

Case Study - Aircraft OEM



The use of heavy compression riveting tools is a typical requirement of most aerospace manufacturing. Many riveting tools are used overhead or in awkward postures that place stress on the user and compromise precision. As a result, areas where riveting is performed often have high injury rates, lower than necessary productivity and incidents of tool damage.



The zeroG® from Equipois is a patented, proven solution for riveting that eliminates the weight of the tool while still allowing them to perform the task effectively. zeroG® systems have provided significant costs savings to many of the largest manufacturing companies in the world. Satisfied users include companies such as Bombardier, Boeing, Spirit AeroSystems and Airbus. As a result of their success, many zeroG® customers have gone on to implement the technology as a best practice.

Project ROI Summary

Total Cost Savings	\$54,000
Less Depreciation	- \$3,000
Less Annual Maintenance	- \$250
Total Net Savings	\$ 50,750
Total zeroG Acquisition Cost	\$ 12,000
ROI	423%
Payback Period	0.24 years

A major manufacturer of commercial aircraft had two injuries directly attributed to the use of rivet squeezers over a 12 month period, one of which resulted in an employee being placed on restricted duty.

zeroG® reduced their injury rate to zero while allowing operators the full freedom of motion they required to perform their job efficiently. Trip hazards were eliminated by running air hoses through the zeroG® arm cavity.

"I only wish I could have had one of these systems earlier in my career. It has completely changed my job." – End User

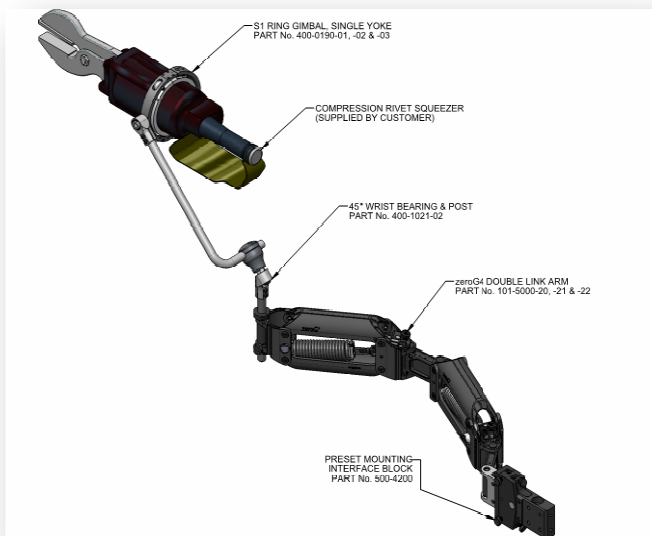
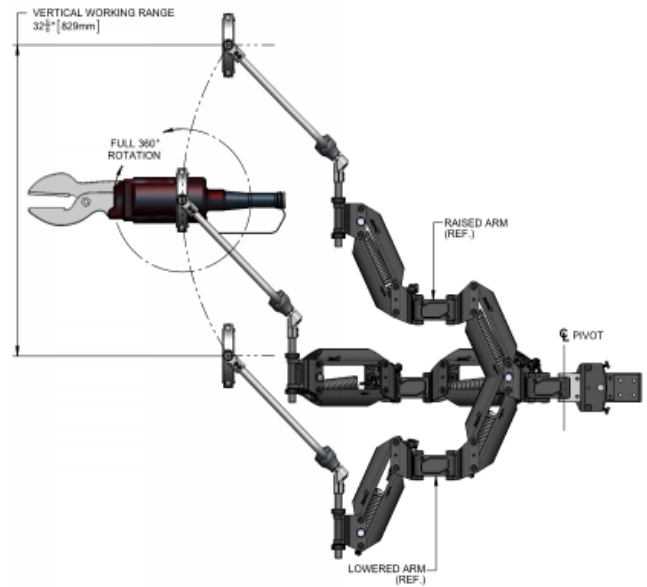
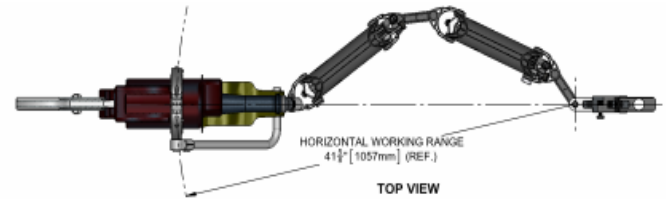
Return-on-Investment

- **Injury Costs.** Primary benefits include the reduction of operator fatigue and strain injuries. For a typical shoulder injury, the direct medical costs alone can exceed US\$20,000. After adding the indirect costs associated with lost time, retraining, etc., costs can easily exceed US\$40,000 for a single injury.
- **Tool & Part Damage.** Riveting tools are often damaged during usage. Damage often occurs when they are dropped due to their heavy weight or lack of grip location. Tool damage can run in the hundreds or even thousands of dollars, while damage to customer parts can run in to the tens of thousands of dollars.
- **Quality.** The need to support a heavy tool compromises precision. zeroG® allows workers to utilize their fine motor skills to be more accurate. Accordingly, zeroG® can help improve the quality where it is utilized. A reduction in the number of rejected parts is a common occurrence with zeroG® systems.
- **Employee Satisfaction.** Riveting is often a task that is overlooked from an ergonomic point of view. Customers using zeroG® systems have seen immediate improvements in employee satisfaction. In some cases, users have been able to return restricted duty employees to work by using zeroG®.

zeroG® Standard Solution

- zeroG Arm: zeroG4 Double Link Arm suitable for payloads 8 lbs to 36 lbs (2.72 kg to 16.33 kg) - Part Number 101-5000-21 (RH Centering), -22 (LH Centering) or -20 (No Centering)
 - Standard Disposable Polycy Double Link Arm Cover – Part Number 300-2100
 - Docking Kit for securing the tool and arm when not in use – Part Number 400-6200-02
- Gimbal and Post System: S1 Ring Gimbal with 45 Degree Wrist Bearing and Post Kit for approved riveters – S1 Ring Gimbals – Part Number 400-0190-01 (Large); -02 (Medium); & -03 (Small) & Post Kit – Part Number 400-1021-02. Both Top Mount and Underslung orientations available (Top Mount shown)
- Mounting Solutions: Both fixed and portable mounting solution options are available (see Mounting Solutions data sheets):
 - Fixed Mount 2-Axis Pre-Set Interface Mounting Block – Part Number 500-4200 (shown in this document)
 - Fixed mount Linear Rail System with 80/20 post to mount zeroG system to wall or fixture –Part Numbers 500-5710-72, -96 or -144 (72, 96 or 144 inch rail)
 - Portable Gantry System with top mounted linear rail –Part Numbers 500-5420-72, -96 or -144 (72, 96 or 144 inch rail)
 - Portable zeroG4 Quad Stand – Part Number 500-5520

Standard Reach Drawings



Approved Tools List

- Alligator squeezes, C-Yoke squeezes and others from the following manufacturers:
- Chicago Pneumatic (Atlas Copco)
- Reliable Tools Company (RTC)
- U.S. Tools