LITTLE JOHN Mk2 REWIRING - SWITCH, MOTOR, & MAINS INPUT

Overview

I could see that the machine needed rewiring by the state of the perished mains lead and the large quantity of insulation tape that Dad had progressively applied. I also knew that Dad had removed the switch and the motor several times throughout the machine's life. The original metal flexible trunking was no longer fixed at all ends and the length from the headstock cover to the motor was too short anyway leaving wires exposed. Dad's earth connection was simply to bare the wire and stuff it back down the metal trunking (and hope it touched something I suppose).

What makes rewiring difficult is that the wiring layout is poorly designed by today's standards and most inaccessible. First, it's not easy to remove just the switch or just the motor. As regards the switch, there's so little room in the switch cavity to pack enough loose wire to enable you to withdraw the switch. Also, if you need to change the mains input cable for any reason it's hard to work the new wire through the tight corners in the small wiring box and then through the curved conduit from the box to the back to the switch cavity. As for the motor, if your lathe is up against a wall, as I guess many are, then you'll drive yourself insane trying to access just the tiny wiring cavity on the motor, which is at the right-hand end but at the bottom of the motor casing.

With all this in mind I decided the easiest way was to treat the headstock cover (containing the small wiring box, curved conduit, and switch), the motor, and the mains input supply as a single module. In other words, I removed the headstock cover and the motor and wired them together on the bench. The headstock cover is held by just two cap screws. The motor is relatively easy to remove although you'll need to first remove a bracket, the LH-end variable-drive pulley and fork. They came off easily in my case.

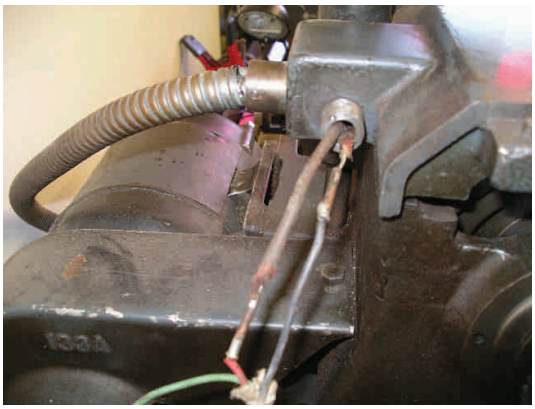
I was horrified at how dangerous the wiring had become and that I've been using the machine for the past 18 months in this state. I found the reward of rewiring as a module well worth the effort, not to mention the peace of mind of seeing and feeling that there are no hidden nasty wiring kinks or tight corners likely to cut insulation.

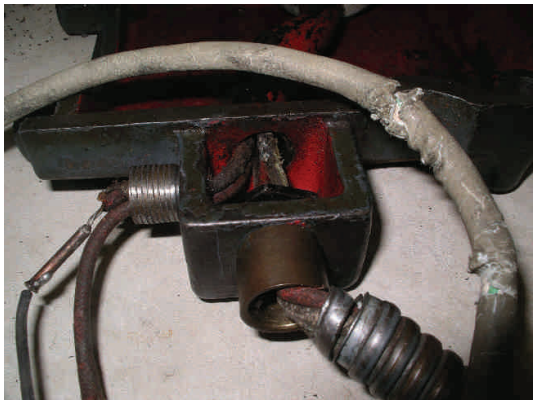
I've written this report mainly for my own records. I'm sure there are other ways of doing this job but I've added the report to our files in case it may be useful for anyone contemplating a similar task.

Brian Kerridge
brian@bwk.demon.co.uk
01502 678181

December 5, 2011

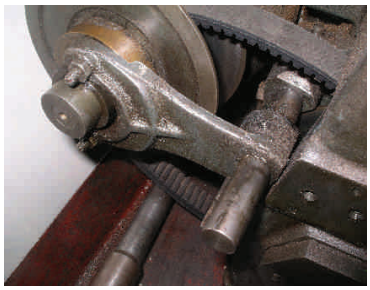
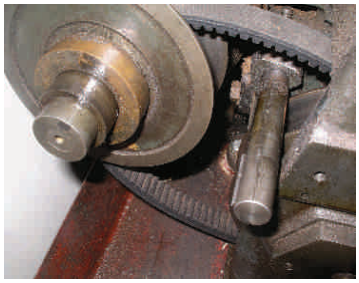
Hmm..?





A chamber of horrors was hiding under several layers of insulation tape!

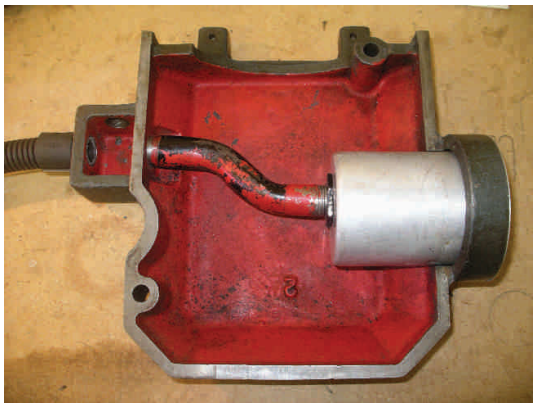
Remove the motor


First remove the end bracket by removing just two screws. Next slacken the cap screw holding the LH fork to the shaft and slide the fork off. You can then slide off the LH pulley face.

Chock up the motor and remove its four fixing screws. Remove the motor speed lever and release the two caps screws from the headstock cover. Now, lift off as one unit the motor, headstock cover, and the power input cable. (It's useful if you have help to carry the unit (headstock cover, motor, and input cable) to and from the lathe, although I managed it alone).

Commence rewiring




With the headstock cover now on the bench it's easy to tidy up the switch box and the curved conduit ready for rewiring. As removed, the switch's metal enclosure (with internal insulation sheet) and curved conduit were badly bent and loosely fixed together as evidence of earlier struggles to rewire in situ, and confirmed the advantage of removing the lot. I was able to restore the box to shape and securely refix all the bits back into the headstock cover prior to rewiring. You can now see how poorly designed the wiring layout.

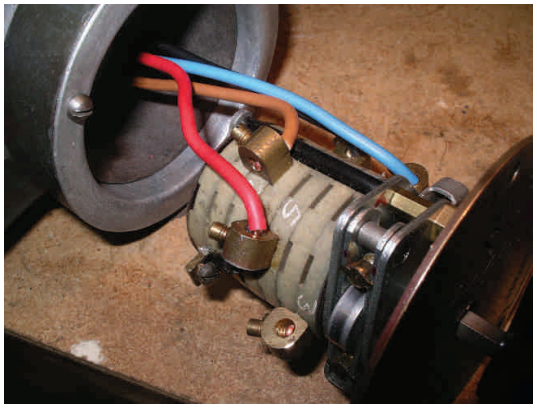
I was mildly concerned at the amount of swarf that had found its way into the motor's wiring cavity and further inside the frame. (I've made a mental note to devise some sort of protection for the future).

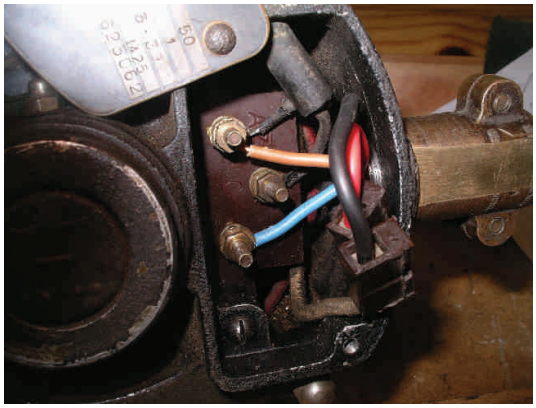
I like to retain as much original machine as possible but I decided to ditch the original metal flex trunking. Dad must have chopped off bits somewhere along the way and the ends were unravelling anyway. I used modern polyester flex trunking from Screwfix that I had to hand. I added a combination of glands to terminate the flex – one original brass on the motor, two turned up tufnol glands for the power cable, and one Screwfix polyester gland to the wiring box as shown.

I made the job a bit harder for myself by using 2.5-mm^2 wire stripped from flat grey domestic power cable. I had some old red-and-black cored cable and with today's brown and blue I had four different colours for wiring the single-phase capacitor-start motor. I reckon 1-mm^2 cable would have done the job and been easier to work with but I'm from the belt and braces brigade. Our photo archive shows that some users have given up on the original switch and installed modern no-volt contactors. These are much safer and – at a stroke - overcome all the issues of tricky rewiring. But, I want to keep the original Santon switch in operation as long as possible. If I was doing the job again, I would consider buying four colours of flexible power cable and then try to leave enough slack in the switch cavity in case just the switch fails. (The wire I used – like the original waxed-cotton insulation wire - from motor to switch is far too stiff to permit slack in the switch box). I did use flex for the power input.

	Old colour	**New colour**
Live supply in	Red (switch terminal 1)	Brown flex
Neutral supply in	Black (switch terminal 3)	Blue flex
Earth supply in	Green	Green/yellow
Motor run coil	Red (switch terminal 2)	Brown 2.5 m^2
Motor run coil	Black (switch terminal 4)	Blue 2.5 m^2
Motor start coil	White (switch terminal 5)	Red 2.5 m^2
Motor start coil	Green (switch terminal 6)	Black 2.5 m^2
	Switch terminals 3 and 7 remain linked	

[Note: Old Santon 137 KA schematics show terminals 3 & 4 swapped against the above. It doesn't matter because <u>all</u> contacts are open in both off positions. I just copied earlier wiring – and it works].

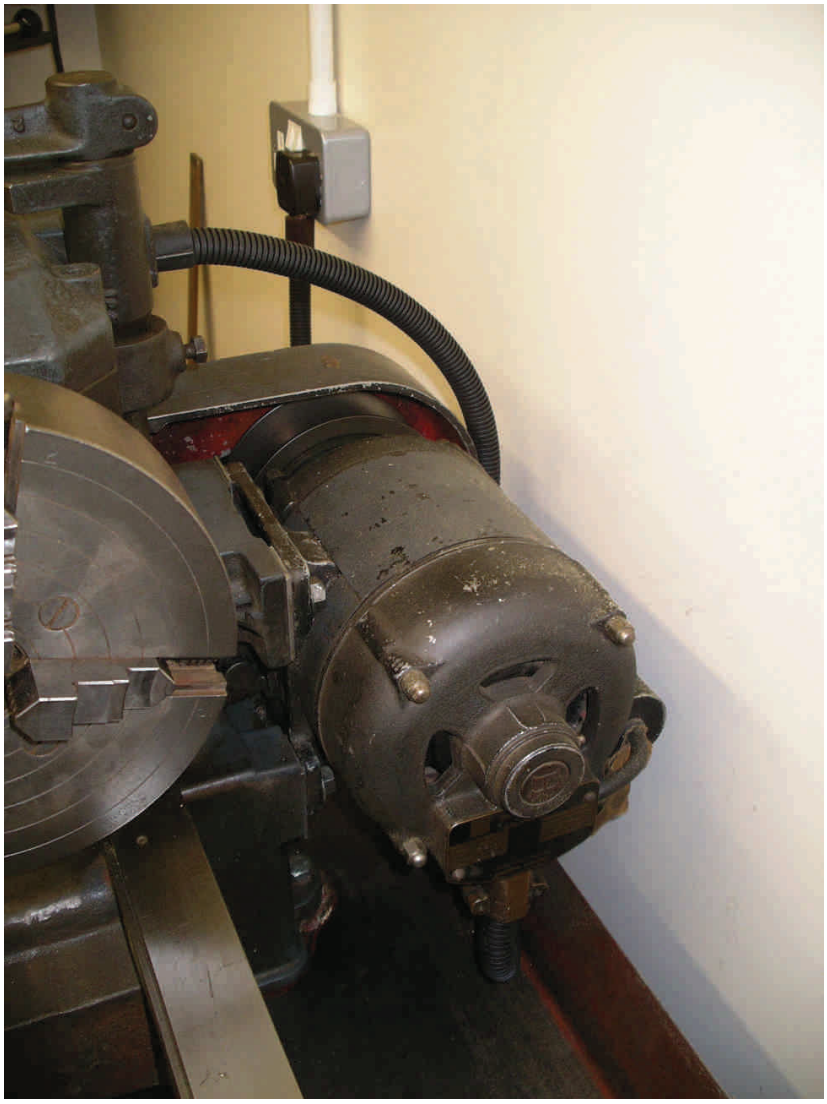


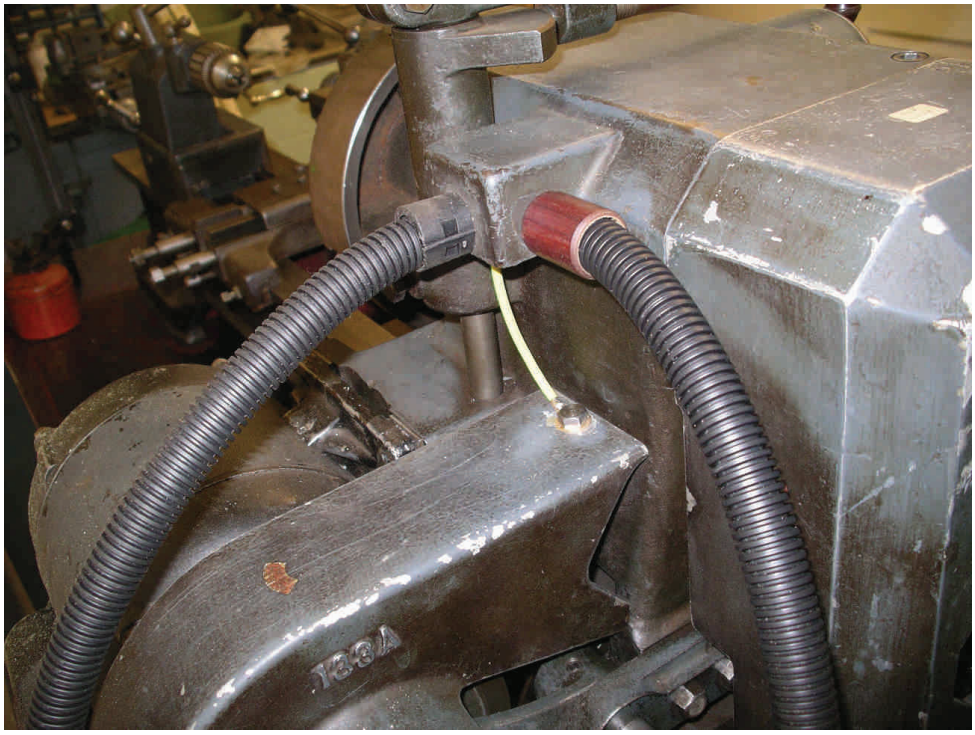


Don’t do what I did. I was pleased with the tidy wiring result and so intent upon taking photos that I forgot to connect in the input power lead. So, I had to disconnect the motor and ease the switch forward again from its box in order to feed through the power flex. However, with all the bits still on the bench it was easy.

As I mentioned, it’s useful to have help to carry the motor and headstock back to the lathe. Once there, it’s straightforward to bolt everything back in place. Setting up the variable-drive pulley required a bit of trial and error because I’d never done it before. It’s not difficult though and there’s useful guidance in past forum messages.

Finally, I made a large brass solder tag and used it to connect the supply cable earth to a conveniently-sited screw below the headstock cover wiring box.





Future problems

Although I'm delighted with the result, the only problem with treating the electrical units as a module is that when, in the future, either switch, motor, or wiring fails then I'll have to remove the lot to effect a repair. The overriding 'advantage' is that with all the bits together on the bench, work on any one part becomes straightforward and not stressful. The big disadvantage is that with no slack wire in the switch cavity then I'll need to disconnect the motor connections and power input cable in order to withdraw the switch.

Lastly, Dad's enduring advice is – with a Santon switch – to operate it smartly off and on to minimise arcing. I know there is a mighty spring on the switch that should ensure fast switching but I still follow his advice. Most of all, Dad advises don't use the switch to power the motor to inch the chuck around. This is tempting, but there's no doubt it will produce contact arcing and greatly reduce switch life. Dad's notes and old receipts show that he returned the switch to Santon (Newport, Mon) for repair in 1956 and again in 1959. I guess he found out the hard way not to inch the chuck. Other times, I know he made and fitted new internal contacts himself. I'm hoping the switch will now see me out.