Basic Brake Test

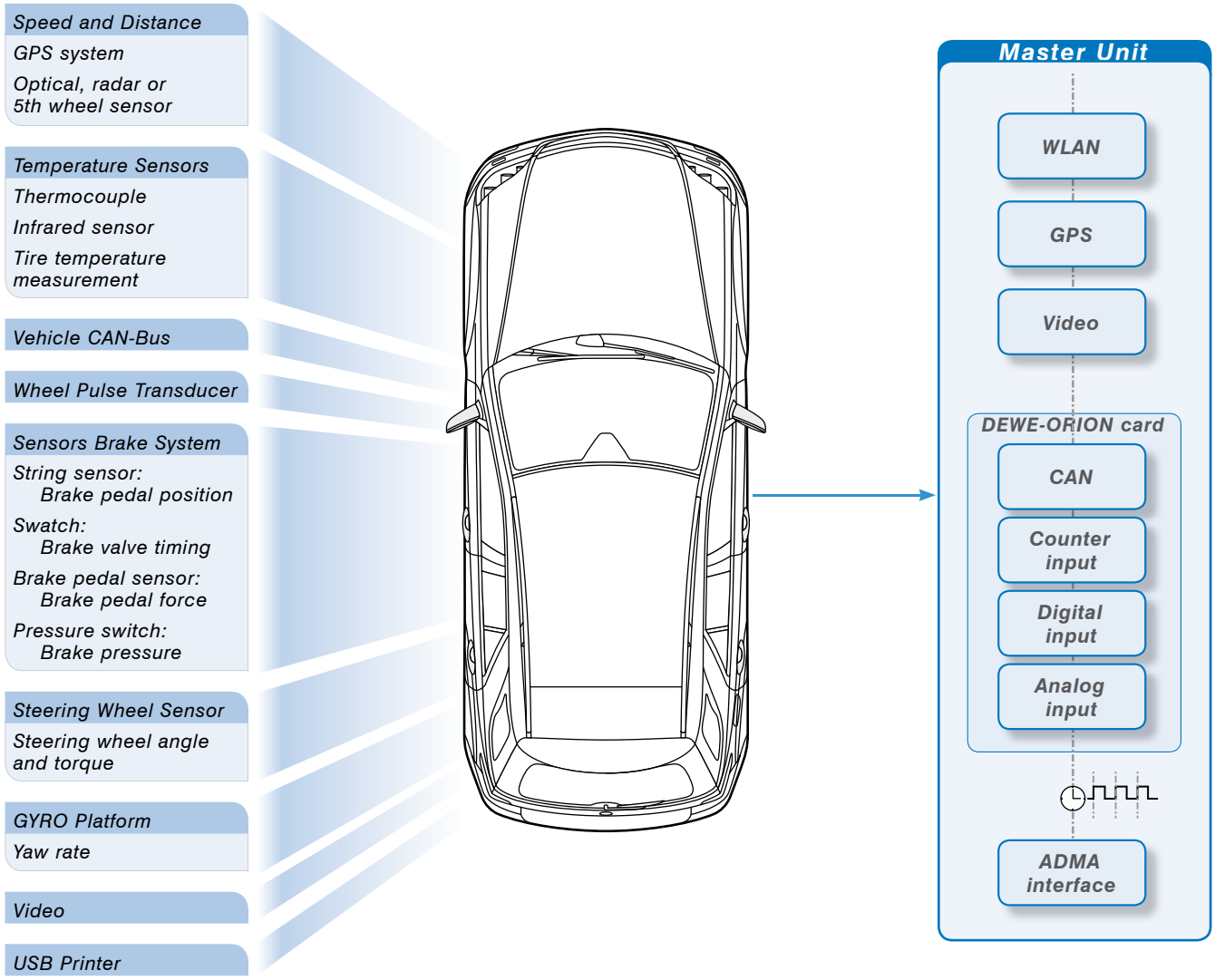
The DEWETRON Brake Test system covers all kind of braking tests and ABS tests – due to its flexibility it also covers test vehicles using regenerative braking. Online checks for validation, visualized online results including post-processing and reporting make the DEWETRON Brake Test system a complete all-in-one solution.

The Brake Test system is based on a 100 Hz GPS system which is very simple and easy to set up. It is not sensitive to road surface conditions .The classical sensors like 5th wheel can be hooked up for comperative testing.

Brake testing is a wide field of different requirements and a flexible and multifunctional solution guarantees a safe investment. Therefore the same equipment is capable to make also tire tests, acceleration tests, odo calibration, fuel consumption, etc. in a very efficient way.

Key Features

- *Integrated 100 Hz GPS receiver*
- *Quick and easy test setup*
- *Automated workflow with DEWESoft sequencer*
- *Automated report generation*
- *Synchronized data acquisition of GPS, analog input, CAN, counter and video data*
- *Multisensor input (voltage, strain, bridge, ...)*
- *Export to different file formats*


Speed and Distance
GPS system
Optical, radar or 5th wheel sensor
Temperature Sensors
Thermocouple
Infrared sensor
Tire temperature measurement
Vehicle CAN-Bus
Wheel Pulse Transducer
Sensors Brake System
String sensor:
Brake pedal position
Swatch:
Brake valve timing
Brake pedal sensor:
Brake pedal force
Pressure switch:
Brake pressure
Steering Wheel Sensor
Steering wheel angle and torque
GYRO Platform
Yaw rate
Video
USB Printer
Master Unit
WLAN
GPS
Video
DEWE-ORION card
CAN
Counter input
Digital input
Analog input
ADMA interface

CAN Bus Data/OBD II

Synchronous data from CAN-bus like

- *Speed*
- *Acceleration*
- *ABS status*
- *Wheel speed*
- *Brake signal*
- *Brake pressure*
- *Acceleration*
- *Steering wheel angle*

Online Mathematics

Distance, MFDD, further calculated channels

Video Information

Synchronized video information

Recorder

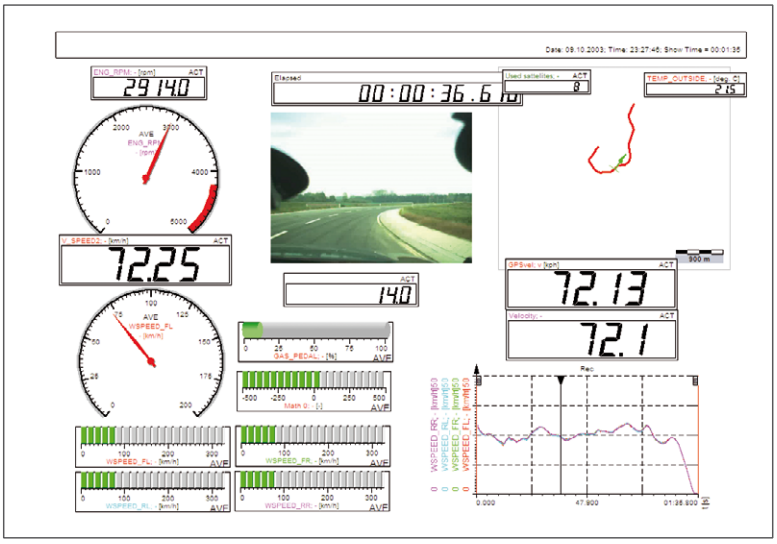
Speed graph over time

GPS Information

Overlay actual position data to a map of the test track

Post processing allows you to generate additional mathematical channels for result calculation. DEWESoft is able to generate reports and also export your measurement as a video clip.

For a more advanced interpretation, DEWESoft supports a wide range of export format such as FlexPro, DIAdem, etc.



Simple Brake Test Application

Brake testing is usually done according to standardized brake test procedures. Setting up a test sequence including the online check of the test boundaries allows performing the required tests for a standardized procedure. These tests are required for development and homologation of vehicles.

On the other hand, brake testing is a wide field of different requirements and a flexible and multifunctional solution guaranties a safe investment. The same equipment is also capable of performing tire testing, acceleration tests, odo calibration, fuel consumption, etc.

DEWETRON's measurement equipment is designed for highly robust data acquisition in the vehicle. All user interface and user interaction is done in an easy and economic way. Effective gadgets help the user to make the daily work simple and easy. Features like Offline Setup, Sensor Database, TEDS or Global Header and powerful Export Features integrate the measurement equipment in the whole process of testing.

The main steps performed for a brake test are supported with the DEWESoft sequencer:

- *Setup of the sensors*
- *Setup the brake test conditions*
- *Close the setup and start the test*
- *Accelerate the vehicle to the start velocity*
- *Press the brake pedal for maximum braking force*
- *Perform the measurement within the braking phase*
- *Validate the data and analyze*
- *Finally generating a report or export the data.*

The brake test requires simply the mounting of the GPS antenna and of the pedal switch. The DEWETRON measurement system can be mounted on the passanger seat via a belt using a snap closure. The display is mounted on the front screen via vacuum cups or on a telescopic pillar.

The channels for velocity, distance and acceleration need to be set up. The start and stop conditions of the test need to be defined in the brake test setup dialog. Starting the test aktivates the sequencer which guides you through the test and starts the measurement of the required data automatically.

For the simple brake test the vehicle accelerates to the defined speed. The sequencer now releases the brake phase which is detected by the switch on the brake pedal. The test is finished, when the car stands still and the software detected the stop chriteria. Now the report can be generated automatically and sent to a small printer

Workflow

Upload the XML setup and choose the sensors from the sensor database. The setup can be done offline. For measurement you connect your sensors and fine-tune the setup. Some sensors need a zero adjustment before measurement. With a few simple clicks you adjust the prepared visualization screens to your needs – and the test starts.

Features to support your workflow:

- *Offline Setup*
- *Sequence Control*
- *Sensor Database*
- *TEDS*
- *Global Header*
- *Data Import and Export*

All relevant data like the measurement jobs, sensor database, setup files, measurement data and results can be stored in a common measurement directory. This fast and efficient way to support the measurement process solves logistical problems of sensors and of the measurement job.

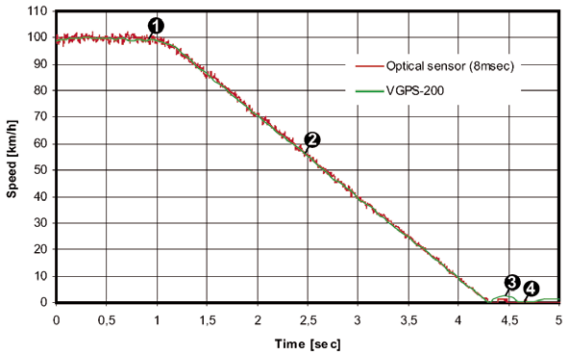
GPS System

GPS System is the easiest and up to now the most elegant way to measure speed and position with the required accuracy. Other devices such as optical, radar or 5th wheel are also supported with DEWETRON Brake Test systems. GPS is the preferred one because it is easy to install, easy to use and gives robust and precise data. GPS is not sensitive to the road surface, it also can be used off road on muddy streets, snow, ice etc.

The GPS receiver is integrated inside a DEWETRON measurement device, so only the antenna has to be put on top of the vehicle and connected to the measurement device.

Features of the DEWETRON GPS system:

- *Easy to install and use*
- *Real-time vehicle speed*
- *Lowest latency time*
- *No calibration required*
- *GPS is not sensitive to road surface – therefore can be used even off-road, snow, ice etc.*
- *Analog speed output and digital displacement output*



Comparing GPS data with conventional optical sensor data shows that signal accuracy and signal latency of the GPS signal is comparable – according its noise even better. A constant latency time of 8 ms of the optical sensor is corrected for this comparison.

A DEWETRON System can handle all types of those sensors whether it is an optical sensor, a radar sensor or a 5th wheel sensor.

VGPS 100 external

The advantage of a GPS system is that it can also be used to replace former mechanical or optical sensors. The VGPS 100 is an external GPS which provides an analog speed output and a digital displacement output.

Multisensor Input

Each input channel supports different sensor types via MSI (Modular Smart Interface) modules. These interfaces are automatically detected and configured by the software.

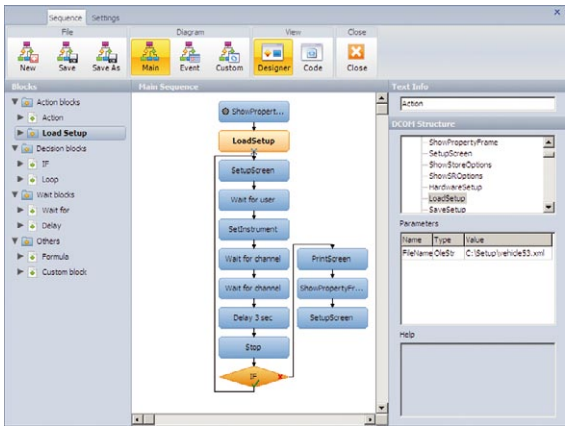
- *Thermocouple*
- *PT100, PT1000, etc.*
- *Acceleration*
- *Voltage*

Brake Test Sequence

The sequencer is a tool to predefine a process of steps in a sequential format. The interface can be graphically programmed or in a code oriented view. The sequence is stored in a file format. Therefore it is possible to manage these sequences centrally to guarantee a standardized and defined measurement procedure.

Within the sequencer you can access all relevant DEWESoft features. In addition you can apply actions, apply formulas and make decisions, wait for interaction or a preset delay and define your customized sequences. So it's possible to define different sequences and fit them together in a single sequence, where the sub sequences are done sequentially. The sequences can be controlled by the user or by an event caused by a certain channel.

For a specific test which consists of different steps and loops it's possible to configure such a test sequence. As shown in this simple example for brake testing.

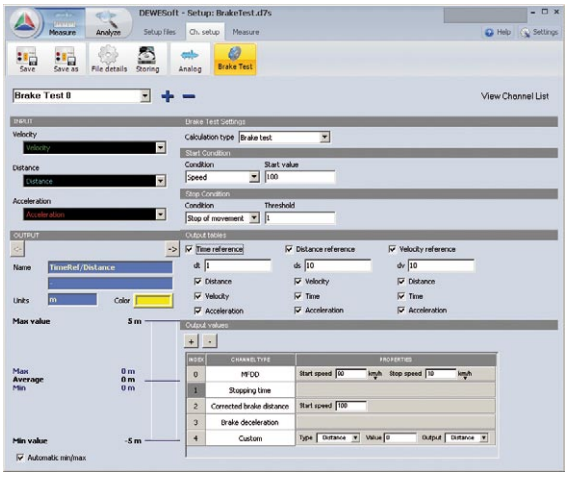


Brake Test Setup

The setup of the Brake Test is shown in this screenshot. Start and stop conditions are set and also the required channels can be setup.

For each output channel you can choose a name and choose the proper unit. You can also configure the color and preset a minimum and a maximum value used as a preset for its indicating instrument.

Clicking on the arrow you can scroll through all the brake test specific channels.

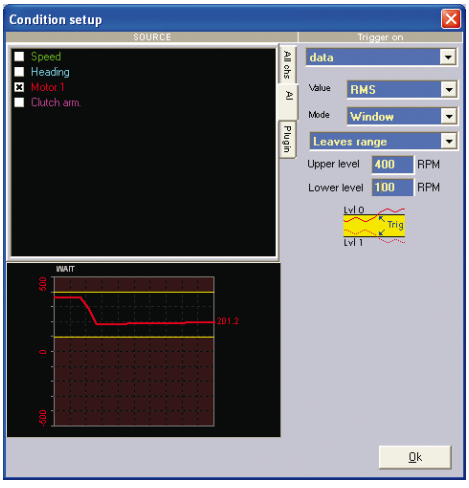


Triggers and Alarms

The STORE and STOP buttons control recording, but DEWESoft also includes a ver-satile TRIGGER section, which includes the following types of trigger method:

- *Simple edge (either rising or falling slope)*
- *Filtered edge (edge plus a rearm level; either slope)*
- *Window trigger (two levels; entering or leaving logic)*
- *Pulse width trigger (longer or shorter than duration logic)*
- *Window and pulse width (completely selectable as above)*
- *Slope Trigger (either rising or falling slope with steepness selection)*

These sources are also available to STOP the acquisition...or simply enter a post-acquisition time. No matter how you set it up, you can always add PRE and POST time to the recording, to add vital seconds or even minutes to either end of the acquisition. The same type of dialog is available to set up an alarm event.



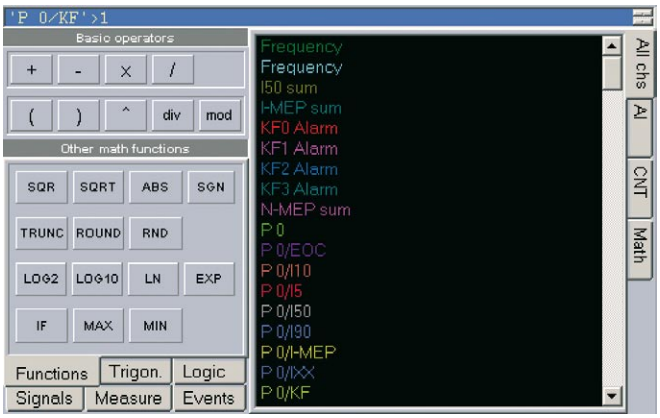
Calculated Parameters

The math for those tests will be done in custom math module of DEWESoft. The values which need to be calculated are interpolated tables of v, a, t, s (velocity, acceleration, time and distance) where the reference could be time, velocity or distance in predefined steps.

The additional parameters which are calculated are:

- *Start speed when pushing brake pedal*
- *Stopping time*
- *Corrected brake distance, calculated as Sc=Sm*Vd²/Va²*
- *Mean fully developed deceleration MFDD (calculation see ECE R13-H)*
- *Brake deceleration over complete measurement*
- *Derivation of acceleration, used to check the passenger comfort*

$$MFDD\ \ d_m = \frac{v_b^2 - v_e^2}{25.92\,(S_e - S_b)} \quad m/s^2$$



Where:

v_o *initial vehicle speed in km/h*

v_b *vehicle speed at 0.8 v_o in km/h*

v_e *vehicle speed at 0.1 v_o in km/h*

S_b *distance travelled between v_o and v_b in meters*

S_e *distance travelled between v_o and v_e in meters*

The speed and distance shall be determined using instrumentation having an accuracy of ± 1 % at the prescribed speed for the test. The dm may be determined by other methods than the measurement of speed and distance; in this case, the accuracy of the dm shall be within ± 3%.

USB Printer for printing results

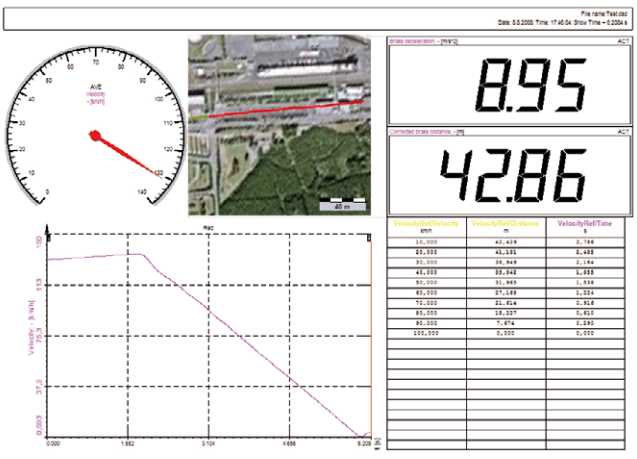
This printer is used to print the most important result parameters direct after the test and makes the documentation very easy.

Analyze Mode - Replay, Export, Share Data

You can replay any captured data file, zoom in with the recorder graph cursors, make measurements, print in full color to any printer, and export the data to a wide variety of formats compatible with today's popular analysis software package, like FlexPro®, Matlab, Excel, DIAdem, UNV, Famos, Nsoft, Text and many more.

You can even export the whole measurement view to an AVI video file from your recorded data to create „moving documentation."

NO LICENSE is needed to use DEWESoft in the ANALYZE mode, so you can install the software on all your computers, or even distribute it to your customers, and they can view the results. In this way, all of your colleagues and customers can replay your data files and do all of the functions that you can – just by sharing the data file!



DEWETRON BT Hardware Configuration

	DEWE-101-BT	DEWE-211-BT
Analog input channels	8 dynamic inputs	16 MDAQ inputs
Digital channels	8 CTR or 24 DI	8 x DIO + 2 CTR or 8 DI
Channel expansion	No	No
CAN interfaces	2	2
Video	USB DirectX	DEWE-CAM or USB DirectX
Display	External MOB-DISP-x	External MOB-DISP-x
Power supply	8 – 36 V_{DC}, external AC adapter	8 – 30 V_{DC}, external AC adapter
Dimensions (W x D x H)	249 x 150 x 82 mm 9.8 x 5.9 x 3.2 in.	317 x 252 x 92 mm 12.48 x 9.92 x 3.62 in.
Weight	2 kg (5.5 lb.)	Typ. 5 kg (11 lb.)
MDAQ series modules are available for almost all kinds of sensors