

Tachograph programmer CD400



User manual

CD400 V2.0 r07 b10 (9/01/2014)

Index

1. Introduction.....	3
1.1. What is a tachograph?.....	3
2. Description	3
2.1 Technical specifications.....	3
2.2. Keyboard	4
2.3. Connections.....	4
3. Operation	5
3.1. Power supply and tachograph type detection	5
3.2. Menu trees	6
3.2.1. KTCO 13xx/1318	6
3.2.2. MTCO 1324/1390	6
3.2.3. Motomet.EGK100.....	7
3.2.4. Kienzle 1319	8
3.2.5. V.Root VR2400.....	9
3.2.6. Digital VDO	10
3.2.7. Digital SE5000.....	11
3.2.8. Digital ACTIA.....	12
3.2.8. Digital EFAS.....	13
4 Functions description	14
4.1. Measure W	14
4.1.1. Manual.....	14
4.1.2. Photo Sensor	15
4.1.3. Rolling road.....	15
4.1.4. Constant speed.....	15
4.1.5. Draw-wire.....	15
4.1.6. Odometer (only for digital tachographs).....	16
4.2 Measure K.....	17
4.3. Parameters	17
4.4. Speed test.....	17
4.4.1 Manual.....	17
4.4.2 Automatic	18

4.5. Odometer test.....	19
4.6. Read DTCs.....	20
4.7. Erase DTCs	20
4.8. Sensor Pairing (Kitas activation).....	21
4.9. Clock test	21
4.10. PIN code	22
4.11. Select tachograph.....	23
4.12. Product info.....	23
4.13. Language	23
5. Software upgrade procedure	23

1. Introduction

1.1. What is a tachograph?

Basically, a tachograph is a device that measures and records the speed and distance driven by a vehicle. The data are recorded in the form of graphics on a paper disk.

The new digital tachographs record those data on its embedded memory and also on the smartcard of the driver.

2. Description

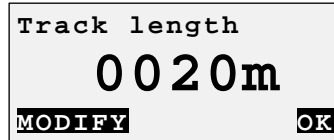
2.1 Technical specifications



- Graphic FSTF LCD Display:
100 x 32 px (4 lines x 20 char) - White LED backlight
- Size: 150 x 100 x 45 mm
- Supply voltage: 9 to 30 VDC
- Supply current: 12mA
- Case: green-blue ABS (IP40)
- Operating temp: -20...+70°C
- Weight: 155g

2.2. Keyboard

- Alternate function keys 'F1', 'F2' & 'F3' are active when a function in inverted video appears on the bottom line of the display.



F1= MODIFY, F3=OK

- Alternate function key '↑' & '↓' are used for example to navigate the menus.

- Alternate function key '←' & '→' are used to select the digit in some parameters.

- 'Ent' (=Enter) is used to select a function or enter a value.

- 'Esc' key is used to go back in the menu, leave a function, to erase the last digit entered and to switch the programmer ON & OFF when powered by the battery.

2.3. Connections



- Left connector:

Serial port for software upgrade (upgrade cable).

- Center connector:

Connection for crocodile clip cable (K13xx/K1318).

- Right connector:

Connection for tachograph cable.

3. Operation

3.1. Power supply and tachograph type detection

For all tachograph types, except for the K13xx/1318 and the FTCO1319, the programmer is powered by the tachograph itself. An automatic tachograph type detection is executed on power ON, so don't switch the programmer ON, simply connect it to the tachograph with the appropriate cable. The programmer will switch ON and detect the tachograph type.

In the case of the K13xx/1318 and the FTCO1319, switch the programmer ON pressing the 'I/O' key. If the FTCO1319 is connected, the programmer will detect it. To switch the programmer OFF, press and hold the 'I/O' key.

If no tachograph is detected, the K13xx/1318 will be selected by default.

On power ON, the programmer will display the product information (Software version, Serial number, etc...), then the menu for the tachograph type detected.

3.2. Menu trees

The functions available in the main menu depend on tachograph model detected (or selected manually).
The tachograph model appears on the top line.

3.2.1. KTCO 13xx/1318

KTCO 13xx/1318

1.Measure W	1.Manual 2.Photo sensor
2.Measure K	
3.Speed test	1.Manual 2.Automatic
4.Odometer test	
5.Clock test	
6.Select Tacho.	
7.Product info.	
8.Language.	

3.2.2. MTCO 1324/1390

MTCO 1324/1390

1.Measure W	1.Manual 2.Photo sensor
2.Parameters	1.K Factor 2.Odometer 3.Instal. Date 4.Calibr. Date 5.Time & Date 6.O/P shaft 7.Service delay 8.CAN priority 9.Binary code 10.Product Code 11.VIN 12.N-RPM Factor 13.L-Tyre 14.Serial number 15.Maximum speed (1390 only)
3.Speed test	1.Manual 2.Automatic
4.Odometer test	
5.Erase DTCS	
6.Sensor pairing	
7.Clock test	
8.Select Tacho.	
9.Product info.	
10.Language.	

3.2.3. Motomet.EGK100

Motomet.EGK100

1.Measure W	1.Manual 2.Photo sensor
2.Parameters	1.K Factor 2.Kn 3.U1 4.U2 5.U3
3.Speed test	1.Manual 2.Automatic
4.Odometer test	
5.Select Tacho.	
6.Product info.	
7.Language.	

3.2.4. Kienzle 1319

Kienzle 1319

1.Measure W	1.Manual 2.Photo sensor
2.Measure K	
3.Parameters	1.K factor 2.Odometer 3.Instal. Date 4.Calibr. Date 5.Odometer Unit 6.Speed Warning 7.Fitter Number 8.Clock Speed 9.Kn ON/OFF 10.Kn Max 11.Kn Warning 12.Code 13.Mercedes ID 14.EEC Tacho. 15.SWISS ABZ 16.Driver change 17.4imp/m output 18.Note 19.Service 20.Tot. distance 21.Model 22.Serial number 23.Electronics 24.Code SO 25.Code ME 26.Code PR
4.Speed test	1.Manual 2Automatic
5.Odometer test	
6.Clock test	
7.Select Tacho.	
8.Product info.	
9.Language.	

3.2.5. V.Root VR2400

V.Root VR2400

1.Measure W	1.Manual 2.Photo sensor
2.Parameters	1.K factor 2.Odometer 3.Pulse per rev. 4.Idle rpm 5.Economy rpm 6.Poor Econ. rpm 7.CANBus RPM 8.RPM Display 9.Dist displ.0s 10.DTCs Display 11.Overspd Flash 12.Overspeed 12.Time & Date 13.O/P shaft 14.4th Chart Tr 15.CANBus enable 16.CAN Type 17.Dual Axle 18.D.Axle Ratio 19.D6 pin funct. 20.Speedo.OP fact 21.Serial Comms 22.Ignit.On rec. 23.Driver 2 Duty 24.Reset HeartBt 25.Eject pin code 26.Sensor type 27.Service Delay 28.Installat.date 29.Calibrat. date 30.Repair Shop ID 31.Vehicle ID n°
3.Speed test	1.Manual 2.Automatic
4.Odometer test	
5.Erase DTCS	
6.Sensor pairing	
7.Clock test	
8.Select Tacho.	
9.Product info.	
10.Language.	

3.2.6. Digital VDO

DIGITAL VDO

1.Measure W	1.Manual 2.Photo sensor		
2.Parameters	1.Calibration	1.W factor 2.K factor 3.L (Tyre Circ.) 4.Tyre Size 5.Max.Auth.Speed 6.Odometer 7.Time & Date 8.Next Cal. Date 9.Veh.Reg.Nation 10.Veh.Reg.Number 11.Veh.Id.Number	
	2.Other param.	1.ResetHeartbeat 2.TCO1 priority 3.O/P shaft 4.CAN rep.rate	
	3.Manufacturer	1.Part number 2.Drv1 ign.ON 3.Drv2 ign.ON 4.Drv1 ign.OFF 5.Drv2 ign.OFF 6.D1D2 Record 7.RPM Record 8.Speed Record 9.Install. date 10.ResetHeartbeat 11.CAN error	12.CAN2 TC01 mess 13.CAN2 WakeUp D3 14.CAN2RemoteDown 15.RD interface 16.Speed Warning 17.Illum.mode 18.IMS Activation 19.IMS source 20.IMS factor 21.VDO Counter
	4.Information	1.Supplier Id 2.Manufact. Date 3.Serial number 4.Hardware number 5.Hardware vers. 6.Software number 7.Software vers. 8.License number	
3.Speed test	1.Manual 2.Automatic		
4.Odometer test			
5.Read DTCS			
6.Erase DTCS			
7.Sensor pairing			
8.Clock test			
9.PIN code			
10.Select Tacho.			
11.Product info.			
12.Language.			

3.2.7. Digital SE5000

DIGITAL SE5000

1.Measure W	1.Manual 2.Photo sensor		
2.Parameters	1.Calibration	1.W factor 2.K factor 3.L (Tyre Circ.) 4.Tyre Size 5.Max.Auth.Speed 6.Odometer 7.Time & Date 8.Next Cal. Date 9.Veh.Reg.Nation 10.Veh.Reg.Number 11.Veh.Id.Number 12.O/P shaft	
	2.Other param.	1.ResetHeartbeat 2.TCO1 priority 3.O/P shaft 4.CAN rep.rate 5.Part number	
	3.Manufacturer	1.Part number 2.CanBus activat 3.Speed Corr. 4.D6 5.D4 6.Light input 7.RPM input 8.Default lang. 9.Serial Output	10.D1D2 Record 11.RPM Record 12.Speed Record 13.Kn factor 14.Install.date 15.IMS Source 16.IMS Gain 17.IMS Factor
	4.Information	1.Supplier Id 2.Manufact. Date 3.Serial number 4.Hardware number 5.Hardware vers. 6.Software number 7.Software vers. 8.License number	
3.Speed test	1.Manual 2.Automatic		
4.Odometer test			
5.Read DTCS			
6.Erase DTCS			
7.Sensor pairing			
8.Clock test			
9.PIN code			
10.Select Tacho.			
11.Product info.			
12.Language.			

3.2.8. Digital ACTIA

DIGITAL ACTIA

1.Measure W	1.Manual 2.Photo sensor								
2.Parameters	<table border="1"> <tr> <td>1.Calibration</td> <td> 1.W factor 2.K factor 3.L (Tyre Circ.) 4.Tyre Size 5.Max.Auth.Speed 6.Odometer 7.Time & Date 8.Next Cal. Date 9.Veh.Reg.Nation 10.Veh.Reg.Number 11.Veh.Id.Number 12.O/P shaft </td> </tr> <tr> <td>2.Other param.</td> <td> 1.ResetHeartbeat 2.TCO1 priority 3.O/P shaft 4.CAN rep.rate 5.Part number </td> </tr> <tr> <td>3.Specific</td> <td> 1.Default Lang 2.Card Language 3.Backlight conf. 4.Drv1 ign.ON 5.Drv2 ign.ON 6.Drv1 ign.OFF 7.Drv2 ign.OFF 8.Install. date </td> </tr> <tr> <td>4.Information</td> <td> 1.Supplier Id 2.Manufact. Date 3.Serial number 4.Hardware number 5.Hardware vers. 6.Software number 7.Software vers. 8.License number </td> </tr> </table>	1.Calibration	1.W factor 2.K factor 3.L (Tyre Circ.) 4.Tyre Size 5.Max.Auth.Speed 6.Odometer 7.Time & Date 8.Next Cal. Date 9.Veh.Reg.Nation 10.Veh.Reg.Number 11.Veh.Id.Number 12.O/P shaft	2.Other param.	1.ResetHeartbeat 2.TCO1 priority 3.O/P shaft 4.CAN rep.rate 5.Part number	3.Specific	1.Default Lang 2.Card Language 3.Backlight conf. 4.Drv1 ign.ON 5.Drv2 ign.ON 6.Drv1 ign.OFF 7.Drv2 ign.OFF 8.Install. date	4.Information	1.Supplier Id 2.Manufact. Date 3.Serial number 4.Hardware number 5.Hardware vers. 6.Software number 7.Software vers. 8.License number
1.Calibration	1.W factor 2.K factor 3.L (Tyre Circ.) 4.Tyre Size 5.Max.Auth.Speed 6.Odometer 7.Time & Date 8.Next Cal. Date 9.Veh.Reg.Nation 10.Veh.Reg.Number 11.Veh.Id.Number 12.O/P shaft								
2.Other param.	1.ResetHeartbeat 2.TCO1 priority 3.O/P shaft 4.CAN rep.rate 5.Part number								
3.Specific	1.Default Lang 2.Card Language 3.Backlight conf. 4.Drv1 ign.ON 5.Drv2 ign.ON 6.Drv1 ign.OFF 7.Drv2 ign.OFF 8.Install. date								
4.Information	1.Supplier Id 2.Manufact. Date 3.Serial number 4.Hardware number 5.Hardware vers. 6.Software number 7.Software vers. 8.License number								
3.Speed test	1.Manual 2.Automatic								
4.Odometer test									
5.Read DTCS									
6.Erase DTCS									
7.Sensor pairing									
8.Clock test									
9.PIN code									
10.Select Tacho.									
11.Product info.									
12.Language.									

3.2.8. Digital EFAS

DIGITAL EFAS

1.Measure W	1.Manual 2.Photo sensor		
2.Parameters	1.Calibration	1.W factor 2.K factor 3.L (Tyre Circ.) 4.Tyre Size 5.Max.Auth.Speed 6.Odometer 7.Time & Date 8.Next Cal. Date 9.Veh.Reg.Nation 10.Veh.Reg.Number 11.Veh.Id.Number 12.O/P shaft	
	2.Other param.	1.ResetHeartbeat 2.TCO1 priority 3.O/P shaft 4.CAN rep.rate 5.Part number	
	3.Specific	1.CAN-A activat. 2.CAN-A tr.rate 3.CAN-A ID mode 4.CAN-A sample 5.CAN-A pro.tach 6.CAN-A pro.diag 7.Trip Reset 8.ExtSerial act. 9.ExtSerial prot 10.Illumination 11.Engine Speed	12.N Factor 13.EngSpdThreshold 14.SpeedThresholds 15.Lang.Handling 16.PrtLocalTimeEn 17.CAN-C activat. 18.CAN-C tr.rate 19.CAN-C ID mode 20.CAN-C sample 21.RemoteDataTrans
	4.Information	1.Supplier Id 2.Manufact. Date 3.Serial number 4.Hardware number 5.Hardware vers. 6.Software number 7.Software vers. 8.License number	
3.Speed test	1.Manual 2.Automatic		
4.Odometer test			
5.Read DTCS			
6.Erase DTCS			
7.Sensor pairing			
8.Clock test			
9.PIN code			
10.Select Tacho.			
11.Product info.			
12.Language.			

4 Functions description

4.1. Measure W

4.1.1. Manual

```
Track length
  0020m
MODIFY      OK
```

1. Check the track length.
Press F3 (OK) to go on, or press F1(MODIFY) to change the track length.

```
Track length
  0020m
  [ 50 ]
```

- (optional)
to set the 'Track length', enter the new value and press 'Ent'.

```
Pulse counter
  0000.0
      START
```

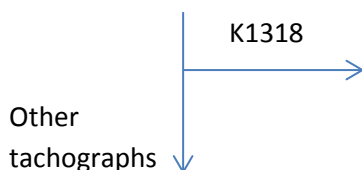
2. Press F3 (START) and drive the vehicle along the track.
The pulse count will start.

```
Pulse counter
  0123.0
      STOP
```

3. At the end of the track, press F3 (STOP).
The W factor will be calculated as a function of the pulse count and the track length.

```
W factor
  6150.0
P:0123.0 K FACTOR
```

4. Press F3 (K FACTOR) to access K factor setting.



```
W= 6150 p/km
K TABLE: 06147p/km
SWITCHES: 1_3_5_7_9_
```

5. The closest value from the K factor table of the 1318 is displayed with the corresponding switches positions.
Press 'Esc' to go back to main menu.

```
K FACTOR: 05347p/km
NEW K:    05347p/km
RECORD NEW K ?
      YES  NO
```

5. Present K factor will be read from the tachograph and displayed. 'NEW K' is the W factor that has been measured and should be recorded as the new K factor.
Press F2 (YES) to record it or F3 (NO) to leave it unchanged.

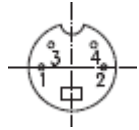
```
K Factor
K = 05347p/km
      MODIFY
```

6. If 'YES' has been selected previously, the new K factor will be read back from the tachograph.
This factor can modified manually if required pressing F3 (MODIFY).

4.1.2. Photo Sensor

The W measure with a photosensor is exactly the same as in manual mode, except that the 'START' and 'STOP' pulses are generated by the sensor. In photo sensor mode, the 'F3' (START & STOP) will not be active.

You can connect any photo sensor using a MiniDIN 4-pins connector connected to the left connector of the CD400.



- Shielding: Ground (GND 0V).
- Pin n°2: photo sensor signal (the signal should be low when the reference object/reflector is not detected).

4.1.3. Rolling road.

[Under development]

4.1.4. Constant speed.

[Under development]

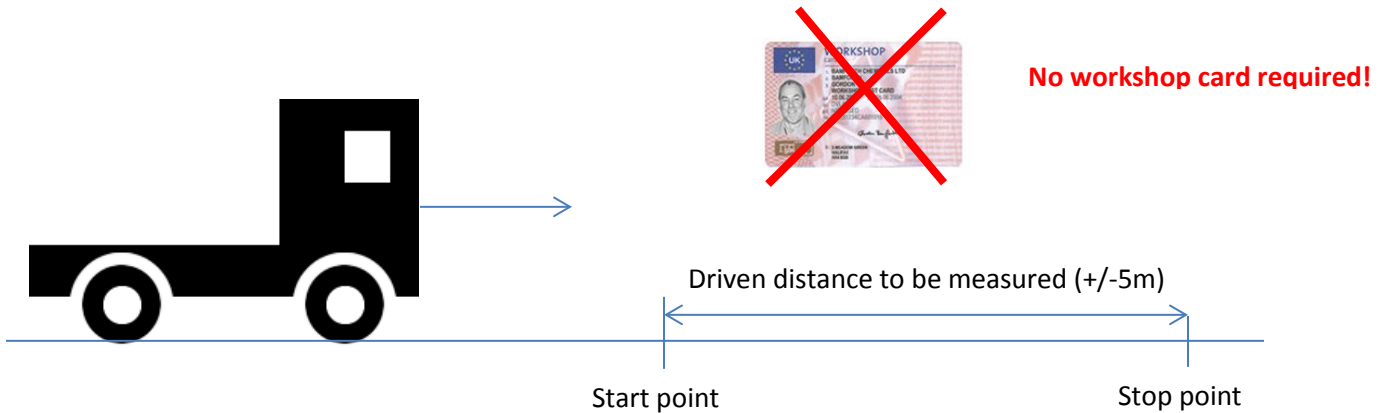
4.1.5. Draw-wire.

[Under development]

4.1.6. Odometer (only for digital tachographs).

[Under development]

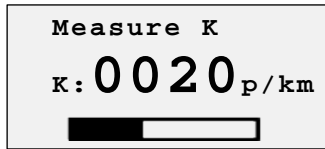
Using the odometer parameter to measure the W factor does not require the workshop card. Therefore, this function can be useful for transport companies or for the authorities. The latest is calculated by measuring the distance driven by a vehicle when the high resolution odometer is incremented by 5m.



	<p>Start Point detection</p> <p>Drive slowly...</p>		<p>Drive slowly, the CD400 will detect the Start Point within +/- 5m.</p>
	<p>Mark Start Point</p> <p>OK</p>		<p>Mark the Start Point on the ground.</p>
	<p>Stop Point detection</p> <p>Drive slowly...</p>		<p>Drive slowly, the CD400 will detect the Stop Point in around 5m (depending on last calibration accuracy).</p>
	<p>Enter distance:</p> <p>[503]cm</p>		<p>Measure the driven distance using a decameter and enter the value in centimeter into the CD400.</p>
	<p>K: 5546 p/km</p> <p>W: 5512 p/km</p> <p>Error: + 000.6 %</p> <p>OK</p>		<p>As a result, the CD400 will display the K factor of the tachograph, the W factor of the vehicle and the calibration error in %.</p>

4.2 Measure K

This function is available only for the K1314/1318 and the FTCO 1319.



Measuring the K factor takes a few seconds.

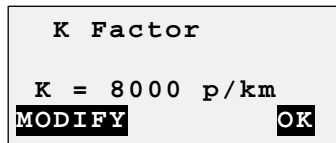
The value is updated every time the progress bar is completed.

4.3. Parameters

The parameter list is available at: [3.2. Menu trees](#)

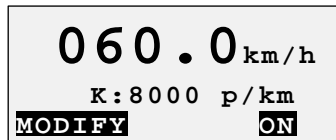
4.4. Speed test

4.4.1 Manual



For the K1314/1318 the K reference is set to the last K measured if available, otherwise it is set to 8000. For the other tachographs the K reference is set to the K factor programmed in the tachograph.

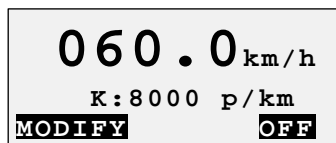
If required, the K reference can be adjusted manually pressing 'F1' (MODIFY).



By default the speed is set to 60 km/h.

Press F1 (ON/OFF) to start/stop speed simulation.

The text "km/h" is blinking when the speed is currently simulated.



Pressing the '↑' and '↓' keys, will increase/decrease the speed by 1km/h steps.

Pressing the '←' and '→' keys, will increase/decrease the speed by 0.1km/h steps.

Press F1(MODIFY) to insert a new speed value.

4.4.2 Automatic

```
Select diagram
→1.Custom diag.
 2.Tacho. 100km/h
 3.Tacho. 125km/h
 4.Tacho. 140km/h
 5.Tacho. 160km/h
 6.Tacho. 180km/h
```

Select the speed diagram to be executed and press 'Ent'.

```
Custom diag.
Kref= 08000 p/km
MODIFY      OK
```

For the K1314/1318 the K reference is set to the last K measured if available, otherwise it is set to 8000.

For the other tachographs the K reference is set to the K factor programmed in the tachograph.

If required, the K reference can be adjusted manually pressing 'F1' (MODIFY). Press 'F3' (OK) if you agree with the K factor value.

```
Custom diag.
Step:01/23
180 km/h - 010s
EDIT      START
```

Using the '↑' and '↓' keys, you can check the speed and duration of each step of the automatic test.

Press 'F3' (START) to start the test.

The 'EDIT' function (F1) is available only for the custom diagram to edit the speed and duration of current step of the automatic test. The automatic test will end at the first step at which the duration is set to zero.

```
Custom diag.
Step:01/23 - 007s
180 km/h - 010s
K:05000      START
```

A count down will show the time left for present step.

Press 'F3' (STOP) to stop the bench test

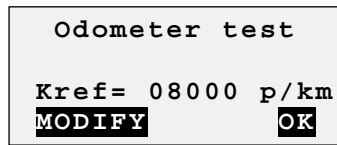
```
Custom diag.
Bench test
Completed
      OK
```

Bench test completed.

Press 'F3' (OK) to go back to the menu.

4.5. Odometer test

The programmer will automatically simulate a speed of 50km/h on 1000m distance and check if the odometer as been incremented by 1000m.



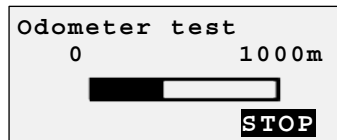
For the K1314/1318 the K reference is set to the last K measured if available, otherwise it is set to 8000.
For the other tachographs the K reference is set to the K factor programmed in the tachograph.

If required, the K reference can be adjusted manually pressing 'F1' (MODIFY).

KTCO1318/FTCO1319/EGK100



Press 'F2' to adjust the position of the start point.
Press 'F3' (START) to start the test.

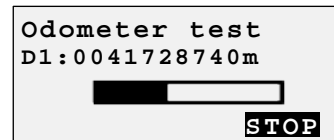


Wait until the progress bar is completed.
The test can be aborted pressing 'F3' (STOP).

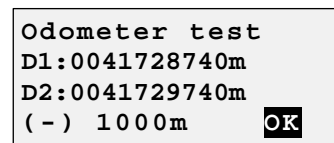
MTCO/VR2400/DIGITAL



The initial value of the odometer (D1) will be read.
Press 'F3' (START) to start the test.



Wait until the progress bar is completed.
The test can be aborted pressing 'F3' (STOP).



At the end of the test, the final odometer value will be read (D2). The difference between D2 and D1 will be calculated (D2-D1). If the difference equals 1000m, the test has been successful.

4.6. Read DTCs

The function "Read DTCs" is used to read the "Diagnostic Trouble Codes" (DTC) stored in the error memory of the tachograph.

It is available for the following tachographs:

- Digital tachographs (DTCO1381, SE5000, SmarTach & EFAS)

```
DTCs number:03
01: 002452 (2F)
SensorTachograph
SignatureMismatch23
```

DTCs number is the error number available in memory
Error code
Full error description

Use the '↑' and '↓' keys to select next or previous error.

Press 'Esc' to go back to main menu.

4.7. Erase DTCs

The function "Erase DTCs" is used to erase the "Diagnostic Trouble Codes" (DTC) stored in the error memory of the tachograph.

It is available for the following tachographs:

- MTCO 1324/1390
- VR2400
- Digital tachographs (DTCO1381, SE5000, SmarTach & EFAS)

The following message is displayed after erasing the error memory.



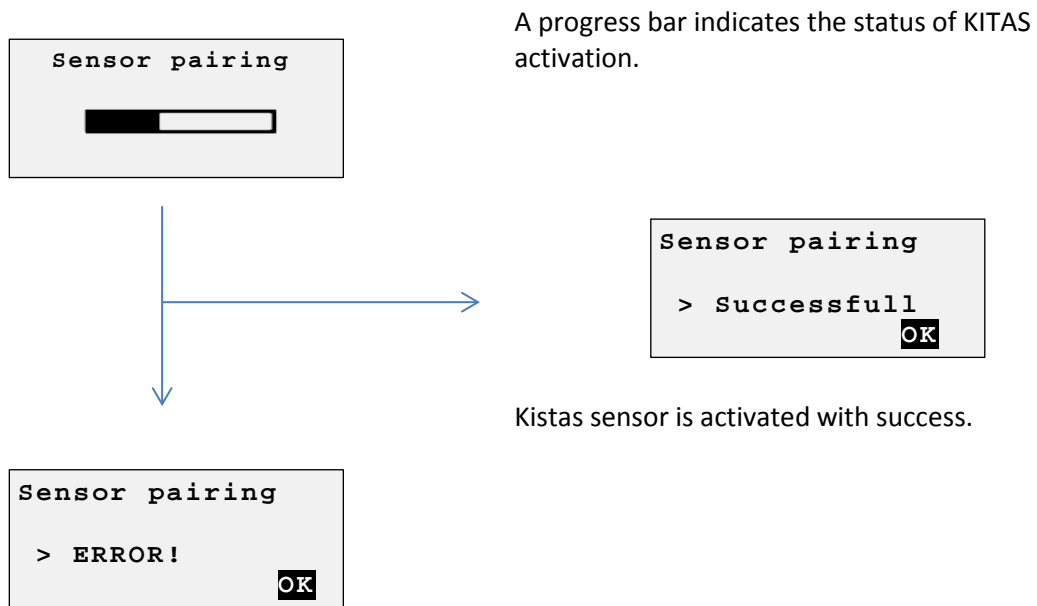
Press 'Esc' to go back to main menu.

4.8. Sensor Pairing (Kitas activation)

This function is available for the following tachographs:

- MTCO 1324/1390
- VR2400
- Digital tachographs (DTCO1381, SE5000, SmarTach & EFAS)

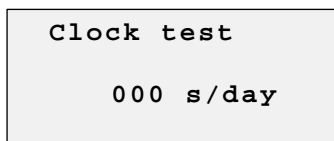
Sensor pairing is executed automatically after modifying any calibration parameter on digital tachographs.



4.9. Clock test

The clock test function will check the accuracy of the clock of the tachograph.

For the K1314, the K1318 and the k1319, an external clock sensor has to be used.



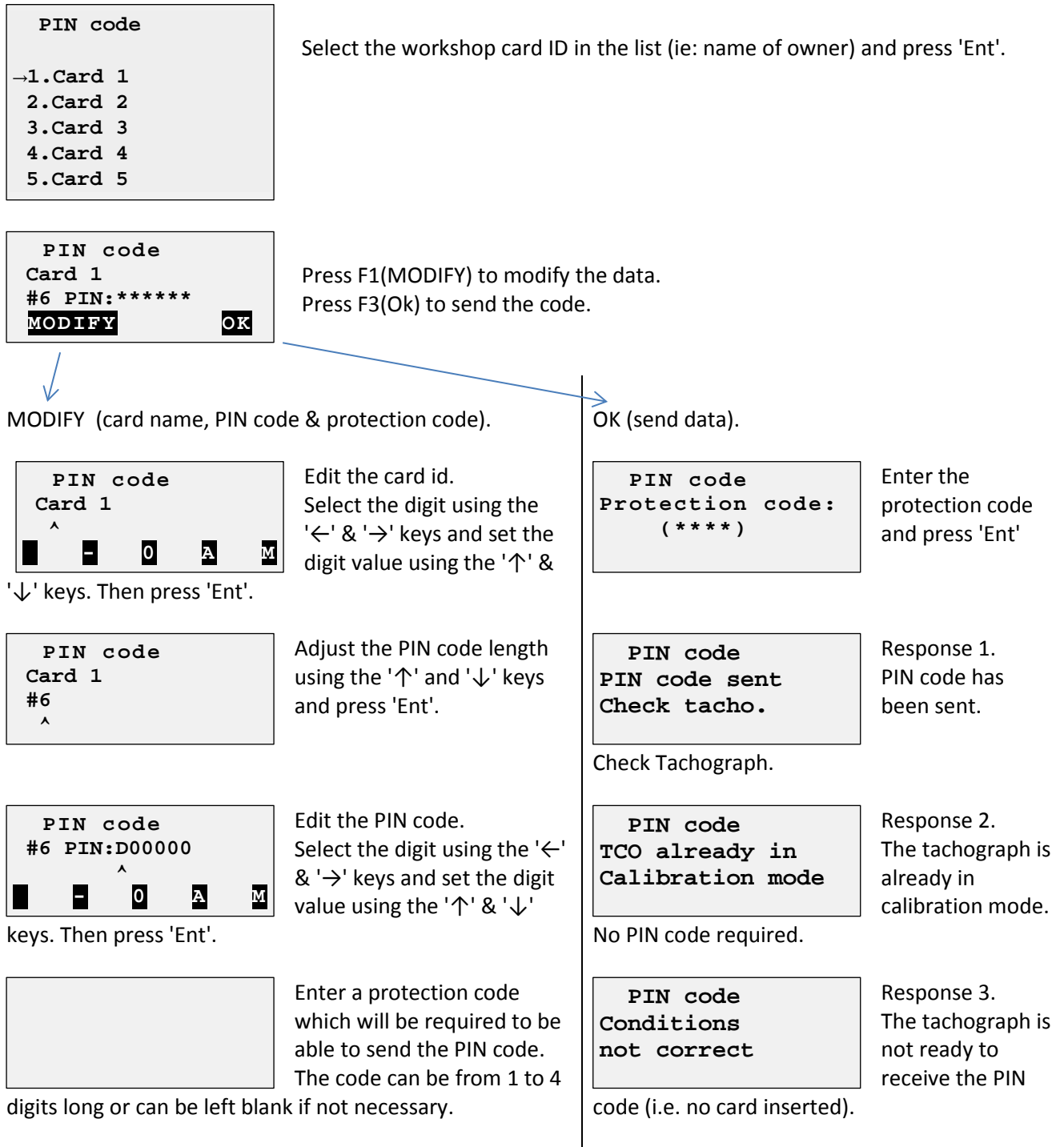
The measure is updated every second.

The result represents the clock deviation in seconds/day.

Press 'Esc' to go back to main menu.

4.10. PIN code

The "PIN code" function permits to send the workshop card PIN code to the tachograph automatically. This function is available for the Digital tachographs (DTCO1381, SE5000 & EFAS)



4.11. Select tachograph

```
Select Tacho.
→1.KTCO 13xx/1318
2.MTCO1324/1390
3.Motomet.EGK100
4.Kienzle 1319
5.V.Root VR2400
6.Digital VDO
7.Digital SE5000
8.Digital Actia
9.Digital EFAS
```

The tachograph type is detected automatically on power ON, but if for any reason, another type has to be selected, this can be done manually.

Select the tachograph type in the menu and press 'Ent'.

4.12. Product info

```
CD400 Programmer
Sn: 56000010
SW: V2.0 r07
www.cdconcept.be
```

Shows software version and serial number.

4.13. Language

```
Language
→1.English
2.Deutsch
3.Español
4.Français
5.Nederlands
6.Português
7.Turkish
8.Romanian
9.Russian
```

Select the language in the menu and press 'Ent'.

5. Software upgrade procedure

1. Download and install the CD200-ISP software: [setup-CD200-ISP-V1-2.zip](#)
2. Connect the CD400 to the serial port of your PC using the upgrade cable (CA-RS232-1).
3. Start the CD200-ISP software.
4. Select the COM port.
5. Select the .hex file.
6. Click on the "Program" button.
7. Switch the CD400 power ON using a tachograph, a DC adapter (9V to 30V), or the internal 9V battery.
8. Wait until the progress bar is completed.