# **PEGASEM P300 Series**

#### Test Unit for Vehicle Brake and Acceleration Performance



### P340 / P330 / P320

The PEGASEM P300 Series has been developed for brake and acceleration performance tests of vehicles using a 5<sup>th</sup> Wheel or other sensors which create distance pulses. Besides its basic function as a control unit, the P300 System incorporates data acquisition capabilities, sensor preamplifiers and a sensor power supply.

Data can be transferred and stored on a mobile PC via a USB interface. The MS–Windows<sup>®</sup> software calculates all necessary information to carry out brake

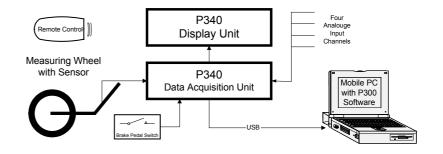


tests according to various international regulations. Results are displayed in tabular and graphic format immediately after the vehicle stops. Data can be further examined using standard software packages (e.g. MS-Excel<sup>®</sup>). The PEGASEM P340 coupled with the PEGASEM 5<sup>th</sup> Wheel form a flexible and competitively priced system for approval and homologation tests e.g. per

- ECE-R13 Approval Of Vehicles With Regard To Braking
- ECE-R89 Speed Limiting Devices (SLD / ASLD)
- ECE-R90 Replacement Brake Lining Assemblies
- DIN70028 Measuring The Stopping Distance With ABS
- FMVSS121 Air Brake Systems
- FMVSS135 Light Vehicle Brake Systems

# Components of the P340 Brake Tester

- Data Acquisition Box
- Windows software for brake testing of vehicles
- Driver Display Unit
- Remote Control Unit
- Brake Pedal Switch



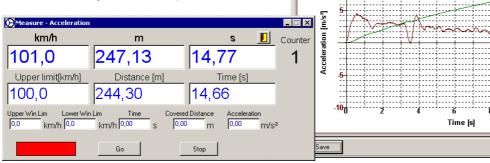
#### Features

- Pulse-based Speed Input Channel for connection to any speed pulse transducer e.g. a 5<sup>th</sup> Wheel
- 4 Analogue Channels with differential inputs
- Full Scale Input Range from ± 20V to ± 20mV
- Software controlled input amplifiers
- 5V and 12V Sensor supply
- Supported sensors include voltage output type sensors, current loop sensors, pressure sensors, force sensors, acceleration sensors and temperature sensors.
  - Brake Measurement can be triggered by either:
    - External brake pedal switch
    - o Vehicle stop lights
    - PEGASEM brake pedal force transducer
    - Software controlled trigger level on any of the 4 analogue input channels

# **Operating Modes**

# **Acceleration and Flexibility Test**

Time, distance and average acceleration are measured from zero to a pre-selected speed. If the starting speed is selected as a non-zero value, a flexibility test can be performed.



ent results

Graph Result Data Summary

10

### **Deceleration Test**

Measurement Results

This mode is suitable for brake, tyre, and coast down tests. Initial speed, stopping distance, stopping time and Mean Fully Developed Deceleration (MFDD) are recorded over the full braking cycle and simultaneously between two selectable speed windows. Measurement is triggered manually, by the stoplights, by reaching a trigger level on one of the analogue channels or by a brake pedal switch which is included with the system.

🕃 Measure - De	celeración					
km/h		m		S	Οοι	Inter
0,0		31,16	2	2,81		2
Start [kn	n/h]	Upper limi	t [km/h]	Lower limit [	[km/h]	
71,9		60,0		5,0		
Jpper Win Lim	Lower Win L		Covered Dis		eration	
<sup>0,0</sup> km/	h 0,0	km/h 0,00	s 0,00	m 0,00	m/s²	
		Go	S	itop		
Measurement R	tesults					
			)eceleration			
			)eceleration			
Graph Result Da			Deceleration	a_sm	8	-
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Graph Result Da 2,37 2,38 2,39 2,40 2,41 2,42	ta Summary v 12,73 12,07 11,82 11,63 11,15	v_sm   12,63   12,29   11,94   11,62   11,30	a 9,22 9,60 9,46 9,13 8,74	8,79 9,01 9,01 9,04 9,08	30,474 30,507 30,540 30,572 30,603	· · · · · · · · · · · · · · · · · · ·
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Graph Result Da   2,37 2,38 2,39   2,39 2,40 2,41   2,42 2,43 2,44   2,46 2,46 2,46	ta Summary v 12,73 12,07 11,82 11,63 11,15 11,06 10,55 10,42 10,00 65 5	v_sm   12,63   12,29   11,94   11,62   11,30   10,97   10,61   10,28   9,94   9,57	a   9,22   9,60   9,46   9,13   8,74   9,10   10,01   9,13   4,76   10,22	8,79 9,01 9,01 9,04 9,08 9,08 9,08 9,11 8,88 8,86 8,86 8,86	30,474 30,507 30,540 30,572 30,603 30,646 30,675 30,703 30,759 30,772	
Graph Result Da t 2,37 2,38 2,39 2,40 2,41 2,42 2,43 2,44 2,44 2,46	v 12,73 12,07 11,82 11,82 11,63 11,15 10,55 10,42 10,55 10,42 10,00 65 24	v_sm   12,63   12,29   11,94   11,62   11,30   10,97   10,61   10,28   9,94   9,57   9,16	a   9,22   9,60   9,46   9,13   8,74   9,10   10,01   9,13   4,76   10,22   11,38	8,79 9,01 9,01 9,04 9,08 9,08 9,11 8,88 8,86 8,86 8,86 9,06	30,474 30,507 30,540 30,572 30,603 30,646 30,675 30,703 30,759 30,772 30,798	
Graph Result Da   2,37 2,38 2,39   2,39 2,40 2,41   2,42 2,43 2,44   2,46 2,46 2,46	Summary   12,73   12,07   11,82   11,63   11,15   11,06   10,55   10,42   10,00   24   84	v_sm   12,63   12,29   11,94   11,62   11,30   10,97   10,61   10,28   9,94   9,57   9,16   8,83	a   9,22   9,60   9,46   9,13   8,74   9,10   10,01   9,13   4,76   10,22   11,38   9,25	8,79 9,01 9,01 9,04 9,08 9,08 9,08 9,11 8,88 8,86 8,86 8,86 9,06 9,02	30,474 30,507 30,540 30,572 30,603 30,646 30,675 30,703 30,759 30,772 30,798 30,822	

Acceleration

TestAc001 10.05.2002 11:05:17

120 100

80 60

40

0 [km/h] .20

40

-60 -80

-100 -120

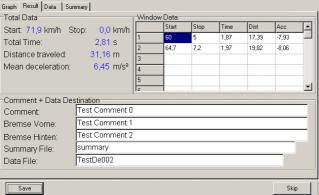
4 0.4

Speed 20

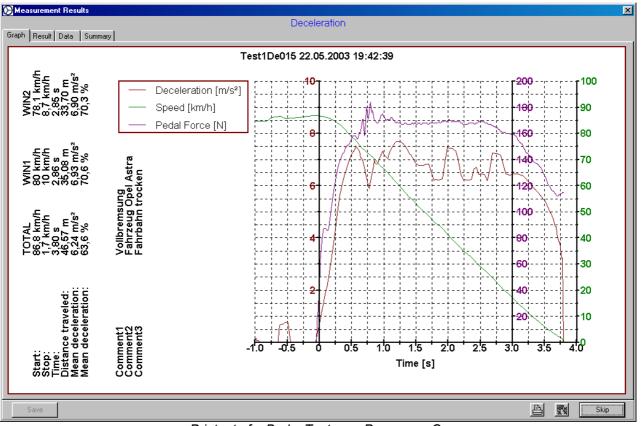
Skip

The MFDD is calculated in accordance to procedure ECE-R13 and ECE-R90 using the following formula:

$$d_m = \frac{{v_b}^2 - {v_e}^2}{25.92 \cdot (s - s_r)}$$



Deceleration



Printout of a Brake Test on a Passenger Car

### **Combined Acceleration and Deceleration Test**

After performing an acceleration test from zero and reaching a predefined speed, a brake test will be executed immediately during the same test run.

### Fade Test (Hot Brake Test)

∑Measure - Fading km/h

Start [km/h]

km/h 7,0

0,0

69,9

56,0

Upper Win Lim

In this mode, before the final deceleration test is carried out, several repetitive brake cycles have to be performed within a given time frame to warm up the brake system. The P300 System automatically records every cycle as described in the section: *Deceleration Test*, and guides the user through the sequence by visible and audible signals. The selectable test schedule, the automatic speed trigger and the audible feedback allow the driver to concentrate on the road, performing the runs without help from a second person.

24,60

56,0

km/h 1,58

Go

Lower Win Lim

m

Upper limit [km/h]

Time

s

	Prading Secup				티비스				
ام	Fading Parameters								
d e		✓ Fixed		□ Variable					
e	Upper limit:	60_	 km/h	90_					
s n	Lower limit:	30_	km/h	10_	%				
y st	Trigger:	65_	km/h						
e	Number of Brake Cycles: 20 💌								
d,	Additional final measurement								
	Final Measurement Parameters								
	Upper limit:	Fixed 60_	km/h	Variable 80_	- %				
_	Lower limit:	30_	km/h	10_	%				
S	Trigger:	65_	km/h						
			🗸 🗸 OK		Cancel				
mit [km/h] Cycle									
4									
Dece 8,66		Cyc. 4							

,46

Lower li

7.0

m

Stop

**Covered Distance** 

13,67

### Wheel Size Calibration

The wheel size is calculated automatically by driving along a test track with a known length. This data is stored for future measurements.

An optionally available light barrier, with two stationary reflectors at the roadside, will conveniently recalibrate the wheel when the vehicle passes the reflectors.

# **Exporting Data to MS-Excel<sup>®</sup>**

All data is sampled 100 times per second and recorded by the P300 software in tabular format. Spreadsheet programs such as MS Excel® and other data analysing software can import this data. This gives the user access to all test details and calculated test results for further processing according to their specific requirements. Examples for post processing include statistical comparisons of test runs, and data links to customised documentation forms.

### **Special Versions**

#### P330

Offers all functions as described above but without Analogue Inputs. The P330 is designed for measuring distance, speed, deceleration, acceleration and derived values.

#### P320

Same as P330 but excludes the Driver Display and Remote Control Unit. The laptop screen is used for displaying all information.

#### **Accessories**

#### **Measuring Wheels**

- 5<sup>th</sup> Wheel Standard 20"
- 5<sup>th</sup> Wheel Eco 20"
- 5<sup>th</sup> Wheel 12"
- 5<sup>th</sup> Wheel Mini 6"

#### FMS Universal 5<sup>th</sup> Wheel Mounting System

- Mounting Set for towing lugs used on passenger vehicles
- Clamp for the ball shaped trailer hitch
- Flange adapter for trucks
- Rod and tube adapter
- Clamping Adapter for the 2" receiver on US vehicles
- H-Adapter with suction cups
- H-Adapter with magnets

#### Miscellaneous

- Interface cable (5m, 10m or 20m) to connect 5<sup>th</sup> Wheel Sensor to P3xx
- Pedal Force Sensor PFS1000
- Reflective Light Barrier