

Vehicle Weighing using mobile HAENNI Wheel Load Scales



Where a weighing is possible?

Practically anywhere if the gross weight only has to be determined, that means right at the place the vehicle is located!

Restriction for axle weight determination:

The weighing site must be even over the full vehicle length and horizontal in the driving direction!



How to weigh with static scales.

The wheels of the vehicle are driven onto the scale platform. The reading is taken as soon as the scale indication is stable.

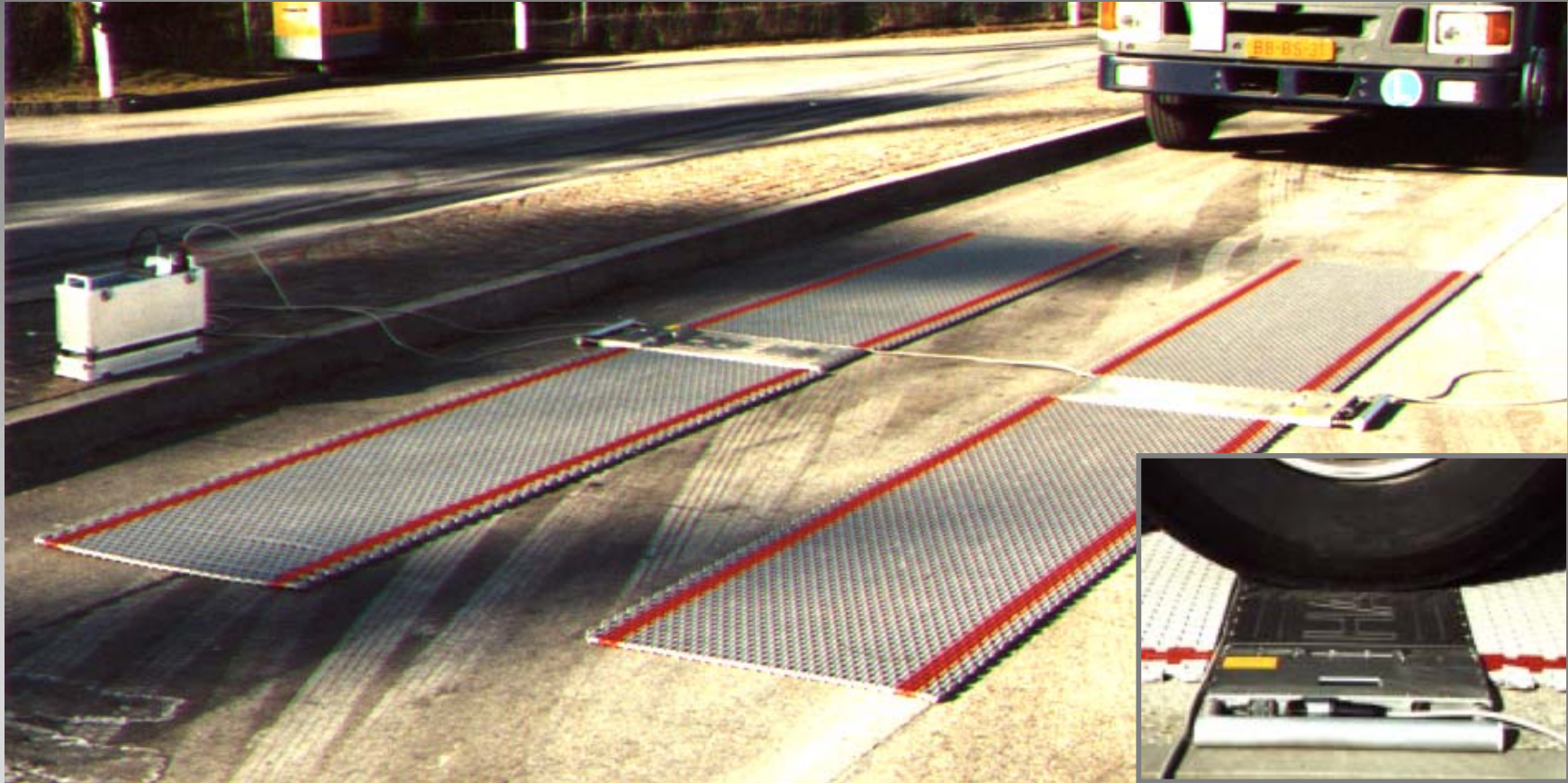
At least two Wheel Load Scales should be used, maximum the same number of scales as the vehicle has got wheels.

Using two Wheel Load Scales the vehicle is weighed axle by axle (quick and inexpensive). With the same number of scales as wheels in one operation (high accuracy).



On a narrow site :
The vehicle stays in place while the
Wheel Load Scales (mechanical or
electronic) are moved from axle to
axle.
Levelling out of non weighed wheels
using small levelling mats.

Weighing on a large site (twice the vehicle length):
Two Wheel Load Scales (mechanical or electronic) and four large levelling mats are placed on the site. The vehicle is moved forward in order to weigh axle by axle.



How to weigh with dynamic scales.

The vehicle is driven over the scales slowly and at constant speed. The wheel weights are determined while passing over the scale.

The dynamic weighing procedure is always axle by axle. It is fast, inexpensive and may be fully automated.

The length of the weighing site must be at least twice the maximum vehicle length.



How to calculate the axle load and the gross vehicle mass

Protocol

Date 8/3/96 Type of Vehicle 3 axle truck
 Time 13:56 Vehicle Make HAN
 Site Berne License Plate BE 271302

Axle No. 1	left	2300	4500
	right	2200	
Axle No. 2	left	4150	8450
	right	4300	
Axle No. 3	left	4400	9000
	right	4600	
Axle No. 4	left		
	right		
Gross			21950

Signature *Chaver*

The axle load is the sum of the two wheel loads.

The axle group load is the sum of the individual axles of the group.

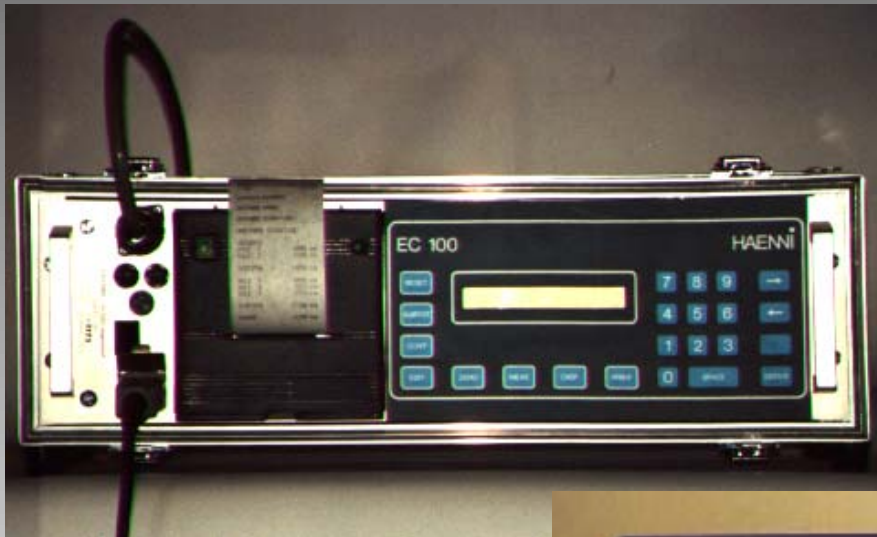
The gross vehicle mass is the sum of all axle loads respectively wheel loads.

Processing devices

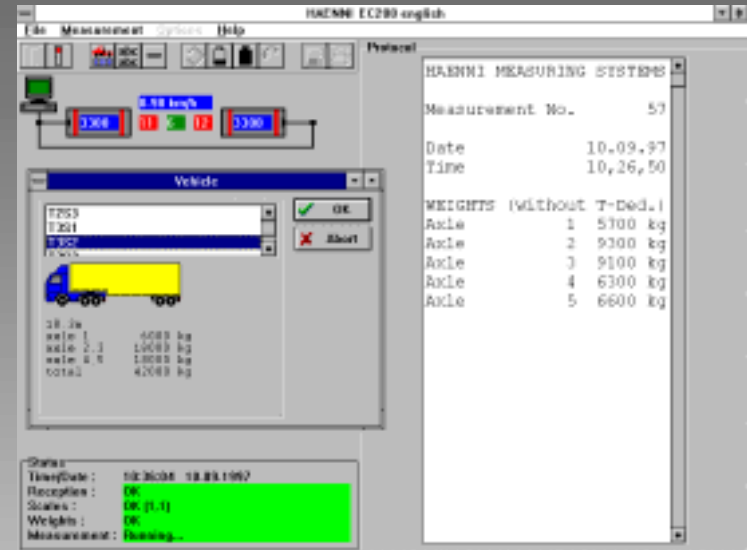
By using a processing unit the weighing procedure can be remote controlled, the weighing results may be stored and printed out and they may be transferred to any other data processing system.

The main purpose of using a processing device is to minimize writing and calculating errors and to reduce work when a big number of vehicles must be weighed in a short time.

Processing devices



Field proof
Processing units



Windows
processing
software

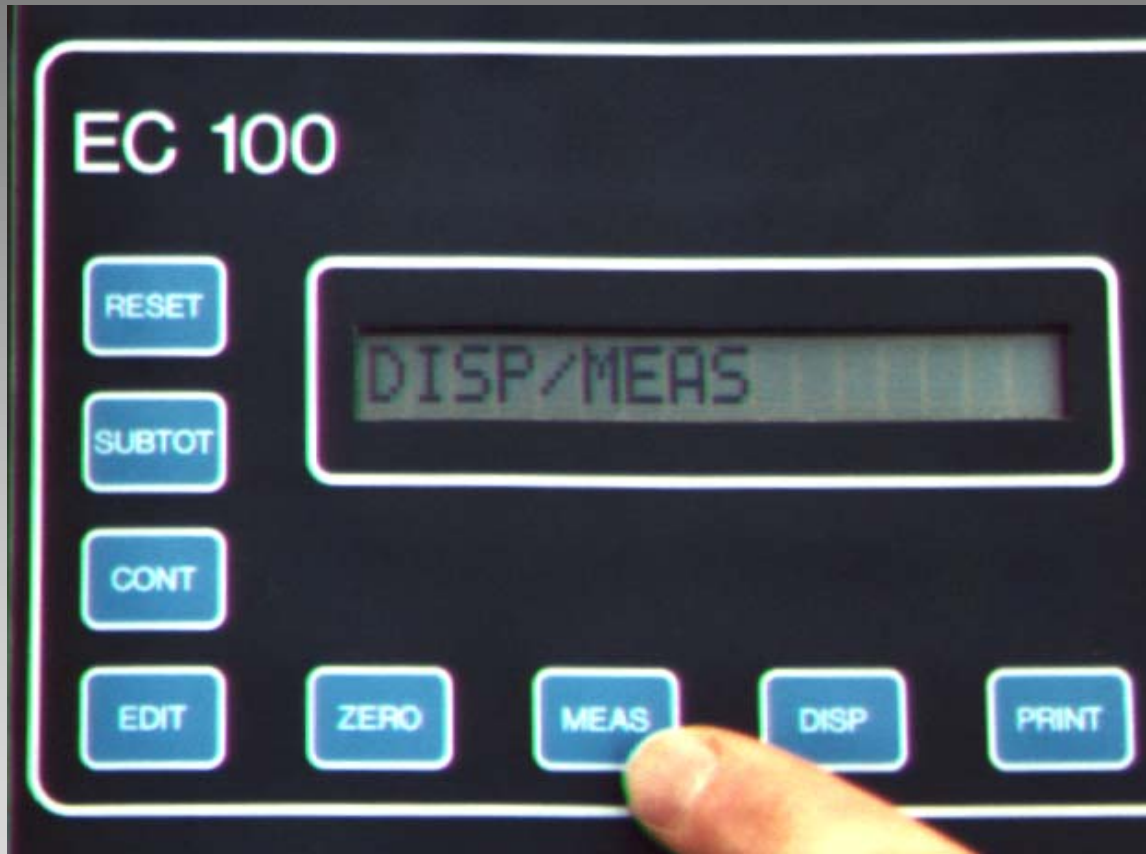


Processing unit EC 100



Field proof
Processing unit
for storing and
printing the
weighing results.

Processing unit EC 100



Storing the axle loads

Processing unit EC 100



Printing the results

Processing unit EC 100



Printout with

- Wheel Loads
- Axle loads
- Gross weight
- Overweights

Additional information:

- Consecutive number
- Date, time
- Weighing site
- Vehicle and driver data

Processing unit EC 110



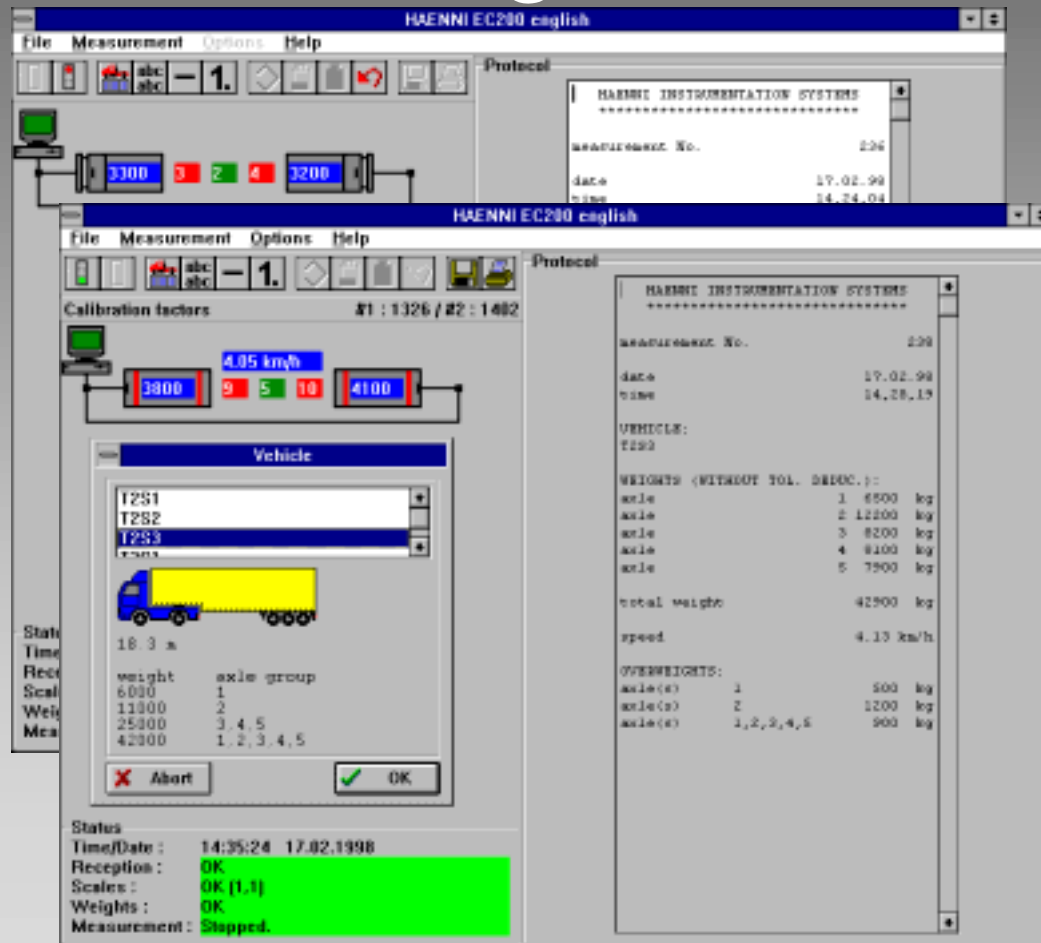
- Battery powered
- Automatic or manual weighing
- Overload detection based on axle or vehicle limits
- Alpha numeric key pad
- Stores up to 2000 vehicles
- Printer interface

Processing software EC 200



- Turns the computer into a weigh processor
- The scales are connected to the serial port
- More benefit from existing computer
- High comfort

Processing software EC 200



- Pre-selection by weighing in motion with WL 110
- Law Enforcement by static weighing with WL 103
- Wheel and axle load, gross weight...
- Automatic vehicle type recognition
- Over weight and fine calculation
- Individual data input
- Data export

Semi-fix Installation

The Wheel Load Scales may be installed in a recess in the pavement if the weighing is performed always at the same place.



Official Approval / Weighing for Trade

The static Wheel Load Scales are approved for weight enforcement by the police but not for trade.

Up to date for dynamic Wheel Load Scales no regulations are available for an official approval.

Static as well as dynamic Wheel Load Scales may be used for trade provided that the two parties agree upon by contract.

What is the accuracy of a weighing

The maximum error of HAENNI Wheel Load Scales is 0.2% to 0.5% depending on the scale division. The scales are checked on a specially designed test bench. Each Wheel Load Scale comes with a test certificate.

Unfavourable conditions of the weighing site and the vehicle as well as the driver and the operator may cause additional external errors. These errors may be largely reduced by taking the appropriate measures.

No additional errors will occur if a two axle vehicle is weighed or when determining the gross weight of a vehicle with more than two axles with the same number of scales as wheels.

<u>Cause</u>	<u>Influence / Remedy</u>
Slope of the weighing site	No influence on the gross vehicle weight! No influence on the axle weights as long as the site is horizontal in the driving direction.
Suspension	If weighing axle groups all wheels must be on the same level! Levelling mats must be used or the scales must be placed in a recess in the pavement or the same number of scales as wheels must be used.
Friction in the suspension	No problem as long as the vehicle is of late design and in good maintenance condition.
Braking forces	Load shifts within axles may occur when braking on a static scale. Therefore the brakes must be released after stopping the vehicle on the scale! The vehicle must be hold by stopping the engine and engaging the first gear or by braking again.

<u>Cause</u>	<u>Influence / Remedy</u>
Vehicle oscillations	Vehicle oscillations may vary the axle loads while passing over the scale. Select a weighing site with the best possible evenness and drive slowly and at constant speed!
Uneven site	May influence the vertical position of individual axles of a group and may therefore cause load shift. Select a weighing site with the best possible evenness!
Driver and Operator	The indication is significantly lower if the wheel is positioned outside the active area of the scale platform!

Find more information in the technical papers P 1196 und P 1216!

How to test a Wheel Load Scale in operation.

- a) By swapping the scales and redoing the weighing. Preferably a two axle vehicle should be used because they do not produce external errors!
- b) By placing the Wheel Load Scale on a certified weigh bridge and loading with one wheel of the vehicle. All other wheels must be located outside the weigh bridge (see Sketch on next page). Both scales must be zeroed before loading. Both weight indications must agree within the error band!

Field Test using a Weigh Bridge

