Instruction Manual
Diagram Force Gauge

SAUTER FP

Version 1.0
01/2016
GB

PROFESSIONAL MEASURING

FP-BA-e-1610

SAUTER FP
Version 1.0 00/2016
Instruction Manual
Diagram Force Gauge

Thank you for buying a SAUTER digital Diagram Force Gauge. This force gauge is compact and convenient, suitable for tension and compression measurement applications. It is small sized, low in weight, multifunctional, high in accuracy and the force curve is displayed on the screen. Combined with test stands and clamps you will get a complete measurement system for a wide range of applications.

We hope you will pleased with your high quality instrument and with its large functional range.

Before first use, please read this manual carefully regarding all function applications and for getting reliable measurement results.

If you have any queries, wishes or helpful suggestions, do not hesitate to call our service number.

Summary:

FP-BA-e-1610

1   Parameters

Capacity and sensor types: FP 2N up to FP 500N with integrated force sensor
FP 1KN up to 50 KN with external force sensor

Display: 240x320 Pixel TFT 65535 Color screen

Units: N, kgf, lbf, ozf
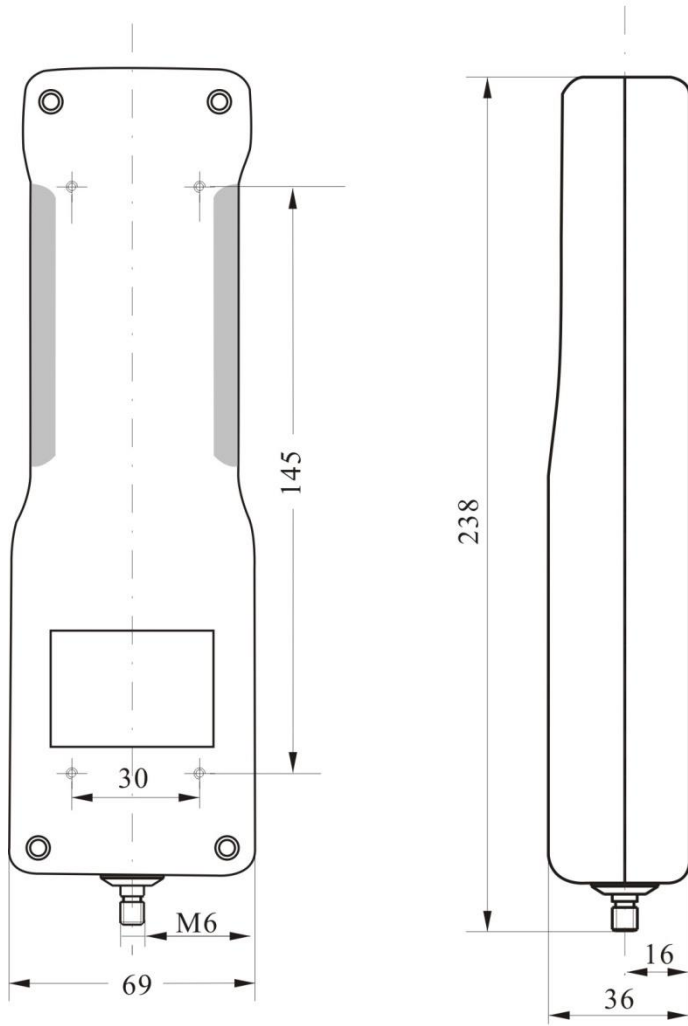
Accuracy: within +/- 0.5%

Power: Adaptor: DC 12V/400mA, battery inside: Ni-MH 7.2V, 1200mAH
Battery life: ≥ 300 times of charging

Operation time: continuous use for about 6 hours

Standby time: about 3 months

Dimensions in mm: 238*69*36

145

238

30

M6

69

16

36

Internal measurement frequency: 2.000 Hz

Overload protection: 150% of max

Application in use with following SAUTER test stands:
          TVP, TVP-L, TVL, TPE, THM, TVO, TVM-N, TVS

2   Features

Peak/real time value/force curve is displayed on the screen simultaneously, Monitor and track testing procedure.

Upper and lower limit setting and judgment, buzzer alarm inside

Turnover display

3 groups curve storage

70 peaks and real-time values storage

Four units option: N/kgf/lbf/ozf

Peak hold, automatic peak zero

Material strength measurement by inputting area

Shutdown design without any operation

Adaptation to several SAUTER test stands, automatic stop after reaching the pre-set force

USB output, multiple test mode options after connecting to a computer, infinite data storage/ transmitting, curve details view, user defined test report
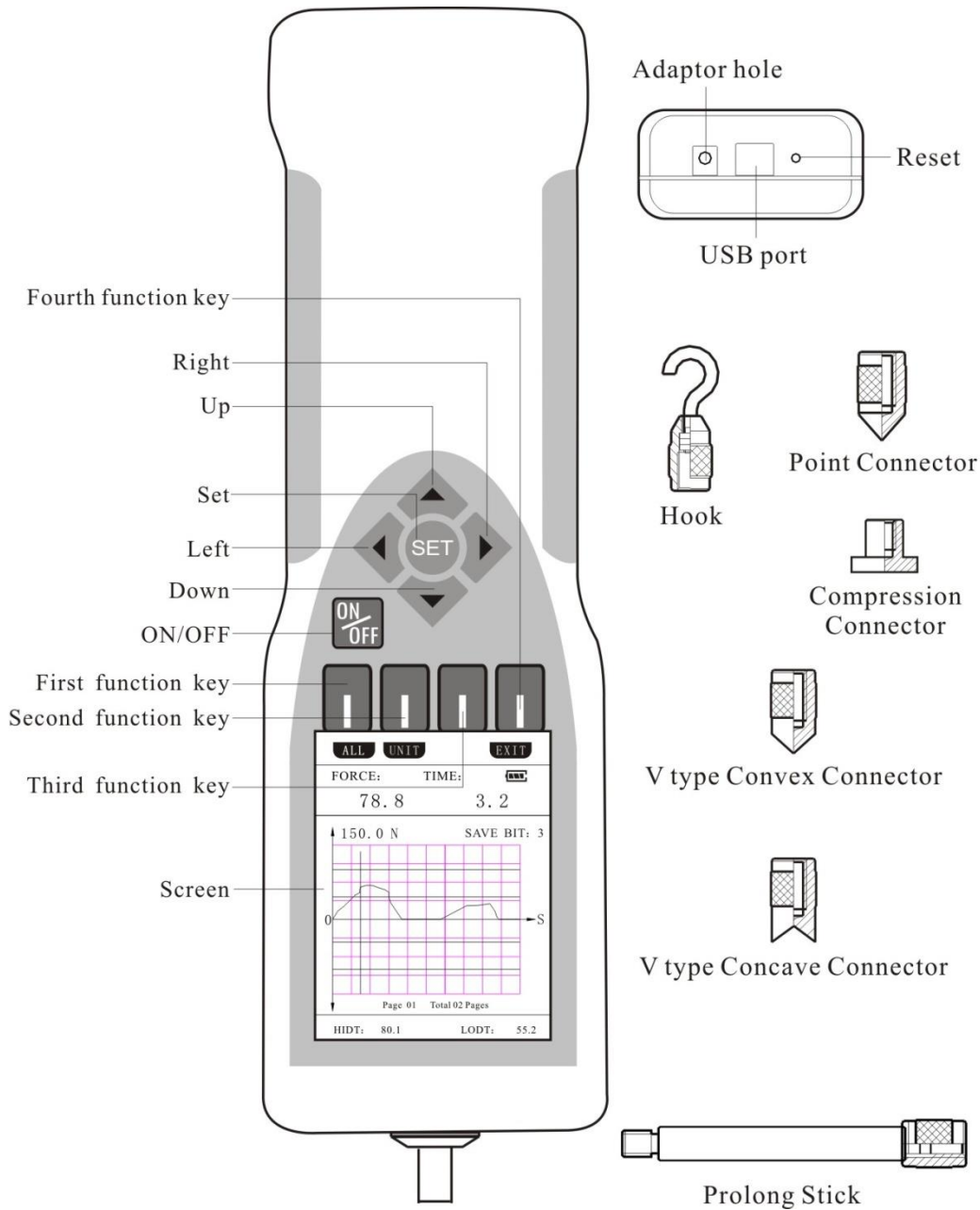
Environmental working conditions:

Working temperature: 20°C+/- 10°C

Relative humidity: 35RH up to 65% RH

No shocks and corrosives around

3 Names of items, buttons and functions

Adaptor hole

Reset

USB port

Fourth function key

Right

Up

Set

Left

Down

ON/OFF

First function key

Second function key

Third function key

Screen

Hook

Point Connector

Compression Connector

V type Convex Connector

V type Concave Connector

Prolong Stick

ALL UNIT EXIT
FORCE: TIME:
78.8   3.2
↑150.0 N   SAVE BIT: 3
0   S
Page 01   Total 02 Pages
HIDT: 80.1   LODT: 55.2

3.1 Fast operating guide

1、

| Button	Description
ON/OFF	ON/OFF
SET	Setting the instrument parameter
Up Button	Under the setting interface, used to select the parameter required to modify. Under the curve detail interface, used to view last page curve. Under data view interface,used to adjust current storage place.
Down Button	Under the setting interface, used to select the parameter required to modify. Under the curve detail interface, used to view next page curve. Under data view interface, used to adjust current storage place.
Left Button	Under the setting interface, move cursor left to select the parameter required to modify. Under curve detail interface, move cursor left to check the point data on curve. Under storage interface,move cursor left to select the storage place. Under curve view interface, move cursor left to select the needed curve to view. Under data view interface,used to adjust current storage place quickly.
Right Button	Under the setting interface, move cursor right to select the parameter required to modify. Under curve detail interface, move cursor right to check the point data on curve. Under storage interface, move cursor right to select the storage place. Under curve view interface , move cursor right to select the needed curve to view. Under data view interface,used to adjust current storage place quickly.
	Depend on displayed description under the function button.
USB Port	Connect with test stands or with PC by software(Stand connection cable need to purchase additionally).
Adaptor Hole	Connect with adaptor DC 12V 400mA.
Reset Hole	To restart once suffer strong jamming.

4 Function and introduction into details

1) Turn on power by pressing ⬚ button. The instrument will start a self checking program. After "SAUTER and model name" is displayed on the screen, it gets into working state (see picture 7). If the screen shows ▭, this means a lack of electricity. You have to charge the gauge as follows: insert the adaptor to 220V/50Hz at one end and on the other connect it with the charging hole in the gauge.

" ◼◣◥ "flickering means "charging", if it stops flickering, charging is finished. The gauge can be charged under ON/OFF state and it can also be used while charging.

If a grip is installed with the sensor and the grip weight does not exceed 5% of the load capacity, the gauge cleans zero automatically. If the grip weight exceeds 5% over the load capacity, this may lead to a wrong measuring result displayed and you should change to choose a light grip.

Turn off: While power is turned on, you have to press ON/OFF to turn power off, or wait for an Auto-turn-off according to the pre-set power-off time before testing.

2) Equipe connector: choose the correct connector accessories or clamps and fix them by screwing. Attention: don't use too much force to screw - this could damage the sensor. See the connector size down below, Pic. 5
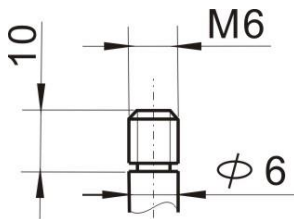

3) Parameter setting interface

Press ⬚ to enter into parameter setting in the initial interface, see below, Pic. 6:
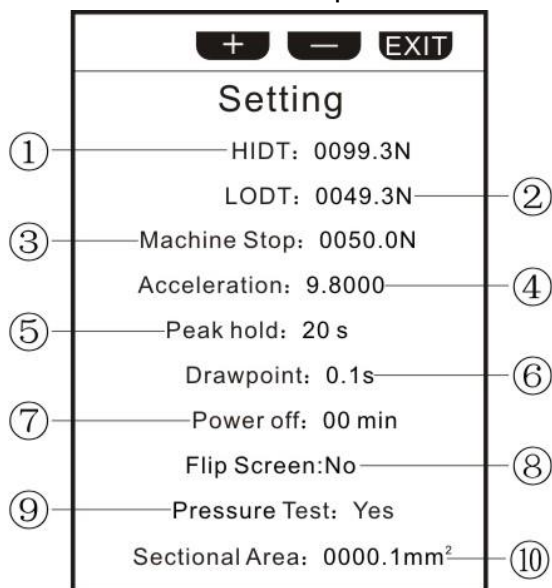

Explication of Picture 6:

1. Upper limit: if the measured value is above the upper limit, the buzzer alarms continuously.

2. Lower limit: if the measured value is below the upper limit, the buzzer alarms once.

3. Machine stop: When the instrument is connected to a test stand, the test stand will stop when the value on the instrument is bigger than the stop value of the test stand.

4. Acceleration: the gravity acceleration has to be set according to the conditions, range: 9.70, 00≈9.8999.

5. Peak-hold time: 1-99 s, „0" means not releasing peak.

6. Drawpoint: interval of curve drawpoint (0.1≈ 0.5 seconds setting)

7. Power off time: setting from 1 to 99 minutes. "0" means not power off automatically

8. Whether to turnover display

9. Whether to make a pressure test or not

10. Material sectional area

Note: Move ▲ ▼ ◀ ▶ to the matching option, then modify the parameter by pressing $\boxed{+}$ $\boxed{-}$. When the modification is finished, press $\boxed{exit}$ and return to the initial.interface.

4) Initial Interface
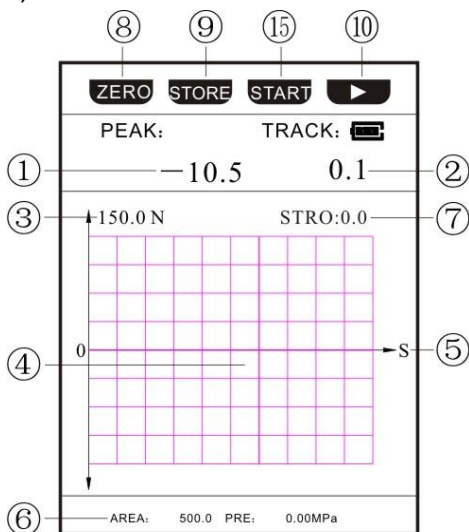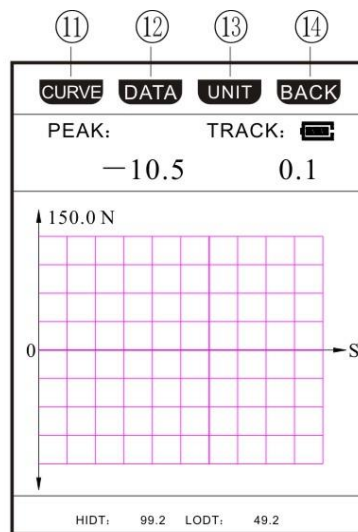
Picture 7   Picture 8

1. Peak

2. Tracking value

3. Grade value: while the curve is drawpointing and the test value exceeds the grade value, it will switch to next grade

4 Region of curve display

5. Curve drawpointing x- coordinate unit: seconds

6. Upper or lower limit, sectional area or pressure indication

   If the parameter of testing material pressure is "yes", then the sectional area and Pressure is displayed; see picture 7.

   If the parameter of testing material intensity is "no", then the upper and lower limit Is displayed; see picture 8.

7. Data: peak and tracking value storage place

   If typeface is white, this means that it has a storage data

   If typeface is not white, this means that it has no storage data

8. Zero: press to clean the peak and tracking value

9. Store: press the button to save the current peak and tracking value to a relevant

   Data place. If the data place has got a storage value, then replace the value

10. ▶: the first function button; by pressing it, it will switch from

    ZERO/STORE/START ▶ to CURVE/DATA/UNIT/BACK button

11. Curve: press to get to the curve view interface

12. Data: press to get to data view interface

13. Unit: press to change units among N/kgf/ lbf/ ozf.

14. Back: the second function button; by pressing this, it will switch from

    CURVE/DATA/UNIT…./BACK button to ZERO/STORE/START/….

15. Start: press to enter to testing interface for curve draw dot ▶

5) Measurement curve draw dot interface

Picture 9   Picture 10
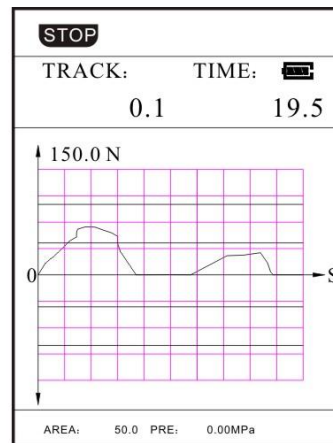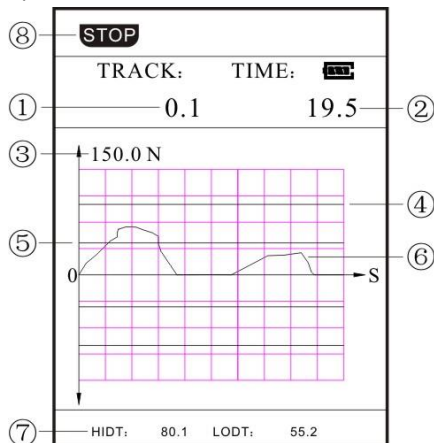
1. Current measurement value

2. Current measurement time, unit is "seconds"

3. Grade value: if the test value exceeds grade value, it will switch to next grade

4. Upper limit line (red): if the upper limit value exceeds grade value, the upper limit line will not be shown

5. Lower limit line (yellow): if the lower limit value exceeds grade value, the lower limit Line will not be shown.

6. Testing curve: the changed curve of the force value during the testing process

7. Upper and lower limit, sectional area and intensity indication:

   If the pressure parameter of the tested material is "Yes", sectional area and pressure will be indicated; see picture 10

   If the pressure parameter of the tested material is "No", upper and lower limit value will be indicated; see picture 9.

8. Stop: testing stop and go to storage interface see picture 11

6) Storage interface
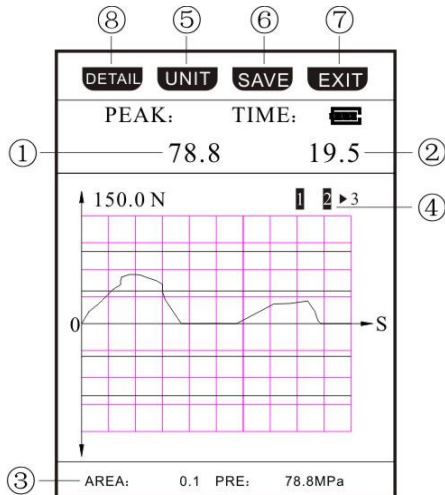
Picture11
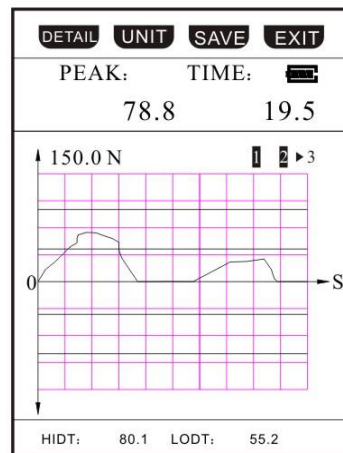
Picture 12

1. Peak: max. value during testing
2. Time: total time during testing, unit: seconds
3. Upper and lower limit/sectional area、pressure.
   If material pressure parameter is "Yes", sectional area and intensity are displayed;
   See picture 11
   If material pressure parameter is "No", upper and lower limit are displayed; see
   Picture 12.
4. Save grid: If the front color becomes white, it indicates that the tested curve is
   saved. If the front color doesn't become white, it indicates that no tested curve is
   saved. ▶ means the current saved grid
5. Unit button: Press this button to convert four units (N, Kgf, lbf, ozf)
6. Save button: this button has to be pressed to save the current test curve into the
   save grid; the sign ▶ points at and make ▶ to switch to next grid.
7. Exit button: this button has to be pressed to get back to work interface
8. Detail button: Press this button and you will get to interface to view the curve de-
   tails (picture 13)   Curve detail interface:
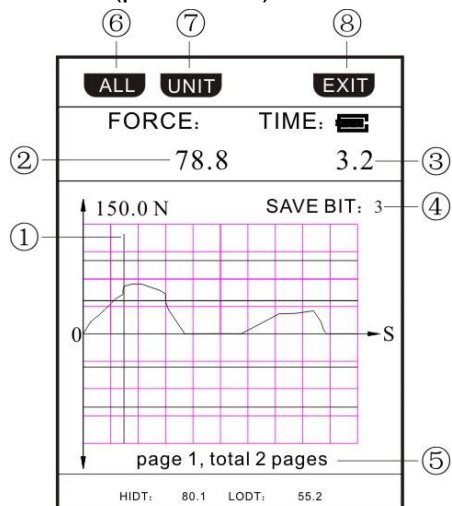
Picture 13
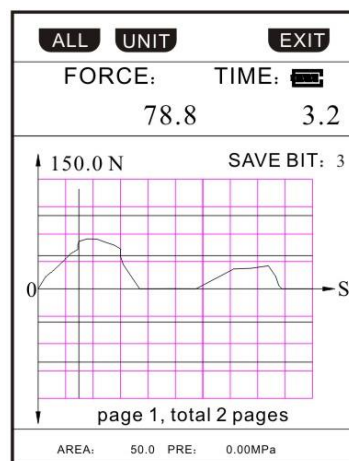
Picture 14

1. Cursor line: point at the view point of the current curve, move the cursor…line by pressing the ◀ ▶ button

2. Force: value of curve spot that the cursor line points at

3. Time: time of curve spot that the cursor line points at. Unit: seconds

4. Save bit: if save bit is "0", this means that the current view is the result curve just now tested. If save bit is 1, 2 or 3, this means that the current view is the measuring curve of the corresponding grid.

5. Curve located screen indication: this indicates the total pages of screen of the current curve, and the locate screen of the current view. Press ◀ ▶ button to flat screen flip.

6. All button: If save bit is "0", press this button to return to save interface (pic. 11)

If save bit is "1", "2" or "3", press this button to return to the curve view interface (picture 15)

7. Unit button: choose between 4 units, N, Kgf, lbf, ozf, and convert automatically

8. Exit button: press "Exit" to return to test interface

View curve interface:
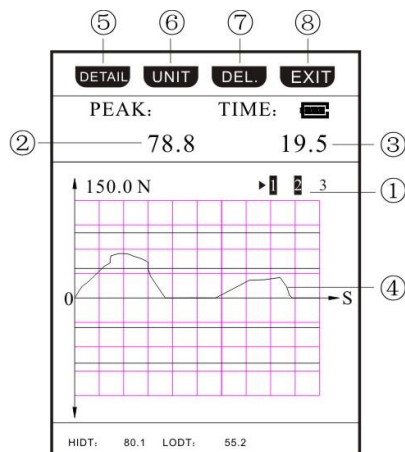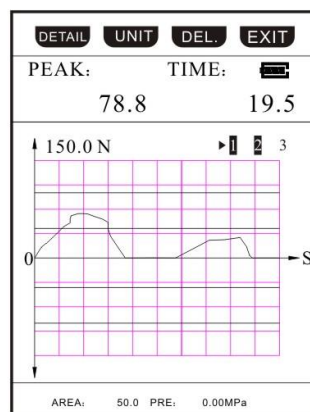
Picture15   Picture 16

Press "view" under the initial interface to get into the view curve interface. If there is no curve button, you can use ▶ button.

1. Save bit:

    If the front color becomes white, it indicates that the test curve is saved.

    If the front color doesn't becomes white, it indicates that no test curve is saved.

    ▶ points to the current saved grid

2. Peak: max. force of the current saved test curve

3. Time: total time of the current saved test curve; unit: seconds

4. Test curve: the saved test curve

5. Detail button: pressing this button, you will get into interface to view the detail
    Curve.

Unit button: choose between 4 units (N, Kgf, lbf, ozf) and convert automatically

7. Delete button: press this button to delete the curve in the current saved grid,
    And front color doesn't become white

8. Exit button: press this button to get back to the initial interface

9. Data view interface

Picture 16

1. Storage test value

In every grid you can put one peak and one track value, every page has 10 grids, Totally there are 7 pages, totally 70 grids to put in 70 peak and 70 track values.

▶ means current storage grid

The current storage grid can be adjusted by ◢◣ and view data.

Quickly adjust the current storage grid by ◀▶ and view data

2. Peak of storage

3. Tracking value of storage

4. Current storage value unit:

the unit can be changed by pressing the unit button

5. Delete button:

Press once to delete the current stored peak and track value

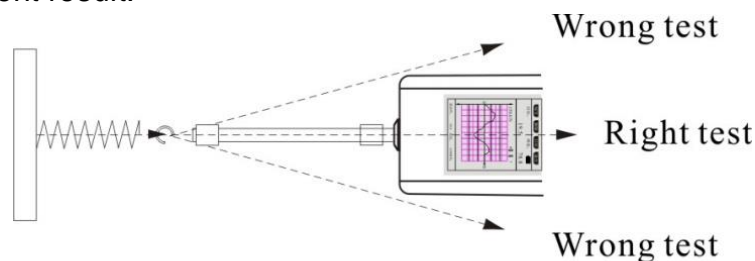Press continuously to delete the current 10 peak and track values

6. Exit button:

Press once to get back to the initial interface

Testing:

Please fix the gauge on a suitable test stand for comfortable and easy measuring.

Keep the gauge and the specimen in a line when testing, otherwise you will get a wrong measurement result.

Picture 18

Turn off the power after your measurements. Clean the instrument and put all parts and accessories into the transport case for the next use.

4.1 Configuration needed for software installation

With USB connection to PC, memory, transmission, tracking, testing curve data un-limited by configured software. The configuration is as follows:

1. Hardware condition
- CPU: Celeron 1G or over
- Memory: 256MB or over
- Hardware disc available capacity: over 300MB
- Driver: CD-ROM or DVD-ROM
2. Software condition
- Operation System: windows (32bit / 64 bit)

4.2 Software installation and use

Put the configured disc into computer driver to assemble software and USB driver (step: driver/ English/ measuring software/ FP/ setup exe).
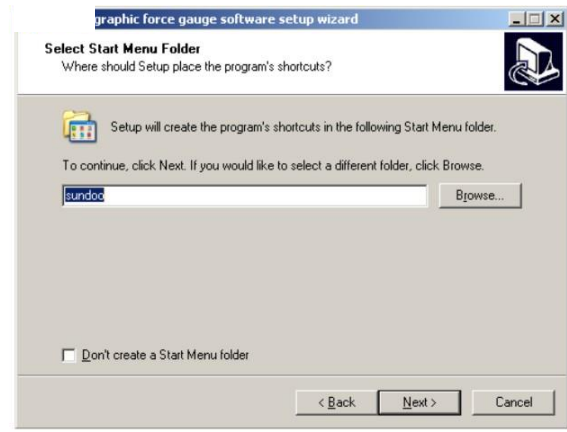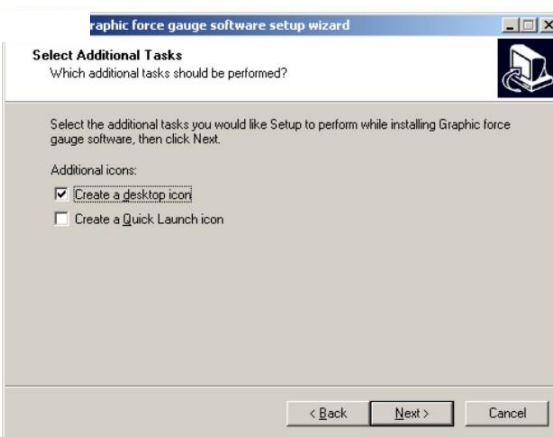

①Click next step
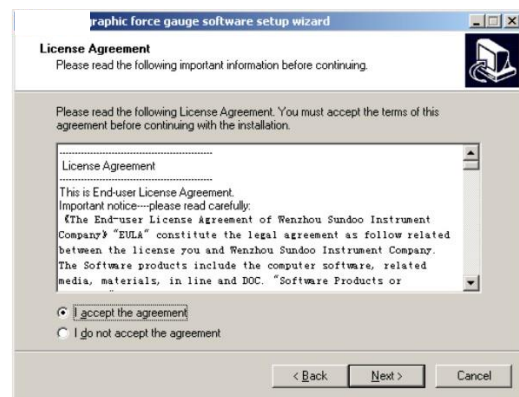
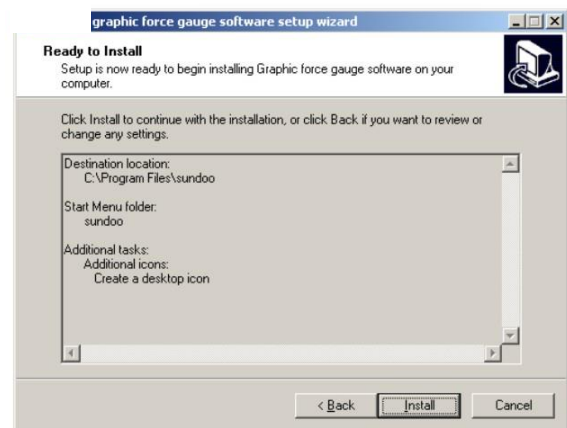②Choose "I agree" and click next step

③Assemble route and click next step

④Click next step

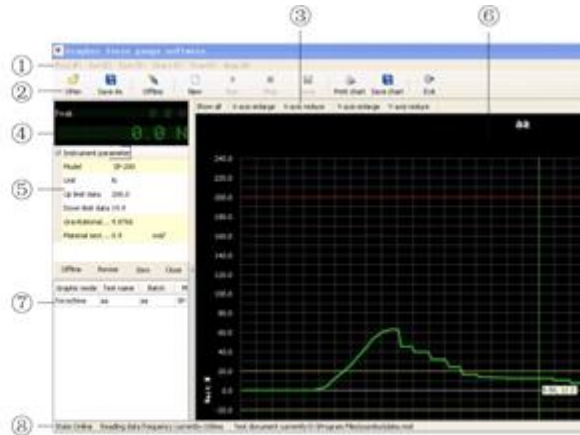⑤Choose to create desktop icon and click next step

⑥Choose to assemble

⑦Click next step

⑧(If step out warning note of not passing Microsoft certificate, please click assemble also)click "finish"button, finish process and assembling USB driver

⑨Click the logo of SP to start the testing software.

Picture 19

2. Connect the force gauge with the PC by using a USB cable

3. Start the force gauge and make it work

4. Software interface introduction is shown (see pic. 19)

   Interface includes 8 parts according to the whole module

   (1) Startup menu bar: all the function menu of software

   (2) Function bar: includes the buttons of data base operation, connect operating, Drew point operating, data save operating and exiting

   (3) Diagram function bar: enlarges or shortens coordinate data in drew point part

   (4) Real testing data display region: this part will display the current peak value and testing value by connection the computer only

   (5) Gauge parameter region: By connecting the computer, the gauge parameter will be displayed at this part, such as model/ unit/ upper limit/ lower limit/ gravity acceleration/ item sectional area and speed and so on. Speed is displayed under "value/ displace"

   (6) Region of curve drew pointing: adapted with FP diagram force gauge, to know the variation trend of the force value immediately. And the corresponding unit of coordinates will be converted automatically by choosing different graphic modes.

   (7) Region of data saving: After operating graphic modes, the saved data will be displayed in this region. Saved data includes graphic mode, test title, test batch, mode, test time, unit, upper or lower limit, acceleration of gravity, detail, graphic unit, max. value, minimum value, peak value, sectional area and unit, sectional area speed unit, move and move unit . Some detail value will not be displayed with different graphic modes, only with specific modes.

   (8) Status bar: displaying the information of the connecting status, frequency of achieving data, route of data base file, program version etc.

5. Function module introduction:

  A. Menu command

    1) File Menu: File Menu including following commands:

   (1) New a test base: create a new data base (see pic. 20)

It will stop when the value on the gauge is bigger than the stop value of the test stand.

Software default data base is the data base file titled "data.rmd" under the root list of installing route. By being connected to testing, it is better to appoint the title of new data base to convenient for future management.

(2) Open the test base: open the saved test base (pic. 21)
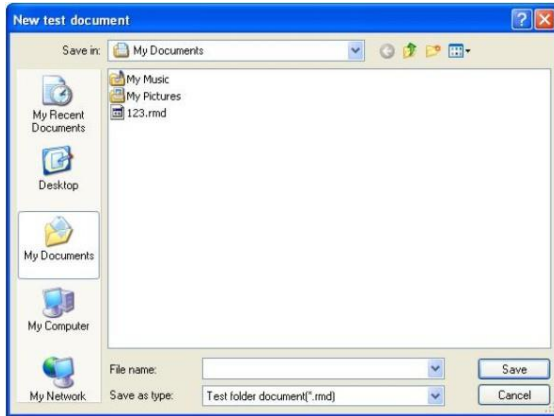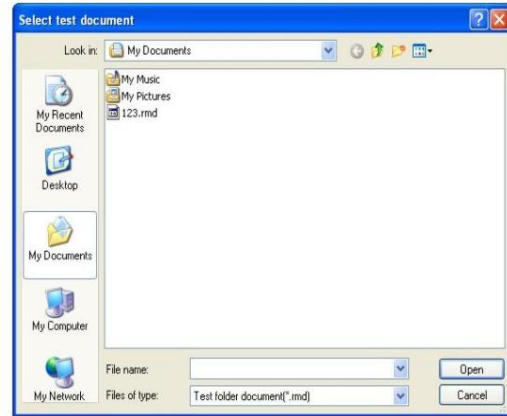
Picture 20   Picture 21

This function is used to exchange and display the data base file between users.

One data base file contains different test results and can be opened in computers with this configured software by other transmission mediums.

(3) Save test base: save the current test result under pointed file title (pic. 22)

Put the current one or more test results into the pointed data file title. This is generally used for data base backing up.
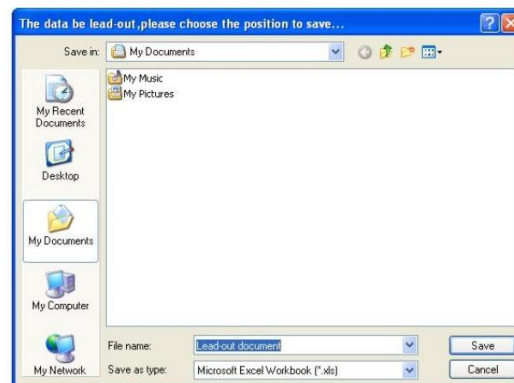
(4) Derive test data: derive the data of the pointed test result to other text files.

Check the specific test value of one test result in data base file by "derive test data"

This function supports xls, csv, htm, ref, txt etc text types of deriving (pic.23)
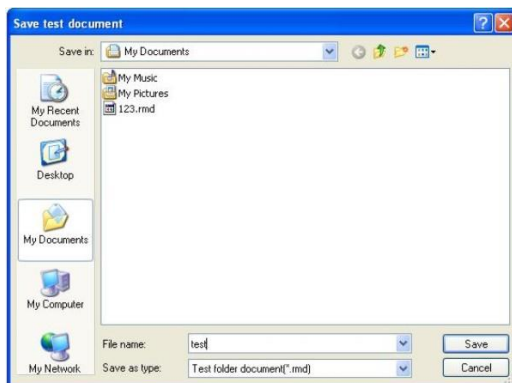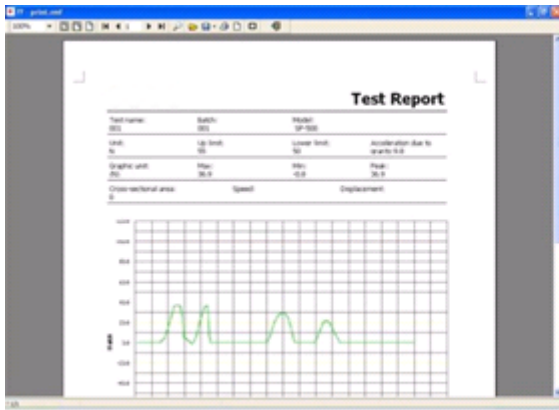

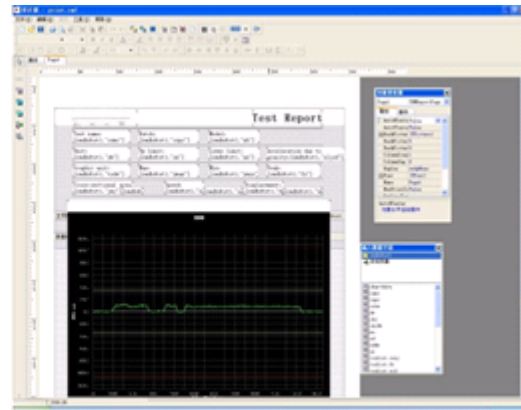Picture 22   Picture 23

(5) Print test report: print pointed test result by the pointed form (pic.24).

The test report contains the details of data saved region, current test curve and other related data. If without the details of data saved region, the details of displayed frame in test report is also zero. Under this window press "save report form" button to save the current test report as rmp text. Press "open report form" button to open the original saved report form.

(6) Define print form: the user defined the display purpose (pic. 25).

Picture 24

Picture 25

The configured print form editor in this software can go on simple type setting and amending display details. As a general rule, the user can only amend the descriptive content in the test report.

(7) Associate files: associate rmd type data base file.

(8) Exit system: exit system

2) Set menu: Set menu includes the following commends:

(1) Graph setting: set the form property in draw pointing region (pic. 26)

Graph setting includes graph color setting and test curve thickness setting.

For the software defaults the form property; the user can choose or amend in corresponding form immediately by pressing "confirm" button with the need to change.

Press the "default value" button to recover the initial status.

(2) Test frequency setting: set the speed rate between software and sensor (pic. 27)
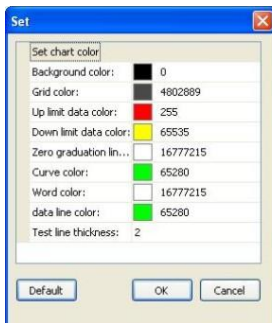
Picture 26
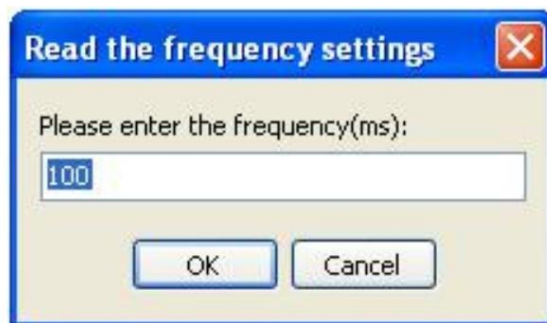
Picture 27

For supporting USB different version agreement, the software can set the speed rate with the sensor. As a general rule, the user should better set 100ms frequency to get best connected with speed rate and curve purpose.

3) Test menu: Test menu can be continued under connected status. After new graphic mode, the other test menu can be continued. They constraint each other. Test menu includes the following commends:

(1) New test set: new graph set mode (pic. 28)

New test set contains test title, test batch, description, current graph mode etc.

The software provides three graph modes: value/time, value/shift and pressure/time.
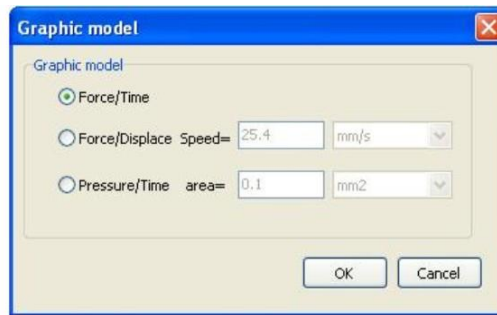
Speed units contain inch/s, mm/s, cm/s, m/s.

Sectional area units contain square millimeter, square centimeter, square meter.

To get more sectional area values, the corresponding sensor parameter has to be changed (pic. 29)
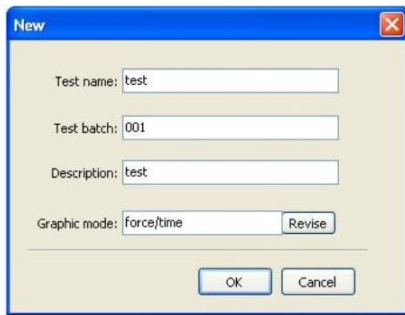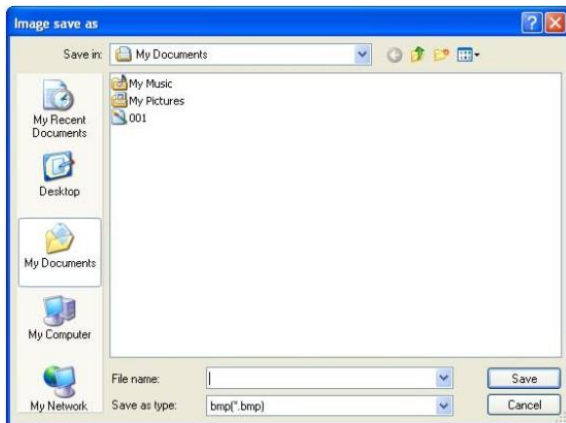

Picture 28

Picture 29

(2) Start testing: starts curve pointing

(3) Stop testing: stops curve pointing

(4) Save test result: saves current curve pointing data

4) Graph menu: Graph menu includes the following commends:

(1) Graph save: saves current curve pointing form as Photoshop file.

Picture 30

The software can save curve pointing form as bmp, jpg etc. Photoshop file types are convenient to analyse and exchange.

(2) Graph print: prints pointed test result by the pointed form

(3) Turn over: turns over the upper and lower value of X-axis.

(4) Display the whole: to display the whole curve pointing data on curve pointing region.

(5) Enlarge X-axis: to enlarge the space of X-axis

(6) Shorten X-axis: to shorten the space of X-axis

(7) Enlarge Y-axis: to enlarge the space of Y-axis

(8) Shorten Y-axis: to shorten the space of Y-axis

(9) Display value line: display value tracking line in curve pointing region

5) View menu: View menu includes the following commends:

(1) Function bar: displays/ hides function bar

(2) Graph function bar: displays/ hides graph function bar

(3) Statue bar: displays/ hides statue bar

6) Help menu: Help menu includes the following commends:

(1) Company homepage: to open company homepage

(2) Animation help: plays the software operation process by flash

(3) Help: provides the illustration of usage help

(4) About: displays the version number of the software

B) Function bar order: Function bar order includes the following commends:

OPen opens the original saved data base

Save saves the current test result by a pointed title

Offline online / offline with sensor

New new graph mode

Run starts curve pointing

Stop stops curve pointing

Save chart saves current curve pointing data

Print chart prints the pointed test result by a pointed form

Save As saves the current curve pointing form as a Photoshop file

Exit exit software

Function bar buttons operated purpose is the same as menu bar buttons, they serve just to provide a simple and convenient operating process.

C) Graph function bar: Graph function bar includes the following commends:

show all displays the whole draw pointing data on the draw pointing region of the
Screen

X-axls emlarge enlarges the space of X-axis

X-axls reduce shortens the space of X-axis

Y-axis enlarge enlarges the space of Y-axis

Y-axis enlarge shortens the space of Y-axis

6. Online operation

A. Get online

First the sensor should be connected with the computer by a USB cable, then press "in-line" button to get in-line. At this moment the real test value screen will show the real test value, the peak value etc. The sensor will display the set parameter at the

same time. When opening the software, it will call out the last time saved data base file. If there are some rude mistakes with it, you will be warned to choose the next step in prompt box (pic. 31)

Pictnre 31

Now you can choose the corresponding step:

1) Press "Next test base" button to new data base file by writing the test title.

2) Press "Use default base" button to use data rmd type data base file immediately

3) Press "re-choose base" button to open the last data base file by choosing the file route

4) Press "Exit" button to exit software

B. Amend the parameter

Amend the sensor parameter in sensor parameter region of software by in-line the FP- diagram force gauge with the software. The parameter available to amend includes: unit, the upper limit value, lower limit value etc.

When the sensor's parameter needs to be amended, press "amend parameter" button in sensor parameter region, then the purpose of "amend parameter" will be changed to "apply amending". After amending, you can press "apply amending" button to save the amending result only. The sensor parameter will be changed also.

The other buttons details are as follows:

Press "Off-line" button to offline the sensor with the software.

Press "Zero out" button to zero the force value in the sensor.

Press "Shut down" button to deactivate the sensor immediately, the same as the power button to turn on the sensor.

C. Start testing

After being in-line, press "new test", insert the detailed "test title", test bath", "description" and other information. Press "Amend" button to choose the graph mode, then press "confirm" button to finish. At the same time, "New test" is changed to "Delete test" button, "Start testing" button is changed to operation status.

In the following it is shown how to set a force/time graph mode spring test (pic. 33)
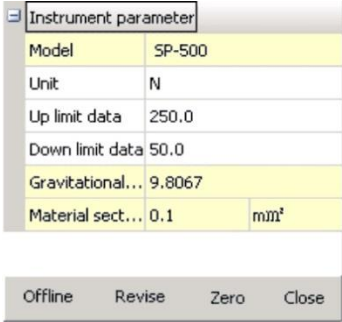
Picture 32
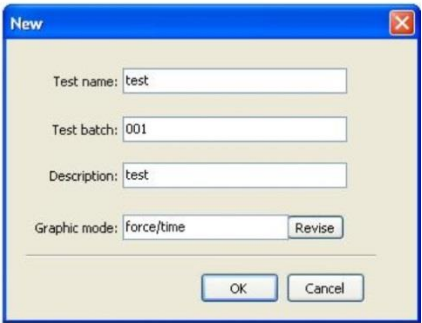
Picture 33

After confirming the information, press "Start testing" button in function bar or in test menu of menu bar to carry out draw pointing record. Press "delete test" button to delete the current testing and information. When having finished testing, press "Stop testing" button to stop the record of current draw pointing, press "Save test" button to save the test information and the data of the drew pointing to the data saved region, or press "Delete test" button to quit data and information.

D. Save data

You can view test data information in data saved region. Double press the test stand button to open the drew pointing of the test data and analyze the change trend. Shown as follows (pic. 34)

(Picture 34)

The corresponding operation in data saved region:

"Open graph" open drew pointing record of pointed test data

"Re-drew graph" has got the same purpose as "Open graph", to re-draw the current drew-pointing.
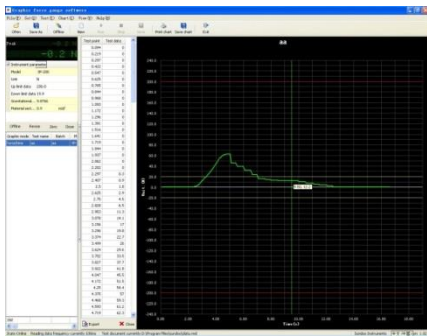
"View data" views the value of drew pointing. Double click one value in text list box to position the value line about the special value at the coordinate. Double click "Call out" button to save the test data by other text types.

"Print test graph" has got the same purpose as "Print graph" in function bar, to carry out printing of the test report.

"Delete test report" serves to delete the pointed test data from a current data base file. Act with caution, please!

When there are many test data in drew pointing record, to view the other drew pointing records, as limited screen area and the layout of software interface, you can move the mouse on X-axis or Y-axis in drew pointing region. After the mouse has been changed to the other hand, hold the mouse to move left, right, up or down.

Besides, you can view the drew pointing record by enlarging or shortening the coordinate, but the shape may be distorted.

5   Rechargeable Battery

If the mark ▭ starts flickering during the usage of the force gauge, this means that battery is very low and needs to be charged. Please only use the matched "DC 12V/400mA" charger. With smart charging technology, it will stop charging automatically after charging fully. This protects the durability of the battery.

Note:

Frequent and long-playing charging will shorten life of battery.

Please only re-charge when the battery only has one grid left or less than one grid power. This avoids not to charge fully because of too low power.

Battery may only be charged fully at least once every three months.

6   Maintenance

The force gauge has to be cleaned with a soft cloth. Put the dry cloth into water with a detergent and clean the instrument after totally wringing out the cloth.

Don't use volatile chemicals such as volatile oil, thinner or alcohol.

Handle with care while using and carrying!

Don't disassemble, repair and remodel the gauge by yourself!

Please contact our company, if any problems or faults are occurring.

7   Packing list

- Main unit (display unit)	1
- Power adaptor	1
- Test attachments	5
- Extension rod	1
- M3 x 8 screws	4+1
- USB cable	1
- CD	1
- Instruction manual	1

8   Declaration of Conformity

Sauter GmbH
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Konformitätserklärung

Deklaracja zgodności dla urządzenia ze znakiem CE
Konformitätserklärung für Geräte mit CE-Zeichen
Déclaration de conformité pour appareils portant la marque CE
Declaración de conformidad para aparatos con marca CE
Dichiarazione di conformità per apparecchi contrassegnati con la marcatura CE

D	Konformitäts-erklärung	Wir erklären hiermit, dass das Produkt, auf das sich diese Erklärung bezieht, mit den nachstehenden Normen übereinstimmt.
GB	Declaration of conformity	We hereby declare that the product to which this declaration refers conforms with the following standards.
E	Declaración de conformidad	Manifestamos en la presente que el producto al que se refiere esta declaración está de acuerdo con las normas siguientes
F	Déclaration de conformité	Nous déclarons avec cela responsabilité que le produit, auquel se rapporte la présente déclaration, est conforme aux normes citées ci-après.
I	Dichiarazione di conformità	Dichiariamo con ciò che il prodotto al quale la presente dichiarazione si riferisce è conforme alle norme di seguito citate.

Digital Force Gauge: FL

EMV-Guideline	**Normatives**
89/336EEC EMC 2004/108/EG	EN 61326: 1997+A1:1998+A2:2001+A3:2003

Date   25.02.2014   **Signa-ture**

Place of issue   72336 Balingen   Albert Sauter
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