

# Motors...

The motors as used in the Spider prototype have a 96.4:1 gear ratio, running at 72-145 rpm on 1.5-3 volt. In the Spider they were powered from 3.6 V, each getting 1.8 V. In the near future they will each have two on-board NiMH cells to eat from.  
The mail order house Conrad sells eight versions of these motors:

Cat. nr.	voltage	gear ratio	rpm	price (Dutch fl)
24 28 02-55	1.5-3	96.4:1	72-145	19.95
24 28 10-55	1.5-3	249:1	27-55	21.95
24 28 29-55	1.5-3	487:1	14-28	21.95
24 28 37-55	1.5-3	916:1	7.5-15	22.95
24 25 51-55	3-6	96.4:1	57-115	19.95
24 25 43-55	3-6	249:1	22-55	21.95
24 25 35-55	3-6	487:1	11-22	21.95
24 25 27-55	3-6	916:1	6-12	22.95

They are a bit expensive (over \$10 a piece), but very high quality. Including the gearbox and shaft they measure about 22 x 23 x 17mm, and power use of the 1.5-3V 96.4:1 version is around 50mW when doing hard work; the 3-6V versions are even more efficient.

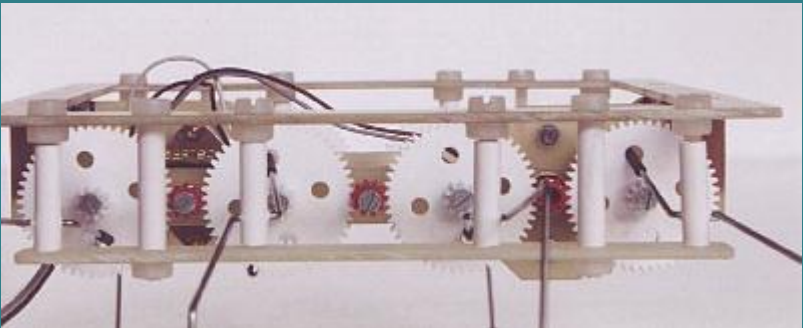
## A word of warning

A while ago I traded some of these beauties with [Andrew Miller](#), who tried attaching the legs of a walking robot direct to motors with a 487:1 gear ratio. Sadly, it proved too easy to strip the gears. So use the 96.4:1 versions, gearing them further as shown here. Then it is possible to turn the output shaft by hand without stripping the gears.

One more thing: You'll need M1.4 x 0.30 (thread) screws for attaching the motors; a rare kind, and afaik not sold by Conrad. I used screws 6mm long. You'll find shorter ones in old cassette players, and Robbe sells a shorter and a longer version in one (fairly expensive) bag.

## ...And gears

Click in the photo to see a larger version (30K)



The large white and small red plastic gears shown add 5:1 to the motors, for a total ratio of 482:1. Four extra holes are already in the white gears, factory-made for driving the legs of the Spider! I gave all gears a bit of brass pipe (3 mm outside, 2.1 mm inside diameter) to make them run well on M2 shafts. These gears are found in a low-priced package from Conrad, which contains 40 large gearwheels (20 red and 20 white, each with 50 and 10 teeth) and 8 small ones (10 teeth), and costs

Dutch fl 11.95 (about 6 dollars). The Catalog number is:  
29 77 04-55

By the way, I cut the red 10-teeth gearwheels shown off the 50/10 type, because they accept 3 mm brass pipe in their shaft holes. So the 8 small gears in the package weren't used. But they fit perfectly on the 2 mm shaft of most small motors, like those found in cassette recorders! So it is not at all difficult to build your own, very cheap geared motors. They would not fit the Spider as shown, but the design can easily be adapted...

## Conrad

The address of this very interesting mail order house is:

Conrad Electronic Nederland BV  
Postbus 12  
7500 AA Enschede  
The Netherlands

Information: (31) 053-4285444  
Fax: (31) 053-4283075

Those in other European countries and overseas may be interested in this [Webpage](#). Ordering by email is possible, but there is no catalog on the Web, and the printed catalogs are not in English.

[previous \(IR `radar'\)](#) / [next \(a new idea?\)](#)