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Compact Test Computer II

CTC II

Operating Instructions

VDO

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Dear User,

The **C**ompact **T**est **C**omputer **CTC II** is a compact, versatile and easy to use Service Diagnostic System by Continental Trading GmbH.

Purpose of this document

These Operating Instructions describe the correct handling and use of the CTC II when commissioning, programming and checking the following tachographs:

- Analogue tachographs
  - Modular tachograph **MTCO 1324**
  - **SE2400*** (Stoneridge Electronics)
- Digital tachographs
  - Digital tachograph **MTCO 1381**
  - **SE5000** (Stoneridge Electronics)
  - **SmarTach**® (ACTIA)

* Firmware version 024.02 and higher

Table of Contents

1 For your safety

Important

Before using the test device, please read the safety and operating instructions in this Chapter carefully.

Protect yourself and prevent damage to the test device and tachograph components.◄

1.1 Personnel/ technical requirements

Requirements for personnel

Each person given the task of using CTC II components must possess a certificate awarded for carrying out the relevant tasks in accordance with legal regulations.

In the following description, the personnel is expected to have

- comprehensive, occupation-specific knowledge and
- to be in complete control of the necessary and relevant tasks.

Technical requirements

In order to carry out the tasks reliably, the

- workshop must be equipped with the standard tools and equipment for vehicle work.
- The premises, means of testing and relevant equipment must comply with the pertinent legal regulations of the country in which they are used.

1.2 General safety instructions

The basic requirement for working safely with the test device and its components is a thorough knowledge of the general instructions, the safety instructions and the safety regulations.

Important

In addition to these Operating Instructions, your own country's valid and binding accident prevention rules and regulations and the recognised technical and professional rules for safe and professional working must also be adhered to.◄

Caution

Danger of explosion!

The CTC II may not be operated in areas which may be endangered by explosions!

Do not use the test device near flammable liquids or gases!◄

Caution

Danger of accidents!

While working with the device, adhere to the relevant trade association's safety and accident prevention regulations.

The power supply must be switched off when maintenance work is being carried out!◄

Caution

Accident danger - rolling road test stand!

Work on the rolling road may only be carried out when the Roller Interface Module is switched off!

Remove the key to prevent anyone switching on the Roller Interface Module accidentally.◄

1.3 Conventions

Caution!

This denotes dangers which may cause injury to persons. To avoid possible injury to persons, always pay special attention to the note(s) pertaining to this pictogram.◄

Danger!

Electric shock upon contact with voltage-carrying parts when the housing is open. Only authorised persons may open the housing!◄

1.4 Notes on operation

Designated use

The CTC II is a test device used for the inspection, commissioning, and programming of radio slot sized tachographs (EC recording equipment and Non-EC tachographs). The test device may only be used for the purpose for which it was manufactured. The manufacturer is not liable for any damage caused by improper use.

Moisture and dampness

Prevent moisture or dampness from seeping into the module. The test device may not be operated in the proximity of water. Do not place any open bottles, beakers, jugs, tumblers, etc. containing liquid on or beside the device!

Environmental requirements

Protect the test device from heat and cold. Do not place the test device near heat sources (e. g. blowers, ovens, etc). Protect the test device from direct sunlight - and do not leave it on the vehicle dashboard when on open-air assignments in summer.

The ideal environmental temperature is around +25 °C.

Operating instructions

Avoid excessive jolting and shaking of the module.
Do not use any sharp-cornered or pointed object to press buttons (e. g. ballpoint pens).

Cleanliness

Prevent dust and dirt from getting into the module.
Ensure that the test device is stored properly after use.

1.5 Important notes on rolling road test stands

1.5.1 Danger when using rolling road test stands

Caution

Risk of injury!

During measurement in speed mode, stones or other items in a tyre tread may be ejected at high speed.

Do not stand near the rollers or the pit while a test procedure is running! This area is off-limits!◄

Caution

Risk of poisoning!

Do not inhale exhaust fumes during a measurement procedure with running engines. You may lose consciousness or be poisoned by toxic fumes.

Ensure that toxic fumes are reliably extracted.◄

Caution

Risk of damage to hearing!

The noise produced during measurement with a running engine may cause damage to your hearing.

Wear hearing protection.◄

1.5.2 Notes on rolling road test stand operation

Important

- The rolling road test stand must be used in accordance with the instructions of the test stand's manufacturer and the relevant Operating Instructions must also be adhered to.
- The test stand type was set up by a VDO service partner during installation. No modifications may be made!
- While working at the test stand, adhere to the relevant trade association's safety and accident prevention regulations.
- The rolling road test stand must be checked for wear and tear of the roller sets before testing takes place (measure the measuring roller if necessary).
  Only a VDO service partner may adjust the rollers.
- During testing and measurement,
  - the speed must always be kept regular.
  - the prescribed tyre pressure must be adhered to.
  - the roller's load limit may not be exceeded.◄

1.5.3 Safety notes on various vehicle types

Important

- Vehicles with several rigidly-coupled drive axles, or those with tandem rear axles must be rolled using a free-running roller set.
- Vehicles with tandem rear axles coupled by a detachable lock may only be rolled on a brake test stand without using a free-running roller set.
- Vehicles with drive axles linked by a load-dependent differential lock e. g. a viscous clutch, may not be rolled using a free-running roller set.
- In the case of vehicles with acceleration slip regulation, the ASR must always be switched off.
- When rolling at higher speeds, (higher than 5 km/h) the differential may be destroyed in the case of a stationary axle.
- In the case of vehicles with automatic transmission, the vehicle manufacturer's prescribed towing speed may not be exceeded.◄

1.5.4 Guidelines for front-wheel drive vehicles

Important

If these guidelines are not adhered to, the vehicle may be ejected from the rolling road test stand!

- The 55 km/h (50 km/h ± 5 km/h) test speed may not be exceeded.
- Hand brakes that affect rear wheels must be put on, or the rear wheels secured with wheel chocks where necessary.
- During the rolling procedure, the vehicle must be at a 90° angle on the rolling road and the front wheels must be aligned in an exact straight line.
- Hold the steering wheel steady when rolling commences.◄

1.6 Installation instructions

Power supply

The test device may only be connected to the voltages stipulated in these Operating Instructions.

Connection cables

Ensure that no one can stumble over the cables.

Caution

Danger of short-circuits!

Cables damaged by other objects can cause short-circuits, adverse effects and malfunctions.

Replace damaged cables immediately!◄

Accessories

Do not modify accessories in any way whatsoever! Never use accessories or spare parts which have not been recommended by the manufacturer - they can cause adverse effects, operational disruptions and accidents.

Important

The use of non-authorised accessories invalidates the CE certificate of conformity!◄

1.7 Preserving the test stand's value

Maintenance and repairs

The test device is sealed - only qualified customer service personnel may maintain and repair it; also see *Chapter 13.1* "*Maintenance*" on *Page 85*.

Control checks

Check the test device (and the accessories) before using it. Replace damaged parts immediately!

Cleaning

Before cleaning the test device, disconnect the power supply. Do not use any volatile solvents to clean the device, e. g. alcohol, thinners, benzine and abrasive cleaning agents.

2 General description

Usage

The CTC II is a service diagnostic system (SDS) which uses a test device by Continental Trading GmbH.

The test device has been designed for the inspection, commissioning and programming of tachographs, in accordance with legal regulations.

CE

The CTC II meets the following requirements:

- EMC Directive 2004/108/EC.
- Electrical equipment designed for use within certain voltage limits 2006/95/EC.
- Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity 1999/5/EC.

2.1 Features of the CTC II

You can carry out the following measurements and inspections on tachograph equipment in the vehicle:

- Determination of wheel circumference "L"
- Determination of the characteristic coefficient "W"
- Device checks
- Programming.

Further information

You'll find details about the CTC II menu in *Chapter 2.8 "Program overview (menu tree)"* on *Page 26*.

2.2 Product description

Below is a description of your CTC II's components, features and functions.

Package contents

1 CTC II test device
2 Device case
3 CD with Operating Instructions for the CTC II (German, English and French)
4 Test cable DTCO 1381/ SE5000/ SmarTach®
5 Test cables, MTCO 1324 and 1390
6 Power supply connection cable 10 – 30 VDC
7 Test cable SE2400
8 Mains adapter 100 – 240V AC

2.3 Available products and accessories

Important

No modifications to accessories may be made (EMC regulations). Never use accessories or spare parts which have not been recommended by the manufacturer
- they can cause adverse effects, operational disruptions and accidents.◀

2.3.1 Available products

Below is a short list of available products with article numbers:

Available products	Article number
CTC II complete	A2C59512169
"CTC II stationary" set	A2C59512714
"Automatic Measured Track" Kit	1602-04020000

2.3.2 Accessories

Below is a short list of available accessories with article numbers:

Accessories	Article number
"Sender unit" set • Test cable, sensor unit • Operating Instructions, sensor unit	A2C59512170
Serial connection cable	A2C59512181

2.4 Functional elements

All functions are carried out by means of the operator buttons on the key panel. The individual operating steps are shown in the display.

Fig. 1: CTC II functional elements

1	Display	**5**	Light barrier connection
2	Key panel	**6**	Device seal
3	Diagnostic cable connection	**7**	Model plate
4	Power supply connection		

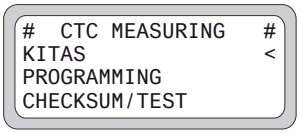
2.5 Operating and display elements

2.5.1 Key panel

Key	Function
W-K	Adjust the K value to match the determined "W value".
Corr	**Correction value** menu (only rolling road).
Apar	Start the Device testing menu (range of functions depends on the tachograph).
#	Enter PIN (if available).
W	Start **Manual measuring track** (measurement on the road) or W measurement function (rolling road).
L	Start wheel circumference measurement (only rolling road).
K	Read out or measure the K value.
Auto	Start **Automatic measured track** (measurement on the road) or **Automatic measurement** (rolling road).
	Raise lifting bar (only rolling road).
	Lower lifting bar (only rolling road).
Dist	Odometer check on roller (if available).
DL	Start the **Data download** menu (download mass memory of digital tachograph).
▲ ... ▼	Move cursor upwards or downwards in the selection menu or text box.
◀ ... ▶ ◀	Move cursor left or right in the text box. Select desired input positions. Delete the character you entered last (text boxes).
0 ... 9	Numerical key panel
	Switch between numerical and alphabetical entry. In alphabetical entry, the letters printed on the keys are active. The cursor is displayed in block form. **Only for PIN entry:** Switch between upper and lower case characters (display: [ABC], [abc], [123], special characters).
+ ... -	Call up predefined values in a text box. Additional functions in individual menu commands.
↵	Apply, confirm or select input values.
C	Exit the input screen. The higher-level program level is displayed.

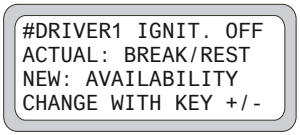
2.5.2 Display and menu guidance

In the CTC II's display, the selection screens and the input screens differ fundamentally from one another.



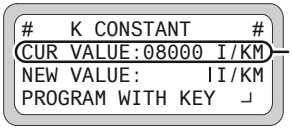
Selection screens

For example, you can use the ▲ and ▼ keys in selection screens to select individual menu commands. Confirm a selected menu with the ↵ key.



Preset values in selection screens

If parameter values are predefined, you can select them with the + and - keys. Confirm the selected parameter with the ↵ key.

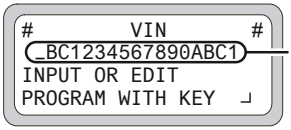


Input screens

The current preset value is displayed in each input screen:

a) in the box **Actual value**

b) directly in a text box.



In the text box you can use the alphanumeric keys 0 ... 9

– to enter a numeric value or

– press ∫ to enter letters.

The display — The first display line contains the name of the selected menu. Below it is the selection of associated programs or functions.

Cancel, Return — Press c to cancel a function or return to a higher level menu or previous function.

2.5.3 Reset function

The CTC II offers you a reset function for cancelling a running program.

1 **Press [DL], [+] and [-] one after another.**

2 **Then press [DL] again.**

The CTC II cancels the running program and restarts automatically. The basic menu is displayed.

2.6 CTC II power supply

The CTC II can be operated either by means of the vehicle power supply or the integrated rechargeable battery.

Start the CTC II by

- connecting it to the vehicle power supply. The basic menu will start automatically.
- pressing any key (battery operation). The CTC II starts and the basic menu is displayed.

! Important

Only programs and settings that are available for the connected tachograph are displayed, see *Chapter 2.8* "*Program overview (menu tree)*" on *Page 26*.◄

2.6.1 Roller Interface Module

Condition

The Roller Interface Module is connected. ◄

Important

Always adhere to the safety guidelines on *Page 10.* ◄

Switching on the Roller Interface Module

1 **Turn the key of the Roller Interface Module clockwise (to Position "I").**

The LED on the Roller Interface flashes green. The Roller Interface Module now attempts to establish a Bluetooth connection with the CTC II.

Important

If the LED turns green, the Roller Interface Module is connected to the CTC II via Bluetooth.

The symbol in the CTC II's display indicates that a connection between the CTC II and the Roller Interface Module exists.

This symbol also gives you information about the field strength of the Bluetooth connection. The more steps that are shown (max. five), the better the field strength. ◄

Switching off

2 **Turn the key of the Roller Interface Module anticlockwise (to Position "O").**

The Roller Interface Module is now switched off.

2.6.2 Battery operation

Important

In battery operation, the **Automatic measured track** function (road measurement) is not available for the CTC II.◄

Important

The "⍰" battery symbol in the CTC II's display indicates battery operation. It does not indicate the battery status.◄

Starting the CTC II

1 **Press any key to start the CTC II.**

The CTC II starts. The basic menu is displayed.

Switching off

2 **Select the "Switch CTC off" menu and confirm.**

Auto off

Select **Adjustments > Auto off** to specify the period of time (after the last operation) that the CTC II will wait before automatically entering "Sleep Mode".

Restarting

When the CTC II is in "Sleep Mode", press any key to restart it. The menu that was used last (before "Sleep Mode" was activated) is displayed.

Important

Power consumption increases when the CTC II enters "Sleep Mode", quickly exhausting the battery.

Always switch the device off via the **Switch CTC off** menu - this uses the full battery capacity.◄

2.6.3 Charging the battery

Important

⊖–ⓒ–⊕: In the battery charger, the plug interior contains the positive supply voltage while the plug exterior contains the negative supply voltage.

Always use an original Continental battery charger to charge the CTC II.◄

1 **Connect the battery charger to the CTC power supply connection.**

2 **Connect the charger to a 230 V/ 50 Hz power outlet.**

The CTC II's battery starts charging.

Important

After two hours (max.) the battery is fully charged. During charging, the CTC II is still available for other functions.◄

2.6.4 Operation via the vehicle power supply

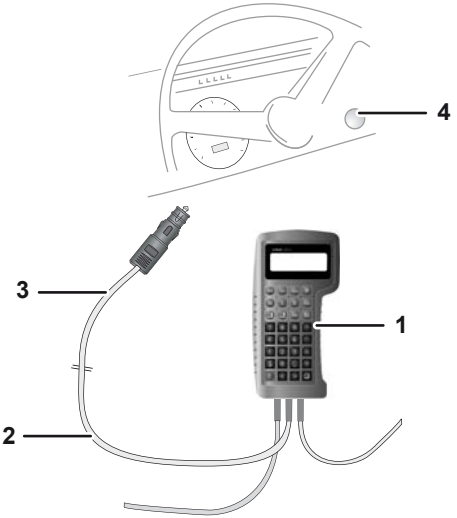


Fig. 2: Connecting the CTC II to the vehicle power supply

Starting the CTC II

1 Connect the CTC II (1) to the vehicle power supply cable (2).

2 Connect the plug (3) of the vehicle power supply cable to the vehicle cigarette lighter (4) (or to a suitable vehicle power outlet).

The CTC II starts and the basic menu is displayed.

Tip

The CTC II's battery is charged during operation via the vehicle power supply.◄

Switching off

1 Disconnect the CTC II from the vehicle power supply and

- **press ⏎ to confirm or**
- **wait for roughly 10 seconds. The CTC II switches off automatically.**

2.7 Connecting the CTC II to a tachograph

1 **Use the diagnostic cable to connect the CTC II to the calibration interface of the tachograph.**

Refer to the information in the tachograph product manual for guidance.

2 **Connect the CTC II to the light barrier.**

Important

Connection to the light barrier is only required for measuring on the road with the Automatic Measured Track!◄

Important

Access to the calibration interface of an activated DTCO 1381, SmarTach® or SE5000 is only possible if a valid workshop card is inserted and the tachograph is in the "Calibration" operating mode.◄

2.8 Program overview (menu tree)

	DTCO 1381	SE 5000	Smar Tach®	MTCO 1324	SE 2400
Function keys					
W-K **Programming (calibration adjustment)**					
Corr **Correction value***					
Apar **Device testing (Test device)**					
├─Speed test				✔	✔
├─Odometer test	✔	✔	✔	✔	✔
├─Test chart				✔	✔
├─Variable speed	✔	✔	✔	✔	✔
└─Clock-test	✔	✔	✔	✔	✔
# **PIN entry**	✔	✔	✔		
W **Measure W**	✔	✔	✔	✔	✔
L **Measure wheel circumference***	✔	✔	✔	✔	✔
K **Read K value**	✔	✔	✔	✔	✔
Auto **Automatic measurement**	✔	✔	✔	✔	✔
Raise lifting bar*/ Engage brake*	✔	✔	✔	✔	✔
Lower lifting bar*/ Release brake*	✔	✔	✔	✔	✔
Dist **Distance roller***	✔	✔	✔	✔	✔
DL **Data download**	✔	✔	✔		
Basic menu					
├─KITAS					
├─Activate KITAS	✔	✔	✔	✔	✔
└─Sensor test					
├─Pulse test	✔	✔	✔	✔	✔
└─KITAS status	✔	✔	✔	✔	✔
├─Programming					
├─Installation data					
├─K constant	✔	✔	✔	✔	✔
├─N constant	✔	✔		✔	✔
├─Wheel circumference	✔	✔	✔	✔	
├─Odometer	✔	✔	✔	✔	✔
├─VIN	✔	✔	✔	✔	✔
├─Drive shaft PPR	✔	✔	✔	✔	✔
├─Installation date	✔	✔	✔	✔	✔
...					
└─cont'd on next page					

	DTCO 1381	SE 5000	Smar Tach®	MTCO 1324	SE 2400
Programming					
Installation data					
Next calibration	✔	✔	✔	✔	
Calibration					✔
Max. speed	✔	✔	✔		
Country code	✔	✔	✔		
VRN	✔	✔	✔		
Tyre size	✔	✔	✔		
TCO parameter					
Configuration				✔	
CAN Bus					
CAN on/ off		✔			
Reset Heartbeat	✔	✔	✔		
Repetition rate TCO1	✔	✔	✔		
Out of scope warn.[2)]	✔				
CAN2 TCO1 on/ off[2)]	✔				
CAN2 wake up on D3[2)]	✔				
Revolution input	✔	✔			
Dimming					
Dim mode[2)]	✔	✔			
CAN dimm mode	✔				
Dim parameters	✔	✔			
Dimm mode preset[2)]	✔				
Military dimming[2)]	✔				
Preferred language		✔	✔		
Adopt card language			✔		
Additional input D1/D2	✔				
Activity/ Ignition					
Driver1 ignition off	✔				
Driver1 ignition on	✔				
Driver2 ignition off	✔				
Driver2 ignition on	✔				
Self-control	✔				
Overspeed Prewarning	✔	✔			
Overspeed Prewarning TCO1 M.		✔			
V-impulse control	✔				
...					

cont'd on next page

	DTCO 1381	SE 5000	Smar Tach®	MTCO 1324	SE 2400
Programming					
TCO parameter					
V-profile					
V-profile on/ off	✔	✔			
V-profile border	✔	✔			
Write V-profile	✔	✔			
N-profile					
N-profile on/ off	✔	✔			
N-profile border	✔	✔			
Write N-profile	✔	✔			
State Remote DI Interface[2) 3)]	✔				
Warn. expire date[2)]	✔	✔			
Calibration	✔				
Driver card	✔				
Company card	✔				
Workshop card	✔				
Control card	✔				
Seal number				✔	
Product code	✔[3)]	✔[3)]	✔[3)]	✔	
Date - Time					
Programming TCO					
System time	✔	✔	✔	✔	✔
Programming CTC					
Time zone	✔	✔	✔	✔	✔
Change-over times				✔	
Manuf. data[3)]	✔	✔		✔	
Distance covered[3)]				✔	
Error memory					
Display error memory	✔	✔	✔	✔	
Erase error memory	✔	✔	✔	✔	✔
Save tco data					
Read tco data	✔	✔		✔	
Write tco data	✔	✔		✔	
Switch CTC off					
Checksum/ Test					

cont'd on next page

	DTCO 1381	SE 5000	Smar Tach®	MTCO 1324	SE 2400
Adjustments					
Function					
Language					
German					
English					
French					
User defined					
Auto off					
Info					
Service[1)]					

1) Access only for VDO service partners.
2) Only for DTCO 1381 Rel. 1.3.
3) Only read access.
* Function only available on rolling road.
✔ Program command available for tachographs.

3 Settings

The periodic inspection procedure of tachographs may vary due to country-specific regulations.

The standard program of the CTC II complies with the legally prescribed tachograph inspection in Germany - an inspection procedure used in many other EU countries.

However, in France, Italy, Portugal and Belgium, national regulations and the procedure itself differ somewhat. Your VDO service partner can set up the relevant CTC II programs via the **Adjustments** menu.

Important

You can get more information on this from your VDO service partner.◄

You can make the following settings:

- Function: stationary/ mobile
- Language
- Auto off; also see *Chapter 2.6.2* "*Battery operation*" on *Page 22*.
- Info.

3.1 Adjustments: Function, Language, Info

Function	Key	Action/ Command	Value/ Information
Function • Mobile • Stationary		• Measuring on the road • Measuring on the rolling road.	
		Start the **Function** menu.	
	[+], [-]	Switch to **Mobile** or **Stationary** and confirm.	
Language		Start the menu.	
		Language selection[1].	• German • English • French
Auto off		Start the menu.	
	[0], [9]	Enter numerical value and confirm[2].	In seconds, 3-digit.
Info		Start the menu.	Display software and hardware version of the CTC II and Roller Interface Module.

1) Your VDO service partner can provide you with an additional user-defined language.

2) The numerical value indicates the period of time (after the last operation) before the CTC II automatically enters "Sleep Mode".

4 Entering a PIN for the workshop card

Thanks to the CTC II, the workshop card PIN does not have to be entered into a tachograph. However, PIN entry is only possible if this function has been activated by your VDO service partner.

Here the method of entry for the workshop card PIN (PIN direct or User selection) is specified. This is dependent on the legitimacy of the action in your specific country.

Important

If you select the [^ ♫] key, you can choose between upper case, lower case and special characters. Observe the display here ([ABC], [abc], [123], special characters).
Press [◄] and [►] to select special characters. ◄

4.1 PIN via PIN direct

The workshop card PIN is not saved in the CTC II - entering it by keyboard merely simplifies the procedure. The value entered is sent directly to the digital tachograph.

Important

If the flow of current to the tachograph is interrupted, the PIN which was entered is retained. If the flow of current to the CTC II is interrupted, the PIN will be lost.◄

1 **Press [° #] to select Input PIN.**

2 **Enter the PIN and confirm.**

You can enter numerical values, letters and special characters; see the note in *Chapter 4*.

3 **End the program.**

4.2 PIN via User selection

Up to 10 users can be created in the CTC II.
The workshop card PIN is protected for each user by a personal 4-digit password. The password consists of numerals.

Important

Be careful with the workshop card and its PIN. Misuse of the workshop card and its PIN must not take place!

Do not pass on the personal password to third parties. Change your personal password regularly to prevent misuse.◄

4.2.1 Creating and deleting users

1 **Press [0 #] to select Input PIN.**

2 **Select the "<new>" menu and confirm.**

3 **Enter the user name (max. 15 characters) and confirm.**

The workshop card PIN and the personal password will be saved under this name.

Remark:
Saved entries cannot be edited. The complete name must always be entered.

4 **Enter the workshop PIN* and confirm.**

**See the note on Page 32.*

Remark:
If you confirm the function without entering the workshop PIN, the user who was entered is deleted (or not created) and the **User selection** menu is displayed.

5 **Enter the personal password* and confirm.**

The settings are saved and the **User selection** menu is displayed.

**4-digit numerical value*

6 **End the program.**

4.2.2 Calling up a saved PIN

1 Press [#] to select Input PIN.

2 Select a saved user and confirm.

3 Enter the user's password and confirm.

The PIN is transferred to the tachograph and the basic menu is displayed.

If the transfer fails, an error message is first displayed, followed by the basic menu.

4 End the program.

5 Preparing for measuring

Remark

With the CTC II you can determine

- the characteristic coefficient "W",
- the wheel circumference and
- the K value.

Measurement can either take place on the road or on a rolling road.

Before starting measurement, you must

Road measurement

- prepare automatic or manual track measurement on the road.
- position the light barrier (automatic measurement track) or the test track pointer (manual measurement track) on the vehicle.
- connect the CTC II to the tachograph and connect up the power supply; see *Chapter 2.7 "Connecting the CTC II to a tachograph"* on *Page 25* and *Chapter 2.6* "*CTC II power supply*" on *Page 20*.

Rolling road

- affix the reflecting strips to the driving axle tyre (on the side on which the light barrier is located).
- determine the correction value for measurement; see the following Chapter.

Important

While checking the tachograph system, you must ensure that

- the vehicle is roadworthy and unloaded.
- the actual tyre size matches the size given in the vehicle registration certificate.
- the tyre pressure matches the vehicle manufacturer's recommendations.

In the case of a rolling road inspection, the determined correction value must be set.

Always adhere to your country's valid legal regulations!◄

5.1 Notes on correction value determination

Condition

The CTC II must be connected to the Roller Interface Module.◄

Wrong measuring results

In contrast to the actual value (on the road), tyre deformations can cause wrong rolling road measurements.
Due to differing vehicle bodies, tyre circumferences and types, an independent correction value must be determined for rolling road and vehicle type.
This significantly offsets any wrong measuring results.

A correction value within ±9.9% can be entered for each measurement procedure.

The L measurement and "W" measurement are evaluated with the correction value.

There are three steps involved in calculating a correction value:

- Measuring wheel circumference on the road
- Measuring wheel circumference on the rolling road

  Set the CTC II correction value here to + 0.0 %.
- Calculating the correction value:

  R_s = determined wheel circumference on the road

  R_r = determined wheel circumference on the rolling road

  K = correction value

  $K = ((R_s - R_r) / R_s) * 100\%$

Important

The determined correction value is vehicle-specific and rolling road-specific; it must be entered before every automatic measuring procedure.◄

6 The steps involved in measuring and testing

In order to program a tachograph, the "W" (characteristic coefficient) and the "K" (device constant) values must be determined and saved.

The determined values are documented in the test certificate/ inspection form (e. g. via KIPAS).

Important

There is a special measuring and inspection procedure for the SmarTach®; see *Chapter 6.3* "*The steps involved in measuring and testing SmarTach®"* on *Page 44*.◄

6.1 Road measurement

Condition

The CTC II is set to the mobile function.

The CTC II is connected to the vehicle cigarette lighter via the vehicle power supply cable.

The CTC II is connected to the tachograph.

The measured track has been prepared, also see *Chapter 5* "*Preparing for measuring*" on *Page 35*.◄

The CTC II reads the tachograph type and identifies it based on the data it receives.

Important

Always adhere to your country's valid legal regulations!◄

6.1.1 Automatic Measured Track

1 Position the vehicle in front of the start reflector stand.

2 Press [Auto] to start the "Automtic measuring track" menu.

The CTC II reads the tachograph type.

3 Drive along the measured track at a steady speed.

4 End of measurement. Continue program.

When the vehicle has been driven past the end reflector stand, an acoustic tone sounds and the determined values are displayed.

5 Press [W-K] to adjust the K value to match the determined W value.

The CTC II programs the determined W value in the tachograph.

Remark:
The K value may deviate by ± 2 imp/km from the determined W value, due to electronic splitting.

6 End the program.

! Important

If the determined characteristic coefficient "W" deviates by ±1% from the set device constant, the K value must be adjusted accordingly.◄

6.1.2 Manual Measured Track

1 Press [W] to start the "Manual measuring track" menu.

The CTC II reads the tachograph type.

■■■■■■■■■■,
_ _ _ _ _ _ _ _ _ _

2 Drive up to the start mark.

- **Stop the vehicle if the pulse changes.**
- **Orient the test track pointer on the start mark of the measured track.**

3 Start the measurement procedure.
Drive at a steady walking speed along the measured track.

4 After passing the end marker (if the pulse changes), stop the vehicle and the measurement procedure.

5 Use a measuring tape to measure the track.

6 Enter the measured track length and confirm.

7 Press [W-K] to adjust the K value to match the determined W value.

The CTC II programs the determined W value in the tachograph.

Remark:
The K value may deviate by ± 2 imp/km from the determined W value, due to electronic splitting.

8 End the program.

! Important

If the determined characteristic coefficient "W" deviates by ±1% from the set device constant, the K value must be adjusted accordingly.◄

6.2 Rolling road test stand

Caution

Danger when using rolling roads!

Measurement takes place on a rolling road. Always adhere to the safety guidelines in *Chapter 1.5.*◄

Measuring roller propulsion

- The measuring rollers of the **rolling road** are vehicle-driven.
- On a **brake test stand**, the measuring rollers are motor-driven.

The measuring procedure is identical in both of these procedures. Operating steps which deviate are dealt with separately.

Condition

The CTC II is set to **Function > Stationary**.

The CTC II has been started up; see *Chapter 2.6* "*CTC II power supply*" on *Page 20*.

The CTC II is connected to the tachograph.◄

The CTC II reads the tachograph type and identifies it based on the data it receives.

Below is a short description of the determination of rolling road values.

Tip

You'll find details about menu guidance in *Chapter 2.5.2* "*Display and menu guidance*" on *Page 19.*◄

Function	Key	Action/ Command	Value/ Information
Engaging brake[1)]			BR = OFF
Releasing brake			BR = ON
Correct. value[2)]	Corr +, - 0, 9	Modify correction value and confirm.	Max. ± 9.9 %
W-Measurem.	W	Drive measuring roller.	
		Start the menu[3)].	
		Characteristic coefficient "W".	Automatic, acoustic signal
		Stop measuring roller.	
	W-K	K value is adjusted.	
Wheel circumference		Drive measuring roller.	
	L	Wheel circumference is determined.	Acoustic signal
Automatic measurement	Auto	Start the **Automatic measurement** menu.	
		• Wheel circumference • Characteristic coefficient "W"[3) 4)].	Automatic, acoustic signal
		Stop measuring roller.	
	W-K	K value is adjusted.	Determined characteristic coefficient "W" is programmed into the tachograph.

1) This function serves as a drive-in, drive-out function for the vehicle and is only effective on a rolling road. Control of this function is carried out by the CTC II.
When driving into the roller set the brake must be engaged.

2) Before each characteristic coefficient *"W"*, wheel circumference or automatic measurement procedure is carried out, the previously-determined correction value must be entered; see *Chapter 5 "Preparing for measuring"* on *Page 35*.
If no new correction value is entered, measurement will take place using the saved value.

3) Brake test stand: Enter number of drive axles and confirm.

4) If the determined characteristic coefficient "W" deviates by ±1% from the set device constant, the K value must be adjusted accordingly.

6.3 The steps involved in measuring and testing SmarTach®

6.3.1 General notes

The execution of a measuring and testing procedure for a SmarTach® differs from that of standard tachographs, depending on the SmarTach's operating status (activated or not activated).

SmarTach® is not activated

In the case of a SmarTach® which has not been activated, you can program the legal and non-legal parameters as individual values (normal procedure).

SmarTach® is activated

In the case of a SmarTach® which has been activated, you can only program the non-legal parameters as individual values (as normal).

The legal parameters can only be programmed during a full calibration procedure; see the following Chapter.

Overview of the parameters

Legal parameters	Non-legal parameters
K constant	CAN configuration
Wheel circumference	Product code (read only)
Odometer	Drive shaft PPR
VIN	Installation date (read only)
Calibration date	And more...
Maximum speed	
Country code	
VRN	
Tyre size	

6.3.2 SmarTach® calibration

Important

During initial calibration or periodic inspection of the SmarTach®, **you must carry out the steps in the exact order in which they are described below!◄**

Step 1	**Programming the installation data** • Confirm or change (where necessary) the legal parameters. • Confirm or change (where necessary) the non-legal parameters, e. g. device-specific and vehicle-specific parameters. See *Chapter 10 "Tachograph programming"* on *Page 56*. **Remark:** The legal parameters are first saved in the test device. The non-legal parameters are immediately transferred as individual values (programmed).
Step 2	**Determination of the characteristic coefficient imp/km (W value):** Measuring on the road or on the rolling road. **Remark:** The determined values are first saved in the test device.
Step 3	**Calibration of the SmarTach® using the W-K key:** The CTC II carries out the following steps: • Adjustment of the K value • Transfer (programming) of the legal parameters • Pairing with the KITAS (updating of the KITAS data); see *Chapter 9* "*Activating KITAS*" on *Page 55*. **Remark:** Calibration lasts around 150 seconds.

7 Device testing

- **Press Apar to start the "Test device" menu.**

  The CTC II reads the tachograph type.

  With the CTC II you can carry out the following device tests:

  - Speed test[1)]
    - Accuracy of the speed indicator
    - Recording of speed on the tachograph chart (record sheet).
  - Odometer test
    - Accuracy of the odometer.
  - Test chart[1)]
    - Test certificate in compliance with § 57b StVZO (Germany)
    - Recording of speed on the tachographl chart
    - Recording of working time on the tachograph chart.
  - Variable speed
    - Accuracy of the speed indicator
    - Test purposes (e. g. RSL).
  - Clock test[2)]
    - Accuracy of clock.

  1) Function to be carried out only in the case of analogue tachographs.

  2) Clock test for digital tachographs only for the purpose of function check (not available for all tachographs).

Important

This Chapter explains the possible functions available for device testing using the CTC II.

Chapter 2.8 "Program overview (menu tree)" on *Page 26* tells you which functions are available for a connected tachograph.◄

7.1 Speed test (MTCO 1324, SE2400)

Testing the accuracy of the speed indicator and the speed recording on the tachograph chart (record sheet).

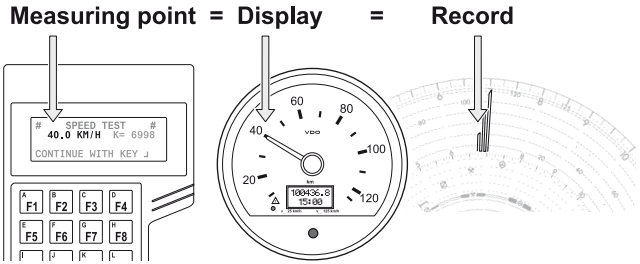


Fig. 3: Speed test

During a speed test, three points must be approached; these points differ according to the upper limit of the measuring range of the tachograph; see the following table.

	Upper limit of the measuring range [km/h]			
	100	**125**	**140**	**180**
1. Measuring point [km/h]	27 … 30	37 … 40	37 … 40	57 … 60
Break	120 seconds			
2. Measuring point [km/h]	57 … 60	77 … 80	77 … 80	97 … 100
Break	120 seconds			
3. Measuring point [km/h]	87 … 90	117 … 120	117 … 120	157 … 160
Break	120 seconds			

1 **Press [Apar] to start the "Test device" menu.**

The CTC II reads the tachograph type and the K value.

2 **Confirm the current K value or use [0] ... [9] to enter the new value.**

Press [▲] or [▼] to increase or decrease the value in increments of 1 km/h (and [+] or [-] in increments of 0.1 km/h).

Remark:
The CTC II sets the three measuring speeds for a tachograph with a measuring range upper limit of 125 km/h.

3 – **Adopt the predefined speed value or**

– **use [0] ... [9] to enter the new value and confirm.**

Press [▲] or [▼] to increase or decrease the value in increments of 1 km/h (and [+] or [-] in increments of 0.1 km/h).

4 **Check speed indicator and display value.**

Waiting time is roughly 120 seconds.

5 **Repeat the test for all three measuring points.**

Please take note of the table's measuring range upper limit.

6 **Check speed recording.**

The value must lie within the given tolerance.

7.2 Variable speed

Testing of variable speeds, e. g. for:

- tests at a defined speed
- function checks of the road speed limiter.

Digital tachographs display the speed at which a vehicle is being driven.
The "Variable Speed" function enables you to check the digital tachograph's display function and the adherence to legal limits of error.

1 **Press Apar to start the "Test device" menu.**

The CTC II reads the tachograph type and the K value.

2 **Confirm the current K value or use 0 ... 9 to enter the new value.**

Press ▲ or ▼ to increase or decrease the value in increments of 1 km/h (and + or - in increments of 0.1 km/h).

3 **– Adopt the predefined speed value or**

– use 0 ... 9 to enter the new value and confirm.

Press ▲ or ▼ to increase or decrease the value in increments of 1 km/h (and + or - in increments of 0.1 km/h).

4 **Approach the speeds (applies only to digital tachographs).**

– 20 km/h (min.)

– 80 km/h

– 180 km/h (max.)

The speed shown in the digital tachograph display may only deviate by a maximum of ± 1 km/h.

Remark:
The CTC II automatically sets speeds of < 20 km/h to a value of 20 km/h.

The CTC II automatically sets speeds of > 200 km/h to a value of 200 km/h.

7.3 Odometer test

Testing the accuracy of the odometer over a distance of 1,000 m. The tests runs completely automatically

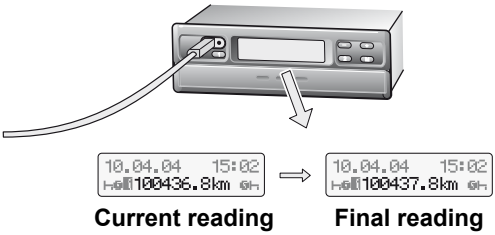


Fig. 4: Odometer test (the MTCO 1324 is pictured)

1 Press Apar to start the "Test device" menu.

The CTC II reads the tachograph type and the K value.

2 Press ↵ to start the test.

The CTC II drives the tachograph at a speed of 100 km/h, (85 km/h for digital tachographs).

3 Compare the actual distance to the target distance.

The actual value must lie between 990 and 1010.

7.4 Creating a test chart (MTCO 1324, SE2400)

In the case of the MTCO 1324 and the SE2400, you must create a test chart for every test, in order to document the correct functioning of the tachograph system.

Important

If used in other countries, please adhere to the relevant legal regulations!◄

1 **Press Apar to start the "Test device" menu.**

The CTC II reads the tachograph type and the K value.

2 **Enter the upper limit of the measuring range.**

Follow the test steps in the following table.

When you have created the test chart, the following recordings can be seen on the tachograph charts for Driver 1 and Driver 2:

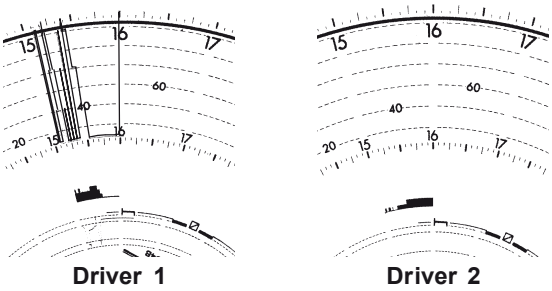


Fig. 5: Automatically created test chart

Important

MTCO 1324: Fully automatic, i. e. the CTC II sets the time groups automatically.

SE2400: Semi-automatic, i. e. the CTC II emits an acoustic tone (🔊) to prompt you to set the time groups, then continue the program.◄

Test speed [km/h]	Test step		Upper limit of the measuring range [km/h]				Time group*	
	No.	Duration [s]	100	125	140	180	Driver 1	Driver 2
	1.	15	0	0	0	0		
	2.	60	110	135	152	150		
	3.	120	0	0	0	0		
	4.	15	30	40	40	40		
	5.	15	60	80	80	100		
	6.	15	90	120	120	160		
	7.	5	110	135	150	190		
	8.	15	90	120	120	160		
	9.	15	60	80	80	100		
	10.	15	30	40	40	40		
	11.	120	0	0	0	0		
	12.	5	30	40	40	40		
	13.	120	0	0	0	0		
	14.	5	60	80	80	100		
	15.	120	0	0	0	0		
	16.	5	90	120	120	160		
	17.	120	0	0	0	0		
	18.	5	110	135	150	190		
	19.	120	90	120	120	160		
	20.	120	60	80	80	100		
	21.	120	30	40	40	40		
	22.	120	0	0	0	0		
	23.	120	0	0	0	0		
	24.	120	0	0	0	0		

Important

Always adhere to your country's relevant legal regulations!◄

Important

Please refer to the MTCO 1324 product manual for further information.◄

7.5 Clock test

1 **Press Apar to start the "Test device" menu.**

The CTC II reads the tachograph type.

2 **Start measurement, test follows automatically.**

Duration is roughly 20 seconds.

! Important

Please refer to the "MTCO Technical Product Manual" for further information.◄

8 DTCO data download

The CTC II enables you to download (copy) all mass memory data from a digital tachograph in order to archive this data using the KIPAS 2 workshop software for instance.

Important

For further information please contact your VDO service partner.◄

1 **Press DL to select the "DTCO data download" menu.**

2 **Press ↵ to confirm the "Overwrite data" prompt.**

The CTC II reads the tachograph type and saves the data.

3 **End the program.**

9 Activating KITAS

1 **Select "KITAS > Activate KITAS".**

The CTC II reads the tachograph type and parameter data and starts KITAS activation automatically.

2 **End the program.**

10 Tachograph programming

The CTC II gives you the option of programming or calling the following data from the tachograph's memory:

- Installation data
- TCO parameters
- Date and Time
- Manufacturing data [2)]
- Distance travelled[3)]
- Displaying or deleting the error memory
- Saving TCO data[1) 2)].

1) Not possible with SE2400.
2) Not possible with SmarTach®.
3) Only possible with MTCO.

10.1 Programming

You'll find a brief programming description below.

Function	Key	Action/ Command	Value/ Information
Starting programming			
		Start the menu[1].	• Installation data • TCO parameter • Date - Time • Manuf. data • Distance covered • Error memory • Save TCO data
	▲, ▼	Select the function[2].	
		Enter a new value.	• Numerical value • Letters

1) Please observe the notes on the various programming functions; see the following Chapter.

2) You'll find details about the programming functions that are available for the connected tachographs in *Chapter 2.8 "Program overview (menu tree)"* on *Page 26*.

10.2 Installation data

Program	Remark	Value
K constant	Enter: characteristic coefficient "W" Read: tachograph constant K [imp/km].	• DTCO 1381: 2400 – 25000 • SE5000: 2000 – 64255 • SmarTach®: 2000 – 64255 • MTCO: 2400 – 25000 • SE2400: 2000 – 64255
N constant	RPM constant [imp/1000 revolutions].	• DTCO 1381: 2000 – 64000 • SE5000: 0 – 64255 • MTCO: 1000 – 64000 • SE2400: 1 – 64255
Wheel circumference	Wheel circumference [mm].	DTCO, SmarTach®, SE5000: 1000 – 7200
Odometer		7-digit numbers
VIN		17-digit (max.) numbers or letters
Drive shaft ppr	Gearbox conversion factor as specified by the vehicle manufacturer.	0.001 – 64.255 imp/rev
Installation date	Date of installation. The SmarTach® sets the current date as the installation date automatically when the VIN has been changed during a successful calibration procedure.	Date format is dd.mm.yy.

Program	Remark	Value
Next calibration	• DTCO, SE5000, SmarTach®: Enter the date of the **next calibration** (current date + 2 years). • MTCO: Calibration date.	Date format is dd.mm.yy.
Calibration	Message that calibration is due.	SE2400: 1 to 104 weeks
Max. speed	Legally permitted maxium speed (vmax).	DTCO, SmarTach®, SE5000: 0 – 220 km/h
Country code		DTCO, SmarTach®, SE5000: 3 letter country code in accordance with Regulation (EEC) No. 3821/85
VRN		DTCO, SmarTach®, SE5000: 13-digit numbers or letters
Tyre size		DTCO, SmarTach®, SE5000: 15-digit numbers or letters

10.3 TCO parameters

Program	Remark	Value/ Information
Configuration	See the MTCO Technical Product Manual.	MTCO: binary entry
Seal number	Will be defined by the local Continental subsidiary.	MTCO: 8-digit number
CAN on/ off	Enabling or disabling the CAN bus.	SE5000: on/ off
Reset Heartbeat	CAN-based instrument communication.	DTCO, SmarTach®, SE5000: on/ off
Repetit. rate TCO1	As specified by the vehicle manufacturer.	DTCO, SmarTach®, SE5000: 20 ms or 50 ms
Out of scope warn.	Suppression of output on CAN.	DTCO 1381 Rel. 1.3: on/ off
CAN2 TCO1 on/ off	Enable TCO1 message on CAN2.	DTCO 1381 Rel. 1.3: on/ off
CAN2 D3 wake up	Wake up CAN2 via input D3.	DTCO 1381 Rel. 1.3: on/ off
Revolution input CAN/ C3		DTCO, SE5000: CAN/ terminal C3
Dim mode	Dimming input.	• DTCO 1381 Rel. 1.3: CAN/ terminal A2 • SE5000: off/ CAN/ terminal A2
Can dimm mode		DTCO 1381: Standard/ Alternative

Program	Remark	Value/ Information
Dim parameters	Brightness of device illumination when light off or on.	Light off: • DTCO 1381: 0 - 100, 0 – 250 (CAN) • SE5000: 0 – 255 Light on: • DTCO 1381: 0 – 100 • SE5000: 0 – 255
Dimm-mode preset	Selection of the dimming parameter record.	DTCO 1381 Rel. 1.3: 0 – 4
Military dimming	Military mode.	DTCO 1381 Rel. 1.3: on/ off
Preferred language	Default language setting if available for the TCO.	SE5000, SmarTach®: 22 languages
Adopt card language	Setting whether or not the language of the inserted card or the default language should be used.	SmarTach®: yes/ no
Addit. input D1/D2	Additional inputs can be enabled/ disabled if the TCO hardware supports this function.	DTCO1381: on/ off
Activity ignition Driver 1 or 2	For igniton on/ off and for driver 1 or 2 you can program whether or not the DTCO is to switch to time group setting automatically.	DTCO Rel. 1.2a/ 1.2U: • break/ rest • availability • work time • no change (of time group)
Self-control	The DTCO's auto-monitoring level can be programmed.	DTCO Rel. 1.2a/ 1.2U: Level 1 should always be programmed to ensure that the DTCO works properly.

Program	Remark	Value/ Information
Speed warniing	Time that is to elapse before a warning is output that vmax has been exceeded.	DTCO, SE5000: 0 – 60 s
V-impulse control B7	Enables/ disables V pulse output monitoring (terminal B7). Depending on the load of connected peripheral devices, the monitoring level may lead to error messages.	DTCO1381: on/off
V-profile/N-profile on/ off	Enables/ disables the saving of the V profile/ N profile.	DTCO, SE5000: on/ off
V-profile border	Divided into 15 sections.	• DTCO: 0 – 220 km/h • SE5000: 0 – 255 km/h • Graduation: 1 km/h Values must be sorted in ascending order.
N-profile border	Divided into 15 sections.	• DTCO: 0 – 8031.875 min-1 • SE5000: 0 – 8191.875 min-1 • Graduation: 0.125 min-1 Values must be sorted in ascending order.
Remote dl interf.	Read only - display of the Remote Download interface status.	DTCO 1381 Rel. 1.3: on/ off
Warn. expire date (calibration)	Message that calibration is due.	• DTCO 1381 Rel. 1.3: – on/ off – 0 – 92 days • SE5000: 0 – 255 days

Program	Remark	Value/ Information
Warn. expire date (driver card, company card, control card, workshop card	Message that the card will expire soon.	DTCO 1381 Rel. 1.3: • on/ off • 0 – 92 days
Product code		• MTCO: See the Technical Product Manual. • DTCO, SmarTach®, SE5000: display only

10.4 Date and Time

The tachograph saves all determined times (working time, rest time, driving time etc.) in UTC time (Universal Time Coordinated, corresponds to time zone "0") and displays local time (official time of the country where the vehicle is registered).

The **Date - Time** menu command enables you to program all the required parameters into the tachograph:

- UTC time
- local time
- time zone offset
- daylight saving time changes (start and end of daylight saving); only for MTCO 1324.

The earth's time zones

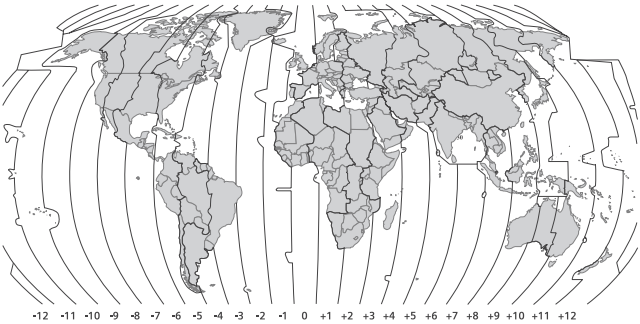


Fig. 6: The earth's time zones

10.4.1 Time zones - EU member states

Time zones - EU member states	
Belgium	*+ 1 h*
Bulgaria	*+ 2 h*
Denmark	*+ 1 h*
Germany	*+ 1 h*
Estonia	*+ 2 h*
Finland	*+ 2 h*
France	*+ 1 h*
Greece	*+ 2 h*
Ireland	*0*
Italy	*+ 1 h*
Latvia	*+ 2 h*
Lithuania	*+ 2 h*
Luxemburg	*+ 1 h*
Malta	*+ 1 h*
The Netherlands	*+ 1 h*
Austria	*+ 1 h*
Poland	*+ 1 h*
Portugal	*0*
Rumania	*+ 2 h*
Sweden	*+ 1 h*
Slovakia	*+ 1 h*
Slovenia	*+ 1 h*
Spain	*+ 1 h*
Czech Republic	*+ 1 h*
Hungary	*+ 1 h*
United Kingdom	*0*
Cyprus	*+ 2 h*

10.4.2 Start and end of daylight saving

Important

Daylight saving time changes (start and end of daylight saving) can only be set for the MTCO 1324.◄

At the factory, the current change-over times (start/ end of daylight saving) and offsets for the EU member states are stored in the test device for the next ten years.

The CTC II is used to program change-over times into the MTCO 1324 for the next five year.

Year	Start of daylight saving time	Offset	End of daylight saving time	Offset
2009	29th March, 2:00	+ 1 h	25th October, 3:00	0 h
2010	28thMarch, 2:00	+ 1 h	31st October, 3:00	0 h
2011	27thMarch, 2:00	+ 1 h	30th October, 3:00	0 h
2012	25thMarch, 2:00	+ 1 h	28th October, 3:00	0 h
2013	31stMarch, 2:00	+ 1 h	27th October, 3:00	0 h
2014	30thMarch, 2:00	+ 1 h	26th October, 3:00	0 h

Northern and southern hemispheres

When programming change-over times you must make a note of countries on the northern and southern hemisphere as the the start and end of daylight saving time will differ.

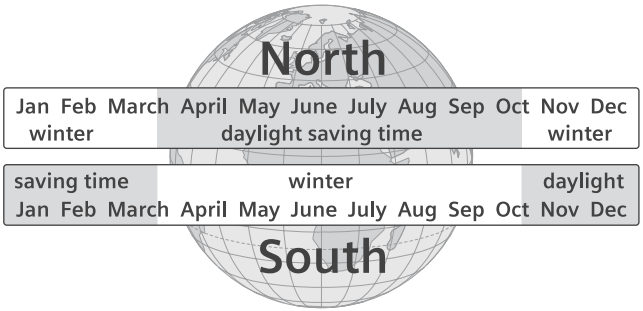


Fig. 7: Daylight saving time - Northern and southern hemispheres

Changing change-over times

In the **Programming CTC** menu, you change the stored change-over times and add new times.

10.4.3 Programming CTC II

! Important

The modified values are now stored in the CTC II and must then be programmed into the tachograph via the **Programming TCO** menu.◄

Time zone

1 **Select "Date - Time > Programming CTC > Time zone" and confirm.**

2 **Press [+] or [-] to set the time zone* (+ 11:00 h …- 12:00 h) and confirm.**

** You'll find the correct value in Chapter 10.4.1 "Time zones - EU member states" on page 65.*

Change-over times

3 **Select "Change-over times" menu and confirm.**

4 **Press [+] or [-] to select the year and confirm.**

5 **Select the first text box (date begin daylight saving).**

** You cannot change the time in the "end of daylight saving" time text box as the CTC II determines this time based on the start of daylight saving time and the offset.*

6 **Select the position.**
Use [0] ... [9] to enter the "date" (dd.mm.yy) and "time" (hh.mm.ss) and confirm.

7 **Press [▲] or [▼] to select the "northern or southern hemisphere" text box and use [+] or [-] to choose the correct setting.**

8 **Press [▲] or [▼] to select the "change over offset" text box and use [+] or [-] to choose the correct setting.**

9 **Confirm your settings and end the program.**

10.4.4 Programming TCO

1 **Select "Date - Time > Programming TCO" and confirm.**

2 **Press ◄ or ► to select the position.**
Use 0 ... 9 to enter the "date" (dd.mm.yy) and confirm.

3 **Press ◄ or ► to select the position.**
Use 0 ... 9 to enter the "system time" (hh.mm.ss) and confirm.

** The CTC II's system time corresponds to the local time.*

4 **End the program.**

10.5 Displaying manufacturing data

1 **Select the "Manuf. data" menu and confirm.**

The CTC II reads the tachograph type and parameter data.

2 **Press ▼ to scroll through the manufacturing data:**
- **D = Date of manufacture**
- **L = Circuit board number**
- **S = Serial number**
- **V = Software version.**

3 **End the program.**

10.6 Distance driven

Important

The MTCO 1324 stores the actual distance driven, irrespective of how often the MTCO 1324's trip counter has been reset and the distance driven with the vehicle.◄

1 Select the "Distance covered" menu and confirm.

The distance driven is displayed.

- LL = actual distance driven
- EI = installation date

2 End the program.

10.7 Error memory

Important

For detailed information about the data stored in the tachograph's error memory please refer to the relevant Technical Product Manual.◄

10.7.1 Displaying the error memory

1 Select "Error memory > Display err memory" and confirm.

The CTC II reads the error memory.

2 Press ▲ or ▼ to scroll through the error memory.

– MTCO 1324 display:

> error code

> symbol "active error".

– Digital tachograph display:

> consecutive number

> memory code (DTCO 1381) or error code (SE5000/ SmarTach®)

> number of errors

> symbol "active error".

3 End the program.

10.7.2 Deleting the error memory

1 Select "Error memory > Display err memory" and confirm.

The CTC II reads the tachograph type and error memory.

2 Press ↵ to delete the error memory.

Remark:
You can only delete inactive errors. Active errors and the "legal error" error memory cannot be deleted.

3 End the program.

10.8 Saving TCO data

When replacing a tachograph, all vehicle-specific and device-specific parameters must be programmed into the new tachograph.

The CTC II enables you to read, save and program the following parameters into the new tachograph:

- **Select the "Save TCO Data" menu and confirm.**

Parameter	DTCO 1381	DTCO Rel. 1.3	SE5000	MTCO 1324
N constant	✔	✔	✔	✔
Odometer	✔	✔	✔	–
VIN	✔	✔	✔	✔
Drive shaft PPR	✔	✔	✔	✔
Maximum speed	✔	✔	✔	–
VRN	✔	✔	✔	–
Country code	✔	✔	✔	–
Tyre size	✔	✔	✔	–
Reset Heartbeat	✔	✔	✔	–
CAN1 repetition rate TCO1	✔	✔	✔	–
Dim mode	–	✔	–	–
Dimming parameters	✔	✔	✔	–
Speed warning	✔	✔	✔	–
V profile	✔	✔	✔	–
N profile	✔	✔	✔	–
Warning expiry date calibration	✔	✔	✔	–
Additional inputs D1/D2	✔	✔	–	–
Activity/ Ignition	✔	✔	–	–
Self-control level	✔	✔	–	–
V pulse monitoring	✔	✔	–	–
RPM input	✔	✔	✔	–

Parameter	DTCO 1381	DTCO Rel. 1.3	SE5000	MTCO 1324
CAN2 TCO1 on/ off	–	✔	–	–
CAN2 wake up on D3	–	✔	–	–
Dim mode preset	–	✔	–	–
Military dimming	–	✔	–	–
Warning expiry date - cards	–	✔	–	–
Vehicle supplier parameter	–	✔	–	–
Vehicle parameter config.	–	✔	–	–
Universal dim mode	–	✔	–	–
Customer logo	–	✔	–	–
CAN on/ off	–	–	✔	–
Preferred language	–	–	✔	–
Configuration	–	–	–	✔

✔ These parameters will be saved.

10.8.1 Reading TCO data

1 **Select the "Read TCO data" menu and confirm.**

The CTC II reads the tachograph type and parameters.

2 **Press [c] to return to the "Save TCO data" menu.**

Important

Saved TCO data will be retained even if the test device's power supply has been interrupted.◄

10.8.2 Writing TCO data

Important

You can only copy the saved TCO data to the same type of tachograph.◄

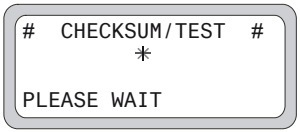
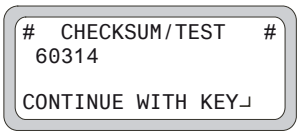
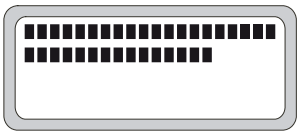
1 **Select the "Write TCO data" menu and confirm.**

The CTC II copies the parameters to the tachograph.

2 **Press [c] to return to the "Save TCO data" menu.**

11 Checksum/ Test

In addition to displaying the software version, the **Checksum/ Test** function also enables you to check the software and the display of the CTC II.

Step/ Display	The program steps
1	**Select the "Checksum/ Test" menu.**
2 	**Checksum** The CTC II determines the checksum.
3 	The determined checksum is displayed. **Press ↵ to go to the display test.**
4 	**Display test** The CTC II shows all individual display segments in succession. **End the program.**

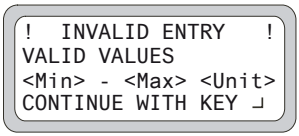
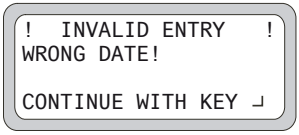
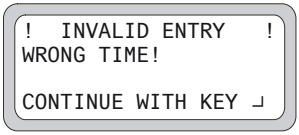
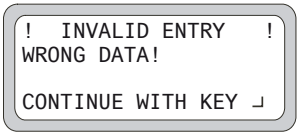
12 Error messages

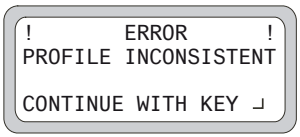
In this Chapter, you'll find all the error messages that can be displayed while checks, measurements and programming are being performed with the CTC II.

Important

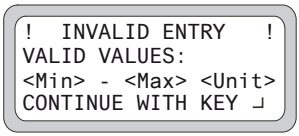
If you cannot correct an error with the documented measures, please contact your VDO service partner.◄

12.1 Invalid user input

Error message	Cause/ Measure to correct error
1 	Values outwith the value range. **Measures**: – **Enter valid values in the <Min> - <Max> boxes.**
2 	The date was not entered correctly. **Measures:** – **Enter the date in dd.mm.yy format.**
3 	The time was not entered correctly. **Measures:** – **Enter the time in hh:mm format.**
4 	A change-over time was not entered correctly.
5 	Parameter programming is not supported by the connected tachograph.

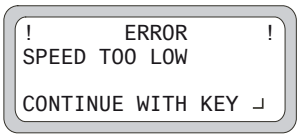
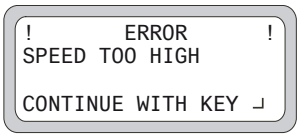
Error message	Cause/ Measure to correct error
6 	The "V" and/ or "N" values are not saved in the CTC II in ascending order. **Measures:** – **Sort profile entries in ascending order.**

12.2 Invalid measuring value

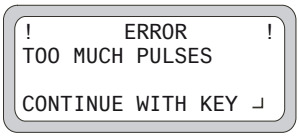
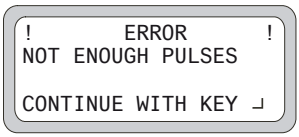
Error message	Cause/ Measure to correct error
	Values outwith the value range.

12.3 CTC II error messages

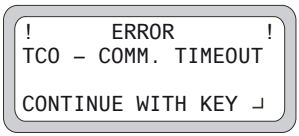
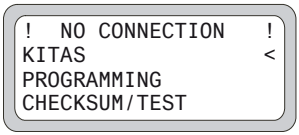
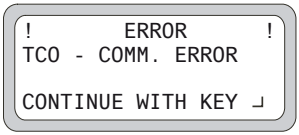
12.3.1 Roller measurement

Error message	Cause/ Measure to correct error
1 	Test program speed is too low. **Measures:** – **Increase vehicle speed.** – **Increase vehicle speed to at least 3 km/h.** – **Check diagnostic cable and replace if necessary.** – **Check connections.**
2 	Test program speed is too high. **Measures:** – **Reduce vehicle speed.**

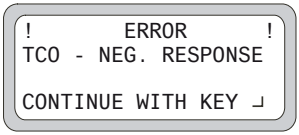
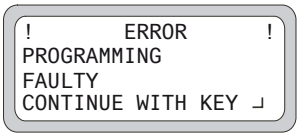
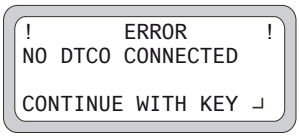
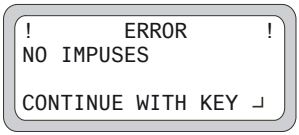
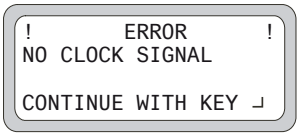
12.3.2 Road measurement

Error message	Cause/ Measure to correct error
1 	Too many pulses were counted during manual measurement, evaluation is not possible. **Measures:** – **Check diagnostic cable.** – **Possibly shorten the measured track.**
2 	Too few pulses were counted during manual measurement, evaluation is not possible. **Measures:** – **Check diagnostic cable and replace if necessary.** – **Possibly lengthen the measured track.**

12.3.3 Tachograph communication

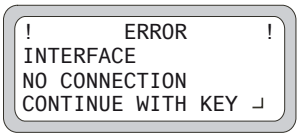
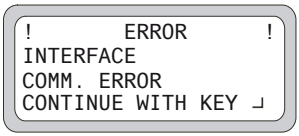
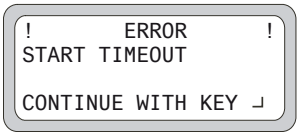
Error message	Cause/ Measure to correct error
1 	The CTC II cannot read a connected tachograph. **Measures:** – **Check diagnostic cable and replace if necessary.** – **Check connections.**
2 	The CTC II cannot establish a connection with the Roller Interface Module. **Measures:** – **Check Bluetooth communication.** – **Check connections.** – **Check Roller Interface Module power supply.**
3 	Communication error on the data interface to DTCO or to computer. **Measures:** – **Check diagnostic cable.** – **Check serial connection to computer.** – **Check connections.**

Error message	Cause/ Measure to correct error
4 ! ERROR ! TCO - NEG. RESPONSE CONTINUE WITH KEY ↵	The tachograph responds negatively on the interface to the tachograph. **Measures:** – **Check diagnostic cable.** – **Check whether or not the tachograph supports the function.**
5 ! ERROR ! PROGRAMMING FAULTY CONTINUE WITH KEY ↵	The value programmed into the tachograph does not match the value read back after saving. **Measures:** – **Check diagnostic cable.** – **Repeat programming.**
6 ! ERROR ! NO DTCO CONNECTED CONTINUE WITH KEY ↵	No digital tachograph connected. **Measures:** – **Connect a digital tachograph.** – **Check diagnostic cable.**
7 ! ERROR ! NO IMPUSES CONTINUE WITH KEY ↵	No pulse received from tachograph during "W" measurement. **Causes:** – **The km reading did not change during the odometer check on the roller.** – **No pulse received from tachograph during "W" measurement.** **Measures:** – **Check diagnostic cable.** – **Check connections.** – **Check tachograph functions.**
8 ! ERROR ! NO CLOCK SIGNAL CONTINUE WITH KEY ↵	No clock signal received from tachograph. **Measures:** – **Check diagnostic cable.** – **Check connections.** – **Check tachograph functions.**

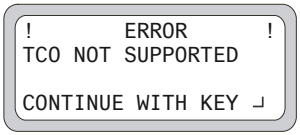
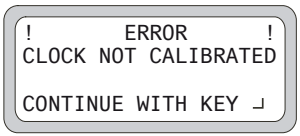
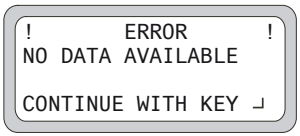
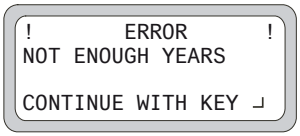
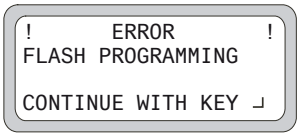
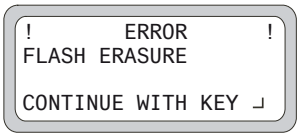
Error message	Cause/ Measure to correct error
4 	The tachograph responds negatively on the interface to the tachograph. **Measures:** – **Check diagnostic cable.** – **Check whether or not the tachograph supports the function.**
5 	The value programmed into the tachograph does not match the value read back after saving. **Measures:** – **Check diagnostic cable.** – **Repeat programming.**
6 	No digital tachograph connected. **Measures:** – **Connect a digital tachograph.** – **Check diagnostic cable.**
7 	No pulse received from tachograph during "W" measurement. **Causes:** – **The km reading did not change during the odometer check on the roller.** – **No pulse received from tachograph during "W" measurement.** **Measures:** – **Check diagnostic cable.** – **Check connections.** – **Check tachograph functions.**
8 	No clock signal received from tachograph. **Measures:** – **Check diagnostic cable.** – **Check connections.** – **Check tachograph functions.**

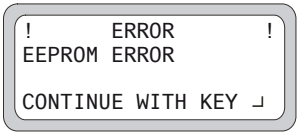
Error message	Cause/ Measure to correct error
9 ! ERROR ! NO KITAS CONTINUE WITH KEY ↵	During the sensor check, no KITAS is not recognised. **Measures:** – **Check sensor test cable and sensor cable and replace if necessary.** – **Wrong sensor type.** **Sensors of the 2170 and 2171 types are supported.**
10 ! ERROR ! KITAS COMM. ERROR CONTINUE WITH KEY ↵	KITAS sensor neither sending echo nor acknowledging. **Measures:** – **Check sensor test cable and sensor cable and replace if necessary.**

12.3.4 Roller Interface Module communication

Error message	Cause/ Measure to correct error
1 	Bluetooth connection to Roller Interface Module does not exist. **Remark:** Also see field strength display in the basic menu. **Measures:** – **Switch on the Roller Interface Module.** – **Check Bluetooth signal's field strength.** – **Change position/ angle of CTC II to Roller Interface Module.** – **Switch the Roller Interface Module off and on.**
2 	Bluetooth connection timeout occurred. Bluetooth connection disconnected. **Measures:** – **Check Bluetooth signal's field strength.** – **Change position/ angle of CTC II to Roller Interface Module.** – **Switch the Roller Interface Module off and on.**
3 	A timeout for the acknowledgement of the start signal has occurred. **Measures:** – **Check Bluetooth signal's field strength.** – **Change position/ angle of CTC II to Roller Interface Module.** – **Switch the Roller Interface Module off and on.**

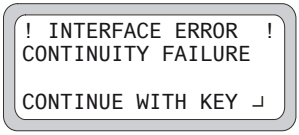
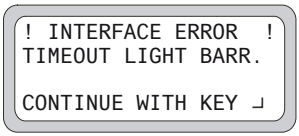
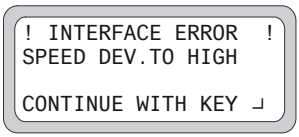
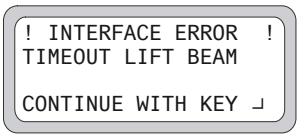
12.3.5 Other error messages

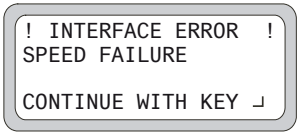
Error message	Cause/ Measure to correct error
1 	The current test program cannot be carried out with the connected tachograph.
2 	No clock calibration has been carried out for the CTC II. No test can be carried out. **Measures:** **– Send the device (via your VDO service partner) to Continental Trading.**
3 	No data is available for transfer from the CTC II to the tachograph. The saved data does not match the current type of tachograph. **Measures:** **– Read the tachograph data.** **– Check tachograph functions.**
4 	Not enough years to load the change-over times into the tachograph. **Measures:** **– Edit the change-over times table manually.** **– Your VDO service partner will load a new table of change-over times for you.**
5 	Flash memory programming error. **Measures:** **– Send the CTC II to your VDO service partner for repair.**
6 	CTC II device hardware defective. **Measures:** **– Send the CTC II to your VDO service partner for repair.**

Error message	Cause/ Measure to correct error
7 	CTC II device hardware defective. **Measures:** – **Send the CTC II to your VDO service partner for repair.**

12.4 Roller Interface Module error

The following error messages are generated by the Roller Interface Module, but displayed on the CTC II.

Error message	Cause/ Measure to correct error
1 	The number of roller pulses between two light barriers deviate by more than ±5 % from the first measured value. **Measures:** – **Check the location of the reflecting strips on the wheel.** – **Clean the light barrier lenses.**
2 	No light barrier signal at start of "I" measurement. **Measures:** – **Check the location of the reflecting strips on the wheel.** – **Clean the light barrier lenses.**
3 	Speed during a measurement deviates by more than ±15 % from the starting speed. **Measures:** – **Ensure that test speed remains constant.**
4 	The response that the lifting bar has been raised or lowered does not occur within 500 ms after the procedure has started. **Measures:** – **Check the magnetic valve's power supply.** – **Check the compressed air.**

Error message	Cause/ Measure to correct error
5 	The speed exceeds the physical limits of the measuring system (< 27,000 Hz pulse frequency). **Measures:** – **Reduce test speed.** – **Check installation.**

13 Maintenance, cleaning and disposal

The CTC II test device has been tested and calibrated for flawless operation in compliance with DIN ISO 9001. The means of measurement used in calibration are in line with (can be traced back to) national standards.

Calibration service A calibration service is available for workshops which are ISO 9001-certified. CTC II calibration can be carried out on site. If you require assistance, your VDO service partner will be pleased to help.

13.1 Maintenance

The CTC II and the Roller Interface Module are equipped with modern maintenance-free technology.
Preventative maintenance is therefore not required.

! Important

Only authorised persons may open the CTCII and the Roller Interface Module. Unauthorised tampering may make the device unserviceable and result in the cancellation of the legal permit/ approval.

The manufacturer is not liable for damages caused by unauthorised tampering, modifications and/ or repairs.◄

13.2 Cleaning

Important

Danger of short-circuits!

Disconnect the CTC II from the power outlet before starting to clean the device!◄

Use a slightly dampened cloth to clean the CTC II's housing, display and key panel. If this does not suffice, you can use special plastic or general cleaning agents.

Important

Do not use any solvents to clean the device, e. g. thinners, benzine and abrasive cleaning agents.◄

13.3 Disposal

The CTC II is equipped with electronic components and an internal rechargeable battery.

Batteries/ rechargeable batteries and electronic scrap may not be disposed of in your household waste!

Please take your CTC II to your VDO service partner for professional disposal - or take it to a community disposal site.◄

14 Technical data

14.1 Technical data CTC II

Power supply:	⎓ 10 ... 30V DC, internal rechargeable battery
Current consumption:	max. 1.2 A
Operating temperature:	+5 ... +40 °C
Storage temperature	-20 ... +70 °C
Rel. humidity	max. 80 %, non-condensing
Type of protection	IP40
Contamination level	II
Dimensions (mm)	120 x 230 x 40 mm (W x L x H)
Weight	650 g
Display	Alphanumerical, 4 lines à 20 characters, 5 mm character height
Key panel	32 keys, double-overlaid with special characters
Interfaces	• Bluetooth • K-Line data format KWP 2000 Protocol • Serial interface RS 232
K constant	Programming range: 2000 imp/km – 50000 imp/km (depending on the connected tachograph)
Measuring range constant "W"	2000 imp/km – 50000 imp/km
"V" control	20 ... 200 km/h
Measuring range of clock accuracy	0 ... ± 120 s/ 24 h

Measured track for road measurement	20 m
Test speed for "W" and "L" measurements on the road	manual 0 ... 15 km/h, automatic 3 ... 25 km/h

14.2 Technical data - Roller Interface Module

Power supply	100 … 240V AC ± 10 %, 50Hz, 60Hz
Overvoltage category	II
Current consumption	max. 1A
Device fuse	1A slow triptime
Operating temperature	0 ... +40 °C
Storage temperature	-20 ... +70 °C
Humidity	max. 80 %, non-condensing
Type of protection	IP54
Contamination level	II
Dimensions	200 x 180 x 95 mm
Weight	1.5 kg
Switching output for lifting bar/ brakes	Alternating contact, supply voltage, contact load 0.6A, fused via device fuse
Connections	• Voltage output for sensor supply: ⎓ 12V DC ± 15%, 1A short-circuit-proof • Roller sensor (NPN or push-pull): 0.2 … 5 cm/imp • Light barrier for wheel circumference measurement (NPN or push-pull)
Correction value setting	± 9.9 % in increments of 0.1 %

Measuring range constant "W"	2000 … 50 000 l/km
Measuring range constant "L"	300 ... 7200 mm
Test speed for "W" and "L" measurements	1 … 60 km/h
Measured track for roller measurement	200 m double roller set, 20 m brake test stand
Odometer check	100 … 10 000 m

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