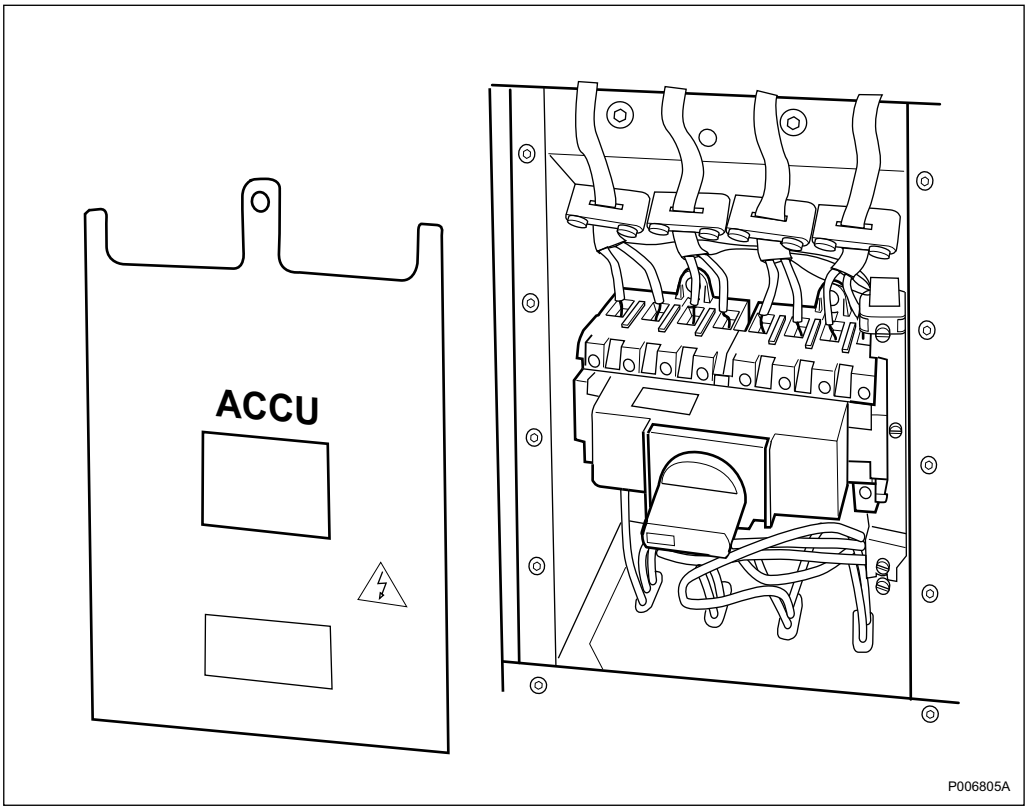
ACCU-01

AC Connection Unit
Unit Description

The AC Connection Unit (ACCU) distributes primary power to the Power Supply Units (PSU).



Contents

1 Product Overview

The ACCU distributes primary power to the PSUs. There is only one ACCU in the cabinet, depending on the type of incoming power.

1.1 Main Functions

The ACCU has the following functions:

- Terminates incoming AC mains cables
- Disconnects incoming AC mains power
- Filters ElectroMagnetic Compatibility (EMC)

2 Dimensions

The physical characteristics of the ACCU are shown in the table below.

Table 1 ACCU Size and Weight

Height	Width	Depth	Weight
293.5 mm	141 mm	60 mm	5 kg

3 Function Description

The ACCU consists of a unit containing:

- A terminal block for incoming AC cables
- An eight-pole mains switch (disconnecting device)
- A EMC filter
- Four connection points for cables to the PSUs

4 Interfaces

The ACCU interfaces are shown in the figure below.

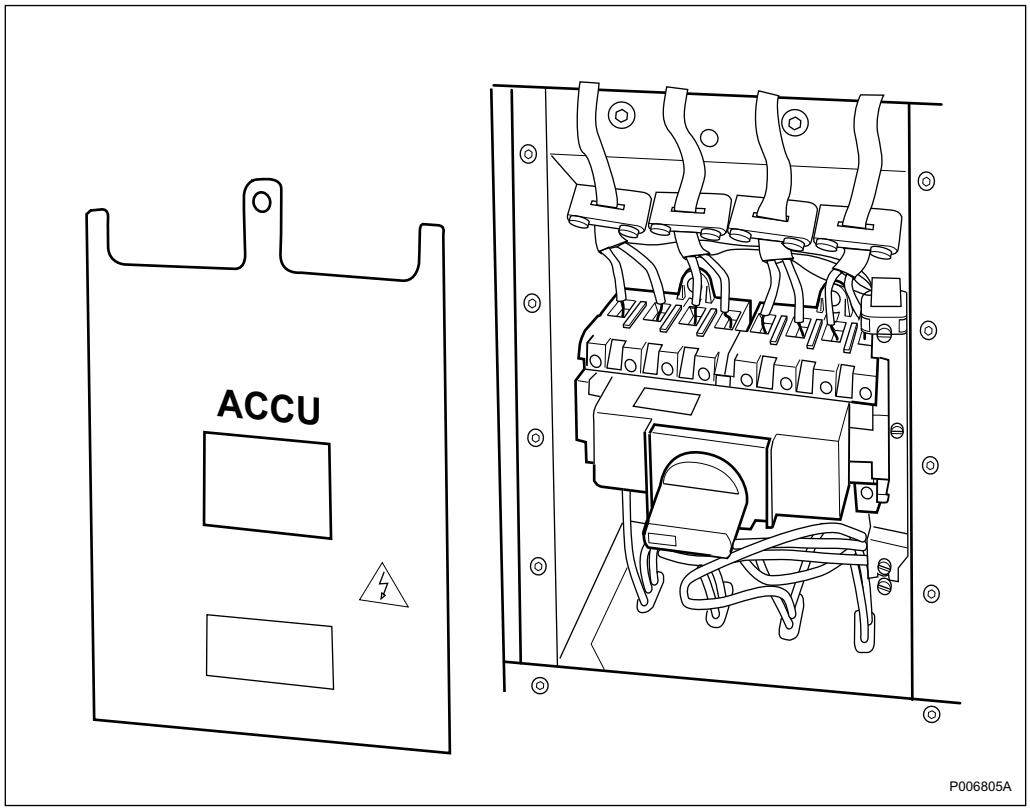


Figure 1 ACCU Interfaces

The ACCU has the following external interfaces:

- Terminal block for incoming AC mains cables
- Four connection points for outgoing cables to the PSUs

4.1 Signal and Power Interfaces

Input Data

The input data is shown in the table below.

Table 2 Input Data

Frequency	50 – 60 Hz
Voltage	120 – 250 AC nominal
External Fuses	4 pcs, max. 16 A
Cable Diameter	8.5 – 12.5 mm
Conductor Area	1.5 – 2.5 mm^2
Number of Conductors	4 x (L, N, PE), four cables

Output Data

Four cables with connectors (according to IEC 320) and for connection to the PSU AC inlet.

4.2 Operator Interface

The operator interface is the mains switch on the ACCU. It has two states:

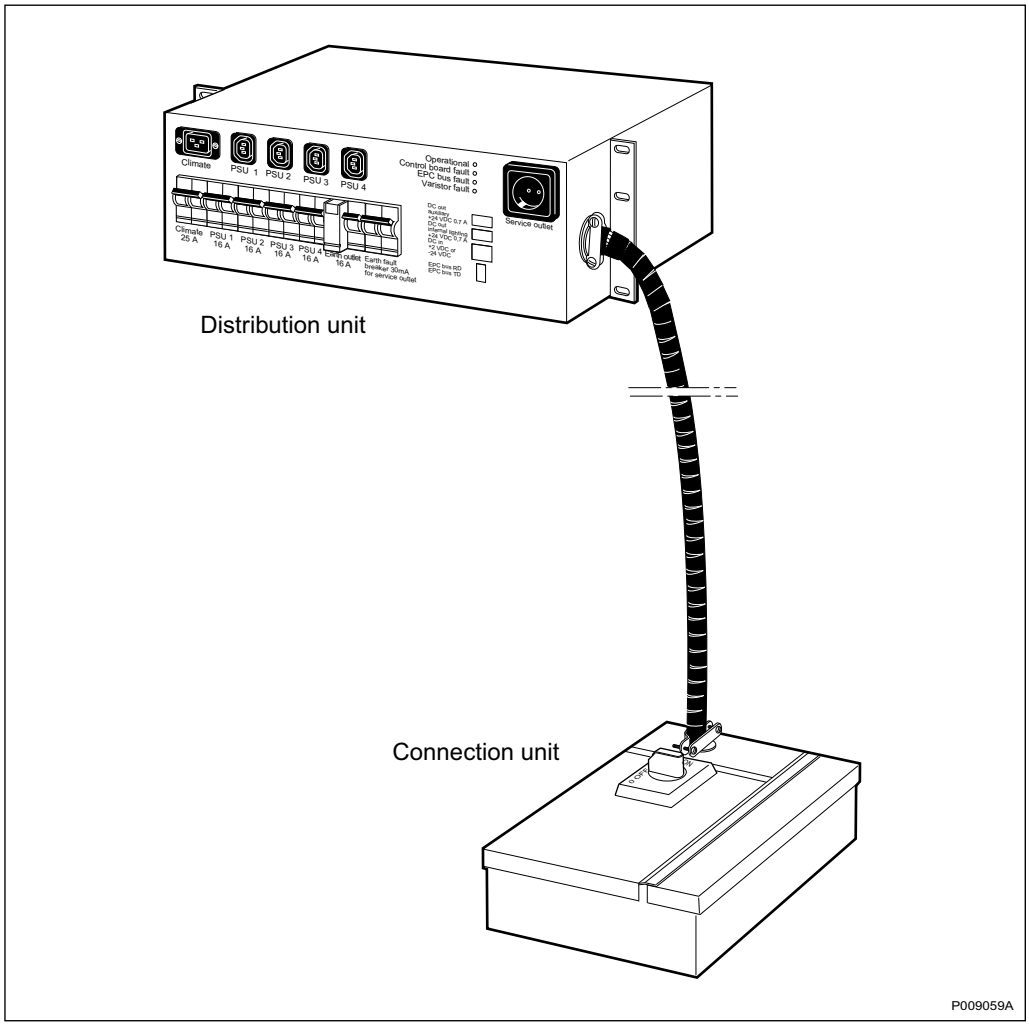
- On (position 1)
- Off (position 0)

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

ACCU-02

AC Connection Unit
Unit Description

The AC Connection Unit (ACCU-02) distributes and supervises the incoming AC mains power to the units in the RBS cabinet.



Contents

1 Product Overview

The ACCU-02 distributes and supervises the incoming AC mains power to the units in the RBS.

The ACCU-02 consists of two units, that is a Connection Unit and a Distribution Unit. The units are connected together by a power cable and a signal cable.

1.1 Main Functions

The ACCU-02 has the following main functions:

- Distributes AC power to the Power Supply Units (PSU) and enables the PSUs to connect and disconnect through the Environmental and Power Control (EPC) bus
- Distributes AC power to the Climate Unit
- Provides ElectroMagnetic Compatibility (EMC) filtering, and Surge Protection Devices (SPD), against power line disturbances on the incoming AC power
- Acts as a disconnecting device (Mains Switch)
- Supervises the mains supply and triggers an alarm when undervoltage and fuse fault occur
- Provides +24 V DC outputs to lighting in the cabinet and to auxiliary equipment
- Provides a service outlet for instruments and tools

2 Dimensions

The physical characteristics of the ACCU-02 are shown in the table below.

Table 1 ACCU-02 Size and Weight

	Height	**Width**	**Depth**
Connection Unit	93 mm	205 mm	301 mm
Distribution Unit	149 mm	435 mm(1)	250 mm

(1) Excluding mounting bracket.

3 Function Description

The ACCU-02 consists of two units, a Connection Unit and a Distribution Unit.

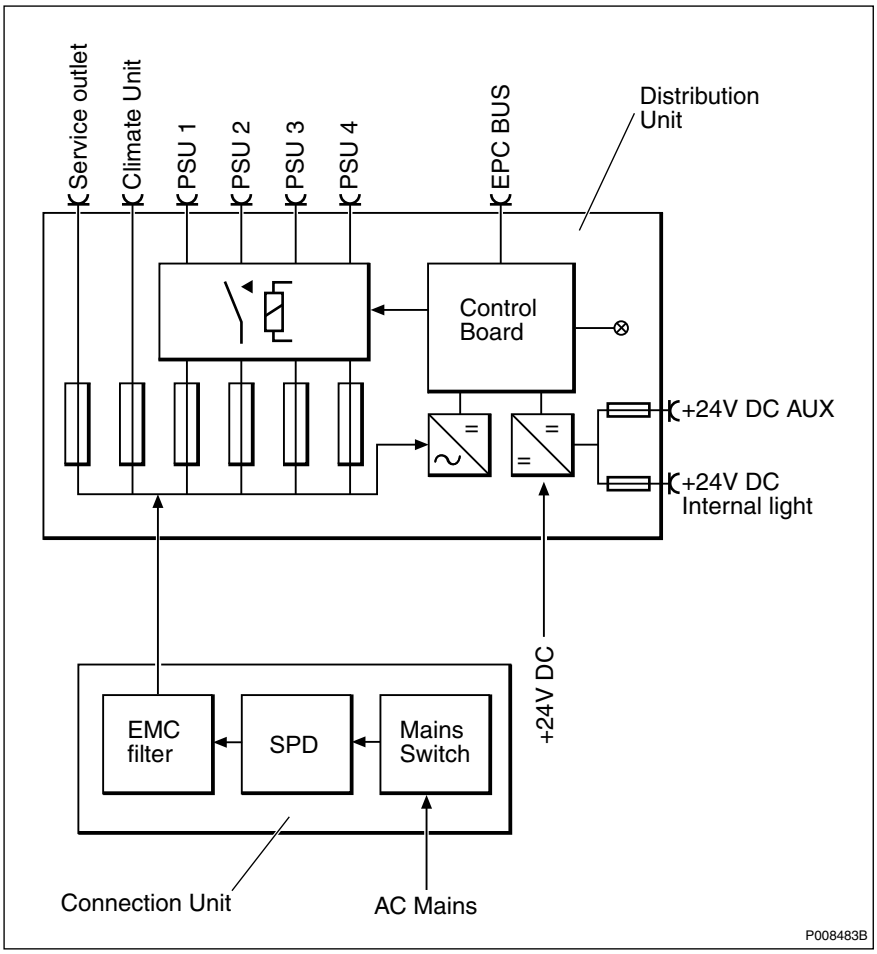


Figure 1 ACCU-02 Block Diagram

3.1 Connection Unit

The Connection Unit consists of:

- Mains Switch
- SPD
- EMC filter

3.2 Distribution Unit

The Distribution Unit consists of:

- Four outlets for the PSUs, protected by 16 A circuit breakers
- One outlet for the Climate Unit, protected by a 25 A circuit breaker
- One service outlet, protected by a 10 A circuit breaker with earthed fault breaker
- Two DC outputs for cabinet lighting and auxiliary equipment, protected by 1 A circuit breakers
- A rectifier for the supply of the Control Unit
- Relays that enable output from the PSUs to turned on and off
- A Control Unit

4 Interfaces

4.1 Signal and Power Interfaces

Input Data

The input terminals accept supply cables with a conductor area of 2.5 – 16 mm^2. The maximum fuse rating allowed is 63 A per phase.

Table 2 AC Supply 50 Hz

Single-phase, Three-wire, Earthed Neutral	200 – 250 V AC
Three-phase star, Four-wire, Earthed Neutral(1)	346/200 – 433/250 V AC
	208/120 – 220/127 V AC

(1) The ACCU can be supplied with a three-phase, five-wire system (separate neutral and earth conductors).

Table 3 AC Supply 60 Hz

Single-phase, Three-wire, Earthed Mid-point	200/100 – 240/120 V AC
Three-phase Star, Four-wire, Earthed Neutral(1)	208/120 – 220/127 V AC

(1) The ACCU can be supplied with a three-phase, five-wire system (separate neutral and earth conductors).

Table 4 Priority DC Supply to Control Unit

Option	Max. Current
+24 V DC	1 A

Output Data

The output data is summarised in the table below.

Table 5 Output Voltage from the ACCU-02

PSU 1 – 4	180 – 275 V AC
Climate Unit	180 – 275 V AC
Service Outlet(1)	Same as input (line to neutral)

(1) For different market standards.

Note: The DC output voltages require DC input voltage.

Table 6 Output Power

PSU 1 – 4	1400 W each
Climate Unit	2300 W
Service Outlet	1500 W, 200 – 250 V AC
	1200 W, 120 V AC
Internal Lighting +24 V DC	1 A
Auxiliary +24 V DC	1 A

4.2 Operator Interface

The indicators are shown in the table below.

Table 7 Indicators

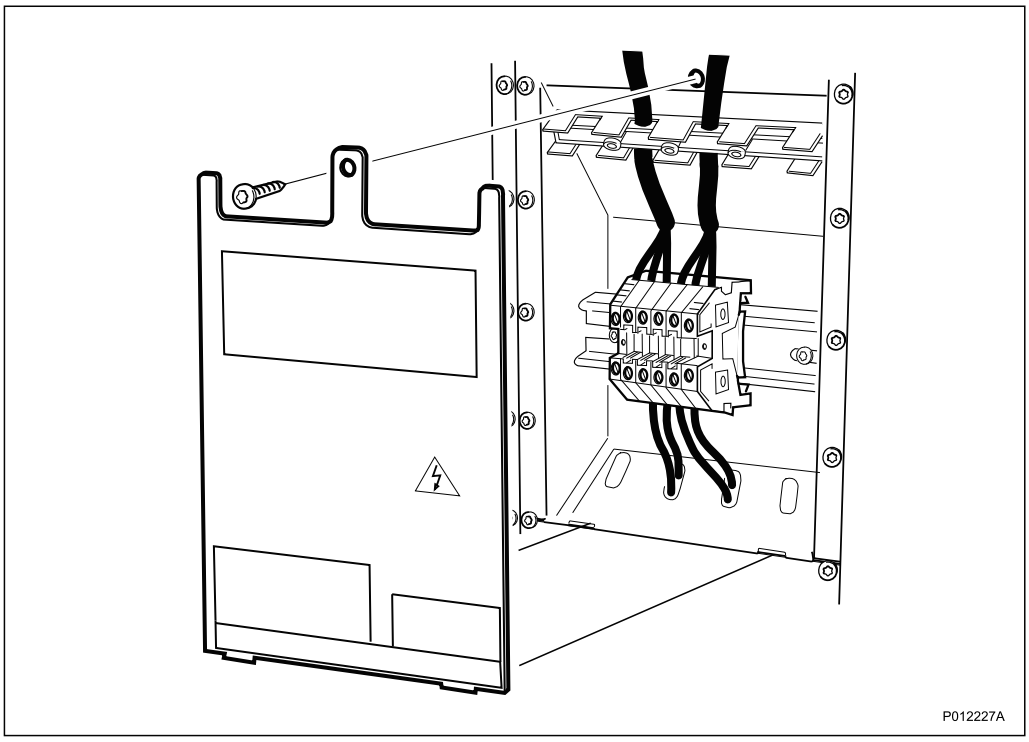
Indicator	**Colour**
Operational	Green
Control board fault	Yellow
EPC bus fault	Yellow
Varistor fault	Yellow

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

ACCU-03

AC Connection Unit
Unit Description

The AC Connection Unit (ACCU) distributes primary power to the Power Supply Units (PSU).



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Contents

1 Product Overview

The ACCU distributes primary power to the PSUs. There is only one ACCU in the cabinet, depending on the type of incoming power.

1.1 Main Functions

The ACCU has the following functions:

- Terminates incoming AC mains cables
- Filters ElectroMagnetic Capability (EMC)

2 Dimensions

The dimensions of the ACCU are shown in the table below.

Table 1 Size and Weight

Height	Width	Depth	Weight
293.5 mm	141 mm	60 mm	5 kg

3 Function Description

The ACCU consists of a box with:

- A terminal block for incoming AC cables
- One EMC filter
- Connection points for cables to the two PSUs

4 Interfaces

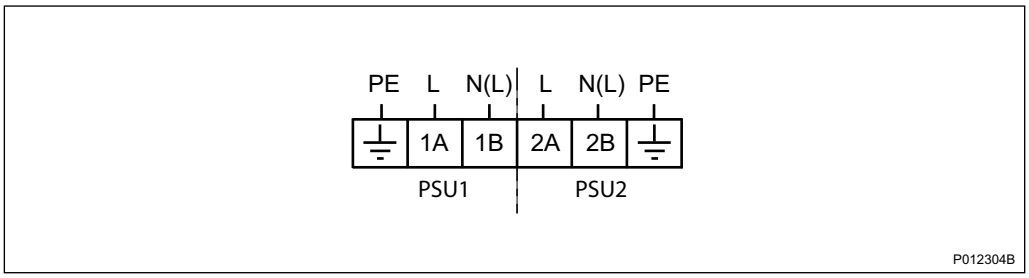


Figure 1 ACCU Interfaces

- Terminal block for incoming AC mains cables
- Two connection points for outgoing cables to the PSUs

4.1 Signal and Power Interfaces

Input Data

The input data for the ACCU is summarised in the table below.

Table 2 Input Data

Frequency	50 – 60 Hz
Voltage	120 – 250 AC nominal
External Fuses	2 pcs, max. 16 A
Cable Diameter	8.5 – 12.5 mm
Conductor Area	1.5 – 2.5 mm^2
Number of Conductors	3 (L, L/N, PE)/cable

Output Data

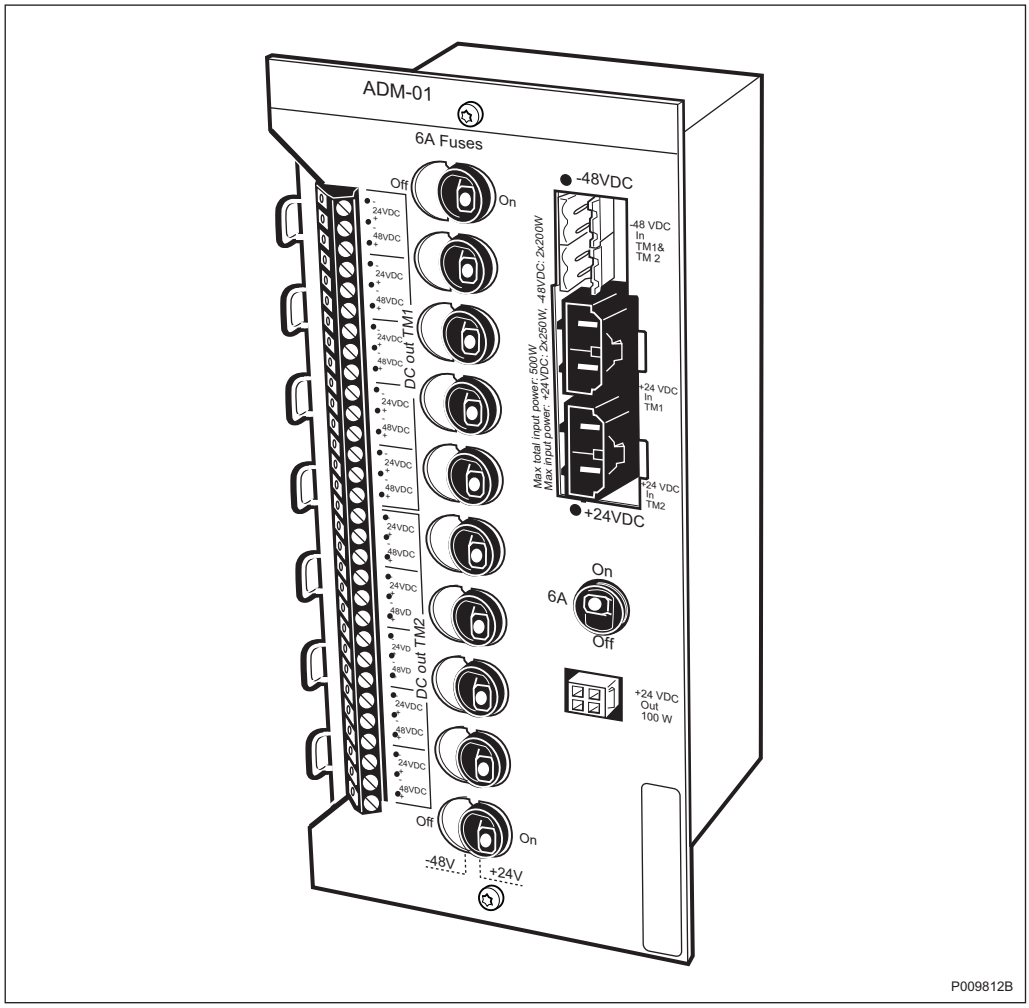
Two cables with connectors (according to IEC 320 and for connection to the PSU AC inlet).

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

ADM-01

Auxiliary Distribution Module Description

The Auxiliary Distribution Module (ADM-01) distributes DC power through circuit breakers to the Transport Module (TM) and to the DC-out 100 W in the RBS 2106.



Contents

1 Product Overview

The ADM-01 distributes +24 V DC or -48 V DC to the TM compartment and to the DC-out 100 W connection in the Distribution Frame (DF) box.

1.1 Main Functions

The ADM-01 has the following main functions:

- Two inputs for +24 V DC
- Two inputs for -48 V DC
- Ten distribution outputs which can be selected for +24 V DC or -48 V DC, protected by 6 A fuses
- One output for +24 V DC, designated ‘‘Out 100 W’’, protected by a 6 A fuse

2 Dimensions

This section describes the physical characteristics of the ADM-01.

Table 1 ADM-01 Size and Weight

Height	Width	Depth	Weight
205 mm	98 mm	80 mm	1 kg

3 Function Description

The circuit breaker diagram for the ADM-01 is shown in the figure below.

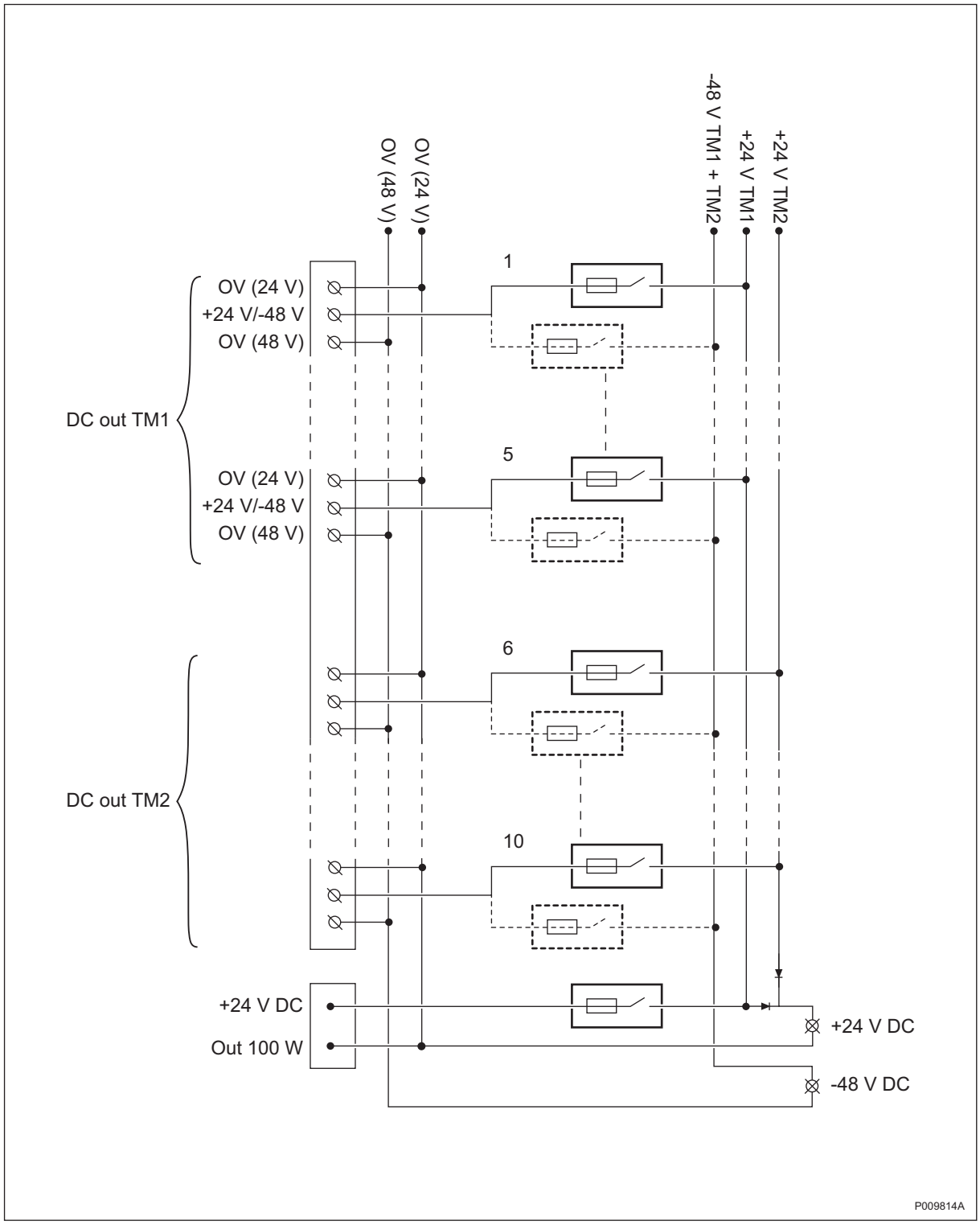


Figure 1 ADM-01 Circuit Breaker Diagram

The ten outputs on the ADM-01 are divided into two groups: DC out TM1 and DC out TM2. The outputs are protected by circuit breakers that function both as fuses and manual disconnect switches.

The ADM-01 can be fed with +24 V DC or -48 V DC, or both. The feed used is shown by two indicators on the front panel.

One +24 V DC input is connected to the TM1 output group. The second +24 V DC input is connected to the TM2 output group.

The two -48 V DC inputs are connected in parallel to both the TM1 and TM2 groups.

The ADM-01 is delivered with a +24 V DC configuration. By removing the front panel and moving a fuse to the -48 V DC position, an output for distribution of -48 V DC can be configured. Connection of the voltages is shown on the label on the front panel.

The output ‘‘Out 100 W’’ is fed +24 V DC from the TM1 input. These outputs are also protected by circuit breakers that function as fuses and manual disconnection switches.

4 Interface

The interfaces for the ADM-01 is shown in the figure below.

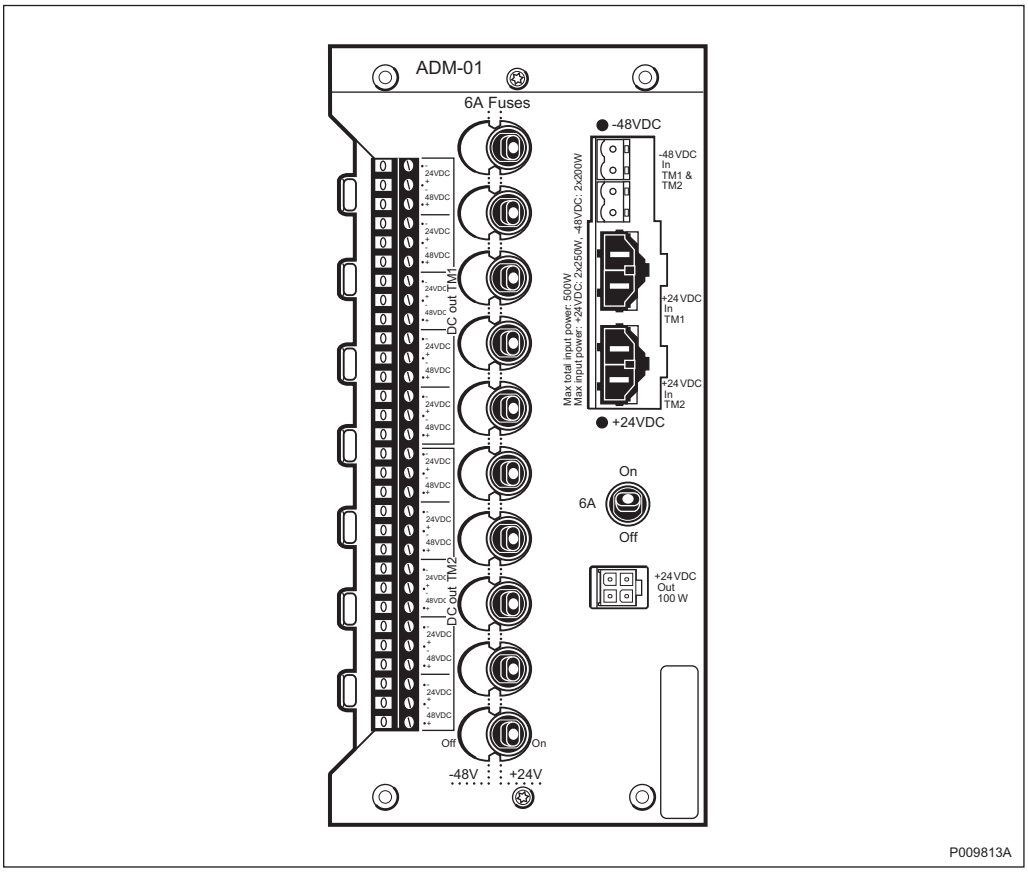


Figure 2 ADM-01 Interfaces

4.1 Signal and Power Interfaces

Input Data

The input data is shown in the tables below.

Table 2 Input Voltage Characteristics

Characteristics	**Nominal Voltage:**	
	+24 V DC	**-48 V DC**
Normal Voltage	+20.0 to +29.0 V DC	-39.0 to -54.0 V DC
Non-destructive	0 to 32 V DC	0 to -70 V DC
Input Power	2 x 250 W	2 x 200 W
Input Fuse Rating	15 A	10 A
Connectors	2 x RPV 403 099/102	2 x RPV 262 001/2

Table 3 Input Power

Nominal Voltages	Input Power	Input Fuse Rating
+24 V DC	2 x 250 W	2 x 15 A
-48 V DC	2 x 200 W	2 x 10 A
+24 and -48 V DC	250 + 200 W	15 and 10 A

Note: The total input power to the ADM-01 must not exceed 500 W.

Output Data

The output data is shown in the table below.

Table 4 Output Connections

Output	Connection	Fuse
DC out TM1, pos. 1 – 5	Screw terminals 0.5 – 2.5 mm^2	6 A
DC out TM2, pos. 1 – 5	Screw terminals 0.5 – 2.5 mm^2	6 A
+24 V DC Out	RPV 403 109/604	6 A

4.2 Operator Interface

Output power can be manually switched off using the eleven circuit breakers on the front panel.

Table 5 Indicators

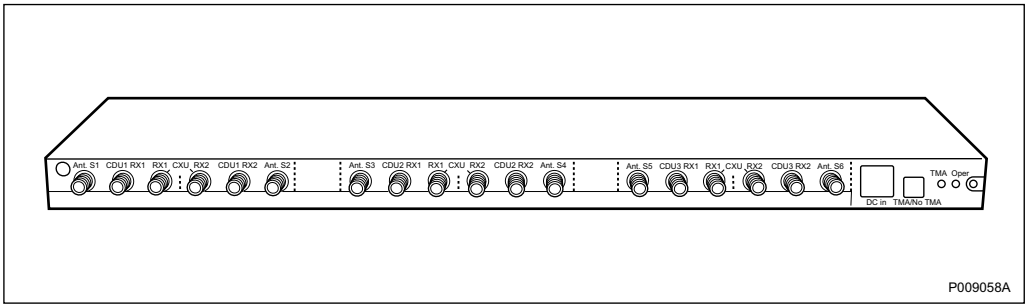
Indicator	Colour
+24 V DC present	Green
-48 V DC present	Green

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

ASU

Antenna Sharing Unit
Unit Description

The Antenna Sharing Unit (ASU) is used in co-siting when a cabinet, operating on another standard, shares antennas with a GSM cabinet in the same sector.



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Contents

1 Product Overview

1.1 Main Functions

Antenna sharing is part of co-siting, that is using a cabinet operating on another standard together with a GSM cabinet in the same sector. It can also be used when sharing antennas with another GSM cabinet. The ASU allows a TDMA (or other) cabinet and a GSM cabinet to share RX antennas. It does this by sharing the RX signals between both cabinets.

The ASU is a broadband product, which means that it covers 800 – 1910 MHz.

2 Dimensions

The physical characteristics of the ASU are shown in the table below.

Table 1 ASU Size and Weight

Height	Width	Depth	Weight
22 mm	437.5 mm	120 mm(1)	2 kg

(1) The ASU protrudes 40 mm from the rack (including the front panel).

3 Power Consumption and Heat Generation

The ASU power and heat generation is shown in the table below.

Table 2 Power Consumption and Heat Generation

Max. Power Consumption	Max. Heat Generation
2 W	2 W

4 Function Description

The general function of the ASU is to take a portion of the RX signal and send it to the co-sited RBS.

The ASU also switches the attenuation according to whether or not a Tower Mounted Amplifier (TMA) is used. It also indicates the attenuation state through an indicator.

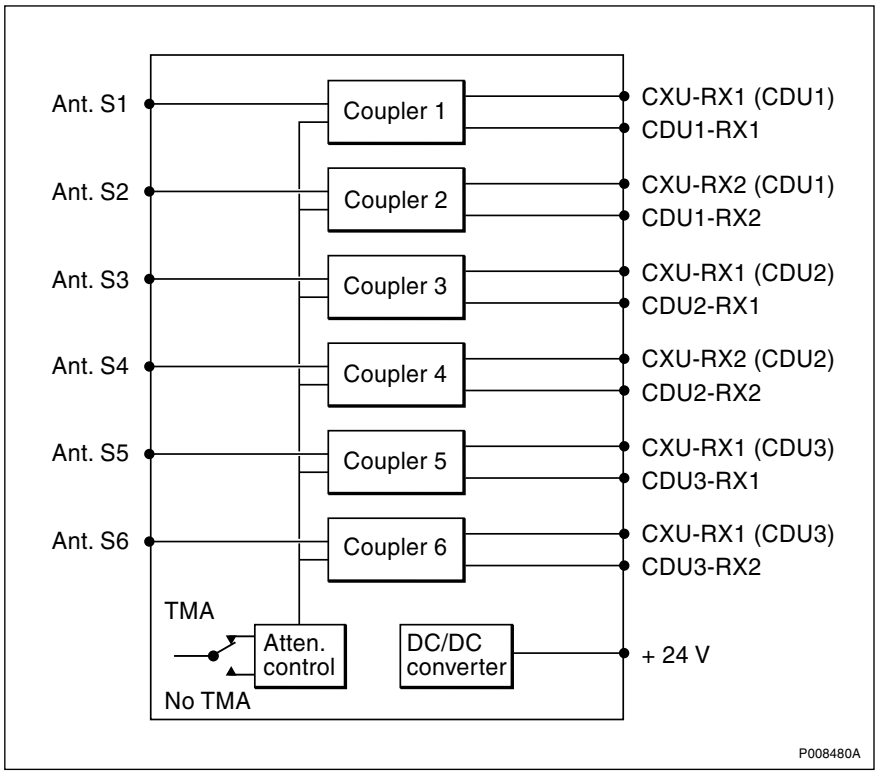


Figure 1 ASU Block Diagram

4.1 RX Signal Path

The RX signal path is fed from the antennas through the feeders to the Antenna Reference Point (ARP). The signal is then filtered and amplified in the Combining and Distribution Unit (CDU). From the RX output of the CDU, the signal is fed to the ASU where a small portion of the signal is fed to the RX input of the co-sited RBS. This is shown in the figure below.

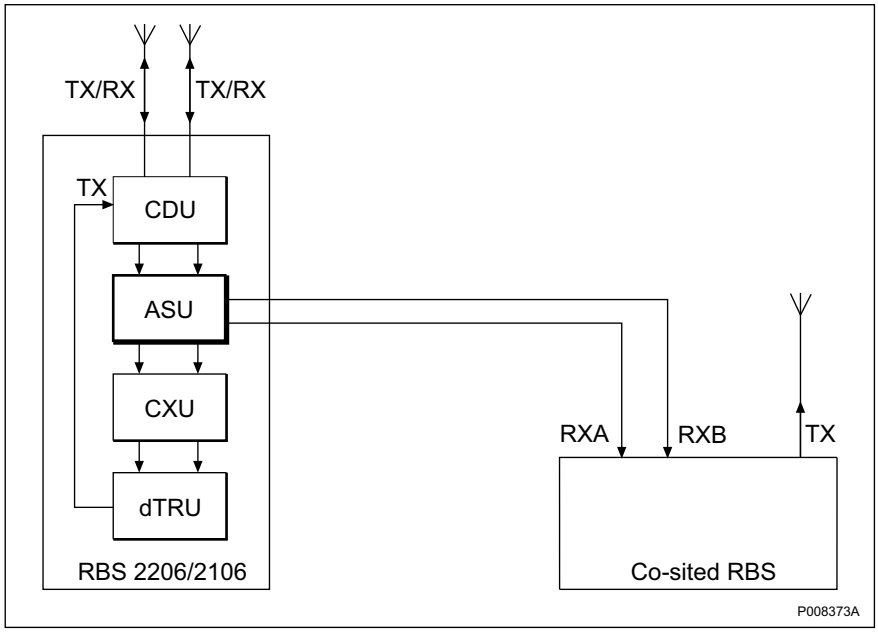


Figure 2 RX Signal Path

The figure below shows an example of co-siting between two GSM cabinets.

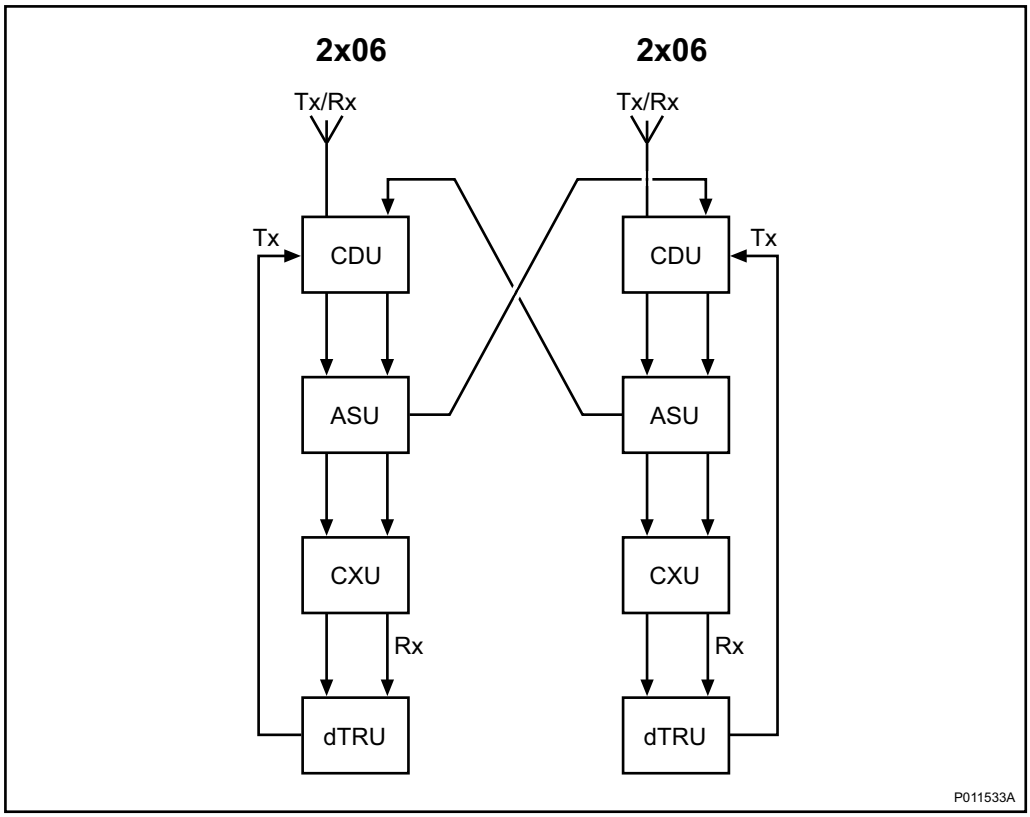


Figure 3 Co-siting of Two GSM Cabinets

4.2 Cable Path and Supervision

The RF cables between the ASU and the co-sited RBSs can be supervised by the TMA support function in the corresponding cabinet.

5 Interfaces

5.1 Signal and Power Interfaces

Connectors

The ASU has the following connectors:

- Six input ports for RX signals from the CDU
- Six output ports for RX signals to the CXU
- Six output ports for RX signals to the co-sited RBS
- A power supply connector

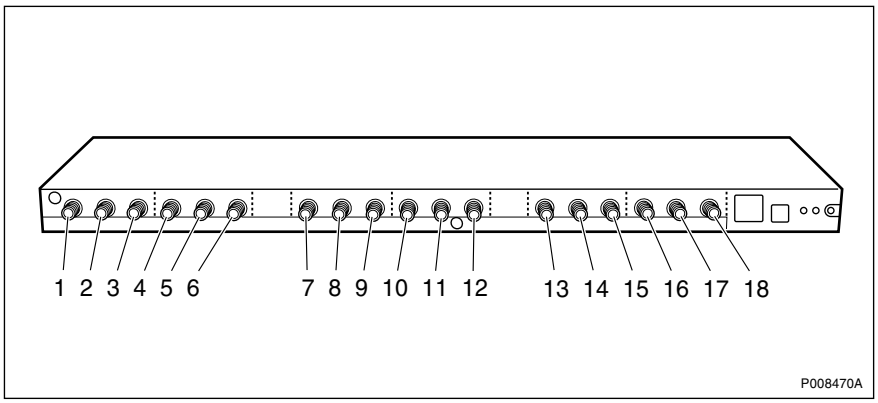


Figure 4 Connection Ports

The ASU connection ports are shown in the table below.

Table 3 Connection Ports

Pos.	ASU Label	Connects to	Type of Connector
1	Ant.S1	Antenna sharing connectors	QMA
2	CDU1 RX1	CDU 1, port RX1	QMA
3	RX1	CXU, port 3	QMA
4	RX2	CXU, port 4	QMA

Table 3 Connection Ports

5	CDU1 RX2	CDU 1, port RX2	QMA
6	Ant.S2	Antenna sharing connectors	QMA
7	Ant.S3	Antenna sharing connectors	QMA
8	CDU2 RX1	CDU2, port RX1	QMA
9	RX1	CXU port 9	QMA
10	RX2	CXU port 10	QMA
11	CDU2 RX2	CDU 2, port RX2	QMA
12	Ant.S4	Antenna sharing connectors	QMA
13	Ant.S5	Antenna sharing connectors	QMA
14	CDU3 RX1	CDU 3, port RX1	QMA
15	RX1	CXU port 15	QMA
16	RX2	CXU port 16	QMA
17	CDU3 RX2	CDU 3, port RX2	QMA
18	Ant.S6	Antenna sharing connectors	QMA

5.2 Operator Interface

There is one switch on the front panel to set the internal attenuators for TMA or no TMA.

There are two indicators on the front indicating the status of the ASU.

Table 4 Indicators

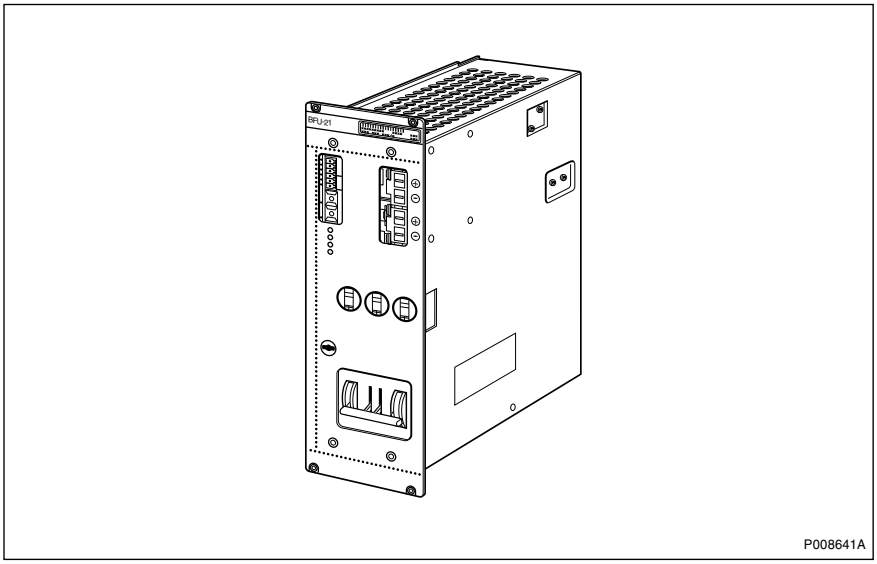
Indicator	**Colour**
Operational	Green
TMA	Yellow

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

BFU-21

Battery Fuse Unit
Unit Description

The Battery Fuse Unit (BFU-21) monitors and controls the battery. It cuts off the load to the RBS at low battery voltage, when the temperature of the battery is too high or if there is a short circuit between the distribution cables.



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Contents

1 Product Overview

The BFU-21 supplies battery backup system voltage to the RBS and disconnects the battery when it has reached its lower discharge limit. The contactor can disconnect and reconnect the battery with a control signal from the Supervision Module (SM).

1.1 Main Functions

The BFU-21 has the following functions:

- Supplies priority power to transmission equipment. Power to transmission equipment can be distributed even if a battery is not present. The relay can select the power source with a control signal from the SM
- Supplies priority power to the EC output. The EC output is protected from reverse currents by a diode. Power to the EC output can be distributed even if a battery is not present. The relay can select the power source with a control signal from the SM
- Communicates on the Environmental and Power Control (EPC) bus (opto cable) with the Distribution Switch Unit (DXU). If the EPC bus is not present, the BFU-21 operates at its default values. The battery voltage, current and temperature are monitored and alarms are sent on the EPC bus
- Disconnects the batteries, if the voltage is too low or the temperature is too high. Reconnects the batteries when the temperature returns to normal
- Sends a ‘‘Battery temperature sensor fault’’ message to the DXU when the battery temperature is faulty
- Disconnects battery backup manually or by control signals on the EPC bus

The SM provides self-detection of internal faults and stores them in non-volatile memory.

2 Dimensions

The physical characteristics of the BFU-21 are shown in the table below.

Table 1 BFU-21 Size and Weight

Height	Width	Depth	Weight
267 mm	82 mm	226 mm	5 kg

3 Function Description

The block diagram of the BFU-21 is shown in the figure below.

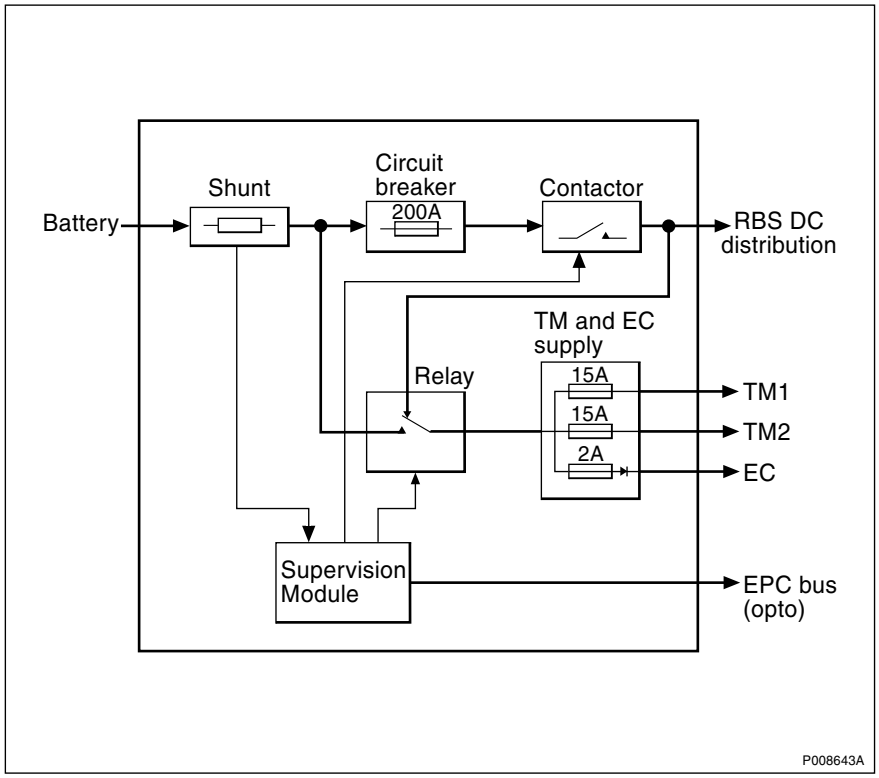


Figure 1 Block Diagram of BFU-21

The BFU-21 consists of the following blocks:

- Contactors
- Circuit breakers
- Shunt
- Transport Module (TM) and EC supply
- Supervision module

3.1 Contactor

The Contactor is used to disconnect the batteries from the system. The Supervision Module controls the Contactor.

3.2 Circuit Breaker

The circuit breaker disconnects the batteries if the current becomes too high. It can also be manually operated on the front of the BFU-21 to connect or disconnect the batteries from the DC distribution.

3.3 Shunt

The shunt is used to sense the input current. The SM senses the value, which is used for control of the BFU-21.

3.4 TM and EC Supply

There are two TM outputs for supply of transmission equipment and one EC output for priority supply of the Control Board in the ACCU.

4 Interfaces

The BFU-21 has the following interfaces:

- Battery
- RBS DC distribution
- TM1 supply 15 A
- TM2 supply 15 A
- EC supply 2 A
- EPC bus

4.1 Signal and Power Interfaces

Input Data

The input data is shown in the table below.

Table 2 Input Data

Nominal Input Voltage	+24 V DC negative ground
Permitted Variation Input Voltage	+18.0 to +29.0 V DC
Non-destruction Input Voltage	0.0 to +32.0 V DC
Power	4800 W
Nominal Input Current	185 A
Maximum Input Current	205 A
Maximum Current Ripple (20 Hz – 20 kHz)	24 A_{rms}

Output Data

The output data is shown in the table below.

Table 3 Output Data

RBS DC Distribution (Nominal)	160 A
RBS DC Distribution (Maximum)	180 A (during a 3 hour period)
TM1 Supply	12 A
TM2 Supply	12 A
EC Supply	1.5 A

4.2 Operator Interface

There are four indicators and four switches on the front panel, see the table and list below.

Table 4 Indicators

Indicator	**Colour**
FAULT	Red
OPERATIONAL	Green
EPC BUS FAULT	Yellow
BATTERY DISCONNECTED	Yellow

Switches

The switches are as follows:

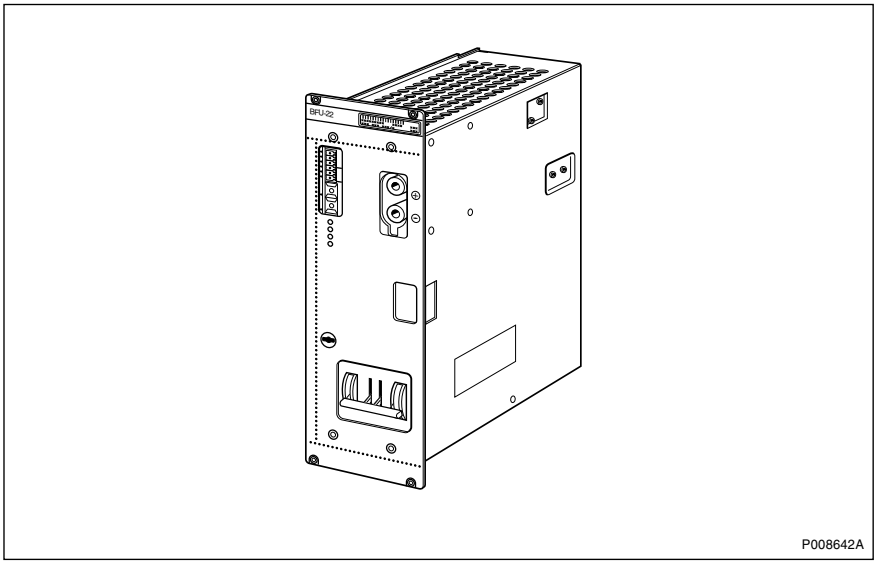
- Battery Disconnect – on/off
- DC out 1 – on/off
- DC out 2 – on/off
- EC – on/off

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

BFU-22

Battery Fuse Unit
Unit Description

The Battery Fuse Unit (BFU-22) monitors and controls the battery. It cuts off the load to the RBS at low battery voltage, when the temperature of the battery is too high or if there is a short circuit between the distribution cables.



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Contents

1 Product Overview

The BFU-22 supplies battery backup system voltage to the RBS and disconnects the battery when it has reached its lower discharge limit. The contactor can disconnect and reconnect the battery with a control signal from the Supervision Module (SM).

1.1 Main Functions

The BFU-22 has the following functions:

- Supplies priority power to transmission equipment. Power to transmission equipment can be distributed even if a battery is not present. The relay can select the power source with a control signal from the SM
- Communicates on the Environmental and Power Control (EPC) bus (opto cable) with the Distribution Switch Unit (DXU). If the EPC bus is not present, the BFU operates at its default values. The battery voltage, current and temperature are monitored and alarms are sent on the EPC bus
- Disconnects the battery, if the current is too low or the temperature is too high. When the temperature returns to normal, the battery is reconnected.
- Sends a ‘‘Battery temperature sensor fault’’ message to the DXU when the battery temperature is faulty
- Disconnects battery backup manually or by control signals on the EPC bus

The SM provides self-detection of internal faults and stores them in non-volatile memory.

2 Dimensions

The physical characteristics of the BFU-22 are shown in the table below.

Table 1 BFU-22 Size and Weight

Height	Width	Depth	Weight
267 mm	82 mm	226 mm	5 kg

3 Function Description

The block diagram of the BFU-22 is shown in the figure below.

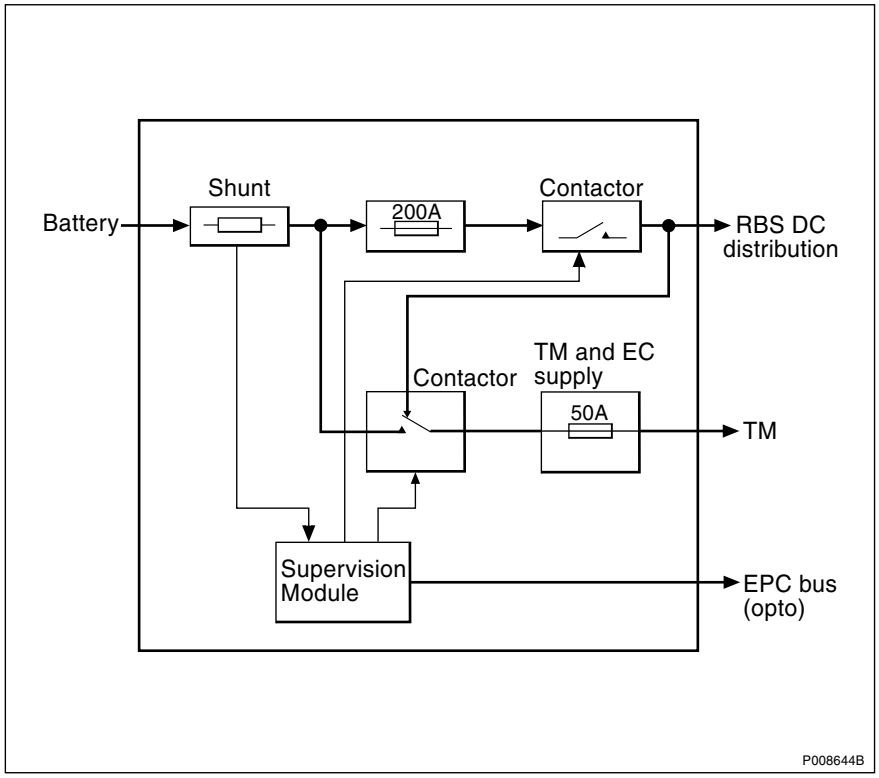


Figure 1 Block Diagram of BFU-22

The BFU-22 consists of the following blocks:

- Contactors
- Circuit breakers
- Shunt
- Transport Module (TM) and EC supply
- Supervision module

3.1 Contactor

The contactor is used to disconnect the batteries from the system. The SM controls the contactor.

3.2 Circuit Breaker

The circuit breaker disconnects the batteries if the current becomes too high. It can also be manually operated on the front of the BFU-22 to connect or disconnect the batteries from the DC distribution.

3.3 Shunt

The shunt is used to sense the input current. The SM senses the value, which is used for control of the BFU-22.

3.4 TM Supply

There is one high-power TM output for supply of transmission equipment.

4 Interfaces

The BFU-22 has the following interfaces:

- Battery
- RBS DC distribution
- TM supply 50 A
- EPC bus

4.1 Signal and Power Interfaces

Input Data

The input data is shown in the table below.

Table 2 Input Data

Nominal Input Voltage	+24 V DC negative ground
Permitted Variation Input Voltage	+18.0 to +29.0 V DC
Non-destruction Input Voltage	0.0 to +32.0 V DC
Power	4800 W
Nominal Input Current	200 A
Maximum Input Current	220 A
Maximum Current Ripple (20 Hz – 20 kHz)	24 A_{rms}

Output Data

The output data is shown in the table below.

Table 3 Output Data

RBS DC Distribution (Nominal)	160 A
RBS DC Distribution (Maximum)	180 A (during a 3 hour period)
TM Supply	40 A

4.2 Operator Interface

Indicators

There are four indicators and four switches on the front panel , see the table and list below.

Table 4 Indicators

Indicator	**Colour**
FAULT	Red
OPERATIONAL	Green
EPC BUS FAULT	Yellow
BATTERY DISCONNECTED	Yellow

Switches

The switches are as follows:

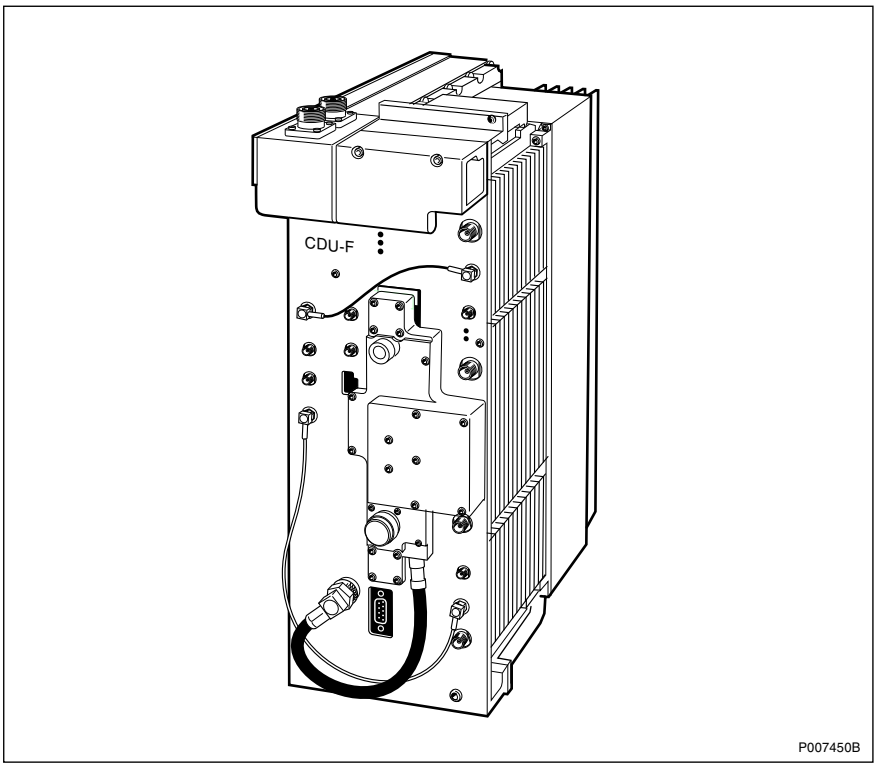
- Battery Disconnect – on/off
- DC out – on/off

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

CDU-F

Combining and Distribution Unit
Description

The Combining and Distribution Unit (CDU-F) is the interface between the TRansceiver Units (TRU) and the antenna system.



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Contents

1 Product Overview

This document describes the CDU-F. A range of CDU types have been developed to support different configurations. The choice depends on the operator's initial and future requirements.

The CDU-F handles one to six double TRansceiver Units (dTRU). It is used in high capacity, medium output power configurations. The CDU-F supports baseband frequency hopping.

1.1 Main Functions

The CDU-F has the following main functions:

- Combines up to six TX signals to one antenna
- Provides automatically-tuned cavity combiners, operated by step motors
- Supports baseband hopping
- Provides simultaneous transmission and reception on one antenna
- Amplifies two RX signals from two antennas for further distribution in the Configuration Switch Unit (CXU)

1.2 Variants

CDU-F is available for GSM 900, GSM 1800, and GSM 1900.

2 Dimensions

This section describes the physical characteristics of the CDU-F.

Table 1 CDU-F Size and Weight

Height	Width	Depth	Weight
400 mm (9 HE x 44.45 mm)	142 mm (28 TE x 5.08 mm)	239 + 90 mm(1)	15 kg

(1) The upper part protrudes 90 mm.

3 Power Consumption and Heat Generation

Figures for power consumption and heat generation are shown in the table below.

Table 2 Power Consumption and Heat Generation

Max. Power Consumption	Max. Heat Generation
70 W	70 W

4 Function Description

This section describes the functions of the TX and RX parts of the CDU-F.

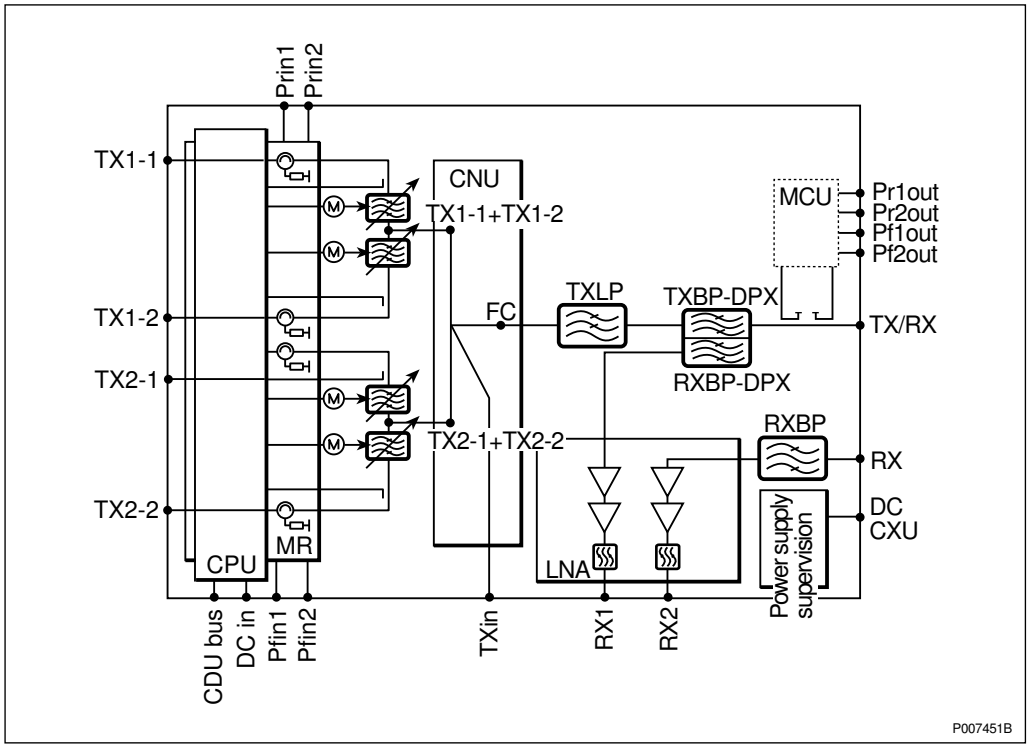


Figure 1 Block Diagram of CDU-F

4.1 TX Part Description

A CDU-F has four filter cavities grouped internally two and two. The two filters form a combiner for two TX signals and can be combined with a Combining Network Unit (CNU) into a combiner for four signals, or can be connected to another CDU-F to form a combining network for six signals.

The combined signals are fed through a lowpass TX filter to a duplex filter. The duplex filter allows the use of a single antenna both for transmitting and receiving. The duplex filter is connected directly to the antenna connector on top of the CDU-F.

All necessary connections for the TX combining network are made on the front of the CDU-F with the CNU.

The Measurement Receiver (MR) and the Central Processor Unit (CPU) control the tuning of the filter cavities.

A small part of the output and reflected power is distributed by the Measurement Coupler Unit (MCU) to four outputs. The signals are then connected to the MR in the same CDU-F, or the MR in another CDU-F, depending on the configuration.

The MR measures the input signal to the filter combiners and also the outgoing signal to the antenna. These two signals are used in the Central Processing Unit (CPU) to control the stepper motors, one for each filter cavity. Moving parts in the filter cavity, tune the combiner to the correct frequency.

4.2 RX Part Description

The duplex filter filters out the RX signal arriving to the antenna. This filtered signal is amplified in a two-stage low-noise amplifier and is then filtered in a lowpass filter.

The CDU-F also has an extra RX chain for diversity reception. This extra RX chain is similar to the duplex RX chain.

Distribution of RX signals is performed in the CXU.

5 Interfaces

The external interfaces of the CDU-F are listed in the table below.

Table 3 Interfaces on CDU-F

Interface	**Type of Connector**
TX/RX, RX	7 – 16 female
RX1, RX2	QMA female
TX1 – TX4	TNC female
Pf in1, PF in2, Pr in1, Pr in2	SMA female
Pf out1, Pf out2, Pr out1, Pr out2	SMA female
FC	N female
CDU bus	15-pin male, D-sub
DC in	2-pin male Molex Mini-Fit

The CDU-F has the following indicators on the front panel.

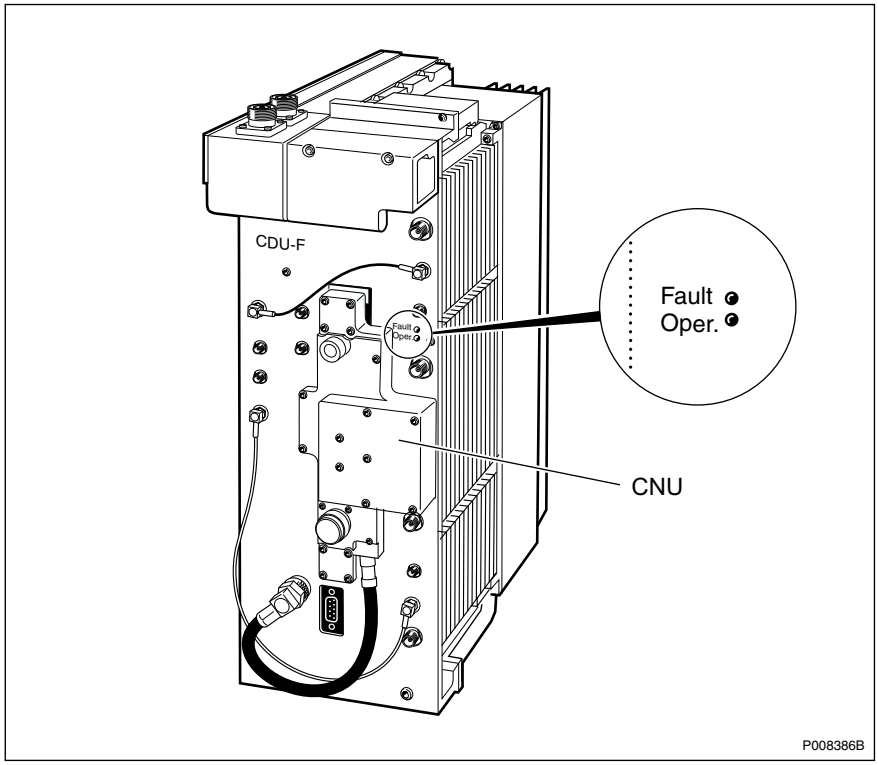


Figure 2 CDU-F Front Panel Indicators

The table below lists the various indicators on the CDU-F.

Table 4 Indicators on CDU-F

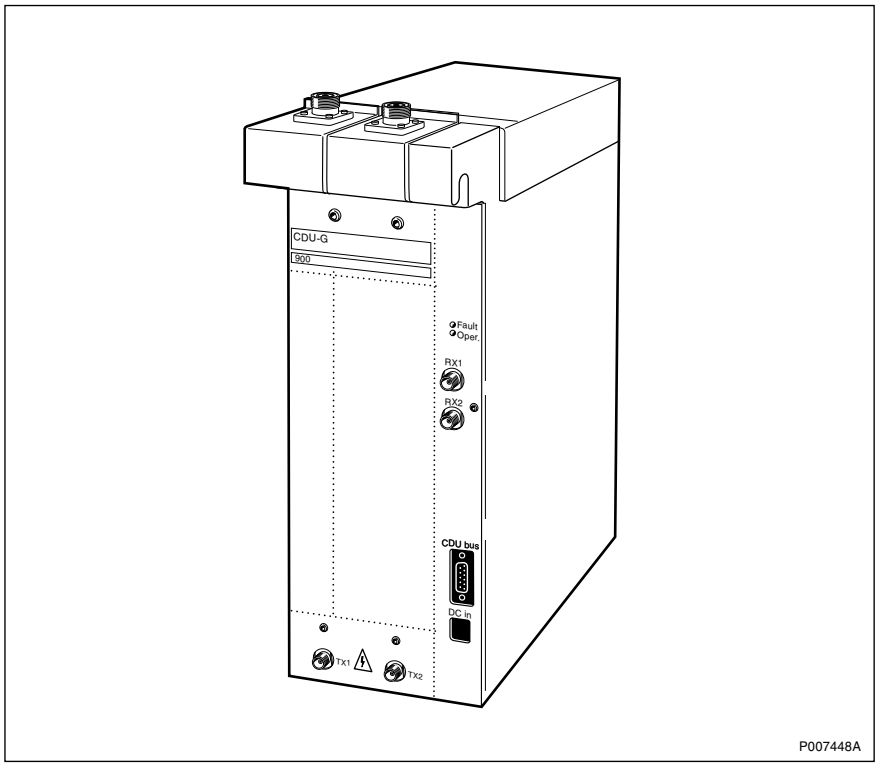
Colour, Label	**Mode**	**Indication**
Red, Fault	Off	No fault is localised in the unit
	On	One or more faults are localised in the unit
	Flashing	The unit has detected lost communication to a superior unit
Green, Operational	Off	The unit is not operational
	On	The unit is operational

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

CDU-G

Combining and Distribution Unit
Description

The Combining and Distribution Unit (CDU-G) is the interface between the TRansceiver Units (TRU) and the antenna system.



Contents

1 Product Overview

This document describes the CDU-G. A range of CDU types have been developed to support different configurations. The choice depends on the operator's initial and future requirements.

The CDU-G handles one or two double TRansceiever Units (dTRU). Connected to one dTRU, it provides a low capacity, high output power configuration. Connected to two dTRUs it provides a high capacity, low output power configuration. The CDU-G supports both synthesizer and baseband frequency hopping.

1.1 Main Functions

The CDU-G has the following main functions:

- Enables connection of two Transmitter (TX) paths to two antennas. The TX path can be two combined signals or two uncombined signals. A CDU-G has no combining circuits; the combining takes place outside the CDU-G
- Provides simultaneous transmission and reception on each antenna
- Amplifies Reciever (RX) path from two antennas for further distribution in the Configuration Switch Unit (CXU), if any

1.2 Variants

CDU-G is available for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 and GSM 1900.

2 Dimensions

This section describes the physical characteristics of the CDU-G.

Table 1 CDU-G Size and Weight

Height	Width	Depth	Weight
400 mm (9 HE x 44.45 mm)	142 mm (28 TE x 5.08 mm)	239 + 90 mm(1)	15 kg

(1) The upper part protrudes 90 mm.

3 Power Consumption and Heat Generation

The power consumption and heat generation are shown in the table below.

Table 2 Power Consumption and Heat Generation

Max. Power Consumption	Max. Heat Generation
30 W	30 W

4 Function Description

This section describes the functions of the TX and RX parts of the CDU-G.

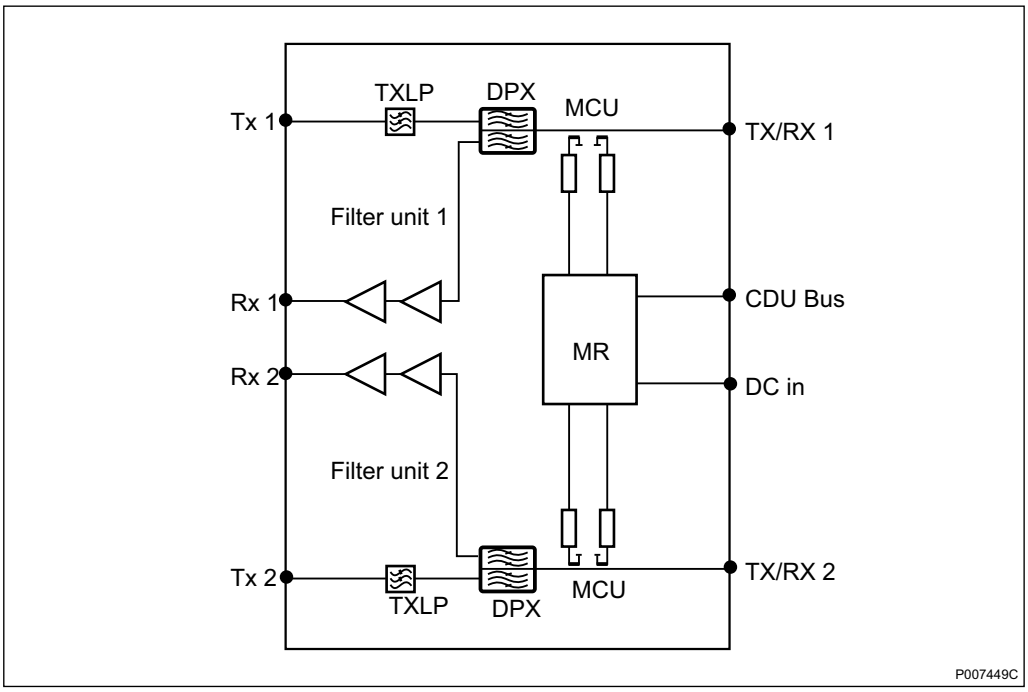


Figure 1 Block Diagram of CDU-G

4.1 TX part description

A CDU-G consists of two identical TX chains (the top and bottom parts in the diagram above).

The TX part contains a Transmitter lowpass filter (TXLP) and a Duplexer (DPX). The TXLP suppresses spurious emissions from the transmitter on frequencies higher than the TX band. The DPX enables the use of a single antenna for both transmitting and receiving.

There is a Measurement Coupler Unit (MCU) between the DPX and antenna connector. The MCU samples forward and reflected signals and distributes them to the Measurement Receiver (MR) for antenna return loss monitoring.

4.2 RX Part Description

A CDU-G consists of two identical RX chains (the middle part in the above diagram). The RX part consists of a filter and a Low Noise Amplifier (LNA). The receiver filter is included in the duplex filter.

Distribution of RX signals is performed in the CXU.

5 Interfaces

The external interfaces of CDU-G are listed in the table below.

Table 3 Interfaces on CDU-G

Interface	Type of Connector
TX/RX1, TX/RX2	7 – 16 female
RX1, RX2	QMA female
TX1, TX2	TNC female
CDU bus	15-pin male, D-sub
DC in	2-pin male Molex Mini-Fit

The CDU-G has the following indicators on the front panel.

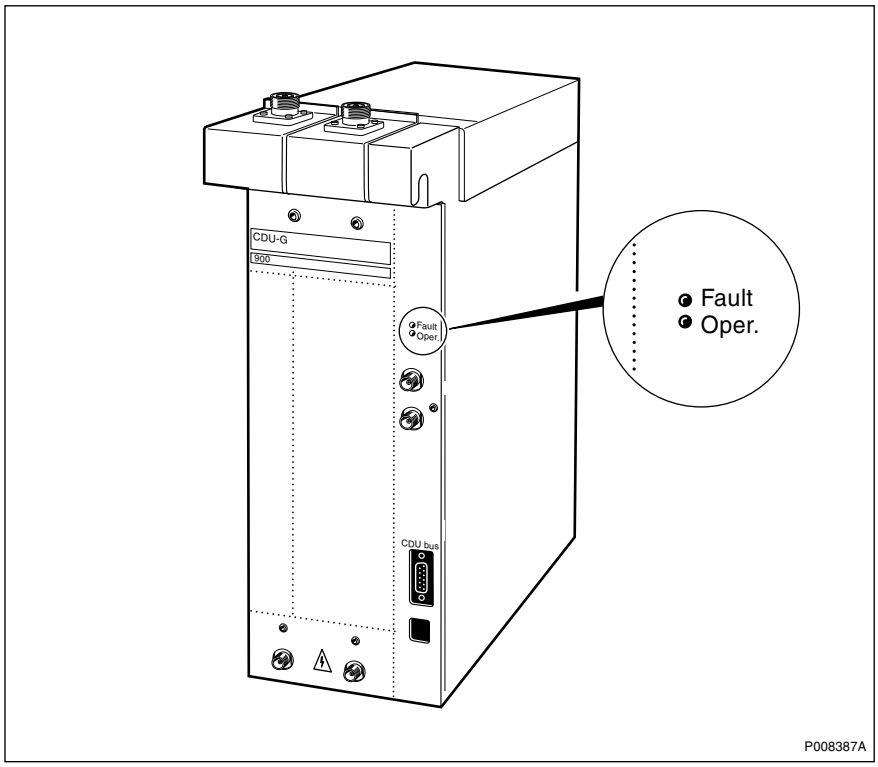


Figure 2 CDU-G Front Panel Indicators

The table below lists the various indicators on the CDU-G.

Table 4 Indicators on CDU-G

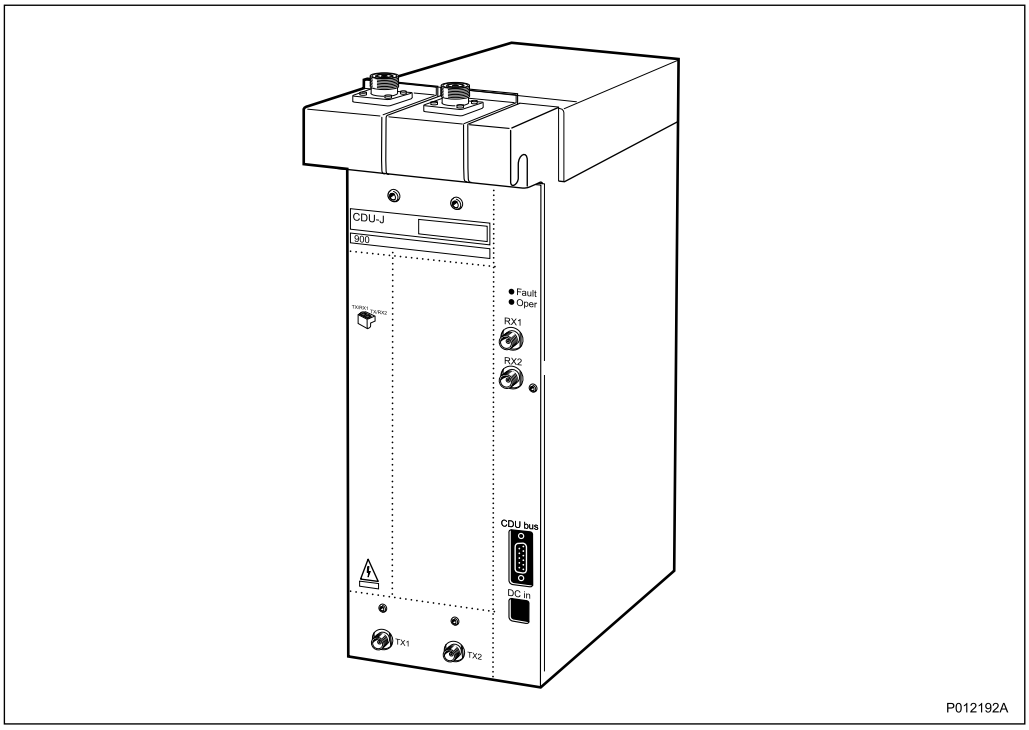
Colour, Label	**Mode**	**Indication**
Red, Fault	Off	No fault is localised in the unit
	On	One or more faults are localised in the unit
	Flashing	The unit has detected lost communication to a superior unit
Green, Operational	Off	The unit is not operational
	On	The unit is operational

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

CDU-J

Combining and Distribution Unit
Description

The Combining and Distribution Unit (CDU) is the interface between the transceiver units (TRUs) and the antenna system.



Contents

1 Product Overview

This document describes the CDU-J. A range of CDU types have been developed to support different configurations. The choice depends upon the operator's initial and future requirements.

The CDU-J handles one dTRU and provides a low capacity, high output power configuration. The CDU-J supports both synthesizer and baseband frequency hopping.

1.1 Main Functions

The CDU-J has the following main functions:

- Enables connection of two transmitter (TX) signals to two antennas. The TX signal can be two combined signals, or two uncombined signals. A CDU-J has no combining circuits; the combining takes place outside the CDU.
- Provides simultaneous transmission and reception on each antenna.
- Amplifies two receiver (RX) signals from two antennas for further distribution in the Splitter unit, if any, otherwise the signals are passed directly to the dTRU

1.2 Variants

CDU-J is available for GSM 800, P-GSM 900, E-GSM 900, GSM 1800 and GSM 1900.

2 Dimensions

This section describes the physical characteristics of CDU-J.

Table 1 CDU-J Size and Weight

Height	Width	Depth	Weight
400 mm (9 HE x 44.45 mm)	142 mm (28 TE x 5.08 mm)	239 + 90 mm (1)	15 kg

(1) The upper part protrudes 90 mm.

3 Power Consumption and Heat Generation

Table 2 Power Consumption and Heat Generation

Max Power Consumption	Max Heat Generation
30 W	30 W

4 Function Description

This section describes the functions of the TX and RX parts of the CDU-J.

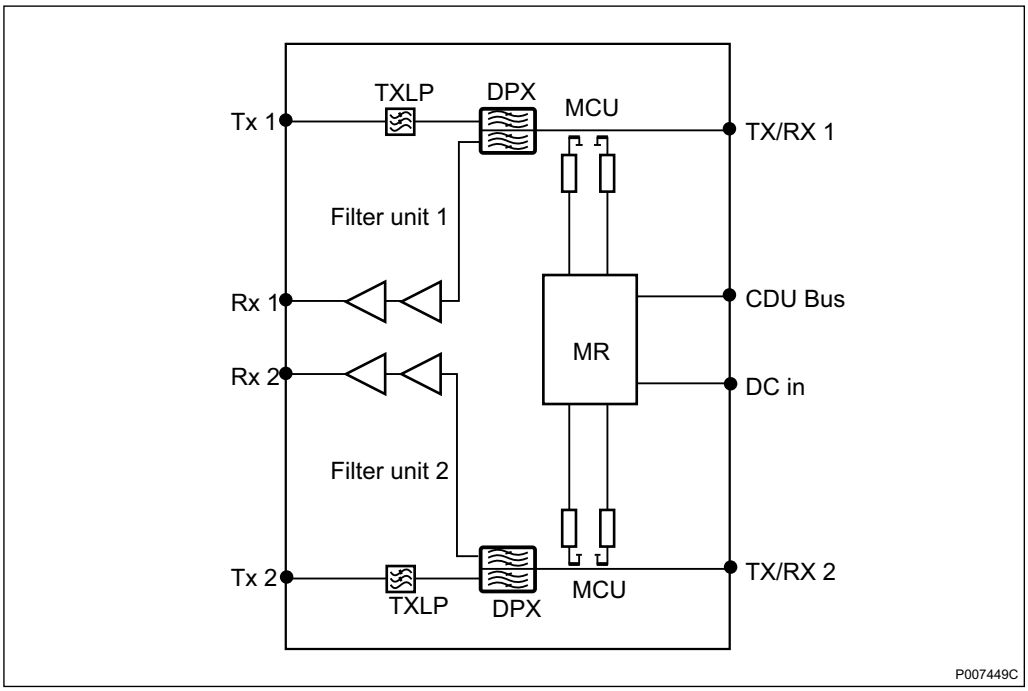


Figure 1 Block Diagram of CDU-J

4.1 TX Part Description

A CDU-J consists of two identical TX chains – the top and bottom parts in the *Figure 1 on page 4*.

The TX part contains a lowpass filter and a duplex filter. The lowpass filter (TXLP) suppresses spurious emissions from the transmitter on frequencies higher than the TX band. The duplex filter (DPX) enables the use of a single antenna for both transmitting and receiving.

There is a Measurement Coupler Unit (MCU) between the DPX and antenna connector. The MCU samples forward and reflected signals and distributes them to the Measurement Receiver (MR) for antenna return loss monitoring.

4.2 RX Part Description

A CDU-J consists of two identical RX chains – the middle part in the *Figure 1 on page 4*. The RX part consists of a filter and a low noise amplifier (LNA). The receiver filter is included in the duplex filter.

The CDU-J has lower RX amplification than CDU-G. The CDU-J is used in RBSs without a Configuration Switch Unit (CXU).

5 Interfaces

The external interfaces of CDU-J are listed in the table below.

Table 3 Interfaces on CDU-J

Interface	Type of Connector
TX/RX1, TX/RX2	7-16 female
RX1, RX2	QMA female
TX1, TX2	TNC female
CDU bus	15-pin male, D-sub
DC in	2-pin male Molex Mini-Fit

The CDU-J has the following indicators on the front panel.

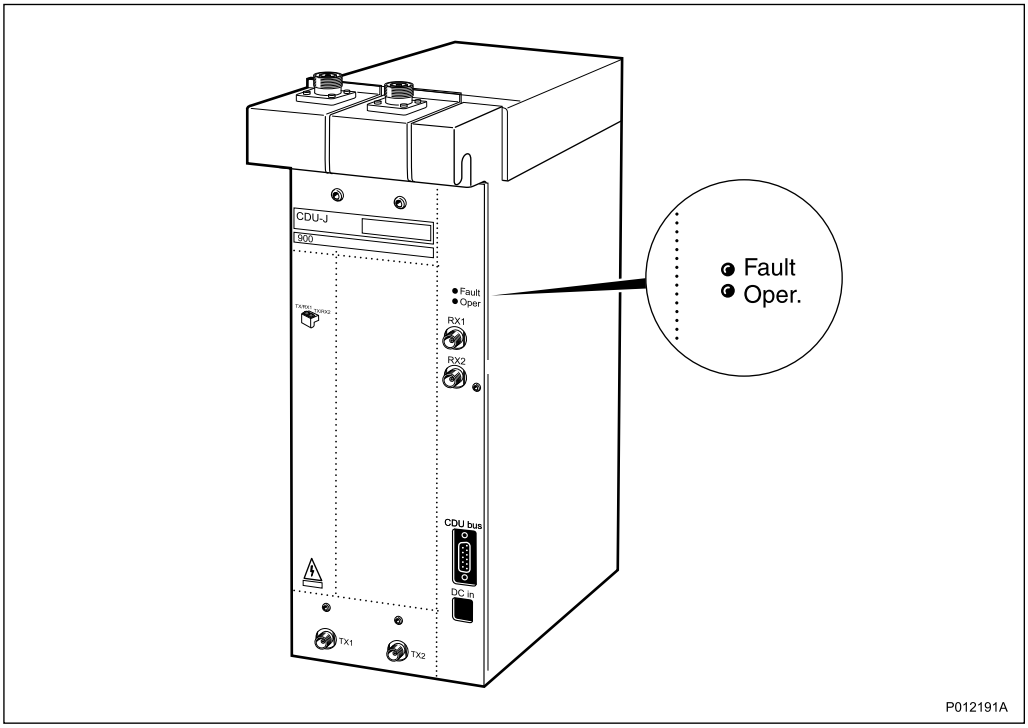


Figure 2 CDU-J Front Panel Indicators

The table below lists the various indicators on the CDU-J.

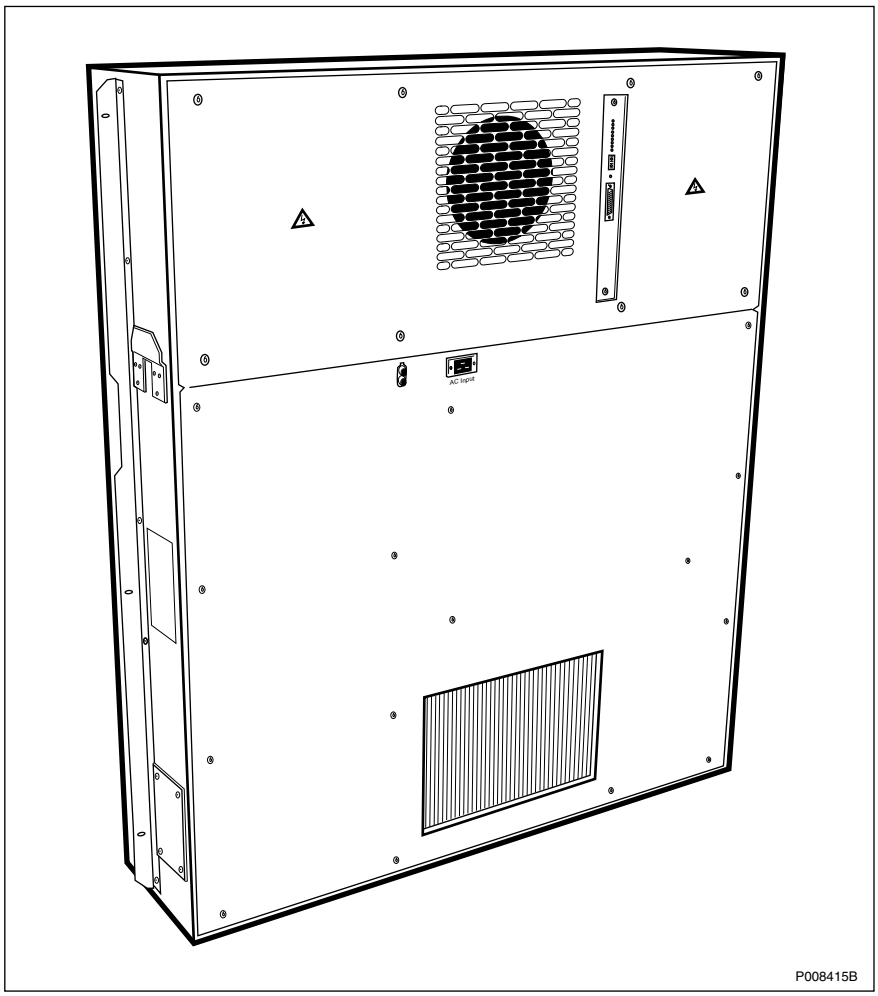
Table 4 Indicators on CDU-J

Colour, Label	Mode	Indication
Red, Fault	Off	No fault is localised in the unit.
	On	One or more faults are localised in the unit.
	Flashing	The unit has detected lost communication to a superior unit.
Green, Operational	Off	The unit is not operational.
	On	The unit is operational.

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

Combined Climate Unit
Unit Description

The combined climate unit maintains internal cabinet temperature within the specified ranges for internal units. The combined climate unit is mounted in the door of the cabinet.



Contents

1 Product Overview

1.1 Main Functions

The main function of the combined climate unit is to provide the RBS 2106 cabinet with cooling or heating to maintain the operating temperature within specified limits.

Variants

The following variants exist:

- Manual voltage selection using the voltage selector switch
- Automatic voltage selection (the voltage selector switch is excluded)

2 Dimensions

The physical characteristics of the combined climate unit are shown in the table below.

Table 1 Combined Climate Unit Size and Weight

Height	Width	Depth	Weight
1250 mm	1050 mm	250 mm	105 kg

3 Power Consumption

Table 2 Power Consumption

Max. AC Power Consumption	Max. DC Power Consumption
2300 W (at 230 V 50 Hz)	450 W

4 Function Description

The block diagram for the combined climate unit is shown in the figure below.

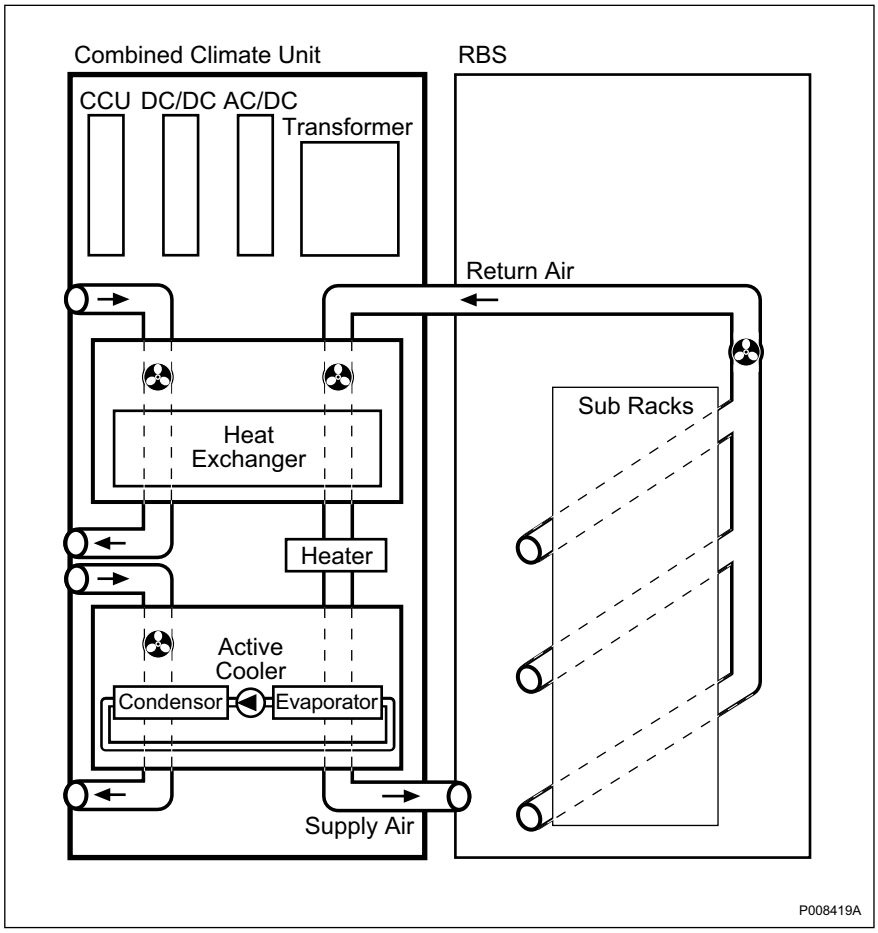


Figure 1 Combined Climate Unit Block Diagram

The combined climate unit consists of the following units:

- Heat exchanger
- Active cooler
- Heater
- Climate Control Unit (CCU)
- DC/DC converter
- AC/DC converter
- Transformer

4.1 Heat Exchanger

This unit consists of a cross-flow heat exchanger, with DC-powered internal and external air circuit fans.

The outside air circulates through one side of the heat exchanger and the inside air circulates through the other side. DC-powered fans force the air through the heat exchanger. The inside air is cooled by the outside air.

4.2 Active Cooler

This unit consists of the following:

- compressor
- reducing valve
- condenser
- evaporator
- AC-powered condenser fan

The liquid coolant passes through a reducing valve, where it evaporates to a cold low-pressure gas. This gas flows through the evaporator and cools it. The inside air that has passed the heat exchanger is blown through the evaporator, cooled, and returned to the cabinet subracks.

The compressor compresses the coolant to a liquid state again in the condenser. The coolant and the condenser become hot in the process. An AC-powered fan circulates the outside air through the condenser and cools it. The coolant used is HFC 134a (tetrafluoroethane).

When the temperature exceeds the compressor start point, the CCU supplies mains voltage, first to the condenser fan and then to the compressor. The condenser fan runs when the compressor is running and also for one minute after the compressor is switched off. The compressor cannot start again before the condenser fan has stopped. This is done to equalise the pressure differences in the cooling system before the compressor starts.

When the temperature decreases below the compressor stop value, a compressor stop signal is activated but the compressor continues running for at least 10 minutes.

If the mains current to the compressor is missing, This is reported as compressor failure.

The condenser fan is provided with a rotation signal output. If the signal is missing, an active cooler fan alarm is reported.

4.3 Heater

The heater is placed in the internal air circuit and heats the air if the ambient temperature is too low for startup.

The heater is powered by mains voltage, and heats the inside air if the startup temperature inside the cabinet is below -5° C. The heater has a capacity of 2 kW.

The CCU measures the return air temperature and controls the heater.

4.4 CCU

The Climate Control Unit (CCU) is a processor-based plug-in unit, controlling and supervising the climate unit. The CCU provides the following main functions:

- Monitors internal and external temperatures
- Monitors and controls the internal and external fans
- Monitors and controls the heater
- Handles alarms
- Supervises mains voltage
- Tests the Heat Exchanger Climate Unit

4.5 DC/DC Converter

The DC/DC converter operates on +24 V DC supply from the RBS. The converter feeds -48 V DC supply to the internal air circuit fan, external air circuit fan in the heat exchanger and the CCU.

4.6 AC/DC Converter

The AC/DC converter converts AC mains to -48 V DC supply for the internal air circuit fan, external air circuit fan in the heat exchanger and the CCU, when the +24 V DC supply is not present.

4.7 Transformer

The transformer supplies the fans, heater, compressor, and AC/DC converter with 230 V AC, independently of the mains input voltage.

The transformer has windings for mains input voltages of 200, 208/220, 230, 240, and 250 V AC.

5 Interfaces

5.1 Signal and Power Interfaces

The combined climate unit has the following external interfaces:

- DC power
- AC mains power
- Environmental and Power Control (EPC) bus (on the CCU)
- Test and general signals (25-pole D-sub on the CCU)

5.2 Operator Interfaces

The CCU operator interfaces are shown in the figure below.

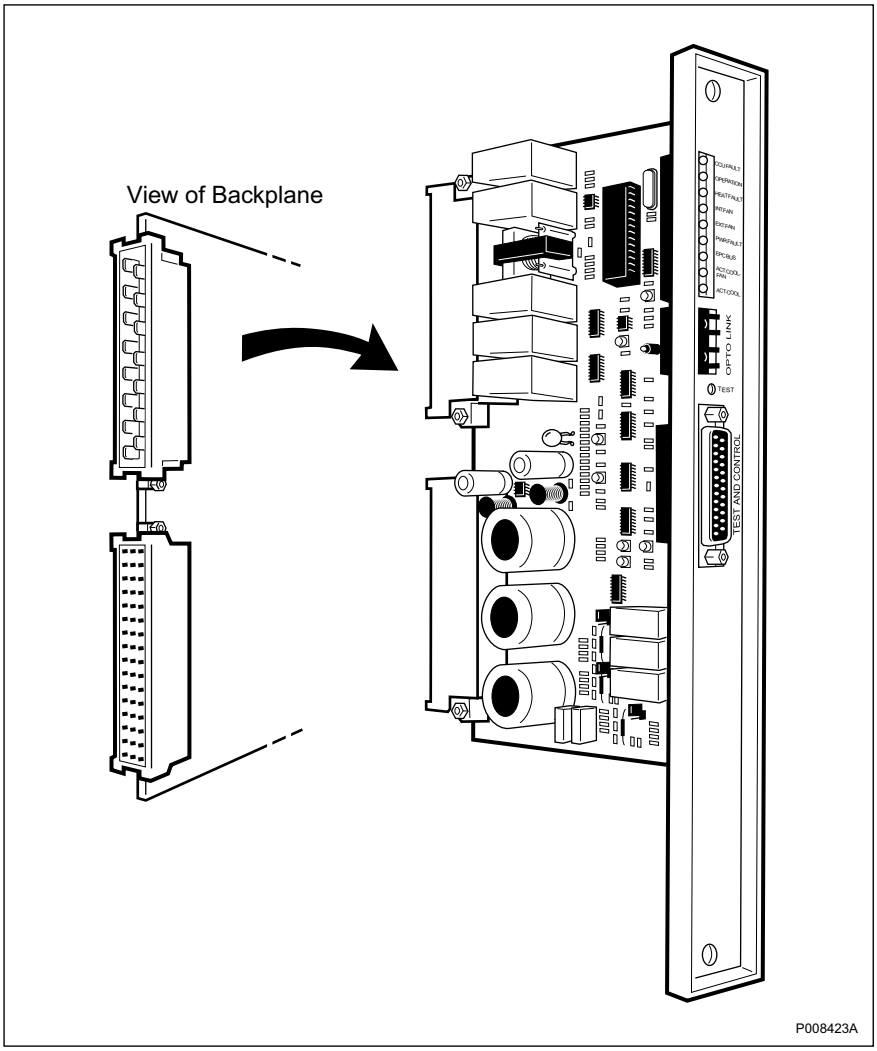


Figure 2 CCU Operator Interfaces

The CCU front panel has the following Man-Machine Interfaces (MMI):

- Indicators
- Test button
- Test and control connector

Indicators

The indicators are shown in the table below.

Table 3 Indicators

Indicator	**Colour**
CCU Fault	Red
Operation	Green
Heater fault	Yellow
Heat exchanger internal fan fault	Yellow
Heat exchanger external fan fault	Yellow
Power fault	Yellow
EPC bus fault	Yellow
Active cooler fan fault	Yellow
Active cooler fault	Yellow

Manual Voltage Selector

The figure below shows the combined climate unit with a manual voltage selector switch.

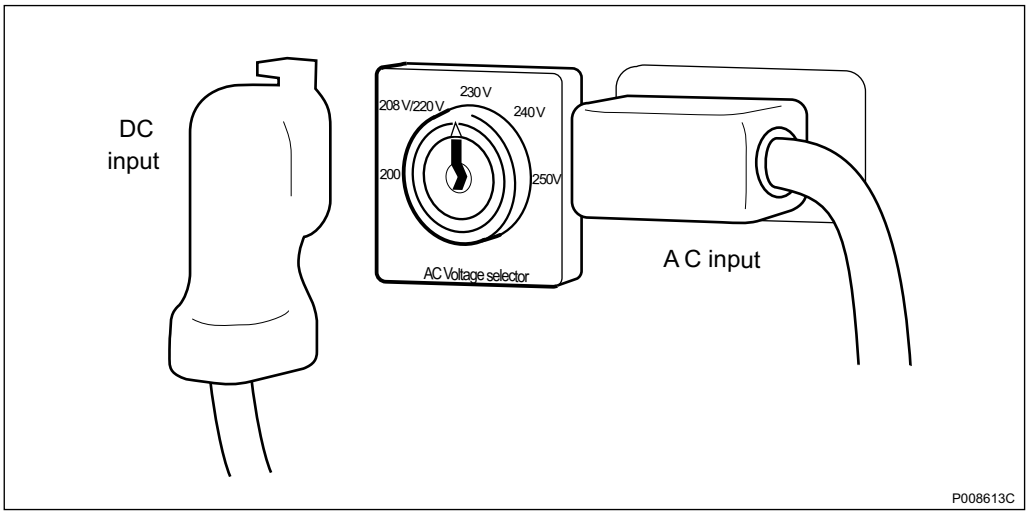


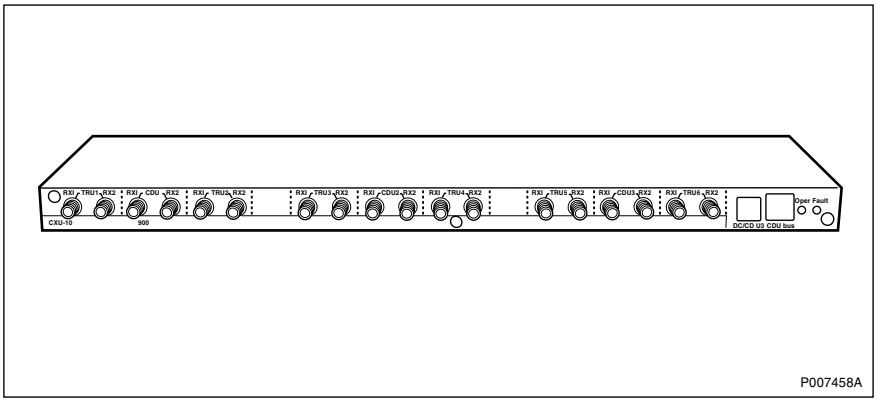
Figure 3 Combined Climate Unit Voltage Selector

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com

CXU-10

Configuration Switch Unit
Unit Description

The Configuration Switch Unit (CXU-10) distributes the Reciever (RX) signals from the Combining and Distribution Unit (CDU) to the double TRansceiver Unit (dTRU) within the same RBS.



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Contents

1 Product Overview

The CXU-10 cross-connects the CDU and the dTRU in the RX path. The CXU-10 makes it possible to expand or reconfigure a cabinet with minimum movement or replacment of RX cables.

The CXU is a multi-band product for GSM 800, GSM 900, GSM 1800 and GSM 1900.

1.1 Main Functions

The CXU-10 has the following main functions:

- Supports both GMSK and 8-PSK
- Supports up to three CDUs
- Connects different CDUs to different dTRUs (six switches are set to configure the CDU connections)

2 Dimensions

The physical characteristics of the CXU-10 are shown in the table below.

Table 1 CXU-10 Size and Weight

Height	Width	Depth	Weight
22 mm	482.6 mm (19in. standard)	120 mm	2 kg

3 Power Consumption

The maximum power consumption is 10 W.

4 Function Description

The block diagram for the CXU-10 is shown in the figure below.

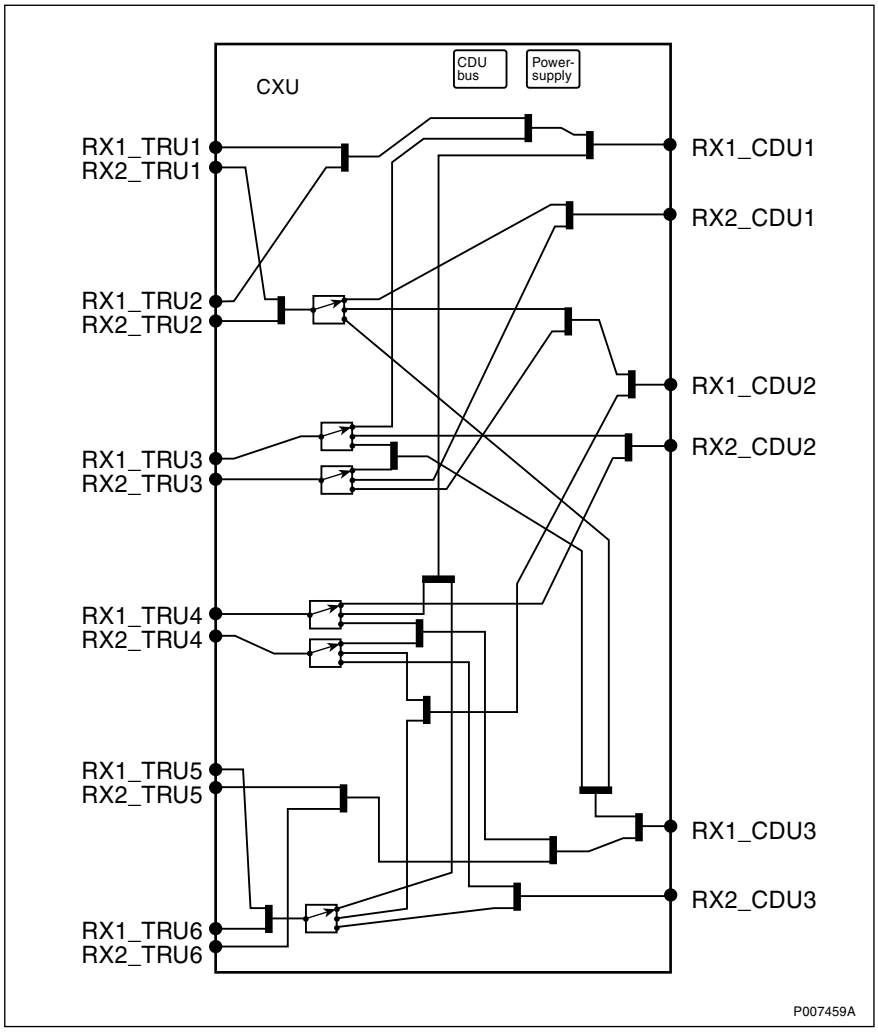

Figure 1 Block Diagram of the CXU-10

4.1 Functions

The CXU has six different switches. By setting the switches in different positions, the CXU can be configured to connect radio signals from a specific CDU to a specific RX input on a dTRU.

The CXU is also connected to a CDU bus. By sending data through the CDU bus, the switches can be set to fulfil the supported configurations.

The unit contains splitters for distribution of incoming RX signals to the switches and in some cases directly to an output.

The RF cables between the CDU and CXU, and the CXU and dTRU, are supervised by the CXU.

5 Interfaces

5.1 Signal and Power Interfaces

The connectors are shown in the table below.

Table 2 Connectors

Function	Quantity
Input for RX signal from CDU	6
Output for RX signal to dTRU	12
CDU Bus connector for alarm and configuration setting	1
Power supply connector	1

5.2 Operator Interface

The indicators are shown in the table below.

Table 3 Indicators

Indicators	Colour
Operational	Green
Fault	Red

Ericsson AB
SE-164 80 Stockholm
Sweden
asq.us@ericsson.com