



SMOKEMETER Equipment Manual

TES1529J
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IMPORTANT

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The information in these Operating Instructions is subject to change without notice, and does not represent a commitment on the part of Crypton Ltd.

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The reliability of this equipment is fully supported by our service agents, with repair workshops and field service engineers to provide a full range of After-Sales Care, including installation, contract maintenance, factory overhaul and emergency repairs on site. Please refer to the page at the end of this manual for full details.

Note:

Your attention is drawn to our Terms & Conditions of Sale, particularly paragraph 2. If a service engineer is called out under service warranty where, upon inspection and test the equipment is found to be in full working order and no fault found, the user is liable to be charged the cost incurred for this call out. Before calling out an engineer, ensure your equipment is faulty by checking its operation, particularly mains supply and fault codes/self test if applicable.

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WARNING:

Do not attempt to operate this equipment unless you have read and understood these instructions.

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CONTENTS

	<u>Page No.</u>
HEALTH AND SAFETY	5
SMOKEHEAD	6
INSTALLATION	6
OPERATION	9
BATTERY CHARGING (Wireless only)	10
MAINTENANCE	12
OIL TEMPERATURE PROBE	16
ADAPTERS	16
CONNECTION	16
OPERATION	16
RPM TACHOMETERS	17
ACCOUSTIC – CDSS1	18
BATTERY – CDSS6/DX211-12	20
CONSUMABLES	21
TECHNICAL SPECIFICATIONS	23
AFTER SALES AND SUPPORT	25

HEALTH AND SAFETY

1. The equipment is not weatherproof and should not be used outside in rain or snow.
2. The internal circuits and components of the analyser should not be tampered with. No internal parts are operator serviceable.
3. Operators should exercise due caution with regard to the engine fan and associated belts.
4. Always provide ventilation by using an exhaust gas extraction system or by having an adequate supply of fresh air.

Vehicle emissions are dangerous. In particular, Carbon Monoxide (CO) from a vehicle exhaust is a highly poisonous gas. If breathed in, it is absorbed by the blood and will result in greatly slowed reactions and if absorbed in sufficient quantity can be fatal. Published figures show that a concentration of 0.3% CO in the air can be fatal if inhaled for 30 minutes.

5. Before starting an engine, ensure that the gear selector is in neutral or park.
6. Care should be taken with regard to scalding from the cooling system, burns from the exhaust system and electric shocks from the ignition HT system.
7. When disconnecting the fuel system of a hot engine beware of the fire hazard caused by fuel spilling onto manifolds, ignition distributor, etc.
8. Position the mains cable and sample pipe in such a manner that they do not present a hazard to anyone.
9. The earth lead of the mains supply cable MUST ALWAYS be connected to a good earth point.
10. Operators should not allow themselves to come into contact with water or other similar conductors when using the equipment.
11. Equipment should be sited in an area designated and clearly marked:

FOR USE BY AUTHORISED PERSONNEL ONLY

INSTALLING EQUIPMENT

A number of optional devices may be fitted for use with the Smoke Test. Please refer to the operating instructions for details of usage.

DX260-1xx SMOKEHEAD (Cabled)

The DX260-1 Smokehead is plugged in to a connector positioned on its cradle base. The base is then connected to the host equipment. The appropriate Sampling Pipe is then connected to the Smokehead. A separate base unit (DX260-1IFP) is available.

The Smokehead should be returned to base when not being used.



DX260-1 shown on the DX260-1IFP base.

DX260-1xxBT SMOKEHEAD (Wireless)

The DX260-1BT wireless Smokehead uses wireless technology to communicate directly with the host computer. The Smokehead has rechargeable batteries built in to enable approximately 1.5 hours of continuous use between charges. A charger Base DX260-1CHP is available.

The Smokehead should be returned to its charger base between tests to keep the batteries charged. The Smokehead will go into hibernation mode if it is not being communicated to by the computer whilst it is off the charger base for longer than approximately 6 minutes.

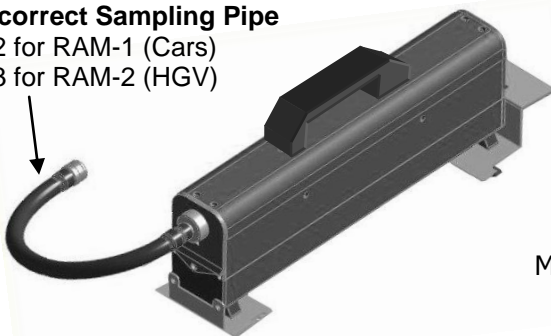


DX260-1CHP Charger base

DX260-1xxCZ (Cabled) & DX260-1xxBZ (Wireless) SMOKEHEADS For use on Zero Emissions Boxes.

Use correct Sampling Pipe

SP12 for RAM-1 (Cars)
SP13 for RAM-2 (HGV)



Mains power input

Signal output to PC
(not used on wireless systems)

Smokehead input

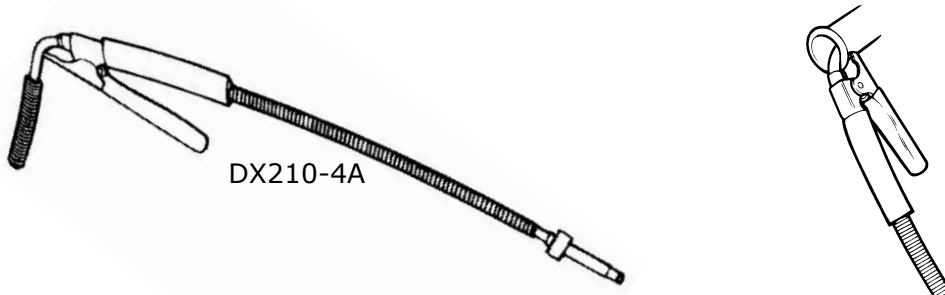
Special versions of the DX260-1 Smokehead have been designed for use on a Zero Emissions Box (ZEB). These Smokeheads have adaptor brackets and a different sample pipe to mount on the ZEB. The Smokehead is plugged in to a specific interface box (AS09188) that is also mounted on the ZEB. For a cabled system the Interface box is then connected to the host equipment. For a wireless system the Interface acts only as a power supply for the smokehead and should not be connected to the host PC.

SAMPLING PIPES

Connect the appropriate sampling pipe to the sampling head.

Sampling pipe DX210-4A

The sampling pipe DX210-4A can be used for all vehicles, but for convenience of use alternative pipes are available. (In some countries a larger probe must be used for tailpipe diameters of greater than 70mm i.e. trucks – use probe DX210-4A-L)



DX.210-4A-EX is a 300mm longer version of the standard supplied probe and is available to be purchased as an optional extra.

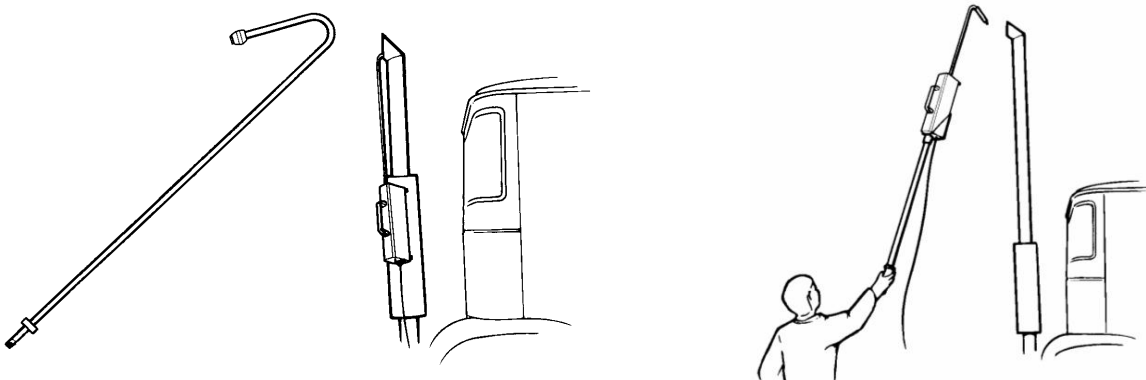
Sampling pipe XP12 & SP13

Sampling pipe SP12 and SP13 are used on a Zero Emissions Box. SP12 is used for testing cars and SP13 for trucks.



Sampling pipe DX210-6

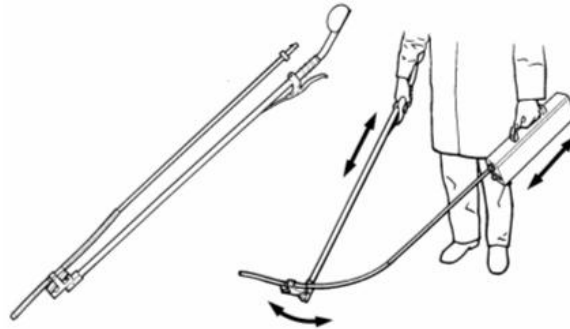
Sampling pipe DX210-6 is used for vertical exhausts. Hang the sampling pipe and the sampling head as shown in the illustration. For very high exhausts, an extension pole 1.5 m or 2 m length may be fitted to the sampling head using an extension kit DX260-160L (1.5m) or DX260-160H (2.0m) as illustrated. (In some countries a larger probe must be used for tailpipe diameters of greater than 70mm i.e. trucks– use probe DX210-6-L)



Sampling pipe DX210-5C

The sampling pipe DX210-5C has remote control and is used to access mid-chassis exhausts on large commercial vehicles. To use, hold the sampling pipe and the sampling head as shown in the illustration with the arm rest under the forearm. The head of the pipe has a pivoting action so that the 'aim' of the pipe can be changed by moving one arm forwards or backwards relative to the other arm.

Use the hand lever to operate the jaws and clamp the pipe in position, then allow the remote control and the sampling head to rest on the floor.



NOTE: Before fitment of a sampling pipe, inspect its 'O' ring for damage and renew if necessary (order part number DX210-5/60). Periodically apply a smear of grease to the 'O' ring to assist fitment of the sampling pipe to the sampling head.

CAUTION: **The results of free acceleration testing will be affected by changes in sampling pipe diameter and/or length. Only genuine pipes must be used and their design must not be altered in any way. The smokehead body must always be positioned in clean air and away from exhaust fumes when in use.**



WARNING: **Sampling pipes can get very hot; take care when disconnecting from the sampling head.**

USING THE SMOKEHEAD OUTSIDE

If it is necessary or desirable to test a vehicle outside the workshop, the following points must be borne in mind.

The sampling head is weather resistant and may be used in temperatures down to a minimum of -15°C. But in the case of severe weather and heavy rain – DO NOT USE OUTSIDE!

WARNING: The power supply and PC are not weather protected and for the safety of both the operator and the equipment, these parts MUST be kept under cover in inclement weather conditions.



OPERATION

WARMING-UP

Switch on power to the base unit. The 'Power On' light will illuminate.

There is a warm-up time of 5 to 15 minutes dependent on the outside temperature. During this time the Smokemeter will not function.

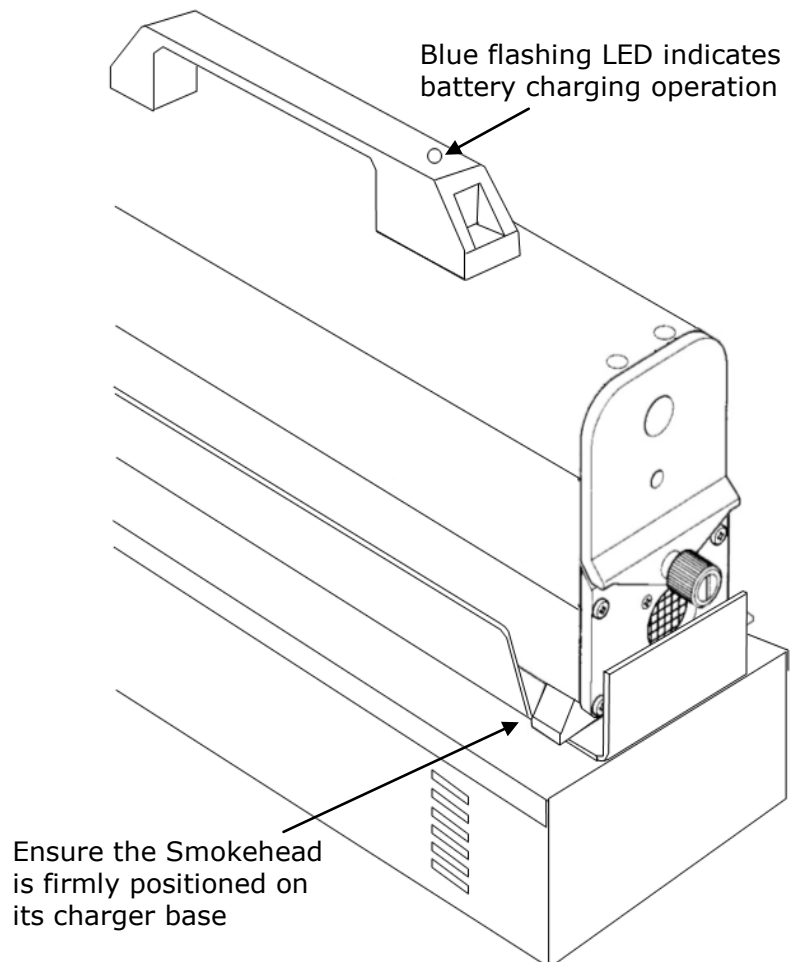
NOTE: For details of software controlled procedures, refer to the appropriate software manual.

WIRELESS SMOKEHEAD OPERATION (DX260-1BT)

For wireless systems the operation of the equipment is identical to the cabled systems but a wireless Smokehead (DX260-1BT) is utilised.

When the equipment is first switched on the smokehead should be firmly positioned onto its charging base and the unit should be allowed to charge for a minimum of five to six hours (or preferably left overnight) to fully charge the batteries.

The equipment screen will prompt the user to return the smokehead to its charging base between tests. This must be obeyed in order to proceed further. Failure to return the smokehead to its base will result in a depletion of the battery charge. The test will not continue until the smokehead has been returned.



BATTERY CHARGING – Care, Modes & Endurance:

The DX260-1BT wireless Smokehead contains a Multi-Cell Rechargeable Battery designed to give a maximum of 1.5 hours endurance from a full charge.

The Smokehead must always be replaced on the charging cradle in between tests.

To recharge, the Smokehead must be returned to and correctly located on its charging cradle. This will maximise the battery endurance and is also necessary for test results to be printed. On the handle of the Smokehead is a highly visible Blue Light emitting Diode (LED). This LED gives indication of the status of the Smokehead whether or not it is on its charging Cradle.

The nominal endurance of the internal Battery pack is 1.5 hours continuous use from a full charge and cold start. This will vary according to ambient temperature. For optimum use and battery life, the smokehead should be removed from the charging cradle for the minimum amount of time and returned to the charger immediately after testing or as prompted by the smoke test Software.

The rate of charging is dependant on a combination of Battery Voltage and Battery Temperature. If the Smokehead has seen reasonable use the charger will switch to 'Fast Charge', taking approximately 1.5 hours to fully recharge. Once full terminal Voltage has been reached, the battery charging rate is reduced to 'Trickle Charge'. When charging for a protracted period, for example overnight, a trickle charge of 15 hours will completely recharge the internal battery. A blue LED on the Handle indicates the Charging Status.

It is strongly advised that the Charger Cradle be left permanently switched ON with the Smokehead in situ overnight to ensure full operational usage at beginning of the working day.

It is also strongly recommended that the batteries be completely discharged on a monthly basis by setting the program to Live Readings with the smokehead off the charger. This could be done at the end of the working day.

Please note that rechargeable batteries have a finite lifespan, therefore the battery pack will need to be replaced periodically if the smokehead is no longer sustaining sufficient charge for correct operation. Please contact a Product Support for battery replacement information.

LED Indication

1. Smokehead removed from Charging Cradle:

LED 'On' continuously: Smokehead is running on internal Battery.

LED pulsing 'ON' for 2 seconds, 'OFF' for 0.5 seconds: Smokehead battery has reached a Low Voltage condition, and has less than 10 minutes life left before Auto-shutdown.

LED 'OFF': Low Voltage condition. Smokehead will Auto Shut down. No more testing possible until Smokehead battery has been recharged.

If the Smokehead has received no Communication from Host Computer for over 6 minutes it will go into 'Sleep' Mode. Return the Smokehead to the Charging Unit to invoke a response.

If the Smokehead is taken outside its maximum operating range of about 100 metres, and wireless communication is no longer possible, after 6 minutes the Smokehead will go into 'Sleep' mode.

To recover from 'Sleep' mode, the Smokehead should be put back in its Charging Cradle, and the LED function observed.

2. Smokehead returned to Charging Cradle:

FAST CHARGE (2.5 flashes per second):

The Smokehead is in 'Fast Charge' Mode. The battery should fully charge within 1.5 hours.

TOP-UP CHARGE (1 flash per second):

The Fast Charge cycle has completed and the battery is being brought to full charge.

SLOW CHARGE (1 flash every 2 seconds):

The Smokehead battery is in 'Slow Charge' mode, the charging rate determined by either Terminal Voltage or, Battery Cell temperature.

TRICKLE CHARGE (1 flash every 3 seconds):

LED Flashing ON/OFF shows the Smokehead battery is in 'Trickle-Charge' mode indicating that the batteries are fully charged.

Fault Diagnosis:

FAST FLICKER (8 flashes per second or more):

The smokehead has detected poor charging contacts. Clean the contacts on both the cradle and the smokehead feet and replace on charger.

LED NOT ILLUMINATED:

Return the Smokehead to Charging Cradle. LED should display according to Charging level required.

LED NOT ILLUMINATED WHEN SMOKEHEAD IS ON CHARGING CRADLE:

Check that the Smokehead is correctly seated on the charging Cradle. The Smokehead has twin connectors on each insulated foot, and may be connected either way round.

Check the Charging Cradle is connected to the 240 V AC Mains.

Check that the sprung connectors that transmit the Charging Current on the Charging Cradle are clean and not stuck in a depressed condition.

Check that the Charging Connectors on the insulated mounts on underside of the Smokehead are clean and free of dirt and obstructions.

To check the charging Voltage at the Charging Cradle: Connect a Digital Multimeter set to measure up to 30V DC to the two charging Connectors on the charging Cradle, and depress the Central Charging Switch. A Voltage of 28 V to 30 V DC should register on the Multimeter Display.

The internal battery pack has a finite lifespan and will need to be replaced periodically. This should be carried out by a qualified Service Engineer.

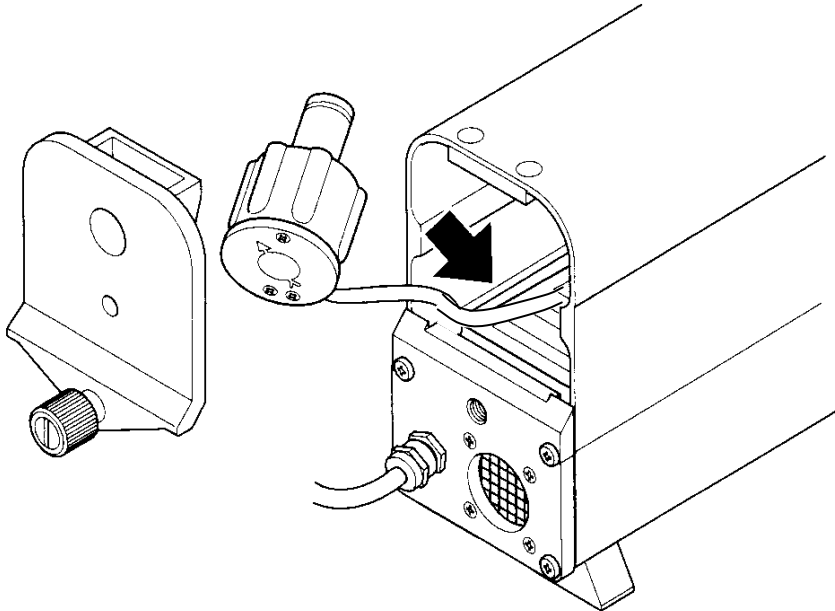
There are no user serviceable parts in the Smokehead.

MAINTENANCE OF THE SMOKEHEAD

Serial numbers

Serial number locations are as follows:

- Smokehead internal - Underneath the lens housing (remove end cap for access).
- Smokehead external – on underside of Smokehead.



Checking the Smokehead serial number

CLEANING SAMPLING PIPES

Under normal circumstances the sampling head does not require cleaning. If a sampling pipe becomes restricted with deposits, the test results can be affected.

To clean a sampling pipe, remove the sample probe from the smokehead. Blow through the sample pipe only, using compressed air. **DO NOT BLOW THROUGH THE SMOKEHEAD.**

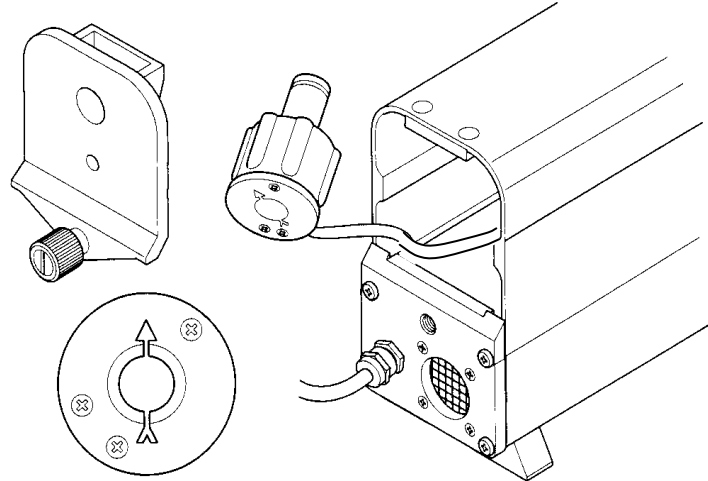


WARNING: Wear eye protection and provide a suitable container to catch the soot that will be blown out from Sample Pipe. **DO NOT** use compressed air on the Smokehead body.

LENS CLEANING

Two lenses are fitted in the smokehead, one at either end.

The Smokemeter checks the cleanliness of the lenses at the start of each test, and the PC will provide a warning when cleaning is required.



Note orientation of lens housing
(arrow up)

Accessing a lens

The cleaning procedure is as follows.

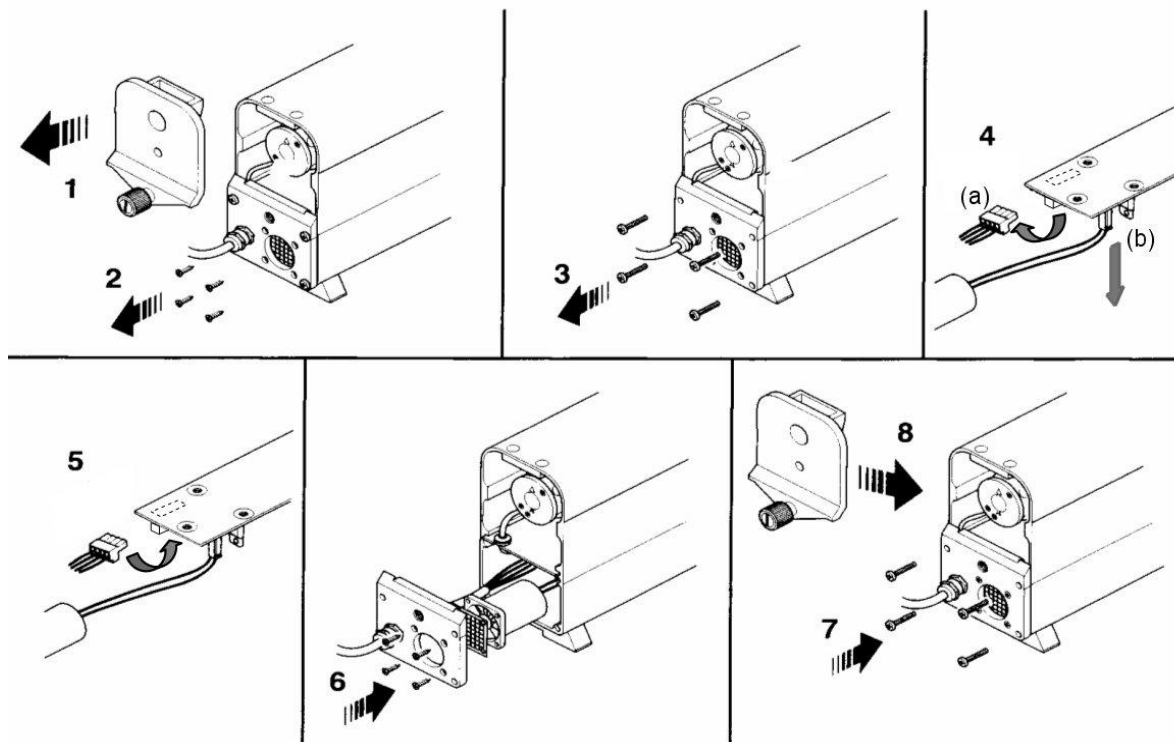
1. If fitted, remove the sampling pipe.
2. Unscrew the knurled knob at the sampling pipe end of the sampling head and remove the end cap.
3. Carefully pull out the lens housing and wipe the lens with a soft cloth (if required, a little methylated spirit will assist cleaning).
4. Refit the lens housing with the arrow pointing upwards (a little silicon grease on the 'O' ring will assist fitment – but do not get on lens!).
5. Refit the end cap and tighten the knurled knob.

NOTE: Ensure the end cap locates fully against the body of the sampling head before tightening the knob. If not correctly located, the lens housing is probably not fully home.

6. Clean the lens at the other end of the smokehead in the same way.

NOTE: The end cap for the sampling pipe must be fitted at the end away from the sampling head cable.

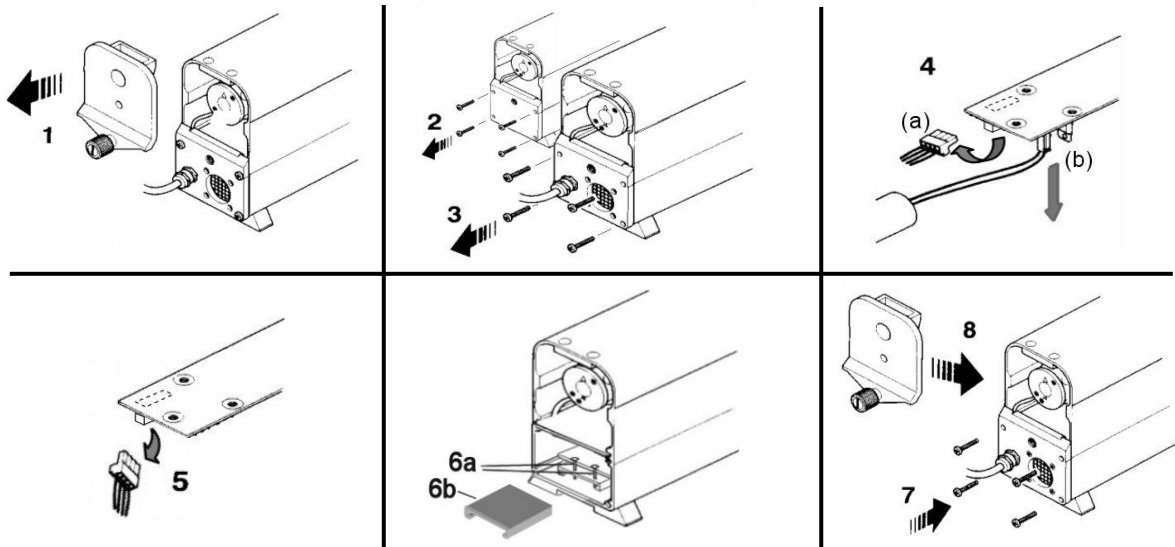
SMOKEHEAD CABLE AND FAN RENEWAL



Should the cable become damaged and require renewal, the procedure is as follows.

1. Unscrew the knurled knob (1) and remove the end cap.
2. Remove the four countersunk screws (2) which secure the internal fan and grille to the smokehead end plate.
3. Remove the four panhead screws (3) securing the end plate and carefully ease the plate clear of the housing.
4. Disconnect the 4-pin multiplug (4a). If carrying out a fan replacement disconnect the 2-pin plug (4b) and replace the fan. Carefully fit the fan and fan grille to the end plate (4 countersunk screws).
5. Remove the 4 wires from the 4-way plug. Undo the metal cable clamp from the end plate. Loosen the cable gland strain relief and remove the cable from the end plate.
6. Re-fit the new cable through the cable gland strain relief and secure to the end plate with the metal clamp (Important: secure the clamp on the earth braid of the cable). Re-fit the 4-way plug. Ensure the cable gland strain relief is tightened.
7. Connect the 4-pin multiplug (4a) and the 2-pin plug (4b).
8. Locate the end plate to the smokehead (cable on left hand side) and loosely secure with the four panhead screws.
9. Check that the lens housing is fully in, then fit the end cap and secure with the knurled knob. Fully tighten the knurled knob then slacken half a turn.
10. Push the end plate upwards as far as it will go, and then fully tighten the 4 panhead screws.
11. Fully tighten the knurled knob on the end cap.

SMOKEHEAD BATTERY REPLACEMENT (DX260-1BT ONLY)



Should the battery pack require renewal, the procedure is as follows.

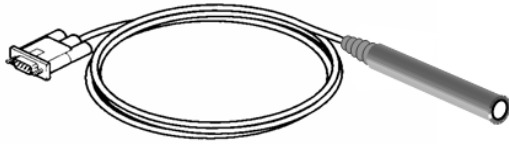
1. Unscrew the knurled knob (1) and open up both end caps.
2. Remove the four panhead screws (2) & (3) securing the end plates and carefully ease the plates clear of the housing.
3. At the fan end, disconnect the 2-pin plug (4a) and also the 2-pin plug (4b) connected to the fan.
4. At the probe end, disconnect the 3-pin plug (5).
5. Depending on which version - loosen the two screws (6a) or the plastic spacer (6b) securing the battery pack and remove old battery pack, do not remove by pulling the cables. Ensure the connectors do not foul any components during removal/replacement of the board.
6. Replace with new battery pack (note orientation). Discard the two securing screws (earlier versions) or the plastic spacer (later versions)– no longer required.
7. Re-connect the 2-pin plug (4a), the 2-pin plug (4b). and the 3-pin plug (5).
8. Relocate the end plates to the smokehead and loosely secure with 4 panhead screws (7).
9. Check that the lens housing is fully in, then fit the end caps and secure with the knurled knob. Fully tighten the knurled knob then slacken half a turn (8).
10. Push the end plate upwards as far as it will go, and then fully tighten the 4 panhead screws.
11. Fully tighten the knurled knob on the end caps.

NOTE: Ensure the battery is disposed of in accordance with current rules and regulations applicable and enforced in your area. When the equipment is first switched on the Smokehead should be firmly positioned onto its charging base and the unit should be allowed to charge for a minimum of five to six hours (or preferably left overnight) to fully charge the batteries.

OIL TEMPERATURE PROBES

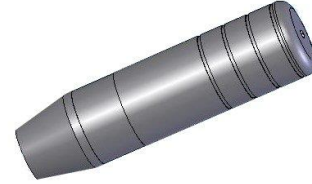
ADAPTERS

The DX211-11 and DX211-11BT Temperature Probe Adapters are used in conjunction with the DX210-25A or DX210-26 oil probes for engine temperature measurements. The DX211-11 is hard-wired to the smokemeter; the DX211-11BT communicates via wireless technology.



DX211-11

Cabled Temperature Probe Adapter



DX211-11BT

Wireless Temperature Probe Adapter

Connection to the Smokemeter

The DX211-11 utilises an RS232 communications cable for connection to the Smokemeter. The unit connects to the smokemeter via a serial port. When not in use the flexible probe should be stored in a protective holster

The DX211-11BT is a wireless device that will communicate with a wireless enabled Smokemeter. A charging holster is supplied which should be used to store and charge the unit when not in use. The DX211-11BT batteries will be charging at all times whilst stored in the holster, indicated by the status indication light on the probe adapter glowing red.

Charging option for the DX.211-11BT



In addition to the trolley mounted storage/charger base, the DX.211-11CH product option offers remote wall mounted storage/charging (standard UK 13A power outlet is required)

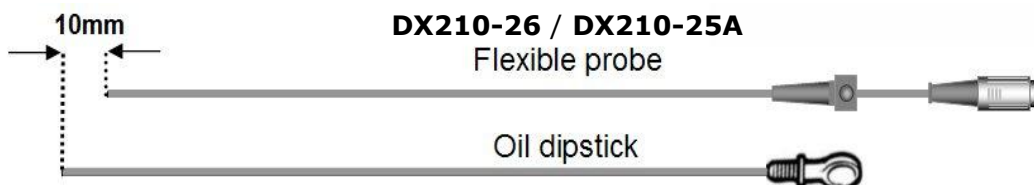
Temperature probes

There are two flexible temperature probes, either of which can be plugged into either adapter. The DX210-26 is a standard 0.75M probe, the DX210-25A is a 2.5M long-reach probe. Connect the flexible oil probe to the socket of the DX211-11 or DX211-11BT. This connector includes a snap-lock feature that ensures a reliable connection between the two devices.

Adjusting oil temperature probe length

Before testing, the probe must be adjusted to the correct length as follows:

Lay it alongside the vehicle dipstick (see illustration) and adjust the position of the depth stop until the effective length of the probe is approximately 10mm shorter than the dipstick.

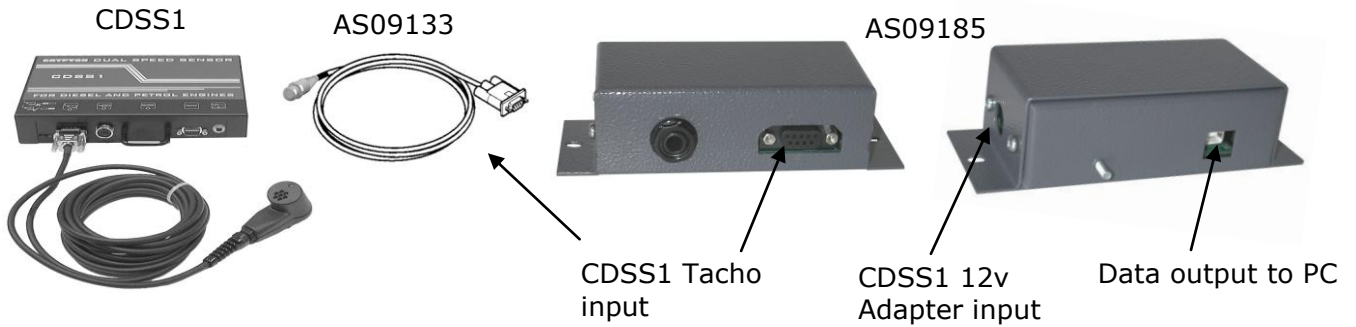


WARNING: ENSURE THAT THE OIL TEMPERATURE PROBE IS SET TO THE CORRECT DIPSTICK LENGTH AND THAT IT IS CLEAN FROM DEBRIS BEFORE INSERTING INTO THE ENGINE. FAILURE TO DO SO MAY RESULT IN SERIOUS DAMAGE TO THE PROBE AND/OR ENGINE.

ENGINE TACHOMETERS

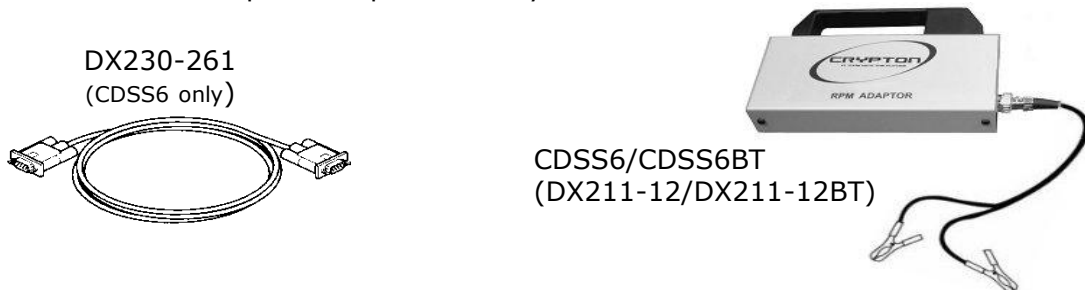
RPM TACHO - Acoustic CDSS1

The CDSS1 RPM Adapter is connected to the Tacho input port of the AS09185 Tacho Adapter. The CDSS1 can derive its power via AS09133 data lead.



RPM TACHO - Battery CDSS6 (DX211-12)

The CDSS6 RPM Tacho provides a signal via an RS232 comms lead DX230-261. The comms lead is connected directly to the host equipment. The CDSS6 derives its power from the vehicle battery. There is no oil temperature probe facility with this device.



RPM TACHO - Battery Wireless CDSS6BT (DX211-12BT)

The CDSS6BT RPM Tacho is identical to the CDSS6 except that it provides a signal to the host PC via a wireless connection. It will only work with wireless enabled equipment and does not use the DX230-261 comms lead. The CDSS6BT derives its power from the vehicle battery. There is no oil temperature probe facility with this device.

USING THE ENGINE TACHOMETERS

Ensure the vehicle engine is switched off before connecting engine speed adapters to the vehicle. The following types of engine speed adapter are available:

ACOUSTIC TACHOMETER CDSS1

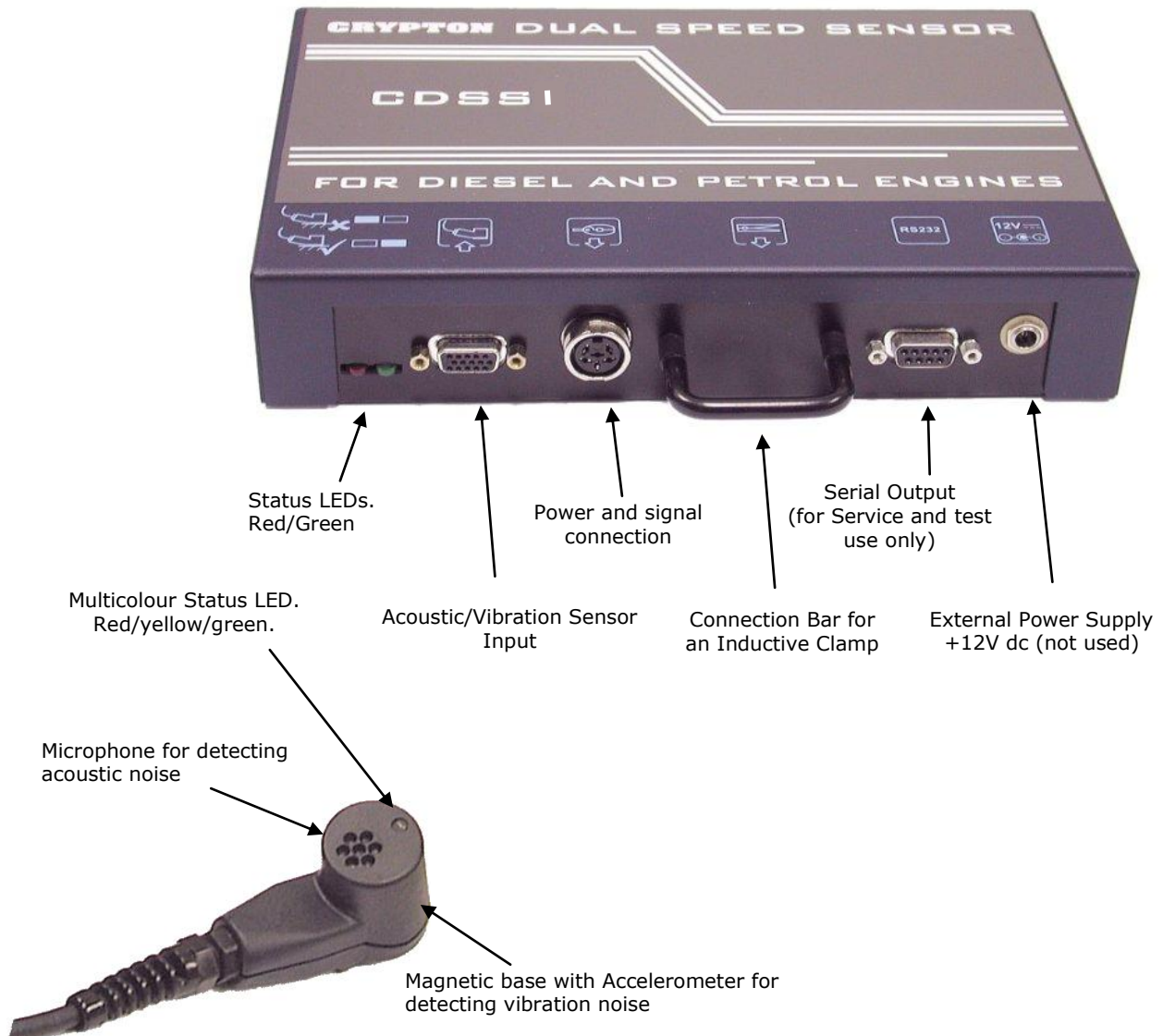
Acoustic sensor type for Petrol and Diesel engines

This adapter measures the noise and vibration of an engine, and converts this information to engine speed.

Note: The CDSS1 connects to the host equipment via a signal interface cable (AS09133). This cable can also carry the power supply for the CDSS1 from the AS09185 Tacho Adapter (the CDSS1 12v external power supply can be connected to either the AS09185 Tacho Adapter or CDSS1).

The engine speed signals produced are equivalent to a conventional ignition system (i.e. one pulse per engine cycle). When defining the ignition system on the host analyser, It is therefore imperative that a conventional system is selected, irrespective of that fitted to the vehicle. Selecting DIS (Distributor-less Ignition System) for example will result in the readings being divided by 2.

Connections



Suggested mounting Positions for the sensor (CDSS1)

The sensor has a powerful magnetic base and should therefore be attached to an iron or steel part of the engine, such as a bolt or lifting bracket. Always ensure that the Sensor is attached to the Engine itself and not to a part of the vehicle where the vibrations may be cushioned by the engine mountings e.g. wing or bulkhead.

Examples of good mounting positions are: Lifting brackets, Cylinder head bolts (where they are accessible), Oil drain plug etc.



CDSS1 Operation

Prior to starting the vehicle attach the magnetic sensor to a part of the engine. The LED on the sensor should be RED

1. Switch engine OFF.



Attach Sensor to a suitable point as described in 'Suggested mounting positions'. The Status LED should be red.

2. Start Engine and allow to idle.



After approx 3 – 10 seconds the status LED will change to Yellow.

3. Rev Engine to high speed (2000 – 6000 rpm) and hold.
Note: In the case of a Diesel this may be 70 – 90% of Governor.



Hold Engine speed until yellow status LED changes to Green. This should take a maximum of 5 seconds. If the status LED does not change, try another mounting position.

BATTERY TACHO CDSS6, CDSS6BT (DX211-12, DX211-12BT)

Battery sensing type for Petrol and Diesel Engines

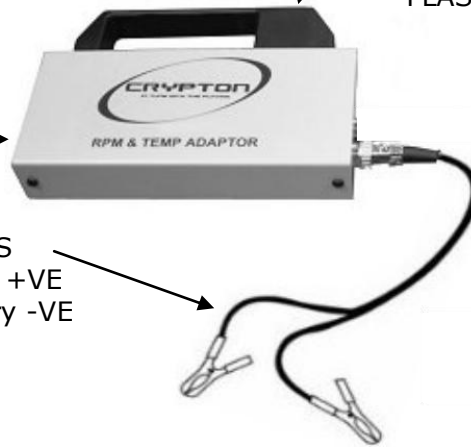
This adapter measures the frequency modulation ripple of the alternator across the battery terminals, and converts this information into engine speed signal. CDSS6BT and DX211-12BT are wireless variants

Connections

SIGNAL OUTPUT
via comms lead DX230-261
(Not CDSS6BT)

BATTERY CLIPS
Red to battery +VE
Black to battery -VE

STATUS LED
ON: Power/Initialising
FLASH: Measurement in progress



CDSS6/CDSS6BT RPM Operation

Ensure the CDSS6 is connected to the host PC via the DX230-261 Comms lead (Not required on CDSS6BT).

Before starting the vehicle, attach the crocodile clips on CDSS6 power/sensing cable to battery terminals, ensuring that the polarity is correct.

Start engine, switch on vehicle lights and allow to idle.

The unit will search for a steady speed each time it is powered up, if the engine speed falls or the engine type is changed. This is the initialisation period and may last up to 17 seconds. During this time, the status LED will flash slowly and the rpm will read zero.

Once the speed has been detected, readings will appear on the host analyser. The CDSS6 updates 10 readings per second.

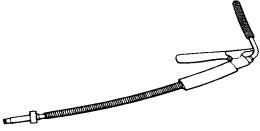

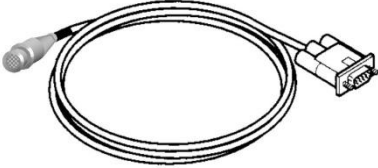


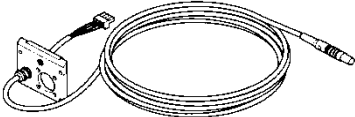
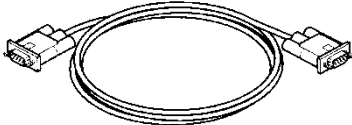
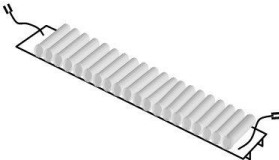
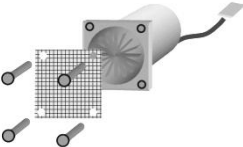

Note: Please note that on a small number of vehicles the readings may be unstable, inaccurate or unreadable. To minimise the risk of this:-


Load the battery as much as possible by doing the following:
Switch on the vehicle headlights/Main beam/Fog/Spots,
Switch on the heated rear window,
However - Switch **off** the cabin fan as this can introduce interference.

Keep the engine speed stable during the initialisation time <17Sec.

If, after initialisation the speed is stable but reading incorrectly, change the cylinder setting on the 'Tacho Set-up' screen until the correct value appears.

CONSUMABLES

	<p>DX210-4A Sampling pipe (Standard) DX210-4A-EX Sampling pipe (Std + 300mm, optional extra) DX210-4A-L Sampling pipe (Large) For large aperture exhausts (>70mm)</p>
	<p>Battery Tacho Power/Sensing cable</p> <p>CABL3016 CDSS6 to vehicle battery</p>
	<p>Tacho Comms Cable</p> <p>AS09133 5m Standard (for CDSS1) DX230-261 2m Standard (for CDSS6)</p>
	<p>Battery Tacho Power/Sensing Cable</p> <p>CABL3023 CDSS6 to vehicle accessory socket</p>
	<p>Sampling Pipe (Special) (For use with Zero Emissions Box only)</p> <p>SP12 – For RAM-1 (Cars) SP13 – For RAM-2 (HGV)</p>
	<p>Cable – Smokehead Cable Assembly</p> <p>DAS00497 10m Standard DAS00556 20m (Optional) DAS00559 0.6m (Use with AS09188 Interface Module)</p>
	<p>Cable – Serial comms cable from PC to VOSA Smartcard reader (UK only).</p> <p>AS08804 (Note: May already be fitted if host PC has EGA)</p>
	<p>DX260-1BT/01 Battery Pack (For use with DX260-1BT Head only)</p>
	<p>DX230-130/16 Fan Kit (Replacement fan for DX260-1 & DX260-1BT)</p>
	<p>Oil Temperature Probes</p> <p>DX210-25A 2.5m (Use with DX211-11 or DX211-11BT) DX210-26 0.75m (Use with DX211-11 or DX211-11BT)</p>

	<p>Temperature Probe Adapters (use with DX210-25A and DX210-26 probes)</p> <p>DX211-11 – 5m cabled Adapter DX211-11BT – Wireless Probe Adapter</p>

TECHNICAL SPECIFICATION

A. SMOKE SAMPLING HEAD

Sampling type	Partial flow.
Light source	Green LED, wave length 560 nm.
Light intensity	8-step autorange for optimum light level
Effective optical path length	250 mm.
Physical response time	Less than 0.4 seconds (varies with gas velocity).
Range	0 - 100% opacity, 0 - 10.00 m ⁻¹ .
Accuracy	1.0% full scale (static).
Measuring cell temperature	70°C min.
Warm-up time	10 minutes approx. at - 15°C ambient
Operating conditions	-15° to +40°C. 10-90% relative humidity (non condensing).
Wireless Range (DX260-1BT only)	Class 1 wireless Module provides up to 100 metres range (maximum range outdoors – line of sight).
Smoke temperature	Checked at the inlet to the measuring cell.
Smoke pressure	Controlled at ambient ± 3.75 mbar.
Sampling pipes	Flexible stainless steel, internal diameter 10 mm, lengths 875 mm (standard) 1175 (std EX option) 1,255 mm (under-chassis and vertical exhausts). Specials available for use with Zero Emissions Boxes.
Lens cleaning	Wipe with soft cloth every 250 vehicle tests approx.
Calibration	Automatic electronic calibration (patented). Manual calibration (using neutral density filters).
Security	Sampling head serial number and software version held in permanent memory.
Fault diagnosis	Condition monitoring for - Dirty lenses, calibration failure, incorrect measuring cell temp.- Excessive smoke temp. etc.
Power	24V DC, 60W (DX260-1 only) - via Interface Box Internal battery (DX260-1BT only) - requires 30V 240W Charging Base
Housing	Aluminium extrusion with aluminium die cast end caps.
Protection	IP22.
Dimensions	450 x 200 x 80 mm.
Weight	3.2 Kg. (DX260-1) 3.9 Kg. (DX260-1BT)

B. CONNECTING CABLE - SAMPLING HEAD TO POWER SUPPLY (DX260-1 only)

Construction	4-core screened.
Sheath	Polyurethane (for low temperature operation).
Length	10m (standard), 20m max. (optional).

C. POWER SUPPLY - Interface Box (for DX260-1)/Charger Base (for DX260-1BT)

Power	100–250V AC, 50-60Hz, 3.2A (Interface Box - DX260-1) 100-260v AC, 50-60Hz, 8.0A . (Charger base - DX260-1BT)
Operating conditions	0 to + 40°C. 10-90% relative humidity (non condensing).
Input (Interface Box - DX260-1)	Smoke sampling head.
Output (Interface Box - DX260-1)	RS232, 9-way 'D' (opacity, smoke temp.) 9,600 BAUD
Security	Interface unit serial number and software version held in permanent memory.
Protection	IP20.

D. OIL TEMPERATURE PROBE ADAPTER

Measurement range	7°C – 116°C
Accuracy	±5°C below 45°C ±1°C above 45°C
Response	<1 Second
Handle Dimensions	22mm Ø x 170mm Length (DX211-11 - cabled) 35mm Ø x 130mm Length (DX211-11BT - wireless)
Cable Length (cabled only)	5 Metres
Wireless Range (Wireless only)	Class 1 wireless Module provides up to 100 metres range (maximum range outdoors – line of sight).

E. TACHOMETERS**Battery Tachometers**

Measurement range	400-9999 rpm
Accuracy	± 20 rpm below 2000 rpm ± 2% above 2000 rpm
Response	< 1 second
Initialisation	≤ 17 seconds
Power requirements	9-15V dc, < 0.5A (reverse protected)
Operating temperature	0 to +45°C
Humidity	< 90% non-condensing
Cable (Cabled version only)	5 metres comms lead.
Wireless range (Wireless only)	Class 1 wireless Module provides up to 100 metres range (max range – line of sight).
Dimensions	230mm x 100mm x 40mm
Weight	790g

Vibration Tachometer

Measurement range	400-6000 rpm
Accuracy	± 10 rpm within range 400-6000 rpm
Response	< 1 second
Initialisation	≤ 15 seconds
Power requirements	9-15V dc, < 0.35A
Operating temperature	0 to +50°C
Humidity	< 90% non-condensing
Cable	5 metres to sensor
Dimensions	227mm x 184mm x 48mm
Weight	1.18Kg

AFTER SALES SERVICE

Apart from the routine maintenance and adjustments stipulated in this manual the equipment must not be tampered with in any way. All further servicing must be carried out only by an engineer from our Authorised Agents. Failure to observe these conditions will invalidate the Guarantee.

UK Customers

If you require a Service Engineer to attend ON SITE within the UK, for any of the following reasons:

- An equipment fault,
- For machine calibration,
- You need spare parts,
- Equipment covered by this manual requires returning for factory overhaul.

Please contact our Product Support Helpline at the following number:

Tel: 0844 665 7610

Fax: 0844 665 7604

e-mail: support@cryptontechnology.com

Crypton can provide information and contracts covering the following: Car Data; Fault Code Information; Diagnostic Information; Software Support Contracts; Software Updates & Accessories.

Overseas Customers

Service and spare parts cover outside the UK is provided by the agent from whom your equipment was purchased.

Disposal of equipment

- Do not dispose of this equipment as miscellaneous solid municipal waste but arrange to have it collected separately.
- The re-use or correct recycling of electronic equipment (EEE) is important in order to protect the environment and the wellbeing of humans.
- In accordance with European Directive WEEE 2002/96/EC, special collection points are available for the delivery of waste electrical and electronic equipment.
- The public administration and producers of electrical and electronic equipment are involved in facilitating the processes of the re-use and recovery of waste electrical and electronic equipment through the organisation of collection activities and the use of appropriate planning arrangements.
- Unauthorised disposal of waste electrical and electronic equipment is punishable by law with appropriate penalties.



Disposal of batteries

- Batteries must be recycled or disposed of properly.
- Do not throw batteries away as part of normal refuse disposal.
- Do not throw batteries into open flame.

