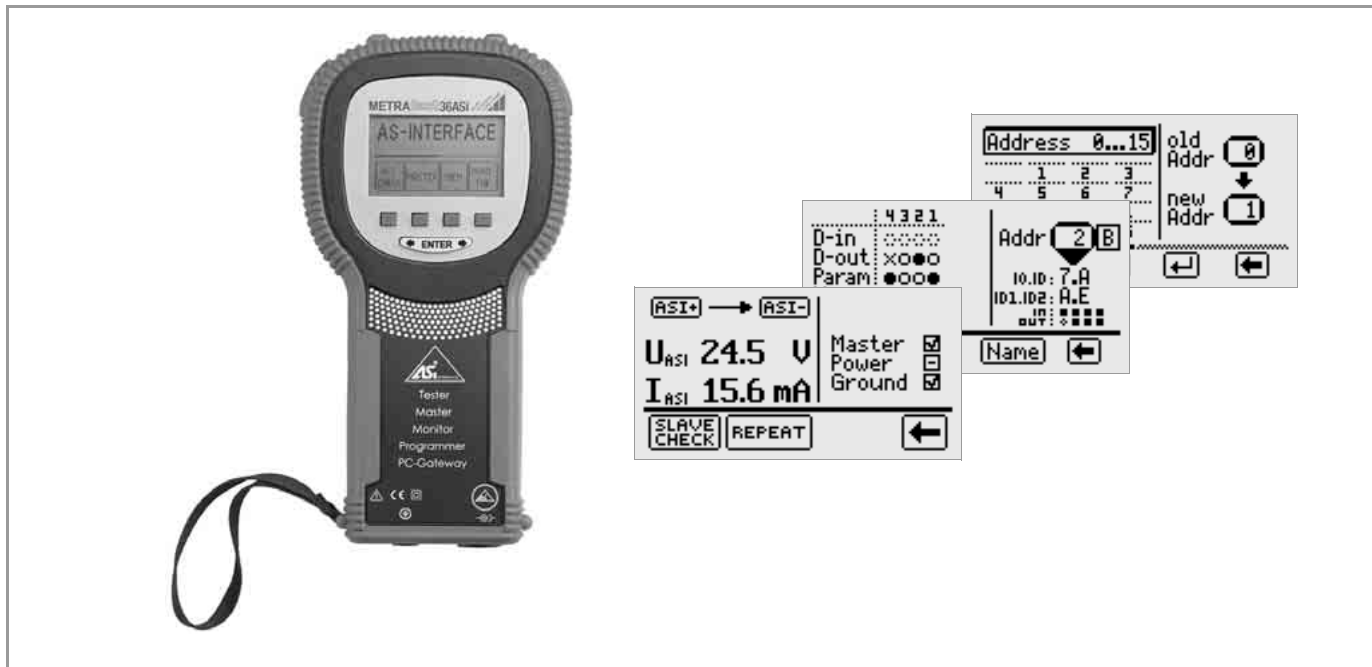


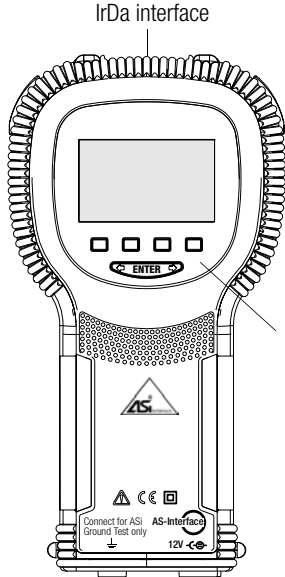
METRAtest 36ASi

AS Interface System Tester

3-349-107-02
2/5.03



METRAtest 36ASI AS Interface System Tester



Control and display unit

M12 socket for KS36A addressing cable or KS36C bus adapter cable

AS-i ground terminal

Socket for external battery charger, article no. Z501D

Error Messages



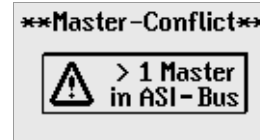
AS-i bus: reversed polarity!



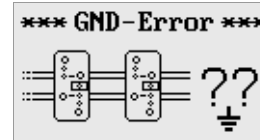
AS-i bus: current overload!



Error reading an identity string from an analog slave



1 external master detected!



AS-i bus: ground symmetry error



Data transmission error between a slave and the test instrument (reading or writing the data string)



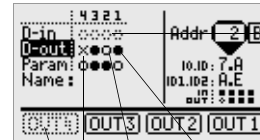
AS-i bus: no slave connected!



List of incorrectly addressed slaves



Error reading a parameter string from an analog slave



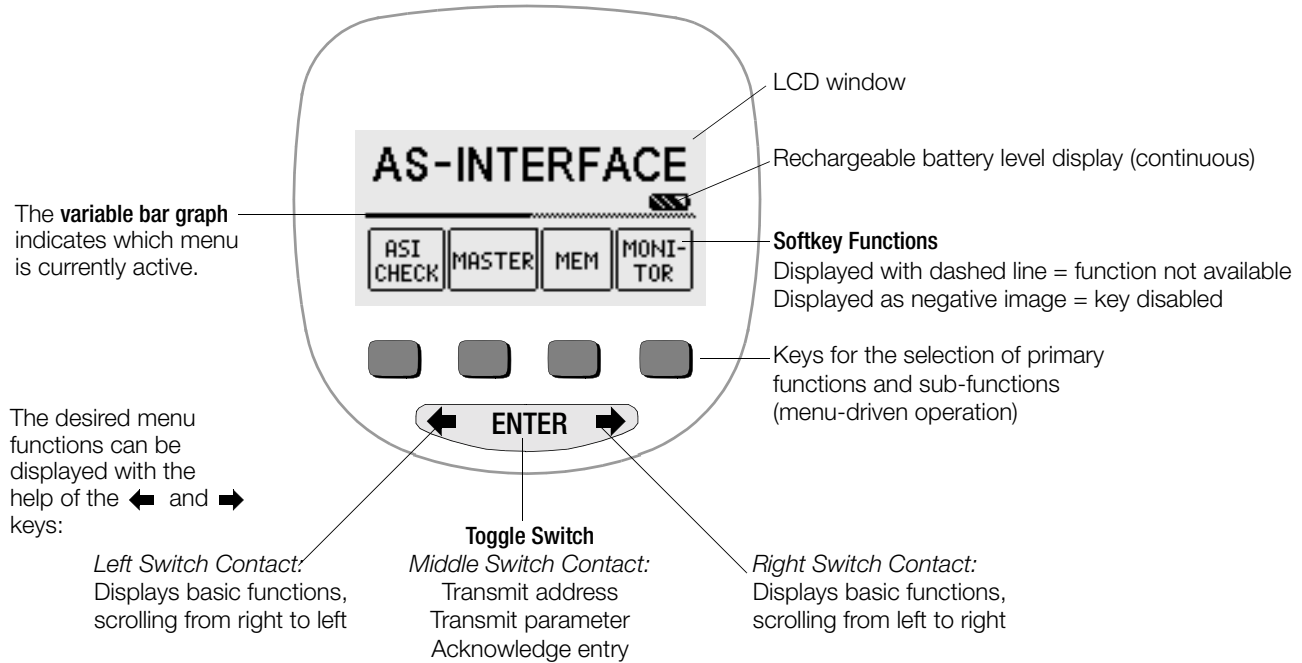
Dashed circles: inputs not updated or outputs not acknowledged

Filled circle: output activated

Empty circle: output not activated

X or dashed square: non-assigned output

METRAtest 36ASi Control and Display Unit



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1 Applications

The METRAtest 36ASi allows for the testing of AS interface bus systems, as well as individual components (AS-i slaves) in accordance with expanded version 2.1 of the AS interface specification.

Beyond this, the instrument can be used as a PC gateway for programming, and as a master.

Testing of the AS interface can be documented as well with the help of appropriate PC software.

Functions

- **AS-i Check**

Voltage measurement (measuring range: 0 ... 40 V), and measurement of current consumption (measuring range: 0 ... 260 mA) at the AS-i bus

- **Slave Test**

Checks data transmission between AS-i slaves and the system tester, as well as peak voltage pulses in the data transmission signal.

- **Master Function**

Can be operated as a bus master and is capable of addressing and programming slaves, testing their functions, reading out AS-i profiles (address, ID, data, extended ID1/2 and extended profile per specification 2.1, e.g. ID string and data string).

- **Memory**

Up to four complete system configurations can be saved to memory (profiles for all slaves, including extended profiles per specification 2.1).

- **Monitoring Function**

Can be operated as a passive bus user. Determination of bus system error quota, individual quotas for master and slave telegrams.

- **PC Interface**

All functions can be remote controlled via the PC interface.

2 Safety Features and Precautions

The METRAtest 36ASi electronic system tester has been manufactured and tested in accordance with safety regulations IEC 61010-1:1990/+A1 Mod.:1992, EN 61010-1:1993, VDE 0411 Part 1: March 1994.

If used for its intended purpose, the safety of the user, as well as that of the instrument, is assured.



Attention!

Changing variables when a process sequence is in progress may be **life endangering**, or may damage system components if malfunctioning or program errors occur. Make sure that no dangerous situations will result before executing functions such as data or parameters.

Read the operating instructions thoroughly and carefully before placing your instrument into service, and follow all instructions contained therein.

The system tester may not be used:

- if the battery compartment cover has been removed
- if it demonstrates visible damage
- with damaged connector cables or measuring adapters
- if it no longer functions flawlessly
- after long periods of storage under unfavorable conditions (e.g. humidity, dust, temperature)

Meanings of symbols on the instrument:



Warning concerning a point of danger (Attention: observe documentation!)



Safety class II device



Recharging socket



AS-i ground



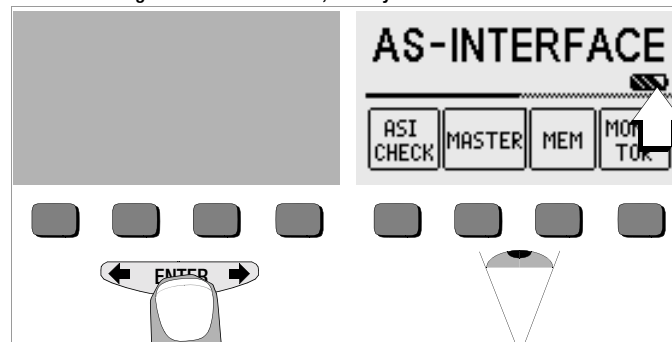
Indicates EU conformity



AS-i bus terminal (M12 socket)

3 Initial Start-Up

3.1 Switching the Tester On and Off, Battery Test



The instrument can be switched on by pressing any key.

A display at the main menu, including five different rechargeable battery levels ranging from fully charged to depleted, keeps the user continuously informed regarding the charge level of the battery pack.

The instrument is switched off by simultaneously activating the two outermost softkeys.

Charging the Batteries

The included battery pack must be charged prior to initial start-up, or if only one solid segment remains within the battery symbol.



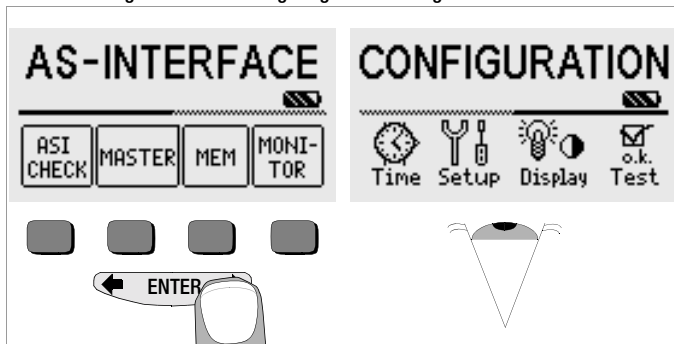
Attention!

Do not connect the battery charger if no battery pack has been inserted into the instrument in order to avoid overvoltages within the tester!

Refer to chapter 10.1 on page 24 regarding charging procedures and the battery charger!

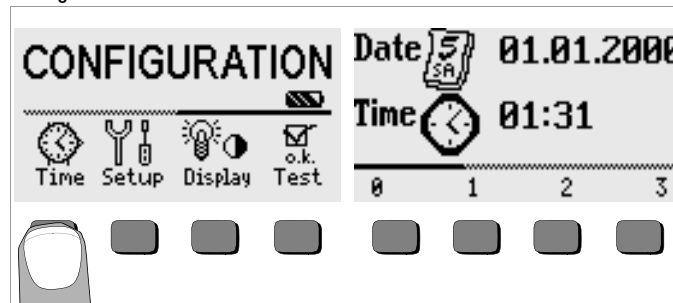
The batteries included with the instrument should be charged for a period of at least 10 hours prior to initial use. The batteries are fully charged when all five segments at the battery display are solid.

3.2 Selecting Menus and Configuring Basic Settings



Press the ◀ or the ▶ key on the toggle switch in order to display the desired measuring function, device settings or database functions.

Setting the Clock



- ▷ Activate the TIME key.
- ▷ The cursor appears at the first digit within the date. Enter the desired numeral by activating one of the softkeys. Numerals which do not appear initially can be displayed by pressing the ◀ or the ▶ key at the toggle switch. Each time a numeral is selected, the cursor moves one place to the right.
- ▷ Date and time are saved as soon as the last numeral has been entered.
- ▷ The time setting menu is exited by pressing the ENTER key, and newly entered data are acknowledged.

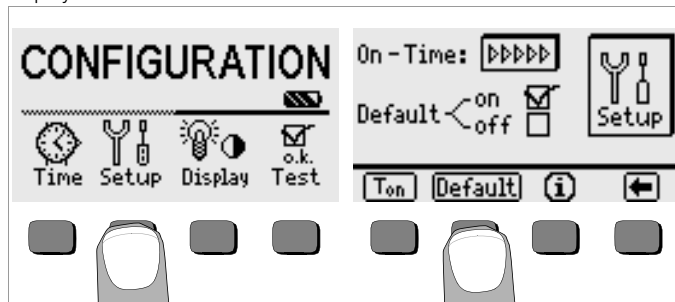


Note

Data which do not lie within the valid range are rejected.

Default Settings – Last Used Settings

A selection can be made here as to whether the menus will be displayed according to the default settings, or if the last opened menu should be displayed.



- ☞ Activate the Setup key.
- ☞ Press the Default key:

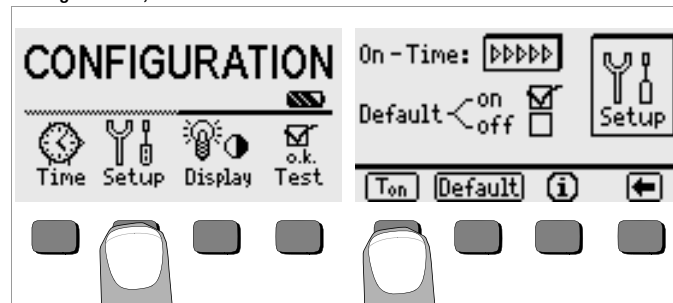
on ✓ Setting such as Contrast and T_{on} (= 1 min) are reset to the default settings each time the instrument is switched on.

off ✓ The last used settings remain active when the instrument is switched on.

- ☞ Exit the setup menu by pressing the key.

See page 9 regarding the online help key “i”.

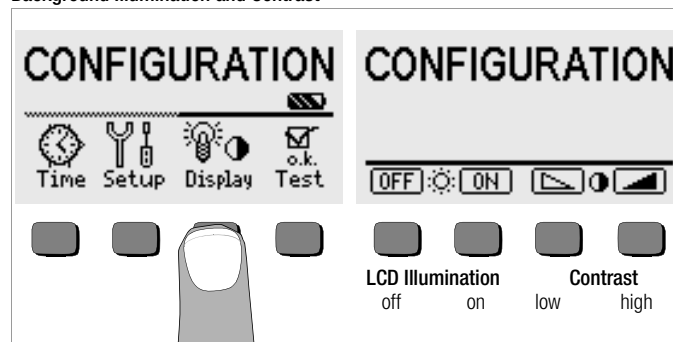
Setting On-Time, Manual Shutdown



- ☞ Activate the Setup key.
- ☞ Press the T_{on} key and then the 1min, 10min or 30min key, depending upon the desired duration after which the test instrument should switch off automatically. The “>>>>” setting indicates that no automatic shutdown will occur. The selected setting has a substantial influence on battery charge level.
- ☞ Exit the setup menu by pressing the key.

See page 9 regarding the online help key “i”.

Background Illumination and Contrast



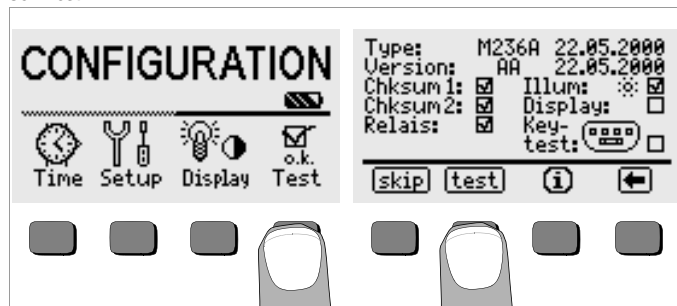
- ☞ Activate the Display key.

- ⊗ In order to extend battery service life, display illumination can be switched off entirely.
Press the corresponding softkey to this end.

If LCD illumination is activated (= ON), it is automatically switched off several seconds after the last key has been activated. As soon as a key is activated again, illumination is switched back on.

- ⊗ Contrast can be optimized with the two keys at the far right.
- ⊗ The setup menu is exited by pressing the **ENTER** key, and newly entered data are acknowledged.

Self-Test



- ⊗ The self-test is started from the main menu with the Test key. The test has a duration of several minutes.

The following information is displayed in the two headers:

Type: Device type / date of last calibration
Version: Software version and issue date

Self-tests for items Chksum through Key-test are performed automatically, one after the other, and are checked off or marked with a horizontal dash if they are not passed.

Chksum1/2: Status display for internal testing (each test must be completed with a check mark. Otherwise, the system tester may no longer be used. Please contact our service center in this case.

Relays: Each relay is switched eight times.

As soon as the tests in the left-hand column have been completed, the following tests must be started manually.

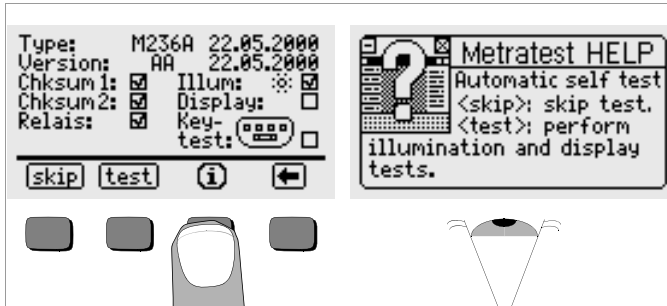
- ⊗ **Illum:** Press the test key twice in order to activate and deactivate display illumination.
- ⊗ **Display:** Press the test key after each test pattern has been displayed in order to test the display elements.
- ⊗ **Keytest:** Perform the key test by pressing each of the softkeys once, and by pressing the **ENTER** key once in each of its three positions. The keys appear filled in at the key pictograph after they have been tested.

Individual tests can be skipped by pressing the skip key before starting the respective test. These tests are then identified with a horizontal dash, as is also the case for tests which have not been passed.

Online Help

Appropriate online help texts can be displayed at the LCD for various functions.

- Press the **i** key to query online help.
Press any key to exit the help function.



4 General Operating Instructions

4.1 Connecting the System Tester to the AS-i Bus and Slave

The tester is equipped with the following connector sockets:

- M12 socket for AS-i connection via various adapter cables
- Contact-protected banana socket for AS-i ground



Note

Assure proper thread engagement when making connections at the M12 socket. The plastic thread at the plug may otherwise be damaged.

Cable Sets (accessories):

Description	Type	Article Number	Included	Accessory
Addressing cable (M12m plug to jack plug)	KS36A	Z236A	•	•
Extension cable (M12m plug to M12w socket) (e.g. for connection of SONAR-BERO)	KS36B	Z236B		•
Bus adapter cable (M12m plug to M12m socket)	KS36C	Z236C		•
1 set (10 ea.) AS-i ribbon cable pick-off bracket	KS36D	Z236D		•
1 ribbon cable pick-off (coupler/socket)	KS36E	Z236E		•

4.2 Automatic Settings, Monitoring and Shutdown

The METRAtest 36ASi makes appropriate settings for all of the operating conditions it is able to determine on its own. It tests voltage and polarity at the AS-i bus to which it is connected.

If battery voltage drops to below 4.6 V, the instrument cannot be switched on, or it is immediately switched off.

The instrument switches itself off automatically, at the earliest after the predefined on-time has elapsed (see chapter 3.2). On-time is reset to the duration selected in the setup menu each time a key is activated.

4.3 Addressing a Slave with the Addressing Cable

Because slave addressing is one of the most frequently used functions, it is described below in detail. This procedure is necessary for assigning an available bus address to newly added slaves (with default address 0), or for readdressing existing slaves. The slave is connected directly to the METRAtest 36ASi addressing and test instrument with the addressing cable to this end.



Attention!

The slave is disconnected from the ASi bus when it is contacted. Readdressing may necessitate re-configuration of the master in bus mode operation, because the data and parameters saved to the master under the old address are not automatically assigned to the new address.



Note

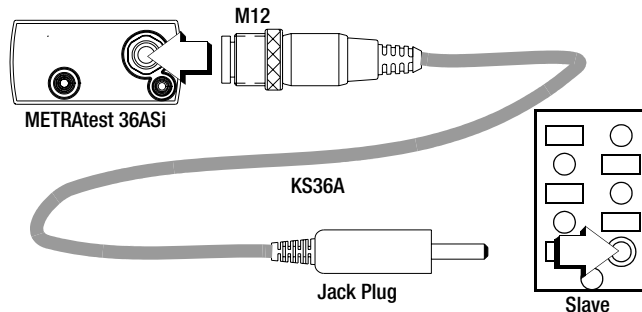
Readdressing via the bus socket is possible with the METRAtest 36ASi, and it helps to avoid duplicate addresses (see chapter 6.2). However, for some companies this addressing method is not an approved procedure.

- ⇨ Locate the included **KS36A** addressing cable.
- ⇨ Insert the end with the M12 plug into the bus socket at the addressing and test instrument.
- ⇨ Insert the jack plug at the other end of the addressing cable into the addressing socket at the slave.



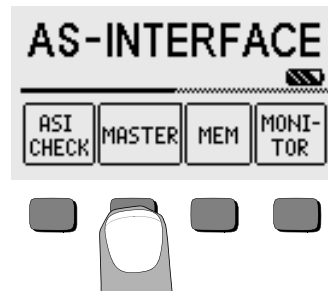
Note

Depending upon the type of slave (e.g. without jack socket), a different connection method may be required.



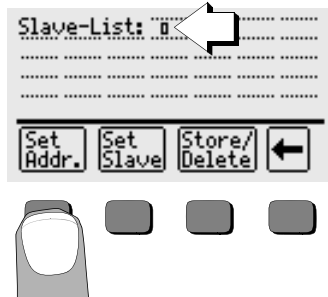
The necessary connections have now been established, and addressing can begin with the METRAtest 36ASi addressing and test instrument.

- ⇨ Press and hold any key at the METRAtest 36ASi to turn the instrument on. The following display appears.



- ⇨ Press the MASTER key.

The currently selected slave appears in the list (slave with default address 0 in this example).



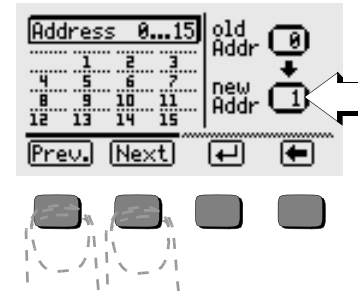
- Press the Set Addr key.

A menu for selection of the desired address appears. A list of all available slave addresses is displayed.

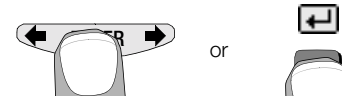


Note

When connection is established with the addressing cable, all addresses are displayed except for the address of the currently connected slave because no bus connection exists. Duplicate addresses cannot be ruled out in this case.



- Select the desired address in the **new Addr.** window with the help of the Prev. and Next keys.
- After the desired address has appeared in the **new Addr.** window, it must be acknowledged with the Enter key.



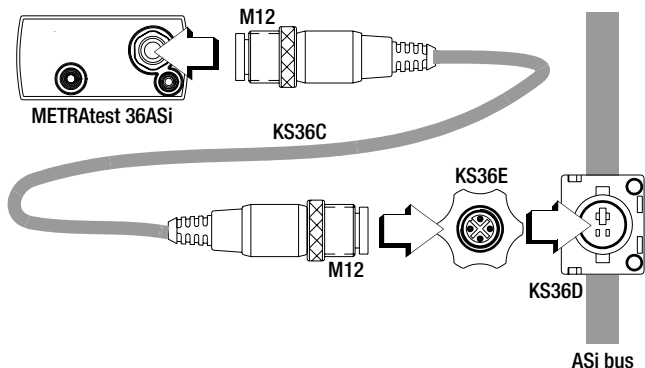
The new slave is addressed when the **ENTER** key is activated. The updated slave list is displayed after readdressing.



4.4 Testing Slaves via the Bus Socket

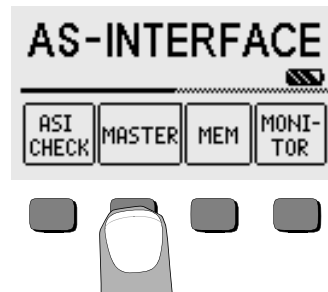
Second to addressing, testing slaves at the bus is the next most frequently used function, and is described in detail below for this reason. The METRAtest 36ASi addressing and test instrument is connected to the ASi bus, and is switched to the “master function” operating mode. Data and parameters are automatically deactivated. This means that the outputs must be switched on and off intentionally, for example in order to open or close a valve. The parameters configuring mode should be started, and then exited. The acknowledgement of data or parameters always results in transmission of data and parameters. The instrument is subsequently switched to the monitoring mode.

- Locate the **KS36C** cable, which is available as an accessory.
- Insert the end with the M12 plug into the ASi bus socket at the addressing and test instrument.
- Contact the yellow ASi bus cable with a **KS36D** ASi ribbon cable pick-off bracket and a **KS36E** ribbon cable pick-off.
- Insert the male end into the bus socket and secure by screwing tight.
- Use a KS36B extension cable to lengthen the KS36C adapter cable if necessary.



The necessary connections have now been established, and testing can begin with the METRAtest 36ASi addressing and test instrument.

- Press and hold any key at the METRAtest 36ASi to turn the instrument on. The following display appears:



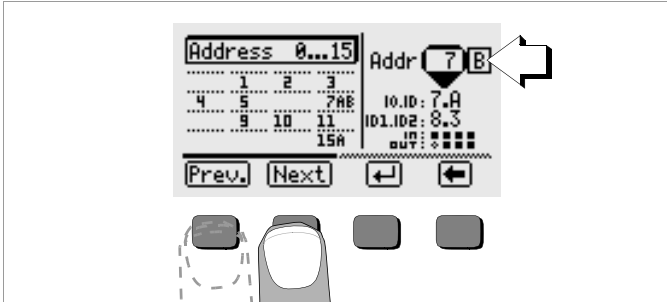
- Press the MASTER key.

The bus is scanned and a list of active slaves is displayed.

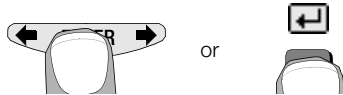


- Press the Set Slave key.

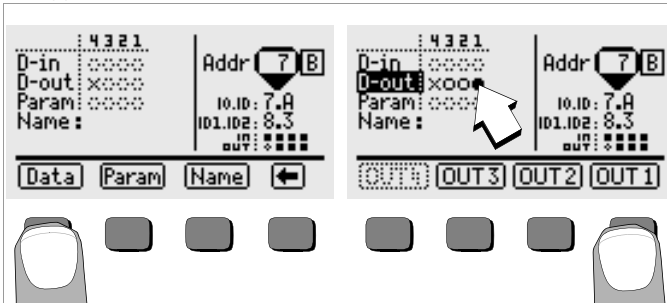
- The slaves at the bus are displayed within the indicated range of 0 to 15, or 16 to 31.



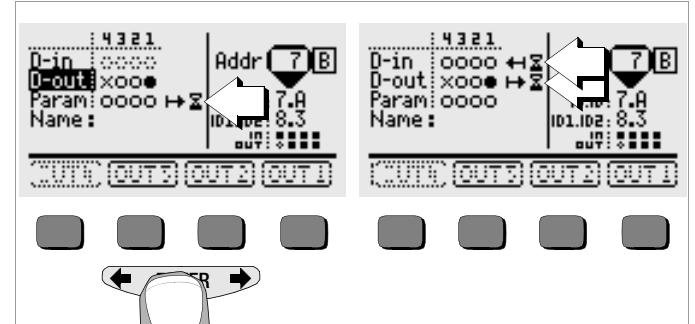
- Select the address of the slave you want to test in the **Addr** (address) window with the help of the Prev. and Next keys.
- After the desired address appears in the **Addr** window, it must be acknowledged with the **ENTER** key.



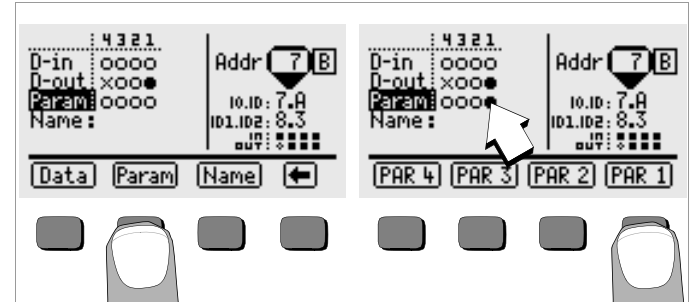
- Press the Data key in order to enable direct activation of the outputs. After first pressing the Data key, all of the outputs are deactivated and appear as dashed circles.



- In order to activate output 1, press the **OUT1** key, etc. The activated output is displayed as a filled in circle.
- After pressing the **ENTER** key, first the parameters and then the data are transmitted to the slave and the “set outputs” mode is exited.

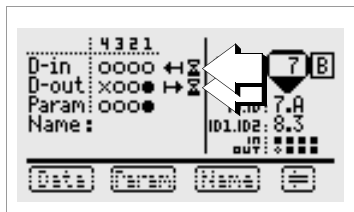
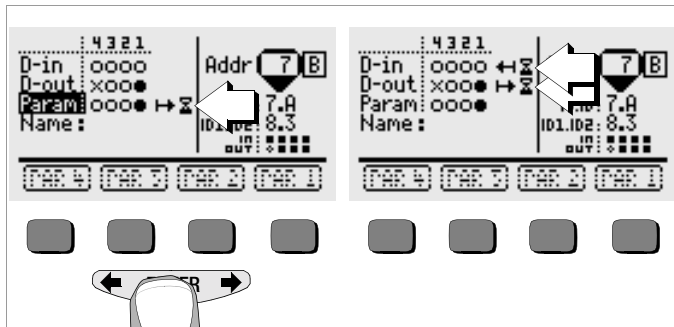


The hourglass and the arrow indicate transmission to the slave and updating of the **D-in** inputs. Key operations are disabled during transmission of parameters and data. This is indicated by means of dashed softkeys.



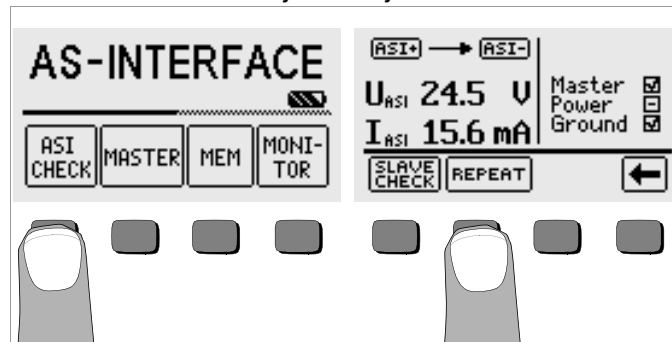
- Press the **Param** key in order to set individual parameter bits.
- In order to set parameter 1, press the **PAR 1** key, etc. The activated parameter is displayed as a filled in circle.

- After pressing the **ENTER** key, first the parameters and then the data are transmitted to the slave, the outputs are subsequently updated and the “set parameters” mode is exited.



The slave is now in the **monitoring mode** and is queried cyclically, i.e. data is exchanged at **D-in** and **D-out**.

5 ASI CHECK Function – System Analysis



After initializing the ASI CHECK function, voltage and polarity are measured. If no external AS-i voltage is detected, power is supplied by the METRAtest 36ASI, which allows for measurement of current consumption for the AS-i slaves.

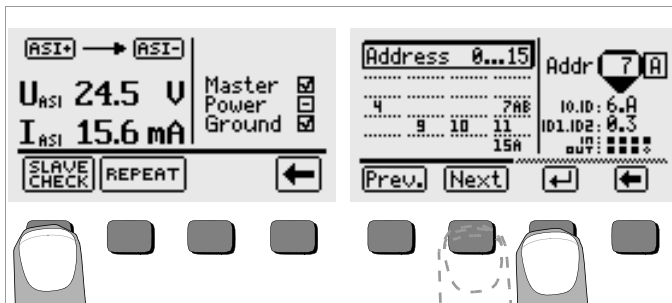
The following conditions are checked for as well during system analysis:

- Master: system master active
- Power: AS-i power pack active
- Ground: AS-i positive and negative voltage symmetric to ground

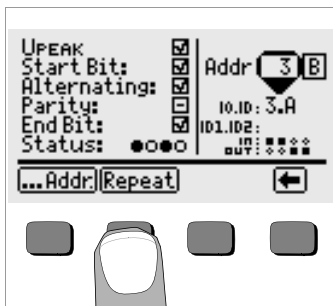
These queries are performed automatically, one after the other, and are checked off or marked with a horizontal dash if negative responses are obtained. Error messages are generated for reversed polarity, or if voltage or current limit values are exceeded (see error messages on page 2).

Measurement is repeated automatically every 5 seconds, at which time the REPEAT key is displayed as a negative image. Key operation is disabled during measurement. The test can be started manually with the REPEAT key as well.

5.1 SLAVE CHECK Function – Read Out Slave Data



After initializing the SLAVE CHECK function, slave addresses 0 through 15 are displayed along with the abbreviated data from the slave with the lowest address. The display can be switched back and forth between address ranges 0 through 15 and 16 through 31 with the \leftarrow or the \rightarrow key at the toggle switch. The desired slave address from either of the address ranges is selected with the Prev. or Next key, and is acknowledged with the \downarrow key.



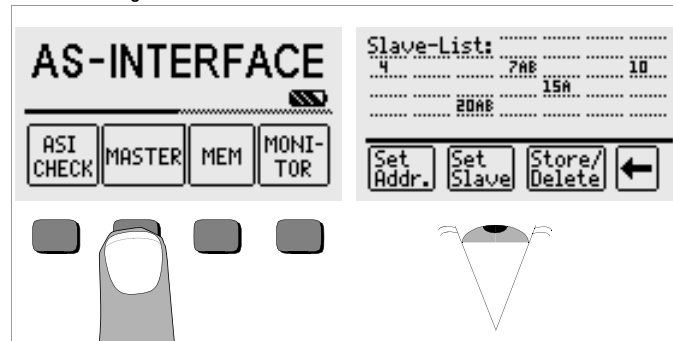
If only one slave has been connected to the bus, the above described selection menu does not appear. The slave's telegram data are displayed, which allows for conclusions regarding possible data transmission errors. Measurement can be repeated with the Repeat key. Voltage pulse peak values (U_{PEAK}) can be determined for the response signals from the slaves. An unusual value may indicate that a given address has been assigned twice. If there is no active master, the METRAtest 36ASi assumes this function and queries the slaves in order to measure peak voltage. A different slave address can be selected by activating the ...Addr key.

If only one slave has been connected to the bus, the above described selection menu does not appear. The slave's telegram data are displayed, which allows for conclusions regarding possible data transmission errors. Measurement can be repeated with the Repeat key.

Voltage pulse peak values (U_{PEAK}) can be determined for the response signals from the slaves. An unusual value may indicate that a given address has been assigned

6 MASTER Function

6.1 Scanning the AS-i Bus



After initializing the MASTER function, addresses are listed for all of the slaves at the AS-i bus.

6.2 Assigning and Changing Slave Addresses



After the Set Addr. function has been initialized, new addresses can be assigned to individual slaves. After selecting the slave address to be changed with the Prev. or the Next key and acknowledging with the \downarrow key, a list of all currently available slave addresses is displayed.



The display can be switched back and forth between addresses ranges 0 through 15 and 16 through 31 with the **◀** and the **▶** keys at the toggle switch.

The first available address from the active address range is entered next to the **new Addr** field as a suggestion. Any of the other available addresses can be selected with the **Prev.** or the **Next** key, and acknowledged with the **↵** key. This procedure prevents the possibility of duplicate addresses.

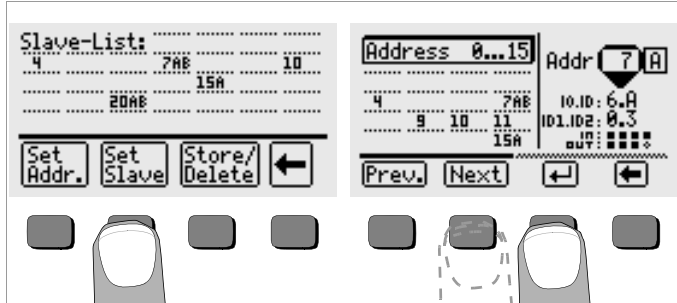


Note

Duplicate addresses can only be avoided if measurement is not performed via the address socket.

The slave list is displayed again after the address has been changed.

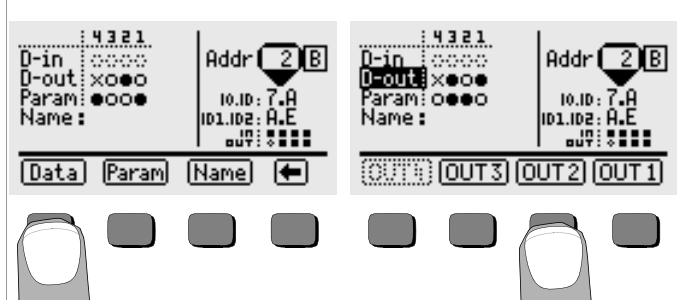
6.3 Reading Out and Changing Slave Profiles

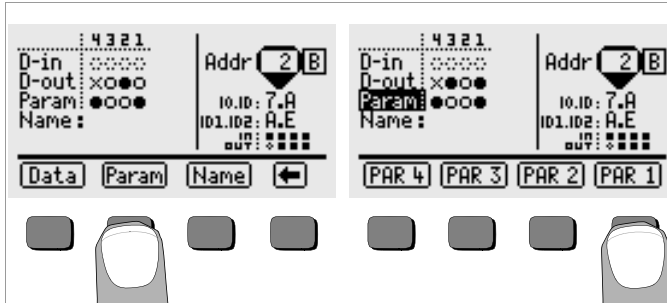


After initializing the **Set Slave** function, slave addresses 0 through 15 are displayed along with the abbreviated data from the slave with the lowest address. The display can be switched back and forth between address ranges 0 through 15 and 16 through 31 with the **◀** or the **▶** key at the toggle switch. The desired slave address from either of the address ranges is selected with the **Prev.** or **Next** key and is acknowledged with the **↵** key. The slave profile appears at the display.

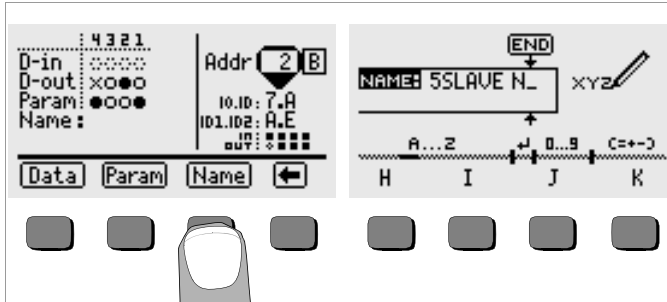
6.3.1 Digital Slaves

Output channels (**D-out**) can be selected and changed with the **Data** key, as can parameters (**Param**) with the **Param** key. Non-selectable data bits are represented by means of keys with dotted outlines. Values are acknowledged and the menu is exited with the **ENTER** key.





If valid data and parameters have been entered completely, they are transmitted to the slave by activating the **ENTER** key. Input data are updated cyclically by the slave.

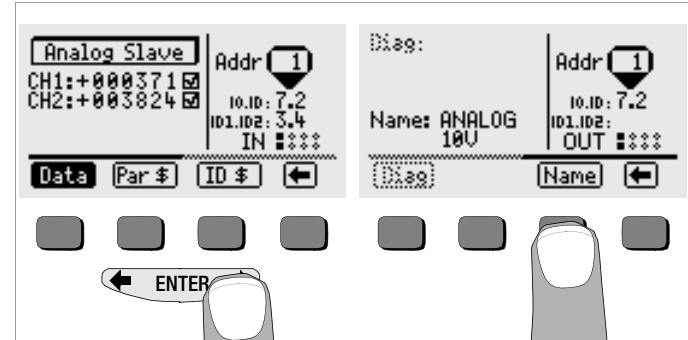


A name can be assigned to a slave, e.g. for documentation purposes. Refer to chapter 7.3 on page 20 regarding the entry of names.

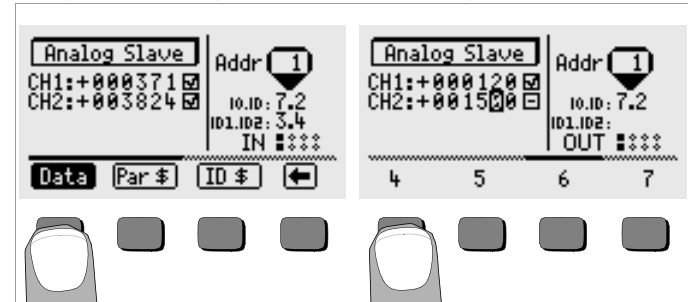
Note

For reasons of safety, data and parameters are only transmitted to the respective slave if both data **and** parameters have been entered or changed.

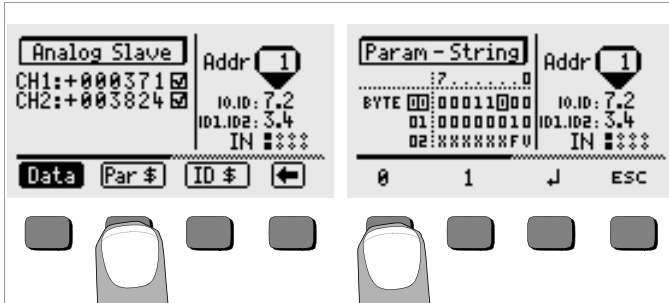
6.3.2 Analog Slaves



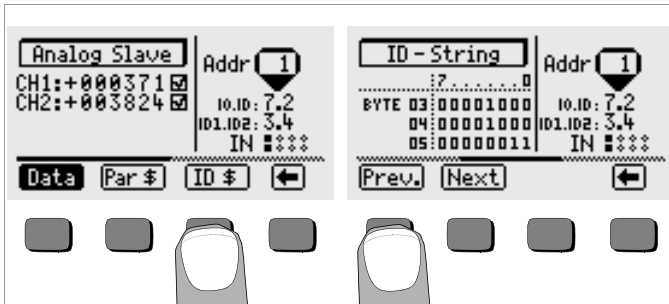
After selecting an analog slave, the slave's analog channels are displayed at the left, and abbreviated slave data appear at the right. The display can be switched to the diagnosis string (if available), as well as to the name entry menu and back to the main menu with the **←** and **→** keys at the toggle switch. After activating the Name key, the instrument is switched to the alphanumeric entry mode as described in chapter 7.3.



Analog data channels can be activated for output modules with the Data key, and transmitted to the slave after acknowledgement. Numerals which do not appear initially can be displayed by pressing the **←** or the **→** key at the toggle switch. Each time a numeral is selected, the cursor moves one place to the right.



Beyond this, the parameter string (Par \$) can be queried or edited, and the ID string (ID \$) can be read out. After the parameter string has been edited, the new values are transmitted directly to the slave. Switching is possible between bytes 00 through 02, 03 through 05, 06 through 08 and 09 through 11 with the Prev. or Next key, or with the ◀ or ▶ key at the toggle switch.



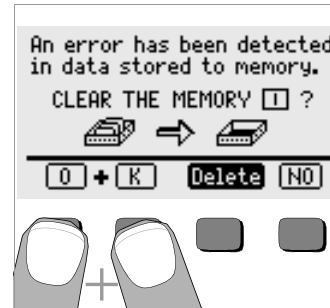
6.4 Saving / Deleting the System Profile – Store/Delete Function

Refer to chapter 7.3 on page 20 regarding the Store function. Refer to chapter 7.4 on page 20 regarding the Delete function.

7 MEM Function – AS-i Bus Memory Operations

The addresses of all slaves connected to the AS-i bus can be saved under any desired system name along with time and date in this operating mode. Four memory addresses are available to this end, and names may contain up to 15 alphanumeric characters.

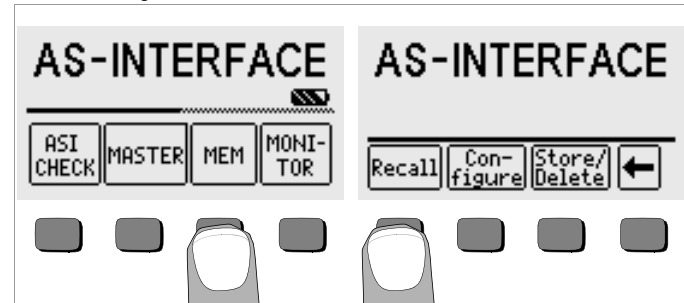
The system configurations stored to these four memory addresses can be loaded back to RAM, changed and saved under a new name. This allows for the copying of individual slaves, as well as entire systems.



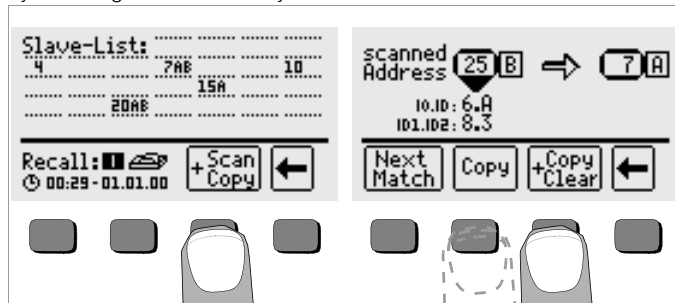
These data can be saved to a PC via a PC interface and reconfigured if desired. Reconfigured data can be uploaded from the PC to the METRAtest 36ASi as well.

If an error is detected in the memory, the user is asked whether the defective memory should be cleared and thus re-initialized. For example, errors may occur after the rechargeable battery has been replaced. Refer to chapter 7.4 regarding memory clearing.

7.1 Retrieving Data Records – Recall Function



After activating the Recall key once, previously saved bus configurations can be selected with the Prev. or the Next key. After activating the Recall key again, stored slave addresses are loaded to RAM. All of the slave addresses can then be transferred, one after the other, to the individual slaves at a new system. A list of all slaves connected to the bus is generated and the copy menu is opened by activating the Scan + Copy key. Only one slave may be connected to the bus, or to the METRAtest 36ASi with the addressing plug. Otherwise the “Copy Conflict” error message appears. If the Copy or Copy + Clear key is activated, the stored address is transmitted to the currently connected slave of the same type. Checking is performed to see if another slave with the same profile exists by activating the Next Match key.



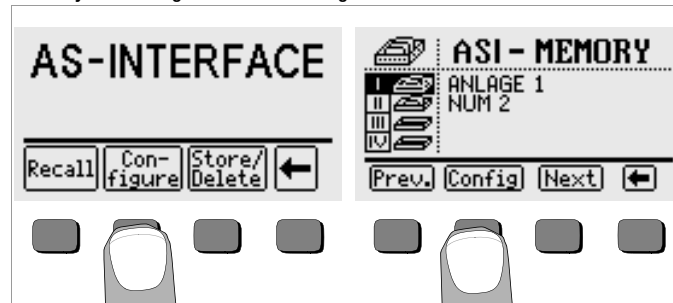
Copying a System

The following procedure is advisable if an entire system needs to be copied: After initializing the Scan + Copy function, the address of the copied slave is deleted after activating the Copy + Clear key. After all of the addresses have been transmitted to the slaves in the new system, all keys are disabled (displayed with dotted lines) except for the return key, and “no matches” appears at the display. This means there are no more equivalent slaves which have not yet been addressed, and that the system has been copied in its entirety.

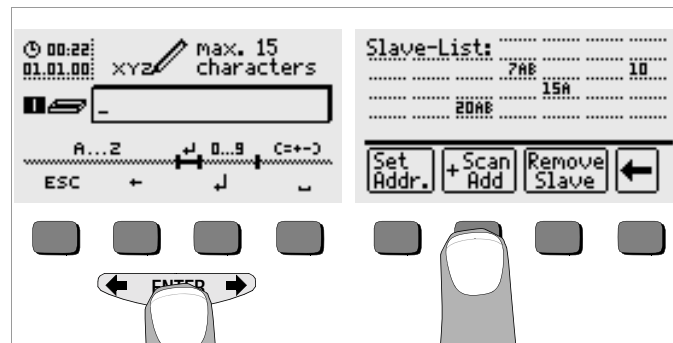
Copying Slaves

If any number of slaves of the same type need to be copied to the same address, this should only be done after the Scan + Copy function has been initialized with the Copy key.

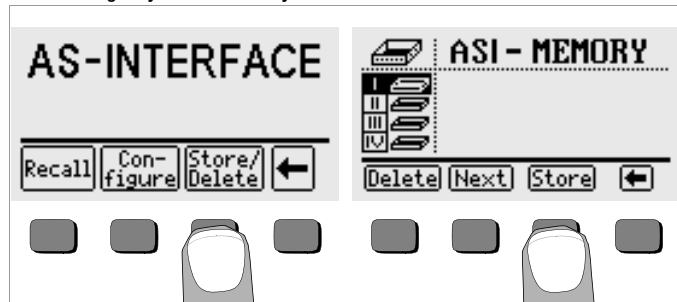
7.2 System Configuration – The Configure Function



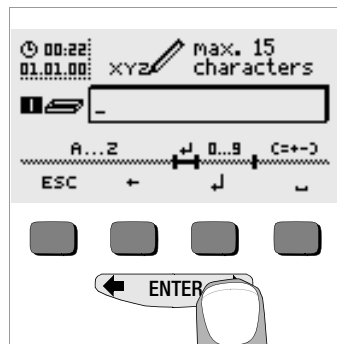
After activating the Configure key once, a previously stored bus configuration can be selected with the Prev. or the Next key. After activating the Configure key a second time, a menu appears for the entry a new system name, or a new AS-i bus name (see chapter 7.3). Addresses can now be changed for individual slaves after activating the Set Addr. key, as already described in chapter 6.2. Additional slaves can be added to the system with the Scan + Add key. Individual slave addresses can be deleted with the Remove Slave key.



7.3 Saving a System to Memory – Store Function



After activating the Store/Delete key once, the desired memory address (I, II, III or IV) must first be selected with the Next key, to which the slave addresses which are now in RAM are to be stored. After activating the Store key a second time, a list of all stored slave addresses is generated. If the Store key is activated again, a menu appears for the entry of a new system name, or a new AS-i bus name for the previously selected memory address.

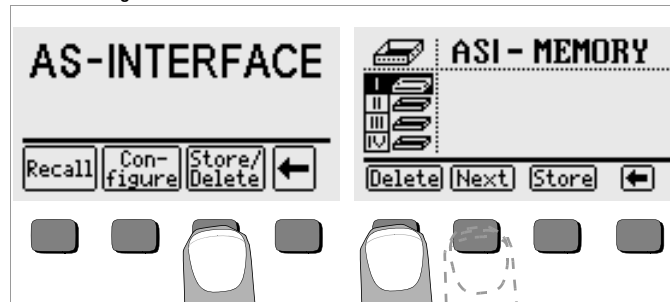


Display the desired alphanumeric character by pressing the ← or the → key at the toggle switch and select it with the corresponding softkey. Control characters are entered in the same way and have the following meanings:

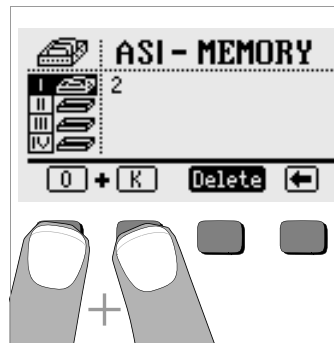
←: delete in reverse, ↵: new (second) line, otherwise identical with the **ENTER** key, **ESC**: exit entry mode without saving data. Each time a character is selected, the cursor moves one place to the right. Previously entered characters can be deleted in reverse by

pressing and holding any softkey (except for the ↵ key).

7.4 Clearing Data Records – Delete Function

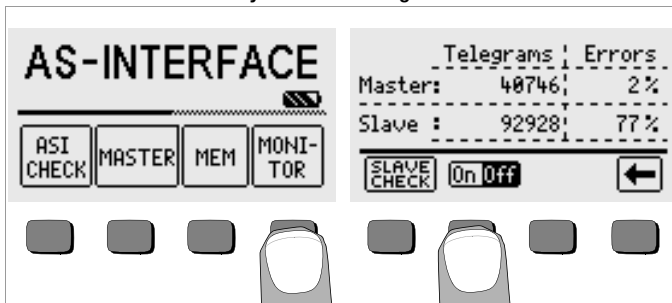


After activating the Store/Delete key, a previously stored bus configuration or the corresponding memory address can be selected with the Next key.

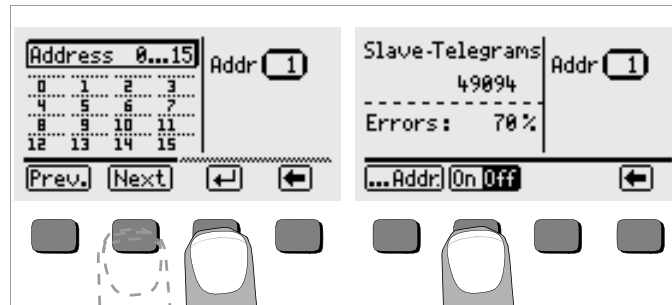


A security query is displayed if the Delete key is activated from the ASI-MEMORY menu: The 0 and K keys must be activated simultaneously in order to acknowledge deletion of the contents of the memory, or the selected memory address.

8 Monitor Function – System Monitoring



The system tester functions as a passive bus user in this operating mode. The instrument detects bus system errors separately for slaves, and for the master. The error quota is calculated as a percentage of the total number of telegrams (from the master and the slaves). System monitoring can be activated and deactivated with the On/Off key. A rotating wheel is displayed when the monitor function is active, and all keys are disabled except for the Off key.



The error quota for a single slave can be viewed in the SLAVE CHECK sub-menu by selecting the desired slave address. The display can be switched back and forth between address ranges 0 through 15 and 16 through 31 with the ← or the → key at the toggle switch. See above for operation of the On/Off key.

9 Characteristic Values

Inputs and Outputs

Output voltage between Asi+ and Asi-: $U_{ASI} = 29.5 \dots 31.6 \text{ V}$

See ASI Complete Specification Version 2.11 (3/2000) for further details.

Measuring Function

Measuring Function	Measuring Range	Display Range	Measuring Error
U_{ASI}	$\pm 35 \text{ V}$	20 ... 35 V	$\pm (2\% \text{ of rdg.} + 2 \text{ digits})$
I_{ASI} (for slaves)	0 ... 240 mA	0 ... 240 mA	$\pm (3\% \text{ of rdg.} + 2 \text{ digits})$

Key rdg. = reading

Reference Conditions

Temperature	23 °C \pm 2 K
Relative Humidity	45% ... 55%
Battery Voltage	5.5 V \pm 1%
Line Frequency	50 Hz \pm 0.2 Hz
Line Voltage Waveshape	sinusoidal (deviation between effective and rectified values < 1%)

Power Supply

Rechargeable Battery Pack	6 NiMH mignon batteries nominal voltage: 7.2 V capacity: 1300 mAh charging: 130 mA/16h
Battery Test	Displayed as symbol
Battery Saving Circuit	Automatic shutdown approx. 5 minutes after last key activation, display illumination can be deactivated
Current Consumption	Closed-circuit current approx. 50 μ A (device off / standby) master \geq 150 mA
Safety Shutdown	The device is switched off or cannot be switched on if supply voltage is too low.
Charging Socket	The rechargeable battery back can be charged inside the device after connecting the Z501D mains charging adapter to the charging socket.

Electrical Safety

Safety Class	II per IEC 61010-1/EN 61010-1/VDE 0411-1
Overvoltage Category	II
Nominal Voltage	50 V
Test Voltage	510 V per IEC 61010-1/EN 61010-1/VDE 0411-1
Contamination Level	2

Electromagnetic Compatibility EMC

Product standard	EN 61326-1: 1997 EN 61326: 1997/A1: 1998
------------------	---------------------------------------------

Interference Emission		Class
EN 55022		B
Interference Immunity	Test Value	Feature
EN 61000-4-2	Contact/Atmosph. - 4 kV/8 kV	A
EN 61000-4-3	10 V/m	B

Ambient Conditions

Operating Temperature	-10 ... +50 °C
Storage Temperature	-20 ... +60 °C (without batteries)
Relative Humidity	max. 85%, no condensation allowed
Elevation	max. 2000 m
Deployment	indoors; outdoors only within the specified ambient conditions

Mechanical Design

Display	multiple dot matrix LCD 128 x 64 pixels (65 mm x 38 mm), illuminated
Protection	housing: IP 52 per DIN VDE 0470, part 1/ EN 60529 sockets: IP 20
Dimensions	275 mm x 140 mm x 65 mm
Weight	approx. 1.2 kg without batteries

Data Interface

Type	infrared (SIR/IrDa) bidirectional, half-duplex
Format	9600 baud, 1 start bit, 1 stop bit, 8 data bits, no parity, no handshake
Range	max. 10 cm recommended distances: < 4 cm

10 Maintenance

10.1 Battery Operation

When only one solid segment remains in the battery symbol, the battery pack must be recharged.

Check the batteries at short, regular intervals, and after lengthy periods of storage, to make sure no leakage has occurred. If leakage has occurred, the electrolyte must be carefully and completely removed from the instrument with a damp cloth before a new battery pack is installed.

Charging the Batteries



Attention!

Use only the NA 0100S battery charger (article no. Z501D) with safe electrical isolation and a nominal secondary output of 12 V DC, 500 mA to recharge the battery pack.

Before connecting the battery charger to the charging socket at the device, make sure of the following points:

- **Rechargeable batteries have been installed (not normal batteries).**
- The voltage selector at the charger has been set to 12 V.

Connect the NA 0100S battery charger to the charging socket with the 3.5 mm jack plug. Set the voltage selector switch at the NA 0100S to 12 V. The system tester recognizes the fact that a battery charger has been connected and starts the charging cycle.

Depleted batteries require a charging cycle of 16 hours at a temperature of 0 ... +45 °C, a charging voltage of 7.8 V and a charging current of 130 mA. If the batteries are exhausted to a great enough extent, the test instrument can no longer be switched on. If this is the case, leave the test instrument connected to the activated battery charger for about 30 minutes, and then proceed as described above.

Storing the Battery Pack

1 year	at –20 ... +35 °C
3 months	at –20 ... +45 °C
1 month	at –20 ... +55 °C

Replacing the Battery Pack

- Loosen the two slotted screws at the battery compartment cover on the housing rear panel and remove the cover.
- Insert the battery pack making certain it is correctly poled in accordance with the symbols.
- Replace the cover and retighten the screws.



Attention!

The instrument may not be operated if the battery compartment cover has not been installed and properly tightened!

Disposing of the Battery Pack

Dispose of rechargeable batteries which no longer take a charge in an environmentally sound fashion, i.e. at collection centers which have been established for this purpose.

10.2 Housing

No special maintenance is required for the housing. Keep outside surfaces clean. Use a slightly dampened cloth for cleaning. Avoid the use of cleansers, abrasives and solvents.



Attention!

For the following reasons, the housing may not be opened by the operator:

- Unexpected problems may occur during reassembly.
 - Sealing requirements are no longer fulfilled.
-

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12 Repair and Replacement Parts Service, DKD Calibration Lab * and Rental Instrument Service

When you need service, please contact:

GOSSSEN METRAWATT GMBH
Service Center
Thomas-Mann-Str. 20
90471 Nürnberg, Germany
Phone: +49 911 86 02 - 0
Fax: +49 911 86 02 - 2 53
E-mail: service@gmc-instruments.com

This address is only valid in Germany.

Please contact our representatives or subsidiaries for service in other countries.

* **DKD** Calibration Laboratory for Electrical Quantities DKD–K–19701 accredited per DIN EN ISO/IEC 17025

Accredited measured quantities: direct voltage, direct current values, DC resistance, alternating voltage, alternating current values, AC active power, AC apparent power, DC power, capacitance and frequency

Competent Partner

GOSSSEN METRAWATT GMBH is certified in accordance with DIN EN ISO 9001:2000.

Our DKD calibration laboratory is accredited by the Physikalisch Technische Bundesanstalt (*German Federal Institute of Physics and Metrology*) and the Deutscher Kalibrierdienst (*German Calibration Service*) in accordance with DIN EN ISO/IEC 17025 by under registration number DKD–K–19701.

We offer a complete range of expertise in the field of metrology: from **test reports** and **proprietary calibration certificates** right on up to **DKD calibration certificates**.

Our spectrum of offerings is rounded out with free **test equipment management**.

An **on-site DKD calibration station** is an integral part of our service department. If errors are discovered during calibration, our specialized personnel are capable of completing repairs using original replacement parts.

As a full service calibration laboratory, we can calibrate instruments from other manufacturers as well.

13 Product Support

When you need support, please contact:

GOSSSEN METRAWATT GMBH
Product Support Hotline
Phone: +49 911 86 02 - 112
Fax: +49 911 86 02 - 709
E-mail: support@gmc-instruments.com

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