

EXTRATALK II / II+ AND EXTENSION OUTDOOR

Commissioning Manual

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1. INTRODUCTION

This document details the commissioning of the Extratalk II / II+ and extension outdoor cabinets as a pre-integration function check.

The commissioning is to be undertaken considering [3].

1.1. Commissioning overview

The Extratalk II / II+ and extension outdoor are designed to be used in conjunction with a Nokia DE / DF 34 Base Station (BTS), and provide three main functions. They supply DC power to the BTS, house a battery backup system and provide space and DC power for customer supplied and fitted Radio Link Equipment (RLEs). The commissioning is to be carried out in conjunction with the BTS commissioning, as described in the DE 34 / DF 34 BTS Commissioning manual.

One objective of the commissioning is to check the functions and the alarm handling of the Extratalk II / II+ and extension by using a PC running the Nokia BTS MMI software. This requires a completely installed, connected and initialised BTS.

For the battery commissioning, there is a separate checklist to be completed. These checks consist of visual checks, mechanical checks, environmental conditions and voltage measurements.

RECOMMENDATION

To minimise costs, the installation and commissioning tasks should be carried out during the same site visit whenever possible.

1.2. Site folders

Nokia recommends a site-specific folder for every BTS site for recording the Factory Acceptance Tests (FAT), the installation, commissioning, and integration logs, inventory lists and site-specific installation information. The project and / or the customer should determine the exact content of the site folder.

Site folders should be archived by the customer.

1.3. 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).

2. TOOLS AND TEST EQUIPMENT

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

2.1. Tools list

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

Table 1 Commissioning Tools

No	Item
1	Anti-static hand strap
2	Socket wrench, 10mm
3	Screwdriver set, flat
4	Screwdrivers, pozidrive (cross head), sizes 1, 2 and 3
5	Synthetic test gas for smoke sensor testing
6	Hot air fan 230AC, adjustable temperature
7	Freezing spray
8	BTS door key and door handle
9	Voltmeter
10	Insulated torque spanner for battery connection

2.2. Test equipment

2.2.1. 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, provided with this manual. See Appendix A.
4. Multimeter.

3. PREPARATIONS

3.1. Installation

Check the installation to ensure the following are in order:

1. Site is clean and safe
2. Grounding:
 - The equipment is correctly grounded.
 - The grounding cable size, colour and routing conform to the requirements.
3. Power:
 - The incoming mains AC power is available for this site, Extratalk II / II+ and extension cabinet, and test equipment.
 - The site power switch and circuit breakers are clearly labelled.
 - The power cables are correctly terminated. See [8] and [14].
4. Extratalk II / II+ and extension cabinets:
 - Cabinets are secured to the mounting surface.
 - The cabinets and the units have suffered no physical damage.
 - Units are securely positioned and electrically connected in the cabinets, refer to [8] and [14].
5. Site folder contains the following:
 - Nokia packing list
 - Nokia factory test results
 - Installation check list

After checking the installation, tick the box in the checklist.



Visual check

failed or passed.

3.2. Preparing the test equipment

Prepare the test equipment as follows:

1. Place the test equipment in the operating environment defined by the manufacturer to ensure correct operation.
2. Power up the test equipment and let it warm up for the recommended period of time.

3.3. Power up sequence

NOTE

If the system has been left without power for a period of greater than two to three days it will be necessary to reset the CSM system. Switch on the breaker marked CSM power, wait five seconds, switch it off, and wait five seconds before resetting the breaker. Repeat if necessary.

Refer to the installation check list in the site folder to determine whether the cabinets have been powered down after installation.

If the cabinets have been powered down, they should be powered up with the power-ON-test as follows.

NOTE

The power up sequence is to be carried out with HMUs removed from the cabinets.

- Check that all circuit breakers for each PDU are switched off.
- Check that the connected BTS or other power consumers are all switched off.
- **Make sure that the input voltage to the cabinets is correct by measuring the voltages at the external mains power distribution box.**
- Switch on the AC voltage in the external mains power distribution box.
- **Measure the voltages at the AC input connector of each PDU, using a voltmeter between N and L1, L2, L3.**
- Switch on DC power to all rectifiers.
- Switch on the AC power circuit breakers for the rectifiers on each PDU and verify that the green power LED on each rectifier is illuminated
- Switch on all DC power circuit breakers now except those for the batteries.
- Verify that the HMU fans start running at high speed and slow down approximately 15 seconds after start-up time.
- Check all RLE outputs by removing the fuses one by one and measuring the voltage at the RLE connectors.
- Switch on the battery circuit breakers.

After the cabinets have been powered up, tick off the box in the checklist.



Cabinets powered up

no or yes.

3.4. Connecting the PC

The PC is connected to the Extratalk II / II+ and extension for reading the site status and alarm data, and configuring the alarms.

Connect the PC as follows:

1. Connect the PC cable between the RS232 interface on the front panel of the Extratalk II / II+ PDU and the communications port on the PC.
2. Turn on the PC.

The PC is connected to the BTS cabinet for the commissioning tests; for example, to monitor generated alarms, perform tests and read test results.

Connect the PC as follows:

1. Connect the PC cable between the MMI test connector on the top of the BTS cabinet and the communications port on the PC.
2. Turn on the PC.

4. SETTING UP THE EQUIPMENT

The site status and alarm data can be read from the PDU using the HyperTerminal program, which is supplied as part of Microsoft Windows '95.

Alarms can be configured using the FPET2 software supplied by Nokia with this manual. See Appendix A.

4.1. Reading alarm data from HyperTerminal

4.1.1. HyperTerminal settings

1. Create new connection by double clicking on **HyperTerminal**. (can be found under **Programs**, then **Accessories**).
2. Name the new connection **CSM**.
3. Select **COM xx** port to connect directly.
4. The **COM** port settings should be as follows: 9600 bps, 8 bits, no parity, 1 stopbit, no protocol.
5. Save the connection when exiting the program.

CAUTION

After typing a command on the keyboard it is essential to hit RETURN. Otherwise the Extratalk II / II+, extension and BTS will be reset by the PDU.

4.1.2. Commands

The following commands can be sent to the PDU:

Table 3 HyperTerminal commands to PDU

Command	Enter	Function
A	↵	Returns the 48 V sensor reading (system voltage)
B	↵	Returns the load current of PDU
C	↵	Returns the load current of PDU extension
D	↵	Returns the battery current

Command	Enter	Function
V	↵	Returns version of CSM software
R	↵	Resets the CSM
S	↵	Returns all CSM readings every second
M	↵	Returns all CSM readings every minute
T	↵	Stops periodic readings (S or M command)

4.1.3. Readings

This is an example reading (returned with S or M command):

```
SDT,12/3/98,STT,9:30,DAT,12/3/98,TIM,9:39:6,BCT,34,CCT,38,CPT,38,NVT,53
.853600,48V,54.112180,LS1,68.294680,LS2,0.000000,BS1,-9.614
779,CLL,1.000000,CLA,0,DAC,122,PWE,42,PWI,9,CHT,0,CLT,0,RC1,0,RC2,0,
RC3,0,RC4,0,RC5,0,RC6,0,SST,0,SMK,0,DCB,0,ACB,0,DOA,0,PH1,0,PH2,0,PH
3,0,SAT,1,LV1,1,LV2,1,LBW,0,EFF,0,IFF,0,RLE,1,AHE,0,REM,0,BFE,1,IFS,93,
EFS,62,2DO,1,2LT,1,2HT,1,2HC,1,2SK,1,COC,194,COM,0,PAC,0
```

The following abbreviations are used within the readings:

Table 4 HyperTerminal reading abbreviations

Abbreviation	Meaning	Remarks
SDT	System date (programming date)	
STT	System time (programming time)	
DAT	Date (reading from CSM)	
TIM	Time (reading from CSM)	
BCT	Battery Compartment Temperature	Reads °C
CCT	Cabinet Compartment Temperature	Reads °C
CPT	Compressor Temperature (Air Con)	Reads °C

Abbreviation	Meaning	Remarks
NVT	Nominal (charging) Voltage	Varies with temperature
48V	48V Sensor reading (system voltage)	
LS1	PDU Load Current	
LS2	PDU Extension Load Current	
BS1	Battery Current	
CLL	Current Limit Level (charge current limit)	
CLA	Current Limit active	0=off ; 1=on
DAC	D/A Converter Value (Voltage Control of Rectifiers)	
PWE	PWM Signal for external fans	
PWI	PWM Signal for internal fans	
CHT	Cabinet High Temperature Alarm	0=off ; 1=on
CLT	Cabinet Low Temperature Alarm	0=off ; 1=on
RC1	Rectifier 1 Alarm	0=off ; 1=on
RC2	Rectifier 2 Alarm	0=off ; 1=on
RC3	Rectifier 3 Alarm	0=off ; 1=on
RC4	Rectifier 4 Alarm	0=off ; 1=on
RC5	Rectifier 5 Alarm	0=off ; 1=on
RC6	Rectifier 6 Alarm	0=off ; 1=on
SST	Site Support Test (BBU Test Command from BTS)	0=off ; 1=on

Abbreviation	Meaning	Remarks
SMK	Smoke Alarm	0=off ; 1=on
DCB	DC Breaker tripped	0=off ; 1=on
ACB	AC Breaker tripped	0=off ; 1=on
DOA	Door Alarm	0=off ; 1=on
PH1	Phase 1 missing	0=off ; 1=on
PH2	Phase 2 missing	0=off ; 1=on
PH3	Phase 3 missing	0=off ; 1=on
SAT	Surge Arrester tripped	0=off ; 1=on (always on when surge arresters not fitted)
LV1	Low Voltage Disconnect 1	0=off ; 1=on
LV2	Low Voltage Disconnect 2	0=off ; 1=on
LBW	Low Battery Warning	0=off ; 1=on
EFF	External Fan Failure	0=off ; 1=on
IFF	Internal Fan Failure	0=off ; 1=on
RLE	RLE Breaker tripped	0=off ; 1=on
AHE	AC Heater	0=off ; 1=on
REM	Remote on/off signal for rectifiers	0=off ; 1=on
BFE	Battery Fan Control	0=off ; 1=on
IFS	Internal Fan Speed	Reads rpm
EFS	External Fan Speed	Reads rpm

Abbreviation	Meaning	Remarks
2DO	Site Support 2 Door Alarm	0=off ; 1=on (always active when SSS2 is not installed)
2LT	Site Support 2 Low Temperature Alarm	0=off ; 1=on (always active when SSS2 is not installed)
2HT	Site Support 2 High Temperature Alarm	0=off ; 1=on (always active when SSS2 is not installed)
2HC	Site Support 2 HCU Alarm	0=off ; 1=on (always active when SSS2 is not installed)
2SK	Site Support 2 Smoke Alarm	0=off ; 1=on (always active when SSS2 is not installed)
COC	Compressor Time Delay	Reads seconds
COM	Compressor Control	0=off ; 1=on
PAC	Phase Absence Count	Reads minutes

When the site status is not being monitored on a time basis (either every second or every minute), the PDU gives alarm reports automatically. An example is given below:

SSS1 Door Alarm Ending

DATE 12/3/98

TIME 9:30:37

Cabinet temperature 34 Degrees Centigrade

Battery temperature 30 Degrees Centigrade

Compressor temperature 29 Degrees Centigrade

Internal Fan Speed 1820 RPM

External Fan Speed 0 RPM

Supply Voltage 54.391110 volts

Supply Current 32.067990 Amps

Battery Current 0.253028 Amps

4.2. Installation of FPET2 software

4.2.1. Diskette

Insert the disk marked Set-up Disk 1 into the disk drive of the PC, and from the Windows '95 **START** menu task bar select the **RUN** command. Using the **Browse** command select the set-up programme on the disk. Select **Open** and then follow the on screen commands.

4.2.2. ZiP file by internet

Using Winzip, unzip the Zip file to a directory on the hard drive of the PC. Using the Windows '95 **START** menu task bar select the **RUN** command. Using the **Browse** command select the set-up programme in the directory where the files were unzipped. Select **Open** and then follow the on screen commands.

4.3. Running FPET2

Using the Windows '95 **START** menu task bar, select **FPET2** from the **Programs** menu.

4.3.1. Comms configuration

On the FPET2 menu select the **Comms** drop down menu and select the serial port, which is connected to the PDU.

4.3.2. CSM software version



WARNING!

The CSM software version loaded should be determined prior to any other operation. This is because the FPET2 only works with software versions of 7.5 and above.

To determine the CSM software version loaded, using the FPET2 menu select **Program Load**, then from the drop down menu select **Version**.

The program will attempt to connect to the PDU. If the version of software loaded is 7.5 or above proceed with further commands, otherwise a **Program Load** will have to be carried out.

4.3.3. Updating the CSM software version



WARNING!

Updating the CSM software will cause the CSM to RESET. In the event that a 2nd LVD function is fitted to the PDU or an Extratalk II / II+ extension PDU is the subject of upgrade, the BTS output and battery output will be disconnected for the period of the upgrade.

To upgrade the CSM software version, using the FPET2 menu select **Program Load**, then from the drop down menu select **File**. Using the **Open CSM Program File** dialogue select the CSM applications file (.HEX) that is to be loaded. Follow the on screen commands.

NOTE

If the previous CSM software version loaded was 7.5 or above then there is no need to reset the CSM module using the breaker, as the software loaded does this automatically.

4.3.4. Updating the CSM database

To update the CSM database, using the FPET2 menu select **Database**, then from the drop down menu select **Retrieve CSM Database** and follow the on screen instructions.

Use the **Select Configuration** from the **Database** drop down menu. Using the **Open CSM Database File** dialogue, select the CSM database that contains the configuration to be loaded. Select **Open** to open the database.

On the **CSM Data Base Lookup** form, select the configuration to be loaded.

Use the **Send CSM Data Base** from the **Data base** drop down menu to send the new configuration to the CSM. If the configuration is correct then the programme will exit.

4.3.5. Updating the CSM RTC

To update the CSM Real Time Clock, using the FPET2 menu select **Set RTC**.

4.4. Producing site configurations

4.4.1. Loading the data base

Using Microsoft Access, open the **CSM Data base**. Using the **Forms** tab open the **CSM Configuration DataBase**.

4.5. Editing the data base

4.5.1. Configuration code

In this field, a unique name should be given for the configuration. The field is limited to 50 text characters.

4.5.2. System description

In this field, a description of the configuration should be given. The field is limited to 255 text characters.

4.5.3. Climatic control

In this field, the type of climatic control for the system configuration should be selected.

4.5.4. System type

In this field, the system type SSS1 or SSS2 should be selected. SSS1 represents the Extratalk II / II+, SSS2 represents the Extratalk II /II+ extension.

4.5.5. Rectifier fit

In this field, the number of rectifiers should be input. Valid range is 0 to 6 for the Extratalk II / II+ and 0 to 20 for the Extratalk II / II+ extension.

4.5.6. Battery capacity

In this field, the battery capacity should be input. Valid range is 21Ah to 99Ah.

4.5.7. Battery charge rate

In this field, the battery charge rate should be input. Valid range is 11% to 39%.

4.5.8. Voltage temperature compensation rate

In this field, the battery voltage temperature compensation rate recommended by the battery manufacturer should be input. Valid range is 0.6mV/cell/°C to 5.9mV/cell/°C.

4.5.9. Low battery warning level

In this field, the low battery voltage warning level should be input. Valid range is 45V to 48V.

4.5.10. Low voltage disconnect level

In this field, the low voltage disconnect level should be input. Valid range is 39V to 44V.

4.5.11. BTS disconnect time

In this field, the BTS disconnect timeout should be input. Valid range is 1 minute to 359 minutes.

4.6. Saving the configuration and data base

Once all information has been input then select **record** to save the configuration. To save the data base simply close the database or the program



Site configured

no or yes.

5. COMMISSIONING TESTS

5.1. Function checks

The function checks forms part of the commissioning to ensure that all of the functions of the Extratalk II / II+ and extension cabinet needed in normal operation are working correctly.

5.1.1. Temperature compensation check

Temperature compensation is needed to provide the required charging voltage to the batteries, which is dependent upon the temperature. To measure this temperature, a battery temperature sensor is installed in the battery compartment. The sensor is supervised by the CSM included in the PDU. The CSM produces a control voltage to adjust the rectifier output voltages in accordance with the battery temperature.

To check the function of the temperature compensation it is necessary to measure the output voltage of the rectifiers. This is undertaken by measuring the Extratalk II / II+ DC output voltage at the roof connector of the BTS cabinet.

The battery temperature sensor has to be warmed up with the hot air fan for a few seconds to check the temperature compensation. The measured voltage should drop. In the reverse manner, when cooling down the sensor with freezing spray (a short burst is enough), the voltage will rise. If the temperature compensation works correctly, tick off the box in the checklist. This check should also be performed on the battery temperature sensor of the Extratalk II / II+ extension, if required.



Temperature compensation check

failed or passed.

NOTE

The temperature compensation can only be tested when the Extratalk II / II+ runs on rectifier power and the battery current limit function is not in operation.

5.1.2. Heater function check

A heater is housed in the cabinet HMU. It is needed to keep the inside temperature of the Extratalk II / II+ and extension within the given range when the ambient temperature is too low. To check the function of the heater a low cabinet temperature has to be simulated. This is undertaken by cooling down the cabinet

temperature sensor (located behind the rectifier frame, as described in [8]) with freezing spray.

The internal airflow from the air conditioner will begin to warm up due to the heater being activated. This check should also be performed on the temperature sensor of the Extratalk II / II+ extension, if required.

NOTE

In the case of low ambient temperature in winter it may not be necessary to cool down the sensor if the heater is already running.

If the heater works correctly, tick off the box in the checklist.



Heater function check

failed or passed.

5.1.3. Heat exchanger function check

The HE of the Extratalk II is used to cool down the inside temperature of the cabinet in order to keep it within the given range.

To check the function of the heater, a high cabinet temperature has to be simulated. This is achieved by warming up the cabinet temperature sensor with a hot air fan.

After a few seconds you will hear the HE speed up.

This check should also be performed on the Extratalk II extension, if required.

If the HE works correctly, tick off the box in the checklist.



HE function check

failed or passed.

NOTE

If the probe becomes too warm the rectifiers may switch off. This is a safety measure to protect the rectifiers from failing.

5.1.4. Air conditioner function check

The ACU in the Extratalk II+ is used to maintain the temperature of the cabinet to keep it within a given range. To check the function of the ACU, a high cabinet temperature has to be simulated. Warming up the cabinet temperature sensor with a hot air fan does this. The ACU only works with the cabinet door closed, therefore to check the ACU it is necessary to bypass the cabinet door switch using the door key provided. The cabinet temperature sensor must be warmed up for a period of six minutes before the ACU operates. When the ACU starts, the internal and external fans will run, and cool air will flow from the cold air outlet in the lower part of the cabinet.

This check should also be performed on the Extratalk II+ extension, if required.

If the ACU works correctly, tick off the box in the checklist.

NOTE

Do not forget to remove the door key after carrying out this check. The cabinet door will not close with the key fitted.



ACU function check

failed or passed.

5.2. Alarm simulations

When faults appear, the Extratalk II / II+ and extension are able to generate alarms, which can be monitored with the MMI software when the PC is connected to the MMI test interface on the top of the BTS. The MMI software should be started in advance mode. Refer to the MMI user's guide for further information. To check the correct function of the alarm, the faults responsible have to be simulated.

5.2.1. Heat control unit alarm (7874)

The Heat Control Unit Alarm indicates a fault in the HMU, by switching off the Heat Management circuit breaker on the PDU.

The fans in the HMU contain a rotation sensor. After the fans stop completely the alarm is generated.

After switching the circuit breaker on again, the alarm must be cancelled.

If the alarm generation works correctly, tick off the box in the checklist.



Heat Control Unit alarm (7874)

failed or passed.

5.2.2. Smoke alarm (7882)

To indicate smoke forming inside the cabinets, there are smoke detectors installed inside the cabinets. Simulating this smoke, by releasing spray test gas towards the smoke detector generates an alarm. After the first contact with the test gas the smoke detector LED will start flashing.

The alarm is generated immediately.

RECOMMENDATION

If the detector is hard to reach with the test gas spray, e.g. if there is radio link equipment installed, an extension tube can be added to the nozzle to overcome this problem

If the alarm generation works correctly, tick off the box in the checklist

 Smoke alarm (7882) failed or passed.

5.2.3. Door alarm (7870)

To indicate an open cabinet door, the Extratalk II / II+ and extension are fitted with a door contact that is able to generate an alarm when open. The normal situation in commissioning is to open the cabinet door, so that the alarm (7870) will be shown in the MMI alarm window as started. To ensure that the alarm stops, the door is to be closed.

If the alarm generation works correctly, tick off the box in the checklist.

 Door alarm (7870) failed or passed.

5.2.4. Low temperature alarm (7873)

The low temperature alarm indicates a low temperature in the cabinet. The simulation of this alarm is based on the heater function check, but extra time is needed to allow the sensor to reach the alarm threshold temperature.

The freezing spray is to be sprayed periodically to avoid suddenly reaching a low temperature on the sensor.

The alarm message in the MMI alarm window must have started and, after warming up the sensor, it must have cancelled after a few minutes.

NOTE

 If the ambient temperature is very low, e.g. in winter, the alarm cancelling can take a longer time or require a warming up of the sensor with the hot air fan.

If the alarm generation works correctly tick off the box in the checklist.

 Low temperature alarm (7873) failed or passed.

5.2.5. High temperature alarm (7872)

The high temperature alarm indicates a high temperature in the cabinet. The simulation of this alarm is based on the HMU function check ie the sensor must reach the alarm threshold temperature.

The hot air fan is to be adjusted to a tolerable temperature (approx. +60°C...+70°C) (140°F...158°F) to avoid any overheating and damaging of the sensor.

The alarm message in the MMI alarm window must be started and, after cooling down the sensor must have cancelled after a few minutes.

NOTE

It may be necessary to turn off the DC Heat Management breaker while performing this test.

If the ambient temperature is very high, e.g. in summer, the cancelling of the alarm can take a longer time or require the cooling of the sensor with the freezing spray.

If the alarm generation works correctly, tick off the box in the checklist.

 High temperature alarm (7872) failed or passed.

5.2.6. Charging failure alarm (7997/31/1-3)

To check this alarm generation a charging failure has to be simulated by switching off the AC power circuit breakers for all the rectifiers.

The charging failure alarms should be simulated at all rectifiers as follows:

- Switch off a rectifier then switch it back on again. Repeat with each rectifier.
- Verify that alarm 7997/31/1, alarm 7997/31/2 and alarm 7997/31/3 are activated in the MMI alarm window.

If the alarm generation works correctly, tick off the boxes in the checklist.

 Charging failure Rectifier 1 (7997/31/1) failed or passed.

 Charging failure Rectifier 2 (7997/31/2) failed or passed

 Charging failure Rectifier 3 (7997/31/3) failed or passed

 Charging failure Rectifier 4 (7997/31/1) failed or passed

 Charging failure Rectifier 5 (7997/31/2) failed or passed

 Charging failure Rectifier 6 (7997/31/3) failed or passed

5.2.7. Mains break down alarm (7995/31/1-3)

In case of a mains breakdown the PDU is able to generate a separate alarm for each phase. To check this alarm generation a mains breakdown has to be simulated by loosening or removing the Phase Monitor fuses on the PDU front panel or to disconnect the AC mains by switching off the circuit breakers in the external power distribution box.

The mains breakdown alarm should be simulated for all three phases as follows:

- Loosen the fuse Phase Monitor 1 at the PDU.
- Check that alarm 7995/31/1 starts in the MMI alarm window.
Replace or tighten the fuse again on the phase monitor.
- Check that alarm 7995/31/1 is cancelled in the MMI alarm window.
- Follow these steps for the other fuses Phase Monitor 2 and 3.
- Fuse 2 generates the alarm 7995/31/2.
- Fuse 3 generates the alarm 7995/31/3.

If the alarm generation works correctly, tick off the boxes in the checklist.

- | | |
|---|--|
|  BBU 1 mains breakdown (7995/31/1) | <input type="checkbox"/> failed or <input type="checkbox"/> passed |
|  BBU 2 mains breakdown (7995/31/2) | <input type="checkbox"/> failed or <input type="checkbox"/> passed |
|  BBU 3 mains breakdown (7995/31/3) | <input type="checkbox"/> failed or <input type="checkbox"/> passed |

5.2.8. Battery low voltage alarm (7996)

To indicate a low battery voltage, the PDU (CSM) is able to generate an alarm. This indication is done by measuring the voltage over the battery (+) and (–) cables. To check the alarm generation, a battery voltage below 45V must be simulated. This can be done in two ways:

1. By disconnecting the batteries from the PDU by means of switching off the DC POWER Battery-circuit breaker and starting the BBU Test.
2. By discharging the batteries down to the threshold voltage (45V).

The first method can be performed in a shorter length of time than the second method. To simulate a battery voltage below 45V using the first method, with the Extratalk II /II+ running on rectifier power, proceed as follows:

- Switch off the DC power battery circuit breaker on the PDU.

- In the MMI Test Windows start the BBU Test. Now the rectifiers start decreasing their voltage down to the support level.
- Check that the battery backup battery low alarm (7996) starts in the MMI alarm window when the rectifiers reach the threshold voltage.
- Switch on the circuit breaker again and check that the alarm will be cancelled.

The second method is used to perform section 5.3.8.

If the alarm generation works correctly, tick off the box in the checklist.

 Battery low voltage alarm (7996) failed or passed.

5.3. Battery backup unit

The BBU (battery backup unit) gives a DC power supply for the Extratalk II /II+ and extension, and other connected devices (e.g. BTS) in case of a temporary mains breakdown.

The battery tests ensure that the batteries are in good condition and take over if the mains (AC voltage) is lost.

5.3.1. Battery commissioning

For the battery commissioning, there is a separate checklist to be completed. These checks consist of visual checks, mechanical checks, environmental conditions and voltage measurements. The measurements to be performed are described in this section

NOTE

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

The standard Battery Backup Unit (BBU) consists of four 12V-battery blocks and their accessories, cables, insulation caps, contact screws and the ventilation tube system. An alternative configuration may consist of 8-16 battery blocks configured as 2*4, 3*4 or 4*4, or 24 blocks in an Extratalk II /II+ extension.

The BBU commissioning consists of visual and mechanical checks, environmental condition checks and general measurements, and is to be performed according to the BBU commissioning checklist. The following guidance shows how to perform the different tests:

5.3.2. Visual checks

This section requires any externally recognisable impairment of the batteries and accessories to be recorded.

5.3.2.1. Cabinet and battery temperature sensor

The cabinet and battery temperature sensors should be in the correct position, as defined in [8]. Tick off the box in the checklist.

 Cabinet and battery temperature sensor position acceptable or not acceptable.

5.3.2.2. External damage

Any visible damage to the batteries or the accessories should be recorded. Tick off the box in the checklist.

 External damage acceptable or not acceptable.

5.3.2.3. Pressure spots

Any visible pressure spots on the batteries case should be recorded. Tick off the box in the checklist.

 Pressure spots acceptable or not acceptable.

5.3.2.4. Deformities

Any visible deformities like swelling of the battery bodies should be recorded. Tick off the box in the checklist.

 Deformities acceptable or not acceptable.

5.3.2.5. Corrosion of battery terminals

Any visible corrosion on the battery terminals should be recorded. Tick off the box in the checklist.

 Corrosion of battery terminals acceptable or not acceptable.

5.3.2.6. Acid escape

Any visible acid escape from the batteries should be recorded. Tick off the box in the checklist.



Acid escape

acceptable or not acceptable.

5.3.2.7. Accessories check

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

- 2 pole screws and washers per battery.
- The connection cable set consisting of sufficient cable bridges equipped with ring tags to ensure that all the batteries are connected together.
- Sufficient rubber pole caps to ensure that all poles are covered.
- Ventilation tube set consisting of sufficient tubes to ensure that all the batteries are connected together.



Accessories complete

acceptable or not acceptable.

5.3.3. Mechanical checks

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

NOTE

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

CAUTION

Working on the batteries requires insulated tools, such as an insulated torque spanner. Avoid any short circuits.

5.3.3.1. Terminal screws torque

The correct torque of the battery contact screws is important to give a safe electrical connection and to avoid damage to 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 re-fasten the screws.

NOTE

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

Tick off the box in the checklist.



Terminal screws checked acceptable or not acceptable.

5.3.3.2. Battery terminal greasing

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 battery terminals, or if soiled, loosen the contact screw, clean the contact areas with a cloth, apply grease and fasten the screws again, considering the required torque.

Tick off the box in the checklist.



Battery terminals greased acceptable or not acceptable.

5.3.4. Environmental conditions

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

5.3.4.1. 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. A ventilation tube system is connected which leads the gas to an outlet on the HMU and then to the outside of the cabinet.

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

Tick off the box in the checklist.



Battery ventilation checked acceptable or not acceptable.

5.3.4.2. HMU installed

In normal circumstances the Extratalk II / II+ and extension cabinets are equipped with a HMU. Check the cabinet for existence of one of these and tick off the box in the checklist.

 ACU installed no or yes.

 HE installed no or yes.

5.3.4.3. Battery compartment temperature

The battery temperature is continually monitored by the PDU. This value is used to work out battery voltage compensation.

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

$$T (^{\circ}\text{C}) = (U (\text{V}) - 54.48\text{V}) * 10.417 ^{\circ}\text{C}/\text{V} - 20 ^{\circ}\text{C}$$

Or

$$T (^{\circ}\text{F}) = (U (\text{V}) - 54.48\text{V}) * 50.75 ^{\circ}\text{F}/\text{V} - 68 ^{\circ}\text{F}$$

U = Charging voltage in Volt

T = Battery temperature in $^{\circ}\text{C}$

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

 Battery compartment temperature _____ $^{\circ}\text{C}$

5.3.5. General measurements

CAUTION

Before starting any battery test or measurement it must be ensured that the batteries have been on charge for at least 24 hours, and that no mains power failures have occurred within that period.

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

5.3.5.1. Batteries idle voltage

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

Switch off the battery circuit breaker of 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 |

NOTE The idle voltage of a fully charged battery should be 12.6V.to.13.2V. A voltage of less than 12.6V indicates a faulty or discharged battery.

5.3.5.2. Entire float charge voltage

The float charge voltage is needed to keep the batteries fully charged during inactivity (no battery operation).

Switch on the battery circuit breaker, with the rectifiers 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

NOTE

The float charge voltage should be 54.48V at 20°C (68°C).

5.3.5.3. Single float charge voltages

The float 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 charging must commence at least 24 hours before the test.

If the system has been run on battery power shortly before this check, the system may still be in a charging operation and will not produce the equalisation charge voltage.

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

 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 |

NOTE

The float charge voltages should be the same for all batteries. Any battery that has more or less voltage than the others is indicated to be discharged or faulty. At 20°C (68°F) each float charge voltage should be $54.48\text{V}/4=13.62\text{V}$.

5.3.6. Completing the BBU commissioning

If all test results of the previous checks are satisfactory, 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 remarks section of the checklist.

5.3.7. Battery function test (minimum test)

For this test a mains breakdown has to be simulated. This can be done by switching off the circuit breakers, or the main switch in the power distribution box outside the Extratalk II / II+, or by switching off the AC power circuit breakers of the rectifiers on the PDU. The Extratalk II / II+ and extension, and the connected BTS, now run on battery power, and the following alarms appear in the MMI alarm window as started:

- BBU 1 mains breakdown (7995/31/1)
- BBU 2 mains breakdown (7995/31/2)
- BBU 3 mains breakdown (7995/31/3)

To provide a short check of the battery conditions the voltage of each battery can be measured now with a multimeter. Under load the voltage of all batteries should be in the same range e.g. $12.50\text{V} \pm 0.50\text{V}$.

The mains voltage can be switched on again now and the three alarms should be displayed as cancelled.

If the test is performed successfully, tick off the box in the checklist and enter the measured battery voltages into the field.



Battery function test (minimum test)

Battery voltage after 1 min. with battery operation

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

NOTE

If you forget to switch on the mains after the test, the Extratalk II / II+ and extension, and the connected BTS, will run on battery power until the battery voltage falls below 39V. At this point the batteries will be disconnected from the load and the BTS will not function because of a lack of supply voltage.

5.3.8. BBU test (full test)**WARNING!**

The BTS DC power is disconnected after thirty minutes.

The second, more revealing test can be performed by means of the MMI. The purpose of this test is again to secure the batteries function and, if the test is performed until low voltage disconnect, the backup time of the BBU can be measured and monitored.

After starting the test with the MMI the rectifiers output voltage is reduced to the support level of 44.3 V and the Extratalk II / II+ and extension will run on battery power.

When the batteries are discharged down to 45V the battery low voltage alarm (INT_AL 10) will be generated and the rectifiers will be switched to normal output voltage. Now the Extratalk II / II+ and extension will run on rectifier power and the batteries will be charged.

As the test result, the duration from the start until the end of the BBU test will be displayed.

If the test is performed successfully the box has to be ticked off in the checklist and the result is to be entered into the field.

 BBU test (full test) BBU time: ____min.____sec.

NOTE The battery backup time depends on the installed battery type and the connected load. It can vary from about ten minutes to several hours.

For minimum test or full tests the following points have to be checked and ticked off in the checklist:

 No influence to BTS/BBU if the main power is disconnected yes or no.

 No influence to BTS/BBU during battery operating yes or no.

 Mains break down alarms 7995/31/1, 7995/31/2 and 7995/31/3 are on during main power disconnection yes or no.

 No influence to BTS/BBU after connecting main power again yes or no.

6. COMMISSIONING FAULT FINDING

6.1. Alarm generation faults

Any Extratalk II / II and extension alarm generation faults registered by the MMI software should be confirmed by connecting the PC to the RS232 interface on the front panel of the PDU. Check the alarm generation by simulating the alarm, and monitoring it using HyperTerminal. See section 4.1.

If the alarm is not generated correctly by the PDU, check the alarm configuration using the FPET2 software, as described in section 4.3, 4.4, and 4.5.

If the alarm is generated correctly, check the alarm cabling connections between the Extratalk II /II+ and extension and the BTS.

7. COMPLETING THE COMMISSIONING

After successful completion of the commissioning tasks:

- Disconnect and remove all test equipment.
- Close the roof and door of the cabinets.
- Lock the cabinet roofs, doors and HMUs in place.
- Leave the site in a clean condition.
- Leave the site at the status declared by the CSC or the customer.
- Complete the commissioning checklist and battery commissioning checklist, and place in the site folder.

8. CHECK LIST

8.1. Commissioning checklist

Section with Instructions	Extratalk II / II+ and extension commissioning checklist		
3.1	Visual check	<input type="checkbox"/> failed	<input type="checkbox"/> passed
3.3	Cabinets powered up	<input type="checkbox"/> failed	<input type="checkbox"/> passed
4.6	Site Configured	<input type="checkbox"/> no	<input type="checkbox"/> yes
5	Function checks	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.1.1	Temperature compensation check	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.1.2	Heater function check	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.1.3	HE function check	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.1.4	ACU function check	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.1	Heat Control Unit alarm 7874	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.2	Smoke alarm 7882	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.3	Door alarm 7870	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.4	Low temperature alarm 7873	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.5	High temperature alarm 7827	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.6	Charging failure alarm Rect. 1 7997/31/1	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.6	Charging failure alarm Rect. 2 7997/31/2	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.6	Charging failure alarm Rect. 3 7997/31/3	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.6	Charging failure alarm Rect. 4 7997/31/1	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.6	Charging failure alarm Rect. 5 7997/31/2	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.6	Charging failure alarm Rect. 6 7997/31/3	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.7	BBU 1 Mains breakdown alarm 7995/31/3/1	<input type="checkbox"/> failed	<input type="checkbox"/> passed

5.2.7	BBU 2 Mains breakdown alarm 7995/31/3/2	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.7	BBU 3 Mains breakdown alarm 7995/31/3/3	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.2.8	Battery Low voltage alarm 7996	<input type="checkbox"/> failed	<input type="checkbox"/> passed
5.3.7	<input type="checkbox"/> Battery function test (minimum test) <p style="text-align: center;">Battery voltage after 1 min. With battery operation</p> <p>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</p>	<input type="checkbox"/> no influence to BTS/BBU if the main power is disconnected <input type="checkbox"/> no influence to BTS/BBU during battery operating <input type="checkbox"/> mains break down alarms 7995/31/3/1-3 are "ON" during main power disconnection <input type="checkbox"/> no influence to BTS/BBU after connecting main power again	
5.3.8	<input type="checkbox"/> BBU test (full test) <p style="text-align: center;">BBU time___min.___sec.</p>		
<p>For any test result failed give remarks in this field</p> <p>Remarks :</p>			

8.2. Battery commissioning checklist

Section with Instructions	Battery commissioning checklist		
5.3.2.1	Cabinet and battery temperature sensor position	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.2.2	External damage	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.2.3	Pressure spots	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.2.4	Deformities	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.2.5	Corrosion of battery terminals	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.2.6	Acid escape	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.2.7	Accessories complete	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.3.1	Terminal screws checked	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.3.2	Battery terminals greased	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.4.1	Battery ventilation checked	<input type="checkbox"/> not acceptable.	<input type="checkbox"/> acceptable.
5.3.4.2	ACU installed	<input type="checkbox"/> no	<input type="checkbox"/> yes
5.3.4.2	HE installed	<input type="checkbox"/> no	<input type="checkbox"/> yes
5.3.4.3	Battery compartment temperature _____C°		
5.3.5.1	Battery idle voltages		

9. REFERENCES

- [1] Extratalk II /II+. Installation Manual DN 9835689
- [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 Citytalk DE 34/DF 34 Outdoor GSM/DCS BTS B6Z 056296 AE

10. APPENDIX A

10.1.FPET2 software

The following wallet contains version 7.5 of the FPET2 software, used for alarm configuration of the Extratalk II / II+ and extension.

The software should be used as described in this manual.