

111.666

OPI-Robo R303



Necessary tools

Fretsaw
Ruler,pencil
Sandpaper
Wood glue
Screwdriver, slot and crosshead
Holemaker
Machine vice
Spannerl M4
Wire strippers
Side cutters
Soldering iron
Instant glue
Drills ø3,4,5
Countersink 90°
Metal saw
Hot air gun

Please Note

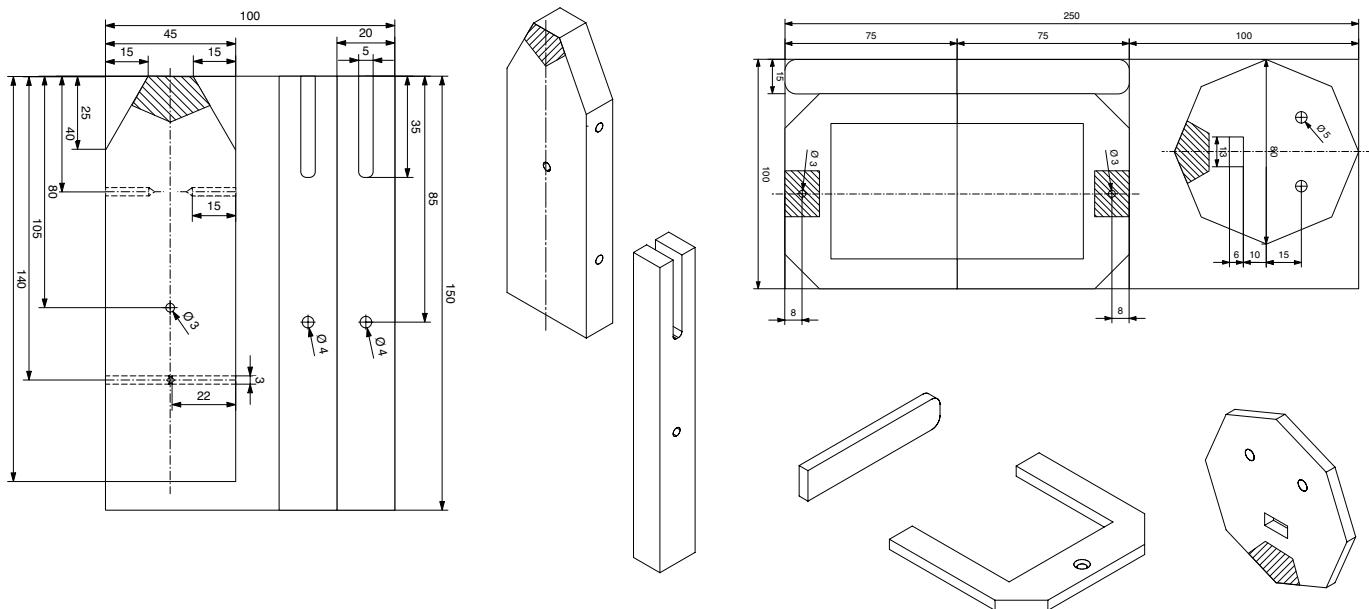
The OPITEC range of projects is not intended as play toys for young children. They are teaching aids for young people learning the skills of Craft, Design and Technology. These projects should only be undertaken and tested with the guidance of a fully qualified adult. The finished projects are not suitable to give to children under 3 years old. Some parts can be swallowed. Danger of suffocation!

PARTS LIST				
Plywood	1	150x100x15	Body ,legs	1
Plywood	1	250x100x5	Head,arms,feet	2
Gearbox	1		Drive	3
Black cable	1	500	Wiring	4
Red cable	1	500	Wiring	5
Battery holder	1		Battery	6
Micro switch	1	19x6	Switch	7
LED red	2	ø5	Eyes	8
Screws	8	12x3	Fixing for foot, battery holder and gearbox	9
Machine screws	2	M4x40	Leg fixing	10
Machine screws	4	M4x30	Leg fixing	11
Nuts M4	6	M4	Fixing	12
Washers	10	M4	Fixing	13
Gear, ø4mm hole, 13 teeth	2	ø15	Drive	14
Gears, ø4mm hole, 38 teeth	2	ø40	Drive	15
Reducers	2	4/3	Drive	16

INSTRUCTIONS

1. Trace the patterns for the body and legs (A) on to the plywood sheet (1) Use a machine vice to hold the body when drilling the side holes 15/20 mm deep. It is important that these holes are drilled opposite each other otherwise the robot will not walk correctly!

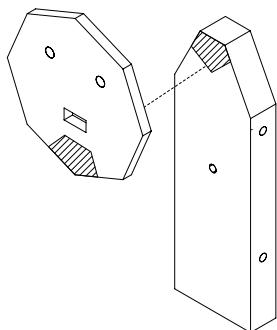
Trace the body and arms (C) on to the plywood sheet (2) Sand to finish Drill the 3mm holes and countersink 2mm deep as shown in the plan



Construction:

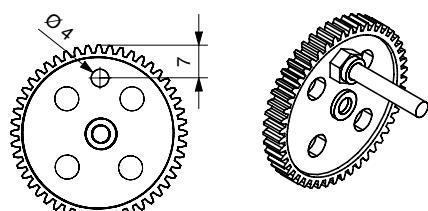
2. Glue the head on the body as shown as shown in diagram 1 (Glue the shaded area)

Dia. 1

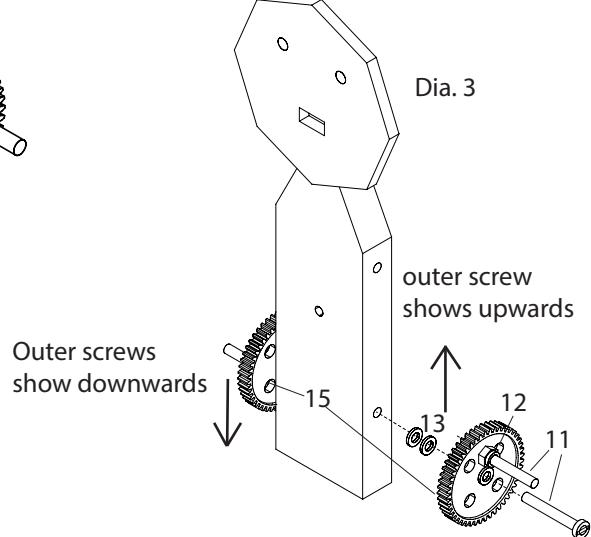


3. Take two gears (15) and drill them out to Ø4mm as shown in (Dia 2)

Dia. 2



4. Insert a machine screw (11) in the 4mm hole in the gears and tighten with a stop nut (12)



5. Now insert in both gears (15) a machine screw (11) as shown and two washers (13) in the holes in the lower body (See dia.3) Tighten the machine screw so that it turns without play.

NOTE:

The thread in the hole will be cut by the machine screw as it is inserted!

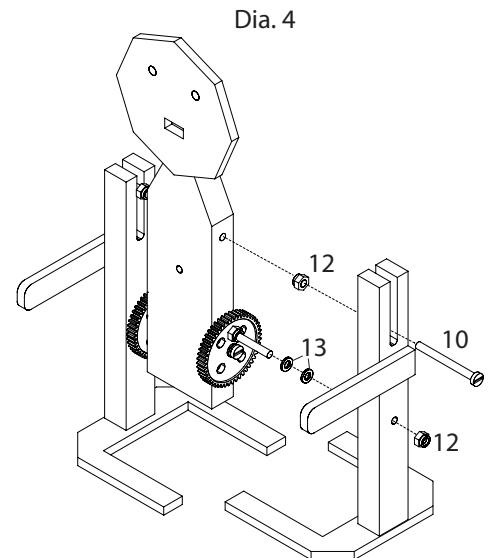
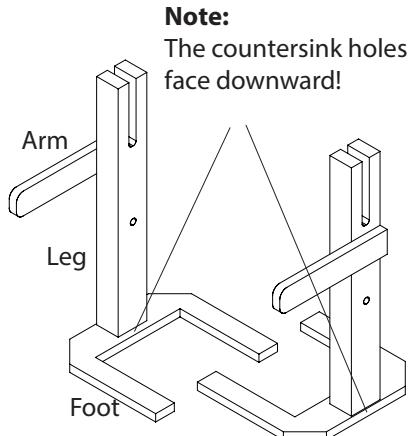
INSTRUCTIONS

6. Glue the arms (Dia 4) under the opening in the legs. Glue the legs with the countersink underneath, and leave to dry well. Glue the second part in a mirror image to the first. Fix the feet from underneath with screws (9)

Insert a machine screw (10) in the top opening in the legs and fix with a stop nut (12) so that the can move smoothly in the opening!

Slide on the machine screws (10) a gear on each side (15) between two washers (13). Mount the legs on the machine screws (10) and add a stop nut (12)

At the same time insert the machine screw (10) in the side hole in the body (The machine screw will make its own thread!)



Note:

After adding the legs turn the gears. By turning the two gears they should be set at 180 degrees. (One drive screw up and the other facing down) By turning the gears equally you can test the mechanical function. The legs should move smoothly and not catch on each other. Should they rub or catch, test the function once more.

7. Mark 20mm on each side of the motor axle (3) with a waterproof pen (Dia 5). Place the axle in a vice and saw off to the previous mark. Clean up the saw cut with a file to remove any burr (Dia.6) Do the same with the other side

Make a notch at 8mm on the axle so that the gear will be held tight (s. Dia.7)

Glue a reducer (16) in both of the gears (14) with instant glue.(Dia. 8)

Squeeze some glue in the reducer and gear so that it remains tight on the axle. (Dia.9)



Dia. 5

Dia. 7



Dia. 8



Dia. 9

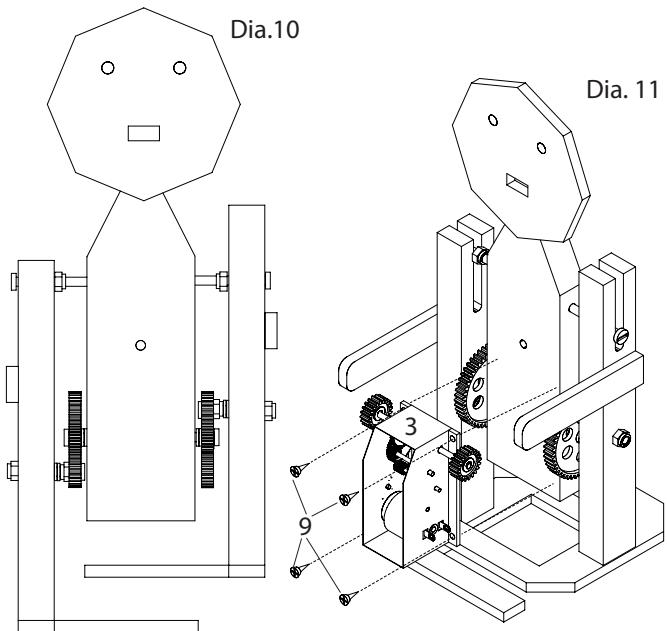


INSTRUCTIONS

8. Note:

Arrange the legs, so that the machine in the large gears, which drive the legs, are set at 180 degrees. (Dia 10) Mount the motor and gearbox (3) with the two small gears (14) on the front of the body with 4 screws (9) The small gear must mesh with the larger gear (15) (Teeth engage). When tightening the screws you should be careful that it does not slip and that the larger gears are still at 180 degrees. (s. Dia.11)

Once the gearbox is in place test the motor with a battery (3volt) Plus to the top motor contact .If all is correct the legs will move one after the other (180 degrees) and not catch against each other



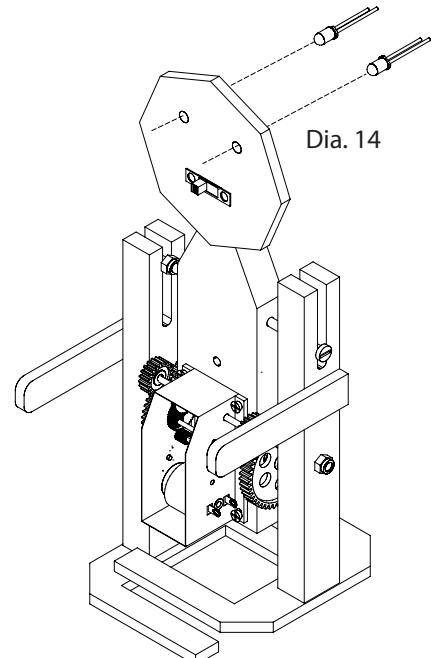
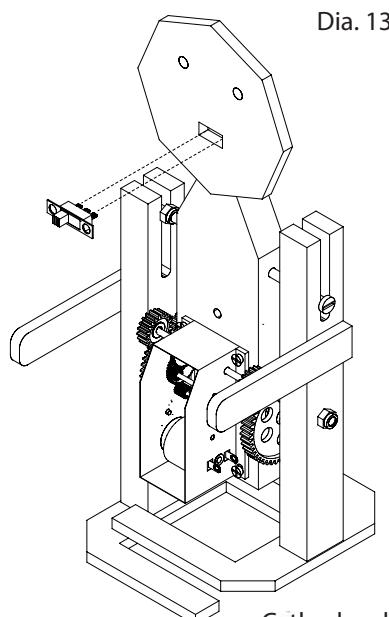
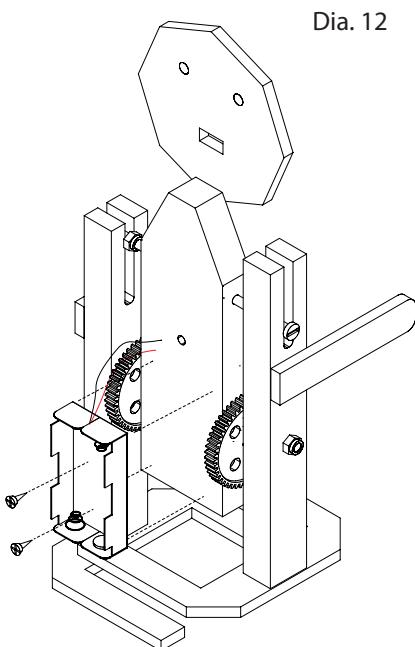
NOTE!

Should the legs not function properly, remove it from the power source immediately. Check over the mechanical function manually once more.

9. Fix the battery holder (6) to the back of the body (6) using 2 screws (9) (see Dia 12.)

10. Fit the micro switch (7) in the mouth with glue (s. Dia 13)

11. Fit the two Light Emitting Diodes (LEDs) (8) as eyes in the 5mm holes in face, secure instant glue. Make sure that the shorter legs (Cathode) ,on the LED side with flat, face upwards. (s.Dia 14)



INSTRUCTIONS

Wiring:

Note:

The wire connections can be twisted together but it is better if they are soldered.

12. - Join the anode legs of the LEDs together (Solder or twist)

- Take the red lead from the battery holder (6) cut it to ca. 20mm long and then remove the insulation and tin the end.

- Solder the resistor (17) to the red cable of the battery holder.

- Cut a 100mm length of red cable (5) remove the insulation from both ends and tin the wire ends. Solder one end to the Anode of the LED and the other to the red battery cable

- Cut off an approx. 150mm long piece of the red switch wire (5), strip it on both sides, tin it and also solder it to the red cable of the battery holder. solder it to the red cable of the battery holder. Pull the other end through the hole in the body to the front. Now solder the cable to the lower connection (towards the body) of the gear motor (3). Make sure that the cables do not obstruct the gear wheels. Insulate the soldering point with insulating tape or adhesive tape.

- Take the remainder of the red cable and remove the insulation from both ends and tin the wire ends. Wind the cable around a pencil to make a coil . Then pull it lightly apart.

Solder the ends to the Cathode connections on the LED(8). The coil should pass over the robot head

- Cut off an approx. 150mm long piece of the sharp switch wire, strip it, tin it and solder one end to the left-hand connection of the switch. solder one end to the left connection of the switch. Lead the other end through the hole in the body to the front and solder it to the free upper and solder it to the free upper gear motor connection. Insulate the soldering point with insulating tape or adhesive tape.

- Cut ca. 40-50mm from the black cable, strip and tin both of the ends. Solder one end to the middle connection on the switch (7) and the other to the black battery cable

- Take the remaining cable. Strip and tin the wire ends . Wind it around a pencil to make a coil . Connect one end to the left hand side of the switch (7) The other end to the Cathode of the right hand LED ,guiding the coil of cable over the robot head

