

15. Clip the syringe hinge (J) onto the syringe without a needle cap. Then, at the same time, slide the hinge onto the rotating base and insert the barrel top into the syringe holder (K) you created in step [C. 1.] as shown. Finally, clip the set's other syringe into handle (S4).
 16. Slide the tubes from (S1, S2, S3) into the holder so the hydraulic arm can rotate freely. Mould the adhesive tab (X) provided onto the base, creating a stable foundation to control the hydraulic system. Optional: Screw in four long screws from home through the holes at the front and back of the base plate (O) and into a thick piece of wood/board. Your Hydraulic Arm is now complete!

E. OPERATION

17. Handle 1 opens and closes the claw.
 18. Handle 2 controls the height of the arm's middle frame.
 19. Handle 3 controls the height of the claw frame.
 20. Handle 4 controls the arm's rotation from side to side.
- Move the handles at a reasonable speed and force. The arm may stop working if the handles are moved too hard or fast.

F. HOW IT WORKS

The basic idea behind any hydraulic system is very simple: Force that is applied at one point is transmitted to another point through an incompressible fluid, which in this case is water. Pressing down on the plunger forces water in the hydraulic system to move and push down on the joint it is connected to, creating movement.

G. TROUBLESHOOTING

- Make sure each plunger is deep enough in the syringe barrel so that hydraulic pressure can be generated.
- The hydraulic arm may become hard to move if it has not been used recently. Use your hands to loosen up the hydraulic system which opens and closes the claw. Apply lotion onto the syringe plunger or any other stiff parts to keep the system running smoothly.
- If you have any problems controlling the hydraulic system, unclip, empty and clean the syringes. Fill the 4 syringes and tube sets using the technique in step [D. 4.], so each hydraulic set has no air inside to generate enough power to move each axis. Finally, reinstall each set as done previously.

H. FUN FACTS

- No new energy is created in a hydraulic system. Hydraulic equipment simply converts existing energy from one form to another.
- Many of the huge cranes used for construction are just larger versions of the hydraulic system you created! The only difference is they fill them with oil instead of water to keep the system running smoothly at high temperatures.
- This hydraulic system uses kinetic energy, produced by the movement of liquids, to power the arm movements.
- The hydraulic pumps in NASA's space shuttles are so powerful, if the same power was put into a garden hose it could easily take all the paint off your walls at home.
- The word hydraulics originates from the Greek word 'Hydros' meaning water. This is because water was the first liquid to be used in hydraulic systems.
- Other ways water powers the world: 99% of the energy Norway uses is from hydroelectric systems that have an average age of over 46 years. The largest hydropower dam in the world was built across the Yangtze River in China. This amazing energy generator is over 50 stories tall, over 2 kilometers wide and can hold back 5 trillion gallons of water.

MEGA HYDRAULIC ARM

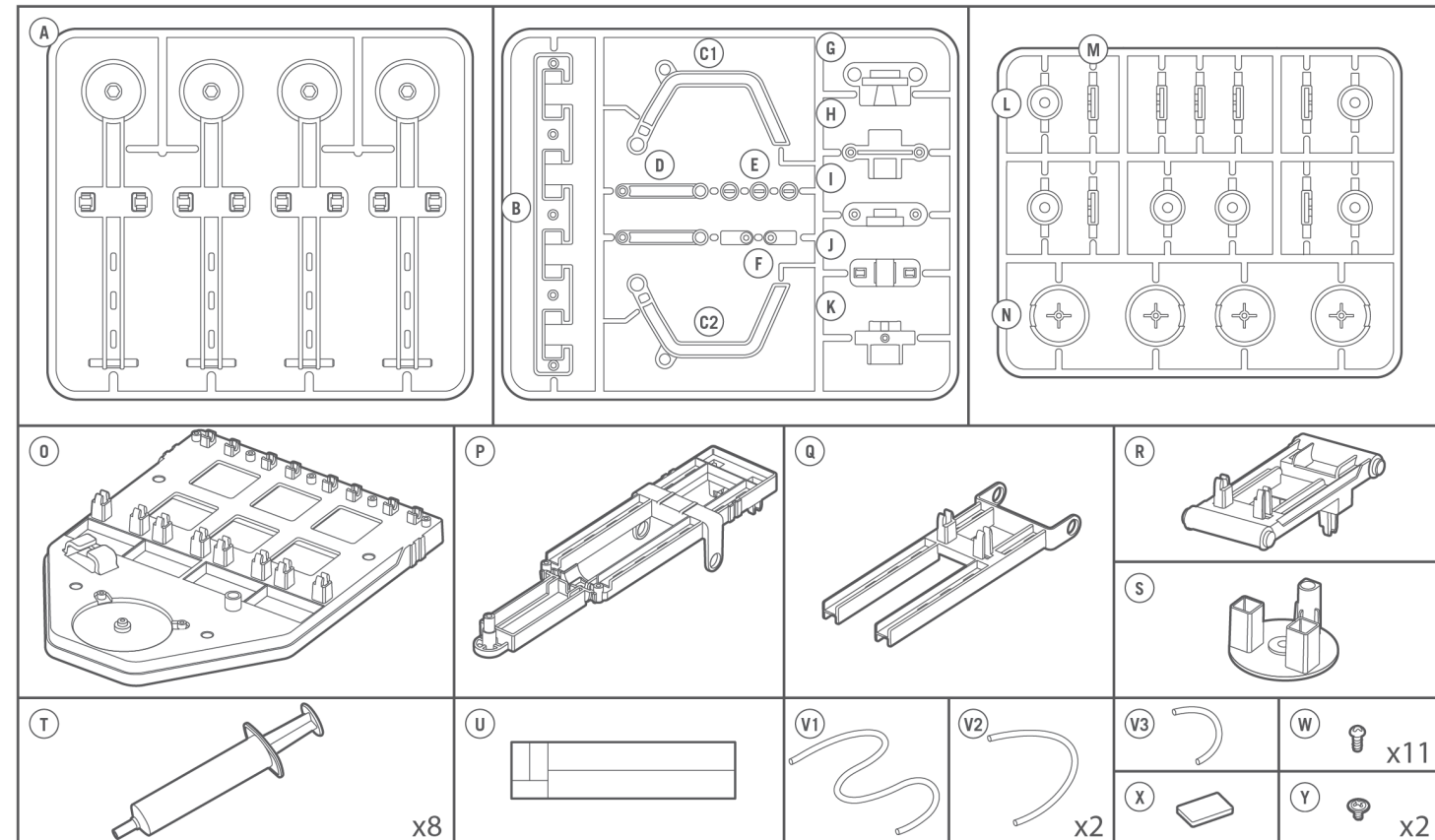


WARNING:
CHOKING HAZARD - Small parts.
Not for Children under 3 years.
 TO PARENTS: PLEASE READ THROUGH THESE INSTRUCTIONS BEFORE PROVIDING GUIDANCE TO YOUR CHILDREN.

A. SAFETY MESSAGES

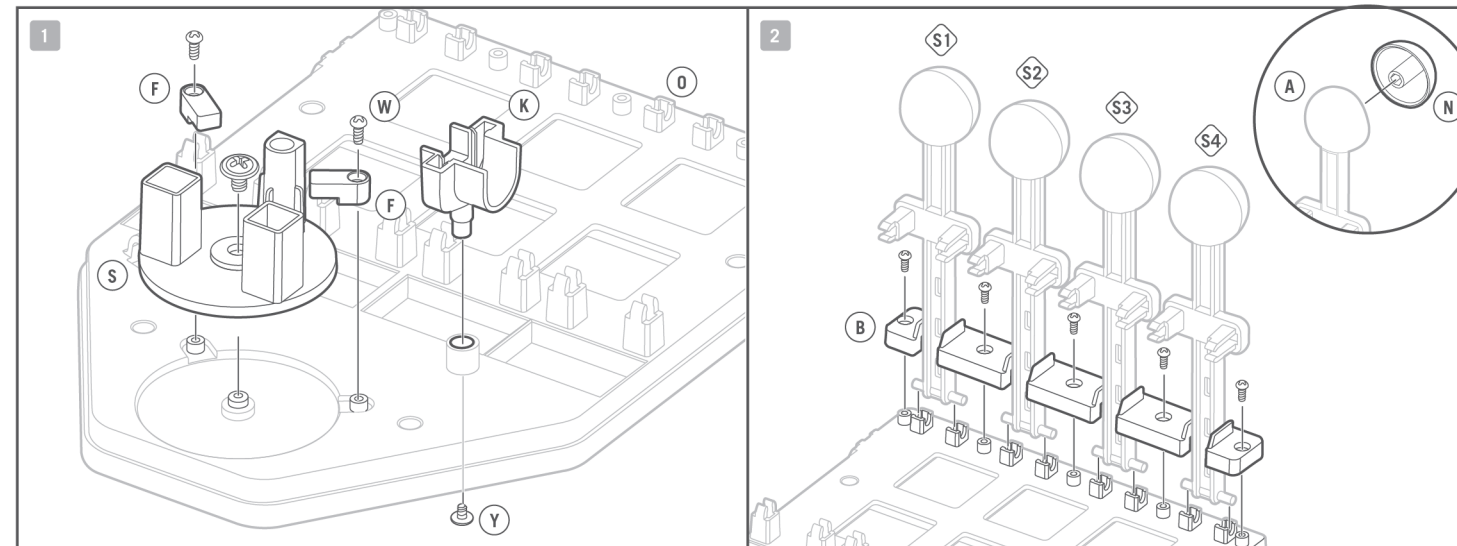
1. Adult assistance and supervision are required at all times.
2. This kit is intended for children over the age of 8.
3. This kit and its finished product contain small parts which may cause choking if misused. Keep away from children under 3 years old.
4. Do not grab humans, animals or any objects that could break.

B. CONTENTS



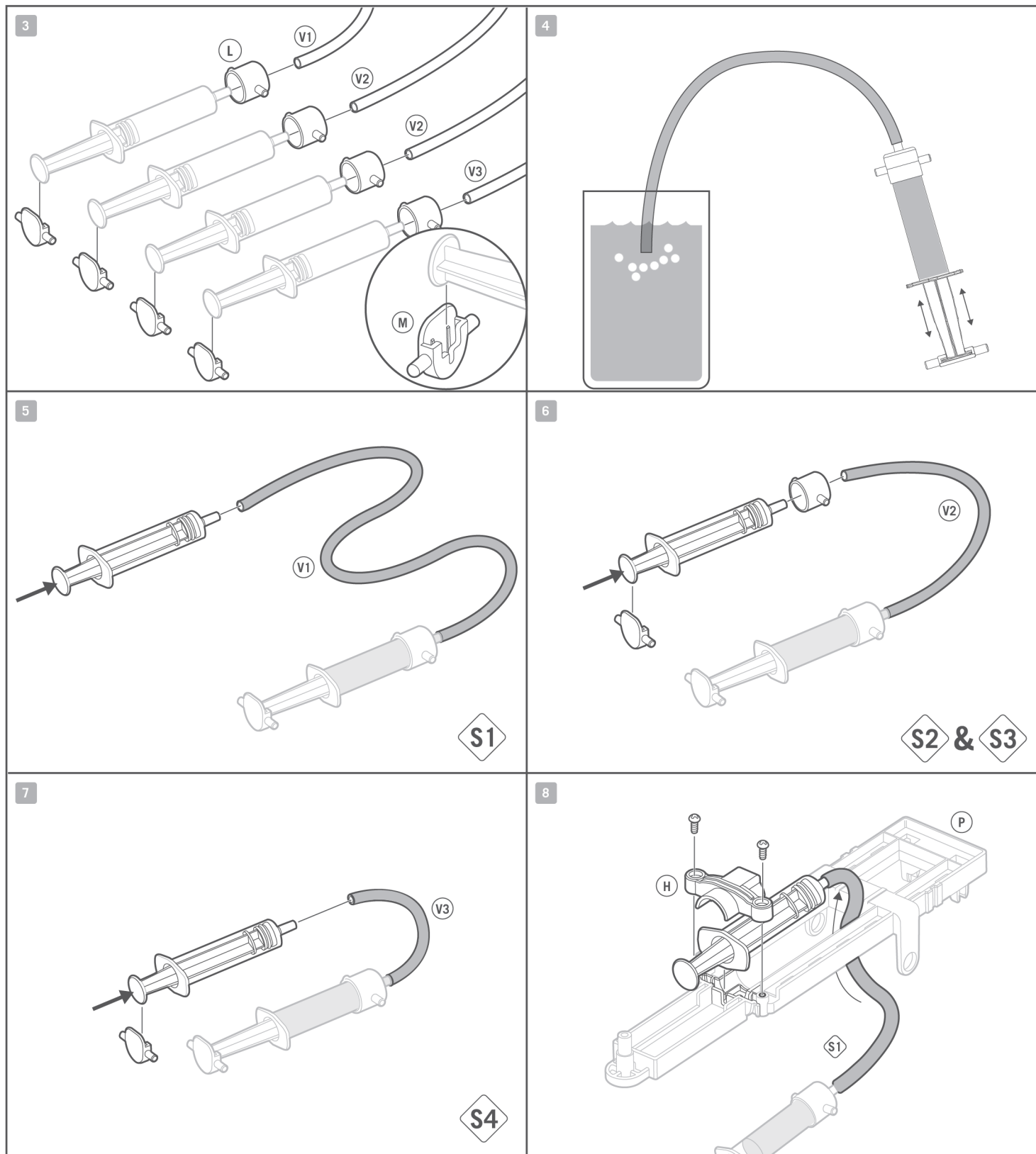
Part: A: Handle x4, B: Handle Cover, C1: Left Claw, C2: Right Claw, D: Claw Connector x2, E: Peg x3, F: Stopper x2, G: Slider Bottom, H: Syringe Cover, I: Slider Top, J: Syringe Hinge, K: Syringe Holder, L: Needle Cap x6, M: Plunger Cap x7, N: Handle Cap x4, O: Base Plate, P: Claw Frame, Q: Rotating Frame, R: Top Arm Frame, S: Rotating Base, T: Syringe Barrel & Plunger x8, U: Claw Pads, V1: Long Tube, V2: Medium Tube x2, V3: Short tube, W: Small Screw x11, X: Adhesive Tab, Y: Washer Screw x2. Also required but not included in this kit: A small crosshead screwdriver, lubricant (lotion) and a used, cleaned tin can.

C. BUILDING THE BASE

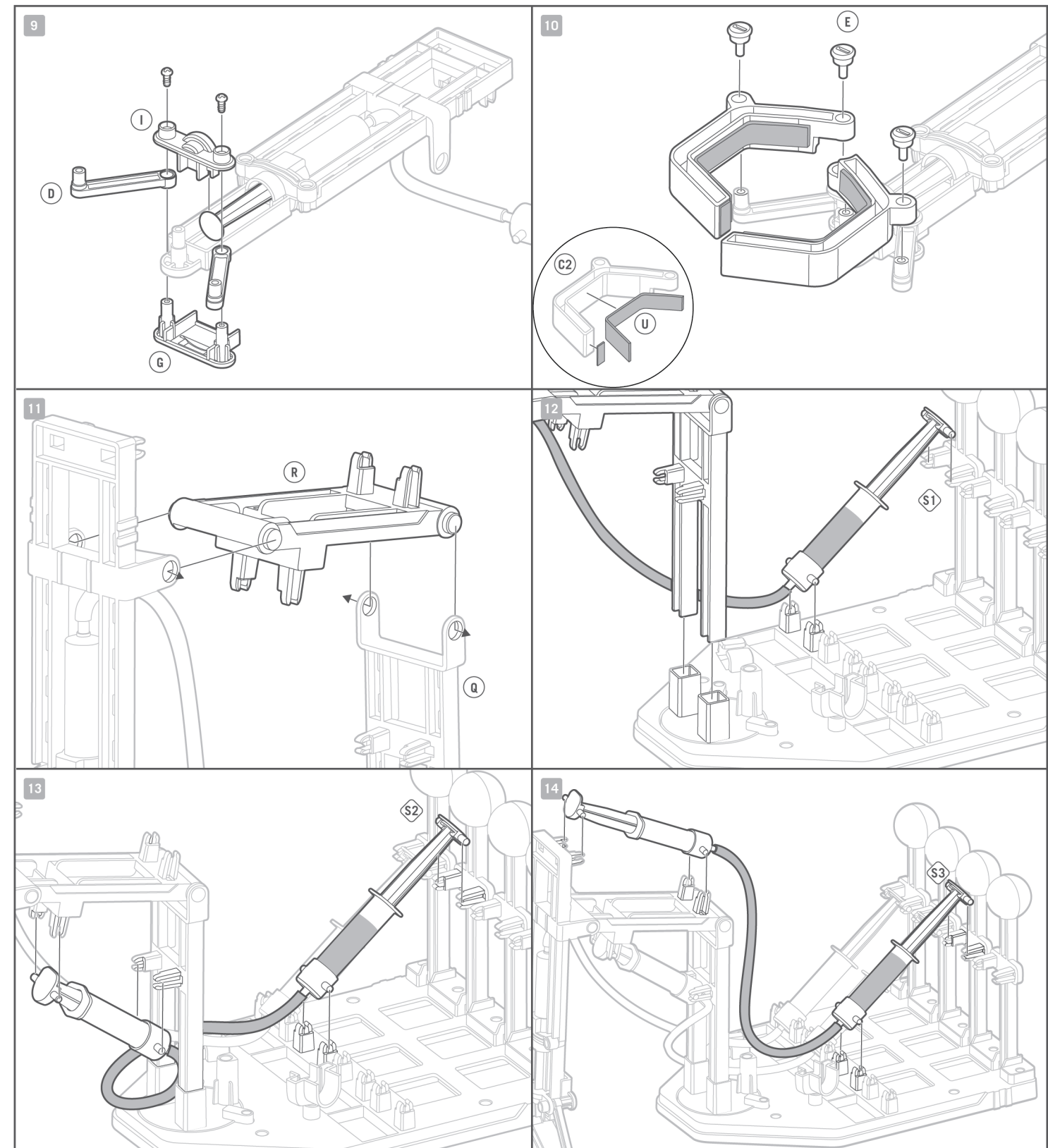


1. Insert the syringe holder (K) into the hole as shown. Then, flip the base plate (O) over and secure the syringe holder with a washer screw (Y). Place the Hydraulic Arm's rotating base (S) inside the base plate's circular indent and secure it with a washer screw. To limit how much the arm can turn from side to side and stabilize the base, screw in the two stoppers (F) using the small screws (W).
2. Push the handle cap's (N) joint into the hole at the top of each handle (A) and insert the handles into the base. Lie the handles flat against the base and screw in the handle cover (B) over top with the small screws (W).

D. BUILDING THE HYDRAULIC SYSTEM



3. Put a needle cap (L) and plunger cap (M) on 4 syringes. Make sure the plunger head goes into the T-joint to create a secure fit. Then attach a tube to each syringe.
4. Point the syringe needle upwards while you push and pull the syringe plunger a few times to fill the 4 syringes and tubes with water, pushing out all the air in the process. Pro Tip: Use watered down paint or food colouring to help you remember which handle controls what section of your Hydraulic Arm.
5. Hydraulic Set 1 (S1): Attach an empty syringe with its plunger fully pushed down to the water-filled long tube (V1) and syringe you created in the previous step.
6. Hydraulic Set 2 & 3 (S2 & S3): Put a needle cap (L) and plunger cap (M) onto an empty syringe with the plunger pushed all the way down. Attach it to a water-filled medium tube (V2) and syringe you created earlier. Repeat to create second identical set.
7. Hydraulic Set 4 (S4): Put a plunger cap (M) onto an empty syringe with the plunger pushed all the way down. Finally, connect the syringe to the water-filled short tube (V3) and syringe.
8. Thread the (S1) tube through the bottom of the claw frame (P) before you insert the syringe into the frame as shown. Have the empty syringe's plunger pulled out a little bit so it can slot easily into the T-shaped groove in the claw frame. Then secure the syringe in place by screwing in the syringe cover (H) with two small screws (W).



9. Put the slider bottom (G) under the claw frame. Slide the two claw connectors (D) onto the slider bottom as shown. Finally, slide the slider top (I) onto the plunger top and claw connectors, securing it with two small screws (W).
10. Stick the claw pads (U) onto the inner surface of the claws (C1 & C2). Slide the claws onto the claw connectors and push the pegs (E) into the holes to secure them in place.
11. Clip the claw frame (P) to the top arm frame (R). Then, clip the top arm frame (R) to the rotating frame (Q).
12. Insert the rotating frame (Q) into the rotating base (S). Clip the other syringe into handle (S1).
13. Pull the plunger half way up before clipping it to the top arm and rotating frame as shown. Wrap the tube around the outside of the rotating frame and clip the set's other syringe into handle (S2).
14. Clip one of the syringes from (S3) to the claw frame and top arm frame. Clip the other syringe into handle (S3).

QUESTIONS AND COMMENTS

We value you as a customer and your satisfaction with this product is important to us. If you have any comments or questions, or you find any parts of this kit missing or defective, please contact our distributor in your country, whose address is printed on the packaging. You are also welcome to contact our marketing support team via email: infodesk@4M-IND.com, fax (852) 25911566, telephone (852) 28936241, or our website: WWW.4M-IND.COM.