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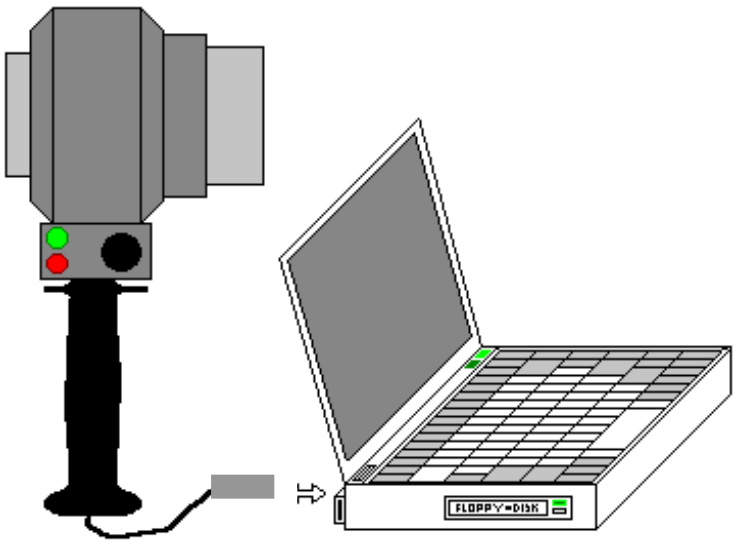
WE SOLVE MEASUREMENT PROBLEMS

CLOSING FORCE

MEASUREMENT UNIT SKM1-A(B/C)C3/5



Applicable standards EEC70/156 Act. 5, EN 14752, VDV111, 2001/85/EG and German SP according to § 35e StVZO

Operation Manual Version 2.4

(09.10.2018)

Contents:

1. Introduction

At automatic doors and closing edges there is a permanent danger for people to get hurt. This appears especially at power driven bus doors, sliding doors, elevator doors, automatic sliding roofs, window drivers and so on.

In order to reduce the danger of accidents and violation, government and other official associations introduced special directions. Herein the maximum intensity of the clamp force and the correct checking of these forces are defined.

The closing force measurement unit „SKM1“ was originally designed to check the forces at power driven bus doors and meets the latest official requirements.

Besides of this application the unit is also designed for measuring exact forces at closing areas or edges, e.g. measuring closing forces at power driven security devices, elevator doors, sliding doors, garage doors, automatic security grids or other closing devices.

2. Installation of SKMess 2

SKMess 2 is the software part of the measurement system, running on PC. It communicates with the sensor, stores measurement data on harddisk and generates printed reports.

2.1. System minimum Requirements

- Windows XP to Windows 10 or Linux with WINE
- Min. 486 processor, 32 or 64 Bit
- A free USB socket on your PC for data and supplying power to the sensor
- 20 MB of RAM
- 4 MB of hard disk space for installation
- Printer (only if printed reports are required)

2.2. What is supplied with your product ?

Your SKM1 measurement system includes the following materials:

- Closing force sensor SKM1-ACx with connection cable USB at sensor
- USB Key with Software and manual
- Manual (this book)
- Aluminium transportation case

If any of these items is missing contact us immediately.

2.3. Installing the software

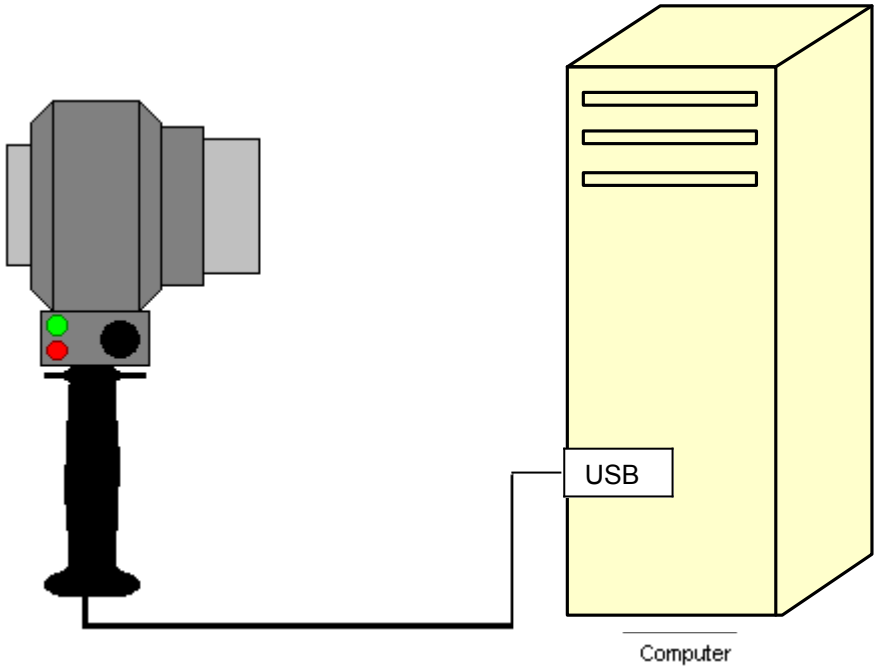
Insert the delivered installation stick and view the contents on your monitor. Double click on the “Skmess_Setup.exe” and let the setup guide you trough the installation. Administrator rights are required to install the necessary driver.

➔ It is advisable to close all applications prior to commencing the installation procedure.

3. Connecting the sensor to the PC

At the end of the sensor cable you find a USB-connector, please connect it to your computer when the setup asks you to do so.

The sensor is powered (+ 5 V DC) out of the USB connector of the computer.



A USB to serial converter is integrated into the measurement unit to serve as interface between the SKM1-ACx and computer.

Usually the setup detects the port the device is attached to. If this fails please select the port manually under settings.

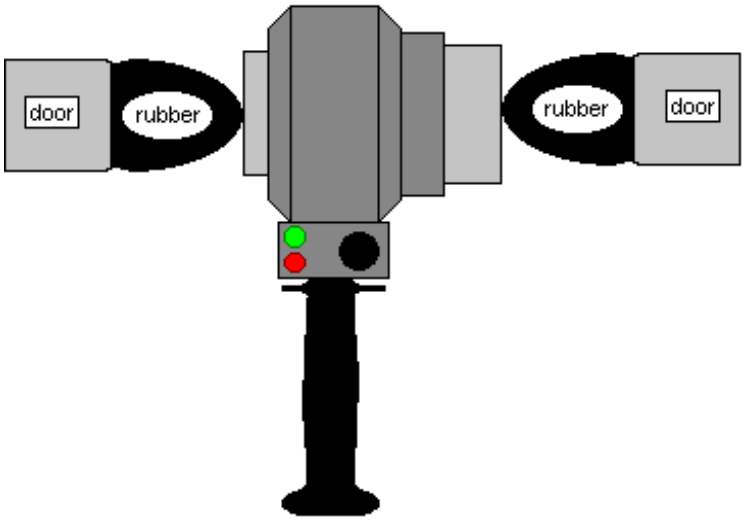
To find the correct port open the device manager, expand “Ports (COM & LPT)” and note the COM number of “USB Serial Port”.

If the device is still not detected often other software reserves the port. Please close other software which may open COM ports and try again. Also changing the COM number may help. To do so open the device manager as before, right click on “USB Serial Port” and choose “Properties”. In the opening window choose “Port Settings” and “Advanced”. Don’t forget to change the setting in the SKMess software too.

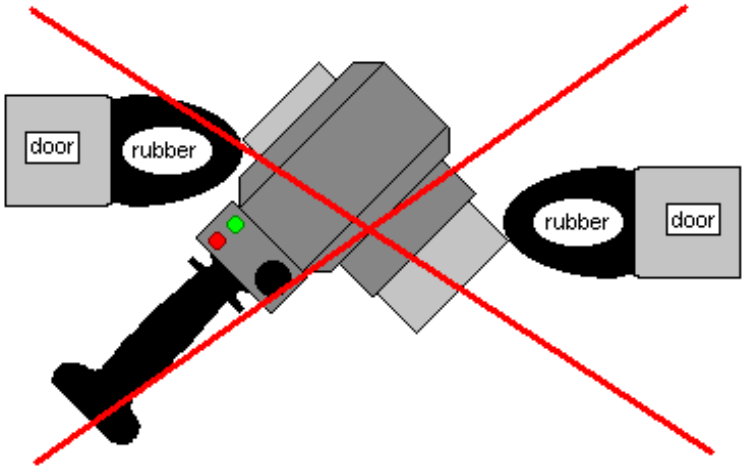
4. Correct handling of the measurement unit

The measurement unit has to be placed between the edges of the closing door and the round plates of the force transducer should be bounced right-angled by the door. When the door is bouncing, the two halfs of the housing move into each other and transduce the force to a highly sensitive electronic pressure sensor.

Right positioning



➔ Do not twist the unit or put any force to the handle !



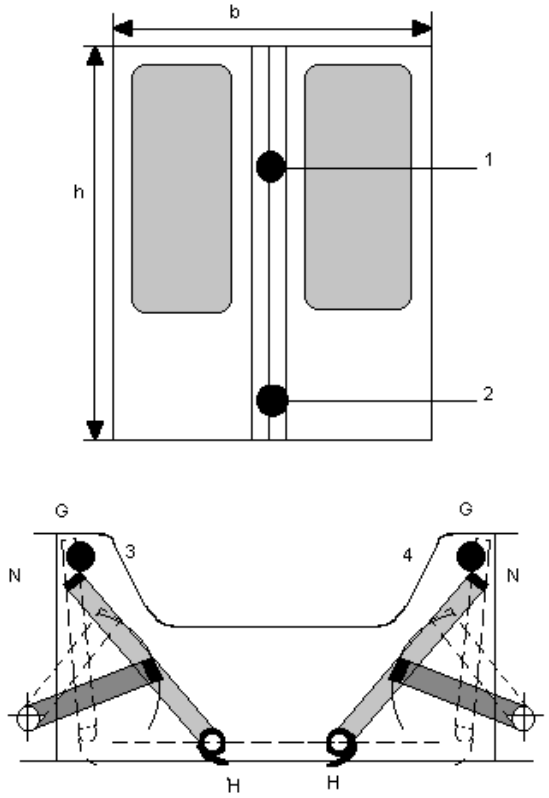
<u>Important Notice:</u>

To avoid wrong measurements the operator should not add any additional force to the handle of the unit during measurement. Therefore it is useful to put the fixed part of the housing plane against one edge of the door and let the movable part be bounced by the other edge.

During the squeezing of the unit, the handle should lie loosely in the operators hand.

If the unit is twisted, for example by bouncing against asymmetrical rubber profiles, the movement should be followed by the operators hand without additional force. Never produce a counteracting force by your hand!

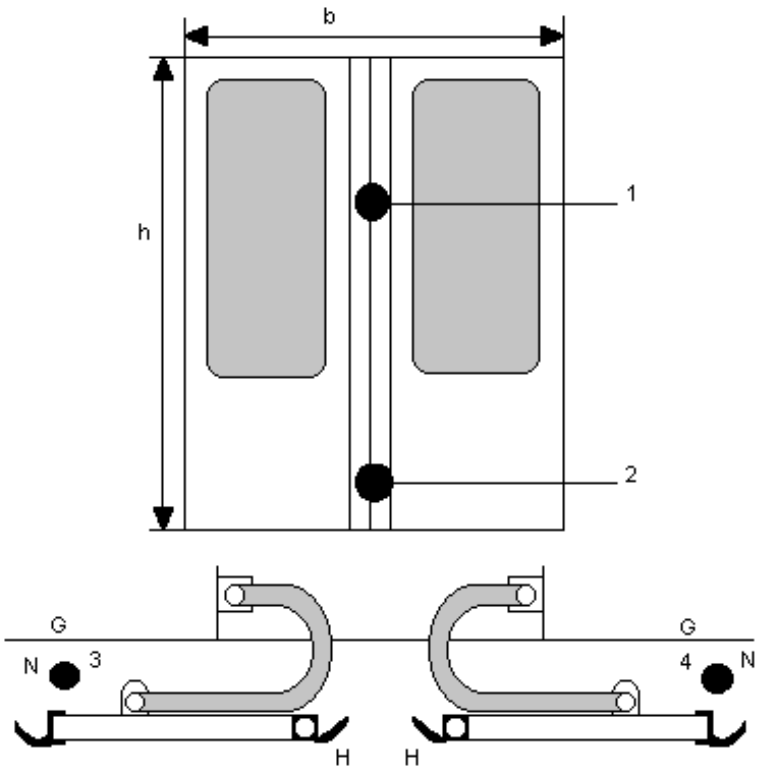
4.1. Examples for measurement points



Double leaf inside sliding door

h	Door height
b	Door width
H	Main closing edge
N	Second closing edge
G	Opposite closing edge

Measurement Position 1:	Middle of the door
Measurement Position 2:	150 mm above lower edge
Measurement Position 3 and 4:	Between lower door edge and step



Double leaf outside sliding door

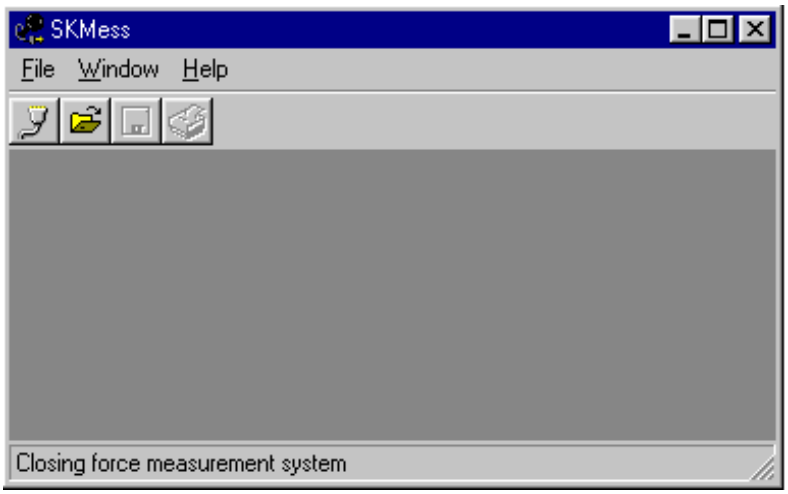
h	Door height
b	Door width
H	Main closing edge
N	Second closing edge
G	Opposite closing edge

Measurement Position 1:	Middle of the door
Measurement Position 2:	150 mm above lower edge
Measurement Position 3 and 4:	Between N and G

5. Doing a measurement with SKMess 2

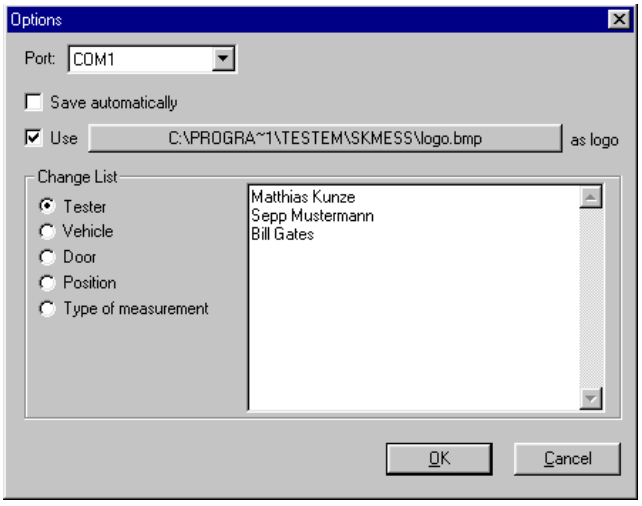
First of all start SKMess 2:

If you have not changed the standard icon folder in the installation programm, you'll find SKMess 2 in Start menu / SKMess / SKMess . Select the program there and it should show like this:



5.1. Configuration of the software

The setup tries to detect the correct COM port for you. But in case you can change the port manually. This works in the Options dialog. Select Options in the application's File menu and the dialog shows:



Now the port to be used may be selected. All changes are saved and will be used whenever the program is started

Besides of the selection of the correct Port you have several other possibilities:

Save automatically

This means that, after all three measurements are done, the record is saved automatically in the installation directory. The filename hereby is a combination of the date and a number. I. e. if the measurement was the second you did on the 24th of decembre 1999 the file's name would be 99122402.SKM. If this option is not activated you'll have to save each measurement by yourself (until you did so it is only stored in the the PC's RAM).

If you quit SKMess 2 and there are any unsaved files, the program always asks you whether you want to save them or not.

Use <....> as logo

Here you can specify a windows bitmap to be used as your logo. This logo will be placed in the upper right corner when a record is printed. When the button is clicked a dialogbox will show up where you can select a bitmap file.

The logo is only displayed if the checkbox is marked.

After installation of SKMess 2 our logo is put in there for demonstration purpose. If you make your own measurements you might use your own logo instead.

Change List

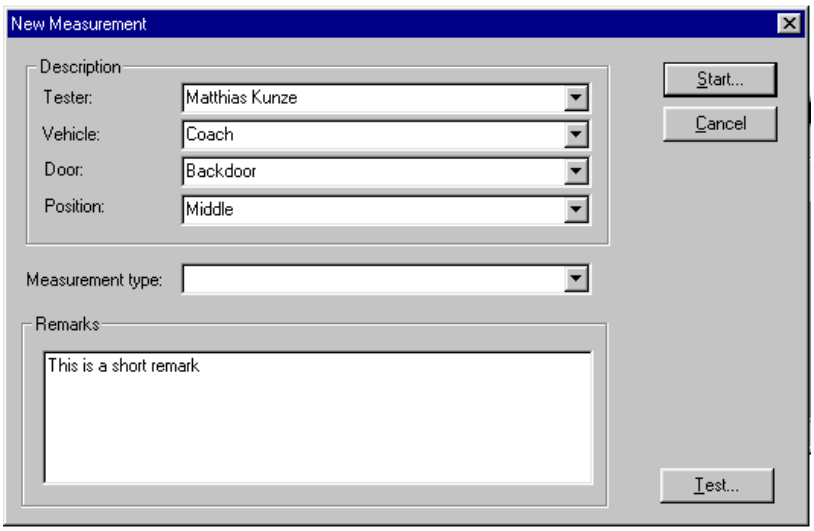
If you do many similar measurements, you can store some descriptive text so you don't need to type each time you start a new measurement. Click the type of list that should be changed and enter the text in the edit window. I.e. select vehicle and type

Coach
Train
.....and so on

If you start a new measurement you can select one of these or enter another description.

5.2. Starting a new measurement

To start a new measurement you can either click the icon  or select New in the File Menu.
This will show up the New Measurement dialog:



Before you start the actual measurement, you can specify some information about the measurement. You can choose one of the predefines entered in the Options dialog or type new descriptions. You can also enter a short remark.

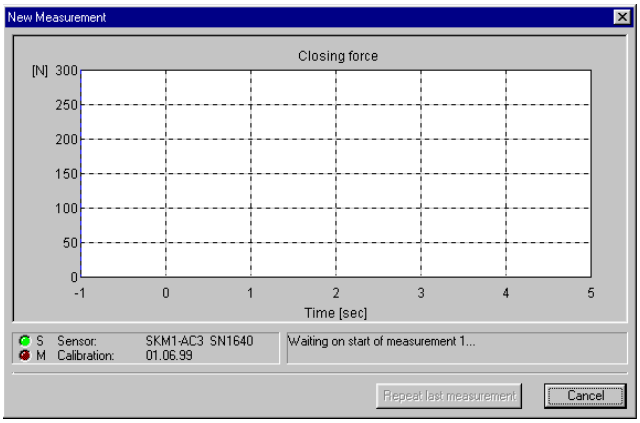
Testing your sensor

If you just want to see your sensor in action, but don't want to save data yet, click on the Test button. If the serial port is set up correctly, you should now see a not time limited graphical display of the sensor's output. After clicking End you are back in the New Measurement dialog.

5.3. A complete measurement

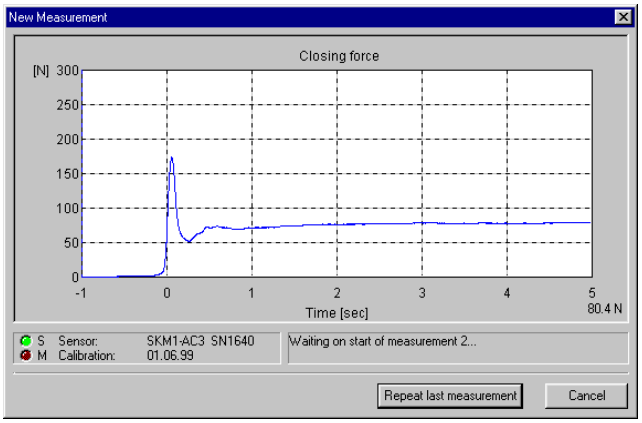
After you've filled in the description form in the New measurement dialog (which is not necessary but might be useful) and maybe run a short test, start a real measurement by clicking the Start button.

Wait until the green LED of the SKM1-unit lights up and then put the sensor in the position where your measurement should take place. When both the sensor and the program are ready for the measurement, the screen should look like this:



(*) Press the unit's start button now and the sensor's output is set to 0 Newton for this position. Now you shouldn't change the sensor's position too much as it would affect the accuracy of the measurement.

Now the red LED of the unit is flashing, which indicates that the system is waiting for the exceeding of a 50 Newton trigger level.
You can now put your measurement object in movement. When the trigger level is exceeded the red LED changes to continuous light until the measurement is finished after 5 sec.
After this 5 sec you'll see something like that:



Now the system is ready to do the next measurement. As the whole measurement consists of three/five independent measurements you have to do two or four more. Just go back to (*) and repeat the steps. After the third measurement is done, press the unit's button once more. Now the measurement is complete. If the Save automatically option is activated, the data are now saved on harddisk.

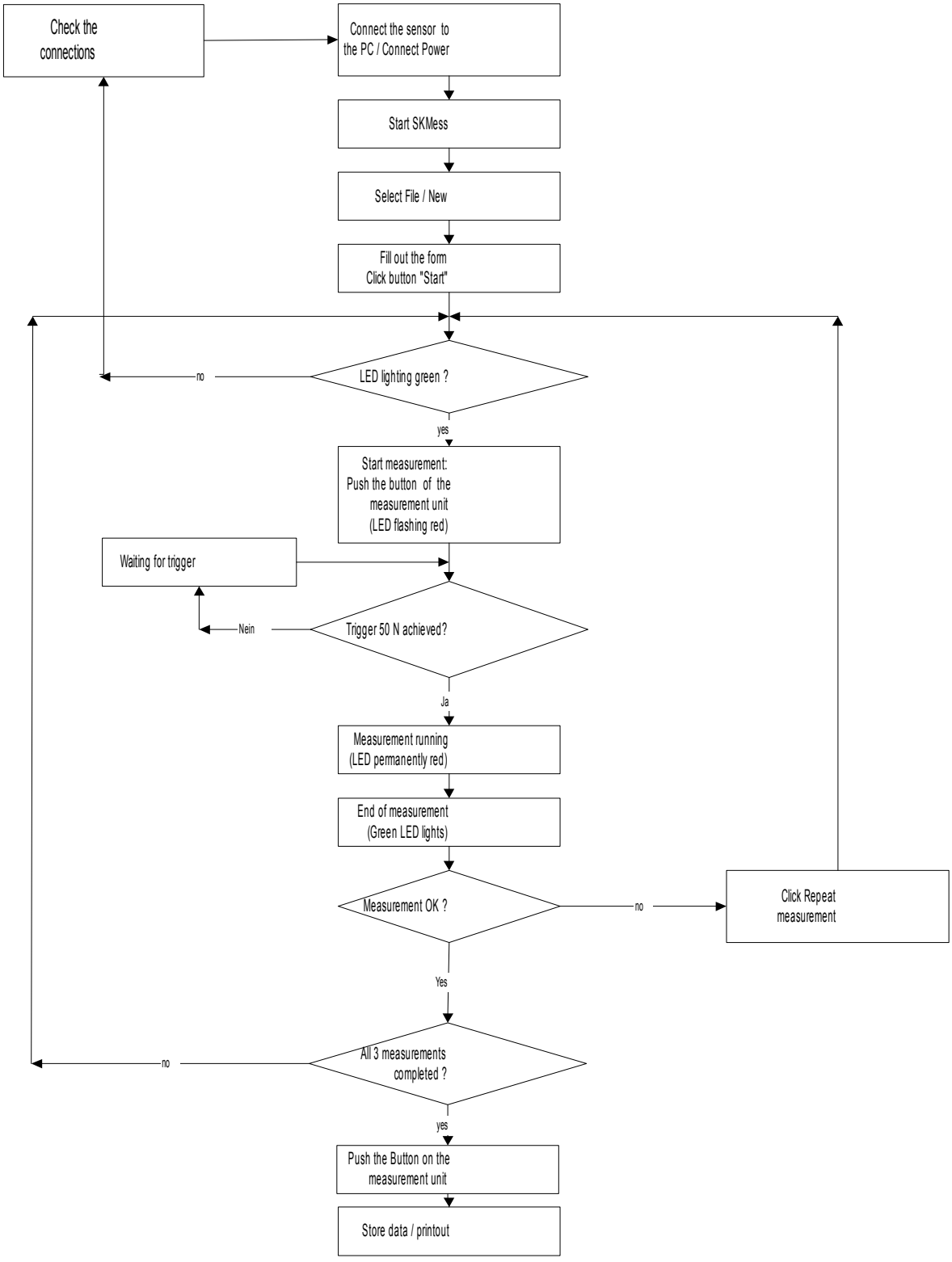
5.4. Repeating a measurement

If something has gone wrong while doing one of the measurement, you have the chance to repeat it by clicking on the Repeat last measurement button. I.e. when the sensor was twisted and so the recorded data are not correct, you don't have to repeat all measurements, but only the last.

5.5. Summary: the unit's LEDs

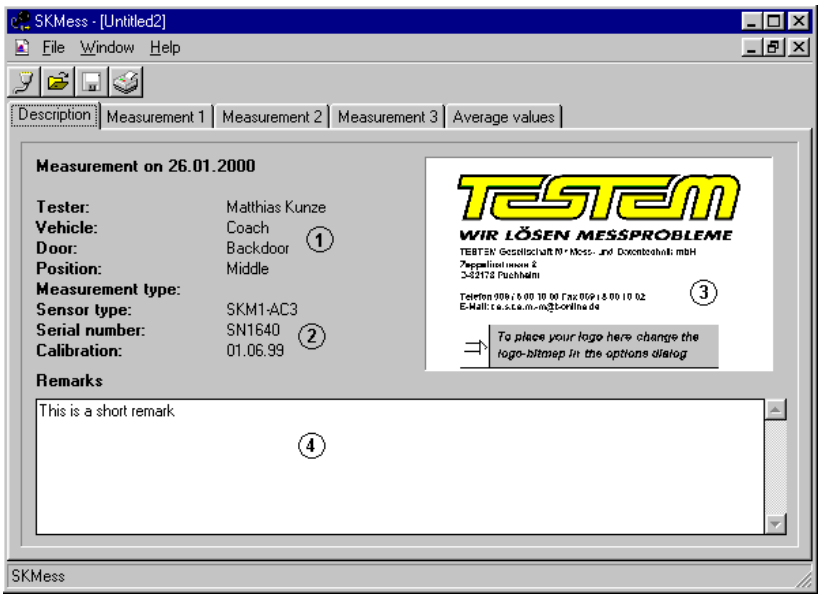
• Green LED lights	Measurement system ready Start measurement by pressing the button at the SKM1 measurement unit.
• Red LED flashing	Measurement started, waiting for trigger 50 N.
• Red LED lights	Measurement running

5.6. Measurement overview



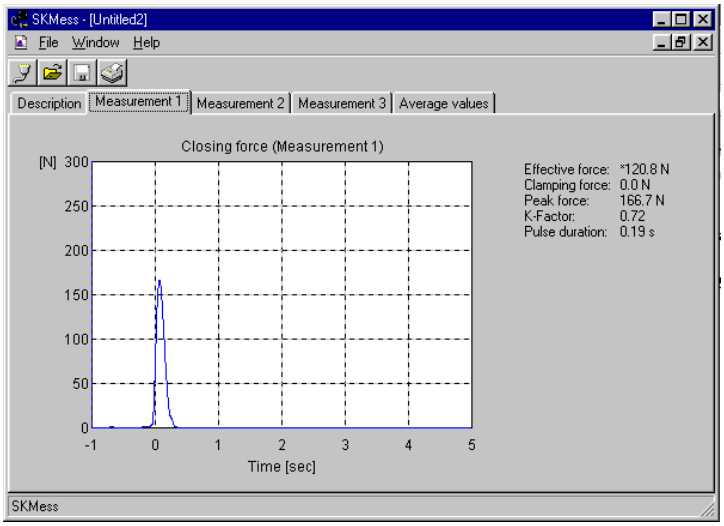
5.7. The measurement record

After clicking End in the Measurement dialog a new record of the measurement is created:



(1) Here the information you entered in the New measurement dialog is displayed. It can not be changed.
(2) This is some information about the sensor used to generate this measurement.
(3) This is the logo which will also appear when you print the record.
If you want to use another bitmap or don't want to include any logo, you can change the Use logo section in the Options dialog.
(4) In this small editor you can enter some additional information.

By clicking Measurement 1,2 or 3 (4, 5) you may display the individual measure-ments. An average calculation of the data is diplayed by Average values.



If you want to zoom a special area of the graph, click on the graph, hold down the mouse button and drag the mouse over the area you like to zoom. Then release the button. When you want to go back to the complete view just click one time in the graph and the zoom will be reset.

Effective force
The effective force is the average force, which is appearing between the first exceeding of the 50 Newton trigger level and the time the force is subceeding this level again. If this value is higher than the clamping force a * is displayed behind it.

Clamping force
This is the force, which is still effective after running out of the 5 sec measurement time. If this value is higher than the effective force a * is displayed behind that.

Peak force
The peak force is the maximum value of the force, which occured during the measurement.

K-Factor
This is the quotient effective force divided by peak force.

Pulse duration
This is the time, which elapsed between first exceeding of the 50 Newton trigger level and the point the force is subceeding this level again.

Please notice that these values correspond to the graph displayed left besides of them, except in the average section: The values of effective force, clamping force, are average values of the three/five measurements. So e.g. the clamping force doesn't have to be identical to the graph beside it!

5.8. Printing

To print your record select File / Print from the menu or click the icon 
Choose OK in the Print dialog box and the document will be printed.

5.9. Saving and opening of measurement records

To save a file you can either use the icon  or choose File / Save as from the menu.

To open an existing file you can use the icon  or choose File / Open.

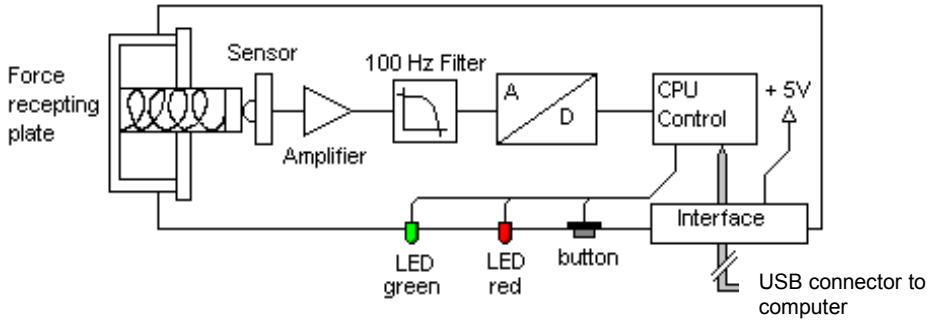
6. Technical features SKM 1

6.1. Mechanical part

Height of the measurement transducer	:	115 mm
Width of the door slot at 150 N	:	100 mm
Diameter of force recepting plate	:	100 mm
Measurement range	:	50 to 300 N (optionally 500 N)
Stiffness of transducer	:	10 ± 0.2 N / mm

5.2. Electronic part

Force sensor range	:	0 to 300 N (Option 500 N)
Sensitivity	:	1,5 mV/V fulload 500N, ± 0.5 %
Linearity error	:	< 0.15 %
Total sensor error	:	< 0.2 %
Signal conditioning	:	Differential amplifier
Signal filter	:	100 Hz –3 dB
Signal digitizing	:	12 Bit A/D convertion
Signal sampling rate	:	625 / sec
Nonl inearity	:	< ± 1 LSB max
Scale error	:	< ± 3 LSB max FS
Total error of measurement system	:	< ± 3 % full scale
Operation	:	PC software Button on the sensor
Display	:	2 LEDs for start and measurement
Data transfer	:	Simulated RS232 via integrated USB converter, 19200 baud
Data display / analyzing	:	PC-program SKMess 2
Data output	:	Printer via PC
Power supply	:	+ 5 Volt / 40 mA (via PC USB-Port)



Technical changes reserved