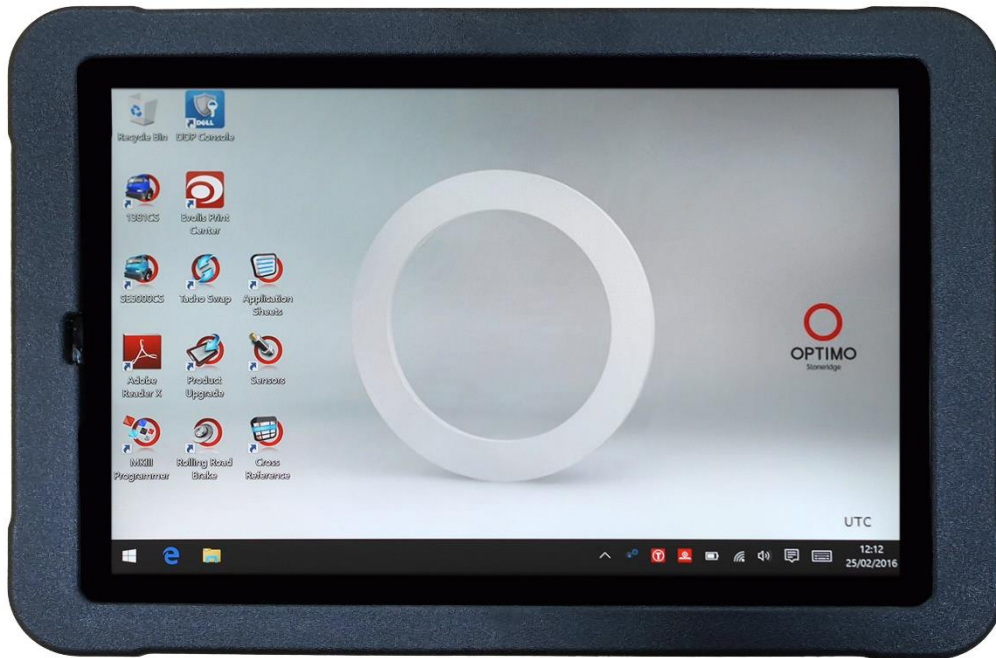


Stoneridge Optimo² Manual



Stoneridge Electronics Ltd

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1. Optimo² Kit



Optimo²



Screen Protector

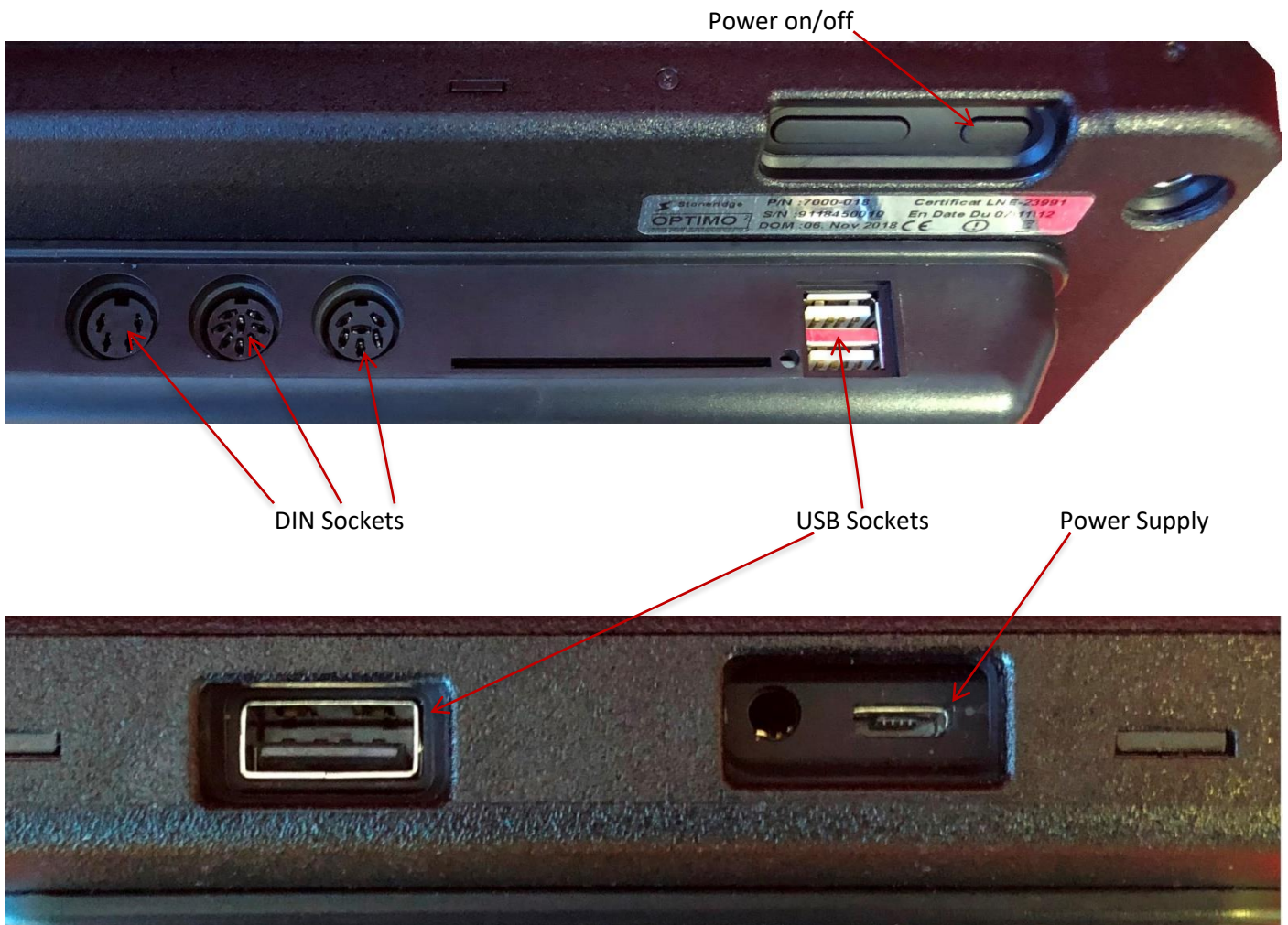


Digital Dongle



PSU/Charger

2. Optimo² Switching On



Power on/off

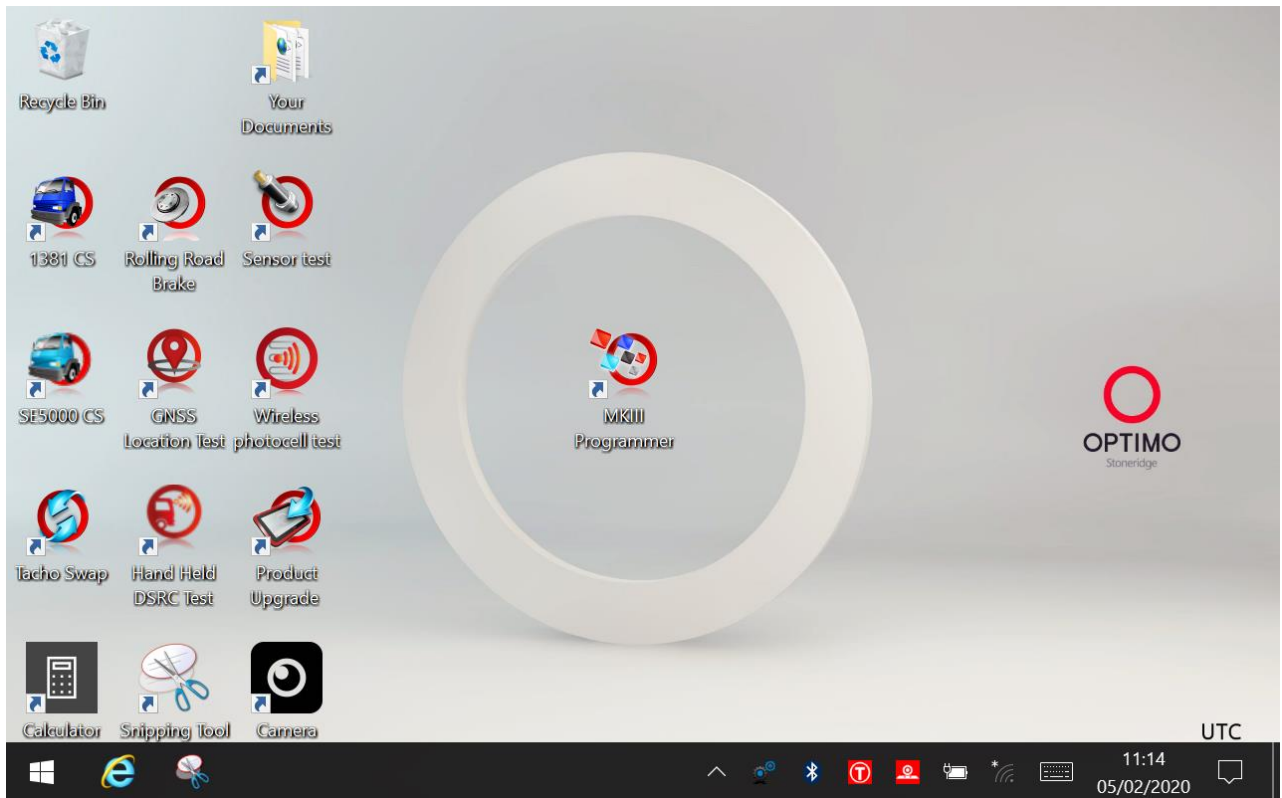
DIN Sockets

USB Sockets

Power Supply

3. Optimo² Main Screen

- Optimo² supports all digital and analogue tachographs.



4. Optimo² Features

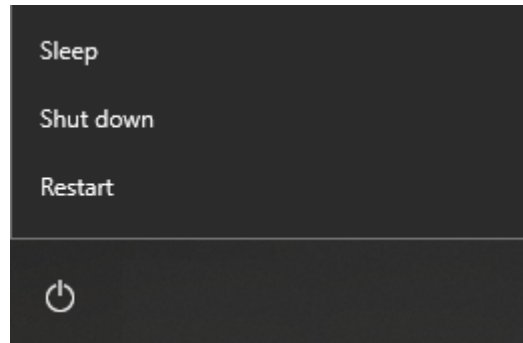
Component	Optimo ²
External USB ports	3
Bluetooth	Yes
Wi-Fi	Yes
Camera	Yes, Front & Rear
Smart card reader	Yes
Dongles	Digital
I/O connectors	DIN connectors
Battery charge time	4 hours
Vehicle charger	Yes, USB
Screen dimming	Yes
Screen rotation	Yes
Screen protector	Yes

5. Optimo² Sleep Mode & Switching Off

5 minutes inactivity	Screen blank – programs still running	Press ON button at rear to wake up
30 minutes inactivity	Optimo ² shuts down	Press ON button at rear to re-start

- To Turn Optimo² Off.

- Tap Windows Icon  in bottom left hand corner of the screen.



- Tap Power Icon, then Tap Shut down.

6. Getting Started

- How to set up your Optimo².

6.1. Task Bar Icons

6.1.1. Workshop Settings

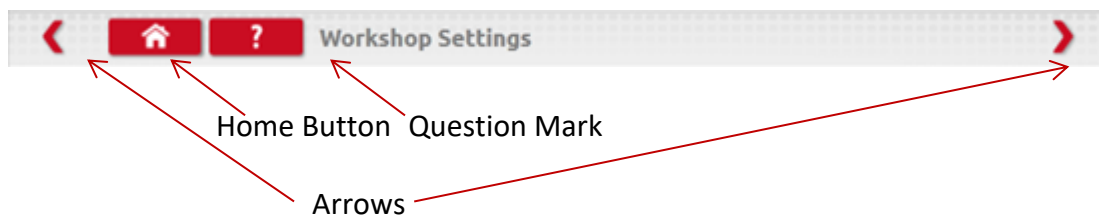
- On first power up of Optimo² several details must be entered into the Workshop Settings screens.
- Workshop Settings screens can also be accessed at any time by tapping here.



- After selecting your Language and Country, enter your workshop details.
- Please 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 the Arrows at the top of the page if highlighted.



- The 'Home' button, single tap, returns to that application's main screen. A double tap closes the application and returns to the Windows desktop.

- This screen displays various details about your workshop and enables selection and settings for Rolling Roads and Roller Brake Testers.
- Please complete all fields.

Workshop Settings	
Station number	SRE123
Date of approval	01/09/2012
Station seal number	SRE123
Date calibration due	03/11/2016
How many days warning for calibration due-date?	30
Rolling road RBT type	SRE 9500
Rolling road/roller brake tester calibration settings	*****
Add tyre factor correction	<input type="radio"/> Yes <input checked="" type="radio"/> No
Manual rolling road test speed	50km/h

- 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.
- For Pan ID and Channel ID, please refer to your dongle label.
- Please note that you cannot run two Optimo² with the same ID’s in the workshop.
- For multiple installation of Optimo² please contact Workshop Support

Workshop Settings	
Fixed distance length	20m
Fixed distance 1	4
Fixed distance 2	4
Analogue bench test type	Standard
Configure analogue bench test	*****
Wireless Pan ID	7777
Wireless Channel ID	11

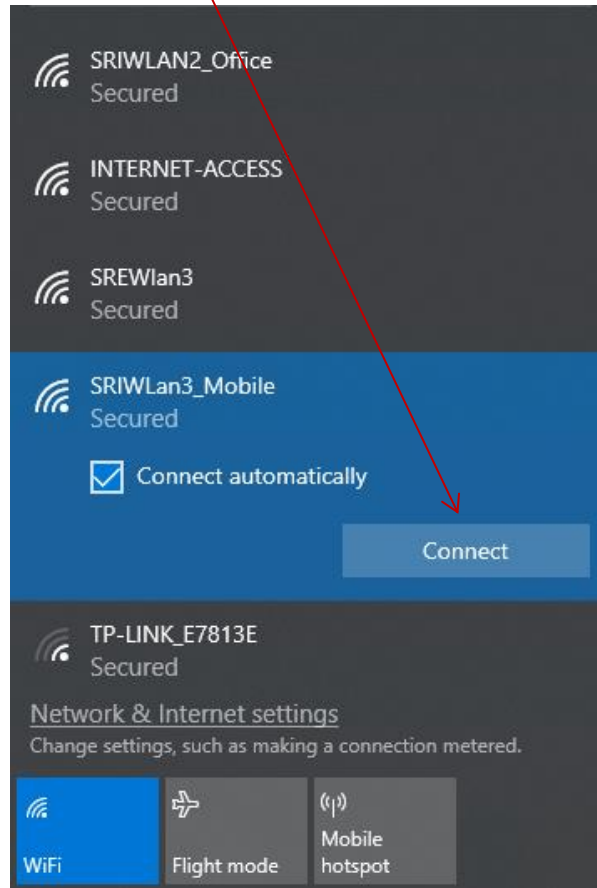
DETAILS ON ALL THESE SCREENS MUST BE COMPLETED BEFORE FIRST USE OF OPTIMO²

6.1.2. Connecting to Wi-Fi

- Tap the Wi-Fi icon.



- Select the network and tap “Connect” button.



- Follow the instructions as requested.

6.1.3. 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 the Tachograph

- 3 dongles are supplied for Digital, 2400 and 1324 tachographs. These are inserted into the programming socket as shown. Please wait 5 seconds after insertion before initiating any Optimo² applications as this allows time for the tachograph and Optimo² to connect.

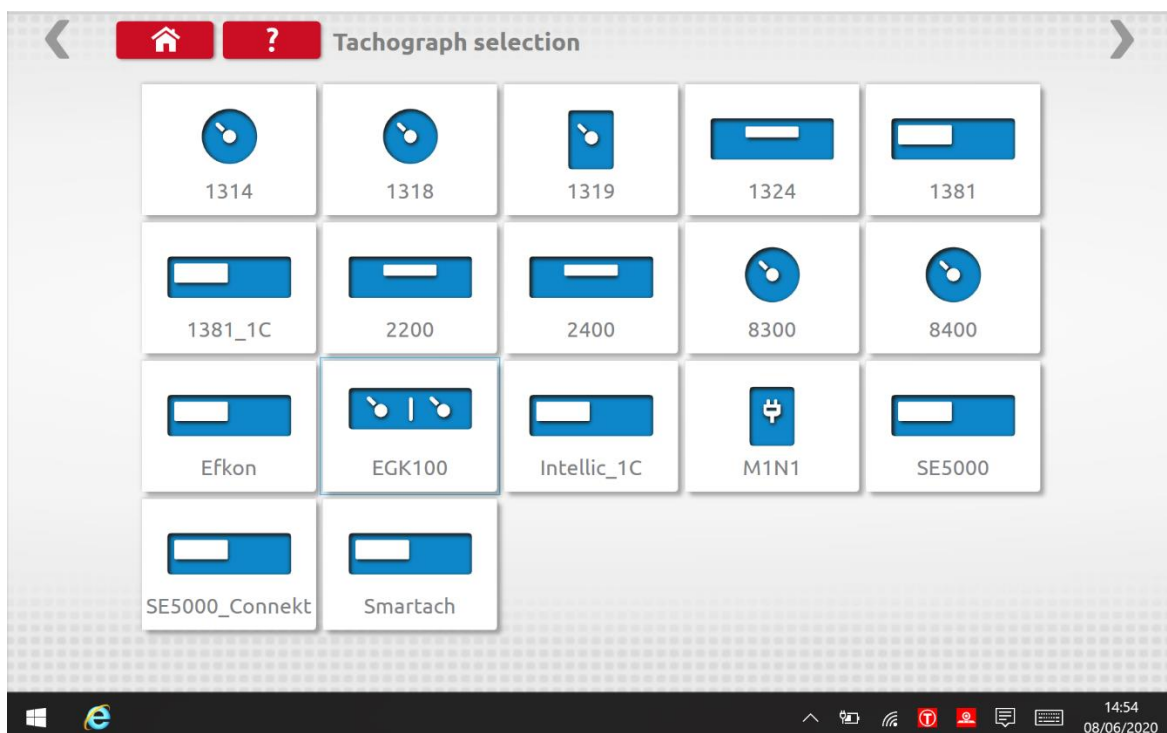


- All tachographs can also be connected using existing MKII cables.
- Note: 1324 Dongle only on 24V tachographs



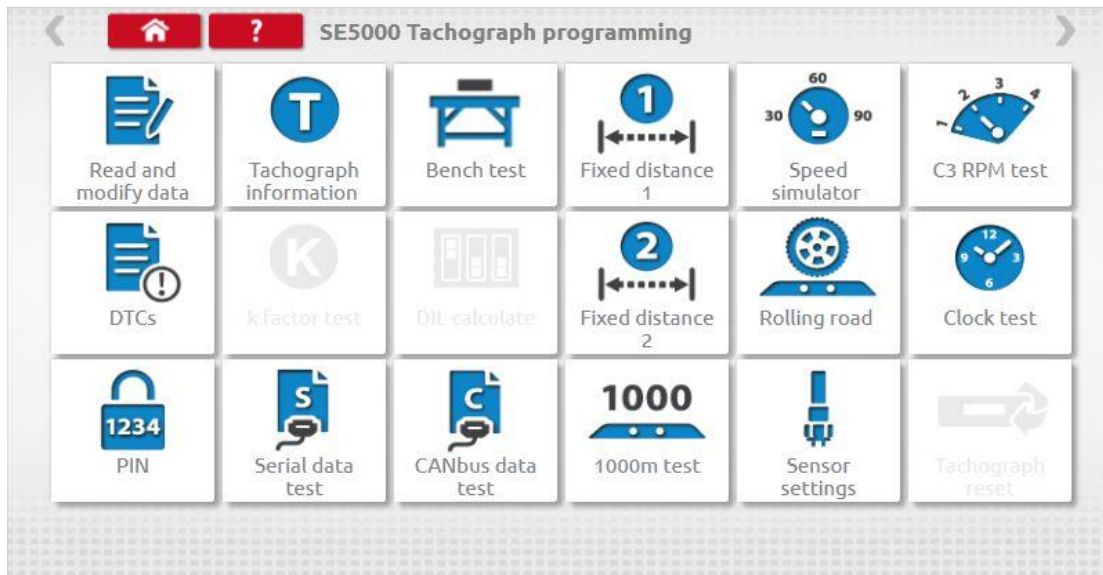
6.3. Calibrating and Programming

- On tapping the icon, Optimo² identifies the connected tachograph. If the tachograph cannot be determined the screen below is displayed. Select correct tachograph type.



7. Optimo² – 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.

Read and modify data	Chapter 7.1
Tachograph information	Chapter 7.2
Bench test	Chapter 7.3
Fixed distance 1	Chapter 7.4
Speed simulator	Chapter 7.5
C3 RPM test	Chapter 7.6
DTCs	Chapter 7.7
K factor test	Chapter 7.8
DIL calculate	Chapter 7.9
Fixed distance 2	Chapter 7.10
Rolling road	Chapter 7.11
Clock test	Chapter 7.12
PIN	Chapter 7.13
Serial data test	Chapter 7.14
CANbus data test	Chapter 7.15
1000m test	Chapter 7.16
Sensor settings	Chapter 7.17
Tachograph reset	Chapter 7.18

7.1. Read and modify data



- Select the icon on the tachograph programming screen.
- Parameters are changed by tapping the value in the “Setting” column and then a new screen is displayed along with the necessary keyboard, or for some parameters by selecting an appropriate option from the list available.

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 the 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 the data.

Annex 1B Parameters			CAN Parameters		
Parameter	Setting	Parameters	Parameter	Setting	Parameters
Time	15:48		Output shaft factor	10.000	
Date	17/03/2016		TCO1 rate	20ms	
Time offset	00:00		Reset heartbeat	Disable	
Odometer	287.7		CAN trip reset	ISO	
k factor	4000		A CAN	Enable	
l factor	3000		A-CAN type	Standard	
w factor	4000		A-CAN diagnostics	ISO	

- 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.

Virtual keyboard layout:

Escape	←	1	2	3	→	Backspace
Tab	→	4	5	6	↺	Keyboard Toggle
Caps	aA	7	8	9	⏏	Space
Shift	↑		0		↵	Enter

7.2. Tachograph Information



- Tap the icon.
- Available on all Digital, 2400 or 1324 tachographs.

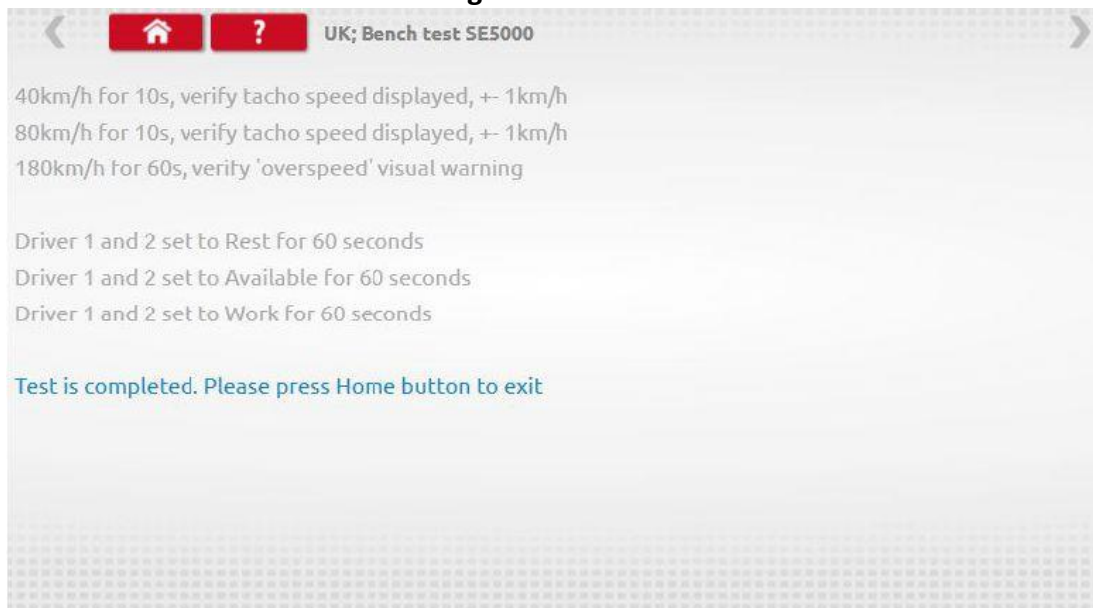
Tachograph information	
System supplier	Stoneridge
Manufacturing date	13/10/2009
Serial number	0000004925
Hardware number	000000900208T7.1
Hardware version	/34R02
Software number	P1AA
Software version	T0L
System name	TCOSC1

7.3. Bench test



- Tap the icon.
- 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 must be selected first.
- 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 the icon 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.

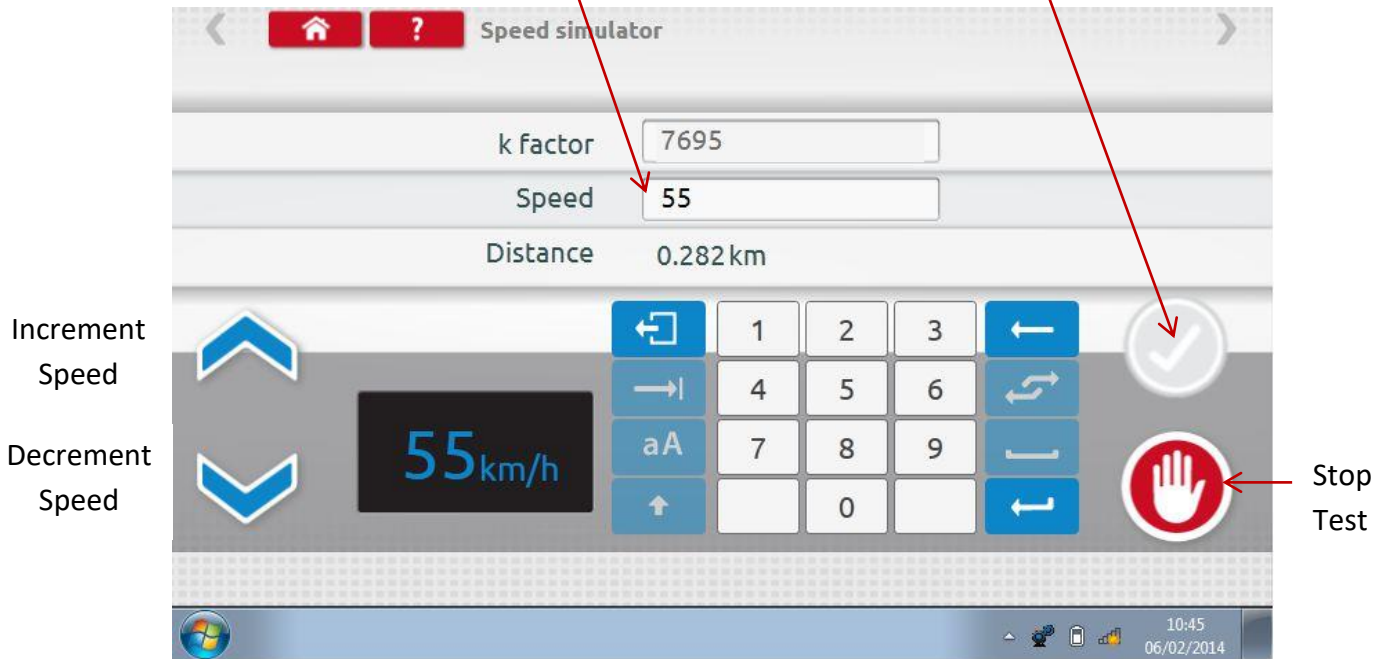
- Test complete

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

7.5. Speed simulator



- Tap the icon and then tap “Speed” box and enter the desired speed, then tap the tick button.



7.6. C3 RPM test



- Connect cable E to Optimo². Tap the icon.



7.7. DTCs



- Tap the icon and the tachograph DTCs are shown.

DTC	Code description	Occurrences
000004	Power supply interruption (VU)	2 12/07/2013 08:45:47
0001C0	Overspeeding pre warning	1 25/07/2013 13:28:18

For further information on DTC codes press the Help Button
To clear all DTCs press here

7.8. k factor test



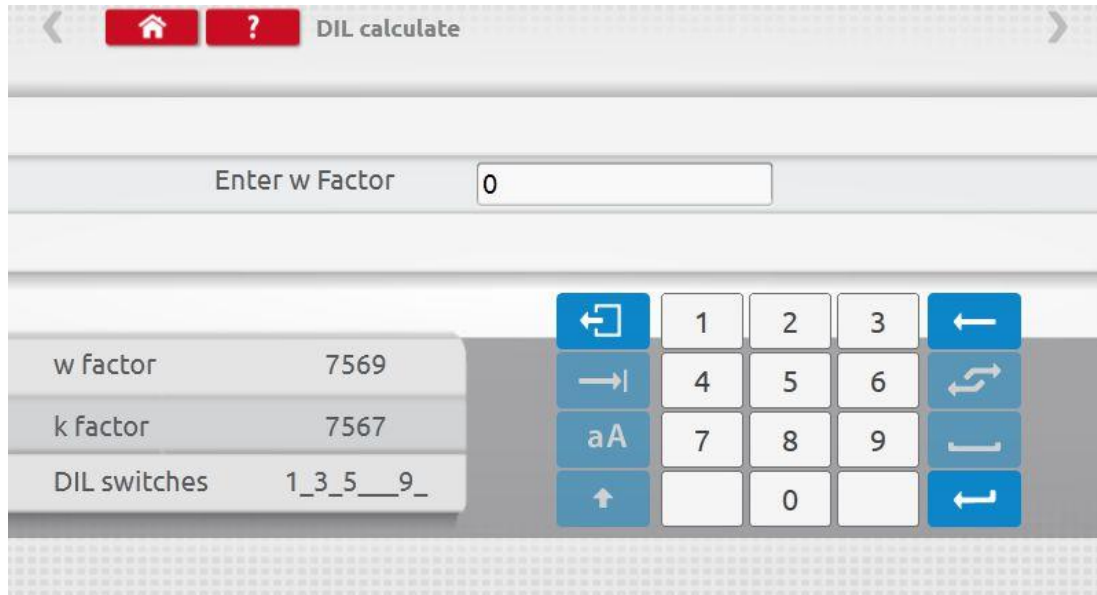
- Tap the icon and using cable G on an 8400, 1318 or 1314, it will provide a reading of the k factor

k factor test	
Sending pulses to the tachograph	
•	k factor = 7990

7.9. DIL calculate



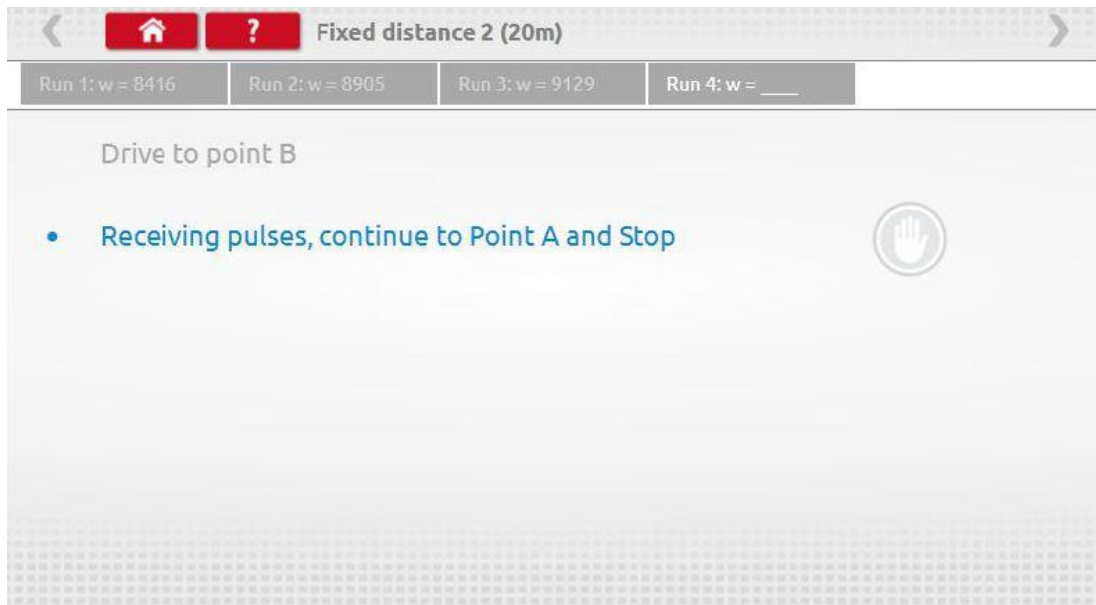
- Tap the icon and enter w factor. DIL switch settings, w factor and k exact are displayed on left. This function does not require connection to a tachograph.



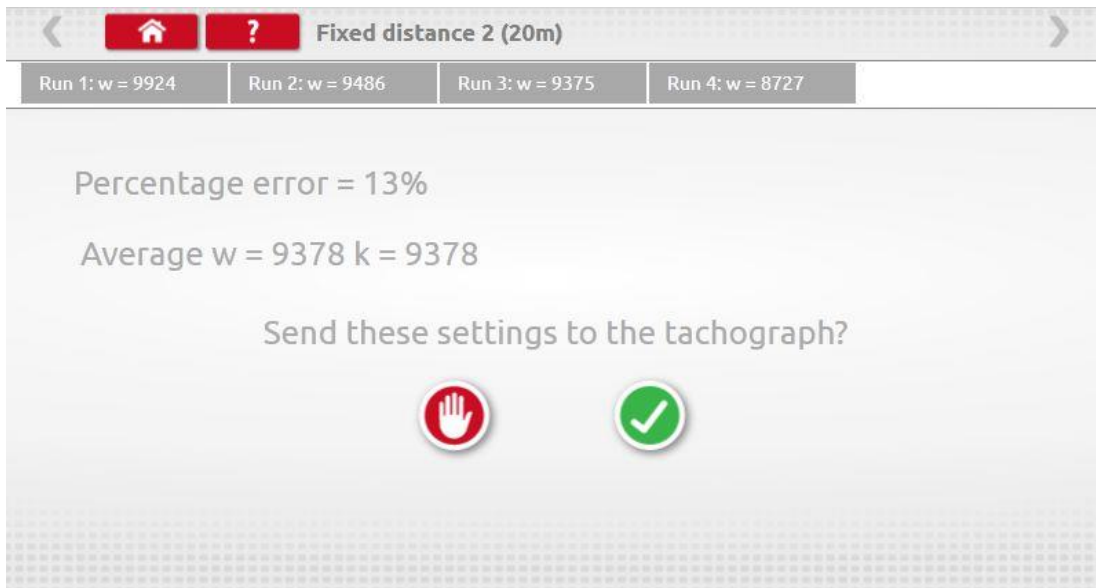
7.10. Fixed distance 2



- Tapping the icon enables the “w” factor to be determined using a physical method with an external device such as a flexi switch, light barrier or wireless photocell over a fixed distance. Connect the external device to Optimo².
- The “w” value for each run is displayed. Carry out appropriate runs as prompted.



- Test complete

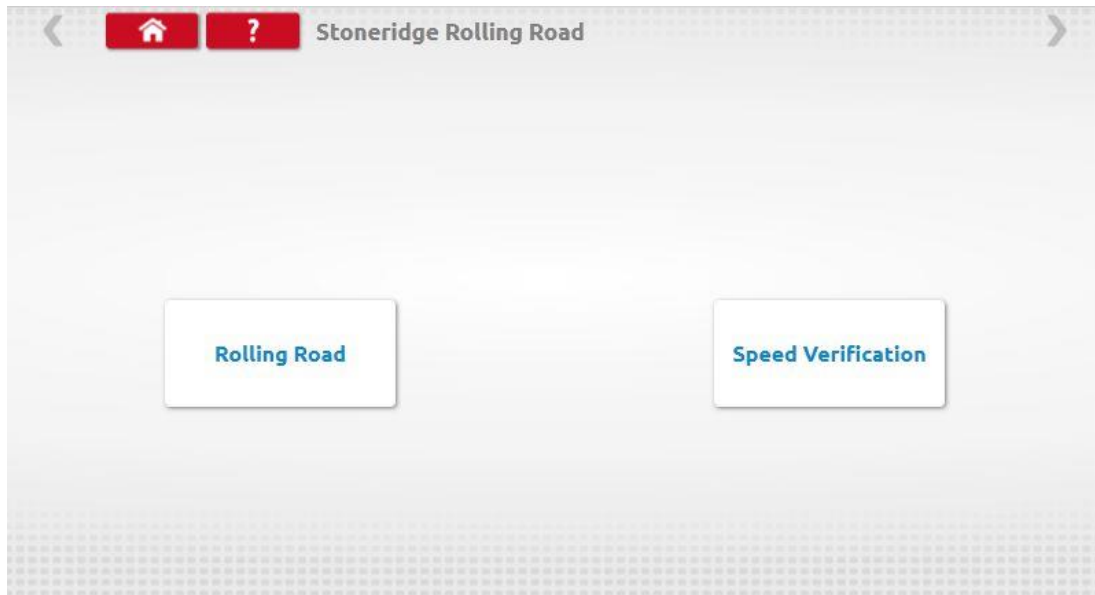


- For round tachographs DIL switch settings shown must be manually set.

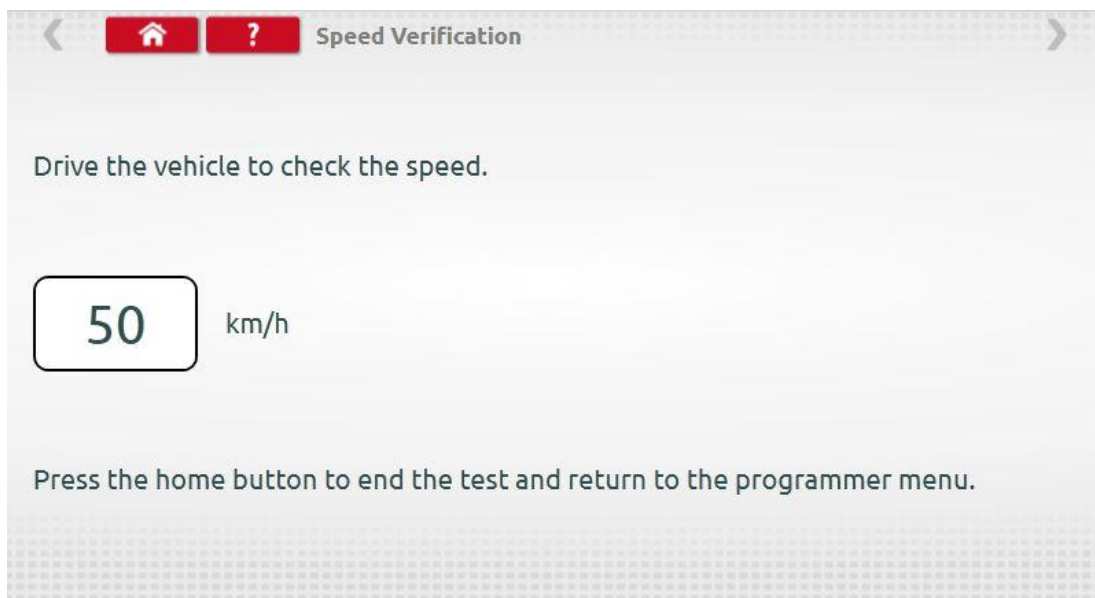
7.11. Rolling road



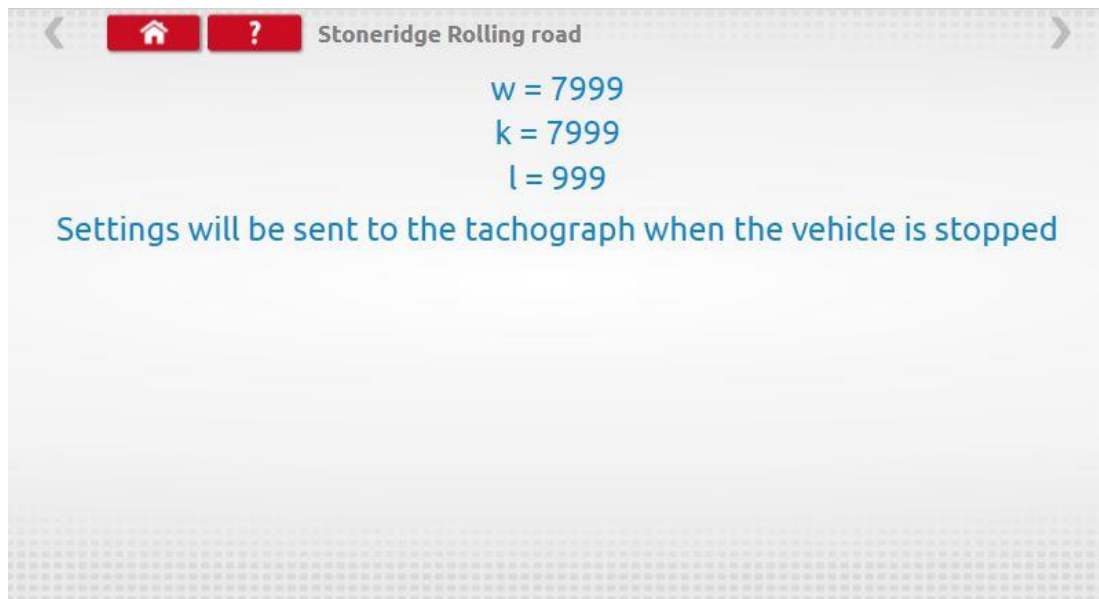
- Tapping the icon enables selection of Rolling Road test or Speed Verification test.



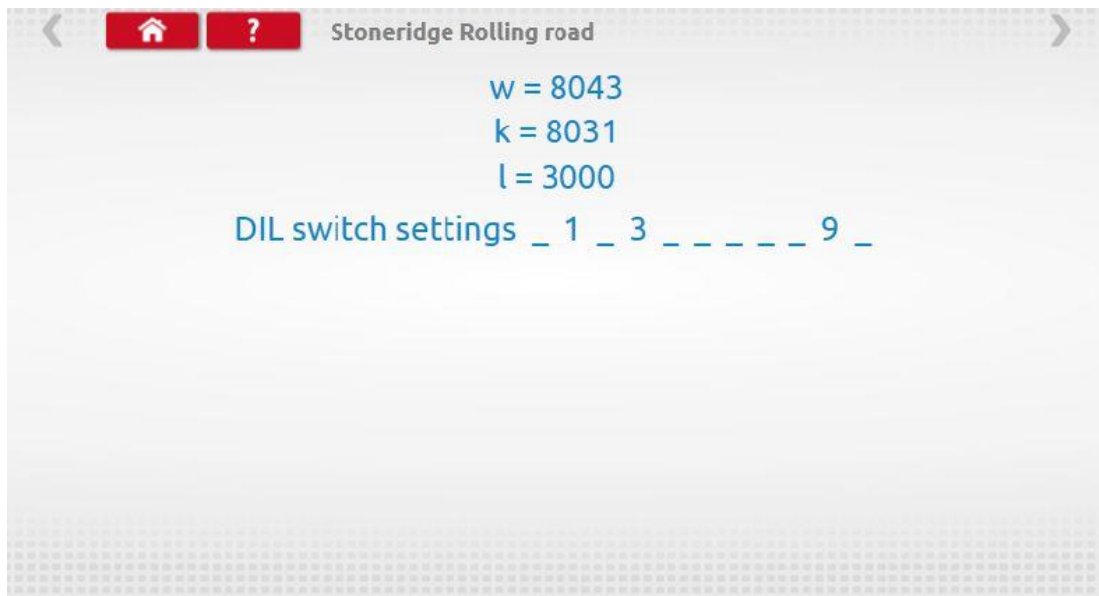
- With vehicle in motion, tap "Speed Verification", check speed of Rolling Road and compare with tachograph speed i.e. speed for speed check.



- For a Stoneridge rolling road, when you tap “Rolling Road” Optimo² determines the w and l factors. When the test is complete, results can be sent directly to radio sized tachographs, followed by a confirmation screen.



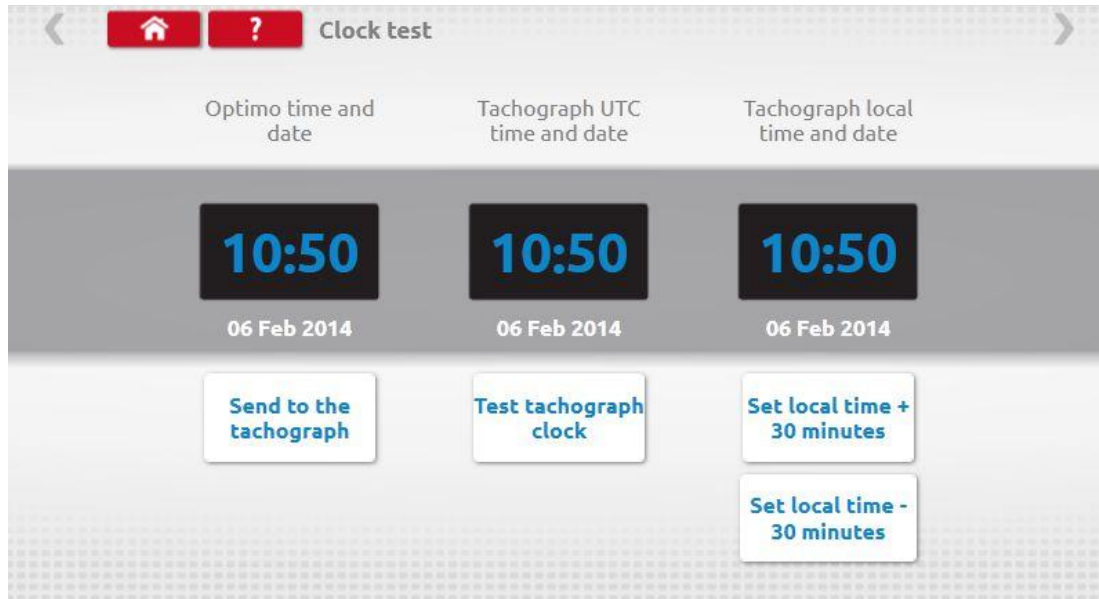
- For round tachographs w, k and l factors are displayed, plus the DIL switch settings which must be manually changed.



7.12. Clock test



- Optimo² is always factory set to UTC time. It is essential that you ensure that Optimo² is always correctly set to UTC time to ensure correct operation as a calibration instrument.
- Tap 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.
- On Digital tachographs all time adjustments should be done from this menu.



7.13. PIN



- Tap enter workshop card PIN. Available on SE5000 and DTCO 1381 only.



7.14. Serial data test



- Tapping the icon displays serial data from the tachograph via cables F & H for an SE5000, or cables X & H for a 2400.

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	yyyyyyyyyyyyyyyyyy* *	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	

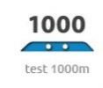
7.15. CANbus data test



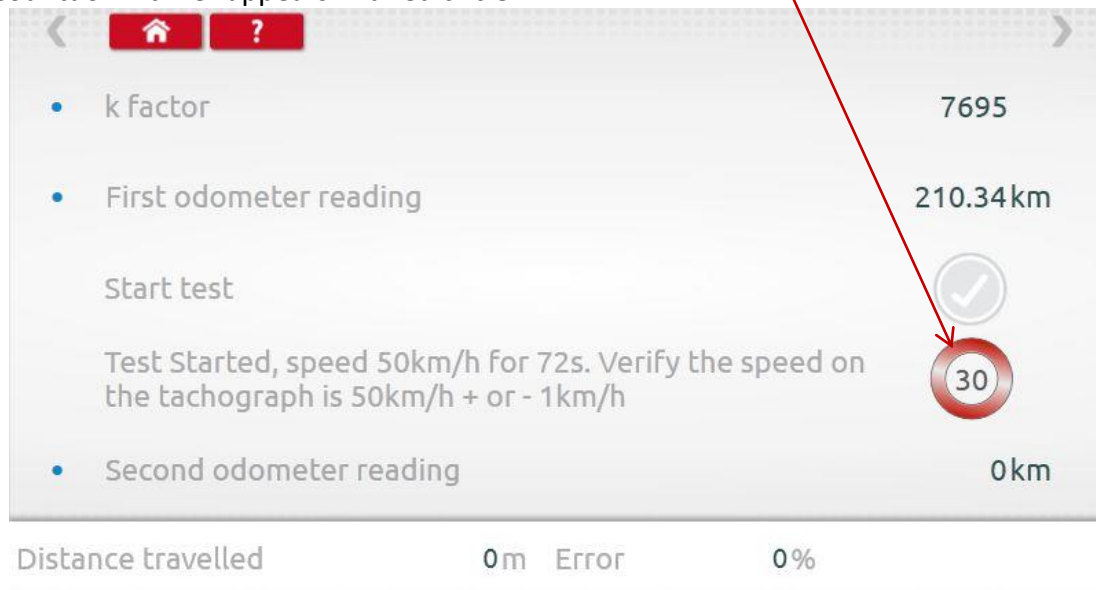
- Tapping the icon displays CANbus data via cable V.

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!		

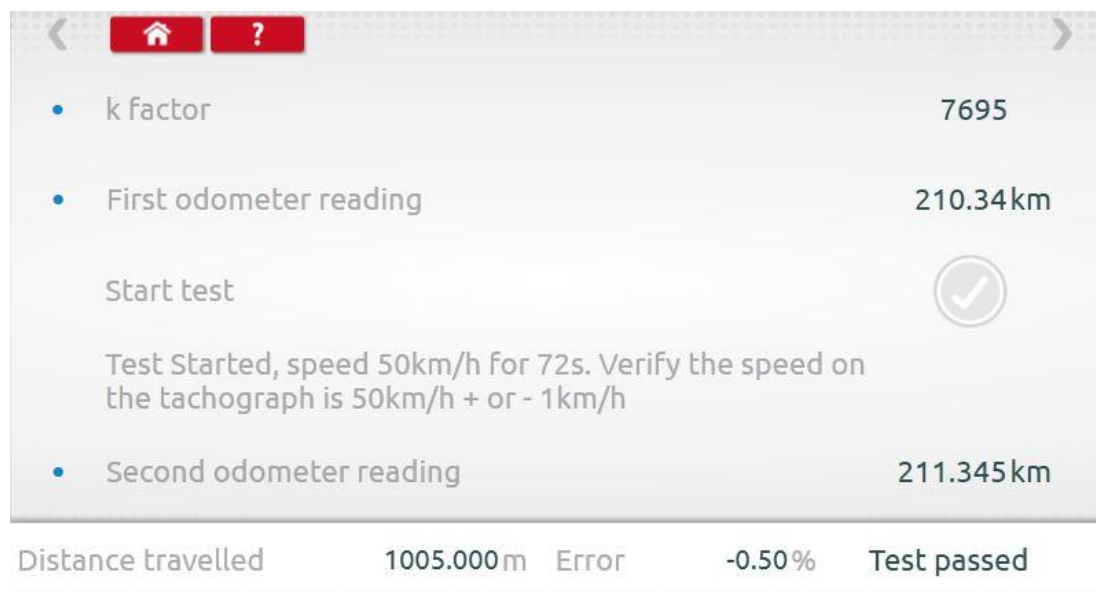
7.16. 1000m test



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



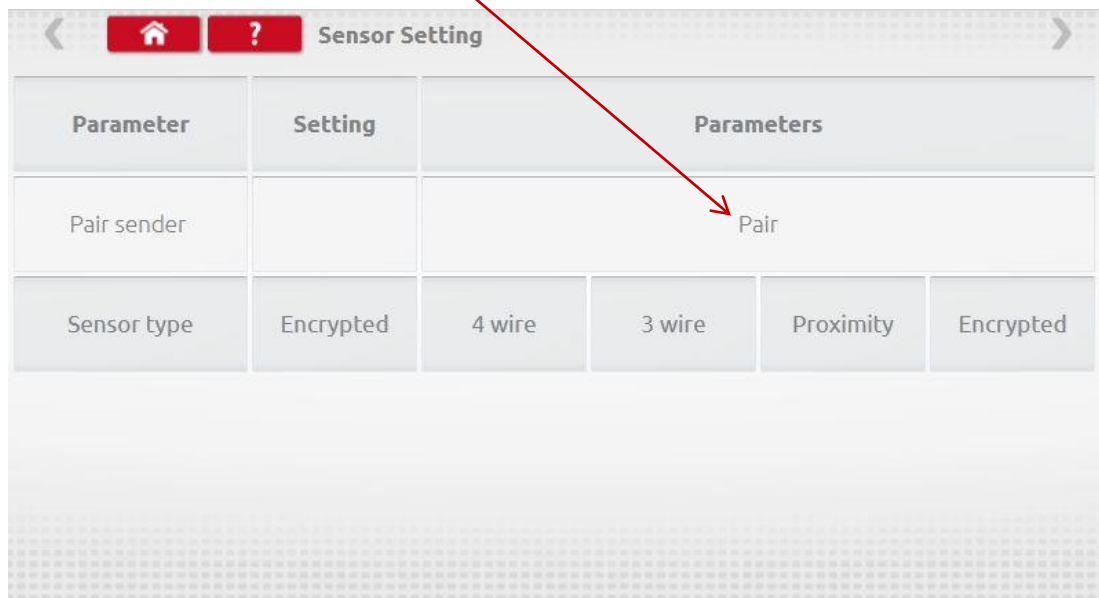
- Test complete.



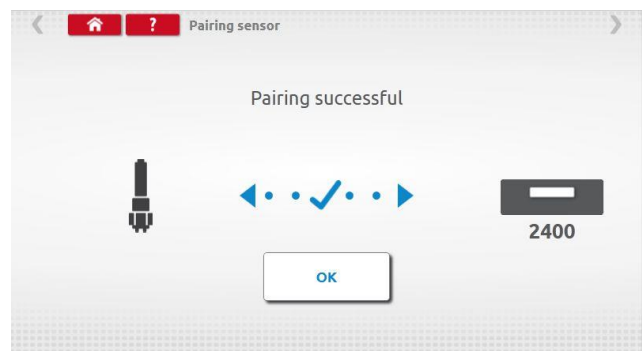
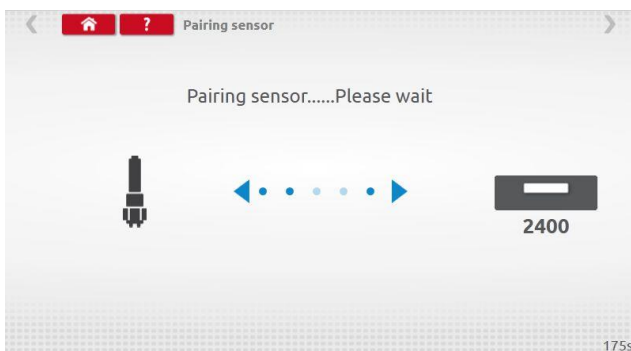
7.17. Sensor settings



- Tapping the icon 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 must be selected as data is transferred at different bit rates.
- If C3 is enabled, a speed factor, derived from the I factor value must be entered to match the two speed signals as close as possible, see table 1 below.
- To force pair a digital sender, tap “Pair”.

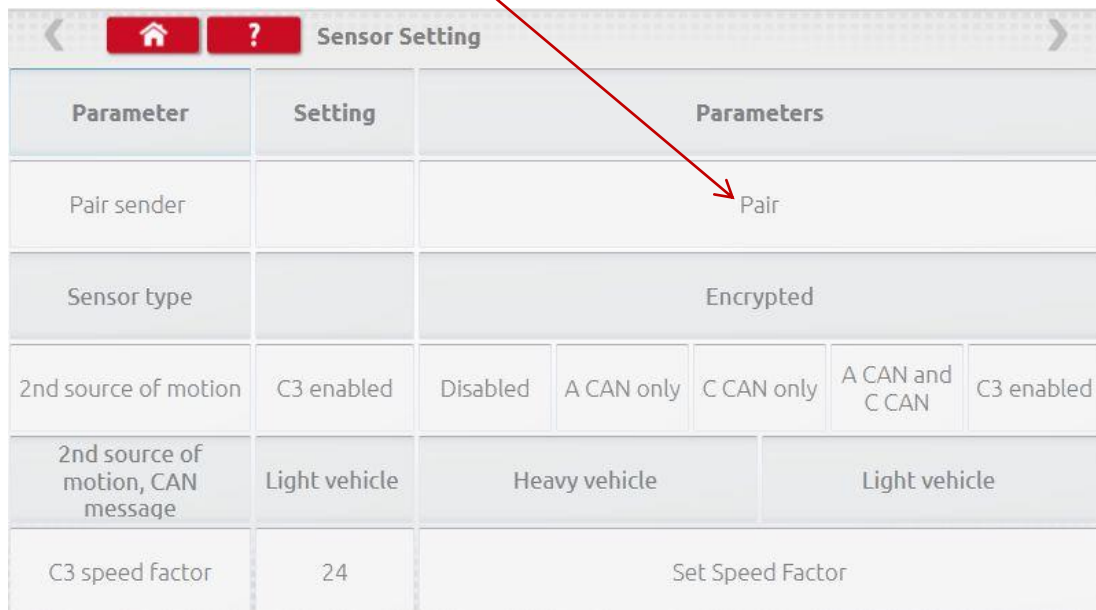


Table 1

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 the tachograph. No screen is displayed on Optimo² when this happens, however there is an interruption to 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 the stars in the box adjacent to “Configure analogue bench test” in the 3rd “Workshop Settings” screen.

The screenshot shows the 'Workshop Settings' interface. At the top, there are navigation icons for back, home, and help, followed by the title 'Workshop Settings'. Below this, there are several settings rows:

Fixed distance length	20m
Fixed distance 1	4
Fixed distance 2	4
Analogue bench test type	Standard
Configure analogue bench test	*****

The 'Configure analogue bench test' field is circled in red, indicating where the user should tap the stars to proceed.

- Enter the PIN, which is obtained from your SRE representative or distributor.

The screenshot shows the 'Enter PIN' screen. At the top, there are navigation icons for back, home, and help. Below this, the text 'Enter PIN' is displayed above a text input field. At the bottom, there is a numeric keypad with the following layout:

↩	1	2	3	←
→	4	5	6	↺
aA	7	8	9	⌋
↑		0		⌌

- Tap “Custom” to enter up to 15 Speed Test steps.

Analogue Bench Test Settings

Select bench test type	Standard	Custom
Speed Test - Step 1	<input type="text"/>	
Speed Test - Step 2	<input type="text"/>	
Speed Test - Step 3	<input type="text"/>	
Speed Test - Step 4	<input type="text"/>	
Speed Test - Step 5	<input type="text"/>	
Speed Test - Step 6	<input type="text"/>	
Speed Test - Step 7	<input type="text"/>	

- Tap an empty box then enter the speed and duration of the step.

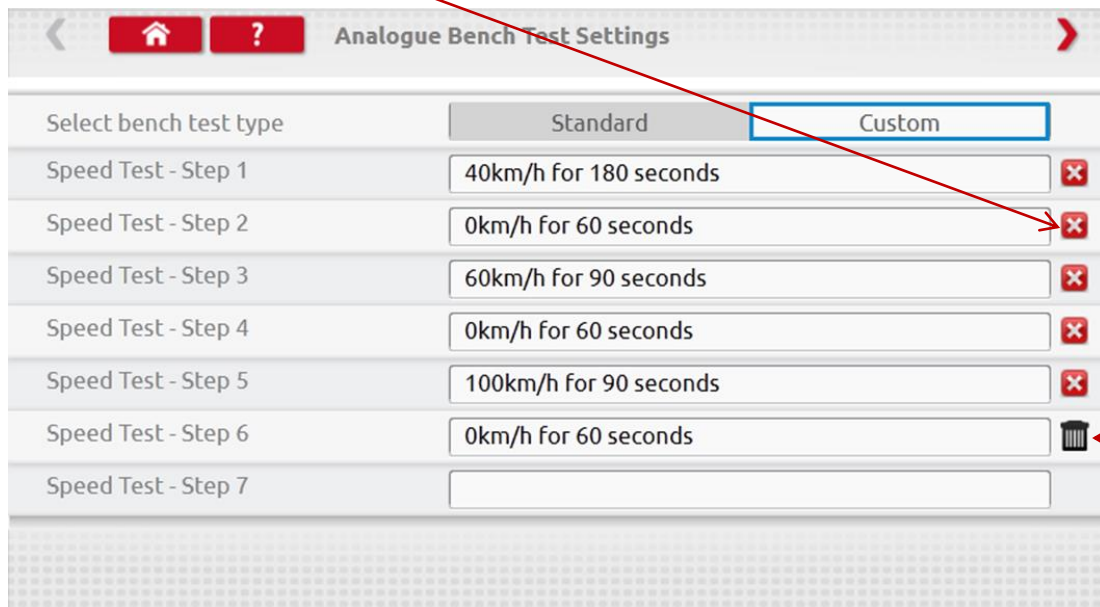
Speed Test Entry

Please enter a speed km/h

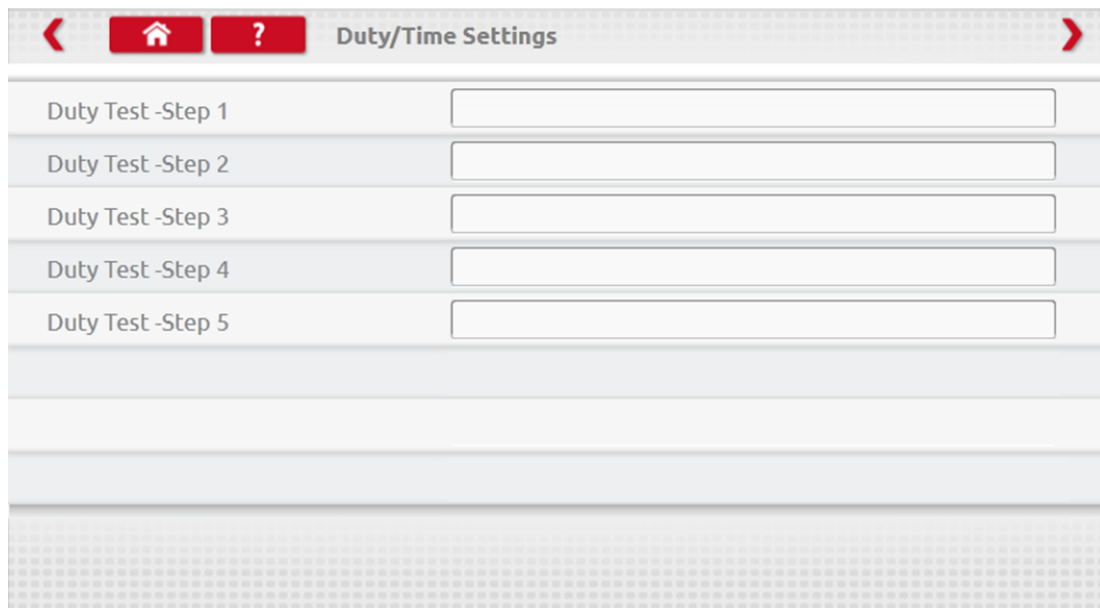
Please enter a duration seconds

	1	2	3	
	4	5	6	
aA	7	8	9	
		0		

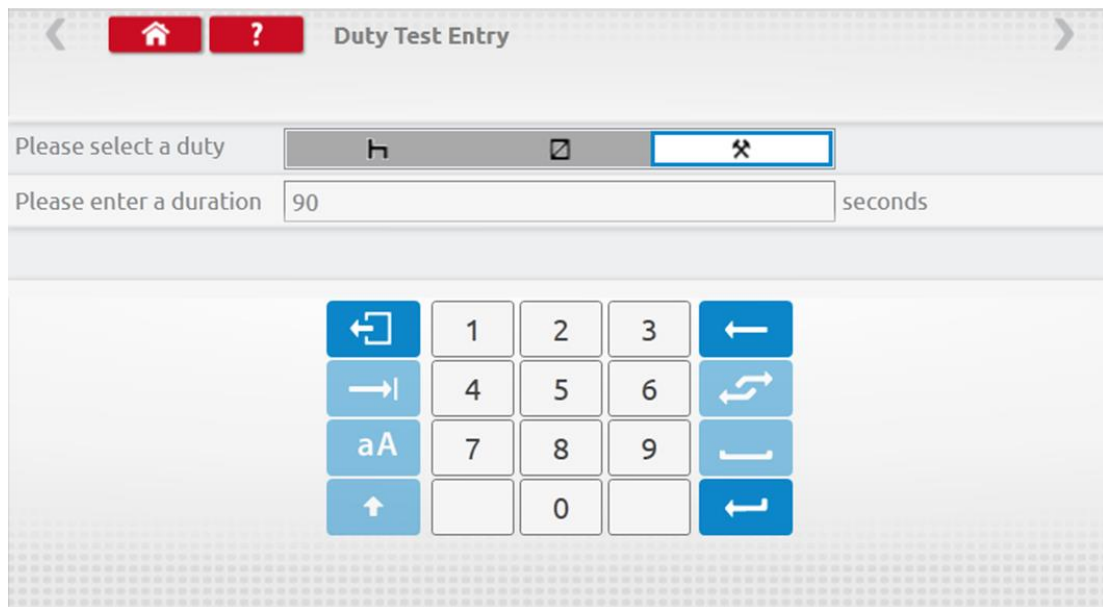
- To delete a step, tap the cross in the red box, then tap bin icon and step is deleted.



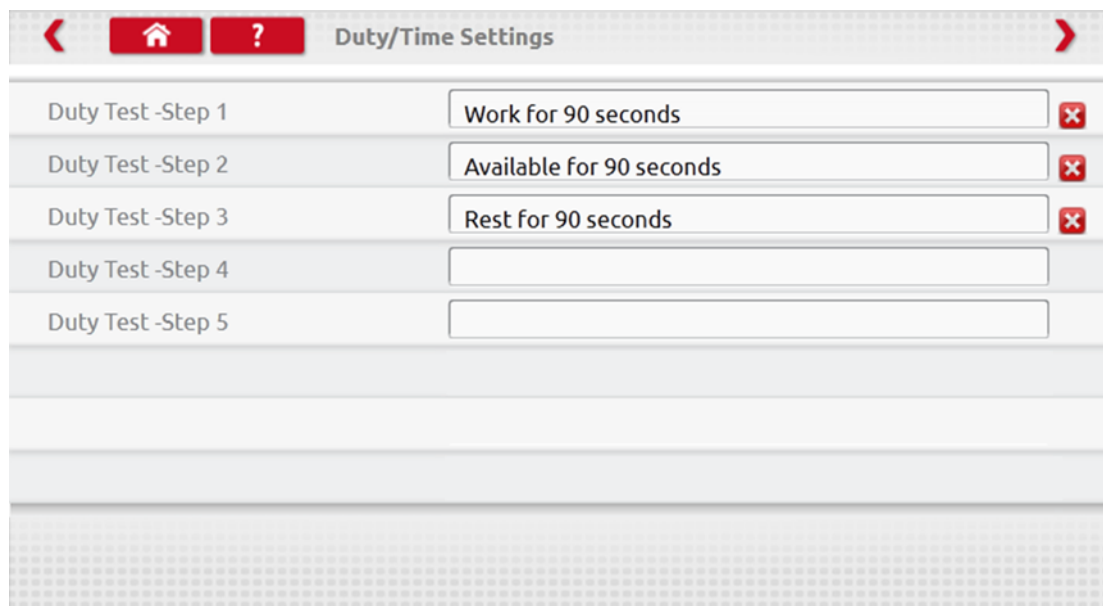
- Once all the Speeds have been entered, tap the red arrow top right to enter up to 5 duty steps. Tap an empty box adjacent to a "Duty Test" step.



- Tap the Duty required, then key in duration for the test.



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

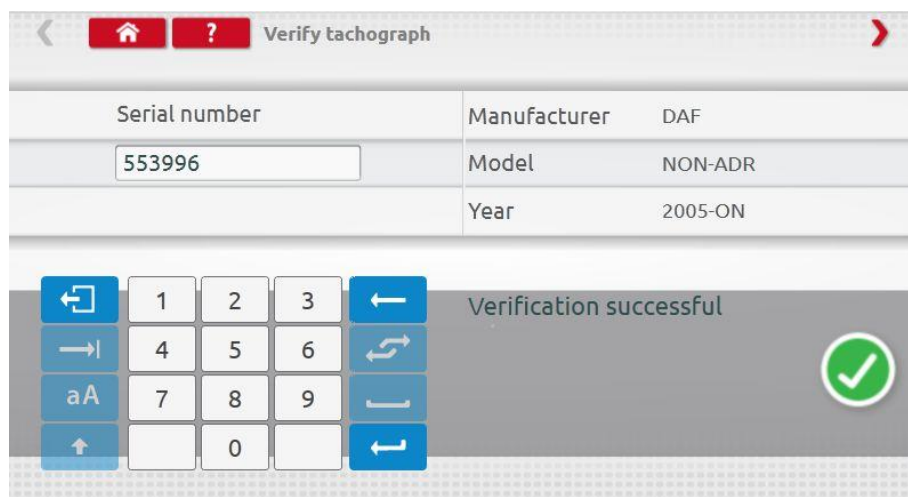
9. SE5000CS – Configuration System



- Tap the icon and the message “Determining the Tacho Type” is displayed whilst Optimo² 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 the icon or tap “Verify Tachograph” to input a serial number.



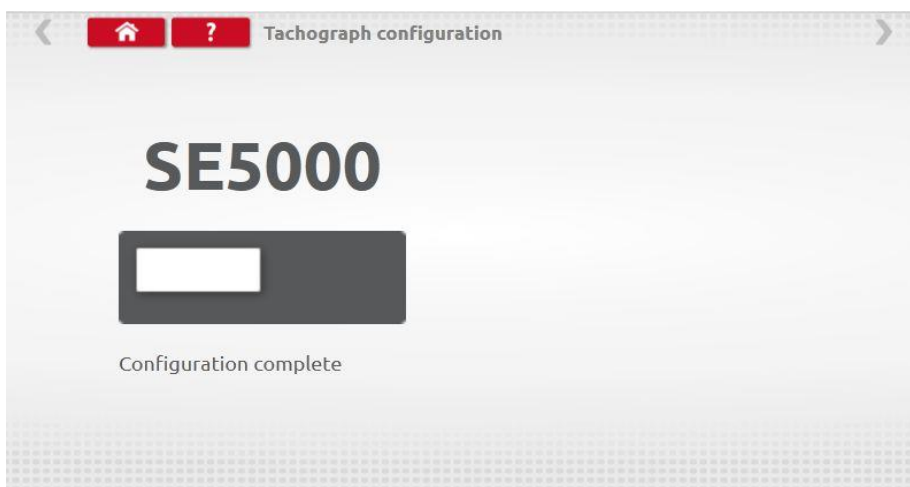
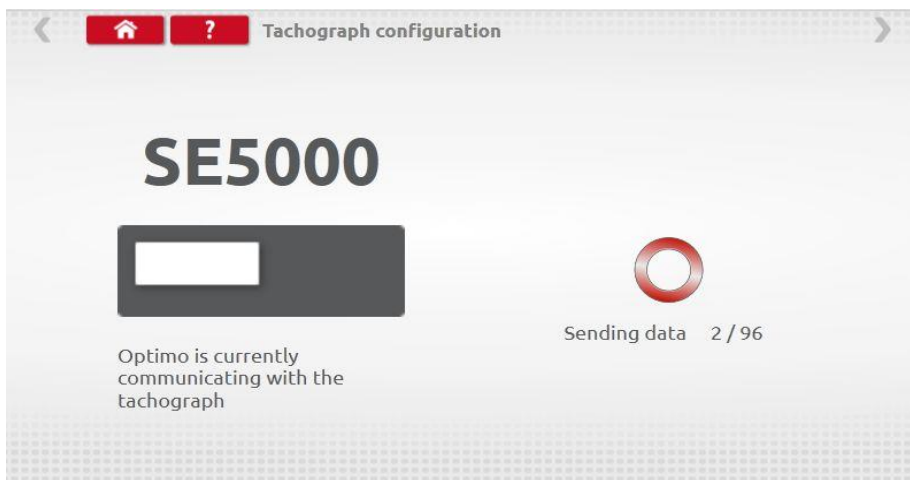
- If verification successful, the make and model of a configured tachograph is displayed.



- 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 Optimo² communicating with the tachograph. After a short time, the result is displayed.



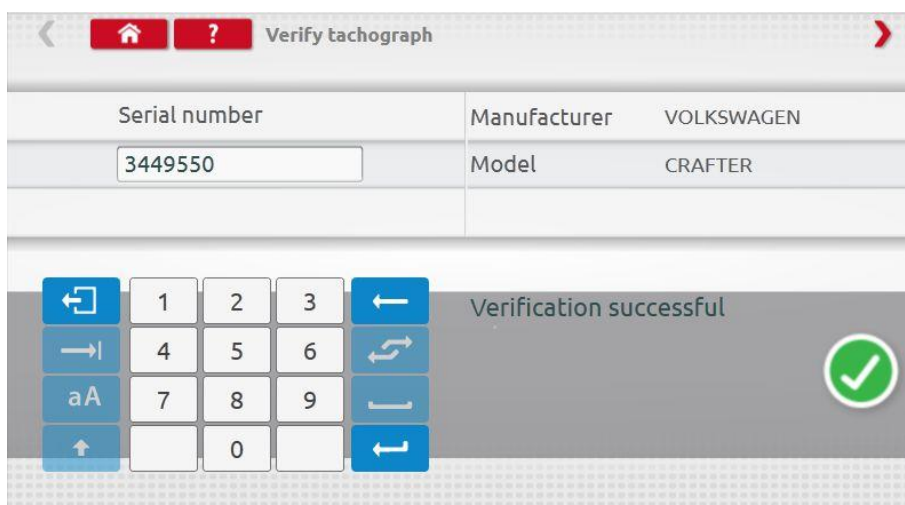


10. 1381CS – Configuration System

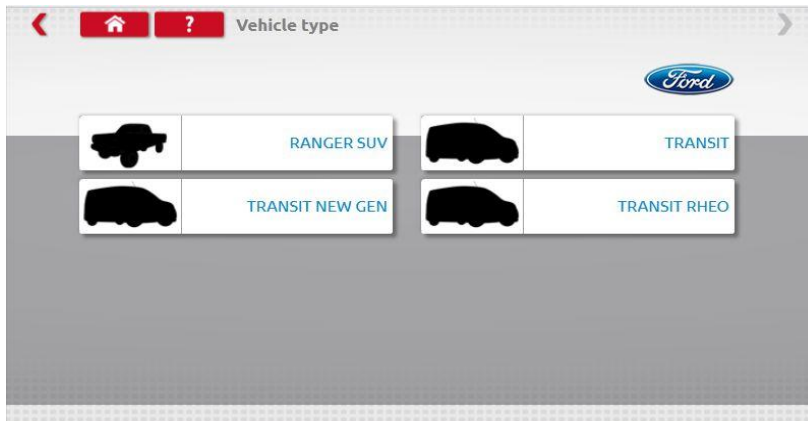
- Tap the icon and a message “Please check the 1381 Tachograph Universal model is connected using a wired connection before beginning the Configuration.” is displayed. Do not use this feature when in wireless operation.
- Then a new message “Determining the Tacho Type” is displayed whilst Optimo² confirms 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.



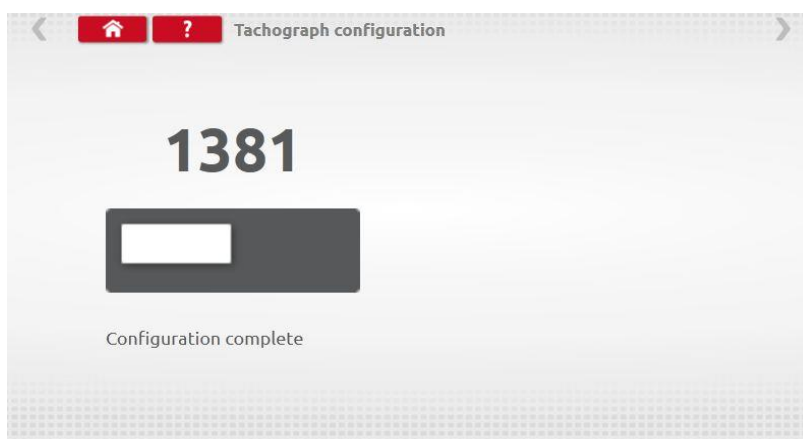
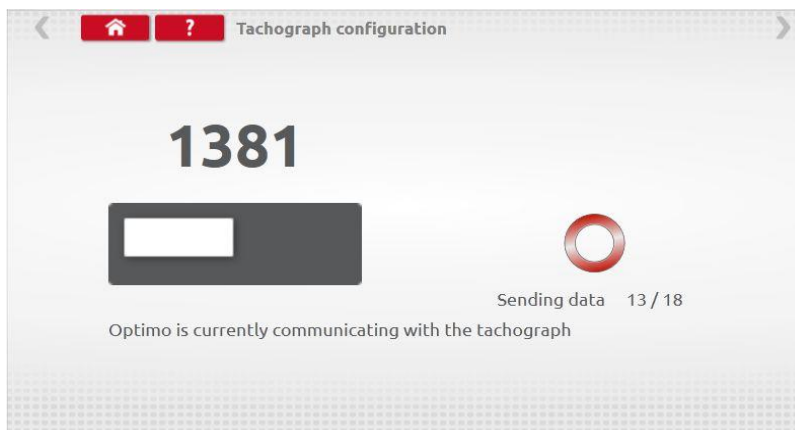
- If verification successful, the make and model of a configured tachograph is displayed.



- 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 the icon for correct vehicle type, and a screen shows Optimo² communicating with the tachograph. After a short time, the result is displayed.

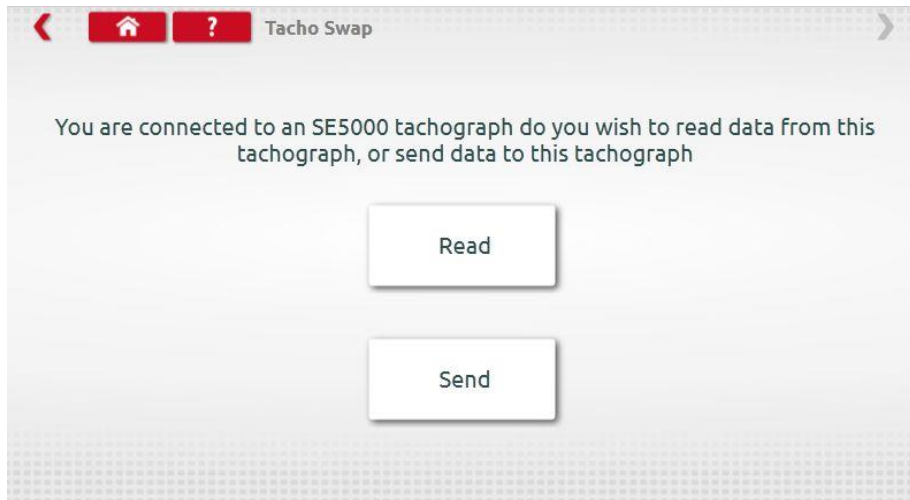


- Note: Should the incorrect configuration of the 1381 be entered, the default VDO configuration must be reloaded, prior to re-configuring the 1381 correctly.

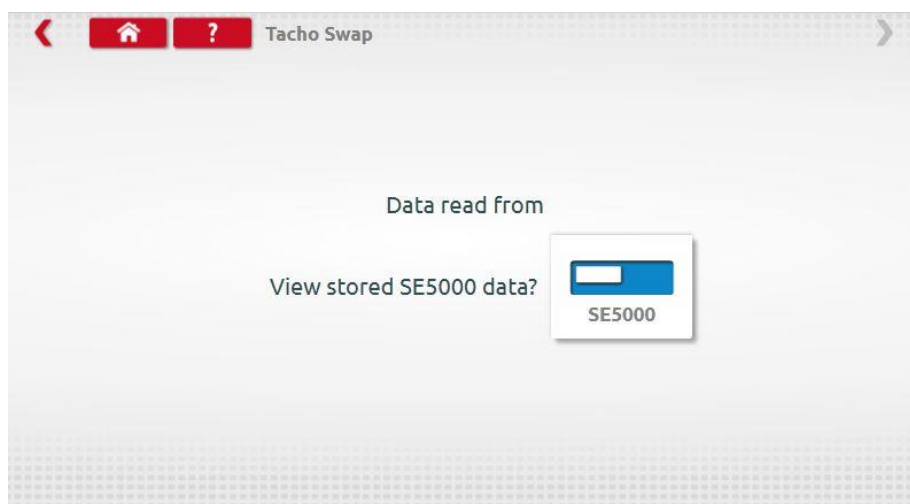
11. Tacho Swap



- Tapping this 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.



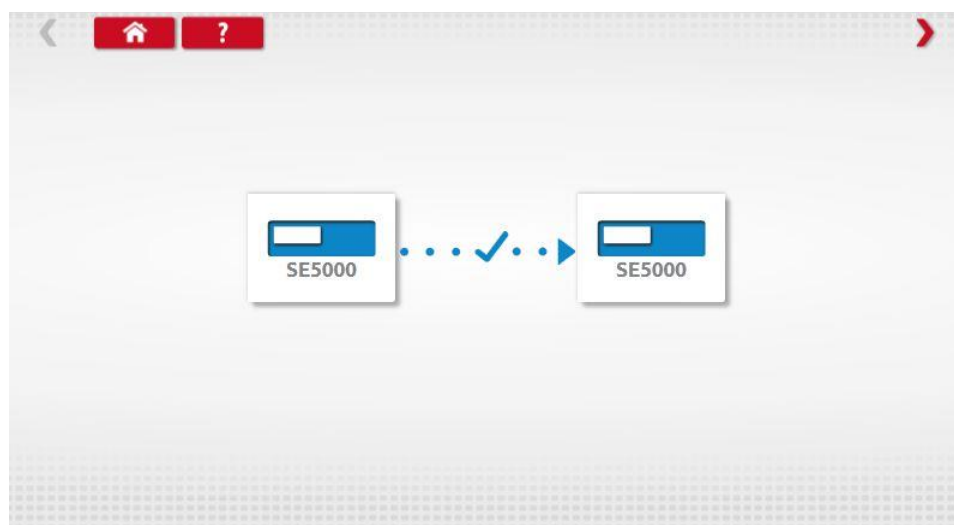
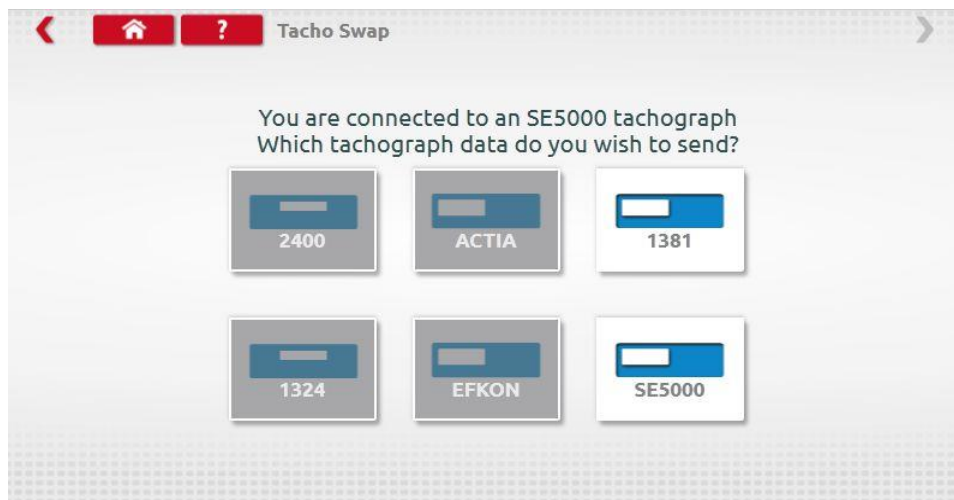
- Tap “Read” and Optimo² reads all data from the tachograph and gives an option to view stored data.



- Tap the tachograph button to display stored information.
Note: You **do not 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

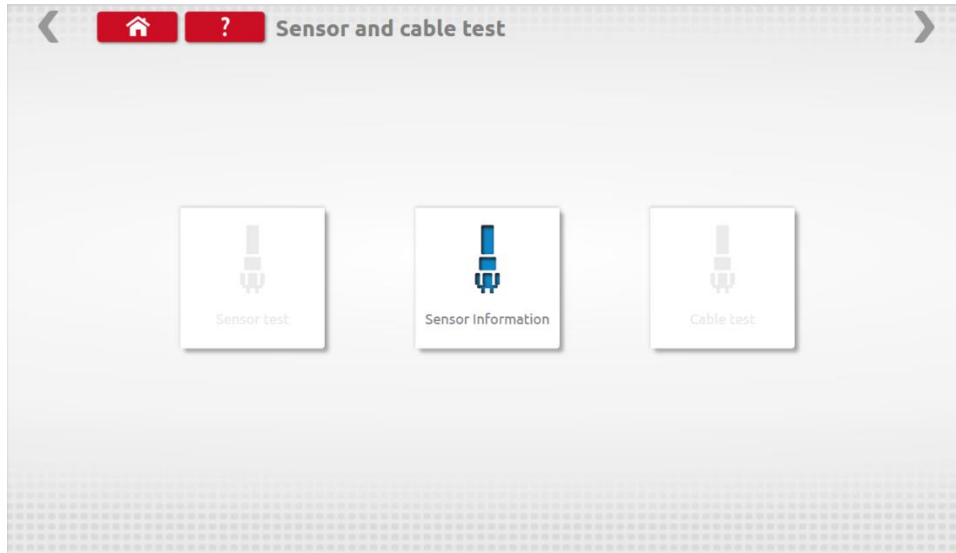
- Tapping “Send” displays which tachograph is connected, and options of which tachograph data to send. Tap the appropriate button and a tick is displayed on completion.



12. Sensor Test



- Tapping this icon provides the facility to read information from the sensor using a cable connected directly to the sensor from Optimo².



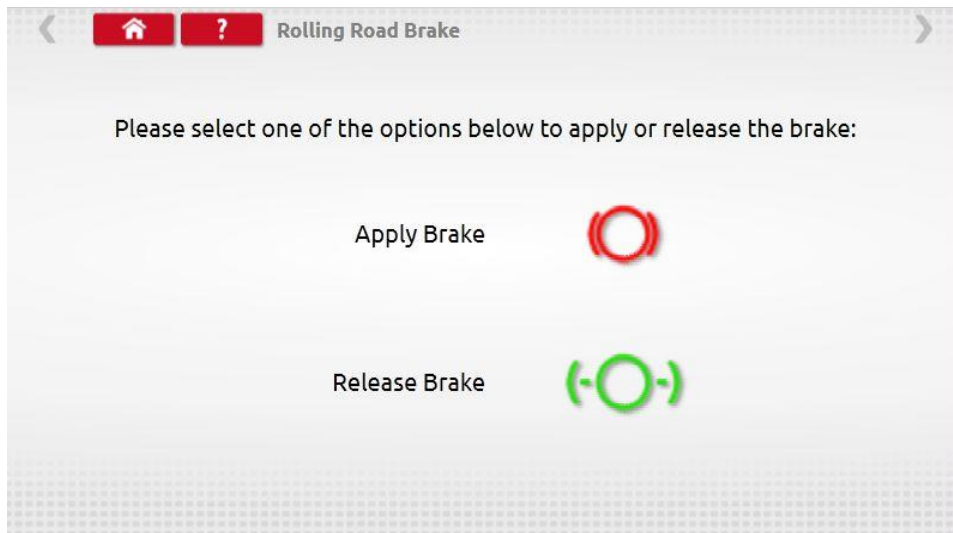
- Tapping “Sensor Information” supplies information about the connected Sensor.

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

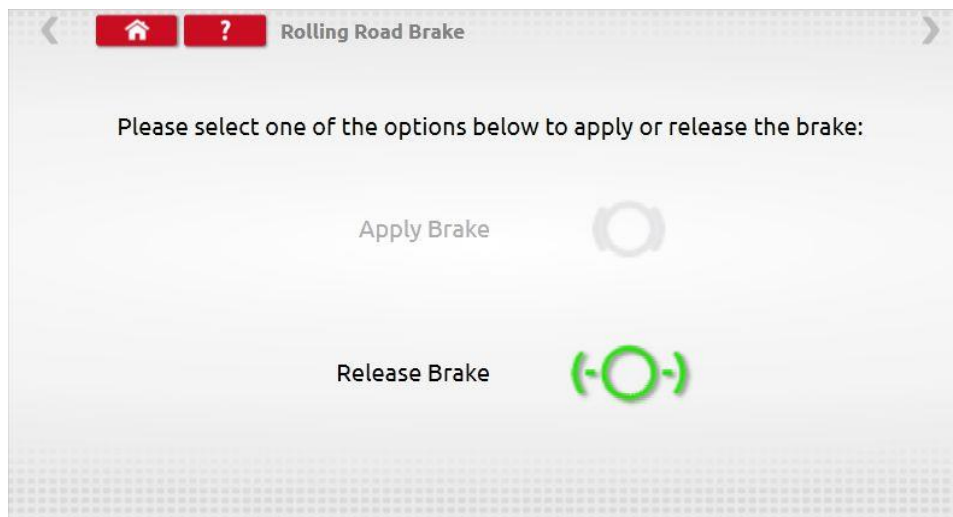
13. Rolling Road Brake



- If your Rolling Road is connected wirelessly to Optimo² the Rolling Road Brake icon will appear.
- Tapping the icon enables a user to Apply or Release the Rolling Road brake via Optimo².



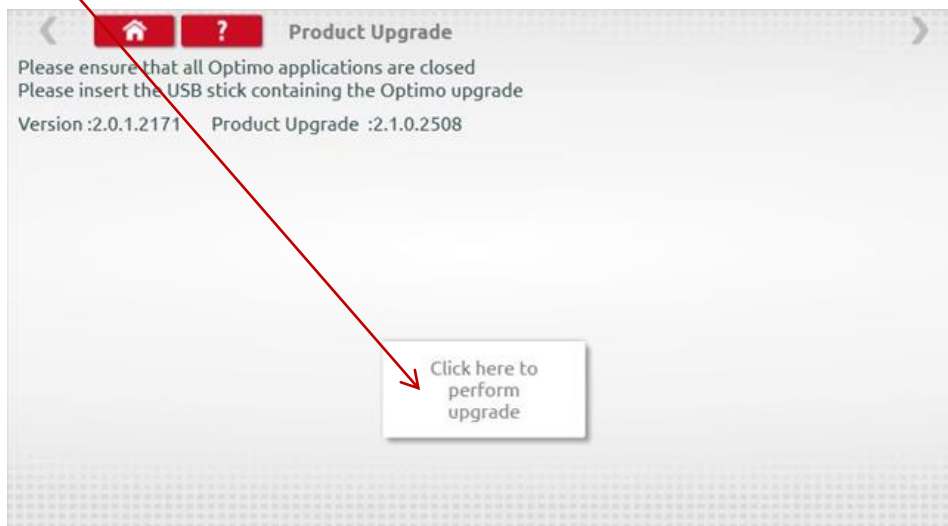
- Initially both buttons will be active as the system does not know what state the brakes are currently set to.
- If you tap the Apply Brake button, it will apply the brakes to the rollers and that button will then be inactive leaving only the Release Brake option, and vice versa.



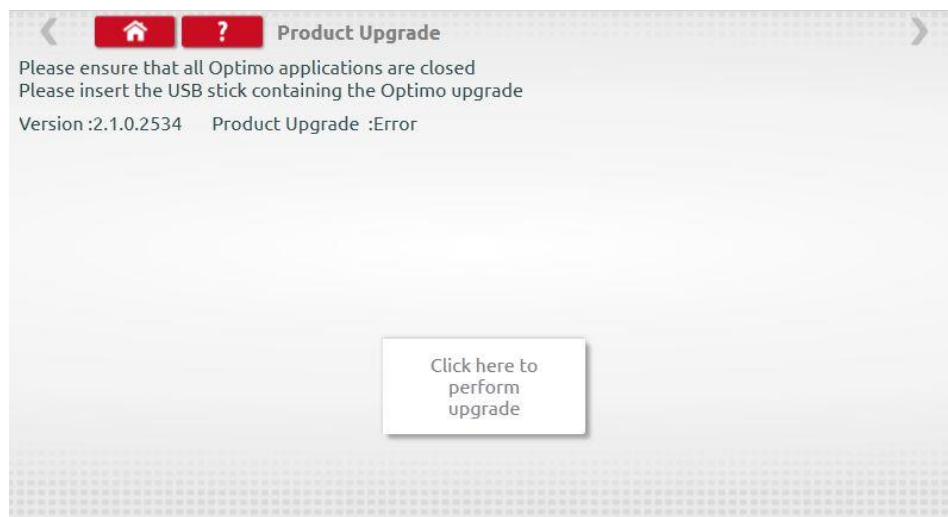
14. Product Upgrade



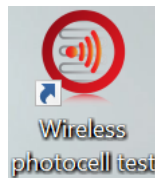
- Product upgrades for Optimo² may be sent to you as a link to download or as a file for you to load onto a USB stick.
- Connect the USB stick with the upgrade files to a USB socket on Optimo². When Optimo² recognises the USB stick it may open a pop-up window; close this window.
- Given that there are different files depending on whether you have a Dell or Linx based Optimo² it is essential you verify on the upgrade screen that you are replacing a .2xxx file with a .2xxx or a .3xxx with a .3xxx file
- Tap the Product Upgrade icon and both current version and new version are displayed.
- Tap the “upgrade” button and follow the prompts.



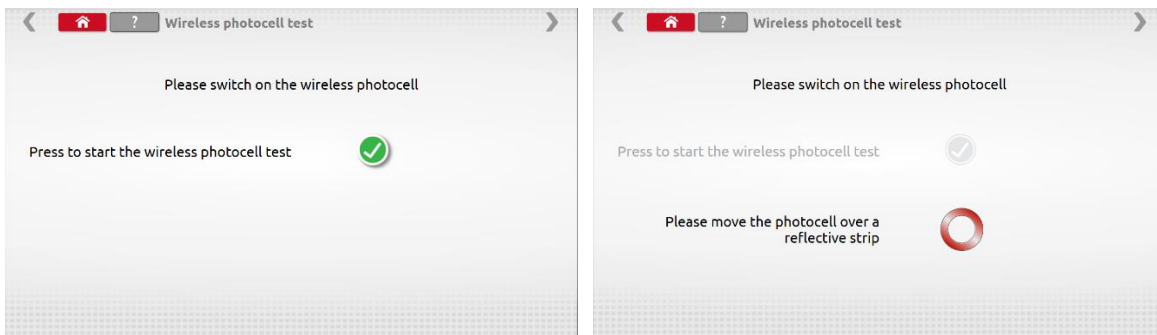
- “Error” is displayed if Optimo² does not recognise the USB device, if no device present, or if the wrong update is present. If this occurs, check the USB device is inserted correctly and the correct upgrade present.



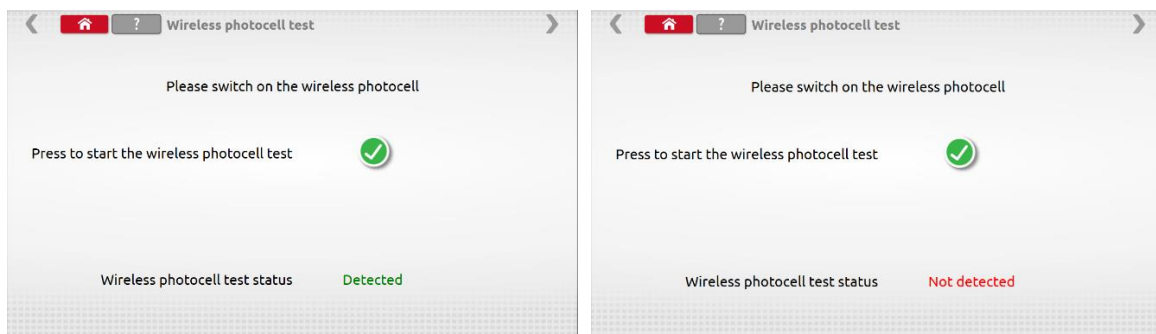
15. Wireless Photocell Test



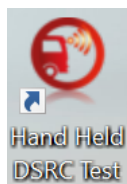
- This application ensures that there is communication between the Wireless Photocell and Optimo².
- Tap the icon to open the program, the screen below is presented. Follow the instructions given.



- Pass the photocell over the tape once every 5 seconds, screen below should be achieved. If the failure screen is received, check that the photocell is fully charge, the LED illuminates when the product passes the tape and the Pan and Channel ID's match. If so, switch off the photocell, leave for 10 seconds, switch back on and repeat the test.

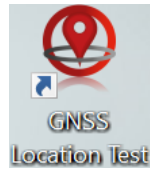


16. DSRC Test



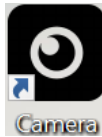
- There is separate manual on Optimo² for the DSRC tester, please refer to this for full guidelines in the use of this application.

17. GNSS Test



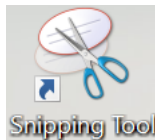
- There is a separate manual on Optimo² for the GNSS Test, please refer to this for guidelines in the use of this application.

18. Camera



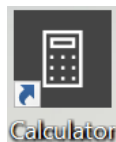
- The camera application permits the user to take pictures using the front or rear camera. Pictures are stored in the Pictures folder in the Your Documents folder on the desktop.

19. Snipping Tool



- This application permits the user to take a snapshot of the Optimo² screen. This can be particularly helpful when trying to describe a fault seen in the workshop where the information needs to be shared with Technical Support. Pictures are stored in the Pictures folder in the Your Documents folder on the desktop.

20. Calculator



- This application permits the user to use the different calculators present in the Windows application.

Annex A – Cable cross reference tables

This table shows a list of existing cables that can be used with Optimo²

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

Available functions and required harnesses

Tachograph	VR2400	VR8400	VR8300	VR1400	K1324	K1319	K1318	K1314	Moto-Meter EGK100	SE5000	DTCO	Smart-tach
Function												
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, light barriers or Wireless Photocell
- (2) DIL Calculate, Tacho Select and Pulser Select do not require any connections to the tachograph

Annex B – Programmable Parameters

Programmable Parameters		Access	SE5000	VR	DTCO	Kienzle	Actia	Efkon
Text displayed	Description	Read/Write	2400	1381	1324			
	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
DSRC Serial Number	DSRC Serial Number	R/W	X		X			
Motion sensor serial number	Sensor Serial Number	R	X					
Tachograph Seal Record	Entry for up to 5 seal records	R/W	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
A-CAN type	Set speed of A-CAN	R/W	X					

Programmable Parameters		Access Read/Write	SE5000	VR 2400	DTCO 1381	Kienzle 1324	Actia	Efkon
Text displayed	Description							
A-CAN diagnostics	Set A-CAN diagnostic version	R/W	X					
C CAN	Enable/Disable C CAN	R/W	X					
C-CAN type	Set speed of C CAN	R/W	X					
C-CAN diagnostics	Set C-CAN diagnostic version	R/W	X					
C2-CAN Type	Set speed of C2-CAN	R/W	X					
A CAN TCO States		R/W	X					
C CAN TCO States		R/W	X					
A CAN TCO Events		R/W	X					
C CAN TCO Events		R/W	X					
DSRC CAN Selection	Select which CAN the DSRC is connected to	R/W	X		X			
DSRC CAN Address	Set CAN Address for the DSRC module	R/W	X		X			
DSRC Parameter Group Number		R/W	X		X			
Optional CAN Messages 3		R/W	X					
Optional CAN Messages 4		R/W	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				
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			
V-Impulse Control		R/W			X			
Serial Data Out	Serial Data Output, (D8 Functions)	R/W	X	X				
Low speed Limit	Low Speed Limit	R/W	X	X				
Card Support	Select what types of card are supported	R/W	X					

Programmable Parameters		Access Read/Write	SE5000	VR 2400	DTCO 1381	Kienzle 1324	Actia	Efkon
Text displayed	Description							
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					
DDS Format		R/W	X					
Speed mean filter parameters		Write once	X					
Ignition Off Level		R/W	X					
Ignition On Level		R/W	X					
No Ignition Warning Delay		R/W	X					
Centralized Language		R/W	X					
Sleep Mode		R/W	X					
Latitude		R	X		X			
Longitude		R	X		X			
Vehicle GNSS-Based Speed		R	X					
GNSS Antenna Choice		R/W	X		X			
GDOP	Geometric dilution of precision	R	X					
PDOP	Position (3D) dilution of precision	R	X					
TDOP	Time dilution of precision	R	X					
VDOP	Vertical dilution of precision	R	X					
HDOP	Horizontal dilution of precision	R	X					
GNSS fix type		R	X					
Number of satellites	Number of satellites locked on for GNSS fix	R	X					
GNSS clock drift								
RD Activity Status	Remote download activation status	R	X					
RD Card Writing	Remote download card writing	R/W	X					
RD A CAN Configuration	Remote download A-CAN configuration	R/W	X					
RD C CAN Configuration	Remote download C-CAN Configuration	R/W	X					
Show Remote Download	Show remote download	R/W	X					
CAN2 remote download		R/W			X			

Programmable Parameters		Access	SE5000	VR	DTCO	Kienzle	Actia	Efkon
Text displayed	Description	Read/Write		2400	1381	1324		
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					
Show Driver Card Download		R/W	X					
Request Card Download		R/W	X					
Confirmed Driver Activity		R/W	X					
Enable driver card download question		R/W	X					
Enable driver card download menu		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				
VRES D	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					
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					
Driver 1 Consent Status		R	X					
Driver 2 Consent Status		R	X					
Warning expiry date – calibration		R/W			X			
Warning expiry date – driver card		R/W			X			
Warning expiry date – workshop card		R/W			X			
Warning expiry date – company card		R/W			X			
Warning expiry date – control card		R/W			X			

Programmable Parameters		Access Read/Write	SE5000	VR 2400	DTCO 1381	Kienzle 1324	Actia	Efkon
Text displayed	Description							
Driver card download reminder		R/W			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	W	X	X		X		
	Calibration Repair Shop Code							
	Calibration Date	W	X	X		X		
	Calibration Equipment Software Number	W	X	X		X		

Annex C – Optimo² Error Codes

Application Codes

APPLICATION	Error Code	
MK3 Programmer	0x00**	Codes 01 to 10 / 20 to 29 / D0 to FF are valid
SE5000 Configuration System	0x01**	Codes 01 to 10 / 40 to 41 / D0 to FF are valid
Tachograph Swap	0x02**	Codes 01 to 10 / D0 to FF are valid
Sensor Test	0x03**	Codes 01 to 10 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**	Codes C1 and C2 are valid
Taximeter	0x09**	
DTC01381 Configuration System	0x0A**	
Wireless Brake	0x0B**	
DSRC Test	0x0C**	Codes 01 to 10 / 20 to 29 / BA / BC / D0 to FF are valid
GNSS Test	0x0E**	Codes 01 to 10 / 20 to 29 / 90 to 93 / D0 to FF are valid
Wireless Photocell Test	0x0F**	

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**30	Comms Timeout Interface Board
0x**0B	Function Not Supported	0x**40	No Config Found
0x**0C	Renesas Frequency Calibration Error	0x**41	Tacho Not Configured
0x**0D	Invalid Key	0x**90	No Internet Connection
0x**0E	Number Attempts Exceeded	0x**91	Internet Mapping Service Error
0x**0F	Required Time Delay Not Expired	0x**92	No GNSS Tacho Data
0x**10	Sub Not Supported Invalid Format	0x**93	No Optimo Location Data
0x**11	Sub Not Supported Inactive Session	0x**A0	Seal Number Incorrect Length
0x**12	Svc Not Supported Inactive Session	0x**BA	Workshop Card Not Detected
0x**13	Svc Not Supported Inactive Diag Mode	0x**BC	Workshop Card Not 1C
0x**14	Transfer Data Suspended	0x**C1	Product Upgrade Error
0x**15	General Programming Failure	0x**C2	Product Upgrade Platform Invalid
0x**16	Incorrect Msg Len Or Invalid Format	0x**D0	Cannot Connect To Or Retrieve Data From App Database
0x**17	Bad Checksum Illegal Byte Count Block Transfer	0x**D1	Data Not Found In App Database
0x**18	Target Address Not This Device	0x**DF	General Data Error
0x**19	Data Received From Unknown Source Address	0x**E0	C8051 Init Error

Error Code	Category	Error Code	Category
0x**E1	C8051 Wrong Device ID		
0x**E2	C8051 Not Blank		
0x**E3	C8051 Flash Update Failed		
0x**E4	IF Board Firmware Upgrade Error		
0x**EF	IF Board Firmware Error		
0x**F0	Unit Not Calibrated Error		
0x**F1	Logging Error		
0x**F2	Calibration Result Error		
0x**F3	Touch Screen Software Not Found		
0x**FE	EULA Not Signed		
0x**FF	General Error		