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1 Introduction

This manual contains information for users of the Daker DK 4.5, 6, 10 kVA models.

You are advised to read this handbook carefully before installing your uninterruptible power supply, meticulously following the instructions given herein.

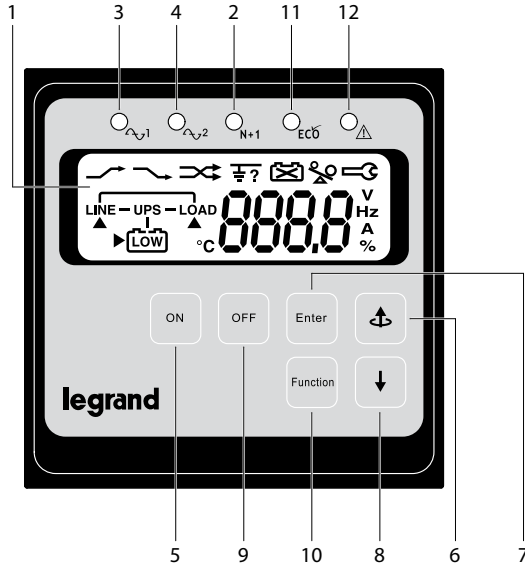
The UPS Daker DK is only been made for civil or industrial use; it is not in conformity with the standards for electro-medical equipment.

In case of problems with the UPS, please read this manual before contacting technical support; The “Troubleshooting” section can in fact help resolving most of the problems encountered while using the uninterruptible power supply.

2 Conditions of use








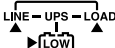


- The UPS has been designed for the power supply of the data processing equipment; The load applied must not exceed the one indicated on the rear label of your UPS.
- The ON/OFF button of your UPS does not electrically isolate the internal parts. To isolate your UPS unplug it from the mains power socket.
- Do not open the UPS container since there may be parts inside with dangerously high voltage even when the mains plug is disconnected; there are no parts inside that the user can repair.
- The front control panel is provided for manual operations; Do not press on the panel with sharp or pointed objects.
- The UPS Daker DK has been designed to work in closed, clean rooms where there are no inflammable liquids or corrosive substances and where it is not too damp.
- Do not place near equipments that generate strong electro-magnetic fields and/or near equipments that are sensible to electro-magnetic fields. (engines, floppy disks, speakers, adapters, monitors, video, etc...)
- Do not pour any liquid on the UPS or inside the UPS.
- Do not place the UPS in humid environment or near liquid, such as water, chemical solution...
- Do not expose the UPS to the direct sunlight or any heat sources.
- Keep the ventilation slits clean to dissipate the heat of the UPS.
- Use grounded power cable to connect the UPS to the mains supply.
- Do not plug laser printers into the UPS because of their high start-up current.
- Do not plug house electric equipments, such as hair dryer, air conditioner, and refrigerator into the UPS outlets.

3 LCD Panel



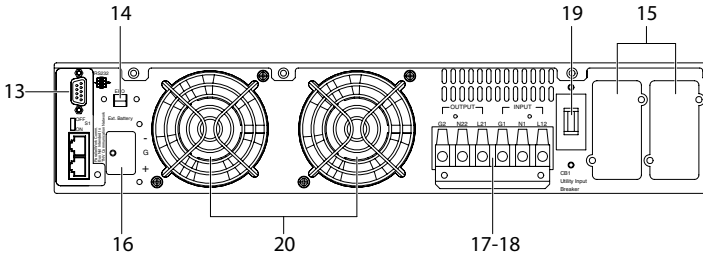
1. LCD panel
2. Green LED indicates that the UPS is able to run under redundancy mode.
3. Solid green LED indicates that the utility input voltage is within the window.
Flashing green LED indicates that the utility input voltage is within the acceptable window.
4. Green LED indicates that Bypass Input is normal.
5. UPS ON/Alarm Silence
6. Go to previous page or change the setting of the UPS.
7. Confirm a changed setting.
8. Go to the next page.
9. UPS OFF Switch
10. Special functions log in/out
11. UPS is working under ECO (Economical) mode.
12. UPS alarm LED

Display LCD symbols

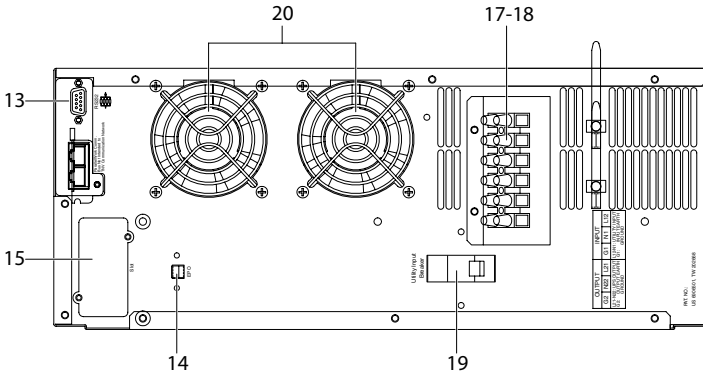
Item	Symbol	Description
1	LINE	Utility or Bypass Source
2		Battery Low
3		Battery Abnormal
4		UPS Overloading
5		UPS Working in specified mode*
6		A Blackout Transfer occurred in UPS Output
7		Bypass Input Abnormal, UPS fails to transfer to bypass
8		Utility Input Abnormal
9	OFF	UPS Shutoff
10	LINE OFF	UPS Abnormal Lock
11		UPS Flow Chart
12		4-Digit Measurement Display
13		Indicates the item to be measured
14	EPO	Emergency Power Off
15	Er05	Battery Weak or Dead
16	Er06	Output Short Circuit

Item	Symbol	Description
17	Er10	Inverter Over-current
18	Er11	The UPS is overheated
19	Er12	UPS Output Overloading
20	Er14	Fan Error
21	Er15	Wrong Procedure to Enter Maintenance Mode
22	Er28	Bypass Overload Time out
23	Er**	Other Error code

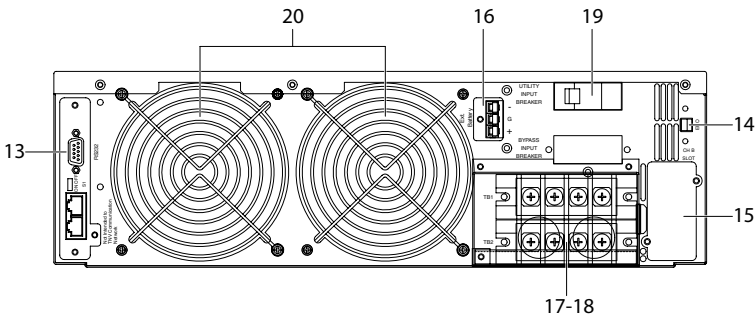
4 Rear panel



3 100 56
3 100 57



3 100 53
3 100 54

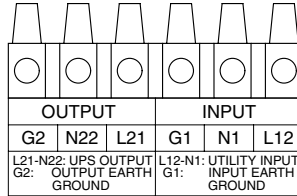


3 100 58
3 100 59

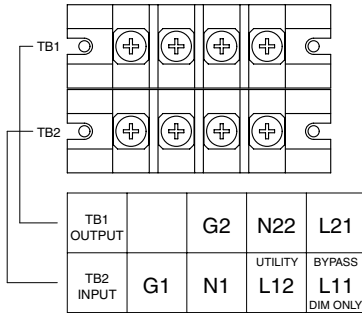
- | | |
|---|-----------------------------------|
| 13. RS-232 Port | 17. AC utility power connection |
| 14. Emergency Power Off (EPO) Dry Contact Signal inputs | 18. AC Outlets power connection |
| 15. Communication Card Options Slot | 19. Utility Input circuit breaker |
| 16. External Battery Connector | 20. Cooling Fans |

Interface Settings

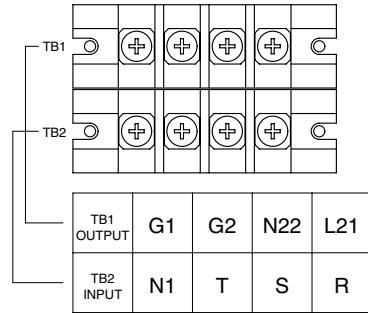
3 100 53/54/55/56/57



3 100 58



3 100 59



L11-N1 : clamps not used in this version

L12-N1 : clamps for connection to the UPS input line (3 100 58)

R-S-T-N1 : clamps for connection to the UPS input line (3 100 59)

G1: clamp for UPS input ground cable connection

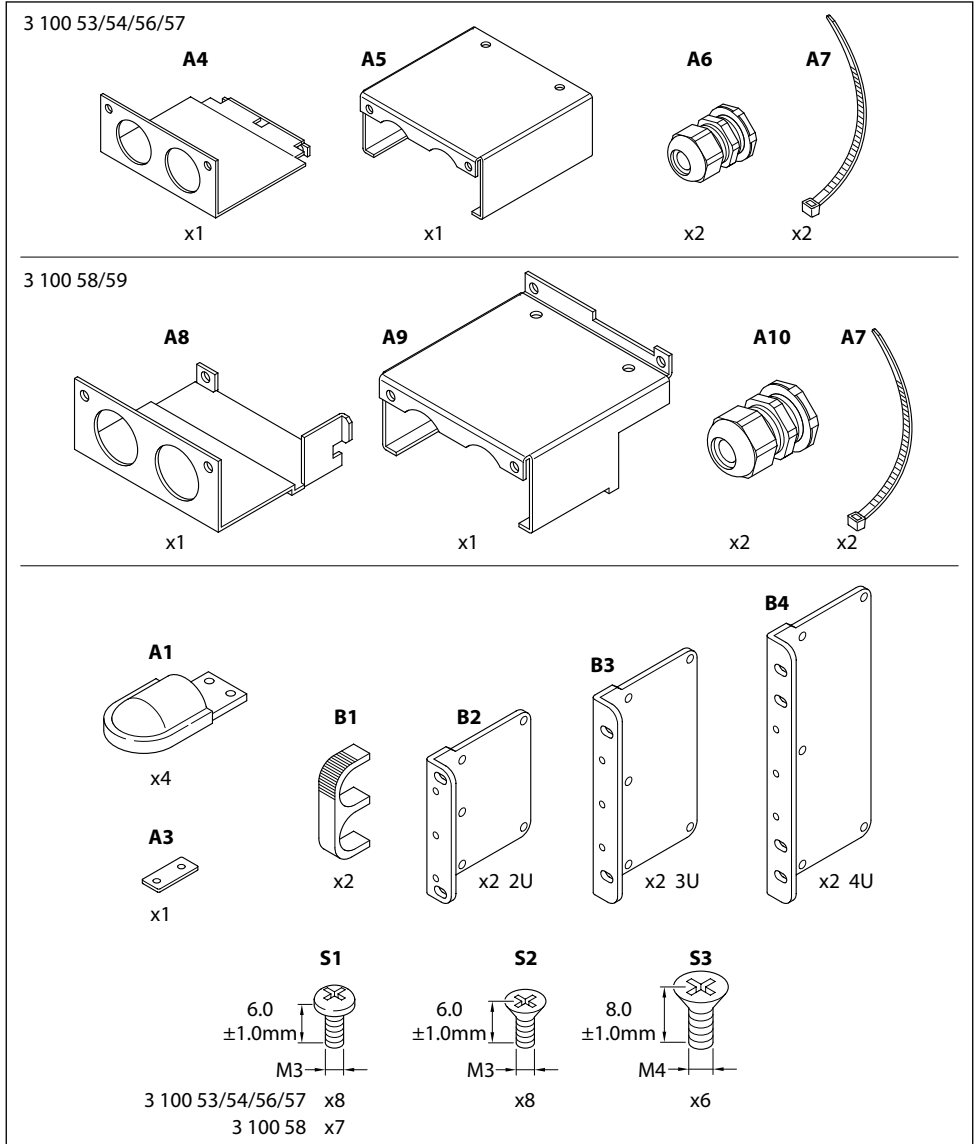
L21-N22: clamps for UPS output connection

G2: clamp for UPS output ground cable connection

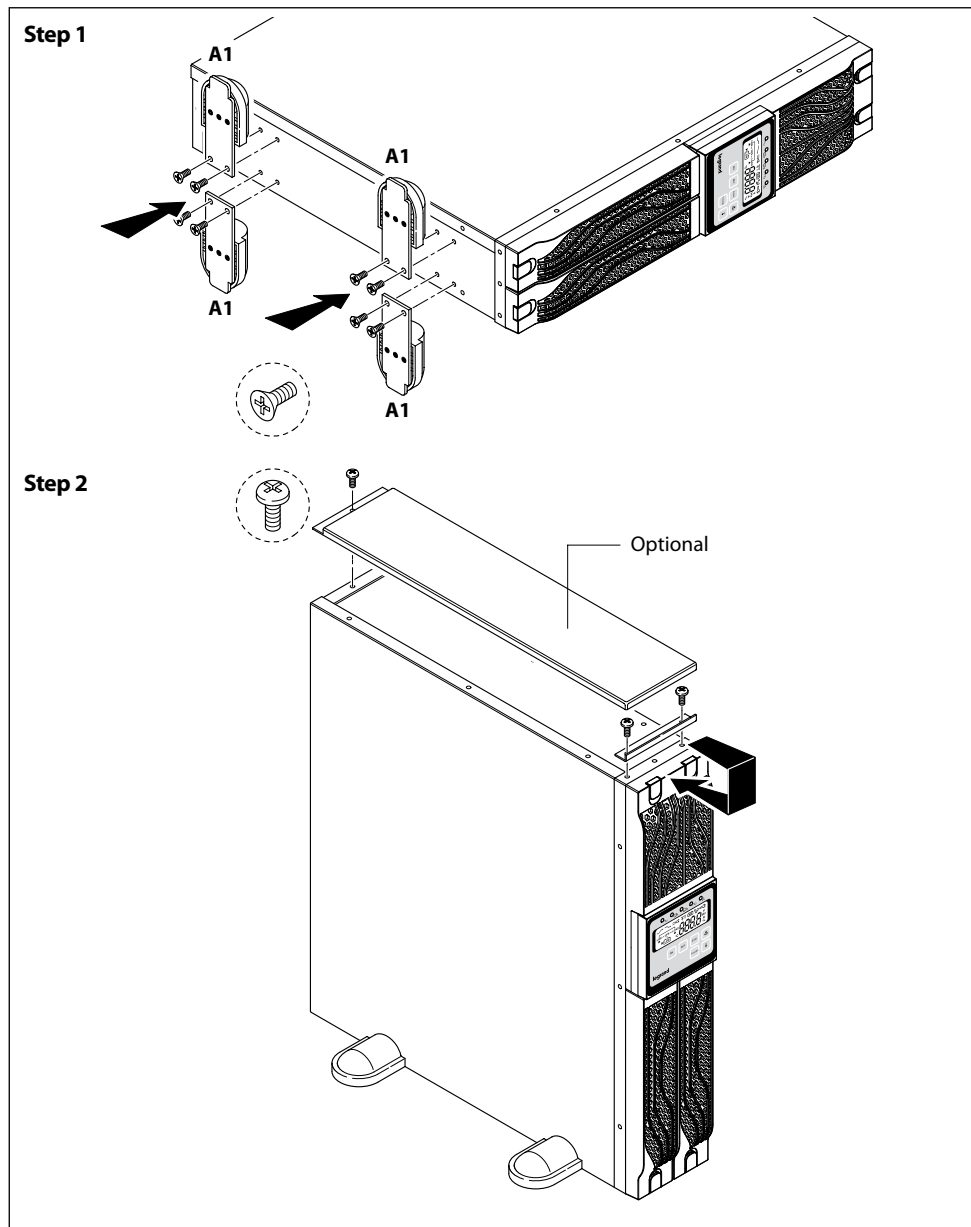
5 Installation

Check for the following standard package contents:

- User Manual
- RS-232 communication cable
- Tower/Rack Accessories Kit as below:

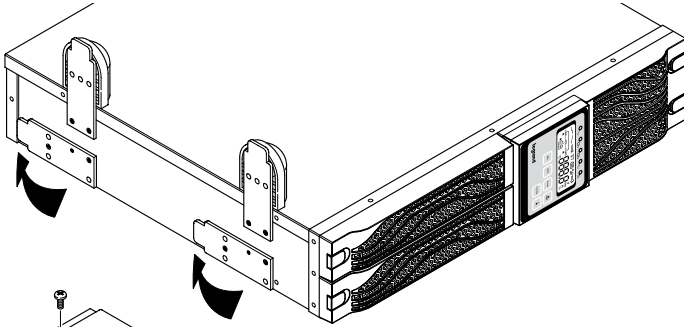


Tower configuration setup

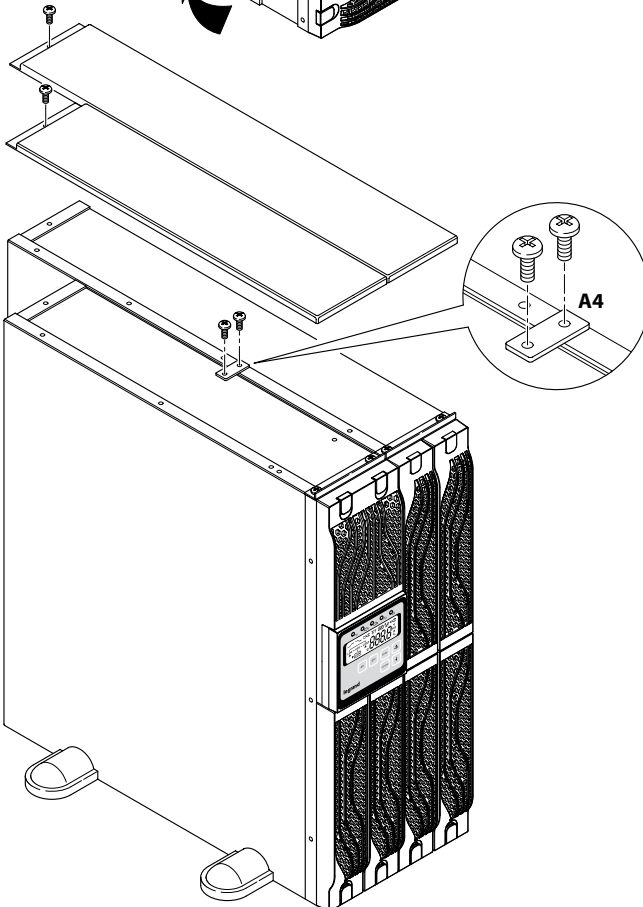


UPS + battery cabinet

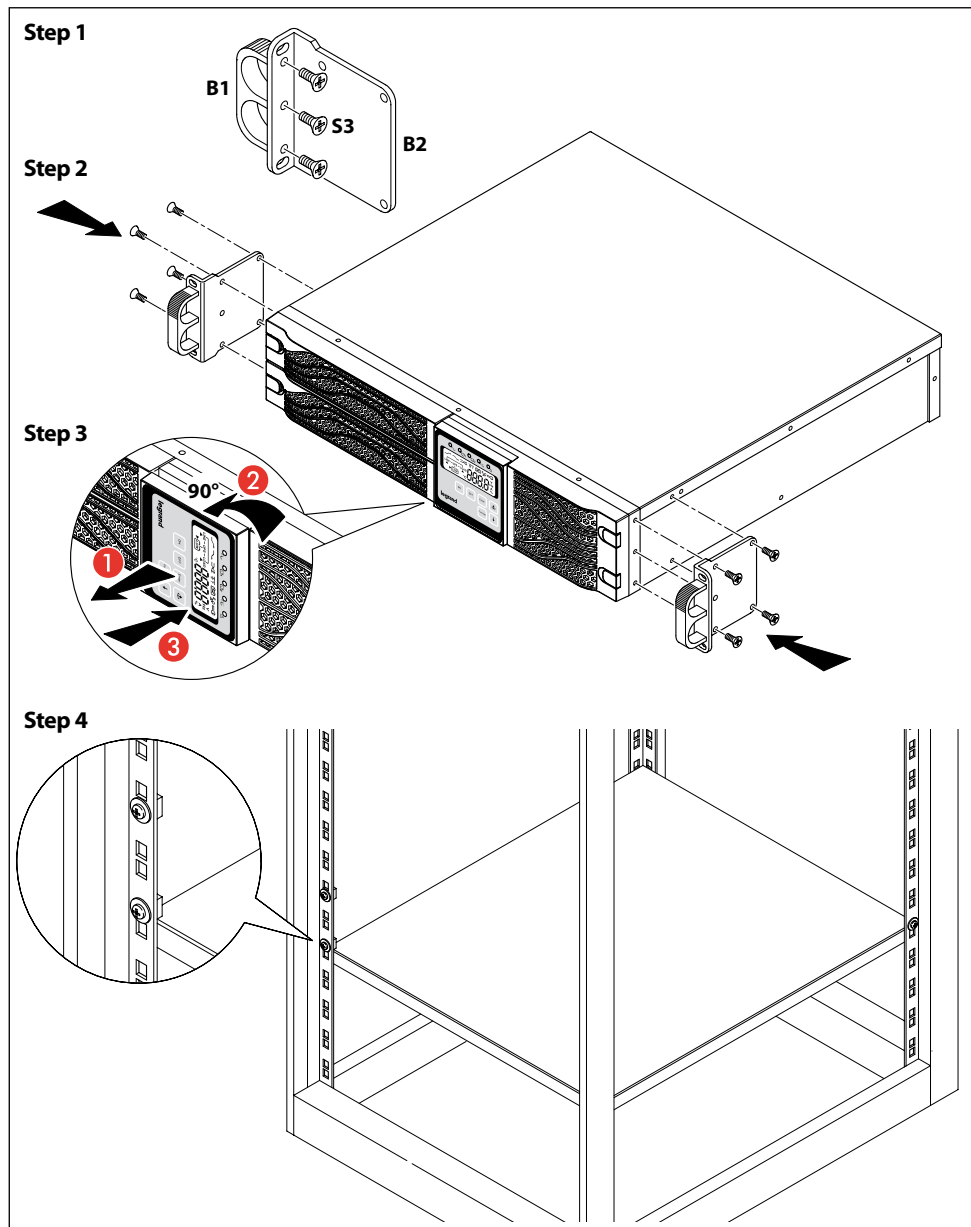
Step 1



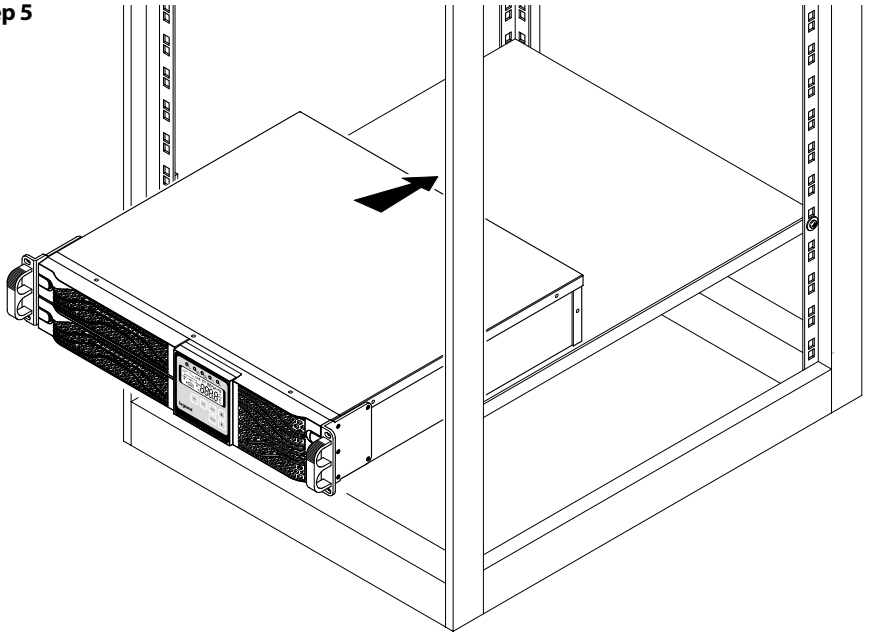
Step 2



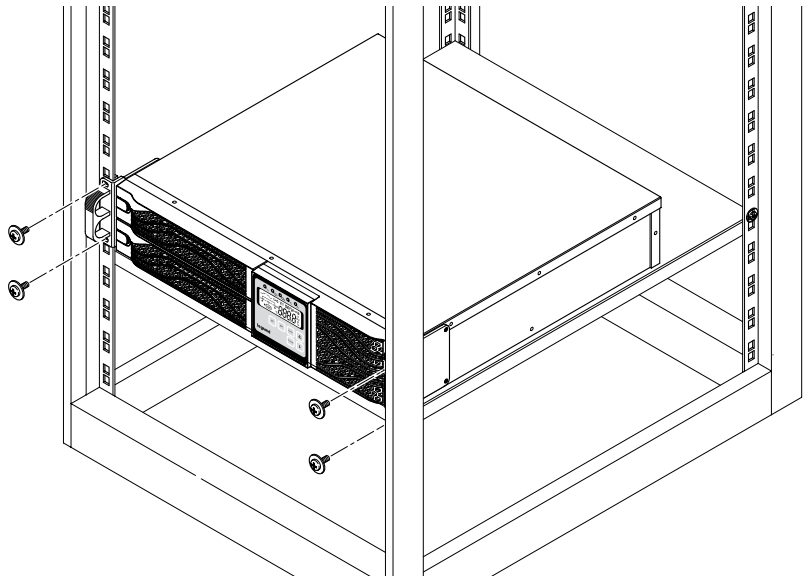
Configuration rack 19"



Step 5

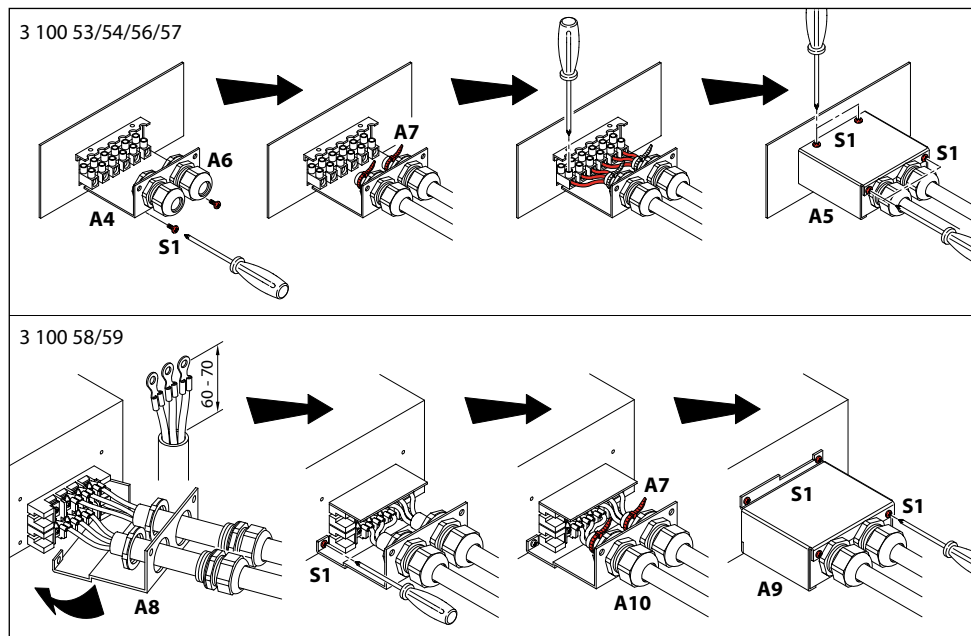


Step 6



On the rear of the uninterruptible power supply are the following connections:

- Output sockets and input connector (17) or (18): connect to these connectors the power cable and the output cables included.
- Socket for connecting computer serial interface RS232 (9 female pins) [4]: required when using the diagnostic and shutdown management software.
- Presetting for the connection of additional batteries [16].



Cable section table

a. AC input and output (minimum 75°C copper wire)

Model	Maximum Current	Conductor Section	Torque
3 100 53/56	25 A	AWG #10/4 mm ²	17.7/ 11 lb-in
3 100 54/57	33 A	AWG # 8/6 mm ²	17.7/ 11 lb-in
3 100 58/59	54.3 A	AWG # 6/10 mm ²	23 lb-in

b. Entrée Batterie

Model	Maximum Current	Conductor Section
3 100 53/56	19 A	AWG #10/4 mm ²
3 100 54/57	25 A	AWG #10/4 mm ²
3 100 58/59	41 A	AWG #10/4 mm ²



WARNING

For safety reasons it is advised not to modify the cables supplied; it is also necessary to make sure that the mains socket the uninterruptible power supply is connected to is fitted with a safe connection to the earth system, and appropriate protection in accordance with current regulations.




WARNING

The mains supply socket, or the disconnection device, must be installed nearby the equipment, and must be easily accessible.


Proceed to the installation as follows:

- 1) Position the uninterruptible power supply so that the vents are not obstructed.
- 2) Connect the input connector [17] or [18], the power cable, and the output cables to the appropriate connectors [17] or [18].
- 3) Connect the loads to the output cables, ensuring that the switches of the various users are off.
- 4) Connect the power supply plug to a power socket with suitable voltage and current.

Start

- 1) Switch on the power breaker [19] of the distribution panel. Then the UPS will start up. Green LEDs \mathcal{U}^1 , and \mathcal{U}^2 show that the Utility and Bypass inputs are normal. The LCD will display OFF after few seconds.
- 2) The UPS is in Bypass Mode now. It will proceed to self-test automatically. If no abnormal message appears then the pre-startup of the UPS was successful and the charger starts to charge the batteries.
- 3) Press the UPS On Switch  [5] for approximately three seconds. The Buzzer sounds twice and the LCD display changes from previous status to RUN mode.
- 4) The UPS is in self-test mode again. The LCD display will show TEST and the UPS will remain in battery mode for approximately four seconds.
- 5) If the self-test fails an error code or error status will appear on the screen.
- 6) Your start-up operation of the UPS is complete now. Make sure the UPS is plugged into the wall receptacle for charging at least 8 hours and the batteries are fully charged before connecting the device to be protected.

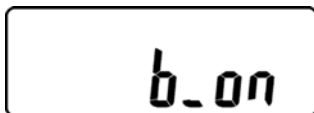
Shutdown

- 7) Press the Off  [9] key for five seconds. The Inverter output will be turned off, and the output load will be supplied by the Bypass loop.
- 8) Turn Off the Input breakers [19].
- 9) The UPS is now turned off completely.

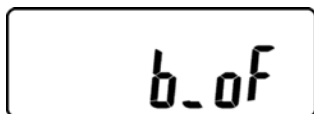
Default data and special function execution


After the UPS completely starts up, press the  key to change the LCD display to figure **Q1**.

Q1
buzzer "On"



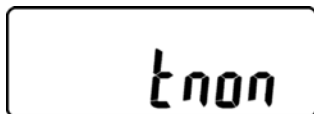
Q2
buzzer "Off"



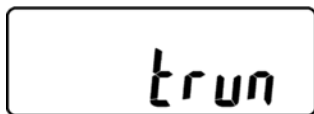
Press the  key to scroll through the UPS settings.

The LCD will display in sequence figure **Q1** (buzzer) → figure **R1** (Self-test) → figure **S1** (Bypass Voltage Windows) → figure **T** (Output Frequency Synchronization Window) → figure **U** (Inverter Output Voltage) → figure **V1** (UPS Operation Mode) → figure **W** (Output Voltage Micro Tune Value) → figure **X** (UPS Id) → figure **Y** (Parallel function status).

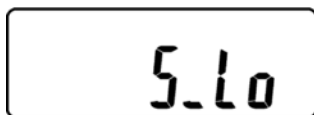
R1
Self-test disable



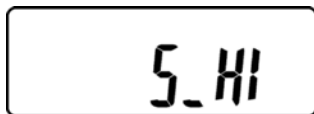
R2
Self-test anable



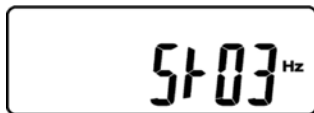
S1
Bypass Voltage is adjusted
to narrow range



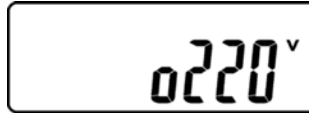
S2
Bypass Voltage is adjusted
to wide range



T
Frequency Window is +/-3 Hz



U
inverter output voltage



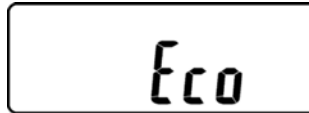
0220^V

V1
The UPS is operating
in "normal mode"



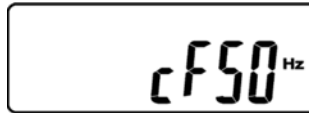
norL

V2
The UPS is operating
in "Eco mode"



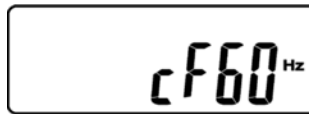
Eco

V3
The UPS is operating
in "CVCF 50 Hz mode"



cF50^{Hz}

V4
The UPS is operating
in "CVCF 60 Hz mode"



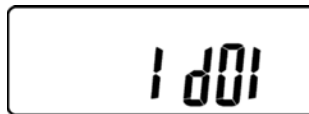
cF60^{Hz}

W
Output Voltage Adjustment
(-3% to 3%)



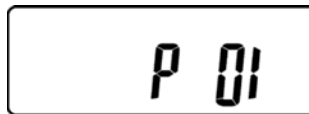
0A 0_%

X
UPS position in parallel mode




1d01

Y
The parallel function is disabled





P 01

Press the scroll up  key to execute special functions.


The functions include buzzer ON (as in figure **Q1**), buzzer OFF (as in figure **Q2**, Alarm silence for UPS Warning), and self-test OFF (as in figure **R1**) or self-test ON (as in figure **R2**).

The UPS will execute the battery test for ten seconds. If the self-test is successful it will display figure **E1**; otherwise, it will display figure **E2** and an error message at the same time.)

UPS Default Settings and their alternatives

Make sure the UPS is not “On”. Press the On  and scroll down  keys simultaneously for approximately three seconds. The buzzer will sound twice, and the LCD will display figure **Q1**, indicating that the UPS is in setting mode.

To scroll through the options press the  key to go DOWN and  to scroll up.

Except for Buzzer (figures **Q1** and **Q2**) and Self-test (figures **R1** and **R2**) all of the other default settings may be changed by pressing the scroll up  key.

Figures **S1** and **S2** indicate the bypass input acceptable window. It can be 184-260 VAC or 195-260 VAC.

Figure **T** indicates the bypass frequency window of the Inverter Output. The acceptable setting values are ± 3 Hz and ± 1 Hz.


Figure **U** indicates the acceptable Inverter Output Voltage. Possible values are 200, 208, 220, 230, or 240 VAC.


Figures **V1**, **V2**, **V3** and **V4** indicate the operation modes of the UPS. Possible values are Online, Eco (Economical) mode, fixed 50 Hz Output, and fixed 60 Hz Output.

Figure **W** indicates the adjustment of the Inverter Output, which may be set to 0%, +1%, -1%, +2%, -2%, +3%, or -3%.

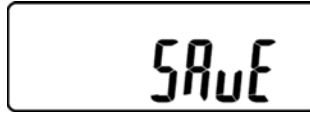
Figure **X** indicates the position of the UPS when the UPS is in Parallel mode. Possible positions are 1, 2, 3, and 4. The position must be 1 if the UPS is not in Parallel mode.

Figure **Y** indicates the parallel function status. “P 01” indicates that the parallel function is disabled, and “P 02” indicates that the parallel function is enabled.

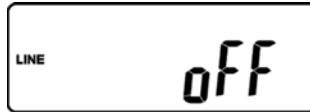
After changing settings you must scroll to the “save” screen (figure **Z**) and then press the enter key  to save all of your changes. Then the LCD will display figure **AA** to indicate completion of the setting changes.

To cancel your changes rather than save them press and hold the “OFF” key  for five seconds. The LCD displays figure **AA** directly, which indicates that your changes were canceled.

Z
* Press the Enter key
to save changes.



AA
The UPS is locked.



Turn Off the Utility Input breaker.

Your setting changes are now complete.

Connection

The UPS has an RS232 serial communication interface that provide access, through a processor, to a range of data for the operation and the history of the UPS.

This function can be accessed through a WINDOWS (*) interfacing program, connecting a serial port of the PC to the interface socket that can be found on the back of the UPS using an RS232 cable.

6 UPS communicator self-diagnostic software

From the website www.ups.legrand.com it is possible to download free of charge a self-diagnostic software running on WINDOWS (16 e 32 bit) e Linux platforms.

This software can be used for the following functions:

- Display of all the operation and diagnostic data in case of problems.
- Setup of special functions.
- Automatic shutdown of the local computer (Windows and Linux operating systems).

* Windows is a registered trademark of Microsoft Corporation.

7 Possible malfunctioning

The UPS always operates on batteries:

- There is no line voltage
- Line voltage is out of allowed UPS range
- The power supply cable is not correctly connected to mains socket.
- The input circuit breaker has to be reset
- The mains socket is defective

The UPS signals overloading:

- Additional loads to the ones normally connected have involuntarily been connected on the output line.
- Check all the loads connected to the output

The UPS doesn't operate in battery mode (it shuts down or immediately signals it is close to the operating limit):

- The UPS has operated with no mains voltage for a long time and has not been able to recharge the battery. Recharge it for at least 6 hours by connecting the uninterruptible power supply to the mains.
- The battery is flat due to not using the UPS for a long period. Recharge it for at least 6 hours by connecting the uninterruptible power supply to the mains.
- The battery has run down due to being used frequently, to ambient conditions, or to having exceeded its average service life; it is necessary to change it.

The UPS doesn't deliver power to the output:

- Check that the loads are correctly connected to the output sockets

8 Technical features

CONSTRUCTION SPECIFICATIONS	3 100 53	3 100 54
Weights	52 Kg	52 Kg
Dimensions L x H x P in mm	440 x 176 x 680	440 x 176 x 680
Protection	Electronic protection against overloading and short-circuiting. Shutdown on reaching operating limit and overheating. Automatic shutdown due to protection triggering	
Ambient specifications		
Operating temperature range	from 0 to +40 °C	
Operating relative humidity range	from 20 to 80% non-condensing	
Degree of protection as per IEC529	IP21	
Noise level at 1 meter	< 50 dBA	
Electrical input specifications		
Rated input voltage	230 V	
Range of input voltage	from 160 V to 280 V	
Rated input frequency	50 or 60 Hz ± 5Hz	
Maximum input current	25 Arms	33 Arms
Number of input phases	Single phase	
Waveform on output		
With battery operation	sinusoidal	
Type of operation	on line - double conversion	
Electrical specifications on output		
Rated output voltage	230 V ± 2%	
Active output capacity on nominal load	4050W	5.4KW
Apparent output capacity on nominal load	4.5KVA	6KVA
Overload capacity	105% continuous 120% for 30 seconds 140% for 10 seconds	
Number of phases on output	Single phase	

8 Technical features

CONSTRUCTION SPECIFICATIONS	3 100 53	3 100 54
Electrical specifications on output with battery operation		
Rated output voltage	230 V \pm 2%	
Output frequency	50/60 Hz \pm 0.5%	
Active output capacity on non-linear load	4.05kW	5.4kW
Apparent output capacity on non-linear load	4.5kVA	6kVA
Battery operation		
Operating time	6 min.	4 min.
Charging time to 90% of the load	4 hours	
Technical data and number of batteries	n°20 maintenance-free, sealed, lead battery 12V 5Ah	n°20 maintenance-free, sealed, lead battery 12V 5Ah
Standards		
Electromagnetic compatibility Emission - Immunity	Conforms to EN 62040 - 2	
Safety	Conforms to EN 62040 -1	
Performance and features	Conforms to EN 62040 -3	



NOTICE

The batteries are considered hazardous waste and should be disposed of in accordance with current regulations.

Daker DK 4.5, 6, 10 kVA

EN

CONSTRUCTION SPECIFICATIONS	3 100 56	3 100 57	3 100 58	3 100 59
Weights	25 Kg	25 Kg	26 Kg	
Dimensions L x H x P in mm	440 x 88 x 680	440 x 88 x 680	440 x 132 x 680	
Protection	Electronic protection against overloading and short-circuiting. Shutdown on reaching operating limit and overheating. Automatic shutdown due to protection triggering			
Ambient specifications				
Operating temperature range	from 0 to +40 °C			
Operating relative humidity range	from 20 to 80% non-condensing			
Degree of protection as per IEC529	IP21			
Noise level at 1 meter	< 50 dBA			
Electrical input specifications				
Rated input voltage	230 V			380 V
Range of input voltage	from 160 V to 280V			from 227V to 485V
Rated input frequency	50 or 60 Hz ± 5Hz			
Maximum input current	25 Arms	33 Arms	54,3 Arms	
Number of input phases	Single phase			
Waveform on output				
With battery operation	sinusoidal			
Type of operation	on line - double conversion			
Electrical specifications on output				
Rated output voltage	230 V ± 2%			
Active output capacity on nominal load	4.05kW	5.4 kW	9 kW	
Apparent output capacity on nominal load	4.5kVA	6 KWA	10 KWA	
Overload capacity	105% continuous 120% for 30 seconds 140% for 10 seconds			
Number of phases on output	Single phase			Three phase

8 Technical features

CONSTRUCTION SPECIFICATIONS	3 100 56	3 100 57	3 100 58	3 100 59
Electrical specifications on output with battery operation				
Rated output voltage	230 V ± 2%			
Output frequency	50/60 Hz ± 0.5%			
Active output capacity on non-linear load	4.05kW	5.4kW	9kW	
Apparent output capacity on non-linear load	4.5kVA	6kVA	10kW	
Charging time to 90% of the load	4 hours		5 hours	
Standards				
Electromagnetic compatibility Emission - Immunity	Conforms to EN 62040 - 2			
Safety	Conforms to EN 62040 -1			
Performance and features	Conforms to EN 62040 -3			



NOTICE

The batteries are considered hazardous waste and should be disposed of in accordance with current regulations.