Network Rail

'BB3' Pin Brazing Equipment – uncontrolled document for information** only

- **Description of Pin Brazing equipment:**

The pin brazing process in the **BB3** is digitally controlled for consistency of the brazing action. The battery capacity is sufficient for approximately 100 brazes with the smallest type of brazing pin and is normally recharged from a mains supply. This can be increased by charging the batteries during transport between brazing sessions using a battery charger mounted in a vehicle. By using this procedure it is possible to increase the number of brazes up to 250 per working day. The batteries are of a new high power design and are completely sealed.

-  **Warning:**

The brazing equipment operates at very high currents (max output **260a**) and very high temperatures (up to **660 degrees C**). Misuse of the equipment or components attached to it could result in serious injury or fatality.
The battery unit MUST not be opened and the equipment MUST not be tampered with in any way.

- **Pre-use checks:**

1. Check the equipment is in good order (leads are intact, no bear wires showing, battery case sealed and handle in good order) and all controls are intact and working.
2. Check the brazing gun is in good order (the end of the ferrule holder and pin holder MUST NOT be damaged in any way), the trigger must be intact and ONLY operate when a ferrule and pin is inserted and pushed down on to a flat surface.
3. Check the unit is fully charged, the green LED will be lit, the Low battery red LED unlit and the Low battery warning buzzer is silent).
   Note: if the green LED is flashing after charging; there is a fault with the battery or charger.
4. Check all the equipment needed is in the case (see parts list – page 3).
5. Check you have sufficient ferrules and brazes (a new ferrule **MUST** be used with each new pin).
6. Check you have the correct copper straps (connecting cables) for the work to be done.
7. **Goggles and appropriate gloves MUST be worn before use by all involved in the brazing.**
8. The new type of brazing gun* does not require a 'time fuse' (the copper tail wire at the base of the pin). However it is capable of brazing with pins fitted with a time fuse. It is recommended to remove the fuse if it comes with one.
   ** The new type of gun will be noticeable by the exclusion of the button on the back of the gun.*

- **Instructions for use:**

1. You MUST read the above before proceeding.
2. ENSURE the main switch is **OFF** first.
3. Set-up the ferrule holder and pin holder distance; this is done by inserting a ferrule and brazing pin and whilst pushing the pin fully down onto a flat surface, the rubber indicator at the back of the gun will be flush with the gun casting.
4. Connect the earth lead by inserting the correct way and twisting (see diagram below).
5. Connect the brazing gun by inserting and twisting.
6. Plug in the grinder by aligning the pins and pushing it in until it clicks.
7. Select the pin braze type switch to correct position;
   The switch has three positions; F, B & G, it **MUST** be selected for the type of pin braze being used, the tin in which the pins are stored will have the letter on the side ***OR*** a ten digit reference code i.e. '270 075 1210' *(see table on page four).*

If the switch is not in the correct position it may cause serious injury due to the extended operating time and potential splash back of weld and debris arising from over-burning.

8. Using grinder, grind off the position in which the braze will be welded *(note: the grinder will still work with main switch in the off position).*
9. Attach the earth lead to the same rail the braze will be welded to, ensure good connection or the braze will not work or injury may be caused from potential sparking.
10. Turn on the main switch.
11. The buzzer will sound for a few seconds and both the red and green LED's will light for the same period of time, after which the buzzer will stop sounding and the green LED will remain lit.
12. Position the copper strap and insert the pin into it ensuring the ferrule is flat against the strap, Note: the pin should be positioned at the top of the hole of the copper strap.
13. Ensure everyone else is well clear and pull the trigger on the gun, keep the trigger pulled in until the automatic timer ceases the welding process. Release trigger.

IMPORTANT: Do not pull the trigger more than once, serious damage could occur by short-circuiting.

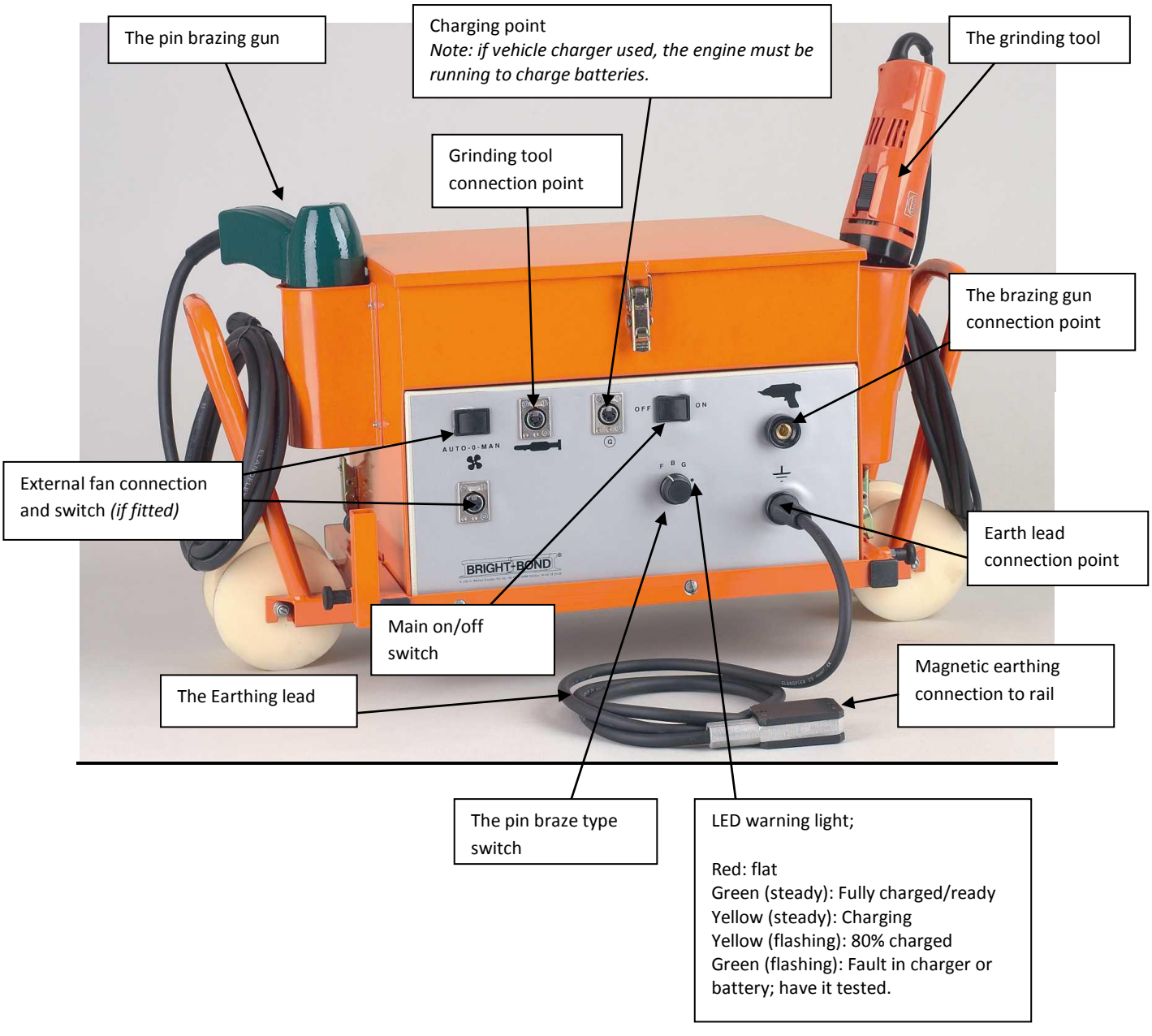
14. Turn **off** main switch and wait 3-4 seconds and remove gun from weld (**DO NOT** bend the gun away from it).
15. Using pliers, remove the spent pin and ferrule from the gun **(Caution: the gun, ferrule and spent pin will still be very hot).**
16. Remove spent shank from the braze on the rail with a hammer to ensure it is brazed properly. Note: If a threaded braze for a track end, test with a torque set to 10Nm. (The braze is designed to fail over 25Nm).
17. Repeat the above process ensuring the ferrule is changed every time.

- **Faults:**

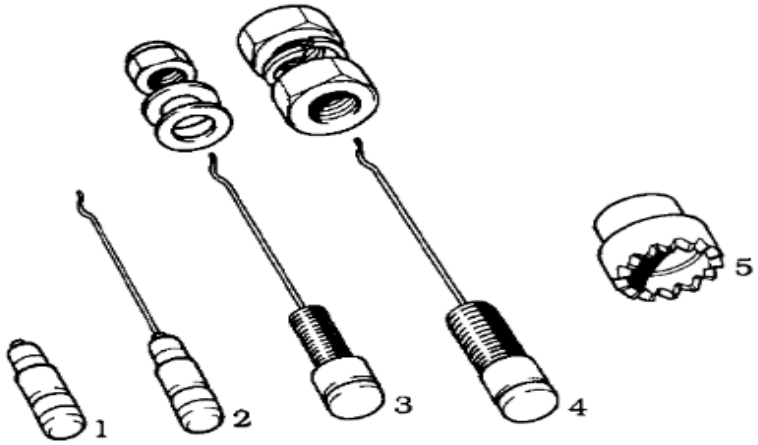
  - **Nothing happens:**
    Is the main switch on and green LED lit steady? *(See step three about flashing green LED).*
    Is the earth lead and gun connections on battery box tight?
    Is the earth lead connected to the same rail and a clean connection?
    Is the pin braze correct type and inserted correctly?
    Is the gun correctly set up?
    The TC rail voltage MAY be opposing the process, try disconnecting the TC (or shorting the TC with a track shunt) and retry.
  - **The weld process is too long:**
    The gun is not correctly set-up (see step 3 above of instructions for use).
    Battery is not fully charged and not enough current available.
  - **The weld process is poor:**
    Wet or dirty ferrules or pins; check, clean, dry and retry.
    Dirty or wet rail where earth lead connected, clean, dry and retry.
    Dirty earth lead, clean and retry.
  - **The Red LED comes on and buzzer sounds:**
    The battery is low, it requires charging, if unable to charge immediately, try turning the unit off for 5 mins, and retry.
    Battery is recharged in 1-2hrs, but if continually used it may take up to 18hrs.
  - **The trigger will not operate:**
    The gun must be loaded and pushed on to the rail to work, if it still does not work using this process, the gun is defective and requires replacing.

    If the fault above is not listed or the instructions fail to rectify the fault, the equipment should be reported to the hire company and replacement sort (see parts list for specific part if applicable).

- **Equipment Layout (Model BB3):**



- **Pins and Ferrules and F, B & G settings:**



Pin Braze Types					
Number *(diagram above)*	Reference number	Description	Length (mm)	Setting on gun	With or without fuse wire
2	270 075 1210	Brazing Pin standard	8	F	with
2	270 083 3520	Brazing pin extra solder	8	B	with
2	278 190 3250	Brazing pin 610 degrees	8	N/A	With
1	278 190 4320	Brazing pin standard	8	F	Without
1	278 190 4360	Brazing pin extra solder	8	B	without
2	270 075 1630	Brazing pin	9.5	G	with
1	278 190 4350	Brazing pin	9.5	G	without
3	278 190 0430	Threaded Brazing pin	12x30	F	with
3	278 190 4920	Threaded Brazing pin	12x30	F	without
3	278 190 3450	Threaded Brazing pin	10x34	F	with
3	278 190 4980	Threaded Brazing pin	10x34	F	without
3	278 190 2560	Threaded Brazing pin	12x34	F	with
3	278 190 4930	Threaded Brazing pin	12x34	F	without

Ferrules			
Number *(diagram above)*	Reference number	Description	Quantity
5	270 065 7230	White Ceramic Ferrule 8mm	200
5	270 065 7240	White Ceramic Ferrule 9.5mm	150
5	270 077 3680	White Ceramic Ferrule 12mm	100
Note: a new ferrule MUST be used with every operation.			

Notes written by F.M.Spowart Version 3 (Updated: Jan 2015)

***Please note that these are **NOT** the instructions that come with the Pin brazing equipment and should only be used as guidance and not solely for operational use, therefore **the operator MUST be trained** to use the equipment and not reliant solely upon this document as an alternative to the appropriate training. The author of this document is **NOT** responsible for any injuries arising from incorrect use whether this document is followed or not.*