Point machine renewal; HW1000 to 2000 Page 1 of 3

These notes are based on just the machine being renewed, the machine is already fitted to plates, (a separate document is for plates) all rods will not be renewed and all moving parts & blades are greased before fitment.

1. Take possession of the line with the signaller.
2. Sign out the points on a RT3187 and make an entry in train register.
3. Remove detection, motor and heater fuses/links.
4. Referring to method statement (existing copy – *NOT* the installation copy), wire count the old machine.
5. Label wires if core numbers are hard to see, and protect all wires using a plastic bag.
6. Unbolt detection lugs via the adjusting nuts x2.
7. Unbolt lock blades via the two brass bolts on the top of lug.
8. Undo and remove bolt (nearest to machine) on drive rod.
9. Undo and remove main machine holding nuts x4.
10. Using two slewing jacks, place one either side of machine at the ends and simultaneously raised the jacks together until machine is clear of bolt heads on the plates.
11. When clear, place wooden blocks under machine and remove jacks.
12. Remove the machine and place clear of the track.
13. Leave wooden blocks in place and lift new machine into place, aligning the holes roughly with the heads of the bolts (note; the middle hole of the first set of holes nearest the cable entry point are used as a guide to where machine is mounted).
14. Then whilst machine is lifted, have an assistant remove the blocks, and very carefully lower the machine on to the bolts, some manipulation maybe required to locate all four bolts, but NEVER bend the bolts with a hammer.
15. Check the measurement from running edge of stock rail to centre of machine; this should be 39” +/- 0.5”. If incorrect, the mounting plates have to be adjusted using packing plates, and longer bolts/insulations.
16. Renew all four locking nuts and tighten to 100-120Nm.
17. Fit new drive lug to machine with the new bolt and insulations, Note; the two bolts in the drive lug MUST be fitted facing down (with nut on bottom).
18. Remove the new grey drop lug from the new lock blades via the two brass bolts x2 and push the blades through the machine from the rear. Make sure the large notches are on the underside. You may have to use point handle to unlock the machine, or blades will not go through.
19. Refit the lug taken off in step above.
20. Making sure the points are closed at the furthest lie, align datum marks on the fixed lock blade and tighten adjusting nuts on the lock rod.
21. Locate and hold both detection blades up to the slots on machine (but do not enter them).
22. If the machine is mounted on the left hand side of the track, the first blade in your left hand needs to have the smallest notch (on the top) entering the machine first *(at the four foot side of the machine).*
    The blade in your right hand then goes in next slot with the largest notch entering the slot first, but before the blades are entered, make sure the two grey lugs are mounted on the outside of the blades, if not, undo lock nuts on the two brass bolts, and UNSCREW the bolts as they are threaded too. Swop the lugs with each and reassemble.

If the machine is mounted on the RHS, the left hand blade will enter machine with largest notch first, and the right hand blade with the smallest notch entering machine first.

23. With points still at the furthest lie, align the datum mark on the first blade (nearest to cable entry point) and tighten the adjusting nuts on the long detection rod.
24. Set up the drive rod on large nuts against four foot lug, ensuring the "springing-of-the-toe" is effective (this is done by placing a large adjustable spanner behind the switch extension and forcing away the switch rail tip, you must be able to pull it away, but it MUST also spring back when released, adjust if incorrect.
25. Wind over the machine, and set up the drive (ignore lock blades at this point if machine fails to lock).
26. With points now at opposite lie, align datum marks on the other lock blade and detector blade and tighten the adjusting nuts on the rods.
27. Making sure ALL nuts, bolts and locking nuts are present and fully tightened, carry out a facing point test.
28. It maybe necessary to check and readjust the drive rod to acquire a perfect fit, but the FPLT and detection test MUST also be rechecked if adjustments are made.
29. Carry out a detection test.
30. Check all contacts in machine for correct alignment and gaps.
31. Fit new cable glands and pull cables through.
32. Rewire machine to method statement (installation copy), paying particular attention to the new positioning of cores 2 & 3 of the motor circuit.
33. The crimps of the each wire fitted to the top contacts must be installed so the wire is facing up.
34. Wire count the machine to the method statement (installation copy).
35. Using tape or preferably spiro-wrap, place it around the loose wiring to keep them clear of the moving parts. NEVER wrap the wires around the machine itself.
36. Fit clear plastic domes to the terminals.
37. Check other measurements such as switch openings, track gauge etc.
38. Reconnect the links/fuses.
39. Fully test the machine to 'SMTH' ***AND*** the method statement.
40. Recheck all nuts to ensure tightness, fit all covers and locks.
41. Shrink down the cable glands.
42. Sign back in the points when ALL tests have been carried out and no further work is outstanding.

Possible faults during renewal or testing:

- **Machine will not align with bolts on plates:**
  If the plates cannot be manipulated to allow the machine to fit, the best way would be to remove machine, remove plates from the sleeper, fit to the machine first, then fit the plates back on to sleeper using a large hammer to manipulate into place.

- **The lock/detection blades will not enter the machine:**
  Loosen the four holding bolts on the four corners of the detection cradle, but DO NOT remove them. Have an assistant pull up the detection roller assembly (which is spring loaded), push the blades in. Remember, the points have to be unlocked to push in the lock blades.

Point machine renewal; HW1000 to 2000 Page 3 of 3

- **The detection rods seem too long, they have run out of adjustment:**
  The machine is too close to the rails. The measurement should be 39" +/- 0.5" from the running edge of the stock rail to the centre of the machine. If incorrect, the plates need adjusting, this is a bigger job which may require the Pway dept to lift the stock rail to move the adjustable plate.

- **When setting up the lock blades, the blade being tested during the facing point test is fouling on adjustable blade in machine (or vice-versa):**
  The switch openings are too large, the tolerance is 102-120Nm. Check the track gauge first, this should be 1430-1438mm, if incorrect, the Pway will need to regauge the points. If the switch openings are too large due to the S&T equipment, the fender and first stretcher will need to be renewed. Temporary packing for the fender and front stretcher is available, but these are only temporary.

- **When setting up the detection rods, they make with the 5mm and break with the 3.5mm gauges:**
  First of all this could be down to the gauges being inserted incorrectly – check and retest.
  It could also be down to the detection blades being fitted incorrectly – recheck the notches in the top of the blades are the correct way round.

- **The detection blades are inserted correctly, but detection will still not make:**
  This is a fault that has happened before and was a manufacturing defect.
  The detection rollers in the machine which fall into the notches are incorrectly installed. This is a fault which cannot be fixed by the S&T, the machine must be renewed.

- **When winding the machine, the handle is being forced to turn and released:**
  The drive on the machine is incorrectly set and is exerting too much stress on the switch rails. This will eventually break the stretcher shoe. Remove the excess drive on the adjusting nuts on the four foot lug. Refer to step 24 above.

- **On powering machine the motor fuse keeps blowing:**
  There could be many reasons why this may be happening, but the most common would be the machine is incorrectly wired (most probably cores 2 & 3 of the motor circuit are not on terminal 'A3' together), recheck **ALL WIRING** to method statement, rectify and fully test the machine to SMTH again.

Written by F.M. Spowart
Retford S&T dept.

21st of March 2011.