

Ingersoll-Rand®

Assembly Solutions



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IR Zimmerman Ergonomic Handling Systems

Take full advantage of IR Assembly Solutions capabilities, and review our complete catalog of ergonomic handling systems (Form MHD55226), covering:

- Rail systems
- Jib cranes
- Balancers
- Intelligent lifting devices
- Arm systems
- Handling devices and solutions
- Torque reaction products
- Electric chain hoists



Introduction

Production processes throughout industry are changing rapidly. Tolerances have tightened. The quest for efficiency brings almost constant reexamination in the best use of resources. Accuracy and precision in assembly and fastening operations have taken on new significance. These considerations are fast becoming the critical measure of product quality in a super-competitive global marketplace.

Likewise, assembly technicians today are the key factors in ultimate product quality – men and women who depend on resources that encourage and maximize the skills that they bring to their tasks. Today's assembly technicians deserve tools that contribute to quality of performance...and quality of life.

As a major worldwide supplier of assembly tools, systems, and accessories, Ingersoll-Rand is a valuable technology resource for your business. The Ingersoll-Rand assembly tool line covers virtually every application in the plant facility, from the most basic drill...to award winning angle wrenches with precision torque control and electronic interfaces.

But there is more to today's assembly function than the tools of the trade. Ingersoll-Rand is also an information resource for your business. By encouraging a complete review of the complex issues surrounding a rapidly changing marketplace, IR can assist in more effective and productive workplace configurations, as well as tool selections. For this reason, each section of this catalog begins with helpful details that should make easier, better choices.

Your selection and purchase of assembly tools has a direct effect on process and product quality. Your decision can make a difference in improved efficiency, and in properly tightened fasteners. The real cost of assembly tools reflects the following considerations:

Cost of acquisition

- Purchase price, as well as installation costs

Cost of operation

- Power consumption
- Training for operators and service technicians
- Positive vs. negative ergonomics and safety factors
- Frequency of repair and time requirements
- Inventory of spare tools, replacement parts, and service parts

Cost of related equipment

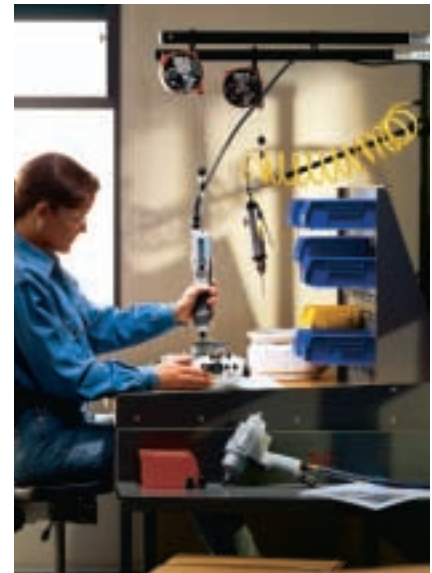
- Equipment specific to the tools of one manufacturer

Cost of quality

- Quality control audit procedures
- Correction of improperly tightened fasteners
- Warranty claims
- Loyalty of satisfied customers vs. long-term effects of lost customers

Cost of salvage

- Residual value of a tool or components



Some of these considerations may seem obvious, while others are often difficult to identify...or quantify. All contribute to the total cost of precision fastening. All reflect the new significance of assembly operations and processes.

On the following page, The Forces at Work explores related issues of rising importance throughout industrial production – the relationship between performance factors and human factors. Whatever the consideration, you can rely on your Ingersoll-Rand representative or distributor for expert consultation, as well as superior products.

The Forces at Work

“Highly sophisticated, mechanical products subject to rigid requirements of standardization and interchangeability.” This is how a recognized industry authority described threaded fasteners. This is not a reference to advanced equipment designed for fastening or measurement functions, but a definition of the seemingly simple screws, bolts, and nuts on which the process is based.



Imagine the additional impact of precise fastening requirements and evaluation:

- Clamp loads and fastener tension
- Hard draw versus soft draw joints
- Stress and strain curves
- Yield points
- Bolt signatures and appropriate fastening methods

All of these issues are addressed in the product sections which follow, and also in related materials available from Ingersoll-Rand. They represent the specification performance aspect of fastening and assembly.

A very different, yet equally important set of forces is also at work. They represent the human factors, or ergonomics – a widely and often too casually used term that describes the interaction of task, tool, and tool user.

Every **task** in fastening and assembly is different. The size, the shape, the tolerance of the workpiece. The setting, the positioning, the process in the workplace.

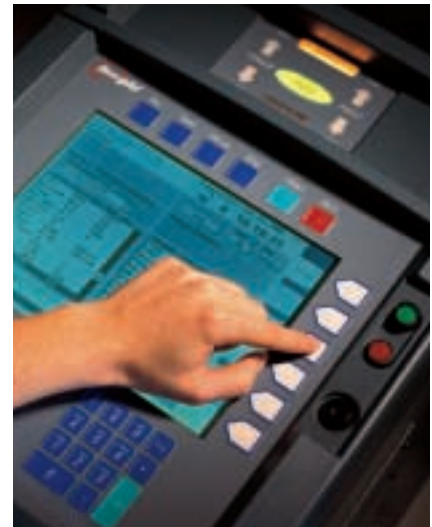
Tool users represent varying degrees of size and strength. They are tall. Small. Male. Female. Hand sizes, grip forces, and natural movements reflect a wide range of proportions.

The **tool** is the link.

Ingersoll-Rand considers this human performance aspect an essential element in all of its new product development activity in power tools. All of our recent and new designs reflect the extensive input of assembly technicians and production managers, as well as plant health and safety experts.

There are many forces at work in the dynamic field of fastening and assembly. Critical tolerance joints. Standards of consistency for product quality and safety. Specification performance. Human performance.

IR Assembly Solutions address the interaction of task, tool, and tool user... with a unique fusion of ergonomics and performance.



High Performance Ergonomics

User-oriented design with a difference you can measure.

What distinguishes an ergonomically correct or enhanced tool from a pretender? How can you recognize form and function rather than mere cosmetics? Ingersoll-Rand has translated the linkage of tool, task, and tool user into a quantifiable factor of productivity improvement – a concept called High Performance Ergonomics. It means more than just bringing performance and ergonomics together. It means bringing them to a whole new level.



™

High Performance Ergonomics

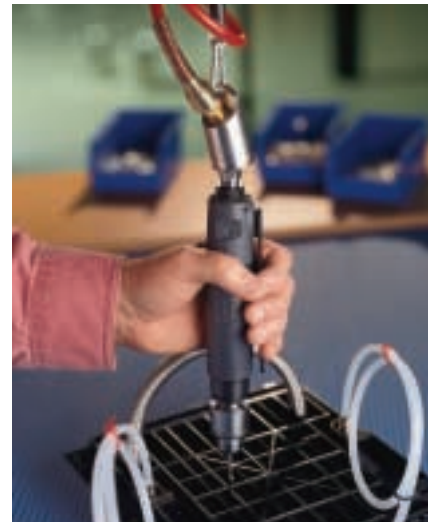
Our new Q2 Series of air fastening tools and drills is a perfect example. Every angle, every feature of the tools has been designed with the user in mind – from shape to feel to control. This focus on real-world user input means that your operators can work longer comfortably, while reducing lost-time injuries and improving productivity and quality.

The Q2 Series tools incorporate...

- Compact size
- Lightweight
- Even balance
- Two-finger triggers and contoured levers for reduced stress and greater distribution of grip force
- Low-force forward/reverse controls.



But in the right hands, ergonomics means more than just comfort. While the carefully conceived external design of the Q2 Series provides the handling and balance necessary for control and quality, the uniquely engineered Q2 Series clutch delivers exceptional accuracy and consistency. Which means cycle #1 is exactly the same as cycle #65,345, which is exactly the same as cycle #1,000,843. And more efficient, high-output motors deliver greater torque at any given speed than competitive models, so your operators can cover more applications with fewer tools.



Ergonomics Technologies Corporation, an independent firm advising a wide range of industries on workplace issues worldwide, has assessed the new Q2 Series, along with competitive products. Their evaluation involved tests for torque reaction, muscle effort, temperature conductivity of tool handles, total work performed, and an in-depth review of design details. They combined this analysis with actual on-site workplace subject testing and interviews, to add still more objective and subjective data to the findings. The comprehensive results then produced an overall ergonomic index.

The Ingersoll-Rand Q2 Series tools achieved the highest ergonomic index for all configurations tested...pistol, straight and angle fastening tools, as well as pistol-grip drills. These results, coupled with substantial functional advancements



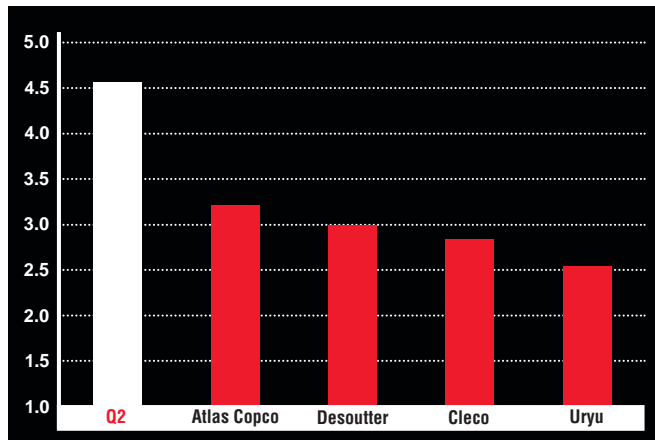
in precision, speed, and durability, demonstrate the class-leading value of the Q2 Series. High Performance Ergonomics – superior design with a difference.

IR offers ETC's objective ergonomics evaluation, training, and consulting services to customers, as one aspect of our High Performance Ergonomics Solutions initiative. It can be as simple and specific as a workplace evaluation or custom training module. Or as extensive as an assembly process redesign. And IR can offer complementary products from our growing portfolio for a comprehensive solution – including IR Zimmerman ergonomic handling systems, and more.

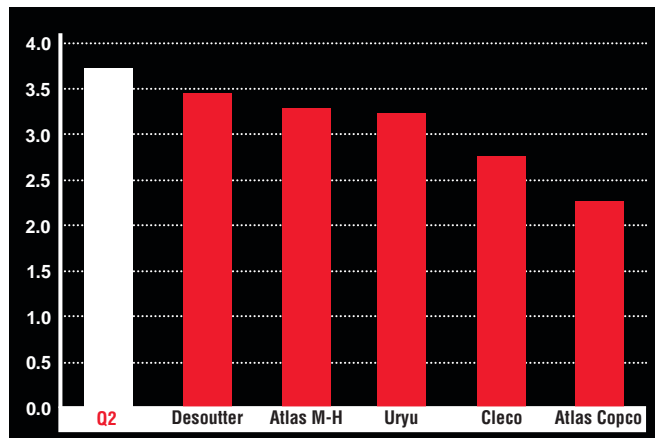
This focus on user-oriented design and workplace productivity is nothing new for IR. We've earned five prestigious IDEA awards for excellence in product design from the Industrial Designers Society of America and *Business Week* magazine, for our Cyclone finishing tools, 2131 and 2080 impact wrenches, D Series fastening tools, and now, our Q2 Series tools. This recognition is a reflection of our drive to help you improve the quality of your products and processes. And our total range of solutions – coupled with new asset management software, analysis tools, and other interface options – will help you measure the difference we can make.



Q2 Series Angle Nutrunner Ergonomic Index



Q2 Series Pistol Screwdriver Ergonomic Index



Detailed results of ergonomics evaluations are available from your IR representative.

TouchSync™ Asset Management System

TouchSync tracks your tools and other critical assets with a comprehensive, yet entirely portable solution!

The TouchSync System from Ingersoll-Rand is a convenient, efficient method to monitor and manage your valuable investments in tools and other performance-critical assets. Its memory chip technology enables data storage in two places — on the tool or asset itself, and in a database. The fast easy-to-use probe provides synchronization between the computer and the asset. This unique capability makes TouchSync entirely portable, storing real-time data on the tool or other asset on a continuous basis, and creating a permanent record that moves from line-to-line, facility-to-facility. This data collection feature is integrated into the design of the new Ingersoll-Rand Q2 Series assembly tools, and will be available for retrofit to other products in late 2001. It's a whole new way to gain control of your processes, with accurate information always readily available.

TouchSync Capabilities

The TouchSync System provides tracking on purchase information, asset location, calibration records, and service histories for your inventory. It enables you to effectively address issues such as return on assets and production capacity, as well as maintenance requirements and procedures. It operates with any computer using Windows 95, 98, NT, or 2000, equipped with a serial communications port and CD-ROM drive. The system presents seven easy-to-read screens for the purpose of transferring and displaying information.



TouchSync System Elements

The TouchSync System includes the following elements, for a quick, easy solution to asset management challenges:

Software

- Ready for your use in a standard PC-compatible format.

Probe

- Provides the link to your chip-equipped tools or other products. Red/green indicator lights on the computer screen serve as visual cues while data is being read and displayed. Also includes RJ-11 connector for serial port adapter.

Serial Port Adapter

- Provides the link to a portable computer for data input and database storage.

AC Power Adapter

- Powers the TouchSync System when data is being added to the chip on your tools or other products.

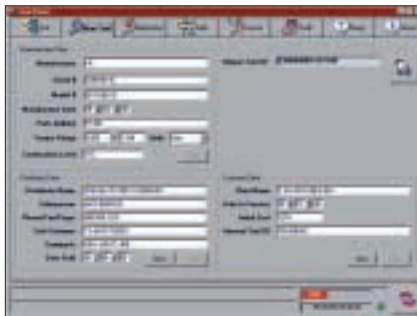


Query

- This feature allows the user to construct and perform a database search, based on a logical selection of parameters with up to three levels of criteria. Once the tools or assets with the specified criteria have been found, reports may be printed. Example: Find all tools with a calibration date between 5/5/00 and 5/5/01.

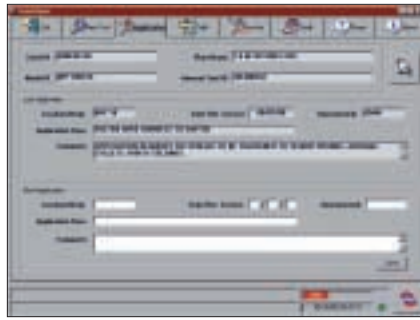
About

- Displays the initial screen for the purpose of selecting language (English, Spanish, French, German, or Italian), the date format, the serial communications and the adapter style.



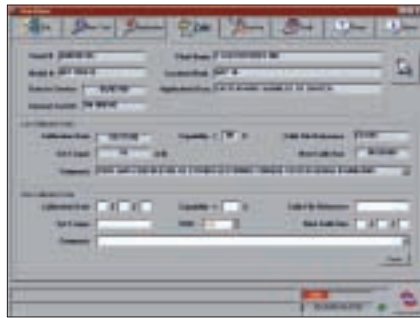
New Tool

- This function performs one-time tool memory programming in three sections – Manufacturer's Data (programmed at time of production for Q2 tools, or by first user for other retrofit products), Distributor Data, and Customer Data, involving information to be entered before the tool or asset is placed into use. While the Distributor and Customer data are changeable, the Manufacturer data is a permanent record.



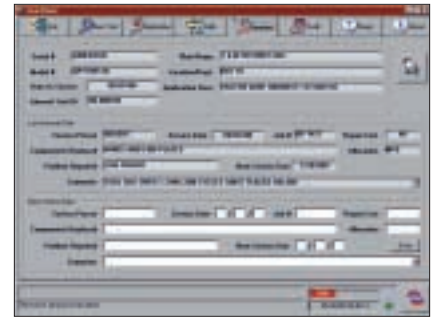
Application

- Allows the user to enter location and operator data into the tool or asset, as well as the database, with space for description and comments.



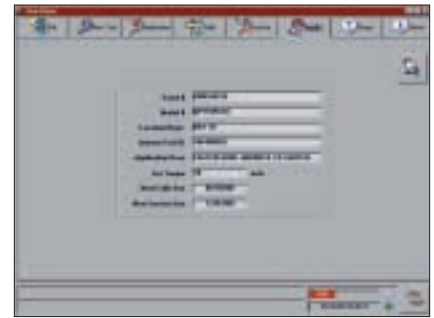
Calibration

- Provides fields for entering calibration parameters, references, and comments, while displaying "old calibration" data.



Service

- This function allows the user to add service data, covering a wide range of details, along with display of "last service" data.



Audit

- Enables user to perform a quick status check of the most recent information stored on the tool. Helpful for checking tool for correct location and application. Calibration and service dates that are past due will be displayed in red.