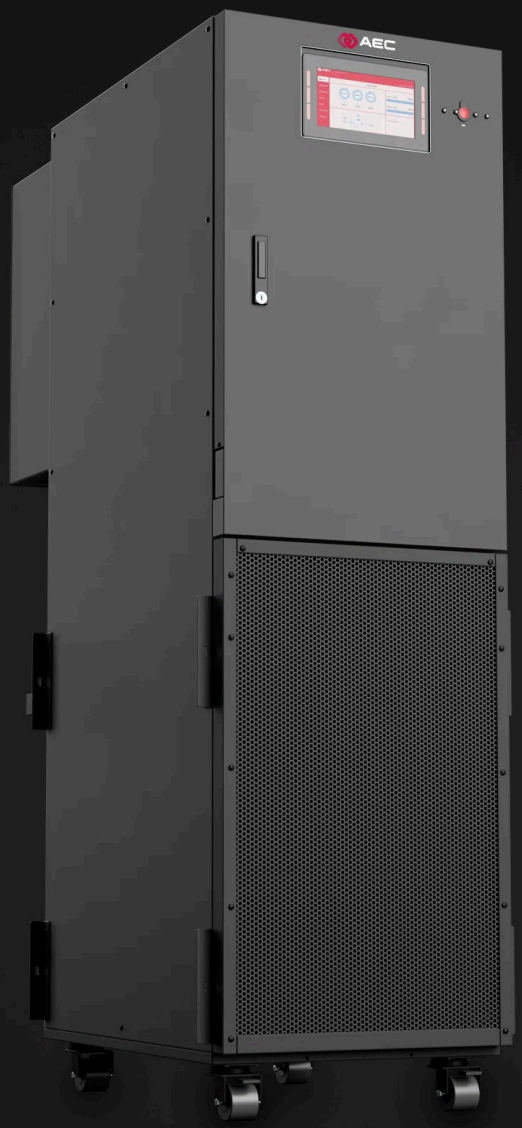
MODULAR ONLINE UPS · BATTERIES INSIDE

RADIANT-IB

20–100 kVA

Online double conversion in 20 kVA hot-swappable power modules, with 240 VRLA blocks in 24 trays inside the same 23.6-inch cabinet, for 208 V three-phase loads.



RADIANT-IB · THE CABINET, CLOSED

N+X
redundant power modules

240
12 V 9 Ah blocks inside

94 %
efficiency, double conversion

208 V
three-phase, 4-wire + PE

Product Overview
RADIANT-IB 20–100 kVA

Key features of the RADIANT-IB series.

20 kVA

Power modules, 1 to 5 per frame

One to five 20 kVA power modules in one frame. Each holds a rectifier, an inverter and a charger; the modules share the load.

N+X

Redundant modules

With one module more than the load needs, a module can stop or be pulled out while the others carry the load on the inverter.

240

Batteries inside

24 trays of ten 12 V VRLA blocks under the modules: strings of 20 blocks with the neutral at the midpoint, ±120 V DC.

94 %

Efficiency and input power factor

DSP full digital control; up to 94 % efficiency in double conversion, input power factor above 0.99.

7"

Color touchscreen

Power flow, cabinet and module readings, logs, settings, control and a scope of the output and bypass waveforms.

×3

Parallel cabinets

Up to three cabinets in parallel with ring cables, for more power or for redundancy.

Key data

Power range	20–100 kVA: 1 to 5 × 20 kVA modules
Input · output	3 phases + N + PE · 208 V L-L
Power factor	1 (kVA = kW)
Efficiency	94 % max, double conversion and battery mode
Battery	240 × 12 V 9 Ah VRLA inside, 24 trays, ±120 V DC

Display	7-inch color touchscreen
Parallel	up to 3 cabinets
W × D × H	23.6 × 39.4 × 78.7 in
Weight	2,191.8–2,399.8 lb with batteries
Standards · warranty	UL 1778 standard · 3 years on the UPS

> 0.99
input power factor

±0.1 %
output frequency

0 ms
inverter ↔ bypass, synchronized

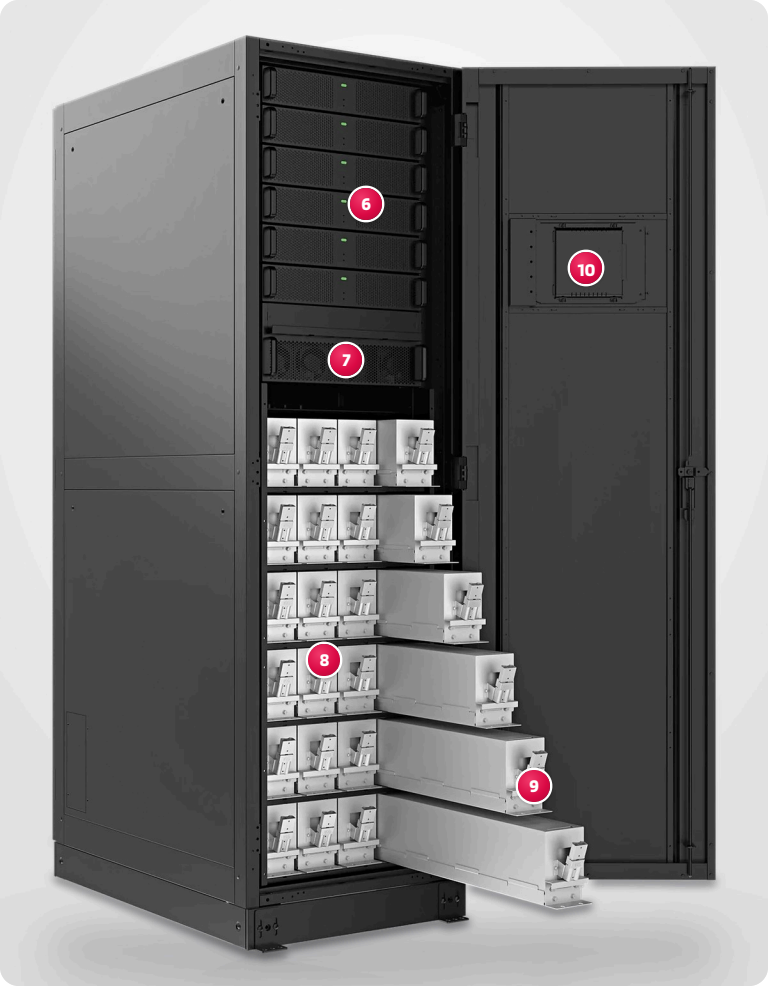
40–70 Hz
input frequency

Front View
RADIANT-IB 20–100 kVA

The RADIANT-IB cabinet from the front, closed and open: the touchscreen and EPO on the door, the modules, the bypass & monitoring module and the 24 battery trays behind it.



DOOR CLOSED



DOOR OPEN

1 Touchscreen
7-inch color, on the front door.

2 Status indicator
Beside the screen.

3 EPO
Covered emergency power off key.

4 Door handle
Lockable front door.

5 Perforated door
Air in at the front.

6 Power modules
One to five 20 kVA modules, hot-swappable, at the top.

7 Bypass & monitoring module
Static switch, controls, ports and the cold-start button.

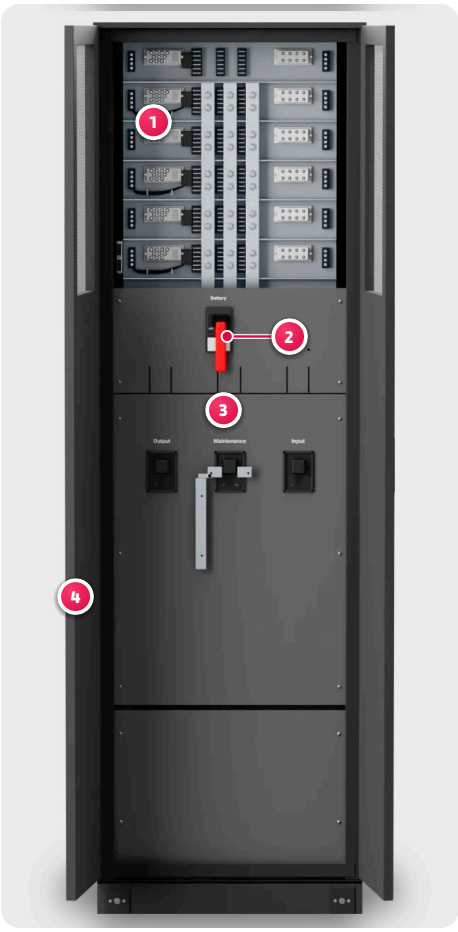
8 Battery trays
24 trays of ten 12 V blocks: 240 blocks.

9 A tray drawn out
Each tray plugs into the battery bus with its own connector.

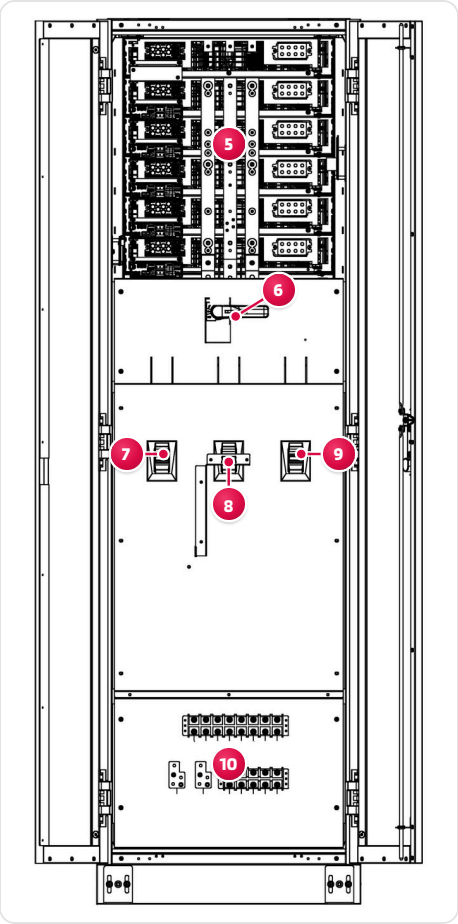
10 Door, inside
The back of the touchscreen.

Rear View
RADIANT-IB 20–100 kVA

The rear of the RADIANT-IB cabinet, both doors open: the breakers and the power terminals.



REAR DOORS OPEN



REAR

1 Power modules, rear side
The 20 kVA modules; they are serviced from the front.

2 Battery breaker
Between the 240 blocks and the DC bus.

3 Breakers
Input, maintenance bypass and output; terminals below.

4 Rear doors
Two, with grilles at the top: air out.

5 Module backplane
The connectors the modules plug into.

6 Battery breaker, as drawn
Tripped by the UPS at end of discharge or on EPO.

7 Output breaker
To the load.

8 Maintenance bypass breaker
Feeds the load from the bypass during service.

9 Input breaker
The mains to the rectifiers.

10 Terminals
Mains, bypass, output, battery and PE; cables from the top or the bottom.

Touchscreen Interface
RADIANT-IB 20–100 kVA

The 7-inch color touchscreen of RADIANT-IB: seven menus, the readings of the cabinet and of every module, the log, the settings behind a login, the commands and the waveforms.



ON THE DOOR

1 Color touchscreen
7-inch, on the front door: power flow, readings, settings, log and scope.

2 Status indicator
Beside the screen: normal, warning, fault.

Login with user permissions for the settings.

A covered EPO key on the door; the log keeps every event with its date and time.

Seven menus

Home
power flow, load, battery, alarms

Cabinet
bypass, input, output, load, battery

Module
each module: input, output, DC bus, temperatures

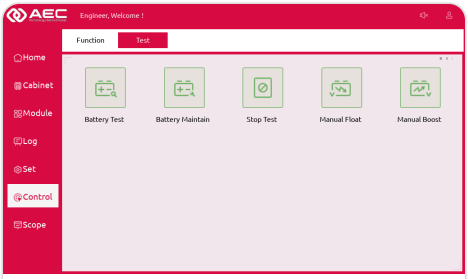
Log
every event with date and time

Set
battery, system, contacts, network, language

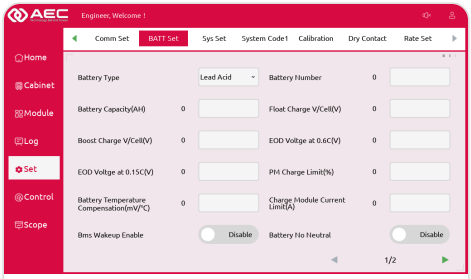
Control
on/off, transfers, tests, resets

Scope
output and bypass waveforms

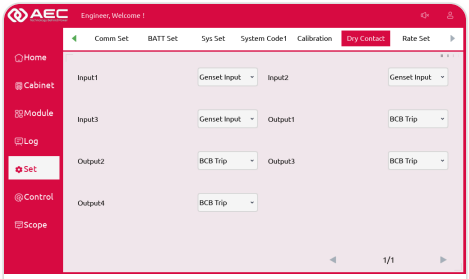
On the screen



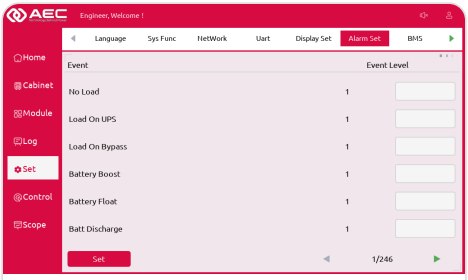
1 Control · Test
Battery test, maintenance discharge, manual float and boost charge.



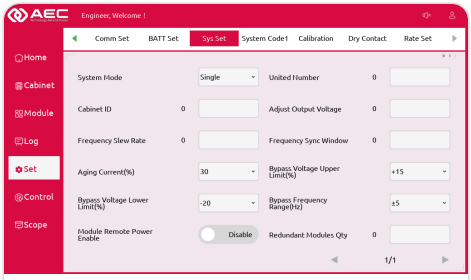
2 Set · Battery
Type, capacity, block count, float and boost charge, end of discharge.



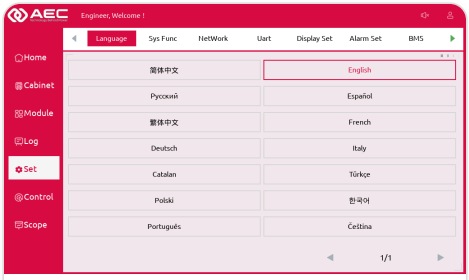
3 Set · Dry contact
Generator input, battery breaker trip and the other relay functions.



4 Set · Alarm
The level of every event, set one by one.



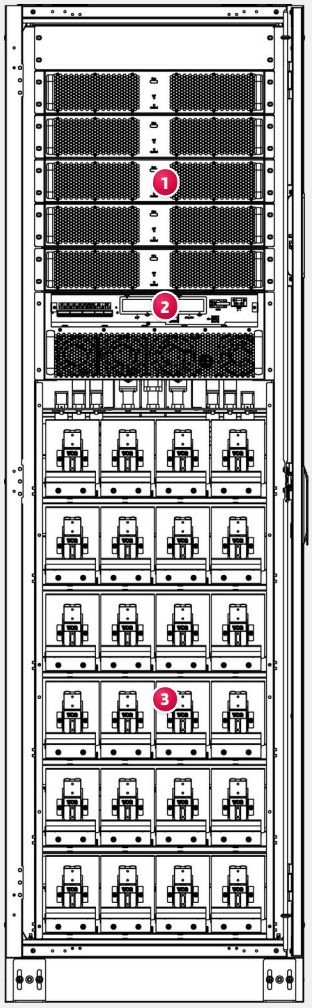
5 Set · System
Single or parallel mode, bypass window and the number of redundant modules.



6 Set · Language
Fourteen languages on the screen, Spanish and Portuguese included.

Modular Technology Architecture
RADIANT-IB 20–100 kVA

Each power module is a complete double-conversion UPS of 20 kVA: rectifier, inverter and charger. The modules sit at the top of the cabinet, above the bypass & monitoring module.

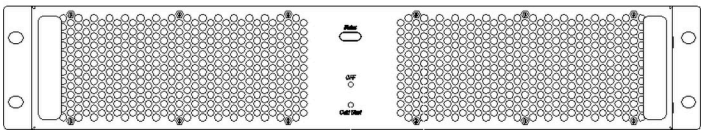


1. **Power modules**
   One to five 20 kVA modules, numbered from the bottom slot up.
2. **Bypass & monitoring module**
   Static switch, controls, interfaces and the cold-start button.
3. **Battery trays**
   24 trays of ten 12 V blocks under the modules.

The module

Rating	20 kVA = 20 kW
Size	17.3 × 26.7 × 3.3 in (440 × 678 × 85 mm), 2U
Weight	52 lb (23.6 kg)
Inside	rectifier, inverter, DC charger
Per cabinet	1 to 5
Front	status indicator, OFF key, cold-start button

The module, front



2U, 17.3 in wide: the OFF key, the status indicator and the cold-start button between two fan grilles.

Hot swap, with the load running

01 **Check the load**
The other modules must carry it; if not, transfer to bypass first.

02 **Switch the module off**
Module ON/OFF in the Control menu, then its OFF key for 3 s.

03 **Pull it out**
After 10 minutes remove the two screws; two people.

04 **Push the new one in**
Fix the screws: it starts and joins the system.

N+X redundancy



With one module more than the load needs (N+1), a module can stop or be replaced while the others carry the load; the screen warns when the redundant module is lost. Example: a 60 kW load on four 20 kVA modules, N = 3, X = 1.

2U
per 20 kVA module

52 lb
module weight

1–5
modules per cabinet

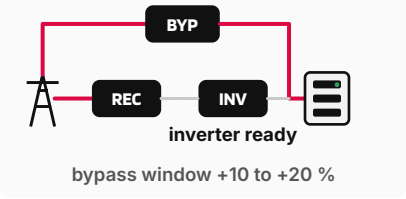
N+1
or N+N redundancy

Smart Functions
RADIANT-IB 20–100 kVA

What each function does for the load and the batteries, and how it is set.

ENERGY

ECO mode

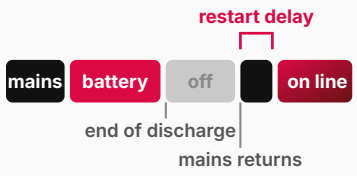


In ECO the load runs on the bypass while it stays in its window, with rectifier and inverter on standby; if the bypass fails the load moves to the battery and inverter in less than 10 ms. Single ECO or parallel ECO, chosen in the system mode.

System mode	**Single ECO · parallel ECO**
ECO → battery	**< 10 ms**

CONTINUITY

Auto-restart after an outage

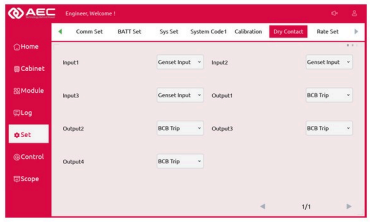


If an outage outlasts the battery, the inverter stops at end of discharge; when the mains returns the UPS restarts by itself and goes back on line, after the delay set by the commissioning engineer.

After	**end of discharge (EOD)**
Restart delay	**set at commissioning**

SITE

On a generator



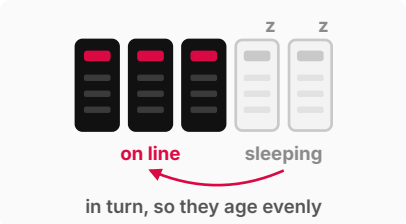
Touchscreen · set, dry contact: genset input

A dry-contact input tells the UPS that the site has moved to its generator, and the event goes into the log with its time: the operator and the monitoring software see at once what is feeding the load.

Input	**IP3, generator connected**
Event	**Generator input, logged**

ENERGY

Module sleep at part load

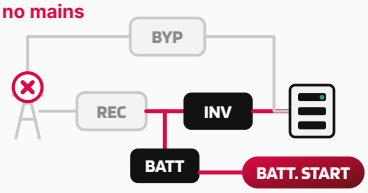


At part load the modules that are not needed go on standby, in turn, according to the load and the setting; the rest carry the load at a better point of their efficiency curve, and wake again as the load grows.

Modules	**stand by in turn**
Set by	**load percent and setting**

START-UP

Battery cold start

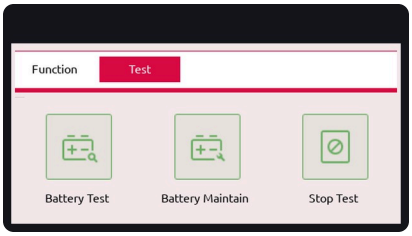


With no mains, press the red battery start button on the monitor module for 3 seconds, then the cold-start button of a power module: the UPS starts from its batteries and is put on line from the panel.

Buttons	**battery start, monitor module, 3 s · cold start, power module**
Needs	**battery connected, breaker closed**

BATTERY

Battery test and maintenance



Touchscreen · control, test: battery test, battery maintain, stop test

A battery test moves the UPS to battery for 20 seconds; a maintenance discharge runs the string down to 1.1 times the end-of-discharge voltage. An automatic maintenance discharge can repeat on a set period, with 20 to 100 % load.

Test	**20 s on battery**
Maintenance	**down to 1.1 × EOD voltage**

Also: Frequency converter · 40–70 Hz in, 50 or 60 Hz out · Service life and wave capture · Temperature compensation · −1.7 mV/°F/cell (−3.0 mV/°C/cell) · Bypass window · +10 to +20, −10 to −40 % · Scope · waveforms

Battery and Runtime
RADIANT-IB 20–100 kVA

The batteries ride in the UPS cabinet: 24 trays of ten 12 V blocks, in strings of 20 with the neutral at the midpoint, on a ±120 V DC bus.



The 24 trays behind the front door: ten 12 V blocks each.

The battery

Blocks	240 × 12 V 9 Ah VRLA
Trays	24 × 10 blocks; 63.5 lb each
Strings	20 blocks, neutral at the midpoint: ±120 V DC
Charge	float 2.25 V/cell, boost 2.3 V/cell; 0.1 C best, 0.2 C max
Compensation	−1.7 mV/°F/cell (−3.0 mV/°C/cell), settable 0 to −5.0, with the optional sensor
End of discharge	1.65 V/cell at 0.6 C, 1.75 V/cell at 0.15 C
Tests	battery test (20 s), maintenance discharge, boost, float
Cold start	from the batteries, about 60 s to output

Battery care

- Best at 68–77 °F (20–25 °C): life halves for every 18 °F (10 °C) above 68 °F.
- The block count set on the screen must equal the blocks installed.
- 'Battery Volt Low' is the pre-warning before the end of discharge.
- Maintenance discharge only with the bypass normal and 25 % capacity or more.

Backup time

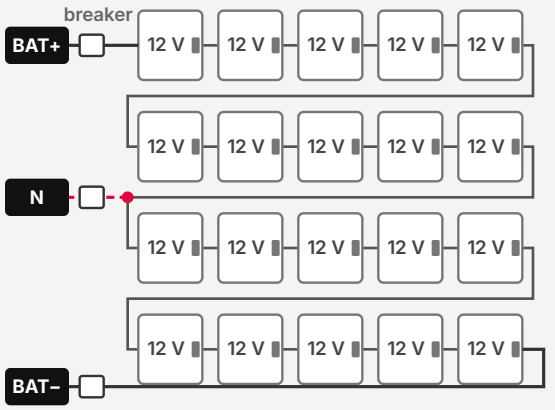
At 50 % load

20 kVA	85 min
40 kVA	32 min
60 kVA	22 min
80 kVA	14 min
100 kVA	12 min

At 100 % load

20 kVA	32 min
40 kVA	14 min
60 kVA	8 min
80 kVA	6 min
100 kVA	3 min

Minutes with the 240 internal blocks, new batteries.



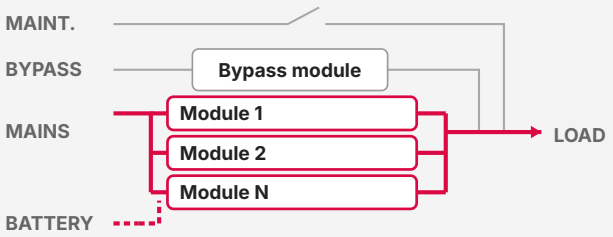
One string: 20 blocks of 12 V with the neutral at the midpoint, ±120 V DC, through the battery breaker; the 24 trays hold 240 blocks in such strings.

±120 V	240	2.25 V	68–77 °F
battery bus	blocks inside	float, per cell	best battery temperature

Technical Specifications
RADIANT-IB 20–100 kVA

Model	20 kVA	40 kVA	60 kVA	80 kVA	100 kVA
Power (kVA = kW)	20	40	60	80	100
Power modules	1 × 20 kVA	2 × 20 kVA	3 × 20 kVA	4 × 20 kVA	5 × 20 kVA
INPUT					
Connection · voltage	3 phases + N + PE · 208 V L-L (200 / 208 / 220 V rated)				
Voltage range	166–261 V L-L at full load; 125–166 V derated to 75 %				
Frequency · power factor	40–70 Hz · > 0.99				
Current THD	≤ 3 %				
Bypass	window +10/+15/+20 %, −10 to −40 % (default +15/−20 %); ±1, 3 or 5 Hz				
OUTPUT					
Voltage · frequency	208 V L-L · 50/60 Hz ± 0.1 %				
THD	≤ 1 % linear, ≤ 5 % non-linear				
Power factor	1 (kVA = kW)				
Inverter overload	110 % 1 h · 125 % 10 min · 150 % 1 min · > 150 % 200 ms				
Bypass overload	110 % long term · 125 % 5 min · 150 % 1 min · > 150 % 1 s				
Transfer	0 ms synchronized; < 10 ms from ECO				
Efficiency	94 % max, double conversion and battery mode				
BATTERY					
Blocks · bus	240 × 12 V 9 Ah VRLA in 24 trays · ±120 V DC, 20 blocks per string				
Charge	float 2.25 V/cell, boost 2.3 V/cell, −1.7 mV/°F/cell (−3.0 mV/°C/cell) compensation				
Backup at 50 · 100 %	85 min · 32 min	32 min · 14 min	22 min · 8 min	14 min · 6 min	12 min · 3 min
SYSTEM					
Rated currents, 100 kVA	348 A mains · 277 A bypass and output · 476 A battery				
Display · communication	7-inch color touchscreen · RS232, RS485, USB, dry contacts, EPO; SNMP and intelligent slots				
Parallel	up to 3 cabinets				
Environment	32–104 °F (0–40 °C) · 0–95 % RH · IP20 · full power to 3,300 ft (1,000 m), −1 % per 330 ft (100 m) above · < 65 dB				
W × D × H	23.6 × 39.4 × 78.7 in · 600 × 1,000 × 2,000 mm				
Weight with batteries	2,191.8 lb	2,243.8 lb	2,295.8 lb	2,347.8 lb	2,399.8 lb
Standards	UL 1778 standard				
Warranty	3 years on the UPS · 2 years on the VRLA batteries				

HOW IT WORKS · ONLINE DOUBLE CONVERSION



PROTECTIONS

- Output overload and short circuit
- Module and inlet over-temperature
- Battery low, end of discharge, reverse polarity
- Lost N+X redundancy
- Input neutral lost, bypass sequence error
- EPO, local and remote

Ordering Information
RADIANT-IB 20–100 kVA

Every RADIANT-IB is ordered with one code: the frame, then the number of 20 kVA modules. The 240 blocks come inside; frames, modules and trays are also sold on their own.

RADIB 100 -3X20

series | frame, kVA | power modules × kVA

The frame first, then its 20 kVA power modules: one for every 20 kVA of load and one more for N+1. Every frame comes with its 240 blocks in 24 trays.

EXAMPLES

RADIB100-3X20
60 kVA: three 20 kVA modules

RADIB100-5X20
100 kVA: five 20 kVA modules

Code	Description
RADIB100-1X20	RADIANT-IB 20 kVA: 1 × 20 kVA module, 240 × 12 V 9 Ah inside · 32 min at full load
RADIB100-2X20	RADIANT-IB 40 kVA: 2 × 20 kVA modules, 240 × 12 V 9 Ah inside · 14 min at full load
RADIB100-3X20	RADIANT-IB 60 kVA: 3 × 20 kVA modules, 240 × 12 V 9 Ah inside · 8 min at full load
RADIB100-4X20	RADIANT-IB 80 kVA: 4 × 20 kVA modules, 240 × 12 V 9 Ah inside · 6 min at full load
RADIB100-5X20	RADIANT-IB 100 kVA: 5 × 20 kVA modules, 240 × 12 V 9 Ah inside · 3 min at full load
RADIB-FRAME	RADIANT-IB 100 kVA frame with the bypass & monitoring module
RADIB-PWR-20	Power module 20 kVA
RADIB-BATTR-EMPTY	Battery tray, empty
RADIB-BATTR-10x9A	Battery tray with ten 12 V 9 Ah VRLA blocks
SNMP-M	SNMP network card
DRYCNT	Dry-contact card



RADIANT-IB 100 kVA cabinet, rear doors open



The same cabinet, front door open: modules, 24 trays

× 1–5

Modules per frame

20 kVA each, up to 100 kVA; one more than the load needs for N+1.

RADIB100-5X20 AS N+1

20 kVA	20 kVA	20 kVA	20 kVA	+1

Four modules carry up to 80 kVA of load; the fifth is the spare.