EXTRATALK II / II+ AND EXTENSION OUTDOOR

Maintenance Manual

NOKIA

Document Number/Version
NTC DN9913238/1.0.0

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INTERNAL HISTORY PAGE

Archive

Location: \\ntcsrv03ca\groupdat\SiSo\Extratalk2\customer

Filename: Maintenance manual.doc

History

Date	Version	Author	Change Note No./Notes
14 Dec 98	0.0.1	Tyrone Williams	First Draft
8 Feb 99	0.0.2	Tyrone Williams	Second Draft
2 March 99	1.0.0	Tyrone Williams	Authorised

APPROVAL PAGE

Edited/Translated by: T Williams Date: _____

Checked by: A Weeber Date: _____

Approved by: M Weckström Date: _____

CONTENTS

1. INTRODUCTION

This document describes the maintenance of the Extratalk II / II+ and extension cabinets as a post-integration function check. This document is to be used together with [8] and [9]. This document is intended for the service personnel of the network operator.

The Extratalk II / II+ and extension cabinets are designed to work in conjunction with a Nokia DE / DF 34 Base Station and contain three main functions. They supply DC power to the Base Station, house a battery backup system and provide space and DC-power for customer chosen and supplied RLEs.

The task of the maintenance is to check the functions of the Extratalk II / II+ and extension and its inventory periodically.

The maintenance is to be undertaken every six months using [3].

In special cases, e.g. dusty ambient conditions, shorter maintenance intervals may be required. This should be decided at the discretion of Nokia and the customer.

1.1. Fault reporting

All damage, failures and faults should be corrected, wherever possible, during installation of the cabinet, and reported to Nokia using a Failure Report Form provided by the Customer Service Centre (CSC).

Update the site folder after maintenance measures or modifications.

1.2. Environmental restrictions

When doing maintenance work on the Extratalk II / II+ and extension cabinet with the front door or the roof open, follow the restrictions below:

1. Rain or snow must not be allowed to fall on the internal surfaces of the equipment. The internal surfaces are the front panels, cables, connectors and documentation.
2. The door must not be opened in environments where dust can be blown into the cabinet through the open door.
3. If a cabinet door is opened in low temperatures (below +5°C), an adequate heating and weather protection must be provided for the cabinet, in order to maintain the cabinet temperature above +5°C.

4. Avoid keeping the cabinet door open in high temperatures in order not to disturb the cabinet cooling system.
5. Exercise great caution when opening a cabinet's roof in strong wind conditions. A forceful wind may tear the roof panel off its hinges, and the falling roof panel may cause danger to personnel and damage to the equipment. Always secure the roof into position with the roof arrester.
6. Exercise great caution when opening a cabinet's door in strong wind conditions. A forceful wind may open or close the door with such force that it can cause danger to personnel and damage to the equipment. Always secure the door into position with the door arrester.

2. TOOLS AND TEST EQUIPMENT

This chapter details the tools and the measurement equipment required for the maintenance of the Extratalk II / II+ cabinet.

2.1. Maintenance tools list

The essential commissioning tools are detailed below. A more detailed list of the maintenance tools can be obtained from your nearest CSC.

Table 1 Maintenance tools

No	Item
1	Anti-static hand strap
2	Socket wrench, 10mm
3	Screwdriver set, flat
4	Screwdrivers, pozi-drive (cross head), sizes 1, 2 and 3
5	Synthetic test gas for smoke sensor testing
6	Hot air fan 230 AC, adjustable temperature
7	Freezing spray
8	BTS door key and door handle
9	Compressed air for cleaning H/E
10	Brush/cloths for cleaning, pH-neutral soap solution if necessary
11	Digital Multimeter
12	Voltmeter
13	Insulated torque spanner, 11 mm (6.78 Nm)

2.1.1. Extratalk II / II+and extension cabinet located with a BTS

NOTE All equipment must be calibrated according to the manufacturer's instructions before use.

1. Portable IBM-compatible PC with the following minimum configuration:
   - IBM-compatible 486 SX or higher.
   - DOS version 5.0 or higher.
   - Microsoft Windows '95
   - VGA display.
   - 5 MB of free disk space.
   - 600 Kbytes free conventional memory.
   - RS232 serial port.
2. Nokia MMI software and cable for local and remote connections (ordered from Nokia Telecommunications, Base Station Systems). The required cable connections are shown in Table 2.

Table 2 MMI cable connections

BCF D9 Male	PC D9 Female	PC D25 Female
Pin No. 2 TXD	Pin No. 3 RXD	Pin No. 2 RXD
Pin No. 3 RXD	Pin No. 2 TXD	Pin No. 3 TXD
Pin No. 5 GND	Pin No. 5 GND	Pin No. 7 GND

3. Nokia FPET2 software.
4. Multimeter.

3. PERIODICAL MAINTENANCE MEASURES

WARNING!

Exercise great caution when maintaining the Extratalk II / II+ and extension. Refer to [3].

This chapter details the perioical maintenance measures for the Extratalk II / II+ and extension.

3.1. Cabinet maintenance

3.1.1. Cleaning the Extratalk II / II+ and extension

WARNING!

Turn the mains site power switch off before cleaning the Extratalk II / II+ and extension.

Keep the Extratalk II / II+ and extension clean; dust may affect the cabinet ventilation. Vacuum or wipe the outside of the cabinets wherever dust has collected on the surfaces.

After cleaning the exterior of the cabinets tick off the box in the checklist.

Cabinet exterior cleaned ☐ yes or ☐ no.

3.1.2. Access to the plinth base

The grid panel on the plinth lower edge may be removable, by unscrewing the ten M6 bolts which secure it to the plinth, as shown in Figure 1.

The cabinet anchor bolts can be tightened via the access provided by the removal of the grids. The access also enables the cleaning of the plinth base.

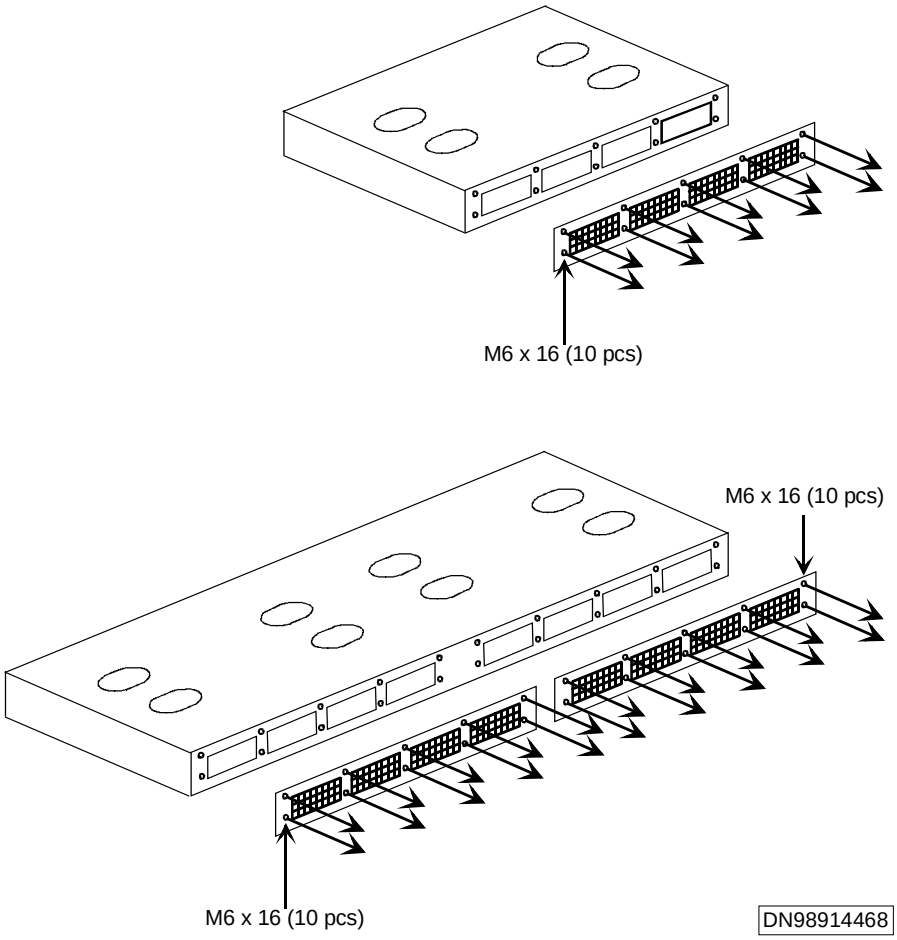

Figure 1 Plinth access

After cleaning the plinth base tick off the box in the checklist.

Plinth base cleaned ☐ yes or ☐ no.

3.1.3. Cabinet paint

Check the exterior of the cabinets during site visits.

For corrections use Nokia ash grey 10A03 BS 4800 polyester paint.

▶ Treat scratches, abrasions and other parts without paint on the cabinet surface as follows:

1. Clean the surface of impurities with a piece of cloth or sandpaper.
2. Paint the area with the official paint

After checking the exterior of the cabinets and correcting any paint defects tick off the box in the checklist.

Cabinet paint ☐ ok or ☐ not ok.

3.1.4. Lock

Lubricate the lock once a year with lubricating oil.

If the cabinet is used in temperatures below 0°C, lubricate the lock with lubricating anti-freeze oil or use both anti-freeze oil and lubricating oil.

After lubricating the lock tick off the box in the checklist.

Door lock lubricated ☐ yes or ☐ no.

3.1.5. Hinges

Lubricate the hinges once a year with petroleum jelly or lubricating oil.

After lubricating the hinges tick off the box in the checklist.

Hinges lubricated ☐ yes or ☐ no.

3.1.6. Seals

The cabinet must be checked for leakages. The seals around the front door, the heat exchanger, air conditioner and the roof should ensure there are no leaks, dust or water inside the cabinet.

In addition although there maybe no recognisable leakage, check that the cabinet seals are not cracked or porous and that they fit properly.

Check all seals on the door, roof and HMU.

3.1.6.1. Door seal check

▶ Check the cabinet door seal as follows:

1. Open the door with the key and handle.
2. Check that the seal does not show any cracks, or porosity.
3. Check that the seal fits properly as shown in Figure 2.

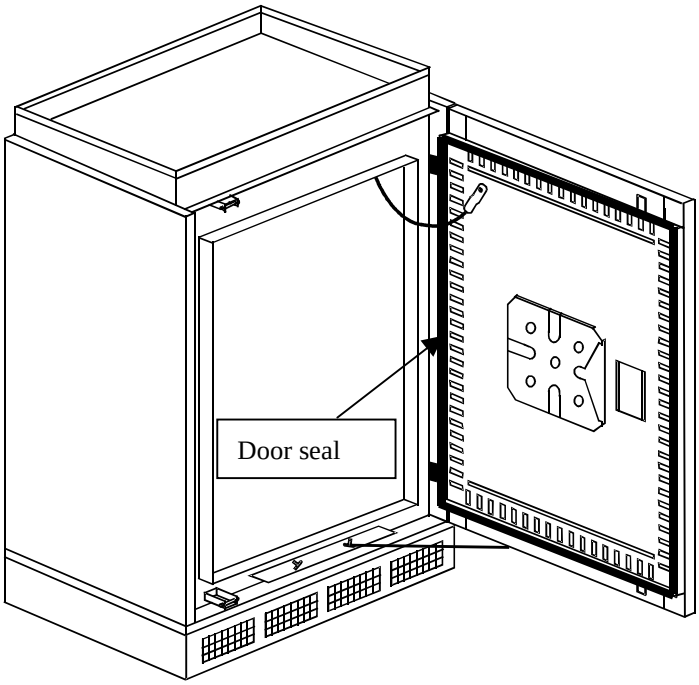

Figure 2 Cabinet door seal

After checking the cabinet door seal tick off the box in the checklist.

Door seals ☐ ok or ☐ not ok.

3.1.6.2. Roof seal check

The roof seals have to be checked against cracks and porousness and for proper fit

▶ Check the cabinet roof seal as follows:

1. Unlock the roof with the triangular key and handle.
2. Check the seal for signs of cracks, or porosity.
3. Check that the seals fit properly, as shown in Figure 3.

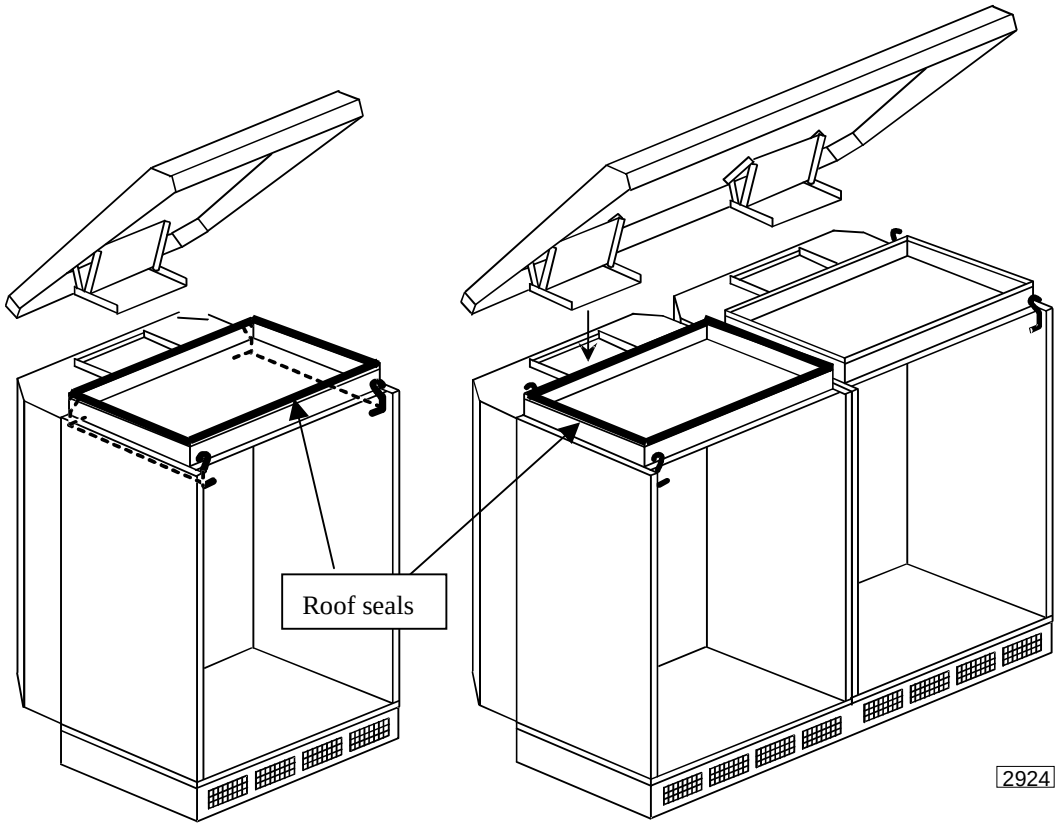

Figure 3 Cabinet roof seals

After checking the cabinet roof seal tick off the box in the checklist.

Roof seals ☐ ok or ☐ not ok.

3.1.6.3. HMU seal check

The roof must first be removed before the HMU can be checked. Refer to [8].

▶ Check the HMU seals as follows:

1. Unlock the HMU with the triangle BTS door key and remove it from the cabinet.
2. Check the seal for signs of cracks, or porosity.
3. Check that the seal fits properly.

After checking the ACU or H/E seal tick off the box in the checklist.

HMU seal ☐ ok or ☐ not ok.

3.1.7. Cabinet interior check

After checking the cabinet interior for dust and humidity tick off the box in the checklist.

No dust and humidity inside the cabinets ☐ ok or ☐ not ok.

3.2. Site

Keep the front of the Extratalk II / II+ and extension clean. Keep the plinth holes and air inlets unobstructed to maintain the proper circulation of air.

After checking the site tick off the box in the checklist.

Plinth holes and air inlets unobstructed ☐ yes or ☐ no.

4. HMU MAINTENANCE

This section details the maintenance of the HMU

In case of a fault in the HMU, contact the Nokia CSA.

HMU maintenance is to be performed every six months.

Maintenance can only be carried out with the HMU removed from the cabinet. Refer to [8] for details of HMU removal and installation.

► Check the HMU as follows:

1. Remove the HMU from the cabinet.
2. If the HMU is an ACU, check the condensation drain tube fitted between the bottom of the ACU and the housing for blockage, and clear as needed.
3. Clean both internal and external fans and the exchanger plates.

NOTE If a failure of the cooling circuit occurs during service, then the complete HMU must be exchanged. Repairs to the HMU must only be carried out by the manufacturer or a licensed agent.

WARNING!

Before opening the cover or replacing components, make sure that power to the unit is switched off and all power plugs are disconnected from their sockets.

After removing the HMU, keep it in an upright position at all times. If the unit is not kept upright during maintenance, it must be allowed to stand in the upright position for 24 hours, before any attempt is made to restart the HMU

4.1. Cleaning fans

Dust sedimentation will occur on fan impellers (especially the external fan). To ensure optimum performance and prevent vibration, which will damage the bearings and reduce lifetime, they must be cleaned every six months.

CAUTION Keep the HMU upright at all times

► Clean the fans as follows:

1. Loosen all the cables from the HMU and remove any battery breather tubes.
2. Move the HMU to a position where it can be supported upright.

3. Remove the front cover from the HMU by turning the screws a quarter of a turn. Before taking away the cover plate, disconnect the earth cable. There is now access to the HMU fixing screws, the internal fan and the exchanger plates.
4. Remove the six off M6 nuts that secure the unit into the housing and remove the unit completely.
5. Remove the fan cover plate from the rear of the housing to gain access to the external fan.
6. The impellers are to be cleaned with a brush or compressed air, or in special circumstances with brush and a pH-neutral soap/water solution (external fan only).

CAUTION Sedimentation on the internal air path indicates a leak in the cabinet and further action is needed.

After cleaning the fans tick off the box in the checklist.

Fans cleaned ☐ yes or ☐ no.

4.2. Cleaning the exchanger plates (ACU)

Dust sedimentation will occur on the exchanger plates of the ACU and to ensure optimum performance they must be cleaned every six months.

CAUTION Keep the ACU upright at all times.

Exchanger plates to be cleaned with compressed air.

CAUTION Sedimentation on the internal air path indicates a leak in the cabinet and further action is needed.

After cleaning the exchanger plates tick off the box in the checklist.

Exchanger cleaned (ACU) ☐ yes or ☐ no.

4.3. Replace drain tube (ACU)

The condensation drain tube of the ACU may become blocked. Therefore it must be serviced every six months to ensure optimum performance.

The condensation drain tube is located at the bottom of the ACU and exits the housing via a rubber bushing on the lower edge of the housing.

▶ Service the drain tube as follows:

1. Remove the ACU from the back of the cabinet.
2. Remove the clip at the top of the tube.
3. Draw the other end of the tube from the rubber bushing
4. Replaced the tube with a new one.

Drain tube replaced (ACU) ☐ yes or ☐ no.

4.4. Cleaning the recuperator (HE)

Dust sedimentation will occur on the recuperator (especially the external air path) and must be cleaned every six month to ensure optimum performance.

Recuperator plates are to be cleaned with compressed air, or in special cases with a pH-neutral soap/water solution (external air path only) sprayed on with compressed air.

CAUTION Do not use water spray for the fans. Use compressed air and/or water spray only for the external air path of the recuperator; being careful not to damage the foam seal.

Sedimentation on internal air path indicates a leak in the cabinet or enclosure and further action is needed.

After cleaning the recuperator tick off the box

Recuperator cleaned (HE) ☐ yes or ☐ no.

5. BATTERY BACKUP UNIT

Maintenance of the BBU has to be performed every six months.

The standard Battery Backup Unit (BBU) consists of four 12V battery blocks and their accessories, such as cables, insulation caps, contact screws and the ventilation tube system. An alternative configuration may consist of 8 to 16 to 24 battery blocks configured as 2*4, 3*4, 4*4, 6*4, 12 volt units.

The BBU maintenance consists of visual checks, mechanical checks, environmental condition checks and several measurements and is to be performed according to the BBU maintenance checklist. If a battery is found to be defective it must be disposed of as detailed in [3] and replaced with a new battery. The following guidance shows how to perform the different tests:

5.1. Visual checks

This section checks for any externally recognisable damage of the batteries and accessories.

5.1.1. External damage

Is there any visible damage on the batteries or the accessories? Tick off the box in the checklist.

No external damage to batteries ☐ ok or ☐ not ok.

5.1.2. Pressure spots

Are there any visible pressure spots on the battery case? Tick off the box in the checklist.

No pressure spots on batteries ☐ ok or ☐ not ok.

5.1.3. Deformities

Are there any visible deformities such as swelling of the battery bodies? Tick off the box in the checklist.

No deformities to batteries ☐ ok or ☐ not ok.

5.1.4. Corrosion of battery terminals

Is there any visible corrosion on the battery terminals? Tick off the box in the checklist.

No corrosion of battery terminals ☐ ok or ☐ not ok.

5.1.5. Acid escape

Is there any visible acid escape from the batteries? Tick off the box in the checklist.

No acid escape from batteries ☐ ok or ☐ not ok.

5.1.6. Accessories check

The check of the accessories in addition to the correct number of batteries includes the following parts correctly installed:

1. 2 pole screws and washers per battery.
2. The connection cable set consisting of 3 cable bridges equipped with ring tags to ensure that all the batteries are connected together.
3. Sufficient rubber terminal caps to ensure that all the terminals are covered.
4. Ventilation tubes sets consisting of sufficient tubes to ensure that all the batteries are connected together.

After checking the list of accessories tick off the box in the checklist.

Battery accessories complete ☐ yes or ☐ no.

5.2. Mechanical checks

The mechanical checks are to be carried out to ensure safe mechanical and electrical connections of the batteries.

The mechanical checks of the batteries have to be done in disconnected mode. Switch off the battery circuit breaker first.

WARNING!
Working on the batteries requires insulated tools. Also the torque spanner has to be an insulated. Avoid any short circuits.

5.2.1. Terminal screws torque check

CAUTION Do not over tighten the screws by exceeding the given torque value! If the required torque cannot be reached, check the screw or battery terminal thread for damage.

The correct torque of the battery contact screw is important to give a safe electrical connection and to avoid damage of the screws or threads.

Check the correct torque by loosening the screws by a half turn, adjust the torque of the spanner to 6.78Nm (5.0 ft-lb.) and fasten the screws again.

Tick off the box in the checklist.


Terminal screws torque checked ☐ ok or ☐ not ok.

5.2.2. Battery terminals greased

To give a good electrical contact with minimum resistance and to protect from corrosion the contact area between battery terminal and the ring tag of the cables should be coated with contact terminal grease.

If there is no grease on the terminals or the battery terminals are soiled, loosen the contact screw, clean the contact areas with a cloth, apply grease to the described places and fasten the screws again considering the required torque.

Tick off the box in the checklist.


Battery terminals greased ☐ yes or ☐ no.

5.3. Environmental conditions

To ensure a trouble free operation of the BBU, some environmental conditions have to be checked.

5.3.1. Battery ventilation

In operation, especially during charging, the batteries produce explosive gas. To allow an escape of this gas out of the cabinet the batteries are equipped with gas

outlets on their top. Connected to these outlets is a tube system which leads gas to an outlet on the HE to the outside.

To ensure the function of this ventilation tube system the tubes and T-connectors have to be checked for proper fit and no leakage.

After that, tick off the box in the checklist.

Battery ventilation checked ☐ ok or ☐ not ok.

5.3.2. Battery compartment temperature

The battery temperature is permanently measured by the CSM module of the PDU. The charging voltage compensation is performed by means of this value.

By measuring the charging voltage of the system the actual battery compartment temperature can be calculated by using the following equation:

T (°C) = (U (V) – 54.48V) * 10.417 °C/V – 20°C

Or

T (°F) = (U (V) – 54.48V) * 50.75 °F/V – 68°F

U = Charging voltage in Volt

T = Battery temperature in °C

Enter the result of the calculation into the field in the checklist:

Battery compartment temperature _____ °C.

5.4. General measurements

These measurements are performed to indicate faults of the batteries or the charging device by detecting their voltages.

5.4.1. Batteries idle voltage

This measurement of the batteries voltage is to be done in idle mode that means the battery circuit is disconnected from the load or charging.

Switch off the battery circuit breaker on the PDU and report the voltage of each single battery block to the checklist:

Batteries idle voltage

Battery 1: _____ V	Battery 2: _____ V
Battery 3: _____ V	Battery 4: _____ V
Battery 5: _____ V	Battery 6: _____ V
Battery 7: _____ V	Battery 8: _____ V
Battery 9: _____ V	Battery 10: _____ V
Battery 11 _____ V	Battery 12: _____ V
Battery 13 _____ V	Battery 14: _____ V
Battery 15 _____ V	Battery 16: _____ V
Battery 17 _____ V	Battery 18: _____ V
Battery 19 _____ V	Battery 20: _____ V
Battery 21 _____ V	Battery 22: _____ V
Battery 23 _____ V	Battery 24: _____ V

5.4.2. Entire float charge voltage

This voltage is to be measured when the batteries are charged by the system. Switch on battery circuit breaker, rectifiers must be in operation. Measure the voltage over all the batteries at the (+) and (-) leads and enter the value into the checklist.

Entire float charge voltage: _____ V.

5.4.3. Single float charge voltage

The equalisation charge voltage is needed to keep the full charge of the batteries during the time of no battery operation.

This measurement requires fully charged batteries, so that they have to be charged at least 24 hours before the test. If the system did run on battery power shortly before, the system may still be in the charging operation and will not produce the equalisation charge voltage.

Measure the voltage separately for all the batteries and enter the values into the fields in the checklist:

Battery float charge voltage

Battery 1 _____ V Battery 2: _____ V
Battery 3 _____V Battery 4: _____ V
Battery 5 _____V Battery 6: _____ V
Battery 7 _____V Battery 8: _____ V
Battery 9 _____V Battery 10: _____ V
Battery 11 _____V Battery 12: _____ V
Battery 13 _____V Battery 14: _____ V
Battery 15 _____V Battery 16: _____ V
Battery 17 _____V Battery 18: _____ V
Battery 19 _____V Battery 20: _____ V
Battery 21 _____V Battery 22: _____ V
Battery 23 _____V Battery 24: _____ V

5.5. Completing the BBU maintenance

If all test results of the previous checks are ok or yes , tick off the field in the checklist.

Battery Backup Unit ok. ☐ yes or ☐ no..

If not, clear the problems if possible and report the faults into the field *Remarks* in the checklist.

6. SMOKE DETECTOR

To ensure that the smoke detector ORM 130/A-UL functions correctly it should be maintained annually.

▶ The test and maintenance procedure should be conducted as follows:

1. Spray the synthetic test gas for smoke sensor testing towards the sensor.
2. The red LED should start flashing and the alarm is generated.
3. Check alarm transmission with the MMI or alarm test box.
4. If the smoke sensor does not work, remove the detector from the mounting base by turning it anti-clockwise.
5. Measure the operation voltage between terminals 1 and 2 of the mounting base. The voltage should be 24V.
6. If the voltage is ok, the smoke sensor should be replaced. Place a new one into the mounting base and repeat the test.

NOTE

Every five years the smoke detector should be returned to the manufacture for cleaning and testing. The detector will be cleaned completely, tested, re-calibrated and sent back to the customer.

After testing the smoke detector tick off the box in the checklist.

Smoke detector test ☐ ok or ☐ not ok.

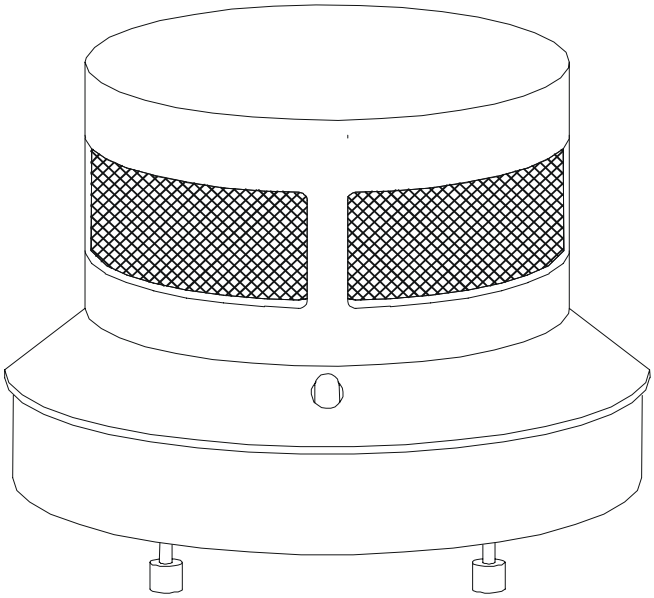

Figure 4 Smoke detector

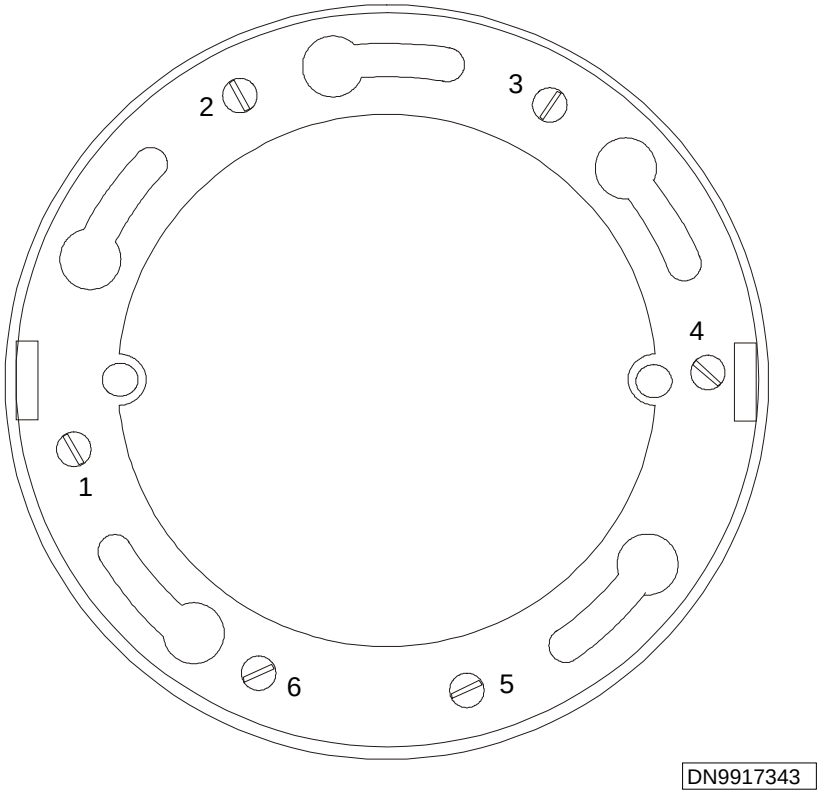

Figure 5 Smoke detector base

7. MAINTENANCE CHECKLIST

Section			
3.1.1	Cabinet exterior cleaned	☐ yes	☐ no
3.1.2	Plinth base cleaned	☐ yes	☐ no
3.1.3	Cabinet paint	☐ ok	☐ not ok
3.1.4	Door lock lubricated	☐ yes	☐ no
3.1.5	Hinges lubricated	☐ yes	☐ no
3.1.6.1	Door seal	☐ ok	☐ not ok
3.1.6.2	Roof seal	☐ ok	☐ not ok
3.1.6.3	HMU seal	☐ ok	☐ not ok
3.1.7	No dust and humidity inside the cabinets	☐ ok	☐ not ok
3.2	Plinth holes and air inlets unobstructed	☐ yes	☐ no
4.1	Fans cleaned	☐ yes	☐ no
4.2	Exchanger cleaned (ACU)	☐ yes	☐ no
4.3	Drain tube replaced (ACU)	☐ yes	☐ no
4.4	Recuperator cleaned (HE)	☐ yes	☐ no
5.1.1	No external damage to batteries	☐ ok	☐ not ok
5.1.2	No pressure spots on batteries	☐ ok	☐ not ok
5.1.3	No deformities to batteries	☐ ok.	☐ not ok
5.1.4	No corrosion of battery terminals	☐ ok	☐ not ok
5.1.5	No acid escape from batteries	☐ ok	☐ not ok
5.1.6	Battery accessories complete	☐ yes	☐ no
5.2.1	Terminal screws torque checked	☐ ok	☐ not ok
5.2.2	Battery terminals greased	☐ yes	☐ no
5.3.1	Battery ventilation checked	☐ ok	☐ not ok

5.3.2	Battery compartment temperature _____C°			
5.4.1	Batteries idle voltage (no battery load, battery circuit breaker ”off”)			
	Battery 1 _____ V	Battery 2_____V	Battery 3 _____ V	Battery 4_____V
	Battery 5 _____ V	Battery 6_____V	Battery 7 _____ V	Battery 8_____V
	Battery 9 _____ V	Battery 10_____ V	Battery 1 1_____ V	Battery 12 _____ V
	Battery 13 _____ V	Battery 14 _____ V	Battery 15 _____ V	Battery 16_____ V
	Battery 17 _____ V	Battery 18 _____ V	Battery 19 _____ V	Battery 20_____ V
	Battery 21 _____ V	Battery 22 _____ V	Battery 23 _____ V	Battery 24_____ V
5.4.2	Entire float charge voltage _____ V			
5.4.3	Battery float charge voltage			
	Battery 1 _____ V	Battery 2_____V	Battery 3 _____ V	Battery 4_____V
	Battery 5 _____ V	Battery 6_____V	Battery 7 _____ V	Battery 8_____V
	Battery 9 _____ V	Battery 1 0_____ V	Battery 11 _____	Battery 12 _____ V
	Battery 13 _____ V	Battery 14 _____ V	Battery 15 _____ V	Battery 16_____ V
	Battery 17 _____ V	Battery 18 _____ V	Battery 19 _____ V	Battery 20_____ V
	Battery 21 _____ V	Battery 22 _____ V	Battery 23 _____ V	Battery 24_____ V
5.5	Battery Backup Unit ok.		☐ yes	☐ no
6	Smoke detector test		☐ ok.	☐ not ok.

Remarks:

Name:_____ Company:_____ Sign._____

8. REFERENCES

Please refer to the following references if necessary:

[1] Extratalk II / II+ Installation Manual DN9835689

[2] Extratalk II / II+ Pre-assembling Manual

[3] Man-Machine Interface Users Guide B6Z 052596AE

[4] DE 34/DF 34 BTS Commissioning B6Z 054211AE

[5] DE 34/DF 34 Warnings and Cautions B6Z 052592AE

[6] Nokia Intratalk DE 34/DF 34 Outdoor GSM/DCS BTS B6Z 056296 AE