

# *Fixtured Fastening Systems*



# Because every assembly is critical



Fixtured fastening applications involve more than merely selecting tools from a catalog. They're an intricate matter of linking users, applications, and systems to deliver an uncompromised combination of ergonomics, speed, durability, and accuracy. The solution: Ingersoll Rand Fixtured Fastening Systems.

With Fixtured Fastening Systems from Ingersoll Rand, you get the benefits of our world-class portfolio of tools, controllers, software, and handling devices, backed up by our global team of experts. Whether you need a simple, single-fixtured spindle or a sophisticated set of custom-engineered multi-spindle systems, we offer a full line of solutions that provide superior ergonomics, reduced cycle times, more even clamp loads, and exceptional durability.

Whether your operations are local or across the globe, our worldwide network of Solutions and Customer Centers will support your needs. From joint analysis and system design to complete project management and on-site run-off, Ingersoll Rand delivers the complete solution to meet your requirements, including the after-sales service and support you should expect from a leader in the industry.

## Trusted tools, proven experience

At Ingersoll Rand, we have extensive experience with threaded fastening processes. For more than 100 years, we've worked with many of the world's leading manufacturers in various industries, and we understand the interface between the tool and operator. We know how to leverage the power of ergonomically designed equipment to maximize productivity and inspire progress.

# Ingersoll Rand fastening portfolio

Ingersoll Rand offers a full line of production fastening equipment, including air and electric screwdrivers, nutrunners, drills, riveters, pulse tools, as well as hand-held and multi-spindle fixtured DC nutrunners. Whether you need a solution for a single, specific application or an entire assembly line, you can trust our century of tool design experience to meet your needs.



## FIXTURED FASTENING SYSTEMS

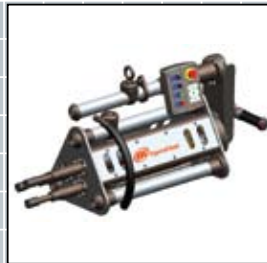
**Vertical**



**Horizontal**



**Rotating horizontal**



### **Custom multiples**

- Custom-engineered solutions
- Specialized fixture design
- Automated stations
- Adjustable bolt centers
- Custom suspensions and reaction systems
- Specialized clamping
- Angle indexing
- Custom displays and HMIs
- Station integration
- Custom attachments

### **Quick multiples**

- Pre-engineered modular designs
- Quick quoting and delivery
- Vertical, horizontal, and rotating horizontal designs
- Up to six DC electric or air spindles per system
- Configurable handle options
- Configurable operator interface module
- Used with world-class QE, QM, and QA spindles, and ICD and M controllers
- Integrated handling devices

*For common applications where off-the-shelf modular components can be quickly and easily configured to meet the job requirements.*

*For more complex applications requiring custom engineering.*



# Quick multiples

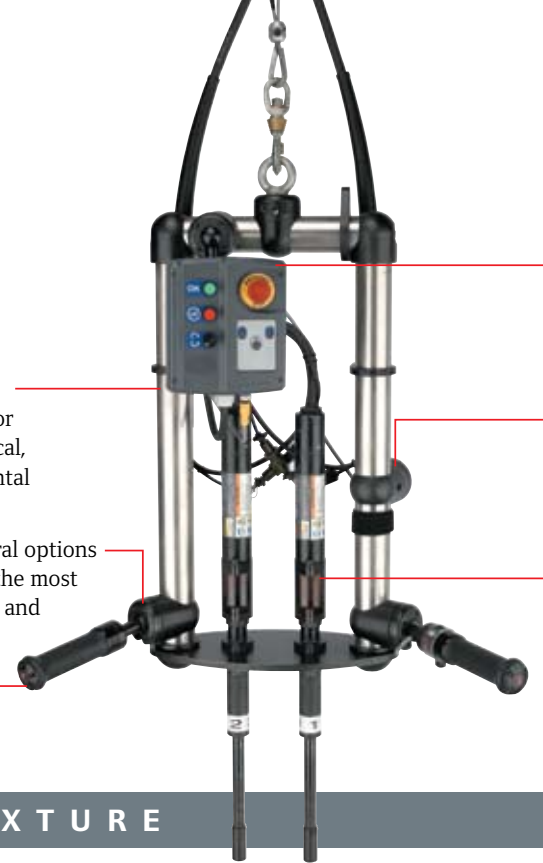
Modular designs, flexible solutions

**Quick multiples** consist of pre-engineered modular component designs that allow quick quoting, manufacture, and delivery of more common fixtured fastening solutions for up to six spindles. Depending on the application, vertical, horizontal, or rotating horizontal systems can be assembled with easily customized handles, displays, fixtures, and integrated handling devices for optimal operator ergonomics and performance.

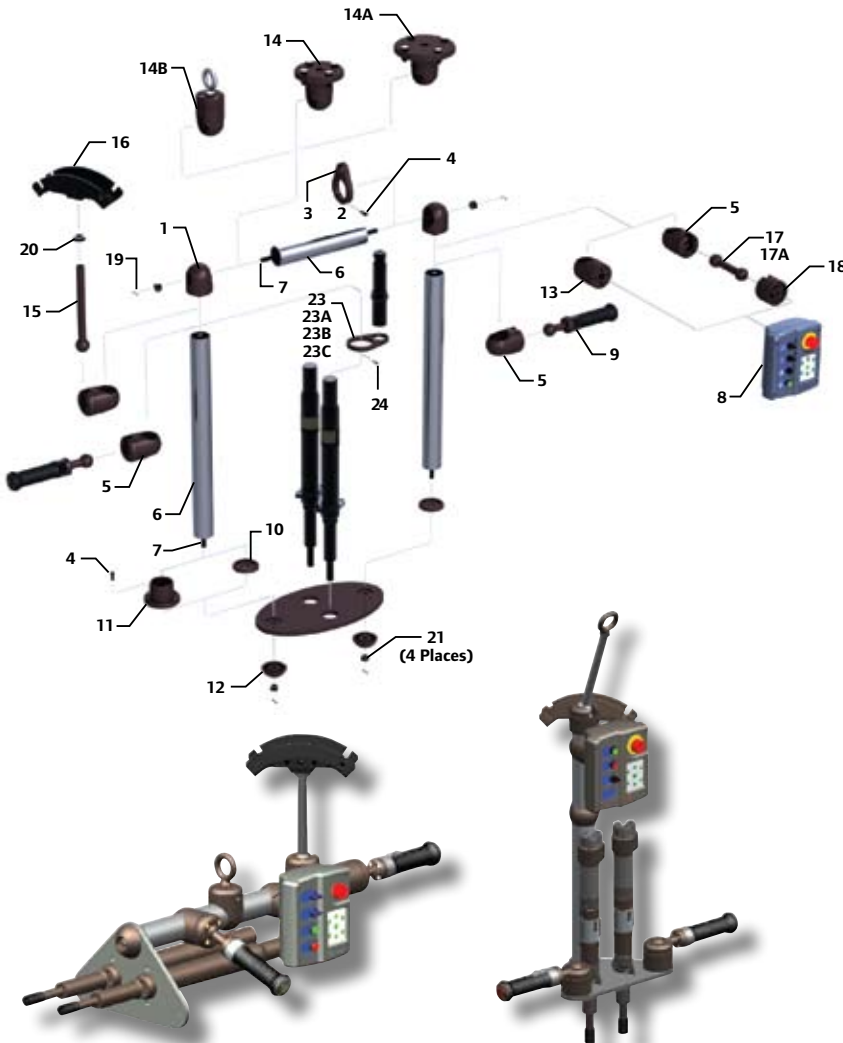
**Modular design** provides for easy customization of open- or closed-frame fixtures in vertical, horizontal, or rotating horizontal configurations.

**Mounts** are available in several options that adjust to give operators the most ergonomic position, visibility, and control possible.

**Handle module** provides multiple switch options based on the application.



## VERTICAL AND HORIZONTAL FIXTURE



| Item                           | Description                    | Part Number |
|--------------------------------|--------------------------------|-------------|
| <b>QUICK MULTIPLE FIXTURES</b> |                                |             |
| 1                              | Tube elbow joint               | QMM-712     |
| 2                              | Redundant eye assembly         | QMM-A463    |
| 3                              | Redundant eye                  | QMM-463-2   |
| 4                              | Cap head screw (M6 x 1 x 6)    | QMM-F1-638  |
| 5                              | Tube holder assembly           | QMM-A30     |
| 6                              | Tube – standard 1M             | QMM-809-1M  |
| 7                              | Tie rod – standard 1M          | QMM-763-1M  |
| 8                              | Interface module               | -           |
| 9                              | Handle module                  | -           |
| 10                             | Tube bracket vertical          | QMMV-601    |
| 11                             | Tube bracket horizontal        | QMM-601     |
| 12                             | Spherical washer               | QMM-248     |
| 13                             | Interface mount assembly       | QMML-A763   |
| 14                             | Suspension joint – 100 Nm      | QMM-TA      |
| 14A                            | Suspension joint – 500 Nm      | QMM-TAA     |
| 14B                            | Suspension joint – eye bolt    | QMM-T       |
| 15                             | Ball end shaft                 | QMM-221-763 |
| 16                             | Cable tray                     | QMM-221     |
| 17                             | Ball to ball shaft – short     | QMM-696-100 |
| 17A                            | Ball to ball shaft – long      | QMM-696-200 |
| 18                             | Flat / tube holder assembly    | QMM-A208    |
| 19                             | Cotter pin                     | QMM-15      |
| 20                             | Lock nut                       | QMM-582     |
| 21                             | Hex nut (M12 x 1.75)           | QMM-H1-638  |
| 22                             | QMM warning label              | QMM-99      |
| 22A                            | QMM branding label             | QMM-301     |
| 23                             | POD mount bracket – tube       | QMM-765-T   |
| 23A                            | POD mount bracket – QM9        | QMM-765-9   |
| 23B                            | POD mount bracket – QM7        | QMM-765-7   |
| 23C                            | POD mount bracket – QM5        | QMM-765-5   |
| 24                             | Cap head screw (M3 x 0.5 x 16) | QMM-765-638 |
| 25                             | Retractable safety strap       | QMM-298     |
| 26                             | Custom mounting plate          | -           |

**Customizable interface** provides the control and feedback you desire. Standard LED display shows individual spindle and master OK/NOK signals.

**Modular design** offers flexibility for easy customization, rapid quotes, and lead-times.

**World-class tools** deliver accuracy and durability to maximize your line's productivity.

- QM and QE Series
- QA4, 6, 8 Series

**Cable tray** provides secure routing path, which keeps cables safe and out of the way, and reduces sharp bends.

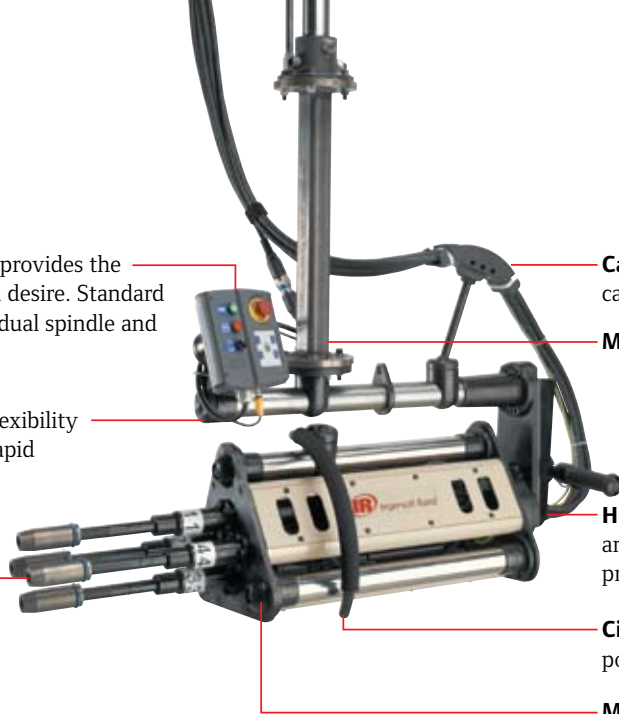
**Multiple suspension and torque reaction** options:

- Balancers
- Torque tubes
- Articulating arms
- Custom devices
- Jib cranes
- Pneumatic suspension

**Heavy-duty bearing** delivers smooth rotation and adjustable stops for up to six spindles and provides for an ideal cable exit.

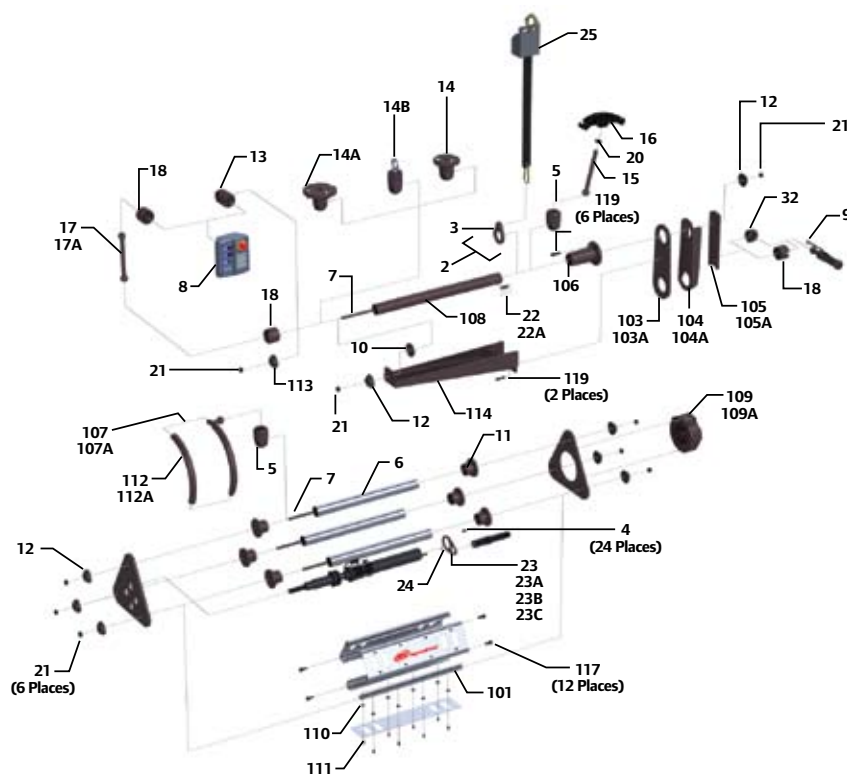
**Circular handle** allows rapid positioning of sockets on bolts.

**Mounting plates** can be quickly and easily machined to the exact job specifications.



## ROTATING HORIZONTAL FIXTURE

| Item                           | Description                     | Part Number |
|--------------------------------|---------------------------------|-------------|
| <b>QUICK MULTIPLE FIXTURES</b> |                                 |             |
| 31                             | Eye bolt (M12 x 1.75)           | QMM-34      |
| 32                             | Plate holder assembly           | QMM-A293    |
| 101                            | Corner spacer – 1 meter         | QMM-93-1M   |
| 103                            | Back plate – small              | QMMR-28C    |
| 103A                           | Back plate – large              | QMMR-28     |
| 104                            | Back plate rib – small          | QMMR-767C   |
| 104A                           | Back plate rib – large          | QMMR-767    |
| 105                            | Back plate – small              | QMMR-756C   |
| 105A                           | Back plate – large              | QMMR-756    |
| 106                            | Suspension tube bracket         | QMM-602     |
| 107                            | Circular handle – small         | QMMR-A48C   |
| 107A                           | Circular handle – large         | QMMR-A48    |
| 108                            | Suspension tube – 1M            | QMM-810-1M  |
| 109                            | Small bearing assembly          | QMMR-A24C   |
| 109A                           | Large bearing assembly          | QMMR-A24    |
| 110                            | Channel nut (M6)                | QMMR-305    |
| 111                            | Button head screw (M6)          | QMMR-638    |
| 112                            | Grip – circular handle – small  | QMMR-144GC  |
| 112A                           | Grip – circular handle – large  | QMMR-144G   |
| 113                            | Tube end cap                    | QMM-202     |
| 114                            | Suspension support              | QMMR-766    |
| 116                            | Cap head screw (M8 x 1.25 x 25) | QMM-T6-638  |
| 117                            | Cap head screw (M10 x 1.5 x 25) | QMM-F8-638  |
| 119                            | Cap head screw (M10 x 1.5 x 35) | QMM-F10-638 |
| 231                            | Cap head screw (M8 x 1.25 x 20) | QMM-T63-638 |



# Customizable to your needs

## Interface module

The Interface's modular design provides for easy customization to meet your needs. The module comes standard with a configurable LED display to match your bolt pattern, an E-Stop switch, label kit, and enclosure assembly, and can be customized with any four of the six additional display and control options to suit the application.

**Modular design** provides flexibility for easy customization.

**Additional options** include:

- Push button
- 2-position switch
- 3-position switch
- 3-position key switch
- Red and green lamps
- Buzzer

**Standard module** includes:

- Enclosure and PCB
- E-Stop, whip cable
- LED display, label kit



Durable metal reinforced composite enclosure.

Standard E-stop.

Standard LED display shows individual and master OK / NOK signal for up to six spindles, and can be organized to match bolt pattern.

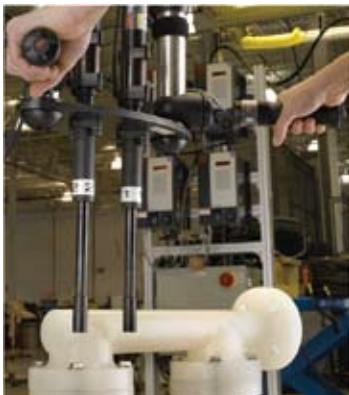
Flexible design provides for panel, tube, or ball joint mounting.

Flexible design allows cable exits from top, bottom, sides, or back of enclosure.

### Interface Module Kits and Options

| Kit                   |               |           |
|-----------------------|---------------|-----------|
| Standard kit          | QMML-A424-Kit |           |
| Interface Options     | Style 1*      | Style 2*  |
| 3-position switch     | QMMC-75-1     | QMMC-75-2 |
| 2-position switch     | QMMC-76-1     | QMMC-72-2 |
| Push button           | QMMC-77-1     | QMMC-77-2 |
| Buzzer                | QMMC-78-1     | QMMC-78-2 |
| Red pilot light       | QMMC-79-1     | QMMC-79-2 |
| Green pilot light     | QMMC-80-1     | QMMC-80-2 |
| 3-position key switch | QMMC-81-1     | QMMC-81-2 |

\*Iddec® \*\*Telemecanique®



### Mounting and Suspension

| Display                  |          |         |          |
|--------------------------|----------|---------|----------|
|                          |          |         |          |
|                          | QMM-A763 | QMM-A30 | QMM-A208 |
| Handle                   |          |         |          |
|                          |          |         |          |
|                          | QMM-A293 | QMM-A30 | QMM-A208 |
| Balancer and Torque Tube |          |         |          |
|                          |          |         |          |
|                          | QMM-T    | QMM-TA  | QMM-TAA  |
|                          | 250 kg   | 250 kg  | 300 kg   |
|                          | -        | 100 Nm  | 500 Nm   |

The modular design allows for a variety of methods to mount operator interfaces and ergonomic equipment including tube, plate, and ball mounting. This intelligent approach gives you the flexibility to easily customize your system for optimal operator ergonomics and system integration.

# Handle module



The **Handle's** modular design provides the flexibility to order exactly what you need for your job. Whether you need to outfit your fixture with trigger or slide-electronic switching, pneumatic control, or only a dead handle, the easy selection chart below provides a shortcut to getting the handle that fits your application.

Actuation options include:

- Trigger, slide switch, both
- Pneumatic
- Dead handle (none)

Slide switch can be configured as momentary or detent style.

Ball, flange, or direct mounting options allow optimal handle orientation with the operator.






20 possible configurations deliver the exact combination needed.

Ergonomic grip provides both comfort and durability.

Trigger and slide switch can be aligned (shown left) or rotated 90 degrees (shown above) based on desired hand positioning.

## Handle Configurations

| Configuration   | Dead Handle | Trigger Only | Pneumatic Pendant | Slide Switch Only     | Slide Switch Type           | Slide Switch + Trigger    |                           |
|---|-------------|--------------|-------------------|-----------------------|-----------------------------|---------------------------|---------------------------|
|   |             |              |                   |                       |                             | Aligned                   | Rotated                   |
| <br>Ball mount   | ✓<br>QMMHB  | ✓<br>QMMHBT  | ✓<br>QMMH-A35     | ✓<br>QMMHBD<br>QMMHBM | ← Detent →<br>← Momentary → | ✓<br>QMMHBTDA<br>QMMHBTMA | ✓<br>QMMHBTDP<br>QMMHBTMP |
| <br>Flange mount | ✓<br>QMMHF  | ✓<br>QMMHFT  | ✓<br>QMMH-A36     | ✓<br>QMMHFD<br>QMMHFM | ← Detent →<br>← Momentary → | ✓<br>QMMHFTDA<br>QMMHFTMA | ✓<br>QMMHFTDP<br>QMMHFTMP |
| <br>Direct mount | ✓<br>QMMH   | ✓<br>QMMHT   |                   |                       |                             |                           |                           |

# Custom engineered systems



**Custom Engineered** fixtured fastening systems are available for more complex jobs with requirements such as adjustable bolt centers, more than six spindles, specialized clamping, indexing, custom fixture design, and automation.

Ingersoll Rand's worldwide network of solution centers can serve your "Rail-to-Floor" project requirements from start to finish. Our full-range offering starts with joint analysis and process audits, spans system design, project management, installation, and after-sales support.



# Proven products, proven results

World-class controllers and tools

## IC1D Controllers



## IC1M Controllers



The IC1D Insight controllers give you full closed-loop control in a compact package. With features like a 1/4-VGA color display and easy, intuitive, quick set-up programming, the IC1D provides unmatched performance.

The IC1M Insight Controller is a basic single line display controller that works with all Ingersoll Rand QE and QM DC Electric Tools and can be either rack or cabinet-mounted as a single unit or in groups of up to 40 units for multiple-spindle systems.

### Standard features

- 1/4-VGA color display (IC1D)
- Full keypad and navigation keys (IC1D)
- One-line LED display (IC1M)
- Ethernet connection
- RS232
- Eight I/O
- 1,000-cycle storage (IC1D)
- 200-cycle storage (IC1M)
- Eight instant configurations
- 256 stored configurations
- Dual power mode 120-240 V AC
- Quick set-up feature
- Small footprint (mm)  
152h x 191w x 238d

### Optional features

- All units are available with the following options:
- 115 V AC power cord
  - 220 V AC power cord
  - 230 V AC EU pigtail power cord
  - Cabinet mount / wall mount
  - PFCS software package
  - Plus software package
  - 16 additional I/O
  - Fieldbus cards

### Languages available

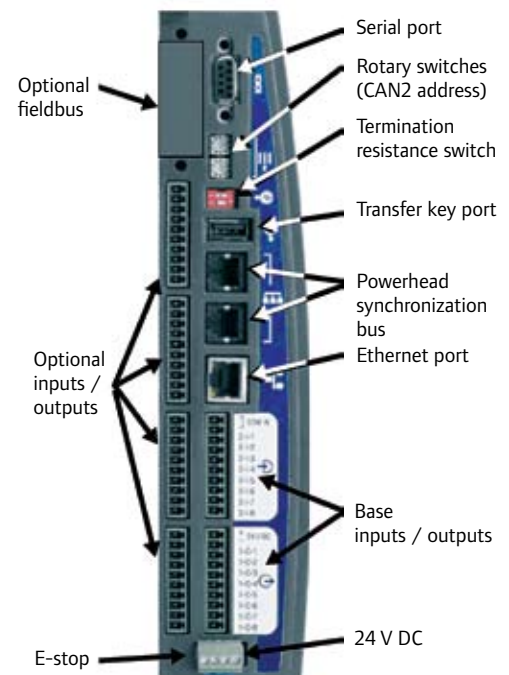
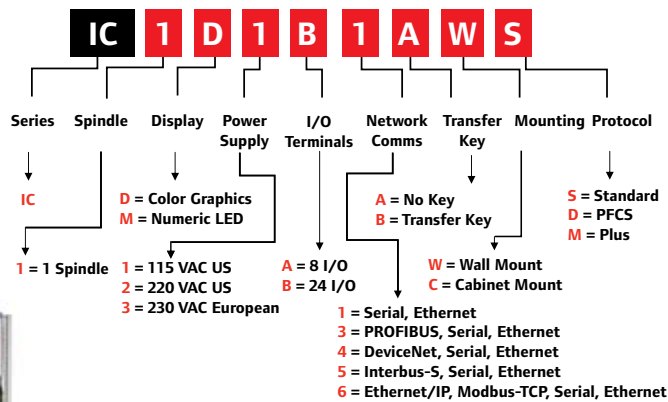
- Chinese
- English
- French
- German
- Italian
- Portuguese
- Spanish

### Services and accessories

- Complete installation and repair service available
- Light tower
- Transfer key: 80150113
- Custom racks



### IC Series DC Electric Controllers





## QM Series

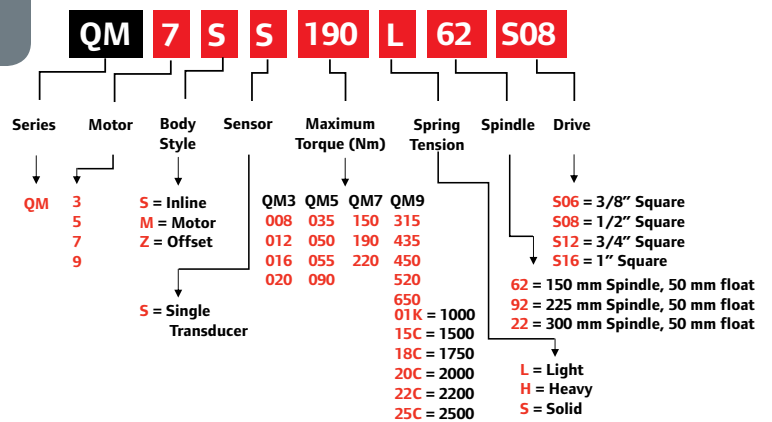


Heavy-duty motors offer excellent accuracy, maximum durability, and complete control over your fastening application. Whether used in single-spindle or multiple-spindle configurations, these world-class tools provide top-quality performance and long life.

### Features

- Torque range 0.59 – 1844 ft-lb (0.8 – 2500 Nm).
- Speeds: Adjustable to 1382 rpm.
- Fully transducerized closed-loop control.
- High-duty cycle motors and components provide excellent durability.
- External electronic pod simplifies integration.
- Available with or without spindles in a variety of length and drive options.

### QM Series DC Electric Fixed Spindles



## World-class software



Paired with an Insight IC1D or IC1M controller and a computer, our groundbreaking ICS Software makes it possible to more precisely control and monitor your fastening processes. Optimizing your system is as simple as selecting one of two packages. Visibility of real-time data and controller status can be viewed from your desktop or other remote locations connected to your network.

## ICS MultiSync

ICS MultiSync facilitates setup and control of multiple spindle systems consisting of up to 100 spindles in groups of up to 40 spindles. This versatile package offers advanced multiple spindle fastening strategies such as fault back-out, as well as remote monitoring and data archiving.

- Nothing new to learn — same groundbreaking software and controllers as used on our handheld series of tools.
- Available in Chinese, English, French, German, Italian and Spanish.
- Advanced tightening strategies improve joint quality.

## ICS Enterprise

ICS Enterprise offers advanced programming and management of a network of up to 500 IC1D and IC1M controllers using QE, QM, and multiple spindle systems. This package includes all elements of ICS MultiSync and ODBC-compliant database archiving, searching, and statistics processing.

### Advanced Tightening Strategies

|                                      |                     |
|--------------------------------------|---------------------|
| Torque control                       | Drag torque         |
| Torque control with angle monitoring | Backout             |
| Torque control with yield override   | Fault backout       |
| Angle control                        | Final fault backout |
| Angle control with torque monitoring | Retorque            |
| Angle control with yield override    | Wait                |
| Yield control                        | Jog                 |
| Prevailing torque                    | Bypass              |

# Global support

## Productivity beyond product

When you work with Ingersoll Rand, you get Productivity Beyond Product. Our experts know assembly environments inside and out, and we have the sales, engineering, and service teams in place around the world to deliver a local solution tailored to your unique operational needs.

Our 360-degree approach to maximizing your productivity includes world-class Auditing, Products, Integration, and Service in all areas of the assembly process. It's an integrated approach that will not only meet your needs, but exceed your expectations.

### Audits

Ingersoll Rand consultants can spend time with you, observing and auditing the layout, ergonomic design, and productivity of your assembly process. Our service and sales teams are uniquely qualified to assess your individual applications and recommend solutions that make sense for you. You can also take advantage of our best-in-class joint consulting capabilities by sending your components and fasteners to one of our application labs. We'll recommend a fastening strategy that gives you the clamp load you need and the quality your customers demand.

- ▶ Application testing
- ▶ Systems capability study
- ▶ Ergonomic audit

### Products

Innovative products are the core of our integrated "rail-to-floor" approach. From world-class DC electric fastening tools, controllers, and software to ergonomic handling systems, our product portfolio spans the full fastening continuum to provide you with the best technology for your application. Add calibration equipment and choose from our full line of accessories including user interfaces, cabinets, cables, selector switches, and sockets to complete your system design.

- ▶ World-class tools
- ▶ World-class controllers
- ▶ World-class software
- ▶ World-class ergonomic handling

### Integration

Our extensive knowledge of systems integration makes connecting your new equipment to your existing facilities a seamless process. The Ingersoll Rand service team has years of experience in program management, custom networking and software, PLC programming, and line integration — exactly the combination you need to get up and running.

- ▶ Installation support
- ▶ Acceptance testing
- ▶ System commissioning
- ▶ Networking and programming
- ▶ Financing

### Service

Want to minimize downtime? No problem. Ingersoll Rand provides unmatched customer service, and a variety of services to keep you running at your peak productivity — from installation and training to preventive maintenance, calibration, and repairs.

- ▶ Operator and skilled trades training
- ▶ Calibration and repair
- ▶ Preventive maintenance contracts
- ▶ Refurbishment programs
- ▶ Global network coverage

### Russia

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# Accessories and literature

## Cable Accessories

| Handle Module Extension Cables  | (2 m)            | (4 m)            | (6 m)             |
|---------------------------------|------------------|------------------|-------------------|
| Handle extension cordset        | QMMC-46-2M       | QMMC-46-4M       | QMMC-46-6M        |
| Interface Module Cables         |                  |                  |                   |
| Interface extension cable (10m) |                  |                  | QMMC-A240-10      |
| Interface extension cable (20m) |                  |                  | QMMC-A240-20      |
| Powerhead cable (2m)            |                  |                  | QMMC-A240-2       |
| DC Tool Cables                  | (3 m)            | (6 m)            | (10 m)            |
| Tool cable                      | GEA40-CORD-3M    | GEA40-CORD-6M    | GEA40-CORD-10M    |
| 90° tool cable                  | GEA40-CORD-3M-90 | GEA40-CORD-6M-90 | GEA40-CORD-10M-90 |
| DC Tool Extension Cables        | (10 m)           | (20 m)           | (40 m)            |
| Extension cable                 | GEA40-EXT-10M    | GEA40-EXT-20M    | GEA40-EXT-40M     |
|                                 | (50")            | (60")            | (70")             |
| 90° extension cable             | GEA40-INT-01     | GEA40-INT-02     | GEA40-INT-03      |
|                                 | (80")            | (90")            | (100")            |
| 90° extension cable             | GEA40-INT-04     | GEA40-INT-05     | GEA40-INT-06      |
|                                 | (110")           | (120")           | (130")            |
| 90° extension cable             | GEA40-INT-07     | GEA40-INT-08     | GEA40-INT-08      |



## Accessories

| System Accessories       |                                     |             |                |
|--------------------------|-------------------------------------|-------------|----------------|
| Light tower              |                                     |             | IC-LIGHT-TOWER |
| Palm button reset        |                                     |             | IC-PALM-RESET  |
| Remote selector switch   | IC-SELECT-2                         | IC-SELECT-4 | IC-SELECT-6    |
| Retractable safety strap |                                     |             | QMM-298        |
| Calibration Equipment    |                                     |             |                |
| EIT torque tester        | 3 - 30 Nm torque range              |             | ETT-30-US      |
| ETA torque analyzer      |                                     |             | ETA5           |
| Rotary transducer        | 3/8" sq dr, 3.8 - 75 Nm, standard   |             | TR75S6         |
|                          | 3/8" sq dr, 3.8 - 75 Nm, Smart      |             | TRD75S6        |
|                          | 1/2" sq dr, 9 - 180 Nm, standard    |             | TR180S8        |
|                          | 1/2" sq dr, 9 - 180 Nm, Smart       |             | TRD180S8       |
|                          | 3/4" sq dr, 12.5 - 250 Nm, standard |             | TR250S12       |
|                          | 3/4" sq dr, 12.5 - 250 Nm, Smart    |             | TRD250S12      |
| Stationary transducer    | 3/8" sq dr, 7.5 - 150 Nm, standard  |             | TS150S6        |
|                          | 3/8" sq dr, 7.5 - 150 Nm, Smart     |             | TS300S8        |
|                          | 1/2" sq dr, 15 - 300 Nm, standard   |             | TS300S8        |
|                          | 1/2" sq dr, 15 - 300 Nm, Smart      |             | TS1000S12      |
| Expert torque wrench     | ETW-E75                             | ETW-E75     | ETW-E180       |

## Literature

| Catalog Name      | Form Number   | Catalog Name       | Form Number   |
|-------------------|---------------|--------------------|---------------|
| DC tools          | AS-0206-061   | Torque arms        | IRPS-0907-044 |
| QA4/6/8 air tools | IRPS-1007-053 | Accessories        | IR-0605-097   |
| Audit wrench      | ASM-1106-128  | Pulse tools        | SW041107      |
| Assembly tools    | IRPS-1007-052 | Ergonomic handling | MHD55226      |
| Feed drill        | 52475-AT-C    | Impact sockets     | IRPS-0506-016 |

To order Ingersoll Rand literature please e-mail: [irlitorders@kencook.com](mailto:irlitorders@kencook.com)

## Suspension and Reaction Devices

| Torque Tubes         |                   | See Literature listed below for more details |                             |                         |                |  |
|----------------------|-------------------|--|-----------------------------|-------------------------|----------------|--|
| Model                | Description       | Lift Capacity @100 psi lb (kg)               | Torque Capacity lb (kg)     | Vertical Travel in (mm) | Weight lb (kg) |  |
| 54044227             | IRZ-TT-100        | 60 (27)                                      | 74 (100)                    | 20 (508)                | 40 (18)        |  |
| 54041819             | IRZ-TT-250        | 60 (27)                                      | 184 (250)                   | 24 (610)                | 50 (23)        |  |
| 54044417             | IRZ-TT-500        | 400 (182)                                    | 368 (500)                   | 36 (914)                | 75 (75)        |  |
| Balancers            |                   | See Literature listed below for more details |                             |                         |                |  |
| Model                | Type              | Lift Capacity lb (kg)                        | Vertical Travel in (m)      | Weight lb (kg)          |                |  |
| BHD Series           | Spring            | 22-143 (10-65)                               | 6.5 (2.0)                   | 23-30 (10-14)           |                |  |
| BSD Series           | Spring            | 33-363 (15-165)                              | 8.2 (2.5)                   | 42-106 (19-48)          |                |  |
| BSDL Series          | Spring            | 33-330 (15-150)                              | 9.8 (3.0)                   | 42-100 (19-46)          |                |  |
| BA/ZA Series         | Pneumatic         | up to 2000 (907)                             | up to 120 (3.0)             | up to 225 (102)         |                |  |
| Torque Reaction Arms |                   | See Literature listed below for more details |                             |                         |                |  |
| Model                | Max Reach in (mm) | Lift Capacity @ 90 psi lb (kg)               | Torque Capacity ft-lbs (Nm) | Vertical Travel in (mm) | Height in (mm) |  |
| QTA270               | 60 (1524)         | 22 (10)                                      | 270 (199)                   | 18.8 (477)              | 79 (2000)      |  |
| QTA475               | 79 (2007)         | 50 (23)                                      | 475 (350)                   | 23.2 (590)              | 79 (2000)      |  |
| Series               | Product           | Parts  | Safety                      |                         |                |  |
|                      | Fixture systems   | 16607228                                     | 16607103                    | 16607095                |                |  |

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