# Stoneridge Optimo Manual



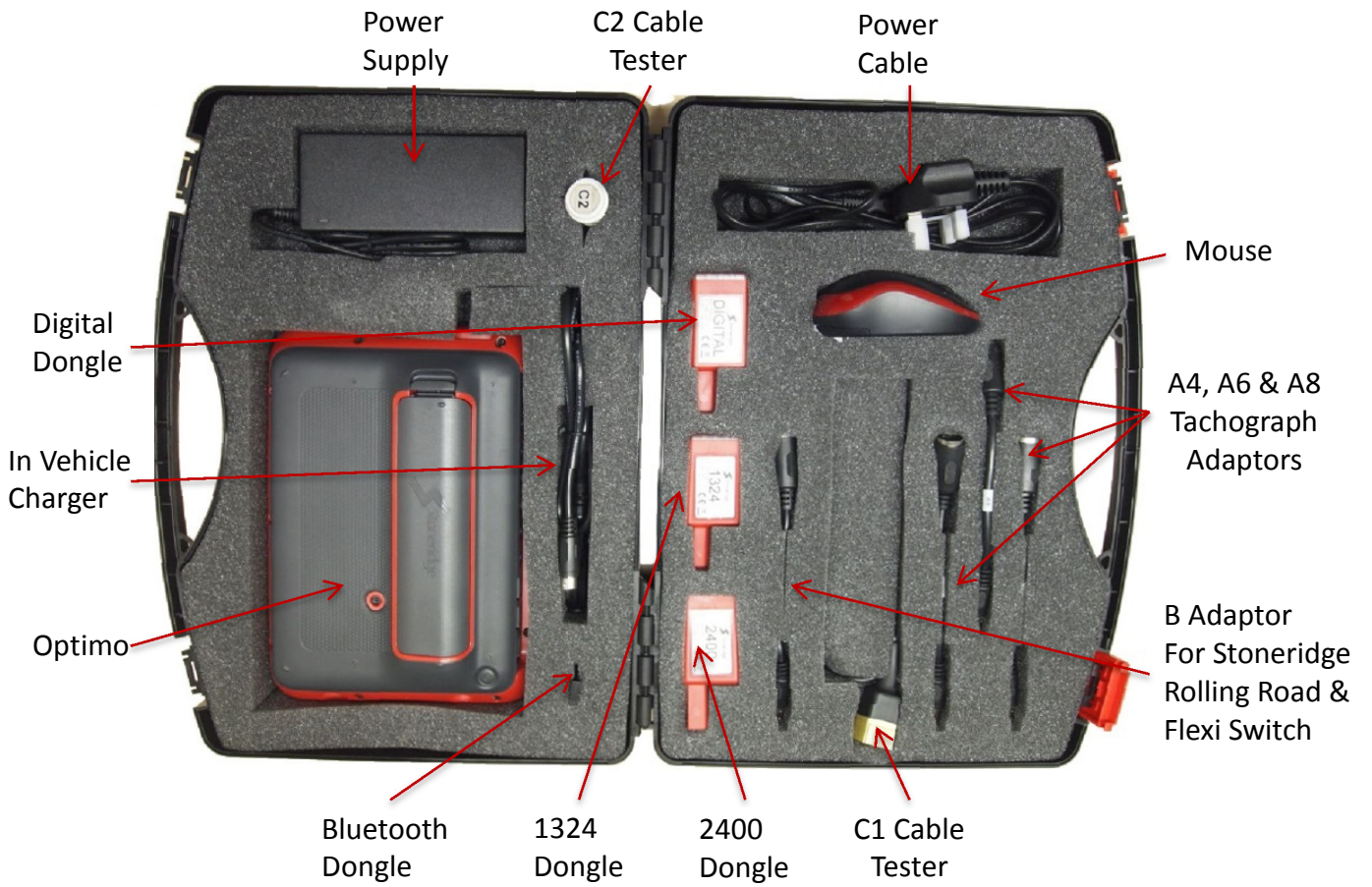# Stoneridge Electronics Ltd

# Copyright

The information contained in this document is the property of Stoneridge Electronics Ltd. and should not be reproduced, revealed or appropriated, either in whole or in part, without the written authority of Stoneridge, Inc.
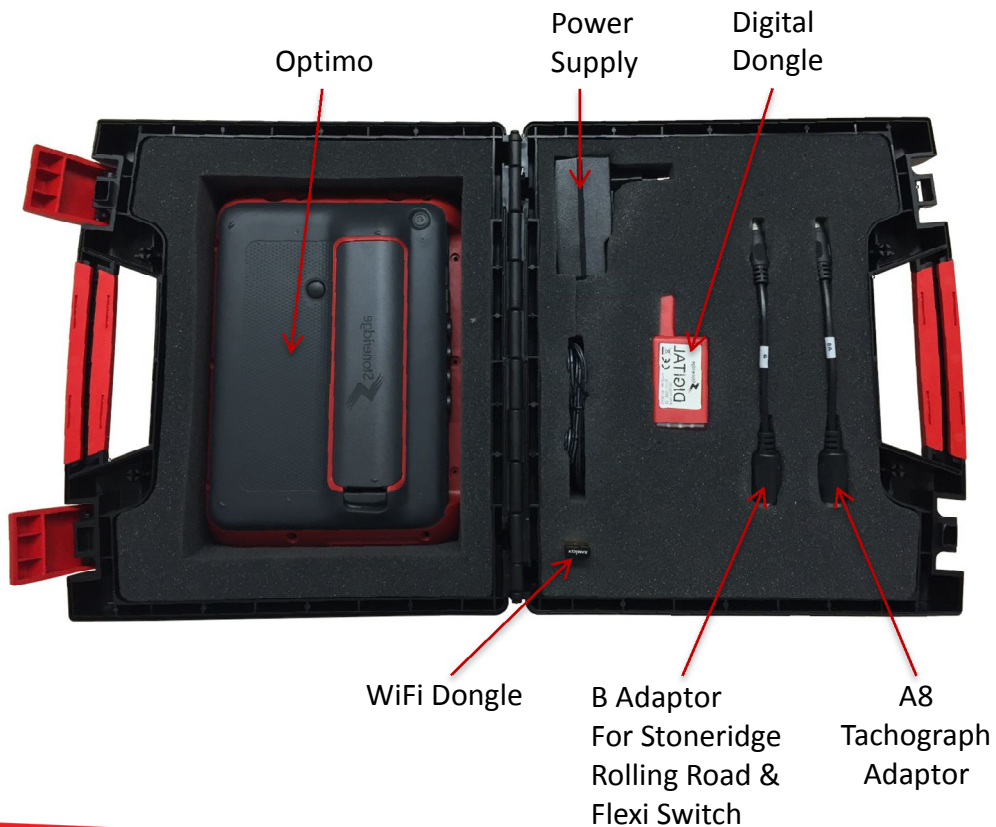
# Contents

# 1. Optimo Kit



Power Supply

C2 Cable Tester

Power Cable

Mouse

Digital Dongle

A4, A6 & A8 Tachograph Adaptors

In Vehicle Charger

Optimo

B Adaptor For Stoneridge Rolling Road & Flexi Switch

Bluetooth Dongle

1324 Dongle

2400 Dongle

C1 Cable Tester

## 1.1. Optimo Light Kit



Optimo

Power Supply

Digital Dongle

WiFi Dongle

B Adaptor For Stoneridge Rolling Road & Flexi Switch

A8 Tachograph Adaptor

## 1.2. Optimo$^2$ Kit

Optimo$^2$

Screen protector

Power Supply

Digital Dongle

## 2. Power – Optimo and Optimo Light

Snap-fit battery pack

Power on/off
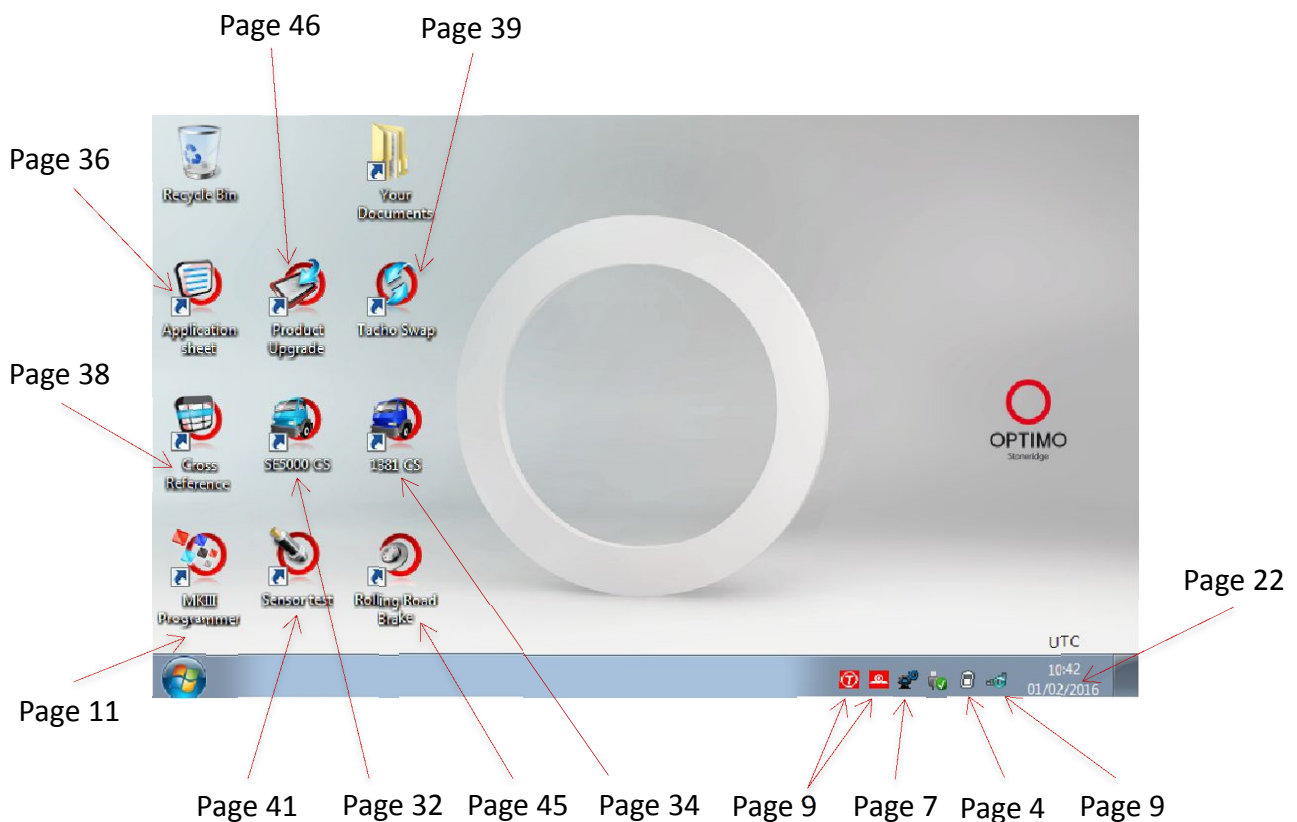
Power socket for mains or vehicle adaptor

- Lithium Ion 14.4V battery, life typically 4 hours.

- Charging – 230V ac supply or vehicle power connector.

- Charging time – typically one hour, overnight on first use.

- Charging time for Optimo Light – typically up to 4 hours.

## 2.1. Power – Optimo²

Power on/off



DIN sockets                                          USB ports

## 3. Optimo Main Screen

▪ Optimo supports all digital and analogue tachographs. Extra cables may be required when using Optimo Light. See table below.



Page 46        Page 39

Page 36

Page 38

Page 22

Page 11

Page 41    Page 32    Page 45    Page 34    Page 9    Page 7    Page 4    Page 9

## 4. Optimo, Optimo Light and Optimo² Features

| Component | Optimo | Optimo Light | Optimo² |
|---|---|---|---|
| External USB ports | 4 | 2 | 2 |
| Bluetooth | Yes | No | Yes |
| WiFi | Yes | Yes | Yes |
| External Mouse | Yes | No | No |
| Camera | Yes | No | Yes |
| Smart card reader | Yes | Yes | Yes |
| Dongles | Digital, 2400, 1324 | Digital | Digital |
| I/O connectors | A,B,C,D,E,F,G | A,B,C | None, DIN connectors only |
| Adaptor cables | A4, A6, A8 B, C1 and C2 connector | A8, B | None |
| Sensors, testing | Yes | No | No |
| Battery charge time | 1 hour | 4 hours | 2.5 hours |
| Vehicle charger | Yes | No | No |
| Screen dimming | Yes | No | Yes |
| Screen rotation | Yes | No | Yes |
| Screen protector | Yes | No | Yes |

## 5. Sleep mode

| 5 minutes inactivity | Screen blank – programs still running | Tap screen to wake up |
|---|---|---|
| 30 minutes inactivity | Optimo shuts down | Press ON button at rear to re-start |

- Power off.



Step 1
Tap
Windows icon

Step 2
Tap
Shut down
button
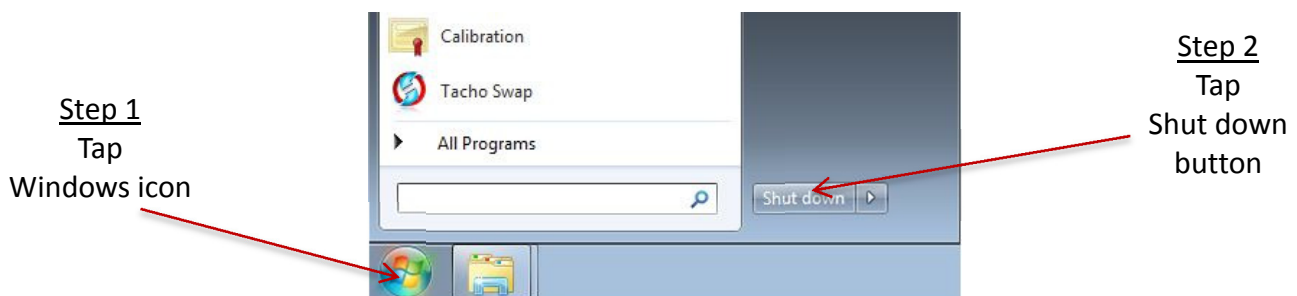
# 6. Getting Started

- How to set up your Optimo

## 6.1. Task Bar Icons

### 6.1.1. Workshop Settings

- On first power up of Optimo a number of details must be entered into a series of settings screens.

- Settings screens can also be accessed at any time by tapping here.



- After selecting Language and Country, enter your workshop details.  Complete all fields.



| Workshop Settings | |
| --- | --- |
| Company name | Stoneridge Electronics |
| Address | Charles Bowman Avenue |
| | Claverhouse |
| | Dundee |
| | Scotland |
| Postcode | DD4 9UB |
| Country | UK |
| Telephone number | 01382866400 |
| Fax number | 01382866401 |
| Email | workshop.support@stoneridge.com |

- Other screens are accessed by tapping Arrows at the top of the page if highlighted.



Home Button    Question Mark

Arrows
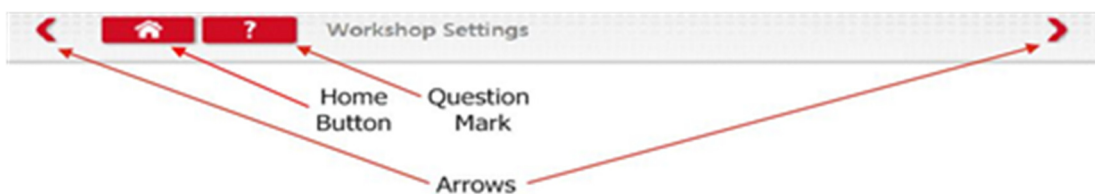
- The 'Home' button closes any application and returns to the Windows desktop or returns to that application's main screen.

- This screen displays various details about your workshop, and enables selection and settings for Rolling Roads. Complete all fields.



- The next screen sets Fixed distance length and number of runs, plus options for "Standard" or "Custom" bench tests.  For Custom Bench test see Chapter 8, page 28



**DETAILS ON ALL THESE SCREENS MUST BE COMPLETED BEFORE FIRST USE OF OPTIMO**.

### 6.1.2. Connecting to WiFi
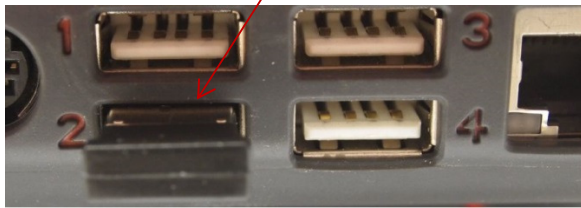
- Tap the Internet icon.



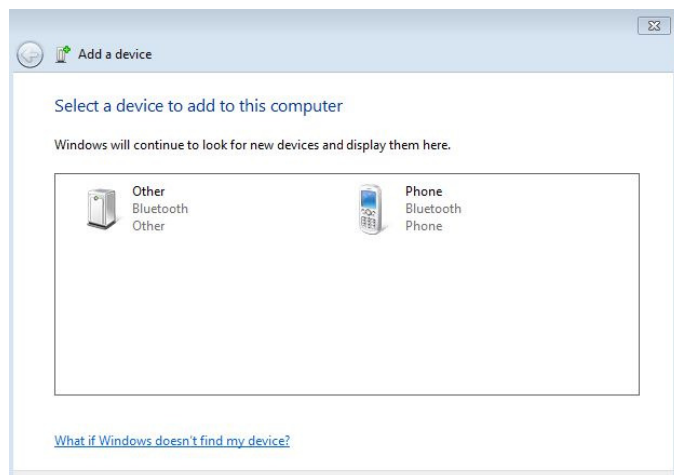- Select the network and tap "Connect" button.



### 6.1.3. Bluetooth

- Insert Bluetooth dongle to USB port, press white arrow and a Bluetooth icon appears.



- On pop up screen tap "Add a Device", a new screen appears showing other Bluetooth devices in the area. Tap on selected device and follow prompts to pair it with Optimo.
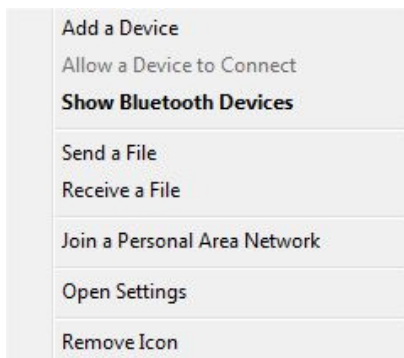


### 6.1.4. Wireless Connections

- There are two wireless indicators in the taskbar, one for connection to the tachograph and one for connection to a Rolling Road. Both are red when disconnected and turn green when connected.

Tachograph & Rolling Road disconnected

Tachograph connected, Rolling Road disconnected

## 6.2. Connecting to Tachographs

▪ 3 dongles are supplied for Digital, 2400 and 1324 tachographs.  These are inserted into the programming socket as shown, wait 5 seconds after insertion before initiating programmes.



▪ All tachographs can also be connected using existing MKII cables via supplied adaptor cables. This is the only way to connect to round tachographs.

▪ Optimo Light and Optimo$^2$ are supplied with the Digital dongle only.

## 6.3. Calibrating and Programming

▪ On tapping  Optimo identifies the connected tachograph.  If the tachograph cannot be determined the screen below is displayed.  Select tachograph type.
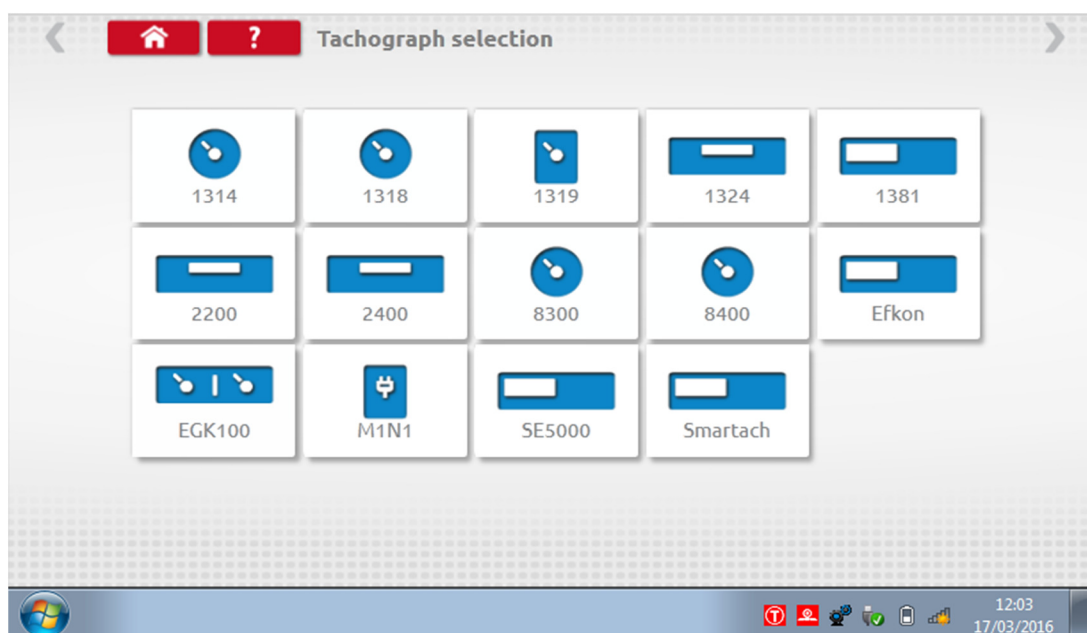
# 7. Optimo – MKIII Programmer – Main screens

- When a tachograph is detected or selected, the screen below is displayed.

- On these screens highlighted icons can be selected, those dimmed out cannot.



- The following sub-chapters briefly explain the function for each icon selection.
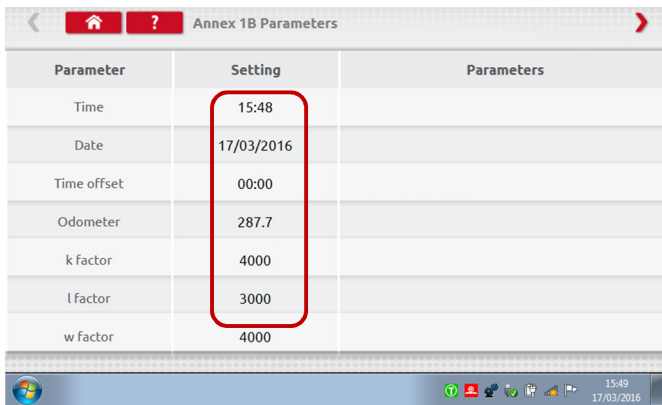
## 7.1. Read and modify data
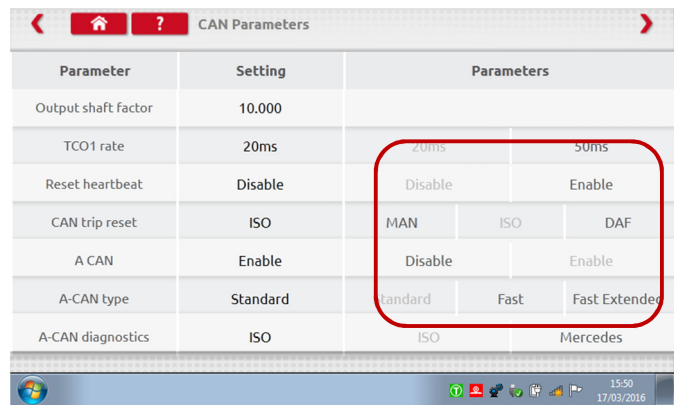
▪ Select  on the tachograph programming screen.

▪ Parameters are changed by tapping values in the "Setting" column, or for some parameters by selecting appropriate buttons.  A new screen is then displayed along with the necessary keyboard.

Note 1: In all cases, once settings have been altered, tapping the enter key immediately sends that information to the tachograph.  More screens are accessed by using highlighted arrows at the top of the page.

Note 2: For some tachographs, such as the Actia, once a setting has altered it will change colour to show the setting has been changed but it will not send to the tachograph until you tap the Home button at the top of the page, whereupon it sends all data.
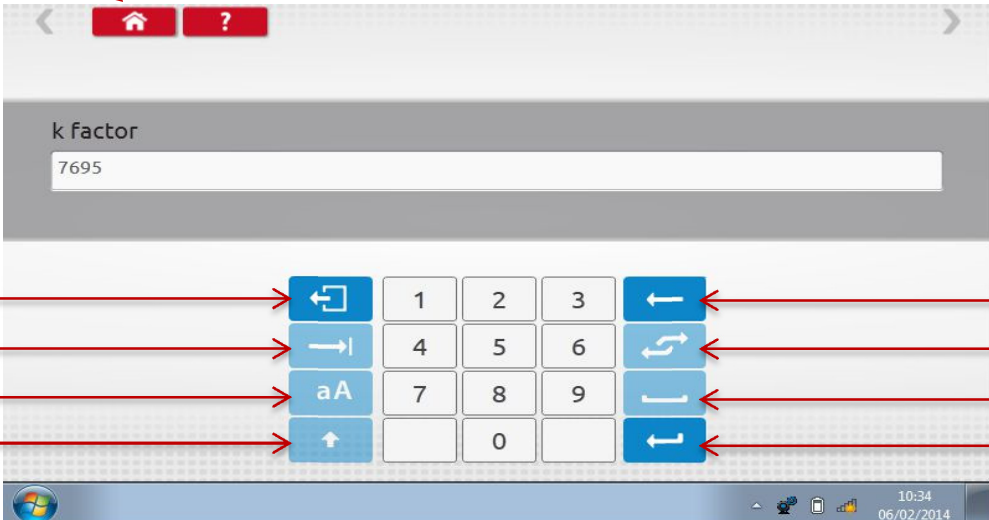


| Parameter | Setting | Parameters |
|---|---|---|
| Time | 15:48 | |
| Date | 17/03/2016 | |
| Time offset | 00:00 | |
| Odometer | 287.7 | |
| k factor | 4000 | |
| l factor | 3000 | |
| w factor | 4000 | |

Annex 1B Parameters

| Parameter | Setting | Parameters | |
|---|---|---|---|
| Output shaft factor | 10.000 | | |
| TCO1 rate | 20ms | 20ms | 50ms |
| Reset heartbeat | Disable | Disable | Enable |
| CAN trip reset | ISO | MAN / ISO | DAF |
| A CAN | Enable | Disable | Enable |
| A-CAN type | Standard | Standard / Fast | Fast Extended |
| A-CAN diagnostics | ISO | ISO | Mercedes |

CAN Parameters

▪ To change a value use Backspace to remove characters, enter new value, then tap the Enter key to update the tachograph.

▪ Tap the Home button to return to main programming screen.

k factor

7695

| | | |
|---|---|---|
| Escape | | Backspace |
| Tab | | Toggle |
| Caps | | Space |
| Shift | | Enter |

## 7.2. Tachograph Information

- Tap



- Available on all Digital tachographs.  Require dongles, or cables plus adaptors for 1324 and 2400 tachographs.



| | |
|---|---|
| System supplier | Stoneridge |
| Manufacturing date | 13/10/2009 |
| Serial number | 0000004925 |
| Hardware number | 000000900208T7.1 |
| Hardware version | /34R02 |
| Software number | P1AA |
| Software version | T0L |
| System name | TCOSC1 |

## 7.3. Bench test

- Tap

  
  Bench test

- For radio sized tachographs these tests are carried out semi automatically, with a countdown timer displaying time remaining for each phase of the test.

- For round tachographs a speed scale first must be selected first.
  Note: for calibration a Clock Test must be carried out either before or after an analogue bench test.

- For all bench tests follow on screen prompts, and select buttons, duties etc. as required.
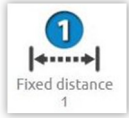
**Digital Bench test**
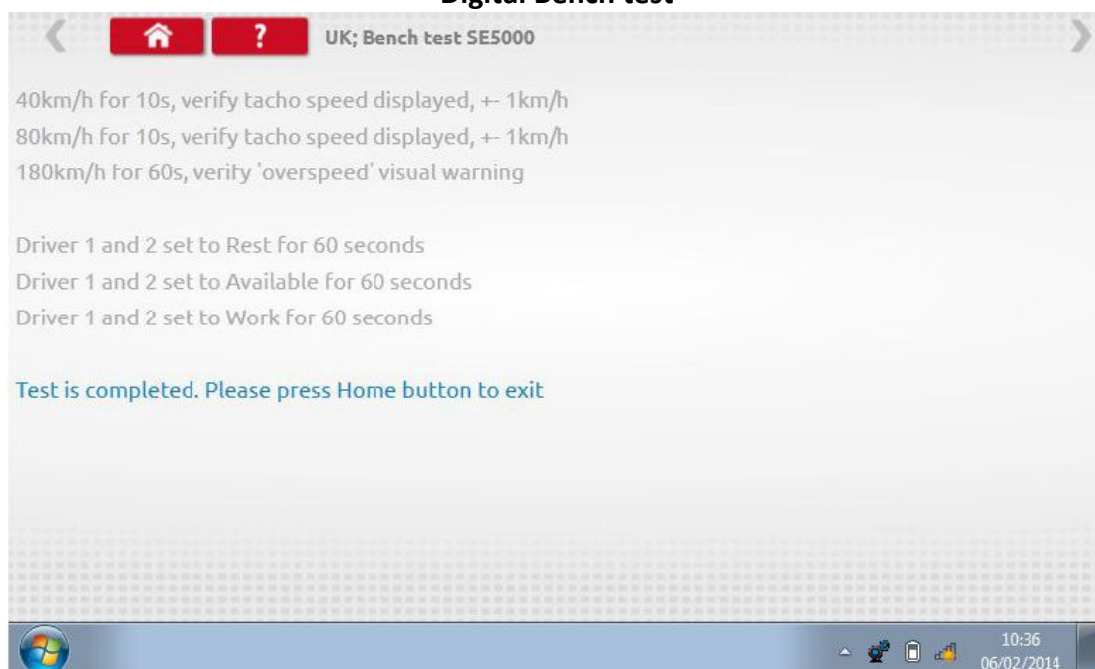


**Analogue Bench test**
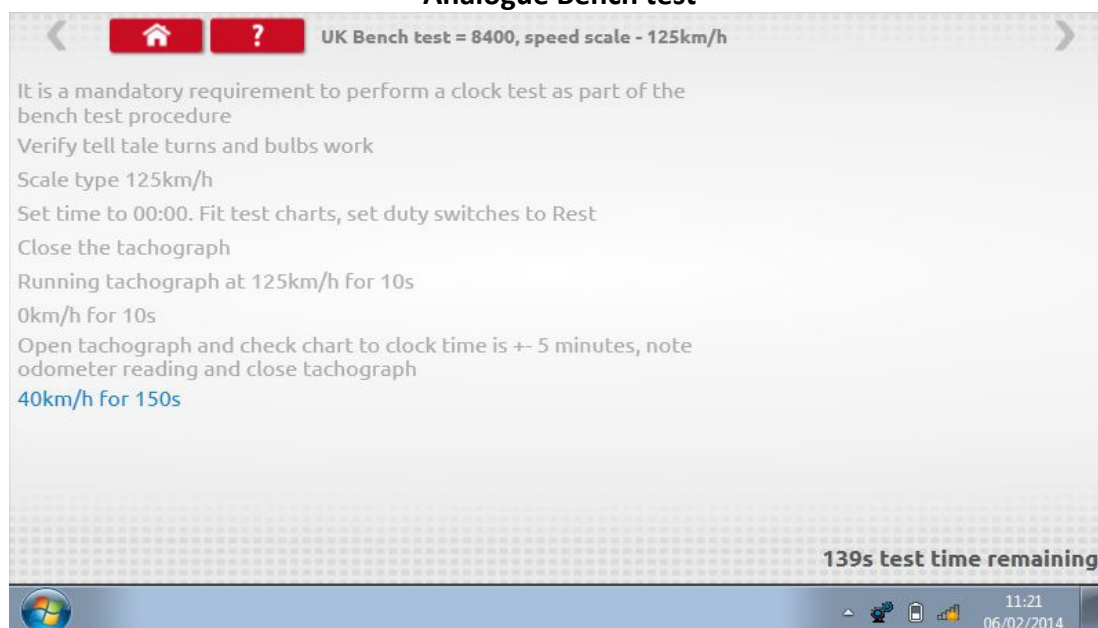
## 7.4.    Fixed distance 1

- Tapping  enables the "w" factor to be determined using a physical method with a fixed pointer over a fixed distance.

- The "w" value for each run is displayed.  Carry out the appropriate runs as prompted.
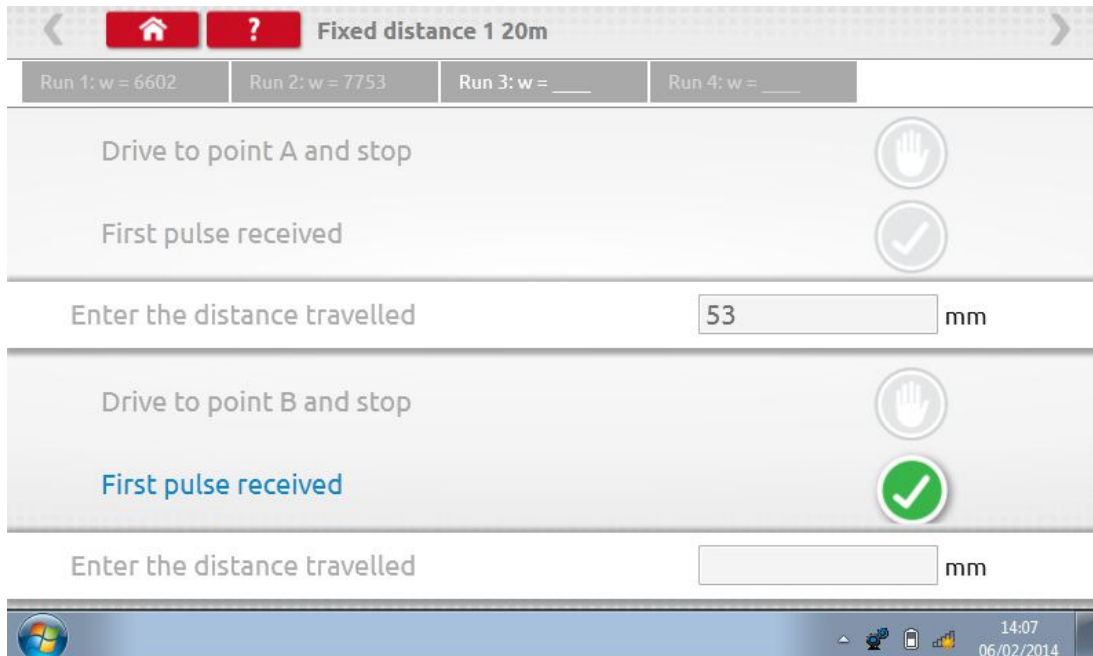


- Test complete.
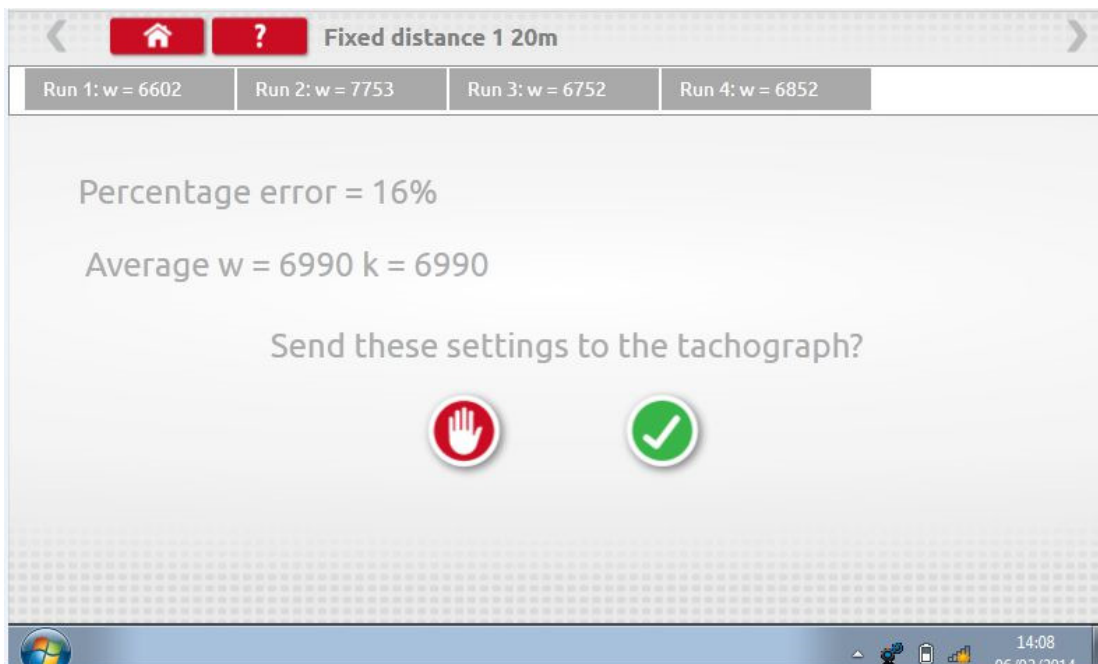


- For round tachographs, DIL switch settings will be shown which must be manually set.

## 7.5. Speed simulator

- Tap  then tap "Speed" box and enter speed, then tap the tick button.



Increment Speed

Decrement Speed

Stop Test

## 7.6. C3 RPM test

- Connect cable E via adaptor A6 for Optimo only. Tap

## 7.7. DTCs

- Tap





- Current faults must be rectified before the vehicle leaves the workshop.

## 7.8. k factor test

- Tap  and using cable G via adaptor A6, Optimo only, on a 8400, 1318 or 1314 it will provide a reading of the k factor.
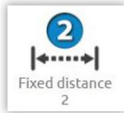
## 7.9. DIL calculate

- Tap  enter w factor.  DIL switch settings, w factor and k exact are displayed on left. This function does not require connection to a tachograph.
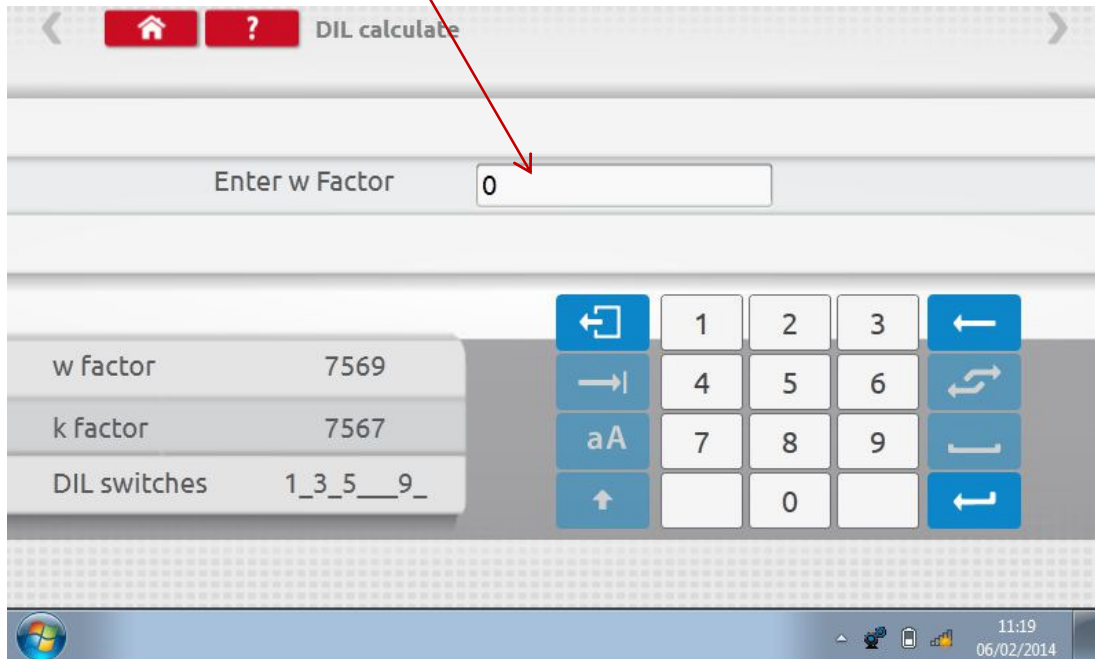
## 7.10. Fixed distance 2

- Tapping  enables the "w" factor to be determined using a physical method with an external device such as a flexi switch or light barriers over a fixed distance. Connect the flexi switch or light barrier device via adaptor B.

- The "w" value for each run is displayed. Carry out appropriate runs as prompted.
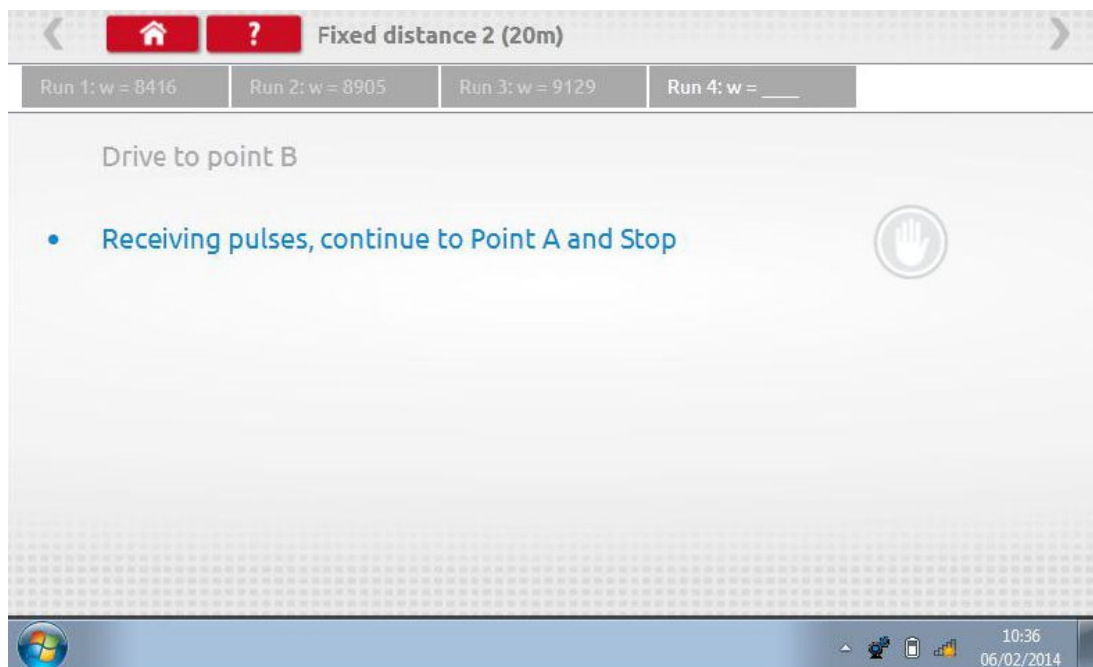


- Test complete.
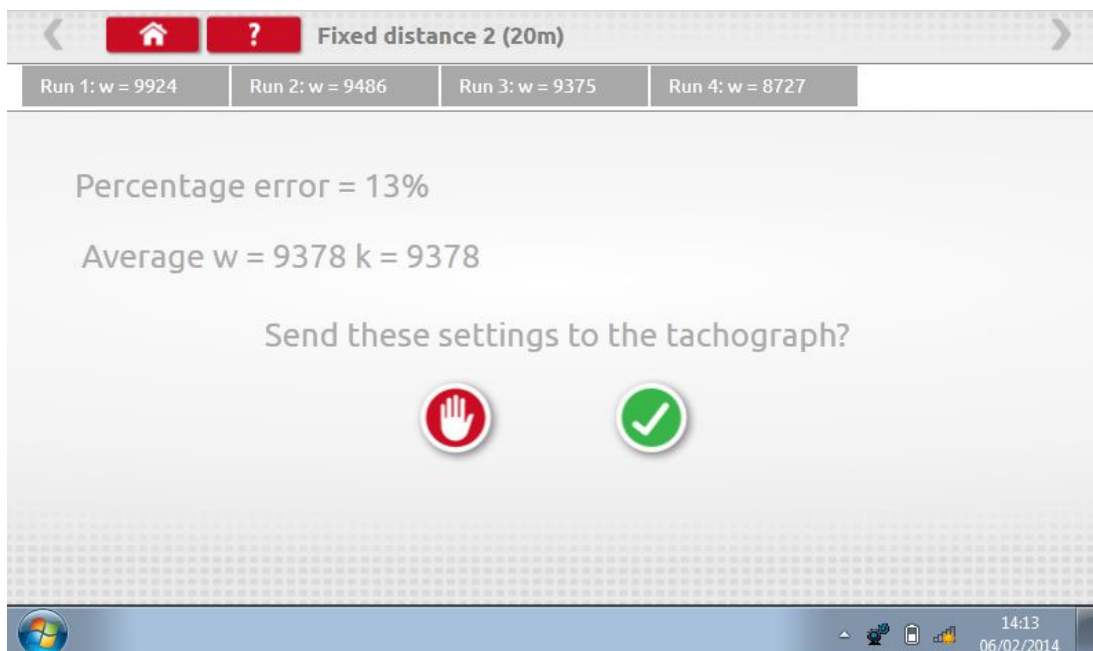


- For round tachographs DIL switch settings will be shown which must be manually set.

## 7.11. Rolling road

- Tapping  enables selection of Rolling Road test or Speed Verification.
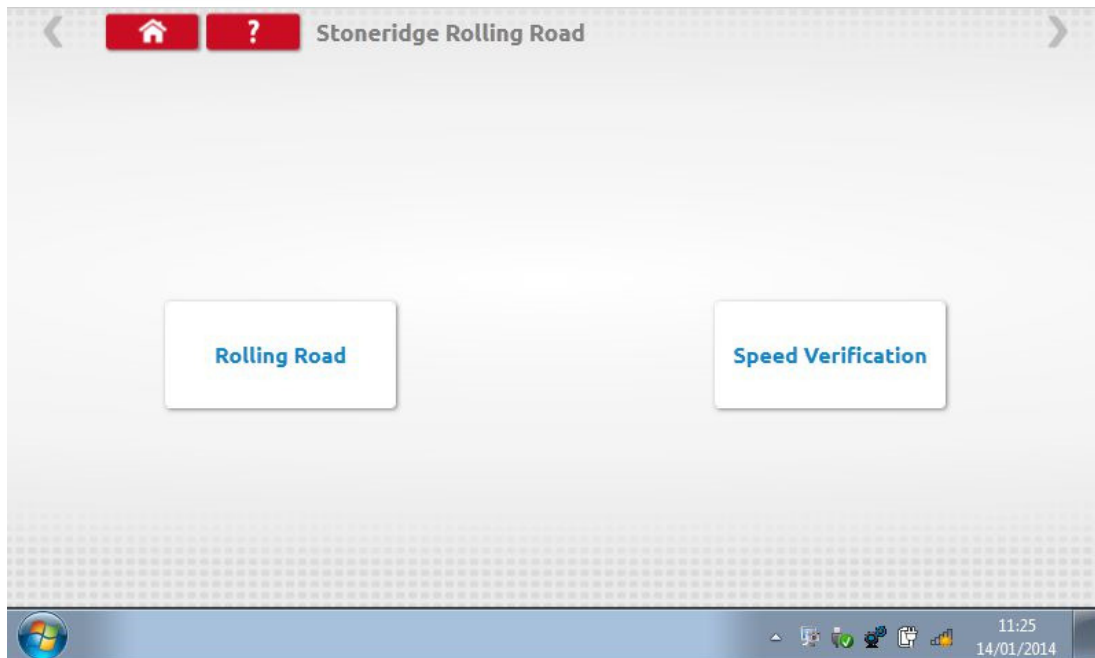


- With vehicle in motion, tap "Speed Verification", check speed of Rolling Road and compare with tachograph speed i.e. speed for speed check.
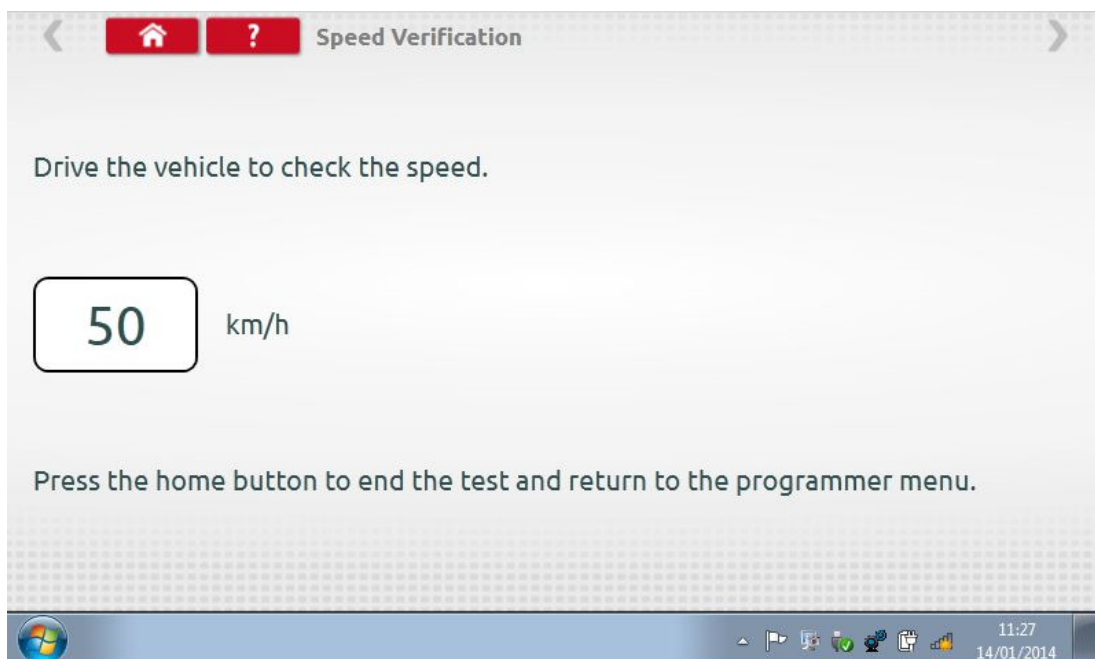
- For a Stoneridge rolling road, when you tap "Rolling Road" Optimo determines the w and l factors. When test complete results can be sent directly to radio sized tachographs, followed by a confirmation screen.
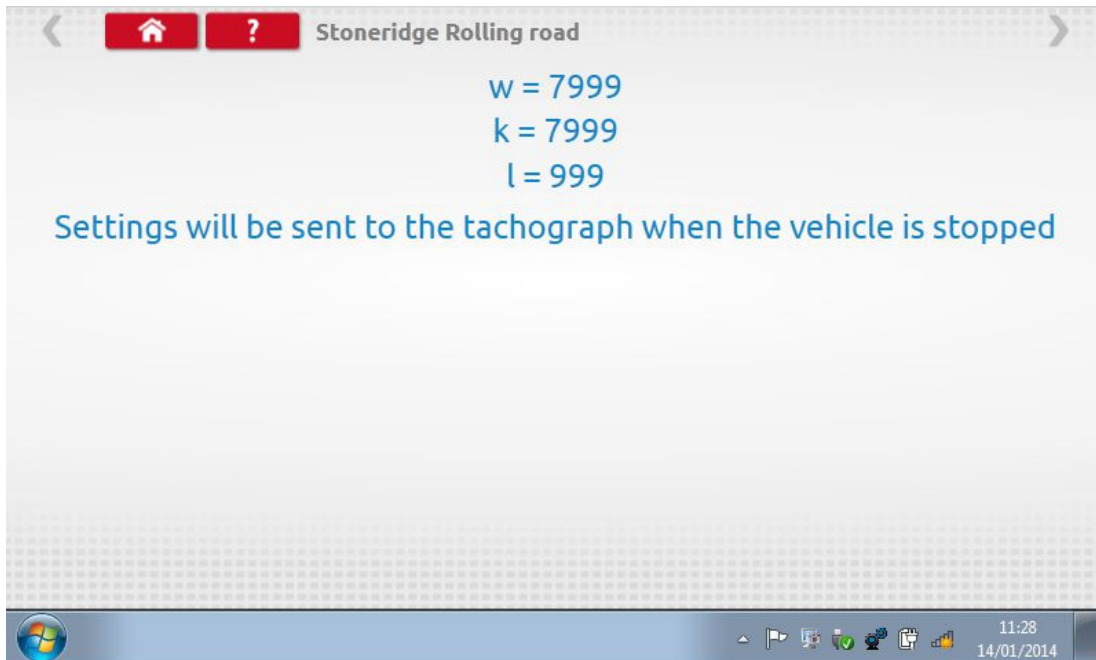


- For round tachographs w, k and l factors are displayed, plus the DIL switch settings which must be manually changed.
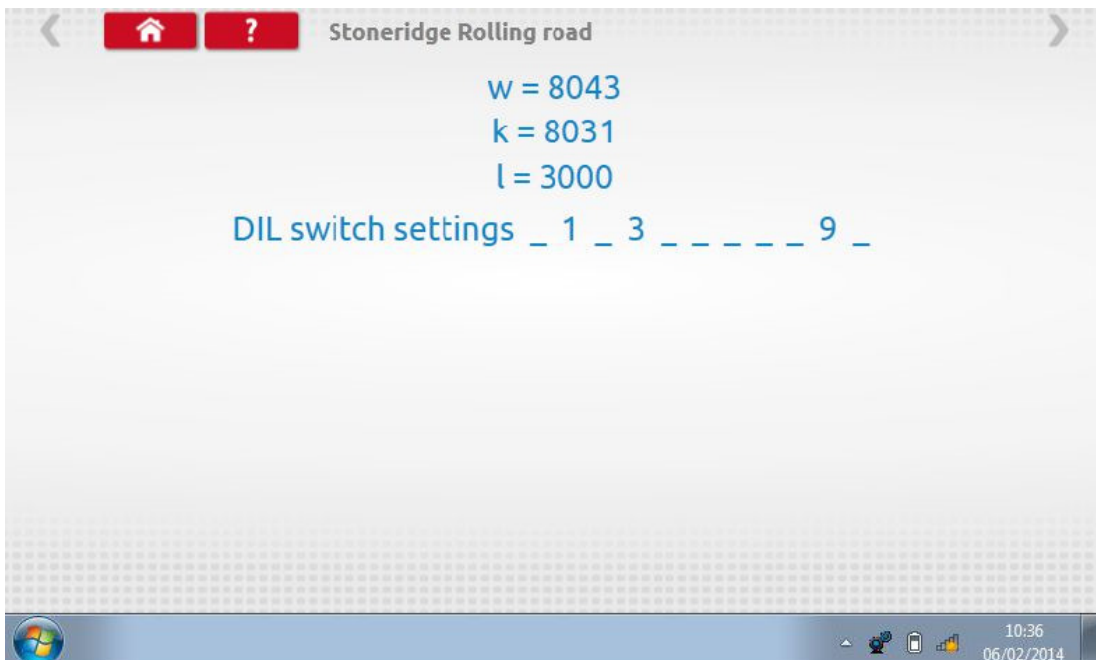
## 7.12. Clock test

- Tap [Clock test icon] to check accuracy of clock and adjust UTC and local time if necessary. For round tachographs a clock tester module is required and only tests the accuracy of the clock.

- Optimo is factory set to UTC time.
- On Digital tachographs all time adjustments should be done from this menu.
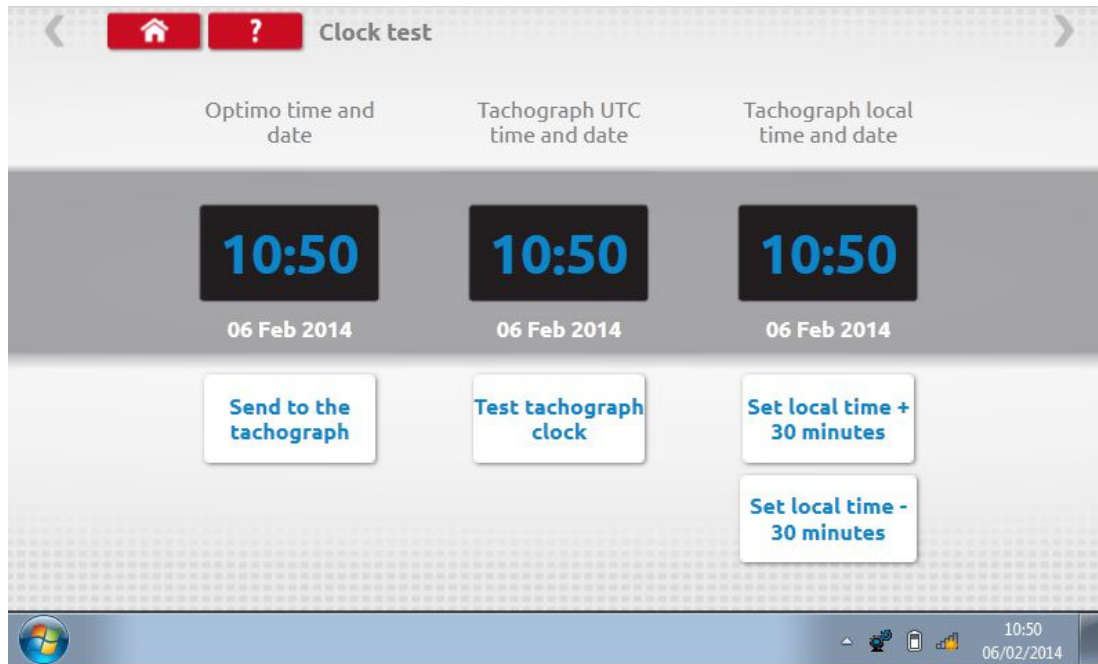


## 7.13. PIN

- Tap [1234 PIN icon] enter workshop card PIN. Available on SE5000 and DTCO 1381 only.
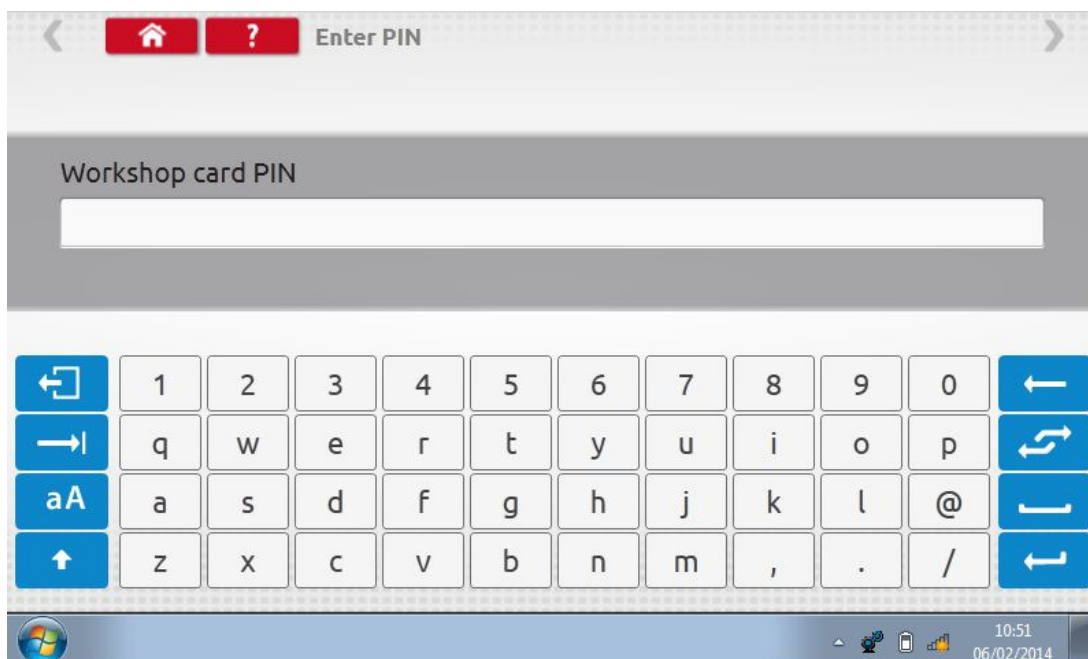
## 7.14. Serial data test

- Tapping  displays serial data from the tachograph via cables F & H plus adaptor A4 for a SE5000, or cables X & H and A4 for a 2400, Optimo only.

**SE5000 Serial data test**

| Parameter | Value | Parameter | Value |
|---|---|---|---|
| Additional information | 11010001 | k factor | 9032 Pulses/km |
| Date | 06/02/2014 | Tachograph status | 11000001 |
| Driver 1 identification | yyyyyyyyyyyyyyyyyyyy * | Speed | 0.0 km/h |
| Time | 14:32 | VIN | Optimo Test unit * |
| Driver 2 identification | | Overspeed | 90 km/h |
| Odometer | 2678.8 km | Vehicle registration number | |
| Driver 1 State | 00000000 | Engine speed | 0.000 Revs/min |
| Trip odometer | 0.4 km | Work states | 00001010 |
| Driver 2 State | 00000000 | RMS | |

14:28
06/02/2014

## 7.15. CANbus data test

- Tapping  displays CANbus data via cable V and adaptor A.

**SE5000 CANbus data test**

| Parameter | Value | Parameter | Value |
|---|---|---|---|
| Date | 06.02.2014 | Driver duty | Invalid! |
| Time | 14:33 | Crew duty | Invalid! |
| Time offset | +01:+00 | Drive1 card | Invalid! |
| Odometer | 2678.8 km | Drive1 time | 1111 |
| Trip odometer | 0.4 km | Drive2 card | Invalid! |
| Speed | 0.0 km/h | Drive2 time | 1111 |
| Output shaft speed | 0.00 Revs/min | | |
| Overspeed | Invalid! | | |
| Drive | Invalid! | | |

14:28
06/02/2014

## 7.16. 1000m test

- Tap **1000** *test 1000m* the k factor is displayed, tap the green tick button, the test starts and a countdown timer appears in a red circle.
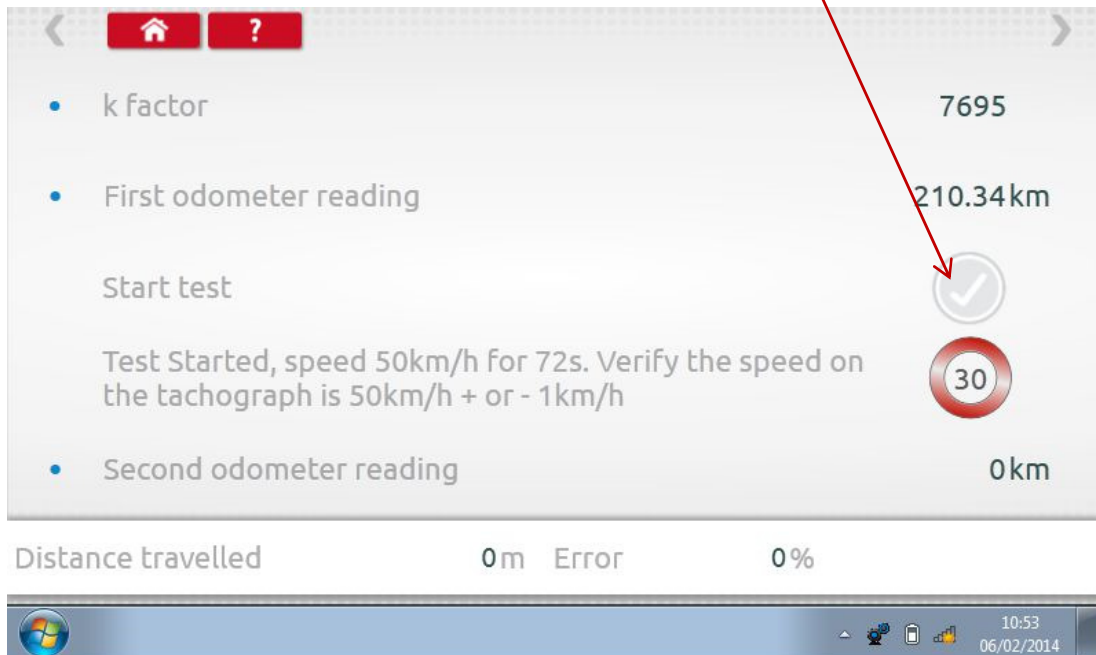


- Test complete.
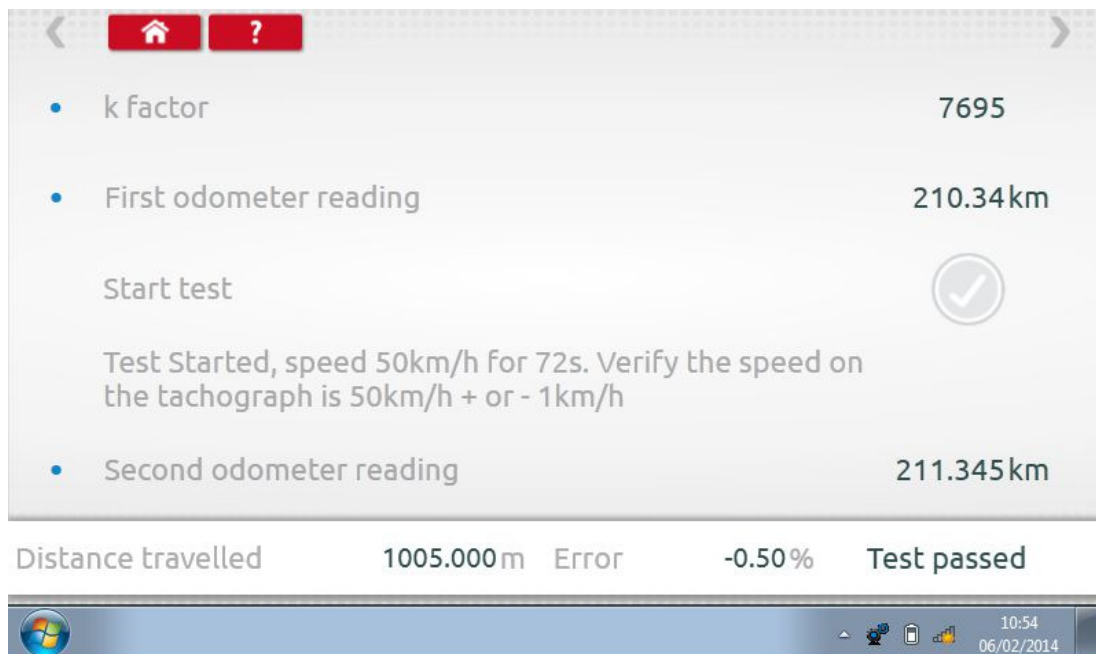
## 7.17. Sensor settings

- Tapping  enables selection of a sensor type on some tachographs.

- The following screen is for a VR2400.

- To pair an Encrypted sensor tap "Pair".
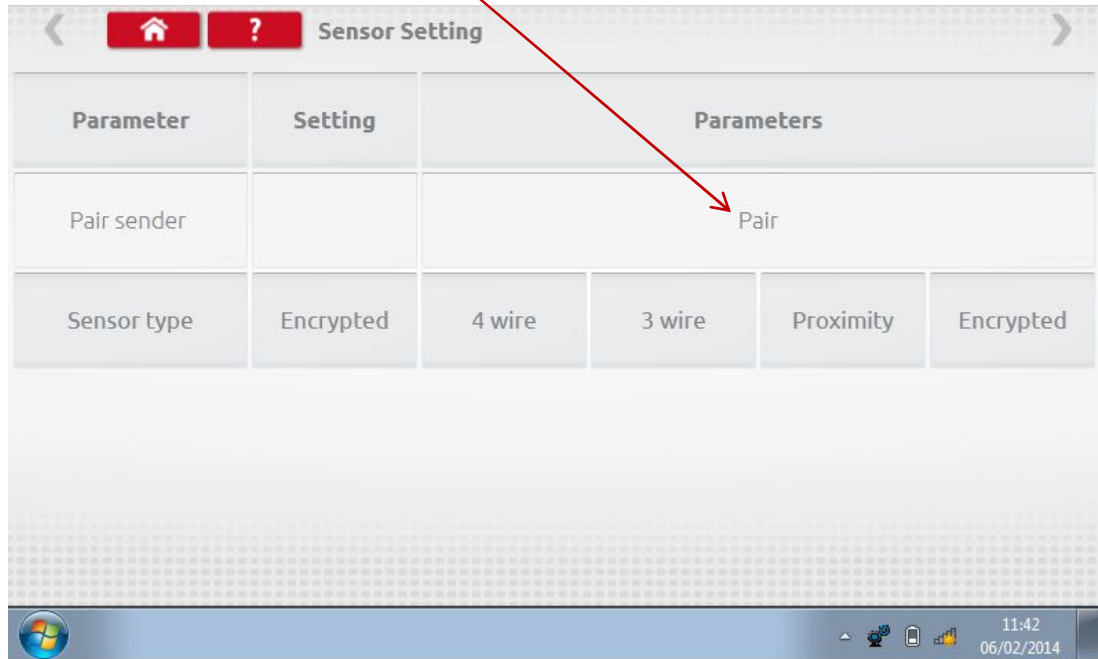


- Test complete.
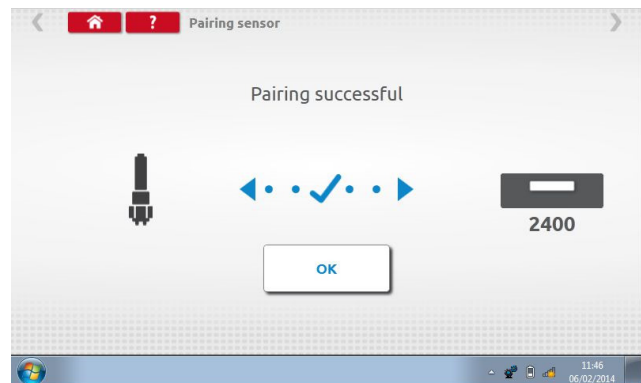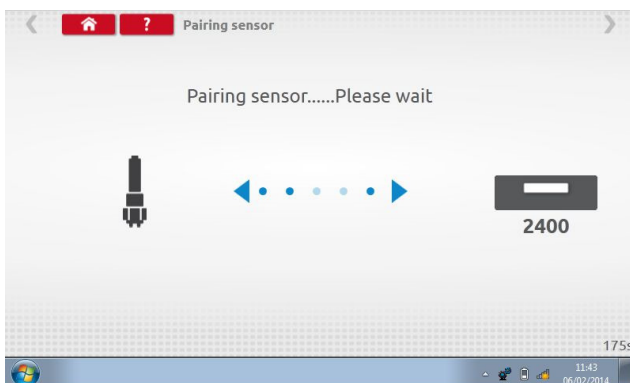
- For 3rd generation digital tachographs activated after 1st October 2012, the following screen is displayed. 2nd source of motion is enabled by selecting the appropriate CANbus or the C3 option. For CANbus "Heavy" or "Light" vehicle also has to be selected as data is transferred at different bit rates.

- If C3 is enabled, a speed factor, derived from the l factor value has to be entered to match the two speed signals as close as possible, see table 1.

- To force pair a digital sender, tap "Pair".
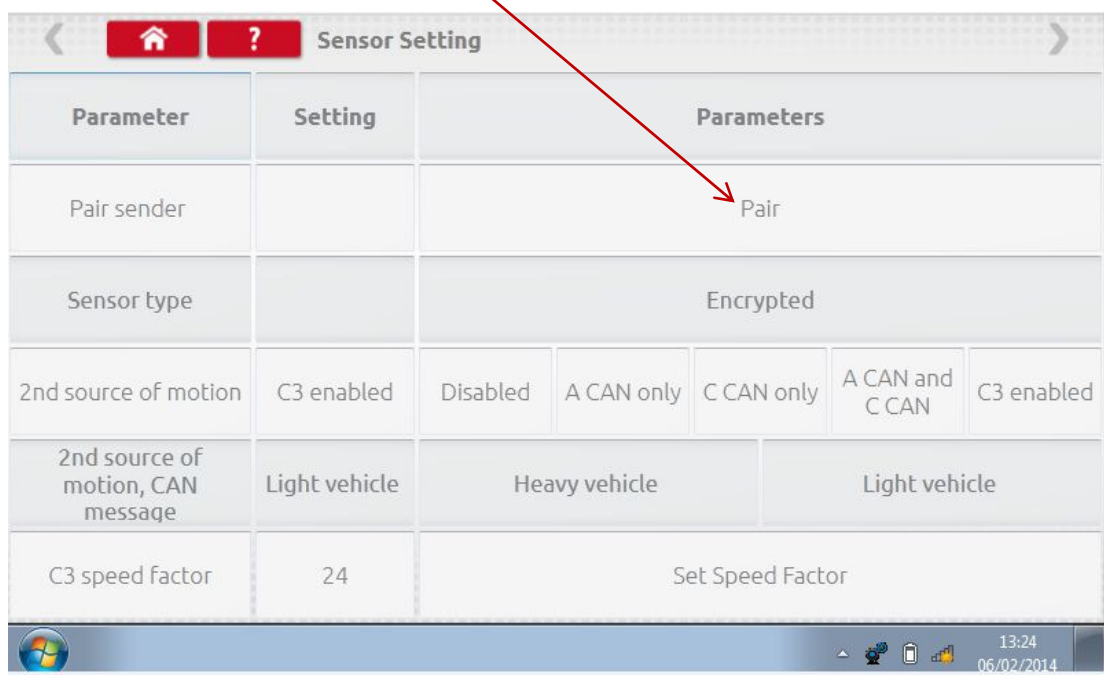


**Table 1**

| C3-Factor | Minimum L | Maximum L | C3-Factor | Minimum L | Maximum L |
|-----------|-----------|-----------|-----------|-----------|-----------|
| 13 | 1563 | 1688 | 29 | 3563 | 3688 |
| 14 | 1688 | 1813 | 30 | 3688 | 3813 |
| 15 | 1813 | 1938 | 31 | 3813 | 3938 |
| 16 | 1938 | 2063 | 32 | 3938 | 4063 |
| 17 | 2063 | 2188 | 33 | 4063 | 4188 |
| 18 | 2188 | 2313 | 34 | 4188 | 4313 |
| 19 | 2313 | 2438 | 35 | 4313 | 4438 |
| 20 | 2438 | 2563 | 36 | 4438 | 4563 |
| 21 | 2563 | 2688 | 37 | 4563 | 4688 |
| 22 | 2688 | 2813 | 38 | 4688 | 4813 |
| 23 | 2813 | 2938 | 39 | 4813 | 4938 |
| 24 | 2938 | 3063 | 40 | 4938 | 5063 |
| 25 | 3063 | 3188 | 41 | 5063 | 5188 |
| 26 | 3188 | 3313 | 42 | 5188 | 5313 |
| 27 | 3313 | 3438 | 43 | 5313 | 5438 |
| 28 | 3438 | 3563 | 44 | 5438 | 5563 |

- It is essential that the speed on the second source is closely matched to the speed from the gearbox sensor. To verify this, and correct where necessary, press the up arrow on the tachograph once to view the dual speed source screen as shown below.



- Run the vehicle at 50km/h and adjust the C3 speed factor until speed 2 is as close to speed 1 as possible. The difference between speed 1 and speed 2 must not exceed 10km/h.

## 7.18. Tachograph reset

- Tapping  sends a reset pulse by simulating an Off/On condition which resets default in the tachograph. No screen displayed on Optimo, however there is an interruption on the tachograph display.

## 8. Custom Bench Test

- For analogue tachographs, a Custom bench test allows a technician to set unique duty and speed parameters in countries which allow this.  To set a Custom bench test go to page 3 of "Workshop Settings" then tap on stars in the box adjacent to "Configure analogue bench test" in 3rd "Workshop Settings" screen.
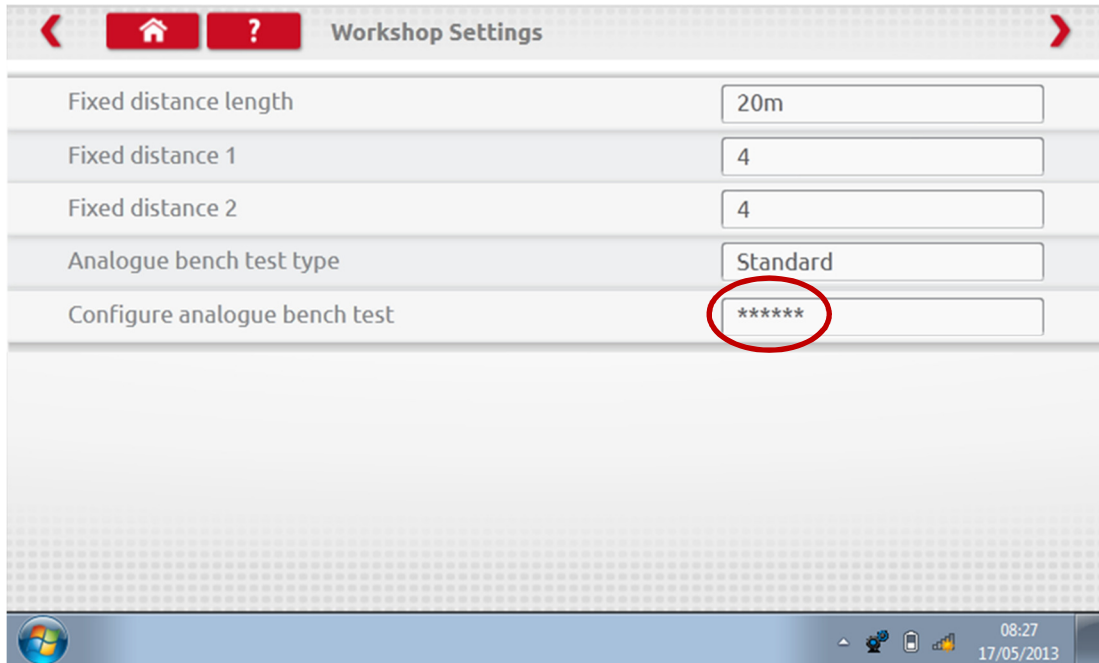


- Enter a PIN, which is obtained from your SRE representative or usual supplier.
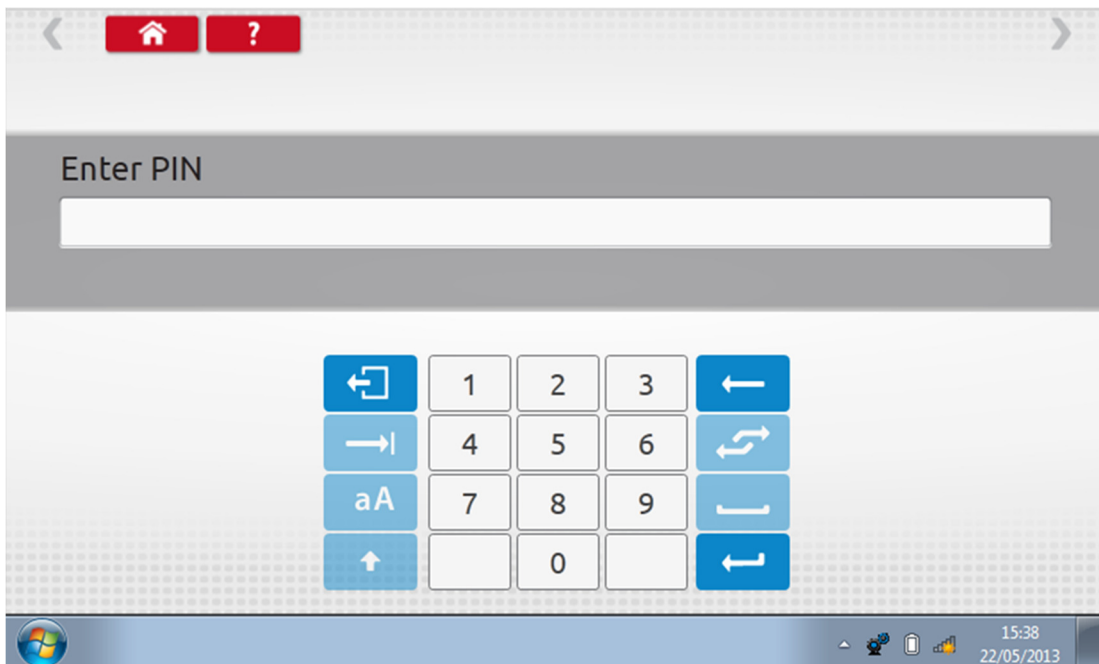
- Tap "Custom" to enter up to 15 Speed Test steps.
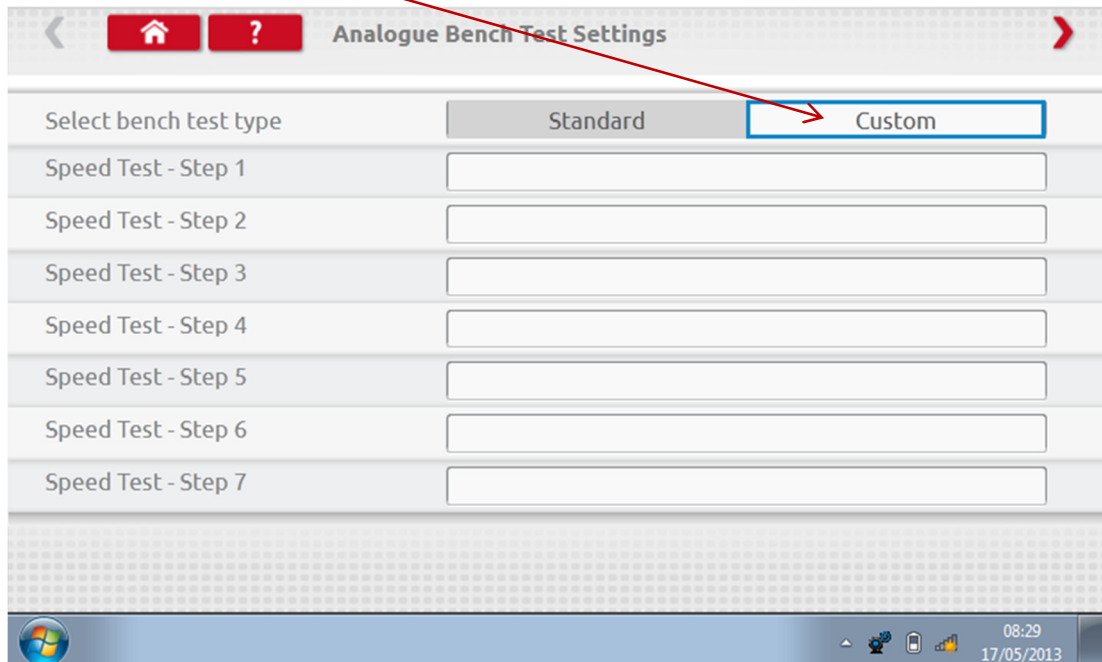


- Tap an empty box adjacent to each Speed Test step then enter the speed and duration of step.
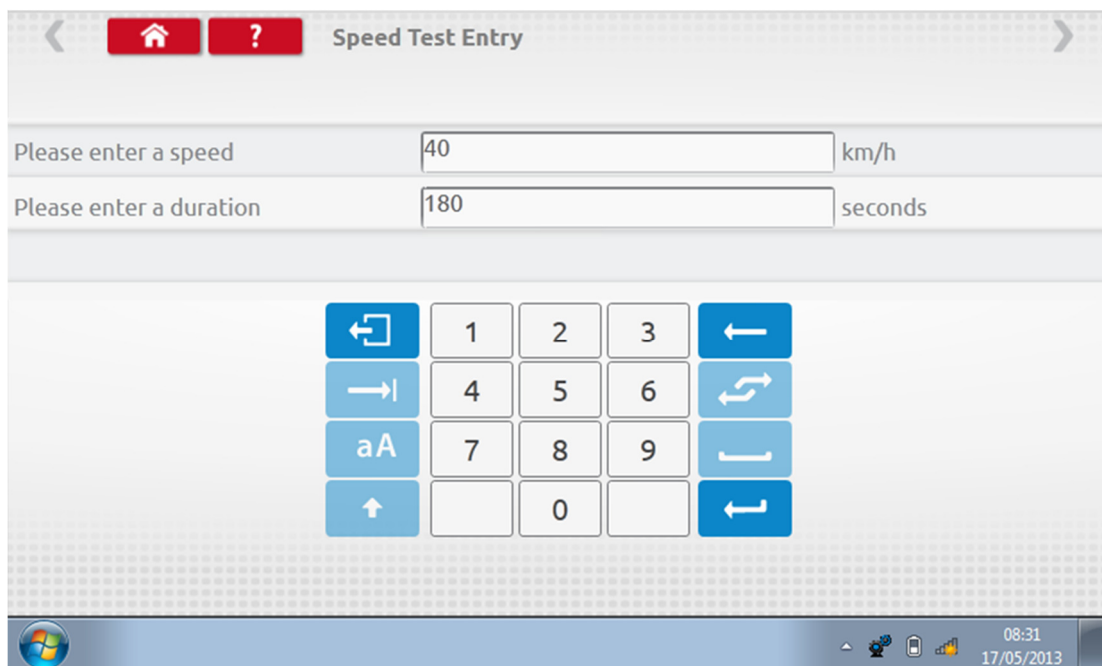
- To delete a step, tap the cross in the red box, then tap bin icon and step is deleted.
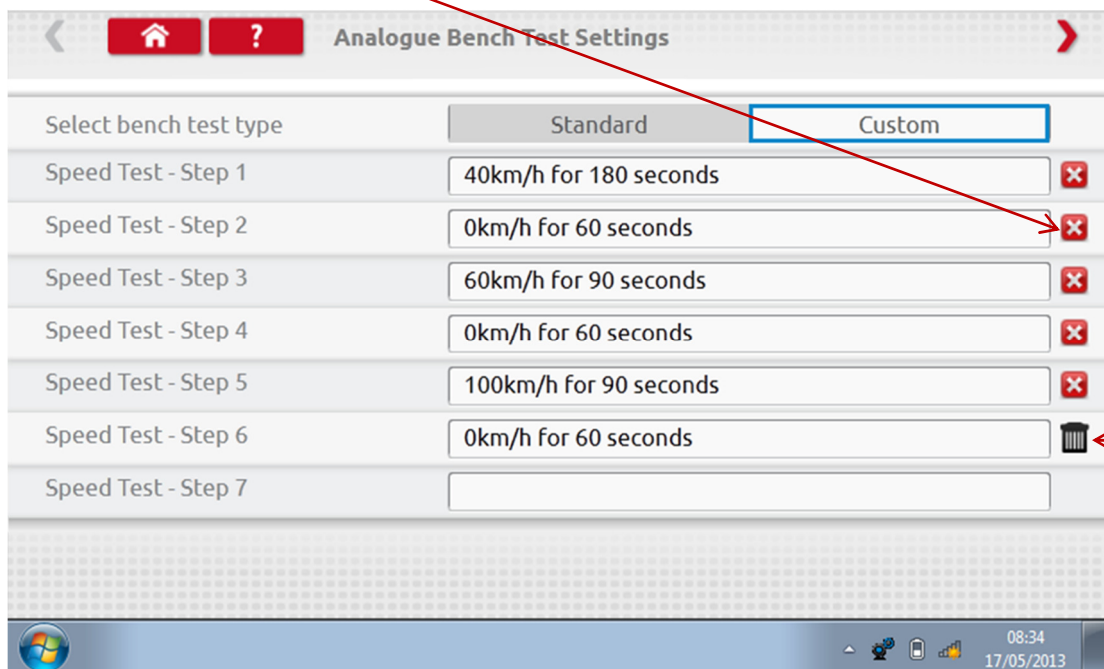


- Once all Speeds entered, tap red arrow top right to enter up to 5 duty steps. Tap an empty box adjacent to a "Duty Test" step.
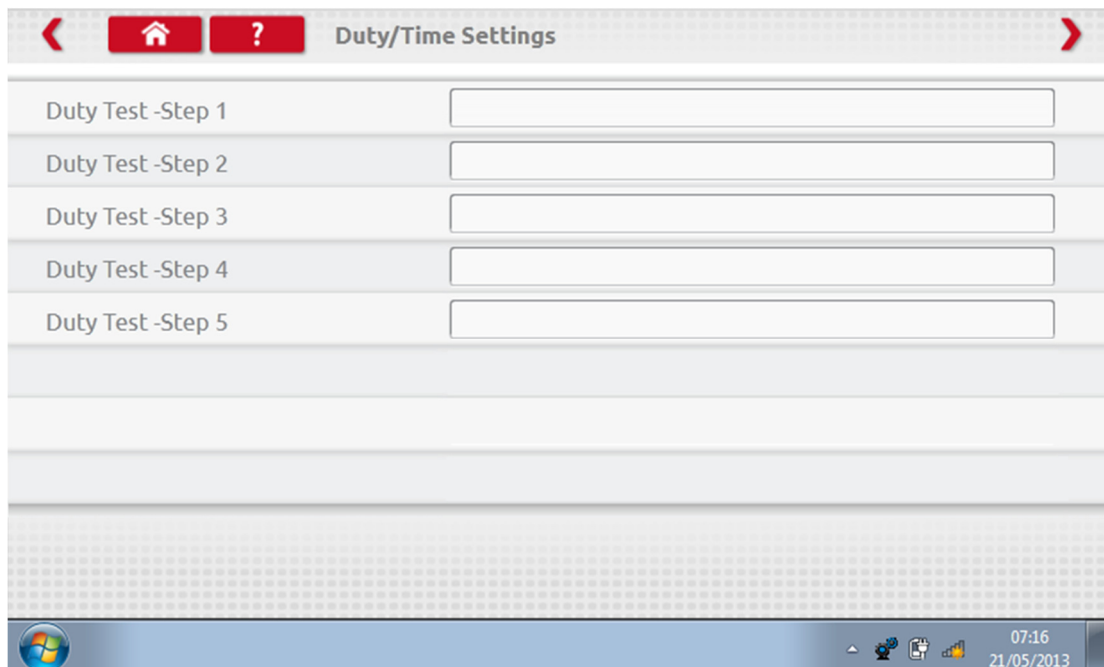
- Tap the Duty required, then key in duration for test.
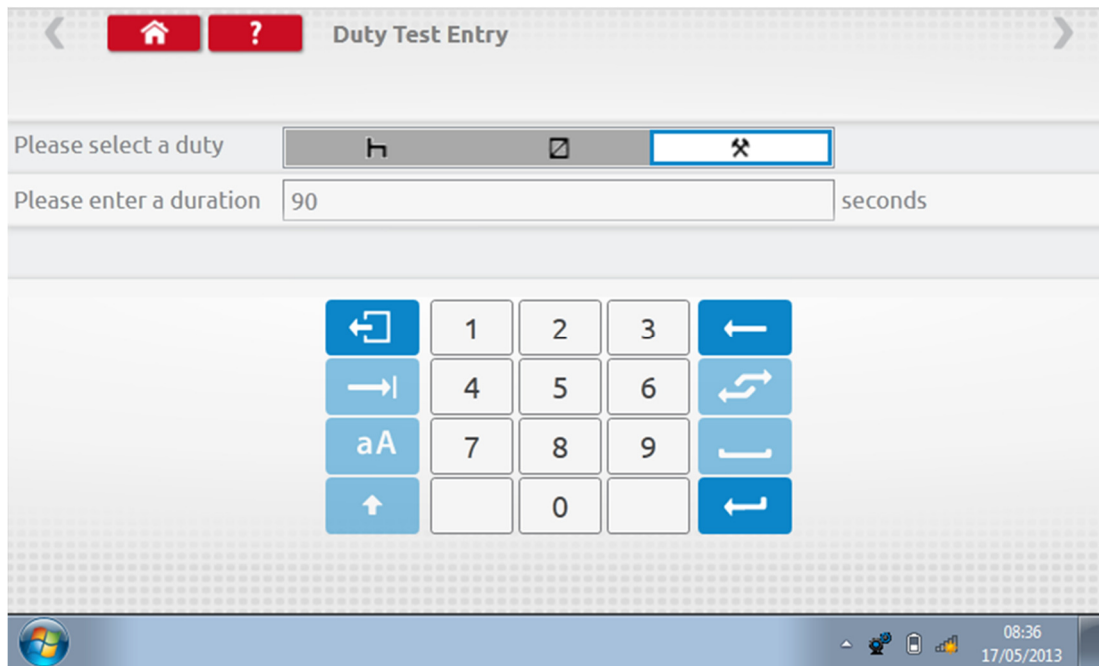


- Once final Duty test is entered, tap red arrow top right, or Home Button, to exit setup procedure.
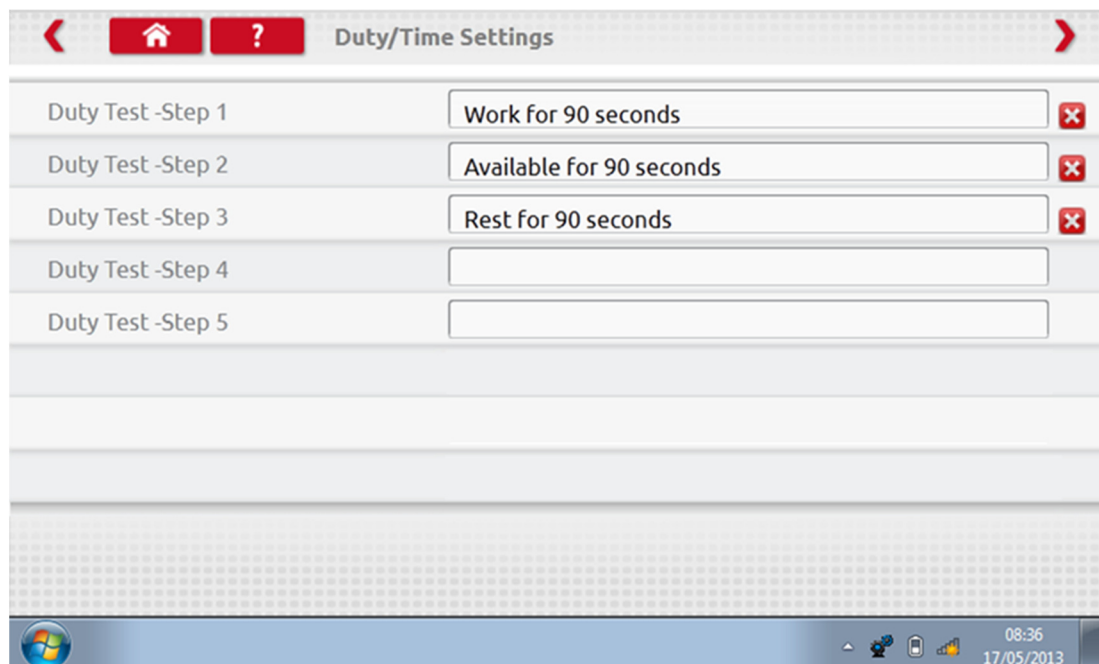


- Now when running an Analogue Bench test the tachograph type will be prefixed with "Custom Bench Test". On radio sized analogue tachographs "Auto Duty" is selected On or Off by tapping the appropriate button, then follow on-screen prompts as normal.

## 9. SE5000CS – Configuration System

- Tap  and a message "Determining the Tacho Type" is displayed whilst Optimo confirms an SE5000 tachograph is connected. This enables configuration of KRM tachographs to parameters of different vehicle types.

- A valid workshop card must be inserted and PIN authenticated to reconfigure all activated tachographs.

- Choose manufacturer by tapping appropriate icon, or tap "Verify Tachograph" to input a serial number.



- If verification successful, make and model of a configured tachograph is displayed.
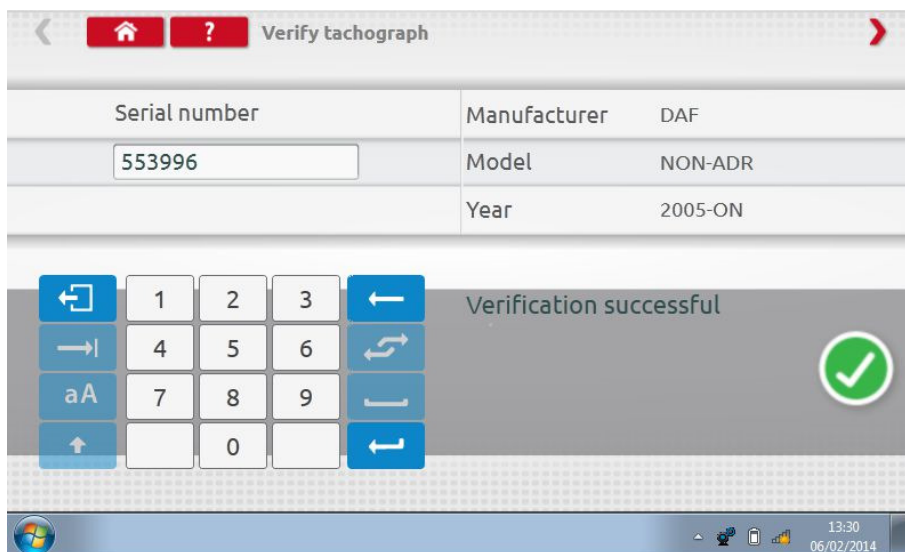
- To configure to another vehicle type, tap appropriate Manufacturer's icon and a list of associated vehicle types is displayed.



- Tap icon for correct vehicle type, and a screen shows Optimo communicating with the tachograph. After a short time the result is displayed.
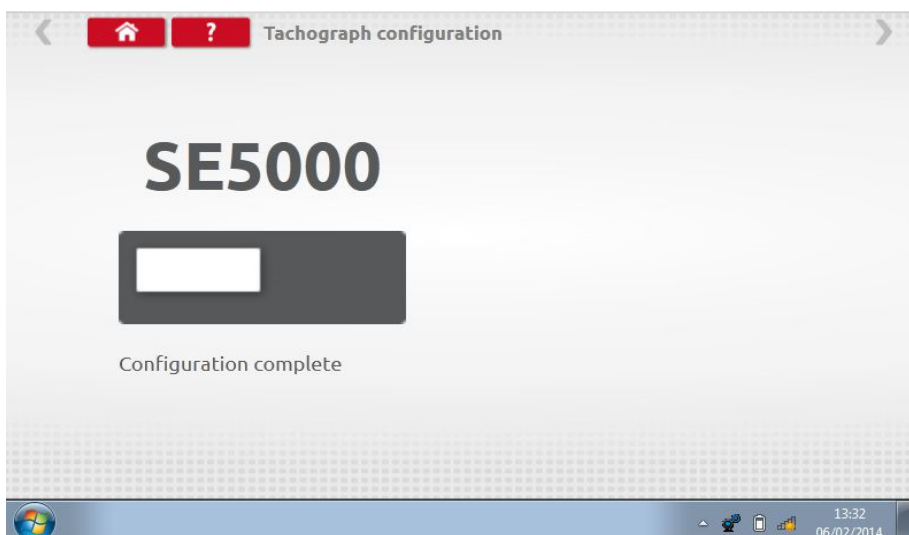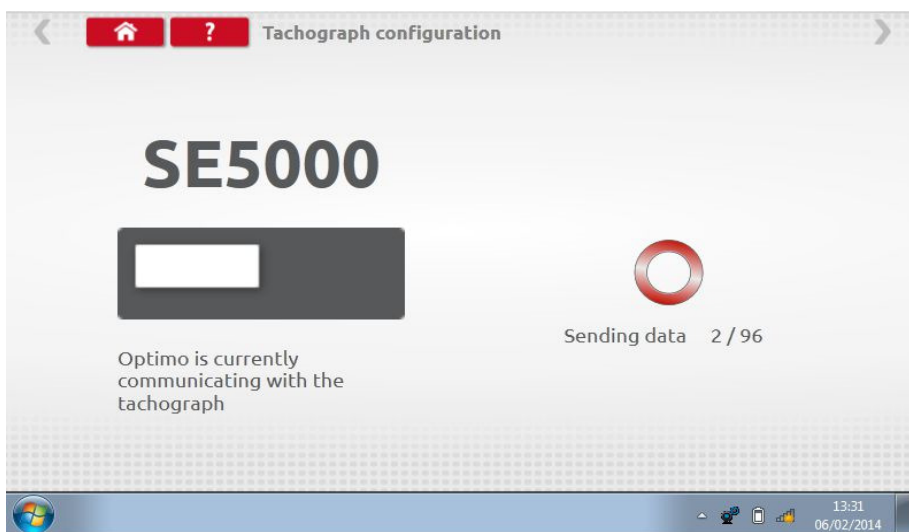
## 10. 1381CS – Configuration System

- Tap [icon] and a message "Please check the 1381 Tachograph (Universal model rev 2.1) is connected using a wired connection before beginning the Configuration." is displayed. Do not use this feature when in wireless operation.
  - Then a new message "Determining the Tacho Type" is displayed whilst Optimo confirms a 1381 tachograph is connected. This enables configuration of 1381 tachographs to parameters of different vehicle types.

- A valid workshop card must be inserted and PIN authenticated to reconfigure all activated tachographs.

- Choose manufacturer by tapping appropriate icon, or tap "Verify Tachograph" to input a serial number.



- If verification successful, make and model of a configured tachograph is displayed.
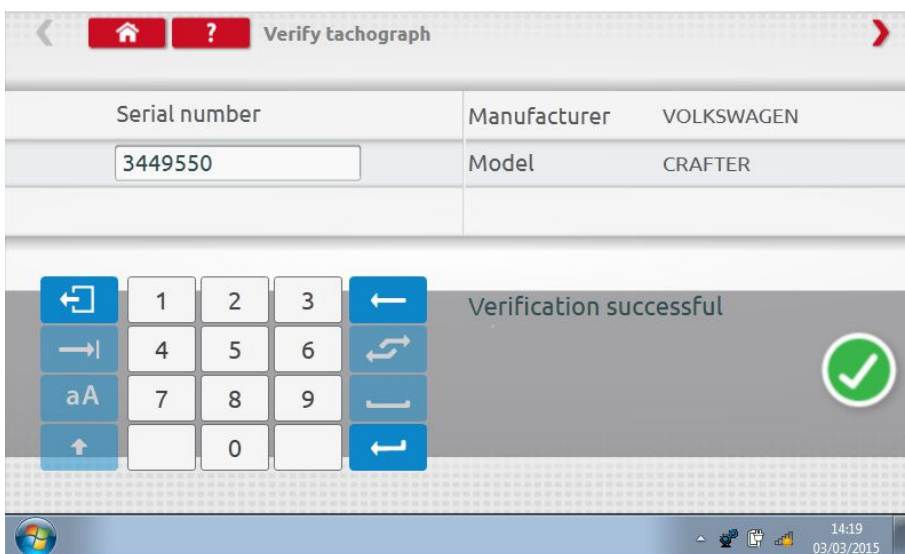
- To configure to another vehicle type, tap appropriate Manufacturer's icon and a list of associated vehicle types is displayed. Select the 1381 Universal Model and then select your target vehicle type.
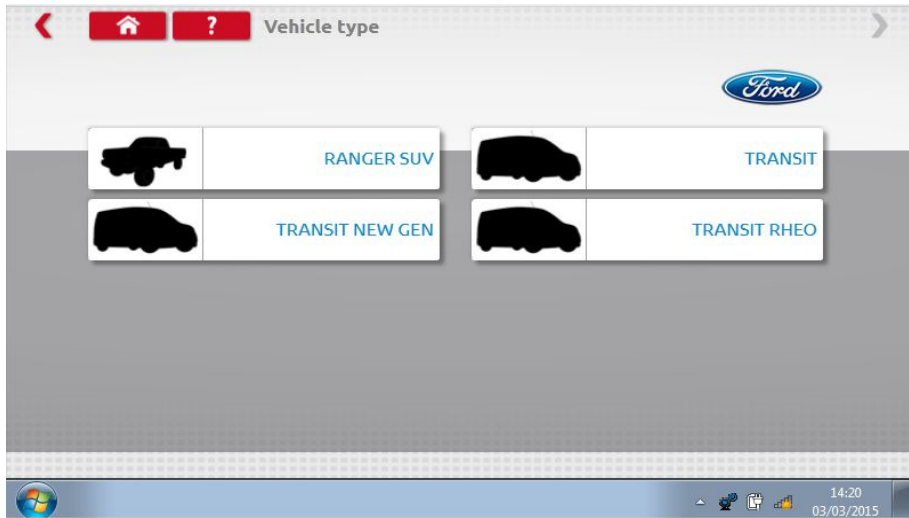


- Tap icon for correct vehicle type, and a screen shows Optimo communicating with the tachograph. After a short time the result is displayed.
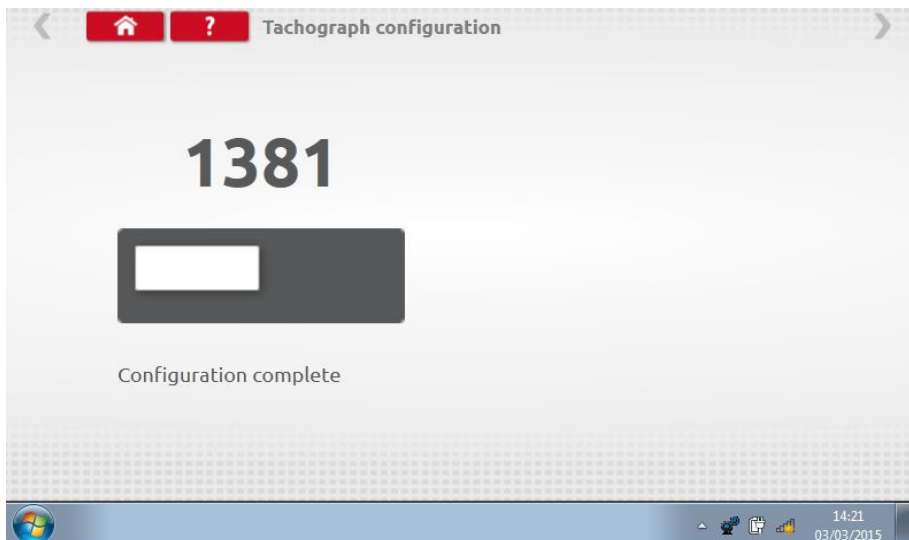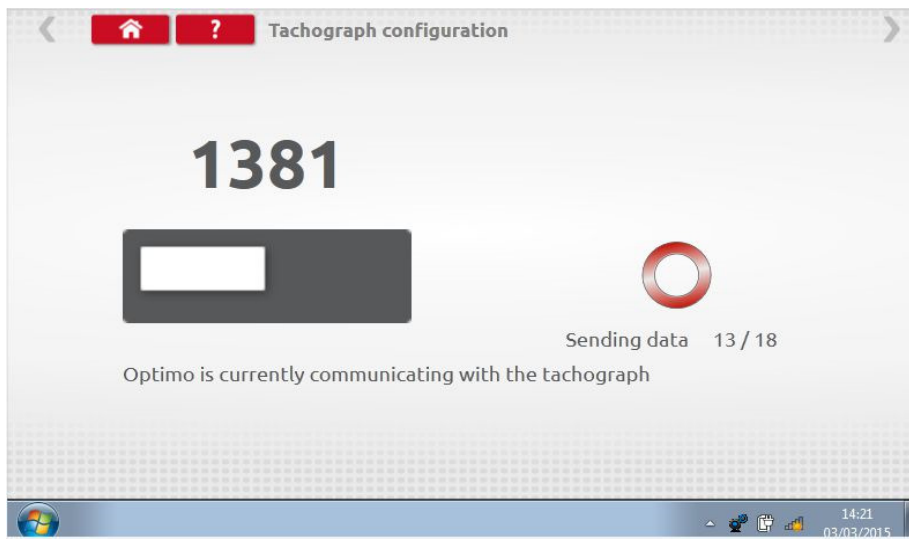
# 11. Application Sheets

- Tapping  details how to fit tachographs and Electronic Road Speed Limiters, ERSLs, to different vehicle types.

- Tap on type of application sheet required.
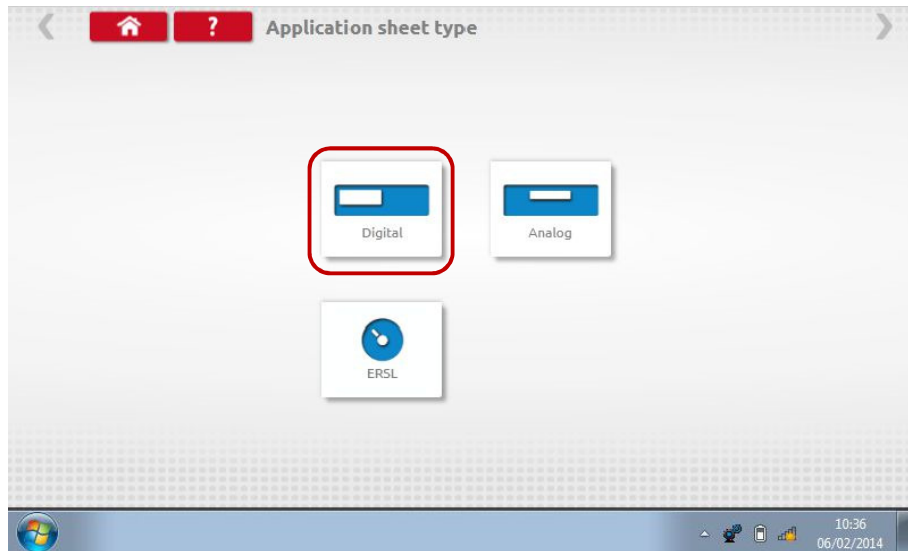


- Tap appropriate manufacturer's icon.

- Tap correct vehicle model icon.
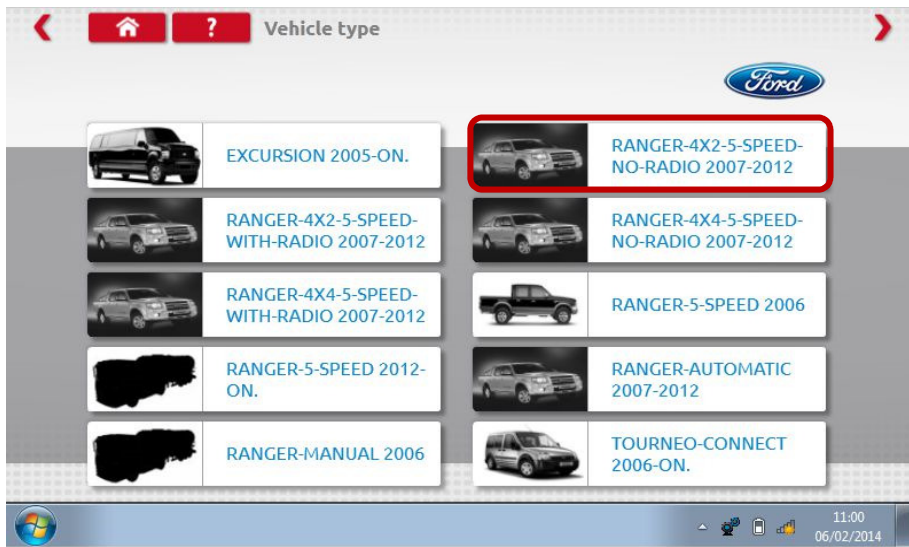


- The application sheet is displayed which details the kit required, and in some cases instructions for non-standard fits.
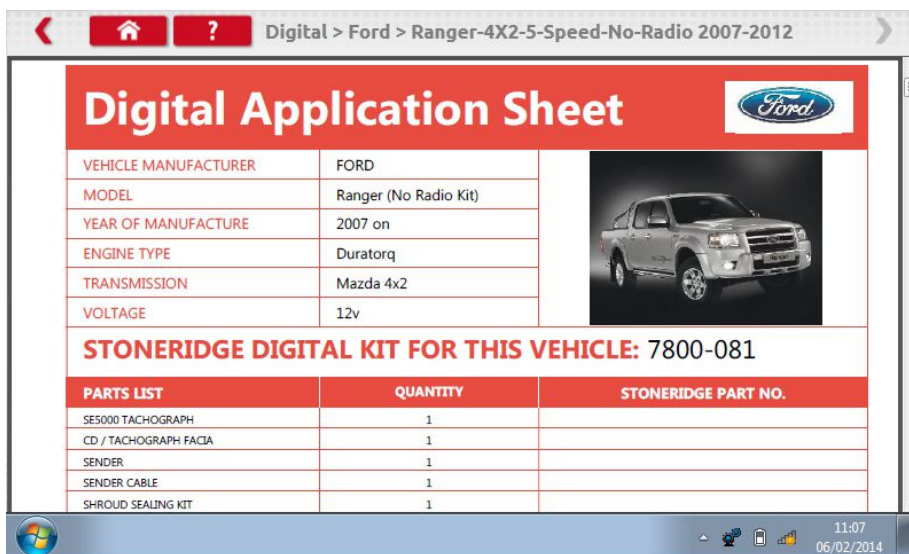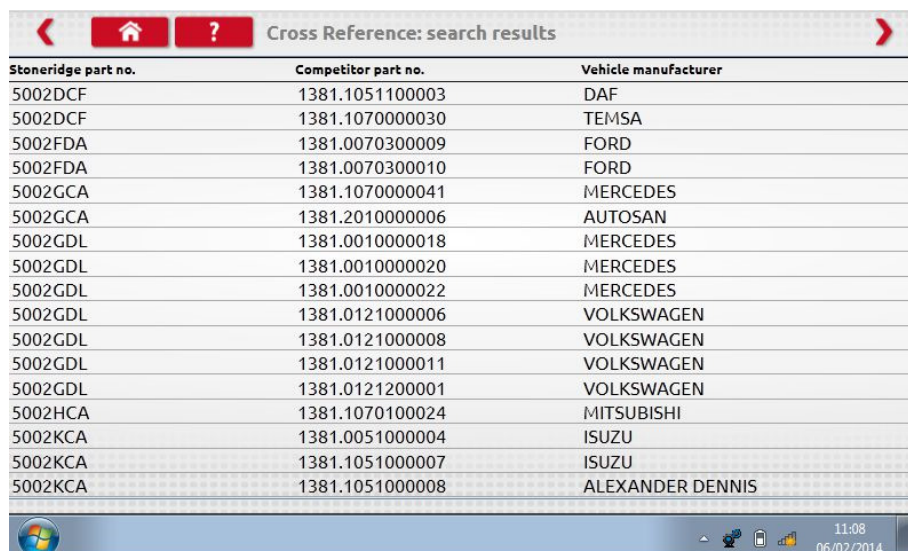
## 12. Cross Reference Tables

- Tapping ▪ enables a user to cross reference tachographs or sensors with Stoneridge equivalents.

- Type the appropriate text or number for the search.
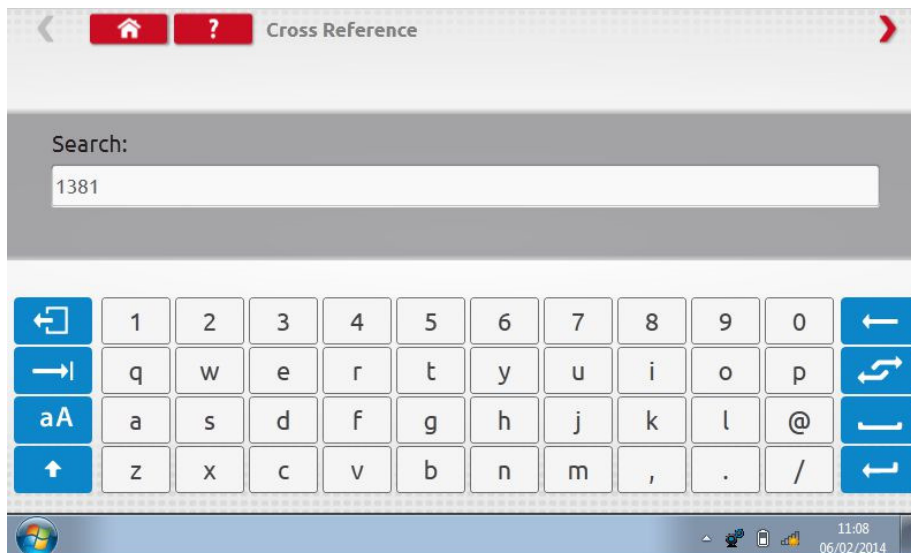


- A list of all items containing the search text or number is displayed.

## 13. Tacho Swap

- Tapping [icon] displays which tachograph is connected and gives options to "Read" or "Send" data. This function enables removal and fitment of a tachograph in a seamless process. For same tacho type exchange all parameters are transferred, for cross type exchange only calibration parameters are transferred.

- Note: the new tachograph must be configured prior to performing the tacho swap operation. For digital tachographs this should be done before the unit is activated.
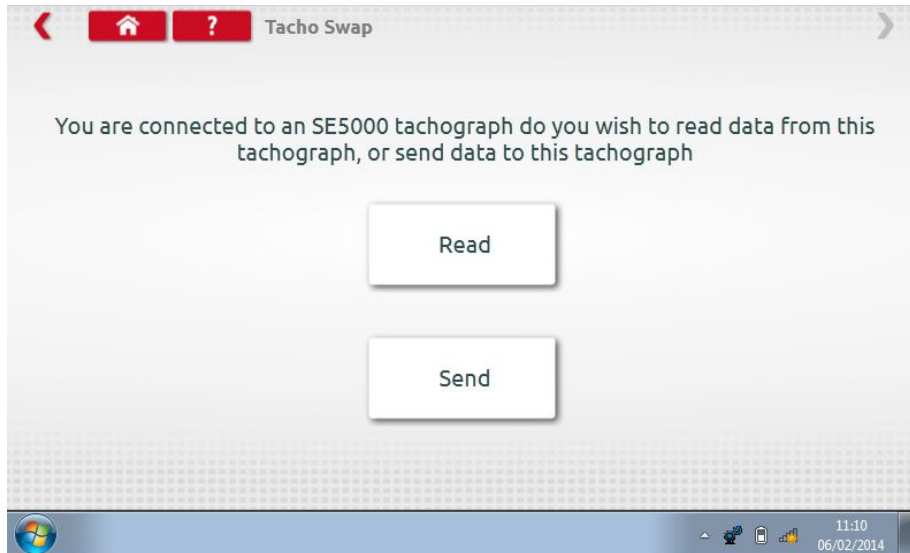


- Tap "Read" and Optimo reads all data from the tachograph and gives an option to view stored data.
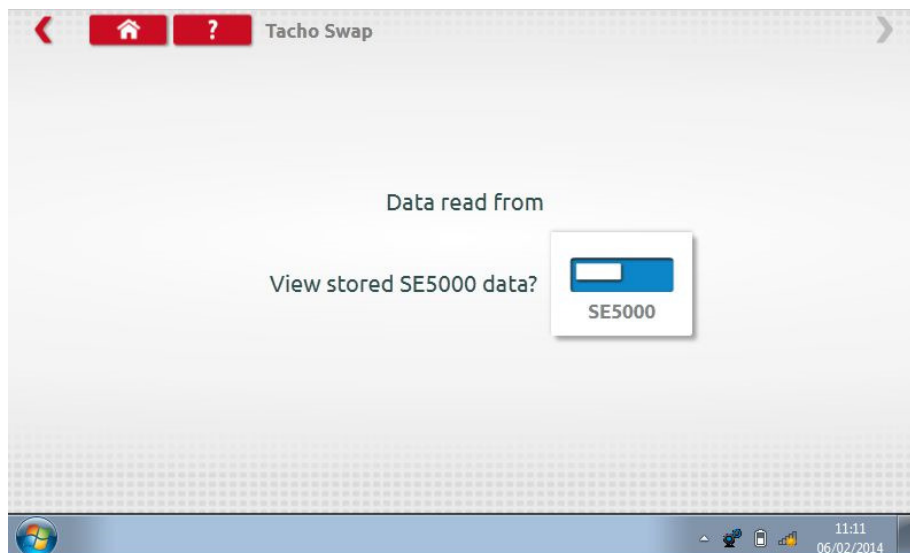
- Tap the tachograph button to display stored information.
  Note: You **don't have** to view data before sending it.

| Annex 1B Parameters | |
|---|---|
| w factor | 7695 |
| k factor | 7695 |
| High resolution total vehicle distance | 211.345 km |
| Tachograph local time and date | 11:10 06/02/2014 00:00 |
| l factor | 3338 |
| Tyre size | 215/80R22.5 |
| Next calibration date | 04/02/2016 |
| Registering member state | GR |
| Vehicle registration number | BOE-1880 |
| Speed authorisation | 90 |

- Tapping "Send" displays which tachograph is connected, and options of which tachograph data to send. Tap the appropriate button and a tick is displayed on completion.
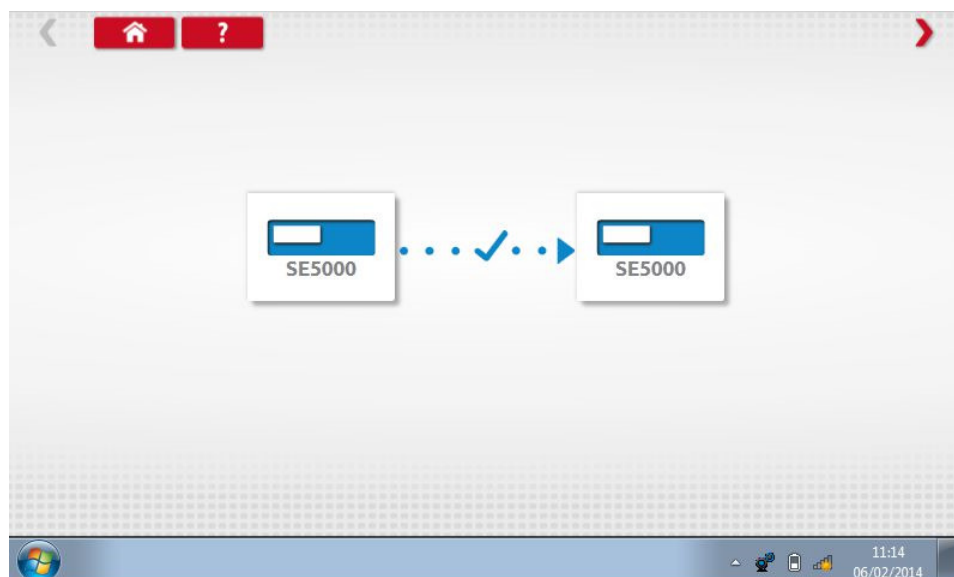
## 14. Sensor Test

▪ Tapping ![Sensor test icon] provides the facility to test encrypted sensors or cables, or get information from the sensor.
Note: Not available on Optimo Light or Optimo[2]
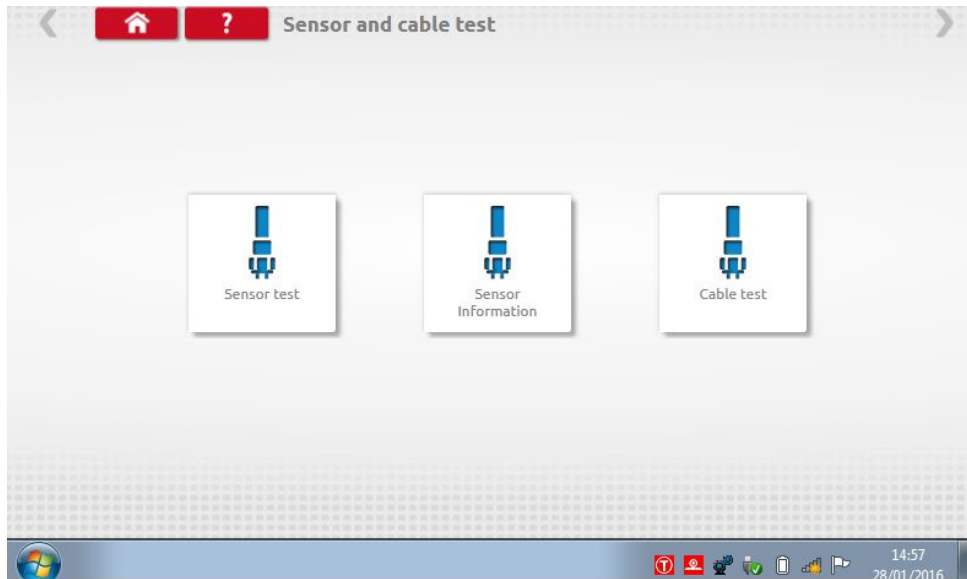


▪ Tapping "Sensor test" displays instructions on which cables to use and how to connect to the sensor.
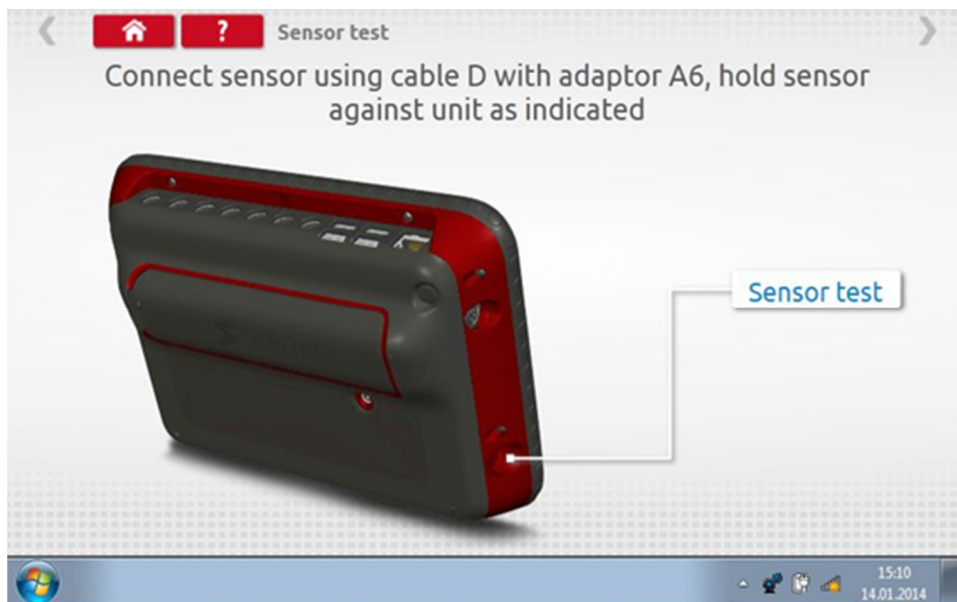
- Connect as shown, press sensor into recess at bottom left of the device and the test begins. A slight vibration is felt at the sensor and results are displayed.

- Tapping "Cable test" gives instructions to test encrypted cables.  Connect as shown with the yellow plug to Optimo via connector C1 and the other end terminated with plug C2.  Tap the red arrow top right and the result is displayed.
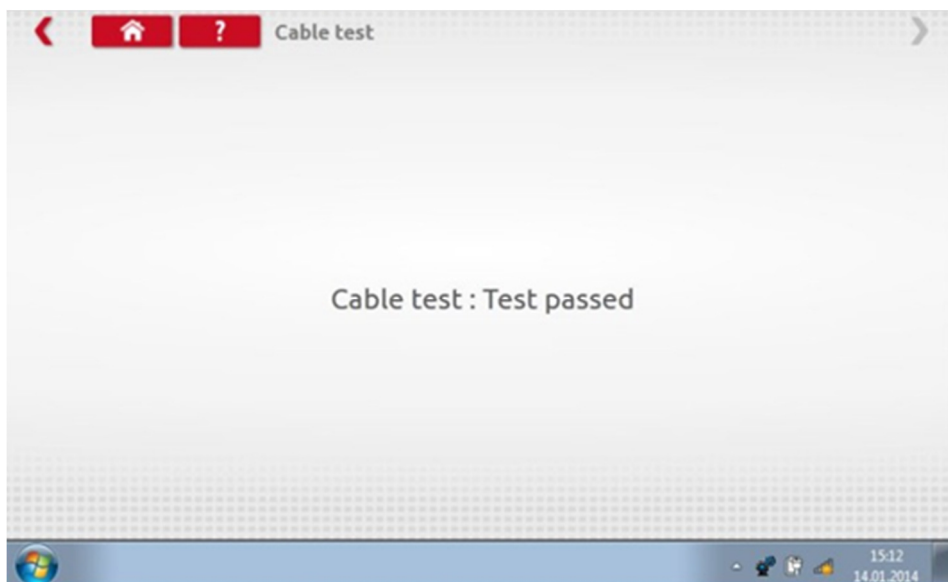
- Tapping "Sensor Information" supplies information about the connected Sensor, such as Serial number etc.  Available on Optimo[2] with purchase of new cable.

| Serial number | 1494489780 |
|---|---|
| Manufacturing date | 5/2005 |
| Sensor type | 20 |
| Manufacturer | Continental Automotive GmbH |

Sensor Information

14:58
28/01/2016

## 15. Rolling Road Brake

▪ If your Rolling Road is connected wirelessly to Optimo the new Rolling Road Brake icon will appear.

▪ Tapping     enables a user to Apply or Release the Rolling Road brake via Optimo.
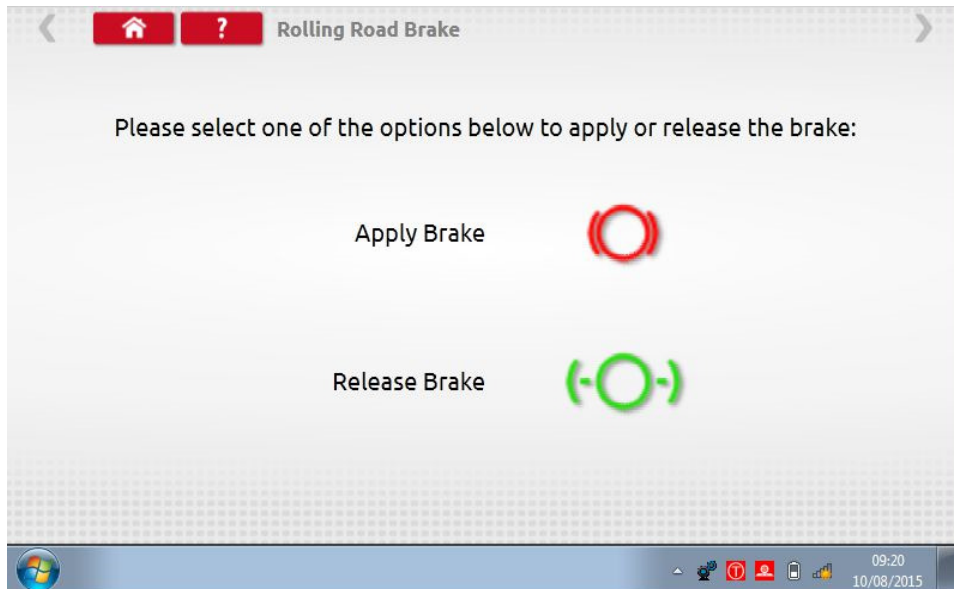


▪ Initially both buttons will be active as the system will not know what state the brakes are currently set to.

▪ If you tap the Apply Brake button, it will apply the brakes to the rollers and that button will then be inactive leaving only the Release Brake option, and vice versa.
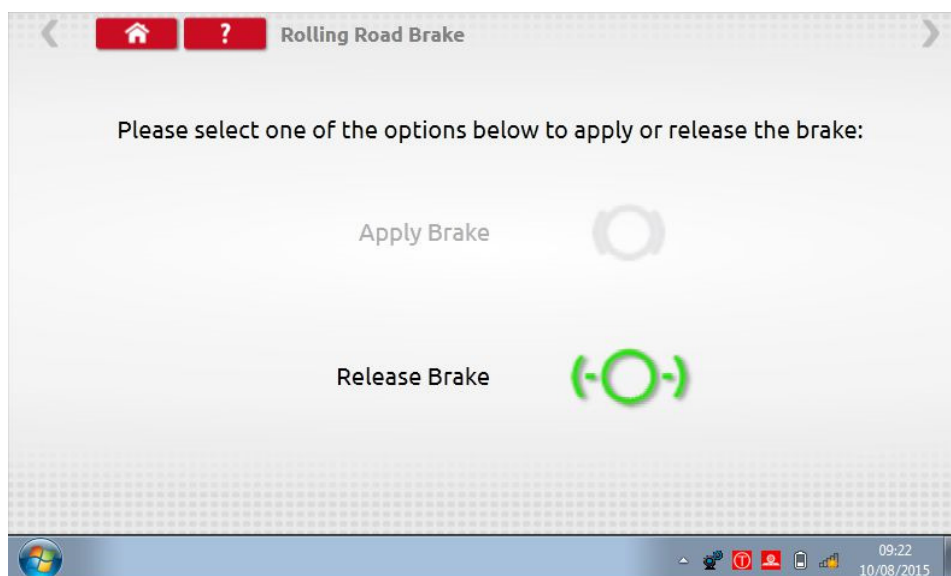
# 16. Product Upgrade

- With links supplied from Stoneridge, download upgrades from the Web to a USB storage device.

- Connect the Upgrade USB stick to an external port. When Optimo recognises the USB it may open a pop up window, close this window.

- Tap  and both current version and new version is displayed.

- Tap the "upgrade" button and follow prompts.
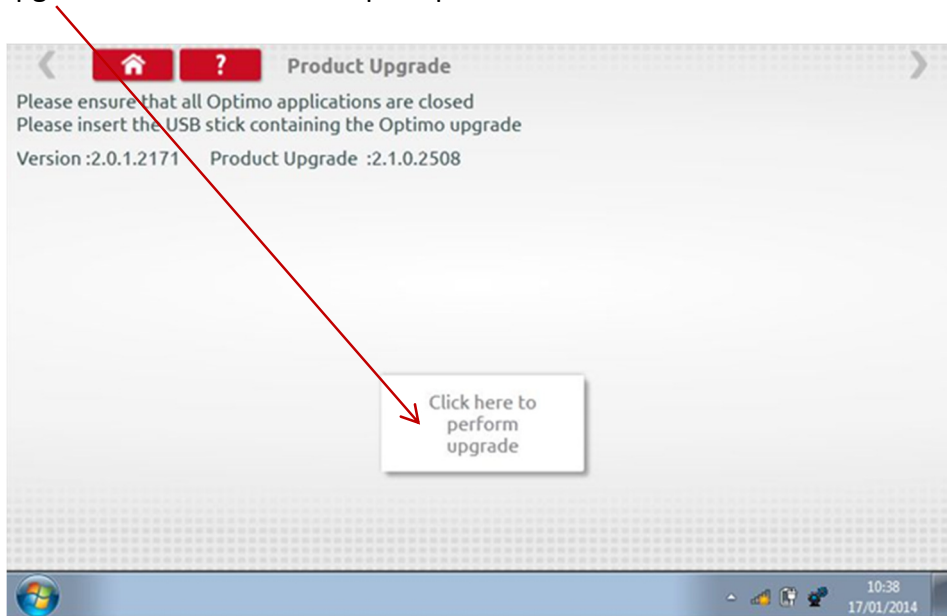


- "Error" is displayed if Optimo does not recognise the USB device, if no device present, or if it is the wrong update. If this occurs, check the USB device inserted correctly and correct upgrade present.
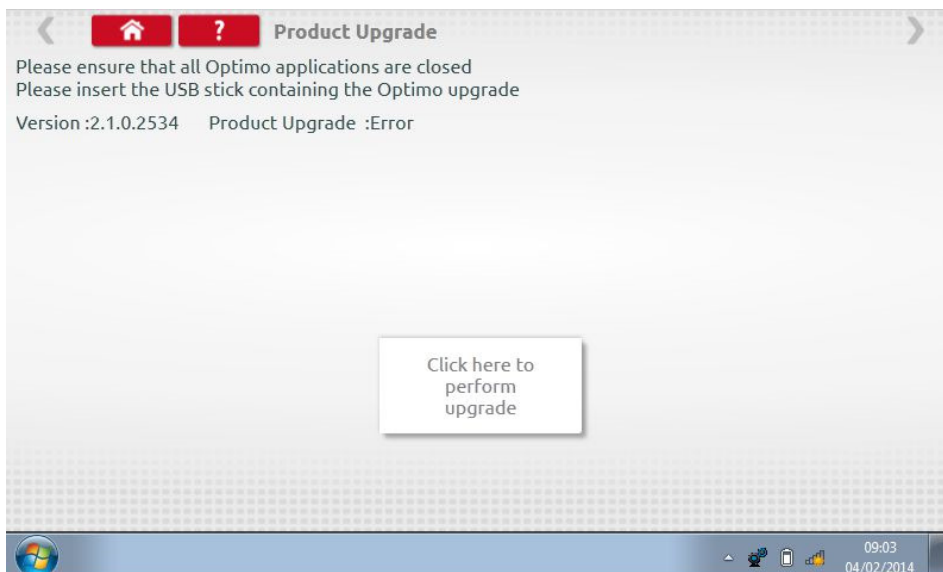
# Annex A – Cable cross reference tables

This table shows a list of existing cables that can be used with Optimo when used in conjunction with the appropriate adaptor cables supplied. Note: only A8 for Optimo Light

| Part Number | Description | Cable Identification | Current Din Connector | Adaptor A or B |
|---|---|---|---|---|
| 7780-981 | Tachograph Drive Lead | CABLE C | 6 way | A-6 |
| 7780-982 | Vehicle Sender Conn. Lead | CABLE D | 6 way | A-6 |
| 7780-983 | PPR/Engine Rev Calibration Lead | CABLE E | 6 way | A-6 |
| 7780-986 | Serial Data Out Adaptor Lead | CABLE F | Use with Cable H | A-4 |
| 7780-984 | Jack Socket Connection Lead | CABLE G | 6 way | A-6 |
| 7780-989 | Serial Data Conn Lead | CABLE H | 4 way | A-4 |
| 7780-987 | Adaptor Cable (1400) | CABLE K | 6 way | A-6 |
| 7780-988 | Adaptor Cable (1314) | CABLE L | 6 way | A-6 |
| 7780-974 | Motometer Pulser Adaptor | CABLE M | Use with Cable C | A-6 |
| 7780-980 | Motometer Programming Lead | CABLE N | 8 way | A-8 |
| 7780-979 | 1319 Jack Socket Adaptor Lead | CABLE O | Use with Cable G | A-6 |
| 7780-973 | 1319 Programming Lead | CABLE P | 8 way | A-8 |
| 7780-975 | Motometer Revs Adaptor | CABLE Q | Use with Cable G | A-6 |
| 7780-978 | Flat Wire Cable Adaptor 8400 | CABLE S | Use with Cable G | A-6 |
| 7780-977 | Flat Wire Cable Adaptor 1314 | CABLE T | Use with Cable H | A-4 |
| 7780-936 | 2400 Programming Lead | CABLE U | 8 way | A-8 |
| 7780-956 | 2400 Canbus Data Lead | CABLE V | 8 way | A-8 |
| 7780-952 | MTCO Programming Lead | CABLE W | 8 way | A-8 |
| 7780-955 | 2400 Serial Data Adaptor Lead | CABLE X | Use with Cable H | A-4 |
| 7780-810 | Digital Programming Lead | CABLE Z | 8 way | A-8 |
| 7955-938 | Clock Tester | | 8 way | A-8 |
| 7955-777 | Flexi Switch | | 4 way | B |
| 7780-948 | Kienzle Laser Device Adaptor | | 4 way | B |
| 7500-008 | Rolling Road Cable | | 4 way | B |

# Available functions and required harnesses

| Tachograph Function | VR2400 | VR8400 | VR8300 | VR1400 | K1324 | K1319 | K1318 | K1314 | Moto-Meter EGK100 | SE5000 | DTCO | Smar-tach |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rolling Road | U or D | G+J or D | G+J or D | K | W or D | G+O+J | G+J or D | G+J or L | N | Z or D | Z or D | Z or D |
| Fixed Dist #1 | U or D | G+J or D | G+J or D | K | W or D | G+O+J | G+J or D | G+J or L | N | Z or D | Z or D | Z or D |
| Fixed Dist #2 | U or D | G+J or D | G+J or D | K | W or D | G+O+J | G+J or D | G+J or L | N | Z or D | Z or D | Z or D |
| Bench Test | C | G+S+J or C | C | K | C or O | G+O+J or C | G+S+J or C | G+T+J or L | C+M or N | Z | Z | Z |
| Speed Simulator | U or C | G+S+J or C | C | K | W or C | G+O+J or C | G+S+J or C | G+T+J or L | C+M or N | Z | Z | Z |
| RPM Pulse Test | E | E | E | - | W | - | E | - | N | - | - | - |
| Clock Test | U | Clock Tester | Clock Tester | - | W | Clock Tester | Clock Tester | Clock Tester | N | Z | Z | Z |
| Tacho Control | U | G+J | - | - | W or C | - | - | - | N | - | - | - |
| Identify Tacho | U | - | - | - | W | - | - | - | - | Z | Z | Z |
| Read/Erase DTCs | U | - | - | - | W | - | - | - | - | Z | Z | Z |
| Send All Data | U | G+J | - | - | W | P | - | - | N | Z | Z | Z |
| Modify Data | U | - | - | - | W | P | - | - | N | Z | Z | Z |
| Read All Data | U | - | - | - | W | P | - | - | N | Z | Z | Z |
| Program Tacho | - | G+J | - | - | - | - | - | - | - | - | - | - |
| k factor Test | - | G+J | - | - | - | G+O+J | G+J | G+J | - | - | - | - |
| Pair / Test | - | - | - | - | - | - | - | - | - | Z | Z | - |
| Time / Date | - | - | - | - | - | - | - | - | - | Z | Z | Z |
| Enter PIN | - | - | - | - | - | - | - | - | - | Z | - | - |

Notes:

(1) Fixed Distance #2 also requires the Flexi Switch or light barriers.

(2) DIL Calculate, Tacho Select and Pulser Select do not require any connections

# Annex B – Programmable Parameters

| Programmable Parameters | | Access | | VR | DTCO | Kienzle | | |
|---|---|---|---|---|---|---|---|---|
| Text displayed | Description | Read/Write | SE5000 | 2400 | 1381 | 1324 | Actia | Efkon |
| | System Supplier Identifier | R | X | X | X | | X | X |
| | ECU Manufacturing Date | R | X | X | X | | X | X |
| | ECU Serial Number | R | X | X | X | | X | X |
| | System Supplier ECU Hardware Number | R | X | X | X | | X | X |
| | System Supplier ECU Hardware Version Number | R | X | X | X | | X | X |
| | System Supplier ECU Software Number | R | X | X | X | | X | X |
| | System Supplier ECU Software Version Number | R | X | X | X | | X | X |
| | System Name Or Engine Type | R | X | X | X | | X | X |
| w-factor | Vehicle Characteristic w factor | R/W | X | X | X | X | X | X |
| k-factor | k factor | R/W | X | X | | X | X | X |
| Odometer | Total Vehicle Distance | R/W | X | X | X | X | X | X |
| Current time + Current date + Time offset | Time/Date | R/W | X | X | X | | X | X |
| l-factor | Tyre Circumference l factor | R/W | X | X | X | X | X | X |
| Tyre size | Tyre Size | R/W | X | | X | | X | X |
| Next Calibration Date | Next Calibration Date | R/W | X | | X | | X | X |
| Vehicle Registration Nation | Registering Member State | R/W | X | | X | | X | X |
| VRN | Vehicle Registration Number | R/W | X | | X | | X | X |
| Speed Authorised | Speed Authorised | R/W | X | X | X | | X | X |
| VIN | Vehicle Identification Number | R/W | X | X | X | X | X | X |
| CANBus enabled | Can Enable on A-CAN | R/W | X | X | | | | |
| CAN Termination | CAN Termination on A-CAN | R/W | X | | | | | |
| CAN trip reset | CAN Trip Reset Service Component Id | R/W | X | | | | | |
| CANBus type | Transmission Repetition Rate Of TCO1 Message | R/W | X | | X | | X | X |
| Reset Heartbeat | Reset Heartbeat Message | R/W | X | X | X | | | X |
| O/P shaft factor | Pulses Per Revolution Of Output Shaft | R/W | X | X | X | X | X | X |
| Backlight Select | Display Backlight Selection | R/W | X | | | | | |
| Illumination Lvl | Illumination Level | R/W | X | | | | | |
| Illumination Off | Illumination Offset | R/W | X | | | | | |
| Illumination Input | Illumination Input, (A2/CAN) | R/W | X | | | | | |
| Speedo Output factor | D6 Factor (speedometer OP factor) | R/W | X | X | | | | |

| Programmable Parameters | | Access Read/Write | SE5000 | VR 2400 | DTCO 1381 | Kienzle 1324 | Actia | Efkon |
|---|---|---|---|---|---|---|---|---|
| Text displayed | Description | | | | | | | |
| D6 pin function | D6 Pin Functions, (Speed Pulse Output) | R/W | X | X | | | | |
| D6 pin function | Pin D6 | R/W | X | | | | | |
| Filter pin B3 | Filter - speed sensor signal pin (B3) | R/W | X | | | | | |
| D5 pin function | D5 Pin Enabled, (Over Speed Output) | R/W | X | | | | | |
| D4 pin function | D4 Pin Functions, (General Warning Output) | R/W | X | X | | | | |
| D7 pin function | D7 Pin Enabled, (K-line Rear) | R/W | X | | | | | |
| C1 pin function | Settings off C1 output | R/W | X | | | | | |
| Revs Input C3/CAN | Revs Input, (C3/CAN) | R/W | X | X | | | | |
| RPM Factor | Rpm Factor, (C3 factor) | R/W | X | X | X | | | |
| Serial Data Out | Serial Data Output , (D8 Functions) | R/W | X | X | | | | |
| Low speed Limit | Low Speed Limit | R/W | X | X | | | | |
| Ignition Activity Change | Activity change at Key on/off | R | X | | | | | |
| Definition Key On/Off | Activity at ignition ON/OFF | R/W | X | | X | | | |
| Pref. Language | Default Language | R/W | X | | | | | |
| Service delay | Service Delay Calendar Time Based | R/W | X | X | X | X | | |
| Install date | ECU Installation Date | R/W | X | X | X | X | | |
| Pre-Next Calibration | Days left until next calibration | R/W | X | | | | | |
| Pre-Overspeed | Pre overspeed | R/W | X | | | | | |
| Display function | Display function | R/W | X | | | | | |
| RD Activity Status | Remote download activation status | R | X | | | | | |
| RD Card Writing | Remote download card writing | R/W | X | | | | | |
| RD CAN Configuration | Remote download C-CAN Configuration | R/W | X | | | | | |
| Show Remote Download | Show remote download | R/W | X | | | | | |
| CAN wake up | CAN wake up | R/W | X | | | | | |
| | 2nd source of motion | R | X | | | | | |
| | 2nd source of motion, allowed offset | R/W | X | | | | | |
| | 2nd source of motion, speed diff. | R/W | X | | | | | |
| | 2nd source of motion, CAN msg. | R/W | X | | | | | |
| | C3 speed factor | R/W | X | | | | | |
| Add. Event Rec. | Use Of D1 D2 Registration | R/W | X | | | | | |
| Eng. Speed Rec. | Use Of Engine Speed Registration | R/W | X | X | | | | |
| VRESD | Vu Ranges Engine Speed Data | R/W | X | | | | | |
| Vehicle Speed Rec. | Use Of Vehicle Speed Registration | R/W | X | | | | | |
| VRVSD | Vu Ranges Vehicle Speed Data | R/W | X | | | | | |
| Maximum Warranty | Maximum Warranty Time | R | X | | | | | |

| Programmable Parameters | | Access Read/Write | SE5000 | VR 2400 | DTCO 1381 | Kienzle 1324 | Actia | Efkon |
|---|---|---|---|---|---|---|---|---|
| Text displayed | Description | | | | | | | |
| Warranty Valid Time | Warranty Validity Time | R | X | | | | | |
| Warranty Time | Warranty Time | R/W | X | | | | | |
| Number of writes Warranty | Number of writings to Warranty Time | R | X | | | | | |
| Activation Time | Time of activation | R | X | | | | | |
| Dimming Input | Dim mode | R/W | | | X | | | |
| CAN Dimming Input | Can Dim mode | R/W | | | X | | | |
| Diming Parameters. | Dim parameters | R/W | | | X | | | |
| Dim preset record | Dim-mode preset | R/W | | | X | | | |
| | Kline Speedo | R/W | | X | | | | |
| | Pulses per engine revolution | R/W | | X | | | | |
| | CANbus RPM | R/W | | X | | | | |
| | RPM Display | R/W | | X | | | | |
| | Odometer leading 0s | R/W | | X | | | | |
| | Overspeed flash | R/W | | X | | | | |
| | Overspeed | R/W | | X | | | | |
| | Customer Type | R/W | | X | | | | |
| | Dual Axle | R/W | | X | | | | |
| | Dual Axle ratio | R/W | | X | | | | |
| | Crew auto duty | R/W | | X | | | | |
| | 7 day eject PIN | R/W | | X | | | | |
| | Ignition-on recording | R/W | | X | | | | |
| | DTCs enabled | R/W | | X | | | | |
| | 4th chart trace | R/W | | X | | | | |
| | Analogue Revs | R/W | | X | | | | |
| | Rev Band Limits - Low Power Band | R/W | | X | | | | |
| | Rev Band Limits - Economy Band | R/W | | X | | | | |
| | Rev Band Limits - Poor Economy | R/W | | X | | | | |
| CANBus type | CANbus Type. **This is part of ECU Hardware Number** | R/W | | | | X | | |
| | Repair Shop Code Or Tester Serial Number | W | X | X | | X | | |
| | Programming Date | W | X | X | | X | | |
| | Calibration Equipment Serial Number OR Calibration Repair Shop Code | W | X | X | | X | | |
| | Calibration Date | W | X | X | | X | | |
| | Calibration Equipment Software Number | W | X | X | | X | | |

## Annex C – Optimo Error Codes

**Application Codes**

| APPLICATION | Error Code | |
|---|---|---|
| MK3 Programmer | 0x00** | Codes 01 to 10 / 1F / 20 to 29 / D0 to FF are valid |
| SE5000 Configuration System | 0x01** | Codes 01 to 10 / 1F / D0 to FF are valid |
| Tachograph Swap | 0x02** | Codes 01 to 10 / 1F / D0 to FF are valid |
| Sensor Test | 0x03** | Codes 01 to 10 / 1F are valid |
| Application Sheets | 0x04** | Codes D0 to FF are valid |
| Cross Reference | 0x05** | Codes D0 to FF are valid |
| Workshop Settings | 0x06** | Codes D0 to FF are valid |
| Calibration | 0x07** | Codes D0 to FF are valid |
| Product Upgrade | 0x08** | Code C1 is Valid |
| Taximeter | 0x09** | |
| DTCO1381 Configuration System | 0x0A** | |
| Wireless Brake | 0x0B** | |

**Specific Error Codes**

| Error Code | Category | Error Code | Category |
|---|---|---|---|
| 0x**01 | Comms Timeout | 0x**20 | Tacho Value Out Of Range |
| 0x**02 | Transfer Aborted Returned | 0x**21 | Upload Not Accepted |
| 0x**03 | General Reject | 0x**22 | Requested Data Unavailable |
| 0x**04 | Security Access Denied | 0x**24 | Tacho Not In Correct Mode |
| 0x**05 | Request Out Of Range Returned | 0x**25 | Data Parameter Not Accepted |
| 0x**06 | Service Error | 0x**26 | Pin Timeout Has Occurred |
| 0x**07 | Tacho Type Incorrect | 0x**27 | No Card Detected In Tacho |
| 0x**08 | Can Or Serial Data Timeout | 0x**28 | Incorrect Card Type In Tacho |
| 0x**09 | IF Board Comms Error | 0x**29 | Invalid Pin Entered Into Tacho |
| 0x**0A | PC Comms Port Error | 0x**C1 | Product Upgrade Error |
| 0x**0B | Function Not Supported , | 0x**D0 | Cannot Connect To Or Retrieve Data From App Database |
| 0x**0C | Renesas Frequency Calibration Error | 0x**D1 | Data Not Found In App Database |
| 0x**0D | Invalid Key | 0x**DF | General Data Error |
| 0x**0E | Number Attempts Exceeded | 0x**E0 | C8051 Init Error |
| 0x**0F | Required Time Delay Not Expired | 0x**E1 | C8051 Wrong Device ID |
| 0x**10 | Sub Not Supported Invalid Format | 0x**E2 | C8051 Not Blank |
| 0x**11 | Sub Not Supported Inactive Session | 0x**E3 | C8051 Flash Update Failed |
| 0x**12 | Svc Not Supported Inactive Session | 0x**E4 | IF Board Firmware Upgrade Error |
| 0x**13 | Svc Not Supported Inactive Diag Mode | 0x**EF | IF Board Firmware Error |
| 0x**14 | Transfer Data Suspended | 0x**F0 | Unit Not Calibrated Error |
| 0x**15 | General Programming Failure | 0x**F1 | Logging Error |
| 0x**16 | Incorrect Msg Len Or Invalid Format | 0x**F2 | Calibration Result Error |
| 0x**17 | Bad Checksum Illegal Byte Count Block Transfer | 0x**F3 | Touch Screen Software Not Found |
| 0x**18 | Target Address Not This Device | 0x**FE | EULA Not Signed |
| 0x**19 | Data Received From Unknown Source Address | 0x**FF | General Error |