Manipulators

Manipulators are singularly the most versatile pieces of equipment directly associated with automatic welding. They can be designed to duplicate the same procedure without variation as well as weld sequentially different procedures on the same weldment. A manipulator performs these functions on a distance and weight scale that man alone cannot achieve. It provides a consistency and accuracy by bringing the welding head to the weldment. Manipulators can be adapted to operate in plate and pipe applications as well as plate burning, painting and air carbon arc gouging.

Red-D-Arc rents and leases manipulators that can duplicate the functions of a highly-skilled welder... only better and with more consistency. Each manipulator can be customized for specific applications like simple straight-line or circumferential welding. The ram ends can be outfitted with small I.D. single- or multiple-arc automatic welding heads for long seam and circumferential welding. Custom designs are available for long reach and heavy loads. All manipulators are available as pedestal mounted, motorized- or fixed-base machines and can be mounted on a free-standing base or motorized travel-carriage for mobility.

### Benefits of Manipulators

- 360 degree mast rotation
- Speeds welding operations
- Cost efficient, easy to operate
- Eliminates the fatigue of hand operations
- Ideal for fabrication or maintenance applications
- Available as free-standing, self-supported fixture or mounted on a mobile carriage and track
- Controls include up/down, in/out travel switch, speed potentiometer and variable-speed carriage travel
- Welding controls include current, voltage, wire speed, start/stop weld, manual cross-seam adjustment, in/out adjustment of electrode and cylinder switch
- Precise x-ray quality welds free from undercut and slag inclusion
- Power source platform and all cables are optional. No special power source required.
- Complete with reliable Red-D-Arc submerged-arc equipment

### Models & Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Vertical Travel</th>
<th>Horizontal Travel</th>
<th>Motor Lift</th>
<th>Base Car</th>
<th>Bolt Circle</th>
<th>X</th>
<th>Y</th>
<th>Travel Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA-44LD</td>
<td>4 ft.</td>
<td>4 ft.</td>
<td>1/4</td>
<td>1/4 or manual</td>
<td>---</td>
<td>97&quot;</td>
<td>6' 6&quot;</td>
<td>Standard</td>
</tr>
<tr>
<td>MA-66LD</td>
<td>6 ft.</td>
<td>6 ft.</td>
<td>1/4</td>
<td>1/4 or manual</td>
<td>---</td>
<td>121&quot;</td>
<td>8' 6&quot;</td>
<td>Standard</td>
</tr>
<tr>
<td>MA-99MD</td>
<td>9 ft.</td>
<td>9 ft.</td>
<td>1/2</td>
<td>1/2</td>
<td>13&quot;</td>
<td>157&quot;</td>
<td>12' 0&quot;</td>
<td>Optional</td>
</tr>
<tr>
<td>MA-1212HD</td>
<td>12 ft.</td>
<td>12 ft.</td>
<td>3/4</td>
<td>3/4</td>
<td>22-1/8&quot;</td>
<td>205&quot;</td>
<td>16' 0&quot;</td>
<td>Optional</td>
</tr>
</tbody>
</table>

Red-D-Arc Welderentals, an Airgas company, is North America’s leading provider of rental welding products and services, with over 30,000 units in a fleet that includes welders, welding positioners and other welding related equipment, for almost any type of welding process and application.

**Positioners**

- **Positioners**
- **Turning Rolls**
- **Submerged-Arc Equipment**

North America’s Largest Fleet of Welding and Positioning Equipment

[reddarc.com](http://reddarc.com)
Rental Centers Across North America

Selecting the Proper Positioner

1. Drivers and idlers should all be of the same make, style and wheel diameter.
2. Install drivers and idlers on a smooth, level, hard floor and preferably on a flat plate steel.
3. Obtain the best possible alignment during setup.
4. Do not anchor the drive and idler to the floor. Let them "float" into best alignment.
5. Use as few idlers as possible to support the load. Multiple idlers absorb power.
6. Always use the closest wheel-spacing possible that will safely handle the load and provide sufficient traction.

Calculating Turning Roll Capacity Requirements

Rotational Torque Calculation

1. Determine the total load of the work piece, including fixtures.
2. Calculate the load center of gravity distance (LOAD C.G.) in inches from the work piece center, including fixtures.
3. Add inherent overhang distances (RH.O.H) in steps 2.
4. Multiply information from step 1 times the sum of step 2 and step 3 to determine the required torque.
5. Compare the required torque with the rated torque from the above table.
6. Select a positioner with a torque rating equal, or greater than, the required torque.

<table>
<thead>
<tr>
<th>Module Available</th>
<th>Load-Carrying Capacity (LB)</th>
<th>Load-Turning Capacity (DRIVE ROLL)</th>
<th>Diameter Range</th>
<th>Roller Speed</th>
<th>Motor HP</th>
<th>Tractive Roller</th>
<th>ROLLER TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDRS-1000</td>
<td>24 ton (50,000 lb)</td>
<td>48 ton (100,000 lb)</td>
<td>6&quot; to 12&quot;</td>
<td>1.4 - 41 (PM)</td>
<td>1/2</td>
<td>rubber</td>
<td></td>
</tr>
<tr>
<td>TDRS-2000</td>
<td>30 ton (60,000 lb)</td>
<td>60 ton (120,000 lb)</td>
<td>6&quot; to 14&quot;</td>
<td>1.9 - 42 (PM)</td>
<td>1.5</td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>TDRS-2500</td>
<td>36 ton (75,000 lb)</td>
<td>72 ton (145,000 lb)</td>
<td>6&quot; to 18&quot;</td>
<td>2.6 - 46 (PM)</td>
<td>2</td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>TDRS-3000</td>
<td>42 ton (90,000 lb)</td>
<td>84 ton (175,000 lb)</td>
<td>6&quot; to 21&quot;</td>
<td>3.8 - 47 (PM)</td>
<td>2.4</td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>TDRS-3500</td>
<td>48 ton (100,000 lb)</td>
<td>96 ton (200,000 lb)</td>
<td>6&quot; to 24&quot;</td>
<td>4.9 - 48 (PM)</td>
<td>3</td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>TDRS-4000</td>
<td>54 ton (110,000 lb)</td>
<td>108 ton (225,000 lb)</td>
<td>6&quot; to 27&quot;</td>
<td>6.0 - 49 (PM)</td>
<td>3.6</td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>TDRS-4500</td>
<td>60 ton (120,000 lb)</td>
<td>120 ton (245,000 lb)</td>
<td>6&quot; to 30&quot;</td>
<td>7.0 - 50 (PM)</td>
<td>4.2</td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>TDRS-5000</td>
<td>66 ton (135,000 lb)</td>
<td>132 ton (270,000 lb)</td>
<td>6&quot; to 33&quot;</td>
<td>8.0 - 51 (PM)</td>
<td>4.8</td>
<td>steel</td>
<td></td>
</tr>
<tr>
<td>TDRS-5500</td>
<td>72 ton (150,000 lb)</td>
<td>144 ton (285,000 lb)</td>
<td>6&quot; to 36&quot;</td>
<td>9.0 - 52 (PM)</td>
<td>5.4</td>
<td>steel</td>
<td></td>
</tr>
</tbody>
</table>
Calculating Turning Roll Capacity Requirements

**Rated Load-CARRYING Capacity of Turning Rolls**

Since the load CARRYING capacity used in this procedure is equal to the total turning moment of the load, and the total turning moment is the load CARRYING capacity times the radius of the turning roll, the total turning moment is equal to the product of the load CARRYING capacity and the turning roll radius.

**Rated Load-TURNING Capacity of Turning Rolls**

A load roll is rated by its load CARRYING capacity, and the load TURNTIENT capacity is equal to the product of the load CARRYING capacity and the radius of the turning roll.

### Turning Roll Sets

- Designed and constructed to provide safe and dependable operation.
- Rubber-tired models are definitely absorb shock during loading and cushion the load during welding. A steel overload-disc (on larger models) protects the rubber tires from excessive overloads.
- The final-drive gearcase is totally enclosed and constructed of steel and aluminum to provide maximum safety, durability, and reliability.

### Turning Roll Alignment

- The load CARRYING capacity used is one and one-half times the load TURNTIENT capacity.
- The total turning moment of the load is equal to the load CARRYING capacity times the radius of the turning roll.
- The total turning moment is the load CARRYING capacity times the radius of the turning roll.
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<tr>
<th>MODELS AVAILABLE</th>
<th>VERTICAL TRAVEL</th>
<th>HORIZONTAL TRAVEL</th>
<th>MOTOR HP LIFT</th>
<th>RAM 1/4 or manual</th>
<th>BOLT CIRCLE BASE</th>
<th>X 12’ 1’’</th>
<th>Y 15’ 9’’</th>
<th>TRAVEL CAR 16’ 0’’</th>
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- Power source platform and all cables are optional. No special power source required.
- Complete with reliable Red-D-Arc submerged-arc equipment
- Optional travel cars with track, NA3 automatic welding-heads, flux-recovery systems and DC600, AC1250 and DC1500 power sources are available with all our manipulators

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