Manipulators

Givens Engineering Inc
London Ontario

Manufactured in Canada and United States

Givens Lifting Systems Inc
Toledo Ohio
Industrial manipulators are pneumatically-balanced manual lift assists. They allow an operator to lift and position a part as if it were an extension of his/her hands.

**Manipulators are the high-speed, high-performance manual material-handling solution.**

Manipulators render the load virtually weightless from the point of view of the operator. Normally, there are no up/down pushbuttons. The operator can concentrate on moving the load quickly without pressing buttons.

Unlike a crane, a manipulator is able to support a load that is offset from the axis of the end effector.

**End Effectors**

No manipulator is complete without an end effector. The end effector consists of handlebars, gripper and rotation components. The cost of the end effector is roughly equal to the cost of the manipulator arm.

While the manipulator arm is stocked on the shelf, the end effector must be custom-designed for the part to be lifted.

**However, we mass-manufacture and stock end effector** components, such as handlebars, grippers, bearing assemblies, and rotation units, all of which have been previously researched and tested.
Manipulators....

- Can reach into enclosed spaces (such as a vehicle)
- Can reach under obstructions
- Offer greater placement precision than is possible with a crane
- Generally offer faster cycle times than cranes
Manipulator Models

There are 6 basic models of manipulator, named by the moment capacity at Axis 1 (the “shoulder”).

<table>
<thead>
<tr>
<th>Manipulator Model</th>
<th>Maximum Moment Axis #1</th>
<th>Payload (End Effector + Part)</th>
<th>Reach (Axis #1 to mEE+PART)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA5</td>
<td>15000 in*lbs</td>
<td>120 lbs</td>
<td>6-8 ft</td>
</tr>
<tr>
<td>M25</td>
<td>25000 in*lbs</td>
<td>150 lbs</td>
<td>8-10 ft</td>
</tr>
<tr>
<td>M35</td>
<td>35000 in*lbs</td>
<td>150 lbs</td>
<td>9-11 ft</td>
</tr>
<tr>
<td>M60</td>
<td>60000 in*lbs</td>
<td>330 lbs</td>
<td>9-11 ft</td>
</tr>
<tr>
<td>M120</td>
<td>120000 in*lbs</td>
<td>770 lbs</td>
<td>10-12 ft</td>
</tr>
<tr>
<td>M200</td>
<td>200000 in*lbs</td>
<td>1200 lbs</td>
<td>11-14 ft</td>
</tr>
</tbody>
</table>

The lengths for Arm 1 and Arm2 increase in increments of 10”.

Both arms are typically available on-the-shelf in sizes:

- 50"
- 60"
- 70"
- 80"
- 90"

The Typical Application, not Definitive:

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- Roll-handler end effector above, with roll mandrel, 90 degree rotate, and vertically sliding handlebars. Controls are 100% pneumatic.
Manipulator Models Photos

TA5 equipped with a tooling gripper

M25 with a custom Arm 2 and an end effector for gripping cutters in a machining center

M35 floating a car door

M35 with 90° degree tilt roll handler

M60 gripping a truck component

M120 with a very long reach
AutoBalance

Manipulators have offered the fastest, smoothest material-handling solution available. But traditionally, they are only able to balance one or two weights without changing settings. **AutoBalance** (patented) is a feature that solves this problem by automatically “memorizing” the weight while lifting the load. It is all-pneumatic. **AutoBalance** is a revolutionary technological advance in manipulator control that automatically balances a succession of loads of unknown weights. The operator has no up/down pushbuttons; as the handlebars are pulled up and down, the balance point rises and falls on-the-fly!

**AutoBalance** also has the effect of assisting the operator in overcoming the inertia of the load and the arm. In the largest manipulators, the M120 and M200, **AutoBalance** is routinely added even if there is only one load.

Manipulators at Work

Handlebars equipped with AutoBalance

**Turbine assembly with an M120**

**Forging manipulator**

**Installing tires directly on the truck**

**Engine cradle floats and pivots to mate to engine**
The Brake Press Manipulator uses a very specialized end effector (patented), that can follow the movement of a plate or sheet that is being formed in a brake press. As the ram descends, the plate rises through an angle while the grippers passively comply with the travel. The brake press manipulator allows a single operator to perform operations that would normally require 2 workers. Typically the sheet is turned over 180 degrees in the process of forming.
Givens Engineering, established in 1993, provides manipulators, cranes and custom machinery to a wide range of customers in the United States, Canada and beyond.

Almost everything we manufacture is customized and engineered to some extent.

We employ engineers (mechanical and electrical), designers, machinists, millwrights, welders, electricians and controls specialists to manufacture cranes, manipulators, grippers and end effectors entirely in-house.

Installation, startup support, maintenance and annual inspections are services that we routinely provide.

We have supplied equipment to these large organizations:

Toyota, Honda, GM, Chrysler, Magna, International Truck, Hino Truck, GE, Volvo, NASA, TRW, Dana, GKN, Siemens, Kaiser and many others.