

# Installation Instructions

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*The contents of this document are subject to revision without notice due to continued progress in methodology, design and manufacturing.*

*Ericsson shall have no liability for any errors or damages of any kind resulting from the use of this document.*

# 1 Introduction

This section contains the information necessary for installing a MOBITECH Base Radio Unit 3, BRU3.

## 2 The BRU3 Delivery Specification

All BRU3 deliveries are packed according to the *BRU3 - Site Documentation* module for the Site.

**Note:** The *Site Documentation* module is not included in the electronically published version of the *Mobitex NTE Client Library* but is delivered on paper together with the hardware.

### 2.1 Standard Installation Equipment (Provided by Ericsson)

The Standard Installation Kit (FE Installation Kit - NTMA 102 22/1) comprises all the parts needed to install the BRU3 on a wall (except for the installation material). The parts included in the Standard Installation Kit are listed in the *Installation Kit* section.

### 2.2 Pole Installation Equipment (Provided by Ericsson)

Together with the Standard Installation Kit, the Pole Installation Kit (FE Mounting Bracket 100 - NTMA 102 23/1) is needed to mount the BRU3 on a Horizontal or Vertical pole. Parts included in the Standard Installation Kit are listed in the *Installation Kit* section.

### 2.3 Storage

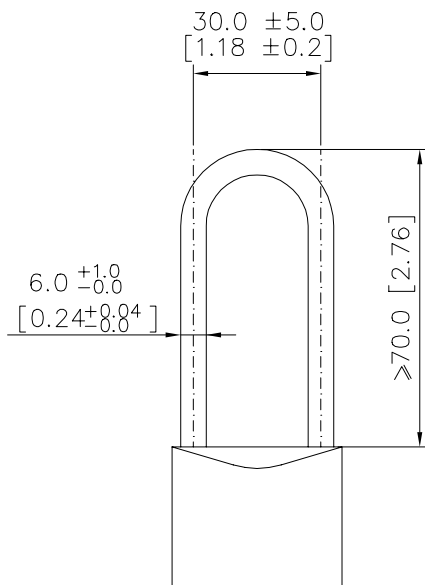
The delivery package for the BRU3 meets standard ETS 300 019-1-1, class 1.3 for storage. However, it is recommended to have any plans for long term storage verified by Ericsson.

## 3 Preparation Before Installation

### 3.1 Installation Material (Provided by the Installation Contractor)

Make sure that the installation material required is available before the installation work is started. Check as follows:

- One set of Grounding material comprising:
  - 1 pc of Copper Grounding Cable,  $\geq 16\text{mm}^2$  (AWG 5).
  - 1 pc of Cable Lug (Stainless) fitting the Copper Grounding Cable  $\geq 16\text{mm}^2$  and the M8 Grounding Bolt.
- 1-2 pcs of Antenna Cables of type “RG 214/U-60”. The quantity of cables depends on whether combined or separate RX and TX Antennas are used. The cable must have an outer diameter of  $\varnothing$  6-12mm to fit the cable bushing.
- 4 pcs of Loose Bolt Expanders of the type “HILTI HDE M10” or equivalent (for installation of the BRU3 Base Plate on a Concrete Wall).
- 4 pcs of M10x70mm Bolts (for installation of the BRU3 Base Plate in the Loose Bolt Expanders of type “HILTI HDE M10” on a Concrete Wall). If an equivalent Loose Bolt Expander is used, see the specification for the recommended bolt.
- 2 pcs of Padlocks in Stainless Steel (for locking the BRU3 to the Base Plate), with the following shackle dimensions (please refer to *Figure 1 “Dimension of the BRU3 padlocks.”*)
- 1 pc of Power Connection Cable,  $1.5\text{ mm}^2$ , (AWG 16) for connection to the FE Power Connection Box.



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Figure 1 Dimension of the BRU3 padlocks.

### 3.2 Installation Documentation (Provided by the Installation Contractor)

Make sure that the following documentation is available before the installation work is started:

- BRU3 Manual (this manual).
- *BRU3 - Site Documentation* module.

**Note:** The *Site Documentation* module is not included in the electronically published version of the *Mobitex NTE Client Library* but is delivered on paper together with the hardware.

### 3.3 Installation Tools (Provided by the Installation Contractor)

Make sure that the following tools are available before the installation is started:

- 1 pc of Drilling Machine (for drilling in walls)
- 1 pc of 18mm Drill Bit (for drilling in walls)
- 1 pc of Drill Template (for drilling in walls. Made by means of the installation drawings)
- 1 pc of Hammer
- 1 pc of Spirit Level
- One set of Wire-Stripping Knives
- One set of Side Cutting Pliers
- 1 pc of Adjustable Spanner 0-30mm
- One set of Open End Wrenches, specially included:
  - 13 mm (for M8 bolts)
  - 16 and 17 mm (for M10 bolts)
  - 24 and 27 mm (for the cable bushings)
- One set of Socket Wrenches, specially included 13, 16 and 17mm.
- One set of Screwdrivers
- Crimp tool for mounting of the  $\geq 16\text{mm}^2$  (AWG 6) Copper Grounding Cable to the cable lug
- Crimp tool for mounting of Antenna Cable “Suhner 75 Z-0-0-15”
- “RG 214/U-60” to the RX and TX Antenna Connector “Suhner 11 TNC-50-7-2c”.

## 3.4 Site Inspection

Ensure that the BRU3 Site has been prepared according to the *Site Requirements* section in the *BRU3 - General* module:

- Check that the BRU3 Site on Wall or Pole is prepared for installation.
- Check that the Receiver (RX) and the Transmitter (TX) Antenna have been installed. If the BRU3 is equipped with a Duplex Filter, check that the combined RX/TX Antenna has been installed.
- Check that the RX and TX Antenna Cables from the antennas are routed to the BRU3. If the BRU3 is equipped with a duplex filter, check that the combined RX/TX antenna cable is routed to the BRU3.
- Check that the BRU3 Ground Cable has been connected to the Main Site Station Ground and that the cable is routed to the BRU3.
- Check that the required 120/230V AC Power Supply Cable has been connected to the Site Power Connection Box.
- Check that the Site Network Connection has been routed to the BRU3.



## 4 Ground Connection

1. Mount the Cable Lug on the Copper Grounding Cable using a Crimp Tool (*Pos 1*).
2. Slide the Spring Washer (*Pos 3*), the Plain Washer (*Pos 4*) and the Cable Lug (*Pos 5*) on to the M8x10mm Grounding Bolt (*Pos 2*).
3. Insert the Grounding Bolt (*Pos 2*) into one of the two tapped ground holes in the Base Plate and tighten it.

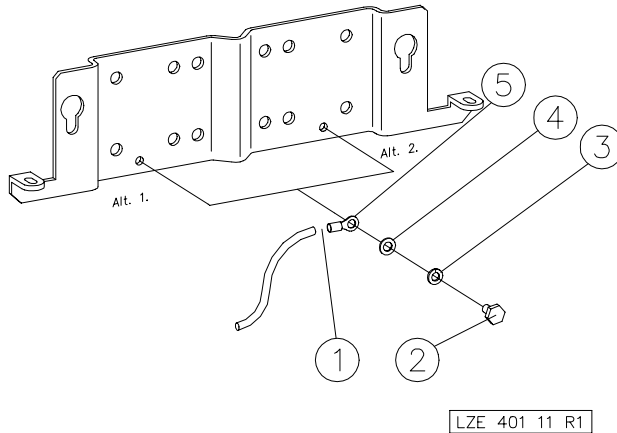


Figure 2 Connection of ground to the BRU3.

## 5 Installation of the BRU3

### 5.1 Installation of the BRU3 on a Wall

1. Unpack the BRU3 equipment. Tick off all parts against the delivery note and the module C manual. Please report missing or damaged parts to the shipper.
2. Mark the positions of four holes using the Drill Template. Drill the four 80 mm deep holes in the Wall with an 18 mm concrete drill (*Pos 1*).

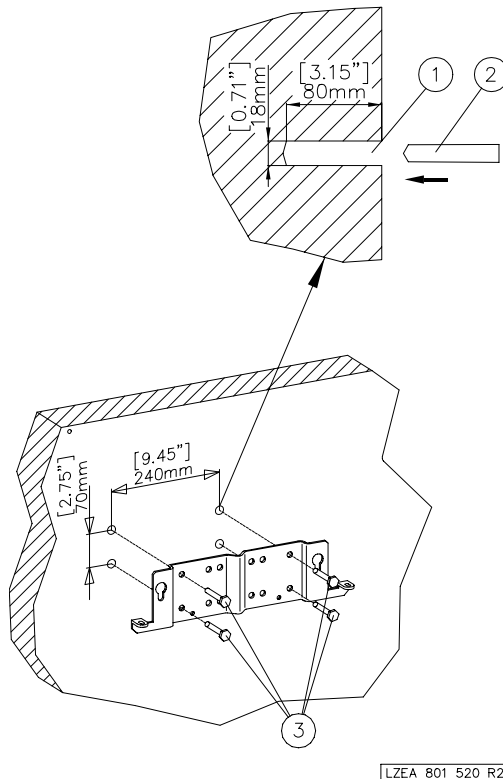
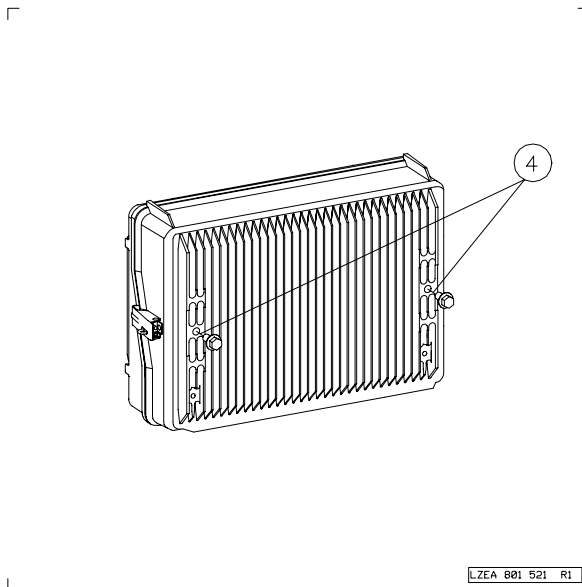


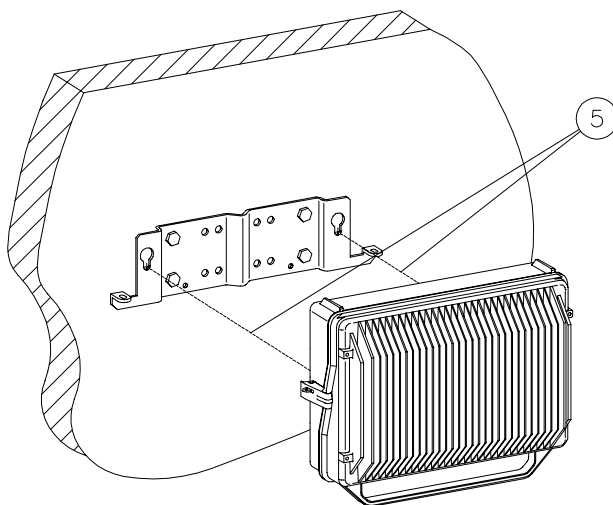
Figure 3 Installation of the base plate on a wall.

3. Clean the Wall and the holes from drill dust.
4. Mount the four Loose Bolt Expanders of the type “HILTI HDE M10” or the equivalent, in the holes (*Figure 2, Pos 2*).
5. Install the Base Plate on the Wall and tighten the four M10x70 mm bolts (or the equivalent) to the Loose Bolt Expanders (*Figure 3, Pos 3*).
6. Tighten the two M10x20 mm hook-up bolts into the BRU3 with a depth of 10 mm (*Figure 4, Pos 4*).



*Figure 4 Installation of the two BRU3 hook up bolts.*

7. Lift the BRU3. Put the two hook-up bolts into the key hole openings in the Base Plate and let the BRU3 slide down into position (*Pos 5*).
8. Tighten the two hook up bolts to the BRU3.



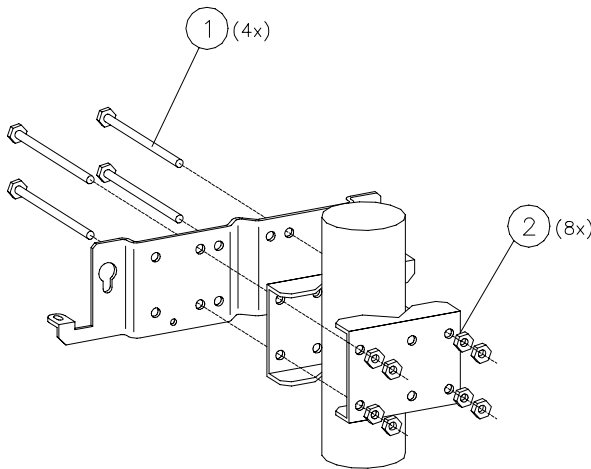
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*Figure 5 Installation of BRU3 on the base plate (mounted on a wall).*

## 5.2 Installation of the BRU3 on a Pole

### 5.2.1 Installation on a Vertical Pole

1. Unpack the BRU3 equipment. Tick off all parts against the delivery note and the module C manual. Please report missing or damaged parts to the shipper.
2. Pass the four M10x200 mm bolts through the Base Plate and the two Braces, the Pole positioned between the Braces (*Pos 1*).
3. Put the eight M10 nuts on to the bolts (two nuts for each bolt) and tighten them (*Pos 2*).

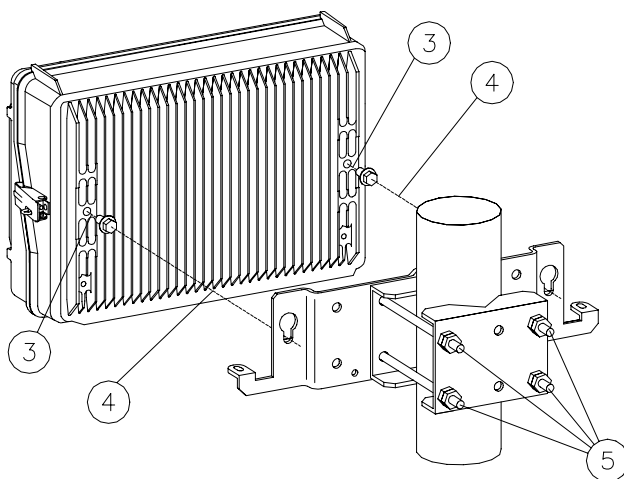


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*Figure 6 Installation of the base plate and the two braces on a vertical pole.*

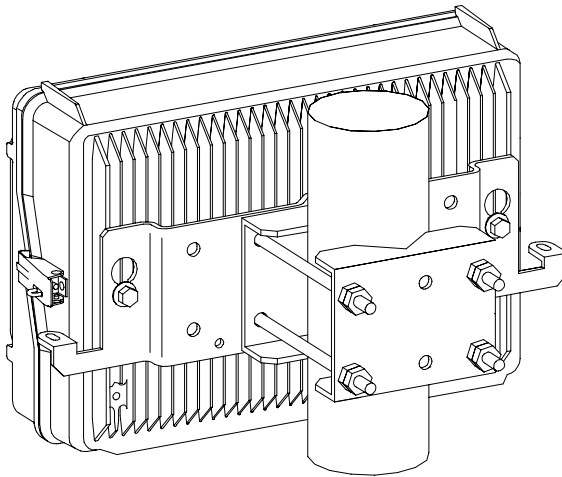
4. Tighten the two M10x20 mm hook-up bolts into the BRU3 with a depth of 10 mm (*Pos 3*).

5. Lift the BRU3. Put the two hook-up bolts into the key hole openings in the Base Plate and let the BRU3 slide down into position (*Pos 4*).
6. Tighten the two hook up bolts to the BRU3.
7. To protect the BRU3 from being removed from the site, stave the four M10x200 mm bolt ends up with a hammer to lock the nuts to the bolts (*Pos 5*).



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*Figure 7 Installation of the BRU3 on a vertical pole.*

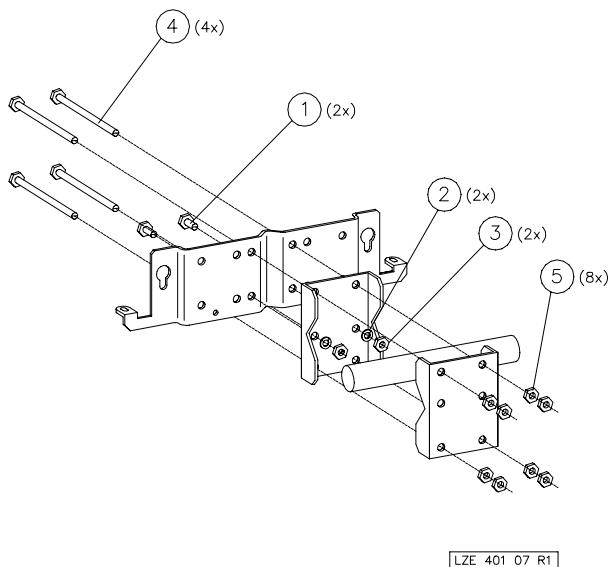


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*Figure 8 The BRU3 installed on a vertical pole.*

### 5.2.2 Installation on a Horizontal Pole

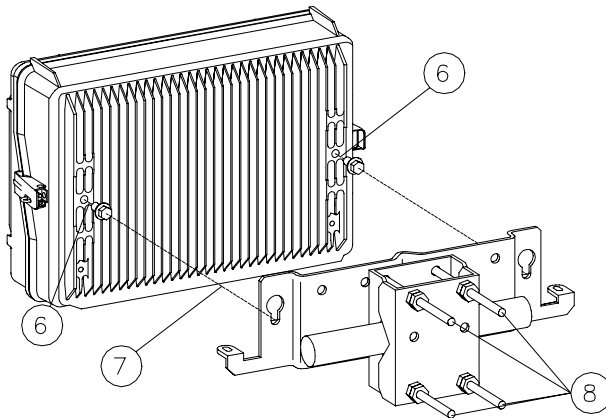
1. Unpack the BRU3 equipment. Tick off all parts against the delivery note and the module C manual. Please report missing or damaged parts to the shipper.
2. Pass the two M10x25 mm bolts (*Pos 1*) through the Base Plate, the first Brace and put on the washers (*Pos 2*).
3. Put the two M10 nuts (*Pos 3*) on to the bolts and tighten them.
4. Pass the four M10x200 mm bolts (*Pos 4*) through the Base Plate and the Braces, the Pole positioned between the Braces.
5. Put the eight M10 nuts (*Pos 5*) on to the bolts (two nuts for each bolt) and tighten them.



*Figure 9 Installation of the base plate and the two braces on a horizontal plate.*

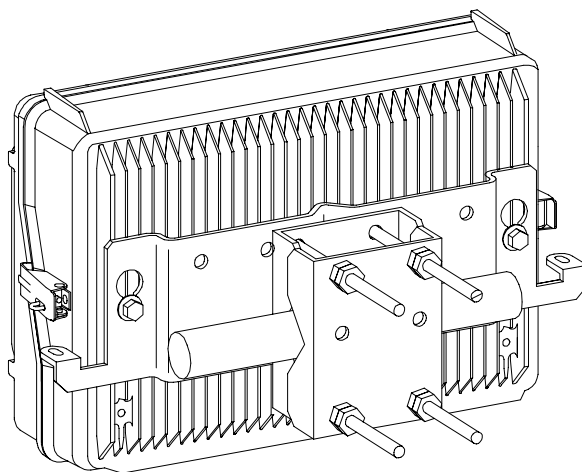


6. Screw the two M10x20 mm hook up bolts into the BRU3 with a depth of 10 mm (*Pos 6*).
7. Lift the BRU3. Put the two hook-up bolts into the key hole openings in the Base Plate (*Pos 7*) and let the BRU3 slide down into position.
8. Tighten the two hook up bolts to the BRU3.
9. To protect the BRU3 from being removed from the site, stave the four M10x200 mm bolt ends up with a hammer to lock the nuts to the bolts (*Pos 8*).



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*Figure 10 Installation of BRU3 on a horizontal pole.*



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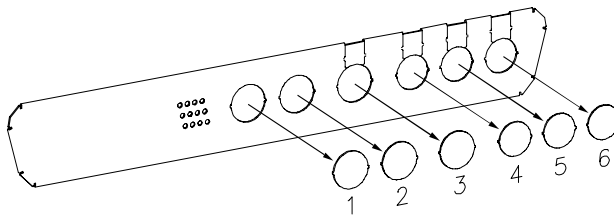
*Figure 11 The BRU3 installed on a horizontal pole.*

## 6 Front Cover Installation

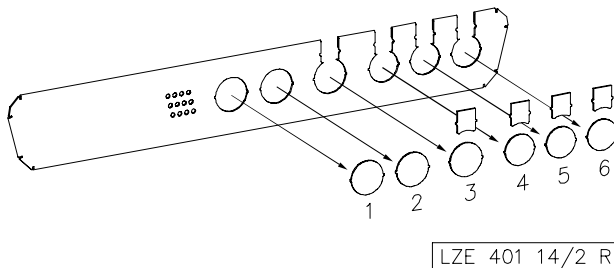
### Safety Instructions

Please refer to the *Safety Instructions* in the *BRU3 - General* module.

**Note!** The BRU3 front cover knock-outs have to be broken differently depending on whether the BRU3 is intended for outdoor or indoor installation (*Figure 12* or *Figure 13*).



*Figure 12 Knock-outs for the BRU3 **outdoor** installation.*



*Figure 13 Knock-outs for the BRU3 **indoor** installation.*

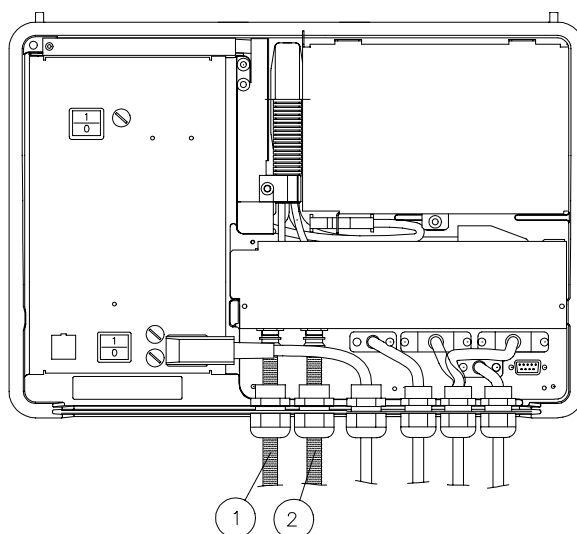
## 7 Connecting the Antenna

### 7.1 Connection of Separate RX and TX Antenna

1. Open the BRU3.
2. Break off knock-outs 1 and 2 in the BRU3 front cover (*Figure 12* or *Figure 13*).
3. Mount and tighten two large Cable Bushings to the Cable Bushing Nuts in knock-outs 1 and 2.
4. Pass the open end of the RX Antenna Cable through knock-out 1. Pass the open end of the TX Antenna Cable through knock-out 2.

**Note!** Pass both Antenna Cables from the outside of the BRU3 and inwards.

5. Mount the Antenna Connectors to the RX and TX Antenna Cables (*Figure 16*).
6. Connect the RX Antenna to the BRU3 connector “RX” (*Figure 14, Pos 1*)
7. Connect the TX Antenna to the BRU3 connector “TX” (*Figure 14, Pos 2*).
8. Tighten the Cable Bushings to the RX and TX Antenna Cables.
9. Connect the open ends of the RX and TX Antenna Cables to the RX and TX Antennas according to the *Site Requirements* section in the *BRU3 - General* module.



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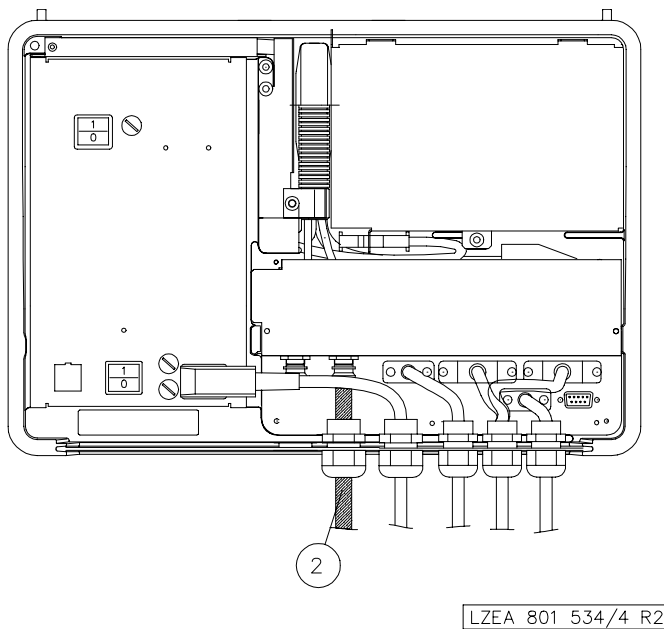
*Figure 14 Connection of RX antenna (Pos 1) and TX antenna (Pos 2).*

## 7.2 Connecting the Combined RX/TX Antenna

1. Open the BRU3.
2. Break off the knock-out 2 in the BRU3 front cover (*Figure 12* or *Figure 13*).
3. Mount and tighten a small Cable Bushing to the Cable Bushing Nut in knock-out 2.
4. Pass the open end of the combined RX/TX Antenna Cable through knock-out 2.

**Note!** Pass the Antenna Cable from the outside of the BRU3 and inwards.

5. Mount the Antenna Connector to the combined RX/TX Antenna Cable (*Figure 16*).
6. Connect the combined RX/TX Antenna to the BRU3 connector “TX” (*Figure 15, Pos 2*).
7. Tighten the Cable Bushing to the combined RX/TX Antenna Cable.
8. Connect the open end of the combined RX/TX Antenna Cable to the RX/TX Antenna according to the *Site Requirements* section in the *BRU3 - General* module.



*Figure 15 Connection of Combined RX/TX antenna (Pos 2).*





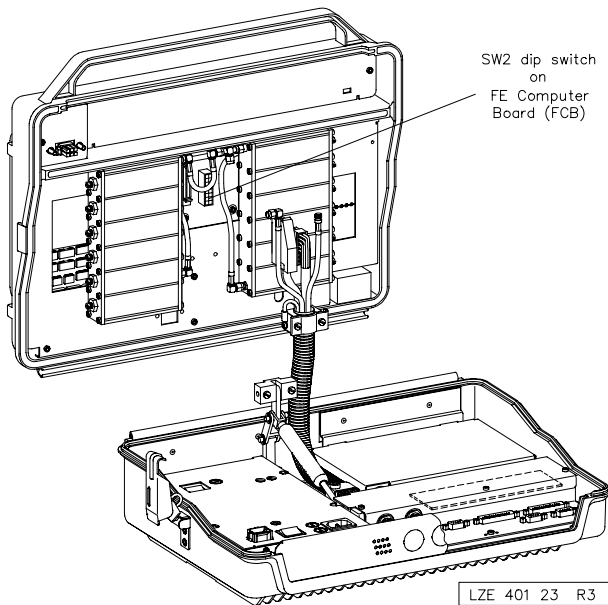
## 8 Connecting Network

### 8.1 General

There are three Network Connection alternatives for connecting the BRU3 to the Mobitex Area Exchange (MOX). One of the following shall be used:

- Telephone Line Connection
- RS232C Line Connection
- RS422B Line Connection

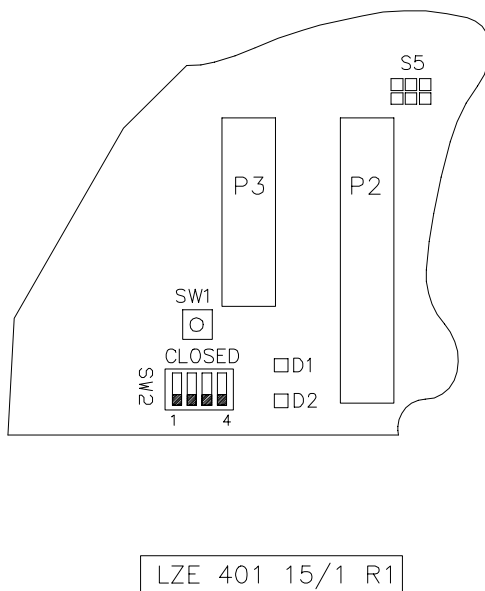
Use the SW2 dip switch on the FE Computer Board (FCB), (*Figure 17* and *Figure 18*) to set the connection alternative.



*Figure 17 Location of SW2 dip switch on the FE computer board (FCB).*

## 8.2 Connecting the Telephone Line

1. Open the BRU3.
2. Locate the SW2 dip switch on the FE Computer Board (FCB) in the BRU3 (*Figure 17*).
3. Set the SW2 dip switch in the following positions: SW2:1-Open, SW2:2-Open, SW2:3-Open, SW2:4-Open (*Figure 18*).



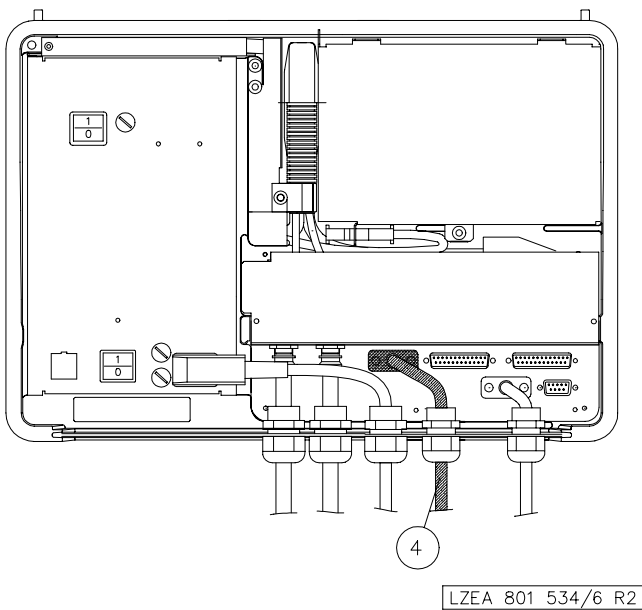
*Figure 18 SW2 dip switch set-up on the FCB for connecting the telephone line.*

4. Break off the knock-out 4 in the BRU3 front cover (*Figure 12* or *Figure 12*).
5. Mount and tighten the small Cable Bushing to the Cable Bushing Nut in knock-out 4.

6. Pass the open end of the FE Telephone Line Connection Cable, TSRA 905 45, through the Cable Bushing in the knock-out 4 in the BRU3.

**Note!** Pass the FE Telephone Line Connection Cable from the inside of the BRU3 and outwards.

7. Connect the FE Telephone Line Connection Cable to the BRU3 connector “P3 - TELEPHONE” (*Pos 4*).
8. Tighten the Cable Bushing to the FE Telephone Line Connection Cable.



*Figure 19 Connection of FE telephone line connection cable, TSRA 905 45 (Pos 4).*

9. Connect the open end of the FE Telephone Line Connection Cable (*Figure 20*) to the Site Network Connection Box according to the *Site Requirements* section in the *BRU3 - General* module.

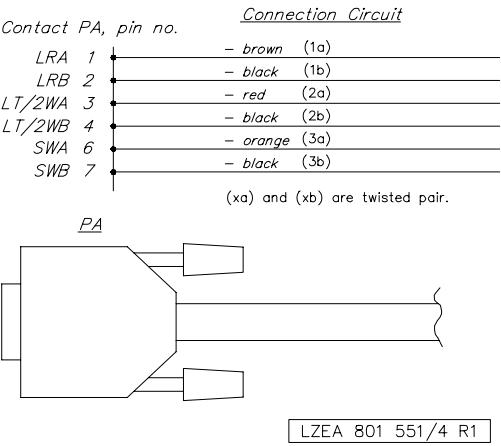
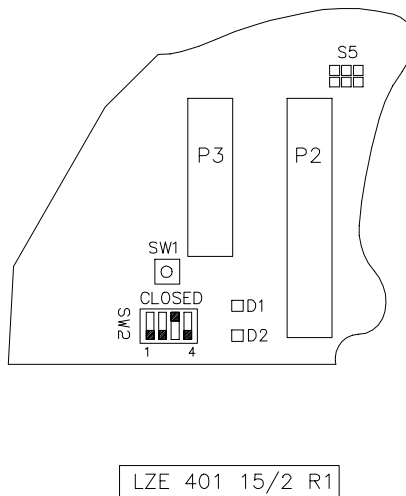


Figure 20 The FE telephone line connection cable, TSRA 905 45.

### 8.3 Connecting the RS232C Line

1. Open the BRU3.
2. Locate the SW2 dip switch on FE Computer Board (FCB) in the BRU3 (*Figure 17*).
3. Set the SW2 dip switch in the following positions: SW2:1-Open, SW2:2-Open, SW2:3-Closed, SW2:4-Open (*Figure 21*).



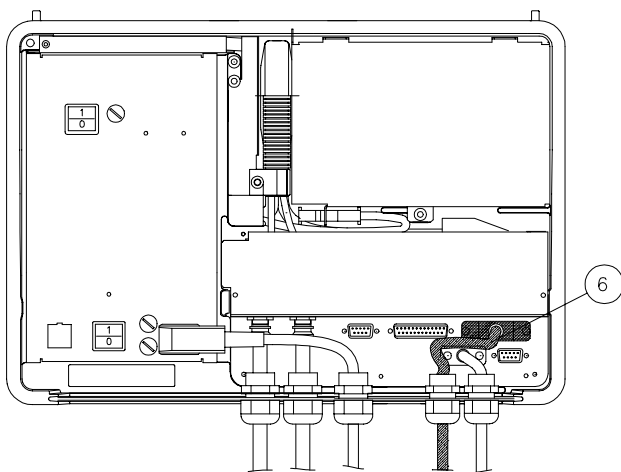
*Figure 21 SW2 dip switch set-up on the FCB for the modem RS232C connection.*

4. Break off the knock-out 5 in the BRU3 front cover (*Figure 12* or *Figure 13*).
5. Mount the small Cable Bushing to the Cable Bushing Nut in the knock-out 5.

6. Pass the open end of the FE Modem Connection Cable RS232, TSRA 904 63 through the Cable Bushing in the knock-out 5 in the BRU3.

**Note!** Pass the FE Modem Connection Cable RS232 from the inside of the BRU3 and outwards.

7. Connect the FE Modem Connection Cable RS232 to the BRU3 connector “P4 - RS232” (*Pos 6*).
8. Tighten the Cable Bushing to the FE Modem Connection Cable RS232.
9. Connect the open end of the FE Modem Connection Cable RS232 to the Site Network Connection Box according to the *Site Requirements* section in the *BRU3 - General* module.



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*Figure 22 Connecting the FE modem connection cable RS232, TSRA 904 63, (Pos 6).*

<i>Contact PA, pin no.</i>		<u>Connection Circuit</u>
SCREEN	1	– screen
TXA	2	– brown (1a)
SGND	7	– black (1b)
RXA	3	– red (2a)
RTS	4	– orange (3a)
DCD	8	– black (3b)
TC	15	– yellow (4a)
NC		– black (4b)
RC	17	– green (5a)
NC		– black (5b)
DTR	20	– blue (6a)
ETC	24	– black (6b)

(xa) and (xb) are twisted pair.  
NC = Not Connected

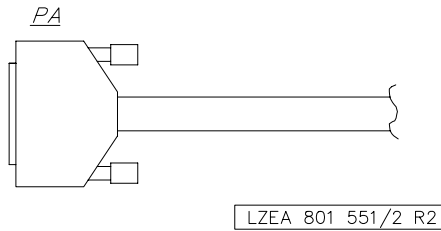
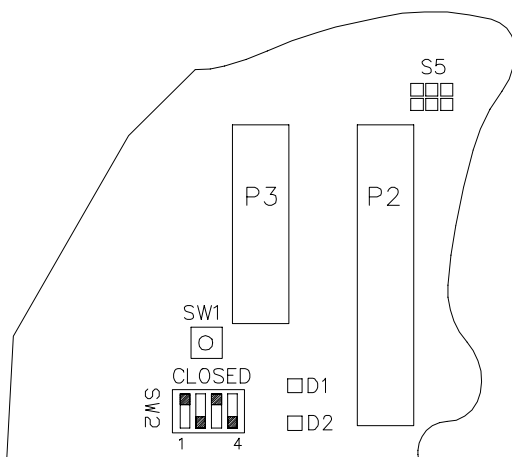


Figure 23 The FE modem connection cable RS232, TSRA 904 63, (Pos 6).

## 8.4 Connecting the RS422B Line

1. Open the BRU3.
2. Locate the SW2 dip switch on FE Computer Board (FCB) in the BRU3 (*Figure 17*).
3. Set the SW2 dip switch in the following positions: SW2:1-Closed, SW2:2-Open, SW2:3-Closed, SW2:4-Open (*Figure 24*).



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*Figure 24 SWP dip switch set-up on FCB for modem connection RS422B.*

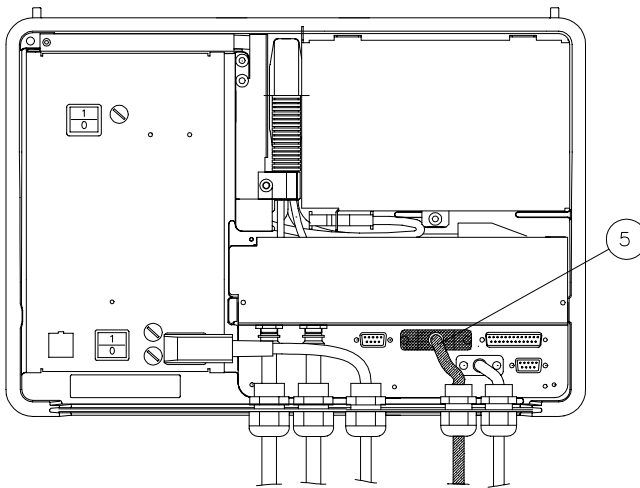
4. Break off the knock-out 5 in the BRU3 front cover (*Figure 12 or Figure 13*).



5. Pass the open end of the FE Modem Connection Cable RS422 (TSRA 904 64) through the Cable Bushing in knock-out 5 in the BRU3.

**Note!** Pass the FE Modem Connection Cable RS422 from the inside of the BRU3 and outwards.

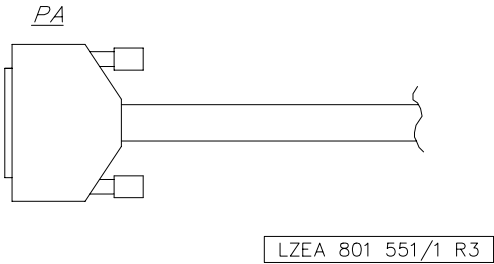
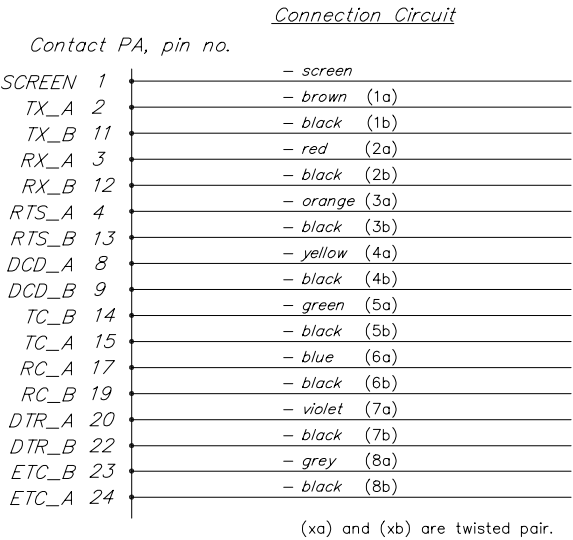
6. Connect the FE Modem Connection Cable RS422 to the BRU3 connector “P5 - RS422” (*Pos 5*).
7. Tighten the Cable Bushing to the FE Modem Connection Cable RS422.



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*Figure 25 Connection of the FE modem connection cable RS422, TSRA 90464, (Pos 5).*

8. Connect the open end of the FE Modem Connection Cable RS422 (*Figure 26*) to the Site Network Connection Box according to the *Site Requirements* section in the *BRU3 - General* module.



*Figure 26 The FE modem connection cable RS422, TSRA 904 64.*

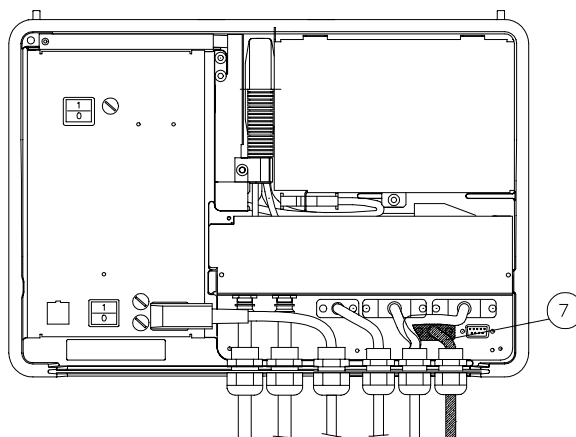
## 9 Connecting the Alarm

It is possible to connect two external alarms to the BRU3. One of the alarm loops (AL2+/AL2-) is by default strapped for the open case alarm but it can be reconnected with an external alarm. The connecting procedure depends on whether the current loop is supplied with power from the BRU3 or from an external Power Supply.

**Note!** Alarm parameters have to be set in CONFIG before Alarm Connection.

The following Alarm Connection data are given:

- Internal Resistance = 16.4 kohm
  - Type Current = 0.5 mA
  - Minimum Current = 0.1 mA
  - Voltage = 12 V
1. Open the BRU3.
  2. Break off knock-out 6 in the BRU3 front cover (*Figure 12* or *Figure 13*).
  3. Mount the small Cable Bushing to the Cable Bushing Nut in the knock-out 6.
  4. Pass the open end of FE Alarm Cable, TSRA 905 44, through the Cable Bushing in knock-out 6 in the BRU3, from the inside out.
  5. Connect the FE Alarm Cable connector to the BRU3 connector “P2 - ALARM” (*Figure 27, Pos 7*).
  6. Tighten the Cable Bushing to the FE Alarm Cable.



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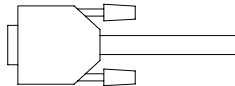
*Figure 27 Connecting the FE alarm cable, TSRA 905 44 to BRU3 (Pos 7).*

Kopplingschema  
Connection Circuit

Kontakt PA, stift nr. Contact PA, pin no.		
VCC_EXT	1	brun – brown
AL1+	2	svart – black
AL1–	3	röd – red
GND_EXT	4	svart – black
SKÄRM	5	skärm – screen
VCC_EXT	6	orange – orange
AL2+	7	svart – black
AL2–	8	gul – yellow
GND_EXT	9	svart – black
NC	10	grön – green
NC	11	svart – black
NC	12	blå – blue
NC		svart – black

NC = Ej ansluten – Not Connected

PA



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Figure 28 FE alarm cable, TSRA 905 44.

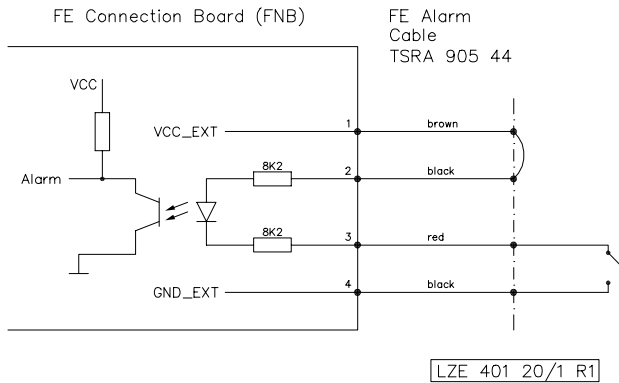
7. Connect the external alarm according to the following two alternatives:

#### Alternative 1:

“Connection of external alarm with current loop powered by the Internal Power Supply” (Figure 29).

- Strap connector pins P2:1 and P2:2 on the FE Connection Board (FNB) in the open end of the FE Alarm Cable TSRA 905 44.

- Connect the external alarm outer current loop to connector pins P2:3 and P2:4 on the FE Connection Board (FNB) in the open end of the FE Alarm Cable TSRA 905 44.

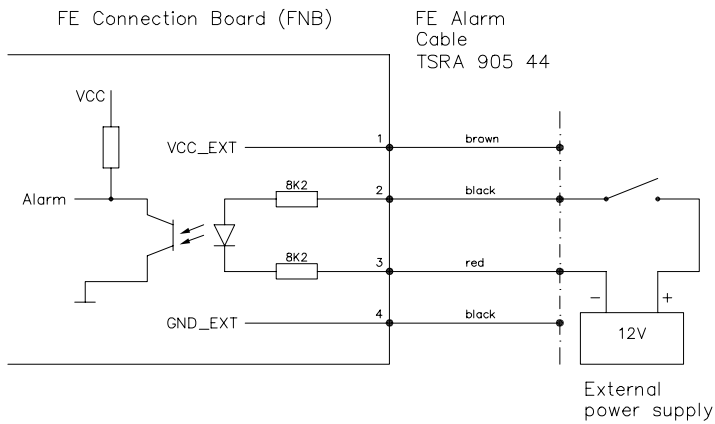


*Figure 29 External alarm powered by the BRU3.*

### Alternative 2:

“Connection of external alarm with current loop powered by External Power Supply” (*Figure 30*).

- Connect the external outer current loop to connector pins P2:2 (+) and P2:3 (-) on the FE Connection Board (FNB) in the open end of the FE Alarm Cable TSRA 905 44.



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*Figure 30 External alarm powered by an external power supply.*

## 10 Connecting Power

### 10.1 Outdoor Installation

#### Caution!

**38xx and 39xx:** Double-pole/Line fusing.

**34xx:** Single-pole/Line fusing.

1. For safety reasons, disconnect the Main Fuses in the Site Power and check that the Power Supply Cable is not live.
2. Open the BRU3.
3. Set the “MAINS SWITCH” on the FE Power Supply Unit (FPU) to position “0” (OFF).
4. Break knock-out 3 in the BRU3 front cover (*Figure 12*).
5. Disconnect the Power Connector from the FE Power Connection Kit (*Figure 31* or *Figure 32*).
6. Pass the Power Supply Cable through the knock-outs in the front cover and connect the Cable Bushing on the FE Power Connection Kit to the Cable Bushing Nut in knock-out 3. Make sure that the rubber washer is placed inside the BRU3.
7. Connect the Power Connector to the power Cable, (*Figure 31* or *Figure 32*).
8. Connect the Power Connector to the “MAINS INLET” on the FPU (*Figure 35*).
9. Mount the FE Power Connection Box on the wall/pole.
10. Remove the front cover of the FE Power Connection Box and connect the AC cable to the connector in the box *Figure 32* or *Figure 33*.



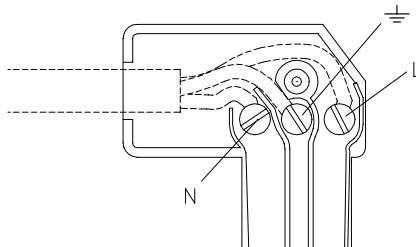
Make sure that the cables are connected as follows:

**38xx and 39xx:**

Pos.	Cable	Colour
PE	Protection Ground	Green or Green/Yellow
N	Neutral	White
L1	Line	Black

**34xx:**

Pos.	Cable	Colour
PE	Protection Ground	Green/Yellow
N	Neutral	Blue
L1	Line	Brown



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*Figure 31 The connector on the FE power supply cable.*

11. Replace the front cover on the FE Power Connection Box.
12. Connect the Main Fuses in the Site Power.

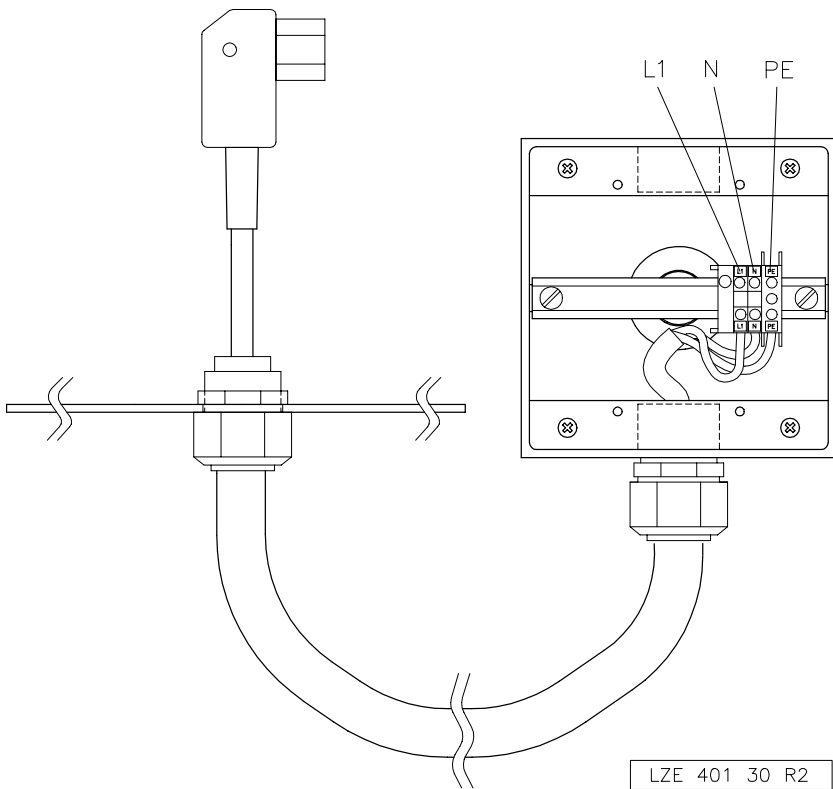
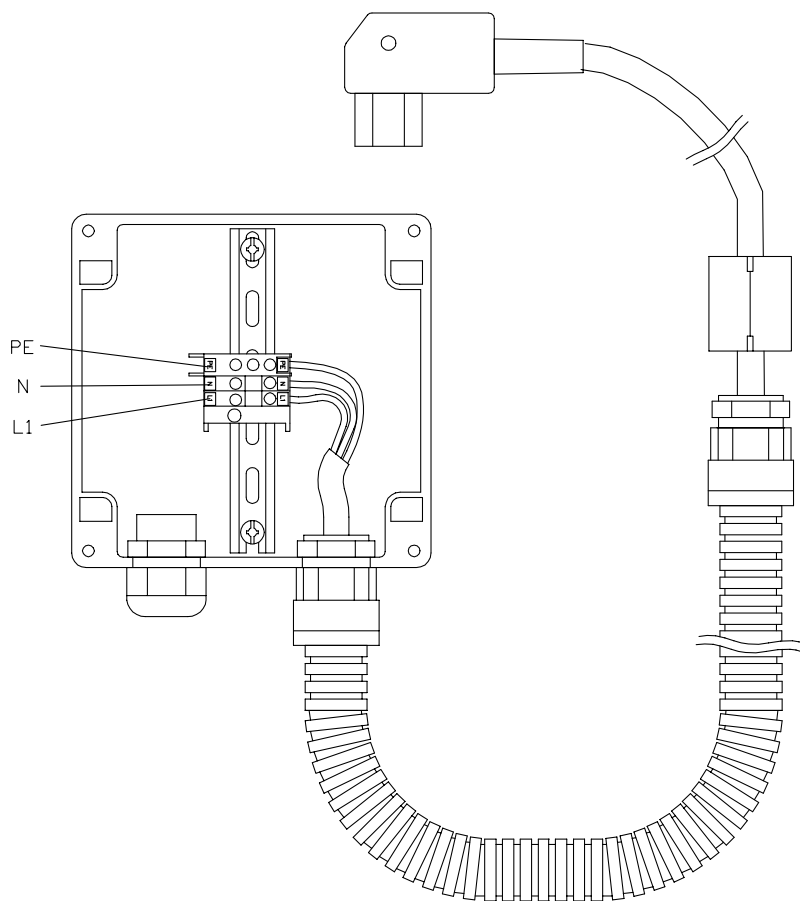


Figure 32 FE power connection kit - NTM 201 1126/1.



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*Figure 33 The FE power connection kit - NTM 201 1127/1.*

## 10.2 Indoor Installation

### Caution!

**38xx and 39xx:** Double-pole/Line fusing.

**34xx:** Single-pole/Line fusing.

1. For safety reasons, disconnect the Main Fuses in the Site Power and check that the Power Supply Cable is not live.
2. Open the BRU3.
3. Set the “MAINS SWITCH” on the FE Power Supply Unit (FPU) to position “0” (OFF).
4. Break knock-out 3 in the BRU3 front cover (*Figure 13*).
5. Connect the Cable Bushing on the FE Power Connection Kit to the Cable Bushing Nut in knock-out 3.
6. Connect the Power Connector to the “MAINS INLET” on the FPU (*Figure 35*).
7. Mount the FE Power Connection Box on the wall/pole.
8. Remove the front cover from the FE Power Connection Box and connect the AC cable to the connector in the box (*Figure 32* or *Figure 33*).

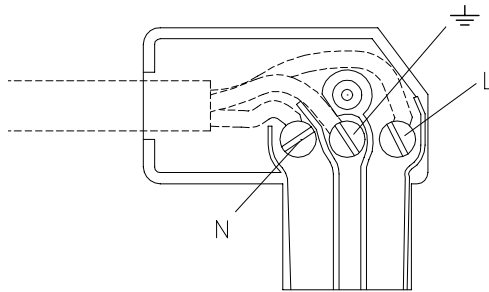
Make sure that the cables are connected as follows:

### 38xx and 39xx:

Pos.	Cable	Colour
PE	Protection Ground	Green or Green/Yellow
N	Neutral	White
L1	Line	Black

**34xx:**

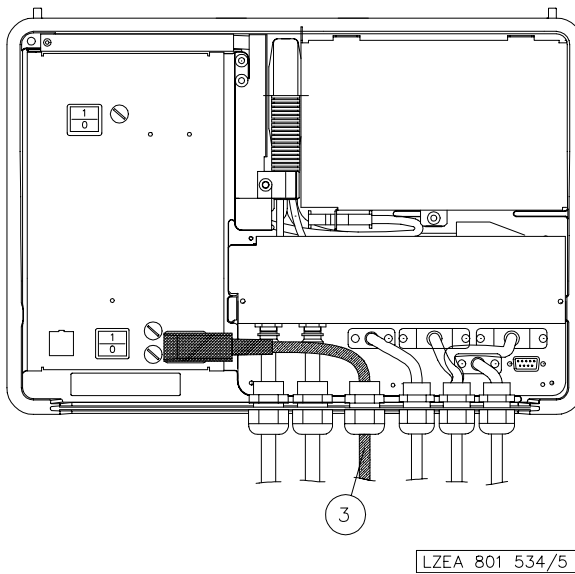
Pos.	Cable	Colour
PE	Protection Ground	Green/Yellow
N	Neutral	Blue
L1	Line	Brown



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*Figure 34 The connector on the FE power supply cable.*

9. Replace the front cover on the FE Power Connection Box.
10. Connect the Main Fuses in the AC Site Power.

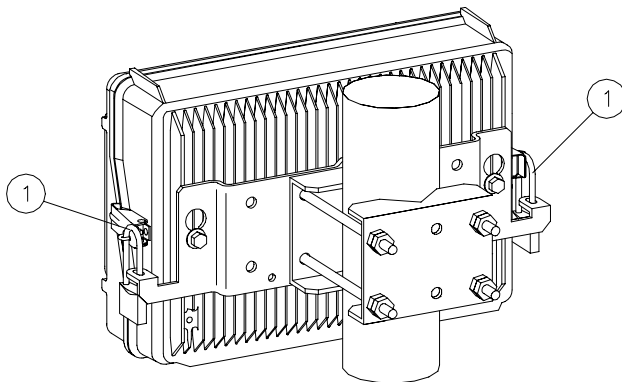


*Figure 35 Connection of the FE power connection kit to the “MAINS INLET” on the FPU in the BRU3.*

## 11 Before Leaving the Site

When the Installation Procedure has been completed, ensure that the installed BRU3 fulfils the following requirements before starting the HW and SW Commissioning Procedures.

1. Check that the “MAINS SWITCH” on the FE Power Supply Unit (FPU) is set in position “0” (OFF).
2. Check that the “BATTERY SWITCH” on the FE Power Supply Unit (FPU) is set to position “0” (OFF).
3. Lock the BRU3 with the two padlocks (*Figure 36, Pos 1*). The BRU3 should always be kept locked for safety reasons.



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*Figure 36 Installation of padlocks on the BRU3 on a vertical pole.*

