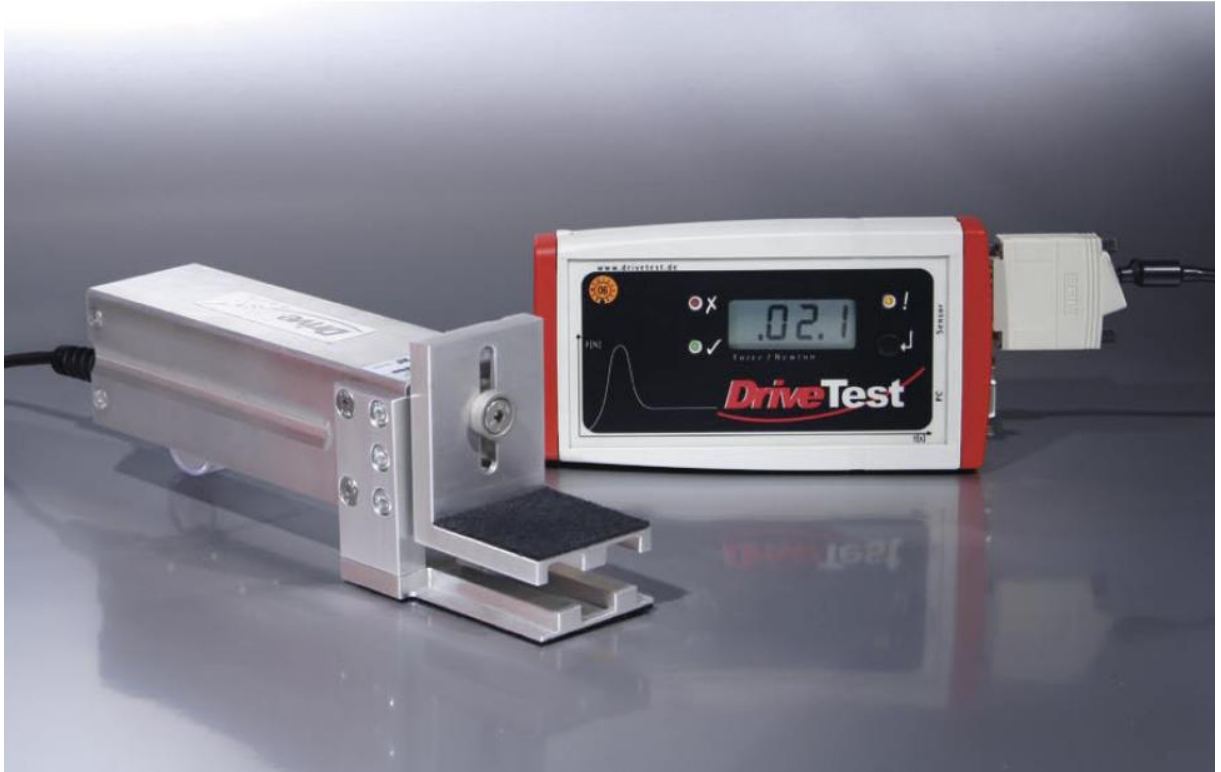# FM200

System for measuring the closing force
of car windows, sunroofs and doors

Manual

CONTENT

1   GENERAL DETAILS

1.1   PURPOSE OF USE

The purpose of use of the Force Meter FM200 is to measure the closing force of power operated closing systems like

- Car windows,
- Car sunroofs,
- Elevator doors,
- machine Protection equipment.
- etc.

The force meter FM 200 evaluates the measured results with respect to the requirements of applicable standards (refer to chapter "Standards").

1.2   STARTING UP

1.2.1   Determining the completeness of the system

- 1 Sensor FM200
- 1 Display unit SEB2
- 1 USB-COM Adapter
- 1 Data cable SubD-9-pol.
- 1 Manual with *PinchPilot*-CD (placed in the cover of the transport case)
- 1 Calibration certificate
- 1 Transport case
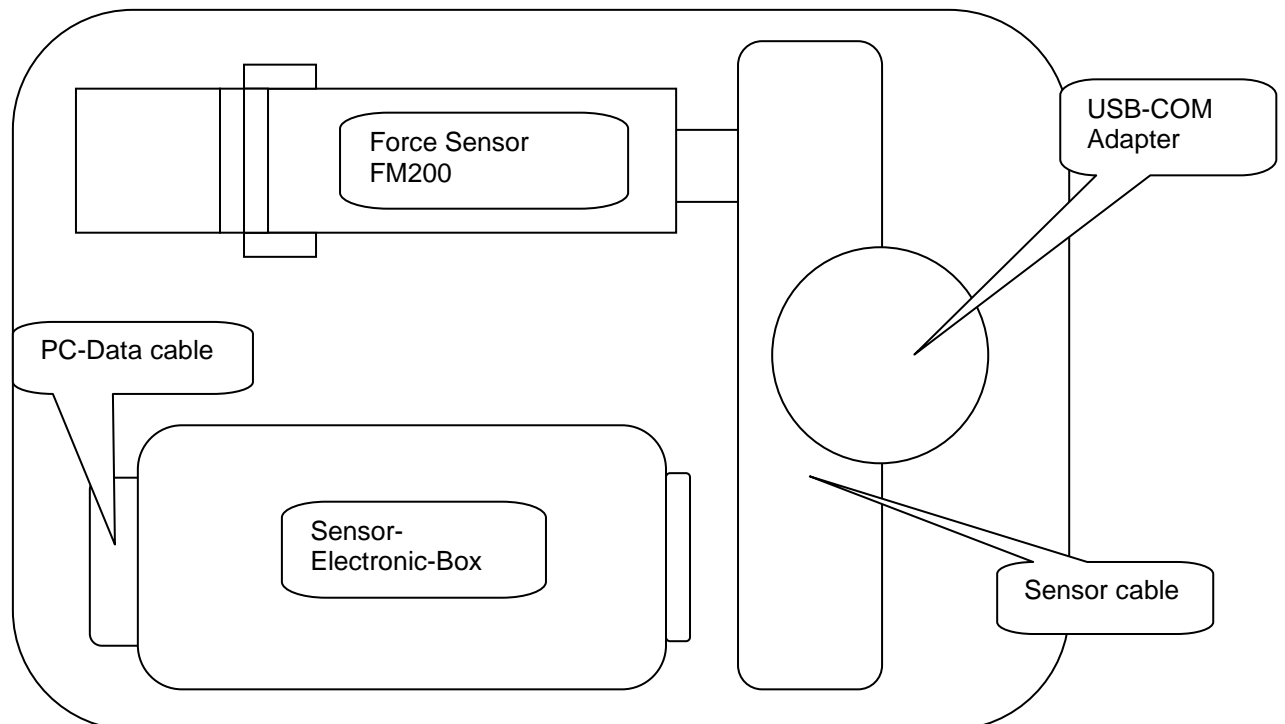
Position plan

Testing measurement function
- connect sensor with the display unit,
- turn on the display unit (briefly press push button),
- start a measurement (briefly press push button),
- put a load on the sensor and remove it,
- after the measurement duration has expired, the peak force measured is displayed.

1.2.2 Installing PC software *PinchPilot*

- insert **PinchPilot** CD,
- start **PinchPilot** setup application,
- follow the installer instructions,
- Select your language (Extras/Sprache/English).

1.2.3 Testing / setting sensor interface

- if needed install USB driver
- enter sensor interface setting (Extra/options/sensor)
- connect display unit to PC,
- turn display unit on (briefly press push button)
- select upload (tool bar: cube with red arrow)
- Status indication in lower left corner of upload window must be "ready"

1.2.4 Testing / setting real time clock of display unit

- turn on the display unit (briefly press push button),
- start *PinchPilot*,
- test clock time of display unit (Sensor/Configuration), if necessary, use the button "set on system time" to set the display unit clock.

1.3 TRANSPORT

For any transport of the instrument the transport case should be used.

1.4 PLACING OUT OF OPERATION

When the instrument will not be used for a longer period of time, please regard these measures:
- Check if data to be used is still stored in the display unit (if so, upload data),
- Remove battery from display unit.

1.5 STORAGE ENVIRONMENT

The instrument should be stored in a dry environment within the limits of storage temperature (refer to "Technical Data").

2   SHORT OPERATION INSTRUCTIONS

2.1   MEASURING

0.	**Turn off !**
	press button long (2s).
1.	**Turn on !**
	connect sensor to display unit, briefly press push button, set limit if needed, yellow LED flashes slowly.
2.	**Note !**
	note memory-no. of display unit, together with point of measurement.
3.	**Sensor in Measuring position !**
	press static sensor side onto static side of closing system.
4.	**Start Measuring !**
	briefly press push button, system tares, yellow LED flashes fast.
5.	**Initiate closing process !**
	wait for end of measurement, green or red LED is on (ok / not ok).
6.	**Measurement is valid ?**
	yes: briefly press push button, no: press button button long.

2.2   EVALUATION

1.	**Connect !**
	connect display unit to PC, briefly press push button of display unit, start *PinchPilot*.
2.	**Upload !**
	load measurements into the PC: tool bar: cube with red arrow
3.	**Enter properties !**
	Select measurements, tool bar: arrows enter properties, tool bar: paper with red check mark
4.	**Print !**
	start printout, tool bar: printer symbol

3   PINCH FORCE SENSOR

3.1   BASIC CONSTRUCTION

The instrument consists of a static and a moveable side. Both sides are linked by a strain gauge sensor and two leaf springs. The leaf springs has a defined stiffness.

The upper force initiation angle can be moved to perform different gaps.
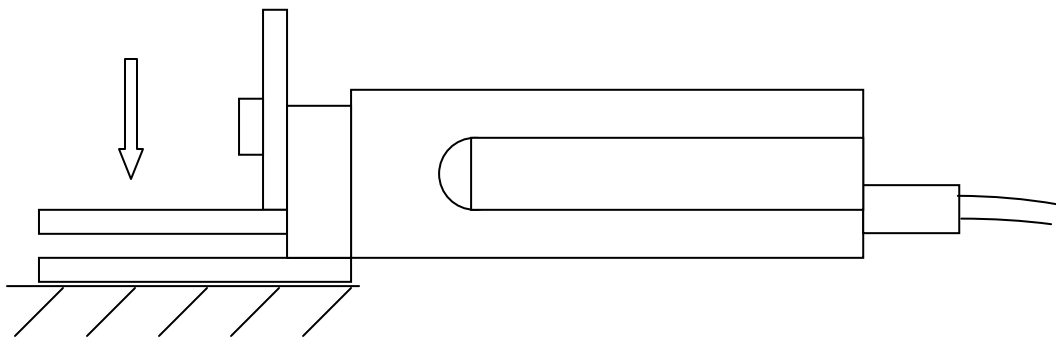
Side view FM200

3.2   SENSOR DATA

Important sensor specific data is stored in a non-volatile memory (EEPROM), situated in the sensors connector (9-pol. Sub-D). The sensor data in detail is:
- Force adjustment data,
- Sensor-ID,
- Version,
- Serial-No. ,
- Guidelines category,
- Date of last calibration,
- Number of measurements.

3.3   MAINTENANCE

The instrument has to be protected from moisture. It is designed to withstand normal handling and transportation, nevertheless excessive shock or load (>500 N) can damage it and should be avoided. Most of the parts are fabricated from aluminium or stainless steel. To clean the device, wipe it with a damp cloth.

4   DISPLAY UNIT SEB2

The functions of the display unit SEB2 are::
- Controlling measurements,
- Storing measurements,
- Display and evaluation of measured values and evaluation directly after measuring,
- Upload measured data into a PC.

4.1   DISPLAY, OPERATING ELEMENTS
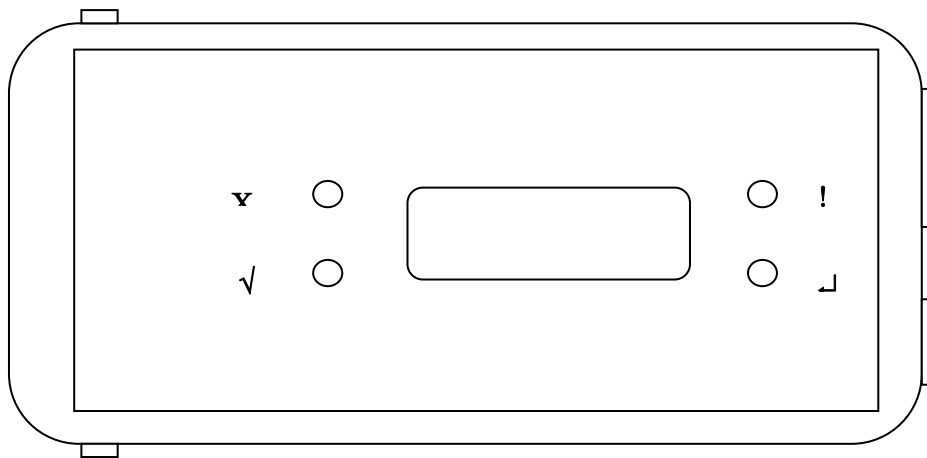
The display elements are three LED`s and a 3 ½ digit LCD-display.

The meaning of the LEDs are:

!	Status-LED

X	Result-LED: not OK

√	Result-LED: OK

There is one push button to operate the display unit:

↵	Operating push button

The function of the operating push button is different, according to the state of the display unit. In the "off" state, the display unit will be turned on. In the "on" state, the display unit can be turned off by pressing the push button longer than 2 s.

After initialisation, the display unit will enter the ready state. The state LED flashes slowly.
The number of the next free memory location is displayed.
In case of an expired calibration period (> 15 month), the red result LED flashes (refer to chapter "calibration").
Display of the next free memory no. :

Single/Triple measurement	Memory No.	Measurement-No.	Display
Single Measurement	1	1	**.01.**
Triple Measurement	1	1	**.01.1**
Triple Measurement	1	2	**.01.2**
Triple Measurement	1	3	**.01.3**

4.2   MEMORY CAPACITY

Measurement data is stored in a compressed format. The capacity of the memory is
- 100 single measurements or
- 80 triple measurements.

4.3   EVALUATION

The peak force over the entire measurement period is displayed. This value is compared with the permissible peak force. Additionally the pulse duration is compared with the actual limit value. Depending on this comparison, the red or green LED will be lit.

4.4   DATA TRANSFER

The transfer of data is controlled by the software *PinchPilot* on a personal computer (PC). The Display unit has to be connected to the appropriate COM- or USB-port and is turned on by pressing briefly on the push button of the display unit. The data transfer is controlled by the PC-software *PinchPilot*.

4.5   BASIC SETTINGS

Some basic settings can be modified at the display unit. All of these settings are modified during the turn on phase of the display unit.
Note: To return to the initial "on" state it might be necessary to turn the display unit off. Pressing the operating button longer than 2 s does this.

4.5.1   Erase memory

This function erases all stored data in the display unit. Make sure the display unit is turned off. Press the push button for a time longer than 2 seconds. This will turn the display unit on; for a shot time three dashes (---) appear, indicating that all data is erased. After this action, the next available memory no. will be 01.

4.5.2   Limit value for peak force

Certain guidelines have, depending on the nature of the measuring point, different peak force limits. Up to three different limit values are available. The setting of the peak force limit before a measurement makes the evaluation easier.

Setting: After turning the display unit on, the actual peak force limit is displayed for a time of 2 seconds. Every short press of the push button during this phase will change the limit to the next value.

4.5.3   Mode of measurement (single, dual or triple)

Depending on the standard, a single, a dual or a triple measurement is needed. An additional setting for dual and triple measurement is the option auto sequence. In this case, the second and if applicable the third measurement is started automatically. The user can fully concentrate on the closing system to be tested.
Setting: After turning the display unit on, the actual peak force limit is displayed for a time of 2 seconds. When pressing during this period the push button on the display unit for a time longer than 2 seconds, the mode setting is entered. The actual mode is displayed (refer table) is displayed for another 2 s. A short press on the push button causes a change to the next mode.
Alternatively this setting can be done via PC software PinchPilot (refer chapter "Sensor/Configuration").

Display	Meaning
1	Single Measurement
3	Triple Measurement
+3	Triple Measurement with Auto Sequence
2	Dual Measurement
+2	Dual Measurement with Auto Sequence

4.6   BATTERY

When the message „BAT" is permanently indicated on the LCD display, it is time to change the battery. A special capacitor ensures that no measurement data will be lost and the real time clock does not stop running.
Change the battery by removing the cap on left hand side of the display unit. Pressing the two locking buttons does this.
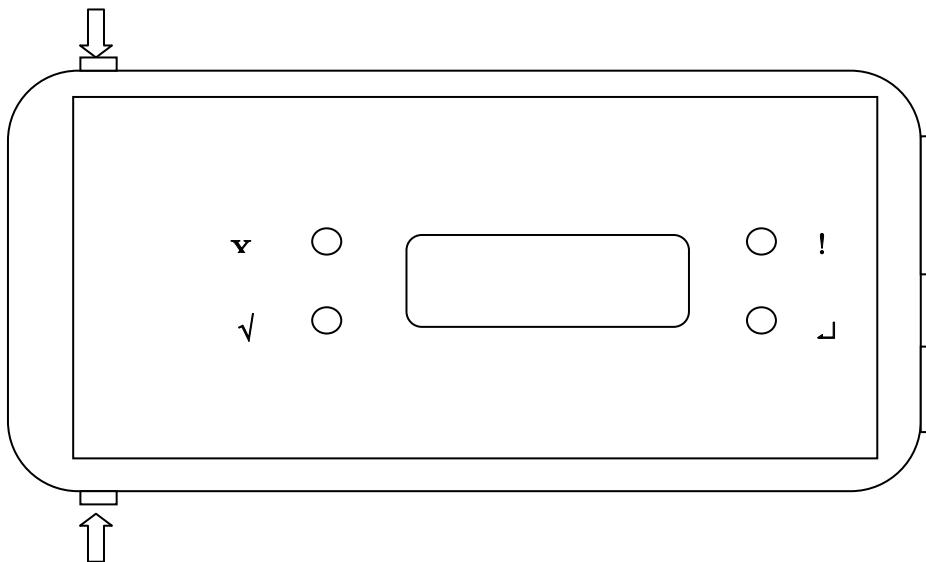
Battery change

Caution! Do not tilt one of the caps sideways; this can damage the locking element.

4.7   ERROR MESSAGES

If the display unit detects a malfunction, an error message is displayed (Exx). The meaning of the two digit error no. is explained in the appendix table "error messages".

4.8   MAINTENANCE

The display unit does not need any special maintenance. It should not be exposed to direct sunlight. When dirty, clean it carefully with a soft, damp cloth.

5   PC-SOFTWARE PINCHPILOT

Main functions of the *PinchPilot* Software are:
- Readout of measurement data stored in the display unit,
- Graphic visualisation,
- Calculation of important characteristic values,
- Evaluation of measurements on the base of guidelines,
- Printout of measurement reports and storage of measurement data.

5.1 INSTALLATION

5.1.1 System requirements

The *PinchPilot* software can be installed on any personal computer that meets the following requirements:
- Operating system Windows 98 SE, NT, 2000, XP, VISTA, W7, W8
- CPU Pentium, $\geq$ 133 MHz
- RAM $\geq$ 32 MB
- Free hard disk memory $\geq$ 50 MB
- CD-drive
- RS232-Interface (COM or alt. USB-Adapter)

For the execution of force measurements, the software is not needed. Therefore, it can be installed on any work station with access to a printer and an interface channel COM or USB. For installation, insert the CD and start the setup application and follow the instructions of the installer.

5.1.2 Installation

Insert CD and start the setup application of *PinchPilot* using the Windows explorer. Everything else will run automatically. During the installation process you are asked to enter the license code. The license code is an 18-digit combination of numbers and letters. It is situated on a label on the CD-envelope. Upper/lower cases make no difference (**not** case sensitive). If the license code is not accepted by the installer, licensing should be repeated later in the *PinchPilot* program. We recommend choosing the standard installation option.

For demonstration purposes the *PinchPilot* software can be started without entering a license code (enter Ignore).

After successful installation *PinchPilot* can be started via "start/programs/PinchPilot/PinchPilot.exe". Alternatively the user may install a desktop link to the application.

Activity check: Test if *PinchPilot* has everything under control:
Mouse click on the *PinchPilot* symbol on the screen and it will give you a subtle hint !

5.1.3 Language

Available languages are German, English, French, Italian and Spanish. The setting is found under: "Extra/Language" ("Extras/Sprache").

5.1.4 Software Updates

The update installation procedure is the same as the original installation. It is not necessary to uninstall the former version of *PinchPilot*. Again, the license code is situated on the CD envelope. In order to prevent a mix up of CD envelopes, the license code label also contains the software version number. The version number is also found on the CD-Label.

5.1.5 Uninstalling

To uninstall *PinchPilot*, you select in Windows:
„Settings/Control Panel/Add,Remove Programs/PinchPilot"
"Add/Remove"
All *PinchPilot* components are removed from the PC.

5.2   END USER LICENSE AGREEMENT

By installing the software on his PC the end user accepts the conditions of this agreement:

The end user has the right to install the software on one Computer at a time. There is no time limit for using the software. The user can copy the software for backup purposes.

The software is licensed and not sold. The holder of all rights is Drive Test GmbH.

Drive Test GmbH warrants that the software is substantially free from defects for a period of one year.

Drive Test GmbH doesn't take any liability for resulting damages resulting from the usage of the software as far as it can be legally excluded.

Drive Test GmbH doesn't warrant that the software will run on every PC-system.

5.3   GENERAL OPERATING STANDARD

The operation of the software is based on the Windows standard and should be known to most of the users. The easiest way to operate the software is a mouse-based operation; nevertheless, a keyboard-based operation is also possible. In the following description only specific functions are explained; general functions like "save" etc. are considered as known to the user. The access description below is based on the menu bar (frequently used functions may also be activated directly via tool bar).

5.4   MAIN MENUE

After starting **PinchPilot** by double clicking the **PinchPilot**-Icon the main menu is displayed.

Four diagrams:
In the middle of the screen there are four diagrams. They represent three single measurements and additionally a fourth diagram displaying all three measurements. Each of the four diagrams can be displayed in a single diagram view.

Menu Bar:
At the upper screen margin there is the menu bar. This bar offers access to all **PinchPilot** functions.

Tool bar:
The tool bar is below the menu bar. This bar offers a fast mouse access to often used functions. All functions can also be activated in several steps via menu bar.

Results:
The result values are displayed in a table in the lower screen area. Result values are discrete values needed for evaluation purposes based on the active guideline, such as the peak force of a measurement. Each of these values is evaluated on the basis of the active guideline and indicated to be ok or not ok. Besides the values of single measurements, the average values of the three measurements are also evaluated. The total evaluation result is displayed in a separate result field with a significant ok / not ok display.

5.5   MEASURE DATA

Measurement data is found in measurement data files. Within the *PinchPilot*-program the expression "file" is equivalent with measurement data file.

5.5.1   File name

The name of measurement data files is composed of several components:

aaaa bbb cc.ppd

aaaa .. Serial No. of the sensor; this part of the name can be activated or deactivated. It is set under „Extras/Options/Sensor/Serial No. in file name".
          The serial no. as part of the name is especially important when more than one sensor is in use. When only one sensor is used, this feature should be deactivated.
bbb ... Continuous block no. This number is incremented at every upload session (transfer of measurement data from display unit to the PC). The block no. can be set under „Extras/Options/Sensor/Bloc No.".
cc ...   No. of the measurement (00-99)
ppd ... Type specific file extension: *PinchPilot* Data.

5.5.2   Location of files

Before uploading data, a destination directory can be selected („Sensor/Load Measure Data/Find"). At the next upload the former directory will be offered.

When loading measure data files stored in the PC, the location can be selected freely. At the next loading the last entered directory will be offered.

5.5.3   Properties

Properties of measurement data are important attributes like name of the customer, point of measurement etc. . All properties appear on the printed report. Without properties measurement data can be easily mixed up and have little information value.

Properties are set under „File/Properties". Changes are valid for the currently loaded measurement. Default setups are also valid for future uploads.

The properties of a measurement data file are entered under "File/Properties":

Name	Meaning	Example
Guideline	Name of the applicable standard	EN12445/EN12453
Tester	Name or code of testing person	Charles Clamp
Customer	Name or code of customer/ Dep. etc.	Bentley Motor Cars
Item	Identification of the item	Door 1
System	Identification of the system	Automatic
Limit	Applicable limit value	1400 N
Measure Point	Identification of the measuring point	Lower edge
Remark	Special details, etc.	New drive system

Depending on the guideline, the names may vary.

In the field "Remarks" additional measurement information can be entered.

In the field "Measure Points" a number of frequently used names of measurement points can be defined. These names will be selectable in "Measure/Measure Point".

All inputs are valid for the currently loaded measurement. In addition, a set of properties can be defined as a default setting. Default settings are inserted automatically when measurements are uploaded.
Default settings are guideline specific, i.e. only available in the corresponding guideline.

For measurements that have to be executed periodically and include several measurement points, usage of the database option is recommended. All properties of all measurement points can be defined within the database and transferred into a selected number of measurements with one mouse click. Refer to chapter "database".

5.5.4   Details

In addition to the course of the force and the result values displayed in the main menu, there are a number of information details linked to the measurement.
These details can be displayed under „View/Details". In case of malfunction, this information can be useful.

5.5.5   Data Administration

The administration of measurement data files has to be organised externally via the Windows Explorer. By this means, files can be deleted, moved or saved.
We recommend creating an adequate folder structure for clearly arranging data.

5.5.6   Single/Triple Measurement

Depending on the setting „Sensor/Configuration/Mode" a measurement data file can consist of one or three measurements.

5.5.7   Export

Depending on the intended purpose, measure data can be exported in different formats. The following options are offered under „File/Export":

Text Format:
Unformatted text, which can be imported by programs like MS EXCEL. The number of exported measure values can be set under „Extras/Options/Measuring/Time Distance".

Measurement Report:
A measurement report is the printable result of a measurement. The data format is EMF (Enhanced Meta Format). MS WORD can import it.

PDF:
The measurement protocol is saved in a PDF formatted file. Advantages of this format are:
- can be sent via email,
- cannot be changed,
- is readable with Acrobat Reader without any other software needed.

Diagram:
A diagram is a single diagram. The active diagram is indicated by a blue coloured title. This diagram will be exported when the export is initiated. The data format is EMF (Enhanced Meta Format). MS WORD can import it

Q-DAS:
See Software Plug-Ins

5.5.8   Print

The printing features can be accessed under „File/Print":
- Selection and setting of a printer,
- Preview before printing,
- Starting the print.

5.6   SETTINGS

PinchPilot offers versatile settings. The default software installation settings ensure reasonable values so that the user has to adapt very few values.

5.6.1   Extra/Options

Submenu	Value	Meaning
Sensor	Port (PC interface)	depending on the connection either Com1,2,3,4. (for changes to become effective, a restart of *PinchPilot* is required)
Sensor	Serial No. part of the file name	select this feature when several sensors are in use, otherwise do not
Sensor	Delete after upload	delete measurement data in the display unit after uploading this data into the PC. Should be set
Sensor	Change Guideline	redefines guideline when uploading measure data
Sensor	Open last Upload	load and display the last measurement after an upload session
Sensor	Bloc No.	the bloc no. defines the upload session. Adapt when needed
Sensor	Compression	Compressed data transfer for shorter transfer duration, set active
Tester Properties	Logo	corporate logo, if available and desired
Tester Properties	Properties appear in report	Text appears in the right, upper field of the report; e.g., postal address etc.
Print	Logo Margins	sets the logo position for printed report
Print	Diagram	1 or all diagrams printed set all
Print	Punch marks	set active
Display	Average	Time for averaging of force values when using PC controlled measuring Refer to chapter Measuring controlled by *PinchPilot*
Plug-Ins	Export Q-DAS Files (Option)	Activation/Deactivation Refer to chapter Plug ins
Plug-Ins	Import Label Data (Option)	Activation/Deactivation Refer to chapter Plug ins

5.6.2   Extras/Settings

These settings are guideline specific and depend on the guideline of the actually loaded measurement. The user can modify the scaling and setting values which are not defined in the standard the guideline is based on.
Changes are only valid after you quit the window with the OK button. Other measurements are not affected. If the parameters shall be changed for future measurements, the actual setting must be stored as default.

Scaling:
Scaling changes the graphic representation of measured data. Time and force axes can be automatically scaled or scaled with fixed parameters.
In general, it is better to have fixed scaling in order to be able to compare different measurement diagrams.

Limit values:
The set of parameters offered depends on the guideline property of the currently loaded measurement. The user can change those parameters which are not defined in the standard the guideline is based on.

5.6.3   Sensor/Configuration

Important: For configuring the sensor, the display unit has to be connected to the PC and the sensor has to be connected to the display unit. The display unit has to be turned on.
The configuration setting is stored in the display unit or in the connector of the sensor.
The actual setting can be read out and rewritten.

Set on system time:
The real-time clock contained in the display unit is set to the PC's system time. This setting is of great importance since every measurement gets a time stamp, thus the time of the measurement is documented.

Limit:
Some guidelines define several force limits. The active limit can be selected. This setting can also be modified via the display unit.

Mode:
Selectable modes are:
- Single measurements
- Dual measurements
- Dual measurements with auto sequence
- Triple measurements
- Triple measurements with auto sequence

This setting can also be modified via the display unit.

Multiplex Display:
If this option is active the display of the display unit will toggle between the peak and the effective force. The effective force is the average force during which the force is greater than the trigger value.

5.6.4   Operating Bars

The menu bar (file, sensor, etc.) and the tool bar (tool symbols) may be customized by the user. The procedure is:
- move the mouse into the area of menu / tool bar
- click the right hand sided mouse key (context-menu)

The menu displayed allows activation / deactivation of the menu, tool, and status bars.
Additionally the graphic view may be defined.

More settings are available by selecting "customize".
Operating bars (tool bar):
Activating / deactivating the entire tool bar. It is also possible to reset the tool bar to a default state.
Actions:
Individual setting of the tool bar.
Options:
More individual view settings.

5.7 MEASURING

5.7.1 Normal operation

To carry out a normal measurement, the sensor and the display unit are the components in use. It is not necessary, to connect the display unit with a PC. The measurement procedure is described in the chapter measuring.

5.7.2 Controlled by PinchPilot

Beside the above mentioned method it is possible to control a measurement from the PC. For this, the display unit has to be connected to the PC.

Put *PinchPilot* into measure mode, turn on display unit.

Settings for measuring mode:

Name	Meaning	Selectable values
Limit	Limit to be used	Limit designation
Autom. Upload	Automatic upload at the end of an measurement	Active / not active
Modus	No. of measurements per measuring point; Auto sequence: autom. Start of 2nd and 3rd Meas.	-single measurement -triple measurement -triple measurement with auto sequ.
Averaging	Averaging of force 1)	Active / not active
Result	Saving of measurements	-Manual (button „save") -Save (always) -discard (never)

1) Setting of averaging time refer to „Extra/Options/Display/Averaging"

The measurement can be started as soon as the PC starts communicating with the display unit and the state ready is indicated.
A normal measurement is initiated by clicking the start button which has the same function like the operating button of the display unit. The measurement process complies with the one of the normal measurement.
The saving of the measurement depends on the result setting.

A permanent measurement is started by the "Permanent" button.

5.8   SOFTWARE MAINTENANCE

During its life time, the software is maintained by the manufacturer, i.e. known bugs will be corrected, functions enhanced or new functions added. Therefore *PinchPilot* updates will be available from time to time. New releases will be delivered regularly when the instrument is calibrated by the manufacturer or an authorised partner.

5.9   SOFTWARE PLUG-INS

Additional functions can be added via plug-ins. Installed plug-ins can be activated/deactivated in menu "Extra/Options/Plug-Ins". A detailed setting is offered in the lower display unit of the extra-menu.

5.9.1   Q-DAS

Q-DAS is offered for statistical evaluation purposes. The relevant result values of a measurement are exported (appended) into a separate Q-DAS file. The data of this file can be imported for evaluation via common statistic software packages.
The Q-DAS option must be activated in the menu "Extra/Options/Plug-Ins".
Additionally the name of the Q-DAS file can be can be defined in menu "Extra/Q-DAS Options". If the import of label data as measurement properties is installed, the Q-DAS file name can be the imported ID-no. .

5.9.2   Label

The option „Label" is useful in an automatic test system, where *PinchPilot* is used to test the profile **and** labels are printed at the end of the testing process. The label plug-in receives print data parallel to the label printer (COM1or 2) and adds relevant data to the properties of the measurement.

6   MEASURING

6.1   PREPARATION

The sensor and the battery driven display unit are needed for measuring. Both have to be connected.
To ease the identification of measurements, prepare a list containing all measuring points.
The provision of an extra battery may be useful.

6.2   NOTE MEASUREMENT

For later evaluation with the *PinchPilot* software, the memory no. of the display unit and the name of the measure point should be noted.

6.3   TURN ON DISPLAY UNIT, SET LIMIT

It is a good idea, to set the applicable force limit in the display unit depending on the guideline and the properties of the point to be measured. Without a valid limit, the evaluation of the display unit makes no sense. It is possible, to change the limit during the *PinchPilot* evaluation, but it saves time to do it before the measurement.
The setting of the limit is performed during the turn on phase of the display unit (refer to chapter "Display Unit / Basic Settings/ Limit value for peak force).
The display unit is now in the "Ready"-state; the yellow LED flashes slowly.

6.4   PUT SENSOR IN MEASURING POSITION

The instrument is to be used such that the static part is connected to the stop of the closing system and the movable part faces towards the moving edge.
In case of two moving edges, choose one of the edges for the static part and follow the movement of this edge manually. Select a solid and even underlay.
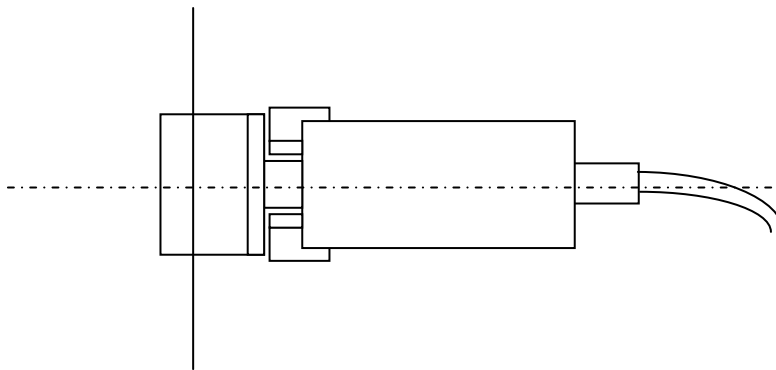
Vertical force initiation:
The force initiation should be vertical to the upper force initiations area.
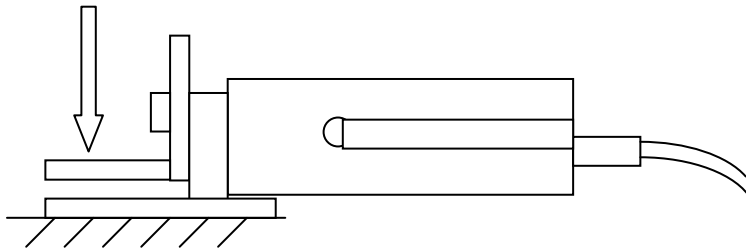
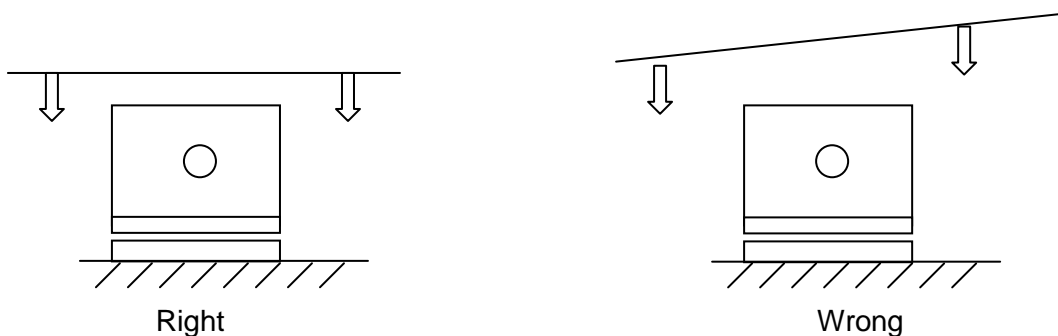**Lined Force Initiation:**
The force should be initiated in the form of a line in an angle of 90° to the symmetrical axis of the sensor. The line should go through the centre of the initiation disc.

Best force initiations line

Parallel Force Initiation:
The force initiation area and the moving edge should be parallel to each other.

Right   Wrong

6.5   MEASURING

Activate force measuring by briefly pressing the push button. The display unit will tare the force, i.e. the actual force is set to zero. Thus all tare weights are compensated. The state LED blinks rapidly.
The measurement starts as soon as the force trigger value is exceeded. The duration may vary. In any case, the end of the measurement is reached when the measurement time has expired.

The peak force over the whole measurement period is displayed. This value is compared with the permissible peak force. Additionally the pulse duration is compared with the actual limit value. When one of the limits is exceeded, the red LED will be lit; otherwise the green LED.

For some reason a measurement may need to be repeated. Therefore the decision step „measurement valid/not valid" has been added.

valid: shortly press operating push button. The measurement will be stored. The display shows the next free memory number.
not valid/repeat: press operating push button for longer than 2 seconds. The display shows the current memory number again.

All further measurements are to be executed in the same manner.

7   EVALUATION

7.1   LOAD MEASURE DATA FROM DISPLAY UNIT (UPLOAD)

Connect display unit to PC and turn display unit on. Start *PinchPilot* .
Select "Sensor/Load Measure Data". The data destination in the PC will be indicated and can be changed ("Find" Button). The number of measurements stored in the sensor and the estimated transfer time is indicated. The upload is started by clicking the start button.
When the upload is finished, the last uploaded measurement is displayed. The arrow buttons in the tool bar can be used for scrolling through all measurements in the active folder.

7.2   ENTER MEASUREMENT PROPERTIES

Properties are measurement attributes like customers name, tester, door system etc.. All properties appear on the measurement protocol.
Via „File/Properties" the property fields can be filled. For more details refer to chapter "*PinchPilot*/Measurement data/Properties"

7.3   PRINT MEASUREMENT PROTOCOL

For documentation purposes a measurement protocol can be printed. It contains the presentation displayed on the screen and all properties.
The printout is initiated by „File/Print" and applies to the currently loaded measurement.

8   MEASUREMENT SEQUENCE

The feature „Measurement Sequence" is intended for all those objects, who have to be measured at several points. Examples are: train doors, bus doors, automatic doors, etc.

Measurement sequence is opened under:
  "file/sequence" or clicking on the sequence symbol Symbol (hand with a sheet of paper).

Measurements can be uploaded into the PC within the sequence window.

In the right hand side area, the loaded measurements are displayed in a table.
The middle area is to specify the measurement points including the limit to be applied.
In the left hand side area sequence properties like guideline to be applied, tester, customer, etc. and remarks can be entered.

After entering all properties, the property setting can be applied to the measurements. The details of this action are:
  - Transfer of sequence properties into the property fields of all measurements. The content of remarks is an exception. It appears only in the remarks field of the report.
  - Application of the guideline and the limits for all measurements.

A printable table is now available which can be inspected (previewed) on the screen.
The results of the measurements can be displayed in two different ways:
  - 4 Lines: display 3 measurements per point plus the average values or
  - 1 Line: display only average values per point.

8.1   TEMPLATES

An essential method to ease working with PinchPilot is the usage of templates. Templates contain the properties of a sequence including the measurement points.

After having entered a set of properties for a certain type, it can be stored in a template file under a freely definable name. Next time, when this type is to be measured, the properties can be loaded from the appropriate template (file/open template).
For clear arrangement reasons templates should be kept in a separate folder, i.e.:
„C:\Pinchpilot\Sequence\Templates"

If the measurements are executed in the sequence defined in the appropriate template, the effort to get the result report is reduced to a few mouse clicks..

8.2   DETAILS TO WORK WITH SEQUENCES

After uploading from the display box, measurements appear in the left hand side table. Alternatively measurements can be loaded by using the open function. Only one measurement file can be marked, but all files with the same block no. (i.e. all measurements of the same upload session) will be loaded. This are normally the measurements related to one object.

An important tool in PinchPilots sequence window is the right mouse key. By clicking the right mouse key, in many situations a context menu is opened, offering appropriate actions like moving, deleting, etc.

Groups can be defined by using the combination of shift and right mouse key. Context menus are also for those groups available.

The documentation of a measurement sequence is the printout of a report. If the user wishes to get another copy of the report at a later date, all steps have to be repeated. A possibility of keeping reports is to use one of the export functions (i.e. PDF format).

By arranging windows the sequence and the graphic windows can be displayed at the same time on the screen. A double click on a measurement in the sequence window will cause the display of this measurement in the graphic display.

PinchPilot supports „drag and drop". With this method, lines or a group of lines in the sequence window can be moved. When windows explorer is on the monitor, some loading processes can be elegantly executed:
- Get measurements into the graphic display or into the sequence window,
- Get templates into the sequence window.

8.3   OPTIONS

8.3.1   Wrong guideline, wrong limit

Every measurement gets at the time of its creation a guideline and a limit property according to the sensor used and the setting of the display box. Normally, the application of sequence properties to the measurement is disabled, if guideline or limit property from the sequence and measurement do not comply.
However, the user can allow the application by changing the option setting (Options).

8.3.2   Unsaved changes

In case of danger of data loss, a message appears and offers the possibility to cancel the required action. This warning message can be suppressed by the an option setting (Options).

9   GUIDELINES, STANDARDS

The expressions used in this manual are defined as follows:
Standard:
General term for a directive for measuring and evaluating the closing force. This can be laws, European standards etc. .
Guideline:
Referred to as a set of parameters and limit values that define the execution of measurements and the way the results are tested. Basis of guidelines are standards.

Parameters defined by the standard applied can not be changed by the user. Parameters not defined by the standard may be user modified.

In addition to the guidelines provided by Drive Test, the user can define one user-defined guideline. All settings of the user-defined guideline can be changed by the user.

The guideline to be applied for measurements is stored in a memory device in the connector of every sensor. All measurements inherit this guideline as a property.

In case of standard changes applicable to closing force measurement , Drive Test will adapt the related *PinchPilot* guidelines. This is ensured by permanent observation of the relevant standards. *PinchPilot* software upgrades are carried out when the device is calibrated by Drive Test or by an authorised partner.

Below the essential requirements of applicable standards are described. No claim is raised concerning completeness and correctness. For exact details refer to the original standard text.

The evaluation result of the display unit may differ from the one of the *PinchPilot* PC software due to the fact that a complete implementation of all details and exception of the standard requirements is performed only by *PinchPilot*.
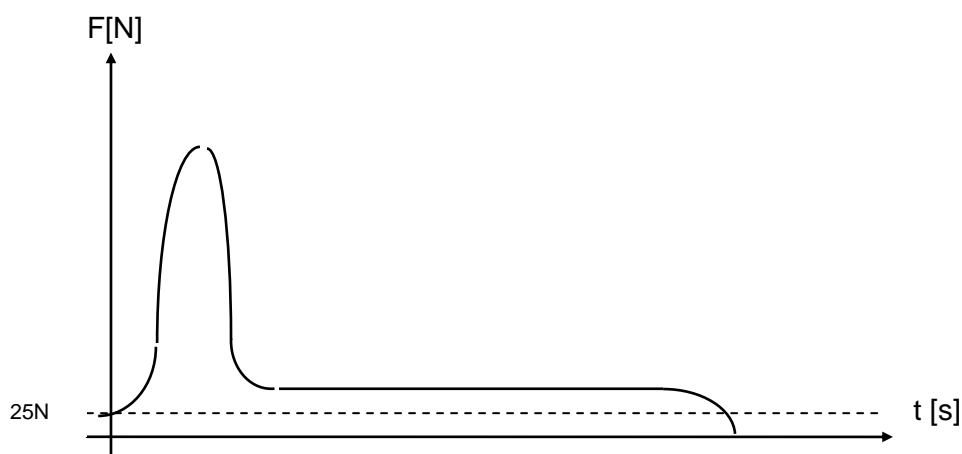
Schematic course of force

10   TECHNICAL DATA

Quantity	FM200-10/200	FM200-20/300	FM200-25/300	FM200-65/300	FM200-100/300
deflection rate	10	20	25	65	100 N/mm
tolerance of deflection rate	±10	±10	±10	±10	±10 %
max. force	200	300	300	300	300 N
Overload protection	Yes	Yes	Yes	Yes	Yes
max. gap width	55	45	45	35	35 mm
min. gap width	10 (4)	10 (4)	10 (4)	10 (4)	10 (4) mm
Force initiation area	50x50	50x50	50x50	50x50	50x50 mm
Weight (ca.)	1300	1300	1300	1300	1300g
Measures (ca.)	240x80 x60	240x70 x60	240x70 x60	240x60 x60	240x60x 60 mm

Quantity	Value
Force Measuring:	
Range	0 – 500 N
Resolution	1 N
Precision (greater tolerance is valid)	± 3 N or ± 3% of measured value
Sample frequency / -rate	500 Hz / 2 ms
Memory	80 single measurements or 80 triple measurements
Power Supply:	
Battery	9 V-Block, i.e. 6LR61
Battery voltage supervision (Warning)	Yes
No. of measurements per battery	> 500
Environment:	
Operation temperature range	-10 bis +40 °C
Extended operating temperature range 1)	-40 bis +90 °C
Humidity	max. 90% rel.H., non condensing

1) Experimentally determined temperature range; values within precision range, not for permanent operation.

11 CALIBRATION

Drive Test meters are very precise instruments, but can be easily damaged by inappropriate treatment like dropping etc. .
To ensure proper function, calibration in intervals of one year is necessary. The calibration date and state appear on the report.

12 GUARANTY

The manufacturer grants the buyer a two years guaranty. Beginning of the guaranty time is the delivery date (date of delivery note).

Defect or non functioning parts are either repaired or exchanged. Excepted from the guaranty are damages due to improper treatment, wear and tear parts and injuries by non authorised personal.

Place of repair is Munich / Germany. For all justified claims the cost of repair (working time and exchange parts) will be paid by DriveTest. Transport will be paid by the buyer.

The liability of DriveTest is limited to the repair of the delivered equipment. Further liability is excluded.

13 SERVICE ADDRESS

Drive Test GmbH
Adi-Maislinger-Str. 9
D-81373 Munich / Germany

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Fax: +49 (89) 7 43 40 94 – 9

EMail: info@drivetest.de
Internet: www.drivetest.de

14   DECLARATION OF CE - CONFORMITY

We,

Drive Test GmbH
Hansastr. 31
81373 Muenchen
Germany

declare that the Pinch Force Meter:
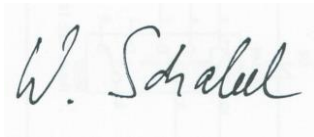
-   FM200

meet the intend of the applicable EC directives:

2006/42/EC	Machinery Directive
2006/95/EC	Low Voltage Directive
2004/108/EC	EMC Directive

W. Schabel

Wolfgang Schabel, Managing Director

15 APPENDIX

15.1 ERROR MESSAGES DISPLAY UNIT

Display	Service	Meaning
E:0x		Protocol error
E:1x		Serial interface error (x: Bit0=Parity, Bit1=Framing, Bit2=Overflow)
E:18		Baudrate error
E:20		Sensor connector change
E:21		Wrong sensor (version conflict)
E:30		Sensor supply error
	C:xx	Bit0=IES invalid, Bit1=IES instable, Bit2=DMS invalid, Bit3=DMS instable, Bit4=timeout
E:31		Missing measure data (Time Out)
E:40		LCD - test error
	n	Number of successfully tests
E:41		SRAM memory fast test error
	n	Number of successfully tests
E:42		SRAM memory test error
	3:xx	Hexadecimal number of errors MSB
	2:xx, 1:xx	..
	0:xx	Hexadecimal number of errors LSB
E:43		EEPROM test error
	nn	Number of error bytes
E:44		EEPROM system parameter initialisation error
	nn	Number of error bytes
E:45		EEPROM test error sensor data
	nn	Number of error bytes
E:46		EEPOROM initialisation error sensor data
	nn	Number of error bytes
E:47		A/D-converter does not react
	n	Number of successful tests
E:48		Real Time Clock does not react
	C:00	Data line constantly 0
	C:01	Data line constantly 1
E:50		Message Queue overflow
E:51		Queue for schedule data overflow
E:52		Queue for long term messages overflow
E:53		System died (Watchdog)
E:54		Stack overflow
E:55		Serial transmit data overflow
E:60		Bus arbitration error
	C:xx	Demanding client
	B:xx	Actual bus activity
E:70		Overflow force measure data
E:71		Overflow position measure data
E:80		Access violation SRAM
	C:01	memory address invalid
	C:02	Bloc length invalid
	C:03	Bloc out of valid range
	C:04	SRAM-address invalid
	C:05	SRAM-length invalid
	C:06	SRAM-overflow
	C:07	Align – error
E:81		Access violation at EEPROM
	C:0x	Error code, see E:80
E:82		Memory Access violation
	C:0x	Error code, see E:80
E:88		EEPROM does not react (not busy)
	C:0x	0 = system parameter, 1 = sensor data
E:89		EEPROM does not react no longer (constantly busy)
	C:0x	0 = system parameter, 1 = sensor data
E:8A		Denied write access on EEPROM for sensor data
E:FF		Error cause unknown

(*) with service button additional error code is available