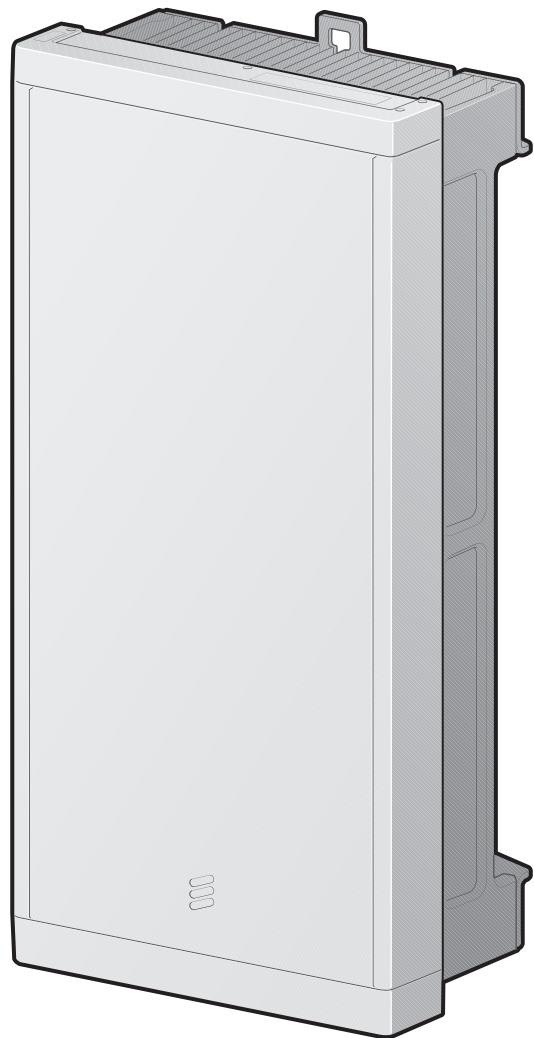


Antenna Integrated Radio Unit Description

AIR 6488

Description





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1 Introduction

This document describes the AIR 6488 unit.

1.1 Warranty Seal

The unit is equipped with two warranty seal stickers.

Note: Seals that have been implemented by Ericsson must not be broken or removed, as it otherwise voids warranty.



2

Product Overview

AIR 6488 is a 64TR TDD AAS for NR. It has a maximum IBW of 100 MHz and maximum transmitted power of 80 W (200 W for B41K, B42, B42F, B42G, and B43).

The AIR unit has beamforming and MU-MIMO technology, capable to fully utilize radio resources in both azimuth and elevation.

The main benefits compared to previous macro solutions are improvements in:

- Enhanced coverage - High gain adaptive beamforming
- Enhanced capacity - High-order spatial multiplexing and multi-user MIMO
- Advanced RAN features - Vertical and horizontal beamforming
- Improved network performance - Low inter-cell interference

The AIR unit is designed for outdoor installations, intended for pole, wall, tower, or mast mounting.

HWACs are required for this product.

A typical configuration is shown in [Figure 1](#). Another installation alternative is shown in [Figure 2](#).

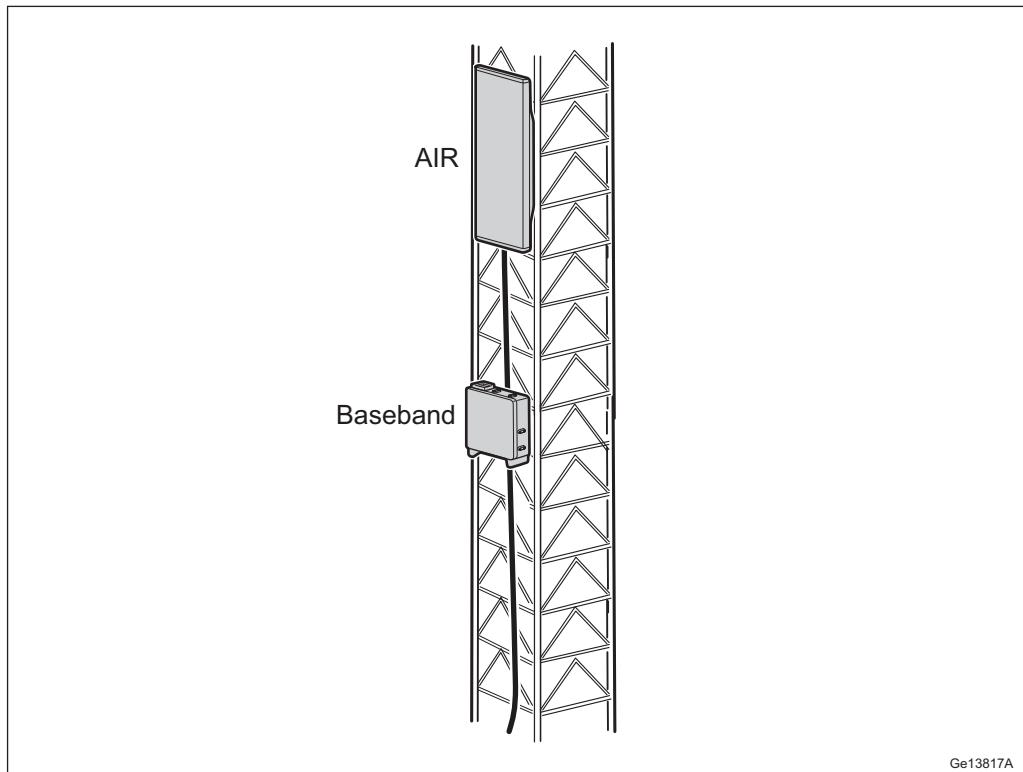


Figure 1 AIR Unit Connected to Baseband

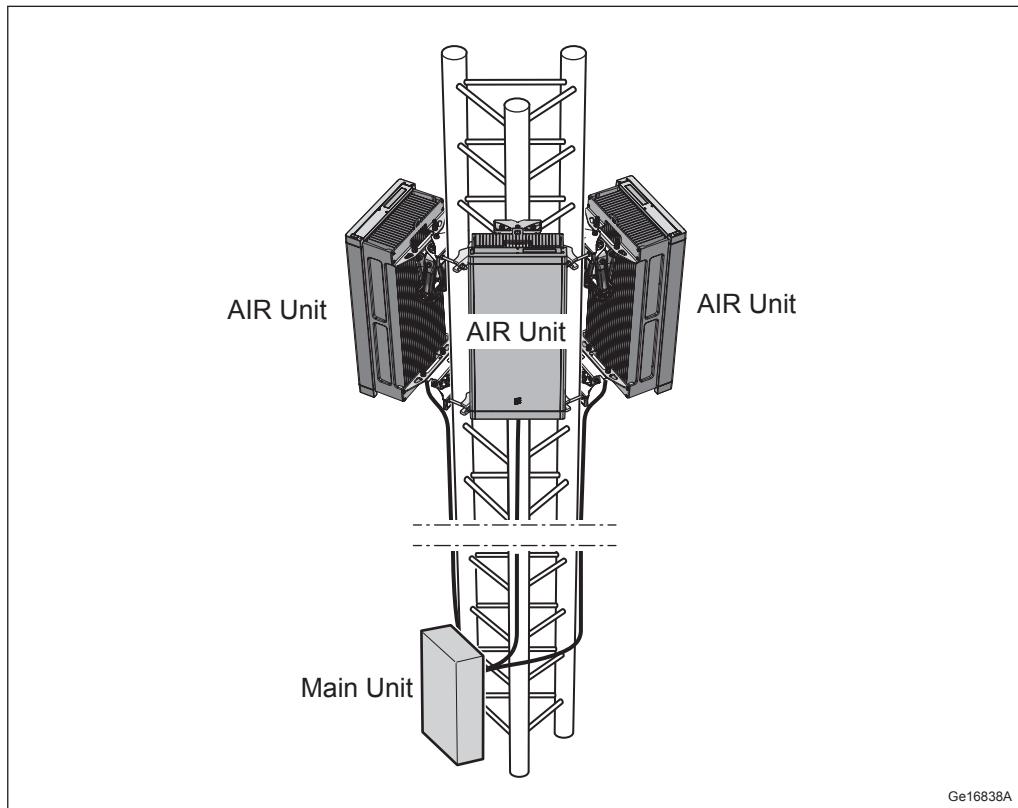


Figure 2 Three AIR Units Pointing at Three Different Directions

2.1 Main Features

- Three-wire (DC-I) and two-wire (DC-C) power connection
- NR TDD
- 64 transmitter/receiver (64TX/64RX) branches
- eCPRI
- Complies with 3GPP base station class Wide Area. For a list of relevant standards, see [Radio Standards Compliance](#) on page 30.
- Supports *Basic Stand-alone Radio Installation Check*, that helps to identify potential faults before the AIR is connected to the network.

2.2 Required Installation Equipment

When an AC PSU is the power source, Power 6302 or Power 6322 is recommended along with a trident DC power cable RPM 777 015 connected on the PSU to get reliable power to the AIR. The AC PSU supplies the 2-wire (DC-C) power solution.



Table 1 Mounting Kit

Mounting Kit	Product Name	Product Number
Swivel mounting kit	AIR Medium, wall and pole mount bracket no tilt with azimuth	SXK 109 2064/1
Tilt and swivel mounting kit	AIR Medium, wall and pole mount bracket with tilt and azimuth	SXK 109 2065/1

For more information, see [Main-Remote Installation Products Overview](#).

Note: Adhere to the following for safety and operation reasons: The mechanical design of the AIR unit is based on environmental conditions that are equal to or exceeding class 4.1 as specified in EN 300 019-1-4 and GR-3178-CORE and thereby respects the static mechanical load imposed on an AIR unit by wind at maximum velocity. Wind loads in this document are calculated with reference to wind pressure. For more accurate results, the specific terrain information for relevant sites and geographical area where the AIR unit will be installed must be carefully analyzed, considered, and calculated according to EN 1991-1-4.

Pole clamps, brackets, mounting accessories and other installation material or equipment specified by Ericsson in the AIR unit product information documentation must be used and Ericsson installation instructions be complied with. In addition, it must be observed that specific environmental conditions that the AIR unit becomes exposed to, such as icing, heat, dust, dynamic stress (for example, strain caused by oscillating support structures) or other environmental conditions that exceed or otherwise deviate from the [Environmental Characteristics](#) on page 15, can result in the breakage of an AIR unit or its mounting accessories and even cause the AIR unit to fall to the ground.

These facts, information, and circumstances must be considered and properly taken into account during the site planning process and adhered to for installation and operation of the AIR unit. Ericsson expressly disclaims any responsibility or liability arising out of failures in this regard.



3 Technical Data

Table 2 Technical Data

Description	Value
Maximum nominal output power ⁽¹⁾ ⁽²⁾	B41K, B42, B42F, B42G, B43: 200 W Other bands: 80 W
Number of carriers	NR: One
Frequency ⁽³⁾	B41 for NR 2496–2690 MHz
	B41K for NR 2515–2675 MHz
	B42 for NR 3400–3600 MHz
	B42F for NR 3420–3600 MHz
	B42G for NR 3410–3600 MHz
	B43 for NR 3600–3800 MHz
	B78B for NR 3500–3600 MHz
	B78H for NR 3542–3700 MHz

- (1) For detailed information about licenses and HWACs, see Manage Licenses and Hardware Activation Codes in the Radio Node libraries.
- (2) For detailed information about output power, see the applicable Output Power feature description.
- (3) For information about IBW, see RBS Configurations.

3.1 EIRP Data

3.1.1 Traffic Beams

This section describes the EIRP of traffic beams for the AIR unit.



Table 3 AIR Unit Typical EIRP Performance Data for Traffic Beams

Uniform Traffic Beams ⁽¹⁾	Directions					
	B41, B41K, B42F, B42G, B43, B78B, B78H			B42 ⁽²⁾		
Htilt, Vtilt	0°, 3°	55°, 3°	0°, 18°	0°, 6°	60°, 6°	0°, 16°
Vertical Beamwidth	9.5°	9.5°	10°	6.5°	6.5°	6.5°
Horizontal Beamwidth	12°	22°	12°	12.2°	22.4°	12.5°
Minimum peak EIRP ⁽³⁾	2 × 74±1.5 dBm	2 × 70±1.5 dBm	2 × 70±1.5 dBm	2 × 75±1.5 dBm	2 × 71±1.5 dBm	2 × 72.5±1.5 dBm

(1) The traffic beamforming of this product is not limited to the uniform beamshapes and directions given in the table. The beams are dynamically optimized.

(2) The output power of B42 needs to be adjusted to a level where the EIRP complies with the limits specified in RSS-192 in the Canada market.

(3) The minimum peak EIRP in the table is calculated for two simultaneous orthogonal beams.

3.1.2 Broadcast Beams

This section describes performance data for broadcast beams in three different scenarios.

Table 4 AIR Unit Typical Antenna Performance Data for Broadcast Beams

Scenario	Macro	Hotspot	Highrise	Macro	Hotspot	Highrise
	B41, B41K, B42F, B42G, B43, B78B, B78H			B42 ⁽¹⁾		
Beam	BrM1 ⁽²⁾	BrHS1 ⁽³⁾	BrHR1 ⁽⁴⁾	BrM1 ⁽²⁾	BrHS1 ⁽³⁾	BrHR1 ⁽⁴⁾
Vertical Beamwidth	10±1°	30±3°	30±3°	6.5±2°	26±3°	26±3°
Horizontal Beamwidth	65±5°	65±5°	20±2°	65±5°	65±5°	20±2°
Digital Downtilt	[−8, 8]°	Fixed 3°	Fixed 3°	[1, 11]°	Fixed 6°	Fixed 6°
Vertical beam pointing error	≤ 1°	≤ 3°	≤ 3°	≤ 1°	≤ 3°	≤ 3°



Scenario	Macro	Hotspot	Highrise	Macro	Hotspot	Highrise
B41, B41K, B42F, B42G, B43, B78B, B78H				B42⁽¹⁾		
Horizontal beam pointing direction	0±5°	0±5°	0±2°	0±5°	0±5°	0±5°
EIRP (max)	1 × 69±1.5 dBm	1 × 64±1.5 dBm	1 × 69±1.5 dBm	1 × 71±1.5 dBm	1 × 65±1.5 dBm	1 × 70±1.5 dBm
Side Lobe Suppression	16 dB (vertical)	12 dB (vertical)	12 dB (horizontal)	15 dB	12 dB	12 dB
Front to Back Ratio	25 dB	25 dB	25 dB	25 dB	25 dB	25 dB
Beam Parallelity	≤ -10 dB	≤ -10 dB	≤ -10 dB	N/A	N/A	N/A

(1) The output power of B42 needs to be adjusted to a level where the EIRP complies with the limits specified in RSS-192 in the Canada market.

(2) Broadcast Beam Macro 1

(3) Broadcast Beam Hotspot 1

(4) Broadcast Beam Highrise 1



3.2

Physical Characteristics

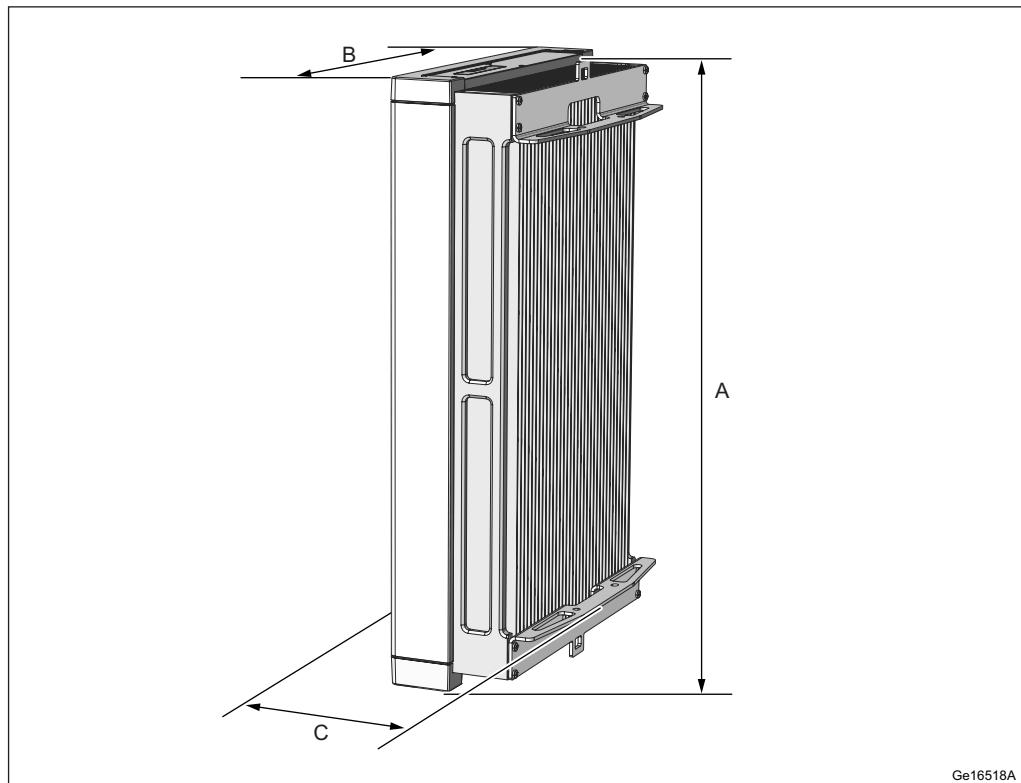


Figure 3 AIR Unit Dimensions

Table 5 AIR Unit Dimensions

AIR Unit Type	Height (A) × Width (B) × Depth (C)
AIR 6488 B41	893 × 520 × 238 mm
AIR 6488 B41K	893 × 520 × 238 mm
AIR 6488 B42	819 × 400 × 272 mm
AIR 6488 B42F	819 × 400 × 256 mm
AIR 6488 B42G	819 × 400 × 256 mm
AIR 6488 B43	819 × 400 × 256 mm
AIR 6488 B78B	819 × 400 × 256 mm
AIR 6488 B78H	819 × 400 × 256 mm



Table 6 AIR Unit Weight

AIR Unit Type	Weight without Mounting Kit	Weight with Mounting Kit	
		SXK 109 2064/1	SXK 109 2065/1
AIR 6488 B41	61.4 kg	65.8 kg	67.1 kg
AIR 6488 B41K	61.4 kg	65.8 kg	67.1 kg
AIR 6488 B42	45.0 kg	49.4 kg	50.7 kg
AIR 6488 B42F	44 kg	48.4 kg	49.7 kg
AIR 6488 B42G	44 kg	48.4 kg	49.7 kg
AIR 6488 B43	45.5 kg	49.9 kg	51.2 kg
AIR 6488 B78B	44 kg	48.4 kg	49.7 kg
AIR 6488 B78H	44 kg	48.4 kg	49.7 kg

The heat-sink of the AIR unit is gray (color code NCS S 4502-B).

The radome, front, top, and side covers of the AIR unit are white (color code NCS S 1002-B).

3.3 Installation Requirements

This section describes the installation requirements for installing the AIR unit. For a complete installation description, see [Install Antenna Integrated Radio Units](#).

The AIR unit is designed for outdoor use, and it can be installed either on a pole, on a wall, on a mast, or on a tower.

3.3.1 Outdoor Installation Environments to Avoid

The AIR unit is designed for outdoor use but to ensure optimal operation, avoid the following:

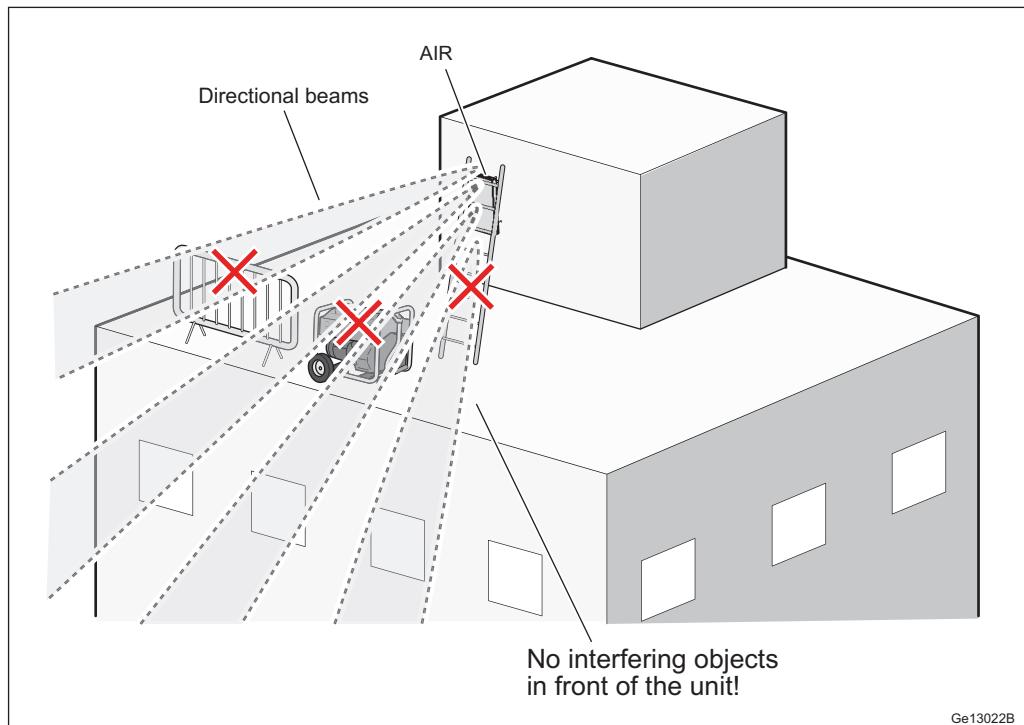
- Hot microclimates caused by, for example, heat radiated or reflected from dark or metallic walls or floors
- Chimney mouths or ventilation system outlets
- Large glass or concrete surfaces

Avoid radio interference by keeping the area directly in front of the antenna clear of the following:

- Metal surfaces or objects such as railings, ladders, or chains



- Equipment generating electromagnetic fields, for example, electric motors in air conditioners or diesel generators
- RBS equipment



3.3.2 Painting Disclaimer

Ericsson recommends to not paint the product as it can affect performance of the product.

Ericsson applies limitations to the warranty and service contract if the product is painted.

If the product is painted, the following commercial limitations apply:

- Failure modes directly related to overheating because of painting are not valid for repair within the scope of the warranty or standard service contract.
- Product failures related to paint contamination of components of the unit are not valid for repair within the scope of warranty or standard service contract.
- When a painted unit is repaired, it might be restored to the standard color before being returned to the market. It is not possible to guarantee that the same unit is sent back to the same place. This is also valid for units repaired under a service contract.



- For repairs within the warranty period or a standard service contract, the customer is charged the additional costs for replacing all painted parts of the unit or the complete unit.

If adaptations are required, contact Ericsson for information.

3.4 Installation Alternatives

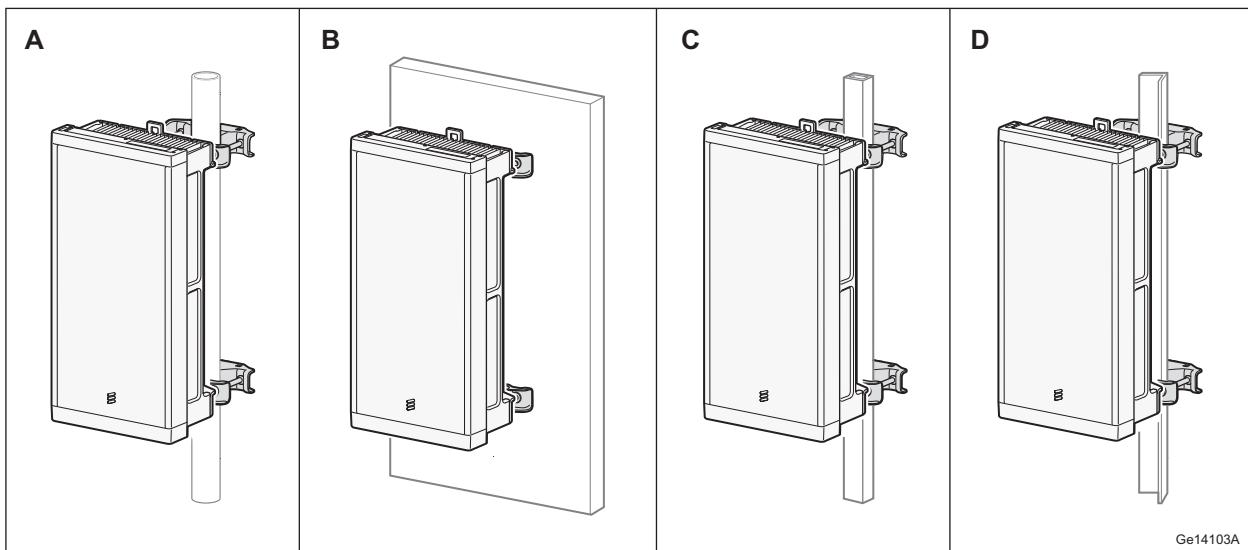


Figure 4 Installation Method Alternatives

Table 7 Installation Alternatives

Installation Method	Description
A	Pole installation (pole with circular cross section)
B	Wall installation
C	Pole installation (pole with square cross section)
D	Pole installation (pole with 90° angle cross section)

Table 8 Pole Mounting Range

Pole	Circular	Square	90° Angle
Minimum outer dimension	Ø76 mm	50 × 50 mm	50 × 50 mm
Maximum outer dimension	Ø120 mm	80 × 80 mm	80 × 80 mm

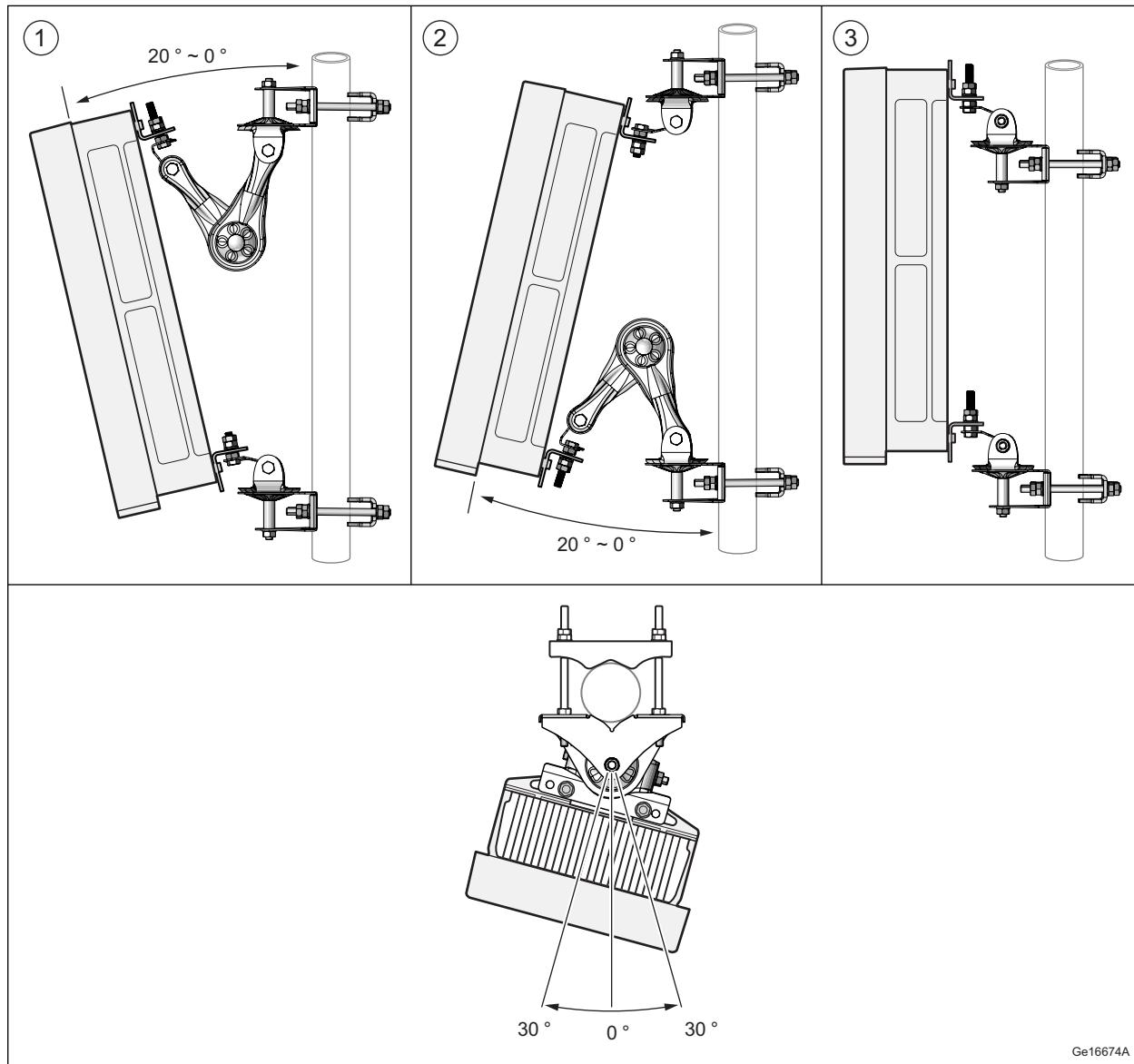


Figure 5 Tilt and Swivel Angle

Note: Mounting kit SXK 109 2064/1 supports swivel angle, and SXK 109 2065/1 supports both swivel and tilt angle.

3.5 Space Requirements

The AIR unit is installed with the cable connections facing down. Allow enough free space below the AIR unit to ensure sufficient working space.



Table 9 Space Requirements Between AIR Units or AIR Unit and Antenna
Installed Side by Side

Required Free Horizontal Space
0.1 m

Table 10 Space Requirements for AIR Unit

Heat Source Below AIR Unit (Y)				
Heat dissipation	< 350 W	350–500 W	500–950 W	950–1200 W
Recommended distance from heat source	> 0.3 m	> 0.5 m	> 0.7 m	> 0.9 m

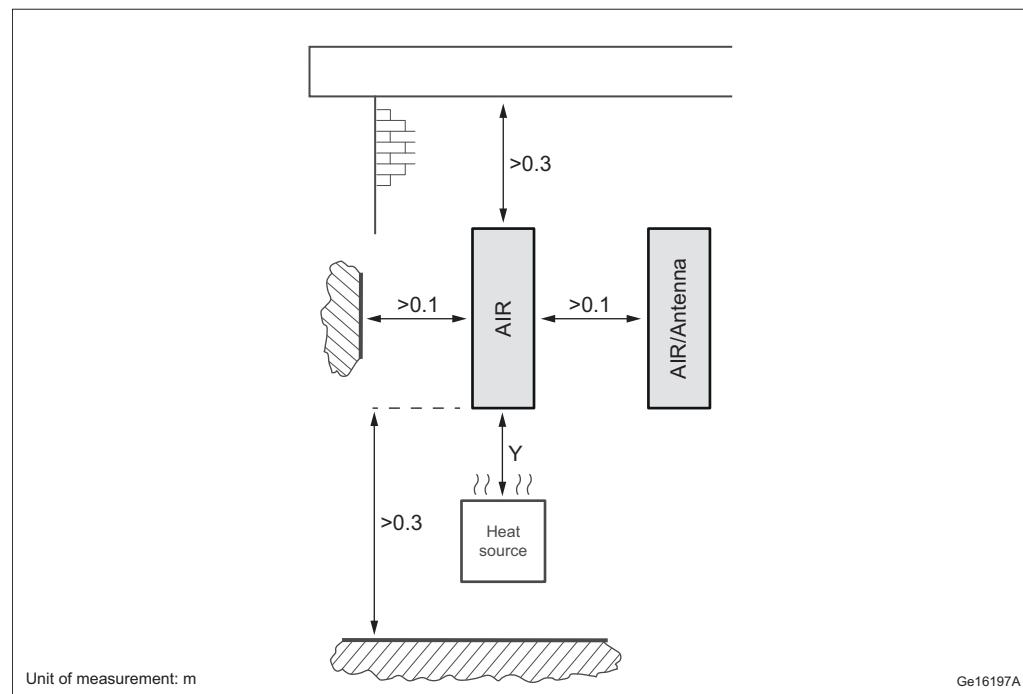


Figure 6 Space Requirements for AIR Unit

Note: To ensure adequate airflow, do not enclose the AIR unit in a box-like environment.

3.6 Acoustic Noise

The AIR unit does not have active cooling components. It can emit low levels of acoustic noise when operating on low capacity.



The sound pressure level when operating on low capacity in NR is lower than 28 dBA at 1-meter distance and hemispherical distribution, and 25 dBA for spherical distribution.

3.7 Environmental Characteristics

This section contains operating environment data for the AIR unit.

3.7.1 Operating Environment

The following are the values for the normal operating environment of the AIR:

Temperature	-40 to +55°C
Solar radiation	≤ 1,120 W/m ²
Relative humidity	2% to 100%
Absolute humidity	0.26 to 40 g/m ³
Maximum wind load at 42 m/s (Pole installed AIR unit)	B41: 692 N (front), 151 N (side) B41K: 692 N (front), 151 N (side) B42: 533 N (front), 278 N (side) B42F: 506 N (front), 171 N (side) B42G: 506 N (front), 171 N (side) B43: 506 N (front), 171 N (side) B78B: 506 N (front), 171 N (side) B78H: 506 N (front), 171 N (side)

3.7.2 Heat Dissipation

The AIR is convection cooled and designed for outdoor installation.

Table 11 AIR Heat Dissipation

Unit	Output Power (W)	Maximum Heat Dissipation (kW)
AIR 6488 B41	200	0.99
AIR 6488 B41K	200	0.99
AIR 6488 B42	200	0.98
AIR 6488 B42F	200	0.96
AIR 6488 B42G	200	0.95
AIR 6488 B43	200	0.95



Unit	Output Power (W)	Maximum Heat Dissipation (kW)
AIR 6488 B78B	200	0.95
AIR 6488 B78H	200	0.96

3.7.3 Vibration

This section describes how the AIR unit tolerates vibrations. The AIR unit operates reliably during seismic activity as specified by test method IEC 60068-2-57 Ff.

Maximum level of RRS	50 m/s ² within 2–5 Hz for DR=2%
Frequency range	1–35 Hz
Time history signal	Verteq II from earthquake standard ATIS 0600329.2014

The AIR unit operates reliably during random vibration as specified by test method IEC 60068-2-64.

Random vibration, normal operation:

ASD-level	0.3 m ² /s ³ on horizontal axes X and Y 0.2 m ² /s ³ on vertical axis Z
Frequency range	2–200 Hz
Time per test direction	30 minutes

3.7.4 Materials

All Ericsson products fulfill the legal, market, and Ericsson requirements regarding the following:

- Material declaration
- Materials' fire resistance, components, wires, and cables
- Recycling
- Restricted and banned material use

3.8 Power Supply Characteristics

This section describes the power supply requirements, power consumption, and fuse and circuit breaker recommendations for the AIR unit.



3.8.1

DC Power Supply Characteristics

The AIR unit is designed for 3-wire (DC-I) power connections used on 3-wire (DC-I) sites. For 2-wire (DC-C) power solutions, a 2-wire (DC-C) connector is used.

When an AC PSU is the power source, Power 6302 or Power 6322 is recommended along with a trident DC power cable RPM 777 015 connected on the PSU to get reliable power to the AIR. The AC PSU supplies the 2-wire (DC-C) power solution.

The following is a list of the power supply requirements:

Nominal Voltage	-48 V DC
Operating Voltage Range	-36.0 to -58.5 V DC
Non-destructive Range	0 to -60 V DC

Fuse and Circuit Breaker Recommendations

The recommendations given in this section are based on peak power consumption, and they give no information on power consumption during normal operation.

The recommended melting fuse type is am-gL-gG, according to IEC 60269-1. Circuit breakers must comply with at least Curve 3 tripping characteristics, according to IEC 60947-2.

The AIR unit has a built-in Class 1 (Type 1) SPD to protect the equipment in case of lightning and network transients. The recommended fuse or circuit breaker rating is therefore dimensioned to not trip the fuse or circuit breaker in case of SPD operation.

Table 12 AIR Unit Fuse and Circuit Breaker Recommendations

Unit (DC Powered)	Minimum Fuse Rating ⁽¹⁾	Maximum Allowed Fuse Rating ⁽²⁾
AIR 6488 B41	40 A	50 A
AIR 6488 B41K		
AIR 6488 B42		
AIR 6488 B42F		
AIR 6488 B42G		
AIR 6488 B43		
AIR 6488 B78B		
AIR 6488 B78H		

(1) These fuse ratings can only be used if it is acceptable that fuses trip because of lightning or network transients.



- (2) The absolute maximum fuse class in accordance with radio design restrictions.

3.8.2 Power Consumption

For information on power consumption, see Power Consumption Calculations.

3.9 System Characteristics

This section describes the system characteristics of the AIR.

3.9.1 RF Electromagnetic Field Exposure

For general information on RF EMF exposure, see Radio Frequency Electromagnetic Fields.

Table 13 through **Table 15** list the compliance boundaries (exclusion zones), outside of which the RF EMF exposure from AIR 6488 is below the limits specified by the ICNIRP, and the limits applicable in:

- EU (1999/519/EC, 2013/35/EU, EN 50385)
- USA (47 CFR 1.1310)
- Canada (Health Canada Safety Code 6)

Information is provided for the theoretical maximum exposure condition and (for some bands) for the actual maximum exposure condition (see IEC 62232). The theoretical maximum exposure condition does not consider how the time-averaged power is distributed within the scan range of the product and is very conservative. The actual maximum exposure condition takes into account the effects of beam scanning on the time-averaged power that contributes to the RF exposure. A PRF of 0.32 was used to represent realistic deployment scenarios (see IEC TR 62669).

Note: National regulations can prescribe requirements on the use of actual maximum exposure conditions for RF EMF compliance assessments.



Table 13 Dimensions of the Box-Shaped Compliance Boundary for General Public (GP) and Occupational (O) Exposure Applicable in the EU and Markets Employing the ICNIRP RF Exposure Limits

Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
B41K	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	19.7	8.8	23.3	10.4	11.1	5.0	0	0
						Actual Maximum (PRF = 0.32)	11.2	5.0	13.2	5.9	6.3	2.9	0	0
B42	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	24.2	10.9	28.6	12.8	11.3	5.1	0	0
						Actual Maximum (PRF = 0.32)	13.7	6.2	16.2	7.3	6.4	2.9	0	0
B42F	LTE, NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	20.4	9.1	24.0	10.8	11.0	5.0	0	0
B42G	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	19.9	8.9	23.5	10.5	10.9	4.9	0	0
						Actual Maximum (PRF = 0.32)	11.3	5.1	13.3	6.0	6.2	2.8	0	0
B43	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	21.1	9.5	23.6	10.6	10.5	4.7	0	0
B78B	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	20.4	9.1	24.0	10.8	11.0	4.9	0	0
B78H	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	20.6	9.2	23.6	10.6	10.6	4.8	0	0
						Actual Max-	11.7	5.3	13.3	6.0	6.0	2.7	0	0



Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
						imum (PRF = 0.32)								

(1) The compliance boundaries are determined for maximum output power with power tolerance and TDD downlink duty cycle included, and for theoretical maximum and actual maximum exposure conditions.

Table 14 Dimensions of the Box-Shaped Compliance Boundary for General Public (GP) and Occupational (O) Exposure Applicable in USA and Markets Employing the FCC RF Exposure Limits

Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
B41	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	19.9	8.9	23.5	10.5	10.9	4.9	0	0

(1) The compliance boundaries are determined for maximum output power with power tolerance and TDD downlink duty cycle included, and for theoretical maximum exposure conditions.

Table 15 Dimensions of the Box-Shaped Compliance Boundary for General Public (GP) and Occupational (O) Exposure Applicable in Canada

Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
B42	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	29.4	12.5	34.7	14.8	13.7	5.9	0	0
						Actual Max-	16.6	7.1	19.7	8.4	7.8	3.3	0	0



Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
						imum (PRF = 0.32)								

(1) The compliance boundaries are determined for maximum output power with power tolerance and TDD downlink duty cycle included, and for theoretical maximum and actual maximum exposure conditions.

3.9.2 Software

For information on software dependencies, see Radio Software Support.

3.9.3 Radio Configurations

For information about available radio configurations, see RBS Configurations.



4 Hardware Architecture

This section describes the AIR unit hardware structure regardless of configuration or frequency. For a description of the currently available radio configurations, see RBS Configurations.

4.1 AIR Unit Parts

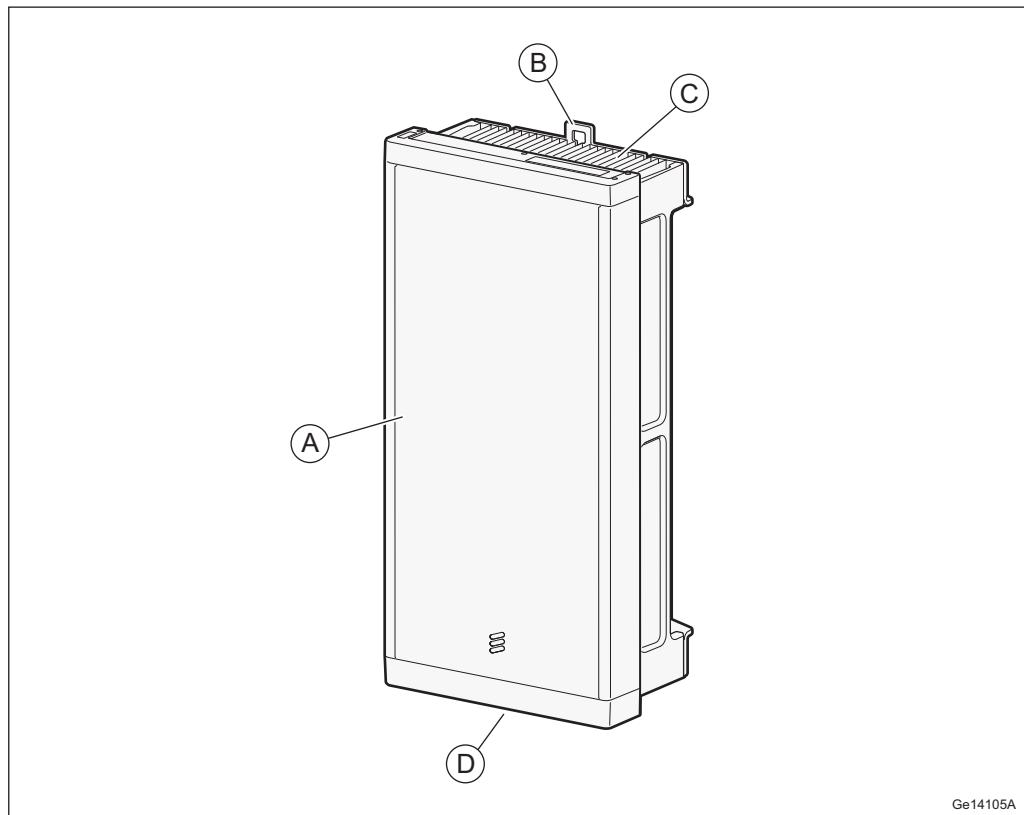


Figure 7 AIR Unit Parts

Table 16 AIR Unit Parts

Position	Component
A	Radome
B	Upper lifting eye
C	Cooling fins
D	Connection interfaces



4.2 Optical Indicators

The AIR unit is equipped with optical indicators that show the system status.

For detailed information about the optical indicators, see [Indicators, Buttons, and Switches](#).

Note: The AIR unit has no maintenance button.

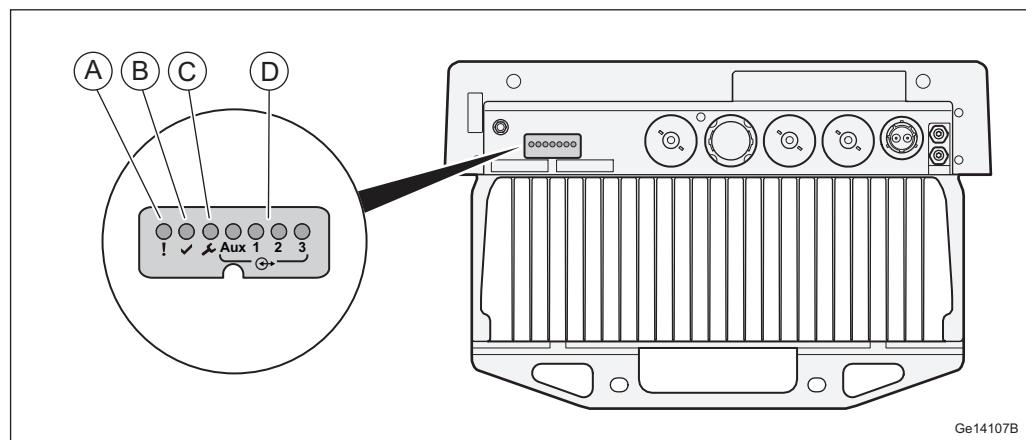


Figure 8 Optical Indicators

Table 17 Optical Indicators

Position	Marking	Indicator	Color	Mode	Interpretation
A	!	Fault	Red	Off	No fault detected in unit
				On	Fault detected in unit
B	✓	Operational	Green	Off	No power
				On	Operational
				Flashing Slowly (0.5 Hz)	Missing dependent resource
				Flickering (16 Hz)	Transitory activity
				Double flashing Off	Loading in progress No ongoing traffic
				Double flashing On	Loading in progress Traffic is ongoing
C	🔧	Maintenance	Blue	Off	No ongoing maintenance activity Traffic is ongoing
				On	Maintenance mode All traffic and alarms are suppressed
				Flashing Slowly (0.5 Hz)	Maintenance mode is initiated When traffic and alarms are removed, the indicator switches to On
D	⊕ AUX, ⊕ 1, ⊕ 2, ⊕ 3	Interface	Green	Off	Disconnected
				On	Connected



5 Connection Interfaces

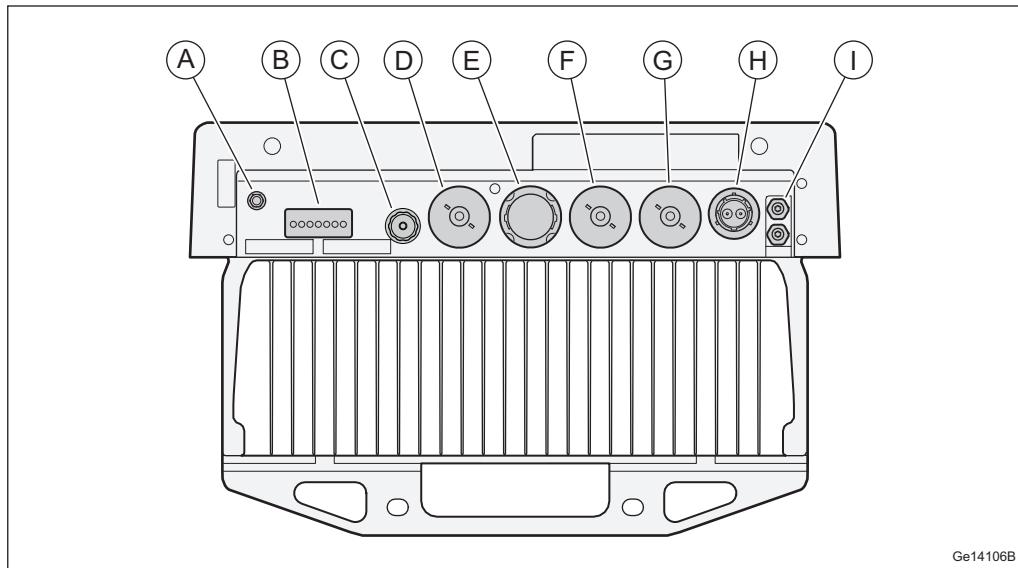


Table 18 AIR Unit Connection Interfaces

Position	Description	Marking	Connector Types	Cable Illustration
A	TX Monitor		SMA female connector	
B	Optical indicators	!, ✓, 🔧 ⊕ AUX, ⊕ 1, ⊕ 2, ⊕ 3	-	-
C	EC light interface		DIN 14 female connector	
D	Optional synchronization timing	⊕ AUX	LC (On SFP+) with support for FullAXS	
E	eCPRI 1	⊕ 1		
F	eCPRI 2	⊕ 2		
G	eCPRI 3	⊕ 3		



Position	Description	Marking	Connector Types	Cable Illustration
H	-48 V DC power supply	-48 V	Power connector	
I	Grounding point		2 × M6 bolt	

5.1 Grounding Interface

The AIR unit must be grounded to protect it from overvoltage and lightning strikes. The grounding interface on the AIR unit accepts an M6 dual cable lug on a coated cable.

For more information about grounding principles, see [Grounding Guidelines for RBS Sites](#).

5.2 -48 V DC Power Supply Interface

The -48 V DC power connection is made through a connector with a 3-wire (DC-I) connection or a connector with a 2-wire (DC-C) connection.

For power cable dimensioning, see [Main-Remote Installation Products Overview](#).

For determining which connector or junction box to use, see [Table 19](#).

Table 19 -48 V DC Power Supply Connector or Junction Box

Cross-Sectional Area of Each Conductor (mm ²)	Connector or Junction Box
10–16	Used with connector RNT 447 38/03 (3-wire (DC-I)) or RNT 447 39/01 (2-wire (DC-C))
25	Used with junction box NTB 101 75/1

The power cable conductor has a wire for both the 0 V conductor and a wire for the -48 V DC conductor.



All cables must be shielded. The shielding must be properly connected both to the power connector and to the grounding in the power supply equipment; otherwise, the AIR unit over voltage and lightning protection does not function properly.

Note: Make sure that the trident DC power cable RPM 777 015 is used if a Power 6302 or a Power 6322 is the power source.

5.3 Optical Cable Interface

The optical cable interfaces provide connections to optical cables for traffic and timing signals between the AIR and a Baseband unit. A Small Form-factor Plugable (SFP)+ is used to connect the optical cable to the AIR.

Note: The AIR uses SFP+ modules for optical transmission and optical radio interfaces on the data ports.

Only use SFP+ modules approved and supplied by Ericsson. These modules fulfill the following:

- Compliance with Class 1 laser product safety requirements defined in standard IEC 60825-1.
- Certification according to general safety requirements defined in standard IEC 62368-1.
- Functional and performance verified to comply with RBS specifications.

Recommended SFP+ modules are obtained from the product packages for the RBS and the Main Remote Installation products. For more information, see Spare Parts Catalog, Main-Remote Installation Products Overview, and SFP Module Selector Guide.

eCPRI Interface

The AIR unit sets up connection with Baseband via eCPRI interface, a 10.3 Gbps Ethernet port.

5.4 Sync Interface

This interface is reserved for future use as a 1.25 Gbps Ethernet port connected to TCU, to receive sync timing via PTP protocol. The connector is SFP+, which is the same as for the eCPRI.



5.5 EC Light Interface

The EC light port delivers communication signals and alarms between the optional PSU and the AIR.

5.6 Optical Indicators

Optical indicators show the system status. For more information about the optical indicators, see [Indicators, Buttons, and Switches](#).

5.7 TX Monitor Interface

The TX monitor interface provides monitoring of output power and performance.

The TX monitor output is the sum of coupled signals from all 64 branches. Compared to the output signals the TX monitor signal is attenuated 20 dB to 53 dB depending on the number of active branches and the amplitude and phase relations between them.

If only one branch is active, the attenuation is 53 dB.



6 Standards and Regulations

This section presents a brief overview of standards, regulatory product approval, and declaration of conformity for the radio.

Declaration of Conformity

"Hereby, Ericsson AB, declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU and 2011/65/EU."

FCC Compliance Statement

"This device complies with Part 15 of the FCC CFR 47 rules. Operation is subject to the following two conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation."

6.1 Regulatory Approval

The product complies with the following market requirements:

- European Community (EC) market requirements, Radio Equipment Directive 2014/53/EU and Directive 2011/65/EU.
- The apparatus may include Radio Transceivers with support for frequency bands not allowed or not harmonized within the EC.
- Products containing radio Equipment outside North America and in countries not recognizing the CE-mark may be labeled according to national requirements or standards.

6.1.1 Environmental Standards Compliance

The product complies with the following environmental standard:

Europe

- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2011/65/EU)

6.1.2 Safety Standards Compliance

In accordance with market requirements, the product complies with the following product safety standards and directives:

**International**

- IEC 62368-1

Europe

- EN 50385
- EN 62368-1

North America

- FCC CFR 47 Part 1.1310
- FCC CFR 47 Part 2.1091
- UL 62 368-1
- CSA-C22.2 No. 62 368-1

6.1.2.1 Outdoor Specific Requirements

The product complies with the following outdoor specific requirements:

International

- IEC 60529 (IP65)
- IEC 60950-22

Europe

- EN 60529 (IP65)
- EN 60950-22

North America

- UL 50E
- UL 60950-22
- CAN/CSA-C22.2 No. 60950-22

6.1.3 EMC Standards Compliance

The product complies with the following Electromagnetic Compatibility (EMC) standards:



International

- 3GPP TS38.113

Europe

- ETSI EN 301 489-1
- ETSI EN 301 489-50

North America

- FCC CFR 47 Part 15 B
- IC ICES-003 B

6.1.4 Radio Standards Compliance

The product complies with the following radio standards:

International

- 3GPP TS38.141-1
- 3GPP TS38.141-2

Europe

- ETSI EN 301 908-1
- ETSI EN 301 908-18

North America

- FCC CFR 47 Part 27
- FCC CFR 47 Part 2

6.1.5 Marking

To show compliance with legal requirements, the product is marked with the following labels:

Europe

- CE mark



North America

- FCC CFR 47 Part 15 Statement
- IC ICES-003 Statement
- usETL/cETL
- FCC ID Number

6.2 Other Standards and Regulations

The standards and regulations in this section are not regulatory approved.

6.2.1 Spare Parts

The product adheres to the Ericsson Serviceability and Spare Part Strategy.

6.2.2 Surface Quality

The surface quality of the AIR unit is according to Ericsson standard class A5 for the radome, top, front, and side covers, and A6 for the heat-sink.

6.2.3 Vandal Resistance

Unauthorized access is not possible without damaging the tamper proof warranty seal.

PHYSICAL DIMENSIONS

RADIO 4415



Radio 4415	Dimension (mm)	Notes
without protruding & wo. Fan	380H x 335W x 137D (change for R5) (~17 liter/~15 liter för R5)	<ul style="list-style-type: none">• H (Handle, connectors and protruding are excluded)• W (Protruding for rail mounting is excluded)• D (Distance plug and higher fin/wall are excluded)
w. protruding but wo. Fan	420H x 342W x 149D	
wo. protruding but w. Fan	380H x 335W x 157D (~20 liter)	<ul style="list-style-type: none">• H (Handle, connectors and protruding are excluded)• W (Protruding for rail mounting is excluded)• D (Distance plug is excluded)
w. protruding & Fan	420H x 342W x 160D	

Note: The fan for R5 will be new, but also work for earlier 4415 revisions

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1

Introduction

The enclosure is an outdoor DC power distribution system. It offers 19 units (19U) of configurable user space for 19-inch equipment. It can also provide power to equipment located outside the cabinet. The enclosure supports to be mounted to the ground or to a base frame.

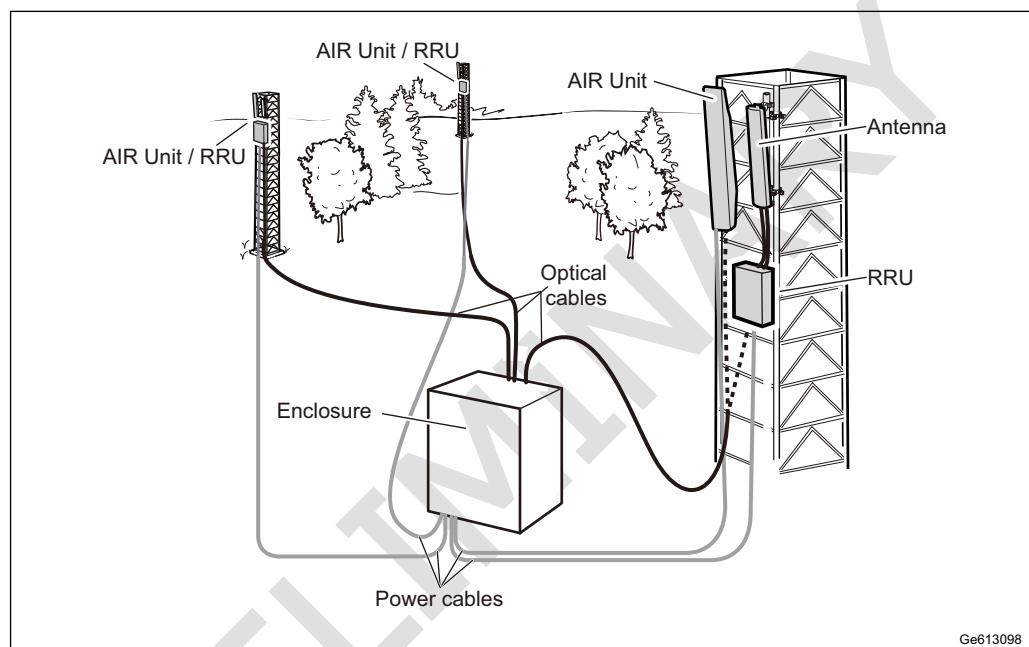


Figure 1 Enclosure with External Radios



Warning!

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.



2 Product Overview

2.1 Main Features

The enclosure has the following main features:

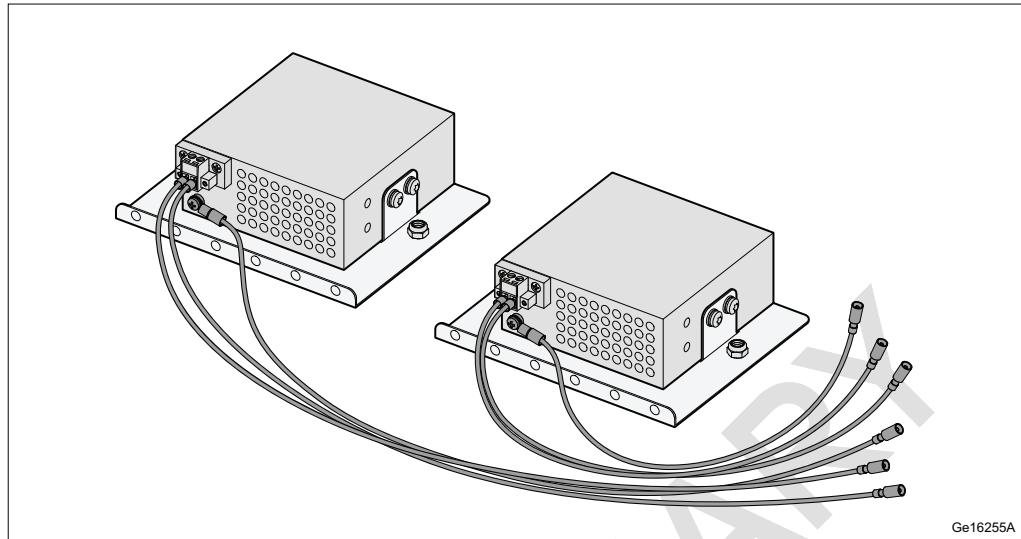
- The enclosure features a power system with a capacity of 20 kW to the load. Total installed power capacity is maximum 27 kW, powering up to 21 individual loads.
- The enclosure can be installed on the ground or to a base frame.
- Local supervision via LCD display and keypad is supported.
- The climate system uses a Heat Exchanger (HEX) to ensure long life and low operational cost.
- The enclosure supports 19 U of 19-inch configurable user space. The equipment must be capable of handling the temperatures and air quality offered by the enclosure's air cooling system.
- The enclosure has the following input voltage range:
 - 200–240 V AC
- The enclosure supports internal and external alarms.
- The enclosure supports internal and external battery back-up. For internal battery back-up:
 - Maximum four 4 U 19-inch lithium-ion battery units.

2.2 Optional Equipment

The equipment presented in this section is optional and can be ordered separately.

2.2.1 Heater

The enclosure can be equipped with a DC heater. The heater is used when the temperature remains below 0°C for substantial periods of time. The heater is delivered with connection cables and installation materials.



2.2.2 Rectifier

The enclosure can be equipped with rectifiers with 96% efficiency.

For more information about rectifiers, refer to Power System Units Description.

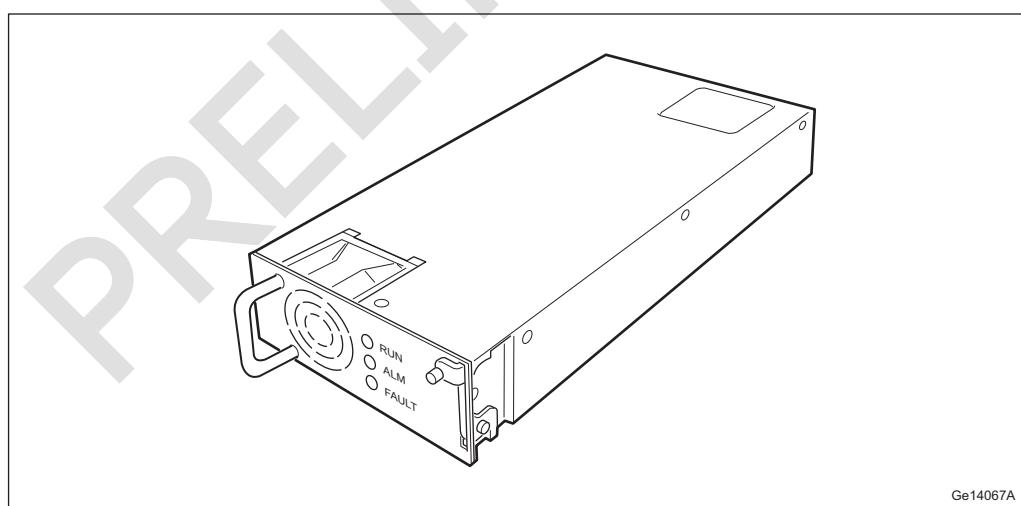


Figure 2 Rectifier

2.2.3 Grounding Cable

The following grounding cables can be provided:

- 35 mm², 6 m



- 35 mm², 13 m

2.2.4 Base Frame

The enclosure can be installed on a base frame.

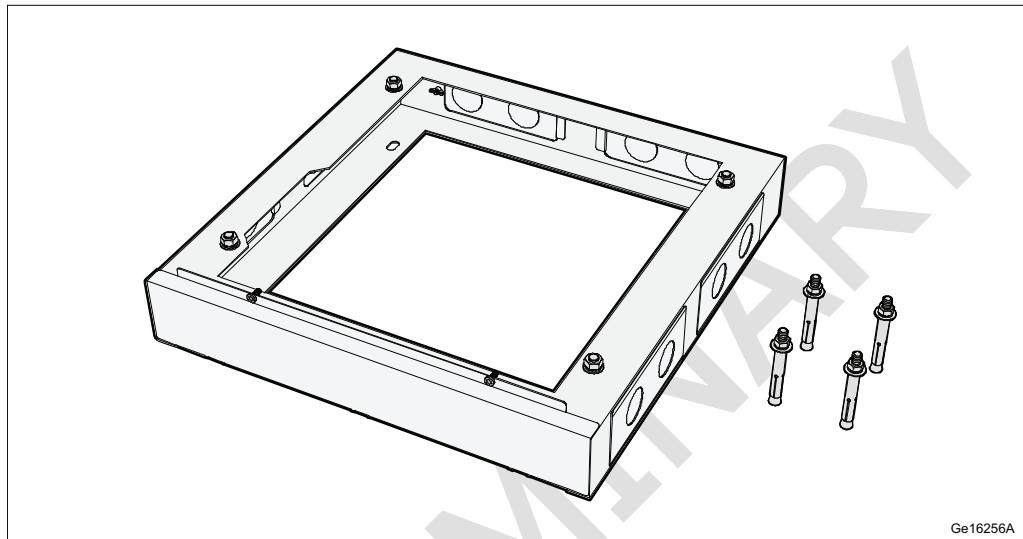


Figure 3 Generic Base Frame

2.2.5 Circuit Breaker for DC Distribution

A wide range of circuit breakers can be used in DC Distribution Unit of the enclosure.

For more information about circuit breaker for DC Distribution, refer to Power System Units Description.

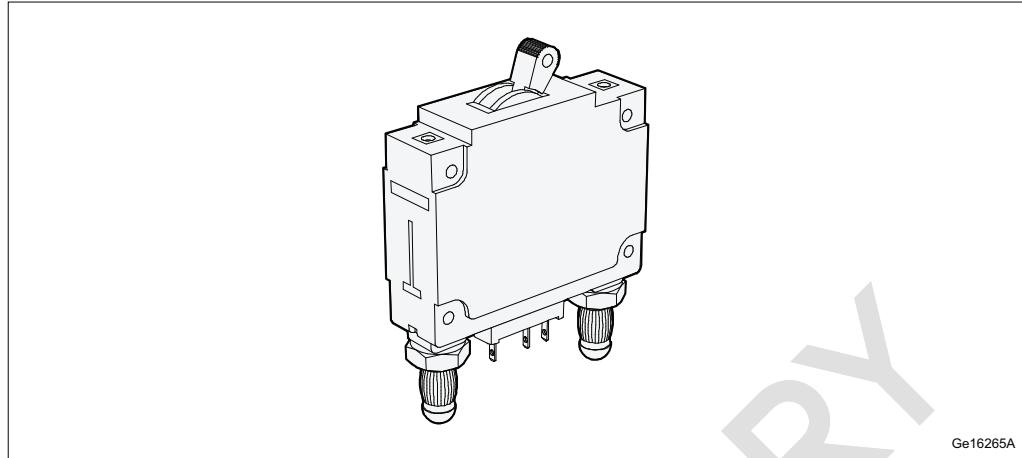


Figure 4 Circuit Breaker for DC Distribution

2.2.6

Circuit Breaker for Battery

The enclosure can be equipped with battery circuit breakers. For more information, refer to Power System Units Description.

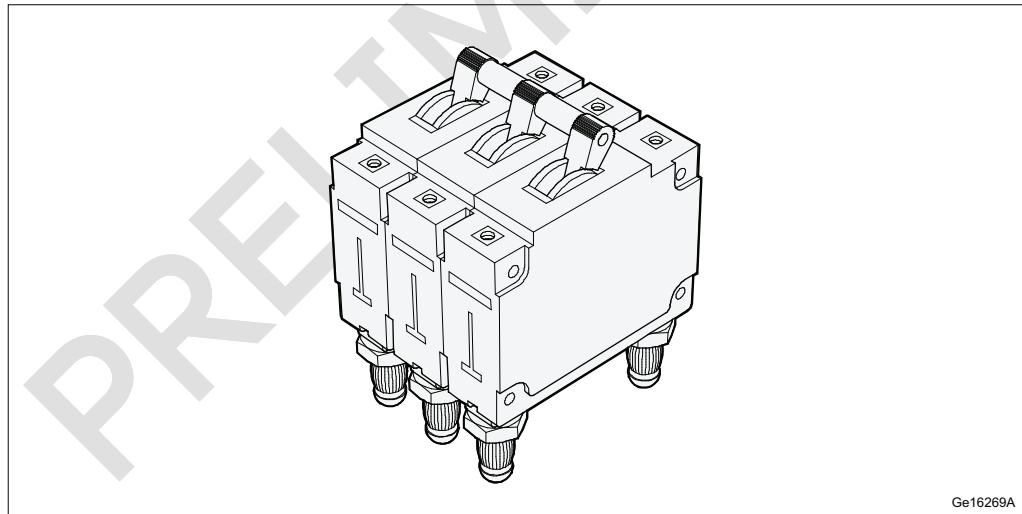


Figure 5 Circuit Breaker for Battery

2.2.7

Battery Temperature Sensor

The cable-connected battery temperature sensor is a physical unit that measures the temperature inside the battery compartment.

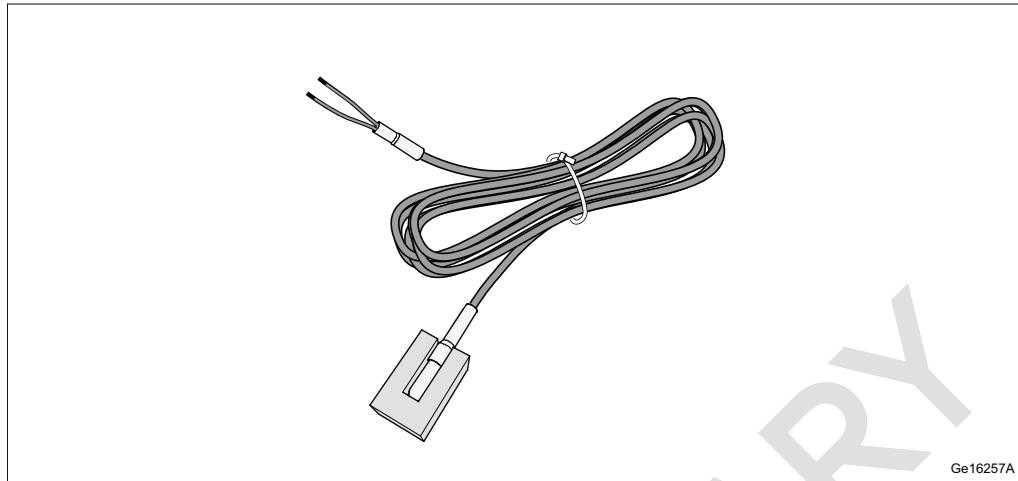


Figure 6 Battery Temperature Sensor

2.2.8 AC Service Outlet

The enclosure can be equipped with an AC power outlet socket, including a Residual Current Breaker (RCB) for personal safety. The service outlet and the RCB are easily installed on site.

AC power sockets for different regions are available:

- China
- Europe
- United Kingdom
- United States of America

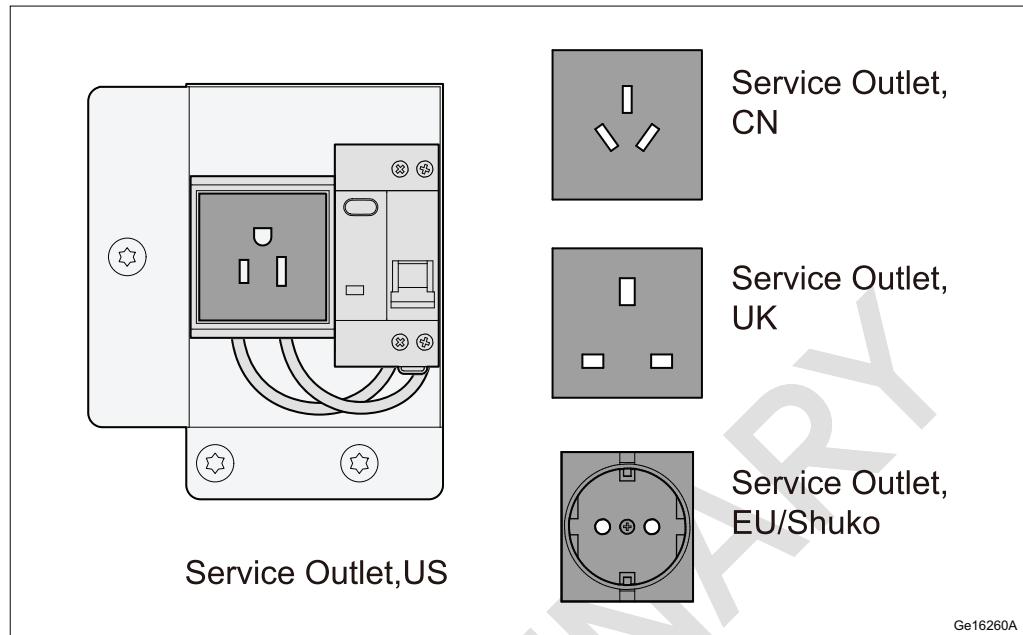


Figure 7 AC Service Outlet

2.2.9

ESC 03 01 or SCU 09 01

The control unit is used for remote management, performance management, and fault management for the enclosure. The control unit is delivered with an Ethernet cable.

Note: To enable the functionality offered by the units, the following is needed:

- Initial configuration of LAN interface

For further information, see Integrate Controller.

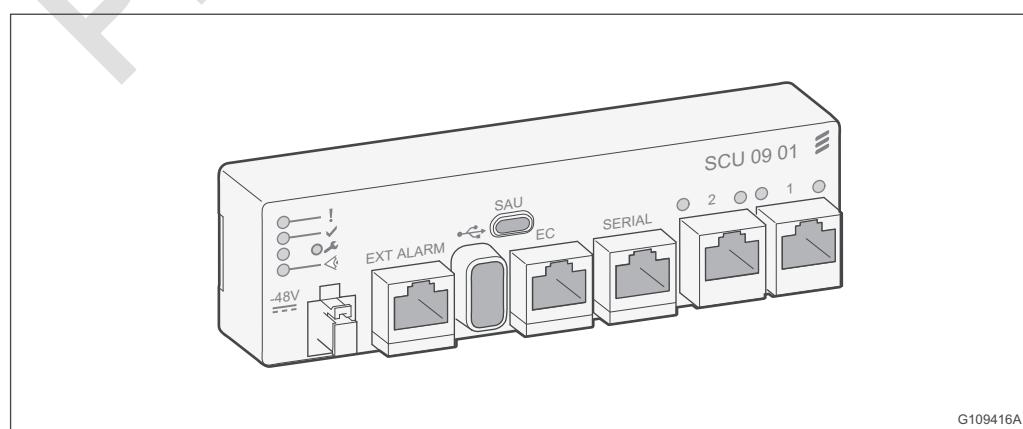


Figure 8 ESC 03 01 or SCU 09 01



2.2.10

SAU 02 01

The Support Alarm Unit (SAU) is an alarm connection panel that connects external alarm cables through the Overvoltage Protector (OVP).

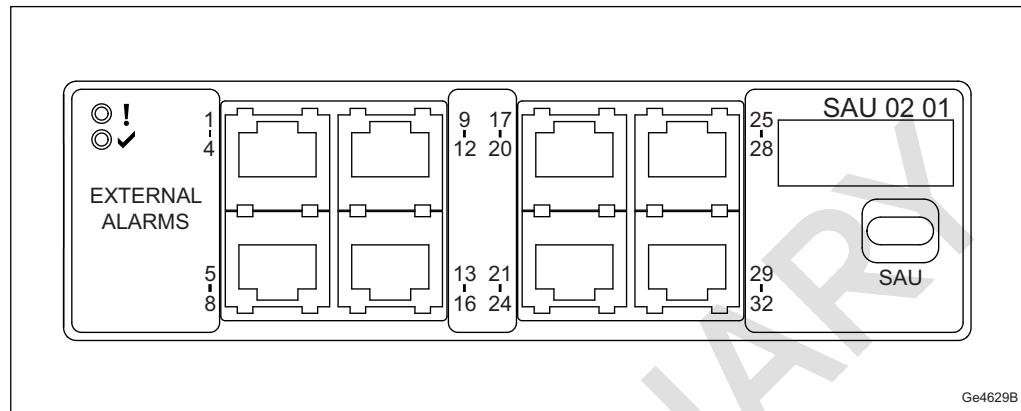


Figure 9 SAU 02 01

For more information about the SAU, refer to SAU Description.

2.2.11

OVP

The Overvoltage Protector (OVP) is an interface between the enclosure and incoming alarm and transmission cables.

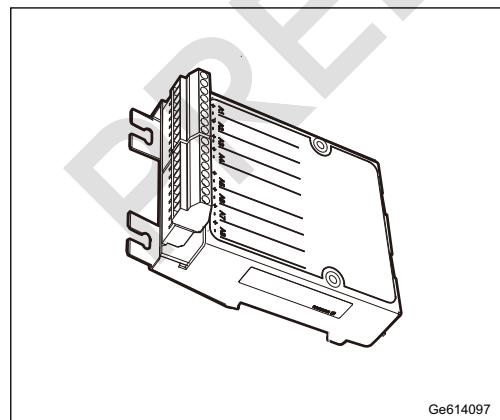


Figure 10 OVP-ALM8

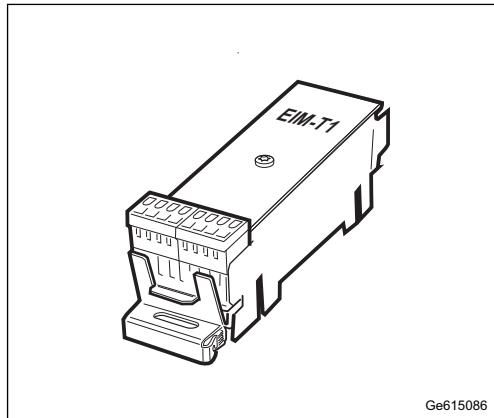


Figure 11 OVP-TRM

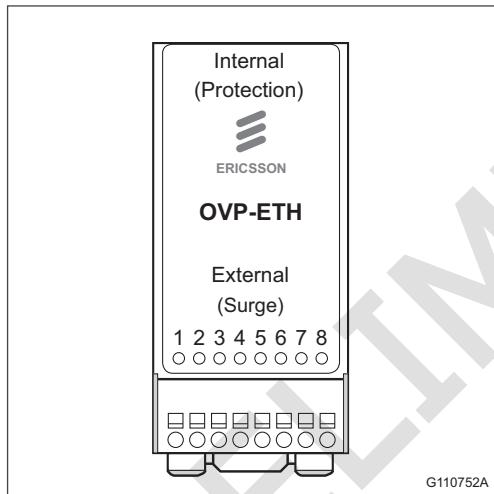


Figure 12 OVP-ETH

2.2.12

L-Support Brackets

The L-support brackets are installed to the 19-inch rack as extra support for equipment. The brackets are recommended to be used when installing heavy equipment.

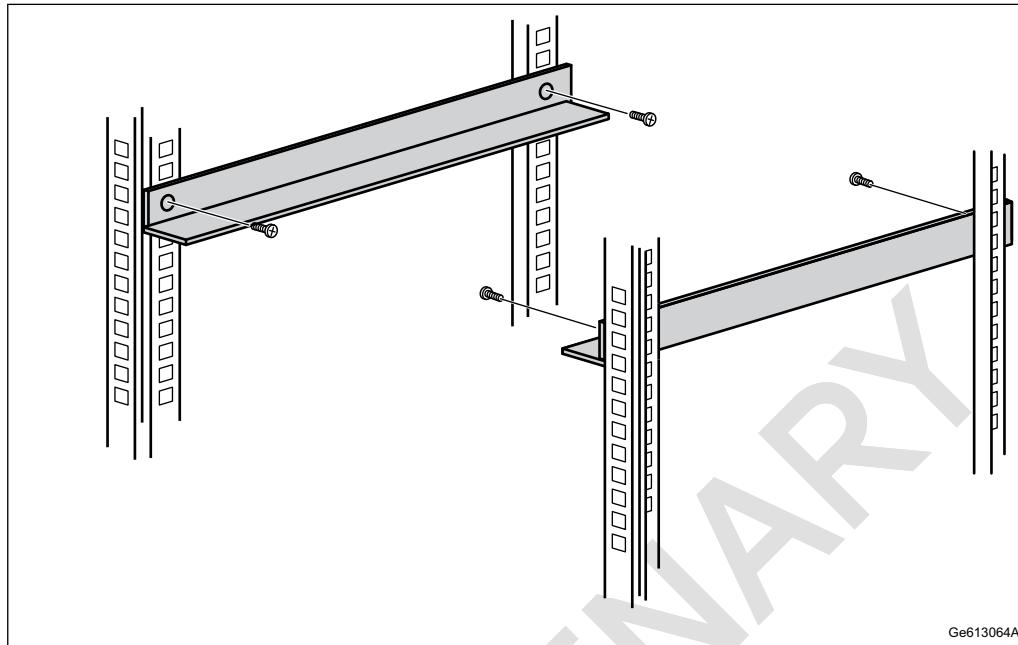


Figure 13 L-Support Brackets

2.2.13 Cylinder Lock

The enclosure uses a padlock by default and can be fitted with a lock cylinder.

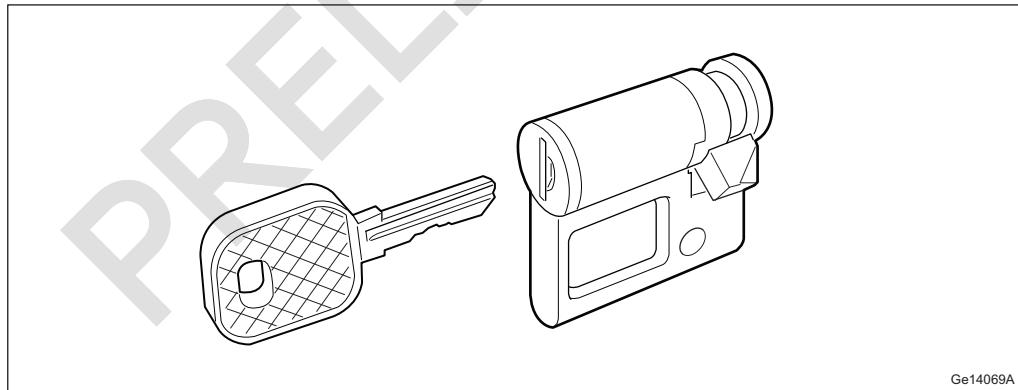


Figure 14 Cylinder Lock

2.2.14 3 U DC Distribution Unit

The enclosure can be expanded with a 3 U DC Distribution Unit with up to 18 circuit breakers.

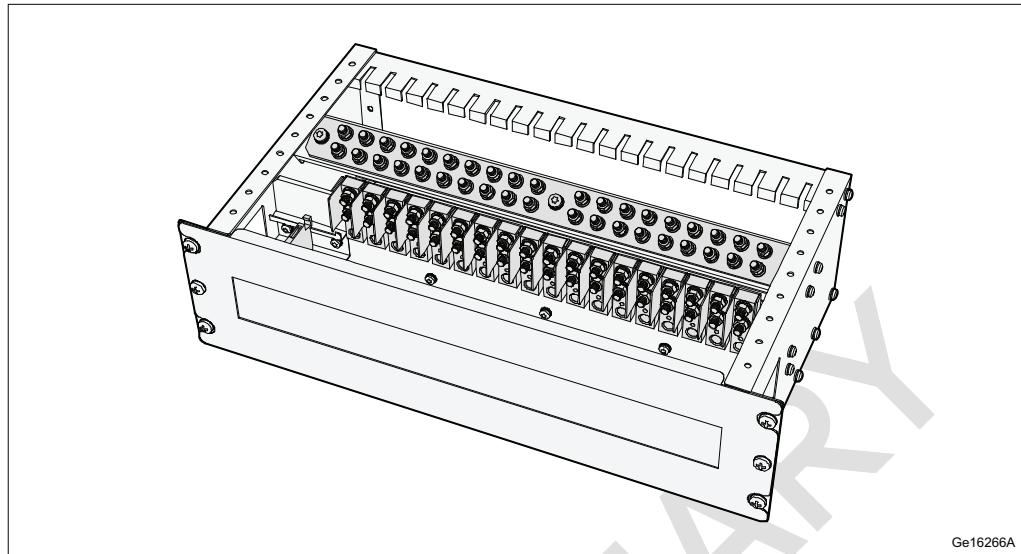


Figure 15 DC Distribution Unit

2.2.15

1 U DC Distribution Unit

The enclosure can be expanded with a 1 U DC Distribution Unit with up to X circuit breakers.

Figure 16 DC Distribution Unit

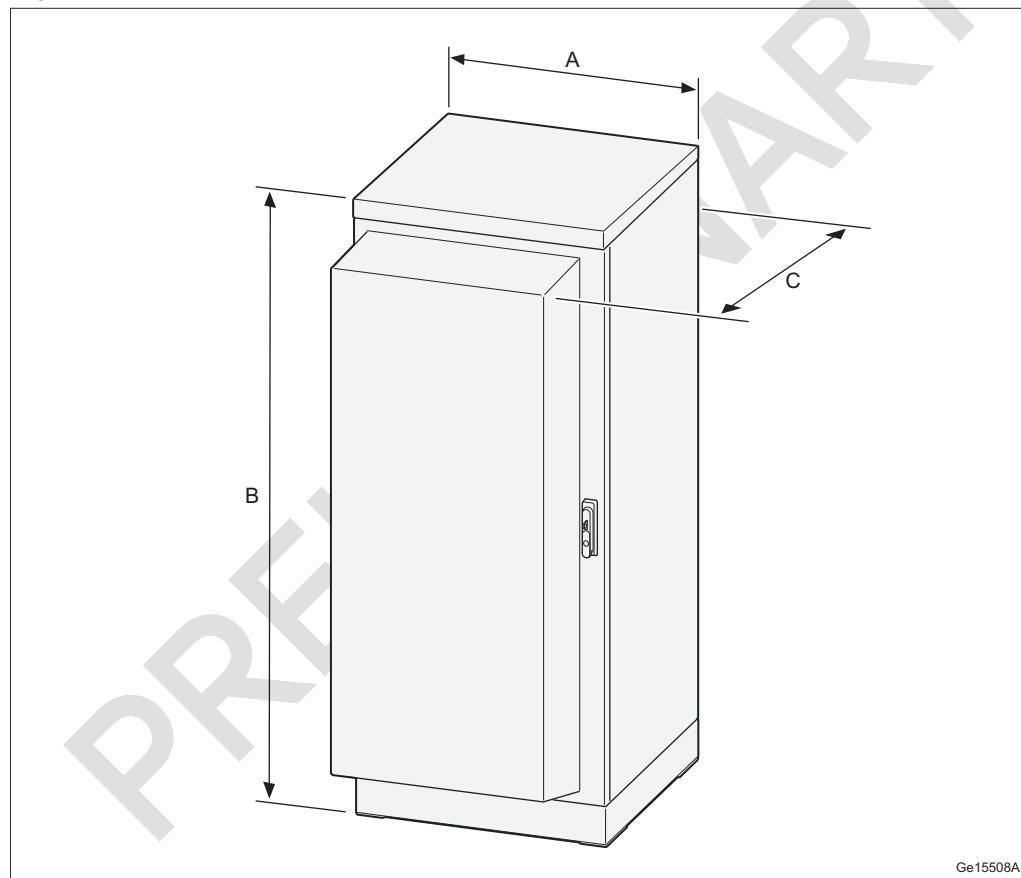


3 Technical Data

This section describes the physical characteristics, environmental data, and the power supply of the enclosure.

3.1 Dimensions

Figure 17 Dimensions of the Enclosure



Ge15508A

Table 1 Dimensions, Weight, and Color

Dimensions	
Width (A)	650 mm
Height (B)	1450 mm (without base frame) 1600 mm (with base frame)
Depth (C)	850 mm
Weight	
Empty enclosure	176 kg



Dimensions	
Color	Gray Reference number: NCS S 2002-B (RAL 7035)

3.2 Space Requirements

Minimum distances to provide adequate working space can be found in the illustration.

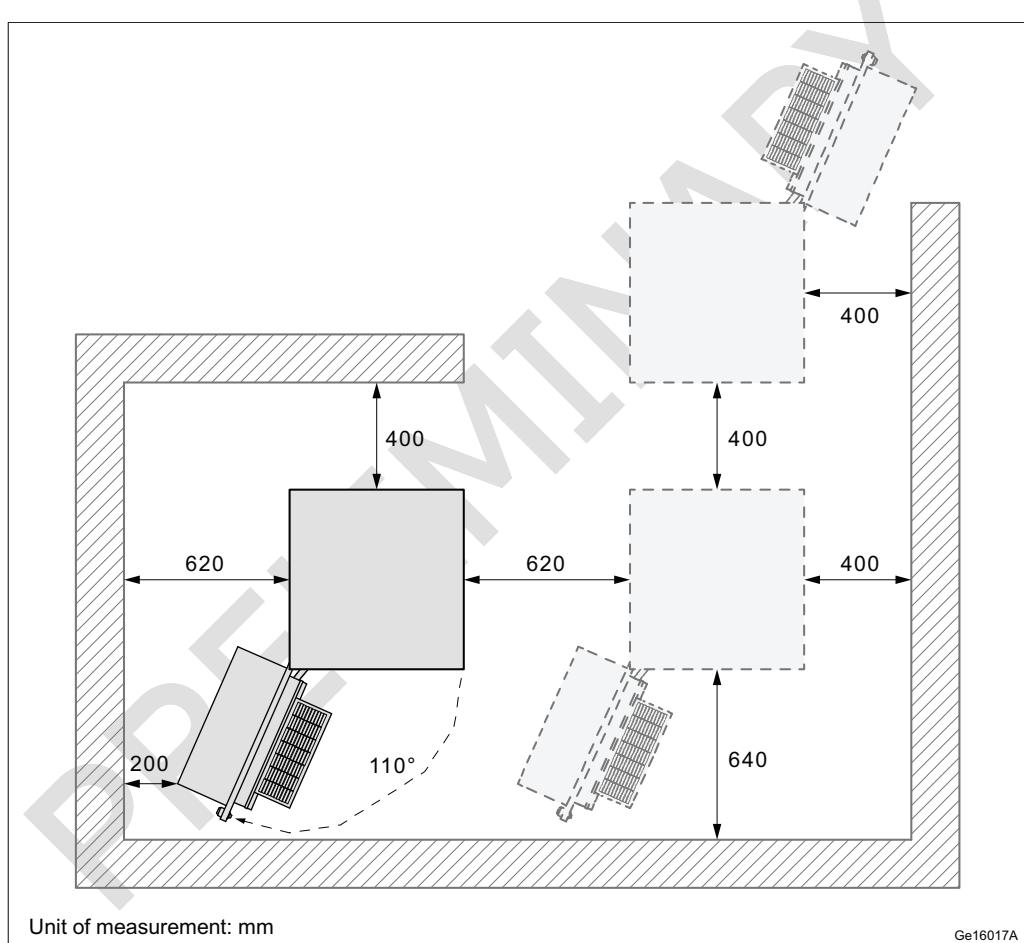


Figure 18 Recommended Minimum Free Working Space

3.3 Environmental Characteristics

This section describes the environmental characteristics of the enclosure.

[Figure 19](#) illustrates what environmental factors to consider when planning the enclosure placement, especially near the sea.

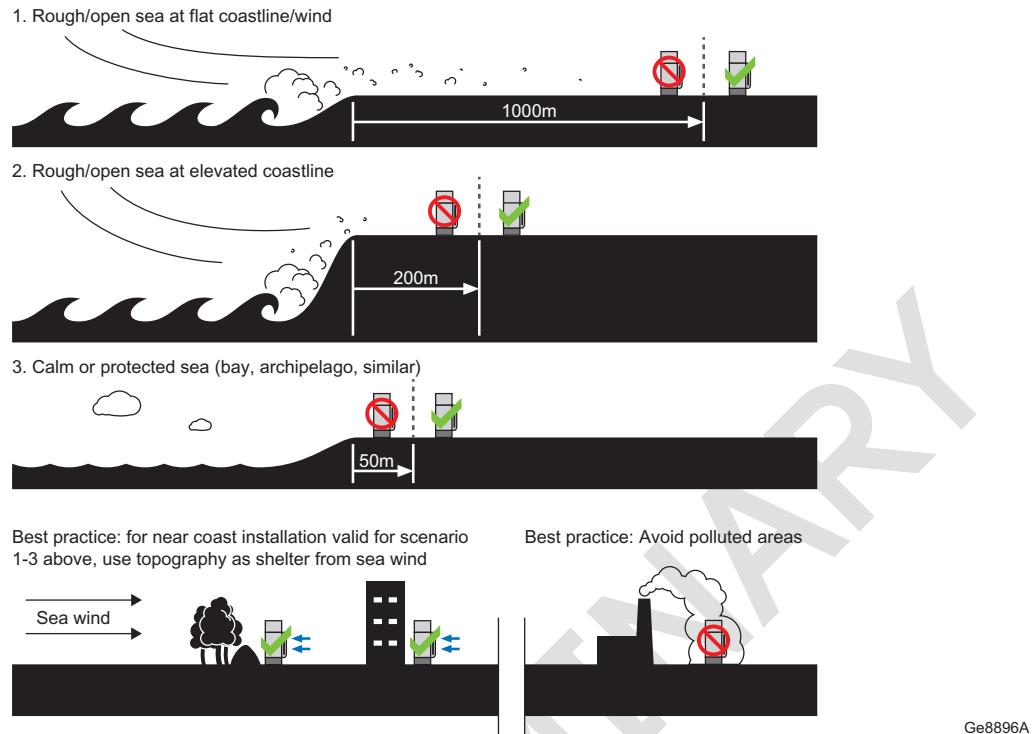


Figure 19 Environmental Factors to Consider

3.3.1 Operating Environment

Table 2 shows the values for the normal operating environment of the enclosure.

Table 2 Operating Environment

Description	Value
Temperature range, operation	-33°C – +45°C
Temperature range, transportation	-40°C – +70°C
Temperature range, storage ⁽¹⁾	-25°C – +55°C
Relative humidity, normal operation	15–100%
Relative humidity, transportation and storage ⁽¹⁾	15–100%

(1) Maximum three months

3.3.2 Acoustic Noise Summary

Table 3 shows how the sound pressure of the enclosure differs depending on temperature and load.



Table 3 Sound Pressure of the Enclosure (Measured at a Distance of 1m)

Ambient Temperature	Sound Pressure at 100% Equipment Heat Load	Sound Pressure at 70% Equipment Heat Load	Sound Pressure at 40% Equipment Heat Load
15°C	X dB(A)	X dB(A)	X dB(A)
30°C	X dB(A)	X dB(A)	X dB(A)
45°C	X dB(A)	X dB(A)	X dB(A)

3.3.3

Vibration and Shock

IEC Class 4M5 for vibration and shocks according to IEC 682-6 and IEC 682-29, assuming proper installation and use of the enclosure approved accessories only.

3.3.4

Materials

The unit is made of galvanized steel. The materials in the unit are managed through the Ericsson lists of banned and restricted substances, based on legal and market requirements.

3.3.5

Heat Dissipation

The maximum heat dissipation for the enclosure is 2700 W. The diagram shows how the heat dissipation capability changes with the outdoor temperature.

3.4

Power Supply Characteristics

This section describes the requirements of the incoming power to the enclosure, the power performance, and the fuse and circuit breaker recommendations for the enclosure.

3.4.1

AC Input

The AC-powered enclosure can handle three-phase, two-phase, and one-phase AC power as listed. The factory default configuration is two-phase.

Table 4 AC Input Data

Description	Value
Input voltage	Nominal: 200–250 V AC Range: 85–300 V AC
	3-phase feeding, L1, L2, L3, N and PE 2-phase feeding: L1, L2, N and PE 1-phase feeding: L, N and PE
Line frequency	45–65 Hz



Description	Value	
Maximum input current	-	-
	20 kW	158 A for 2-phase and 1-phase feeding 53 A for 3-phase feeding
Rectifier efficiency	93% or 95.5%	

AC input can have many different local variations. External main power breakers and cable dimensions depend on the local power delivery options. The different options are listed in table, together with recommended dimensions of main power breakers and cable dimensions.

Table 5 AC Power Supply Options

Configuration	Voltage range V AC	Recommended AC Main Breaker	Recommended AC cable size (mm ²)	Maximum AC cable size (mm ²)
3W + N + PE	346/200–433/250	20 kW : 3-pole 50 A × 2 groups	20 kW : 16 × 2 groups	20 kW ST : 25 × 2 groups
2W + N + PE	208/120–220/127	20 kW : 2-pole 125 A × 2 groups	20 kW : 16 × 2 groups	20 kW : 25 × 2 groups
1W + N + PE	200–250	20 kW : 2-pole 125 A × 2 groups	20 kW : 16 × 2 groups	20 kW : 25 × 2 groups

3.4.2 DC Output

Table 6 DC Output

Description	Value
Output voltage	Nominal: -48 V DC
	Range: -42.3 V DC to -57.6 V DC
Output power	20 kW to the load, X kW to the batteries
Circuit breaker ratings (A)	ML ⁽¹⁾ CB 1–12: rated 2 A to 100 A PL ⁽²⁾ CB 13–20: rated 2 A to 100 A PL ⁽³⁾ CB 21: rated 125 A
Battery interface	2 × 2 circuit breakers rated 300 A (optional)

(1) Main Load (ML)

(2) Priority Load (PL)

(3) Priority Load (PL)

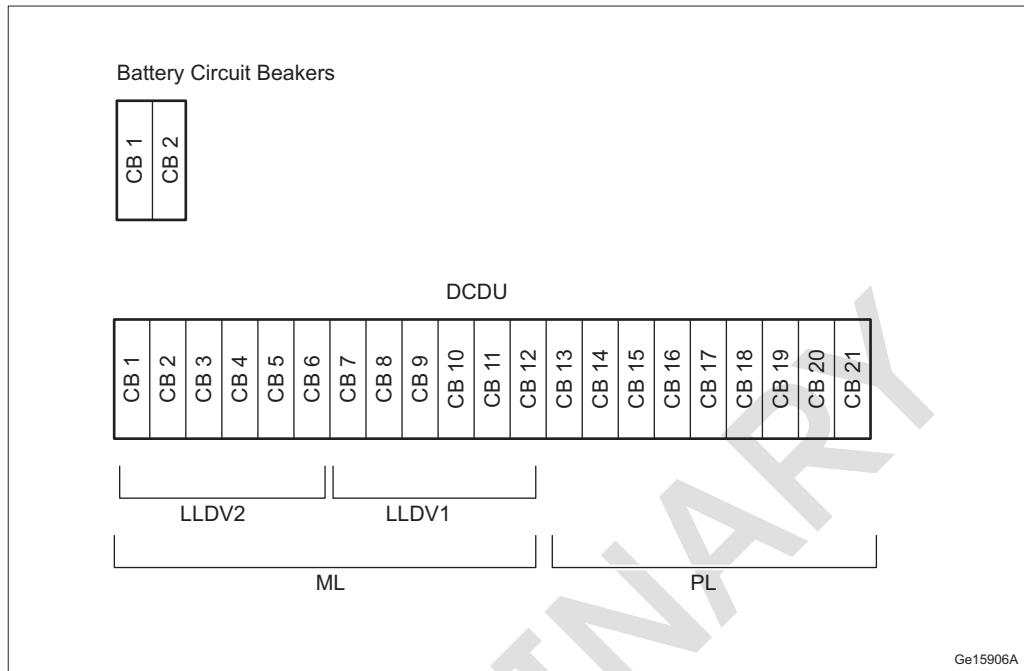


Figure 20 DC Output

3.5 Label

The label for the enclosure is BFM XXX/X.



4 Hardware Architecture

This section contains information on both mandatory and optional hardware units based on a fully equipped enclosure.

4.1 Enclosure Overview

This section contains information on both mandatory and optional hardware units based on a fully equipped enclosure.

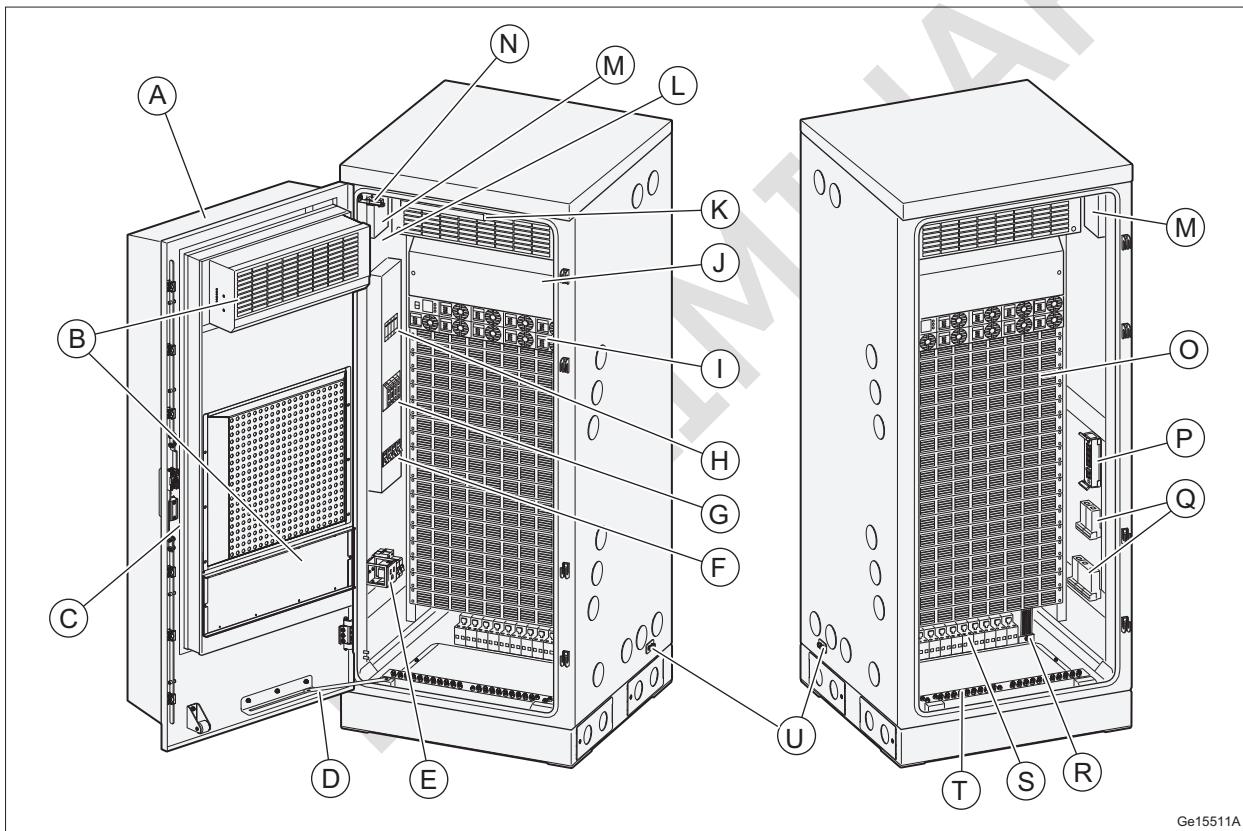


Figure 21 Overview for Enclosure

Table 7 Enclosure Overview

Position	Name of Unit	Description
A	Cabinet door	Cabinet door including HEX climate system.
B	HEX climate system	Climate system including three internal fans, three external fans, climate control board, temperature sensor, and a heater (optional). The internal fans are located



Position	Name of Unit	Description
		behind a cover on the upper part of the door. The external fans are located behind a cover on the lower part of the door.
C	Cylinder lock	Lock for cabinet door.
D	Door latch	The latch holds the door in position.
E	AC service outlet	AC service outlet and Residual Current Breaker (RCB).
F	AC circuit breakers	Incoming AC power interface.
G	AC input terminal	Incoming AC power interface.
H	AC SPD	The SPDs protect the power system from lightning and surge.
I	Power subrack	Includes DC distribution unit, power controller and rectifiers.
J	DCDU	DC distribution unit including 21 circuit breakers.
K	Internal lamp	Service lamp to facilitate installation and maintenance work.
L	Fuses	Fuses for internal equipment such as climate system, SCU, and heater.
M	Battery input terminal	Battery power interface.
N	Door switch and light switch	The door switch sends an alarm signal to indicate door open when the door is open. The light switch turns the light on or off when the door is opened or closed.
O	User space for 19-inch equipment	User space compartment for optional 19-inch equipment.
P	DIN rail	DIN rail to be used for SCU. Remote control and monitor of the enclosure through Internet Protocol (IP) connectivity.
Q	DIN rail	DIN rail to be used for installing optional equipment, such as OVP, SAU, GNSS.
R	DC Heater	The DC heater.
S	DIN rail	DIN rail to be used for installing optional equipment, such as DC SPDs.
T	Internal grounding bar	Grounding bar that comprises the MET. Used to connect the cable shield from external cables.
U	External grounding point	The grounding connection point comprises an Main Earthing Terminal (MET).

4.2 Space for 19-Inch Equipment

The enclosure can supply -48V DC to optional 19-inch equipment. The optional equipment is installed in the user space compartment of the enclosure.

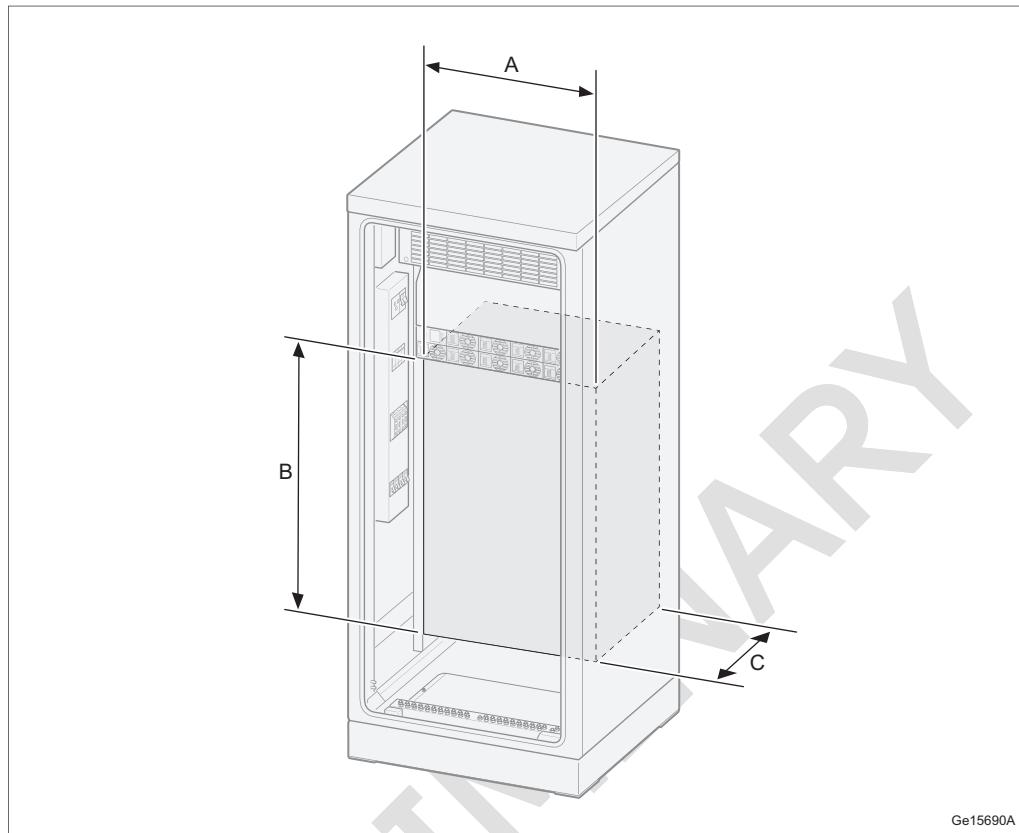


Figure 22 Space for 19-Inch Equipment

Table 8 Space for 19-Inch Equipment

Distance	Value
A	19 inch
B	19 U
C	355 mm

4.2.1 19-Inch Units

A 19-inch unit is a 19-inch wide Ericsson Radio System module. It requires -48 V DC, which is standard Ericsson Radio System voltage, minimizing the need for extra power supply.

For more information about the 19-inch units, see CPI for the specific unit, for example, the following:

- Baseband Description, for baseband units.
- Router Description, for routers.



- Main Unit Description, for RBS 6601.

Note: The 19-inch units are installed in the space for 19-inch equipment in enclosures and in the space for optional equipment in RBSs.

PRELIMINARY



5 Climate System

This section introduces the composition of the climate system.

5.1 Air Flow Path

Two external fans are located in the lower part of the enclosure door. The external fans push air coming from outside the cabinet upwards through the external side of the heat exchanger. The heated air is then expelled out from the upper part of the door front.

Two internal fans are located in the upper part of the enclosure door. The internal fans pull internal heated air from the equipment exhaust airflow downwards through the internal side of the heat exchanger. The cooled air is then expelled from the lower part of the door to the inside of the enclosure and directed to the inlet of the 19-inch user space on the right side. The cold air then continues through the enclosure equipment from right to left, and from bottom to top.

The speed of the internal and the external fans is controlled by the climate control board and its temperature sensor. The sensor is located near the internal fans in order to register the temperature of the air returning to the heat exchanger. The sensor reading is the base for fan start, stop, and linear speed regulation.

If a fan failure occurs, an alarm signal is sent to the climate control board for alarm monitoring.

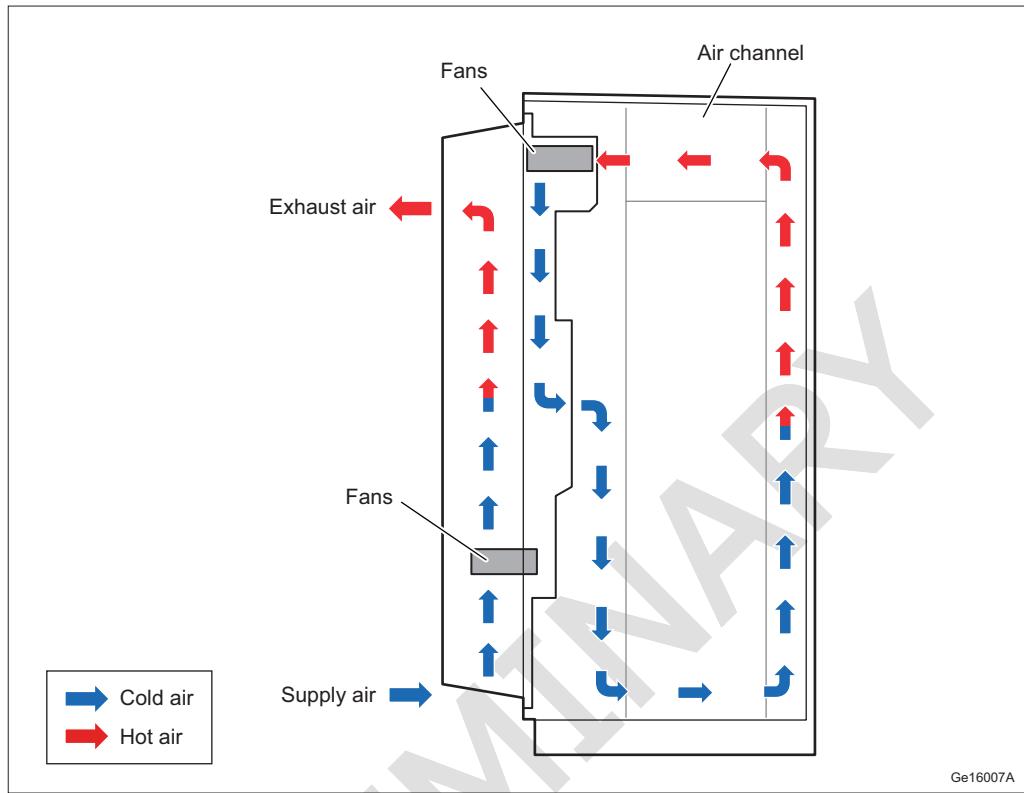


Figure 23 Schematic Overview of the Air Flow

5.2 HEX Control Interface

The control interface for the HEX climate system is on the inside of the cabinet door, at the front of the air channel.

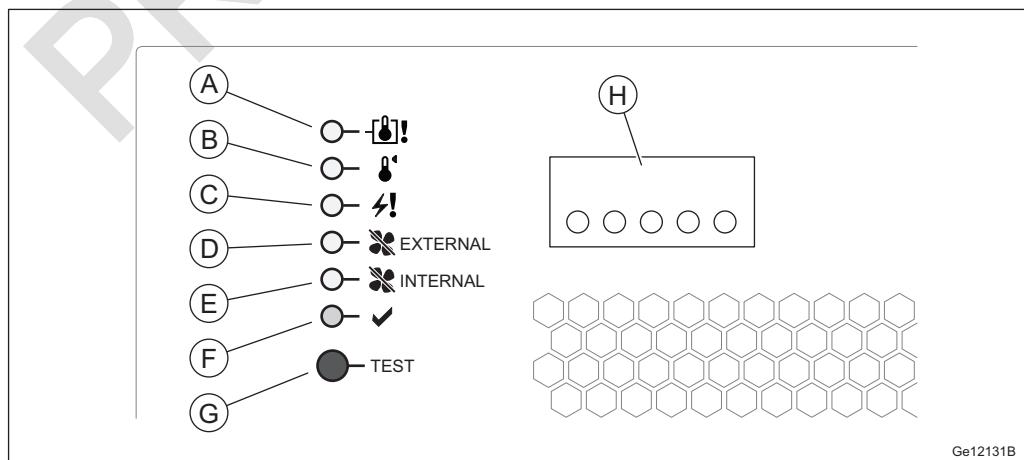


Figure 24 HEX Control Interface



Table 9 HEX Control Interface

Marking	Definition
A	Temperature sensor alarm: When the sensor is faulty or disconnected, the optical indicator will be lit RED
B	Temperature alarm: When the temperature is higher than 55°C or lower than 0°C, the optical indicator will be lit RED.
C	Voltage alarm: When the input voltage is higher than 58V or lower than 44V, the optical indicator will be lit RED.
D	External fan alarm: When the external circulation fan is faulty, the optical indicator will be lit RED.
E	Internal fan alarm: When the internal circulation fan is faulty, the optical indicator will be lit RED.
F	HEX power: When the HEX is powered on and works well, the optical indicator will be lit GREEN.
G	HEX test button: When holding the button down for three seconds, the HEX starts self-check and resets.
H	HEX connection interface: For connection of power and alarm to internal and external fans.



6

Power Configurations

This section describes the power system variants that exist in different installations of the enclosure and how they are equipped to meet the power consumption requirements.

6.1

Power Subrack

This configuration is prepared for an input power feed of 200–240 V AC and with a DC system load up to 20 kW.

The number and type of circuit breakers and rectifiers that are installed can vary depending on configuration needs..

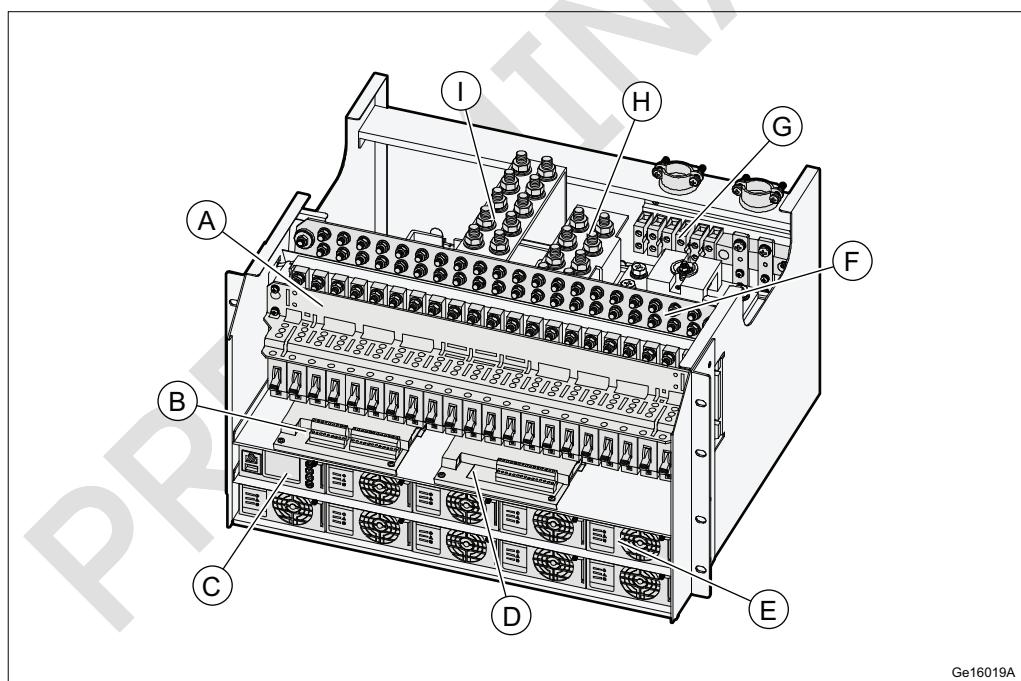


Figure 25 Power Subrack

Table 10 Power Subrack

Position	Unit	Number of Units in Configuration	Comment
A	DC distribution circuit breakers	21	
B	Alarm board		



Position	Unit	Number of Units in Configuration	Comment
C	Power controller	1	
D	Alarm board		
E	Rectifier	1-9	
F	Positive busbar		
G			
H			
I			

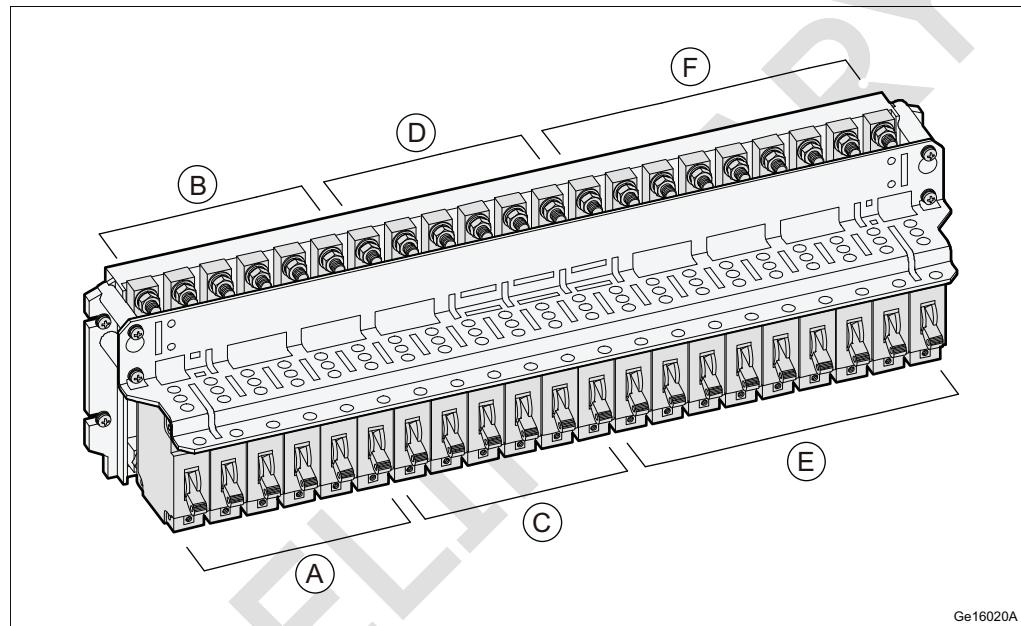


Figure 26 DC Distribution Circuit Breakers

Table 11 DC Distribution Circuit Breakers

Position	Unit	Number of Units in Configuration	Comment
A	ML ⁽¹⁾ circuit breaker	0-6	LLDV1 CB 1-6: rated 2 A to 100 A
B	ML ⁽²⁾ , connector	0-6	LLDV1
C	ML ⁽³⁾ circuit breaker	-12	LLDV2 CB 7-12: rated 2 A to 100 A
D	ML ⁽⁴⁾ , connector	0-6	LLDV2
E	PL ⁽⁵⁾ circuit breaker	0-9	CB 13-21: rated 2 A to 100 A CB 21: Rated 125 A CB X is dedicated for climate units. CB Y is dedicated for the ESC/SCU.



Position	Unit	Number of Units in Configuration	Comment
F	PL ⁽⁶⁾ , connector	0–9	

- (1) Main Load (ML)
- (2) Main Load (ML)
- (3) Main Load (ML)
- (4) Main Load (ML)
- (5) Priority Load (PL)
- (6) Priority Load (PL)

6.2 DC Distribution Circuit Breakers

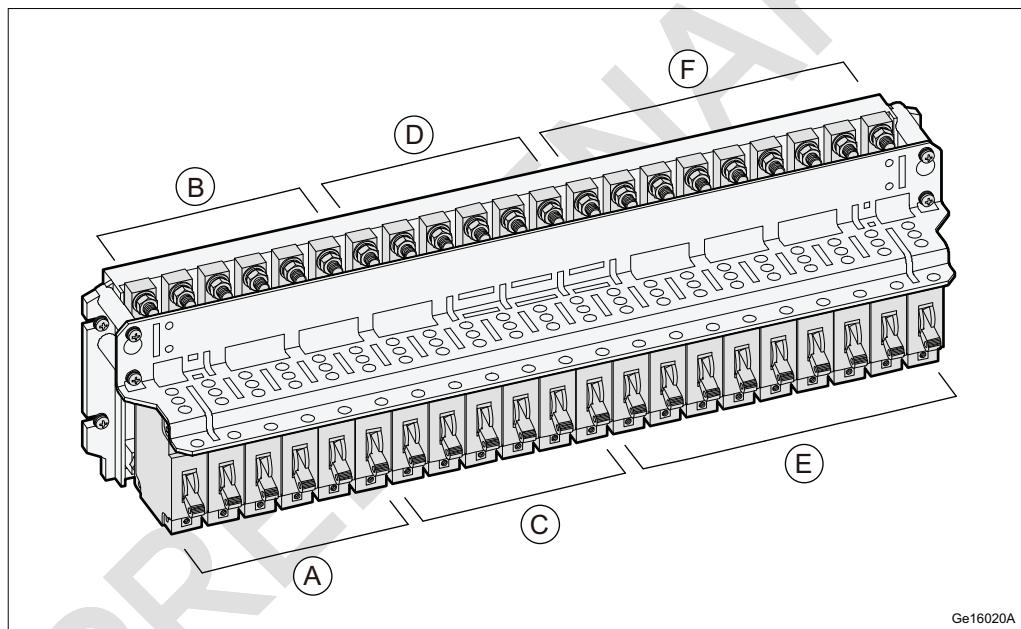


Figure 27 DC Distribution Circuit Breakers

Table 12 DC Distribution Circuit Breakers

Position	Unit	Number of Units in Configuration	Comment
A	ML ⁽¹⁾ circuit breaker	0–6	LLDV1 CB 1–6: rated 2 A to 100 A
B	ML ⁽²⁾ , connector	0–6	LLDV1
C	ML ⁽³⁾ circuit breaker	–12	LLDV2 CB 7–12: rated 2 A to 100 A
D	ML ⁽⁴⁾ , connector	0–6	LLDV2
E	PL ⁽⁵⁾ circuit breaker	0–9	CB 13–21: rated 2 A to 100 A CB 21: Rated 125 A



Position	Unit	Number of Units in Configuration	Comment
			CB X is dedicated for climate units. CB Y is dedicated for the ESC/SCU.
F	PL ⁽⁶⁾ , connector	0–9	

- (1) Main Load (ML)
- (2) Main Load (ML)
- (3) Main Load (ML)
- (4) Main Load (ML)
- (5) Priority Load (PL)
- (6) Priority Load (PL)

PRELIMINARY



7

Power System Functionality

Power system features are defined and controlled by the power system controller. This functionality is applicable for configurations containing an ESC or SCU.

For more information on the controller, see [Power System Controller User Guide](#).

7.1

Power Controller Monitoring Functions

The power system controller provides energy-saving management and battery charging-discharging management. It displays the value of the system voltage, load current, battery voltage, battery current, battery temperature. It also displays information regarding AC power distribution detection, alarm reports, control of load disconnection and battery protection functionality.

7.2

Alarm Functionality

The power system controller has capabilities to alert the user of alarms through LED-lights as well as by using sound. Crucial alarms are also sent to and handled by the ESC 03 01 or SCU 09 01. There are three levels of alarms: CRITICAL, MAJOR, and OBSERVATION alarms. Users can set the level of each alarm according to the actual situation. Users can also set the corresponding relay output, or NO relay output for each alarm type.

Users have access to history alarm logs and current logs. The history alarm logs include alarm type, start time, and end time, while the current logs only cover alarm type and start time. The logs are displayed in chronological order of start time. The latest 1000 history alarm logs can be saved at most.

7.3

ESC and SCU Functionality

The control unit enables remote management and supervision of site equipment:

- Configuration Management of power system parameters using CLI or Ericsson Site Controller Management System (ESCM).
- SNMP v2/v3 alarms to management system.
- Performance Management

Management systems with support for ESC 03 01 or SCU 09 01:

- Configuration: ESCM



- Alarms: ESCM, OSS-RC version 10.3 or later
- Performance: ESCM

PRELIMINARY



8

Connection Interfaces for External Cables

This section contains information about the cable inlets and connection interfaces for external cables in the enclosure.

8.1

Enclosure Cable Inlets

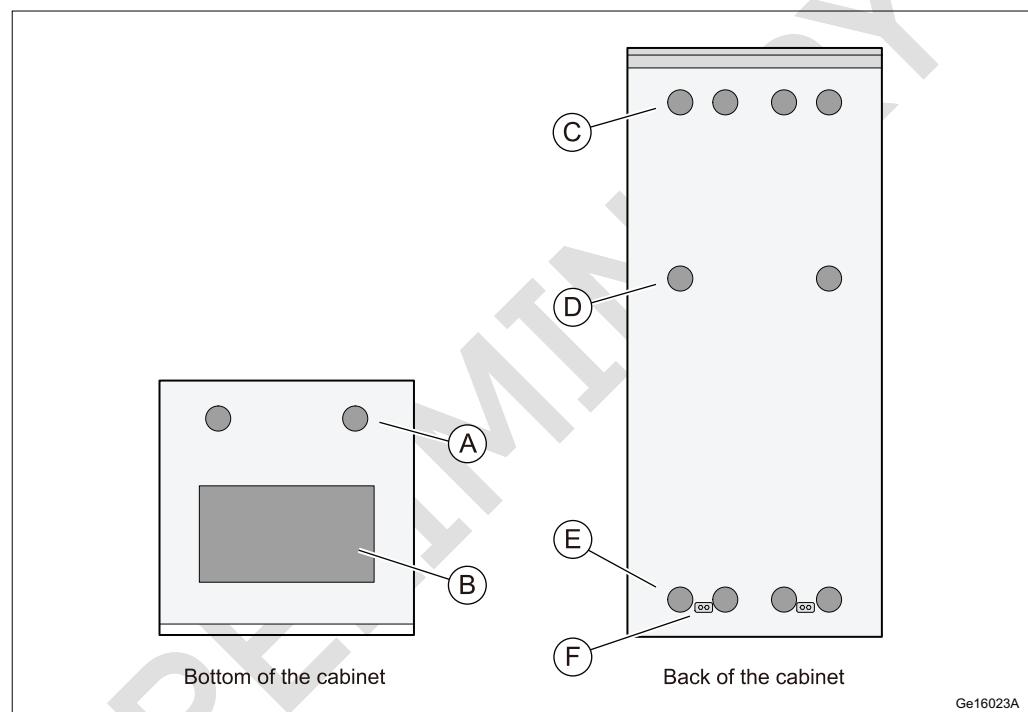


Figure 28 Enclosure Cable Inlets, Bottom and Back

Table 13 Enclosure Cable Inlets, Bottom and Back

Position	Interface	Description
A	Cable inlet/outlet	
B	Cable inlet/outlet	
C	Cable inlet/outlet	
D	Cable inlet/outlet	
E	Cable inlet/outlet	
F	Grounding bolt	
G	Cable inlet/outlet	
H	Cable inlet/outlet	

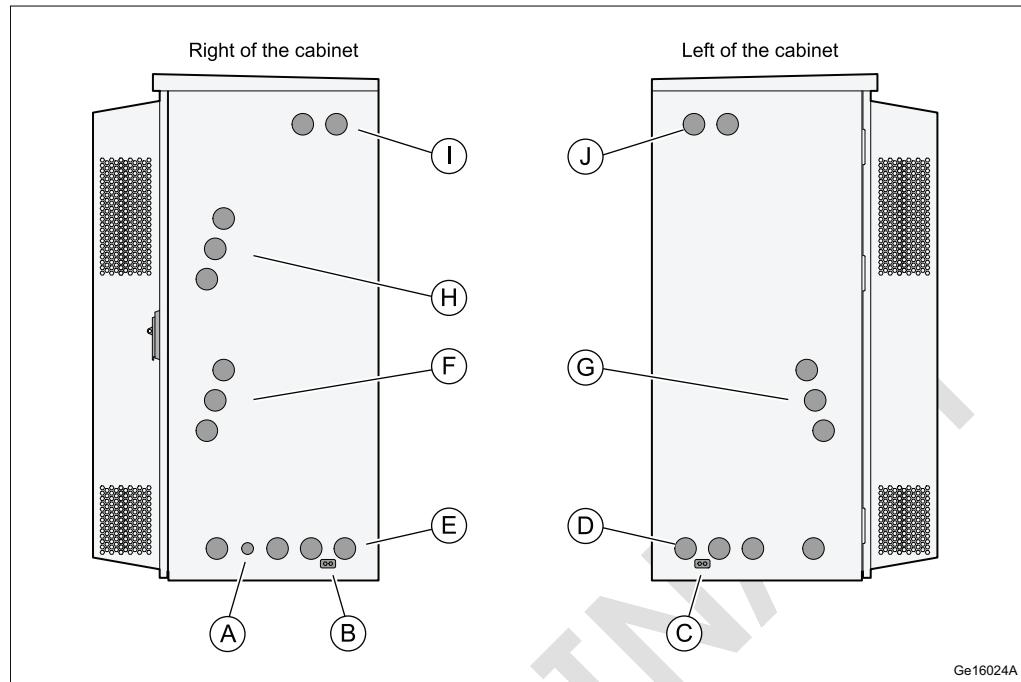


Figure 29 Enclosure Cable Inlets, Left and Right Side

Table 14 Enclosure Cable Inlets, Left and Right Side

Position	Interface	Description
A	GNSS connection point	
B	Grounding bolt	
C	Grounding bolt	
D	Cable inlet/outlet	
E	Cable inlet/outlet	
F	Cable inlet/outlet	
G	Cable inlet/outlet	
H	Cable inlet/outlet	
I	Cable inlet/outlet	

8.2 Grounding Interface

All equipment must be connected to the same Main Earthing Terminal (MET) at the site, using a 35 mm² grounding copper cable or equivalent.

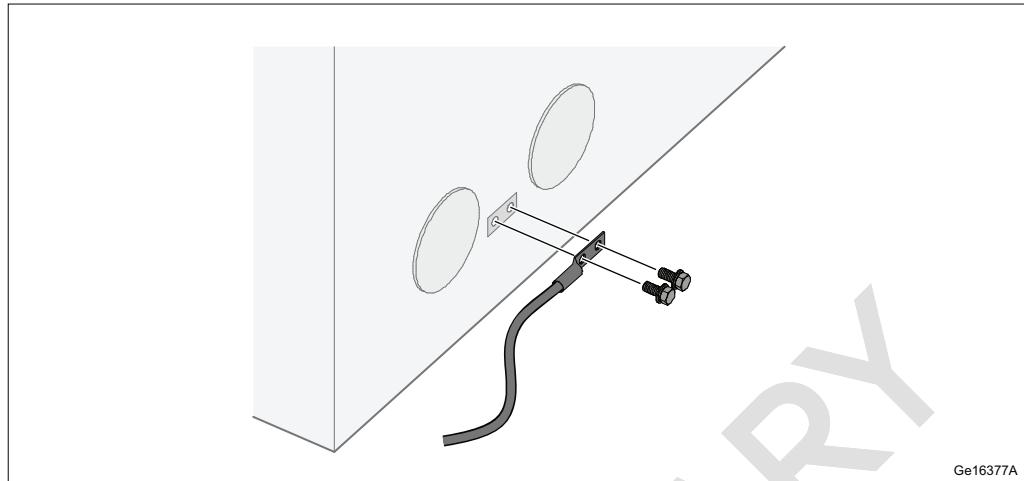


Figure 30 Position of the Grounding Cable

8.3 AC Power Interface

The connection interface for the incoming AC cable is shown in the illustration.

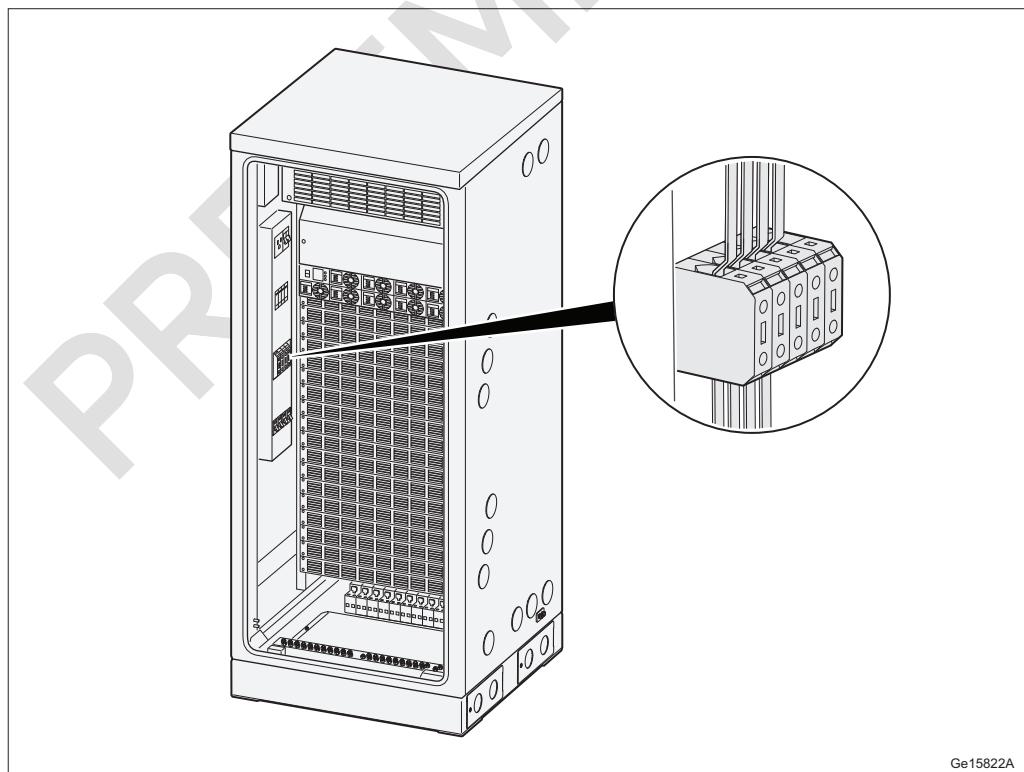


Figure 31 AC Power Interface



8.4

DC Power Distribution Interface

The enclosure can supply –48 V DC to various other site equipment.

The connection interface for the DC distribution cables is shown in the illustration.

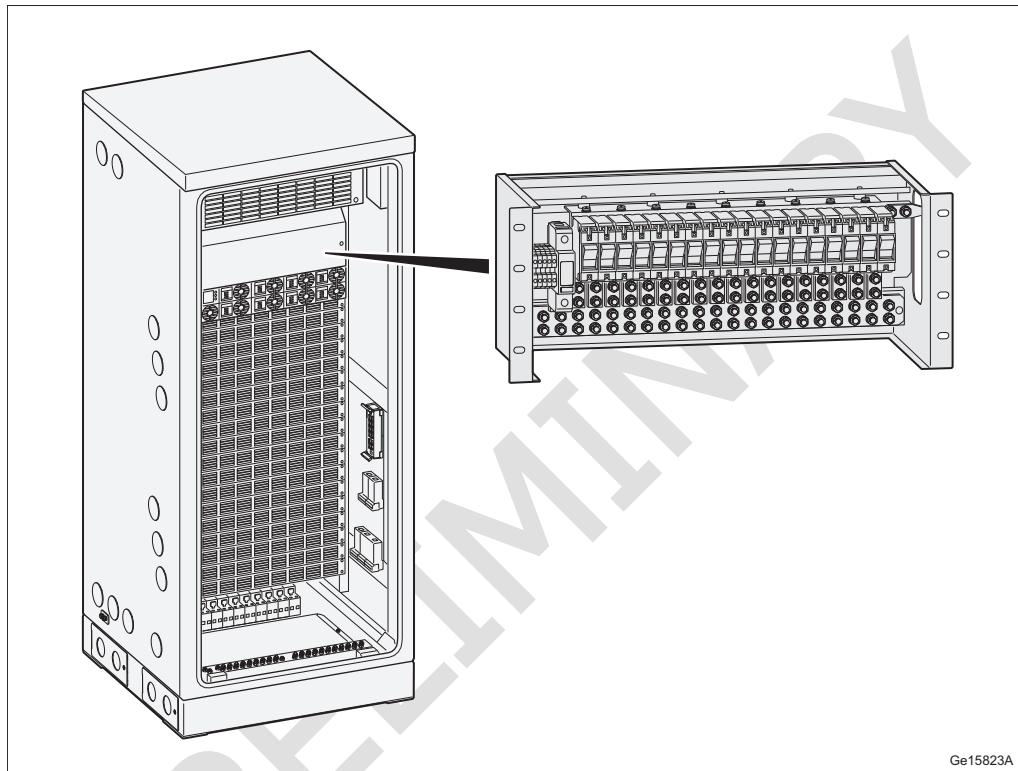


Figure 32 DC Power Distribution Interface

8.5

Battery Power Cable Interface

The connection interface for the battery power cables is shown in the illustration.

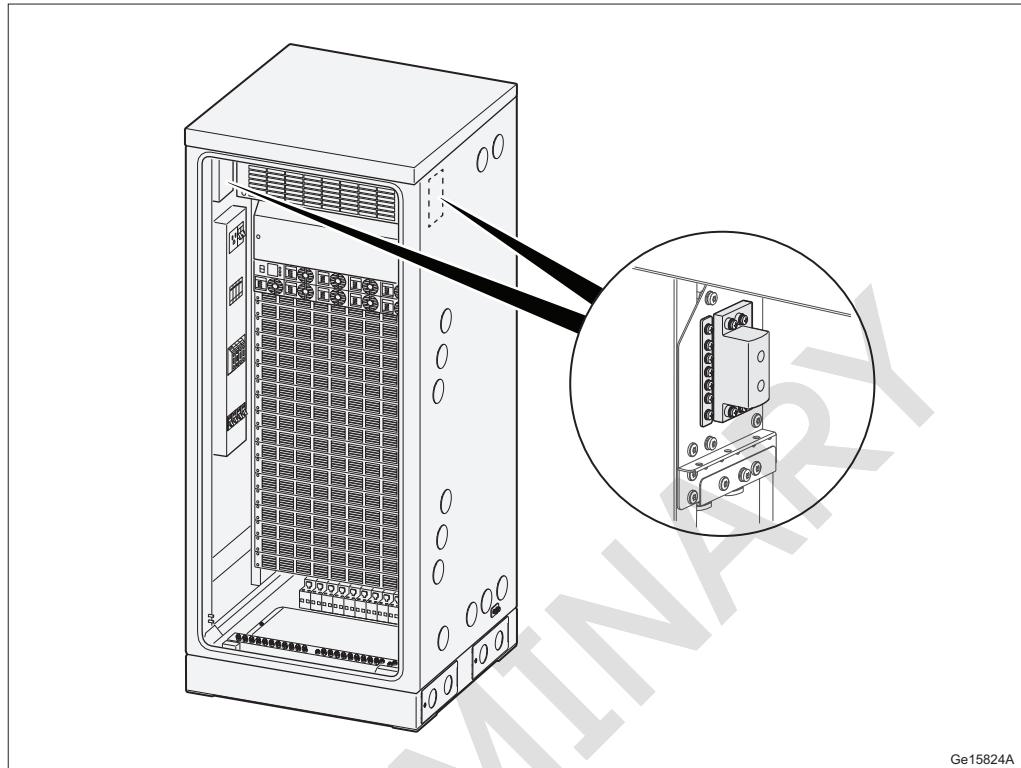


Figure 33 Battery Interface

8.6

Battery Temperature Sensor Interface

The enclosure has three battery temperature sensor interfaces as shown in illustration.

Figure 34 Battery Temperature Sensor Interface

8.7

Ethernet Interface on ESC 03 01 or SCU 09 01

The ESC 03 01 or SCU 09 01 has two electrical Ethernet 10/100 baseT interface ports. The ports are marked 1 and 2. Port 1 is dedicated for northbound connection to OSS and/or ESCM. Port 2 is intended for connection to site equipment. Both ports support VLAN switching.

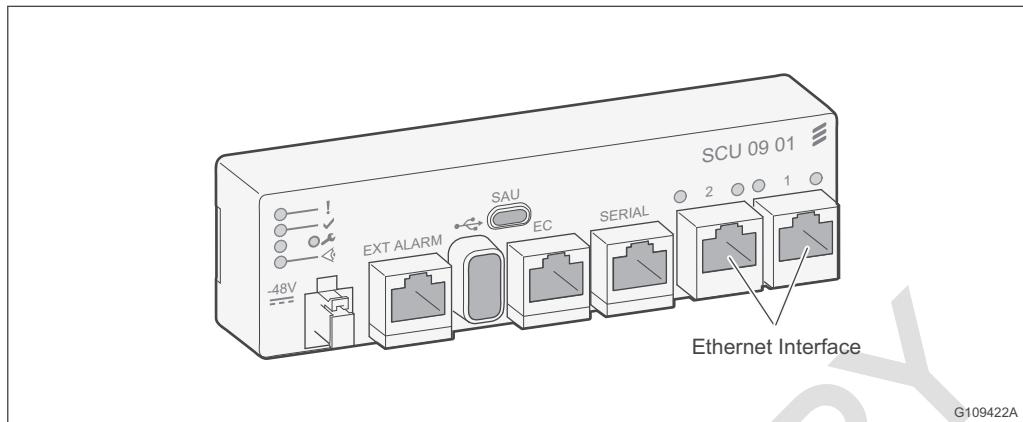


Figure 35 Ethernet Interface

8.8

External Alarm Interface to SCU, SAU, OVP

The ESC 03 01 or SCU 09 01 external alarm interface supports four alarms in addition to the external alarms managed by the power controller. An alarm is triggered by a closed contact (closed loop) or an open contact (open loop).

If using SAU 02 01 together with three OVPs, the ESC 03 01 or SCU 09 01 SAU interface supports 24 alarms.

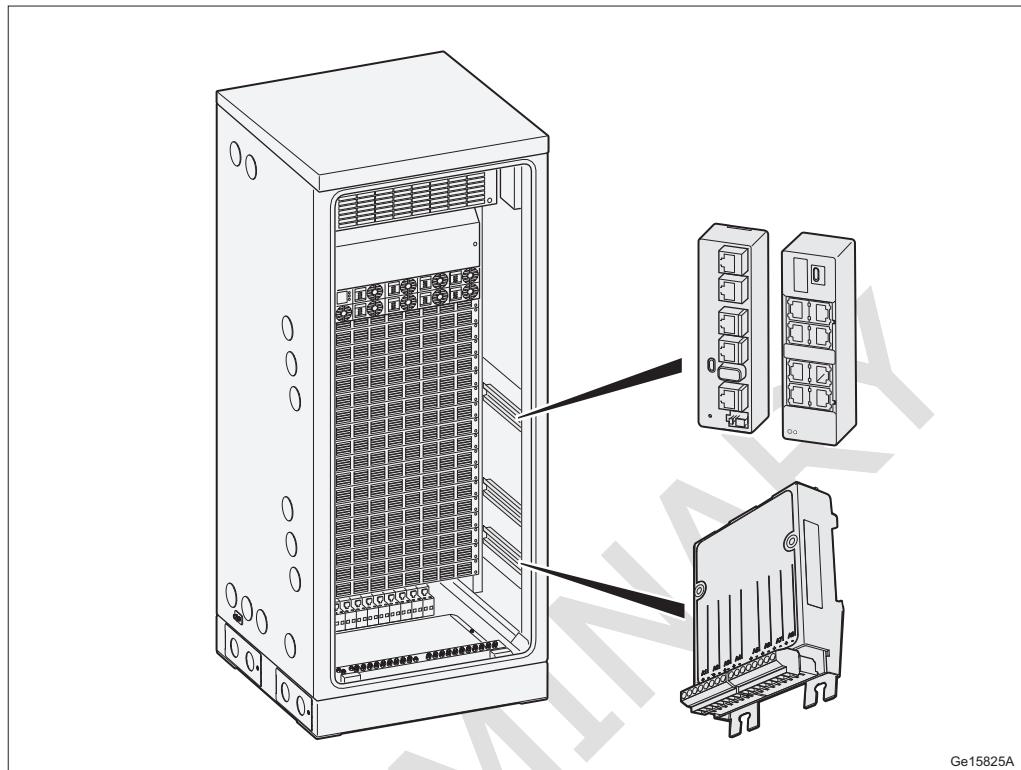


Figure 36 External Alarm Interface to SCU, SAU, OVP

8.9

External Alarm Interface to Power System Controller

The enclosure has four configurable alarm inputs and four configurable alarm outputs, as shown in illustration.

Figure 37 Interface to Power System Controller

Table 15 Interface to Power System Controller

Position	Description
DI1	Digital input 1
DI2	Digital input 2
DI3	Digital input 3
DI4/DG_IN	Digital input 4 or DG_IN
RS485	An RS485 interface that is connected to ESC 03 01 or SCU 09 01 Serial port.
DO1	By default set to HEX climate alarm output
DO2	By default set to door alarm output
DO3	Digital output 3
DO4/DG_OUT	Digital output 4 or DG_OUT



8.10 External Alarm Interface to Alarm Plinth

The interfaces on the alarm plinth are shown in [Figure 38](#).

Figure 38 Interface on Alarm Plinth

PRELIMINARY



9

Internal Cabling

9.1

Internal Power Cables

9.1.1

Climate System

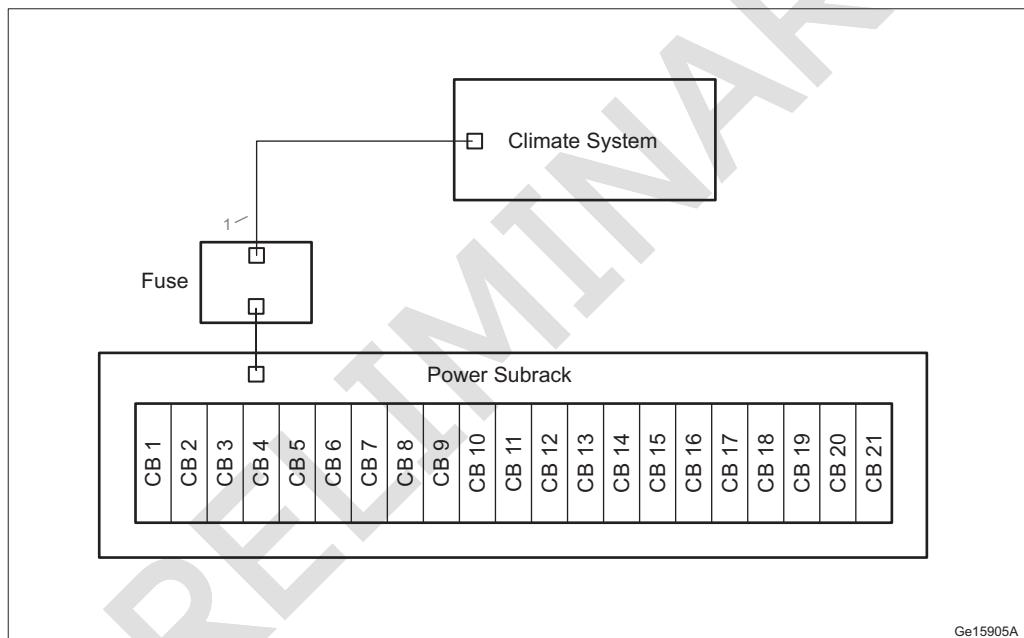


Figure 39 Climate System and Fans Cabling

Table 16 Climate System and Fans Cabling

Pos.	Connections	Qty.	Product No.
1	Fuse connector – Climate System: DC Power Connector	1	-



9.1.2

Internal Lamp

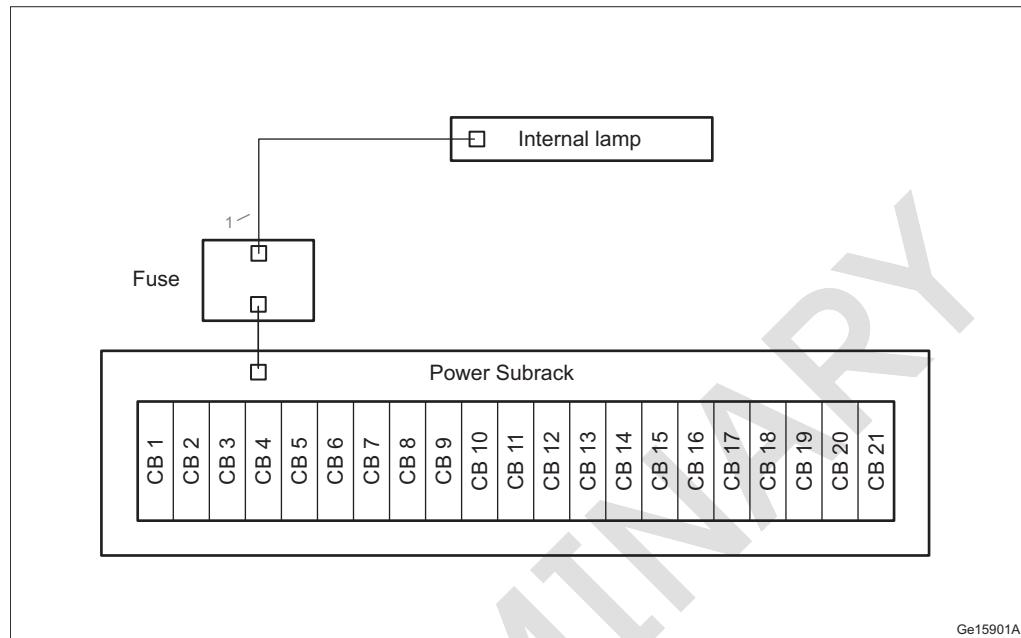


Figure 40 DCDU and Internal Lamp Cabling

Table 17 DCDU and Internal Lamp Cabling

Pos.	Connections	Qty.	Product No.
1	Fuse connector – Internal Lamp	1	-



9.1.3

ESC 03 01 or SCU 09 01 (Optional)

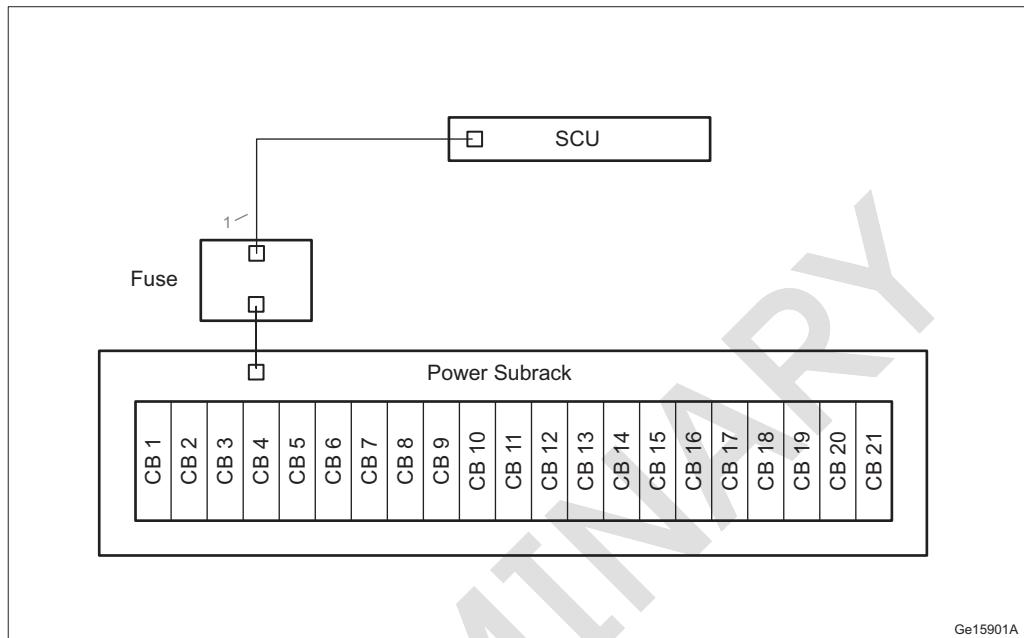


Figure 41 ESC or SCU Power Cabling

Table 18 ESC or SCU Power Cabling

Pos.	Connections	Qty.	Product No.
1	Fuse connector – ESC or SCU: -48 V	1	-



9.1.4

19-Inch Unit

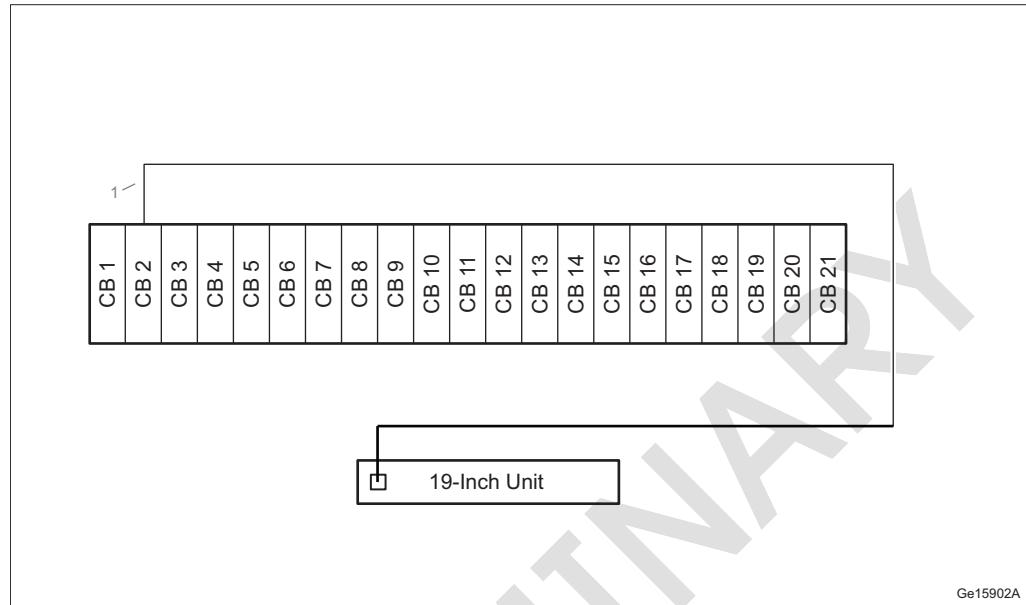


Figure 42 19-Inch Unit Power Cabling

Table 19 19-Inch Unit Power Cabling

Pos.	Connections	Qty.	Product No.
1	PDU: CB1-21 – 19-inch unit: -48 V (1)	1-19	-

(1) All ML and PL CBs are applicable, except the CB used for ESC 03 01 or SCU 09 01.



9.1.5

DC Distribution Expansion (Optional)

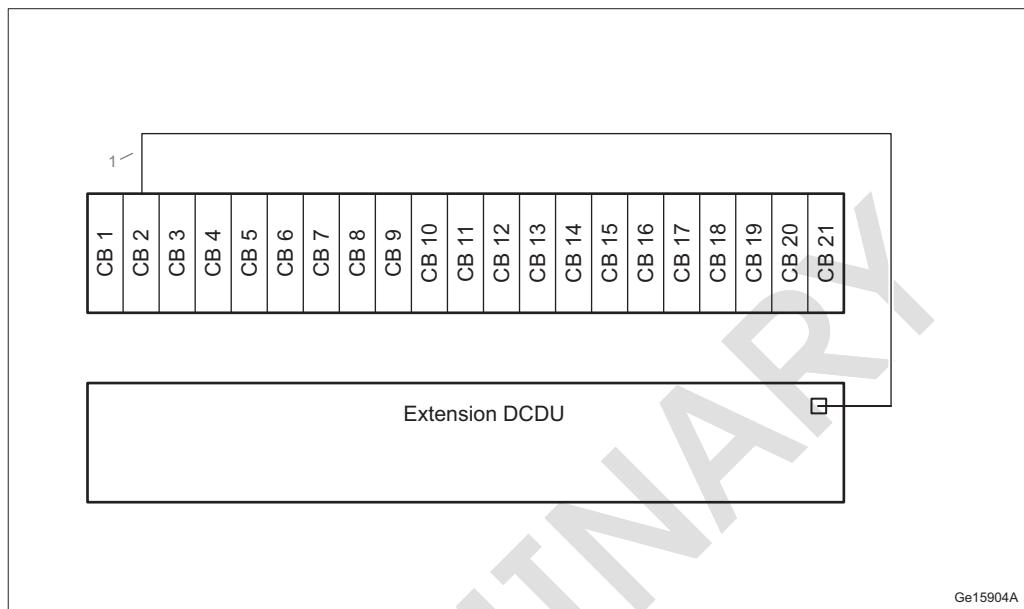


Figure 43 DC Distribution and DC Distribution Expansion Cabling

Table 20 DC Distribution and DC Distribution Expansion Cabling

Pos.	Connections	Qty.	Product No.
1	DCDU: ML CBX – DC Distribution Expansion: -48 V	1	-

9.2

Signaling Cables

9.2.1

Power System Controller to ESC 03 01 or SCU 09 01

Figure 44 shows and Table 21 describes the signaling cable from the power system controller to the ESC 03 01 or SCU 09 01.

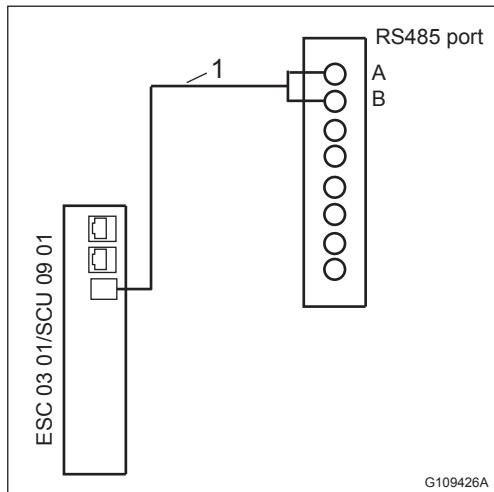


Figure 44 Power System Controller to ESC 03 01 or SCU 09 01

Table 21 Power System Controller to ESC 03 01 or SCU 09 01

Pos.	Connections	Qty.	Product No.
1	Alarm Digital Output RS485 – ESC 03 01 or SCU 09 01: Serial	1	The cable is included and pre-assembled in the Enclosure.

9.2.2 DC Distribution Expansion to Power System Controller (Optional)

[Figure 45](#) shows and [Table 22](#) describes the signaling cable from DC Distribution Expansion to the power system controller.

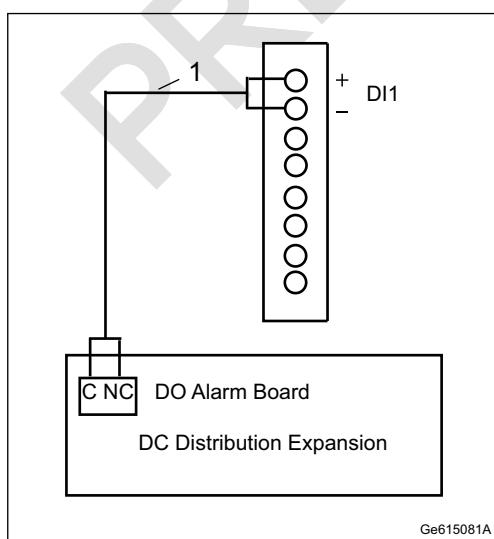


Figure 45 DC Distribution Expansion to Power System Controller



Table 22 DC Distribution Expansion to Power System Controller

Pos.	Connections	Qty.	Product No.
1	DC Distribution Unit: Alarm Digital Output – Alarm Digital Input 1	1	The cable is included in the DC Distribution Expansion.

9.2.3

OVP-ETH to ESC 03 01 or SCU 09 01 (Optional)

[Figure 46](#) shows and [Table 23](#) describes the signaling cable from an OVP-ETH to the ESC 03 01 or SCU 09 01.

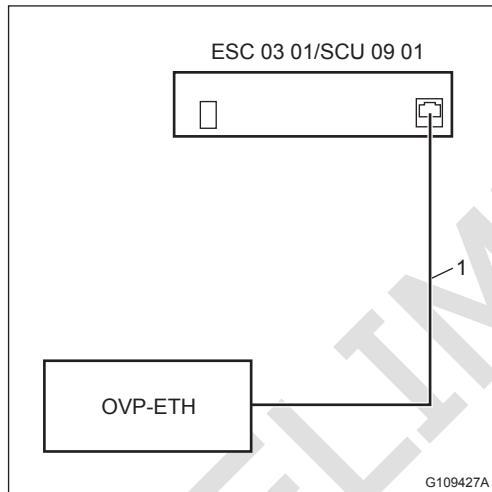


Figure 46 OVP-ETH to ESC 03 01 or SCU 09 01

Table 23 OVP-ETH to ESC 03 01 or SCU 09 01

Pos.	Connections	Qty.	Product No.
1	OVP-ETH – ESC 03 01 or SCU 09 01: Ethernet 1	1	RPM 777 143/00500

9.2.4

OVP-ALM8 to ESC 03 01 or SCU 09 01 (Optional)

[Figure 47](#) shows and [Table 24](#) describes the signaling cable from an OVP-ALM8 to the ESC 03 01 or SCU 09 01.

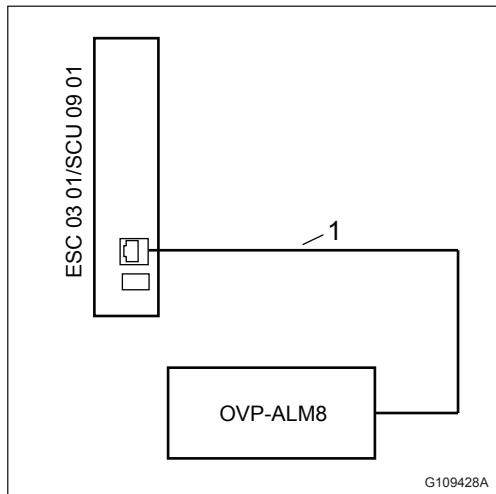


Figure 47 OVP-ALM8 to ESC 03 01 or SCU 09 01

Table 24 OVP-ALM8 to ESC 03 01 or SCU 09 01

Pos.	Connections	Qty.	Product No.
1	OVP-ALM8 – ESC 03 01 or SCU 09 01: External Alarm	1	RPM 777 143/00500

9.2.5

OVP-ALM8 to SAU 02 01, and SAU 02 01 to ESC 03 01 or SCU 09 01
(Optional)

[Figure 48](#) shows and [Table 25](#) describes the signaling cable from OVP-ALM8 to the SAU 02 01, and from the SAU 02 01 to the ESC 03 01 or SCU 09 01.

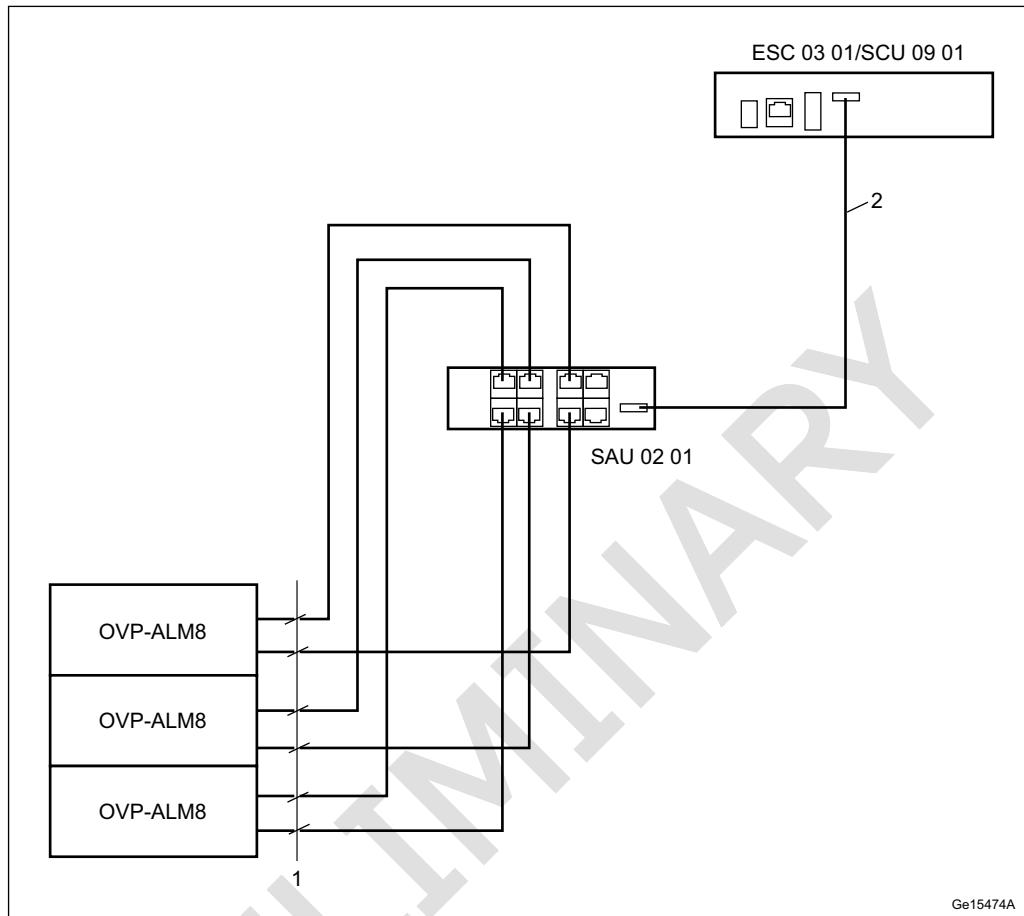


Figure 48 OVP-ALM8 to SAU 02 01, and SAU 02 01 to ESC 03 01 or SCU 09 01

Table 25 OVP-ALM8 to SAU 02 01, and SAU 02 01 to ESC 03 01 or SCU 09 01

Pos.	Connections	Qty.	Product No.
1	OVP-ALM8 – SAU 02 01	6	RPM 777 143/00500
2	SAU 02 01 – ESC 03 01 or SCU 09 01: SAU	1	RPM 777 405/01700

9.2.6

OVP-ALM8 to 19-inch Unit (Optional)

[Figure 49](#) shows and [Table 26](#) describes the signaling cable from an OVP-ALM8 to the 19-inch unit.

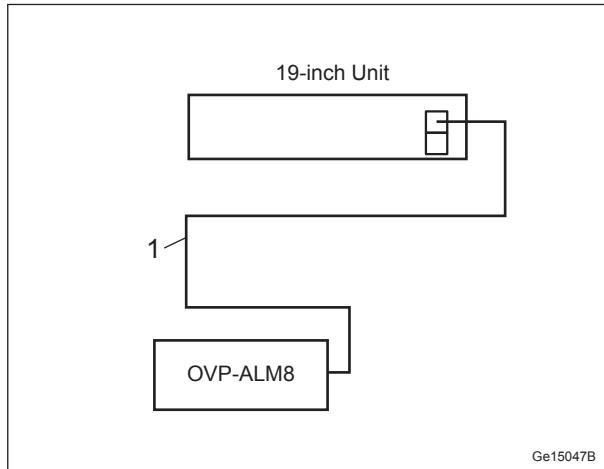


Figure 49 OVP-ALM8 to 19-inch Unit

Table 26 OVP-ALM8 to 19-inch Unit

Pos.	Connections	Qty.	Product No.
1	OVP-ALM8 – 19-inch Unit: External Alarm	1	RPM 777 143/L

9.2.7 Cables for 19-Inch Units

For more information about the cabling for 19-inch units, see CPI for the specific unit:

- Baseband Connections, for Baseband 6620, 6630 and P614.
- Router library for routers in general, such as Router 6672, 6471 and 6675.
- Fronthaul library for fronthauls in general, such as Fronthaul 6020 and 6080.
- Non-RF Connections RBS 6601, for RBS 6601.
- Transmission Connections for Mobile Backhaul Solution MINI-LINK 66xx, for MINI-LINK units.
- Main-Remote Installation Products Overview, for general information about cables and equipment for main-remote sites.



10

Standards and Regulations

This section presents a brief overview of standards, regulatory product approval, and declaration of conformity.

Declaration of Conformity

"Hereby, Ericsson AB, declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/35/EU, 2014/30/EU, and 2011/65/EU."

10.1

Regulatory Approval

The enclosure complies with the following market requirements:

- The Low Voltage Directive (LVD) 2014/35/EU
- The Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2011/65/EU

10.1.1

Environmental Standards Compliance

The product complies with the following environmental standard:

Europe

- EN 50581 (RoHS)

10.1.2

Safety Standards Compliance

In accordance with market requirements, the enclosure complies with the following product safety standards and directives:

International

- IEC 62 368-1

Europe

- EN 62 368-1



10.1.2.1

Outdoor Specific Requirements

The enclosure complies with the following outdoor specific requirements:

International

- IEC 60 529 (IP55)
- IEC 60 950-22

Europe

- EN 60 529 (IP55)
- EN 60 950-22

10.1.3

EMC Standards Compliance



Warning!

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

The enclosure complies with the following EMC standards:

Europe

- ETSI EN 300 386
- ETSI EN 61000
- EN 55022

10.1.4

Marking

To show compliance with legal requirements, the product is marked with the following label:

Europe

- CE mark



10.2 Dependability

The enclosure is designed for a technical lifetime of 10 years (24-hour operation). The following preventive maintenance conditions must be fulfilled to guarantee the availability of the enclosure:

- Fans

The fans must be inspected (and cleaned if necessary) every year.

For more information on preventive maintenance, see [Enclosure Maintenance Instructions](#).

10.3 Spare Parts

The product adheres to the Ericsson Serviceability and Spare Part Strategy.

10.4 Vandal Resistance

Unauthorized access is not possible without damaging the unit.

10.5 Transportation and Storage

For information about transportation and storage of the product, see [Transportation and Storage](#).

B160:

Capacity	
VRLA 12v	100Ah / 150Ah / 170Ah / 190Ah / 210Ah
Strings (max)	3
Electrical Specification	
DC output	-48VDC/200A
Battery breakers	2x 125/2p
Alarms	Door open, climate failure, MCB connection
Mechanical Specification	
Weight	295 lbs
Dimensions H x W x D	63" x 26" x 26" (including base frame)
Base frame height	6"
Material	Galvanized steel (180g/m ²)
Color	Powder paint NCS 2002-B
Door	Front access
Locking type	Pad lock / cylinder
Environmental Specification	
Ingress protection	VRLA/Sokium IP44
Relative humidity	15 – 100%
Climate System	
Air conditioner	
- Fan type	DC
- Cooling capacity	500W @L35/L35
Convection cooling	
- Emergency fan	

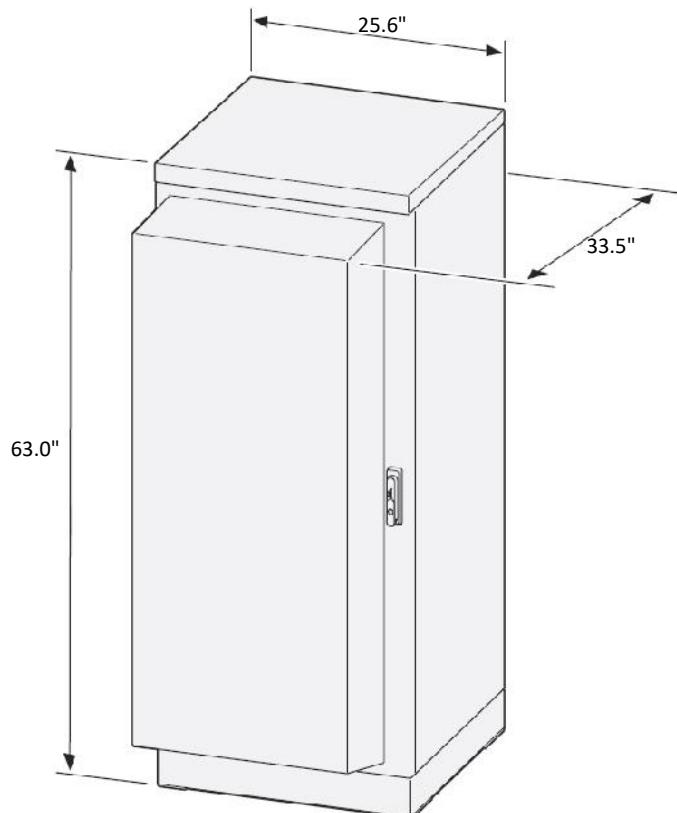
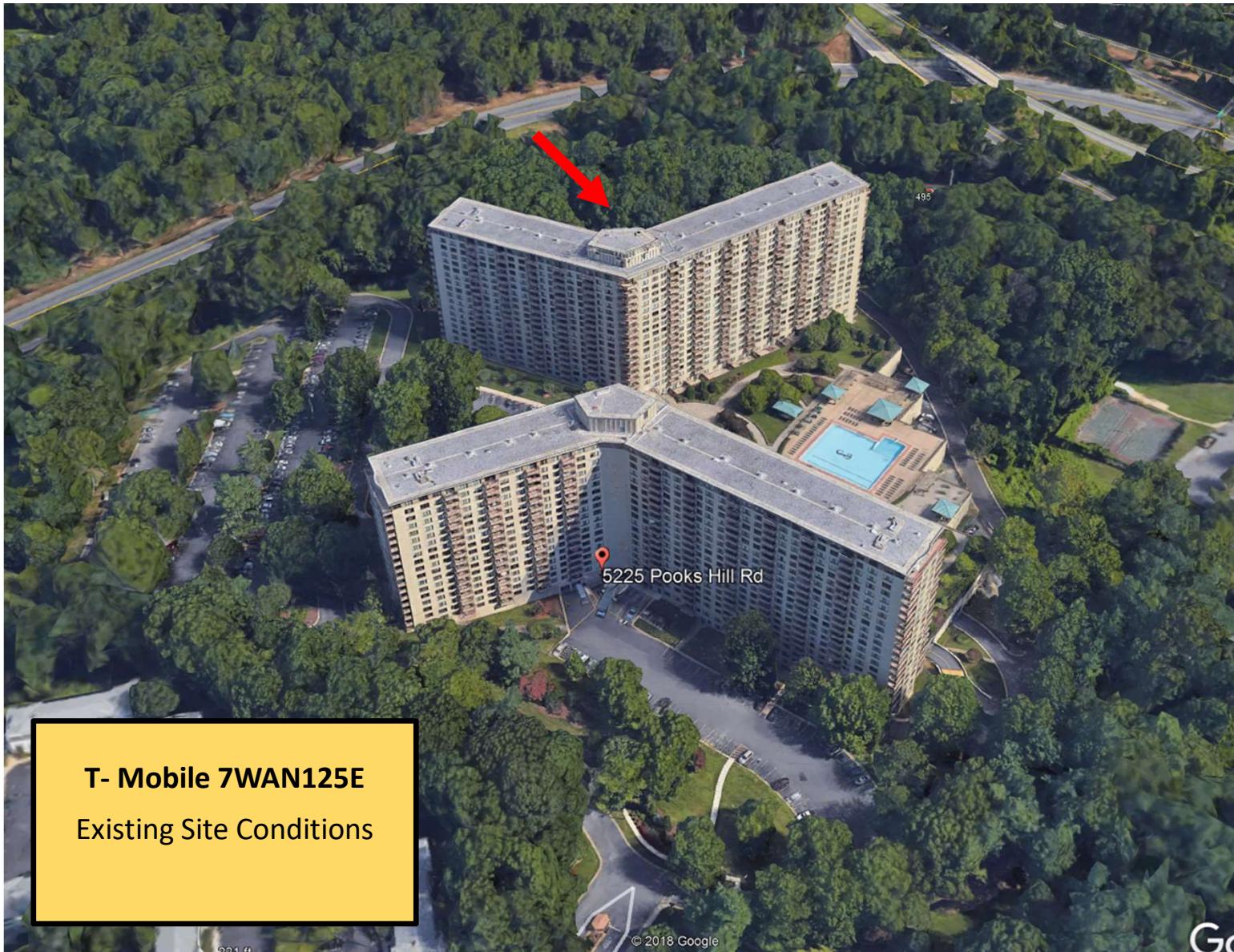
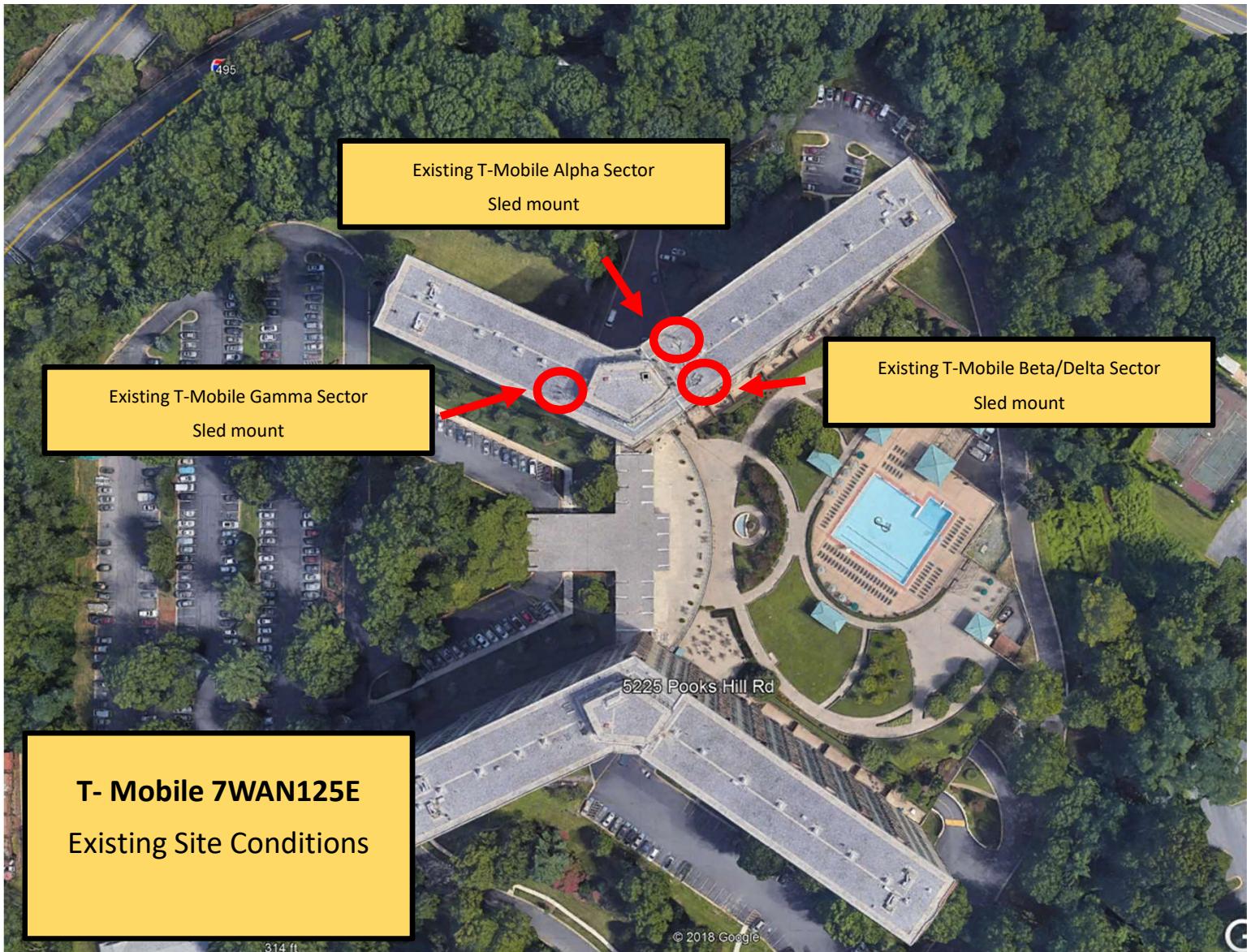


Figure 1





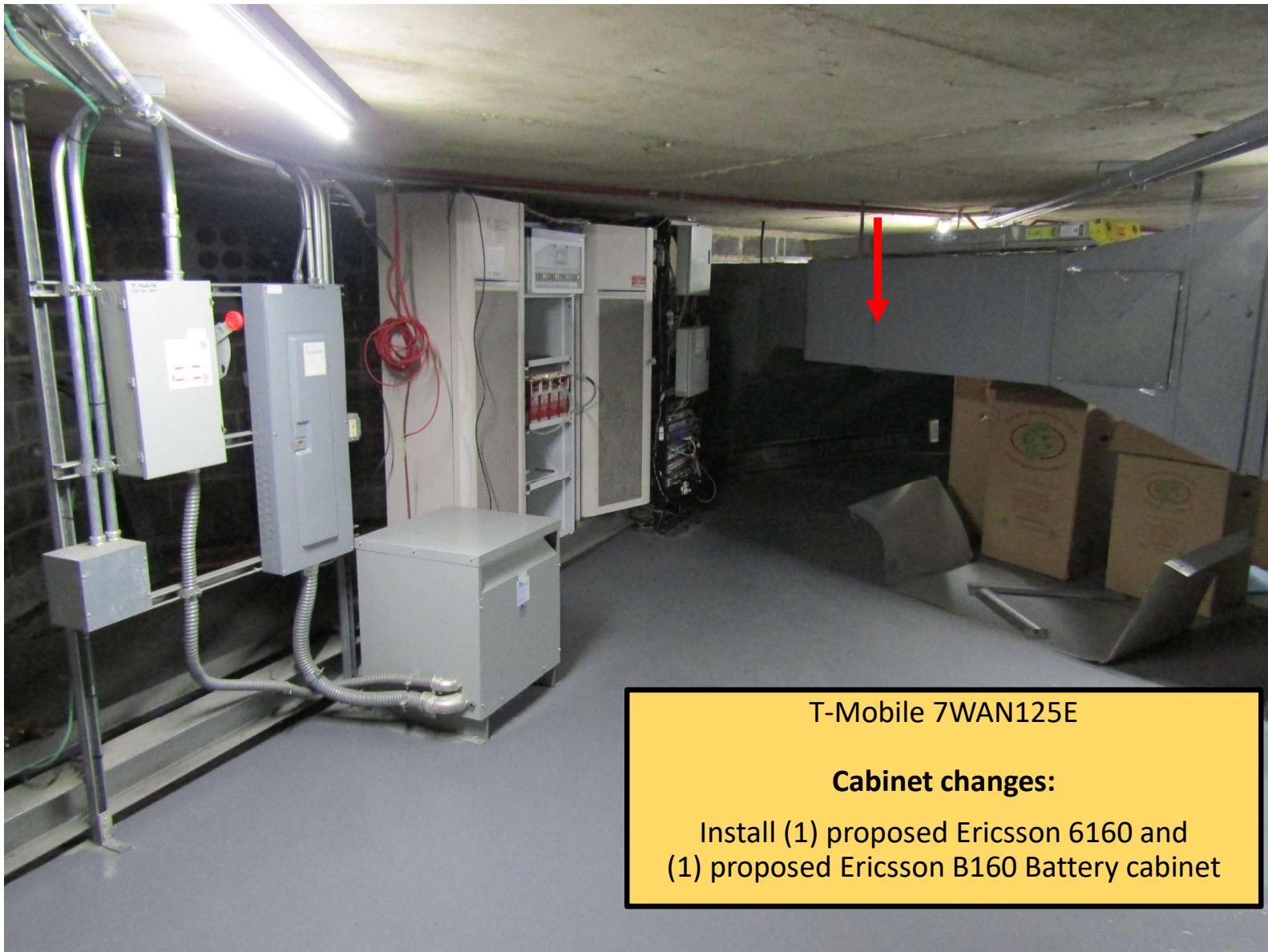


T-Mobile 7WAN125E
Alpha Sector changes:
Remove (1) existing Ericsson AIR21 B2A/B4P and
install (1) proposed Ericsson AIR 6488 B41 and
(1) proposed Ericsson RRU 4415 B25



T-Mobile 7WAN125E
Beta Sector changes:
Remove (1) existing Ericsson AIR21 B2A/B4P and
install (1) proposed Ericsson AIR 6488 B41 and (1)
proposed Ericsson RRU 4415 B25





App No:

2019070898

Applicant Name	Network Building + Consulting	Antenna Compliance	Yes	
Application Type	Minor Modification	Updated Ann. Plan?	7/10/2019 Yes	Compliance Desc
Carrier	T-Mobile	Will site be used to support government telecommunications facilities or other equipment for government use?	No	Antenna Location
Solution Type	Macro	Gvt. Use Desc.		Antenna Loc. Desc.
Existing	Existing			Env. Assessment
Application Description		Cat. Excluded?	checked	Routine Env. Evaluation

T-Mobile proposes to remove (3) existing antennas, and install (3) new antenna, (3) RRU's and (2) equipment/battery cabinets.

Site Id	47	Zoning	R-H
Structure Type	Building	Latitude	39.01745
Address	5225 Pooks Hill Rd, Bethesda	Longitude	-77.10685
County Site Name	Promenade	Ground Elevation	295
Carrier Site Name	7WAN125E	City	Bethesda
Site Owner	Promenade Towers MH Corp	Lease Status	Leased
Structure Owner	Promenade Towers MH Corp	Does the structure require an antenna structure registration under FCC Title 47	
Existing Structure Height	177	No	
Provide the proposed height of the replacement structure without any antenna (New, Replacement Apps Only)		Distance to Residential Property (New, Replacement, Colocation Only)	
		Distance to Commercial Property (New, Replacement, Colocation Only)	

Justification of why this site was selected:

Site is an existing telecommunications facility on which the applicant carrier is currently installed.

NearbySites (New, Replacement Apps Only):

Screening considerations(New, Colocations, Replacement Apps Only):

App No:

2019070898

6409 Questions

Does this qualify as a 6409 application? (Minor Mod, Colocations Only)

 Yes

For towers outside the public ROW will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 20 feet, whichever is greater?

 No

Will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 6 feet?

 No

For towers outside the public ROW will the proposed installation increase the width by adding appurtenance to the body of the structure that would protrude from the edge of the structure by more than 20 feet?

 No

More than four Equipment Cabinets? YN

 Yes

Will the proposed installation increase the height of the structure by: (1) more than 10% or (2) more than 10 feet, whichever is greater?

 No

Will the proposed installation require excavation or expansion outside the current boundaries of the site?

 No

Does the structure or current installation have concealment elements/measures?

 No

If yes, describe how the proposed installation does not defeat the existing concealment.

Small Wireless Facility Questions

Small Wireless Facility? No

Is the structure 10% taller than adjacent structures?

8.7

Please list adjacent structure heights

Tribal Lands?

 No

Cumulative volume of the proposed wireless equipment(s) exclusive of antennas in cubic feet

Cumulative volume of the proposed antenna antenna(s) exclusive of equipment

ROW Question

PROW?

 No

ROW owner

Provide the Right of Way width

Pole Number

App No:

2019070898

Antenna Model

Ericsson AIR 6488

Frequency

DL/Tx: 2496-2690 MHz UL/Rx: 2496-2690 MHz

RAD Center

177

Max ERP

1000

Antenna Dimensions

34.8" x 20.5" x 7.2"

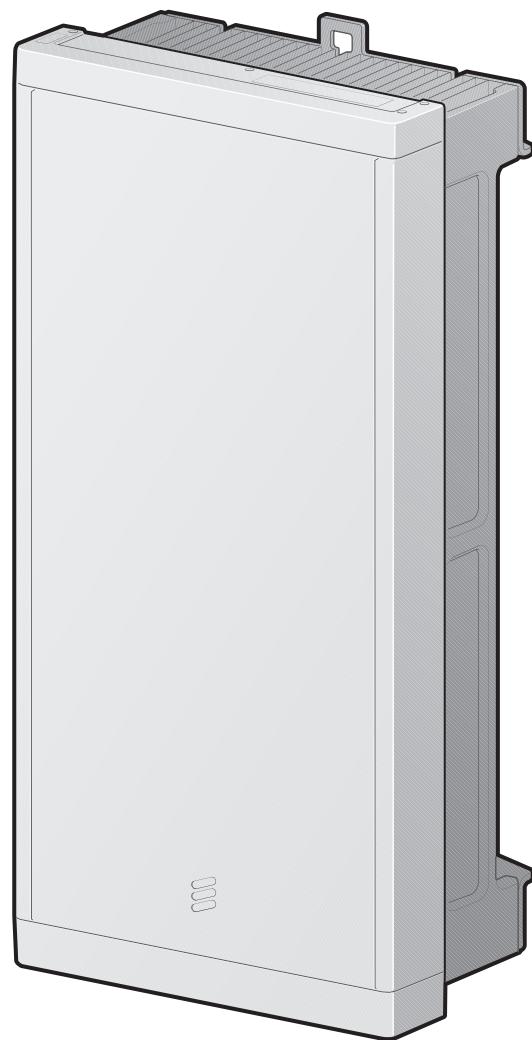
Quantity

3

Antenna Integrated Radio Unit Description

AIR 6488

Description



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1 Introduction

This document describes the AIR 6488 unit.

1.1 Warranty Seal

The unit is equipped with two warranty seal stickers.

Note: Seals that have been implemented by Ericsson must not be broken or removed, as it otherwise voids warranty.



2

Product Overview

AIR 6488 is a 64TR TDD AAS for NR. It has a maximum IBW of 100 MHz and maximum transmitted power of 80 W (200 W for B41K, B42, B42F, B42G, and B43).

The AIR unit has beamforming and MU-MIMO technology, capable to fully utilize radio resources in both azimuth and elevation.

The main benefits compared to previous macro solutions are improvements in:

- Enhanced coverage - High gain adaptive beamforming
- Enhanced capacity - High-order spatial multiplexing and multi-user MIMO
- Advanced RAN features - Vertical and horizontal beamforming
- Improved network performance - Low inter-cell interference

The AIR unit is designed for outdoor installations, intended for pole, wall, tower, or mast mounting.

HWACs are required for this product.

A typical configuration is shown in [Figure 1](#). Another installation alternative is shown in [Figure 2](#).

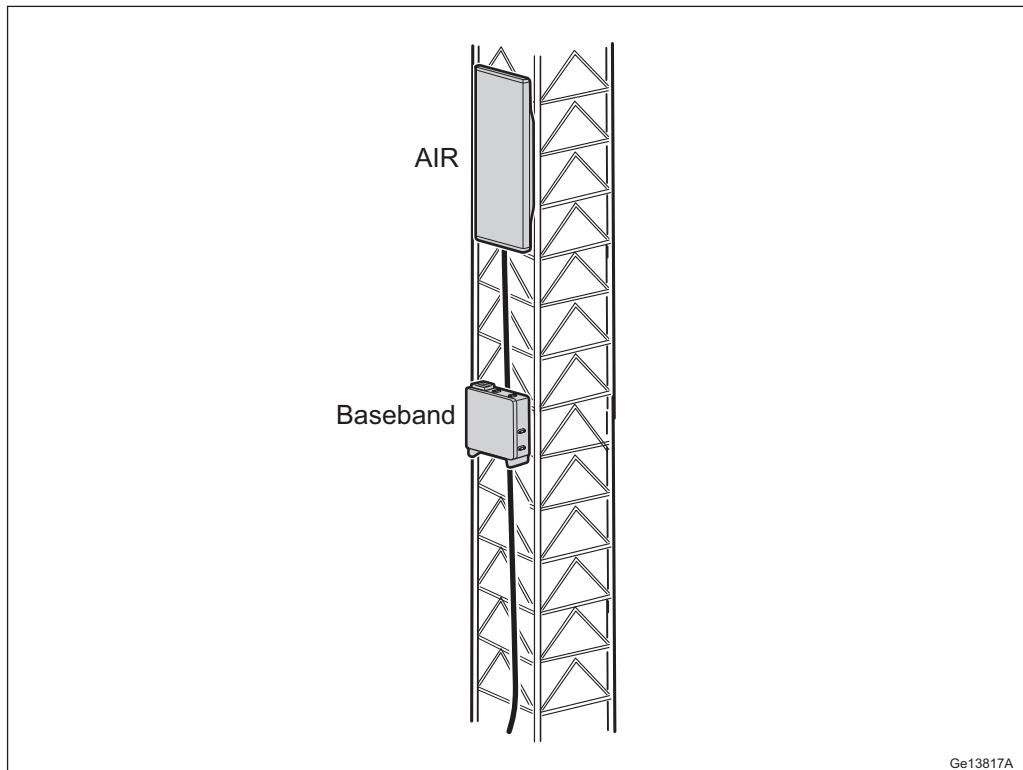


Figure 1 AIR Unit Connected to Baseband

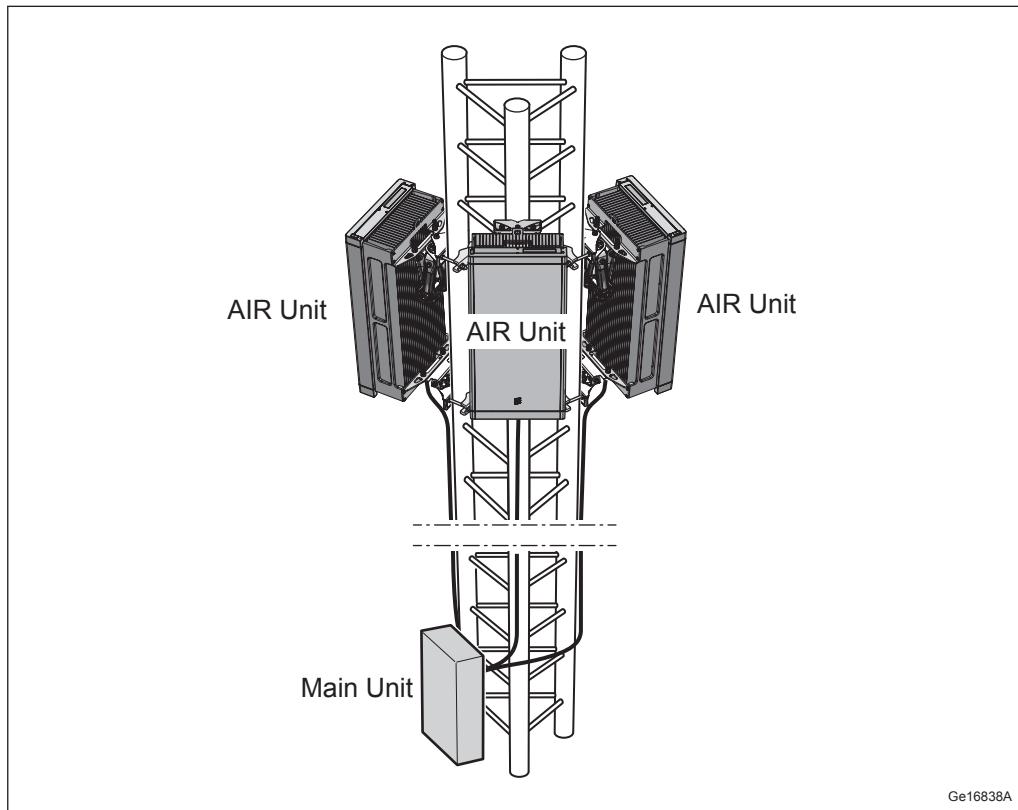


Figure 2 Three AIR Units Pointing at Three Different Directions

2.1 Main Features

- Three-wire (DC-I) and two-wire (DC-C) power connection
- NR TDD
- 64 transmitter/receiver (64TX/64RX) branches
- eCPRI
- Complies with 3GPP base station class Wide Area. For a list of relevant standards, see [Radio Standards Compliance](#) on page 30.
- Supports *Basic Stand-alone Radio Installation Check*, that helps to identify potential faults before the AIR is connected to the network.

2.2 Required Installation Equipment

When an AC PSU is the power source, Power 6302 or Power 6322 is recommended along with a trident DC power cable RPM 777 015 connected on the PSU to get reliable power to the AIR. The AC PSU supplies the 2-wire (DC-C) power solution.



Table 1 Mounting Kit

Mounting Kit	Product Name	Product Number
Swivel mounting kit	AIR Medium, wall and pole mount bracket no tilt with azimuth	SXK 109 2064/1
Tilt and swivel mounting kit	AIR Medium, wall and pole mount bracket with tilt and azimuth	SXK 109 2065/1

For more information, see [Main-Remote Installation Products Overview](#).

Note: Adhere to the following for safety and operation reasons: The mechanical design of the AIR unit is based on environmental conditions that are equal to or exceeding class 4.1 as specified in EN 300 019-1-4 and GR-3178-CORE and thereby respects the static mechanical load imposed on an AIR unit by wind at maximum velocity. Wind loads in this document are calculated with reference to wind pressure. For more accurate results, the specific terrain information for relevant sites and geographical area where the AIR unit will be installed must be carefully analyzed, considered, and calculated according to EN 1991-1-4.

Pole clamps, brackets, mounting accessories and other installation material or equipment specified by Ericsson in the AIR unit product information documentation must be used and Ericsson installation instructions be complied with. In addition, it must be observed that specific environmental conditions that the AIR unit becomes exposed to, such as icing, heat, dust, dynamic stress (for example, strain caused by oscillating support structures) or other environmental conditions that exceed or otherwise deviate from the [Environmental Characteristics](#) on page 15, can result in the breakage of an AIR unit or its mounting accessories and even cause the AIR unit to fall to the ground.

These facts, information, and circumstances must be considered and properly taken into account during the site planning process and adhered to for installation and operation of the AIR unit. Ericsson expressly disclaims any responsibility or liability arising out of failures in this regard.



3 Technical Data

Table 2 Technical Data

Description	Value
Maximum nominal output power ⁽¹⁾ ⁽²⁾	B41K, B42, B42F, B42G, B43: 200 W Other bands: 80 W
Number of carriers	NR: One
Frequency ⁽³⁾	B41 for NR 2496–2690 MHz
	B41K for NR 2515–2675 MHz
	B42 for NR 3400–3600 MHz
	B42F for NR 3420–3600 MHz
	B42G for NR 3410–3600 MHz
	B43 for NR 3600–3800 MHz
	B78B for NR 3500–3600 MHz
	B78H for NR 3542–3700 MHz

- (1) For detailed information about licenses and HWACs, see Manage Licenses and Hardware Activation Codes in the Radio Node libraries.
- (2) For detailed information about output power, see the applicable Output Power feature description.
- (3) For information about IBW, see RBS Configurations.

3.1 EIRP Data

3.1.1 Traffic Beams

This section describes the EIRP of traffic beams for the AIR unit.



Table 3 AIR Unit Typical EIRP Performance Data for Traffic Beams

Uniform Traffic Beams ⁽¹⁾	Directions					
	B41, B41K, B42F, B42G, B43, B78B, B78H			B42 ⁽²⁾		
Htilt, Vtilt	0°, 3°	55°, 3°	0°, 18°	0°, 6°	60°, 6°	0°, 16°
Vertical Beamwidth	9.5°	9.5°	10°	6.5°	6.5°	6.5°
Horizontal Beamwidth	12°	22°	12°	12.2°	22.4°	12.5°
Minimum peak EIRP ⁽³⁾	2 × 74±1.5 dBm	2 × 70±1.5 dBm	2 × 70±1.5 dBm	2 × 75±1.5 dBm	2 × 71±1.5 dBm	2 × 72.5±1.5 dBm

(1) The traffic beamforming of this product is not limited to the uniform beamshapes and directions given in the table. The beams are dynamically optimized.

(2) The output power of B42 needs to be adjusted to a level where the EIRP complies with the limits specified in RSS-192 in the Canada market.

(3) The minimum peak EIRP in the table is calculated for two simultaneous orthogonal beams.

3.1.2 Broadcast Beams

This section describes performance data for broadcast beams in three different scenarios.

Table 4 AIR Unit Typical Antenna Performance Data for Broadcast Beams

Scenario	Macro	Hotspot	Highrise	Macro	Hotspot	Highrise
	B41, B41K, B42F, B42G, B43, B78B, B78H			B42 ⁽¹⁾		
Beam	BrM1 ⁽²⁾	BrHS1 ⁽³⁾	BrHR1 ⁽⁴⁾	BrM1 ⁽²⁾	BrHS1 ⁽³⁾	BrHR1 ⁽⁴⁾
Vertical Beamwidth	10±1°	30±3°	30±3°	6.5±2°	26±3°	26±3°
Horizontal Beamwidth	65±5°	65±5°	20±2°	65±5°	65±5°	20±2°
Digital Downtilt	[−8, 8]°	Fixed 3°	Fixed 3°	[1, 11]°	Fixed 6°	Fixed 6°
Vertical beam pointing error	≤ 1°	≤ 3°	≤ 3°	≤ 1°	≤ 3°	≤ 3°



Scenario	Macro	Hotspot	Highrise	Macro	Hotspot	Highrise
B41, B41K, B42F, B42G, B43, B78B, B78H				B42⁽¹⁾		
Horizontal beam pointing direction	0±5°	0±5°	0±2°	0±5°	0±5°	0±5°
EIRP (max)	1 × 69±1.5 dBm	1 × 64±1.5 dBm	1 × 69±1.5 dBm	1 × 71±1.5 dBm	1 × 65±1.5 dBm	1 × 70±1.5 dBm
Side Lobe Suppression	16 dB (vertical)	12 dB (vertical)	12 dB (horizontal)	15 dB	12 dB	12 dB
Front to Back Ratio	25 dB	25 dB	25 dB	25 dB	25 dB	25 dB
Beam Parallelity	≤ -10 dB	≤ -10 dB	≤ -10 dB	N/A	N/A	N/A

(1) The output power of B42 needs to be adjusted to a level where the EIRP complies with the limits specified in RSS-192 in the Canada market.

(2) Broadcast Beam Macro 1

(3) Broadcast Beam Hotspot 1

(4) Broadcast Beam Highrise 1



3.2

Physical Characteristics

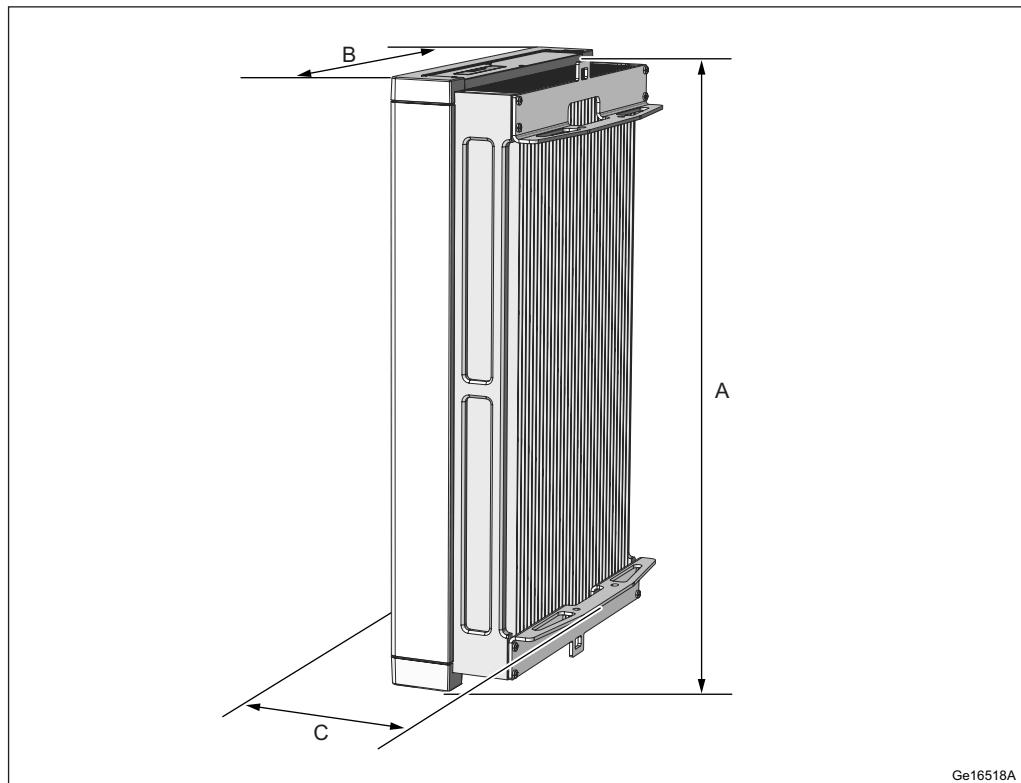


Figure 3 AIR Unit Dimensions

Table 5 AIR Unit Dimensions

AIR Unit Type	Height (A) × Width (B) × Depth (C)
AIR 6488 B41	893 × 520 × 238 mm
AIR 6488 B41K	893 × 520 × 238 mm
AIR 6488 B42	819 × 400 × 272 mm
AIR 6488 B42F	819 × 400 × 256 mm
AIR 6488 B42G	819 × 400 × 256 mm
AIR 6488 B43	819 × 400 × 256 mm
AIR 6488 B78B	819 × 400 × 256 mm
AIR 6488 B78H	819 × 400 × 256 mm



Table 6 AIR Unit Weight

AIR Unit Type	Weight without Mounting Kit	Weight with Mounting Kit	
		SXK 109 2064/1	SXK 109 2065/1
AIR 6488 B41	61.4 kg	65.8 kg	67.1 kg
AIR 6488 B41K	61.4 kg	65.8 kg	67.1 kg
AIR 6488 B42	45.0 kg	49.4 kg	50.7 kg
AIR 6488 B42F	44 kg	48.4 kg	49.7 kg
AIR 6488 B42G	44 kg	48.4 kg	49.7 kg
AIR 6488 B43	45.5 kg	49.9 kg	51.2 kg
AIR 6488 B78B	44 kg	48.4 kg	49.7 kg
AIR 6488 B78H	44 kg	48.4 kg	49.7 kg

The heat-sink of the AIR unit is gray (color code NCS S 4502-B).

The radome, front, top, and side covers of the AIR unit are white (color code NCS S 1002-B).

3.3 Installation Requirements

This section describes the installation requirements for installing the AIR unit. For a complete installation description, see [Install Antenna Integrated Radio Units](#).

The AIR unit is designed for outdoor use, and it can be installed either on a pole, on a wall, on a mast, or on a tower.

3.3.1 Outdoor Installation Environments to Avoid

The AIR unit is designed for outdoor use but to ensure optimal operation, avoid the following:

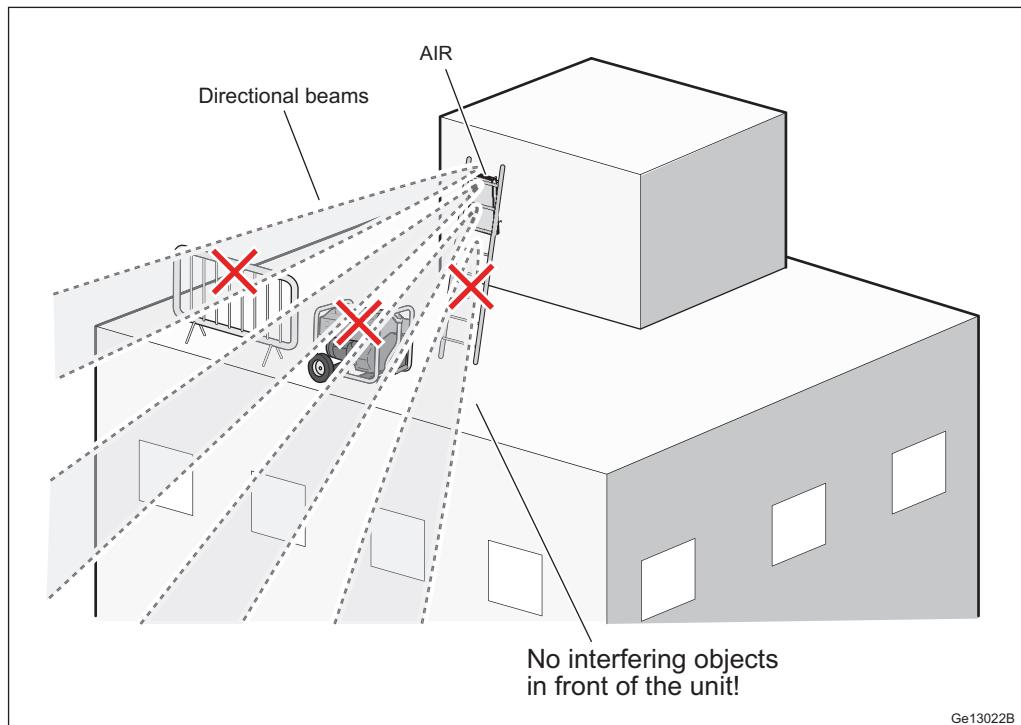
- Hot microclimates caused by, for example, heat radiated or reflected from dark or metallic walls or floors
- Chimney mouths or ventilation system outlets
- Large glass or concrete surfaces

Avoid radio interference by keeping the area directly in front of the antenna clear of the following:

- Metal surfaces or objects such as railings, ladders, or chains



- Equipment generating electromagnetic fields, for example, electric motors in air conditioners or diesel generators
- RBS equipment



3.3.2 Painting Disclaimer

Ericsson recommends to not paint the product as it can affect performance of the product.

Ericsson applies limitations to the warranty and service contract if the product is painted.

If the product is painted, the following commercial limitations apply:

- Failure modes directly related to overheating because of painting are not valid for repair within the scope of the warranty or standard service contract.
- Product failures related to paint contamination of components of the unit are not valid for repair within the scope of warranty or standard service contract.
- When a painted unit is repaired, it might be restored to the standard color before being returned to the market. It is not possible to guarantee that the same unit is sent back to the same place. This is also valid for units repaired under a service contract.



- For repairs within the warranty period or a standard service contract, the customer is charged the additional costs for replacing all painted parts of the unit or the complete unit.

If adaptations are required, contact Ericsson for information.

3.4 Installation Alternatives

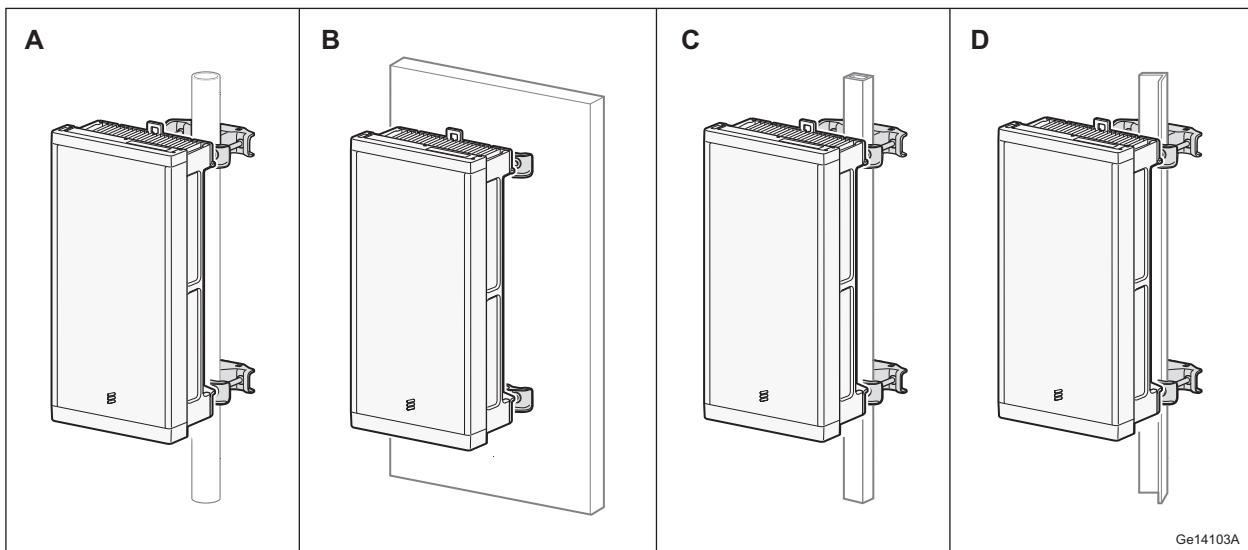


Figure 4 Installation Method Alternatives

Table 7 Installation Alternatives

Installation Method	Description
A	Pole installation (pole with circular cross section)
B	Wall installation
C	Pole installation (pole with square cross section)
D	Pole installation (pole with 90° angle cross section)

Table 8 Pole Mounting Range

Pole	Circular	Square	90° Angle
Minimum outer dimension	Ø76 mm	50 × 50 mm	50 × 50 mm
Maximum outer dimension	Ø120 mm	80 × 80 mm	80 × 80 mm

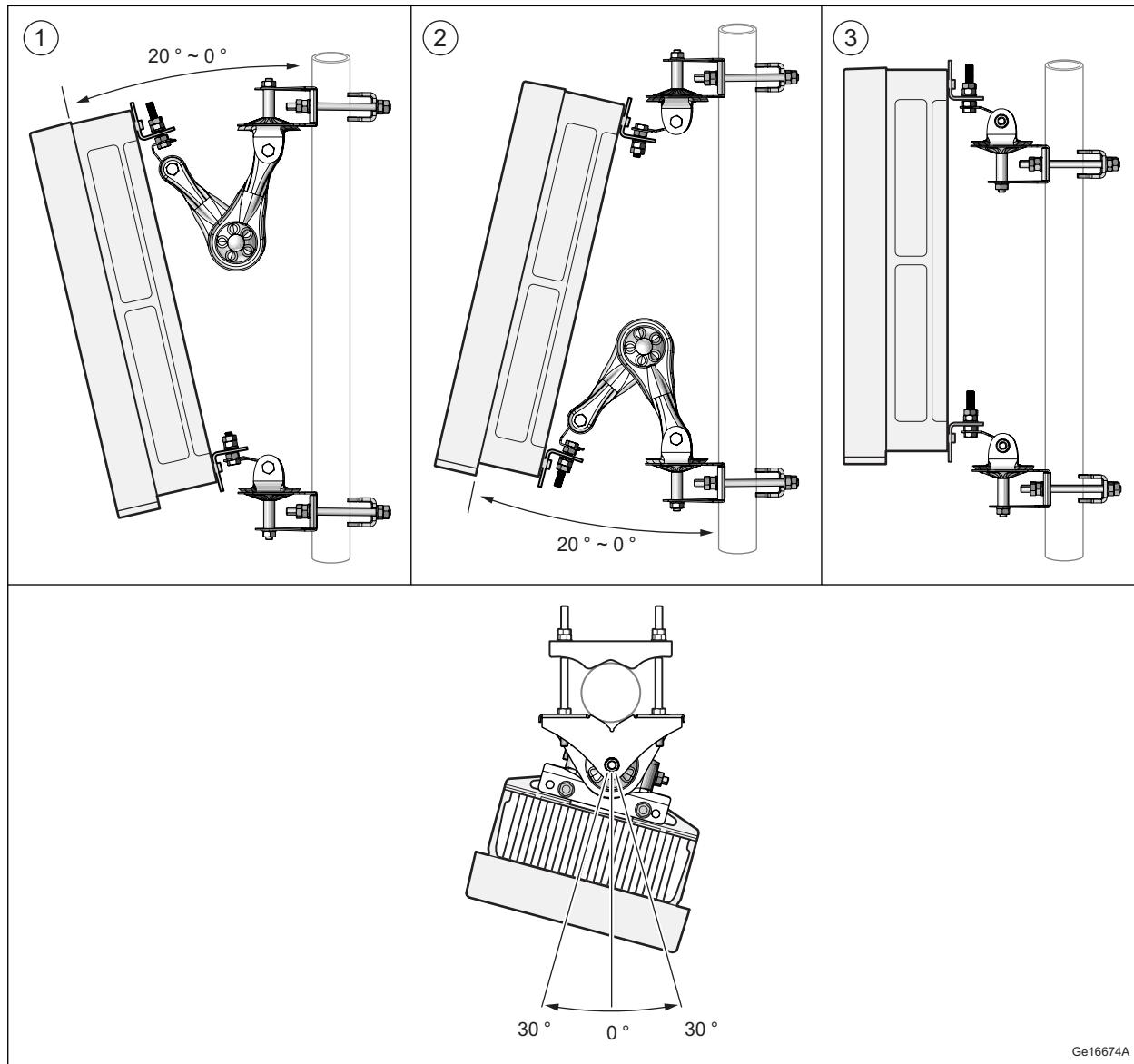


Figure 5 Tilt and Swivel Angle

Note: Mounting kit SXK 109 2064/1 supports swivel angle, and SXK 109 2065/1 supports both swivel and tilt angle.

3.5 Space Requirements

The AIR unit is installed with the cable connections facing down. Allow enough free space below the AIR unit to ensure sufficient working space.



Table 9 Space Requirements Between AIR Units or AIR Unit and Antenna
Installed Side by Side

Required Free Horizontal Space
0.1 m

Table 10 Space Requirements for AIR Unit

Heat Source Below AIR Unit (Y)				
Heat dissipation	< 350 W	350–500 W	500–950 W	950–1200 W
Recommended distance from heat source	> 0.3 m	> 0.5 m	> 0.7 m	> 0.9 m

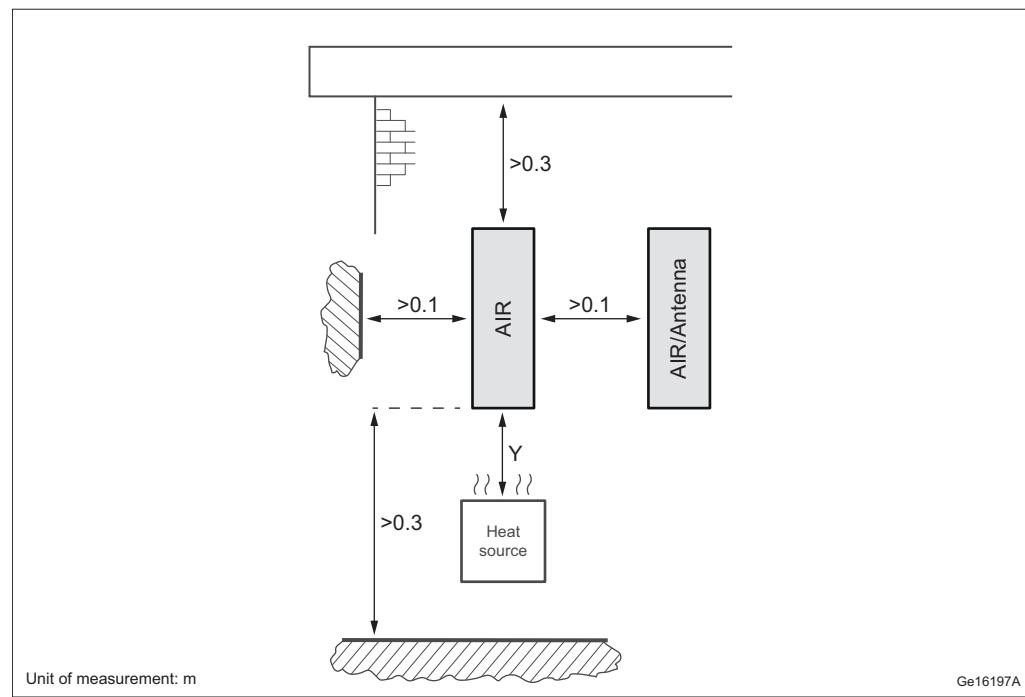


Figure 6 Space Requirements for AIR Unit

Note: To ensure adequate airflow, do not enclose the AIR unit in a box-like environment.

3.6 Acoustic Noise

The AIR unit does not have active cooling components. It can emit low levels of acoustic noise when operating on low capacity.



The sound pressure level when operating on low capacity in NR is lower than 28 dBA at 1-meter distance and hemispherical distribution, and 25 dBA for spherical distribution.

3.7 Environmental Characteristics

This section contains operating environment data for the AIR unit.

3.7.1 Operating Environment

The following are the values for the normal operating environment of the AIR:

Temperature	-40 to +55°C
Solar radiation	≤ 1,120 W/m ²
Relative humidity	2% to 100%
Absolute humidity	0.26 to 40 g/m ³
Maximum wind load at 42 m/s (Pole installed AIR unit)	B41: 692 N (front), 151 N (side) B41K: 692 N (front), 151 N (side) B42: 533 N (front), 278 N (side) B42F: 506 N (front), 171 N (side) B42G: 506 N (front), 171 N (side) B43: 506 N (front), 171 N (side) B78B: 506 N (front), 171 N (side) B78H: 506 N (front), 171 N (side)

3.7.2 Heat Dissipation

The AIR is convection cooled and designed for outdoor installation.

Table 11 AIR Heat Dissipation

Unit	Output Power (W)	Maximum Heat Dissipation (kW)
AIR 6488 B41	200	0.99
AIR 6488 B41K	200	0.99
AIR 6488 B42	200	0.98
AIR 6488 B42F	200	0.96
AIR 6488 B42G	200	0.95
AIR 6488 B43	200	0.95



Unit	Output Power (W)	Maximum Heat Dissipation (kW)
AIR 6488 B78B	200	0.95
AIR 6488 B78H	200	0.96

3.7.3 Vibration

This section describes how the AIR unit tolerates vibrations. The AIR unit operates reliably during seismic activity as specified by test method IEC 60068-2-57 Ff.

Maximum level of RRS	50 m/s ² within 2–5 Hz for DR=2%
Frequency range	1–35 Hz
Time history signal	Verteq II from earthquake standard ATIS 0600329.2014

The AIR unit operates reliably during random vibration as specified by test method IEC 60068-2-64.

Random vibration, normal operation:

ASD-level	0.3 m ² /s ³ on horizontal axes X and Y 0.2 m ² /s ³ on vertical axis Z
Frequency range	2–200 Hz
Time per test direction	30 minutes

3.7.4 Materials

All Ericsson products fulfill the legal, market, and Ericsson requirements regarding the following:

- Material declaration
- Materials' fire resistance, components, wires, and cables
- Recycling
- Restricted and banned material use

3.8 Power Supply Characteristics

This section describes the power supply requirements, power consumption, and fuse and circuit breaker recommendations for the AIR unit.



3.8.1

DC Power Supply Characteristics

The AIR unit is designed for 3-wire (DC-I) power connections used on 3-wire (DC-I) sites. For 2-wire (DC-C) power solutions, a 2-wire (DC-C) connector is used.

When an AC PSU is the power source, Power 6302 or Power 6322 is recommended along with a trident DC power cable RPM 777 015 connected on the PSU to get reliable power to the AIR. The AC PSU supplies the 2-wire (DC-C) power solution.

The following is a list of the power supply requirements:

Nominal Voltage	-48 V DC
Operating Voltage Range	-36.0 to -58.5 V DC
Non-destructive Range	0 to -60 V DC

Fuse and Circuit Breaker Recommendations

The recommendations given in this section are based on peak power consumption, and they give no information on power consumption during normal operation.

The recommended melting fuse type is am-gL-gG, according to IEC 60269-1. Circuit breakers must comply with at least Curve 3 tripping characteristics, according to IEC 60947-2.

The AIR unit has a built-in Class 1 (Type 1) SPD to protect the equipment in case of lightning and network transients. The recommended fuse or circuit breaker rating is therefore dimensioned to not trip the fuse or circuit breaker in case of SPD operation.

Table 12 AIR Unit Fuse and Circuit Breaker Recommendations

Unit (DC Powered)	Minimum Fuse Rating ⁽¹⁾	Maximum Allowed Fuse Rating ⁽²⁾
AIR 6488 B41	40 A	50 A
AIR 6488 B41K		
AIR 6488 B42		
AIR 6488 B42F		
AIR 6488 B42G		
AIR 6488 B43		
AIR 6488 B78B		
AIR 6488 B78H		

(1) These fuse ratings can only be used if it is acceptable that fuses trip because of lightning or network transients.



- (2) The absolute maximum fuse class in accordance with radio design restrictions.

3.8.2 Power Consumption

For information on power consumption, see Power Consumption Calculations.

3.9 System Characteristics

This section describes the system characteristics of the AIR.

3.9.1 RF Electromagnetic Field Exposure

For general information on RF EMF exposure, see Radio Frequency Electromagnetic Fields.

Table 13 through **Table 15** list the compliance boundaries (exclusion zones), outside of which the RF EMF exposure from AIR 6488 is below the limits specified by the ICNIRP, and the limits applicable in:

- EU (1999/519/EC, 2013/35/EU, EN 50385)
- USA (47 CFR 1.1310)
- Canada (Health Canada Safety Code 6)

Information is provided for the theoretical maximum exposure condition and (for some bands) for the actual maximum exposure condition (see IEC 62232). The theoretical maximum exposure condition does not consider how the time-averaged power is distributed within the scan range of the product and is very conservative. The actual maximum exposure condition takes into account the effects of beam scanning on the time-averaged power that contributes to the RF exposure. A PRF of 0.32 was used to represent realistic deployment scenarios (see IEC TR 62669).

Note: National regulations can prescribe requirements on the use of actual maximum exposure conditions for RF EMF compliance assessments.



Table 13 Dimensions of the Box-Shaped Compliance Boundary for General Public (GP) and Occupational (O) Exposure Applicable in the EU and Markets Employing the ICNIRP RF Exposure Limits

Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
B41K	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	19.7	8.8	23.3	10.4	11.1	5.0	0	0
						Actual Maximum (PRF = 0.32)	11.2	5.0	13.2	5.9	6.3	2.9	0	0
B42	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	24.2	10.9	28.6	12.8	11.3	5.1	0	0
						Actual Maximum (PRF = 0.32)	13.7	6.2	16.2	7.3	6.4	2.9	0	0
B42F	LTE, NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	20.4	9.1	24.0	10.8	11.0	5.0	0	0
B42G	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	19.9	8.9	23.5	10.5	10.9	4.9	0	0
						Actual Maximum (PRF = 0.32)	11.3	5.1	13.3	6.0	6.2	2.8	0	0
B43	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	21.1	9.5	23.6	10.6	10.5	4.7	0	0
B78B	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	20.4	9.1	24.0	10.8	11.0	4.9	0	0
B78H	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	20.6	9.2	23.6	10.6	10.6	4.8	0	0
						Actual Max-	11.7	5.3	13.3	6.0	6.0	2.7	0	0



Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
						imum (PRF = 0.32)								

(1) The compliance boundaries are determined for maximum output power with power tolerance and TDD downlink duty cycle included, and for theoretical maximum and actual maximum exposure conditions.

Table 14 Dimensions of the Box-Shaped Compliance Boundary for General Public (GP) and Occupational (O) Exposure Applicable in USA and Markets Employing the FCC RF Exposure Limits

Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
B41	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	19.9	8.9	23.5	10.5	10.9	4.9	0	0

(1) The compliance boundaries are determined for maximum output power with power tolerance and TDD downlink duty cycle included, and for theoretical maximum exposure conditions.

Table 15 Dimensions of the Box-Shaped Compliance Boundary for General Public (GP) and Occupational (O) Exposure Applicable in Canada

Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
B42	NR	53.0 dBm	E+	1.5 dB	75%	Theoretical Maximum	29.4	12.5	34.7	14.8	13.7	5.9	0	0
						Actual Max-	16.6	7.1	19.7	8.4	7.8	3.3	0	0



Mode and Output Power for AIR 6488							Dimensions of the Box-Shaped Compliance Boundary ⁽¹⁾ (m)							
							Distance in Front of AIR		Width		Height		Distance Behind AIR	
Band	Standard	Nominal Peak Output Power from the AIR	IEC 62232 Installation Class	Power Tolerance	TDD DL Duty Cycle	Exposure Condition	GP	O	GP	O	GP	O	GP	O
						imum (PRF = 0.32)								

(1) The compliance boundaries are determined for maximum output power with power tolerance and TDD downlink duty cycle included, and for theoretical maximum and actual maximum exposure conditions.

3.9.2 Software

For information on software dependencies, see Radio Software Support.

3.9.3 Radio Configurations

For information about available radio configurations, see RBS Configurations.



4 Hardware Architecture

This section describes the AIR unit hardware structure regardless of configuration or frequency. For a description of the currently available radio configurations, see RBS Configurations.

4.1 AIR Unit Parts

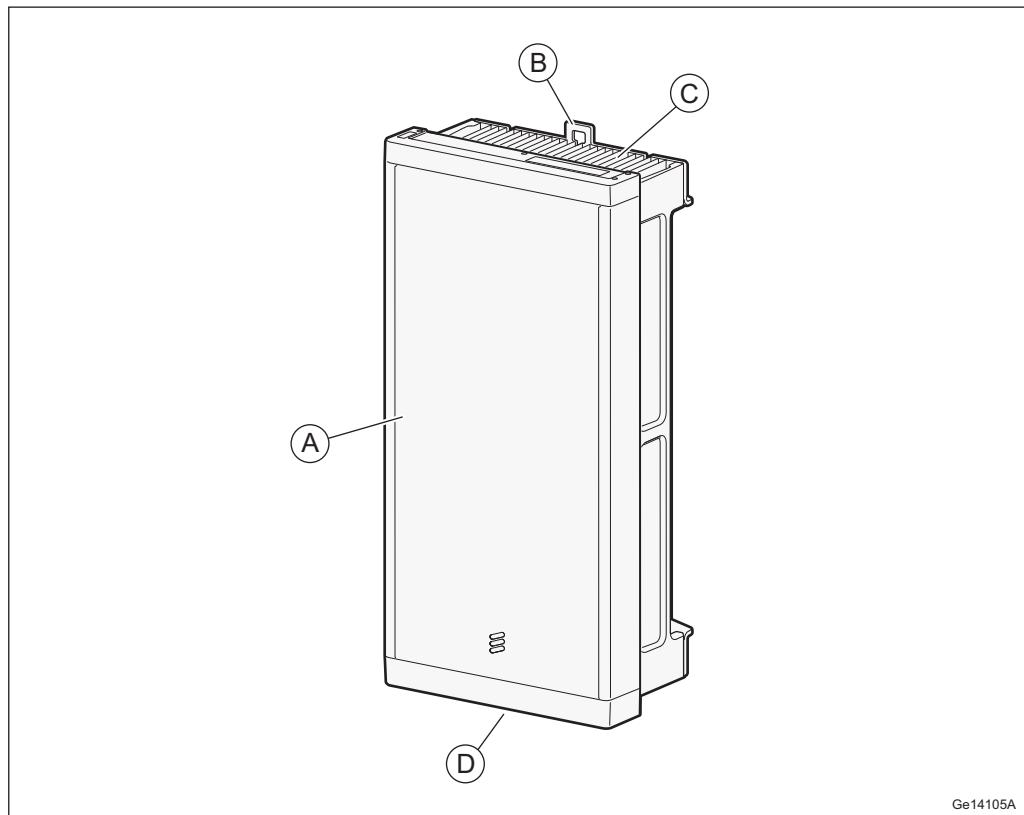


Figure 7 AIR Unit Parts

Table 16 AIR Unit Parts

Position	Component
A	Radome
B	Upper lifting eye
C	Cooling fins
D	Connection interfaces



4.2 Optical Indicators

The AIR unit is equipped with optical indicators that show the system status.

For detailed information about the optical indicators, see [Indicators, Buttons, and Switches](#).

Note: The AIR unit has no maintenance button.

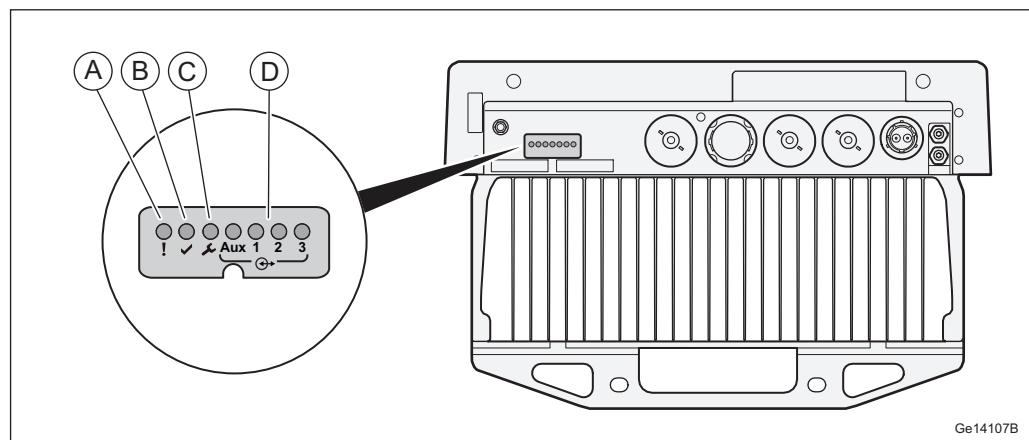


Figure 8 Optical Indicators

Table 17 Optical Indicators

Position	Marking	Indicator	Color	Mode	Interpretation
A	!	Fault	Red	Off	No fault detected in unit
				On	Fault detected in unit
B	✓	Operational	Green	Off	No power
				On	Operational
				Flashing Slowly (0.5 Hz)	Missing dependent resource
				Flickering (16 Hz)	Transitory activity
				Double flashing Off	Loading in progress No ongoing traffic
				Double flashing On	Loading in progress Traffic is ongoing
C	🔧	Maintenance	Blue	Off	No ongoing maintenance activity Traffic is ongoing
				On	Maintenance mode All traffic and alarms are suppressed
				Flashing Slowly (0.5 Hz)	Maintenance mode is initiated When traffic and alarms are removed, the indicator switches to On
D	⊕ AUX, ⊕ 1, ⊕ 2, ⊕ 3	Interface	Green	Off	Disconnected
				On	Connected



5 Connection Interfaces

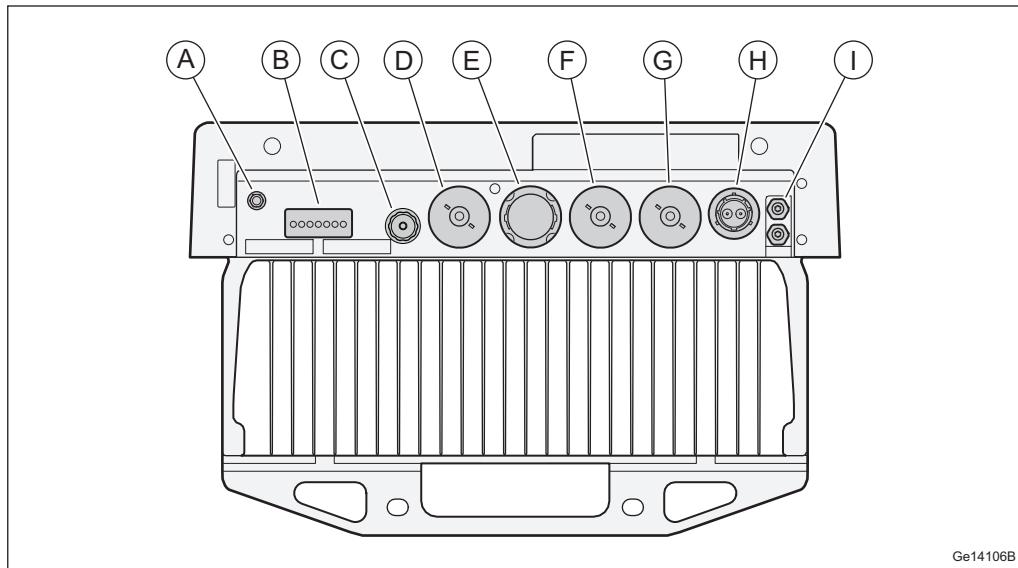


Table 18 AIR Unit Connection Interfaces

Position	Description	Marking	Connector Types	Cable Illustration
A	TX Monitor		SMA female connector	
B	Optical indicators	!, ✓, 🔧 ⊕ AUX, ⊕ 1, ⊕ 2, ⊕ 3	-	-
C	EC light interface		DIN 14 female connector	
D	Optional synchronization timing	⊕ AUX	LC (On SFP+) with support for FullAXS	
E	eCPRI 1	⊕ 1		
F	eCPRI 2	⊕ 2		
G	eCPRI 3	⊕ 3		



Position	Description	Marking	Connector Types	Cable Illustration
H	-48 V DC power supply	-48 V	Power connector	
I	Grounding point		2 × M6 bolt	

5.1 Grounding Interface

The AIR unit must be grounded to protect it from overvoltage and lightning strikes. The grounding interface on the AIR unit accepts an M6 dual cable lug on a coated cable.

For more information about grounding principles, see [Grounding Guidelines for RBS Sites](#).

5.2 -48 V DC Power Supply Interface

The -48 V DC power connection is made through a connector with a 3-wire (DC-I) connection or a connector with a 2-wire (DC-C) connection.

For power cable dimensioning, see [Main-Remote Installation Products Overview](#).

For determining which connector or junction box to use, see [Table 19](#).

Table 19 -48 V DC Power Supply Connector or Junction Box

Cross-Sectional Area of Each Conductor (mm ²)	Connector or Junction Box
10–16	Used with connector RNT 447 38/03 (3-wire (DC-I)) or RNT 447 39/01 (2-wire (DC-C))
25	Used with junction box NTB 101 75/1

The power cable conductor has a wire for both the 0 V conductor and a wire for the -48 V DC conductor.



All cables must be shielded. The shielding must be properly connected both to the power connector and to the grounding in the power supply equipment; otherwise, the AIR unit over voltage and lightning protection does not function properly.

Note: Make sure that the trident DC power cable RPM 777 015 is used if a Power 6302 or a Power 6322 is the power source.

5.3 Optical Cable Interface

The optical cable interfaces provide connections to optical cables for traffic and timing signals between the AIR and a Baseband unit. A Small Form-factor Plugable (SFP)+ is used to connect the optical cable to the AIR.

Note: The AIR uses SFP+ modules for optical transmission and optical radio interfaces on the data ports.

Only use SFP+ modules approved and supplied by Ericsson. These modules fulfill the following:

- Compliance with Class 1 laser product safety requirements defined in standard IEC 60825-1.
- Certification according to general safety requirements defined in standard IEC 62368-1.
- Functional and performance verified to comply with RBS specifications.

Recommended SFP+ modules are obtained from the product packages for the RBS and the Main Remote Installation products. For more information, see Spare Parts Catalog, Main-Remote Installation Products Overview, and SFP Module Selector Guide.

eCPRI Interface

The AIR unit sets up connection with Baseband via eCPRI interface, a 10.3 Gbps Ethernet port.

5.4 Sync Interface

This interface is reserved for future use as a 1.25 Gbps Ethernet port connected to TCU, to receive sync timing via PTP protocol. The connector is SFP+, which is the same as for the eCPRI.



5.5 EC Light Interface

The EC light port delivers communication signals and alarms between the optional PSU and the AIR.

5.6 Optical Indicators

Optical indicators show the system status. For more information about the optical indicators, see [Indicators, Buttons, and Switches](#).

5.7 TX Monitor Interface

The TX monitor interface provides monitoring of output power and performance.

The TX monitor output is the sum of coupled signals from all 64 branches. Compared to the output signals the TX monitor signal is attenuated 20 dB to 53 dB depending on the number of active branches and the amplitude and phase relations between them.

If only one branch is active, the attenuation is 53 dB.



6 Standards and Regulations

This section presents a brief overview of standards, regulatory product approval, and declaration of conformity for the radio.

Declaration of Conformity

"Hereby, Ericsson AB, declares that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU and 2011/65/EU."

FCC Compliance Statement

"This device complies with Part 15 of the FCC CFR 47 rules. Operation is subject to the following two conditions: This device may not cause harmful interference. This device must accept any interference received, including interference that may cause undesired operation."

6.1 Regulatory Approval

The product complies with the following market requirements:

- European Community (EC) market requirements, Radio Equipment Directive 2014/53/EU and Directive 2011/65/EU.
- The apparatus may include Radio Transceivers with support for frequency bands not allowed or not harmonized within the EC.
- Products containing radio Equipment outside North America and in countries not recognizing the CE-mark may be labeled according to national requirements or standards.

6.1.1 Environmental Standards Compliance

The product complies with the following environmental standard:

Europe

- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive (2011/65/EU)

6.1.2 Safety Standards Compliance

In accordance with market requirements, the product complies with the following product safety standards and directives:

**International**

- IEC 62368-1

Europe

- EN 50385
- EN 62368-1

North America

- FCC CFR 47 Part 1.1310
- FCC CFR 47 Part 2.1091
- UL 62 368-1
- CSA-C22.2 No. 62 368-1

6.1.2.1 Outdoor Specific Requirements

The product complies with the following outdoor specific requirements:

International

- IEC 60529 (IP65)
- IEC 60950-22

Europe

- EN 60529 (IP65)
- EN 60950-22

North America

- UL 50E
- UL 60950-22
- CAN/CSA-C22.2 No. 60950-22

6.1.3 EMC Standards Compliance

The product complies with the following Electromagnetic Compatibility (EMC) standards:



International

- 3GPP TS38.113

Europe

- ETSI EN 301 489-1
- ETSI EN 301 489-50

North America

- FCC CFR 47 Part 15 B
- IC ICES-003 B

6.1.4 Radio Standards Compliance

The product complies with the following radio standards:

International

- 3GPP TS38.141-1
- 3GPP TS38.141-2

Europe

- ETSI EN 301 908-1
- ETSI EN 301 908-18

North America

- FCC CFR 47 Part 27
- FCC CFR 47 Part 2

6.1.5 Marking

To show compliance with legal requirements, the product is marked with the following labels:

Europe

- CE mark



North America

- FCC CFR 47 Part 15 Statement
- IC ICES-003 Statement
- usETL/cETL
- FCC ID Number

6.2 Other Standards and Regulations

The standards and regulations in this section are not regulatory approved.

6.2.1 Spare Parts

The product adheres to the Ericsson Serviceability and Spare Part Strategy.

6.2.2 Surface Quality

The surface quality of the AIR unit is according to Ericsson standard class A5 for the radome, top, front, and side covers, and A6 for the heat-sink.

6.2.3 Vandal Resistance

Unauthorized access is not possible without damaging the tamper proof warranty seal.