

# TGMmini

*get cardoorspeed in metres per second...*

*... in seconds*



- easy and fast to install
- all-in-one small device
- measures all doors, trunks, closures...
- very precise
- various data exports



The aim of a typical measurement sequence is to get the unique value of the slowest speed necessary for a safe closure of this specific car door

closing process	measured speed [m/s]	door condition	slowest speed closed [m/s]	fastest speed open [m/s]
1	0.65	open	-	0.65
2	0.72	open	-	0.72
3	1.03	closed	1.03	0.72
4	0.70	open	1.03	0.72
5	0.95	closed	0.95	0.72
6	0.85	closed	0.85	0.72
7	0.77	closed	0.77	0.72
<b>0.77m/s = is the slowest speed necessary for a safe closure of the measured car door</b>			delta between fastest speed open and slowest speed closed is below 0.10 m/s ( $0.77 - 0.72 = 0.05$ m/s)	

Use this unique slowest safe closure speed for:

- target value for quality control and end of line testing
- benchmarking, marketing and comparison
- duration and wear testing

- easy and fast to install



- use the included magnetic holder to directly put the TGMmini on the car body.
- use the ¼ UNC connection or the M5 thread to mount the TGMmini on any camera mounting system like vacuum suction cup, gooseneck, 3d-jointed arms or tripods.
- use any of these to install the TGMmini near (max 10mm distance) to the edge of the door, trunk, flap or any other closure or moving obstacle to get the speed shown directly on the LCD display.

- all-in-one small device

## Light and small

- 230 gramm | 80mm\*54mm\*42mm
- Powered by commercially available standard 9 Volt block battery
- Accus can be charged directly in the TGMmini
- Small energy consumption power for up to 20 hours

## Easy to use

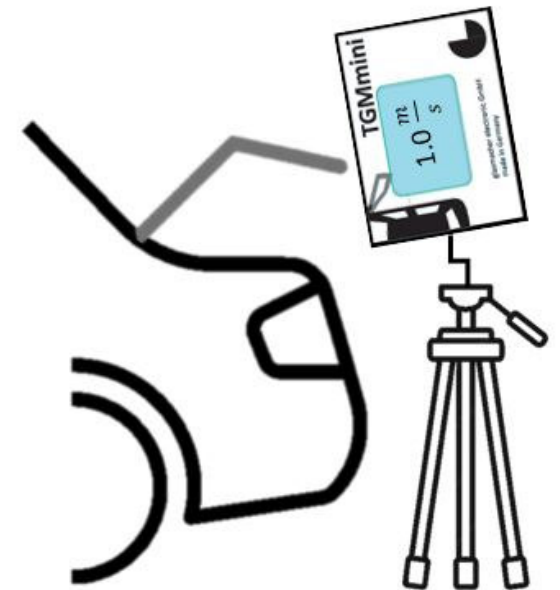
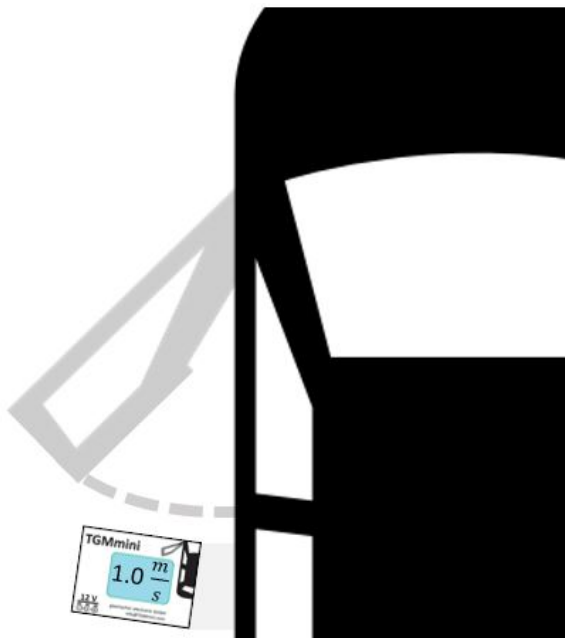
- Only one button
- Measurement result shown directly on the 4cm LCD Display
- Mishandling ruled out



- measures all doors, trunks, closures...

Use the TGMmini to measure any moving object

- Measures any ferromagnetic edge passing in a distance of max 10mm | use an included measuring edge for non ferromagnetic edges
- No counterpart on the moving object needed
- Independent of external conditions



• very precise

Allowed deviation and external proofed accuracy of  $\pm 0.05\text{m/s}$  with a very high repeatability

MESSMITTEL-FÄHIGKEITSENTSUCHUNG für TGM 5 Türschloß-Messgerät

Messgerät	TGM 5 Türschloß-Messgerät	X soll	0.604
Serien-Nummer		Toleranz T	0.003
Inventar-Nummer	123456	Einheit	m / sec
Firma		Messwert	Türschloß-Geschwindigkeit
Abteilung	ABC-12	Prüfer	Hans Schubert

n	Xn
1	0.604
2	0.604
3	0.604
4	0.604
5	0.604
6	0.604
7	0.604
8	0.604
9	0.604
10	0.604
11	0.604
12	0.605
13	0.604
14	0.604
15	0.604
16	0.604
17	0.604
18	0.604
19	0.604
20	0.604
21	0.604
22	0.604
23	0.604
24	0.604
25	0.605
26	0.604
27	0.604
28	0.604
29	0.604
30	0.604
31	0.604
32	0.604
33	0.604
34	0.604
35	0.604
36	0.604
37	0.604
38	0.604
39	0.604
40	0.604
41	0.604
42	0.604
43	0.604
44	0.604
45	0.604
46	0.604
47	0.604
48	0.604
49	0.604
50	0.604

n	50	R	0.001
X <sub>quer</sub>	0.60404	S	0.0002
X <sub>max</sub>	0.605	4 x S	0.0008
X <sub>min</sub>	0.604		



C <sub>q</sub>	$= \frac{0,2 \times T}{4 \times S}$	12.630
C <sub>pk1</sub>	$= \frac{(X_{\text{soll}} - 0,1 \times T) - X_{\text{quer}}}{2 \times S}$	12.628
C <sub>pk2</sub>	$= \frac{X_{\text{quer}} - (X_{\text{soll}} - 0,1 \times T)}{2 \times S}$	12.731
C <sub>pk</sub>	Der kleinste Wert von C <sub>pk1</sub> und C <sub>pk2</sub> ist der Wert C <sub>pk</sub> (Mindestforderung C <sub>q</sub> , C <sub>pk</sub> ≥ 1,33)	12.628

Beurteilung:  zufriedenstellend  
 nicht zufriedenstellend

Stempel:

Datum: 30. Mai 2023 Unterschrift:

Calibration certificate-No. XX/XX-X dated DD.MM.YYYY Page 1 of 2

Calibration certificate

Calibration certificate-No. XX/XX-X

Artikel:	Doorclosingmeter
Producer:	glasmacher electronic GmbH, 58802 Balve, GER
Version:	TGM X
Serial-Number:	XXXXX
Inventory number:	Only if known
Number of pages of the calibration certificate:	2
Date of calibration:	DD.MM.YYYY
Owner:	Company name of the TGM owner

This calibration certificate may only be circulated completely and unchanged. Extracts and changes require the approval of the issuing company.

This english calibration certificate is only for translation. Only the german certificate is valid.

Calibration certificates without signature and stamp are not valid. This blank translation is not a valid certificate.

Company Stamp	Date of issue	Head of calibration lab	Processor
	DD, MM, YY		



Kalibrier-Zertifikat Calibration certificate

4824133

Messeinrichtungen Measuring equipment

Index	Referenz Reference	Rückführung Traceability	Rekal. Next cal.	Zertifikat-Nr. Certificate-no.	Eq.-Nr. Eq.-no.
a	Universal Counter HP 5334B Universal Counter HP 5334B	15070-01-01 2022-10	2023-10	E216066	10288056

Referenzzertifikate sind auf [www.primasonline.com](http://www.primasonline.com) abrufbar Reference certificates are available at [www.primasonline.com](http://www.primasonline.com)

Umgebungsbedingungen Ambient conditions

Temperatur Temperature (20...26) °C Feuchte Humidity (20...70) % rF % RH

Messverfahren Measuring procedure

Die Kalibrierung erfolgte durch Direktmessung mit einem optischen Drehzahlmessgerät. An der Welle wurde eine Reflexmarke angebracht.

Calibration was done by direct measurement with an optical speed measuring device. A reflex mark was attached to the shaft.

Messergebnisse Measuring results

Kanal Channel ---

Bezugswert Reference value	Angezeigter Messwert Indicated measured value probe	Abweichung Deviation	Zulässige Abweichung <sup>2)</sup> Allowed deviation <sup>2)</sup>	Messunsicherheit (k=2) Measurement uncertainty (k=2)	Bewertung Confirmation
1/s	1/s	1/s	1/s	1/s	
0,600 <sup>a</sup>	0,62	0,020	± 0,05	0,013	pass
0,800 <sup>a</sup>	0,83	0,030	± 0,05	0,013	pass
1,000 <sup>a</sup>	1,02	0,020	± 0,05	0,013	pass
1,200 <sup>a</sup>	1,21	0,010	± 0,05	0,013	pass

<sup>2)</sup> gemäß Kunde in accordance with the customer

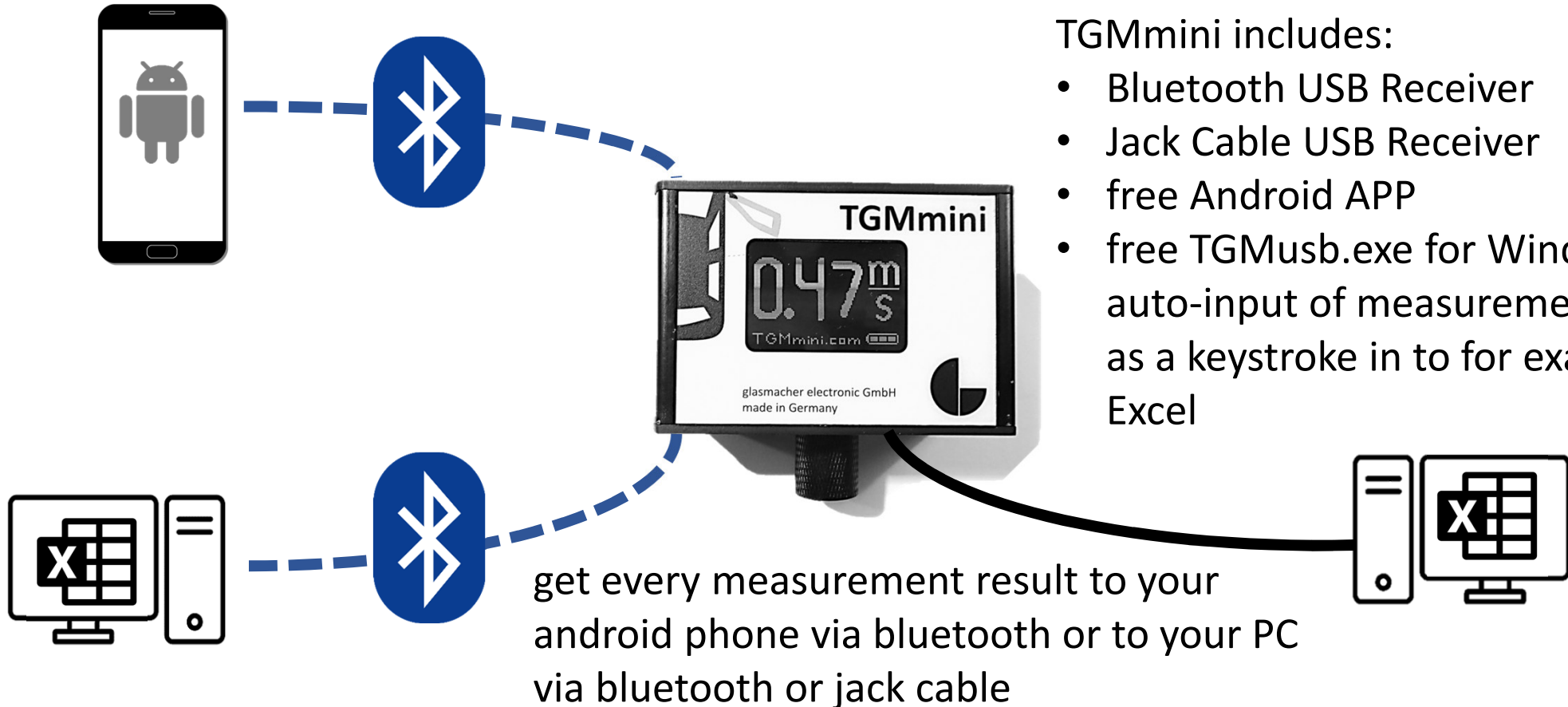
Besondere Bemerkungen Special remarks

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- easy data export

TGMmini includes:

- Bluetooth USB Receiver
- Jack Cable USB Receiver
- free Android APP
- free TGMusb.exe for Windows for auto-input of measurement result as a keystroke in to for example Excel





- **datasheet**

Processor:	TI MSP G2955
Program/Data memory:	56 kB / 4 kB
Operating voltage:	3,3 V= / 5 V=
Current consumption:	ca. 15 mA
Accumulator:	9 V Block
Type:	Ansmann 300
Voltage:	8,4 V=
Capacity:	300 mAh
Charging current:	30 mA (16 hours)
Power adapter:	100 – 230 V~ / 12 V=
Temperature range:	-10 – 70 °C
Size:	42mm*54mm*80mm
Weight (incl. Accu):	230g

Measurement range:	0.13...5.00 m/s		
Measurement tolerance:	+/- 0,05 m/s		
Section of measurement:	55 mm		
Measurement frequency:	1 MHz		
Door speed v [m/s]	0,13	1,00	5,00
Measurement time t [s]	0,423	0,05	0,011
Resolution +/- Δv [m/s]	0,01	0,01	0,01
Δt [μs]	4230	550	110
max. distance between sensor and edge:	10 mm		
Display:	3 digit LED 25mm*35mm		
Display unit:	m/s		