

Base Station

INSTALLATION GUIDE



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1 INTRODUCTION

This document describes how to install the Base Station.

The document is intended for service technicians.

For information on how to operate the device, see the applicable Installation and Operation Manual for the device.

For information about supported PBXs contact your supplier.

1.1 ABBREVIATION AND GLOSSARY

Base Station	Common name for IPBS, DECT Base Station (BS3x0) and TDM-DECT Base Station.
DECT	Digital Enhanced Cordless Telecommunications: global standard for cordless telecommunication.
DECT Base Station	Another name for <i>BS3x0</i>
TDM-DECT Base Station	Another name for <i>BS3x2</i> .
GUI	Graphical User Interface
IP	Internet Protocol: global standard that defines how to send data from one computer to another through the Internet
IPBS	Also referred to as <i>IPBS Base Station</i> . Previously called <i>IP-DECT Base Station</i>
LAN	Local Area Network: a group of computers and associated devices that share a common communication line.
PBX	Private Branch Exchange: telephone system within an enterprise that switches calls between local lines and allows all users to share a certain number of external lines.
RFP	Radio Fixed Part. DECT base Station part of the DECT Infrastructure.

2 DESCRIPTION

This section gives a general description of the following devices:

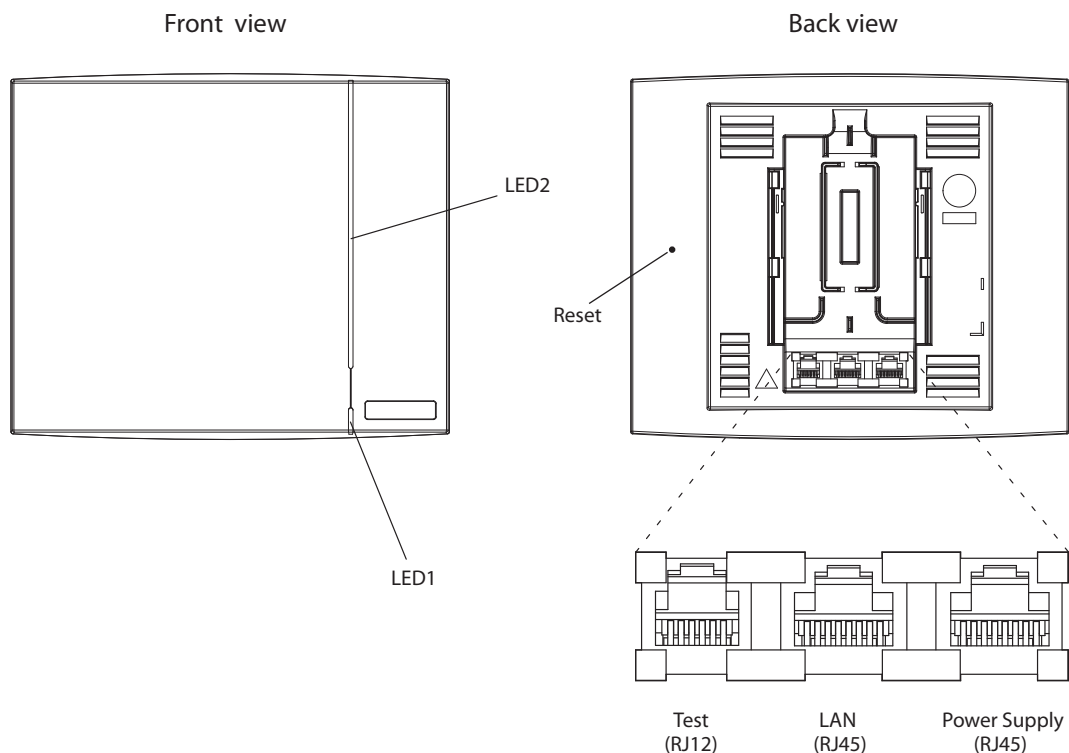
- IPBS1, see [2.1 IPBS1](#) on page 2
- IPBS2 and IPBS3, see [2.2 IPBS2/IPBS3](#) on page 6
- BS3x0, see [2.3 BS3x0](#) on page 10
- BS3x2, see [2.4 BS3x2](#) on page 12

2.1 IPBS1

The following versions of the IPBS1 are available:

- IPBS1 with internal antenna
- IPBS1 with external antenna

2.1.1 IPBS1 WITH INTERNAL ANTENNA



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Figure 1. IPBS1 Overview

Contents of the Box

The box in which the IPBS1 is packed contains:

- An IPBS1 with integrated antennas
- A mounting bracket
- Two screws with wall plugs

Power Distribution

The IPBS1 can be powered using the following methods:

- Power over Ethernet, IEEE 802.3af
- A local AC-adapter

NOTE: For more information about power distribution, see [3.3 Power the Base Station](#) on page 24.

Software

The software in the IPBS1 can be updated by downloading new software without disconnecting the equipment. The new software is stored in flash memory. For information on how to update the software in the IPBS1, see the applicable Installation and Operation Manual for the IPBS1.

Connectors

- Two 8-pin RJ45 modular jacks for LAN/PoE and powering
- A 6-pin RJ12 modular jack for factory testing

LEDs

Status of LED1 (lower LED)	Description
Steady Green	Operational
Flashing fast amber	Download of firmware in progress.
Steady Amber	TFTP mode
Alternating red/green	No Ethernet connection

Status of LED2 (upper LED)	Description
Not lit	IPBS1 operational and no traffic on the IPBS1.
Steady green	IPBS1 operational and traffic on the IPBS1.
Flashing slow green	Fully occupied with traffic.
Flashing red	No air synchronization - searching for air sync candidates.
Flashing fast red	Download of RFP software in progress.
Alternating red/green	RFP not initialized.

2.1.2 IPBS1 WITH EXTERNAL ANTENNAS

The IPBS1 is available with two omni-directional external antennas. Other external antennas can be mounted as well. This section contains the differences between the IPBS1 with internal and external antennas. For all other information see [2.1.1 IPBS1 with Internal Antenna](#) on page 4.

Contents of the Box

The box in which the IPBS1 is packed contains:

- An IPBS2 for external antennas
- Two antennas
- A mounting bracket
- Two screws with wall plugs

NOTE: The IPBS1 cannot be mounted with the antennas pointing downwards as the mounting bracket does not support it.

Insert the antennas into the IPBS1 before following the installation instructions in [3.2 Install the Base Station](#) on page 17.

2.2 IPBS2/IPBS3

The following versions of the IPBS2 and IPBS3 are available:

- IPBS2 with internal antenna
- IPBS2 with external antennas
- IPBS3 with internal antenna
- IPBS3 with external antennas

The IPBS2/IPBS3 is backward compatible with the IPBS1 when it comes to coverage, functionality, accessories and mounting bracket. If an old IPBS1 has to be replaced you just reuse the mounting bracket and install the IPBS2/IPBS3.

2.2.1 IPBS2/IPBS3 WITH INTERNAL ANTENNA

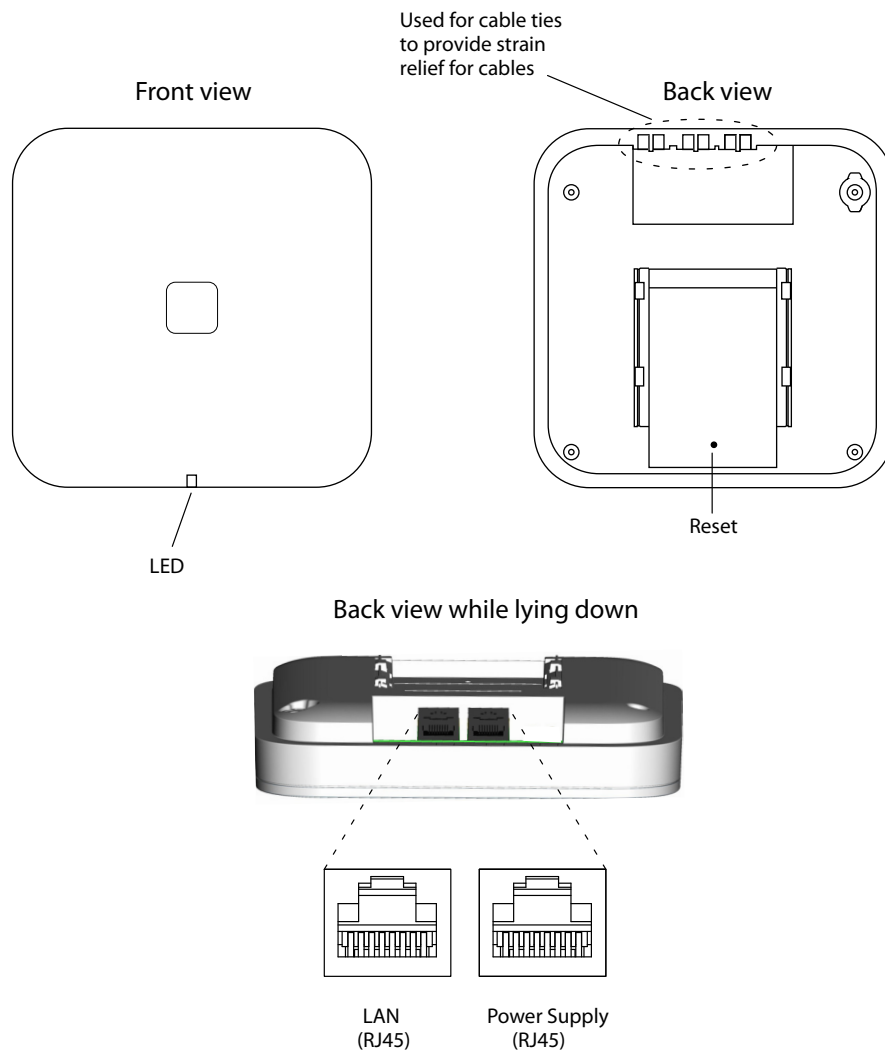


Figure 2. IPBS2/IPBS3 Overview

Contents of the Box

The box in which the IPBS2/IPBS3 is packed contains:

- An IPBS2/IPBS3 with integrated antennas
- A mounting bracket
- Two screws with wall plugs

Power Distribution

The IPBS2/IPBS3 can be powered using the following methods:

- Power over Ethernet, IEEE 802.3af
- A local AC-adaptor

NOTE: For more information about power distribution, see [3.3 Power the Base Station](#) on page 24.

Software







The software in the IPBS2/IPBS3 can be updated by downloading new software without disconnecting the equipment. The new software is stored in flash memory. For information on how to update the software in the IPBS2/IPBS3, see the applicable Installation and Operation Manual for the IPBS2/IPBS3.







Connectors

- Two 8-pin RJ45 modular jacks for LAN/PoE and powering

LEDs

The IPBS2/IPBS3 has one RGB LED to indicate status. This section describes the different indications and when they shall be used. In the illustrations below: Each blink pattern is represented by a number of blocks where each block is 100 ms. Light grey blocks means that the LED is off. Whenever the indication is changed the new pattern always starts from the first block.

Idle/OK	Solid blue. 	IPBS2/IPBS3 operational and no traffic on the IPBS2/IPBS3.
Starting up/ searching	100 ms blue, 100 ms off. 	The IPBS2/IPBS3 is in start-up phase, e.g. waiting for parameters from PARI Master, or is searching for air synchronization, or the radio is disabled.
Active traffic	400 ms off, 2000 ms blue. 	IPBS2/IPBS3 operational and traffic on the IPBS2/IPBS3.
Fully occupied for speech traffic	400 ms red, 2000 ms blue. 	Fully occupied with traffic.
Software download	400 ms blue, 600 ms off. 	Download of firmware in progress.
Mini firmware	100 ms yellow, 100 ms off. 	The IPBS2/IPBS3 is in mini firmware mode.

TFTP mode	Solid yellow. 	TFTP mode.
Error	100 ms red, 100 ms off. 	No Ethernet connection.
Fatal error	Solid red. 	Fatal hardware error.
Deployment: Good sync	2000 ms blue, 400 ms yellow. 	The IPBS2/IPBS3 is in deployment mode and has good air sync coverage.
Deployment: Bad sync	400 ms blue, 600 ms off, 400 ms blue, 600 ms off, 400 ms yellow. 	The IPBS2/IPBS3 is in deployment mode and does not have adequate air sync coverage.
Deployment: No sync	2000 ms red, 400 ms yellow. 	The IPBS2/IPBS3 is in deployment mode and has no air sync coverage.

2.2.2 IPBS2/IPBS3 WITH EXTERNAL ANTENNAS

This section contains the differences between the IPBS2/IPBS3 with internal antenna and external antennas. For all other information see [2.2.1 IPBS2/IPBS3 with Internal Antenna](#) on page 7.

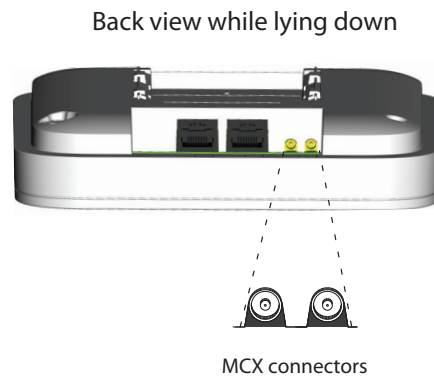


Figure 3. IPBS2/IPBS3 with MCX connectors for external antennas

Contents of the Box

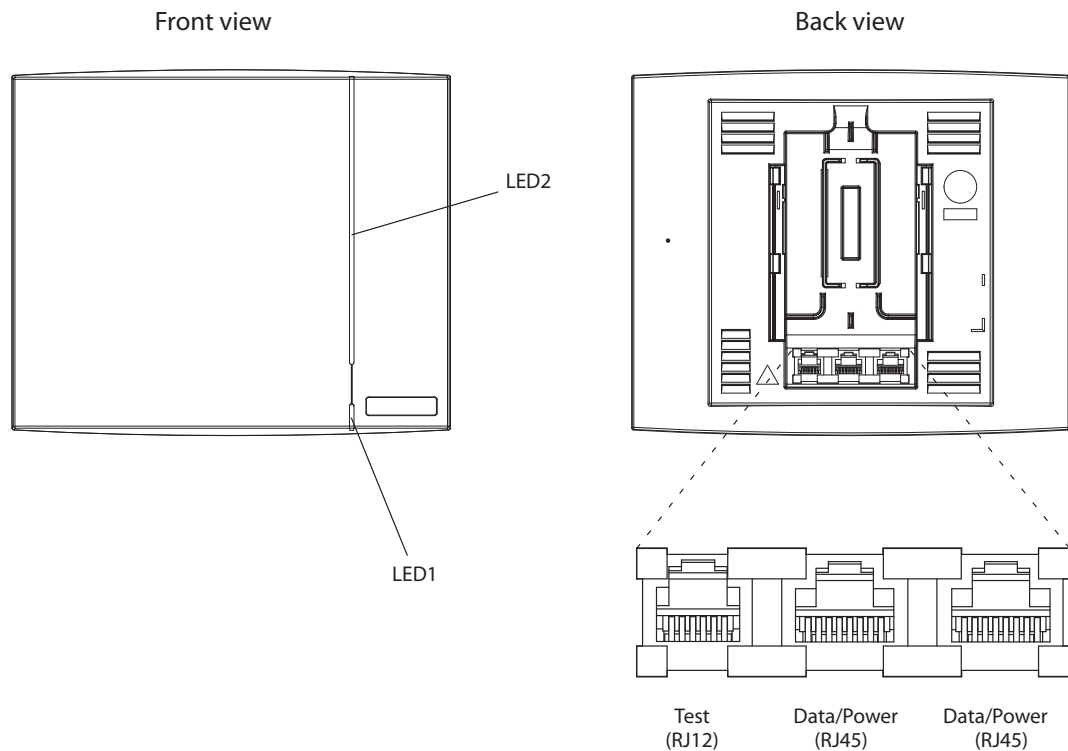
The box in which the IPBS2/IPBS3 is packed contains:

- An IPBS2/IPBS3 with external antennas.
- A mounting bracket
- An antenna bracket
- Two antenna coaxial cables.
- Two antennas.
- Four screws with wall plugs

2.3 BS3X0

The following versions are available:

- BS330 with Internal antenna
- BS340 with External antennas
- BS330-9131 (EU) with Internal antenna
- BS330-9134 (US) with Internal antennas
- BS340-9131 with External antenna



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Figure 4. BS3x0 Overview

Contents of the Box

The box in which the base station is packed contains:

- A base station
- Two antennas (only base station with external antenna)
- A mounting bracket
- Two screws with wall plugs

Power Distribution

The base station can be powered using the following methods:

- From the PBX via the Express Powering Pair (EPP) and data pairs
- With a local AC-adapter

NOTE: For more information about power distribution, see [3.3 Power the Base Station](#) on page 24.

Software

The software in the BS3x0 can be updated by downloading new software without disconnecting the equipment. The new software is stored in flash memory. For information on how to update the software in the BS3x0, see the applicable Installation and Operation Manual for the BS3x0.

Connectors

- Two 8-pin RJ45 modular jacks for data and powering
- A 6-pin RJ12 modular jack for factory testing

LEDs

Status of LED1 (lower LED)	Description
Steady Green	Power LED

Status of LED2 (upper LED)	Description
Not lit	Base station operational and no traffic on the base station.
Flashing green	Fully occupied with traffic.
Steady green	Base station operational and traffic on the base station.
Flashing amber	Software is being downloaded to the base station
Steady amber	Base station is OK, but not available (self-test, not initialized, no communication with PBX)

2.4 BS3X2

The following versions of the BS3x2 are available:

- BS332 with internal antenna
- BS342 with external antennas

The BS3x2 is backward compatible with the BS3x0 when it comes to coverage, functionality, accessories and mounting bracket. If an old BS3x0 has to be replaced you just reuse the mounting bracket and install the BS3x2.

2.4.1 BS3X2 WITH INTERNAL ANTENNA

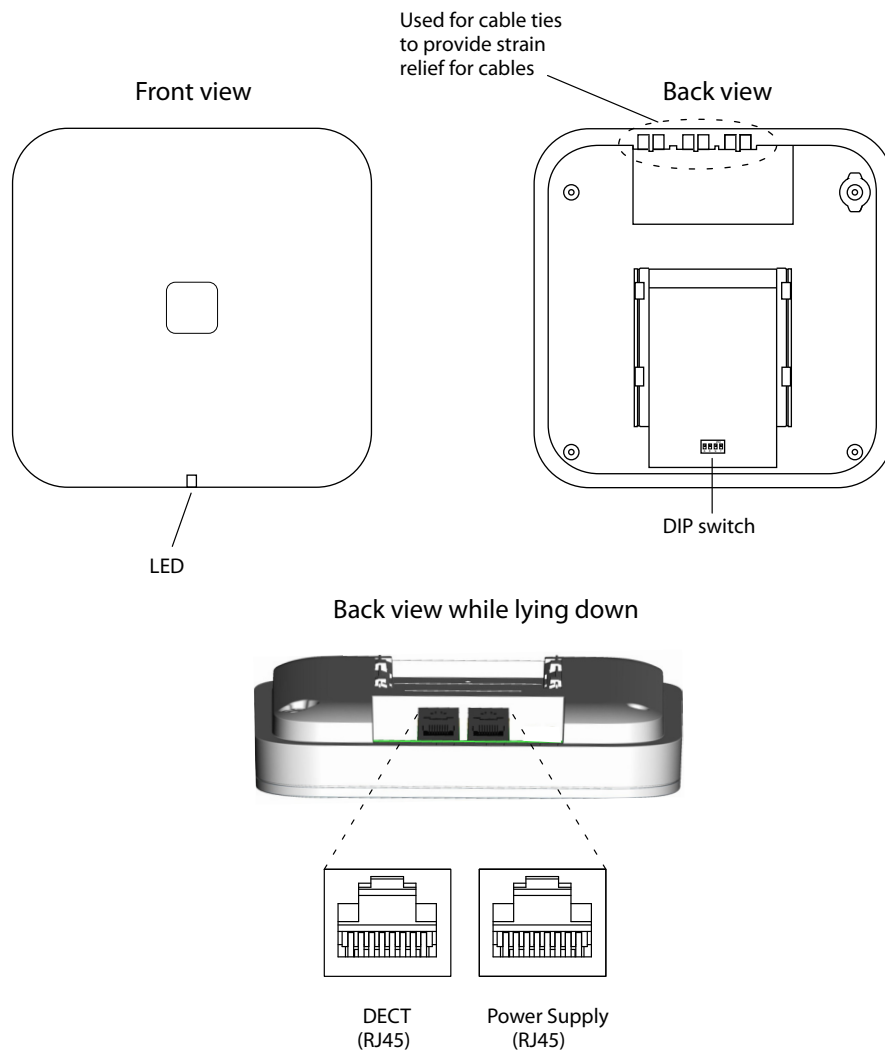


Figure 5. BS3x2 Overview

Contents of the Box

The box in which the BS3x2 is packed contains:

- A BS3x2 with integrated antennas
- A mounting bracket
- Two screws with wall plugs

Power Distribution

The BS3x2 can be powered using the following methods:

- From the PBX via the Express Powering Pair (EPP) and data pairs
- With a local AC-adapter

NOTE: For more information about power distribution, see [3.3 Power the Base Station](#) on page 24.

Software







The software in the BS3x2 can be updated by downloading new software without disconnecting the equipment.

Connectors

- Two 8-pin RJ45 modular jacks for data and powering

LEDs

The BS3x2 has one RGB LED to indicate status. This section describes the different indications and when they shall be used. In the illustrations below: Each blink pattern is represented by a number of blocks where each block is 100 ms. Light grey blocks means that the LED is off. Whenever the indication is changed the new pattern always starts from the first block.

Idle/OK	Solid blue. 	BS3x2 operational and no traffic on the BS3x2.
Starting up	100 ms blue, 100 ms off. 	The BS3x2 is in start-up phase, i.e. waiting to be initialized by the PBX.
Active traffic	400 ms off, 2000 ms blue. 	BS3x2 operational and traffic on the BS3x2.
Fully occupied for speech traffic	400 ms red, 2000 ms blue. 	Fully occupied with traffic.
Software download	400 ms blue, 600 ms off. 	Download of firmware in progress.
Error	100 ms red, 100 ms off. 	U _{PN} layer 1 communication error.

Fatal error

Solid red.

Fatal hardware error.

DIP Switches

The DIP switches can be found on the back of the BS3x2, see [figure 5](#) on page 13.

NOTE: Note: DIP switch 3 and 4 shall be set to ON.

Set DIP switch 1 and 2 to ON or OFF as follows:

DIP switch 1: ON DIP switch 2: ON	1880-1900 MHz (Europe, Africa, Middle East, Australia, New Zealand and most of the countries in Asia)
DIP switch 1: OFF DIP switch 2: ON	1900-1920 MHz
DIP switch 1: ON DIP switch 2: OFF	1910-1930 MHz (Latin America)
DIP switch 1: OFF DIP switch 2: OFF	1920-1930 MHz (North America)

2.4.2 BS342 WITH EXTERNAL ANTENNAS

This section contains the differences between the BS3x2 with internal antenna and external antennas. For all other information see [2.4.1 BS3x2 with Internal Antenna](#) on page 13.

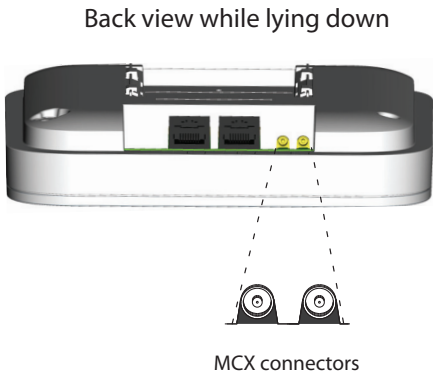


Figure 6. BS342 with MCX connectors for external antennas.

Contents of the Box

The box in which the BS342 is packed contains:

- A BS342 with external antennas.
- A mounting bracket
- An antenna bracket
- Two antenna coaxial cables.
- Two antennas.
- Four screws with wall plugs

2.5 AC-ADAPTER

The AC-adapter is used to power a base station locally.

NOTE: The maximum length of cable from adapter must not exceed 10 meters.

Versions (different type of mains plug)

For European countries except U.K.	Art. no.: 130137B	Order. no.: BSX-0013
For U.K.	Art. no.: 130136B	Order. no.: BSX-0014
For NA	Art. no.: 130138A	Order. no.: BSX-0015
For Australia	Art. no.: 130139B	Order. no.: BSX-0016

If local power supply is used for the RFPs, the EPP cable pair must NOT be connected.

3 INSTALLATION OF THE BASE STATION

This section describes how to install the IPBSs, BS3x0 and BS3x2. All three base stations can be fixed to a wall, a ceiling, a pole or a beam, by means of the mounting bracket included. When fixing the base station to a wall or ceiling the included plugs and screws must be used. When fixing it to a pole or beam a strap or a flexible band must be used, this is not included.

NOTE: It is recommended to mount the Base station at least 30 cm away from a metal surface.

3.1 BASE STATION CABLING

Recommended base station cable is a standard CAT5 unshielded ethernet cable with minimum 26 AWG copper conductors, this cable is also used for powering the base station. It is assumed that installation personnel know how to crimp RJ45 connectors to a cable.

NOTE: Since the distance between the base station and the wall is limited, a RJ45 modular jack without cable retention must be used.

NOTE: Ensure that during the installation of an base station, each base station is given an extra length (5-10 metres) of cable because it is possible that it will have to be moved for one reason or another.

3.2 INSTALL THE BASE STATION

The base station can be mounted vertically or horizontally. Mount the base station at places and positions as determined in the base station plan, see the applicable System Planning documentation for IP-DECT. The base station must be placed in a way that it is not facing large metal objects such as large heating pipes.

3.2.1 FIX THE MOUNTING BRACKET TO A WALL

Fix the mounting bracket (see [figure 7](#) on page 18) to the wall as follows:

- 1 Hold the mounting bracket with its flat side against the wall with the text 'TOP' upwards and mark the two holes. The minimum distance between the upper hole and the ceiling or any object above the base station must be at least 65 mm for IPBS1/BS330 and 100 mm for IPBS2/IPBS3/DB1, see [figure 7](#) on page 18. If the distance is less than 65/100 mm, the base station cannot be slid onto the bracket.
- 2 When using wall plugs: Drill the two holes using a \varnothing 6 mm drill and insert the included wall plugs.
- 3 Position the mounting bracket with its flat side to the wall and fasten it with the two included \varnothing 3.5 mm screws.

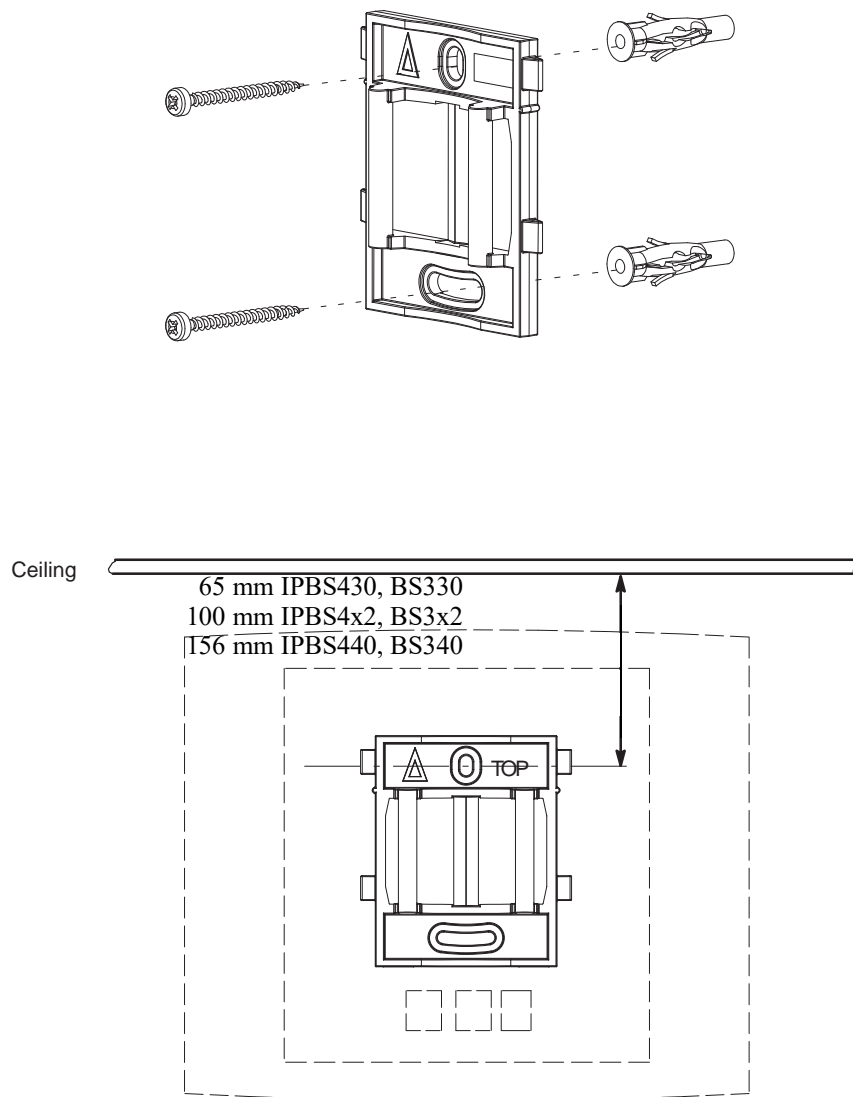


Figure 7. Fixing the mounting bracket to a wall.

3.2.2 FIX THE MOUNTING BRACKET TO A CEILING

Fixing to a ceiling is done in the same way as the a wall, see [3.2.1 Fix the Mounting Bracket to a Wall](#). When the base station has to be positioned above a suspended ceiling, make sure that the front of the base station points downwards.

3.2.3 FIX THE MOUNTING BRACKET TO A POLE OR BEAM

The mounting bracket can be fixed to a pole (diameter ≥ 45 mm) or a beam (wider than 50 mm) by means of a strap or flexible band less than 30 mm wide. The strap or flexible band is not included in the box.

- 1 Fix the mounting bracket to a pole or beam using the band, see [figure 8](#) on page 19.

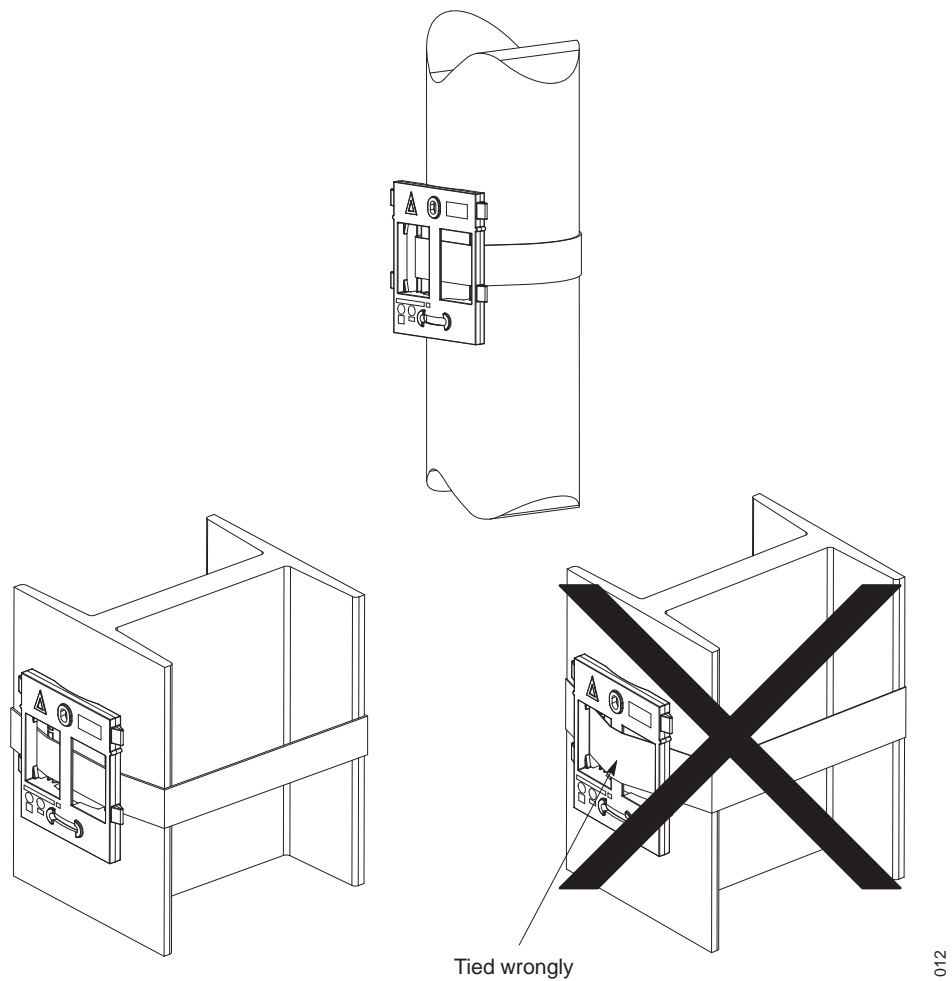


Figure 8. Fixing the mounting bracket to a pole or beam.

3.2.4 USE THE CABLE DUCTS FOR IPBS1

When the base station IPBS1 is mounted to the wall, cable ducts can be used to route the wiring through.

- 1 Fix the cable duct to the wall in one of the positions shown in [figure 9](#) on page 20.

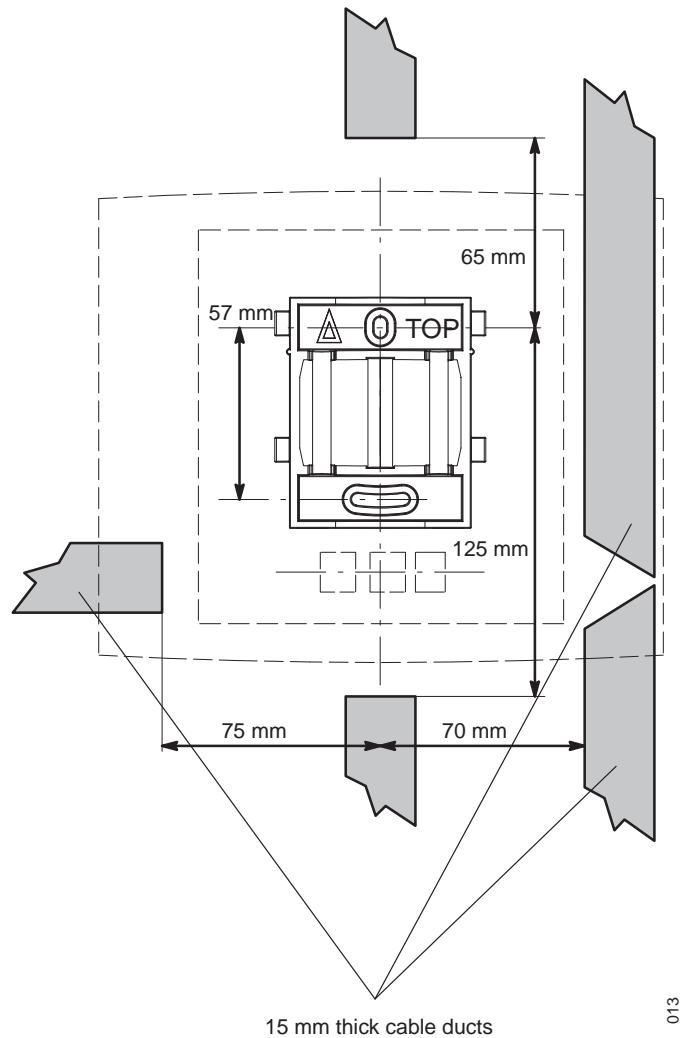
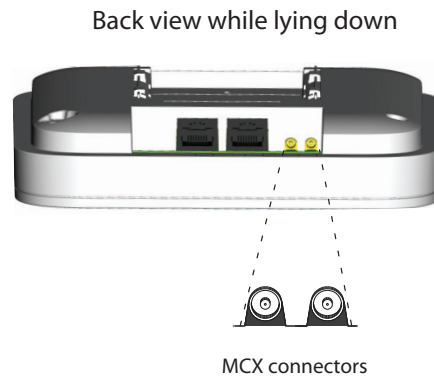


Figure 9. Minimum distances between a cable duct and the mounting bracket.

3.2.5 CONNECT EXTERNAL ANTENNAS (ONLY IPBS2, IPBS3 AND DB1)

- 1 Position the included antenna bracket above the mounting bracket with a minimum distance of 74 mm (250 mm maximum) and mark the two holes for the antenna bracket, see [figure 10](#) on page 21 (1).
- 2 When using wall plugs: Drill the two holes using a \varnothing 6 mm drill and insert the included wall plugs.
- 3 Position the antenna bracket to the wall and fasten it with the two included \varnothing 3.5 mm screws.
- 4 Mount the two included coaxial cables on the antenna bracket [figure 10](#) on page 21 (2). Fasten the coaxial cables with the lock nuts which are found on the coaxial cable antenna connectors.
- 5 Mount the antennas on the antenna connectors (2).

- 6 Connect the coaxial cables to the MCX connectors on the base station.



- 7 Mount the base station (3), see [3.2.9 Mount the Base Station](#) on page 23.

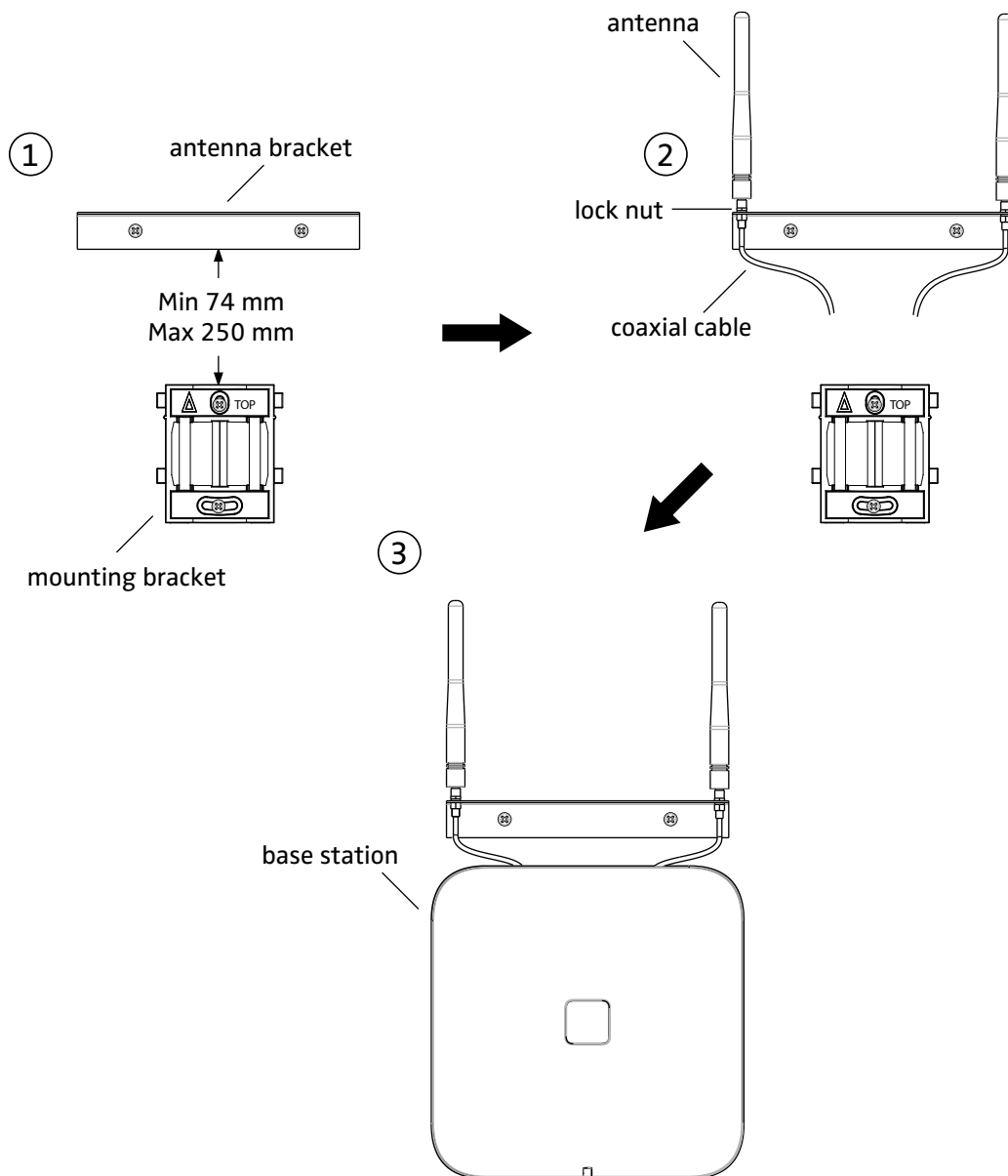


Figure 10. Connect external antennas.

3.2.6 SECURE THE CABLE

For safety reasons secure the base station cable to a convenient point at about 30 cm from the base station.

If for some reason the base station drops, it is secured by the cable.

3.2.7 PINNING

- 1 Cut the cable to the correct length and connect the cable to a RJ45 modular jack.
- 2 For information on the pinning of the data jack see the following:
 - IPBS, [Pin the IPBS Cable](#) on page 22.
 - BS3x0 and BS3x2, [Pin the BS3x0/DB1 Cable](#) on page 23.

Do **not** plug the connector in the base station yet!

NOTE: Since the distance between the base station and the wall is limited, a RJ45 modular jack without cable retention must be used.

Pin the IPBS Cable

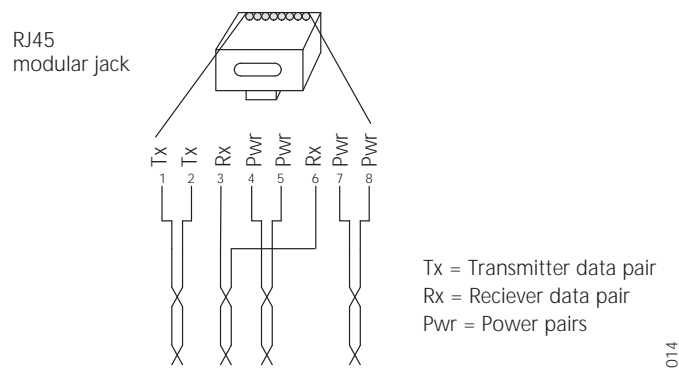


Figure 11. Connector pinning of the LAN/PoE connector, power feed over the spare cable pairs.

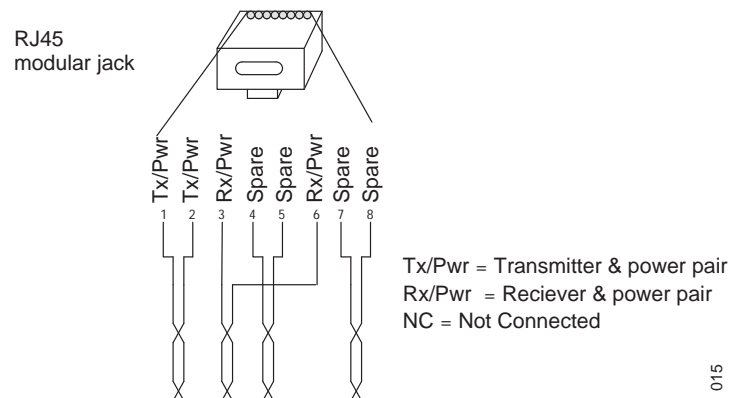
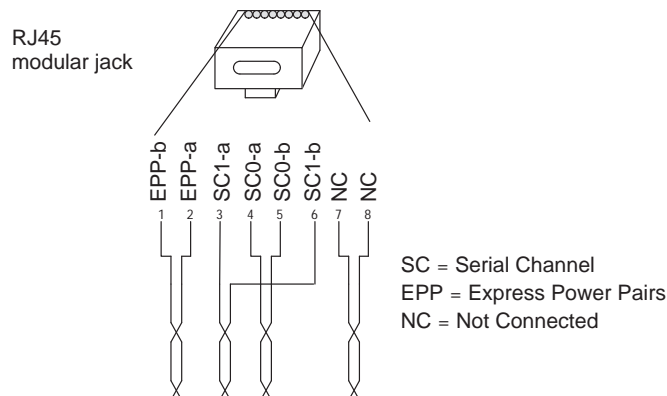


Figure 12. Connector pinning of the LAN/PoE connector, power feed over the Rx/Tx data cable pairs.

Pin the BS3x0/DB1 Cable



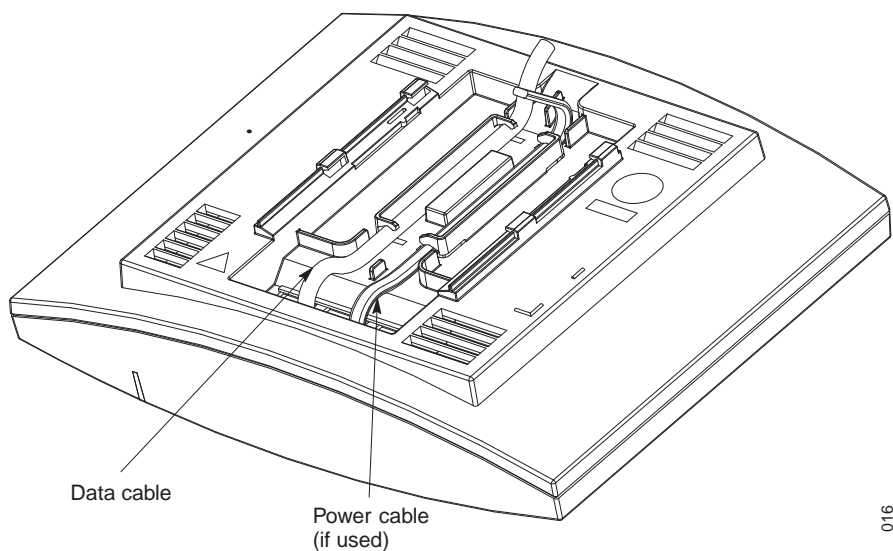
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Figure 13. Connector pinning of the Data connector

IMPORTANT: If local power supply is used, the EPP cable pair must NOT be connected.

3.2.8 CONNECT THE BASE STATION CABLES

- 1 Only for IPBS1: If it is required that the cables enter the base station centrally from above, guide the cables through the recess in the middle of the base station as shown below.



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- 2 Plug the modular jack of the data cable into one of the data/power connectors.
- 3 When an AC-adapter is used:
 - Plug the modular jack of the AC-adapter in one of the data/power connectors.
 - Plug the AC-adapter into a wall-outlet.

3.2.9 MOUNT THE BASE STATION

Hold the base station flat against the mounting bracket and move it downwards until it clicks, see below.

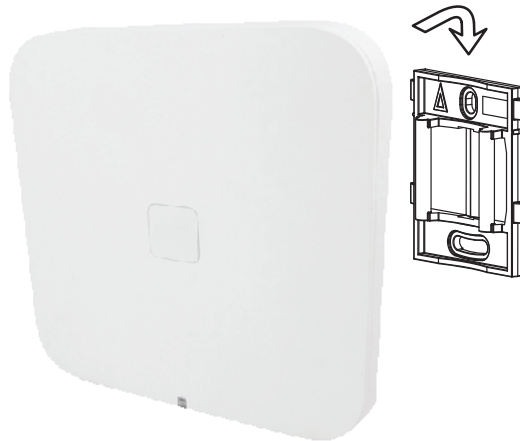


Figure 14. Mounting of the IPBS

3.3 POWER THE BASE STATION

The base station is powered the following ways:

- Power over Ethernet (only IPBS).
- Power over Express Powering Pairs (EPP) and data pairs (only BS3x0 and DB1)
- By a local power supply.

NOTE: Do not power the base station using both power supplies. Parallel powering will not harm the base station but it can disturb the signalling.

3.3.1 POWER THE IPBS OVER ETHERNET

The IPBS supports Power over Ethernet, IEEE 802.3af, class 2. The power source will allocate 7W to the IPBS. This must be regarded when planning the powering of the IPBSs so that the power limit of the PoE power source is not exceeded.

The PoE standard supports two ways of feeding the power:

- 1 Power over the Rx/Tx data pairs.
- 2 Power over the spare cable pairs.

Both power feed methods are supported in the IPBS, it is also insensitive to change of the polarity.

3.3.2 POWER THE BS3X0 AND DB1 OVER EXPRESS POWERING PAIR (EPP) AND DATA PAIRS

When a base station is powered remotely via the PBX, the maximum length between the base station and the PBX depends on the supply voltage, the number of twisted pairs used and the wire size. The length of the cable should never exceed "data-limited" length of the cable, see [Appendix A: RFP Power Consumption](#) on page 27.

3.3.3 POWER THE BASE STATION WITH A LOCAL POWER SUPPLY

Powering the base station with a local power supply can be done using the second data/power inlet on the base station. The base station can be powered individually by an AC-adapter. The AC-adapter is provided with an 8-pin RJ45 plug that can be plugged into the *Power Supply* jack. For specification see [2.5 AC-adapter](#) on page 16.

Only approved power supply according to valid editions of EN/IEC/CSA/UL/AU/NZS 60950 is to be used when the base station is powered by a local power supply.

4 RELATED DOCUMENTS

Installation and Operation Manual for IP-DECT Base Station 13/1531-ANF 901 14

Appendix A: RFP Power Consumption

The table below show power consumption for a base station connected to and powered from the PBX.

The maximum cable length for base stations connected to the PBX must **not** exceed 1700 meters.

A.1 IPBS4x0, BS3x2 and BS3x0 R4H and later

Cable length (metres)	0.4 mm wire size (\varnothing)		0.5 mm wire size (\varnothing)		0.6 mm wire size (\varnothing)	
	Without EPP	With EPP	Without EPP	With EPP	Without EPP	With EPP
0	2.0	2.0	2.0	2.0	2.0	2.0
100	2.0	2.0	2.0	2.0	2.0	2.0
200	2.1	2.0	2.0	2.0	2.0	2.0
300	2.1	2.1	2.1	2.0	2.0	2.0
400	2.1	2.1	2.1	2.1	2.1	2.0
500	2.2	2.1	2.1	2.1	2.1	2.0
600	2.2	2.1	2.1	2.1	2.1	2.1
700	2.3	2.2	2.2	2.1	2.1	2.1
800	2.3	2.2	2.2	2.1	2.1	2.1
900	2.4	2.2	2.2	2.1	2.1	2.1
1000	2.5	2.3	2.3	2.2	2.2	2.1
1100	2.6	2.3	2.3	2.2	2.2	2.1
1200	2.7	2.3	2.3	2.2	2.2	2.1
1300	2.8	2.4	2.4	2.2	2.2	2.1
1400	2.9	2.4	2.4	2.2	2.2	2.1
1500	3.2	2.5	2.4	2.3	2.3	2.2
1600	3.7	2.5	2.5	2.3	2.3	2.2
1700	-	2.6	2.5	2.3	2.3	2.2

Table 1 *Power consumption (watts) of base stations and cabling when powered from the PBX*

A.2 BS330 and BS340 proir to R4H

Cable length (metres)	0.4 mm wire size (\varnothing)		0.5 mm wire size (\varnothing)		0.6 mm wire size (\varnothing)	
	Without EPP	With EPP	Without EPP	With EPP	Without EPP	With EPP
0	5.0	5.0	5.0	5.0	5.0	5.0
100	5.2	5.1	5.1	5.1	5.1	5.1
200	5.3	5.3	5.2	5.2	5.1	5.1
300	5.6	5.5	5.3	5.3	5.2	5.1
400	5.8	5.7	5.5	5.4	5.3	5.2
500	6.1	5.9	5.6	5.5	5.4	5.2
600	6.5	6.2	5.8	5.6	5.4	5.3
700	-	6.6	6.0	5.8	5.5	5.3
800	-	7.1	6.2	5.9	5.6	5.4
900	-	7.9	6.5	6.1	5.7	5.4
1000	-	-	-	6.3	5.8	5.5
1100	-	-	-	6.6	5.9	5.6
1200	-	-	-	6.9	6.1	5.6
1300	-	-	-	7.3	6.2	5.7
1400	-	-	-	7.9	6.4	5.8
1500	-	-	-	-	6.6	5.8
1600	-	-	-	-	6.8	5.9
1700	-	-	-	-	7.0	6.0

Table 2 *Power consumption (watts) of base stations and cabling when powered from the PBX*

