DB 200 + n°1 CLEANISLAND 100 AU/NZ
DB 200 + n°2 CLEANISLAND 100 AU/NZ
(GRID CODE AS/NZS 4777.2:2020)

DB 200

INTERFACE DISTRIBUTION BOARD
200 kW – 3 Phase 400 Vac / 415 Vac

1 or 2 unit of CLEANISLAND 100 AU/NZ

THREE-PHASE CONVERTER
FOR GRID CONNECTED / ISLAND APPLICATION
each 100 kW – 3 Phase 400 Vac/415Vac

Elpower S.r.l.
Via Beggiato, 23
36025 Noventa Vicentina (VI)

Tel. +39 0444 787882
Fax. +39 0444 787758
e.mail: info@elpower.it http://www.elpower.it

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1. GENERAL FEATURES

DB 200 is an interface distribution board with integrated EMS (energy management system). It include an interface protection relay and disconnection devices to disconnect 1 or 2 converter type CLEANISLAND 100 AU/NZ from the grid in case of black-out, and to operate the system in grid forming. It is included a bypass switch to operate the system even in case of maintenance on the converters. DB 200 size and pre-equipment are designed to connect up to n°2 unit CLEANISLAND 100 AU/NZ, but it can operate even with a single unit of CLEANISLAND 100 AU/NZ.

There are two configurations:

1) DB 200 + n° 1 CLEANISLAND 100 AU/NZ
2) DB 200 + n° 2 CLEANISLAND 100 AU/NZ

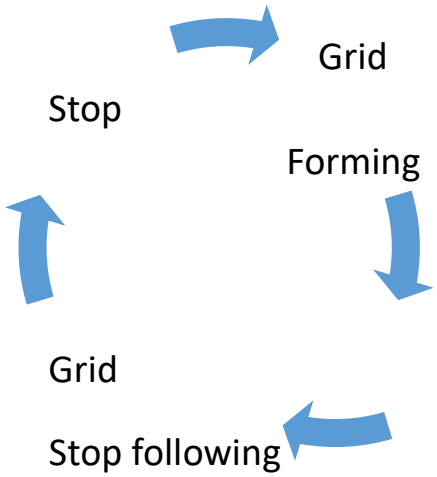
Basically there are two working modes:

a) Grid Following (on-grid) – in this working mode the DB 200 maintains the converters connected to the grid. The converters are used as a standard grid tied inverter to connect an Energy Storage System to a local grid with the capability of charging the batteries and / or to support the local grid in feeding the loads.
b) Grid Forming (off-grid) – in this working mode the DB 200 disconnects the converters from the grid. The converters become the master grid generator; they feed the loads taking energy from the batteries and / or from renewable energy resources time by time available.

CLEANISLAND 100 AU/NZ is a DSP (Digital Signal Processor) based converter system, specifically designed for on-grid and off-grid applications. CLEANISLAND converter basically present two working modes:

a) Grid Following (on-grid) – in this working mode the converter is used as a standard grid tied inverter to connect an Energy Storage System to a local grid with the capability of charging the batteries and / or to support the local grid in feeding the loads.
b) Grid Forming (off-grid) – in this working mode the converter become the master grid generator; it feeds the loads taking energy from the batteries.

The switch between two working mode described above happens with a passage through a stop condition:

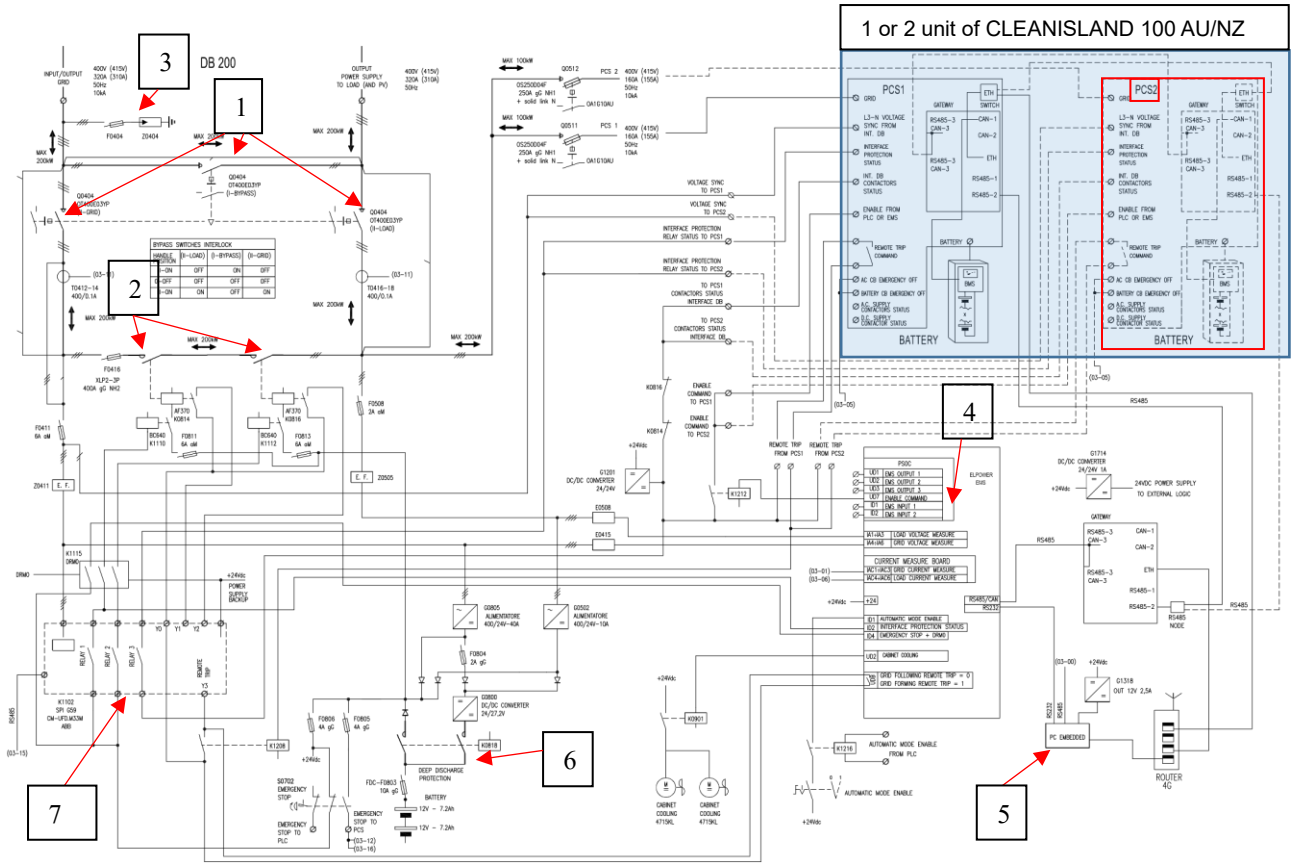


2. DB 200 - CONSTRUCTIVE CHARACTERISTICS

The DB 200 is supplied inside a cabinet which already includes all electromechanical components necessary for grid following and grid forming as listed below:

- Main/Bypass switch
- Disconnection contactors
- Surge suppressors
- EMS (Energy Management System)
- Embedded PC
- Power supply with battery backup
- Interface protection relay

Please find below the DB 200 + n° 2 CLEANISLAND 100 AU/NZ single line diagram; it is possible to identify all components you could find inside the distribution board. The configuration DB 200 + n° 1 CLEANISLAND 100 AU/NZ doesn't have PCS2 (see red box) and related connections.



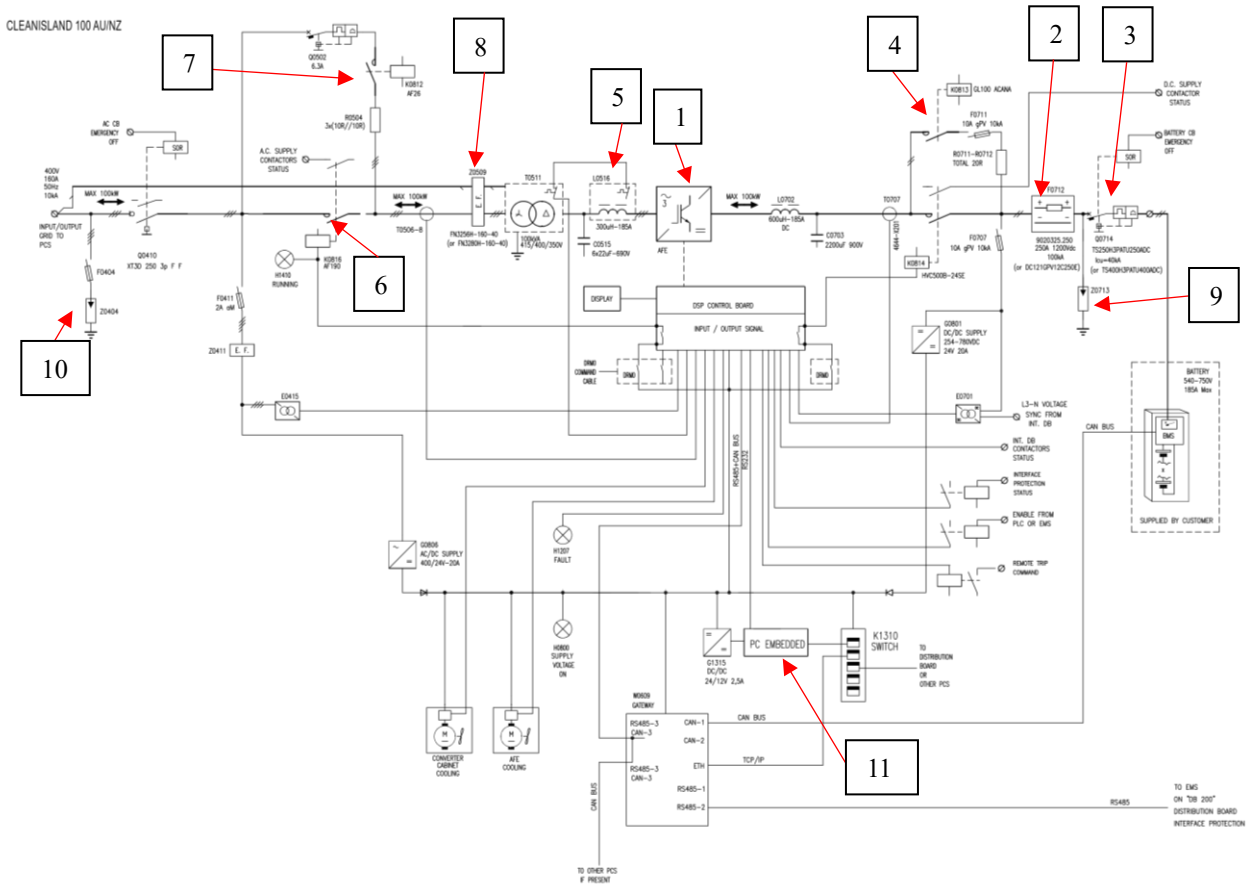
1) Main/Bypass switch
2) Disconnection contactors
3) Surge suppressors
4) EMS (Energy Management System)
5) Embedded PC
6) Power supply with battery backup
7) Grid monitoring protection relay

3. CLEANISLAND 100 AU/NZ - CONSTRUCTIVE CHARACTERISTICS

The converter system is supplied inside a cabinet which already includes all electromechanical components necessary for grid, battery connections as listed below:

- Automatic mains circuit breaker
- EMI filter
- Mains contactor
- Mains side dry type transformers
- L-C filter
- Mains side three phase IGBT inverter bridges
- C filter
- Battery side DC rated fuses
- Battery side DC rated contactor
- Battery side DC rated circuit breaker
- Optional Embedded PC

Please find below the converter single line diagram; it is possible to identify all components you could find inside the CLEANISLAND 100 AU/NZ conversion system:



1) 3 phase AC converter
2) DC fuse on battery side
3) DC circuit breaker on battery side
4) Precharge DC side
5) L-C output filter
6) Output contactor
7) Precharge AC side
8) EMI filters on AC side
9) Surge suppressor on battery side
10) Surge suppressor on grid side
11) Embedded PC

4. OPERATING PARAMETERS AND MAIN PERFORMANCES

In the following are listed main parameters of the distribution board DB 200 and PCSs according to the different configuration.

4.1 Configuration 1: 1 DB200 + 2 PCS 100 (see scheme below)

General data

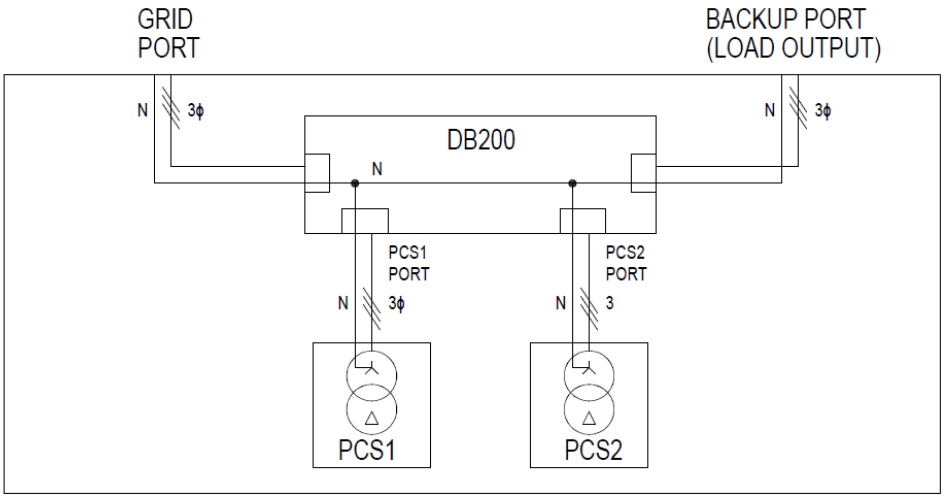
Protection degree:	IP20
Temperature:	from -20 to +45 °C
Humidity:	from 0 to 95% max (non condensing)
Elevation:	Up to 2000 meters above sea level For higher altitudes, derating the output current of 2% per 100 meters beyond 2000 m (max 4000 m)
Overall dimensions:	H 2000 x W 1020 x D 820 ±10mm
Weight:	500kg

Grid port Electrical Data

Voltage:	400 V or 415 V (range according to AS/NZS 4777.2: 2020 requirements)
Frequency:	50 Hz (range according to AS/NZS 4777.2: 2020 requirements)
Rated power:	200 kW
Apparent power:	222.4 kVA
Rated current:	321 A

Backup port (Load output) Electrical Data

Voltage:	400 V or 415 V (range according to AS/NZS 4777.2: 2020 requirements)
Apparent power:	222.4 kVA
Rated current:	321 A



N.B: Internal neutral passthrough connection as depicted.

4.2 Configuration 2: 1 DB200 + 1 PCS 100 (see scheme below)

General data

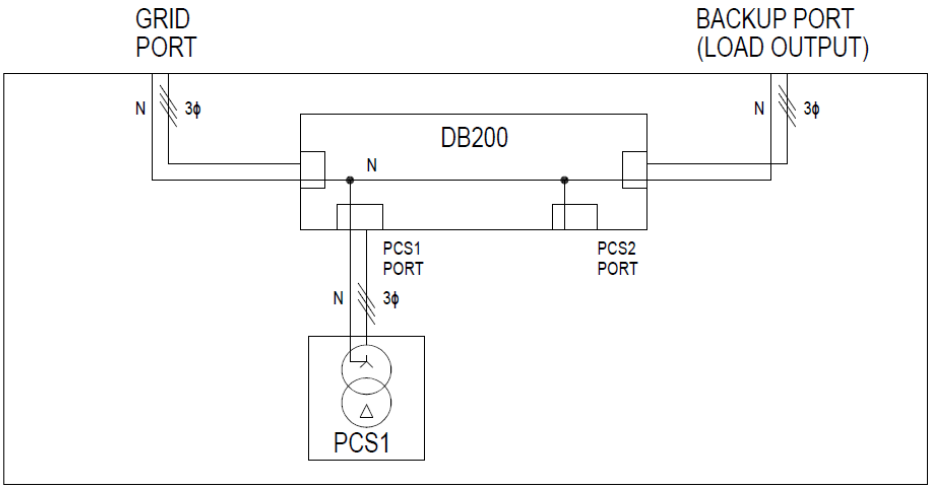
Protection degree:	IP20
Temperature:	from -20 to +45 °C
Humidity:	from 0 to 95% max (non condensing)
Elevation:	Up to 2000 meters above sea level For higher altitudes, derating the output current of 2% per 100 meters beyond 2000 m (max 4000 m)
Overall dimensions:	H 2000 x W 1020 x D 820 ±10mm
Weight:	500kg

Grid port Electrical Data

Voltage:	400 V or 415 V (range according to AS/NZS 4777.2: 2020 requirements)
Frequency:	50 Hz (range according to AS/NZS 4777.2: 2020 requirements)
Rated power:	100 kW
Apparent power:	111.2 kVA
Rated current:	160.5 A

Backup port (Load output) Electrical Data

Voltage:	400 V or 415 V (range according to AS/NZS 4777.2: 2020 requirements)
Apparent power:	111.2 kVA
Rated current:	160.5 A



N.B: Internal neutral passthrough connection as depicted.

5. CLEANISLAND 100 AU/NZ – PCS OPERATING PARAMETERS AND MAIN PERFORMANCES

In the following are listed main parameters of the PCS converter system CLEANISLAND 100 AU/NZ.

5.1 General data

Protection degree:	IP20
Protective class	I
Overvoltage category	OVC III
Inverter topology	Isolated
Inverter efficiency	95,6%
Temperature:	from -20 to +45 °C (50°C inside cabinet)
Thermal protection:	yes
Humidity:	from 0 to 95% max (non condensing)
Elevation:	Up to 2000 meters above sea level
	For higher altitudes, derating the output current of 2% per 100 meters beyond 2000 m (max 4000 m)
Overall dimensions:	H 2060 x W 820 x D 820 ±10mm
Weight:	800kg
Country of manufacture	Italy

5.2 Mains

Voltage:	400 V or 415 V (range according to AS/NZS 4777.2:2020 requirements)
Frequency:	50 Hz (range according to AS/NZS 4777.2: 2020 requirements)
Rated power:	100 kW
Apparent power:	111.2kVA
Rated current:	160.5 A
Overload capability:	110% continuative
	120% for 1 min / 10 min
Control:	digital
THDI (@ rated power):	$\leq$ 3%

Power factor range:	from ± 0,8 to 1
Over current electronic protection:	yes
Thermal protection:	yes

5.3 Battery side

Maximum battery voltage:	756 V dc
Minimum battery voltage:	540 V dc
Max charge/discharge current:	185A
Rated power:	100 kW
Power overload capability:	120% for 1 min / 10 min 110% continuative
Control:	digital
Ripple on battery side:	≤ 5%

5.4 Compatible batteries types

The CLEANISLAND 100 AU/NZ is compatible with this types of batteries:

- Lithium
- Lead Acid
- Flow

The inverter doesn't have a port to connect a remote battery temperature sensor. Remote battery temperature monitoring is not possible by the inverter.

6. SPECIAL DESIGN CHARACTERISTICS

The design concept is focused on reaching the highest reliability level. For this reason inside our product we have adopted following criteria:

- Remove of the electrolytic capacitors (from both power system and control boards)
- Tropicalized PCB's with extended industrial range components rated to operate well above operating conditions temperature range

- Cooling fans with 50.000 hours expected lifetime; temperature controlled and monitored.
- The cables are RADOX 155 type with rubber extended temperature insulation and tinned copper

7. CERTIFICATES

AS/NZS 4777.2: 2020 number SAA203410 and SAAEMC-1273

EMC
Certificate of Conformity

Certificate No.: SAAEMC-1273

Certificate Holder: ELPOWER S.r.l.
Via Beggiato, 23
Noventa Vicentina,
Vicenza 36025
Italy

Product Description: Energy Storage PCS
Brand Name: Elpower Srl
Model No.: DB 200 + n°2 CLEANISLAND 100 AU/NZ
Ratings: 400V 50Hz (3P+N+PE), 222.4 kVA, 321A
Class I, IP20

Applicable Standard/s: IEC 61000-6-2:2005
AS/NZS 61000.6.4:2012

Test Report Number/s: 312/20/00503/EMC, 312/20/00504/EMC

Date: 27 January 2021

For and on Behalf of
SAA Approvals Pty Ltd

EMC
Certificate of Conformity

Certificate No.: SAAEMC-1273

Product Description: Energy Storage PCS
Brand Name: Elpower Srl

Additional Models:

Model No.	Trade Name	Ratings
DB 200 + n°1 CLEANISLAND 100 AU/NZ	Elpower Srl	400V 50Hz (3P+N+PE), 111.2 kVA, 160.5A Class I, IP20

For and on Behalf of
SAA Approvals Pty Ltd

Certificate of Suitability

Certificate No.: SAA203410

Certificate Holder: ELPOWER S.r.l.
Via Beggiato, 23
Noventa Vicentina,
Vicenza 36025
Italy

Regulatory Definition: Non-Declared
Product Description: Energy Storage PCS
Trade Name/s: Elpower Srl
Model No.: DB 200 + n° 2 CLEANISLAND 100 AU/NZ
Rating/Marking/s: 400V~ 50Hz (3P+N+PE), 222.4 kVA, 321A
Class I, IP20

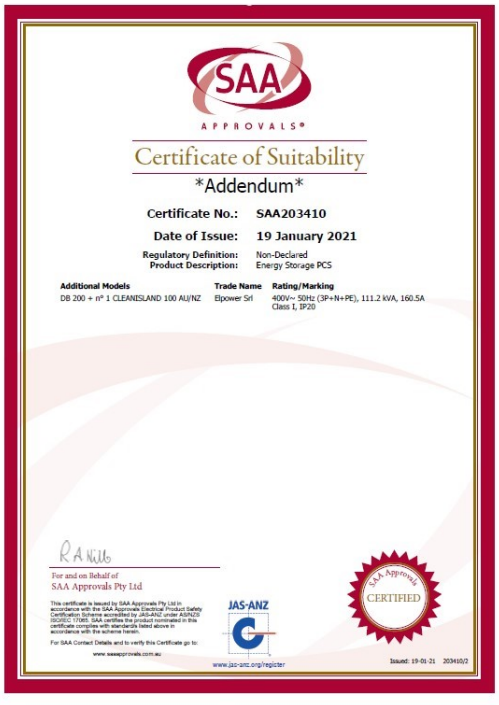
Standard/s: AS/NZS 4777.2:2015
AS 62040.1:2019
Condition/s: Nil

Approval Marks: SAA203410 or RCM

Initial Issue Date: 19 January 2021
Expiry Date: 19 January 2026

For and on Behalf of
SAA Approvals Pty Ltd

JAS-ANZ



Certificate of Suitability
Addendum

Certificate No.: SAA203410

Date of Issue: 19 January 2021

Regulatory Definition: Non-Declared
Product Description: Energy Storage PCS

Additional Models	Trade Name	Rating/Marking
DB 200 + n° 1 CLEANISLAND 100 AU/NZ	Elpower Srl	400V~ 50Hz (3P+N+PE), 111.2 kVA, 160.5A Class I, IP20

For and on Behalf of
SAA Approvals Pty Ltd

JAS-ANZ

8. NAMEPLATES

Elpower

Via A. Beggiato, 23
36025 NOVENTA VICENTINA
(VI) - ITALY
Tel +39 0444 787882 Fax +390444 787758
www.elpower.it

TYPE: **DB 200**

MATR. / N°: _

JOB: _

Grid code: AS/NZS 4777

AC-OUTPUT

Rated voltage frequency: 400V 50Hz (3ph + N + PE)

Rated apparent power: 222,4kVA

Protective class I

Rated current: 321A

Enclosure IP: 20

Short Circuit current Icc: 10 kA

Manufactured: _

Elpower

Via A. Beggiato, 23
36025 NOVENTA VICENTINA
(VI) - ITALY
Tel +39 0444 787882 Fax +390444 787758
www.elpower.it

TYPE: **CLEANISLAND 100 AU/NZ**

MATR. / N°: _

JOB: _

Inverter topology: Isolated

Protective class I

Grid code: AS/NZS 4777

DC-INPUT

AC-OUTPUT

Max. voltage: 756V

Rated voltage frequency: 400V 50Hz (3ph + N + PE)

Min. voltage: 540V

Rated apparent power: 111,2kVA

Rated current: 185A

Rated current: 160,5A

Power factor range: ± 0,8 ÷ 1

Enclosure IP: 20

Short Circuit current Icc: 10 kA

Manufactured: _