Manipulators

GIVENS
ENGINEERING INC
London Ontario

Manufactured in Canada and United States

GIVENS
LIFTING SYSTEMS INC
Toledo Ohio

Industrial Manipulators

M35 Manipulator with end effector for gripping an auto chassis component

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 effector for engine blocks with 180 rotation

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.

M35 carries an auto sidebody with an end effector that grips and tilts

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

An M120 floats a truck instrument panel into the cab

Four M60 manipulators with custom arms for a low-profile configuration

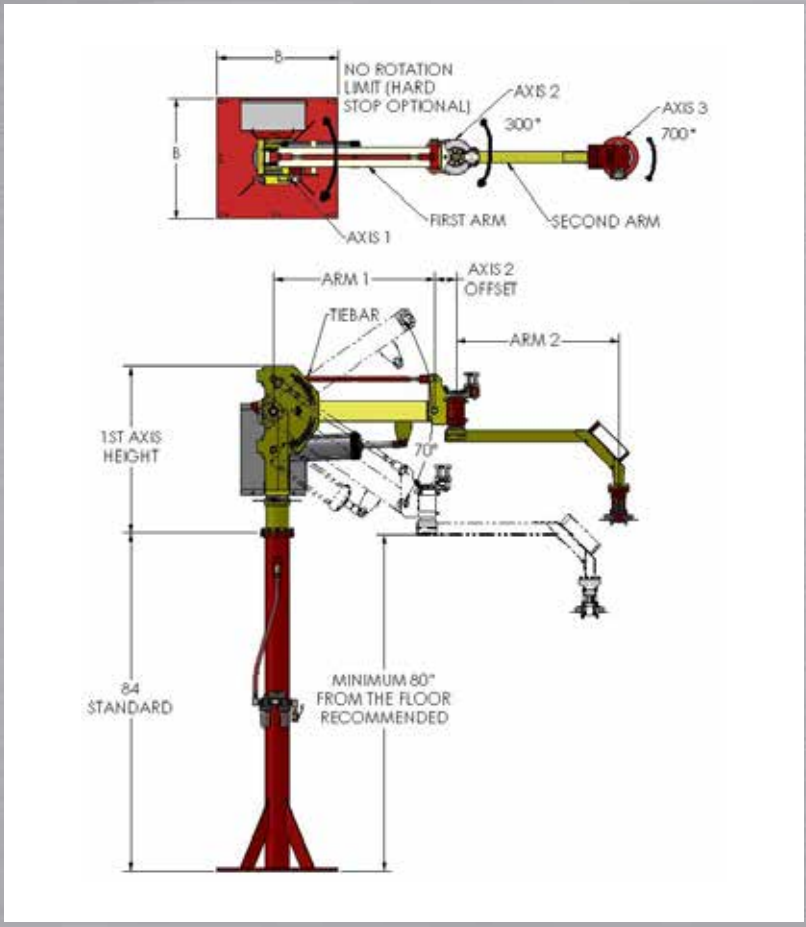
M35 hanging from a Cantilevered Manipulator Stand (CMS); end effector grips and tilts seat frame.

Manipulator Models

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

		Typical Application, not Definitive	
Manipulator Model	Maximum Moment Axis #1	Payload (End Effector + Part)	Reach (Axis #1 to mEE+PART)
TA5	15000 in*lbs	120 lbs	6-8 ft
M25	25000 in*lbs	150 lbs	8-10 ft
M35	35000 in*lbs	150 lbs	9-11 ft
M60	60000 in*lbs	330 lbs	9-11 ft
M120	120000 in*lbs	770 lbs	10-12 ft
M200	200000 in*lbs	1200 lbs	11-14 ft

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"

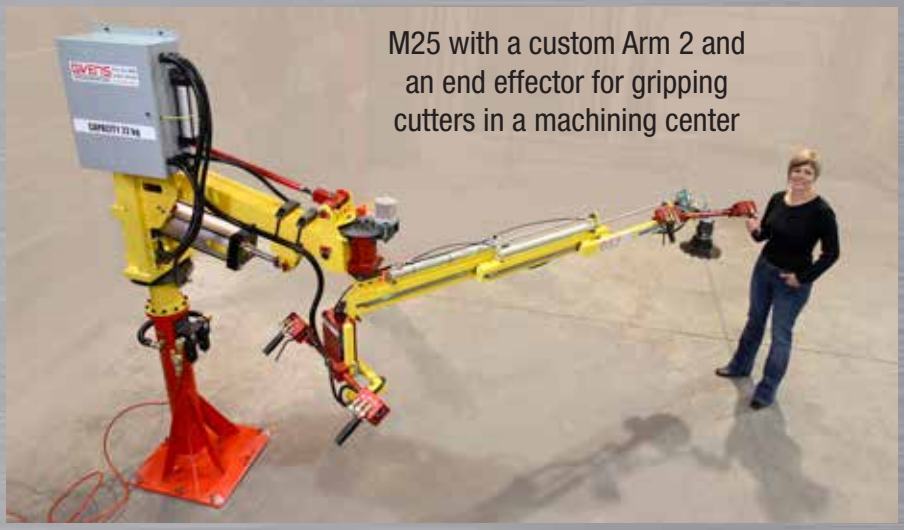


Model	Baseplate Size 'B'	1st Axis Height	Axis 2 Offset
TA5	20" x 20"	NA	4.125"
M25/M35	30" x 30"	41"	5"
M60	38" x 38"	42"	5.25"
M120	48" x 48"	43"	7.375"
M200	48" x 48"	43"	8.25"

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!

Handlebars equipped with AutoBalance

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

Turbine assembly with an M120

Forging manipulator

Installing tires directly on the truck

Engine cradle floats and pivots to mate to engine

Brake Press Manipulators

Brake Press Manipulator turns a 10' sheet 180 degrees

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.

Specially-mounted Manipulators

M60 mounted on a crane to allow far greater travel

2 M35s mounted on a frame

Manipulator mounted on an extra-tall column

M120 mounted on a forkliftable heavy base for mobility

M120 at NASA at
Kennedy Space Center

M60 with
Instrument Panel

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.

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