The CFM Closing Force Monitor is an outstanding instrument for the measurement and evaluation of the closing force of train, tram and bus doors. The device is constructed according to international standards (DIN EN 14752 and VDV 111).

The CFM is able to meet all requirements placed on the measurement of door closing forces. Due to the device’s easy operation and precisely measured values the review process is implemented quickly, simply and effectively. Its main components include its Load Cell and Psion Workabout Pro C.

The housing of its Load Cell has been made from special plastic which offers weight savings, high resistance to environmental factors and maximum impact resistance. The Load Cell contains high-quality, durable controls with very low friction resistance.

By using innovative materials and components, the Closing Force Monitor has achieved a high measuring accuracy with a difference of ±3 % of the measured value at the range from 50 up to 350N.

The Psion Workabout Pro C is supplied with a bag and shoulder strap for ergonomic working. The user is thereby enabled to have one hand free during measuring work.

Measurement data are recorded immediately and are displayed visually by the Psion Workabout Pro C handheld device. The menu guidance of the unit’s software is deliberately kept simple in order to allow quick and easy operation by the user.

The user has the choice of several inputs: job number /vehicle number, running performance (mileage) of the vehicle, notes, signature (touch screen), number of doors, door name (4 digits, alphanumeric) and door type with corresponding limit values and measuring points.
The measuring process provides information about the measured peak force and effective force. If the preset limit value is exceeded, this is brought to the user’s attention both visually and audibly. The door overview provides the user with an immediate overview of the status of the doors to be measured and those already measured. A tick is displayed if the door is OK. A red cross appears if a limit value has been exceeded.

An advantage of our software is that a measuring process that has been started can be interrupted and restarted later.

This enables the user to flexibly organise his work and time.

Special Measurement 1 (Option1) 
- for doors with a repeating closing process.

This enables measurement of the closing force of a door according to DIN EN 14752 standard for doors with repeating closing process. Special Measurement 1 is designed for a closing process which consists of several measuring sections.

The highest value of the peak forces occurring in all measuring sections is recorded and displayed. The effective value of each measuring section is determined and the average is formed.

Maximum Values:
- Peak force \( F_p \) 350N
- Effective force (1)\( Fe \) 350N
- Effective force (2)\( FE \) 350N

Measuring range: 30 to 350N

Measuring accuracy: \( \pm 3 \% \) of the measured value within the range from 50 to 350N

The Psion Workabout Pro C provides storage capacity for more than 1,000 vehicle measurements of 26 doors, up to 3 measuring points (with 3 measurements per measuring point). At the end of each measuring process a detailed measurement log is created which can be retrieved immediately on the Psion Workabout Pro C and can be transferred to a PC in PDF, Excel or MDB database format.
Optional: Special Measurement 2
- for doors with temporary force impulse at the beginning of the closing process.

This works in relation to temporary force impulse (overriding and dropping below the minimum force height of 50N) at the beginning of closing process - according to DIN EN 14752 standard. It allows a door closing measurement with a variable time period (tx) at which dropping below the minimum force of 50N will not be taken. The initial force impulse, e.g. that caused by a rubber edge of the door, does not cause a measurement to abort.

This Special Measurement 2, based also on DIN EN 14752, can be selected in the menu of the Psion Workabout Pro C software and can be assigned to the appropriate type of vehicle / door. Additionally, in the metrology record “Special Measurement 2” is registered.
Product overview:

Load cell technical data:
- Weight: c.1500 g
- Dimensions: outer diameter 100 mm, width 115 mm
- Effective range: 30N up to 350N
- Accuracy: ±3 % of measured value at the range from 50N to 350N
- Enhance operating temperature range of (OTR) DIN 14752 standard

Psion Workabout Pro C technical data:
- Weight: c.455 g
- Colour Touchscreen Display
- Processor: 400 Mhz Intel Xscale
- Memory: 128 MB FlashROM, 128 MB RAM, 2 GB SD-Card
- Operating system: Microsoft Windows CE 5.0
- Protection class IP 65 – can withstand multiple drops onto smooth concrete surfaces from 1.5 metres
- Protective bag (with shoulderbelt and belt clip) included

CFM - Closing Force Monitor delivery package

Weight: c.5 kg with Docking Station

Scope of delivery:
- Load Cell
- Connecting cable
- USB transfer cable from tabletop station to the PC
- Tabletop station / docking station with A/C-adaptor for charging the battery as well as for data transfer
- User manual for Psion Workabout Pro C and tabletop station/docking station
- Closing Force Monitor user manual
- Enclosed “Administrator Information” sheet
- Psion Workabout Pro C with rechargeable battery and 2 GB SD memory card
- Installation CD with Closing Force Monitor DataManager software (Detailed instruction manual for the software on CD)
- Case for Load Cell and Psion Workabout Pro C

(Load Cell and Psion Workabout Pro C are available separately if required.)