

General Information STOP-MO-TEC Plug-In-System

Vers. 2.0 JAN 2012

Choosing a wire diameter

The steeltubes used in our Plug-in-Wire-Armature-System have an inner diameter of 5mm. This way all wires up to a diameter of 4,9mm can be used.

The wire-diameter you need for your character depends on the height and the weight of your final puppet. The wire should be strong enough to support your puppet and hold it's weight in every position. This is the minimum diameter but you can choose one size bigger if your animator prefers stronger wires rather than a softer one. You can use one thick strand (singlestrand) or 2 (doublestrands) or more thinner ones (multistrands). Twisting wires is an option not a must.

For puppets with a height of 30cm / 12" and more we usually use 2x2.5mm or 1x4mm for legs, 2x2mm for arms, 2x2.5mm or 1x4mm for the back and 2x2mm or 2x1.5mm for the neck, depending on the size and weight of the head.

On smaller puppets we use 2x2mm or 2x2.5mm for legs and 1.5mm for arms, 2x2.5mm for the back and 2x2mm or 2x1.5mm for the neck.

For fingers usually 1x1.5mm or 1x1mm.

But there is no universal formula, every puppet has different proportions, size and weight and therfor requires an individual armature.

Since the system allows you to easily change wires without bigger problems you can simply create several limbs in different sizes and replace them when needed.

Glueing the wires into the tubes:

The job of the tube is to protect the wires from the pressure of the grub screws. If unprotected wires are being inserted the screw will penetrate the soft wire and your wire-limbs will come loose after a while or break off.

It is recommended to use a 2 component epoxy or acrylit glue like Pattex Stabilit, Uhu Acrylit or other brands

To make sure the wire can not turn inside, or get pulled out of the cured glue the wire ends need to be prepared prior to glue them into the tubes.

Singlestrands:



When using a **single strand with a diameter up to 2.5mm** make sure to bend the wire back 180° to create a „U“ shaped loop. Use some pliers to press the loop together in case it won't fit into the tube. Once the glue is set the wire will be secured against turning and getting pulled out of the glue.



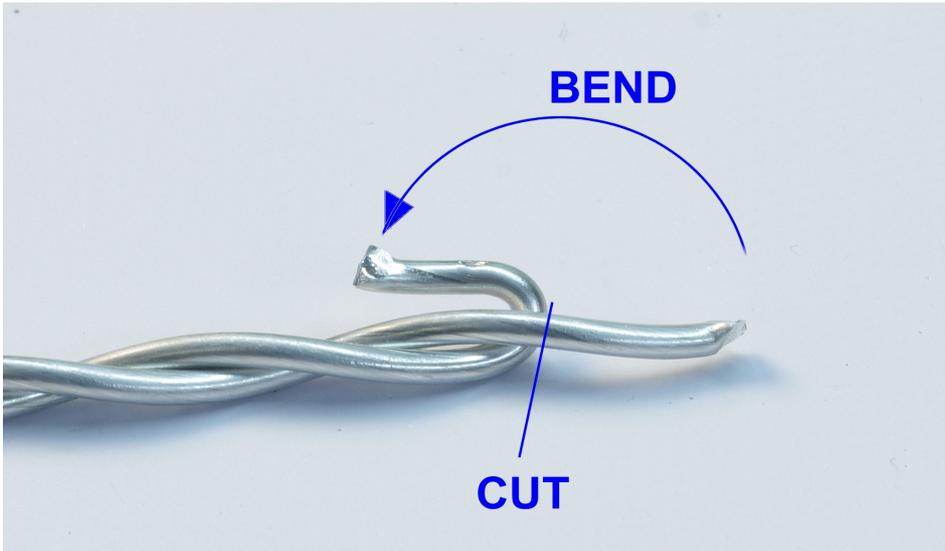
When using thicker **Singlestrands with a diameter from 3.00mm or more** bending the wire back is not possible since the total diameter would exceed the inner diameter of the tube. To prepare these wires squeeze them with some pliers to create some „bite“ marks and to roughen the surface. It is important that these bite marks are only applied to the part of the wire that is later glued inside the tube otherwise

the wire can break very fast ! The marks increase the surface of the wire, the glue will flow into the dents and will physically grab the wire instead of just stick to it like it would on a smooth surface. This will help to keep the wire from turning inside and being pulled out the glue. Besides this a rough surface is always best for glued connections.

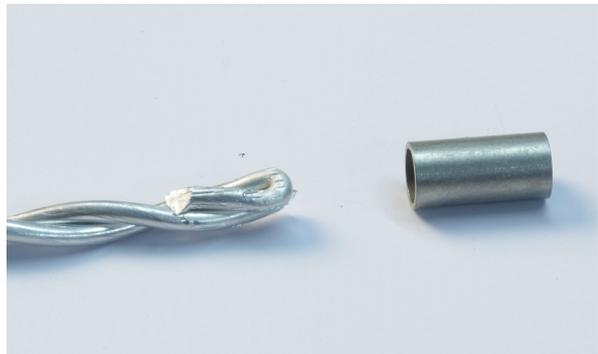
Doublestrands:



Doublestrands with 2x1,0mm and 2x1,5mm should be bend back 180° to create a U shaped loop before being glued into the tubes.



When using **2x2mm Doublestrands** it is not possible to bend both wires back since the total diameter would exceed the inner diameter of the tube. As an alternative you can bend back one of the wires and cut off the 2nd strand. A 180° bend back u-shaped loop is the best way to secure a wire against turning inside the glue.

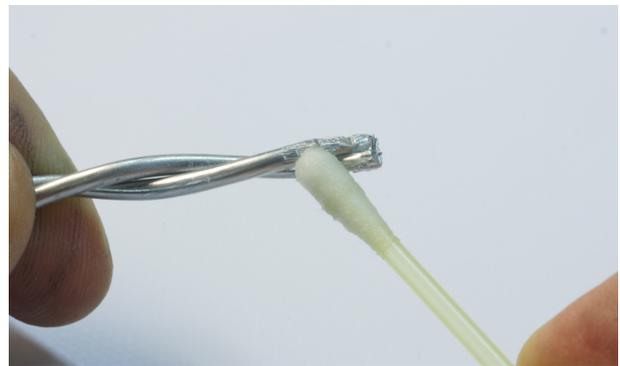
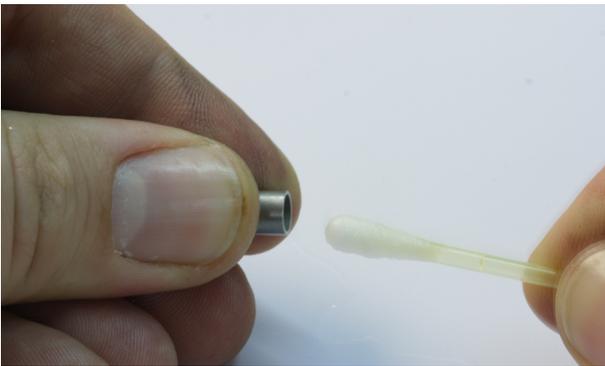


Doublestrands with 2x2,5mm can not be bend back at all, the total diameter would exceed the inner diameter of the tube. Clamp these wires with some pliers to create some bite marks and to roughen the surface before glueing them into the tubes.

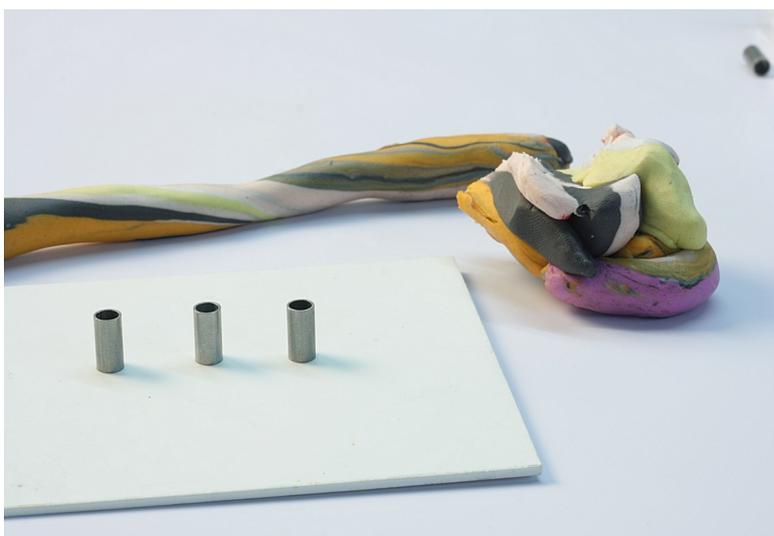
Important for all glued connections:

Roughen surfaces: A rough surfaces is a bigger surface that's why you generally get a better bondage when glueing parts with rough surfaces. Therfor it is recommended to roughen all wireends prior to glue them into the tubes. This can be done with sandpaper or just with some pliers. Roughening the wire-ends is more important when glueing wires that are not bend back. Wires that are bend back are anchored inside the glue wether or not the glue sticks to the wire surface, therfor the bondage between glue and wire surface is secondary.

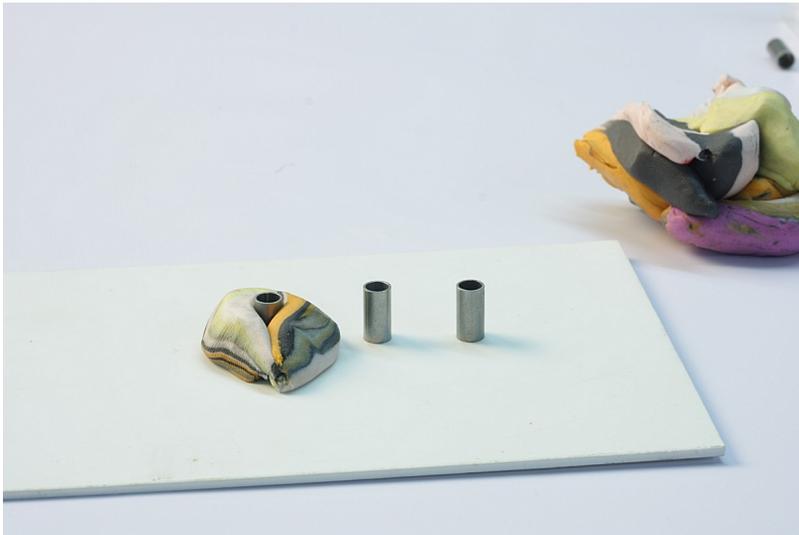
Clean / degrease surfaces : Tubes and Wire-ends should be cleaned with alcohol, white spirit, Aceton or any other cleaning liquid that will remove wax, grease and fat from the surfaces. Grease is the enemy of any glue ! A Q-Tip is perfect to clean the inside of the tubes. Wires can also be dipped into a cleaning liquid, then wiped of with a clean cloth or a Q-Tip.



Glueing wires into the tubes :



1,
To glue the wires into the tubes place the tubes on a plain, smooth surface such as a plasticboard. You might want to use some kind of realease agent to make sure the glue will not stick to your surface. Vaseline usually does the job so there is no need to buy a special spray. Alternatively you can also place the tubes on a sheet of paper which you dispose after use. Baking paper is also an option.



2.

Now roll some old clay to form a clay „snake“ and place it around the tube. Make sure the tube is firmly embedded up to the upper edge. This helps to avoid that glue runs down on the outer surface of the tube.

Make sure the tube is in full contact with your surface so no glue can run out of the tube.

Watch out that no plastilin get's inside the tube. If that happens remove the clay and de-grease the tube again !



3.

Once all tubes are ready for glueing you can start with mixing the glue.

It is recommended to check that all prepared wires really do fit inside the tubes prior to start mixing the glue.

It can be quite stressful to find out that wires do not fit while you are already glueing parts together.



4.

Now fill the glue into the tubes. Depending on what diameters you use the tubes do not have to be filled up to the top. The wire need some room and will push the glue up.

Most 2 component glues have a rather short work-time. You should only fill the amount of tubes that you can glue in one run before the glue starts to set.

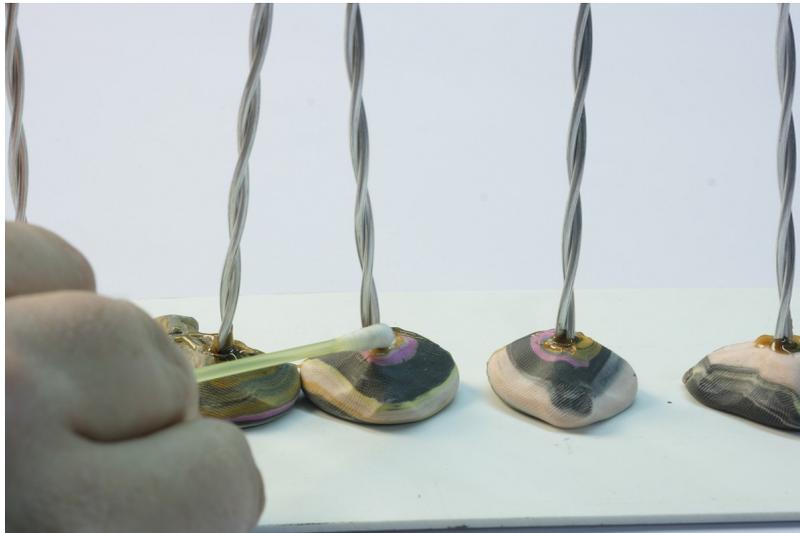
It is vital that your glue is still liquid when inserting the wires so the glue can flow into all dents and inbetween the wires.



5.

Now stick the wires into the tubes.

The plastilin wall around the tube keep the wired from falling over. The outer tube surface stays clean.

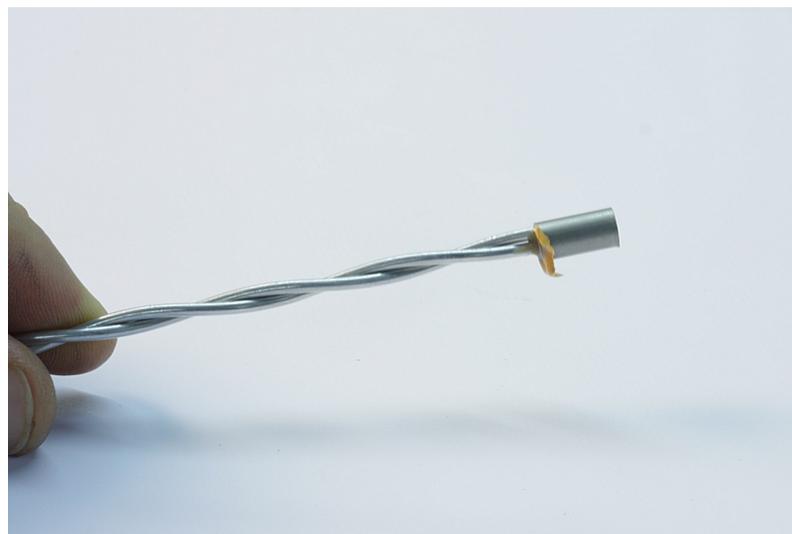


6.

Use a Q-TIP to wipe off any excess and then let the glue set up.

Most 2 Component glues start to set after only a few minutes but it takes several hours for the glue to reach it's final permanent hardness. (please check the the documentation of your glue for the exact data)

Until then the wires should not be wildly bend to make sure they don't come loose in the still soft glue.



7.

Once the glue has start to set the wire can be carefully taken out of the clay-bed and any flashings can be trimmed of. While making sure not to bend the wires at this point the second tube (if neccessary) can now be glued onto the wire as described above)

It is very important that the tubes are completely filled with glue and that there are no air pockets inside the glue. In case there are visible air pockets or glue is missing on one site of the tube add some extra glue before you use the wires in an armature.

General Information:

- Never use any force to insert the tubes into a block they could get clamped and you will need some pliers to pull them out. If a tube can not be inserted easily chances are it is deformed or something is blocking the slot. If a wire is glued into a tube you can easily pull it back out.
- When inserting a tube into a slot for the first time you might feel a little resistance and the tube will not slide in very easy. This comes from a little edge at the threaded hole for the grub screw which builds up during tapping and will vanish once you inserted a tube a few times. In case you inserted a plain tube without a wire you can use a tool to toss it out of the slot from the opposite side or use some pliers to carefully pull it out.
- Avoid bending the wire right where it comes out of the tube (no hard, sharp bends !) this can cause the wire to break faster.
- Never use pliers to bend your wire in joint areas. Pliers will „hurt“ your wire and leave marks. At these spots your wire will break faster. Using pliers is okay at „no-joint“ areas.
- When tightening the setscrews use just enough force to secure the tubes. Although the Blocks are made from a hard Aluminium it is still not as hard as steel and a rather soft but lightweight Metal. If you use disproportionate force on the screws chances are that you will destroy the small M-3 thread. Aluminium is mainly used because of its weight and is easily able to withstand the necessary forces.
- The 1.5mm hex keys / allen wrench that come with the BASIC KIT PLUS, small L shaped Hex Keys in general, do not have special hardened tips, they are okay to assemble the Kit several times, after that there are chances that the tip is worn out and has no grip to the hex head anymore and the key will turn inside the head without turning the screw. To fix this problem cut off the deformed tip to receive a new sharp hex shaped tip ! for more professional use we recommend „T-handle“ or „screwdriver-style“ 1.5mm Hexkeys screwdrivers from WIHA have a special hardened tip that will serve you well for years and are available at the Stop-Mo-Tec online-shop.
- At times inserting 2x2.5mm wires into the tubes can be a little tricky. Here are possible reasons:
 - Production tolerances of wires and tube. → trying another tube can help
 - The wire was overtwisted, this increased the wire's total diameter which is now slightly over 5mm → twist another wire and make sure not to overtwist it.
 - The tip of the 2x2.5mm wire deformed when snapping the wire. There's a small edge standing out, the total diameter has increased.
→ use a file to get rid of the snapping edge. Or use some pliers to press the wire back into shape.

If you have any further question please contact us via E-Mail.