

Operating Instructions

FSC 2011



Enabling locked devices

The FSC 2011 is shipped with a 3-digit security code. The device can be used for approximately 4 weeks without restrictions. After 4 weeks the FSC 2011 will continue to function for another 14 days, but the message “Limited operating time” briefly appears in the display when the device is turned off. After that the FSC 2011 will become disabled, and the message “Device locked” appears in the display when it is switched on. Only once the validation code has been entered can the device be used again.

Entering the validation code:

In order to unlock the FSC 2011, open the device menu by pressing the **P** key. Choose the validation menu, enter the supplied code with **+** / **-** and confirm your entry. The FSC 2011 is now unlocked.

Device overview



Start:

Three measuring programs can be stored in the FSC 2011. These are started by pressing the keys 1, 2 or 3.

Print:

Press the **Print 1** key to print the measurement parameters and results.

Press the **Print 2** key to print the measurement parameters, results and chart.

Press the **Print P** key to call the device menu of the FSC 2011.

In order to avoid unintentional actuation, the keys must be pressed for at least two seconds.

Operating the FSC 2011

Menu guidance

The keys:

- P** Call device menu
- ✓ Select menu
- ▼ Go to next menu item
- ▲ Go to previous menu item
- ◀ Return to main menu / Leave device menu and save changed values
- +
- Increase value to be set
- Decrease value to be set

Quick reference guide

1. Select measurement location

Choose your location based on the measurement task.
Ensure that the drive wheels are dry.

2. Select the slider

Select the appropriate slider for your measurement:

Leather, plastic

SBR rubber, rubber

Insert the selected slider in the underside of the device.

3. Put the device on the floor, pointing in the desired direction

Ensure that the device can traverse the path to be measured without obstruction.

4. Start the measurement

Start the measurement by pressing one of the start keys:

Start 1: Dynamic-friction measurement, 30 cm, standard grading 0.1

Start 2,3: Same as Start 1, but with measured path of 60 cm or 100 cm

5. Optional printout

Once measurement has been completed, press the **Print 1** or **2** key to print out a short or long version of the measurement results.

6. Remove the slider

In order to protect the measuring device from damage, remove the slider after each measurement.

Preface

With the purchase of the FSC 2011 you have acquired a modern and high-quality measuring device for precise determination of the static and dynamic friction of floor surfaces.

Periodic checking of floor surfaces using the FSC 2011 can detect changes of the floor characteristics in time, so that remedial measures can be implemented. Thus, the FSC 2011 is decisive in helping to prevent accidents caused by slipping.

Read these operating instructions carefully: They contain important information about operation of the FSC 2011.

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Device menu

Device data:

The “Device data” menu is used to display all relevant data, such as the manufacturer, serial number, etc. of your FSC 2011. This data is permanently stored in the device. The user can only change the device name.

Measurement programs:

Different test methods, scaling, measured paths and dwell times can be assigned to each of the three start keys individually.

The device can be reset to the factory settings at any time by selecting the “**Restore standard**” menu item.

Also refer to “Measuring with the FSC 2011”

Device settings:

If necessary, the display’s language and brightness, the time and the unit of measurement can be changed.

The date is set in the factory, and cannot be changed by the user.

The signal tone can be activated as a **warning signal** while the device is in motion.

Device menu

Archive:

The FSC 2011 stores all successful measurements in a data archive. These measurements can be printed using the built-in printer. Only all measurements of any given day can be printed.

Slider data:

Under “**Slider data**” you can see the data of the inserted slider, such as the date of manufacture, the coating, and the degree of wear.

Miscellaneous information:

Counters and statistics give an overview of the number of measurements.

Print values:

All values that have been set in the device can be printed out for archival purposes.

That manufacturer recommends printing out all device parameters once initial setup is completed, and to keep this information with other important documents.

Measuring with the FSC 2011

Start keys:

The start keys have been pre-programmed with different measurement programs. These can be changed as needed:

Call the **Measurement programs** menu item in order to select one of the three start keys.

The test method, path to be traversed, dwell time and scaling can be changed in the submenu.

Due to the characteristics of each test method, not all parameters can be changed for each test method. Therefore, only those parameters that can be changed by the user will be shown.

Test methods

The following test methods are currently available:

Dynamic friction

The glider is lowered and measurement begins

Static friction

Like dynamic friction, but with static friction

Static friction 3

The FSC 2011 performs three static friction measurements with a selectable dwell time

Static friction 5

Like static friction 3, but with five static friction measurements

Flying start

The FSC 2011 begins moving, but the slider is not lowered until after approx. 10 cm of traverse

Dwell time:

Before measurement begins, the slider's dwell time can be set within a range of 1 to 99 seconds.

Measured path:

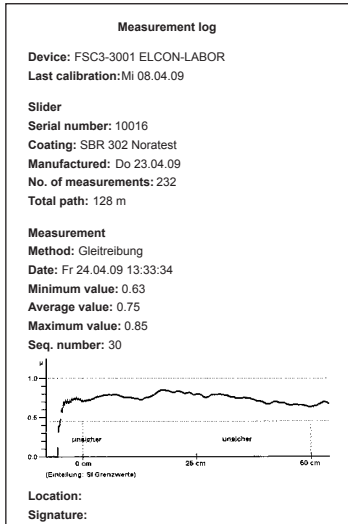
The measured path can be set within a range of 30 cm and 200 cm. The factory settings for the three start keys are detailed under **Start the measurement** of the quick reference guide.

Measuring with the FSC 2011

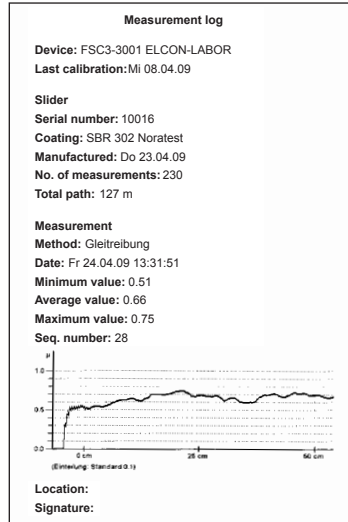
Scaling:

Various scaling methods are available, depending on where the device is being used. Here are the most common:

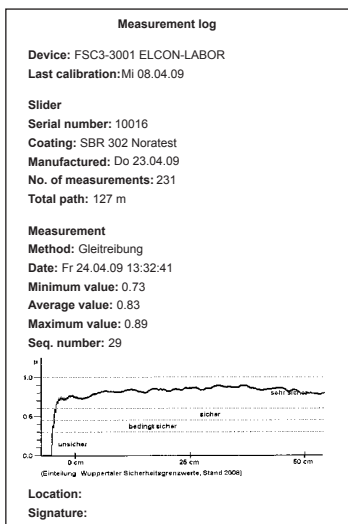
Si limit value



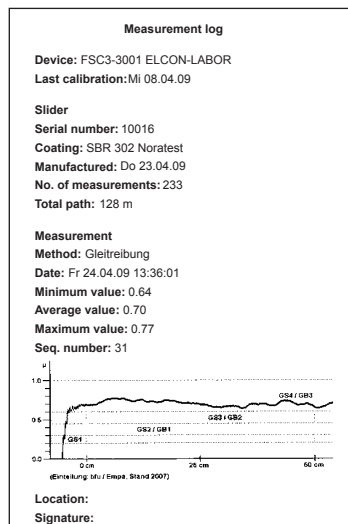
Standard O.1 Grading 0.1 to 1



Wuppertal safety: Classification according to Wuppertal safety limit values



bfu Switzerland Swiss safety standard according to bfu/EMPA



Measuring with the FSC 2011

The slider assemblies:

The measuring sliders have a decisive influence on the measured values. They are to be checked for abrasion and hardening, as well as for their general condition. They must be returned to the factory for re-coating after at most 200 measurements.

Four slider types are included with the FSC 2011:

SBR rubber (yellow slider)

Rubber (black slider)

Plastic (blue slider)

Leather (red slider)

Other slider types are available as accessories.

Measuring with the FSC 2011

Performing a measurement:

The FSC 2011 must acclimate itself to the location's temperature for at least half an hour before performing any measurement.

Dry measurement:

Before being put into operation, the slider must be cleaned and then inserted in the recess in the bottom of the device. Place the FSC 2011 on the floor at the intended location. Press one of the start keys for the device to begin the pre-defined measurement.

Once measurement has been completed, the determined value is shown in the display and can be printed using the built-in printer.

Wet measurement:

The slider and the path to be measured must be moistened 10 minutes before measurement is begun. Then proceed as for dry measurement.

Assessing the measurement results

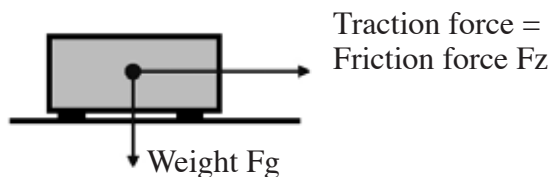
Periodic checking of floor surfaces yields meaningful measured results. This can reveal tendencies over long periods of time, permitting the optimization of floor maintenance. The efficiency of anti-slip cleaning fluids and floor-renewal measures can also be tested.

The devices of the FSC series measure the coefficient of dynamic friction, which is a physical quantity. Until now, the German standard DIN 51131 does not prescribe any limit values for this; therefore the University of Wuppertal's safety limit values for protection against slipping are used to assess the measured results.

These have been generally recognized, and have also been commented by the relevant trade associations.

Information about friction in general:

The friction force is the force required to pull an object over a surface.



The coefficient of friction [friction factor] “ μ ” shows the ratio between the traction force **F_z** and the weight **F_g** of the object. The coefficient of friction only indicates the ratio, and therefore has no physical unit itself.

Assessing the measurement results

Static friction or dynamic friction

The static friction must be overcome in order to put a body into motion. In order to keep the body in motion, only the dynamic friction must be overcome.

Physical designations:

Coefficient of static friction = μ^0

Coefficient of dynamic friction = μ

Examples:

	μ^0	μ
Car tire on dry street	0,65	0,45
Car tire on wet street	< 0,20	< 0,20
Steel on steel (train)	0,15	0,12

For most material combinations, the coefficient of static friction is greater than the coefficient of dynamic friction.

Printing out the parameters / measurement results

The FSC 2011 is equipped with a high-speed thermal printer. It can be used to print out all measurement parameters and measurement results.

Press the **Print 1** key to print a log of the most recent measurement.

If a diagram is desired, press the **Print 2** key.

Maintenance and service

Thermal printer

The thermal printer can hold a 20-meter long roll of paper. The end of the roll is announced by a red coloration. In order to exchange the paper roll, open the front cover of the printer. Unroll about 15 cm of the paper, and then place the roll in the open tray. Let some paper protrude from the printer, and close the cover carefully.

Drive wheels

The drive wheels feature a special type of rubber that ensures optimum traction on all surfaces. The wheels should be cleaned before the first measurement of the day, as well as whenever necessary. They can be pulled off after the side cover is removed.

Charging the battery

The FSC 2011 has a rechargeable, closed gel battery with a capacity of 12 V and 2 Ah. An adapter (230 V / 110 V / 18 V / 840 mA) is included for recharging the battery. The charging time with this adapter is approx. four hours. The FSC 2011 has an overload protection device, so the battery cannot be overcharged.

Maintenance and service

Maintenance of the FSC 2011

In order to ensure that measurements continue to be accurate, the FSC 2011 indicates that maintenance is due. Once this message appears in the display, or at the latest after 24 months, the device must be sent to the manufacturer for inspection.

The FSC 2011 must always be returned with all accessories, since only then can all maintenance work be performed.

Software

The software for connection to a PC is stored on the USB stick included with the FSC 2011.

Furthermore, you can download the respectively current software version from www.mcs-mechanik.de.

Automatic monitoring	Rechargeable battery, wheel slippage, slider, measuring system, temperature, speed
Measuring programs	μ values 0.1, Wuppertal table, bfu Switzerland, USA Standard, Si limit value, BG limit-value table
Memory	Integrated memory for approx. 1000 measurements Internal data archiving and evaluation
Data transmission	Integrated USB port for connection to a PC
Package contents	Complete FSC 2011 device <ul style="list-style-type: none"> - Aluminum case - 4 sliders (leather, SBR rubber, rubber, plastic) - Charger (international version) - 2 paper rolls - Operating instructions - USB cable - USB stick with PC software

Dimensions	288 x 177 x 113 mm
Weight	7.5 kg
Environmental conditions	Storage: -20 °C to +85 °C 5% to 85% rH without condensation Operation: 0 °C to +40 °C 10% to 80% rH without condensation
Chassis	4-wheel chassis with rear swing axle
Speed	200 mm/s, electronically controlled
Modes	Wet and dry measurement
Slider	Motor-driven rising and lowering; four different types of sliders with internal microchip for data capture
Slider downforce	24 N
Power supply	12 V rechargeable battery, capacity for approx. 200 measurements with printouts
Measurement sensor	DMS system (stretch-measure stripe), accuracy 2% of the end value
Operation	User guidance on a 4" display with full graphics, various regional languages Printer: High-speed thermal printer Paper length: 20 m; Paper width: 104 mm
Printouts	Standard printout: Date, time, slider name, min/avg/max values, Expanded printout: As above, with chart Copy function:

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