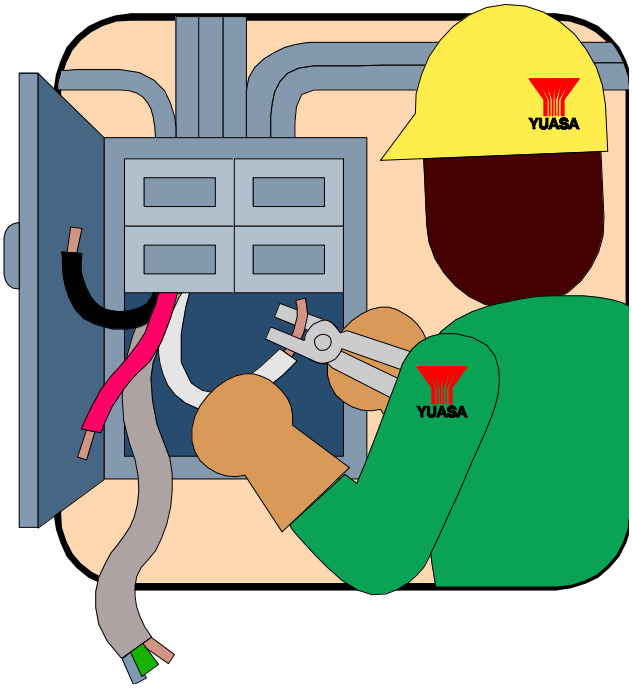
ENGLISH

INSTALLATION, USE AND AUTONOMY TRIAL INSTRUCTIONS



YUASA BATTERIES

NP/NPL/SW/ WL/EN/ENL/UXL/FXH/YFT/YUCEL

CONTENTS

This guide is for anyone installing YUASA NP/NPL/SW/SWL/EN/ENL/UXL/FXH/YFT/YUCEL batteries or called upon to work with these batteries. Information refer to industrial batteries installation and operation standard EN50272-2, NFC15-100.

1/ FITTERS OR PERSONS HANDLING YUASA BATTERIES

Staff installing or guaranteeing the maintenance of any battery must be authorised to work with live batteries in accordance with the UTE C 18-510 (or local equivalent) standard.

They must be trained and equipped in such a way as to be able to apply all the necessary safety measures described in this document.

Staff involved in such tasks must also respect the safety measures specific to the place of the installation or intervention (prevention plan). Take care about alone work conditions.

2/ RISKS AND SAFETY MEASURES

This danger symbol will figure in this document to indicate all the messages relating to staff safety.

WARNING !

Before unwrapping, transporting, installing or handling YUASA VRLA batteries, read carefully this paragraph on RISKS and SAFETY MEASURES, as well as all the paragraphs in which the danger symbol appears.

2-1/ DESIGN/APPLICATION TIPS TO ENSURE MAXIMUM SERVICE

UL Cautionary Statement:
WARNING: Risk of fire, explosion or burns. Do not disassemble, heat above 50°C, or incinerate.

2-2/ RISK OF SULPHURIC ACID BURNS

The batteries contain sulphuric acid which can cause burns and other injuries.

⇨ In case of contact with the skin or eyes, rinse abundantly with water and consult a doctor.

⇨ When handling the batteries for any reason, wear rubber gloves, safety helmet (with visor) and make sure to be equipped with an individual eye-bath.

⇨ The acid also burns clothing. It is recommended that acid-resistant aprons or clothing be worn.

2-3/ RISK OF GAS EXPLOSIONS 

The batteries may generate gases (including hydrogen). These gases are capable of being ignited and causing explosions which may cause deafness, blindness or other injuries.

For example, if the charger/rectifier develops a fault or is incorrectly adjusted, explosive gases may be released through the safety relief valves of the cells or monoblocs of the battery.

⇨ Any form of spark (static electricity or other), all flames and short-circuits must be forbidden.

⇨ Do not use plastic walkways.

⇨ Do not smoke in or near the battery room.

2-4/ RISK OF ELECTROCUTION AND BURNS 

A battery composed of several cells or monobloc units connected in series can reach dangerously high voltage levels.

All measures must be taken during the installation or intervention in order to avoid any risk of electrocution or electrical burn.

⇨ Use insulated tools (in accordance with the NFEN 60 900 or IEC 60900 or local equivalent) when installing or handling the batteries.

⇨ Never place metallic tools or objects on the batteries in order to avoid any risk of short-circuit, electrocution or electrical burn.

⇨ Remove all metallic chains, watches, rings and bracelets if possible; otherwise ensure they are insulated.

⇨ Wear insulating gloves and safety glasses. Insulate yourself from the ground with an insulating mat, wooden walkway or stool for batteries with a potential difference exceeding 120V.

⇨ Connectors in bad working condition can provoke fires. Make sure that the connectors are in good working condition and verify that they are attached to the right tightening torque.

⇨ Disconnect the batteries from the charger/rectifier before any maintenance work. If necessary, disconnect one part of the batteries in series so that the potential difference of the whole unit on which the operator is working is not more than 120V.

⇨ Mark out the work area to prevent non-authorised persons from entering.

2-5/ LIST OF PROTECTIVE MATERIAL 

- Safety helmet (with visor).
- Safety boots.
- Handling gloves.
- Acid-resistant gloves.
- 1000V electrical protection gloves.
- Safety glasses anti-UV (EN166 and 170).
- Insulating mat or insulating stool.
- Anti-static and acid-resistant clothing.
- Insulated tools (NFEN 60 900, IEC 60900 or local equivalent).
- Insulated torque wrench.
- Insulated caps for wire ends.
- Individual eye-bath.
- Marking equipment.
- Lifting tools if necessary.
- Product for neutralising acid (for open batteries).

3/ RECEIPT OF A DELIVERY

3-1/ CONTROLS ON RECEIPT OF THE DELIVERY

⇨ Make sure that the number of packages corresponds to the delivery slip.

⇨ Make sure that the packages have not been damaged during transportation.

⇨ A damaged package may be the result of bad handling.

⇨ Write a description of any problems noted on the delivery slip before signing. If the batteries or accessories (stand or rack, cabinet, case, connectors and so on) have been damaged, ask the driver to witness the damage and immediately inform the carrier that the delivery has been refused.

⇨ All batteries with damaged terminals, damaged cases or any trace of leaked acid must be replaced.

3-2/ BATTERIES DELIVERED IN CABINETS 

⇨ On reception, unwrap the cabinet.

⇨ Visually verify the condition of the cabinet and the batteries on both the outside and the inside.

⇨ It is advised to check the terminal tightening with an isolated torque key to avoid all loosening during transportation. To limit this risk we advise to use flexible inter batteries connectors.

Warning: dangerous voltage levels may be present

⇨ Remove any hopping and fixing of the batteries before start up. **Space the batteries to facilitate ventilation if possible.**

⇨ Anything that does not conform must be informed in writing to YUASA's logistics department.

4/ STORAGE BEFORE INSTALLATION

4-1/ STORAGE SITE

⇨ If the battery is not installed and recharged immediately after delivery, it is recommended that it be stored inside, in a clean, dry place at an ambient temperature (15°C to 30°C).

⇨ Do not stack more than 2 pallets of batteries.

⇨ All batteries stored at temperatures of more than 30°C will have to be recharged more quickly. (*See the TECHNICAL MANUAL corresponding to the type of battery*).

4-2/ STORAGE DURATION

The duration of the storage period, from manufacture date (date-code marked on the batteries) to the first recharge, must not exceed:

12 months at an ambient temperature of less than 20°C

9 months at an ambient temperature from 21°C to 30°C
5 months at an ambient temperature from 31°C to 40°C

It should be noted that batteries stored at higher temperatures must have a reduced storage period before recharging.

Storing a battery for longer without recharging it leads to sulphation of the plates. This reduces the performance and shelf life of the battery. If the battery is stored for too long it may not recover full performance and/or life. (*See the TECHNICAL MANUAL corresponding to the type of battery).*

The respect of these advices allows to store the batteries for few years.

5/ GENERAL INSTALLATION CONDITIONS

The following chapter should be read carefully before starting the installation of YUASA batteries.

5-1/ POSITION OF THE BATTERY

It is recommended that the battery be installed in a clean, dry and cool place.

⇨ The ground must be flat and able to bear the weight of the battery.

⇨ Install the battery in a well-ventilated place so as to maintain an ideal temperature for the battery:

An ambient temperature of 20°C+/-5°C is optimal for the performances and service life of the battery.

An ambient temperature of less than 20°C reduces the efficiency and performance of the battery.

An ambient temperature of more than 25°C reduces the service life of the battery.

⇨ During installation of the battery, make sure there is sufficient room around the battery, the cabinet, stand or the rack. This is to ensure that future interventions for monitoring or performing maintenance of the battery are easier and safer. Avoid installations against a site wall or cabinets with more than 3 rows of batteries or more than 600 mm deep.

To allow emergency evacuation an unobstructed escape path shall be maintained at all times with a minimum of 600 mm.

⇨ The installation of other equipment close to the battery must not make access to the battery difficult.

5-2/ VENTILATION 

YUASA NP/NPL/SW/SWL/EN/ENL/UXL/FXH/YFT/YUCEL batteries are described as Valve Regulated Lead Acid batteries. Under normal floating charge conditions, very little gas will be released.

YUASA NP/NPL/SW/SWL/EN/ENL/UXL/FXH/YFT/YUCEL batteries have a gas recombination efficiency of more than 95%.

Good natural ventilation is enough to prevent all dangerous accumulations of gasses (*see standards EN 50 272-2 or NFC15-100*).

In case of overcharge, hydrogen and oxygen will be released from the battery. As a result, the battery must never be installed in a gas-tight enclosure.

Sufficient precautions must be taken to avoid overcharge (monitoring the charge system).

It is recommended that a space of 5 to 10 mm be provided between each cell or monobloc to allow for easier ventilation. On site, this space should be envisaged in the sense of the length of the site (small side of the monoblocs). In cabinets, where there is less ventilation, at least leave a space between one of the sides of the monoblocs.

The batteries can be installed near electronic equipment (following EN50272-2 standard). The heat dissipated by such equipment must be evacuated by ventilation.

In case of fire, smoke : to prevent anyone from suffering the ill effects of smoke inhalation and also protect equipment, ensure the ventilation exhaust (natural or forced) goes directly to atmosphere, and is not recycled or vented into any other part of the building.

5-3/ DIFFERENCES IN TEMPERATURE

The differences in temperature of the various cells or monoblocs making up a battery cause differences in voltage in the same units. This perturbs the performances of the battery.

External heating, sunlight, a natural air current or air conditioning can all be the source of a difference in temperature.

Particular attention must be paid to reducing the differences in temperature between the various cells or monoblocs of a battery.

5-4/ FLOOR LOADING 

The ground on which the battery will be installed must be able to bear the weight of the battery, cabinet or case. The total weight is indicated on the assembly plan supplied by YUASA.

Attention must also be paid to the point loading (weight per stand insulator foot).

5-5/ HANDLING 

Depending on the model, the weight of the battery cells or monoblocs can be significant.

⇨ Take all the required precautions involved in installing batteries in cabinets or stands and use lifting equipment if necessary.

⇨ Wear safety shoes, handling gloves and a helmet.

⇨ Do not lift the batteries by their terminals (this may rupture the terminal sealing).

⇨ Respect the handling order of the packages.

6/ INSTALLATION IN CABINETS OR ON YUASA STANDS

It should be noted that it is always preferable to install batteries on stands rather than in cabinets, for the following reasons:

⇨ Installation and maintenance both reduced and easier.

⇨ More efficient ventilation.

⇨ Simplified connections between monoblocs (more single rigid connection links, less end cables, reduced voltage drops).

⇨ Reduced equipment and installation costs.

For the assembly and connections, refer to the documents supplied with the battery:
- *Yuasa assembly/wiring plan and nomenclature.*
- *Instructions for assembly in cabinets or on stands.*

⇨ Before installing the monoblocs in a cabinet or on site, make sure that the shelves and beams are stable and well-attached.

⇨ Verify the homogeneity of the voltages of the monoblocs prior to assembly. Do not assemble a monobloc with a voltage that is too low.

⇨ Within a single string and whenever possible, assemble monoblocs with the same date code (etched or stuck to the top of the battery).

⇨ During installation, make sure that there are no bumps or scrapes that damage the battery container.

⇨ During installation, ensure that there is sufficient space for good ventilation (use a gauge).

⇨ Using the stickers provided, and in accordance with Yuasa's plan, number the top of each monobloc, making sure not to conceal the date code of the batteries.

⇨ Dip trays are not useful with VRLA batteries.

⇨ Yuasa stands are isolated (no need to connect to the ground).

7/ ELECTRICAL CONNECTIONS

7-1/ CONNECTING BETWEEN CELLS OR MONOBLOCS 

⇨ Use the connectors (cable, bar or braid) adapted to each battery supplied by YUASA. The flexible connectors can limit the risks of terminal loosening during the transportation.

The choice of connector should be made in relation to the maximum discharge current and the drop in voltage to be minimised. The total drop in voltage in this connector must not exceed 1 % of the nominal battery voltage with nominal current or power.

The inter-row end cables must be assembled on the batteries to avoid being loosened by mistake.

The inter-level end cables and other cables must be assembled without stress on the terminals and can, if necessary, be attached to avoid being loosened by mistake.

⇨ No washer between terminals and connectors, risk of high temperature.

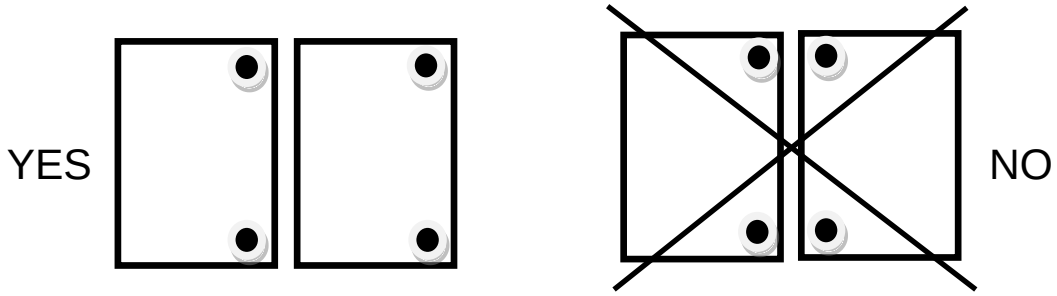
⇨ The holes in the connectors, end cable or cable eyes must be adapted to the diameter of the terminal screws supplied with the batteries (+0.5 mm max). For example, never assemble cable eyes of 8 mm or more with M6 screws. There is a significant risk of damaging the terminal, leading to poor electrical contacts and acid leakage.

⇨ The terminal screws used must be those provided with the batteries. Always assemble spring washers under the screw heads and flat washers in contact with the

end cables, cable eyes or cables. First screw them in by hand, then use a torque wrench (don't use electric screwdrivers).

⇨ The terminal covers must be assembled on to the screw heads by means of manual pressure on the cylindrical part, then fold the black cover down on to the top of the battery.

⇨ Safety Requirement: Place the cells or monoblocs in such a way that the terminals or bare conductor parts having a potential difference of potential of more than 120V cannot be touched simultaneously by accident.



⇨ To minimise electrical risks during cabling, here is the recommended method:

a) Choose from the battery string an end cable or cable eye that is easy to access, and that you will assemble only at the end of the cabling process after having verified that there is no difference in potential between the 2 terminals.
b) Cable the end cables for each shelf or level.
c) Cable the most difficult to reach cable eyes for each shelf or level, mainly at the back.
d) Cable the inter-shelf or inter-level cable eyes or cables.
e) Connect the cables to the terminal cabinet, fuses or circuit breaker, making sure there is no difference in potential between the polarities of the cabinet.

⇨ At the end of the cabling**,** it's important to check that no electrical potential exists between cabinet or rack metal-framed and each polarity (+/-) of final batteries.

7-2/ CONNECTING THE BATTERY TO THE APPLICATION

The performance of the battery is measured at the level of its take-off terminals. As a result, the length of the connections between the battery and the application must be as short as possible, so as not to affect the efficiency of the unit as a whole.

The section of connectors must not only be chosen on the basis of its current capacities. The section must also be chosen to minimise the potential difference between the battery and the application. If the potential difference is too significant, the expected autonomy of the equipment will be reduced.

Generally speaking, the drop in voltage in the cables between the battery and the application must not exceed 1 % of the nominal battery voltage at nominal current or power.

⇨ For new assemblies, make sure the battery is secure, that is, remove an end cable per battery string (accessible and visible…) so as to avoid any potential danger when connecting the battery to the application (terminal, fuses, circuit breaker, terminal box,…).

Contact YUASA for definitions and supplies.

7-3/ PARALLEL CONNECTION

When several batteries have to be connected in parallel, the choice of section from the connectors is made in relation to the current and the potential difference that is admissible.

The length of the connectors for each battery must be equal and of the same section so as to avoid any imbalance between the batteries in terms of charge and discharge performance.

If all the Yuasa conditions of installation are respected, it's possible to connect up to 8 strings in parallel.

For an assembly of more than 5 strings in parallel, consult YUASA France.

⇨ When being connected in parallel, it is recommended that all the polarities - be connected together, and to fully verify that there is no potential (close to 0 V) between the polarities + before connection.

7-4/ TIGHTENING TORQUE FOR THE TERMINALS 

An insulated torque wrench must be used when assembling connectors to the terminals of threaded or freeboard deck batteries. The recommendations for the tightening torque must be respected (don't use electric screwdrivers).

The tightening torque is specified on our technical files, technical manuals and on our assembly charts.

If insufficiently tightened, this will be the source of faulty connections (electric arc, fire, loss of autonomy and soon).

Excessive tightening can damage the battery (rupture of the terminal sealing, rupture of the brass insert/lead terminal link).

It is recommended that the tightening of the terminals be checked regularly (every 2 years, for example) during maintenance visits. During batteries transportation inside cabinet, it is advised to check the terminal tightening before commissioning.

In some cases, where the cables can be worked loose by mistake, the tightening torque can be increase up to 1Nm under the maximum values recommended in our technical manuals (don't use electric screwdrivers).

7-5/ GENERAL INFORMATION 

⇨ The battery terminals and connectors must be clean and have no traces of corrosion. If this is the case, following the transport or storage conditions, it is necessary to clean the terminals with a cloth and a sodium bicarbonate solution. Contact Yuasa for details concerning the dosage and procedure.

⇨ Terminal greasing is not obligatory except when batteries are installed in corrosive atmosphere (saline atmosphere, ...)

⇨ For the cabling**,** use insulating boots or caps for the ends of the connectors attached to the batteries or charger.

⇨ In order to limit the risk of contact with the battery terminals, assemble the protection guard or terminal covers on each battery as it is connected.

⇨ If the battery terminals are insulated by terminal covers, the use of a walkway is not necessary. Use an insulating mat or insulating stool each time a battery with a voltage of more than 120V is handled.

WARNING: DISCONNECT THE CHARGER OR APPLICATION BEFORE TOUCHING THE CONNECTORS. 

8/ CHARGE:

⇨ For the charge of the batteries, refer to the TECHNICAL MANUAL of the corresponding type of battery.

⇨ It should be noted that YUASA NP/NPL/SW/SWL/EN/ENL/UXL/FXH/YFT/YUCEL batteries are delivered ready charged. Their state of charge will depend on the length of the storage period since they were last charged. Before complete discharge (autonomy trials), it is therefore recommended that chapter 12, AUTONOMY TRIALS, be studied carefully.

***For info**:*

Floating charge voltage at 20°C per cell:

- NP/NPL/SW/SWL/YFT/FXH/YUCEL battery: 2.275V

- EN/ENL battery: 2.26V

- UXL battery: 2.23V

The voltage of the charger, and the adjuster if necessary, should be verified at least once a year.

9/ DISCHARGE:

⇨ Do not leave a battery discharged. Recharge it as soon as possible to avoid the risk of deterioration.

Lead-calcium batteries are subject to damage when they are deeply discharged. It is important that the cut-off voltage be respected in relation to the discharge regime (*see the TECHNICAL MANUAL of the corresponding type of battery*).

10/ CLEANING: 

⇨ Clean the batteries periodically with a damp cloth. Do not use a dry cloth or synthetic material to limit the risks caused by static electricity.

⇨ Never use solvents or detergents. This type of product damages the ABS used in the manufacture of the containers and covers.

11/ RECOVERING USED BATTERIES (LEAD): 

Recovering used lead acid batteries for recycling in a recycling plant can be performed by YUASA France at the client's request. The following document must be used: "*Bordereau de suivi des déchets"* ("follow-up note for industrial waste", *contact YUASA's logistics department*).

Information for preparing this operation:

⇨ The personnel involved must use the safety equipment mentioned in this document for dismantling of the battery.

⇨ The following must be readily available, mainly in case of spilling or breaking open batteries: products that neutralise acid (sodium bicarbonate), an ample supply of water, sand or sawdust to absorb the acid. Before starting the dismantling process, find out where the nearest water supply is.

⇨ Do not forget to disconnect the battery from the load and charger before dismantling.

⇨ Use lifting equipment if necessary.

⇨ Pack VRLA batteries on a film-wrapped pallet or in a container (without the cardboard packaging).

⇨ Pack open batteries in a watertight container.

⇨ Nickel-cadmium batteries cannot be recovered without prior agreement from YUASA’s logistics department.

12/ TEST METHOD FOR UPS BATTERY AUTONOMY DURING COMMISSIONING

Recommended for SWL/FXH/EN batteries. For other batteries, please contact Yuasa

12-1/ AIM

To ensure that the battery is working correctly and that the expected autonomy has been attained when the UPS has been switched off at the cut-off voltage.

12-2/ DATA

Battery reference: ……

Battery: Number of strings: …… x Number of blocks in series: ……..….

UPS: ……. Power: ……..kVA, Power factor: ……..

Battery power: ……..W

Floating voltage: ……..V (at 20°C)

Cut-off voltage at the battery terminals: …….V

Expected autonomy at 20°C: ……..min, at 25°C: ……..….min

12-3/ LIST OF MATERIAL REQUIRED

a/ Triple or single phase discharge bench that can be adjusted and adapted to charge the UPS at rated capacity + the cables needed for connection.

b/ Multimetres for measuring battery voltage.

c/ DC current clamp for measuring battery current (one per string with recorder if possible).

d/ Thermal camera for measuring battery temperatures and detecting hot points during discharge.

e / Chronometer for measuring the autonomy.

f/ Insulated torque wrench adjusted for the tightening torque recommended for the terminals.

g/ Stickers for identifying any particular blocks.

12-4/ PREPARATIONS AND CONTROLS TO BE CARRIED OUT ONE WEEK BEFORE THE AUTONOMY TEST (D-7)

a/ Ensure that the temperature of the battery blocks at different points is situated between +15°C and + 25°C, bearing in mind that the ideal temperature is 20°C:

Average T = ……°C

b/ Put the charging battery in floating voltage (see Data in 12-2). If the temperature is not 20°C, adjust or compensate for this floating voltage at -3mV/°C/cell.

Floating U measured = ……V

c/ Ensure that the floating voltage in each block in each string is within the -2% / +6% range of the floating voltage at 20°C,SWL/FXH 2.275V/cell, EN 2.26V/cell.

or 13.2V and 14.4V (for 12V blocks).

or 6.6V and 7.2V (for 6V blocks).

or 2.21V and 2.40V (for 2V blocks).

If it is not possible to measure each block, do a single measurement per group (4 or 5 blocks at once) to verify the homogeneity of the voltages, or per sample (5 mini battery blocks per string).

Blocks whose voltage is not within this range must be monitored or replaced: contact Yuasa.

To reduce the charge time to 5 days, it is possible to carry out a boost charge at 2.35V per cell for 24h with a return to floating for 4 days. For other voltages or times, please contact Yuasa.

12-5/ AUTONOMY TEST (D DAY), CONTROL

a/ Ensure that the temperature of the premises has remained constant and that the battery has not undergone a discharge since D-7.

b/ Ensure that the floating current is close to 0 (around 1mAh/Ah).

c/ Re-verify on a few blocks in each string that the floating voltages are within the -2% / +6% range (see 12-4c/).

d/ Verify by sweeping each block with the thermal camera that the batteries are at the same temperature as the premises (+2°C max).

Min. T = …….. °C Max. T = …….. °C Average T = ……. °C

If the temperature is not 20°C, the expected autonomy must be recalculated with the minimum temperature obtained.

This autonomy can easily be determined using our ISY light/indirect calculation calculator, which can be accessed freely at http://yuasa.itelios.net

Extended autonomy: ……. min

e/ Connect the charge bench to the UPS, and adjust the bench power.

The charge bench must be positioned as far as possible from the batteries to prevent the temperature of the premises from rising during discharge.

It should be noted that discharge battery power must correspond to the battery power retained in the data (see 12-2/).

During the discharge measurements, the battery power will be determined by the product of the voltage at the battery terminals (to eliminate any voltage drop in the cables) and the battery's total current, which is the sum of the currents in each battery string.

f/ Before switching the power supply of the UPS to the battery, wait a few minutes in order to ensure that the power output of the UPS has stabilised.

12-6/ AUTONOMY TEST (D DAY), JUST BEFORE BATTERY DISCHARGE

Just before switching the charge to the battery (switching off the UPS), prepare to:

- Start the chronometer.
- Sweep the blocks and their connections with the thermal camera to identify any hot points. In discharge, a battery does not heat up, but on the contrary, the connections and cables, depending on the discharge current, will heat up progressively (30/40°C is possible). Any abnormal hot points on a battery terminal are the sign of poor tightening.
- Measure the currents in the different strings using a current clamp (or clamps) and check that they are balanced (+/-20% max.).
- Measure the discharge voltage by sampling the blocks and ensuring that they are homogenous. It should be noted that at the end of the discharge (around 80% autonomy) the dispersion in voltage between the blocks can be accentuated (+/-10%). To save time, it is possible to measure the voltage of the blocks 2 by 2.
- Measure the total voltage in the battery terminals (the voltages in each string will be identical).

12-7/ AUTONOMY TEST (D DAY), SWITCHING THE UPS TO THE BATTERY

a/ Start the chronometer when switching over and carry out as many of the measurements described in (12-6/) as possible, depending on the number of technicians available.

b/ Take regular readings, for example every minute for autonomy of 10 minutes.

It should be noted that the voltages of the blocks in the string with the lowest current must be verified as a priority.

At the end of the discharge, it is normal for the disparity in voltage between the blocks to accentuate, +/- 10% is possible in relation to the average voltage.

c/ Identify and mark any blocks (using stickers) that heat up in an abnormal manner, or that have abnormal voltage in relation to previous measurements.

d/ If a block terminal is at an abnormally high temperature (poor tightening), it can be retightened to the right torque during discharge using a torque wrench.

e/ Ensure that the product of the total battery voltage and total battery current remains constant and close to the battery's rated capacity.

f/ During this discharge, measure the voltage drop in the cables between the battery and the UPS. This voltage drop must not be of more than 5V.

g/ When the battery's voltage is similar to the cut-off voltage, prepare to stop the chronometer.

h/ Stop the chronometer when the UPS stops with the cut-off voltage. Note this battery cut-off voltage and verify that this value is the same as the value in the data.

i/ Verify that the autonomy is equal to, or greater than, the value in the data.

It should be noted that if the surrounding temperature is not at 20°C, if the rated capacity of the batteries is not the same as the values in the data, if the UPS stops at another cut-off voltage, the expected autonomies must be recalculated with these new values.

Example of a reading table during discharge (2-branch battery).

Autonomy (min)	Total battery voltage (V)	Current string 1 (A)	Current string 2 (A)	Battery power (W) P = Ub x (Cb1 +Cb2)	Remarks
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
……min…...sec					UPS cut-off
Average power					

12-8/ A FEW POSSIBLE EXPLANATIONS, OTHER THAN A BATTERY PROBLEM, FOR WHEN THE AUTONOMY IS NOT ACHIVED

a/ Temperature too low in relation to the data.

b/ Battery power higher than in the data.

c/ Significant voltage drop in the cables between the battery and the UPS.

d/ Battery not 100% charged.

e/ Cut-off voltage too high in relation to the data.

f/ The UPS stops before it reaches the cut-off voltage (through a delay, for example).

g/ Loss of a string (loosened terminal).

NOTES

Customer: .....

Business: .....

Order n°: .....

Site: .....

Type of Battery: .....

Commissioning date: .....

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INSTALLATION SHEET V21 / 03-2017