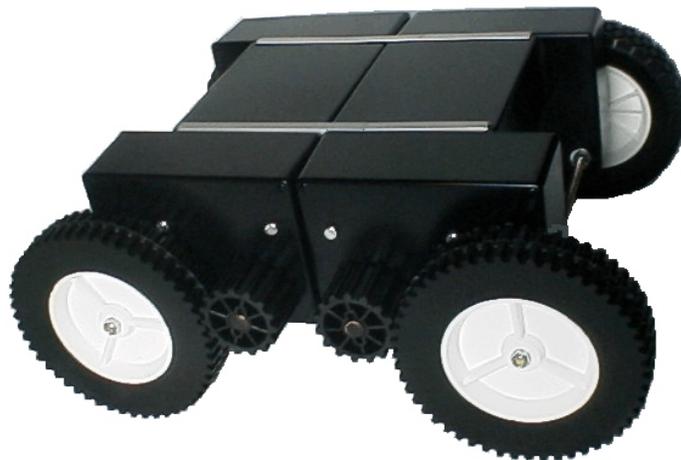


## **Workman Mobile Robot Platform**

**Design & Construction,**

**Preview Edition**

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## **1. Preface**

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## 2. Introduction

This manual describes the Workman mobile robot platforms and contains details regarding design, construction, and assembly. Available in two forms, two-wheel drive (Workman II), and four-wheel drive (Workman III), these platforms form the basis for a powerful mobile robot.



Workman II



Workman III

Each Workman model consists of large plastic compartments that are joined together to form an attractive platform. In addition to providing housing for the motors, these compartments can contain your choice of internal electronics and battery. With plenty of available surface area for mounting sensors, cameras, or actuators, the Workman platform is ideally suited for a variety of uses. The 8" cogged wheels provide the drive for each 'bot. The Workman II consists of two 12VDC drive motors, while the Workman III utilizes 4 drive motors. Each unit uses a system of metal pulleys and a belt to drive the cog which, in turn, drives the wheel.

The Workman III is ideal for applications requiring power and traction. The Workman II is a two-wheel drive unit that uses a unique custom-designed rear idler system consisting of two 6" wheels that swivel, allowing this robot to make tight turns.

### 3. Specifications

This section summarizes drive information, dimensions, and capacities for Workman II and III platforms.

#### **Workman II:**

- Measures 21"L x 18"W x 9"H
- Weighs 20 lbs.
- Load capacity 20 lbs.
- Drive type: belt-driven cogs
- Two drive motors (12 VDC, 2.25A, 2370 RPM, 10 AWG leads)
- Large 8" drive wheels
- Two 6" idler wheels
- Max wheel speed (no load): 4 ft./sec.

#### **Workman III:**

- Measures 23"L x 18"W x 9"H
- Weighs 30 lbs.
- Load capacity 40 lbs.
- Drive type: belt-driven cogs
- Four drive motors (12 VDC, 2.25A, 2370 RPM, 10 AWG leads)
- Large 8" drive wheels
- Max wheel speed (no load): 4 ft./sec

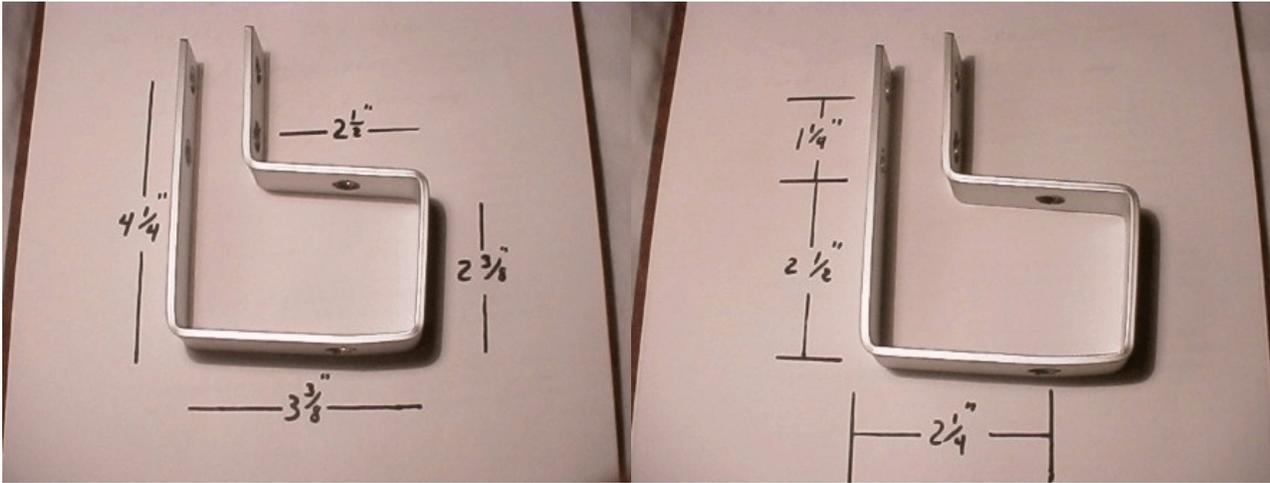
## 10. Idler Sub-Assembly

The rear idler sub-assembly is used on the Workman II only and attaches to the rear of the center platform described earlier. It allows for easy turns with the two-wheel drive platform. The idler bracket is formed from 1" flat aluminum stock, bent into the shape shown. Holes are drilled for the 3/8" x 3-1/2" center bolt and 5/16" x 1" coupler retainer bolts. The 3/8" center bolt attaches the idler to the bottom lid of the rear cavity. The two 5/16" retainer bolts hold in place a 3/8" coupler. The purpose of the coupler is to attach wheel bolts.



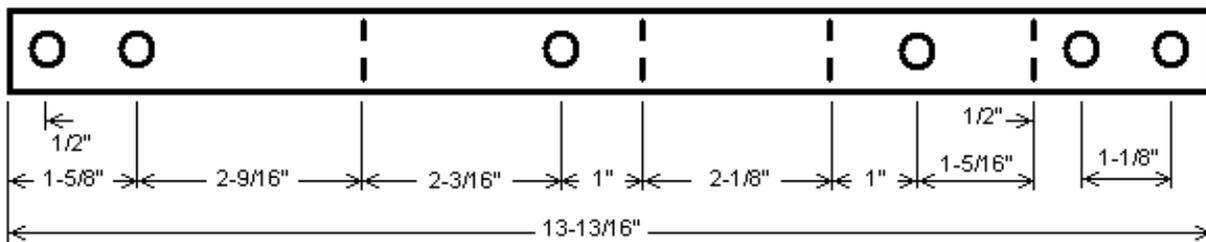


The photo above shows the underside of the platform assembly. Drill a 3/8" diameter hole in the platform rear lid approximately 7/8" from the back edge as shown. A corresponding hole must be drilled through to the top of the platform assembly into the mating enclosure. However, this hole in the top of the enclosure must be 1/2" diameter. The purpose of these holes is to support and attach the rear idler assembly.



The photos above indicate measured dimensions of the idler bracket. The left photo indicates overall dimensions and shows how to form the bracket. The photo on the right indicates the locations of the holes to be drilled. All holes are  $\frac{3}{8}$ " diameter.

### Idler Bracket Dimensions



All holes  $\frac{3}{8}$ " diameter. Dashed lines indicate bends.

The diagram above indicates locations of bends and holes for forming the bracket. If desired, you may create a template using this diagram.

(Note: Use caution when bending the aluminum material as it can be broken if improperly handled.)

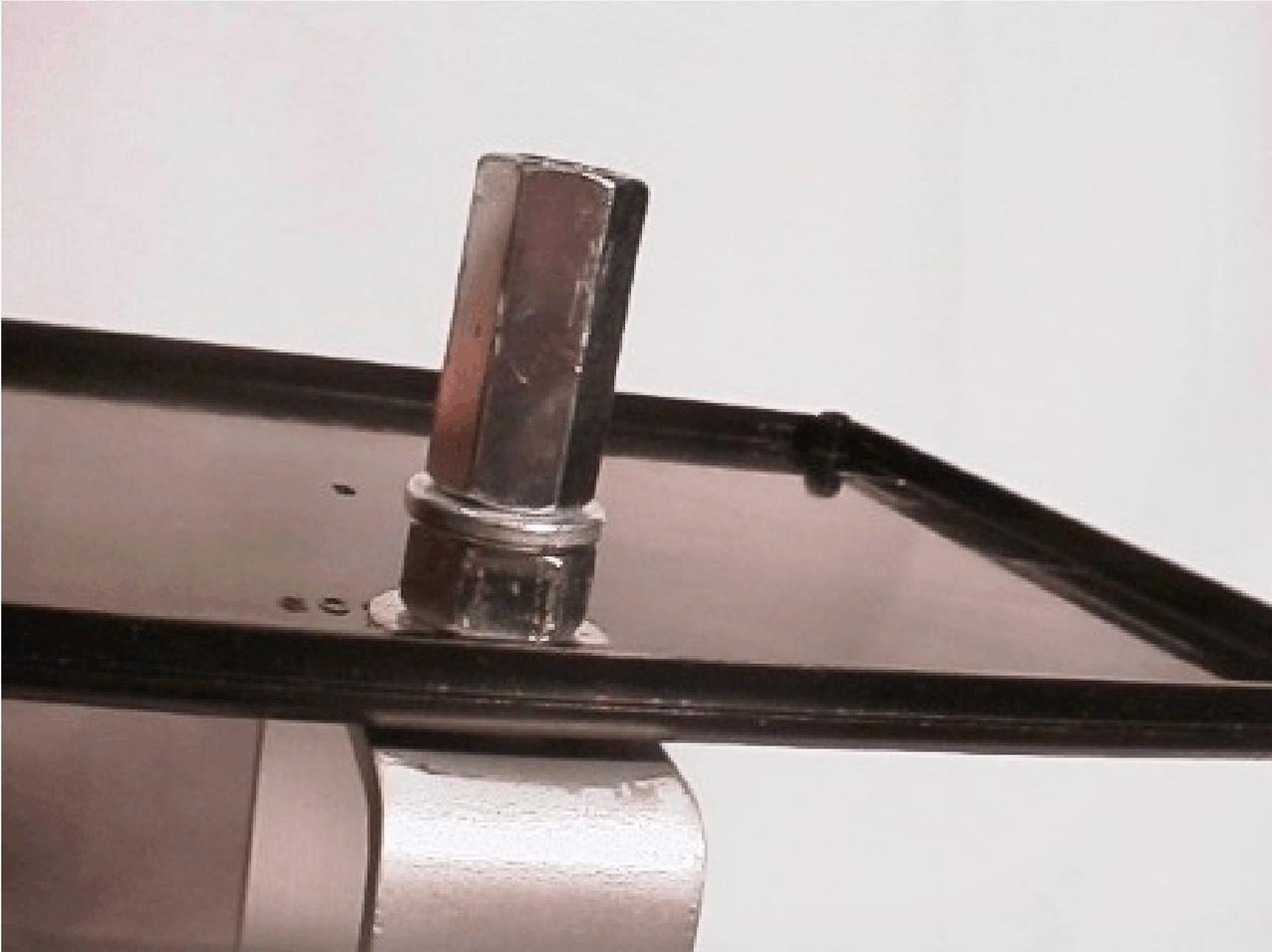


The photo above shows the parts assortment required for assembling the idler unit. Refer to the parts lists earlier in this document for details.



The photo above shows the platform rear lid with assembled idler. The entire assembly is shown upside-down for visual clarity. Place a 3/8" coupler between the two vertical supports and secure with two 5/16" hex screws as shown. Use lock nuts to secure the assembly. Place a flat washer on a 3/8" x 3-1/2" hex screw and insert into both horizontal supports as shown. The idler should freely rotate around the bolt without binding. You should also apply a thin layer of lubricating grease on the bolt.

Insert the 3-1/2" bolt through the enclosure lid with a 3/8" flat washer separating the two.



To the opposite side of the platform rear enclosure lid, apply a 3/8" flat washer, hex nut, lock washer, and coupler as shown. Tighten the nuts against each other, ensuring that the idler bracket is able to freely rotate.



You're now ready to mate the idler assembly (and attached lid) to the platform. Apply a mower wheel bolt through the 1/2" hole in the top of the platform. (Note: If the bolt is too long, it may require cutting with a hacksaw. Recommended length of this bolt is 1-3/4".) Mate the bolt through the top of the platform with the vertical idler coupler through the bottom. Patience is required at this step since you will not be able to see inside the unit while performing the attachment. Secure the assembly by threading the top bolt into the coupler. (Caution: The plastic enclosure can be damaged if the top bolt is over-tightened. Do not use tools to tighten the bolt. Use hand-force only.)



You should now prepare a 6" mower wheel for idler attachment. Insert a wheel bolt through the wheel bore and apply 3/8" flat washer, hex nut, and lock nut as shown. Thread the wheel bolt (with attached wheel) into one end of the horizontal idler coupler.

Prepare the second 6" mower wheel as described and thread it into the opposite end of the idler coupler.



The photo above shows the completed idler unit with attached wheels.