AEC

SPLIT-PHASE ONLINE UPS · 120/240 V

FERRUS SP 6–10 kVA

Quick Installation Guide

From delivery to normal operation. Qualified electricians only. Read every safety message.

FERSP6000-16X9 · FERSP10000-16X9 · BB4US battery cabinet

AEC-QG-FSP-US · REV. A1 · NOVEMBER 2026



1 Safety first

Read these messages before you start. Keep this guide and the user manual near the UPS.

⚠ DANGER

Hazardous voltage. The UPS carries 16 × 12 V batteries inside (192 V DC) and stays live from them when every breaker on the rear panel is open. The battery circuit is not isolated from the utility input: check that there is no voltage between the battery terminals and ground before you touch any battery part. Open the BB4US battery breaker before you open any cover.

⚠ WARNING

Qualified electricians only. The UPS is hardwired. Install it to the National Electrical Code (NFPA 70) and local codes. Switch off and lock out the utility supply before wiring. Never feed the UPS from a wall receptacle.

⚠ WARNING

Batteries. Wear rubber gloves and rubber-soled boots, remove rings and watches, and use tools with insulated handles only. Do not lay tools on the batteries. Reversed battery polarity damages the UPS: always check it with a voltmeter.

⚠ WARNING

The UPS is heavy: 196.2 lb (89 kg) for the 6 kVA, 235.9 lb (107 kg) for the 10 kVA. Move it on its casters on a flat floor only, with two or more people. Do not tilt it more than 10°.

2 Check the delivery and the site

What is in the box, the room and the free space around the tower.

In the box: 1 × FERRUS SP UPS with its internal batteries · 1 × user manual · accessory kit (check it against the packing list). A BB4US battery cabinet, if ordered, comes separately.

1. Inspect the unit for transport damage. If anything is damaged or missing, do not switch it on: notify the carrier and your AEC dealer.
2. If the UPS was unpacked in a cold place, wait until it is completely dry inside and out. Condensation can cause electric shock.
3. Check the site against Table 2-1 and Figure 3-1.

TABLE 2-1 Site requirements

Item	Requirement
Location	Indoors, ventilated, on a level floor rated for the weight; away from water, heat sources, flammable gases and corrosive agents
Temperature	32–104 °F (0–40 °C); battery life is best at 59–77 °F (15–25 °C)
Humidity · altitude	Below 95 %, non-condensing · full power up to 3,300 ft (1,000 m)
Clearance	At least 19.7 in (500 mm) on all four sides; the air flows from front to rear: never put the rear against a wall
Floor area	49.3 × 63.0 in (1,252 × 1,599 mm) with the clearances
Working space	NEC 110.26 working space in front of the rear panel (terminals and breakers)

3 Place the tower

Roll it in, lock it, anchor it if required.

1. Roll the tower into place on its casters.
2. Check the clearances: 19.7 in (500 mm) free on all four sides (Figure 3-1).
3. Lock the caster brakes (6 in Figure 3-2).
4. For a fixed or seismic installation, anchor the 4 brackets to the floor with M8 anchors (by the installer). The anchor slots are 10 × 17 mm, 11.0 in (280 mm) apart across the cabinet and 7.4 in (188 mm) front to back.
5. If a BB4US cabinet is used, place it beside the UPS, within reach of its battery cable, with its own clearances.

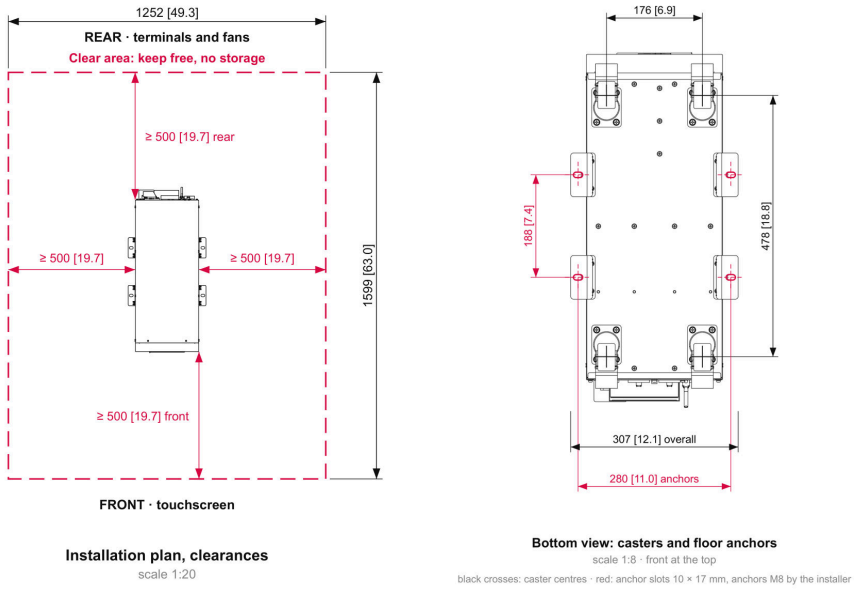
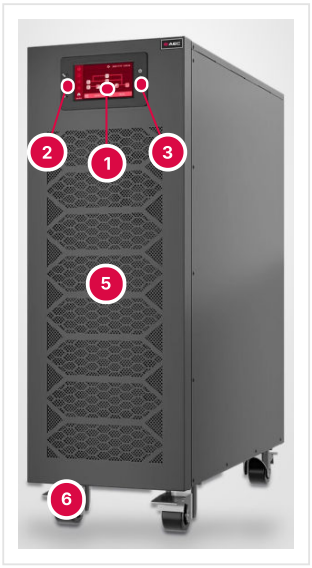


FIGURE 3-1 Installation plan and clearances (left) and bottom view with caster centers and anchor slots, front at the top (right) — AEC drawing sheet 6, mm [in]

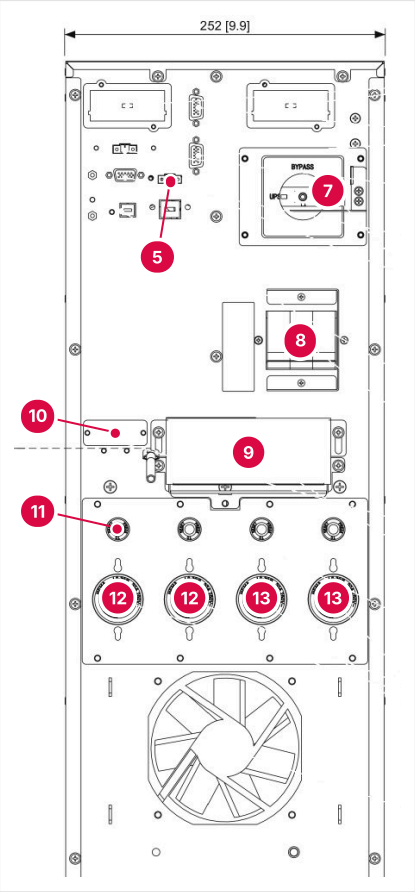


1. Color touchscreen
2. Status LEDs ALM · BYP · BAT · INV · mute
3. Power button
5. Front grille — cool air in
6. Casters, four, two with brakes

FIGURE 3-2 FERRUS SP front view

4 Wire the power

Ground first, then the input, the output with its jumpers, the battery cable last.



5	EPO, normally closed loop
7	Maintenance bypass switch UPS / BYPASS
8	Input breakers, 3 × 63 A 1-pole: Byp-L1 · Mains-L1 · I/P-L2
9	Terminal cover; the 7-terminal strip is behind it
10	Battery connector BAT+ · BAT−, separate block left of the strip
11	Output surge protection, resettable
12	NEMA L5-30R × 2, 120 V
13	NEMA L6-30R × 2, 240 V

FIGURE 4-1 Rear panel, terminal cover fitted (AEC drawing sheet 4) — numbers as in the user manual

Where the terminals are. Behind the terminal cover (9) is **one strip of 7 terminals, from left to right seen from the rear: PE · I/P-L1 · I/P-L2 · O/P-L1 · O/P-N1 · O/P-L2 · O/P-N2.** M4 screw clamps, pitch 0.57 in (14.5 mm), 3.4 in (87 mm) first to last terminal, terminal height 1.7 in (43 mm). **Terminal center line 17.0 in (433 mm) above the floor**, casters included. The battery has its own connector, **BAT+ · BAT−, on a separate block to the left of the strip** (10) — not on the strip. Cables enter from below, through the terminal cover. The terminals as they look on the unit: Figure 4-3.

Size the input circuit. The input is the two line conductors of a 120/240 V or 120/208 V service (L1 and L2, 240 V or 208 V between them) and the equipment grounding conductor — **no input neutral**. Input breaker: the next standard rating (NEC 240.6) at or above both the maximum input current and 125 % of the rated input current at 240 V (rated power ÷ 93 % efficiency ÷ 240 V; NEC 215.2, 215.3). The maximum input current flows only at low input voltage, full load and full battery recharge. The result in Table 4-1 is the same on a 208 V supply.

TABLE 4-1 Input circuit, conductors and output current

Rating	Input current, max.	Recommended branch breaker, 2-pole	Factory cable size, input and output	Output current per 120 V leg
6 kVA	36 A	40 A	10 AWG (6 mm²)	25 A
10 kVA	63 A	70 A	8 AWG (10 mm²)	42 A

TABLE 4-2 Recommended overcurrent protection and copper conductors

Circuit	Sizing current	Recommended breaker (NEC 240.6)	Copper conductor, 75 °C (NEC 310.16)
Input, 6 kVA (2-pole)	36 A max.; 125 % × 26.9 A rated = 33.6 A	40 A	8 AWG
Input, 10 kVA (2-pole)	63 A max.; 125 % × 44.8 A rated = 56 A	70 A	4 AWG
Output leg, 6 kVA (configurations 03, 04)	31.25 A	35 A	10 AWG
Output leg, 10 kVA (configurations 03, 04)	52.5 A	60 A	6 AWG
Battery cable, 6 kVA (BB4US)	53.75 A	—	6 AWG
Battery cable, 10 kVA (BB4US)	81.25 A	—	4 AWG

The example assumes copper THHN/THWN conductors at 75 °C, no more than three current-carrying conductors in the raceway and an ambient of 86 °F (30 °C). The 10 kVA input and battery sizes (4 AWG) are larger than the factory sizes and may not fit the M4 clamps of the strip: ask AEC before you plan the cables.

Size the conductors for the breaker, with the 75 °C column for the terminations (NEC 110.14(C)). PE as the largest phase conductor; BB4US battery cable 8 AWG (10 mm²) for the 6 kVA, 6 AWG (16 mm²) for the 10 kVA. The factory sizes are the minimum the terminals are designed for: if the NEC size is larger, check that it fits the M4 clamp and ask AEC before you install. Install an output circuit breaker for every output circuit.

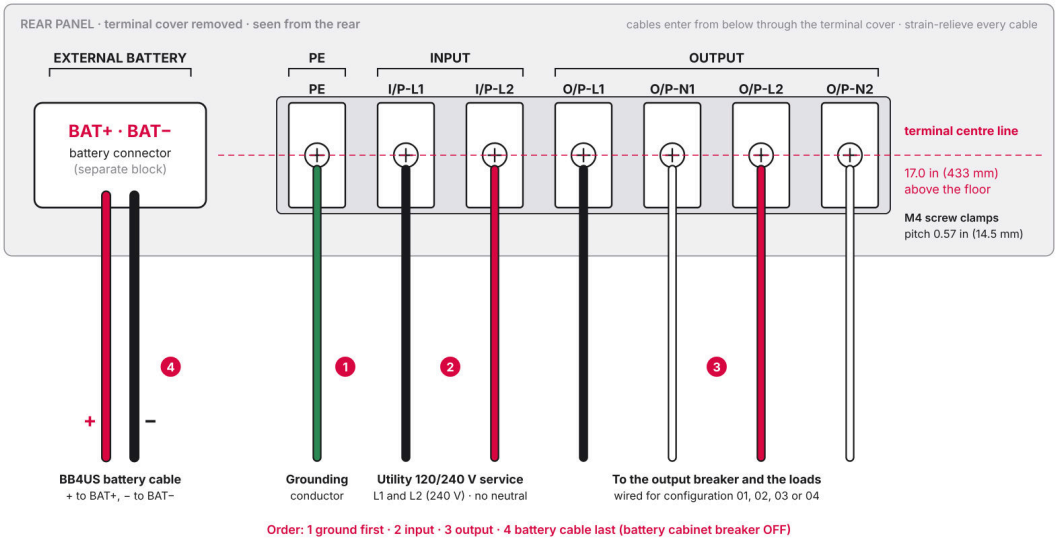
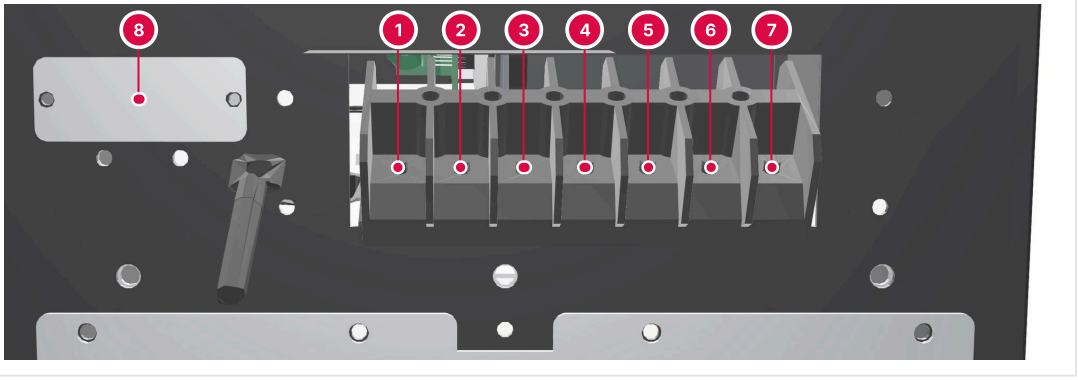


FIGURE 4-2 Power terminals and battery connector, seen from the rear with the terminal cover removed: wire order 1–4



1	PE	5	O/P-N1
2	I/P-L1	6	O/P-L2
3	I/P-L2	7	O/P-N2
4	O/P-L1	8	Battery connector BAT+ · BAT–

FIGURE 4-3 The same terminals on the unit, cover removed (rendering from the factory 3D model)

1. Check that the input breakers **Byp-L1**, **Mains-L1** and **I/P-L2** (8 in Figure 4-1) are open and the utility supply is locked out.
2. Remove the terminal cover (9 in Figure 4-1).
3. Bring the cables in from below, through the terminal cover.
4. **Ground first** (1 in Figure 4-2): connect the grounding conductor (green or green/yellow) to PE before any other wire.
5. **Input** (2): connect service line L1 to I/P-L1 and service line L2 to I/P-L2. Do not connect a neutral to the input.
6. **Output** (3): choose the output configuration in Table 4-3, fit its jumpers and connect O/P-L1, O/P-N1, O/P-L2 and O/P-N2 for it (Figure 4-4).
7. **Battery, last** (4): if a BB4US cabinet is used, connect its cable to the battery connector as in **Connect the battery**.
8. Tighten every screw to the torque on the terminal label. Pull each wire gently to check it is held. Strain-relieve every cable.
9. Check every connection and refit the terminal cover.

Choose the output configuration. The isolation transformer makes two 120 V legs; jumpers on the output terminals set the output for the site. In a parallel system every unit uses the same configuration.

TABLE 4-3 Output configurations

No.	Output	Jumpers	Loads
01	Two separate 120 V	none	**Not allowed on the FERRUS SP 6/10 kVA tower: see the warning under the figure.**
02	One 120 V	O/P-L1–O/P-L2 and O/P-N1–O/P-N2	**Not allowed on the FERRUS SP 6/10 kVA tower: see the warning under the figure.**
03	One 240 V	O/P-N1–O/P-L2	One load across O/P-L1–N2: the full rating at 240 V; no neutral needed by the load.
04	120 V and 240 V together	O/P-N1–O/P-L2	120 V on O/P-L1–N1 and O/P-L2–N2, 240 V on O/P-L1–N2. Split-phase 3-wire loads: O/P-L1, O/P-N1 (= O/P-L2) as the neutral, and O/P-N2.



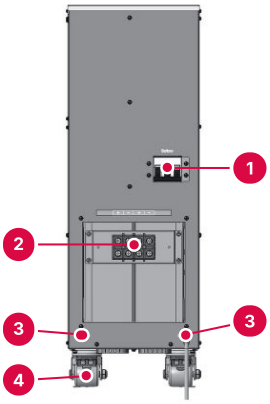
FIGURE 4-4 The four output configurations — jumpers in red, on the output terminals of the strip

> ⚠ **WARNING**
> **Use configuration 03 or 04 only.** The FERRUS SP 6/10 kVA tower has two NEMA L6-30R (240 V) receptacles, so O/P-N1 is linked to O/P-L2 inside the UPS. The jumpers of configuration 01 or 02 would short the transformer windings and damage the UPS. Configuration 04 feeds both receptacle types: the two NEMA L5-30R (120 V, 30 A) take the two legs, the two NEMA L6-30R (240 V, 30 A) the output across them. For 120 V loads only, use 04 and share the loads between the two legs (up to 50 % of the rating each). Keep the total load within the UPS rating.

5 Connect the battery

The 16 internal blocks are connected at the factory. A BB4US cabinet goes on the separate battery connector.

The internal battery (16 × 12 V 9 Ah, 192 V DC) needs no connection. For longer runtime, the BB4US cabinet (32, 64 or 80 blocks of 12 V 9 Ah in strings of 16, 192 V DC) connects to the **battery connector BAT+ · BAT−**, the separate block to the left of the 7-terminal strip (10 in Figure 4-1).



1. Battery breaker (MCB)
2. DC terminal block, two strings (+ − + −)
3. Ground stud, one at each lower corner
4. Casters

FIGURE 5-1 BB4US, rear

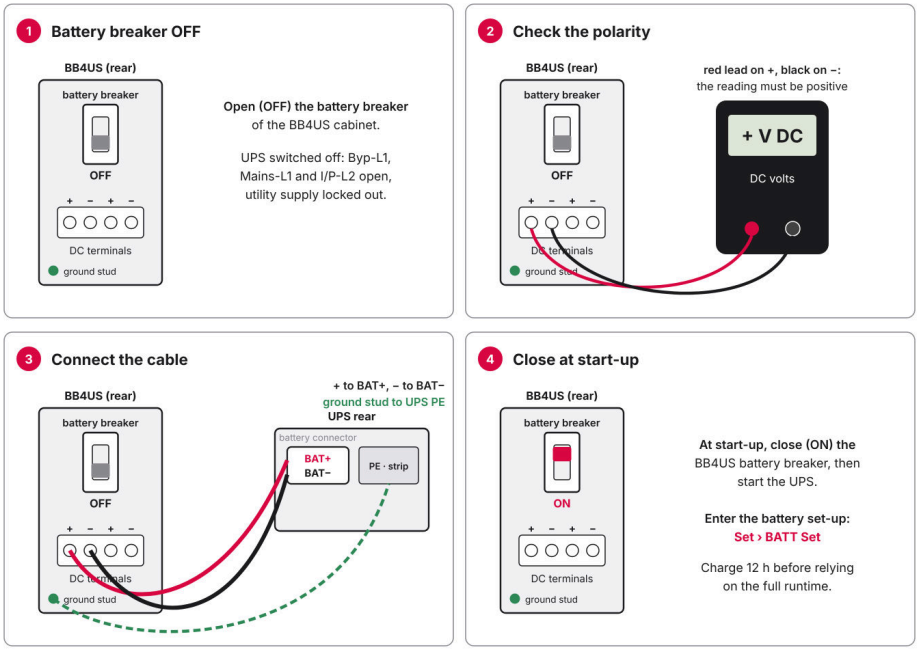


FIGURE 5-2 Connecting the BB4US: breaker off, polarity, cable, breaker on at start-up

⚠ CAUTION

Check the polarity of the battery cabinet with a voltmeter before connecting. Reversed polarity damages the UPS.

1. Check that the UPS is off: Byp-L1, Mains-L1 and I/P-L2 open, utility supply locked out.
2. **Open the battery breaker of the BB4US cabinet** (1 in Figure 5-1, OFF).
3. Connect the ground stud of the cabinet (3) to PE of the UPS.
4. **Check the polarity with a voltmeter** (DC volts): red lead on +, black lead on −. The reading must be positive (192 V DC nominal for a string of 16 blocks). If the cabinet terminals are dead with the breaker open, check at the UPS end of the cable with the breaker closed for the measurement only, then open it again.
5. **Connect the BB4US cable to the UPS battery connector:** + to BAT+, − to BAT−. Cable 8 AWG (10 mm²) for the 6 kVA, 6 AWG (16 mm²) for the 10 kVA.
6. Refit the covers. Leave the cabinet breaker open until start-up.

6 Start the UPS

Breakers in the order below; the UPS reaches line (normal) mode in about one minute.

Before you start: the wiring is complete and the terminal cover refitted, the loads are switched off, the output breaker is installed, and the communication, EPO and parallel cables (if used) are connected.

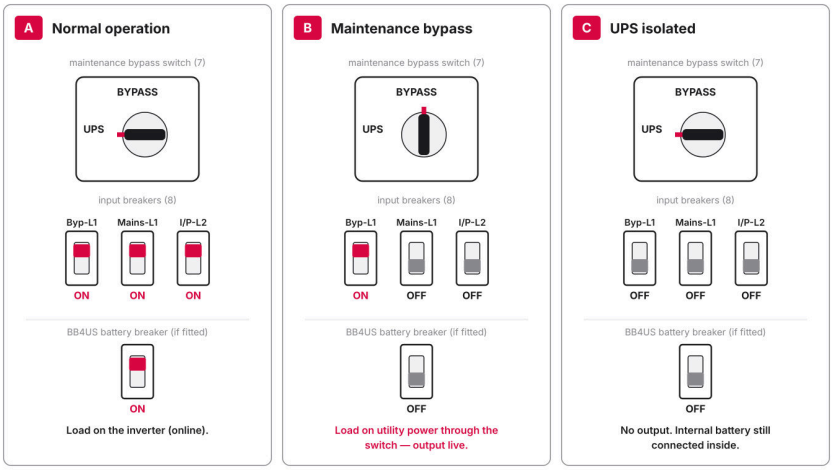
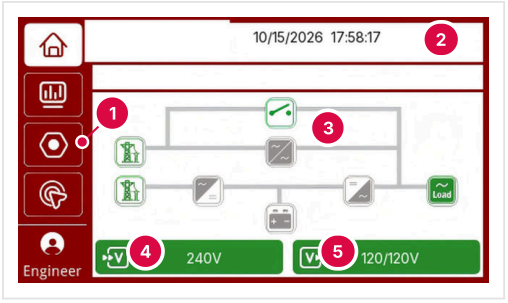


FIGURE 6-1 Breaker and maintenance bypass positions: A normal operation, B maintenance bypass, C UPS isolated. Numbers as in the rear panel figure



1. Side menu — Home, Data, Set and Control; the user level logged in below
2. Status bar — the current message, buzzer mute, date and time
3. Power flow — green active, grey not active
4. Input voltage
5. Output voltage of the two legs

FIGURE 6-2 Home page

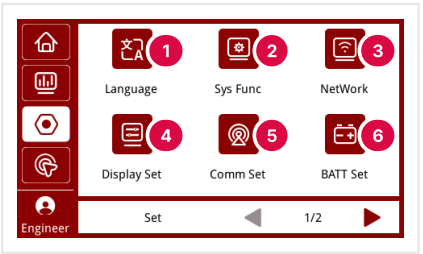
1. Check that the maintenance bypass switch (7 in Figure 4-1) is on **UPS** (Figure 6-1, A).
2. If a BB4US is connected, close its battery breaker (ON).
3. Close the input breakers **Byp-L1**, **Mains-L1** and **I/P-L2** (8). The fans start and the touchscreen lights.
4. Wait. The rectifier starts; after about one minute the UPS goes to line (normal) mode and **INV** lights.
5. Check the home page (Figure 6-2): power flow from the utility through rectifier and inverter to the load, no alarm in the status bar.

7 Set and check

The few settings needed at the first start, the checks for normal mode, then the loads.

⚠ CAUTION

Only qualified personnel, logged in as **Engineer**, may change the settings. The number of batteries set must equal the number installed, or the batteries and the UPS can be damaged.



1. Language
2. Sys Func — date and time, serial number
3. NetWork
4. Display Set
5. Comm Set
6. BATT Set — battery set-up

FIGURE 7-1 Set, page 1

1. **Battery: Set › BATT Set** (6 in Figure 7-1) — 16 blocks per string and the capacity: 9 Ah internal only; with a BB4US-32X9 27 Ah, -64X9 45 Ah, -80X9 54 Ah. Keep the charger current at 1 A; raise it (1 to 8 A) only for a set-up above 24 Ah.

2. **Date and time: Set › Sys Func** (2).
3. **Output:** the output is 120/240 V, 60 Hz. The rated voltage per leg (110, 115, 120 or 127 V) and the system mode (single, parallel or ECO) are on Set, page 2 — engineer level, at commissioning.
4. **Check normal mode:** only **INV** lit on the front panel; **Data › Current Alarm** empty; **Data › Output** shows the voltage of both legs.
5. **Switch on the loads** one at a time, the largest first. Then check **Data › Load**: the load of each leg in % and kW, each 120 V leg within 25 A (6 kVA) or 42 A (10 kVA).
6. **Charge the batteries for at least 12 hours** before you rely on the full runtime (6 kVA, internal battery: 6 min at full load, 14 min at half load; 10 kVA: 3.2 and 7.5 min).

i NOTE Re-check the tightness of the terminals after 24 hours of operation. Write the input breaker, conductor size, output configuration and battery set-up in the installation record of the user manual.

8 Shut down and maintenance bypass

Breaker states as in the breaker positions figure of the start-up step.

Shut down (normal mode)

1. Switch off the loads.
2. Switch the inverter off: **Control › Function › ON/OFF Control**. The UPS transfers to bypass.
3. Open **Mains-L1**, **I/P-L2** and **Byp-L1**.
4. If a BB4US is connected, open its battery breaker (Figure 6-1, C).
5. Switch the UPS off completely with the power button on the front panel (3 in Figure 3-2), so that it does not discharge its internal battery.

To maintenance bypass — keeps the load on utility power while the UPS is serviced.

1. Transfer the UPS to bypass: **Control › Function › Manual Bypass**. BYP lights.
2. If a BB4US is connected, open its battery breaker.
3. Turn the maintenance bypass switch (7 in Figure 4-1) to **BYPASS**: the load stays on utility power.
4. Open **Mains-L1** and **I/P-L2**. Leave **Byp-L1** closed: the maintenance bypass is fed through it (Figure 6-1, B).
5. Switch the UPS off with the power button on the front panel, so that it does not run from its internal battery.

Back to normal operation

1. Close **Mains-L1** and **I/P-L2**; wait until the rectifier has started.
2. Turn the maintenance bypass switch to **UPS**.
3. If a BB4US is connected, close its battery breaker.
4. Select **Control › Function › Manual Transfer to Inverter**. INV lights (Figure 6-1, A).

⚠ *WARNING*

With the maintenance bypass on, the output terminals and receptacles stay live from the utility. The input terminals, Byp-L1 and the bypass circuit are live too. The internal battery stays connected inside the UPS.

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Settings, alarms, maintenance and every detail: **FERRUS SP 6–10 kVA User Manual, AEC-UM-FSP-US** (aecups.com · AEC app › Support › Downloads).