Product Information

Door closing force measurement device
Type: HGE-DC700NBT

According to: EN 14752:2020/2022

Your advantage:

- **Meets all requirements of the standard EN 14752:2020/2022**
- Compact force sensor with only approx. 1.9 kg weight
- No laptop required for the measurement, the measuring protocol can be viewed directly on the handheld display
- Operation and entry of the signature via touchscreen display
- Memory for up to 1,000 vehicle measurements
- Allows input of tester name, job number, vehicle number, vehicle running performance (mileage), notes, door name and door type with the corresponding limit values
- Special measurement mode for doors with an temporary force impulse at the beginning of closing process
- Multiple usage of the handheld computer for further HGE measuring devices
- The device includes spacers and accessories fit into a handy case approx. (52 x 42 x19 cm)
- Simplified row measurement of doors possible

Content

Version 12/23

Door closing force measurement device
Type HGE-DC700N

The door closing force measuring device type **HGE-DC700NBT** is an outstanding instrument for the measurement and evaluation of the closing force of railway-, tram- and bus doors. The measuring device was constructed according to **EN 14752:2020/2022**. This applies to side entrance systems for rolling stock of all new constructed railways and existing vehicles with modernized door systems.

The comprehensive measurement system consists of a handheld computer **Zebra TC 21** with measurement software and carrying case, a charging station for transmitting the data to the computer, the closing force sensor with a measuring range up to 700 N and defined spacers to be able to measure at different door opening widths. The data can be transferred using the evaluation software HGE-DataManager © on the computer.

The simple constructed measurement software guides the user systematically through the measurement process. The results are displayed directly after a measurement on the handheld computer.

In addition to the actual measurement mode according to the standard, we are able to provide a special measurement for doors with temporary impulse force at the beginning of closing process based on the EN 14752: 2020/2022.

The door-closing force measuring device meets all the requirements on the measurement of door closing forces. With the simple operation combined with precise measurements, the verification process can be carried out quickly and easily. Our approach also has the advantage that additional gauges from HGE can be operated with the same hand computer **Zebra TC 21**. For example, the door-closing force measurement according to EN 14752:2005. Thus, only one hand computer is needed for a variety of measuring equipment, which reduces the expenses.

The measuring program

The measuring process is quick and uncomplicated. The measured data are recorded immediately and are displayed visually on the handheld computer Zebra TC 21.
The menu guidance of the handheld computer Zebra TC 21 software has consciously been kept simple in order to allow the user a fast and simple operation.

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 the corresponding limit values.
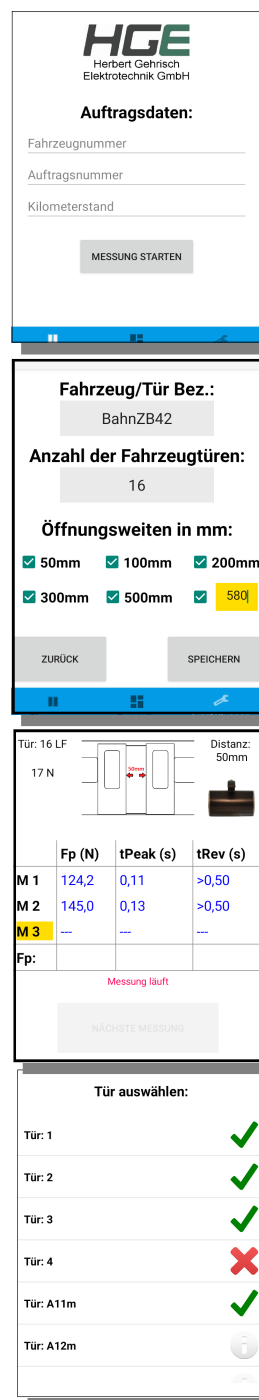
The measuring process provides information about the time period of the door closing process, the measured peak force and the time period from the door opening process to the next closing process. If the preset limit value is exceeded, this will be indicated to the user - both visually and acoustically. The door overview provides an immediate overview of the status of the doors to be measured and of 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 organize his work and time.

The handheld computer Zebra TC 21
provides storage capacity for more than 1.000 vehicle measurements of 32 doors.
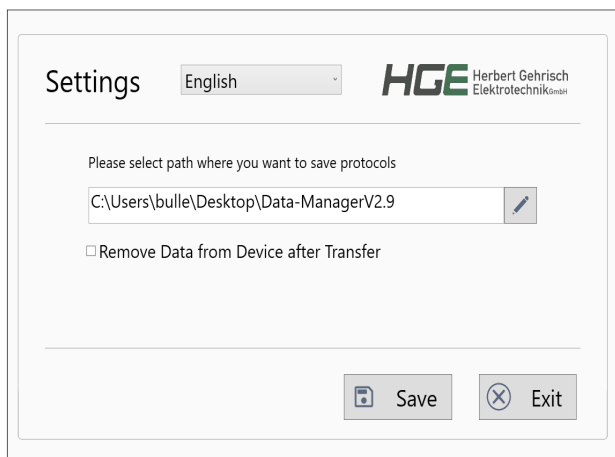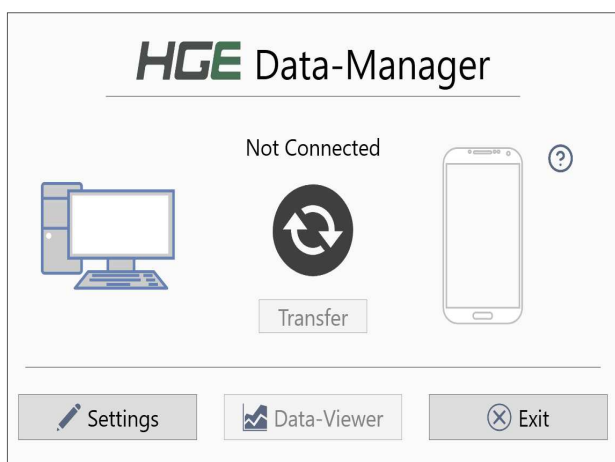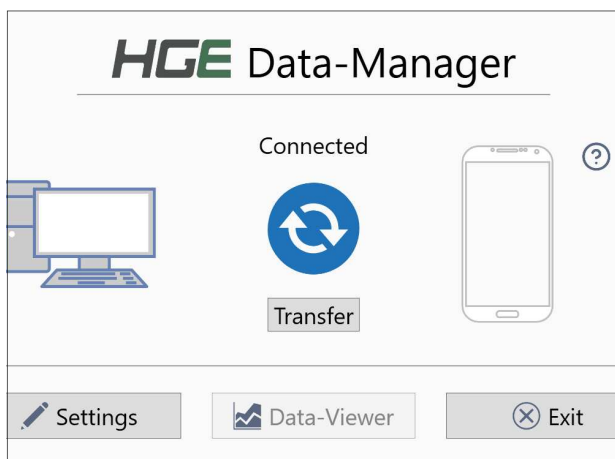
The HGE DataManager ©

At the end of each measuring process a detailed measuring log is created, which can be retrieved immediately on the handheld computer. The log can be signed by the inspector for a definite identification.

Auftragsdaten:

Fahrzeugnummer

Auftragsnummer

Kilometerstand

MESSUNG STARTEN

Fahrzeug/Tür Bez.:
BahnZB42

Anzahl der Fahrzeugtüren:
16

Öffnungsweiten in mm:

☑ 50mm ☑ 100mm ☑ 200mm
☑ 300mm ☑ 500mm ☑ 580

ZURÜCK   SPEICHERN

Tür: 16 LF   Distanz: 50mm
17 N

	Fp (N)	tPeak (s)	tRev (s)
M 1	124,2	0,11	>0,50
M 2	145,0	0,13	>0,50
M 3	---	---	---
Fp:			

Messung läuft

NÄCHSTE MESSUNG

Tür auswählen:

Tür: 1   ✓
Tür: 2   ✓
Tür: 3   ✓
Tür: 4   ✗
Tür: A11m   ✓
Tür: A12m   ⓘ

Measuring log CFM (all sizes in mm)

Herbert Gehrisch Elektrotechnik GmbH

Vehicle No.	Job No.	Serial:	Place:	Date:	Time:	Inspector:
132	64	TM 19	sk6	16.06.2010	15:37:30	Service
Milage	35		Vehicle-State:	o.k.		

Vehicle Note: 55534442

Limit values in N:	Fp(50)	400	Fp(100)	300	Fp(200)	300	Fp(300)	400	Fp(500)	4000	Fp(x)	400	

Closing force measurement:

Door nr.:1:	50mm		100mm		200mm		300mm		500m		custom mm		
Measurement 1	85.76		85.88		86.22		79.17		69.37		74.62		Force Fp
	0.17	0.50	0.20	0.50	0.25	0.50	0.21	0.50	0.16	0.50	0.17	0.50	tMess tRev
Measurement 2	94.05		90.54		94.80		86.07		76.43		65.42		Force Fp
	0.23	0.50	0.19	0.50	0.17	0.50	0.19	0.50	0.12	0.50	0.16	0.50	tMess tRev
Measurement 3	93.65		85.51		82.68		99.82		91.99		108.71		Force Fp
	0.17	0.50	0.17	0.50	0.17	0.50	0.23	0.50	0.23	0.50	0.34	0.50	tMess tRev
Average:	85.76		85.88		86.22		79.17		69.37		74.62		
Door state	i.O.												

Legend: [xx,xx] = Limitting value is overrun or underrun | *xx,xx* = measuring range exceeded

The **HGE**-*DataManager* © software for the door closing force measuring device offers a simple and fast data transfer from the handheld computer Zebra TC 21 to the user's PC. A choice of several formats is available for storing the measured data (PDF, Excel). The measured data are going to be displayed in the form of a closing force graph for a improved analysis.

User interface of **HGE**-*DataManager* ©

View of measurement log of PDF-Format
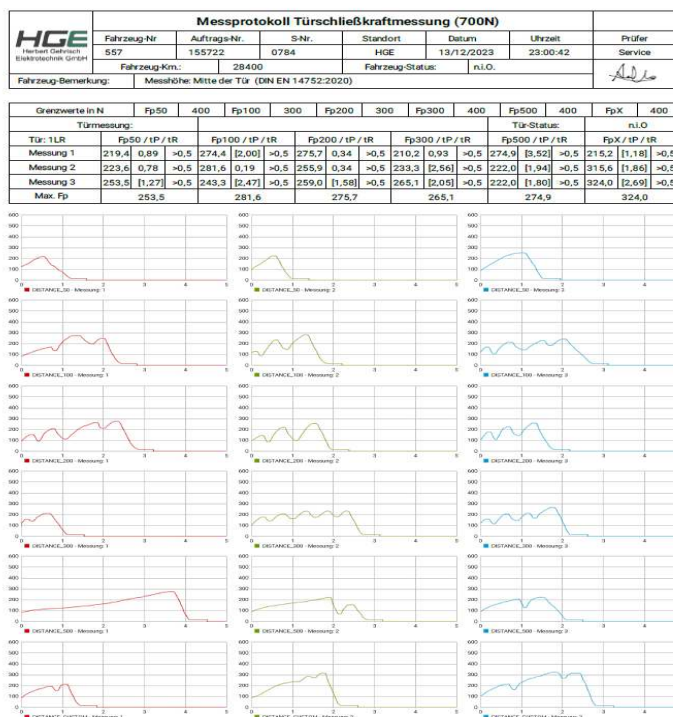
The Data Manager automatically displays the connection status of the handheld computer and offers an easy way to transfer and manage your measurement protocols.
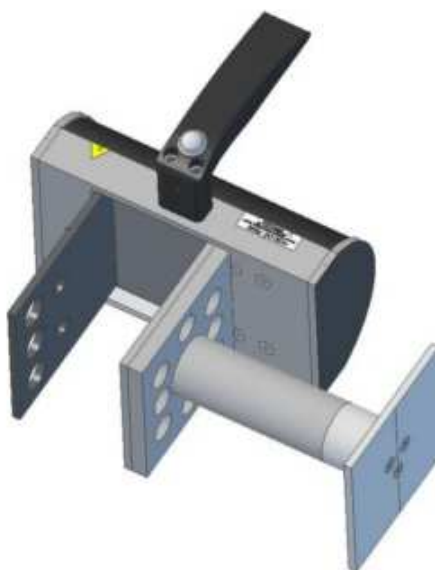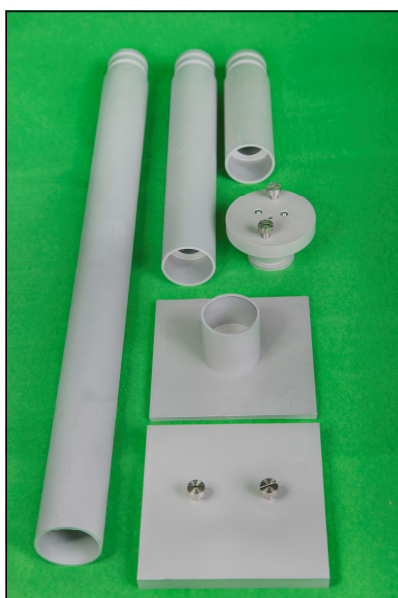
The Spacers

According to the standard EN 14752: 2020/2022, the force transducer is only measured with defined spacers for different door openings.

The measuring point of the closing force is located at mid-height between the main closing edges of the door. The peak force has to be measured at the door opening widths of 50, 100, 200, 300 and 500 mm and another measuring point at which the greatest force is expected . The spacers are secured with a quick-release on the device.
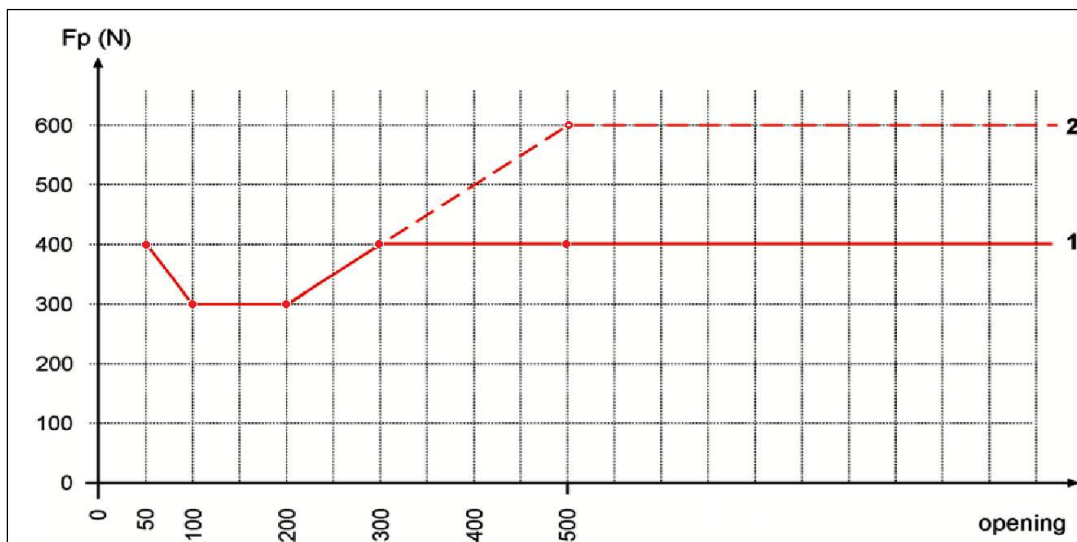
Graph with the maximum allowable forces as a function of the door opening. The higher level of force (2) is aligned with very high traffic densities. Based on the general security concept, the operator must specify the force level in the technical specification.


Spacers for different door openings with quick-release for a fast and safe adaptation (opening widths: 50, 100, 200, 300, and 500 mm according the standard). Additional opening widths can be ordered individually.

The closing force measurement according to EN 14752: 2020

The measuring range of the door-closing force measurement is **50 N** up to **700 N**. Via software the force level 1 or 2 of each door (Max. 400 N or 600 N for high traffic densities) can be set. The measurement accuracy is at forces of 50 N to 100 N ± 3 N, at forces above 100 N ± 3% of the measured reading.

The diagram below shows all the measurement data of the normative measurement. The closing process is represented here by the force F [N] over time t [s]. The measured values are the peak force (Fpeak), the duration of the closing process (tpeak) and the duration of the door opening to re-close (trev).
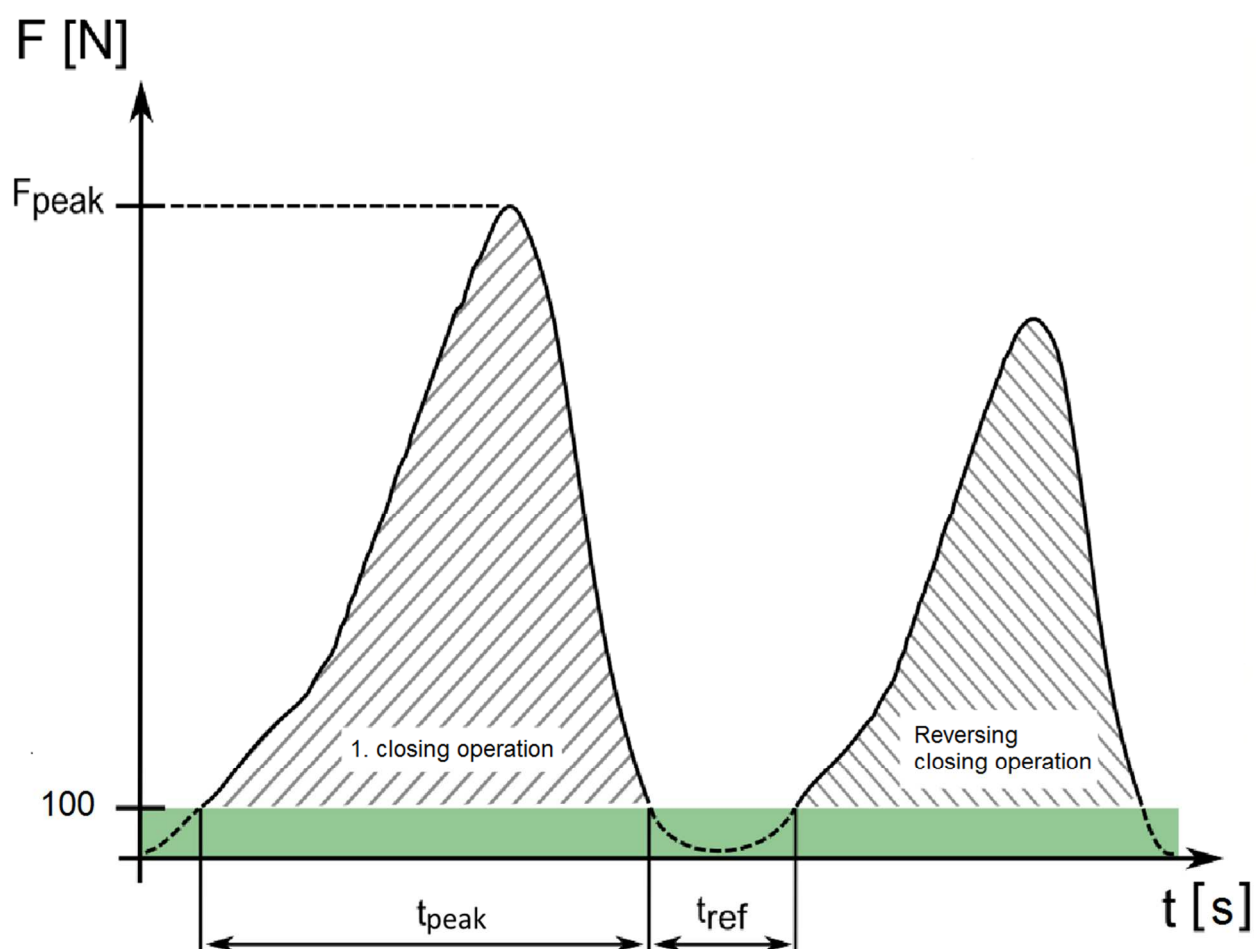
The closing process according EN 14752:2020

Special measurement - for doors with temporary force impulse at the beginning of closing

Special measurement with a temporary force impulse (Overriding- and dropping below the minimum force of 50N) at the beginning of the closing process - similar to **EN 14752:2020/2022.**
The special measurement allows a door closing measurement in which the lower deviation of the 100 N limit will not be taken into consideration regarding the variable time periode tx. The initial force impulse e.g. caused by a rubber edge of the door does not lead to an abort of measurement.
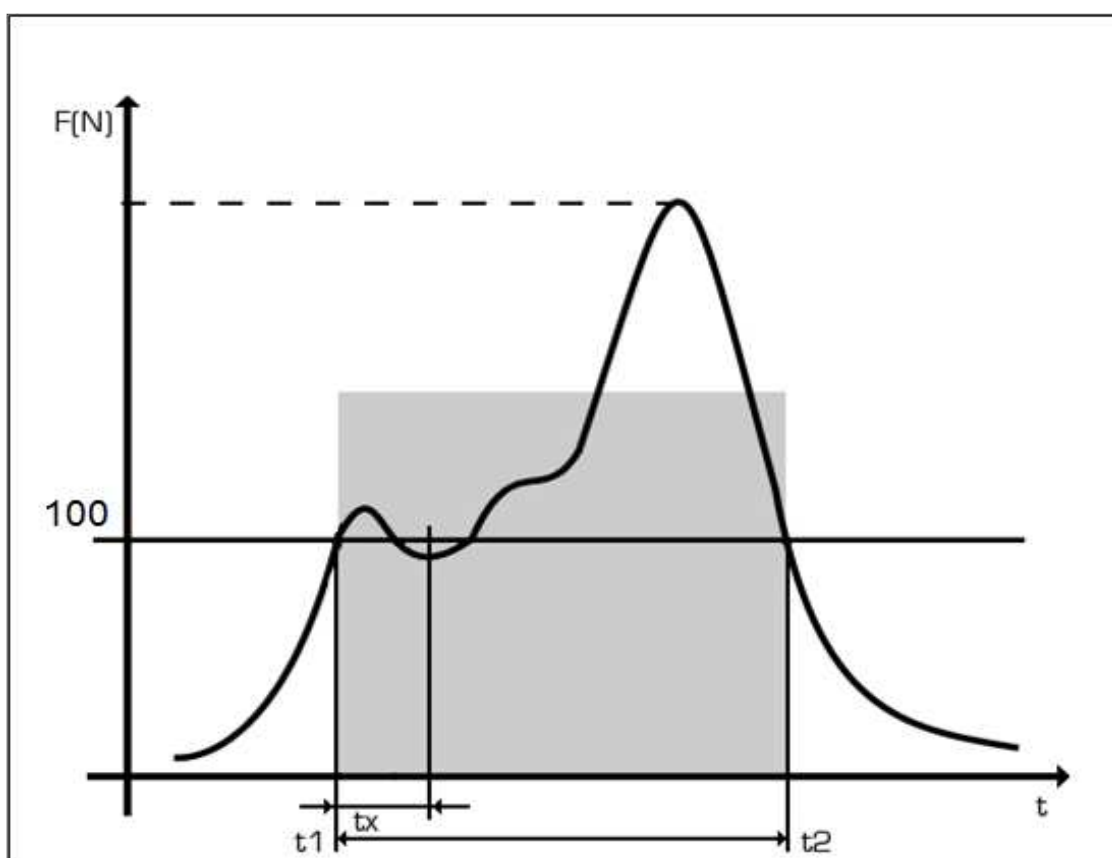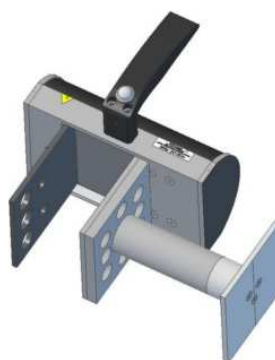

Figure: Force impulse at the beginning of a closing process

This special measurement is similar to the **EN 14752:20202022** and can be selected in the menu of the handheld software and can be assigned to the appropriate type of vehicle/door. In the vehicle remarks of the measurement log, the hint "special measurement" is registered.

Product overview: Door closing force measurement DC700NBT according to EN 14752:2020/2022

Load cell	
Load cell material:	Plastic, Aluminium, Carbon, Steel
Weight of the load cell:	Approx. 1.9 kg
Measuring range:	50 to 700N Force level 1: Standard doors (Max. 400 N) Force level 2: for high traffic density (Max 600 N)
Measuring accuracy:	Forces 50 N up to 100 N: ± 3 N Forces higher than 100 N: ± 3 % from value
Spring Stiffness (compression spring):	10 ± 0,2 N/mm
Measuring values:	Peak force (Fpeak), Duration of closing procedure (tpeak), Time until the door reverses (trev)
Gap width:	80 mm according to EN 14752:2020/2022
Dimensions:	190 x 110 x 167 mm, Initiation Area 100 x 100 x 5 mm
Operating temperature range:	+ 10°C to + 30°C
Handheld Computer	
Operating time:	Without charging the battery in normal operation approx. 8 hours
Weight:	Approx. 263g
Memory:	32 GB internal
Display:	5 inch HD-Touchscreen
Protection class **IP 67** – can withstand multiple drops onto smooth concrete surfaces from 1.5 meters - with a protective bag, protection against dust and short term submersion - with Shoulderbelt and belt clip.	

HGE-Door closing force measurement device with case

Weight approx. 10 Kg, Guarantee 2 Years

Scope of delivery:
- Handheld computer Zebra TC 21 including Battery and protection bag
- Load cell DC700NBT, Special measurement mode
- Spacer for different doorways according to EN 14752:2020/2022
- Optional: Tabletop station/docking station with A/C-adapter for charging the battery as well as for data transfer
- USB transfer cable from tabletop station to the PC
- User manual for handheld computer Zebra TC 21 and tabletop station/docking station
- "Door closing force measurement device" user manual
- Enclosed sheet: "Administrator Information"
- Installation-USB-Stick with the HGE DataManager software
- Company calibration document

Further Product: **Door closing force measurement DC360N according to EN 14752:2005**

Load cell	
Load cell material:	Glass fiber-reinforced plastic / aluminium
Weight of the load cell:	Approx. 1.4 kg
Measuring range:	30 to 360N
Measuring accuracy:	± 3% of measuring value at the range from 50 to 360N
Spring Stiffness (compression spring):	10 ± 0,2 N/mm
Diameter:	100 mm
Gap width:	115 mm
Dimensions:	115 mm x 126 mm x 288 mm
Operating temperature range:	+ 10°C to + 30°C
Handheld Computer	
Operating time:	Without charging the battery in normal operation approx. 8 hours
Weight:	Approx. 455 g
Memory:	4 GB SD-Card
Display:	Colour-Touchscreen Display
Protection class **IP 65** – can withstand multiple drops onto smooth concrete surfaces from 1.5 meters - with a protective bag with Shoulderbelt and belt clip.	

HGE-Door closing force measurement device with case

Weight approx. 7 Kg, Guarantee 2 Years

Scope of delivery:
- Handheld computer PSION WORKABOUT including Battery, 4 GB SD memory card and protection bag
- Load cell DC3600N, Special measurement mode
- Connecting cable
- Tabletop station/docking station with A/C-adapter for charging the battery as well as for data transfer
- USB transfer cable from tabletop station to the PC
- User manual for handheld computer PSION WORKABOUT and tabletop station/docking station
- "Door closing force measurement device" user manual
- Enclosed sheet: "Administrator Information"
- USB Stick with the HGE DataManager software
- Company calibration document

Optionally to the door closing force measurement:

Set of measurement rods DIN EN 14752 and VDV 111/ VDV 157 inclusive spring balance with calibrating service

Measurement rods according to DIN EN 14752 and VDV 111 /VDV 157 to meet the requirements in the test sequence of clo- sing force measurement.

- Measurement rod 1 to review the pinch protection on doors (10mm x 50mm)

- Measurement rod 2 to review the pinch protection on doors (30mm x 60mm)

- Measurement rod 3 to review the trapping detection on doors

- Spring balance, measuring range up to 200N

- Measurement rod 4 for verification of power -operated steps

Measurement rod 1 (10 mm x 50 mm)
Measurement rod 2 (30 mm x 60 mm)
Measurement rod 3
Spring Balance
Measurement rod 4

Right image:

Measurement rod „Testing of area monitoring system" according DIN prEN 14752:2020, diameter 8 mm, length 300 mm, radiance 2% - 5% / > 90%

Case for measurement rods 1 to 3 with spring balance

- Special measurement rod (15 mm x 60 mm) on demand
- Special measurement rods DIN 18650 Automatic door systems type CA, CB and CC on demand

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