

ZTC CONTROLS 302 MKII

Installation Insertions

Please note if you fail to read the installation instructions properly it is possible that you could accidentally damage your ZTC unit. Such damage is **NOT** covered by our guarantee. So to prevent avoidable and potentially expensive mistakes, please take the time to read these instructions before attempting to install your equipment.

The ZTC System is only intended for controlling model railways by experienced modellers over the age of 14. It should only ever be operated by young persons under competent adult supervision.

We hope you enjoy the decoder and hope the manual details everything you need to know in a clear and concise way. If you are stuck check the FAQ - Frequently Asked Questions section. If this doesn't help then please fill in the Customer feedback form or contact us via email, phone or letter.



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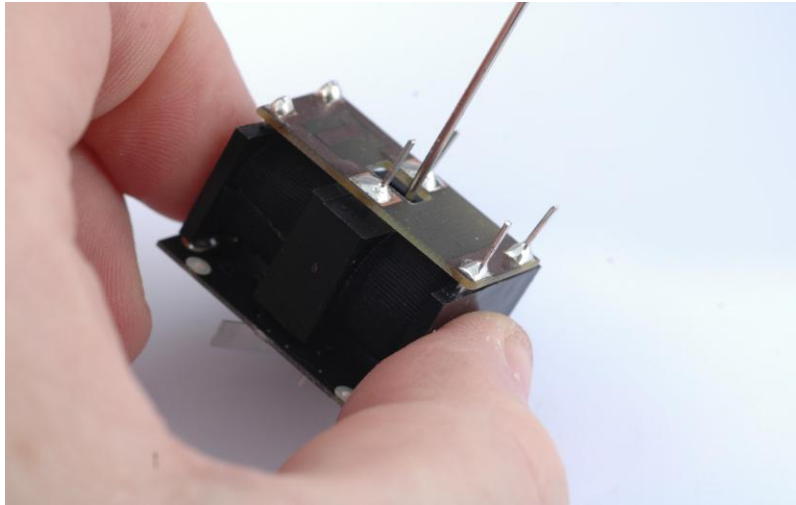


General Description

Thank you for purchasing the ZTC 302 DCC Point Motor. It has been designed to interface with insulfrog and electrofrog points. In particular PECO Code 100, 80 or 75 and Hornby track-work. It can be used on 0, 00, N, narrow gauge and Crazy track and is suitable for either right hand, left hand, Y, three-way, single and double slip points.

Read through this manual once or twice before starting the installation so you are familiar with each step. Following these instructions will ensure a good and reliable installation!

***Note:** It is good practice to always hold the point motor by the ends of the plastic body. This is especially true when power is applied. We do not recommend touching the electronic components at any time*



***Note:** These instructions should always be read in conjunction with those supplied by the point manufacturer.*

WARNING! Protective eye-glasses should be used when cutting metal.

***Note:** The ZTC 302 will work with all NMRA controllers providing they can supply sufficient current for the point operation.*

Fitting the ZTC 302MkII to N Gauge Peco points.

Before starting the installation please ensure your point moves easily and freely from side to side.

Step 1

For an N gauge point cut off the two end pins as shown in figure 1. Ensure these pins are on the side of the dark arrow.

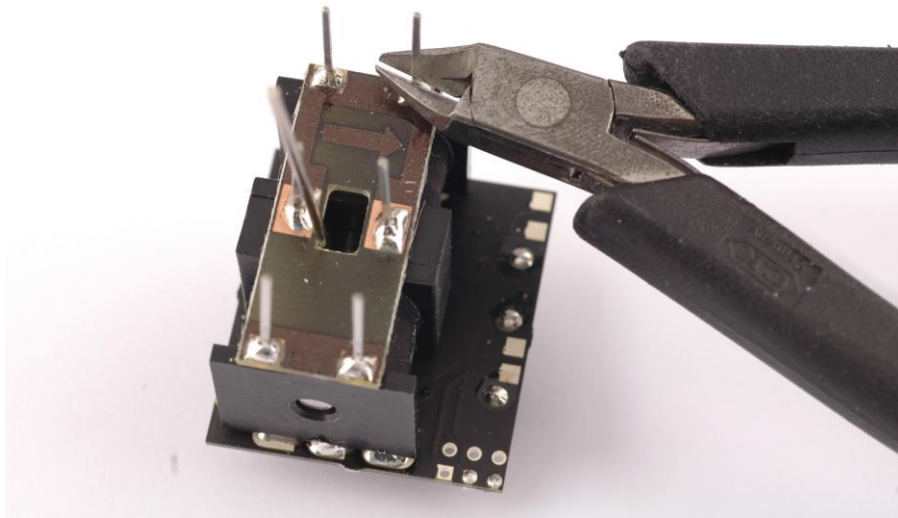


Figure1

Step 2

Cut the four remaining pins to a height of approximately 10mm measured from the surface of the board.

Note: If you are mounting your point motor via small holes through the base board, add the thickness of the baseboard to this value. For example 6mm base board would require cutting the four remaining pins to a height of approximately 16mm. Direct connection to the point with a square hole cut in the baseboard is the best method though.

Please also note that measurements will vary by a mm or so due to practical tolerances. CHECK BEFORE CUTTING!

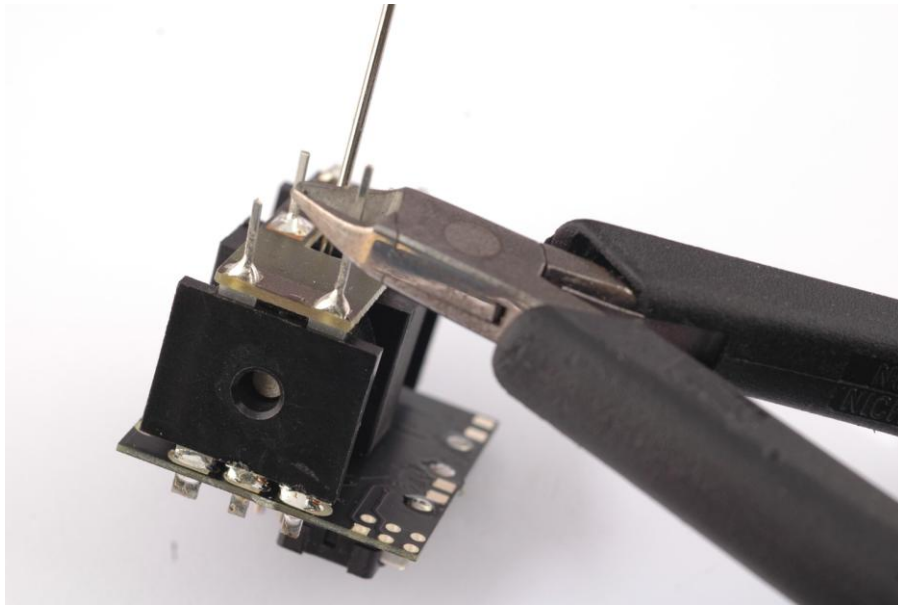


Figure2

Step 3

Position the point motor so that the large dark arrow points away from the point's frog.

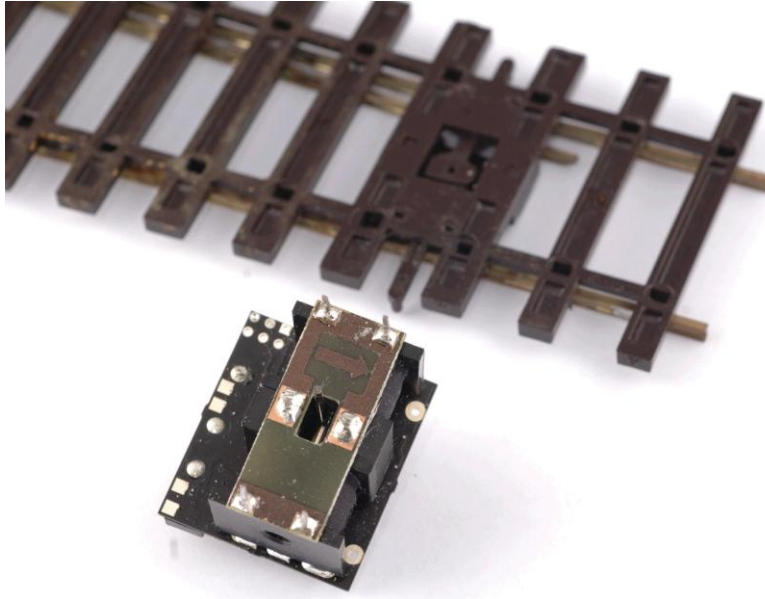


Figure3

Flip the point motor over and insert the four fixing pins and the long operating rod into the five holes at the bottom of the point as seen in figure 3. See figure 4 for how it should look once you have completed this step.

DO NOT use the point motor fixing pins to clear any blind mounting holes, but use a sharp tool such as described in the point manufactures instructions

Once the mounting holes are clear carefully insert the four fixing pins and the long operating rod into the five holes at the bottom of the point.

Step 4

Ensure that the point motor is seated parallel to the base of the point and bend the two pins over as shown in figure 4. Ensure they are flat against the sleeper but also reach the side of the rails.

Note: If they are not flat this could cause a derailment

Hold the point motor firmly in contact with the underside of the point and check that the point operates smoothly when pushed from side to side with your fingers.

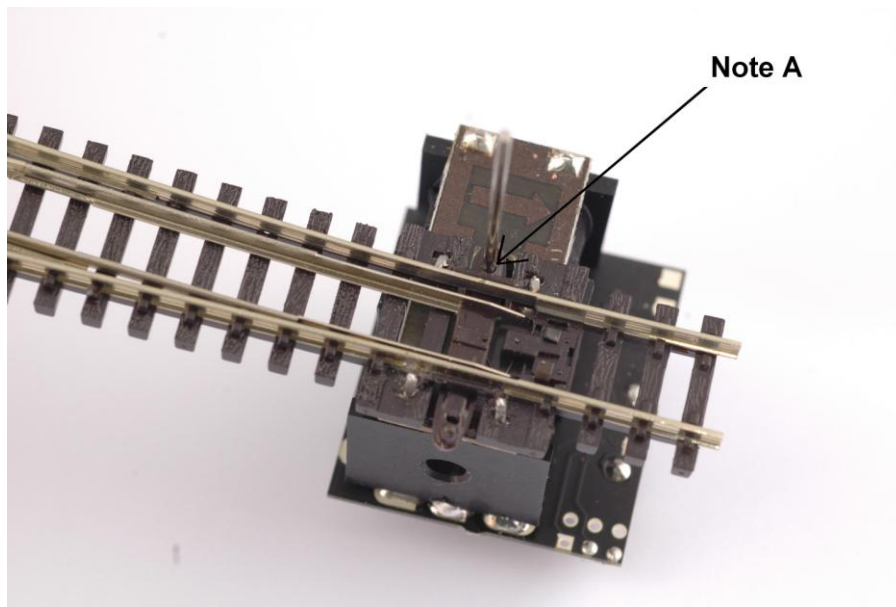


Figure4

Note A: On some points the hole diameter is a little tight for the rod to fit through. This can lead to the point movement becoming stiff when the ZTC302 is fitted. It is recommended that this hole be enlarged to 2mm diameter.

Step 5

Bend over the two pins on the other side and solder one pin on each side. This gives power to the track. There is no requirement to solder both pins on the same side (as shown in Figure 5) unless increased reliability is sought.

Alternatively you can connect one end of a short piece of wire to the right hand rail, connect the other end of the wire to position A on the point motor diagram. Connect one end of a second wire to the other rail and then connect the other end of the wire to point B on the point motor diagram. This is shown in figure 10 for 0 gauge, but can just as easily be used for 00/N.

If you do not wish to solder to your track then the same connections on the point motor should be used to operate and power your points using a separate DCC Bus, this could be driven O/P 2 on your controller or from a separate ZTC 550 Booster.

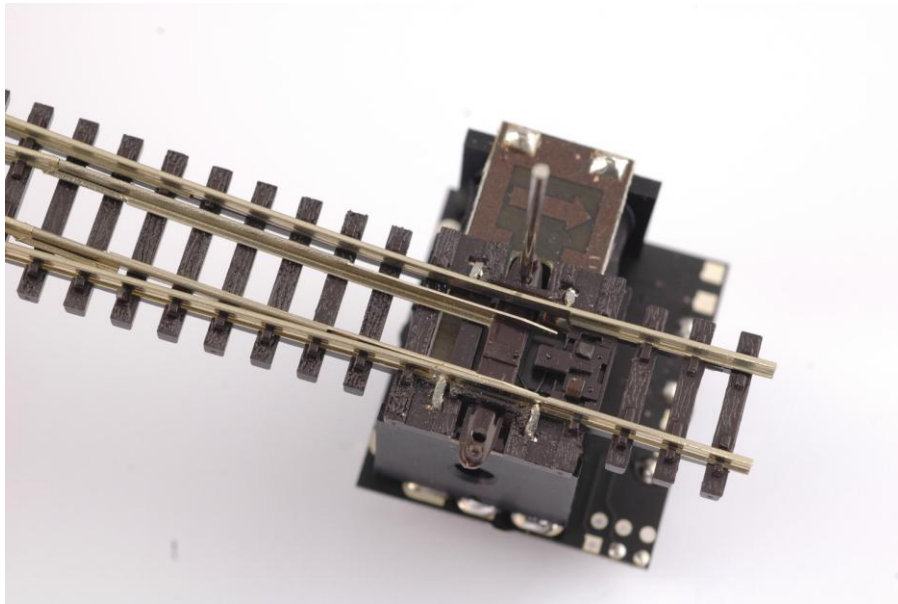


Figure5

Step 6

WARNING! Protective eye-glasses should be used when cutting the metal operating bar.

Using a pair of **heavy duty** wire cutters crop the operating pin so that it is flush with the top of the point tie-bar. See Figure 6.

RREMEMBER that you can always shorten the rod but you cannot make it longer when it has been cut too short. Measure twice and cut once is a good maxim to follow.

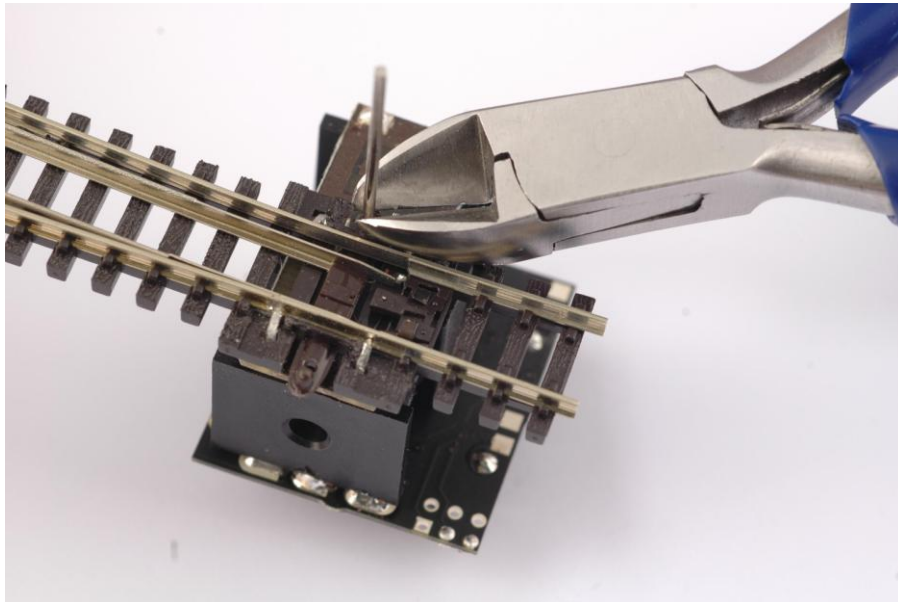


Figure6

Step 7

On all Electro-frog points you will need to connect one wire from the point Frog (V) to the wiper of the switch.

Please refer to the point manufacturer's instructions regarding the frog connection.

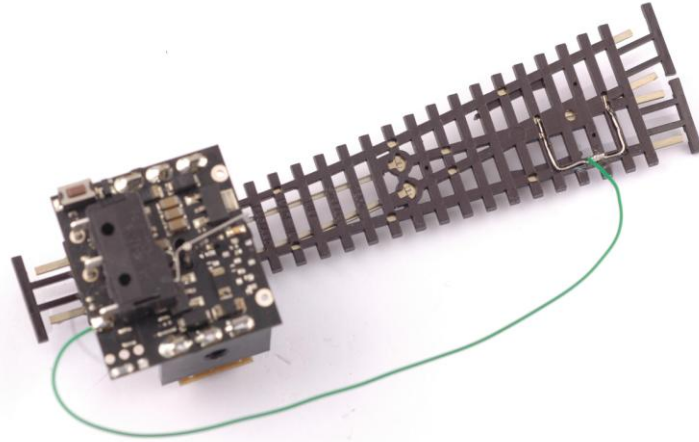


Figure7

Please note the picture above shows a ZTC 302 MkI. The picture below details the connection for the ZTC 302MkII

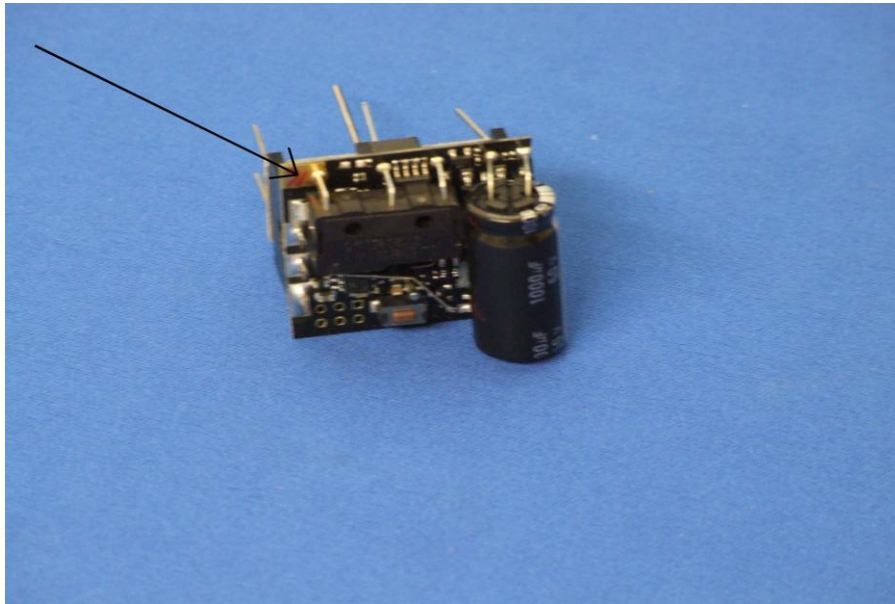


Figure8

Fitting the ZTC 302 to OO-HO Gauge Peco points.

Before starting the installation please ensure your point moves easily and freely from side to side.

Step 1

For an OO gauge point cut off the two centre pins as shown in figure 1.

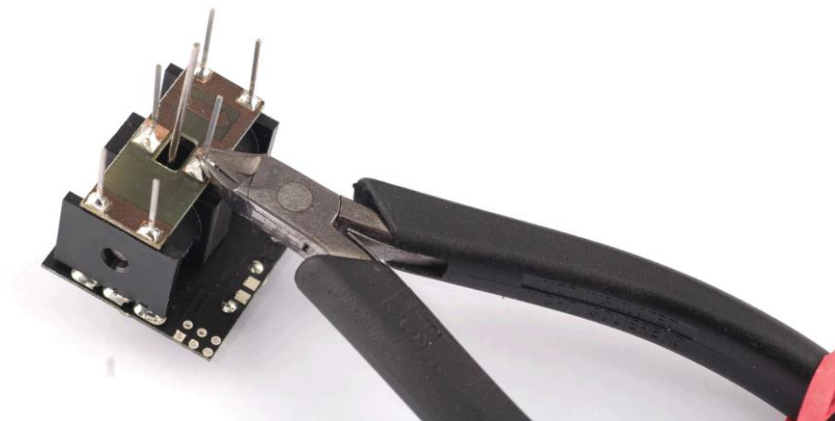


Figure1

If you are unsure just check figure 2 to see which pins are left.

Step 2

Cut the four remaining pins to a height of approximately 10mm measured from the surface of the board.

Note: If you are mounting your point motor via small holes through the base board, add the thickness of the baseboard to this value. For example 6mm base board would require cutting the four remaining pins to a height of approximately 16mm. Direct connection to the point with a square hole cut in the baseboard is the best method though.

Please also note that measurements will vary by a mm or so due to practical tolerances. CHECK BEFORE CUTTING!

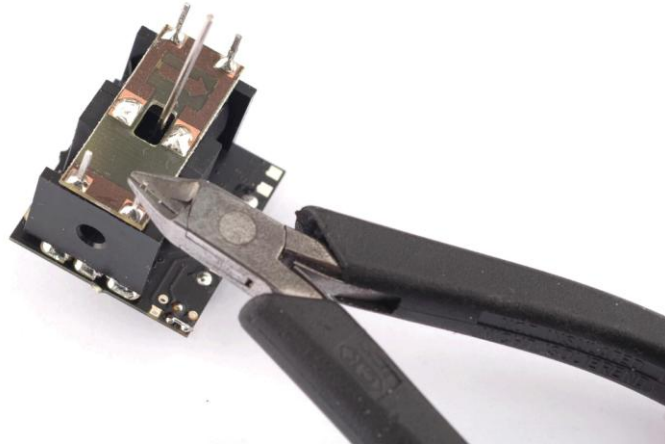


Figure2

Step 3

Position the point motor so that the large dark arrow points away from the point's frog.

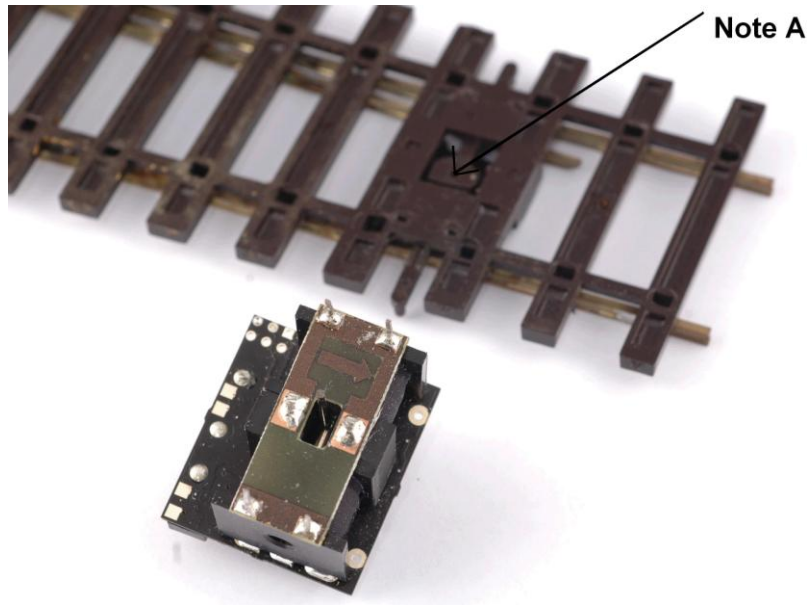


Figure3

***Note A:** On some points the hole diameter is a little tight for the rod to fit through. This can lead to the point movement becoming stiff when the ZTC302 is fitted. It is recommended that this hole be enlarged to 2mm diameter.*

Flip the point motor over and insert the four fixing pins and the long operating rod into the five holes at the bottom of the point as seen in figure 3. See figure 4 for how it should look once you have completed this step.

DO NOT use the point motor fixing pins to clear any blind mounting holes, but use a sharp tool such as described in the point manufactures instructions.

Once the mounting holes are clear carefully insert the four fixing pins and the long operating rod into the five holes at the bottom of the point.

Step 4

Ensure that the point motor is seated parallel to the base of the point and bend the two pins over on each side as shown in figure 4. Ensure they are flat against the sleeper but also reach the side of the rails.

Note: If they are not flat this could cause a derailment.

Hold the point motor firmly in contact with the underside of the point and check that the point operates smoothly when pushed from side to side with your fingers.

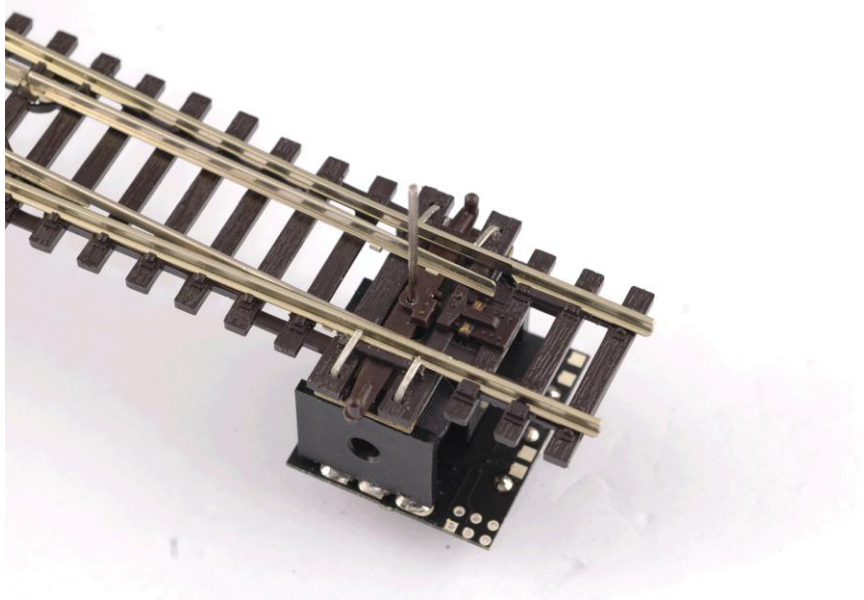


Figure4

Step 5

Solder one pin on each side. This gives power to the track. There is no requirement to solder both pins on the same side (as shown in Figure 5) unless increased reliability is sought.

Note: Ensure the pins are soldered down flat else this may cause a derailment.

Alternatively you can connect one end of a short piece of wire to the right hand rail, connect the other end of the wire to position A on the point motor diagram. Connect one end of a second wire to the other rail and then connect the other end of the wire to point B on the point motor diagram. This is shown in the 0 gauge section, but can just as easily be used for 00/N.

If you do not wish to solder to your track then the same connections on the point motor should be used to operate and power your points using a separate DCC Bus, this could be driven O/P 2 on your controller or from a separate ZTC 550 Booster.

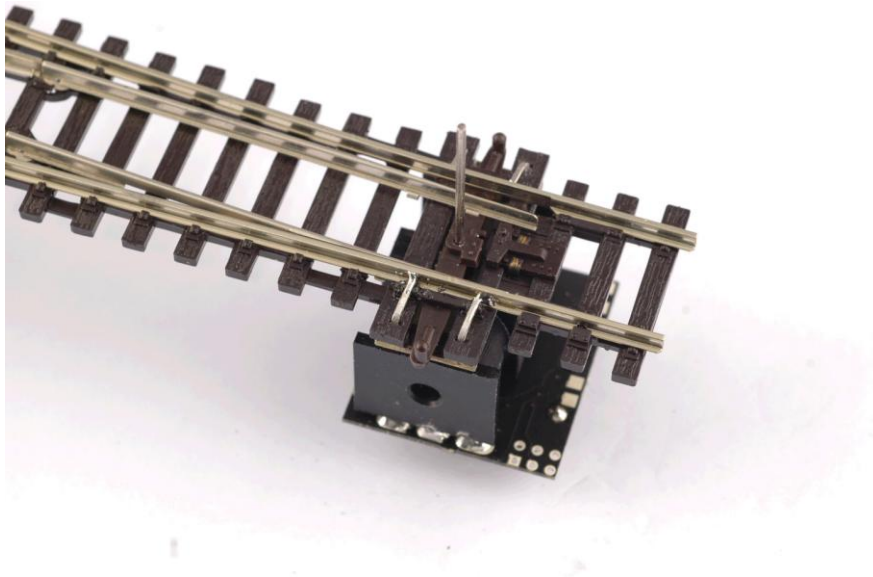


Figure5

Step 6

WARNING! Protective eye-glasses should be used when cutting the metal operating bar.

Using a pair of heavy duty wire cutters crop the operating pin so that it is flush with the top of the point tie-bar. See Figure 6.

REMEMBER that you can always shorten the rod but you cannot make it longer when it has been cut too short. Measure twice and cut once is a good maxim to follow.

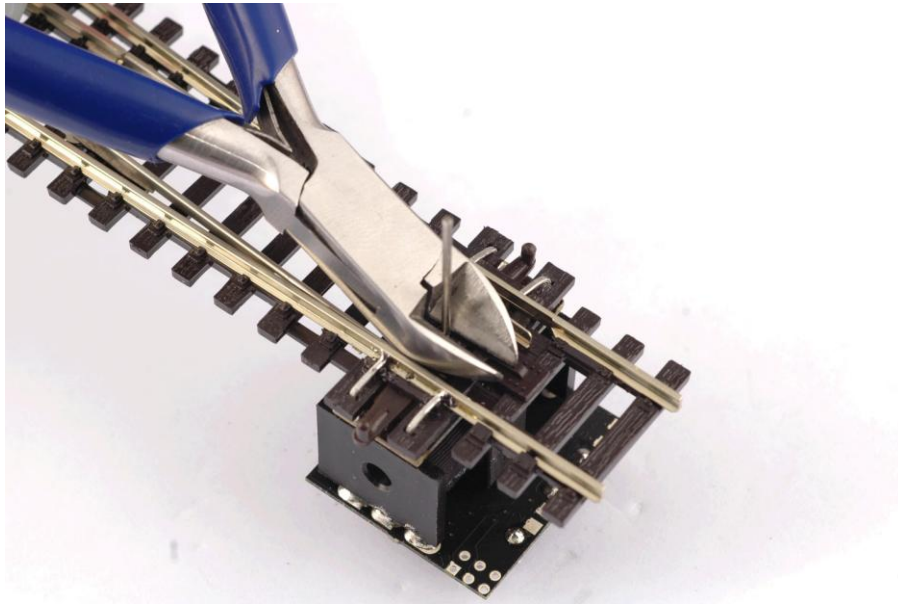


Figure6

Step 7 - Wiring Electro-frog points (IF REQUIRED)

On all Electro-frog points you will need to connect one wire from the point Frog (V) to the wiper of the switch. Figure 7 shows an example of a connection for an N gauge point but it is applicable to OO as well.

Please refer to the point manufacturer's instructions regarding the frog connection.

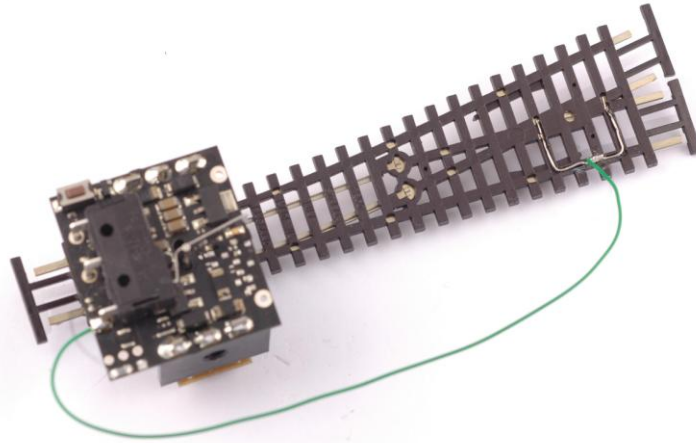


Figure7

Please note the picture above shows a ZTC 302 MkI. The picture below details the connection for the ZTC 302MkII

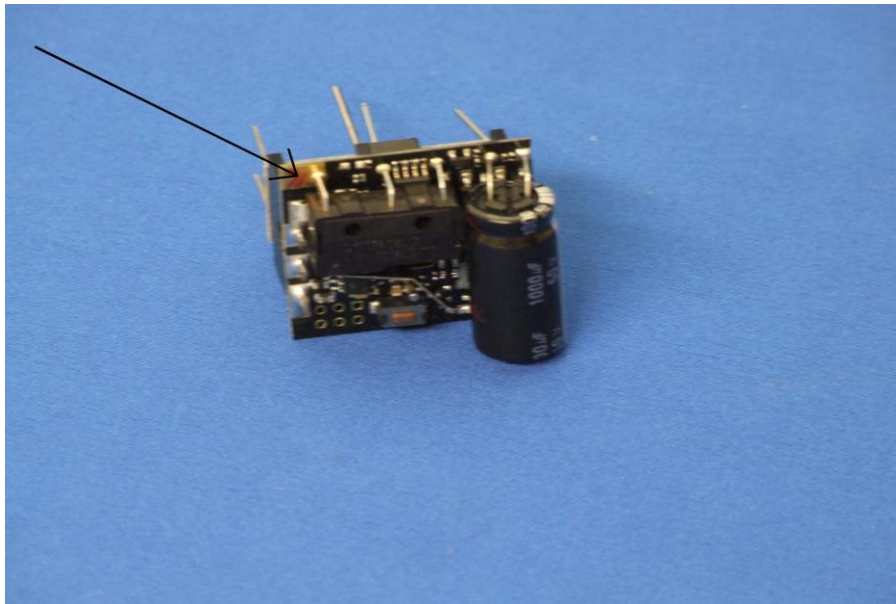


Figure8

Fitting the ZTC 302 to O Gauge Peco points.

Before starting the installation please ensure your point moves easily and freely from side to side.

Step 1

For an 'O' gauge point cut off the two centre pins as shown in figure 1.



Figure1

If you are unsure just check figure 2 to see which pins are left.

Step 2

Cut the four remaining pins to a height of approximately 8mm.

Note: If you are mounting your point motor via small holes through the base board, add the thickness of the baseboard to this value. For example 6mm base board would require cutting the four remaining pins to a height of approximately 14mm. Direct connection to the point with a square hole cut in the baseboard is the best method though.

Please also note that measurements will vary by a mm or so due to practical tolerances. CHECK BEFORE CUTTING!

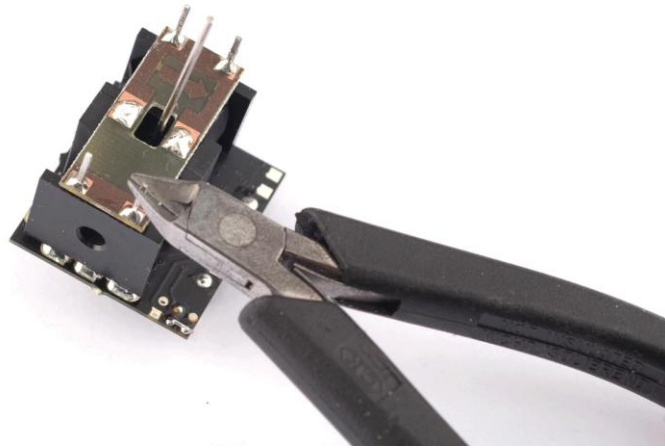


Figure2

Step 3

Once the mounting holes are clear carefully remove the spring cover from the point.

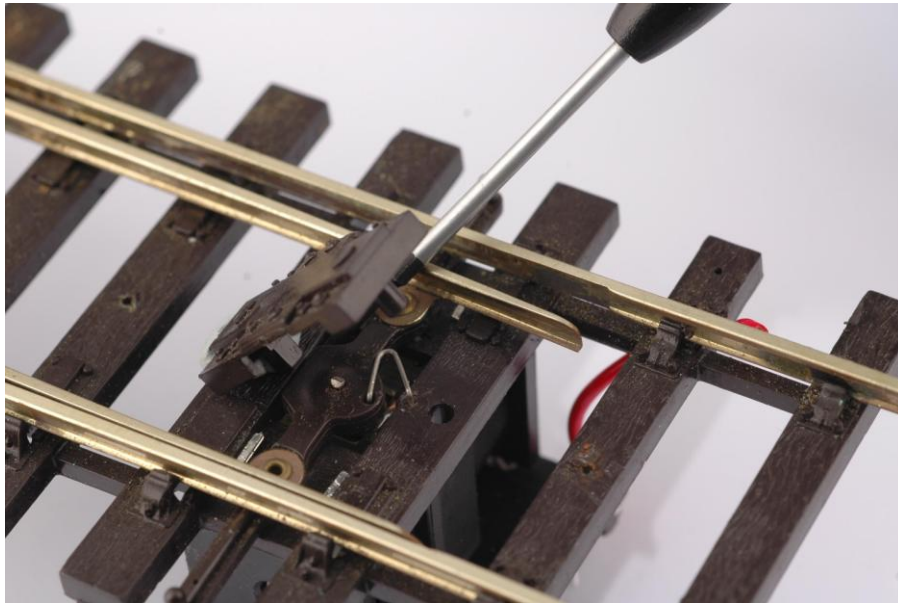


Figure3

(Please note this picture just illustrates removing the spring cover. The ZTC 302 should not actually be installed yet!)

***Note:** Take care not to lose the over-centre spring. If in doubt, remove the spring and keep it safe. Remember to re-insert the spring when completing the installation.*

Step 4

Position the point motor so that the large dark arrow points away from the point's frog.

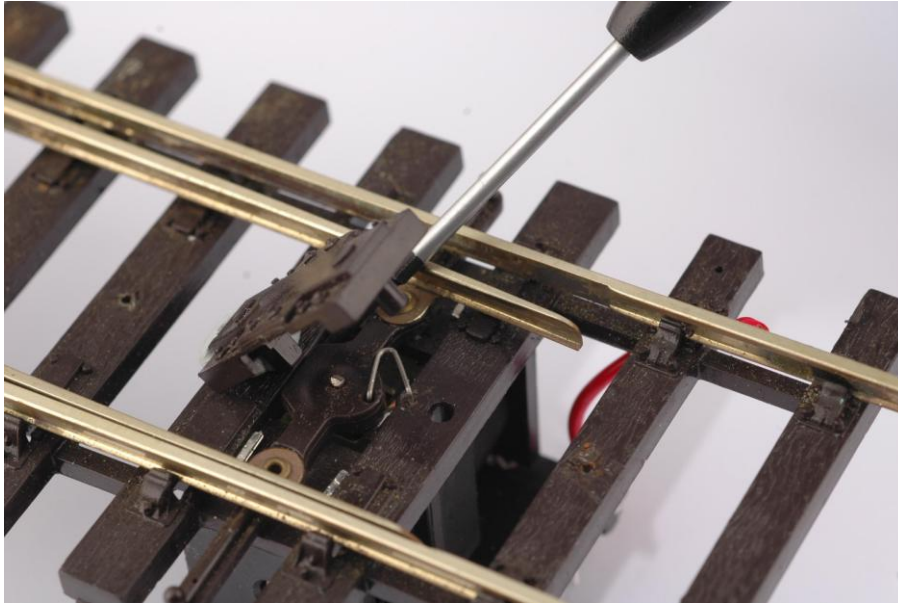


Figure4

Flip the point motor over and insert the four fixing pins and the long operating rod into the five holes at the bottom of the point as seen in figure 4. See figure 5 for how it should look once you have completed this step. Notice the pins on one side are between the track and the blade. This is okay for now.

Step 5

Ensure that the point motor is seated parallel to the base of the point and then bend the two pins over. Carefully pushing a jeweler's screwdriver in at the side below the rail will help to get them started. Figure 5 shows this being done.

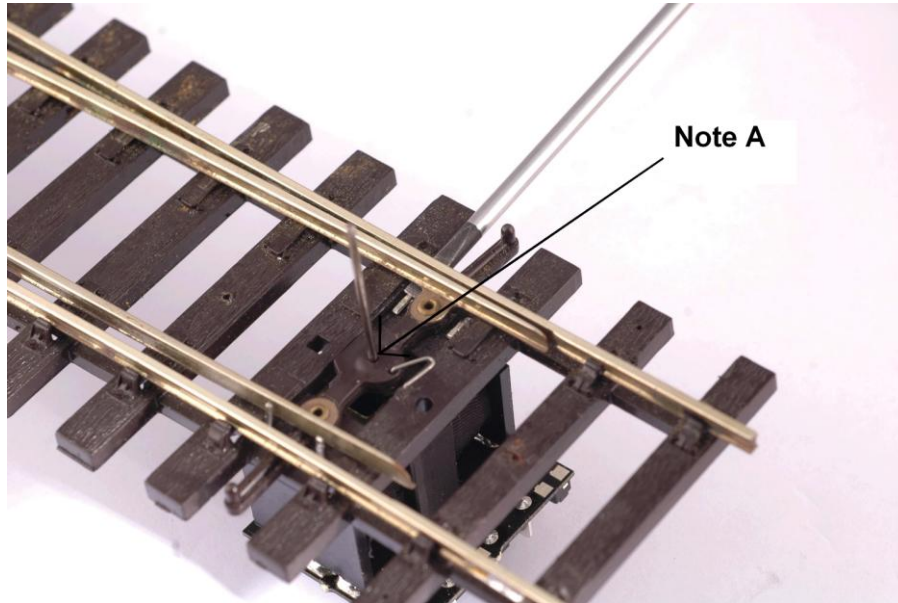


Figure5

***Note A:** On some points the hole diameter is a little tight for the rod to fit through. This can lead to the point movement becoming stiff when the ZTC302 is fitted. It is recommended that this hole be enlarged to 2mm diameter.*

It is important that the pins are flat against each sleeper to ensure that they do not foul the bottom of the point blades.

Step 6

The two pins on the other side need a little bit more work. First ease these two pins back out of the point and move the blade across to the track. Figures 6 and 7 show the terminals being eased out.

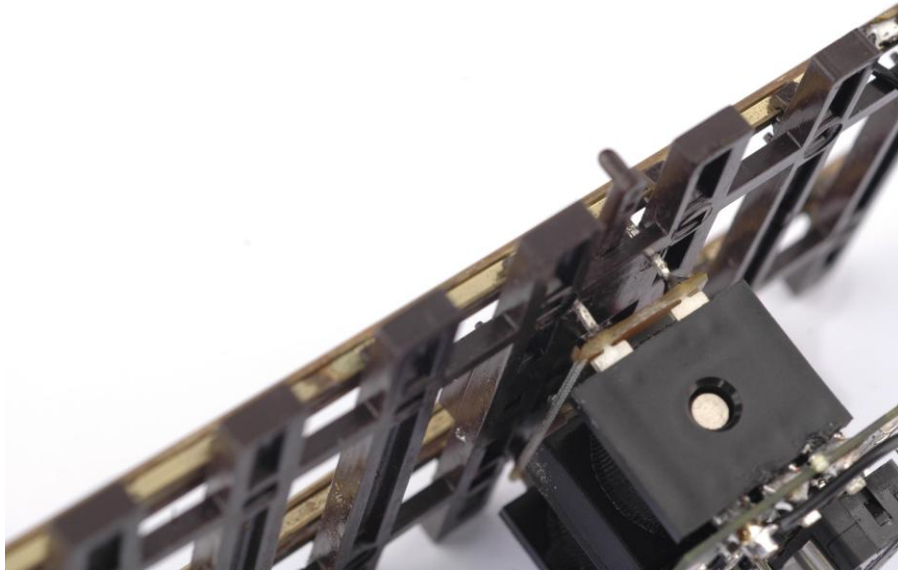


Figure6

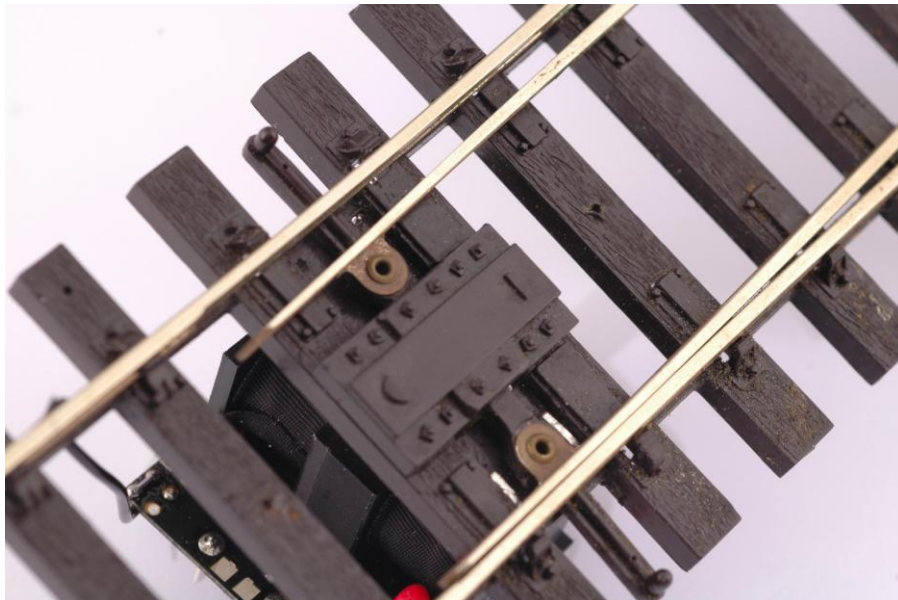


Figure7

Insert the pins through again so that they are the right side of the blade for you to bend inwards. Again make sure the two pins are bent flat. See figure 8.

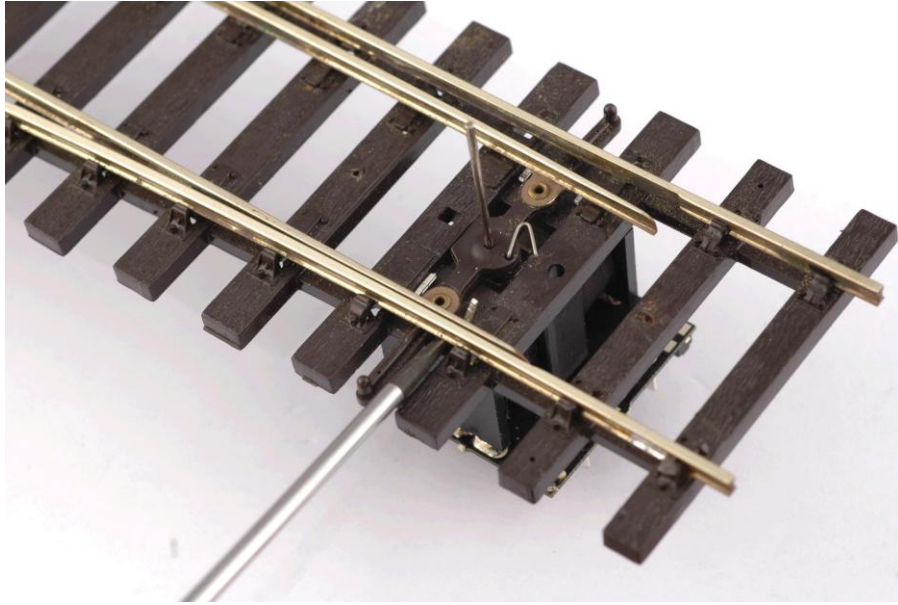


Figure8

Ensure that the point still moves freely with your fingers

Step 7

WARNING! Protective eye-glasses should be used when cutting the metal operating bar.

Using a pair of **heavy duty** wire cutters crop the operating pin so that it is flush with the top of the point tie-bar. See Figure 9.

REMEMBER that you can always shorten the rod but you cannot make it longer when it has been cut too short. Measure twice and cut once is a good maxim to follow.

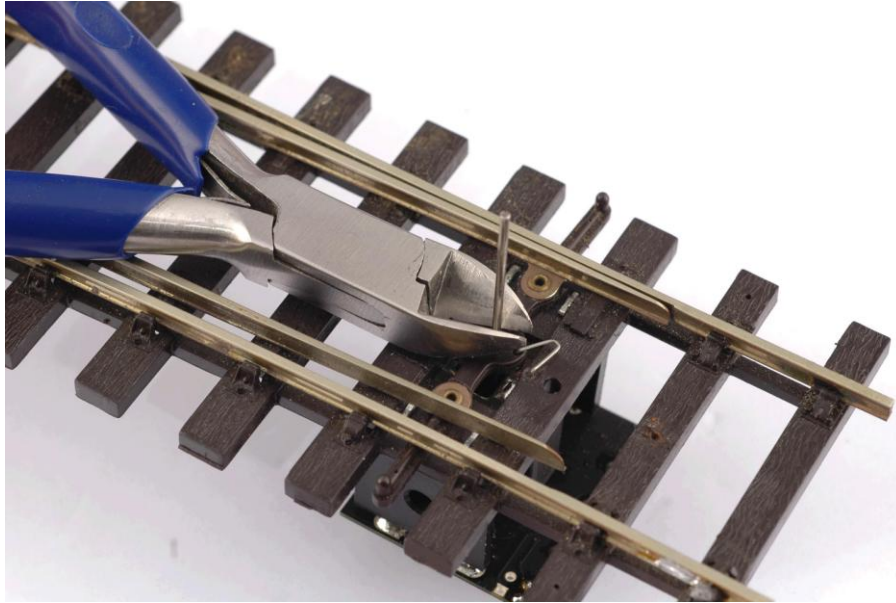


Figure9

Replace the point spring cover noting that the square pin is inserted into the square mounting hole. Don't forget the over-centre spring if you removed it earlier. Whilst holding the point motor firmly check the point moves smoothly. If it feels stiff then the operating rod might be catching on the spring cover. Trim the length of the operating rod a little bit further and see if that frees the movement up.

Step 8

Solder one end of a short piece of wire to the right hand rail. Solder the other end of the wire to position A. Do the same with the left rail and position B. Figure 10 shows the finished wiring.

If you do not wish to solder to your track then the same connections on the point motor should be used to operate and power your points from a separate DCC Bus. This could be driven from O/P 2 on your controller or from a separate ZTC 550 Booster.

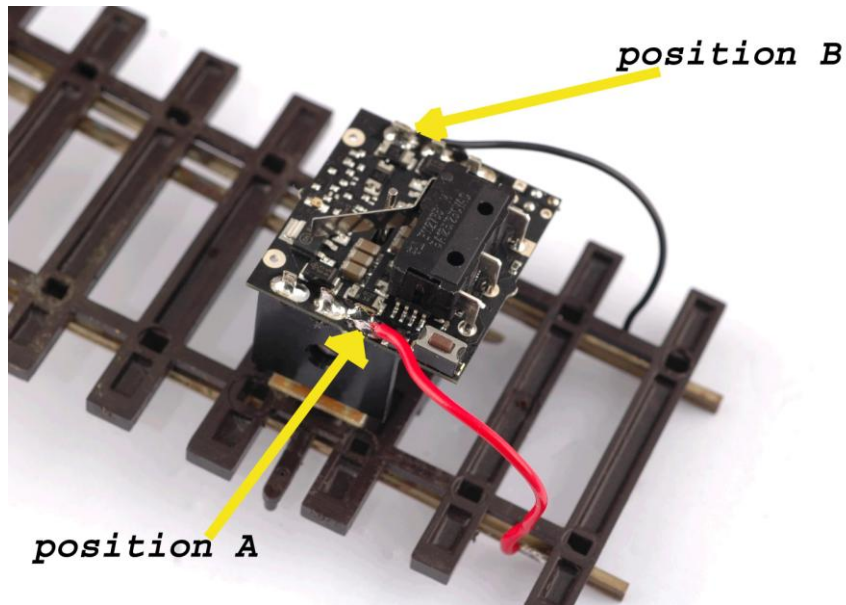


Figure10

Step 9 - Wiring Electro-frog points (IF REQUIRED)

On all Electro-frog points you will need to connect one wire from the point Frog (V) to the wiper of the switch. The image below shows these connection for an N gauge installation.

Please refer to the point manufacturer's instructions regarding the frog connection.

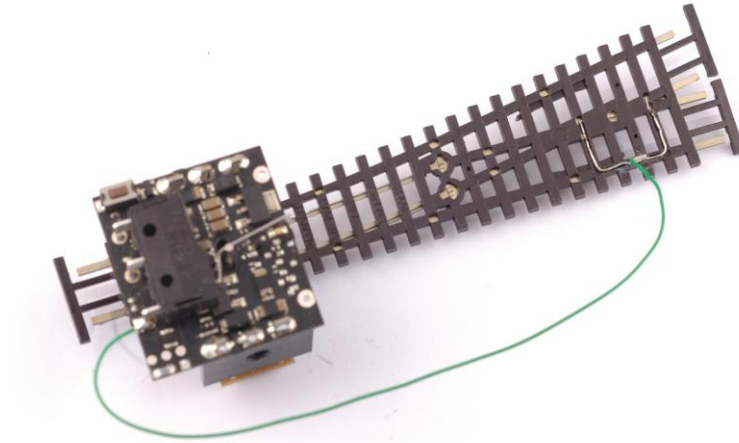


Figure11

Please note the picture above shows a ZTC 302 MkI. The picture below details the connection for the ZTC 302MkII

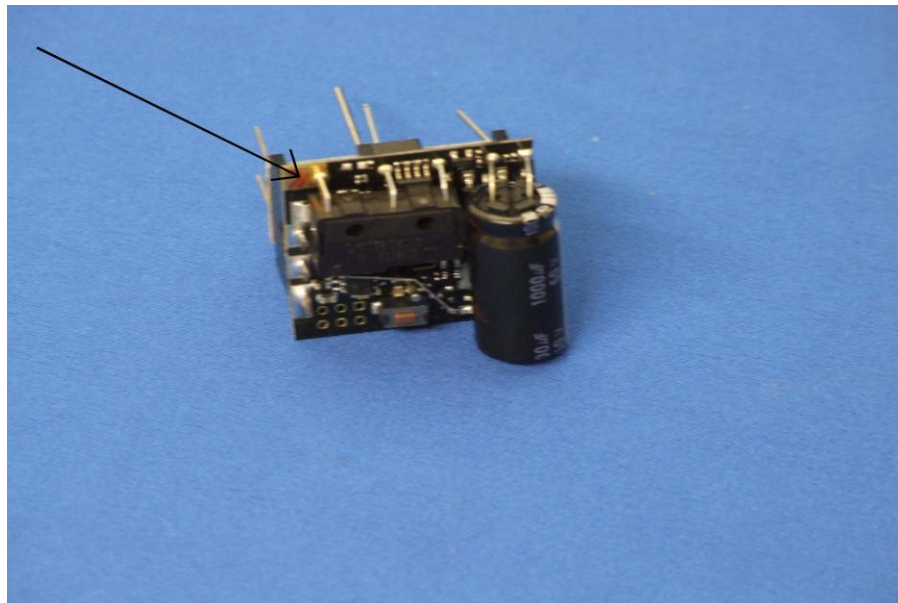


Figure12

Testing

Three simple tests will ensure your point motor will work reliably.

Test 1

Step 1

Using two test leads fitted with insulated crocodile clips attach one lead to each rail at the heel (blade end) of the point. Connect the other ends of the leads to a DCC source such as the powered track of your layout. The signal LED on the ZTC 302 may or may not light.

DO NOT press the test button at this time.

Step 2

Manually move the point with your finger a few times from side to side. You should see the signal LED illuminate when the point is in one position and go out when it is in the other.

If the signal LED does not go out, remove the power by disconnecting one of the crocodile clips and adjust (bend) the switch lever. Apply the power and retest.

Repeat this step until a position is found where the LED comes ON (RED) in one position and is OFF (DARK) in the other.

This test should only be conducted once the point has been fitted to the point motor otherwise misleading results will occur. It is also important that **ONLY** when this test has been successfully completed should you proceed to Test 2.

Test 2

Step 1

With the power still applied press and hold the button on the ZTC 302 until the signal LED flashes once. Then release the button. The point should move to the opposite position. Press the button again and release when the signal LED flashes again. The point should then return to its starting position.

If this is successful proceed to Test 3

Test 3

Step 1

Using your ZTC command station enter the following key sequence.

POINT → 1 → **ENTER R** or **ENTER L**

The point should change position as you select Enter R or Enter L.

If the test is successful then your installation is complete and you now have your ZTC 302 installed. Please proceed to the next section to learn how to change the address of the point motor and set the orientation of the point movement.

***Note:** If this point has already been used then it is possible the address has already changed. If this is the case the ZTC 302 will not respond the above test. If you know the address, substitute that in for '1' in the above instruction. If you do not know the address the next section shows how to change the address.*

Address and Direction Configuration

By using the unique ZTC Capture Method, programming the ZTC 302MkII could not be easier.

Step 1

To set the point number you first need to place the ZTC 302 in programming mode. This is done by connecting power to the outside point rails as before with a pair of crocodile clips.

Press and hold down the button on the ZTC 302. You will see the signal LED flash slowly. When the signal LED starts to flash rapidly you can let go of the button. The ZTC 302 is now in programming mode.

The signal LED will continue to flash rapidly whilst the board is in programming mode.

Step 2

Using your finger, move the point blades so that the track is set to turn a locomotive to the right.

Note that a left handed point turns to the right when the road is set in the straight position.

Step 3

On your ZTC 505 or ZTC 511 controller press the following buttons. 'Number' refers to the address you want to give this point and can be a value between 1 and 2000. Please note for the ZTC505 this must be a number between 1 - 99.

The 'ENTER' button pressed will determine which button turns the track to the left.

POINT → **1** → **ENTER R** *or* **ENTER L**

The ZTC 302 will move the point to the left turn position to indicate receipt of the command and to indicate successful programming of the new address.

If you do not have a ZTC Controller, all you need to do at step 3 is follow your manufactures instructions to operate a point. The ZTC 302 will capture the address using its unique ZTC Address Capture technology.

Step 4

To exit the programming mode, press the button for one second. Upon release the signal LED will stop flashing and the ZTC 302 will now be back to normal operation.

***Note:** Turning power off does not exit programming mode. When you power the ZTC 302 up again it will still be in programming mode. The signal LED will be flashing rapidly to indicate this.*

Once you have exited programming mode the ZTC 302 is in normal mode. The signal LED now acts as a visual indication of the point position. It will be on whilst the point is in one position and off when in the other.

ZTC PointBack

The new ZTC Point Back allows for a remote indication of the point's position. The signal is a 5V signal. It will be 0V for one position and 5V for the other. The signal has a 2k2 resistor fitted to protect it and also to allow an LED to be connected directly to it. On the ZTC302MkII there are two signals available, output LED1 and output LED2. When output LED1 is 5V, output LED2 is 0v and vice versa. The 0V is a return for when driving LEDs directly.

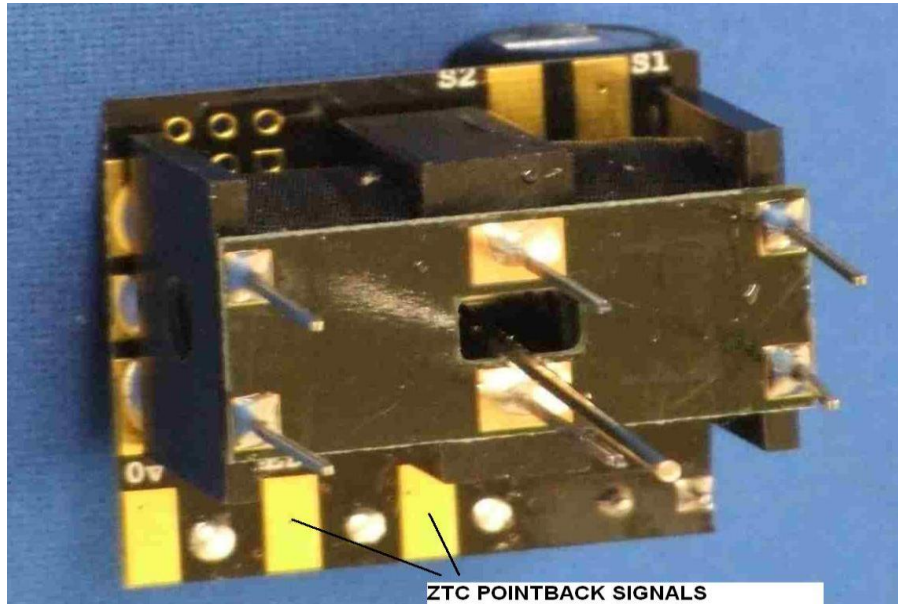


Figure1

Local Pushbutton

The ZTC 302MkII has two pads on the board which allow the user to connect a momentary, push-to-make switch. This enables the user to operate the point by a local switch.

The ZTC 302MkII is able to detect the position of the point and thus when the switch is pressed it will automatically move the point in the required direction. If the point did not move across for some reason, the next time the switch is pressed the ZTC 302 will know to move the point the same way again.

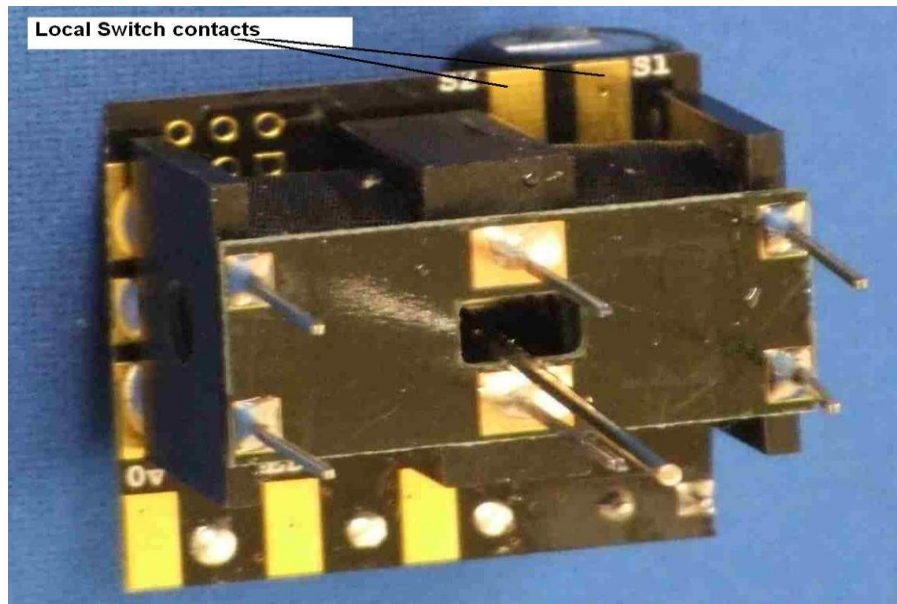


Figure1

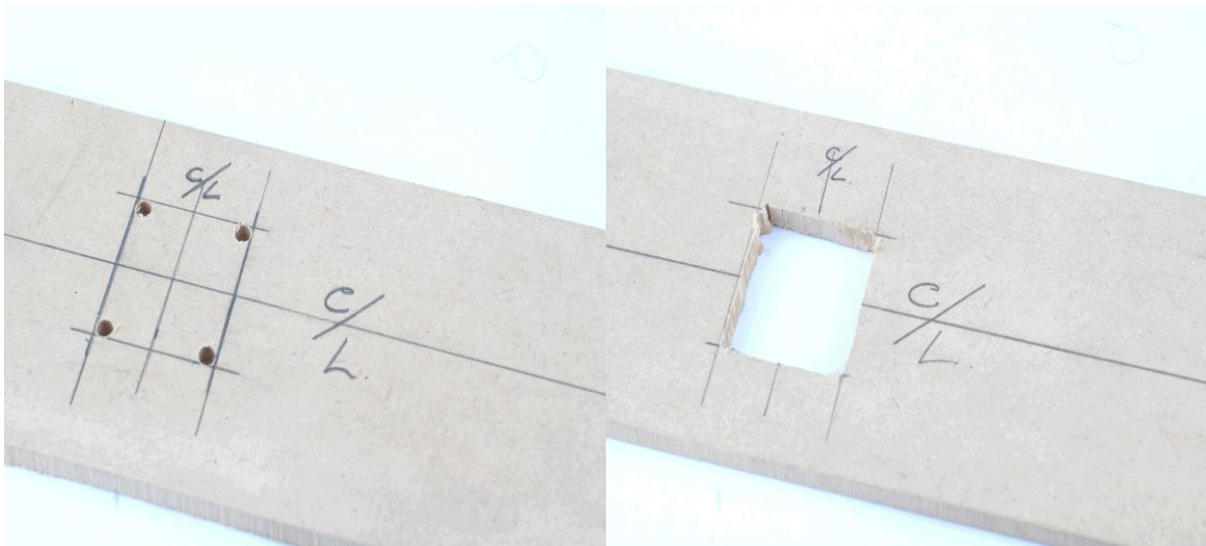
It should be noted that prolonged pressing (approximately five seconds) of this switch will cause the point motor to enter the programming mode. The LED will flash slowly for the 5 seconds whilst the button is pressed. If it starts to flash rapidly the ZTC 302MkII has been placed in programming mode. To exit this mode just give the button a one second press. Upon depressing the button it will exit programming mode and will be in normal operating mode.

Point Installation through baseboard

The following techniques are demonstrated with an 0 gauge point but are equally applicable all gauges.

Step 1

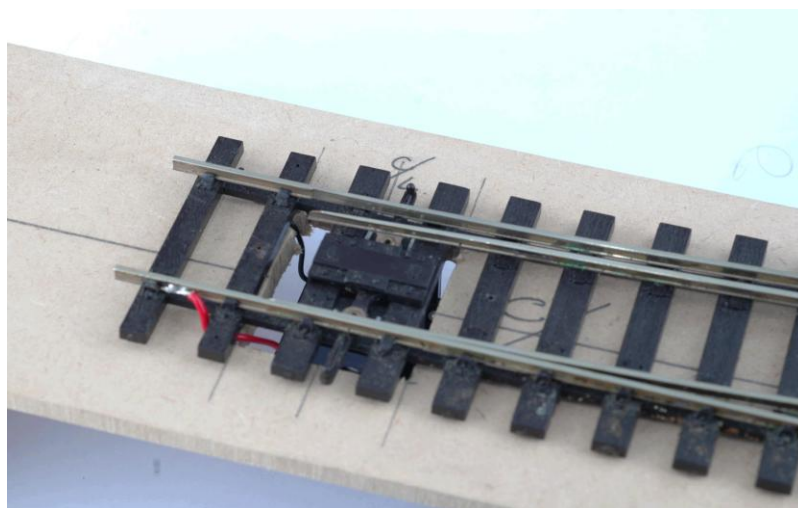
To install a point with an attached ZTC 302 to a layout base board you will need to cut a square hole 36 mm wide by 31 mm long, situated on the track centre line. This is easiest achieved by drilling a 4mm diameter hole at each of the four corners and then using a carpenters Pad-saw to cut along the line joining each of the holes. See Figure 10 and 11



Alternatively if you are using fibre board you can drill a number of holes along the same lines between the corners and use a sharp Stanley knife to cut the remaining baseboard away. This second method is not so neat, but just as effective.

Please be careful when using sharp tools.

In both cases the point and its point motor then mount as shown in Figure 12



An alternative method, if your points are already installed on the layout, is to fit the point motor from below the baseboard. This can be achieved by passing the four fixing pins through four suitably positioned 4 mm diameter mounting holes. The operating rod should pass through a fifth central, 10mm diameter hole. The installation procedure should then be followed as before.

This style of fixing is only possible on baseboards which are 9 mm thick or less. For baseboards over 9mm and up to 45 mm thick an additional mounting plate (ZTC 301) should be used.

Step 2

Once the point has been installed in position on the baseboard and only after comprehensive testing has been completed, you can cover up the mounting and operating holes.

This can be achieved by placing and gluing two pieces of 160 gram (cartridge) paper each side of the mounting and operating holes and then applying your favourite track ballast. Take great care not to obstruct the operating hole or pin.