

KidzLabs™ Robotic Hand

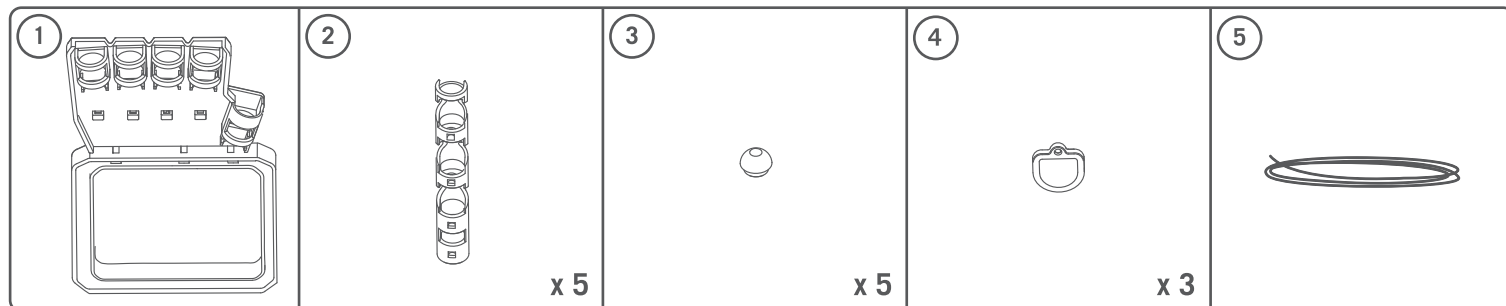


A. SAFETY MESSAGES

1. Please read carefully through all these instructions.
2. Adult supervision and assistance are required at all times.
3. This kit is intended for children over 8 years of age.
4. This kit and the finished product contain small parts which may cause choking if misused. Keep away from children under 3 years of age.
5. Use of scissors is required. Adult supervision is required when using scissors.

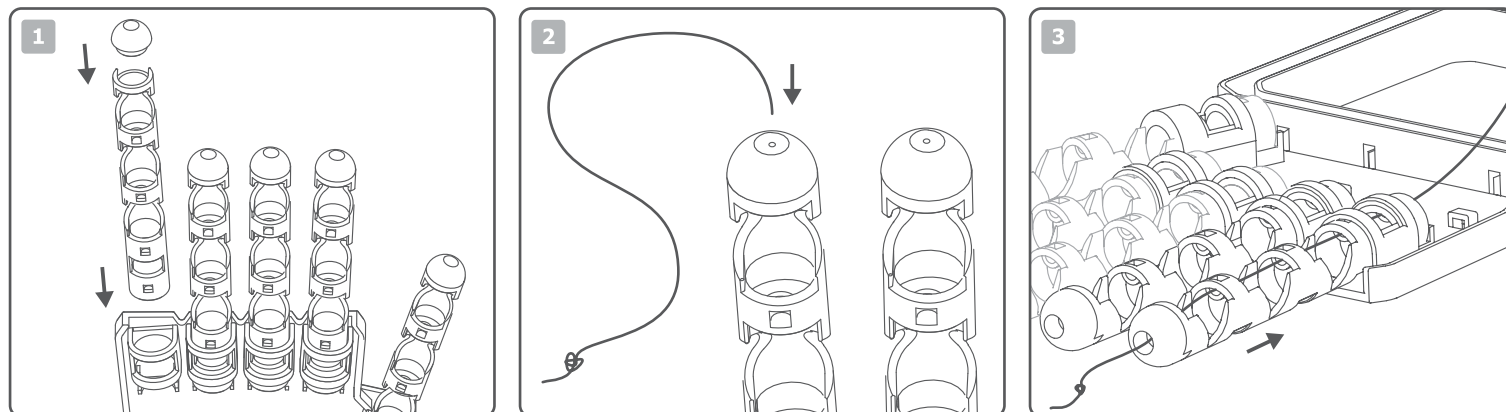
⚠ WARNING:
CHOKING HAZARD – Small parts.
Not for Children under 3 years.

B. CONTENTS

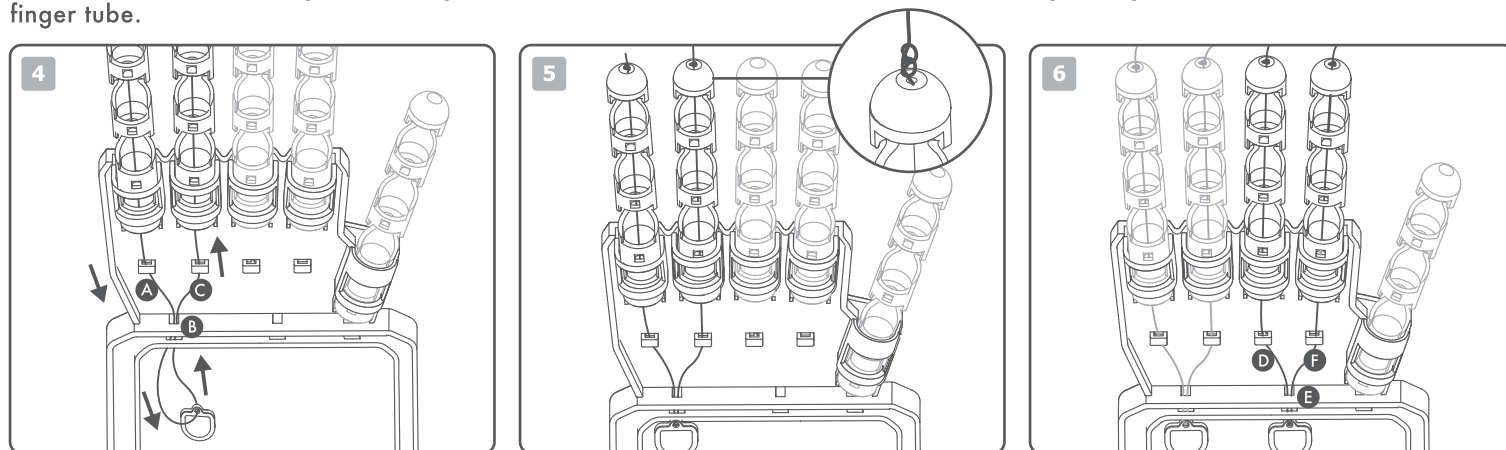


Part 1: Hand frame, Part 2: Finger tube x 5, Part 3: Finger end cap x 5, Part 4: Pull ring x 3, Part 5: String. Also needed but not included: a pair of scissors.

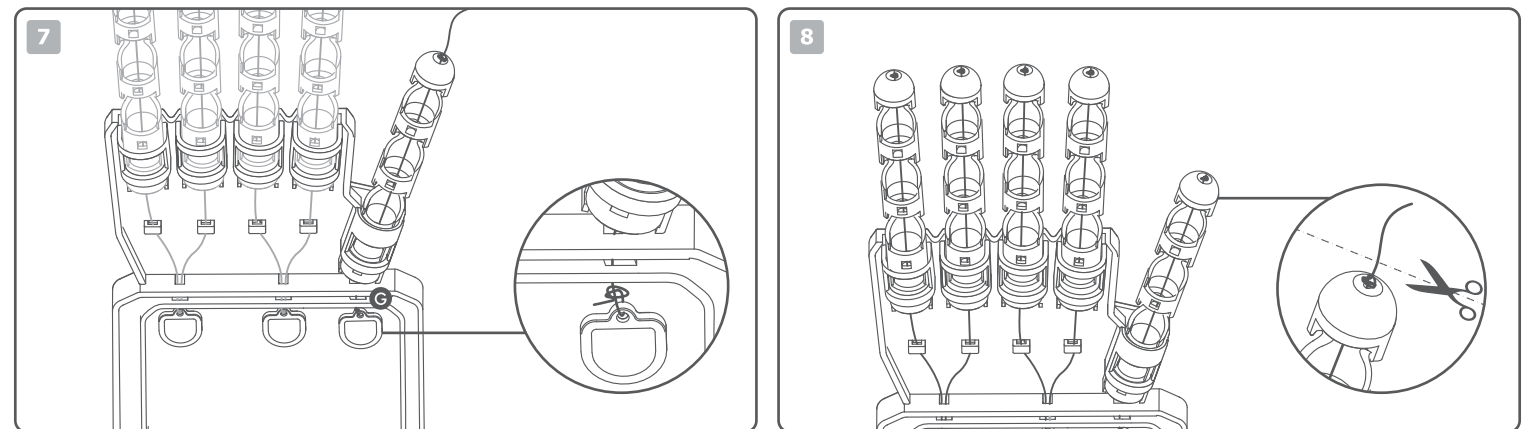
C. ASSEMBLY



1. Starting with the little finger, examine the finger tubes. The end with the narrower ring is the tip and the end with the wider ring is the finger root. Now hold the hand frame with the plastic loops facing upwards. Push the root of all fingers into the plastic loops as shown. Slot the finger end caps onto the finger tips. Make sure the finger tubes and hand frame are at the same orientation so that the fingers will bend the correct way.
2. Cut a 50 cm long piece of string. (Tip: Use the 25 cm ruler at the top for easy measurement – it's easy to measure out 25 cm, fold the string and measure 25 cm more, then cut!) Tie a knot at one end of the string. Thread the other end of the string through the finger end cap of the little finger.
3. On the inside of the rings on the finger tubes are small sleeves. Continue to feed the string through all the sleeves to the end of the finger tube.

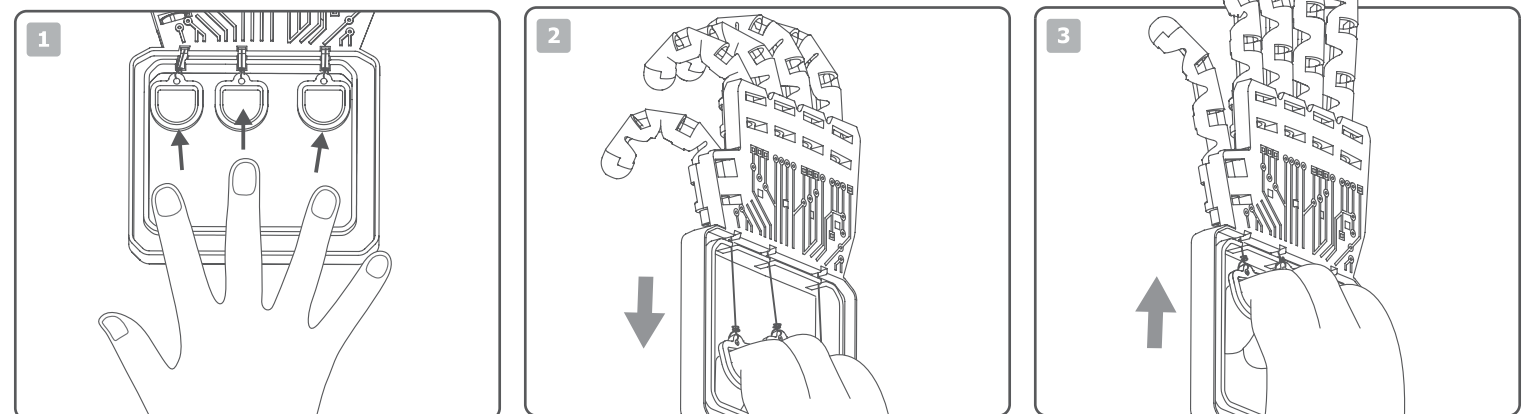


4. Thread the string through holes A and B as shown in the diagram, and then through the hole of a pull ring. Next feed the string back through holes B and C, and then through all the sleeves from the root to end cap of the ring finger.
5. Pull the string tight so that the pull ring touches the upper edge of the frame. Tie a knot close to the end cap to secure the string in position. The string should be tight after tied. This will allow the fingers to bend properly when it is in operation. Try pulling the pull ring – the two fingers should bend properly. If they don't, redo the knots.
6. Repeat steps 2 to 5 for the middle and index fingers. Use holes D, E and F to connect the two fingers with the pull ring and hand frame.



7. For the thumb, cut a piece of 25 cm long string and follow steps 2 and 3. Unlike the first four fingers, the thumb does not share a pull ring with another finger. Just tie the string directly to the pull ring under hole G. Make sure the pull ring just touches the upper edge of the hand frame after the string is tied tight.
8. Check that all knots are secure, pull the rings to see if all fingers bend properly, and cut away any loose string. Congratulations! Your Robotic Hand is complete.

D. OPERATION



1. Hold the Robotic Hand with the flat side (i.e. the back of the hand) facing up. Grasp the frame with your right hand. Put your first three fingers into the pull rings, holding the frame with your thumb and little finger.
 2. Pull on the rings to make the Robotic Hand's fingers and thumb bend.
 3. Release the rings to straighten the fingers and thumb.
- Can you grip your other hand? Can you pick up an object? Put a glove to Robotic Hand. Find a long sleeve clothes which sleeve is long enough to hind your hand when you are holding the frame operation. Shake hands with your friends with your unique Robotic Hand. They will be amazed.

E. HOW IT WORKS

When you pull on one of the rings, the strings shorten the inside of the fingers attached to the ring. The outside of the finger remains the same length, so the shortening makes the fingers bend inwards.

F. FUN FACTS

- Industrial robots work in factories, moving and joining parts of things being made. They have grippers for picking up objects, with two or three fingers that can open and close.
- In robot hands, the fingers are moved by tiny motors, hydraulic rams or air-powered artificial "muscles".
- Robot researchers have built robot hands that look like human hands and have fingers that move like human fingers. They are very complicated machines, using many joints and a dozen or more motors.
- Human-like robot hands could be used in humanoid robots.
- Robot hands have pressure sensors in the finger tips. When the fingers are gripping an object, the sensors prevent the fingers from squashing the object.
- In human hands, thin tendons running inside the fingers make the fingers bend. The tendons are pulled by muscles in the forearm.
- Prosthetic hands are for people who have lost a hand or arm in an accident. They are like robot hands, but they are controlled by electrical signals from the remaining muscles in the arm.

QUESTIONS & COMMENTS

We value you as a customer and your satisfaction with this product is important to us. If you have comments or questions, or you find any parts of this kit missing or defective, please do not hesitate to contact our distributor in your country. You will find the address printed on the package. You are also welcome to contact our Marketing Support Team: Email: infodesk@4m-ind.com, Fax (852) 25911566, Tel: (852) 28936241, Web site: WWW.4M-IND.COM

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