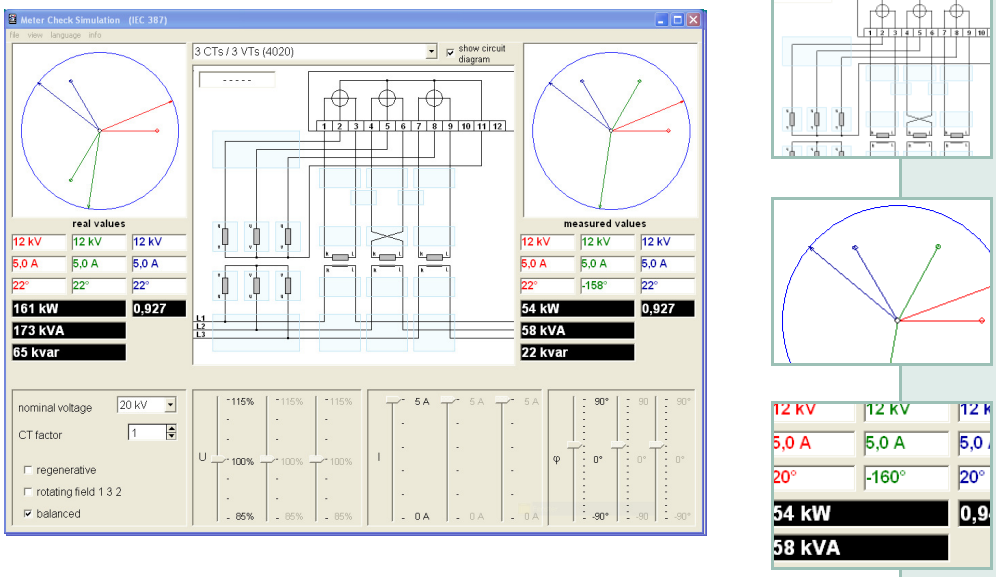
MCS_MAN_EXT_GB_V101



ZERA

Meter Check Simulation

Version 1.1.0

Keep for future use.

Status as at: 10.09.2008

ZERA

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Sphere of application of MCS

The Meter Check Simulation (MCS) program is used to simulate errors in the switching of voltage and current paths in meter installations within a low-, medium- or high-voltage network.

The benefit: Errors can be presented, for example for training purposes, without any real metering installations. During on-site error detection, the physical wiring does not have to be checked each time; instead, the suspicion of an error can first be checked via the simulation. MCS can be used independently from a certain measuring device.

Possible places of installation are:

- On a laptop for conducting on-site simulations.
- On a PC at a test centre if this is used as a central contact point.
- For training purposes at training centres.

Installation/de-installation

This chapter describes the system requirements, the licensing process and the de-installation process.

System requirements

- *Operating system*: Windows 2000 or Windows XP
- *Processor*: At least Pentium III with 500 MHz
- *Screen*: Minimum resolution 1024 x 768 pixels with 16- or 32-bit colour depth. DPI settings for the display: 96 DPI (small font or standard size).
- *Drives*: CD-ROM drive for installation.
- *Disk space*: 20 MB free hard-drive space for the program
- *Access rights*: Local administrator rights for installation and program activation. User rights during operation.

Installation process

The installation procedure is identical vor full version and for demo version.

1. Place the CD into the corresponding drive. The window offering the language options for installation will automatically appear. If the window should not appear after a short time: Call up Windows Explorer. On the CD, open the setup.exe file by double-clicking on it.
2. Select the desired language from the list and confirm by clicking on OK.
3. The installation wizard will be started and take you through the remaining installation. Follow the on-screen instructions.
4. Once the installation has been completed, the licensing statement will appear when you start the program for the first time.

Use as demo version

After installation, you can use MCS for ten days as demo version.

To use the demo version, proceed as follows:

1. Start MCS. The dialog of the licensing process opens.

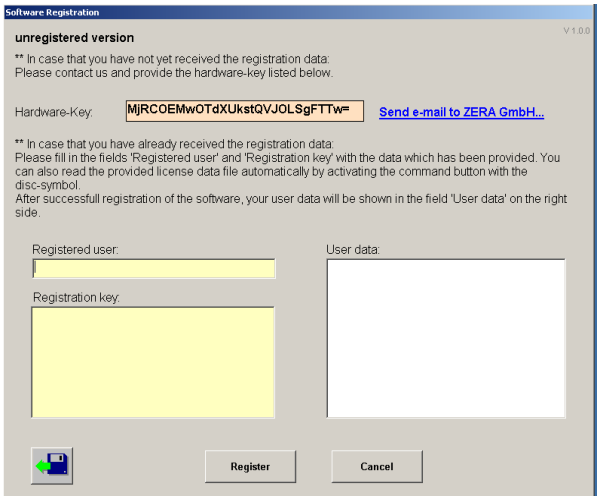


Figure 1: Dialog of licensing process

2. Click „Cancel“ and MCS starts as demo version.

The licensing of the full version

Licensing of the full version takes place via an automatically generated hardware identifier that is transmitted to ZERA together with the order number and the customer number. The data are normally sent out by e-mail, a procedure that is described below. ZERA uses the data transmitted to generate a registration code that is sent to the customer and entered into MCS.

- If the PC on which the installation takes place cannot send e-mail, please contact our service department. For any other type of communication, please observe the capital/small letter spelling of the hardware identifier.
- If the PC hardware is changed, it may become necessary to repeat the licensing process.

The licensing process

With the first start of MCS software you have to run through the licensing process.

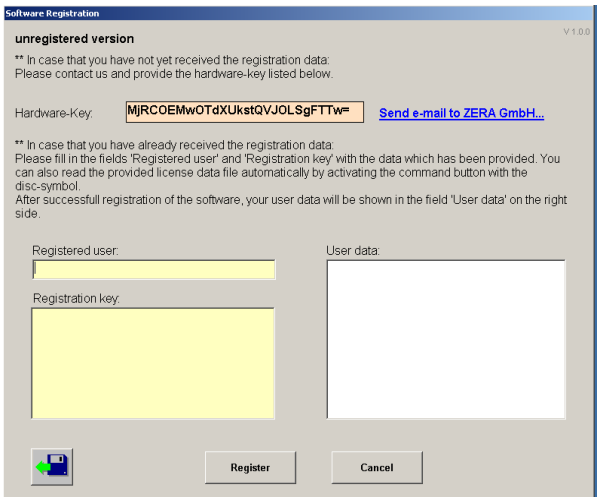


Figure 2: Dialog of licensing process

1. Start MCS.
2. Click on "Send e-mail to ZERA GmbH". The mail program installed on the computer generates a new mail with the recipient, subject and hardware identifier already inserted.
3. In addition, the ZERA order number and customer information (company name and contact person) must be entered into the e-mail.
4. Send e-mail. ZERA will handle this e-mail within the next working day.
5. Close the dialog with "Cancel".
6. The response mail will contain a TXT file containing the registration data as an appendix. Save this file to any location you wish.
7. Start MCS.
8. Click on the diskette symbol and select the previously stored TXT file. The registration code it contains will be read. Confirm by clicking on "OK".
9. Click on "Continue" in the registration window MCS will be opened.

De-installation

MCS can be de-installed via the Windows function "Control panel / add or remove programs". After re-installation, the licence number will no longer be requested. The program will start immediately.

General procedure

The values and general conditions (e.g. current, voltage, circuit, etc.) that would exist in a correctly connected system are entered into MCS. Various errors can be simulated on the basis of these entries, to see how a circuit with this error would look when taking a measurement. When entering the system values, there is no prescribed sequenced; however, all information required must be entered before an error is selected. The sample process described refers to the chapters of the manual that contain more information on this subject.

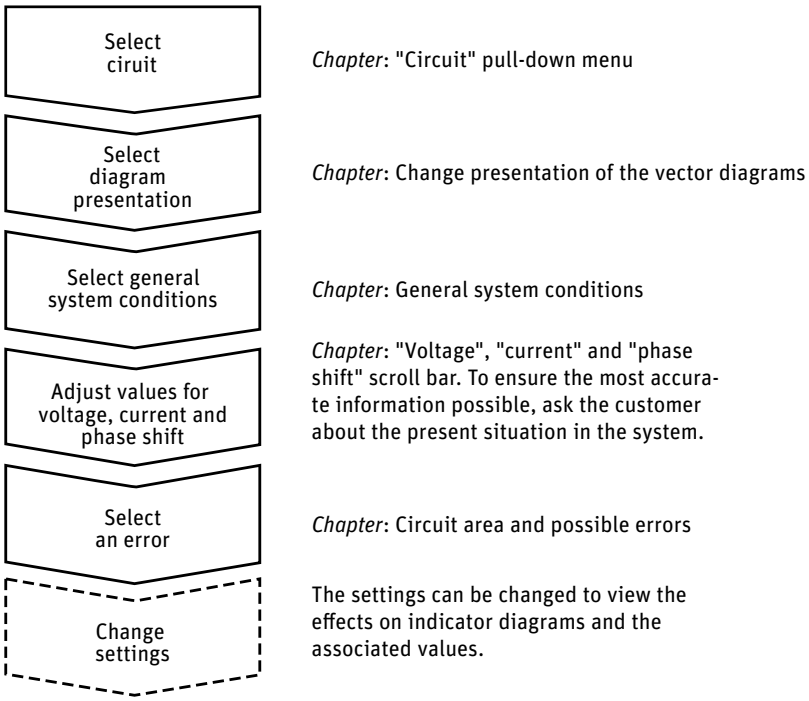


Figure 3: General procedure when working with MCS

The operating area in detail

The following colour allocation applies in this :
L1 = red, L2 = green, L3 = blue. The numbers behind the heading refer to the position in the figure "Overview of the operating area".

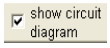
Figure 4: Overview of the operating area

"Circuit" pull-down menu (1)

The normal standard circuits are available for selection. Earth connections are not shown.

- Direct connection (4000)
- 3 current transformers (4010)
- 3 current / 3 voltage transformers (4020)
- 3 current / 2 voltage transformers (4020)
- 2 current / 2 voltage transformers (4020)

"Circuit" checkbox (2)



The checkbox can be used to hide or show the selected circuit. To select errors, the circuit must be shown. If, however, only the vector diagrams are to be shown, for example for training purposes, the circuit can be hidden.

- To show the circuit, activate the checkbox "Show circuit".
- To hide the circuit, de-activate the checkbox.

"Circuit" display area (3)

This area shows the circuit selected from the pull-down menu and the circuit errors to be simulated are selected.

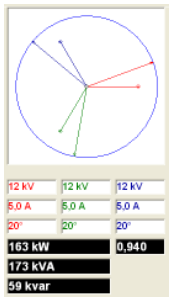
Each blue field within the circuit are indicates one position at which an error may occur. As soon as the mouse cursor is in a blue field, the current status of this position is shown in the circuit area at top left. By repeatedly clicking on a light-blue field, all the possible forms this error may take will be consecutively displayed.

- ***Example***: Exchange of "voltage" phase sequence on the secondary side of the voltage transformer.
- Current status: 2-5-8
- The first click will select 2-8-5, the second click 5-2-8, etc.

Figure 5: "Circuit" display area

The errors shown in the diagram show the maximum number of errors that can be displayed in MCS, using the "3 current / 3 voltage transformer" circuit as an example. Other circuits have less error potential and correspondingly fewer errors for selection. More than one error can be selected for a circuit. ***Note***: The "rotating field 1 3 2" entry is also an error. However, this is not a circuit fault and is selected from among the "General conditions".

„Real“ and „Measured“ values (4/5)



The voltage indicators have been marked with arrows and the current indicators with circles in this vector diagram.

The colour can be changed (see “Presentation of the indicator diagrams” p. 10.).

“Real values” vector diagram

This shows the values as the actually appear in the system. It is based on the values entered by you.

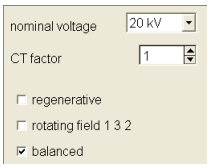
“Measured values” vector diagram

This shows the values as they appear in the measurement. It is based on the values entered by you, in combination with the selected errors.

Value indication

The electrical values of each system are given as figures underneath each vector diagram. The voltage, current and phase angle for each phase are shown in the same colour as in the vector diagram. The active power, apparent power, idle power and the efficiency factor ϕ are shown in white on a black background. The colour cannot be changed.

General conditions of the system (6)



Nominal voltage

Nominal voltage of the network into which the meter has been incorporated.

- *When to select*: Always.

CT factor

Transmission ratio of the voltage transformer

- *When to select*: If switching with voltage transformer(s).

Regenerative

Customer's option to allow the power to flow back into the network. The controller for the phase shift (9) can be adjusted from -180° to 180° during energy recovery.

Note: In order to interpret the measurement correctly, it is important to clarify whether the customer is feeding energy back into the system at the time of measuring. If this setting is incorrect, errors may appear as correct values and vice versa.

- *When to select*: If applicable.

Rotating field 1 3 2

This means that there is a rotating field 1 3 2 in the real alternating current system.

Note: This indicates an error on the power supply side. During the selection process, the vector diagram is adapted accordingly and the measuring values can be interpreted on this basis.

- *When to select*: If applicable.

Balanced

Determining that this is a balanced system.

This condition is selected if the exact values for the individual phases are not important or where the load is symmetrical. If the checkbox has been marked, only one scroll bar is active for the current, voltage and phase shift respectively, which is used to change the values of all three phases.

- *When to select*: If applicable.

“Voltage”, “current” and “phase shift” scroll bar (7, 8, 9)

The scroll bars are used to enter the values for the “voltage”, “current” and “phase shift”, as they occur in the real system. Usually the ideal system values or the expected values for the customer are used. To ensure the most accurate information possible, the customers were asked how the current power supply situation is, for example whether it is under load or not.

Dependencies on other interface fields:

- In each case, only one scroll bar is active if "balanced" was chosen among the general conditions.
- *“Phase shift” scroll bar*: The setting range is from 90° to -90°. If "Regenerative" is selected from among the general conditions, the setting range varies from 180° to -180°.
- *“Current strength” scroll bar*: in the event of a direct connection 0 A to 60 A can be entered, whereas for a transformer current, this range is from 0 A to 5 A (secondary current of the transformer). The transmission ratio of the current converters is entered under "CT factor" among the general conditions.
- *“Voltage” scroll bar*: the setting is in percent (85 % to 115 %) of the nominal voltage. This is selected under "Nominal voltage" among the general conditions. The values that can be selected depend on the circuit that has been chosen.

Adapt interface

You can change several settings such as language and phase presentation to adapt the interface to your needs.

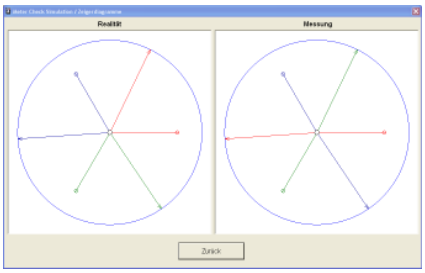
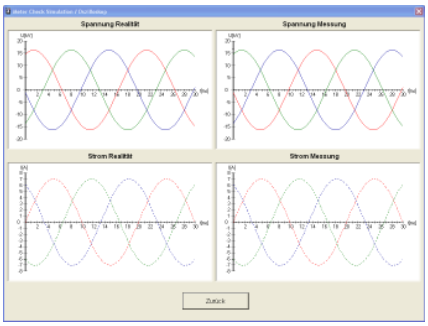
Select language

The available languages are shown in the Language menu. The currently selected language has been marked with a tick.

- Select the desired language from the Language menu. The new settings will be effective the next time MCS is started.

Separate windows

In each case, you can open a separate window for the indicator diagrams and for the oscilloscope view (shows the time progression of the electrical values).

Window “indicator diagram”	Window “oscilloscope”
	
Select *View/vector diagram* from the menu.	Select *View/oscilloscope* from the menu.

Presentation of the indicator diagrams

You can adapt the indicator diagrams to your application via the settings mentioned below. To do this, you can use combinations of the reference size and the type of phase presentation. The settings are not saved on closing the program.

Selection options for norms / reference values

- DIN410
- IEC387
- Mathematical

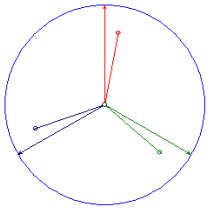
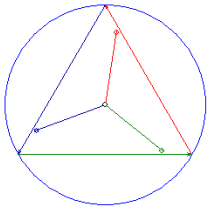
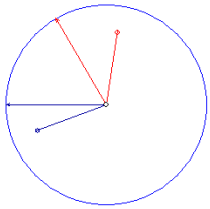
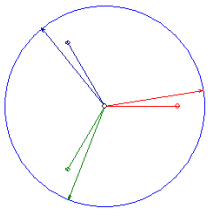
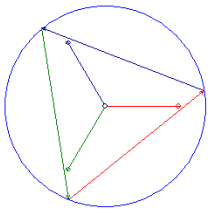
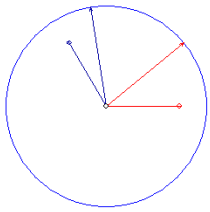
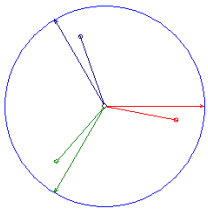
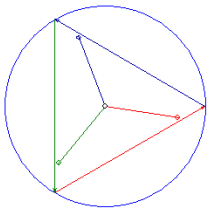
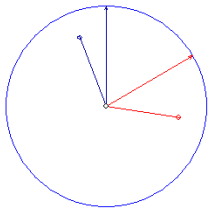
Hint: If it appears as though no error can be allocated to a diagram, this frequently means that a reference value is involved in the error. If you change the view in such a case, e.g. from DIN410 to IEC387, the errors are often easier to detect.

Selection options for phase presentation

- Phase/neutral presentation
- Phase/phase (4 conductors) presentation
- Phase/phase (3 conductors) presentation

Please note that the phase presentation must always go with the circuit selected.

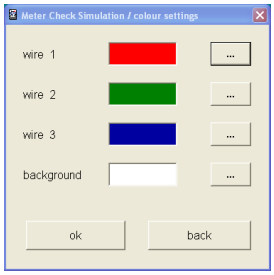
Overview of the presentation options

Presentation according to	Refe-rence	Example: phase/zero presentation	Display phase/phase presentation (4 cond.)	Display phase/ phase presentation (3 cond.)
DIN410	UL1 upwards			
IEC387	IL1 to the right			
Mathe-matical	UL1 to the right			

Colour setting of the indicator diagrams

The colour settings for the indicator diagrams can be changed. The colours of the phase values below the indicator diagrams will be automatically adapted.

1. Choose “View/vector display/colour settings” from the menu.
2. To change a colour, click on the button with the three dots and select a colour from the window that follows. By clicking "OK", you will return to the main window. The colours have been adapted accordingly.



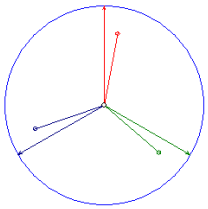
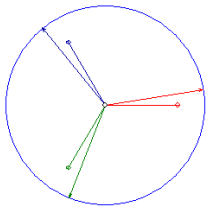
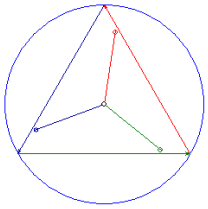
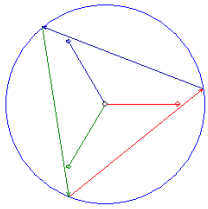
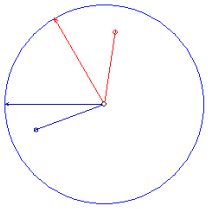
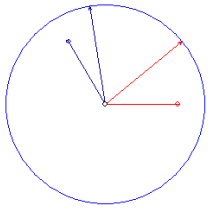
Storing and loading files

Scenarios with the various settings can be stored and recalled. This, for example, is used to send this file to people not present on site or to save ready-made scenarios for training purposes.

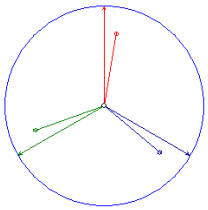
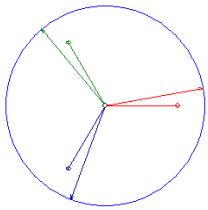
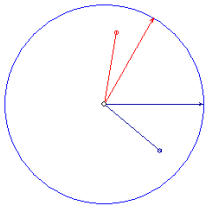
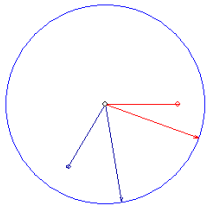
- *Saving the current scenario*: select "File save" from the menu and save the file in the desired location.
- *Loading a saved scenario*: select "File load" from the menu and open the desired scenario.

Examples: Correct connection and various errors

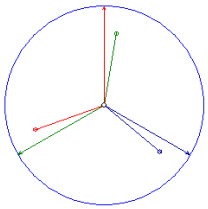
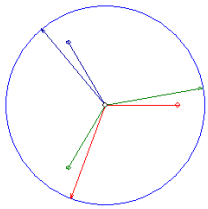
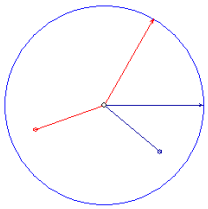
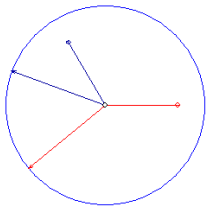
Correct connection

Correct connection, phase shift U/I = 10° inductive		
	According to DIN410 (clockwise angle direction)	According to IEC387 (anti-clockwise angle direction)
4W P/N		
4W P/P		
3W P/P		

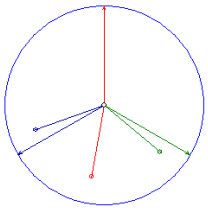
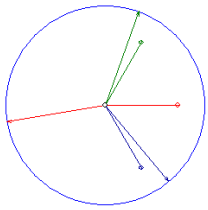
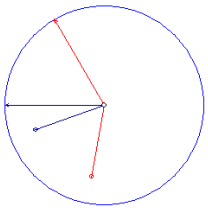
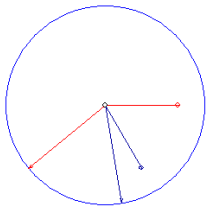
Wrong rotating field

Wrong rotating field, phase shift U/I = 10° inductive		
	According to DIN410 (clockwise angle direction)	According to IEC387 (anti-clockwise angle direction)
4W P/N		
	The phase sequence of the systems is now L1, L3, L2.	
3W P/P		
	The U12 voltage has been shifted by 60° and U32 by 180°. The current I3 has been shifted by 120°. The system angles between U and I have therefore been switched around.	

Switching around the voltage phases

Switching around the voltage phases UL1 and UL2, phase shift U/I = 10° inductive, circuit: 3 current / 3 voltage transformers		
	According to DIN410 (clockwise angle direction)	According to IEC387 (anti-clockwise angle direction)
4W P/N		
	The phase sequence of the systems is now L1, L3, L2. The currents I1 and I2 have been switched around.	
3W P/P		
	The U12 voltage has been shifted by 60° and U32 by 180°. The currents I1 and I3 have been shifted by 120°.	

Exchange of current connections I1

Exchange of current connections I1 (reverse polarity), circuit: 3 current / 3 voltage transformers		
	According to DIN410 (clockwise angle direction)	According to IEC387 (anti-clockwise angle direction)
4W P/N		
	The switch is directly visible.	All values except for I1 are shown in switched form.
3W P/P		
	The switch is directly visible.	All values except for I1 are shown in switched form.