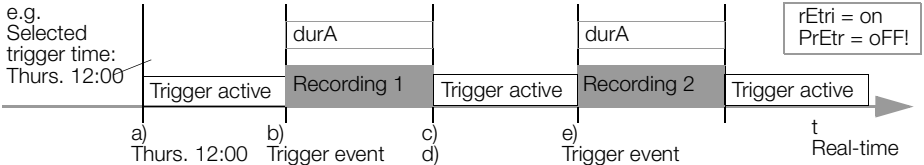
The recording command (after all settings are complete) is executed with the hot-key combination ESC and ↵, or in the StorE menu.

- **Start Recording as of the Trigger Event (without re-trigger or pre-trigger)**



- The prescribed trigger activation time is reached. The trigger is active as of this point in time.
- A trigger event occurs. Recording is started and runs for the selected duration (durA).
- The recording duration (durA) has transpired and recording is stopped – it may also stop earlier if insufficient memory capacity is available, or if the cyclical memory mode (CYLCE) has been selected.

- **Multiple Recordings as of the Trigger Event (with re-trigger)**



Only possible for trigger types triG = in and triG = out.

The pre-trigger must be disabled for this recording mode (PrEtr = oFF!)

- Same as above example without re-trigger or pre-trigger.
- The trigger is once again active as soon as recording has ended.

- **Recording Before the Trigger Event, or Immediate Recording (with pre-trigger)**



- The prescribed trigger activation time is reached. The trigger is active as of this point in time. Recording begins (da PrEtr = on). A recording duration (durA) can be selected in this case as well, in order to stop recording.
- A trigger event occurs and recording is stopped.

- **Disabling the Trigger**

Key Sequence: **SEt** ← ... ↗ ... ↗ **trIG** ← OFF ← **tiME** ← **oFF** ←
 Settings: triG = oFF, the trigger is disabled

- **Enabling the Trigger - Select Level (HI, LO) and Type (out, in, st-ou, st-in)**

Key Sequence: **SEt** ← ... ↗ ... ↗ **trIG** ← OFF ↗ **out** ↗ ↗ ←
HI ← nnnnn ↗ ↗ ← **LO** ← nnnnn ↗ ↗ ←
PrEtr ← on ↗ **oFF** ← **rEtri** ← on ↗ **oFF** ← **tiME** ← **oFF** ←
 Settings: nnnnn = upper / lower trigger level in digits

The left-hand trigger digits (nnnnn) correspond to the left-hand measurement value digits (for each measuring range). For example, a trigger value of 12300 in the 3.0000 V range corresponds to a 1.2300 V trigger.

		Selected Trigger Value in Digits			
		12300	01230	00123	
Measuring Range		Effective Trigger Threshold			
300	mV	123	mV	012.3	mV
3.0000	V	1.2300	V	0.1230	V
3.00000	V	1.23000	V	0.12300	V
30.000	V DC	12.300	V	01.230	V

Trig = st-ou: Only measurement values outside of the HI - LO level limits are recorded.

Trig = st-in: Only measurement values within the HI - LO level limits are recorded.

Trig = out: All measurement values are recorded if 1 measurement value is within, and one of the following measurement values is outside of the HI - LO level limits.

Trig = in: All measurement values are recorded if at least 1 measurement value is outside of, and one of the following measurement values is within the HI - LO level limits.

- **Start Recording at a Selected Point in Time and then Activate the Trigger (t.time)**

Key Sequence: **SEt** ← ... ↗ ... ↗ **trIG** ← OFF ↗ **out** ↗ ↗ ←
HI ← nnnnn ↗ ↗ ← **LO** ← nnnnn ↗ ↗ ←
PrEtr ← on ↗ **oFF** ← **rEtri** ← on ↗ **oFF** ← **tiME** ← oFF ↗ **on** ←
dd ↗ ↗ ← **hh:mm** ↗ ↗ ↗ ←

Settings: dd = day of the week to begin recording
 hh:mm = time in hours and minutes to begin recording
 nnnn = upper / lower trigger level in digits
 nn = pre-trigger memory as a percentage

Recording of measurement values is started at a predetermined point in time (trigger time), after which the trigger is activated.

7.4 Recording: Duration and Type – durA, CYCLE

• Recording without Time Limits – durA

Key Sequence: **SEt** ← ... ↑ ... ↑ **durA** ← on ↑ **OFF** ←

Settings: OFF = time limiting disabled

Recording is continued until the memory is full. If the CYCLE function has been activated, memory is overwritten in a cyclical fashion. See also drawing in chapter 7.3, page 16.

• Time-Limited Recording – durA

Key Sequence: **SEt** ← ... ↑ ... ↑ **durA** ← **ON** ←

dd ↓↑ ← **hh:mm** ↓↑ → ←

Settings: d = number of days (adjustable from 0 to 6)

hh = number of hours, mm = number of minutes

Recording is ended after the predetermined duration has expired.

See also drawing in chapter 7.3, page 16.

• Cyclical Recording – CYCLE

Key Sequence: **SEt** ← **rAtE** ↑ ... ↑ **CYCLE** ← OFF ↑ **on** ←

Settings: on = cyclical recording activated

When the memory is full, the oldest data are overwritten with new data (FIFO). See also drawing in chapter 7.3, page 16.

• Record Until Memory is Full – CYCLE

Key Sequence: **SEt** ← ... ↑ ... ↑ **CYCLE** ← **on** ↑ **OFF** ←

Settings: OFF = cyclical recording deactivated

When the memory full, data recording is ended. See also drawing in chapter 7.3, page 16.

7.5 Internal Time – timE

• Set Current Weekday and Time (no date)

Key Sequence: **SEt** ← ... ↑ ... ↑ **timE** ← **dd** ↓↑ ← **hh:mm** ↓↑ → ←

Settings: dd = current weekday

hh:mm = current time in hours and minutes

Current weekday and time are set with this function.

7.6 Select Address and Modem Option – Addr, ModEM

Key Sequence: **SEt** ← ... ↑ ... ↑ **Addr** ← nn ↓↑ ← **ModEM** ← **no** ↓↑ **YES**

Settings: nn = 1 ... 15

ModEM = YES, if the adapter is connected to the PC with a modem

If several memory adapters are connected to the PC, a separate address must be assigned to each. Address number 1 should be assigned to the first adapter, address number 2 to the second and so forth.

Note: If only one adapter has been connected, it should be set to address number 1.

7.7 Set Transmission Speed – bAud-ou, bAud-in

• Set Transmission Speed to the PC – bAud-ou

Key Sequence: **SEt** ← ... ↑ ... ↑ **bAud-ou** ← **19200** ↓↓

Settings: 9600 (default setting), 19,200 or 38,400 baud

This parameter sets the speed of data transmission between the memory adapter and the PC. The same baud rate must be selected in METRAWin 10 software at the PC.

• Set Transmission Speed to the Multimeter – bAud-in

Key Sequence: **SEt** ← ... ↑ ... ↑ **bAud-in** ← **9600** ↓↓

Settings: 9600 (default setting) or 8192 baud

This parameter sets the speed of data transmission between the memory adapter and the multimeter.

Note: 8192 baud is the only transmission speed available with METRAHit 1xS multimeters. METRAHit 2x series multimeters automatically transmit at a speed of 8192 baud if the RS232 or the SI232 setting has been selected. The SI232-II must also be set to 8192 baud in this case.

If you want to operate the METRAHit 2x at 9600 baud it must be set to adapter type BD232 (under interface parameters), and the SI232-II must be set to 9600 baud.

7.8 Start / Interrupt / Stop Data Recording – StorE, LABEL

• Start Data Recording (StorE mode)

Preparations at the multimeter:

– Select the correct adapter type as follows:

SI232-II: AdAPt = SI232 onlinE

SI232: AdAPt = SI232 StorE

(DMM menu: **SEt** ← ... ↑ ... ↑ **SI232** ← **StorE** ↓↓ ← ...)

- Select a sampling rate, e.g. ratE = 0.05. METRAHit 12S-18S instruments cannot be adjusted: A fixed baud rate is used which is dependent upon the measuring function.
- Select the required measuring function (V, A, ...), as well as the measuring range.
- Activate measurement data transmission by simultaneously pressing DATA and ON, or in the menu: SEt – SEnd – on.

Preparations at the adapter:

- Data recording is influenced by the following settings, which should therefore be checked in advance: sampling rate (rAtE), hysteresis (HYSt), trigger settings (triG), recording duration (durA), recording type (CYCLE).
- Weekday and time (tiME) should be properly set.
If the contents of the adapter's memory are to be read out subsequently along with other adapters, the adapters' clocks should be set with the help of METRAWin 10 to assure correct synchronization.
- ↗ Select manual data recording with the SEt and rAtE functions. The following display must appear: -- -- --
- ↗ After the adapter has been switched on, press ESC and ON simultaneously. Memory occupancy is displayed as a percentage, for example 00.0 if the memory contains no data. DATA and ON appear briefly at the display.

Start manual data recording:

Shortcut: Press and hold the yellow ESC key and press the \blacktriangleright key once for each desired measurement.

– Or, use the **StorE** menu (with assignment of a name to the memory block):

Key Sequence: **SEt** \blacktriangle **StorE** \leftarrow **LABEL** \leftarrow no \blacktriangle **YES** \leftarrow mybloc \blacktriangle \blacktriangle \blacktriangleright ESC
Settings: mybloc = name of the current memory block (optional)
Start recording with the ESC key.

A new memory block is activated for the storage of data. The new memory block can be named if desired (LABEL). The name is made available for purposes of analysis with METRAWin 10 software. After recording has been activated with the ESC key, the following display appear:

bL.nnn = ID number for the current memory block between 1 and 128 (continue with \blacktriangle)

d.nnnn = ID number for the current measurement value within the memory block between 1 and 1000 (continue with \blacktriangle)

nn.n = percentage memory occupancy from 00.1 to 99.9%

The display can be returned to the initial menu with the ESC key without causing interference to memory mode operation.

• Interrupt Data Recording

Key Sequence: Activate the ESC key twice.

Measurement values can now be queried with the reCALL and SEE functions.

Data recording can be resumed by pressing and holding the ESC key, and simultaneously pressing the \leftarrow key.

• Stop Data Recording (StorE mode)

Key Sequence: **SEt** \blacktriangle **StorE** \leftarrow **LABEL** \leftarrow no \leftarrow **bL.nnn** \leftarrow **StOP** \leftarrow
Settings: StOP = end of data recording

Manual data recording is stopped and the corresponding memory block is closed off.

Shortcut: Simultaneously press the yellow ESC key and the \blacktriangleright key.

7.9 View Data at the Adapter – reCALL

• Statistical Overview of Stored Data

Key Sequence: **rECaIl** \leftarrow **bbbb** \blacktriangle \blacktriangle \leftarrow **StAt** \leftarrow
bEGin \leftarrow **dd** \leftarrow **hh:mm** \leftarrow **mm:ss** \leftarrow **End** \leftarrow **dd** \leftarrow **hh:mm** \leftarrow **mm:ss** \leftarrow
MINxxxxx \leftarrow **dd** \leftarrow **hh:mm** \leftarrow **mm:ss** \leftarrow
MAXxxxxx \leftarrow **dd** \leftarrow **hh:mm** \leftarrow **mm:ss**

Settings: bbbb = block number for stored data
bEGin = time recording was begun for data in the memory block
End = time recording was ended for data in the memory block
dd = weekday
hh:mm, mm:ss = time in hours minutes and seconds
MIN, MAX = display minimum and maximum values
xxxxx = measurement value (digital and analog display)

This function displays a statistical overview for a selectable memory block. Memory block ID number, beginning and ending time of the recording, minimum and maximum values, as well as the date and time for each, appear at the display.

• View Individual, Recorded Measurement Values

Key Sequence: *rECAlI* ← bbbb ↕ ↕ ← *StAt* ↕ *SEE* ←
(bEGin) ... nnnnn₁ ... nnnnn_m ... *(End)* ↕ ↕ ←
dd ← *hh:mm* ← *mm:ss*

Settings: bbbb = block number for stored data
bEGin = flag for beginning of recording within the memory block
End = flag for end of recording within the memory block
nnnnn₁..._m = individual measurement value from 1 to m
dd = weekday
hh:mm, mm:ss = time in hours, minutes and seconds

This function displays the individual, recorded measurement values from within a given memory block. The individual values within the memory block can be selected by scrolling up or down with the ↕ or the ↕ key.

The displays *bEGin* and *End* identify the beginning and the end of the memory block.

The time at which the selected measurement value was recorded (weekday and time) can be read out by repeatedly activating the ← key.

Note: Pressing and holding the ↕ or the ↕ key causes rapid scrolling, either up or down, through the primary recorded values. Downward scrolling is slower than upward scrolling.

• View Primary Values from within a Memory Block

Key Sequence: *rECAlI* ← bbbb ↕ ↕ ← *StAt* ↕ *SEE* ↕ *SCAn* ← Select memory block
(bEGin) ... xxxxx₁ ... xxxxx_m ... *(End)* ↕ ↕ ← Select primary value
dd ← *hh:mm* ← *mm:ss* ← Select recording time

Settings: bbbb = block number for stored data
bEGin = flag for beginning of recording in the memory block
End = flag for end of recording in the memory block
xxxxx₁..._m = primary value from 1 to m
dd = weekday
hh:mm, mm:ss = time in hours, minutes and seconds

This function displays the primary values for stored measurement data from a given memory block. The respective intermediate values are skipped. This function allows for a quick overview of the entire contents of the memory block.

The individual values within the memory block can be selected by scrolling up or down with the ↕ or the ↕ key.

The displays *bEGin* and *End* identify the beginning and the end of the memory block.

The time at which the selected measurement value was recorded (weekday and time) can be read out by repeatedly activating the ← key.

Note: Pressing and holding the ↕ or the ↕ key causes rapid scrolling, either up or down, through the primary recorded values. Downward scrolling is slower than upward scrolling.

7.10 Reading Out Data from the Adapter at the PC / Parameter Configurations – PC

Key Sequence: **PC** ← **PC-nn**

Settings: nn = selected memory adapter address

With this bidirectional operating mode, memory adapter parameters can be configured at the PC via the interface. Beyond this, recorded measurement data can be uploaded to the PC.

Shortcut: Press and hold the yellow ESC key and then press the ▲ key as well.

Note: A different address must be assigned to each of the interconnected memory adapters (chapter 7.6, page 18), but the address for each adapter must be identical with the address of its respective multimeter.

7.11 Live Measurement Data Transmission from the Multimeter to the PC – onlinE

Key Sequence: **onlinE** ← **on-nn**

Settings: nn = selected memory adapter address

This operating mode allows for the transmission of data from the multimeter directly to the PC (without activating this function at the PC), and only in one direction. The adapter functions as a transmitter only and does not store any data.

Shortcut: Press and hold the yellow ESC key and then press the ▼ key as well.

Note: A different address must be assigned to each of the interconnected memory adapters (chapter 7.6, page 18). Up to 4 adapters can be operated in this mode without batteries.

7.12 Clear the Memory – CLEAR

Key Sequence: **CLEAR** ← **no** ▲ **YES** ←

Settings: no = memory content is not deleted

YES = memory content is deleted **without** any additional security queries

This function deletes the entire contents of the memory adapter.



Caution: Make sure that all recorded measurement values which need to be saved have been uploaded and archived at a PC **before** clearing the entire contents of the memory adapter.

7.13 Query General Information – inFo

• Display Current Weekday and Time

Key Sequence: **inFo** ← **tiME** ← **dd** ← **hh:mm** ← **mm:ss**

Settings: dd = current weekday: MO = Monday,
tu = Tuesday, We = Wednesday, th = Thursday,
Fr = Friday, SA = Saturday, SU = Sunday
hh:mm, mm:ss = time in hours, minutes and seconds

The current day and current time are displayed one after the other.

• LCD Test

Key Sequence: **inFo** ← **tiME** ▲ **tEst** ← **DISP** ← **Pattern 1** ▲ **Pattern 2** ▲ ...

All possible displays appear at the LCD after the display test has been acknowledged. Various test displays can be selected with the ▲ and ▼ keys. The software version number is displayed numerically as part of the test.

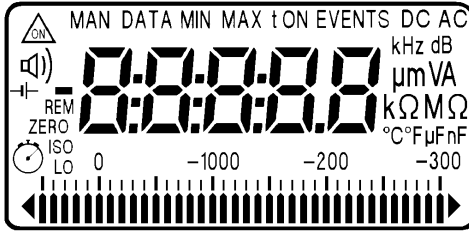


Figure 4.5 LCD Test

• Internal Memory Test

Key Sequence: *Info* ← *tiME* ↑ *tEst* ← *diSP* ↑ *rAM* ← *no* ↑ *YES* ← *buSY*

Settings: no = no memory test is performed

YES = the memory test is started without any additional security queries

After acknowledging **YES** with the **ENTER** key, the adapter's internal memory is tested. Testing takes about 5 minutes.

All data stored to memory are deleted during the memory test.

buSY appears at the display during testing.

PASS appears at the display when the test has been completed. The adapter is then returned to its initial display by pressing the **ENTER** key.



Caution:

Make sure that all recorded measurement values which need to be saved have been uploaded and archived at a PC **before** starting the memory test.

8.1 Installing METRAWin 10

WINDOWS version 3.1 or higher is required for installation.
METRAWin 10 is installed automatically.

- ⇨ Insert the **program floppy disk** into drive A or B.
- ⇨ Open the root directory for the drive into which the disk has been inserted.
- ⇨ Open the **README** file with the Word notebook which contains the most up-to-date information and corrections which are not included in these operating instructions.
- ⇨ Start installation by entering **INSTALL <ENTER>**.
- ⇨ Follow the instructions displayed at the monitor.

8.2 Program Documentation / Online Help

Viewing online help:

Program documentation and online help can be queried at any time with the F1 key.

Printing online help files:

Online help files can be viewed with the .HLP files and printed out with the .WRI files. Open the .WRI files with the WRITE editor in order to print them out. Open the MULTIGER.WRI file and print out the online help texts.

8.3 Starting METRAWin 10

After the software has been successfully installed, you should at least connect a multimeter and set it to the data transmission operating mode before starting METRAWin 10. Simultaneously press the **DATA** and **ON** keys in order to set the multimeter to the data transmission operating mode.

- If the multimeter is equipped with an interface adapter, it should be connected to the PC at a vacant serial port.
- If the multimeter is equipped with a memory adapter, the memory adapter must now be connected to the PC for **online** operation.
The memory adapter and the multimeter are connected to the PC via the serial port by pressing and holding the **yellow ESC** key, and by simultaneously pressing the **▲** key (chapter 6.2, page 12).



Note

A different address must be assigned to each of the interconnected memory adapters (chapter 7.6, page 18), but the address for each adapter must be identical with the address of its respective multimeter.

9 Memory Adapter Technical Data

Supported Measuring Instruments

METRAHit 12S ... 16S, 16I/T, 18S, 14A, 22S/M ... 29S

Operating Elements and Operation

7 segment LCD display and 4 keys.

Almost all parameters can be configured manually, or with a PC via the interface.

Memory

128 kB CMOS memory with battery backup.

Measurement value storage in accordance with the differential value method (compressed) with adjustable hysteresis. An average of 50,000, and at least 20,000 measurement values are acquired depending upon whether or not significant signal changes or time spans occur between the individual measurements. A maximum of 100,000 measurement values are acquired if only minimal signal changes occur, if the sampling rate is equal to or less than 0.5 s and if hysteresis has been set to ALL.

Real-Time Clock

Real-time clock with battery backup. Max. error: 0.5 minutes per month

Interface

To the Multimeter

Optical receiver/transmitter, 950 nm wavelength, 8192 / 9600 baud, 8 bits, no parity, 1 stop bit

To the PC

Bidirectional, adjustable baud rate: 9600, 19,200 or 38,400 baud, 8 bits, no parity, 1 stop bit

Number of Adapters

Up to 10 data memory adapters can be interconnected.

The maximum number depends upon the selected sampling rate for online PC data acquisition:

With METRAHit 1x

up to 6 adapters at a baud rate of 19.2 kBd

up to 4 adapters at a baud rate of 9.6 kBd

With METRAHit 2x

up to 3 adapters at a sampling rate of 50 ms

up to 8 adapters at a sampling rate of 200 ms

Connections

Pin 9 is used for the synchronization of interconnected adapters in the PC operating mode.

Pins 4 and 7 must be connected to high level at the PC and are used to supply electrical power to the data memory adapter. Power is drawn from this source by the data memory adapter for levels of down to 5 V. Power is drawn from the battery for lesser voltage levels.

Pin 3 (PC-TXD) is used for negative level generation of the PC-RDX signal from the RS232 interface.

With the exception of pin **1** and pin **9** (used for synchronization), all of the interface conductors are looped through to additional data memory adapters.

Power Supply:

2 ea. 1.5 V mignon cells

Dry cell per IEC R6 type 3006:

1100 mAh

Alkaline-manganese per IEC LR6 type 4006: 2300 mAh

Service Life

With alkaline-manganese cells, switched off:
27,000 h = 3 years (without self-discharging)

With alkaline-manganese cells, switched on:

Sampling Rate	Service Life
50 ms ... 1 s	750 h
2 s	2,200 h
5 s	4,400 h
10 s	6,600 h
20 s	8,800 h
30 s	10,000 h
60 s	11,000 h

Battery Test

Automatic display of the -II- symbol when battery voltage drops to below approximately 2.5 V, after which approx. 30% capacity remains.

Power Consumption

Batteries are not depleted when the adapter is connected to a PC with adequate auxiliary power supply (sufficient for up to approximately 4 series connected adapters).

Consumption from PC control lines approx. 1.1 mA at a sampling rate of 50 ms

Electrical Safety

Safety low-voltage device per DIN VDE 0411, clearances and creepage distances per IEC 1010/ DIN VDE 0411

EMC

Interference Suppression

Radio interference level N per DIN VDE 0875, limit value class B per DIN VDE 0871

Temperature Range / Climatic Category

Operating Temperature 0 °C to + 50 °C

Storage Temperature -25 °C to + 70 °C

Climatic Category 2z/0/50/70/75% in compliance with DIN VDE 3540

Mechanical Design

Housing Made from electrically conductive plastic

Dimensions 135 x 97 x 39 mm

Weight approx. 0.25 kg with batteries

Interface To the PC:

9-pin subminiature integrated socket with threaded sleeves

To the Data Memory Adapter:

9-pin subminiature integrated plug with knurled screws

10 Repair and Replacement Parts Service DKD Calibration Lab and Rental Instrument Service

When you need service, please contact:

GOSEN-METRAWATT GMBH
Service-Center
Thomas-Mann-Strasse 20
90471 Nürnberg, Germany
Phone +49 911 86 02 - 410 / 256
Fax +49 911 86 02 - 2 53
e-mail fr1.info@gmc-instruments.com

This address is for Germany only.
Abroad, our representatives or establishments are at your disposal.

11 Product Support

When you need support, please contact:

GOSEN-METRAWATT GMBH
Product Support Hotline
Phone +49 911 86 02 - 112
Fax +49 911 86 02 - 709

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