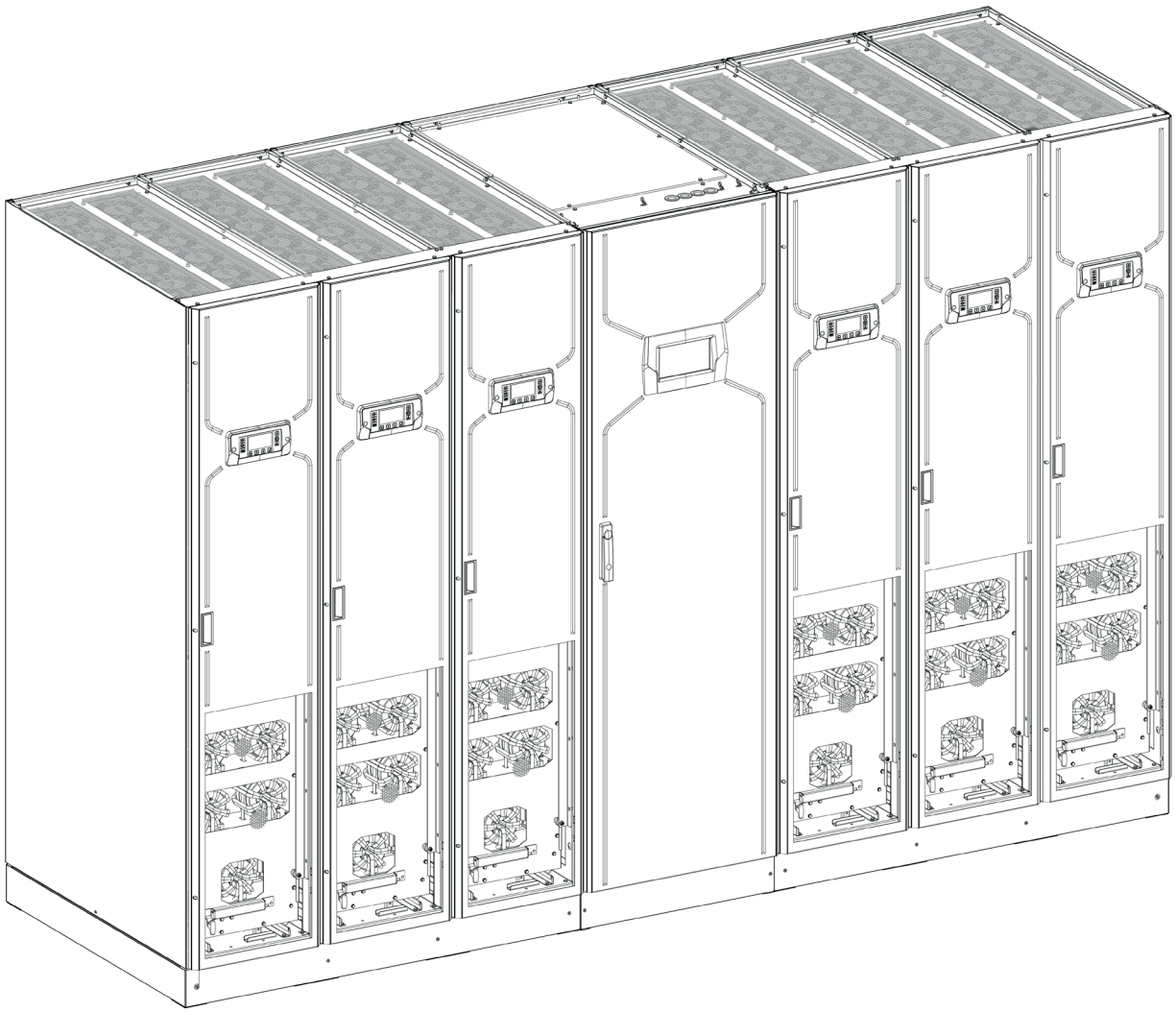
TECHNICAL DATA SHEET

MEGAFLEX DPA UPS

1000-1500 kW 380/400/415 V IEC



About this document

Document information

File name	:	4NWD005384_ABB_UPS_TDS_MFG_DPA_IEC_1M0_1M5_EN_REV-C
Model	:	MegaFlex DPA IEC
Date of issue	:	29.09.2020
Issued by (department)	:	Product Marketing
Checked by (department)	:	R&D
Article number	:	N/A
Document number	:	4NWD005384
Revision	:	REV-C
Revision date	:	26.02.2021

Contents

1. Introduction

ABB MegaFlex DPA IEC is a three phase double conversion uninterruptible power supply for critical environments that have high power demands. The UPS is specially designed for modern data storage infrastructures such as enterprises, colocation, cloud, internet, media and telecomunications data centers.

ABB MegaFlex DPA provides a continuous flow of clean, sustainable power. The UPS is based on 250kW power modules with scalable power up to 1500kW or 1250 N+1 for redun-dancy in a single system.

1.1. Key feature and benefits

Uninterruptible power – power capacity and redundancy on demand

Up to 1,500 kW power protection in a single UPS by paralleling power modules of 250 kW. Power modules can be slid in, adding power capacity or providing internal redundancy (N+1).

Readiness for parallel redundantsystem configurations (2N, 2(N+1), 3N/2) securing uptime and reliability

Maximized availability and resiliency

Proven technology and maximized availability based on power modules of 250 kW that include all necessary functional parts, such as rectifier, inverter, battery converter, static bypass and back-feed protection. The UPS architecture provides fully redundant critical components and shares the load equally among the power modules.

Concurrently maintainable power modules for continuous uptime. The power core is online swappable while the load is secured in double conversion mode. Insertion or re-moval of the power core is smooth and simple thanks to wheels and guide rails. Further, the power mod-ule plug-in concept supports easy and safe power connection, thus eliminating electrical hazards.

Fail-safe startup of the system without human intervention by testing of power modules before applying to the critical load.

Fault-tolerant UPS operation. If one power core fails, the others take up the load - without impacting the power supply.

Operational sustainability for your infrastructure

Minimized energy losses, heat dissipation and electricity cost while the critical load is protected by the UPS in double conversion or ECO modes. The UPS achieves an efficiency of up to 97.4% in double conversion mode and 99 % in ECO mode.

Flexible operation optimizes UPS efficiency and reduces power loss when the load is low compared to the UPS total capacity. ABB Xtra VFI mode can improve system efficiency by optimizing the number of power modules used in double conversion mode to feed the load.

Simply and safe installation. The UPS is provided with pre-engineered power frames consisting of metal busbars - which eliminate wiring entirely - and slide-in power modules with safe, plug-in connections that remove any hazard.

Easy and failsafe maintenance. The UPS can be maintained without af-fecting UPS operation. Power core replacement takes just a few minutes and maintenance can be performed in a suitable environment - improv-ing safety and freedom of movement and reducing risk of human error.

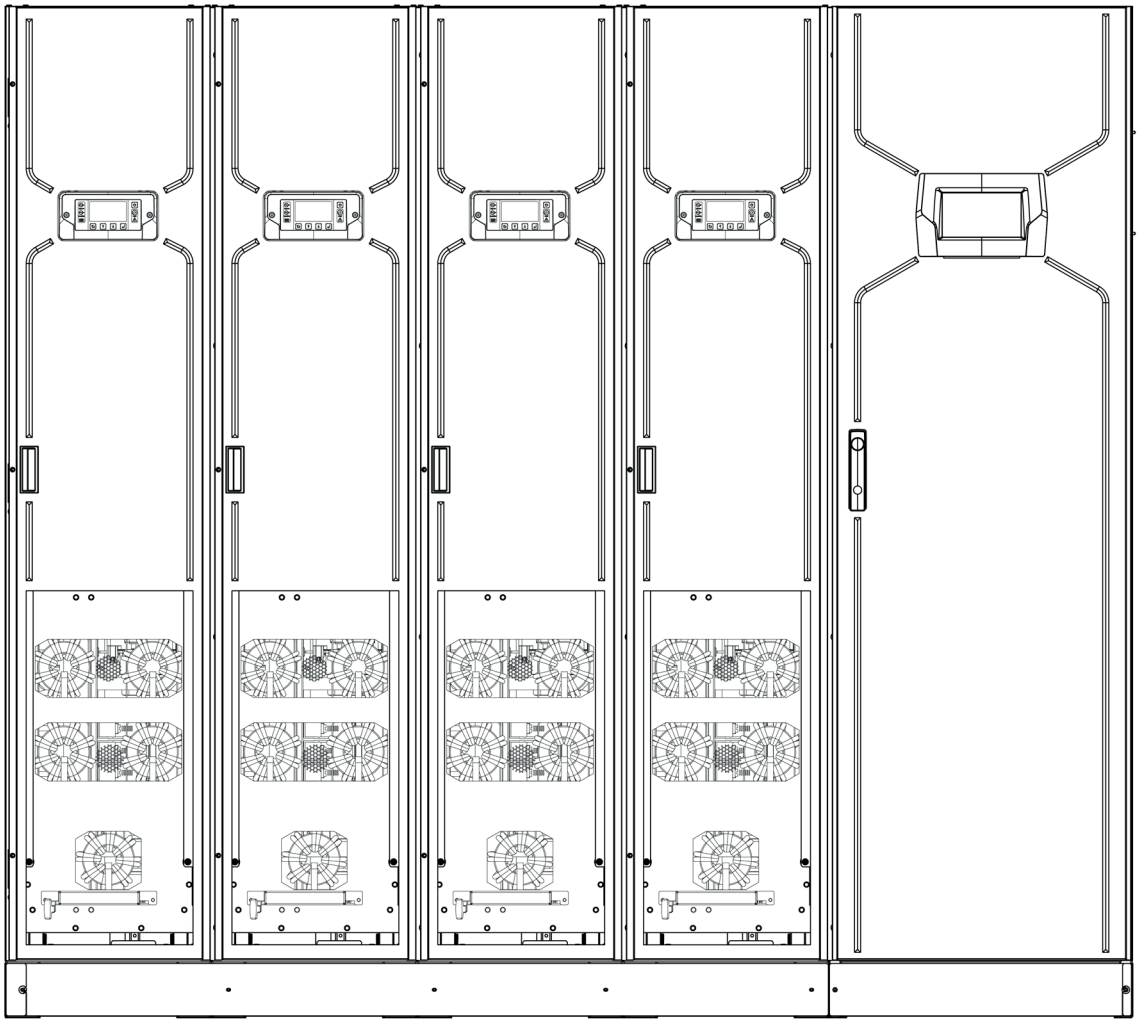
Ease to operate and manage. Real-time monitoring is provided by the local system display or in the control room via the web application.

Design life of up to 15 years reduces the cost of system replacements over the infrastructure lifespan.

2. Mechanical & safety characteristics

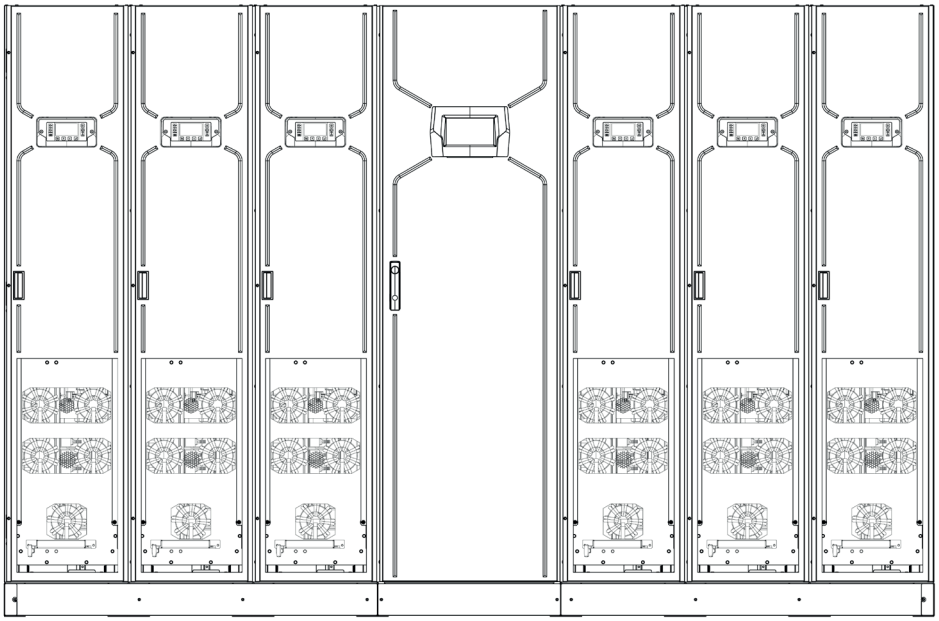
2.1. Mechanical characteristics

2.1.1. MegaFlex DPA 1000kW IEC



Power rating	kW	1000
Dimensions (w x h x d)	mm	2235 x 2000 x 1000
Weight (without Power Modules)	kg	540
Weight (with Power Modules)	kg	1940

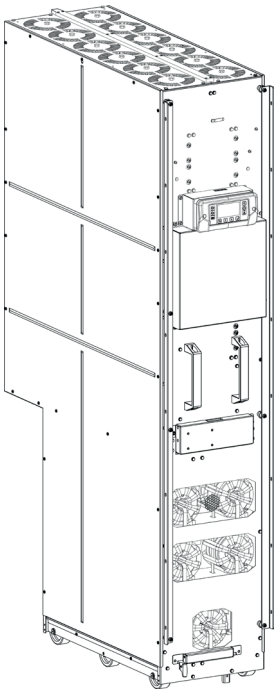
2.1.2. MegaFlex DPA 1500kW IEC



Power rating	kW	1250	1500
Dimensions (w x h x d)	mm	3045 x 2000 x 1000	
Weight (without power modules)	kg	1150	
Weight (with power modules)	kg	2900	3250w

2.1.3. MegaFlex DPA power module 250kW IEC

Dimensions (w x h x d)	mm	356 x 1825 x 1000
Weight	kg	350
Ventilation		Forced ventilation with fan failure detection and fan speed regulation. N+1 fan redundancy
Service Access		removable power module with 360° access



2.2. General UPS cabinet specifications

UPS cabinet color	RAL 9005
Ingress of protection	IP 20
Cable Entry	Bottom or top
Ventilation	Front to top
Service access	Front

2.3. Electromagnetic compatibility

Emission	[Cat]	C3
Immunity	[Cat]	C3

2.4. Environmental characteristics

Environmental service conditions		Indoor unconditioned
Climatic class		3K2
Pollution degree		2
UV Resistance		N.A
Ambient operating temperature range	[°C]	0-40 °C
Relative humidity range	[%]	≤ 95% (non-condensing)
Altitude without de-rating	[m]	up to 1000 m
Altitude with de-rating	[m]	up to 5000 m
Vibration		according to EN60721-3-2
Ambient storage temperature range	[°C]	-25… 55 °C(1
Noise emission	[dBA]	78

1) Elevated storage temperatures may impact useful life, specifically for the UPS capacitors. Ideal storage temperature is between +5 and +35 °C and at relative humidity of up to 75%. Long term storage in an environment with high humidity should be avoided. Likewise, one should avoid storage in environments that con-tain halogenated gases (and other hazardous gases), sprinkling water or oil as well as exposure any radiation.

3. Electrical characteristics

3.1. Input AC power distribution system

Input AC power distribution system compatibility (earthing system)		TN-S, TN-C, TN-C-S
Input AC power distribution system wiring		3ph + neutral + PE
Overvoltage category		II
Input rated conditional short circuit current (Icc)	[kA]	120
Additional information		Single feed for rectifier and bypass

3.2. Input voltage and frequency

Input rated voltage	[V]	380, 400 or 415 V ph-ph 220, 230 or 240 V ph-N
Input voltage tolerance 40°C	[%]	Load ≤ 100% (−10%, +15%) Load ≤ 80% (−20%, +15%) Load ≤ 60% (−30%, +15%)
Input rated frequency	[Hz]	50 or 60
Input frequency tolerance	[Hz]	40-70*

***Nominal frequency ± 10Hz**

3.3. Input current and overload characteristics

POWER RATING		1000	1250	1500
Input rated current (with energy storage device charged at 100% load 380 / 400 / 415 V configuration	[A]	1575 1496 1442	1969 1870 1803	2363 2245 2163
Input maximum current (with low in-put voltage and/or energy storage device charging) 380 / 400 / 415 V configuration	[A]	1767 1679 1619	2121 2014 1942	2651 2518 2428
Total harmonic distortion (THDi), 100 % load -normal mode - linear load (at 400V input voltage; input THDU < 2%; toler-ance of ±0.3% may apply)	[%]	<3		
Total harmonic distortion (THDi), 100 % load-normal mode-non-linear load (at 400V input voltage; input THDU < 2%; tolerance of ±0.3% may apply)	[%]	<3		
Rectifier input in-rush (% of rated current against time)	[%]	<100		
Rectifier input power factor (rated linear load; rated non-linear load)		0.99 @ 100% load		

4. Output electrical characteristics

Output AC power distribution system compatibility (earthing system)	TN-S, TN-C, TN-C-S, TT
Output AC power distribution system wiring	3ph + neutral + PE

4.1. Output voltage

Output rated voltage	[V]	380, 400 or 415 V ph-ph 220, 230 or 240 V ph-N
Output voltage variation - normal mode	[%]	± 1
Output voltage variation - stored energy mode	[%]	± 1
Total harmonic distorsion (THDu), 100% load -normal mode - linear	[%]	<2.0
Total harmonic distorsion (THDu), 100% load -normal mode non linear	[%]	<4
Total harmonic distorsion (THDu), 100% battery mode - linear	[%]	<2.0
Total harmonic distorsion (THDu), 100% battery mode, non linear	[%]	<4

4.2. Voltage transient and recovery time

Voltage transient and recovery time - 100 % step load - linear	[%, s]	<4%, (<2s)
Voltage transient and recovery time - 100 % step load - non-linear	[%, s]	<4%, (<2s)
Voltage transient and recovery time - stored energy mode - 100 % step load - linear	[%, s]	<4%, (<2s)
Voltage transient and recovery time - stored energy mode - 100 % step load - non-linear	[%, s]	<4%, (<2s)

4.3.Output frequency

Output rated frequency	[Hz]	50 or 60 Hz
Output frequency variation - normal mode	[%]	± 2 or 4 selectable (synchronized with mains, allowing for transfer to static bypass)
Output frequency variation - stored energy mode	[%]	± 0.1
Output frequency variation - free-running	[%]	± 0.1
Synchronization (max ± % range of rated frequency)	[%]	± 2 or 4 selectable
Max synch. phase error (re- ferred to a 360° cycle)	[°]	2

4.4. Output current

Power rating	**[kW]**	**1000**	**1250**	**1500**
Output rated current (380 / 400 / 415 V configuration)	[A]	1516 1450 1389	1894 1812 1737	2273 2174 2084
Output overload (% of rated current / time duration	[% / s]	150% : 1min 125% : 10 min		
Output current limitation, "short circuit current" (% or rated current / time duration, 400V rated voltage)	[% / s]	2.8 x In, 40ms (default) 2.5 x In, 100ms 2.3 x In, 250ms		
Fault clearing capability (normal mode / stored energy mode, 400V rated voltage)	[A]	4060	5074	6087

4.5. Power factor

Load power factor - rated	1.0
Load power factor - displacement (permissible lead-lag range)	0.6 lag to 0.8 lead

4.6. Efficiency

Double conversion efficiency - 100% rated load	[%]	96.5
Double conversion efficiency - 75% rated load	[%]	97.0
Double conversion efficiency - 50% rated load	[%]	97.4
Double conversion efficiency - 25% rated load	[%]	97.3

4.7. Static bypass switch

Power rating	**[kW]**	**1000**	**1250**	**1500**
Rated current (380 / 400 / 415 V configuration)	[A]	1516 1450 1389	1894 1812 1737	2273 2174 2084
VFD Efficiency at 100% rated load	[%]	99		
Bypass overload rated current /time duration (@ 400V)	[A]	Continuous: 1595 10min: 2030 2min: 2755	Continuous: 1993 10min: 2536 2min: 3442	Continuous: 2391 10min: 3043 2min: 4130
Bypass voltage tolerance (% of rated voltage @ 400V)	[%]	-10% +15%		
Bypass fault clearing capability (% of rated current/ time duration @ 400V)	[%/s]	20 In/ 10ms		

5. Battery and energy storage

Energy storage type		No integrated batteries, external energy storage needed Line-and-match cabinets available as accessory		
Technology		Lithium ion, VRLA, NiCd		
Design life	[years]	Lithium ion: 15 years VRLA, NiCd: Ref to battery manufacturer provided infor-mation		
Quantity of cells per string	[pcs]	Lithium ion: 136 cells / 17 modules VRLA 12V: 40-50 blocks/ 240-300 cells NiCd: 400-500 cells		
Nominal voltage (total)	[Vdc]	480 V - 600 V		
Nominal capacity (C10)	[Ah]	Battery type dependent Lithium ion: 67 Ah		
Stored energy time (back-up time at 100 % rated load)	[min]	Up to any autonomy value without derating Refer to battery autonomy calculators for proper sizing		
Restored energy time (re- charge time to 90 % capac- ity)	[h]	Lithium ion: 3 h VRLA: 10 h NiCd: 10 h		
Ambient reference temperature (To secure maximal service life)	[°C]	Battery type dependent: Lithium ion: 18-28°C VRLA: 20-25°C NiCd: Refer to manufacturer provided information		
Nominal discharge current	[A d.c.]	2182-1870	2727 - 2337	3272 - 2805
Min/Max fault current rating	[A d.c.]	6.3 / 200kA		

5.1. Charging regime

Charge voltage (float, boost) and tolerance band	[V d.c.]	4.20 V/Cell Lithium ion 2.23 V/Cell VLRA 1.40 V/Cell NiCd		
End of discharge voltage	[V d.c.]	3.20 V/Cell Lithium ion 1.68 V/Cell VLRA 1.05 V/Cell Ni-Cd		
Charge current limit (or range)	[A d.c.]	750	938	1125
Charge power limit	[kW]	300	375	450
Battery ripple current max.	[A]	400mA RMS		

5.2. Additional information

Cable voltage drop recommendation	1%
Battery temperature compensation	Supported by standard UPS. Temperature sensor available as option
Battery test	Automatic battery test performed by UPS

NOTE: Lithium-ion battery values indicated in table above are valid just for Samsung SDI product (136S).

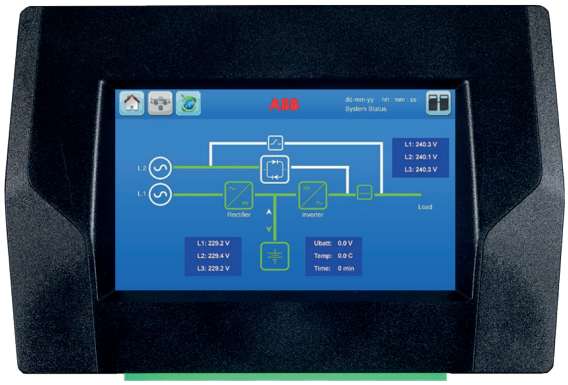
(*) Conditions apply as referred in chapter 4.1

6. Control & Monitoring

6.1. System display

The UPS system has a system graphical dis-play. It is a 7” touchscreen display enabling the operator to perform:

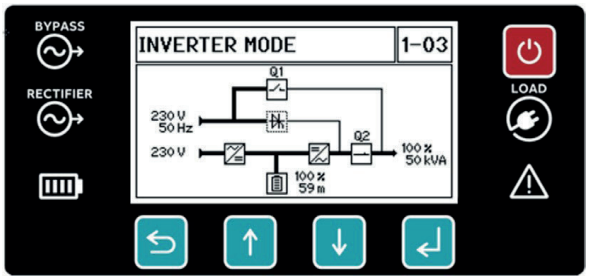
- Monitoring and measuring of the power flow through the UPS system, individual power modules and batteries.
- Monitoring of UPS operational status, events and alarm his-tory
- UPS setting configuration
- UPS Data



6.2. Control panel power module

The power module has its own control panel consisting of an LCD display, control and naviga-tion buttons and led status indicators. The LCD display shall display :

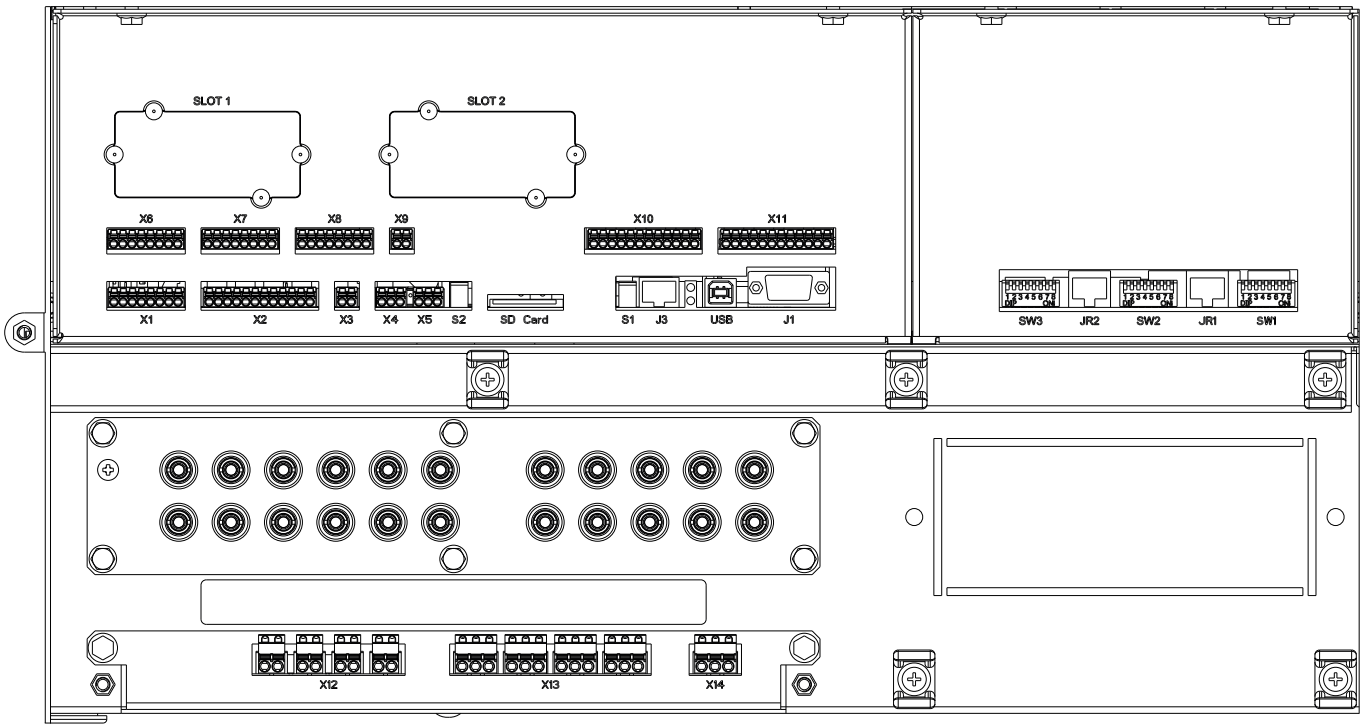
- Mimic diagram of the power core showing the rectifier, battery, static bypass, inverter status and the input, bypass, battery and output measurements : voltage, frequency, power
- Power core status: off, disconnected, in-verter mode, bypass mode, battery mode, stand-by mode
- Power core location : Power frame and pow-er core number



The control and navigation buttons shall allow the user to perform settings and ad-justments, monitor the voltages, currents, frequencies, power measurements and scroll the main and sub-menus in the UPS module.

The user shall be able to identify the status of the bypass, rectifier, battery and UPS output and the alarm by reading the LED indicators. The LEDs are always active even if the display is in screensaver mode. Please refer to the OPM for more information.

6.3. Communication interfaces



Inputs dry ports X1,X7,X8	X1 / X7 / X8 can hold Cable from 0.2mm2 – 1.5mm2 All X1 / X7 / X8 are inputs, cable max. R 50Ω at 10mA X1 (4 inputs): Generator operation ON, External output breaker, external manual bypass, remote shut down X7-X8 (8 inputs) are programmable inputs
High voltage input port X12	X12 terminals can hold Cable from 0.2mm2 – 1.5mm2 X12 are inputs rated: Min. 87 Vac – Max. 277 Vac 50Hz/60Hz X12 are programmable inputs
Input analog port X6	X6 can hold Cable from 0.2mm2 – 1.5mm2 All X6 are analogue inputs, designed for sensors with standard industry output 1-24Vdc or 4-20mA
Input battery temperature sensor X3	X3 can hold Cable from 0.2mm2 – 1.5mm2
Modbus communication power X4	X4 terminals can hold Cable from 0.2mm2 – 1.5mm2 X4 are differential 5V RS485 signals
CAN bus communication port X5	X5 terminals can hold Cable from 0.2mm2 – 1.5mm2 X5 are differential 5V RS485 signals
Output dry port X2,X10, X11	X2, X10 and X11 terminals can hold Cable from 0.2mm2 – 1.5mm2 X2, X10 and X11 are potential free contacts and are rated: Max 30Vac/1A; 60Vdc/0.5A. X2 (4 outputs) : common alarm, battery low, load on inverter, main failure X10,X11 (8 outputs) are programmable outputs
High voltage output power X13	X13 terminals can hold Cable from 0.2mm2 – 1.5mm2 X13 are output rated: Max. 5A @ 277 Vac or 5A @ 30VDC X13 are programmable outputs
Output + 24dc X9	X9 can hold Cable from 0.2mm2 – 1.5mm2 X9 is an output port rated: 24Vdc @ 100mA Ma
Synchronization input port X14	X14 terminals can hold Cable from 0.2mm2 – 1.5mm2 X14 are inputs and are rated: Max. 415 Vac

6.4. ABB Network Management card

Value Proposition

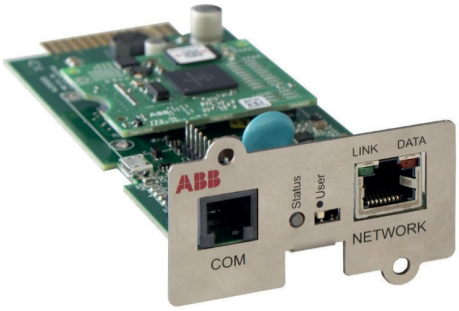
The ABB Network Card is ABB's state of the art proprietary technology for UPS remote monitor and management.

Its modern user interfaces allows the user to monitor his UPS anytime from anywhere. Designed for cybersecurity, both hardware and firmware, guarantees the highest robustness against cyberattacks.

Key Features

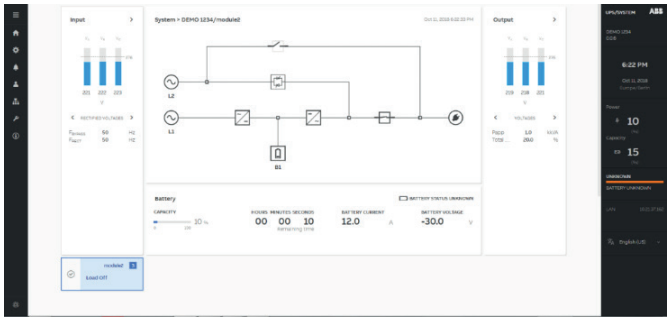
Supported protocols:

- http, Modbus TCP/IP, Modbus RS485, SNMP V2 and V3, SMTP
- Individual module visualiza-tion up to 30 modules
- Multi-language localization (English, French, Spanish, German, Italian)
- Designed for cybersecurity: its hardware meets the strin-gent ABB requirements for cybersecurity
- (TPM, secure boot)
- Easy to configure through intuitive wizard
- Possibility to directly connect to ABB Ability via secure, uni-directional connection



Benefits

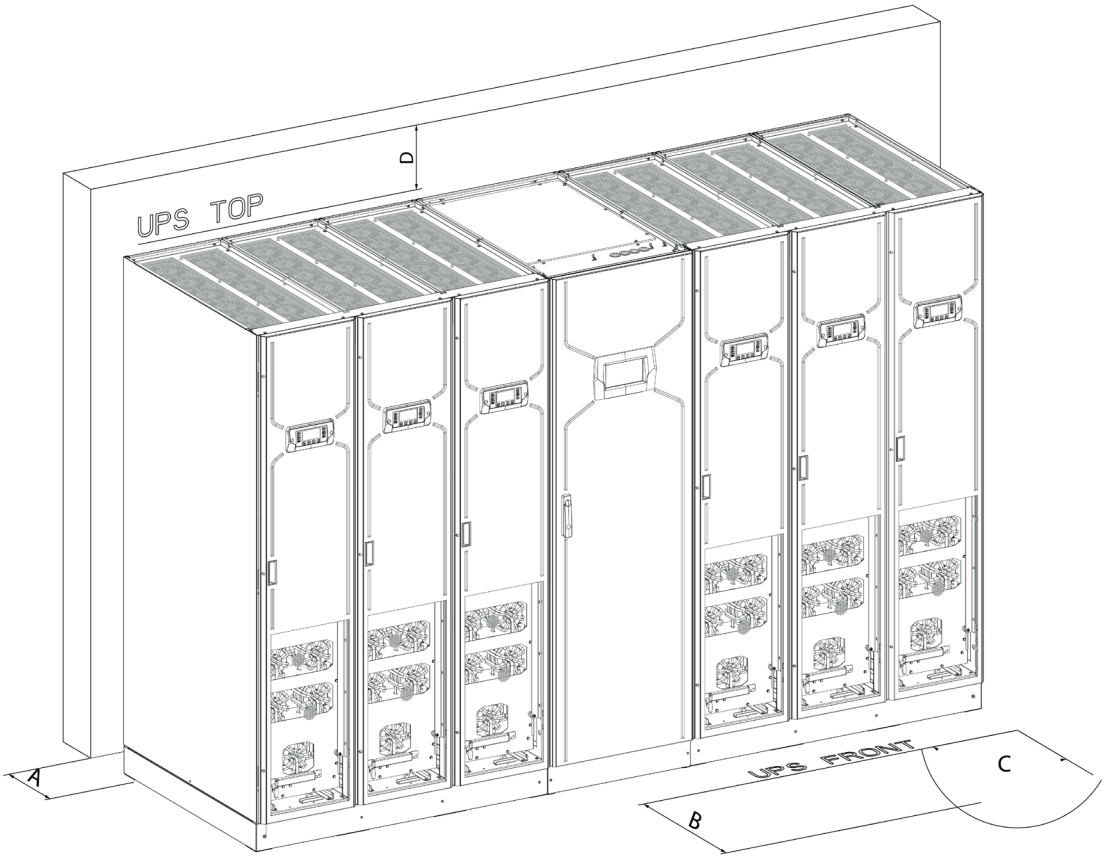
- Internal development, proprie-tary technology allows timely and full control of updates, bug fix and cybersecurity improve-ment.
- Strong password management
- ABB cybersecurity certified
- Modern and rational user inter-face look and feel, ease of use
- Configurable alerts via secure SMTP mail server
- Graphs, trends of the UPS values, monitoring via a simple web browser
- Secure firmware updates



7. Site planning information

7.1. Installation footprint and clearances

The minimum needed clearances to allow proper airflow on the UPS system and to allow proper services and maintenance shall be respected as reported below



A	Back clearance	No minimum clearance required
B	Front clearance needed to allow a correct door opening	1555 mm
C	Maximum door opening angle	95°
D	Top clearance	500 mm

7.2. Single line diagram

7.2.1. Single input feed and separate batteries

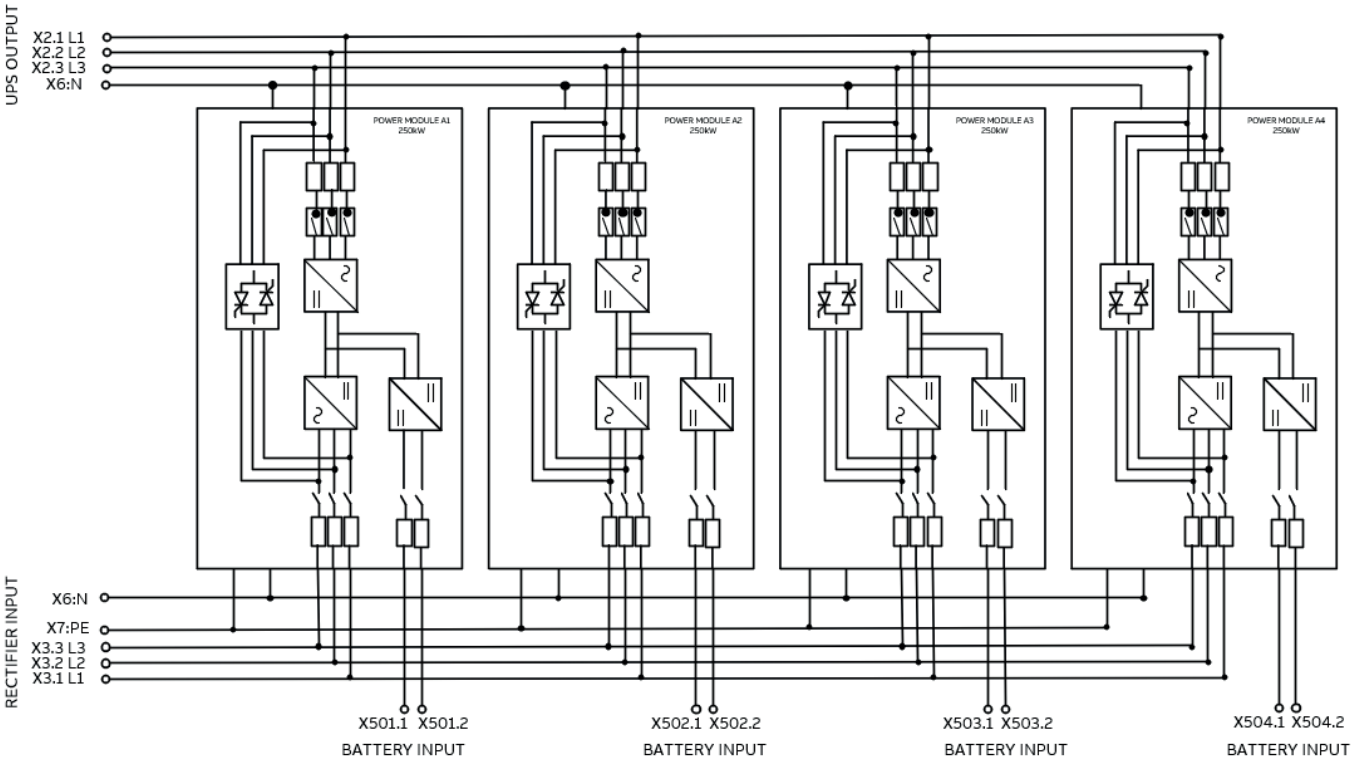


Figure 5-2-1 MegaFlex DPA 1000kW

7.2.1.1. Recommended external protection and cable sizes

Input and output voltage: 380/380V

UPS POWER RATING	kW	1000	1250	1500
Rectifier input fuse gL or MCCB 3P or 4P	A	1600	2000	2500
Rectifier input cable section (L1,L2,L3,N)	mm2	4x(4x300)	4x(5x300)	4x(6x300)
UPS output fuse gL or MCCB, 3P or 4P	A	1600	2000	2500
Output cable section (L1,L2,L3,N)	mm2	4x(4x300)	4x(5x300)	4x(6x300)
Battery input fuse gR or MCCB	A	4x630	5x630	6x630
Battery cable section (+,-)	mm2	2x(8x185)	2x(10x185)	2x(12x185)
Earth cable section (PE)	mm2	4x185 or 2x300	5x185 or 3x300	5x185 or 3x300

7.2.2. Single input feed and common batteries

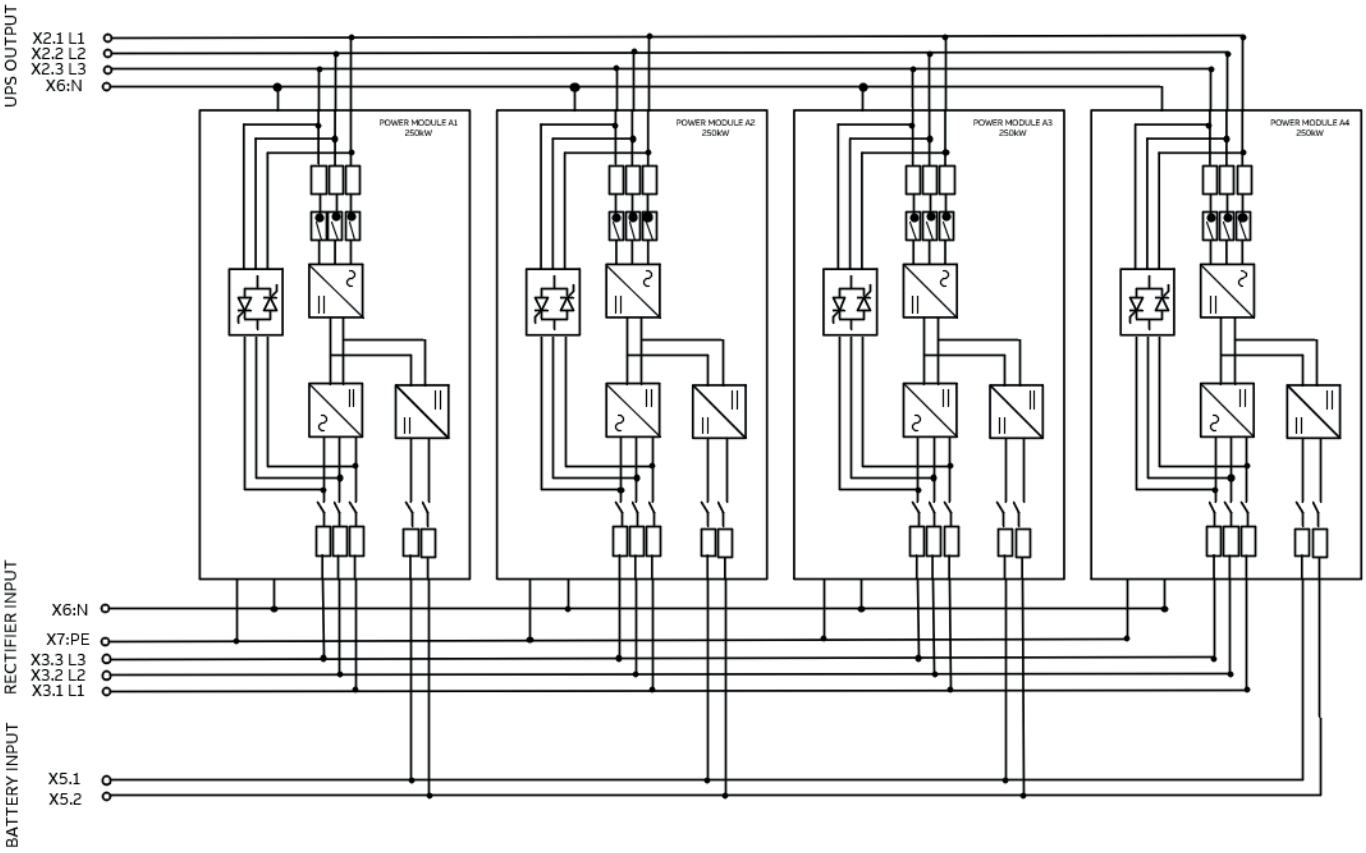
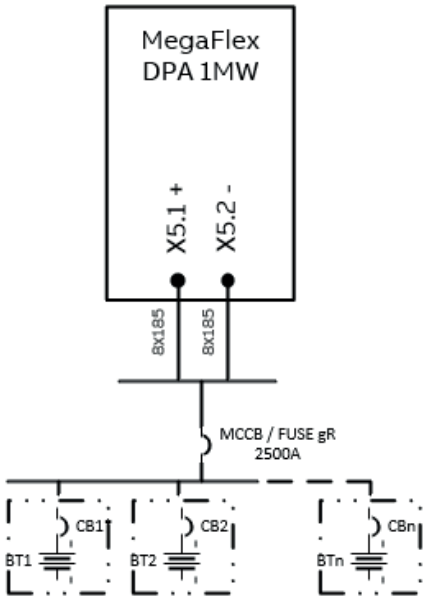


Figure 5-2-2-1 MegaFlex DPA 1000kW



(*)Fuse gR or CB per battery string is recommended

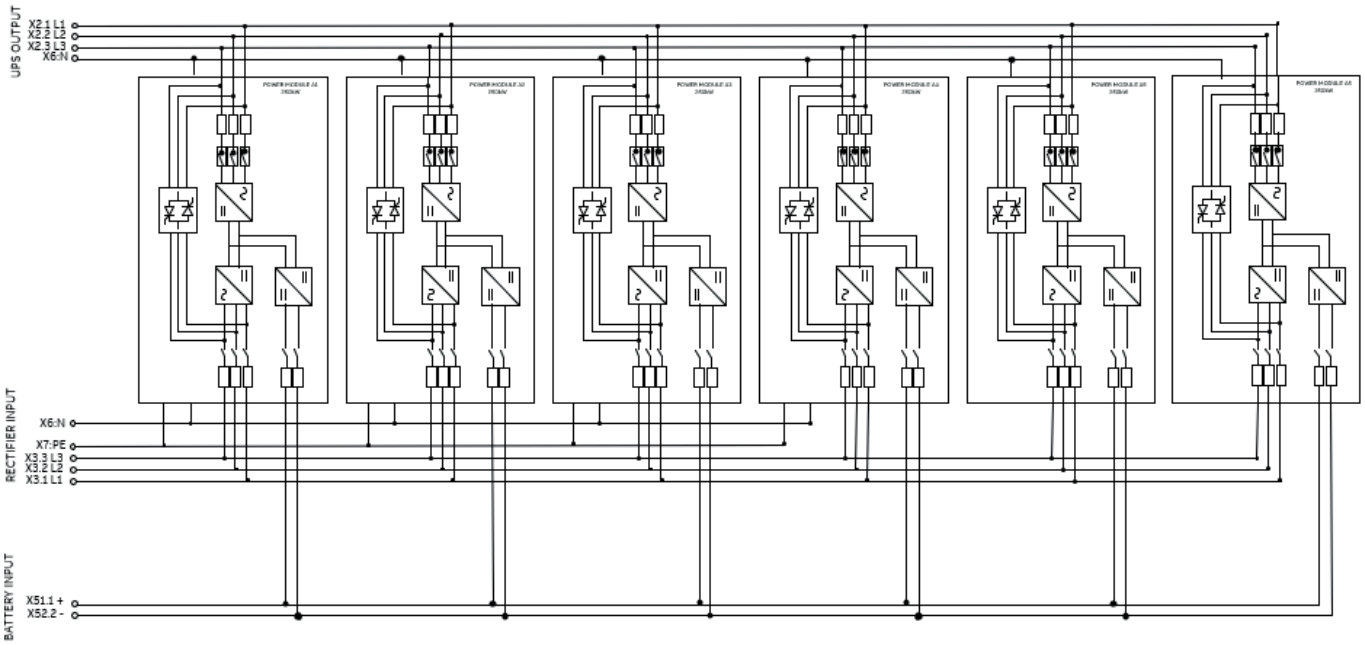
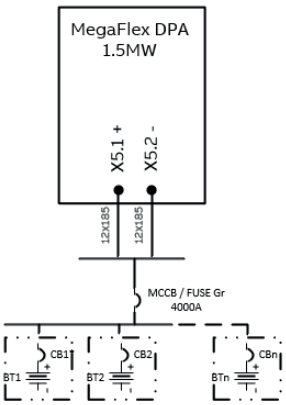


Figure 5-2-2-2 MegaFlex DPA 1500kW



(*)Fuse gR or CB per battery string is recommended

7.2.2.1. Recommended external protection and cable sizes

Input and output voltage: 380/380V

UPS POWER RATING	kW	1000	1250	1500
Rectifier input fuse gL or MCCB, 3P or 4P	A	1600	2000	2500
Rectifier input cable section (L1,L2,L3,N)	mm2	4x(4x300)	4x(5x300)	4x(6x300)
UPS output fuse gL or MCCB, 4P	A	1600	2000	2500
Output cable section (L1,L2,L3,N)	mm2	4x(4x300)	4x(5x300)	4x(6x300)
Battery input fuse gR or MCCB	A	2500	3200	4000
Battery cable section (+,-)	mm2	2x(8x185) or 2x(6x300)	2x(10x185) or 2x(7x300)	2x(12x185) or 2x(9x300)
Earth cable section (PE)	mm2	4x185 or 3x300	5x185 or 4x300	6x185 or 5x300

7.3. UPS terminal sizes

LABEL	CABLE SIZE	TORQUE (Nm)	TERMINALS DESCRIPTION
X3.1: L1	M12 Bolt Terminal	50-75	Input Line L1
X3.2: L2	M12 Bolt Terminal	50-75	Input Line L2
X3.3: L3	M12 Bolt Terminal	50-75	Input Line L3
X6: N	M12 Bolt Terminal	50-75	Neutral bar (N) [Common neutral]
X7: PE	M12 Bolt Terminal	50-75	Earth bar (PE) [Common earth]
X2.1: L1	M12 Bolt Terminal	50-75	Output terminal, L1
X2.2: L2	M12 Bolt Terminal	50-75	Output terminal, L2
X2.3: L3	M12 Bolt Terminal	50-75	Output terminal, L3
X501.1: +	M12 Bolt Terminal	50-75	Battery Terminal, +
X502.2: -	M12 Bolt Terminal	50-75	Battery Terminal, -

7.4. Heat dissipation

UPS POWER RATING	kW	1000	1250	1500
Maximum Airflow (EN 62040-1-1)	m3/h	7576	9470	11364
Heat Dissipation with 25% linear load	[W]	7053	8817	10580
Heat Dissipation with 40% linear load	[W]	10288	12860	15432
Heat Dissipation with 50% linear load	[W]	13426	16783	20140
Heat Dissipation with 75% linear load	[W]	22539	28174	33809
Heat Dissipation with 100% linear load	[W]	35578	44472	53367
Heat Dissipation with 40% non-linear load	[W]	12480	15601	18721
Heat Dissipation with 50% non-linear load	[W]	15177	18971	22765
Heat Dissipation with 75% non-linear load	[W]	23679	29599	35519
Heat Dissipation with 100% non-linear load	[W]	36297	45372	54446
Heat Dissipation without load	[W/BTU]	4000/13647	5000/17059	6000/20471

https://library.abb.com

—

ABB Power Protection SA
Via Luserte Sud 9
6572 Quartino
Switzerland

www.abb.com/ups