

CableSniffer[™] Operating Manual



Model No: CS2, CS-DE, CS-SB Document Version: V03.02.00

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Version History

Date	Version	Notes
February 2016	2015/L/01/2	Minor update to sections, added safety information for Drill Extension Bar
January 2018	2015/L/01/3	New Charger Details
August 2023	2015-MANUL-S001-V03.01.00	T12975 / T13208
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Safety Precautions and procedures



CableSniffer instrumentation is only to be used by competent responsible persons with the permission from authorized DNO & local authorities as applicable.



Working areas to be clearly highlighted and sectioned off as applicable to the general public. Equipment to always remain within this area.



Distribution cables and other services must be positively and accurately located before a hole is made with the searcher or drill extension bar. To reduce the risk of network infrastructure penetration the sample hole must always be shallower than the standard burial depth for the country of operation.



Extra care required for transportation, storage and use of CableSniffer & peripherals. Ensure all locking mechanisms are active when not in use. Always put tools away when not in use.



Where cable depths and pavement construction is uncertain, operators are recommended to perform a risk assessment before providing advice to staff on the maximum sample hole depth.



CableSniffer instrumentation is designed for detection & location of fault gases within electrical cabling and distribution networks, it is not designed to detect domestic gas leaks or sewer gases.



Equipment referenced in this document has supporting safety critical information, failure to adhere to this information can cause damage and/or destruction to major utilities supply and/or infrastructure, personal injury and/or even death.



PPE listed (page iii) is to be used for identified tasks throughout the manual. Failure to comply can result in injury, long term sickness and/or even death.



Drilling/piling carried out by the CableSniffer peripherals must be done in accordance with manual instructions and follow its hazard warnings.



CableSniffer outdoor work inc. drilling, piling, sampling, are not to be carried out in adverse weather conditions. Inc. Rain, lightening, temperatures <0°C.



CableSniffer maintenance of equipment inc. Charging, Inspections, Calibrations are to be carried out by authorized personnel or EA authorized approved facility only.



Equipment is designed for outdoor use only (Except for maintenance). **DO NOT** use in ATEX environments.



Alkaline (Primary) & NiMH (Secondary) batteries can be used to operate the CableSniffer. Ensure only secondary cells are installed when using the device charger. Never attempt to charge primary cells.



Do not expose equipment to overload / overheating in or around a sampling area. **NEVER** use naked flames or sparking equipment.

Personal Protective Equipment (PPE)

#	Item	Comments	Manual identification
1	Safety goggles/glasses	Drilling, piling and sampling	9
2	Overalls	All tasks	Ä
3	Steel toe cap boots	All tasks	<u> </u>
4	Gloves	Drilling and piling	
5	Ear defenders/plugs	Drilling and piling	②

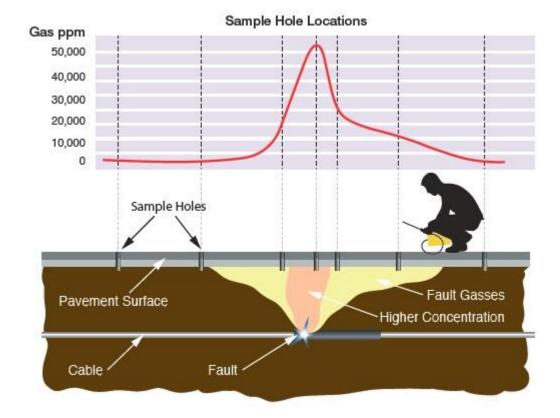
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1. General Description

Following extensive research, EA Technology identified the gases that were produced by faults in all known cable types and cable joints. Of the large number of different gases produced, many were common to all of the cable types.

The CableSniffer TM locates faults in underground LV cables. Instead of relying on exploratory excavations, it senses the gases given off when cable insulation starts to break down.



2. Operating Instructions

2.1 Charging the CableSniffer

Using (Primary) non-rechargeable batteries could damage the CableSniffer™

Currently only one battery charger is offered with the CableSniffer TM system: CS-BC (ordered directly from EA Technology).

It is to be noted that the following 2x legacy (obsolete) battery chargers can also continue to be used:

2019-0001 NiMH 4Cell charger (100 - 240V \sim 50 - 60 Hz) Vehicle Systems 10 \rightarrow 16Vdc

ACS 410 trav. Mobi (l100 – 240V \sim 50 – 60 Hz) Vehicle Systems 10 \rightarrow 16 & 24 \rightarrow 32Vdc

- 1. Turn off the CableSniffer.
- 2. Connect the battery charger to the CableSniffer charger socket.
- 3. Plug the battery charger into the mains supply or use the adaptor to plug into a vehicle power outlet.
- 4. Unplug the battery charger before using the CableSniffer.

A full charge can take up to 16 hours.

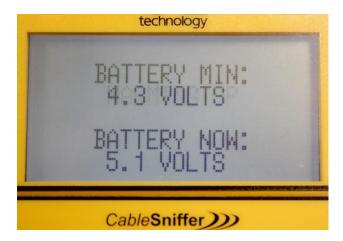
When the charger has been plugged into the CableSniffer with either the mains supply or a vehicle supply, the GREEN LED will start to FLASH to indicate the charging has started. When the CableSniffer batteries are fully charged the GREEN LED will become CONTINUOUS. The charger can be left in this state indefinitely and will not over charge the batteries.

To use the charger from a vehicle system 12VDC or 24VDC (ACS410 model only) the supplied adaptor needs to be plugged into the vehicle power outlet socket and into the socket on top of the charger. **ENSURE** that the charger is **NOT** also plugged into a mains network during this process.

Check the battery voltage periodically. Recharge the batteries before the voltage drops below 4.5V.

2.2 Displaying the Battery Voltage

- 1. From the normal screen, press the DISPLAY/ADJUST/NO button to enter display mode.
- 2. Press the DISPLAY/ADJUST/NO button until the Battery Voltage screen displays.
- 3. The screen displays for 20 seconds before returning to the normal screen.



2.2.1 Low Battery Alarm

When the battery charge drops to near the lower limit, the CableSniffer displays BATT along the left side of the display from top to bottom.

2.2.2 Dead Battery Alarm

When the battery charge drops below an acceptable level, the gas reading is replaced by **RECHARGE INSTRUMENT BATTERIES** and the Alarm LEDs flash in a double flashing pattern. Switch the CableSniffer off and put it on charge.

2.3 Control Panel



Control Button	Function(s)
POWER/ENTER/RESET	Turns the CableSniffer on and off and silences and resets the audible alarm.
DISPLAY/ADJUST/NO	Activates display modes.
AIR/▲/YES	Activates the demand-zero function (automatically resets the CableSniffer in fresh air conditions).
RANGE/▼/SHIFT	Not used in detection mode.
Alarm LEDs	Indicate Gas, low battery and failure alarms.

2.4 Assembly

Connect the hose to the quick connect inlet fitting.



Connect the Inline Filter Assembly to the hose.



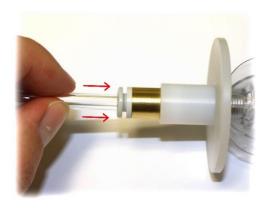
For use with the Drill System, ensure the Sensor Straw Adapter is installed in the threaded hole on the end of the Inline Filter Assembly.



Searcher Bar & drill extension System produces a larger diameter sample hole and requires an additional Top Hat Adaptor fitted to the Inline Filter Assembly in place of the Sensor Straw Adapter. The Top Hat Adaptor creates a seal and prevents air from being drawn into the Sensor Straw.

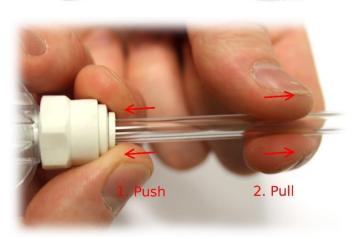


Connect the clear end of the Sensor Straw to the Sensor Straw Adapter or Top Hat Adaptor (push fit).

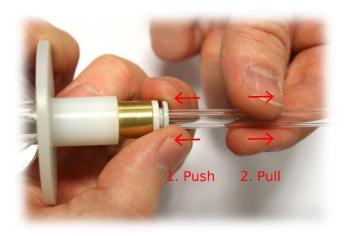




To remove the Sensor Straw from the Sensor Straw Adapter after use, press on the small white ring which surrounds the straw whilst pulling it straight out of the Adapter.



The Top Hat Adaptor is fitted with a release ring, which, when pressed in using a thumb nail, allows the Sensor Straw to be easily removed.



2.4.1 How to Turn On the CableSniffer

Press and hold the POWER/ENTER/RESET button for 2 seconds



Logo screen.

CableSniffer is warming up.



The Battery Voltage screen displays the minimum operational battery voltage and the current battery voltage. If the battery voltage is too low, the CableSniffer will not continue to operate.



The Calibration Due Date screen will display for a few seconds.



This screen will display if the calibration due date has passed. The CableSniffer will sound a double pulsing tone and the LEDs will flash.



The Date and Time Screen will display for a few seconds.



The serial number screen will display for a few seconds.



Finally the normal operation screen is displayed. The CableSniffer is monitoring for fault gases and the concentration is displayed on the screen.

2.4.2 How to Turn Off the CableSniffer

Press and hold down the POWER/ENTER/RESET button. The LCD backlight will turn on and the buzzer will pulse for a few seconds while the display indicates TURN OFF. Release the button when GOODBYE appears on the display. The CableSniffer has been turned off when GOODBYE disappears, and the backlight is off.

2.5 Performing Demand Zero

New units may register a few hundred ppm; this is due to volatiles in the new tubing, and this will reduce after several minutes of operation. It is prudent to perform the Demand Zero procedure before use. Take it to a known "fresh air" environment, and then perform the Demand Zero procedure as follows.



technology

Press and hold down the AIR/ \blacktriangle /YES button.

The display will indicate that the CableSniffer is making an adjustment. Continue to hold the AIR Button.



Continue to hold the AIR button until the display prompts you to release the AIR/ \(\Lambda /YES \) button.



The CableSniffer will set the fresh air reading. When the Demand Zero is complete, the normal operation screen will return.

If 0 PPM has not been achieved, repeat the Demand Zero procedure again. If 0 PPM cannot be achieved after several attempts, the sensors have been contaminated and the CableSniffer will require repair.

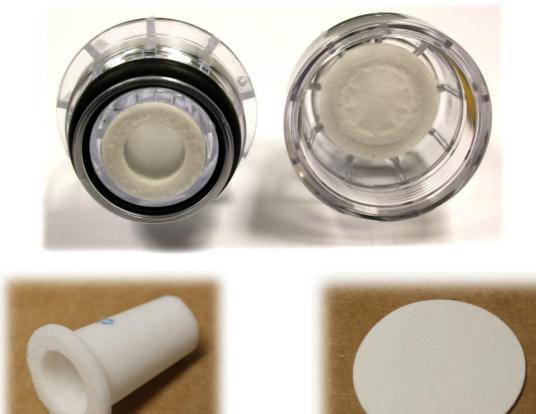
2.6 Inline Filter Assembly

The filter paper and particle filter located in the Inline Filter Assembly are extremely important to the reliable functioning of the CableSniffer as they not only keep dust out of the electronic sensors, but also water. It is recommended that the filter paper and particle filter are cleaned regularly during use, particularly when using drill Systems, as this can produce large quantities of dust.

When exposed to water the Filter Paper immediately swells and blocks the air path causing the Low Flow Alarm to operate on the CableSniffer. This stops water getting into the instrument which would result in expensive damage. When the filter paper is wet it can either be dried out (if a suitable heat source is available), or replaced with a new one.

2.6.1 Filter Assembly Components

Inside dismantled Inline Filter Assembly: Particle Filter on left, Filter Paper on right.



Particle Filter



Filter Paper

2.6.2 Changing the Filter Paper and Particle Filter

Access to the Filter Paper and Particle Filter is gained by unscrewing the Inline Filter Assembly body. Replace the Particle Filter and place a new Filter Paper on top of the Particle Filter. Screw the other half of the Inline Filter Assembly on top. Ensure that the two black rubber '0' rings remain in place to prevent dust and water bypassing the filters and causing damage to the instrument.

Making a Sample Hole and Taking a Sample 3.











3.1 **Drill System**

The Drill System uses a 24 volt battery drill (not supplied) fitted with an SDS chuck, Drill Extension Bar and drill bit to drill an 8mm x 200mm (8 inches) deep (Max) hole.



WARNING: The drill extension bar does NOT provide electrical isolation

It is essential that all cables are located and marked prior to using the Drill System, using CAT techniques or similar. If possible the depth of the cables needs to be ascertained before using the Drill System. Use the Drill System approximately 150mm (6 inches) from the centre line of the cable run

Aerosol markers should not be used to mark the cable or test location, as they produce gases that can affect the CableSnifferTM readings or damage the sensors.

It is recommended to use a pulse method when drilling to keep the tips of the drill bits cool during the process. Coolants can be used but must be removed from the holes before sampling can take place.

To avoid damage to the Drill Extension Bar or injury to the user, it is important to follow the guidelines below:

- Only use the Drill Extension Bar to drill in Concrete surfaces. Use a Searcher Bar to create a hole in other surfaces (see 3.2).
- Do not reverse the drill while using the Drill Extension Bar.
- Use 8 X 200mm SDS Drill Bits (Max) only. Spare Drill Bits can be purchased from EA Technology, in 5x pack or as part of the Drill Consumable Kit.

Do not use the Drill Extension Bar to drill holes between paving slabs or in cracks between surfaces.



Connect the Drill Extension Bar to the drill chuck.



Connect the drill bit to the end of the Drill Extension Bar.



Locate the cable and drill a hole 150mm to the side of the cable.

Clear away the surrounding dust and/or liquids, remove the drill and immediately insert the Sensor Straw into the sample hole.



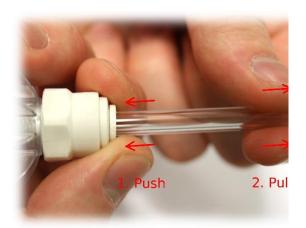
A short delay occurs while the gas is drawn up the Sensor Straw. If the fault gases have reached this location, the CableSniffer will produce a reading.

Repeat this procedure across the target area until the highest reading is obtained, this will indicate the location of the cable fault.



The Sensor Straw should be replaced after every cable fault detection. This will make sure that on 'start up' the CableSniffer will not pick up gas contamination from the previous fault location.

Press the Sensor Straw Adaptor release ring pulling it straight out of the Adapter to remove the Sensor Straw.



It is important to clear the dust away from the sample hole before using the CableSniffer to reduce the amount of dust drawn into the sensor.

Some cable faults produce very small amounts of fault gas, so it is important to insert the Sensor Straw as soon as the drill is removed and not to let the hole vent before a sample is taken.

The gases produced by a cable fault tend to rise through the ground directly over the fault. If samples are taken within 24 hours of the fault occurring, the gas will be concentrated directly over the fault with almost no gas detectable 2 metres away.

Over approximately 3 days the gases will spread out from the fault site and can be detected up to 10 metres away. The concentration of the gases over the fault will have dropped making the location of the fault less obvious. Faults can be located up to 6 weeks later but this will depend on the ground type (heavy soils hold the gases longer) and the integrity of the pavement.

3.1.1 Mastic Hole Repair System

Ensure Mastic is within its use by date.





MSDS is included with order acknowledgement, or on request from Product Support.

Remove the protective cap from the mastic cartridge and break the end seal/plug. This is best achieved with a sharp tap to the end, either from a hammer or on the floor.



Screw in the mixer nozzle.

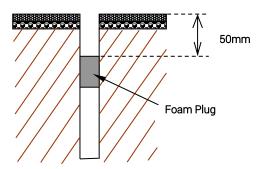
Fit the mastic cartridge to the applicator gun.



Insert a foam plug into the sample hole to the required depth.

Position the nozzle over the sample hole and slowly squeeze the trigger. Fill the sample hole to the surface to form a small dome. Sand or bauxite can be added to produce an anti-skid surface.

The plug and protective cap can be replaced for secondary application at a later date.



3.2 Searcher Bar System

The Searcher Bar method is best suited to asphalt surfaces.

The Searcher Bar is an insulated 'slide' hammer which produces a 16mm x 205mm deep hole. The insulation is rated to 22 kV in accordance with GIS/E8:2006 and each Searcher Bar is marked with a serial number to allow a record of annual insulation checks, required for traceability.

Only 205mm Spike, Non-reversable coupling units provided by EA Technology are to be used. Replacements available directly from EA Technology.

Searcher Bars are to remain in horizontal orientation with the spike retracted, rubber spike cap fitted, and retaining thumb screw locked when not in use, including transit and storage.

It is essential that all cables are located and marked prior to using the Searcher Bar using CAT techniques or similar. If possible, the depth of the cables are to be ascertained by local authorities before using the Searcher Bar. Use the Searcher Bar approximately 150mm (6 inches) from the centre line of the cable run.

Some cable faults produce very small amounts of fault gas, so it is important to insert the Sensor Straw as soon as the drill is removed and not to let the hole vent before a sample is taken.

Remove the rubber protective cap and place the spike end onto the ground 150mm to the side of the cable.

Undo the spike retaining thumb screw.

Raise the handle and force down sharply so the top closure plug (inside the handle) hits the boss head of the spike. The "pile driver" action will drive the spike into the ground. When you reach the depth required, remove the spike by lifting the handle straight up.

Retighten the spike retaining thumb screw and replace the rubber protective cap on the end of the spike when the Searcher Bar is not in use.





Remove the Searcher Bar and immediately insert the Sensor Straw into the sample hole.

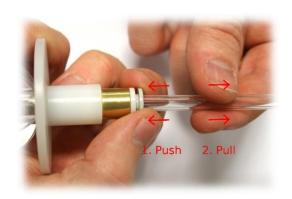
A short delay occurs while the gas is drawn up the Sensor Straw. If the fault gases have reached this location the CableSniffer will produce a reading.

Repeat this procedure across the target area until the highest reading is obtained, indicating the location of the cable fault.



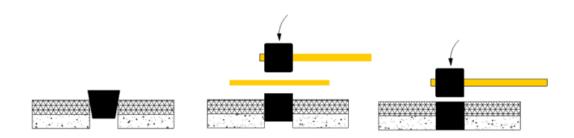
The Sensor Straw should be replaced after every cable fault detection. This will make sure that on 'start up' the CableSniffer will not pick up gas contamination from the previous fault location.

Press the Sensor Straw Adaptor release ring to remove the Sensor Straw.



3.2.1 Tar Plug Hole Repair System

Place the Tar plug into the sample hole and using a flat robust material, hammer flat with no protruding parts. Care is required during the process to avoid personal injury.



4. CableSniffer Alarms

4.1 Low Flow Alarm

If the CableSniffer's sampling system becomes restricted or blocked (e.g. fouled straw, blocked filter, pinched tube) the following screen displays:



When this screen is displayed the buzzer sounds a double pulsing tone, the alarm LEDs flash in a double flashing pattern, and the air pump shuts off automatically to prevent damage.

Clear the blockage and press the POWER/ENTER/RESET button to turn off the alarm and restart the pump. If the low flow condition still exists then the CableSniffer will go into alarm again. If the condition cannot be corrected then the unit will need to be returned to EA Technology for repair.

4.2 Sensor Failure Alarm

The CableSniffer™ constantly monitors itself for correct operation. The CableSniffer alerts with both audible and visual alarms if a malfunction occurs. If the sensor fails, FAIL SENSOR(S) appears at the top of the display and the Alarm LEDs flash in a double flashing pattern.

If this occurs, the CableSniffer will need to be returned to EA Technology for a new sensor to be fitted and calibrated.

Maintenance

Calibration

Calibration interval: 12 months

The calibration due date is displayed on start up. The screen will display if the calibration due date has passed, and the CableSniffer will sound a double pulsing tone and the LEDs will flash.

Cleaning and Storage

The CableSniffer should be cleaned with a damp cloth. If more heavily soiled, a foam cleanser may be used, provided care is taken not to allow fluid to enter the instrument. Abrasive cleaners must not be used. Take care not to scratch the plastic overlay of the front panel.

No attempt should be made to gain access to the internal circuitry of the CableSniffer or its accessories. Advice should be sought from the manufacturer, or the supplier, if any doubt exists over the equipment's performance or operation.

Avoid storage in damp and humid conditions and do not subject it to temperature extremes, excessive vibration or shocks. Do not stand on the case of the CableSniffer.

Waste electrical and electronic equipment directive (WEEE)

EA Technology is a member of an approved compliance scheme as defined by the WEEE directive. When an EA Technology product reaches the end of its operational life, it must be recycled by a licensed waste management operator or returned to EA Technology for recycling.

6. Technical Specification

Physical

Size	241 (L) x 133 (W) x 149 (H) mm	
Weight	1.72 kg	
Enclosure	Weatherproof, Chemical resistant, Anti RFI / EMI coated inc. ergonomically balanced rugged top mounted handle.	
Impact	High impact polycarbonate – PBT Blend.	
Indicators	1x Display	
	1x Buzzer 95 dB (at 30 cm)	
	4x High intensity LEDs	
Controls	4x External glove friendly push buttons:	
	 Power / Enter / Reset Display / Adjust / No Air / ▲ / Yes Range / ▼ / Shift 	
Sampling Method	Long life internal pump (6000 Hrs) drawing samples up to 125 feet. Flow rate approx. 0.9I/min	
Detectable Gases	Hydrocarbons – (Produced from failing cable insulators)	
Toxic Gas Detection	Ammonia, Arsine, Carbon Dioxide, Carbon Monoxide, Chlorine, Hydrogen Cyanide, Hydrogen sulfide, Phosphine, Sulfur Dioxide	
Combustible Ranges	PPM leak, %LEL, % Volume up to125ft	
Response time	30 Seconds to 90% using standard 5ft hose.	
Alarms (Audible & Visual)	Low Flow, Sensor failure, Low/dead battery, Gas detection	

Environmental

Operating Temperature	-20 to 50 °C
Humidity	0 to 95% non-condensing
IP Rating	54
Altitude	Up to 2000m

Power

Internal Batteries	4x 1.2V 4500 mAh NiMH Secondary C Cells
The Har Batteries	17.1.2V 1000 HII WHANNI OCCOMBALLY O OCHO
	(Primary Alkaline cells optional)
Typical Operating Time	Secondary Chargeable Approx. 18 hours
	Primary non-rechargeable Approx. 16 hours
Battery Conservation	Charger has alkaline recognition to prevent battery damage if charging attempted with Alkaline (primary) cells.
Power Source/Battery Charger	CableSniffer Battery Charger (CS-BC)

Compliance

Electromagnetic compatibility	BS EN IEC 61326-1:2021
(EMC)	BS EN IEC 61000-6-2:2019
	BS EN IEC 61000-6-3:2021
	BS EN IEC 61000-6-4: 2019
Environmental (IP)	BS EN IEC 60529:1992 +A2 2013
ROHS	BS EN 68000:2018

Declaration of Conformity

Hereby, EA Technology declares that the equipment described in this document is in compliance with EU Directive 2014/35/EU, UK Statutory Instrument 1989 No. 728, and all other applicable EU Directives and UK Statutory Instruments.

The full text of the EU and UK declarations of conformity are available at the following internet address: www.eatechnology.com/declaration

Claims of compliance made in any document other than the relevant declaration of conformity are for guidance only.

7. Sales and Service

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For details of EA Technology's international offices and distributors, please visit our website: www.eatechnology.com/contact-us/corporate-offices

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Continuous Improvement

EA Technology has a policy of continual product development and enhancement. Consequently, there may be minor variations in specifications or operation that are not covered in this operating manual.

Every effort has been made to ensure that the information provided in this operating manual is accurate at the time of going to print.

If any errors or omissions are noticed, please notify: product-support@eatechnology.com

8. Accessories and Options

CableSniffer 2

Product Code	Description
CS2-SBS	CableSniffer (for use with but not including a Searcher Bar System) CableSniffer CS2 Instrument (1), Carry Case (1), Battery Charger (1), Connector Hose (1), In-line Filter Assembly (1), Top Hat Adaptor (1), Sensor Straw (10), Spare Filter Paper (4), Spare Particulate Filter (4)
CS2-DS	CableSniffer (for use with but not including a Drill System) CableSniffer CS2 Instrument (1), Carry Case (1), Battery Charger (1), Connector Hose (1), In-line Filter Assembly (1), Sensor Straw Adaptor (1), Sensor Straw (10), Spare Filter Paper (4), Spare Particulate Filter (4)

CableSniffer Spares and Accessories

Product Code	Description	
CS-BC	CableSniffer Battery Charger (Mains only)	enter SQ enter SQ CT da da I
CS-CC	CableSniffer Carrying Case	
CS1-FP	CableSniffer Filter Paper (10) & Rubber '0' Ring (1), for use with CS1-FA only	
CS-FK	CableSniffer Filter Paper (10) & Particulate Filter (10) for use with CS1-FA2	
CS-FA2	CableSniffer In-line filter assembly	
CS-CH	CableSniffer Connector Hose	
CS-SS125	CableSniffer Sensor Straws (10) 125mm	
CS-SS150	CableSniffer Sensor Straws (10) 150mm	
Searcher Bar System 15mm		
CS-SB	CableSniffer 25cm Searcher Bar	
CS-TP	CableSniffer Tar Plugs (pack 100)	
CS-SBK	CableSniffer Searcher Bar Metal Spike only	
CS-THA	CableSniffer Top Hat Adaptor	*
Drill System 8mm		
CS-DE	CableSniffer Drill Extension Bar	
CS-SSA	CableSniffer Sensor Straw Adapter	
CS-DBIT	CableSniffer 8mm x 200mm SDS Drill Bits (pack 5)	
CS-MDG	CableSniffer Mastic Dispenser Gun	
CS-BM	CableSniffer Black Mastic Cartridge	
CS-DN	CableSniffer Mastic Dispenser Nozzles (pack 20)	
CS-F	CableSniffer Foam Pack (pack 100)	
CS-DSAK	CableSniffer Mastic Dispenser Gun & Drill Extension Bar	
CS-DSCK	CableSniffer Drill System 10 Fault Consumable Kit	
	Sensor straw (10), Sensor straw adapter (1), Filter paper (10), '0' ring (1), Mastic dispenser nozzle (10), 8mm x 200mm SDS drill bit (5), Black mastic cartridge (1), Foam pack of 100 (1)	



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