SERVICE MANUAL - Level 1

ID5000, XR5000 Scale Indicator

Contents

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Service centre requirements

Product feedback

Receiving feedback from Service Centres about the types of field problems encountered is an important part of product development. To assist us with improving the product, we ask that a Service Report be returned to us each month. With this information, we can accurately identify trends in the field and offer appropriate technical support.

We also encourage you to provide us with your comments about the product. We value your feedback.

Only qualified Service Centres are authorised to carry out service work on Tru-Test weigh scale indicators.

⚠️ *Warning!* Static discharge can damage some components on the indicator. Such damage may degrade an electronic component and may result in faults developing within that component over time. When working on an indicator, ensure that correct anti-static procedures are used.
- Use a wrist band and earth strap.
- Work only on a grounded bench top.
- Use a suitable lead-free anti-static soldering iron and solder sucker.
- Store PCAs and LCDs in anti-static bags.

Technical bulletins

Technical bulletins are prepared as needed. They should be read in conjunction with the service manual. Technical bulletins are available on the service website **www.service.tru-test.com**

The current technical bulletins cover:

- Span calibration guide
- Updating firmware
- Cell codes
- Cloning the data on the 5000 series weigh scale indicator
- LCD dead pixels

Returning a product

Before a product or assembly is returned to Tru-Test for service or analysis, please request a Return Authorisation (RA) number so that one can be allocated. The RA number will ensure that we are ready for the product when it is received and assist us in providing efficient and prompt service. Please mark all packaging with the RA number.

Fault report card

Email to:	From:
Service Department Tru-Test Ltd service@trutest.co.nz	(Distributor)
	(Tru-Test Ltd representative)
Date	Return authority (RA) number
	Warranty ☐ Yes ☐ No

Product returned:

Indicator ☐	Model: ☐ ID5000 ☐ XR5000
Serial number	

Load bar/Load cells ☐	
Load bar Serial number(s):	Load cell Serial number(s):
Load bar/Load cell model:	Load cell code:
Distributor:	Date installed:
Zero offset:	Insulation test:

Bridge resistances

red/black	green/white	red/white	red/green	black/white	black/green

Fault description (include visual impression and display messages)

Fault report (Service centre)

Service equipment

To service ID5000 and XR5000 indicators, you will require the following equipment:

Item	Description
Multi-meter	Good quality digital type with 300 mA and 300 mV range
Screwdrivers	Pozi-drive, size 1 (for connectors, PCA and cradle – torque setting 0.5 Nm (4 lb-in.))
	Pozi-drive, size 2 (for case back screws, bumper screws – torque setting 0.9 Nm (8 lb-in))
	A driver with adjustable torque setting is strongly recommended
	DO NOT use a variable speed electric drill!
	Small flat-head screwdriver to help with the removal of the rubber bumpers
Pliers	Long-nose, side cutting
Indicator 0 mV/V calibration plug	Part no. WIA70020. For field service technicians
Indicator 2 mV/V calibration plug	Part no. WIA70022. For field service technicians
Personal computer	*Windows XP* or later
USB flash drive	For cloning indicator data before servicing
Craft/utility knife with flexible, snap-off blade. See picture on *Figure 21*.	For removing the LCD from the case front.
Plastic pen	Plastic pen for use during the assembly of the o-ring
Cotton buds (q-tips) or tissues	For removing the oily residue in the seal groove when replacing the case o-ring.
IPA (Isopropyl alcohol)	For removing any residue left by the sticky gasket when replacing the LCD and for cleaning the LCD.
Rubber mat	Suitable for placing the indicator on while servicing
Soft cloths	For cleaning the LCD and for laying on the work surface to protect the indicator components.

Changes to product

In June 2017, the LCD on ID5000 and XR5000 indicators was discontinued in favour of an LCD which had better contrast and brightness. Indicators with a serial number of <510,000 (a number between 0 and 510,000) will have been manufactured with the old LCD. Indicators with a serial number of >510,000 (a number after 510,000) will have been manufactured with the new LCD. The serial number can be found on the back of the case:

It is important that you check the details of the indicator you are servicing, as the spare parts and repair procedures differ considerably.

Here are the key differences between the spare parts provided for the two types of indicator:

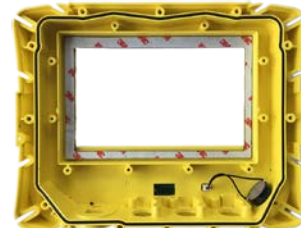| Indicators with serial number <510,000	Indicators with serial number >510,000
Case front assembly has a window. The LCD is positioned behind the window.	Case front has no window. The LCD is affixed directly to the case front assembly using a sticky rectangular gasket (fitted to the case front).
The old PCA has been discontinued. The new PCA can be used on the old model indicator.	New PCA
LCD FPC does not have a connector	LCD FPC has a connector on one end.
Different LCD.	Different LCD. It comes with a sticky rectangular gasket which is used to affix the LCD to the case front.
The black, rubber gasket which surrounds the LCD is provided as a separate part.	The LCD does not have a black, rubber gasket.

No connector clips are required.	Connector clips are used to secure the LCD FPC in place (see *Figure 22*).
Different battery	Different battery
Different cradle	Different cradle

Servicing procedures

When servicing an indicator with a serial number <510,000, replace parts with their like equivalent, with the following exceptions:

- LCD - If the LCD requires replacement, replace the whole indicator with a new one. This repair *may* be covered under warranty. To find out more, see the technical bulletin *5000 series indicators – LCD dead pixels* available on the service website www.service.tru-test.com. The reason that the whole indicator must be replaced is that the new LCD does not fit fit into the old case and there are also many other associated spare parts which are required to perform this repair. For this reason, it is more economical to replace the entire indicator. If you have stock of old LCDs in your inventory, these should be used up first.
- PCA – The old PCA has been discontinued so when you order a new one, it will always be the same part, regardless of the serial number. If you have stock of old PCAs in your inventory, these should be used up first.

When servicing an indicator with a serial number >510,000, replace parts with their like equivalent. Do not attempt to fit parts that are only suitable for <510,000.

Parts diagrams

Parts for ID5000 and XR5000 indicators with serial number >510,000

The spare parts differ, depending on the when the indicator was manufactured. Make sure that you have checked the serial number on the indicator before ordering any spare parts.

816752P
823285P
827834
827837

SSS20416P
831940P
XR5000 - 832663P
ID5000 - 831943P
831945P
832344P
831706P
831705P
824573P
823351P
XR5000 - 832718P
ID5000 - 832664P
827831
823283P
823284P
SSS20416P
816604P
EKZ31070P
827833
827832

Parts for ID5000 and XR5000 indicators with serial number <510,000

The spare parts differ, depending on the when the indicator was manufactured. Make sure that you have checked the serial number on the indicator before ordering any spare parts.

816752P

823285P

827834

827837

SSS20416P

825662P

XR5000 - 832663P
ID5000 - 831943P

823345P

823346P

823360P

Part not available. See
"Changes to product"

824573P

823351P

XR5000 - 827836
ID5000 - 827835

827831

823283P

823284P

SSS20416P
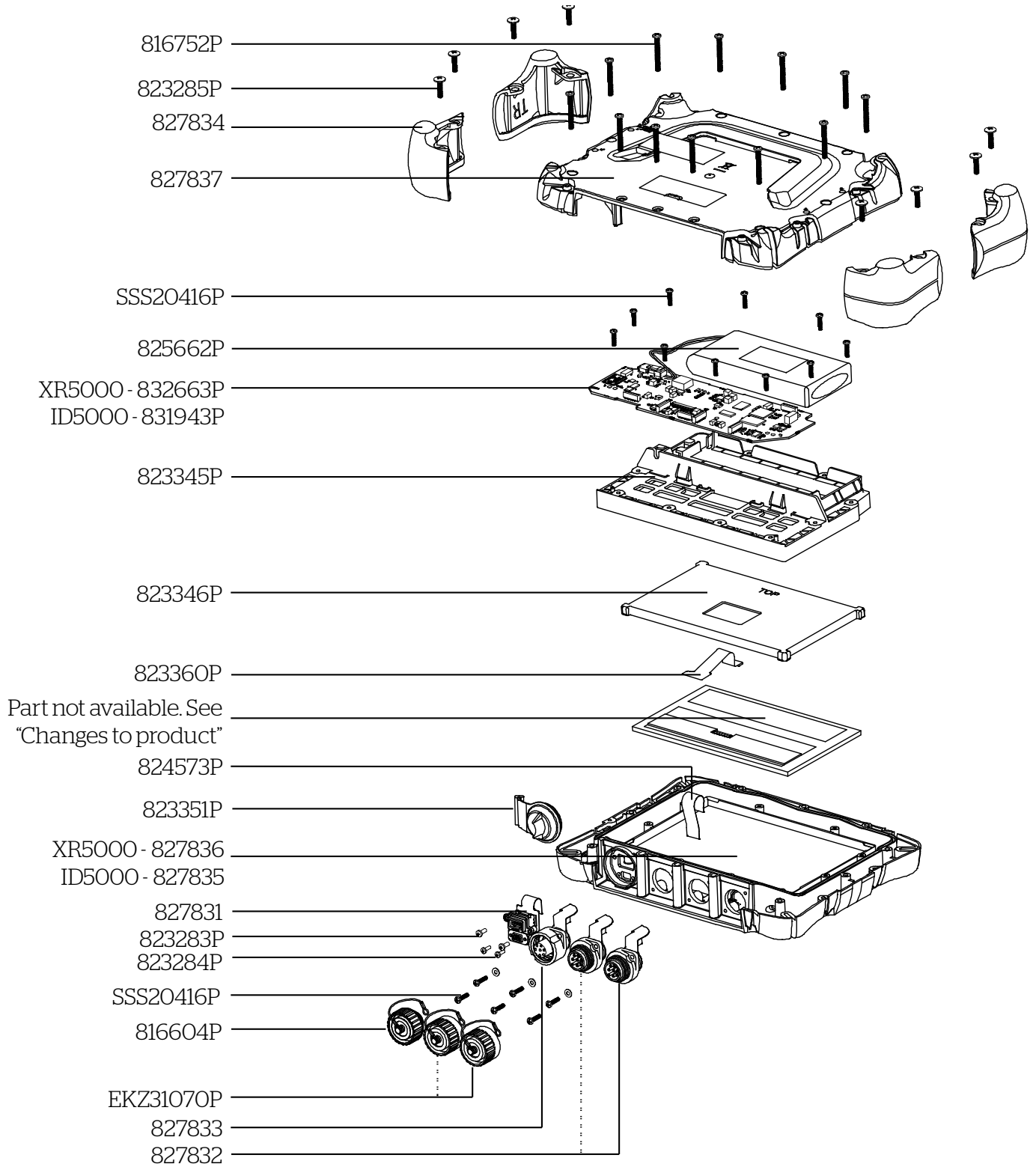
816604P

EKZ31070P

827833

827832
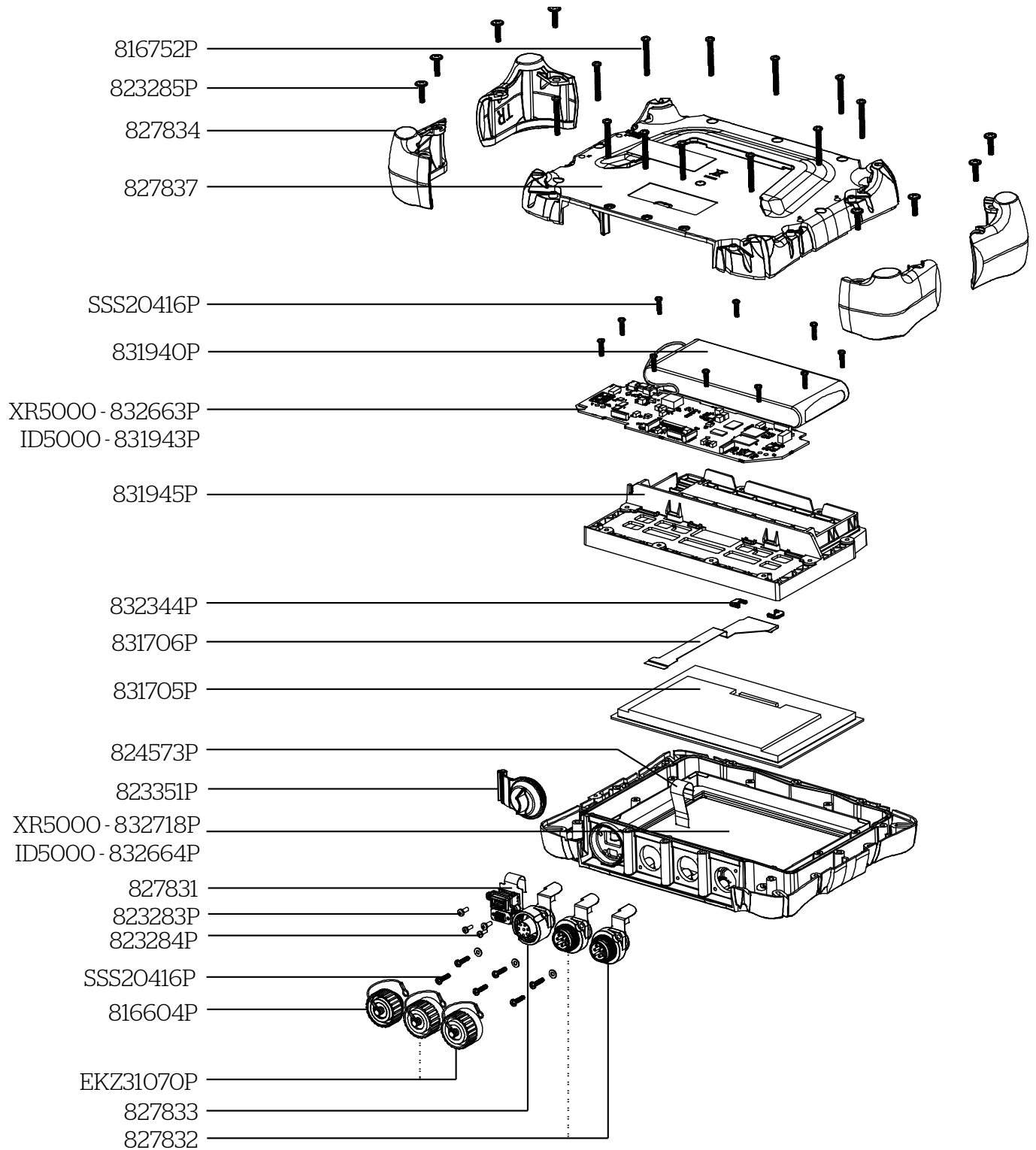
Parts list

The spare parts differ, depending on the when the indicator was manufactured. Make sure that you have checked the serial number on the indicator before ordering any spare parts.

Description	Contents	Quantity per unit	Part number
LCD	Models with serial number >510,000 (includes sticky rectangular gasket).	1	831705P
	Models with serial number <510,000 Replace the entire product with a new indicator. See *Changes to product* on page 7.		Not available
LCD FPC	Models with serial number >510,000 (includes connector).	1	831706P
	Models with serial number <510,000	1	823360P
LCD connector clips	Models with serial number >510,000 (Kit of 10 clips).	2	832344P
LCD black rubber gasket	Black rubber gasket. Models with serial number <510,000	1	823346P
Battery	Models with serial number >510,000 (Kit of 2 batteries).	1	831940P
	Models with serial number <510,000 (Kit of 2 batteries).	1	825662P
PCA (printed circuit assembly)	XR5000	1	832663P
	ID5000	1	831943P
Keypad FPC		1	824573P
Case front assembly	XR5000 with serial number >510,000	1	832718P
	ID5000 with serial number >510,000 (sticky rectangular gasket fitted, without LCD)	1	832664P
	XR5000 with serial number <510,000	1	827836
	ID5000 with serial number <510,000 (with window and screen protector)	1	827835
Case rear	(includes vent)	1	827837
O-ring	One o-ring is required per indicator.	1	823287P
Cradle	Models with serial number >510,000	1	831945P
	Models with serial number <510,000	1	823345P
USB connectors assembly	(Includes FPC)	1	827831
C16 male load bar connector assembly	(1 connector supplied, includes FPC)	2	827832
C16 female power/comms connector assembly	(1 connector supplied, includes FPC)	1	827833
Screw kit case	(Kit of 50 screws used for securing the case components).	12	816752P

Screw kit bumper	(Kit of 40 screws used for securing bumpers).	8	823285P
Screw kit C16 and cradle/PCA	(Kit of 50 screws used for securing power/comms connector, load bar connectors, cradle and PCA).	16	SSS20416P
Screw kit USB connectors	(Kit of 10 large screws)	2	823283P
	(Kit of 10 small screws)	2	823284P
Rubber bumper kit	(Kit of 4 rubber bumpers used to protect corners).	1	827834
Load bar connector dust cap		2	EKZ31070P
USB dust cap		1	823351P
Power/communication connector dust cap		1	816604P
Power adaptor	Accessory	1	826639
USB cable	Accessory	1	824575P
Car charger (cigarette lighter adaptor)	Accessory	N/A	827195

Troubleshooting

Symptom	Possible Fault	Action
Indicator does not switch on, or switches off during the boot process, or battery is not charging.	Battery deep discharged	If the red stable LED turns on when the power adaptor is plugged in, then leave it on charge for 30 minutes to see if the battery will recover and allow the indicator to turn on. If the red stable LED does not turn on when the power adaptor is plugged in, or if the battery does not recover after 30 minutes of charging, then check the battery voltage and if less than 2.5 V, replace the battery (see page 27). *Warning!* Do not short-circuit the battery as it can deliver a peak current in excess of 100 A and possibly overheat.
	Faulty power adaptor	The battery may be deep discharged if the power adaptor is faulty. Use a known good power adaptor and check if the battery recovers after 30 minutes of charging.
	Bad internal connection	Check that the battery cable, power/comms FPC, and keypad FPC are correctly plugged into the PCA. If the indicator still does not switch on, try known good FPCs.
	Keypad damaged	If the indicator switches on when the power adaptor or USB is plugged in but not when the power key is pressed, plug in a known good case front assembly to check if the power key is damaged. If the keypad is faulty, replace the case front assembly (see page 38).
	Corrupted memory	If possible, update the firmware. Refer to the technical bulletin *Updating the firmware*.
	Faulty PCA	Replace the PCA (see page 32).
Short battery run time, less than eight hours with backlight on	Battery not fully charged	Try recharging for at least twelve hours. Check that the charging indicator on the LCD is cycling.
	Faulty battery	Measure the open circuit voltage on the battery. If less than 2.5 V, replace the battery (see page 27).
	Faulty PCA	Replace the PCA (see page 32).
LCD picture incomplete, or only white display, or only black display.	Bad internal connection	Check that the LCD FPC is correctly plugged into the PCA and the LCD, considering the hinged retaining flap on the connector on the LCD. If the LCD still does not work properly, try a known good FPC.
	Faulty LCD	Replace the LCD (see page 35).
	Faulty PCA	Replace the PCA (see page 32).
Consistent line(s), vertical or horizontal, across LCD	Cracked or damaged LCD	Replace the LCD (see page 35).
Back light very dim or not working	LCD FPC not connected properly	Check that the LCD FPC is correctly plugged into the PCA and the LCD: At the 'PCA end' of the LCD FPC, ensure that the locking bar is closed properly. At the 'LCD end' of the LCD FPC, ensure that the locking clips are in place.
	Faulty LCD FPC	If the LCD still does not work properly, try a known good LCD FPC.
	Faulty LCD	Replace the LCD (see page 35).
	Faulty PCA	Replace the PCA (see page 32).

Displayed weights unstable and / or will not zero, "UNDERLOAD" or "OVERLOAD" displayed, or indicator displays incorrect weight	Span calibrated on cell code 99 (no code)	This behaviour is normal when no load bars are connected.
		Caution! Scan calibration settings can be important to the customer so check before changing.
		If the customer no longer requires this span calibration, clear the settings. See the technical bulletin *Span Calibration Guide*.
	Load cell settings may have been modified	If the customer no longer requires these settings, reinstate the default settings. See the technical bulletin *Span Calibration Guide*.
		Caution! These settings can be important to the customer so check before changing!
	Load bar is faulty	Test the load bar to see if it is functioning correctly. See load bar service manual.
	Bad indicator internal FPC connection	Check that both load bar FPCs are correctly inserted into the PCA.
		Plug a good load bar FPC into the PCA and check if the weights are stable.
	PCA is faulty	Replace the PCA (see page 32).
Bad cell code displayed	Non Tru-Test load cell	Probably needs span calibration. See the technical bulletin *Span Calibration Guide*.
Note: See diagnostics menu and compare cell code with technical bulletin *Cell Codes*.	Cell code in load cell connector incorrect	Check load bar cell code with a known good indicator.
		Replace load cell connector ensuring fit correct cell code. See load bar service manual.
	Bad indicator load bar connector	Check that the load bar FPC is correctly inserted into the PCA.
		Plug a good load bar FPC into the PCA and check if it reads the correct cell code. See the diagnostics menu to check measured cell code.
	PCA is faulty	Replace the PCA (see page 32).
Stable LED not working	Weight never stabilizes	Check indicator settings for Damp System and Resolution:
		Damp System - set to Superdamp III (Cattle) or Superdamp III (Sheep)
		Resolution may be set to too small. Set to a coarser resolution. See the technical bulletin *Span Calibration Guide*.
	Load bar faulty	Test the load bar to see if it is functioning correctly.
		Test the indicator using calibration plugs.
	Bad load cell FPC	Check that both load cell FPCs are correctly inserted into the PCA.
		Plug a known good load cell FPC into the PCA and check if the weights are stable.
	LED damaged	Check that the keypad FPC is correctly inserted into the PCA.
		Plug a known good case front assembly into the PCA and check if the LED is working.
		If the LED is damaged, replace the case front assembly (see page 38).
Stable LED on, but nothing works	Firmware error	If possible, update the firmware. See the technical bulletin *Updating firmware*.
	PCA is faulty	Replace the PCA (see page 32).
Some or all keys not working	Bad keypad connections	Check if the keypad FPC is connected (see page 38). Try a known good keypad FPC.
	Keypad fault	Unplug the existing keypad FPC and try plugging in a new known good case front assembly. If the keypad is faulty, replace the case front assembly (see page 38).

User data lost	PCA is faulty	Replace the PCA (see page 32).
No accessory power output from power connector	Power adaptor loom faulty	Replace power/comms connector (see page 29).
	Bad internal connection	Check that the battery cable, power/comms FPC, and keypad FPC are correctly plugged into the PCA. If the indicator still does not switch on, try known good FPCs.
	PCA is faulty	Replace the PCA (see page 32).
RS232 not working	RS232 cable faulty	Replace the RS232 cable.
	Bad internal connection	Check that the battery cable, power/comms FPC, and keypad FPC are correctly plugged into the PCA. If the indicator still does not switch on, try known good FPCs.
	Wrong bit rates	The handshaking settings for the ID5000 and XR5000 are: 8 data bits, 1 stop bit, no parity, with 9600 bps. Ensure that the other device has matching settings.
	PC fault	Try another PC
	PCA is faulty	Replace the PCA (see page 32).
Bluetooth® wireless connection not working	*Bluetooth* wireless connection not established	Check that the indicator is on. Check that the Wi-Fi Data Link screen is not active. Press "Finish" soft key if in this screen. Check the *Bluetooth* wireless connection (see page 18).
	Problem with master device	When connected to another *Bluetooth* enabled device, the indicator is always the slave and the other device is always the master. When troubleshooting the master device, refer to the documentation supplied with that device. On the master device, ensure that the Bluetooth setting is enabled. Check that the master device is connected to the indicator and not to another device. The *Bluetooth* functionality on the master device may be faulty.
	PCA is faulty	Replace the PCA (see page 32).
USB not working	USB cable faulty	Replace the USB cable.
	USB Drivers did not install properly	Re-install the Data Link software.
	PC fault	Try another PC.
	Firmware fault	Update the firmware. See the technical bulletin *Updating firmware*.
	Bad internal connection	Check that the USB FPC is correctly plugged into the PCA. Try a known good FPC.
	USB connector is faulty.	Replace the USB connector (see page 30).
	PCA is faulty	Replace the PCA (see page 32).
Save files to USB flash drive (USB host) not working	USB flash drive faulty	Try the USB flash drive on a PC.
	USB flash drive with wrong file system	Replace with a known good USB flash drive.
	PCA is faulty	Replace the PCA (see page 32).

Service page / screen

Accessing the service login page

You can access the **Service** login page by pressing the ⌂ key, then the **Settings** soft key. Press the **Next page** soft key until the Service option appears, then press the **Service** soft key.

The **Service Log in** page will prompt you for a password. Enter 5000, then press the **Log in** soft key.

Main service page items

Item	Description
Charge	The state of the battery charge
Battery Voltage	The voltage of the battery. Typically varies from 2700 mV (flat) to 3600 mV (fully charged).
Battery Current	The current of the battery. Typically approx 2000 mA during charging, although this will decrease when the battery approaches fully charged. Typically approx -800 mA during discharge.
Charger Temperature	Ignore
Ambient Temperature	The temperature sensed from the thermistor located on the far right of the PCA.
Battery charging status	The charging status (e.g. Constant current, Not charging)
External power	Connected/Not connected
Ambient light	From the light sensor above the LCD. 0=dark, larger numbers are brighter.
ADC noise	A measure of the noise on the AD7192 load-cell ADC.
Raw ADC	Raw reading from the AM335x ADC channels, AIN0 to AIN7. These correspond to: AIN0 - 3V3/2 AIN1 - 5V wall AIN2 - 5V USB Device AIN3 - Temperature AIN4 - Cell Code 0 AIN5 - Cell Code 1 AIN6 - Main ID resistor AIN7 - UI (keypad) ID resistor

Testing the indicator

Checking for stable weights

A stable weight is defined as a reading that does not move more than one division (resolution step) in either direction. Testing the indicator for stable weights requires the use of a calibrator or a set of calibration plugs. You should use a known good load bar.

Auto zero track may hide any small movements. Disable auto zero before testing for stable weights.

Follow these steps to disable auto zero on an ID5000 or XR5000 indicator.

1   Press **Home** 🏠.
2   Press the soft key **Settings**, then **Weighing Settings**.
3   Set Auto Zero Track to Off.

How to test for stable weights

1   Connect the 0 mV/V calibration plug to a load cell connector on the indicator.
2   Press **Power** ⏻ to turn on the indicator.
3   Press **Zero** ⓩ to zero the indicator.

Checking the calibration

1   Test that the weights are stable, as described in *Checking for stable weights* above.
2   Connect the 2 mV/V calibration plug to the other load cell connector and remove the 0 mV/V calibration plug.
    The weight displayed should be 2000 kg (4410 lb) within ±1 kg (2 lb).

Checking the load cell codes

Each type of load bar has a unique cell code. Plug in a known good load bar. The **Weigh** screen should display the expected weight when a test weight is put on the load bar.

If not,

•   Check that the indicator is not span calibrated. Go to the **Settings > Service > Load Cell** screen.

✋ These settings can be important to the customer so check before changing.

The easiest way around a span calibrated cell code is to check the weighing performance using another type of load bar (e.g. single load bar instead of both load bars plugged in).

•   Check the load bar connector assembly and PCA. See *Troubleshooting* on page 13.
•   To view the cell code number of the load bar that is connected, go to the **Settings > Service > Load Cell** screen.
•   The latest firmware may include some new load cell codes for new models of load bars. If in doubt, update firmware to the latest version from the Tru-Test website. Refer to the technical bulletin *Updating firmware*.

For more information about load cells, refer to the technical bulletin *Cell Codes*.

Checking the power connection

Connect the power adaptor and check that battery-charging symbol on the **Home** or **Weigh** screen is showing lightning bolt .

When the battery is fully charged, the battery-charging symbol will show a plug , but may restart periodically to apply a top-up charge.

Checking the USB connections

Run Data Link (supplied with the ID5000 and XR5000 indicator, or available to download from the Tru-Test website).

Communication with Data Link indicates that the USB interface is functioning correctly.

Checking the RS232 connection

Check that the indicator receives EIDs from an XRP2 Panel Reader, XRS Stick Reader, or other known good EID reader with RS232 connectivity.

Checking the *Bluetooth*® wireless connection

1   Establish a *Bluetooth* wireless connection between the indicator and a known good EID Reader with *Bluetooth* wireless connectivity (see the *5000 Series Weigh Scale Indicator Quickstart Guide* or ID5000/XR5000 online help for details).
2   Check that the *Bluetooth* wireless connection status indicator is displayed on the **Home** or **Weigh** screen.
3   When the indicator is connected to a device via *Bluetooth* wireless connection, a *Bluetooth* icon is displayed on the top left-hand corner of the **Home** and the **Weigh** screen.
4   Check that the indicator receives EIDs.

Bluetooth settings

If you are troubleshooting a *Bluetooth* wireless connection, you may require the following information.

MAC address

The indicator's MAC address is displayed on the **Settings > Connections > Bluetooth** screen.

Bluetooth PIN

The indicator's *Bluetooth* PIN is **0000**.

Checking the *Wi-Fi* wireless connection

1   Press .
2   Press the **Wi-Fi Data Link** soft key.
3   Launch the Data Link app on your smart phone and follow the instructions to connect.

Checking save/back up data to USB flash drive

Plug in a known good USB flash drive into the USB port on the indicator. On the indicator, you should see the **Save information to USB flash drive** screen.

Checking the LCD

Try various functions to check that the LCDs are operating correctly. Watch for missing or faded segments, rows or columns of dots.

Follow these steps to test the backlight operation (ID5000 and XR5000).

1   Press 🏠.
2   Go to the the **Settings > General** screen.
3   Change the Display Backlight to On, Off, Auto.

Testing the keypad

Test the keypad in the order specified below. Every key on the keypad should produce a display response.

ID5000 and XR5000

Power	⏻
Weigh	▭
Zero*	ZERO
Record*	REC
Keypad	(all alphabet and numbers)
Enter	ENTER
Help	?
Escape (Back)	↩
Arrows	‹ › ∧ ∨
Home	🏠

* Requires load bars or a load bar emulator to be connected to the indicator to populate the weight display.

Checking the battery

The indicator has a long life lithium iron phosphate battery fitted. An application-specific charging circuit on the PCA manages the battery. Charge indication is by a dedicated precision Coulomb counter which measures the current flow in and out of the battery.

Caring for the indicator battery

The indicator can be charged using the supplied power adaptor or from the optional car charger (cigarette lighter adaptor - Part 827195). A computer USB port cannot deliver enough power to effectively charge the indicator battery. To prevent the battery discharging if a computer USB port is used, a power adaptor or car charger should also be connected.

The charging time will be longer if the indicator is left turned on while charging the battery. Charging will also pause at extreme temperature, below 0 °C and above 45 °C (32-113 °F).

After storage, charge the indicator overnight (at least 10 hours) before use. The battery state of charge indication might become inaccurate if the battery is repeatedly only partly charged, but it will correct itself as soon as the battery is fully charged.

Always store the indicator at least half charged in a cool dry place (not in the sun).

To keep the indicator battery fresh, fully charge the indicator overnight at least once every 6 months. Even when not using the indicator, the battery will slowly discharge by itself. Battery life is shortened if the battery remains deep discharged for long periods.

If the battery is deep discharged, upon connecting a charger, the indicator will enter a special recovery mode to trickle charge the battery for up to 30 minutes during which the indicator will not turn on. If after 30 minutes of charging the battery has not recovered, then attempt one more time by disconnecting and reconnecting the external power. If the battery still does not recover within 30 minutes, you will need to replace the battery.

Battery information

- In normal operation, the indicator's battery save feature will turn the indicator off when it has not been used for 15 minutes. This may give the impression that the battery has gone flat. Press ⏻ to continue weighing. This feature can be turned off through the Auto Power Off option on the **Settings > General** screen.
- It is safe to leave the indicator on charge indefinitely.
- The battery cannot be over-discharged during use.
- The battery may not reach full charge in extreme temperatures.
- Battery run time may be reduced at freezing temperature.

Battery problems

If there are doubts about the battery capacity or if the battery does not appear to hold its charge, follow these steps to test the battery.

1 Charge the indicator in a cool dry place for 10 hours at 10-45 °C (50-113 °F). The battery will not fully charge if too hot or cold, or as quickly if the indicator is left on while charging.

2 Check that the charging symbol on the **Home** or **Weigh** screen is displayed during charging and displays full after charging is completed. If not charging, check the power adaptor, USB cable, power/comms connector, PCA and ensure that the indicator has the latest version of firmware installed.

3 When fully charged, disconnect the power adaptor and check the **Settings > Service Info > Status** screen to confirm a battery discharge current of less than 800 mA. Excessive discharge current suggests a faulty PCA.

4   Check the **Settings > Service Info > Status** screen for the battery voltage. If less than 3.3 V, replace the battery (see page 27).

5   You need to remove the battery for further testing.

    a   Shut down the indicator (see page 22).

    b   Remove the battery, as described in *Replacing the battery* (see page 27).

    c   Disconnect the battery and plug it into a battery test load (2 x 3.3 Ω 5 W resistors in parallel).
      This will discharge the battery at approximately 2 A. If after four hours the battery voltage is less than 2.5 V, replace the battery.

    d   Refit the battery, as described in *Replacing the battery* (see page 27).

Faulty batteries need to be disposed of properly. Generally for lithium batteries this includes deep discharging the battery with a resistor and then leaving the battery in a bucket of salty water for a week. However, you should seek advice from local authorities.

Repair procedures

Before you begin

Before repairing the indicator, clone all data to an external device. See the technical bulletin *Cloning the data on the 5000 Series Weigh Scale Indicator*.

Before opening the case, shut down the indicator.

Shutting down the indicator

There are two ways to shut down the indicator:

- On the **Settings** screen, press the **Next page** soft key until you see the Power off option. Press the **Power off** soft key.
- In the **Settings > Service Info** screen, select the menu option to power off the indicator.

Using flexible printed circuit (FPC) connectors

When servicing an indicator, flexible printed circuits (FPCs) may need to be disconnected and connected. Ensure that these guidelines are followed:

- Do not force the FPC out of the FPC connector. They can be easily damaged.
- The tracks on the FPCs have a pitch of only 0.5 mm (1/50") and are only on one side of the strip. It is therefore critical that they are inserted straight and in the correct orientation.

The FPC used for the LCD has a locking bar on the FPC connector.

The other FPCs do not have a locking bar.

To disconnect and reconnect the LCD FPC

To disconnect the LCD FPC:

1   Place fingernails underneath the black locking bar on the FPC connector.
2   Lift up the locking bar up to open the lock.

Figure 1:
LCD FPC connector open

3   With your fingertips on either side of the FPC, gently slide the FPC out of the connector body without bending or crumpling the FPC.

To connect the LCD FPC:

1   Ensure that the black locking bar is open, then gently slide the FPC into the FPC connector body. Ensure that the FPC is connected properly (straight and correct way around). The FPC should be straight without any bends or folds.
2   Lower the locking bar to close the lock.

Figure 2:
LCD FPC connector closed.

To disconnect and reconnect all other FPCs

1   With your fingertips on either side of the FPC, gently slide the FPC out of the connector body without bending or crumpling the FPC.

2   Gently slide the FPC into the connector body. Ensure the FPC is connected properly (straight and correct way around). The FPC should be straight without any bends or folds.

Removing and refitting the bumpers

Removing the bumpers

1   Remove the rubber corner bumpers, starting at the back, by unscrewing the bumper screws, then peeling off the bumper.

2   If necessary, you can carefully insert a small flat screwdriver as shown and push up to help remove the bumper. Be careful not to damage the case back during this operation.

Figure 3: Removing bumpers with small flat screwdriver

Refitting the bumpers

1   To fit the bumpers, make sure the correct bumper is used for each corner. The location designation is inside the bumper, e.g., BL - Bottom Left (looking from the front).

2   Hook the corners of the top edges on the front.

Figure 4: Refitting bumpers

3   Make sure the foot edge is not folded in when pushing the bumper over the foot.

4   Inspect the eight screws and replace any that are damaged.

5   Remove any plastic swarf from the screw bosses, the screws, and the case.

6   Before tightening, first turn the screw anti-clockwise until it drops into place. Tighten screws using a torque-limited screwdriver set to 0.9 Nm (8 lbf-in), or a hand screwdriver. The screws can be fitted in any order.

Removing and refitting the case back

Removing the case back

1 Remove the rubber corner bumpers (see page 23).

2 Manually unscrew the 12 screws securing the case back to the case front (see *Figure 5* below). Take care not to continue turning the screw once fully unscrewed as it will damage the thread in the plastic boss.
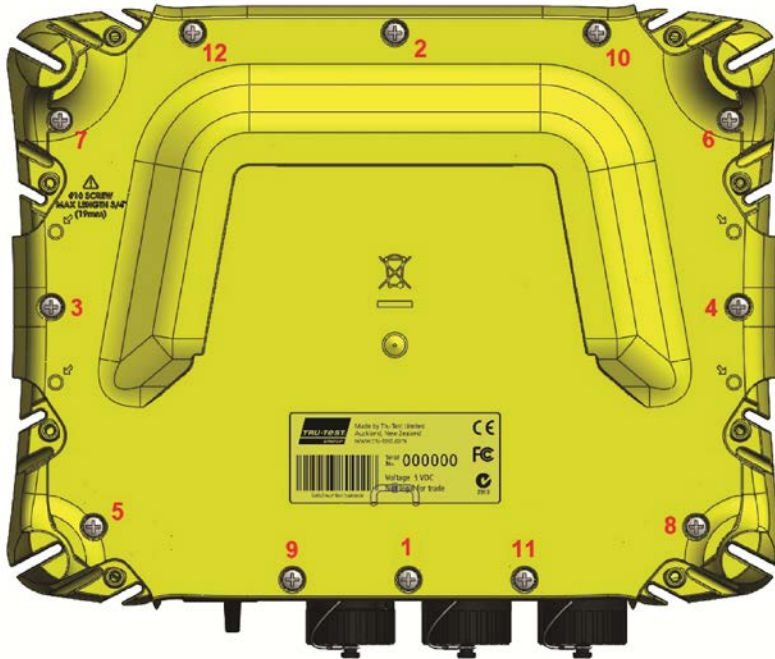

Figure 5: Location of screws securing the case back to the case front

3 Remove the screws.

4 Lift off the case back.

Refitting the case back

These indicators are often used in very harsh environmental conditions. Correct installation of the case back, o-ring, and screws is essential to help maintain an effective environmental seal for the case. Incorrect installation can lead to case leaks and serious malfunctions.

- Ensure that the cleaned screw fits the old thread when tightening. First turn the screw anti-clockwise until it drops into place before tightening.

- Ensure that the case sealing o-ring is in place and does not get pinched between the case halves. It is highly recommended to replace the o-ring with a new one. The case back screws are an integral part of the sealing of the case. If any of the screw threads are stripped for any reason, the case front must be replaced.

1 Inspect the 12 screws and replace any that are damaged.

2 Remove any plastic swarf from the screw bosses, the screws, in the case, and around the case o-ring.

3   Inspect for damage the lip on the case front against which the o-ring seals. Even minor damage to this surface can reduce case sealing properties. It is highly recommended to replace the case o-ring with a new one whenever the indicator is serviced. See page 27 for instructions.
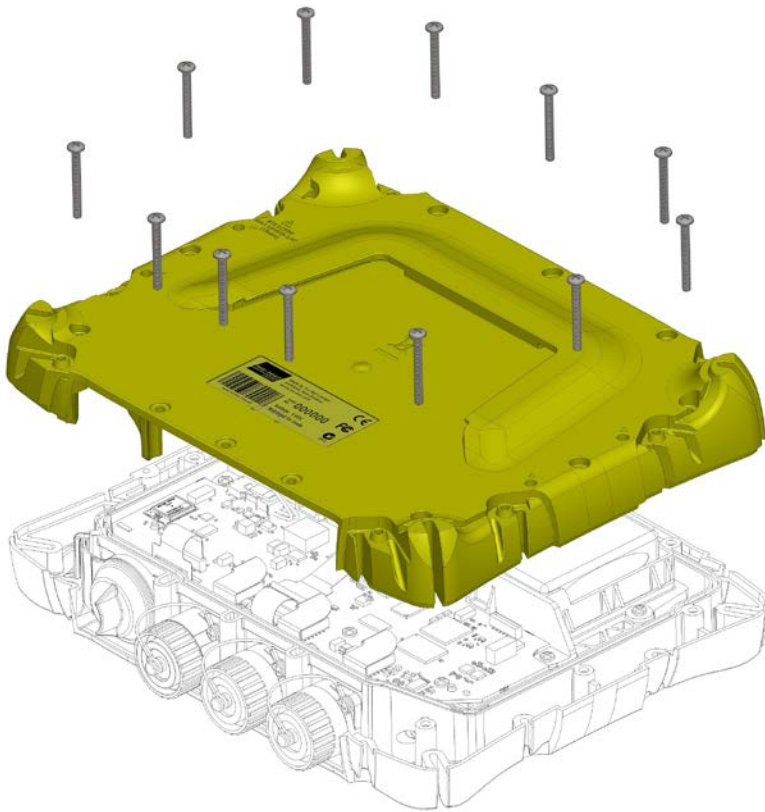

Figure 6: Case back exploded view

4   Tighten the screws using a torque-limited screwdriver set to 0.9 Nm (8 lbf-in), or hand screwdriver. The screws must be tightened in the order as shown in *Figure 6* in order to obtain a consistent pressure on the o-ring.

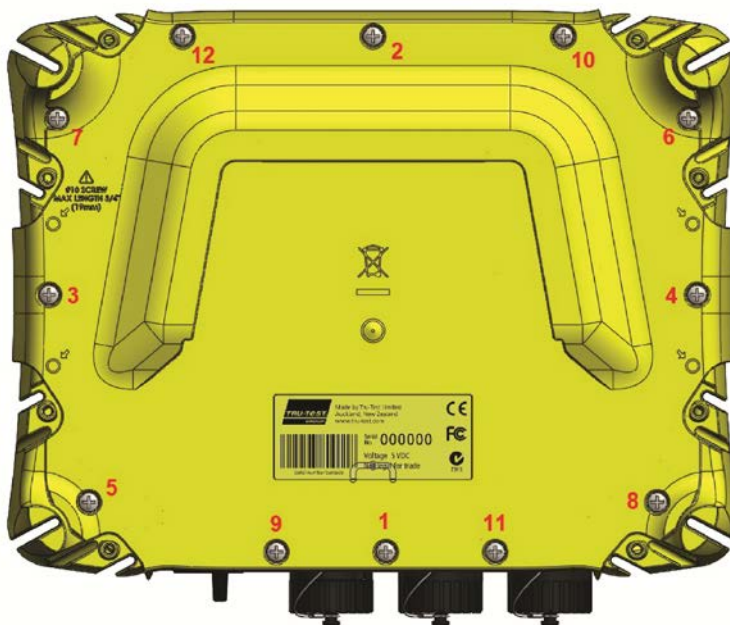*Do NOT use a variable speed drill to tighten or undo the screws.*

Figure 7: Required order of tightening screws on the case back

Refit the rubber corner bumpers (see page 23).

Replacing the case o-ring

1 Remove the rubber corner bumpers (see page 23).

2 Remove the case back (see page 25).

3 Use a fine screwdriver to lever out the o-ring and remove it from the case. Be careful not to damage the mating surfaces of the case.

4 *Do not use a knife to remove the o-ring as it may damage the case; even a small cut can create sealing problems.*

5 Ensure that the seal groove is clean. Use cotton buds (q-tips) or tissues to remove any excess oily residue.

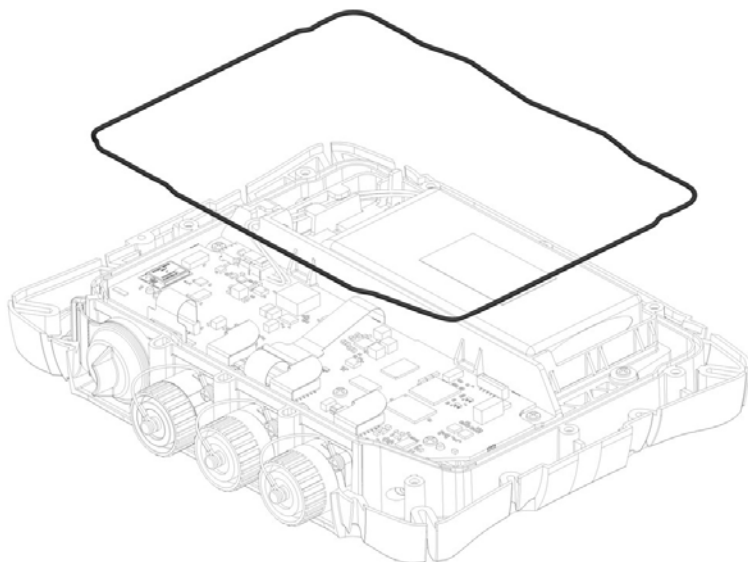6 Replace the o-ring, taking care to get an even stretch along its length.

Figure 8: Case front assembly indicating the location of the case o-ring.

7 Use a plastic pen to ensure that the o-ring sits tightly in the corners.

Figure 9: Using a plastic pen to press the o-ring into the groove at the corners.
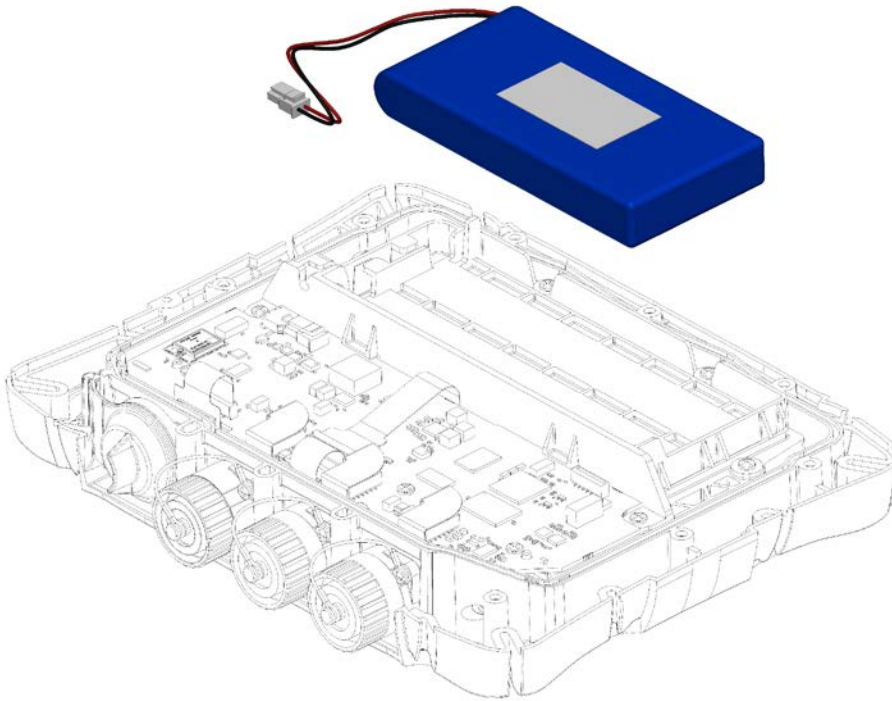
8 Refit the case back (see page 25).

9 Refit the rubber corner bumpers (see page 23).

Replacing the battery

The batteries are different, depending on the serial number the indicator has. See *Changes to product* on page 7.

Figure 10: Battery location

Removing the battery
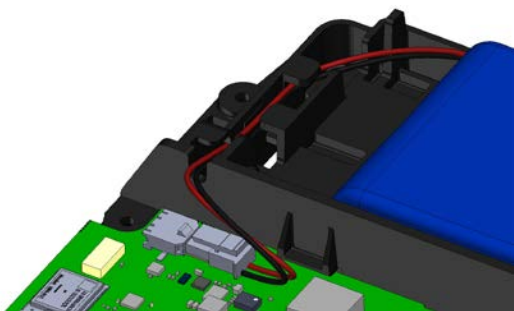
1   Remove the rubber corner bumpers (see page 23).

2   Remove the indicator case back (see page 25).

3   Unplug the battery from the PCA by pressing down carefully on the rear of the clip on top of the connector and sliding the tab out at the same time.

4   Remove the old battery. The battery is secured to the cradle bottom using double sided adhesive tape, so you need to carefully but firmly pry the battery from the cradle.

Faulty batteries need to be disposed of properly. Generally for lithium batteries this includes deep discharging the battery with a resistor and then leaving the battery in a bucket of salty water for a week. However, you should seek advice from local authorities.

Fitting the battery

1   Plug the battery into the PCA.

2   Remove the liner from the double sided tape and place the battery into the cradle pressed up against the right-hand side. Press down firmly to ensure adhesion of the tape.

3   Push the battery cables into the cradle's cable retention feature and into the groove in the cradle rib.

Figure 11: Battery retention feature

Models with serial number <510,000   Models with serial number >510,000

Write the installation date on the battery with a permanent marker.

4   Refit the case back (see page 25).

5 Refit the rubber corner bumpers (see page 23).

6 Check that the indicator operates and place on charge for four hours. The indicator must be off during charging to ensure that the battery is fully charged.

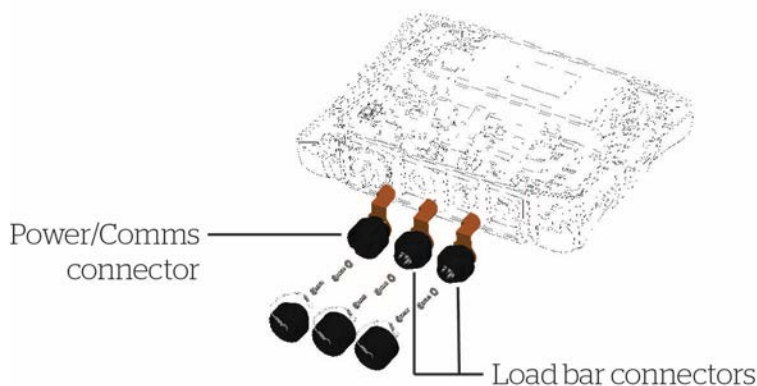## Replacing the load bar and power/comms connectors

Figure 12: C16 power/comms and load bar connectors

The procedure for replacing the load bar and power/comms connector assemblies is the same.

Removing the power/comms and load bar connectors

1 Remove the rubber corner bumpers (see page 23).

2 Remove the indicator case back (see page 25).

3 Unplug the battery from the PCA.

4 Slide the FPC of the connector out of the connector body on the PCA.

5 Remove the dust cap, unscrew the two screws securing the connector, then remove the assembly.

Refitting the power/comms and load bar connectors

1 Check that the case is clean where the connector meets the case and that all plastic swarf is removed.
   The orientation of the FPC on the connector is facing up, out of the case.

2 Replace the dust cap.

3 Tighten the two screws using a torque-limited screwdriver set to 0.5 Nm (4 lbf-in), or hand screwdriver.

4 Gently slide the FPC connector into the connector body on the PCA. Ensure that the FPC connector is connected properly (straight and the correct way around).

5 Plug the battery connector into the PCA.

6 Refit the case back (see page 25).

7 Refit the rubber corner bumpers see page 23).

Removing and refitting the USB Dust Cap

Removing the USB dust cap

1 Remove the rubber corner bumpers (see page 23).

2 Remove the indicator case back (see page 25).

3 Remove the USB dust cap by pulling it off the USB port recess (Step 1) and lifting it out of the dovetail groove (Step 2).
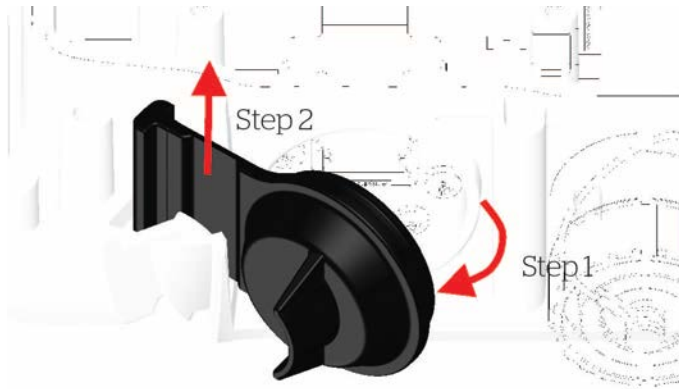
Figure 13: USB dust cap removal

Refitting the USB dust cap

1   Place the USB dust cap in the dovetail groove (Reverse of Step 2 - See *Figure 13*)

2   Push the cap closed (Reverse of Step 1 - See *Figure 13*)

3   Refit the case back (see page 25).

4   Refit the rubber corner bumpers (see page 23).
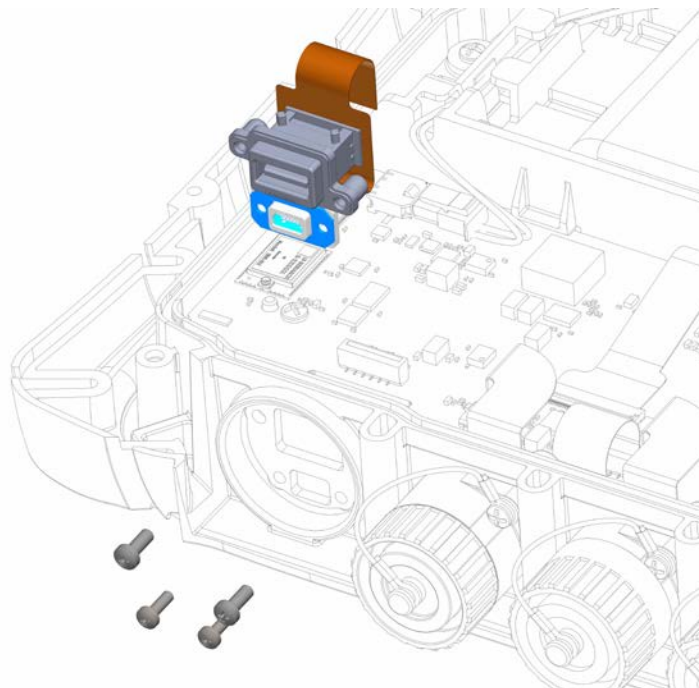
Replacing the USB connectors

Figure 14: USB connectors assembly

Removing the USB connectors

1 Remove the rubber corner bumpers (see page 23).

2 Remove the indicator case back (see page 25).

3 Remove the USB dust cap (see page 29).

4 Unplug the battery from the PCA.

5 Slide the USB FPC out of the connector body on the PCA.

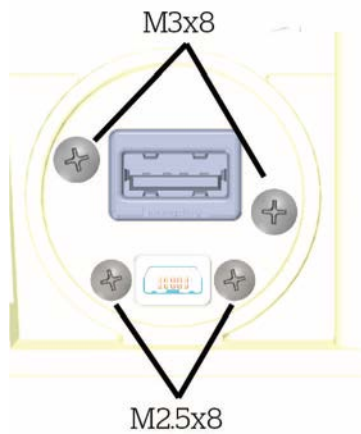6 Unscrew the four screws and remove the USB connectors assembly.

Figure 15: Screws for USB connectors

Refitting the USB connectors

1 Hold the new USB connectors assembly in place.

2 Tighten the four screws using a torque-limited screwdriver set to 0.5 Nm (4 lbf-in), or hand screwdriver. Do not over tighten. Make sure the correct screws are used with the correct connector.

3 Gently slide the USB FPC into the connector body on the PCA.

4 Plug the battery connector into the PCA.

5 Replace the USB dust cap (see page 29).

6 Refit the case back (see page 25).

7 Refit the rubber corner bumpers (see page 23).

Removing and refitting the PCA

Removing the PCA

1 Remove the rubber corner bumpers (see page 23).

2 Remove the indicator case back (see page 25).

3 Disconnect the battery connector and the six FPCs, as shown below.

> To remove the LCD FPC, carefully lift the back of the black locking bar of the connector body before sliding out the FPC.
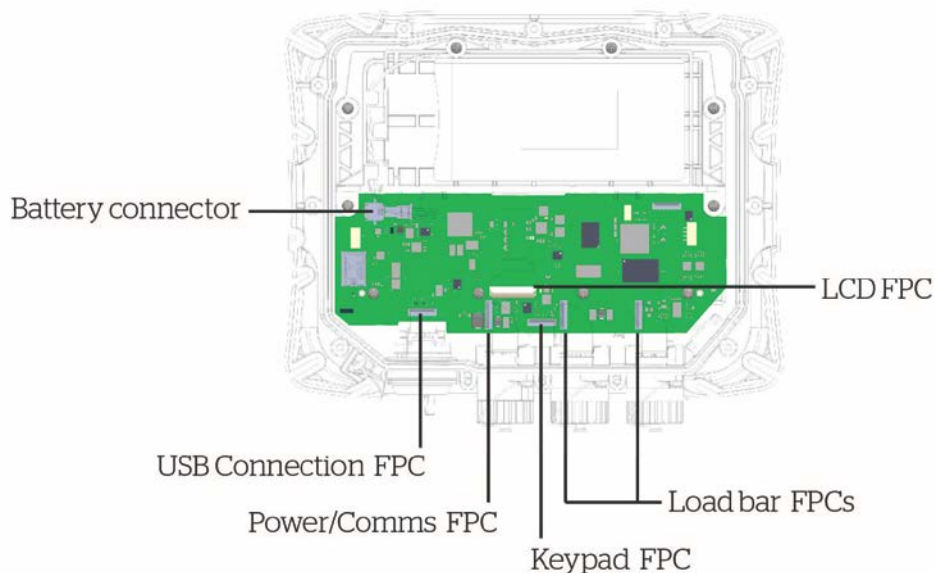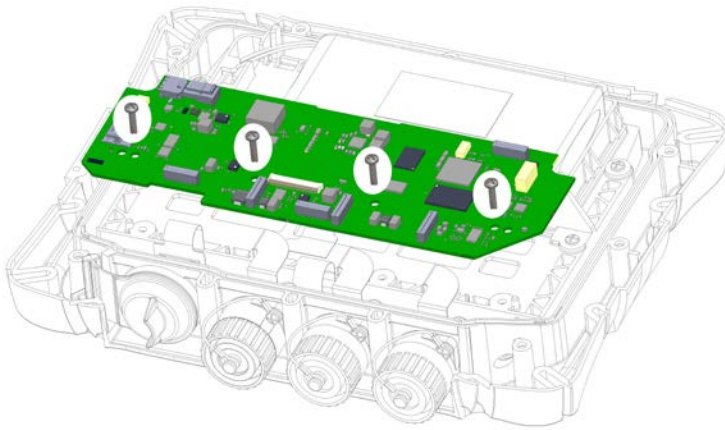

Figure 16: PCA connections

4   Unscrew the four retaining screws holding the PCA to the case front.

Figure 17: PCA retaining screws

5   Lift and slide the PCA out of the cradle.

Refitting the PCA

The PCA is factory pre-set to ID5000 or XR5000. If fitting a replacement PCA, ensure that the spare part matches the model being serviced.

1   Fit the PCA in place by sliding the board under the clips and positioning the locating holes over the locating pins on the cradle.
2   Ensure that the LCD FPC is correctly positioned between the PCA and cradle so that it can be re-connected to its connector on top of the PCA.
3   Screw in the four retaining screws to fasten the PCA to the case front (see *Figure 17: PCA retaining screws*). If available, use a torque limited screwdriver set to 0.5 Nm (4 lbf-in).
4   Connect the six FPCs and the battery (see *Figure 16: PCA connections*).
5   Refit the case back (see page 25).
6   Refit the rubber corner bumpers (see page 23).

Replacing the cradle

Removing the cradle

1   Remove the rubber corner bumpers (see page 23).
2   Remove the indicator case back (see page 25).
3   Remove the battery (see page 28).
4   Remove the PCA (see page 32).

5   Unscrew the six screws securing the cradle to the case.

Figure 18: Cradle screws


6   Lift the cradle out of the front case, taking care to pull the LCD FPC through the gap in the middle of the cradle.

Refitting the cradle

1   Ensure that the LCD has been fitted with the LCD FPC into the LCD gasket and placed in the front assembly. See *Refitting the LCD* on page 36.

2   Place the cradle into the case front, taking care to thread the LCD FPC through the gap in the middle of the cradle.

3   Fit the PCA in place in the cradle. See steps 1 and 2 of *Refitting the PCA* (on page 33).

4   Refit the battery (see page 28).

5   Screw in the ten screws to fasten the PCA and cradle to the case front. If available, use a torque limited screwdriver set to 0.5 Nm (4 lbf-in). Fasten the screws in the order shown in *Figure 18*.

Figure 19: Cradle and PCA screw fastening order
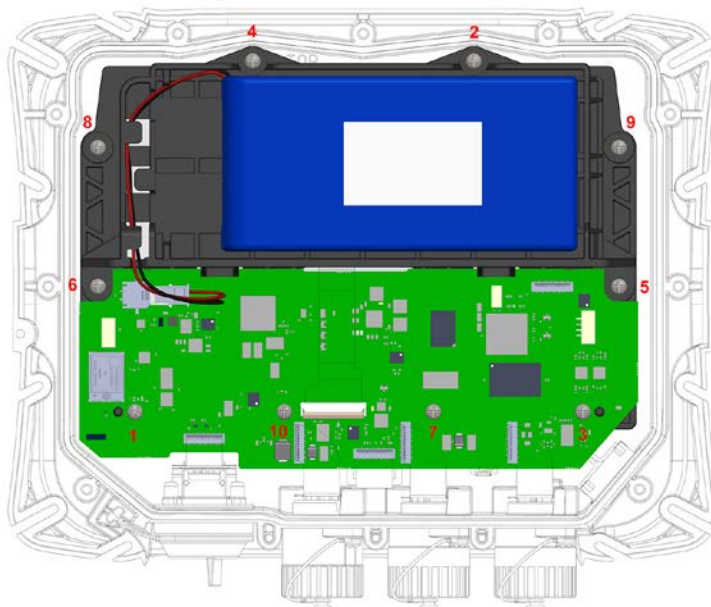
6   Connect the six FPCs and the battery (see *Figure 16: PCA connections*).

7   Refit the case back (see page 25).

8   Refit the rubber corner bumpers (see page 23).

Replacing the LCD (indicators with serial number >510,000 only)

New, improved LCD – Changes to product which you should be aware of

The LCD is different on indicators manufactured after June 2017 (indicators with serial number >510,000). For indicators with a serial number of <510,000, no spare LCD is available and it will be necessary to replace the entire indicator. See *Changes to product* on page 7.

LCD handling and storage precautions

The LCD is made of glass. Do not subject it to mechanical shock.

If the LCD is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth. If the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

Do not apply excessive force to the display surface or adjoining areas, as this may cause a variance in the colour tone.

If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten the cloth with IPA. *Do not use water, ketone or any aromatic solvent as they will damage the polariser*.

Do not attempt to disassemble the LCD.

When storing LCD modules, avoid exposure to direct sunlight, light of fluorescent lamps or harmful gases. The recommended storage temperature range is 0 to 40 °C (32 to 104 °F) and the relative humidity should be less than 80%.

Removing the LCD

1   Remove the rubber corner bumpers (see page 23).
2   Remove the indicator case back (see page 25).
3   Remove the cradle, complete with the PCA:

   a   Disconnect the six FPCs (see *Figure 16: PCA connections*). For the LCD FPC, pull up the black locking bar on the FPC connector before removing the FPC. See *Using flexible printed circuit (FPC) connectors* on page 22.

   b   Unscrew the 10 screws securing the PCA and cradle to the case (see *Figure 19* for position of the screws).

   c   Lift the cradle with PCA out of the front case, taking care to pull the LCD FPC through the gap between the cradle and the PCA. Place the cradle assembly to one side.

Figure 20: Removing the cradle assembly

4   Lay a soft cloth on the work surface beneath the case front to prevent damage to the LCD. Turn the case front over so that the overlay is uppermost. Use a flat-bladed craft knife to separate the LCD from the case front. Run the knife around the edges in order to break the sticky seal provided by the gasket.

Figure 21: Using a craft knife to separate the LCD from the case front

5   Lift up the case front to expose the LCD on the work surface.

6   In the case front, remove all traces of the sticky rectangular gasket using the craft knife and IPA.

7   Turn the LCD over. Remove the two LCD connector clips, then disconnect the other end of the LCD FPC from the LCD.

Figure 22: Removing the LCD connector clips and disconnecting the LCD FPC

Refitting the LCD

1. If the LCD is a *new* spare part, remove any protective film and packaging.

2. Place the LCD face down on a soft cloth on the work surface.

3. Refit the LCD FPC to the LCD by inserting the LCD FPC and refitting the LCD connector clips. See *Figure 23*.

> It is **essential** that the LCD connector clips are used to lock the LCD FPC in place. Be sure to refit them.

4. Make sure that the case front has no sticky residue remaining from the old sticky rectangular gasket. If it does, remove it using the craft knife and IPA.

5. Affix a new sticky rectangular gasket to the case front by peeling away the backing and pressing it firmly around the edges of the window. Peel away the other side of the backing.

6. Insert the LCD into the case front, ensuring that the orientation is correct. Press down firmly all the way around the perimeter.
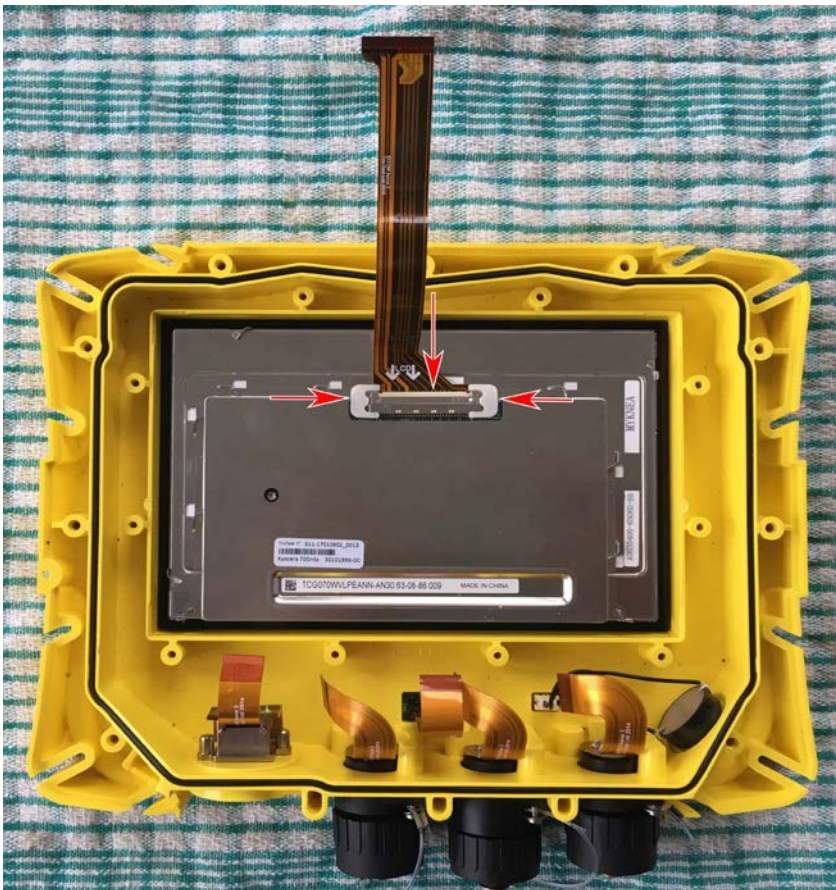

Figure 23: Orientation of LCD in case front

7. Replace the cradle, complete with the PCA, over the LCD:

   a. Position the cradle with PCA in the front case, taking care to thread the LCD FPC through the gap between the cradle and the PCA.

   b. Tighten the 10 screws securing the PCA and cradle to the case (see *Figure 19* for position of the screws).

   c. Reconnect the six FPCs (see *Figure 16: PCA connections*). For the LCD FPC, pull up the black locking bar, insert the FPC, then press down on the black locking bar to lock it. See *Using flexible printed circuit (FPC) connectors* on page 22.

8. Refit the case back (see page 25).

9. Refit the rubber corner bumpers (see page 23).

10. Clean the LCD with IPA to remove any fingerprints or grease.

Replacing the case front assembly

1   Remove the rubber corner bumpers (see page 23).

2   Remove the indicator case back (see page 25).

    If the battery is not being replaced, it can be left on the cradle and refitted into the new front assembly.

3   Remove the cradle, complete with the PCA:

    a   Disconnect the six FPCs (see *Figure 16: PCA connections*).

    b   Unscrew the 10 screws securing the PCA and cradle to the case (see *Figure 19* for position of the screws).

    c   Lift the cradle with PCA out of the front case, taking care to pull the LCD FPC through the gap between the cradle and the PCA. Place the assembly to one side.

4   Remove the LCD.

    Models with serial number >510,000: For instructions on removing the LCD, see page 35. Note that if the LCD is not being replaced, you can leave the LCD FPC attached to it.

    Models with serial number <510,000: Do not separate the LCD from the black rubber gasket, just lift the whole LCD assembly including the LCD FPC out of the case.

5   Remove the load bar and power/comms assemblies, USB dust cap and USB FPC assemblies and refit them into a new case front. See pages 29, 29 and 30 respectively.

6   Models with serial number >510,000: Remove the backing on the sticky rectangular gasket and refit the LCD into the case front (see page 37).

    Models with serial number <510,000: Place the whole LCD assembly into the new case front. Make sure that the window is clean and clear of any dust or contamination. Make sure that the LCD is clean before fitting it into the case front assembly.

7   Replace the cradle, complete with the PCA, over the LCD:

    a   Position the cradle with PCA in the front case, taking care to thread the LCD FPC through the gap between the cradle and the PCA.

    b   Tighten the 10 screws securing the PCA and cradle to the case (see *Figure 19* for position of the screws).

    c   Reconnect the six FPCs (see *Figure 16: PCA connections*). For the LCD FPC, pull up the black locking bar, insert the FPC, then press down on the black locking bar to lock it. See *Using flexible printed circuit (FPC) connectors* on page 22.

8   Refit the case back (see page 25).

9   Refit the rubber corner bumpers (see page 23).

10 Models with serial number >510,000: Clean the LCD with IPA to remove any fingerprints or grease.