



Battery Installation, Commissioning and Maintenance Guide

Yuasa NP, NPL, SWL, FXH, RE, EN, ENL, UXL and UXF Installation, Commissioning
and Maintenance Guide

1.0 Storage

If the batteries are **not** to be installed immediately, keep them boxed and store in a cool, clean and dry place.

If the batteries are to be stored for six months or more they will need a supplementary charge prior to installation as outlined in Section 3.

2.0 Unpacking and Inspection

DANGER

Batteries are electrically live at all times. Do not short circuit the battery terminals.

Inspect the battery consignment for obvious signs of transit damage. Ensure the consignment has all items listed on the advice note or invoice, i.e. batteries, cables, shrouds etc.

Unpack each battery taking care not to drop on the terminals. Inspect each battery for physical damage such as cracks or distortion of the case and terminals.

Measure the battery open circuit terminal voltage which should be > 2.1 volts/cell (12.6 volts for a 6 cell battery). If any batteries are lower they will need a supplementary charge prior to installation.

3.0 Supplementary Charge

To ensure maximum service life a supplementary charge may be required prior to installation. Apply a supplementary charge if:

1. The batteries have been in storage 6 months or more.
2. The battery open circuit voltage is under 2.1 volts per cell.



Supplementary Charge for NP, NPL, SWL, FXH, REC, Yucel, UXH & UXF at 20°C

Supplementary Charge for EN & ENL at 20°C

Supplementary Charge for UXL at 20°C

After the charge period, check that the battery open circuit voltage is above 2.1 volts/cell.

WARNING

DANGER

Batteries are electrically live at all times. Do not short circuit the battery terminals.

Under no circumstances should batteries be charged in a sealed container.

The batteries in the UPS should be installed in a dry and adequately ventilated area, with an operational temperature of between 20°C and 25°C.

CAUTION

Battery operational temperature over 25°C will have a severe detrimental effect on battery service life, see Table in Section 5.1



4.1 Installation and Connection

A wire brush should be used on all battery terminals to remove any oxidation layers. Application of a non-oxidising grease (such as Vaseline) is not necessary. However there may be some installations where there are corrosive compounds/elements nearby or in the atmosphere. In these special cases it is recommended that a non-oxidising grease is used.

When fastening connectors provided to battery terminals an insulated **spanner** must be used.

When installing batteries remove any jewellery and watches.

When connecting the batteries, free air space must be provided between each battery. The recommended distance is 10mm

Since a battery may generate ignitable gases, do not install close to any items that produce sparks.

The battery case is made from ABS resin, do not place in an atmosphere with organic solvents or adhesive material.

4.2 Single string battery connection

When multiple numbers of batteries are being used, make connections as follows.

4.2.1 Positive termination

Connect positive terminal (+) of battery No.1 securely to the positive terminal (+) of the charger/load.

4.2.1 Intercell connections

Connect the negative terminal (-) of battery No.1 securely to the positive terminal (+) of battery No. 2.

Following this procedure for each battery in sequence until the full string is connected. Note, the inter cell connectors may vary in length to accommodate the battery rack or cubicle configurations.

4.2.3 Negative terminal

Connect the negative terminal (-) of the final battery securely to the negative terminal (-) of the charger or load.

4.3 Multiple string battery connection

The connection procedure in Section 4.1 and 4.2 should be followed for each of the multiple strings in this type of battery system.

Connect the positive termination cables together through a battery breaker or isolator switch.

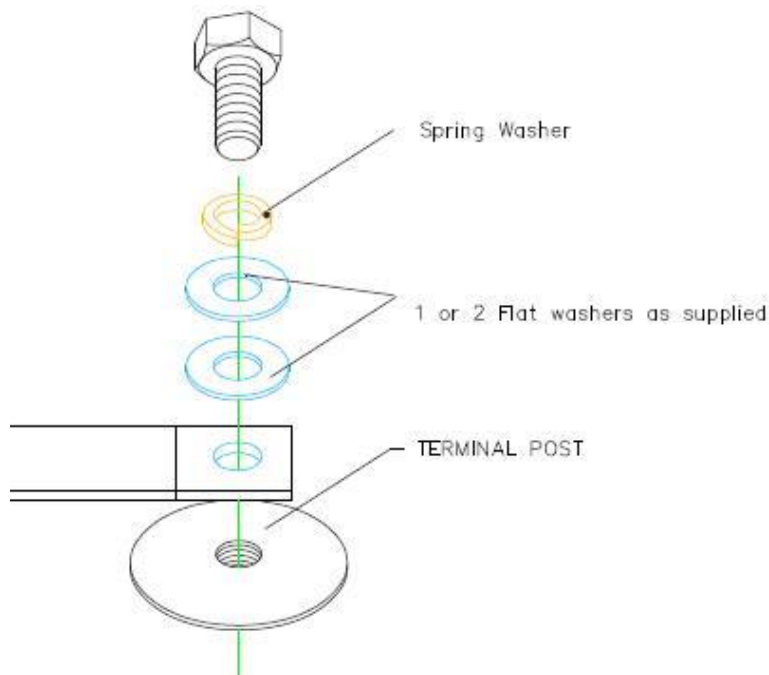


4.4 Fastening terminal bolts

The following table shows the recommended torque settings for terminal nuts and bolts.

| Battery | Bolt diameter | Fastening Torque (Nm) |
|--|---------------|-----------------------|
| NP17-12 | M5 | 2.45Nm |
| NP/NPL24-12 | | |
| NP/NPL38-12 | | |
| SWL750, SWL1100 | | |
| NP/NPL65-12, NPL130-6 | M6 | 4.76Nm |
| SWL1800, SWL1850 | | |
| FXH90-12FR, FXH140-12FR, FXH185-12FR, FXH190-12FR, FXH200-12FR | M8 | 9.0-11.9Nm |
| FXH45-12FR, FXH10012FR, FXH155-12FR | M6 | 3.9-5.4Nm |
| SWL2500-12 | M6 | 4.84 Nm |
| EN/ENL RANGE | M8 | 6.1Nm |
| NPL78-12 | | |
| SWL2250, SWL3300 | | |
| NPL100-12, NPL200-6 | M10 | 16.5Nm |
| UXF100-12, UXF150-12 | M8 | 9.4 -14Nm |

4.5 Typical Bolt Assembly



5.0 Charging and Commissioning

After connecting the battery system a float charge voltage needs to be applied. This voltage may be calculated from the figures in the table below (figures at 20°C).

Float Charge Voltage at 20°C

| Battery Type | Charge Voltage Per Cell (Volts/Cell) |
|------------------|--------------------------------------|
| NP/NPL, SWL, FXH | 2.275 |
| EN | 2.26 |
| UXL | 2.245 |
| UXH | 2.29 |
| UXF | 2.275 |

This value will be high enough to compensate for the batteries self-discharge and keep the battery in a fully charged condition. It should be noted that after applying the float charge voltage, full battery capacity may not be available for 72 hours. This is allowing for a charging and equalisation period.

5.1 Effect of temperature on float charge Voltage and battery life

The float charge voltage stated in Section 5.0 relates to an operational temperature of 20°C. For other operational temperatures see the table below.

CAUTION

High operational temperature will have a severely detrimental effect on the battery life. This is also shown in the table below.

Effect of temperature on float charge Voltage and battery life

| Operational Temperature (°C) | Temperature Compensated Charge Voltage Per Cell | | | |
|------------------------------|---|-------|-------|-------|
| | RE/NP/SWL/UXF | UXL | EN | UXH |
| 0 | 2.335 | 2.305 | 2.32 | 2.35 |
| 5 | 2.32 | 2.29 | 2.305 | 2.335 |
| 10 | 2.305 | 2.275 | 2.29 | 2.32 |
| 15 | 2.29 | 2.26 | 2.275 | 2.305 |
| 20 | 2.275 | 2.245 | 2.26 | 2.29 |
| 25 | 2.26 | 2.23 | 2.245 | 2.275 |
| 30 | 2.245 | 2.215 | 2.23 | 2.26 |
| 35 | 2.23 | 2.2 | 2.215 | 2.245 |
| 40 | 2.215 | 2.185 | 2.2 | 2.23 |
| 45 | 2.2 | 2.17 | 2.185 | 2.215 |



| Operational Temperature °C | Expected Battery Life (years) | | | |
|-------------------------------|-------------------------------|------------|------------|-----|
| | NP | NPL/RE/SWL | EN/UXL/UXF | ENL |
| 0 | 5 | 7-10 | 12 | 15 |
| 5 | 5 | 7-10 | 12 | 15 |
| 10 | 5 | 7-10 | 12 | 15 |
| 15 | 5 | 7-10 | 12 | 15 |
| 20 | 5 | 7-10 | 12 | 15 |
| 25 | 5 | 6-9 | 10 | 10 |
| 30 | 3 | 5-7 | 8 | 8 |
| 35 | 2 | 4-6 | 6 | 6 |
| 40 | 1 | 2-3 | 4 | 4 |
| 45 | <1 | 1-2 | 2 | 2 |

5.3 Setting a cut off voltage

Towards the end of a battery discharge the voltage will begin to fall below its nominal value. To prevent deep discharging the battery system a cut off voltage needs to be set. This will depend on the discharge rate. Typically the higher the discharge rate the lower the cut off voltage can be used. A good average cut off voltage is 1.7 volts/cell.

CAUTION

The minimum cut off voltage is 1.6 volts/cell to prevent possible permanent damage and reduction of service life.

6.1 Inspection and Maintenance

To prevent battery problems the inspection and maintenance procedures outlined need to be implemented. With each six month inspection, please complete the voltage log sheet provided. This will act as a historical record of the battery system and will help foresee any problem areas before they fully develop.

7.0 Customer Services

Please contact our Technical Department if you have any queries concerning your battery system on 0870 850 0314, visit www.yuasaeurope.com or email enquiries@yuasaeurope.com



Stationary Battery Log Sheet

Note: Duplicate this page, adding the appropriate string and Cell/Monobloc numbers as and when required.

String No: On Load / Off Load/ On Charge *

Time Interval:

| C/M | V | Z | C/M | V | Z | C/M | V | Z | C/M | V | Z | C/M | V | Z |
|-----|---|---|-----|---|---|-----|---|---|-----|---|---|-----|---|---|
| 1 | | | 30 | | | 59 | | | 88 | | | 117 | | |
| 2 | | | 31 | | | 60 | | | 89 | | | 118 | | |
| 3 | | | 32 | | | 61 | | | 90 | | | 119 | | |
| 4 | | | 33 | | | 62 | | | 91 | | | 120 | | |
| 5 | | | 34 | | | 63 | | | 92 | | | 121 | | |
| 6 | | | 35 | | | 64 | | | 93 | | | 122 | | |
| 7 | | | 36 | | | 65 | | | 94 | | | 123 | | |
| 8 | | | 37 | | | 66 | | | 95 | | | 124 | | |
| 9 | | | 38 | | | 67 | | | 96 | | | 125 | | |
| 10 | | | 39 | | | 68 | | | 97 | | | 126 | | |
| 11 | | | 40 | | | 69 | | | 98 | | | 127 | | |
| 12 | | | 41 | | | 70 | | | 99 | | | 128 | | |
| 13 | | | 42 | | | 71 | | | 100 | | | 129 | | |
| 14 | | | 43 | | | 72 | | | 101 | | | 130 | | |
| 15 | | | 44 | | | 73 | | | 102 | | | 131 | | |
| 16 | | | 45 | | | 74 | | | 103 | | | 132 | | |
| 17 | | | 46 | | | 75 | | | 104 | | | 133 | | |
| 17 | | | 47 | | | 76 | | | 105 | | | 134 | | |
| 19 | | | 48 | | | 77 | | | 106 | | | 135 | | |
| 20 | | | 49 | | | 78 | | | 107 | | | 136 | | |
| 21 | | | 50 | | | 79 | | | 108 | | | 137 | | |
| 22 | | | 51 | | | 80 | | | 109 | | | 138 | | |
| 23 | | | 52 | | | 81 | | | 110 | | | 139 | | |
| 24 | | | 53 | | | 82 | | | 111 | | | 140 | | |
| 25 | | | 54 | | | 83 | | | 112 | | | 141 | | |
| 26 | | | 55 | | | 84 | | | 113 | | | 142 | | |
| 27 | | | 56 | | | 85 | | | 114 | | | 143 | | |
| 28 | | | 57 | | | 86 | | | 115 | | | 144 | | |
| 29 | | | 58 | | | 87 | | | 116 | | | 145 | | |

Key: C/M = Cell or Monobloc

* Delete as required

V = Volt

Z = Impedance



Stationary Battery Log Sheet

| | |
|-----------------------------|--------------------|
| Customer Reference: | |
| Inspected / Tested by: | Date: |
| Battery Type: | Configuration: |
| Original Installation Date: | Next Service Date: |

| | | |
|---|----------------|----------------------|
| Commissioning / Routine Service Date: * | System Load: | |
| Float Test: YES/NO * | Float Current: | Total Float Voltage: |

| | | |
|---------------------|-----------------|-----------|
| Load Details: | | |
| Load Test: YES/NO * | Load Duration : | Interval: |
| | | |

Observations: -

Notes: 1. This document should be kept for record purpose 2. * Delete as required

