WORLD CLASS BATTERY MANUFACTURER

# 4Ah INTRINSIC SAFE MINER'S CAP LAMP

## R68 Headpiece Assembly

# MAINTENANCE AND TROUBLE SHOOTING NOTES


## FIRST NATIONAL BATTERY
### A DIVISION OF METINDUSTRIAL PTY LTD
### REG. 1949/031259/07

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# LAMP ROOM ROUTINE

**Before a lamp is issued or taken it should be checked to verify that the lamp is in good working condition.**

**At the end of the working shift faulty lamps must be handed in for repair.**

**Lamps returned at the end of the working shift should be handed in to a lamp room staff member or placed on charge in a clean condition.**

**Lamps used on different shifts should, as far as possible, be segregated into different charging frames and marked accordingly.**

**Cap Lamps, accumulators held as spares should be cycled (discharged and recharged) every 3 months.**

**Once per month, lamp room attendant to re-charge lamps after shift, and then place lamp on "Burn Down" test as follows:**

**(i)Test must be conducted in the lamp room–remove from charge.**
**(ii)Burn down period –9 hours/shift.**
**(ii)Switch on and check hourly.**
**(iii)After this has been achieved, allow specified burn down duration to elapse and check if lamps pass the set burn down period.**
**(v)If it is considered passed, put the lamps back on charge.**

**UNDER NO CIRCUMSTANCES should the accumulator be carried by the cable.**

**Do not switch the lamp on until necessary**

## 4Ah I/S LED CAPLAMP - 102447

# PREVENTATIVE MAINTENANCE

**It is recommended that a quantity of headpieces complete with cables be assembled and kept ready to be fitted to replace lamps which are handed in as faulty.**
**The advantages of this system are:**

1. **Minimal time is lost in returning the lamps to their charging positions.**

2. **This method ensures that the replacement headpiece and cable has been completely overhauled and should function as new.**

3. **The repair staff has sufficient time available to overhaul the faulty headpiece and cable the following day/night shift.**

4. **The lamp room supervisor should examine a percentage of repaired lamps daily to ensure repairs are being done correctly.**

5. **Visually inspect all lamps after these have been placed on charge and check for loose or damaged outer covers, damaged headpieces or cables and unsealed headpieces. Also do random checks to ensure that the headpieces have been correctly inserted for correct charging.**

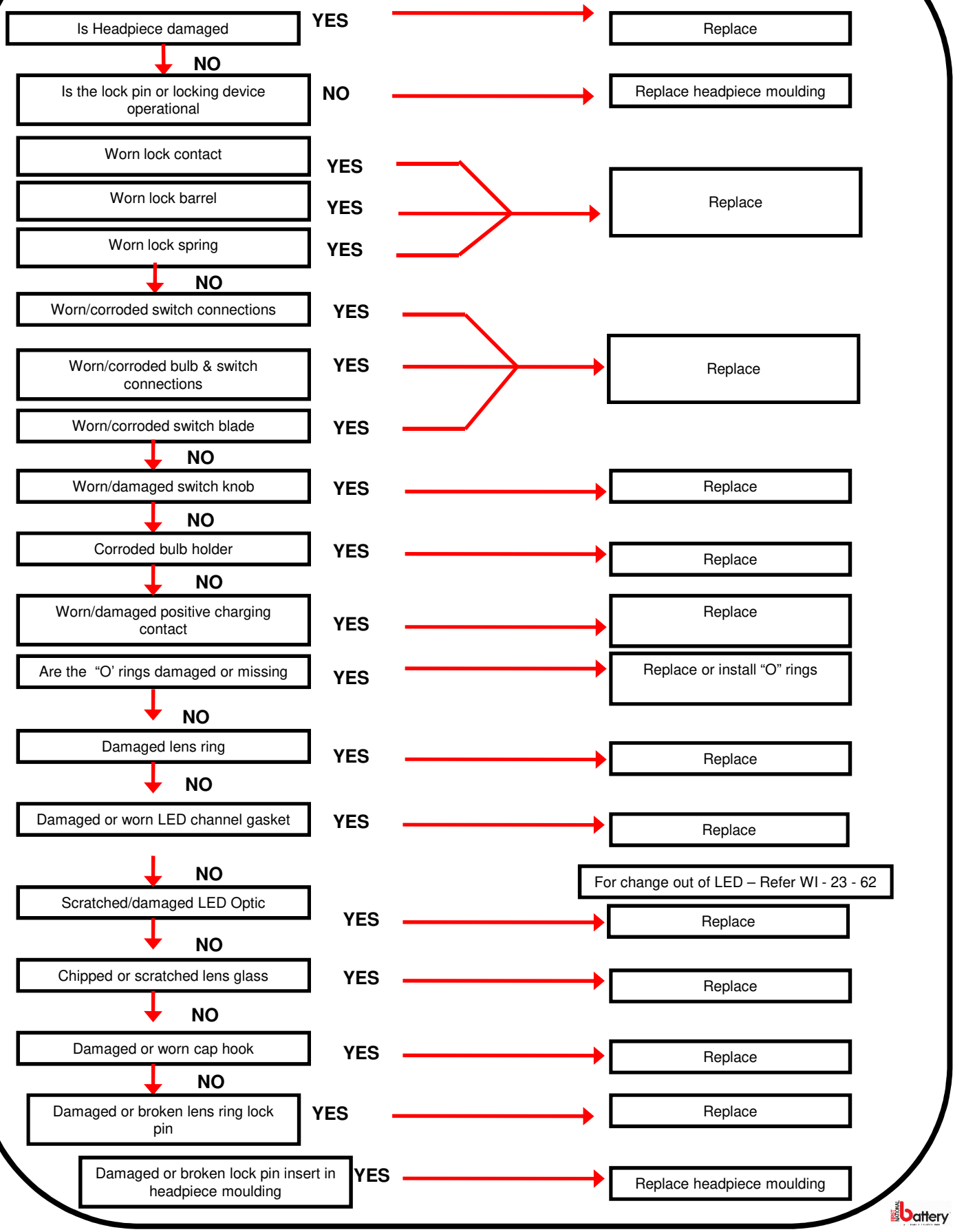
6. **For good accumulator life and recharge performance, lamp room to lamp room working shifts should not exceed:**

## FOR LED ACCUMULATORS

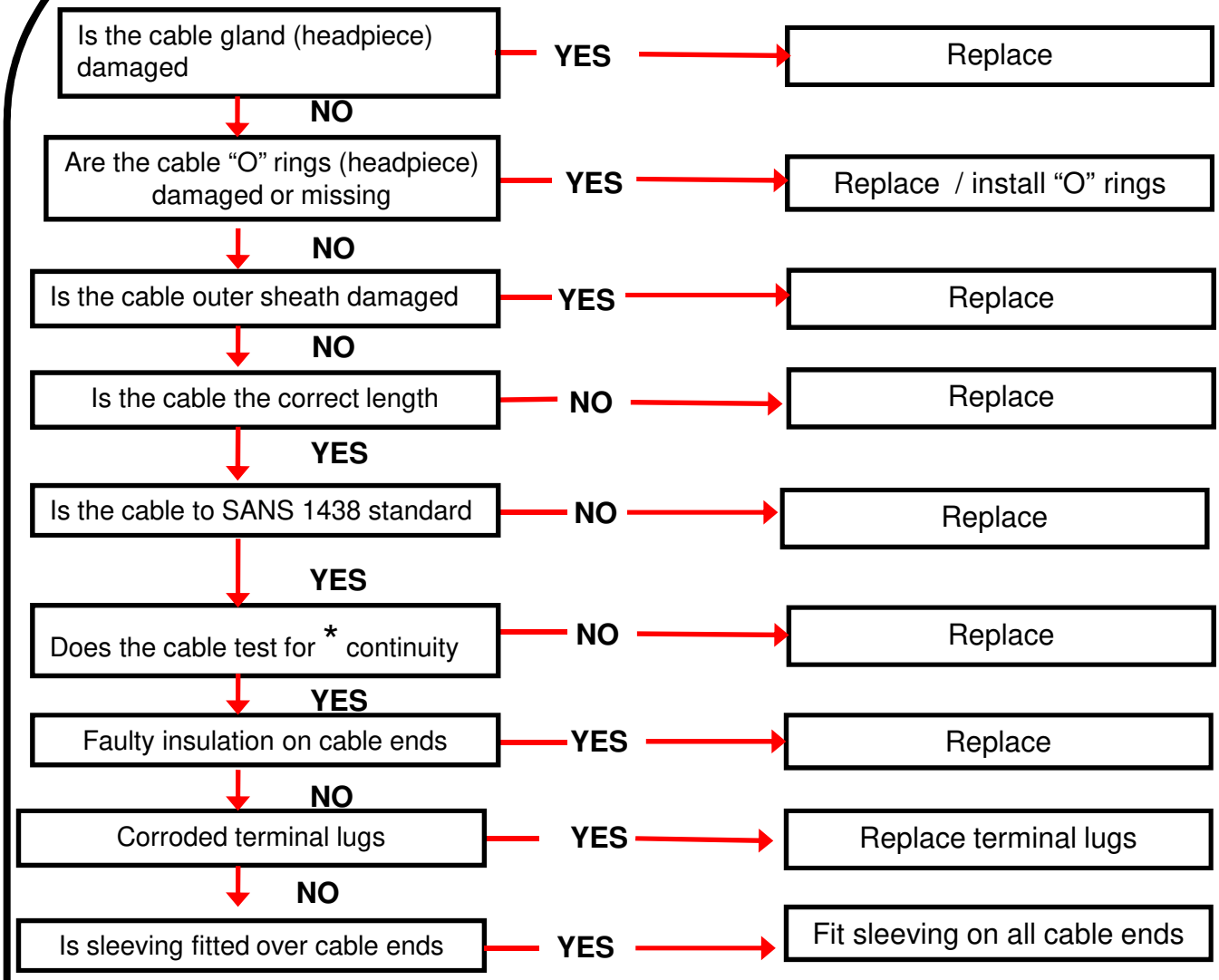
**9 Hours using 4 Ah accumulator**

7. **It is important to record all repairs done and the date of these repairs to keep a control on the quality of the repair work, to eliminate the misuse of lamps by the users, and to prevent the loss of certain spares.**

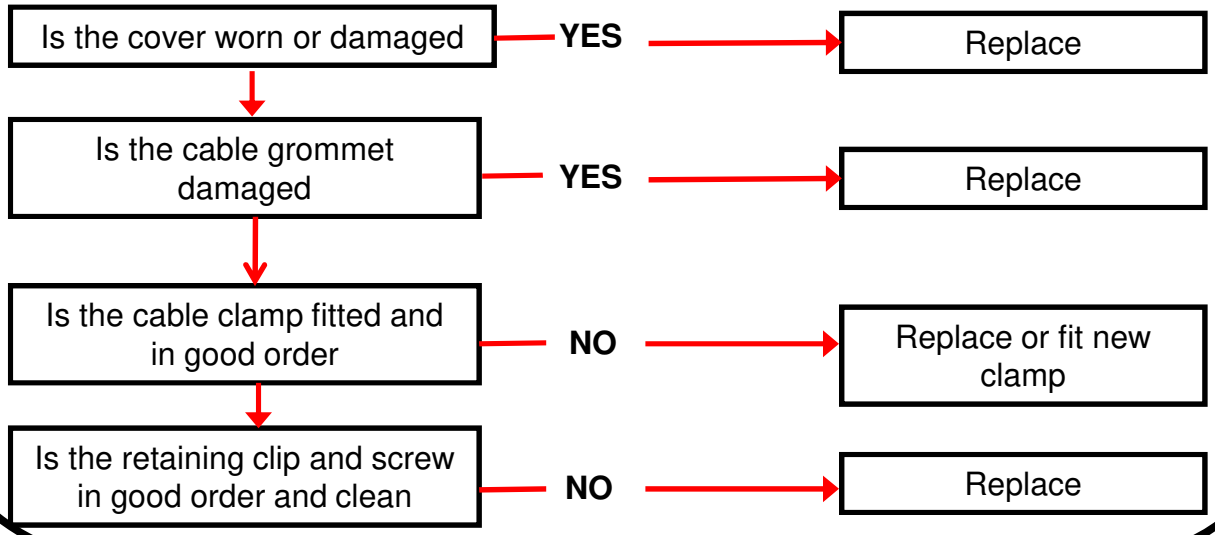
# R68 HEADPIECE MAINTENANCE



# CABLE MAINTENANCE

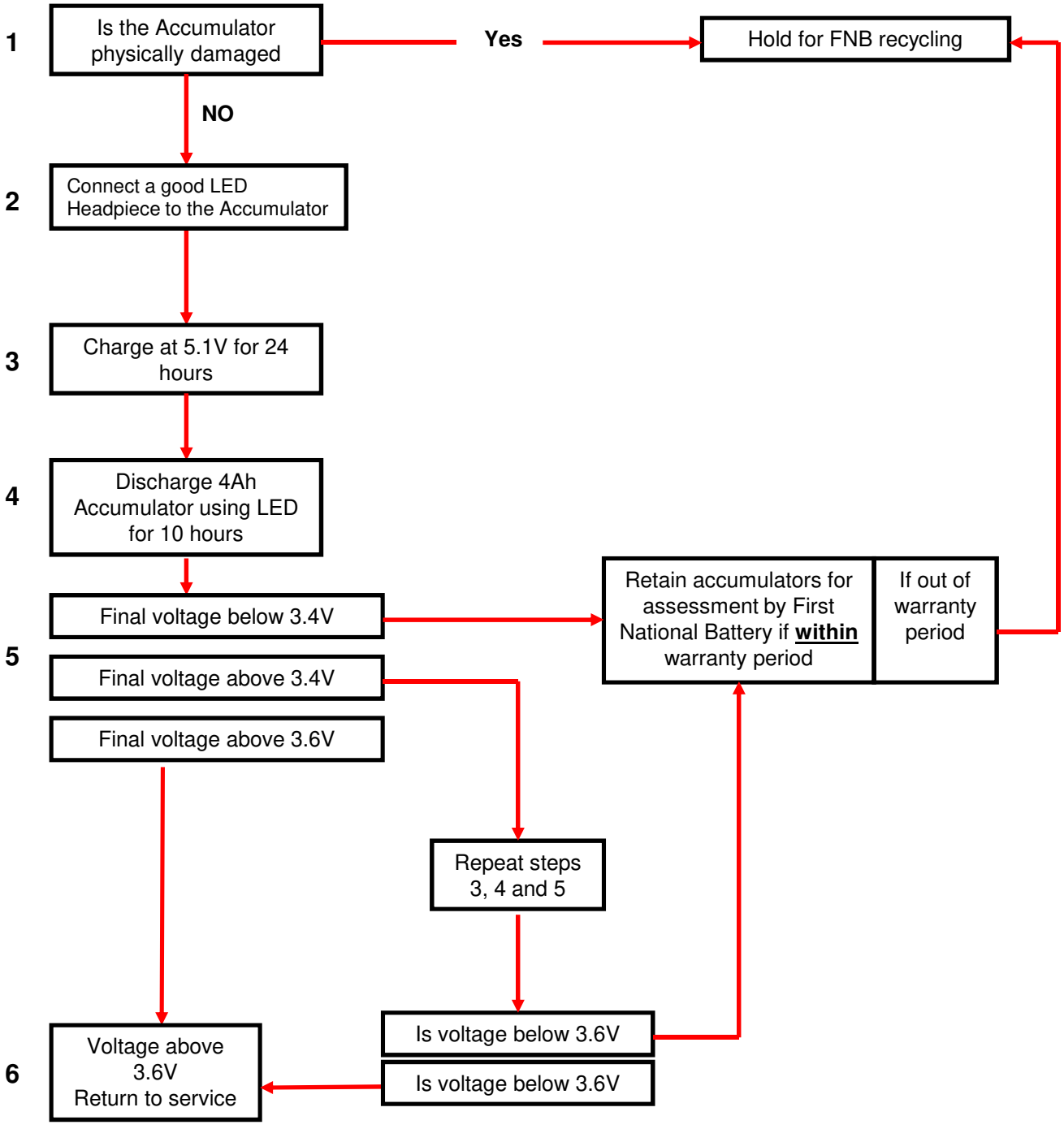



# OUTER COVER MAINTENANCE

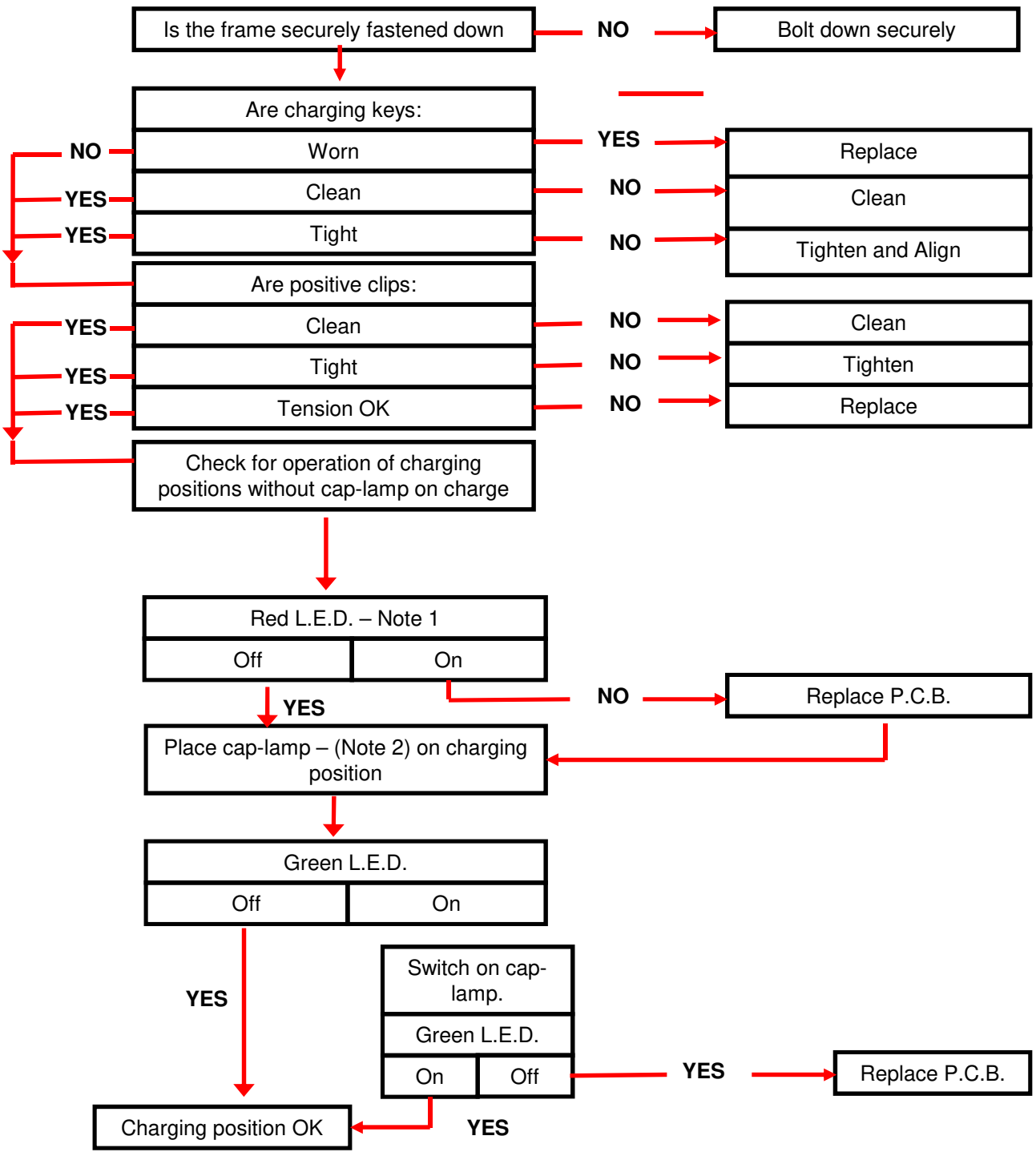



*** Note: test for continuity (ohm) using multimeter**

# ACCUMULATOR HOSPITALISATION PROCEDURE



# MAINTENANCE FOR STAINLESS STEEL CHARGING FRAME

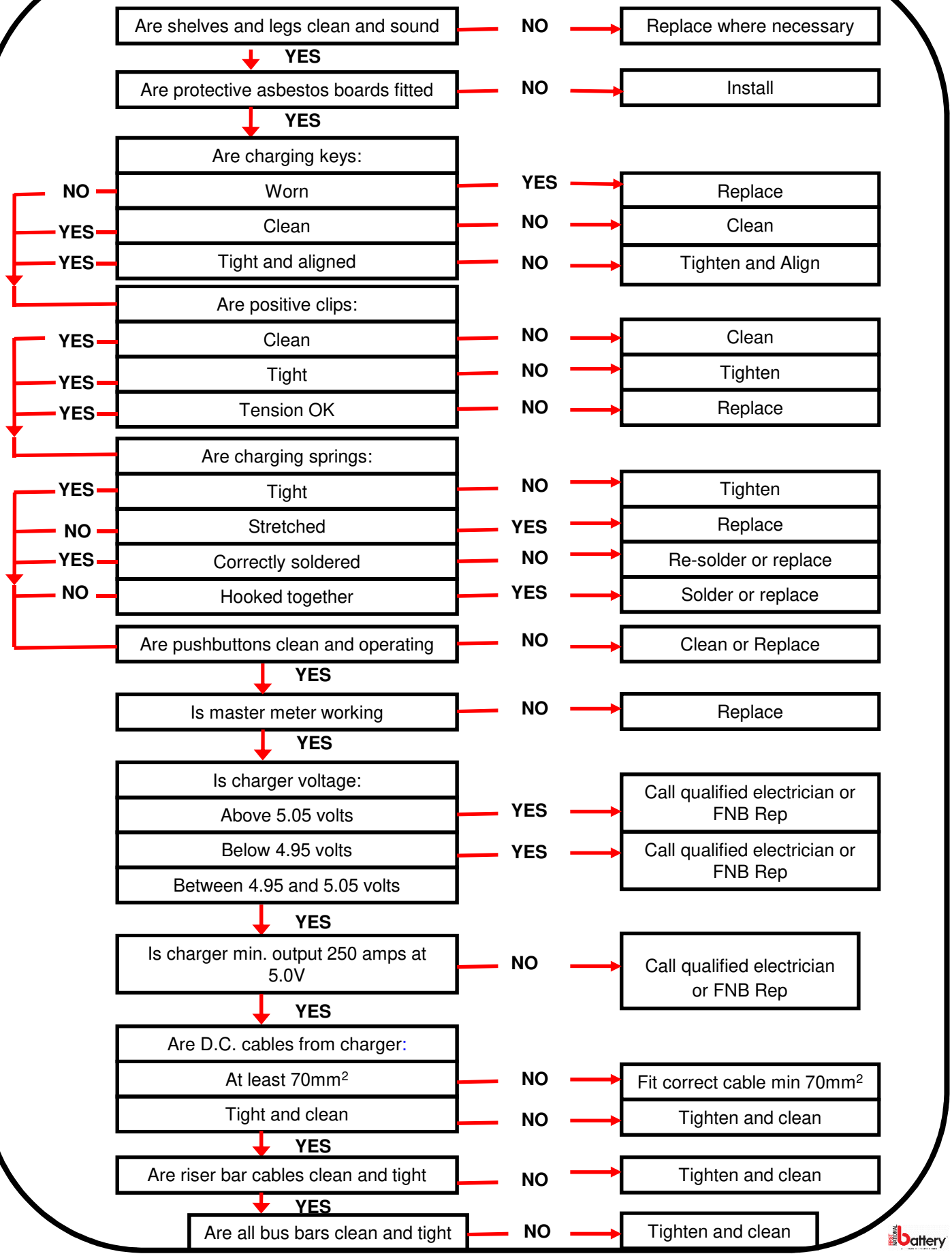



**Note 1 – Should the RED L.E.D. indicate ON when the cap-lamp is placed on charge – the lamp/accumulator is faulty – check accumulator and headpiece for polarity and for short circuits.**

**Note2 – To test the charging positions ensure that a fully charged accumulator is used. The cap-lamp must be in good working condition.**

**Note3 – On a regular basis check the charger D.C. output voltage and charging position voltages, which must read between 4.95 and 5.05 volts. Should, at any charging position, the L.E.D.'s flicker or charging positions read low voltages, the P.C.B. must be checked for loose connections**

# MAINTENANCE FOR WOODEN CHARGING FRAME



# MAJOR CAP-LAMP CHARGER

## Service Conditions

**The equipment is suitable for operation in ambient temperatures not exceeding 40°C or temperatures ranging between 10 – 35°C at altitudes from sea level to 2000m above sea level.**

## A.C. Input

**The equipment is designed to operate from a three phase 50 Hz A.C. supply, having a nominal voltage of 380 – 525 volts. The voltage may vary by a maximum 10% without materially effecting the output of the charger. (220 volt 50hz chargers can be supplied on request).**

## D.C. Output

**The equipment has been designed to recharge 2 cell, 4.0V nominal cap-lamp accumulators.**

| | | |
|---|---|---|
| **Maximum output current** | **-** | **300 amps at 5.1V nominal;** |
| **C.V.C. voltage** | **-** | **adjustable between 4.95 volts and 5.05 volts** |
| **Lamp capacity** | **-** | **recommended 204 cap-lamps maximum** |

## Maintenance

**The charger requires no preventative maintenance apart from occasional cleaning to prevent "tracking" due to a build-up of conductive dirt.**

## Cabling

**The D.C. supply cable from the charger output to the charging frame must not be less than 70mm$^2$ and must be firmly bolted at the charger and frame connection points. The lugs should preferably be soldered and not crimped.**

## Charger Protection

**3 Phase circuit breaker in the A.C. input.**
**Fuse protection in the diode circuit.**
**Transient suppression network.**

**The unit is factory pre-set and should not be tampered with by unauthorised personnel. Incorrect adjustment can damage the charger or accumulators. If the charger is suspect, contact a qualified electrician and notify your nearest First National Battery branch.**

## Warning

**High voltage testers, meggers, etc. should not be used for checking the charger or frame circuitry as this will damage the electronic circuits.**

# SWITCH MODE POWER SUPPLY CAP LAMP CHARGER

## Service Conditions

**The equipment is suitable for operation in ambient temperatures not exceeding 40°C or temperatures ranging between 10 – 35°C at altitudes from sea level to 2000m above sea level.**

## A.C. Input

**The equipment is designed to operate from a single phase 50 Hz A.C. supply, having a nominal voltage of 200 – 240 volts. (380 volts 50 Hz chargers can be supplied on request)**

## D.C. Output

**The equipment has been designed to recharge 2 cell, 4.0V nominal cap-lamp accumulators.**

| | | |
|---|---|---|
| **Maximum output current** | **-** | **200 Amp at 5.1V nominal;** |
| **Voltage** | **-** | **4.95 volt ~ 5.05 volt** |
| **Lamp capacity** | **-** | **recommended 102 cap-lamps maximum** |

## Maintenance

**The charger requires no preventative maintenance apart from occasional cleaning to prevent "tracking" due to a build-up of conductive dirt. Also ensure that the internal fan is in clean working order and free from dust build up.**

## Cabling

**Each unit is factory assembled and all cabling conforms to specifications.**

## Charger Protection

**2 Pole circuit breakers installed at the A.C. supply.**
**Transient suppression network.**
**The unit is factory pre-set and should not be tampered with by unauthorised personal.**
**Incorrect adjustment can damage the charger or accumulators. If the charger is suspect, contact a qualified electrician and notify your nearest First National Battery branch.**

## Warning

**High voltage testers, and meggers etc. should not be used for checking the charger or frame circuitry as this will damage the electronic circuits.**

# PRODUCT DESCRIPTION

The new FNB Intrinsic Safe battery packs with enhanced safety features are a direct replacement for the standard batteries when the headpieces are connected to the two battery terminals. The new battery features explosion prevention for hazardous locations.

The Intrinsic Safety battery packs are constructed with the same materials as for the existing units.

Container = Polycarbonate
Lids = ABS
Compression Bushes = Polypropylene and Santoprene
Posts = Lead / brass Inserts
O-rings = E.P.D.M
Plates = Lead
Fasteners = Stainless Steel
I.S. Circuit Board = FR4

# INSTALLING THE INTRINSIC SAFE BATTERY

Procedure to be carried out in the lamps room.

1. Remove the Outer Cover from the existing cap lamp battery assembly using a T-bar Allen key spanner 101869, and keep the cover clamp and socket screw for later use.

2. Disconnect the red and black wires from the battery terminals by removing the nut and washer holding leads to the terminals. Dispose of the old battery in accordance to the waste management system.

3. Reconnect the red and black wires from the headpiece assembly and or electronic tags to the new Intrinsic Safe battery, connecting the red wire to the positive (+) battery terminal and the black wire to the negative (-) battery terminal and apply a torque of 45cNm.

4. Assemble Outer Cover, Retaining Clip and Screw to battery. Ensure all wires are underneath the cover before tightening screw.

5. Ensure unit is operational before moving to the next unit by turning the lamp switch on and off.

# GENERAL PRODUCT SPECIFICATION

| BATTERY TYPE | 4 Ah |
|---|---|
| External Dimensions | 135 x 92 x 58 mm |
| Weight | 1041 gram |
| Ingress Protection | IP 54 |
| Current Consumption | LED 350 mA |

# APPROVALS / CERTIFICATION

- SANS IEC 1438:2018
- DME : PN100
- SANS 60079-0:2009
- SANS 60079-11:2007
- MASC: 10 – 077 – R2

# EXPLOSION-PROTECTED EX RATING

| TESTING AUTHORITY | EX RATING | CERTIFICATE NUMBER |
|---|---|---|
| MASC | Ex ia I/IIC T4 | MASC MS/10-077X |

# CONDITIONS OF SAFE USE

- This instruction manual shall be read and understood prior to use of the equipment.
- The equipment shall only be repaired or disassembled and or parts removed in a non-hazardous area by designated qualified personnel in an approved service centre who have undergone adequate training associated to task.
- The equipment shall only be charged in a non-hazardous area.
- The equipment may only be charged from a power supply with the following parameters:
    - 5.1 Volt constant voltage charger
- The ambient temperature range suitable for the equipment not exceeding 40°C
- Intrinsic Safety may be impaired by the substitution of components – only approved components to be used as supplied by FNB.
- To prevent ignition of flammable / combustible atmospheres, read, understand and adhere to the manufacturer's live maintenance procedures.

# REPAIR AND MAINTENANCE

- The equipment does not require any maintenance except to be kept clean and to be recharged.
- If the unit is found to be faulty, return to FNB for warranty claim – cannot be repaired.
- If battery assembly needs cleaning, use a mild detergent and wipe – Do not submerge.

# BATTERY CHARGING

All batteries must be charged after each period of an 8hr discharge shift in the following manner:

1. Ensure that the power supply or charging station is set to the correct charging parameter of 5.1 Volt.
2. Fit headpiece to charge key on charging rack.
3. Once charger is fully loaded with batteries start charging cycle.
4. Allow batteries to remain on charge until it is fully recharged.

# INTENDED USE

The unit may only be used in the following classified zones:

- Zone 0
- Gas Group IIC
- Temperature Class T4
- Hazardous environments in ambient temperature of –20° C to 40° C

# APPLICABLE STANDARDS

| STANDARD NUMBER | STANDARD TITLE |
|---|---|
| SANS IEC 1438 : 2018 | Lead-Acid Batteries for use in miners' lamp assemblies |
| SANS 60079-0 : 2009 | Electrical apparatus for explosive gas atmospheres Part 0: General requirements |
| SANS 60079-11 : 2007 | Electrical apparatus for explosive gas atmospheres Part 11: Intrinsic Safety "I" |

# ELECTROSTATIC / CAPACITANCE APPROVAL

| STANDARD NUMBER | STANDARD TITLE | COMPLIANCE |
|---|---|---|
| SANS 60079-0 : 2009 | Electrostatic charge on external non-metallic materials | MASC 10-077-R2 |

# QUALITY STATEMENT

FNB produces all products in accordance to our accreditations.

| STANDARD NUMBER | STANDARD TITLE | COMPLIANCE |
|---|---|---|
| ISO 9001:2008 | Quality System | Certificate #: 493266 QM08 |
| ISO 14001:2015 | Environmental Management | Certificate #: 493265 UM |

# WARNING AND CAUTIONS

**NOTE:**

1. **Do not remove PCB Potting Resin from circuitry compartment as this will annul the warranty and will lead to failures.**
2. **Ensure headpiece leads are connected to the corresponding polarity on the battery.**
3. **If unit needs cleaning, use a mild detergent and wipe – Do not submerge.**