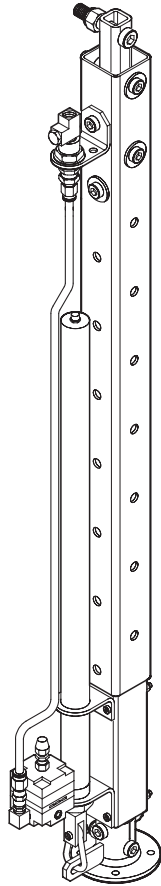


PARTS, OPERATION AND MAINTENANCE MANUAL

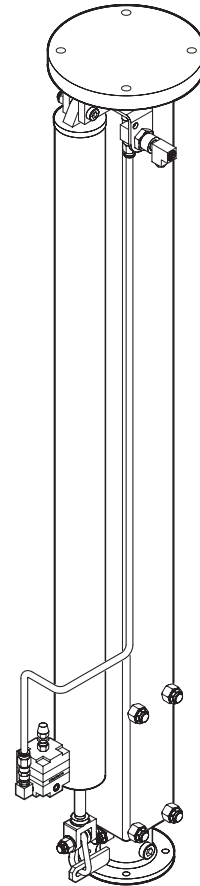
for

TORQUE TUBE MODELS

IRZ-TT-100 IRZ-TT-250 IRZ-TT-500



(Dwg. MHP2477)



(Dwg. MHP2478)



READ THIS MANUAL BEFORE USING THESE PRODUCTS. This manual contains important safety, installation, and maintenance information. Make this manual available to all persons responsible for the installation, operation and maintenance of these products.

⚠ WARNING

This equipment is intended for industrial use only and should not be used for lifting, supporting, or transporting people or lifting or supporting loads over people.

Always operate, inspect and maintain this unit in accordance with applicable safety codes and regulations.

SAFETY INFORMATION

This manual provides important information for all personnel involved with the safe installation, operation and proper maintenance of this product. Even if you feel you are familiar with this or similar equipment, you should read this manual before operating the product.

Danger, Warning, Caution and Notice

Throughout this manual there are steps and procedures which, if not followed, may result in a hazard. The following signal words are used to identify the level of potential hazard.

DANGER

Danger is used to indicate the presence of a hazard which **will** cause **severe** injury, death, or substantial property damage if the warning is ignored.

WARNING

Warning is used to indicate the presence of a hazard which **can** cause **severe** injury, death, or substantial property damage if the warning is ignored.

CAUTION

Caution is used to indicate the presence of a hazard which **will** or **can** cause injury or property damage if the warning is ignored.

NOTICE

Notice is used to notify people of installation, operation, or maintenance information which is important but not hazard-related.

Safety Summary

Personal protective and safety equipment must be used and maintained in accordance with the manufacturer's instructions. The Torque Tube tool should not be left suspended when not in use, lower the tool to the floor or a suitable location.

WARNING

- **Do not use this unit or attached equipment for lifting, supporting, or transporting people or lifting or supporting loads over people.**
- **Supporting structures and load-attaching devices used in conjunction with these units must provide a safety factor of at least three times the rated capacity of the unit. This is the customer's responsibility. If in doubt, consult a registered structural engineer.**
- **If system air pressure is lost, lower the tool immediately. Operator's must stay out of the vertical path of the tool.**

NOTICE

- **Lifting and handling equipment is subject to different regulations in each country. These regulations may not be specified in this manual.**

Employees who work near suspended loads or assist in positioning or arranging a load should be instructed to keep out from under the load. From a safety standpoint, one factor is paramount: conduct all lifting and positioning operations in such a manner that if there were an equipment failure, no personnel would be injured. This means keep out from under a raised load and keep out of the line of force of any load.

It is the owner's and user's responsibility to determine the suitability of a product for any particular use. It is recommended that all applicable industry, trade association, federal, state and local regulations be checked. Read all operating instructions and warnings before operation.

This manual has been produced by **Ingersoll-Rand** to provide dealers, mechanics, operators and company personnel with the information required to install, operate, maintain and repair the products described herein.

It is extremely important that mechanics and operators be familiar with the servicing procedures of these products or similar products, and are physically capable of conducting the procedures. These personnel shall have a general working knowledge that includes:

1. Proper and safe use and application of mechanic's common hand tools as well as special **Ingersoll-Rand** or recommended tools.
2. Safety procedures, precautions and work habits established by accepted industry standards.

Ingersoll-Rand cannot know of, or provide all the procedures by which product operations or repairs may be conducted and the hazards and/or results of each method. If operation or maintenance procedures not specifically recommended by the manufacturer are conducted, it must be ensured that product safety is not endangered by the actions taken. If unsure of an operation or maintenance procedure or step, personnel should place the product in a safe condition and contact supervisors and/or the factory for technical assistance.

SAFE OPERATING INSTRUCTIONS

The following warnings and operating instructions are intended to avoid unsafe operating practices which might lead to injury or property damage.

Ingersoll-Rand recognizes that most companies using this type of equipment have a safety program in force at their facility. If you are aware that some conflict exists between a rule set forth in this publication and a similar rule already set by an individual company, the more stringent of the two should take precedence.

This manual supports a fully installed system. Operators should be familiar with the operation of the unit before use.

Safe Operating Instructions are provided to make an operator aware of dangerous practices to avoid and are not necessarily limited to the following list. Refer to specific sections in the manual for additional safety information.

1. Only allow personnel trained in, safety and operation on this product to operate and maintain the system.
2. Only operate unit if you are physically fit to do so.
3. When a **“DO NOT OPERATE”** sign is placed on the system, do not operate the unit until the sign has been removed by designated personnel.
4. Before each shift, check the unit for wear and damage. Never use a unit that inspection indicates is worn or damaged.
5. Never exceed the tool capacity of the unit.
6. Be certain tool holder and tool extension are properly secured.
7. Pay attention to the tool at all times when operating unit.
8. Make sure everyone is clear of the torque tube path. Do not lift over people.
9. Never use unit for lifting or lowering people, and never allow anyone to stand on a suspended load.
10. Never weld or cut on components connected to the unit.
11. Ensure safety wire rope is installed.
12. Shut off air supply before performing any maintenance.
13. Use good posture when operating the system.
14. Check air connections for leakage.

SPECIFICATIONS

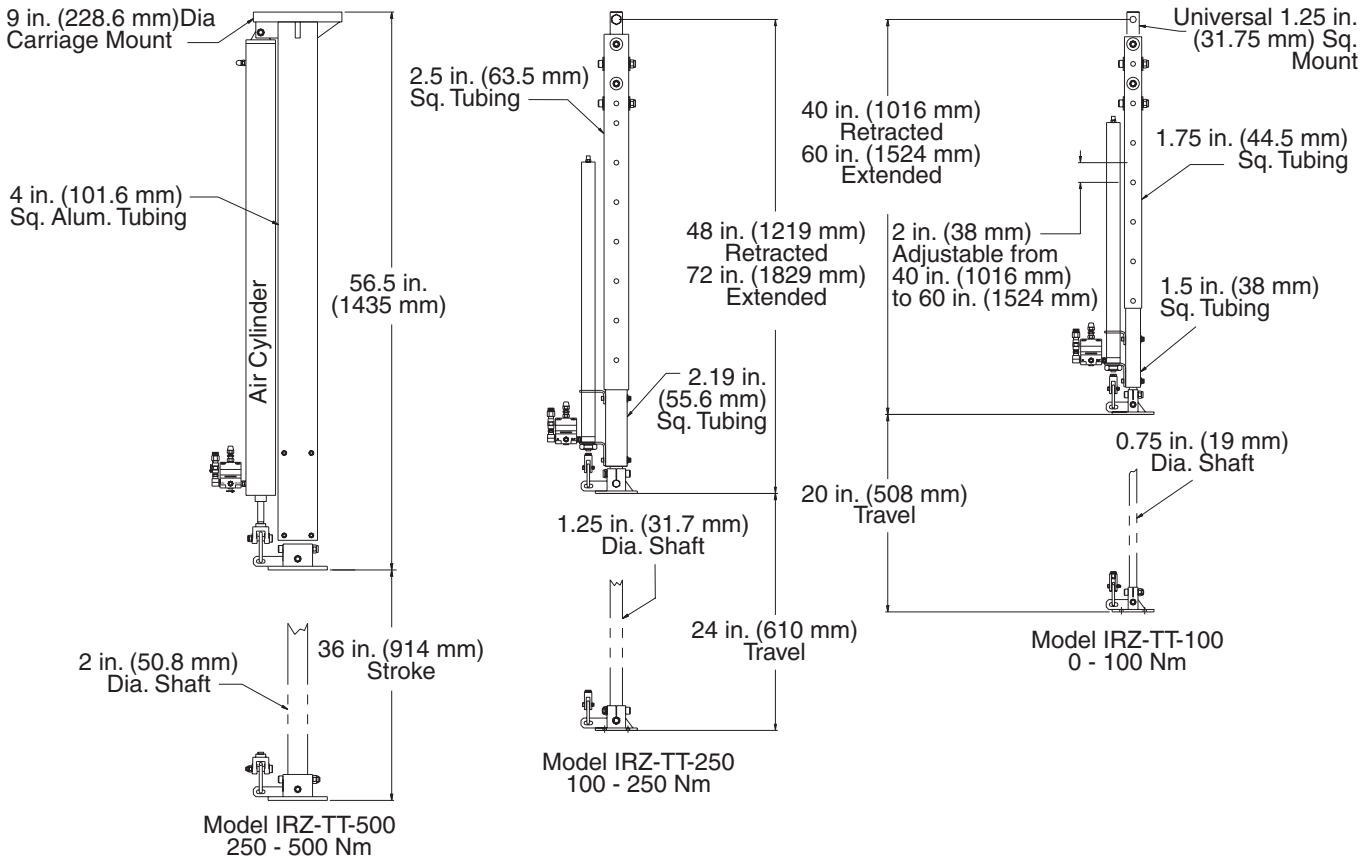
Model	Vertical Travel		'A' Dimension Cylinder Extended *		'B' Dimension Cylinder Retracted *		Torque Tube Weight **	
	inches	mm	inches	mm	inches	mm	lbs	kg
IRZ-TT-100	20	508	60	1524	40	1016	40	18
IRZ-TT-250	24	609.6	72	1829	48	1219	50	23
IRZ-TT-500	36	914.4	92.5	2349.5	56.5	1435	75	34

* Refer to Dwg. MHP2491 on page 4 for location of 'A' and 'B' dimensions.

** Weight listed does not include trolleys, tool holder or other attachments.

	IRZ-TT-100		IRZ-TT-250		IRZ-TT-500	
Lift Capacity at 100 psi (7 kg/cm²)	60 lb	27 kg	60 lb	27 kg	400 lb	182 kg
Maximum Torque Reaction	74 ft lb	100 Nm	184 ft lb	250 Nm	368 ft lb	500 Nm

Torque Tube Configurations



(Dwg. MHP2491)

INSTALLATION

Prior to installing unit, carefully inspect it for possible shipping damage.

CAUTION

- Owners and users are advised to examine specific, local or other regulations, including American National Standards Institute and/or OSHA Regulations which may apply to a particular type of use of this product before installing or putting the unit into use.
- Before installing, read “SAFETY INFORMATION”.

Ensure unit is properly installed. A little extra time and effort in doing so can contribute a lot toward preventing accidents, injuries and will help achieve the best service possible.

NOTICE

- Lubrication of the Torque Tube is not recommended.

Adjustments

Prior to operating the Torque Tube, but after installation, ensure the following adjustments, as they apply to your assembly and optional components, are made:

1. If necessary, adjust air regulator as described in this section. Refer to “Regulator Installation” and “Operational Adjustments”.
2. Ensure air cylinder is correctly installed, fasteners are tightened and any adjustments are complete in accordance with manufacturer’s instructions.

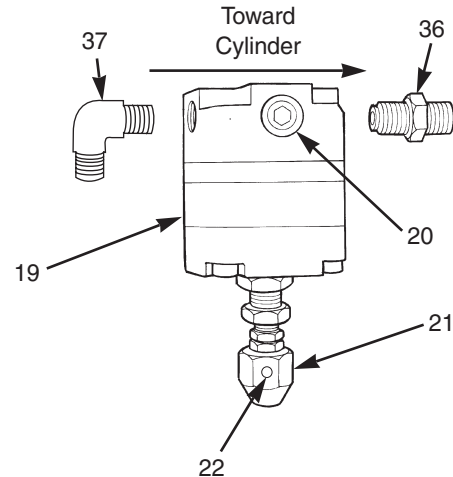
Regulator Installation

Refer to Dwgs. MHP1703 on page 5, MHP2475 on page 14 and MHP2476 on page 16.

The regulator is connected with a connector fitting (36), elbow (37) and a check valve (26). Connector fitting (36) should be threaded into rod end port on air cylinder. Check valve (26) will be threaded into elbow (37), which is threaded into the regulator input.

NOTICE

- Arrow on the check valve (26) must be pointing towards cylinder. If check valve is installed backwards, cylinder will not function.



(Dwg. MHP1703)

Regulator Parts List

Item No.	Description of Part	Qty Total	Part Number
19	Regulator Assy (Includes items 19 through 22)	1	13830
20	Plug	2	10764
21	Control Knob	1	13832
22	Setscrew	1	13833
36	Fitting, Connector	1	10731
37	Fitting, Elbow	1	10375

Operational Adjustments

To establish a “zero gravity” condition for the operator to manipulate the tool, complete the following adjustment procedures:

WARNING

- Prior to performing operational adjustments, or servicing, ensure air supply is off and unit is not under load.

1. Turn adjustment knob (21) counterclockwise until unit stops.
2. Attach tool to unit. This will require tool be installed in tool holder. Connect coiled air tube.
3. Turn on air supply.
4. Turn adjustment knob clockwise until tool begins to move. Regulator is properly set when equal effort is required to raise and lower the tool.
5. Tighten locknut on regulator stem to lock adjustment in position.

Air System

An air supply system is required to operate the Torque Tube and air operated tool.

Supply air must be clean and free from water, water vapor and oil. 6.9 bar/690 kPa (100 psig) at the unit is required to provide rated capacity. Do not exceed 6.9 bar/690 kPa (100 psig).

CAUTION

• **Do not use an air line lubricator of any kind. Oil may damage Torque Tube.**

Check tool manufacturer's specifications for correct air supply requirements.

Air Lines

The inside diameter of the air supply lines should not be smaller than 10 mm (3/8 inch) based on a maximum of 30 metres (100 feet) between the air supply and the unit. Contact the factory for recommended air line sizes for distances greater than 30 metres (100 feet). Before making final connections, all air supply lines should be purged. Supply lines should be as short and straight as installation conditions will permit. Long transmission lines and excessive use of fittings, elbows, tees, globe valves, etc. cause a reduction in pressure due to restrictions and surface friction in the lines. If quick-disconnect fittings are used at the inlet of the unit, they must have at least a 10 mm (3/8 inch) air passage. Use of smaller fittings may affect performance.

Air Line Filter

It is recommended that a filter/regulator package be used. Refer to "OPTIONS, ATTACHMENTS AND ACCESSORIES" section.

The air line strainer/filter should be installed as close as practical to the Torque Tube air inlet port. The strainer/filter should provide 5 micron filtration and include a moisture trap. Clean strainer/filter monthly to maintain its operating efficiency.

To maintain dry air, the frequency for draining the filter should also be based on the condition of the air supply. It is recommended that the filter be drained weekly at first. Depending on air supply condition, a proper filter drain schedule should be established.

Moisture in Air Lines

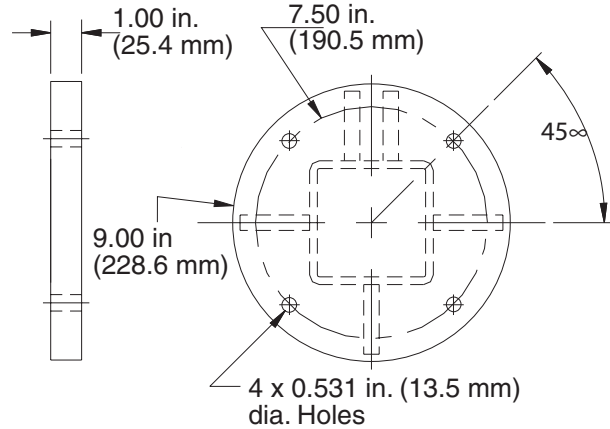
Moisture that reaches the Torque Tube and associated components through the supply lines is the chief factor in determining the length of time between service overhauls. Moisture traps can help to eliminate moisture. Other methods, such as an air receiver which collects moisture before it reaches the unit, or an aftercooler at the compressor that cools air prior to distribution through supply lines are also helpful.

Mounting The Unit

Ensure supporting member to which Torque Tube is attached is strong enough to support the weight of the unit plus the weight of any attached optional components and a maximum rated load plus a generous factor of at least 300% of the combined weights. If in doubt, contact a registered structural engineer.

Ensure installation area provides adequate room to safely operate Torque Tube and attached components throughout complete range of motion.

The Torque Tube may be mounted to numerous overhead structures. For information on mounting to a rail trolley unit, or to a stationary foundation, refer to the applicable product manual or consult a registered structural engineer. Refer to Dwg. MHP2492 on page 6 for mounting bolt information.

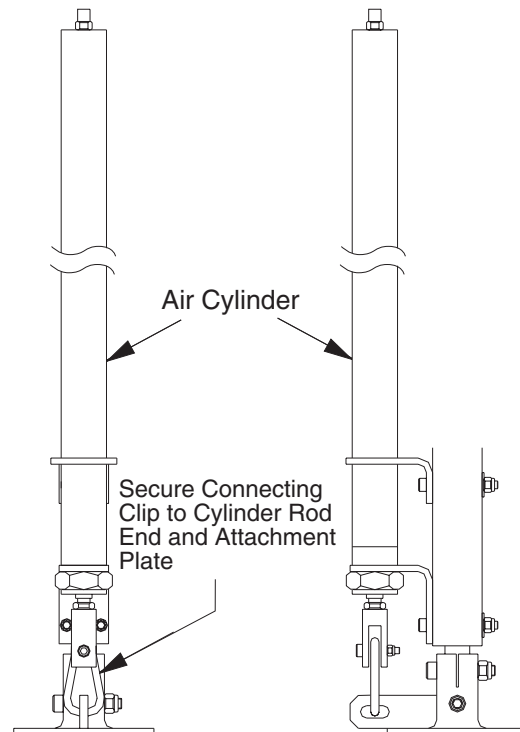


(Dwg. MHP2492)

Ensure Torque Tube is mounted to provide operators with the most ergonomically efficient operating range.

Check that all components are correctly attached to internal column. Refer to Dwg. MHP2493 on page 6.

Component Attaching Locations

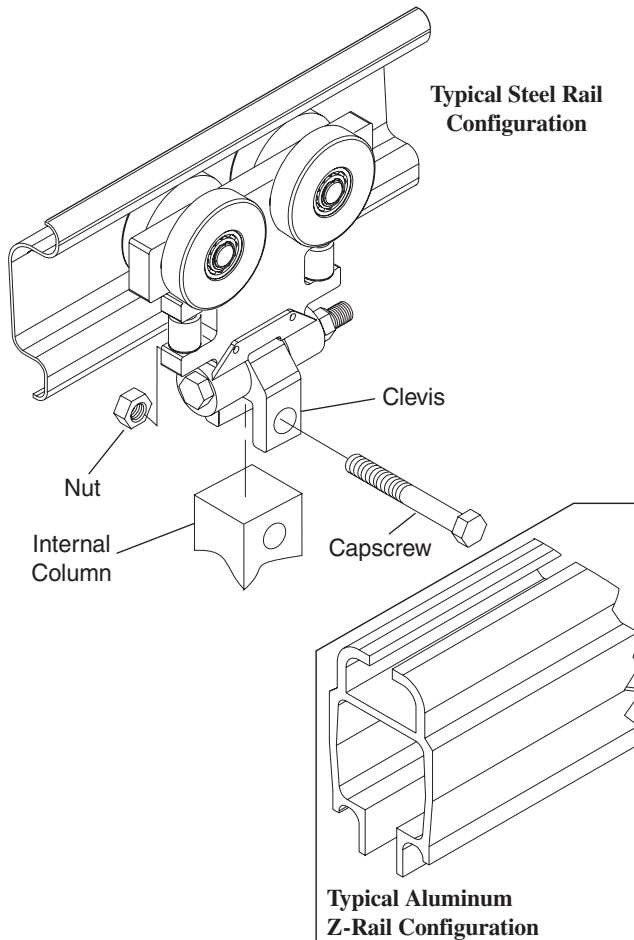


(Dwg. MHP2493)

An air cylinder is required for Torque Tube operation. A tool holder can be added for specific applications.

Mounting to Single/Dual Rail Trolley

To attach the Torque Tube to a single/dual rail trolley, secure internal column to trolley clevis using capscrew and nut as shown in Dwg. MHP1552 on page 7. Tighten capscrew until snug. Do not over-torque. It is recommended that nut be replaced if removed.



(Dwg. MHP1552)

Attaching Safety Cable

Refer to Dwg. MHP2482 on page 7 and MHP2131 on page 8.

⚠ WARNING

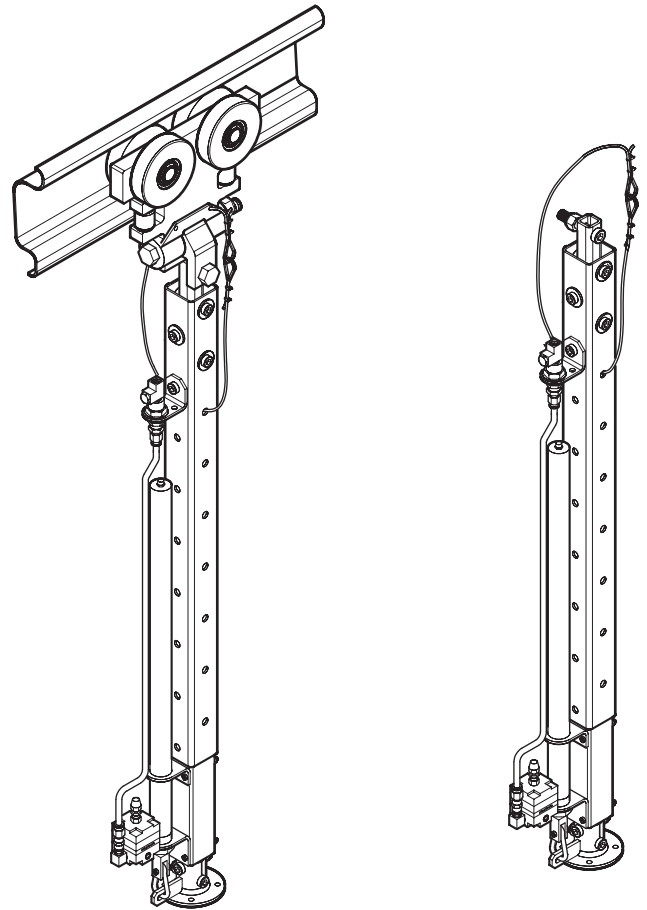
• A safety cable assembly is provided with this assembly. Ensure safety cable is properly installed. Safety cables must be installed to allow free movement of the trolley, yet provide minimum free drop of equipment if primary support fails.

1. Route safety cable through hole in internal column and trolley hanger assembly.

NOTICE

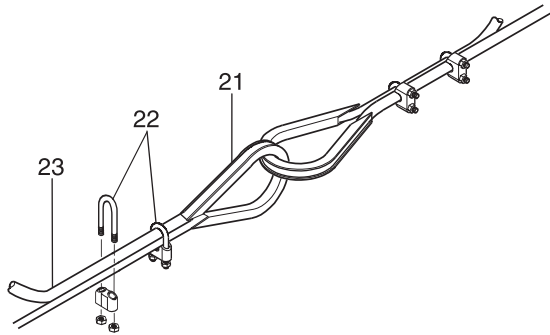
• If, for any reason, safety cable cannot be placed through trolley hanger, then it may be located over the rail.

Installed Safety Cable



(Dwg. MHP2482)

2. Interlock the two thimbles (21) and route wire rope through thimbles. Determine appropriate length of wire rope and, using side cutters part number 01942, cut to length.
3. Install first clamp (22) assembly one clamp width from dead end of wire rope. Snug the nuts, but do not torque.
4. Install second clamp (22) at thimble end. Snug nuts but do not torque.
5. Remove any slack wire rope between thimble and clamp, and between the two clamps. Torque nuts to clamp wire rope.
6. Repeat steps 3 through 5 for the other end of wire rope.



(Dwg. MHP2131)

Safety Cable Parts List

Item No.	Description of Part	Qty Total	Part Number
21	Thimble	2	10212
22	Clamp Assembly	4	10235
23	Wire Rope	As Req'd.	10099

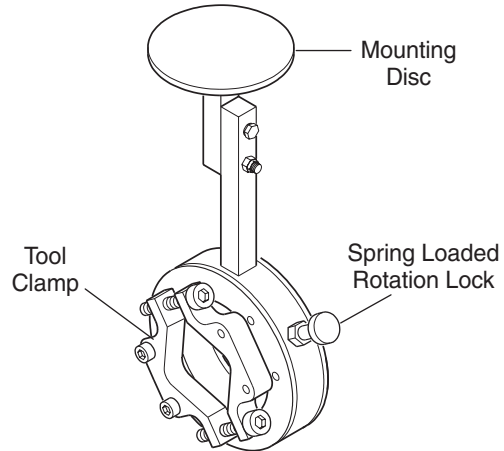
Attaching the Tool Holder

Refer to Dwg. MHP1697 on page 8.

Attach tool holder to lower flange of Torque Tube using four capscrews, washers, nuts and two clamping plates. To position tool holder, loosen capscrews and rotate until desired position is achieved. Retighten capscrews. Torque fasteners to 30 Nm (22 ft lbs).

Install tool in tool holder and tighten capscrews to clamp into position.

**Tool Holder Components
360° Swivel Type**



(Dwg. MHP1697)

OPERATION

The four most important aspects of operation are:

1. Follow all safety instructions when operating the unit.
2. Only allow people trained in safety and operation of this product to operate the unit.
3. Subject each unit to a regular inspection and maintenance program.
4. Be aware of the unit capacity at all times.

Ensure operators use suitable personnel protective equipment when operating Torque Tubes and attached tools. Maintain personnel protective equipment in accordance with manufacturers instructions.

At the end of each shift, or prior to turning off air supply, lower tool to its lowest position.

Description Of Operation

The Torque Tube is an integrated group of components designed to maximize the interaction of man and machine. Ease of operation minimizes operator fatigue and incorporates added safety during the performance of repetitive tasks.

Principles Of Operation

The Torque Tube is designed to allow vertical operational control within a specific range of motion.

When installed on a trolley-rail system, push on the external column or tool to move in a horizontal direction. During travel ensure load travel path is clear and pay attention to direction of travel during movement.

Vertical raising and lowering of the system should be easily accomplished by exerting force on the attached tool. Use tool to raise and lower Torque Tube.

Tool Holder (optional feature)

Two Tool Holder designs are available.

Fixed Horizontal/Vertical (Two Axis):

To reposition tool either loosen tool clamp capscrews to rotate tool in holder, or loosen the four mounting capscrews to rotate complete tool holder assembly. Tighten capscrews when correct adjustment is obtained.

360° Tool Holder (Three Axis):

To rotate a tool held in tool holder. Pull out plunger and rotate to desired position. Allow plunger to spring return to locked position. Rotate tool slightly to engage locking pin.

Tool holder may also be rotated by loosening the four mounting capscrews to rotate complete tool holder assembly. Tighten capscrews when correct adjustment is obtained.

⚠ WARNING

- **All new, altered or repaired equipment should be inspected and tested by personnel instructed in safety, operation and maintenance of this equipment to ensure safe operation at rated specifications before placing equipment in service.**
- **Never use a unit that inspection indicates is damaged.**

The inspection intervals recommended in this manual are based on intermittent operation of the equipment eight hours each day, five days per week, in an environment relatively free of dust, moisture and corrosive fumes. If the equipment is operated almost continuously, or more than eight hours each day, more frequent inspections will be required.

Frequent and periodic inspections should be performed on equipment in regular service. Frequent inspections are visual examinations performed by operators or personnel trained in safety and operation of this equipment and include observations made during routine equipment operation. Periodic inspections are thorough inspections conducted by personnel trained in the safety, operation and maintenance of this equipment. Inspection intervals depend upon the nature of the critical components of the equipment and the severity of usage.

Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.

Deficiencies revealed through inspection, or noted during operation, must be reported to designated personnel instructed in safety, operation and maintenance of this equipment. A determination as to whether a condition constitutes a safety hazard must be made, and the correction of noted safety hazards accomplished and documented by written report before placing the equipment in service.

Records and Reports

Inspection records, listing all points requiring periodic inspection should be maintained for all load bearing equipment. Written reports, based on severity of service, should be made on the condition of critical parts as a method of documenting periodic inspections. These reports should be dated, signed by the person who performed the inspection, and kept on file where they are readily available for authorized review.

Frequent Inspections

For equipment in continuous service, frequent inspections should be made by operators at the beginning of each shift.

1. **OPERATION.** Check for visual signs or abnormal movement which could indicate a potential problem. Ensure tube and trolley movements are smooth and unrestricted.
2. **FASTENERS.** Ensure fasteners are secure. Tighten loose and replace damaged fasteners.
3. **COLUMNS AND OPTIONAL TOOL EXTENSION.** Check for wear and damage. Repair or replace as necessary.
4. **SAFETY CABLE.** Check clamps are secure. Tighten clamps if necessary.
5. **AIR SYSTEM.** Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks or damage, tighten any loose connections.

Periodic Inspection

Frequency of periodic inspection depends on the severity of usage:

NORMAL	HEAVY	SEVERE
yearly	semiannually	quarterly

Disassembly may be required for HEAVY or SEVERE usage. Keep cumulative written records of periodic inspections to provide a basis for continuing evaluation.

Inspect all the items in "Frequent Inspection". Also inspect the following:

1. **FASTENERS.** Verify fasteners are tight. Torque fasteners to recommended torque levels.
2. **BUSHINGS/BEARINGS.** Check for smooth operation. Replace if worn, damaged or binding occurs.
3. **AIR CYLINDER.** Check cylinder vent is clean and unrestricted. Check cylinder for leaks and external damage. Replace or repair cylinder as required.
4. **TOOL HOLDER.** Check tool holder rotates freely and locking mechanism provides positive stop. Check tool holder clamps are not damaged.

INSPECTION AND MAINTENANCE REPORT

Ingersoll-Rand Torque Tube

Model Number:	Date:								
Reason for Inspection: (Check Applicable Box)	Inspected By:								
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 5%;"></td> <td>1. Scheduled Periodic Inspection: _____ Quarterly _____ Semiannually _____ Yearly</td> </tr> <tr> <td></td> <td>2. Discrepancies noted during Frequent Inspection</td> </tr> <tr> <td></td> <td>3. Discrepancies noted during Maintenance</td> </tr> <tr> <td></td> <td>4. Other: _____</td> </tr> </table>		1. Scheduled Periodic Inspection: _____ Quarterly _____ Semiannually _____ Yearly		2. Discrepancies noted during Frequent Inspection		3. Discrepancies noted during Maintenance		4. Other: _____	Operating Environment: Normal _____ Heavy _____ Severe _____
	1. Scheduled Periodic Inspection: _____ Quarterly _____ Semiannually _____ Yearly								
	2. Discrepancies noted during Frequent Inspection								
	3. Discrepancies noted during Maintenance								
	4. Other: _____								

Refer to the Parts, Operation and Maintenance Manual "INSPECTION" section for general inspection criteria. Also, refer to appropriate National Standards and codes of practice. If in doubt about an existing condition, contact the nearest **Ingersoll-Rand** Distributor or the factory for technical assistance.

COMPONENT	CONDITION		CORRECTIVE ACTION		NOTES
	Pass	Fail	Repair	Replace	
Fasteners			---		
Columns					
Bushings			---		
Safety Cable					
Tool Extension					
Supporting Structure					
Rail System/Hangers					Refer to Rail System Manual
Labels and Tags			---		
Air Cylinder					
Tool Holder					
Air System					
Other Components (list in NOTES section)					

This page may be photocopied and used as an Inspection/Maintenance record.

TROUBLESHOOTING

This section provides basic troubleshooting information. Determination of specific causes to problems are best identified by thorough inspections performed by personnel instructed in safety, operation and maintenance of this equipment. The chart below provides a brief guide to possible problems and remedies.

Symptom	Probable Cause	Remedy
Difficult to raise tool OR Tool drifts down while idle	Air pressure too low for weight of tool	Increase air pressure to 100 psi (7 kg/cm ²) or highest maintainable pressure
	Regulator setting too low	Refer to "INSTALLATION" section of this manual
	Damaged or loose fittings or tubing	Check and tighten fittings and tubing
	Air cylinder vent restricted	Check and clean vent
	Air cylinder leaking	Check air cylinder for leakage
	Torque tube over capacity	Refer to "SPECIFICATIONS" table for maximum load
	Linear support bearings damaged	Check and replace bearings
	Guide wheel damaged	Inspect and replace guide wheels
Difficult to lower tool OR Tool drifts up while idle	Regulator setting too high	Refer to "INSTALLATION" section of this manual
	Air pressure off (Check valve holding pressure)	Increase air pressure to 100 psi (7 kg/cm ²) or highest maintainable pressure
	Linear support bearings damaged	Check and replace bearings
	Guide wheel damaged	Inspect and replace guide wheels
Torque Tube does not roll smoothly in the rail	Dirt or debris on running surface of rail	Inspect and clean rail
	Support trolley wheels damaged or bearings worn	Check trolley wheels and bearings

MAINTENANCE

⚠ CAUTION

- Use of replacement parts other than genuine Ingersoll-Rand parts could result in damage to the unit and void the warranty.

⚠ WARNING

- Never perform maintenance on the Torque Tube while it is supporting a tool.
- Before performing maintenance, tag controls:
WARNING - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.
- Only allow service personnel trained in safety and maintenance on this unit to perform maintenance.
- After performing any maintenance on the unit, adjust and test unit in specified application before returning to service.
- Shut off air system and depressurize air lines before performing any maintenance.

Maintenance Intervals

The Maintenance Interval chart is based on intermittent operation of the unit eight hours each day, five days per week. If unit operation exceeds eight hours per day, or use is under HEAVY or SEVERE conditions, more frequent maintenance should be performed. Refer to 'Periodic Inspection' in the INSPECTION section for interval guidance.

INTERVAL	MAINTENANCE CHECK
Start of each shift (Operator or Maintenance Personnel)	Make a thorough visual inspection of the Torque Tube and attached components for damage. Do not operate the unit, or components, if damaged.
	Operate the unit through the normal range of movements. Unit must operate smoothly without sticking, binding or abnormal noises.
3 Months (Maintenance Personnel)	Inspect and clean Torque Tube. Replace parts as required.
Yearly (Maintenance Personnel)	Check all the supporting members, including the foundation, fasteners, nuts, trolley, rail, cylinder, tool holder, etc. for indications of damage or wear. Repair or replace as required.

Adjustments

Refer to "INSTALLATION" section for regulator adjustment.

Disassembly

Torque Tube

Refer to Dwg. MHP2475 on page 14.

1. Rotate the regulator adjustment knob (145) counterclockwise until torque tube lowers to bottom of travel.
2. Turn off the main supply to the torque tube.

3. Disconnect main air supply from regulator at connector (142).
4. Remove the torque tool from the torque tube.
5. Disconnect air cylinder connecting clip (114) from attachment plate (117).
6. Remove capscrews (107), nuts (123) and washers (108).
7. Remove air cylinder (106).
8. Remove inner shaft assembly (109-117).
9. Remove capscrews (126), nuts (127) and washers (128).
10. Remove inner support tube (100) from outer support tube (129).

Inner Shaft

1. Remove capscrews (115) and nuts (116) from adapter plate (117).
2. Remove adapter plate (117).
3. Remove bushings (112) and housing or spacer (113).
4. Using a suitable size drift punch and mallet remove spring pins (110) and guide wheels (109) from shaft (111).

Air Cylinder Removal

1. Rotate the regulator adjustment knob (145) counterclockwise until torque tube lowers to bottom of travel.
2. Turn off the main supply to the torque tube.
3. Disconnect main air supply from regulator at connector (142).
4. Remove the torque tool from the torque tube.
5. Disconnect air cylinder connecting clip (114) from attachment plate (117).
6. Remove regulator (145) and hex nipple (36) from air cylinder (106).
7. Remove air cylinder exhaust vent (105) from rod end of air cylinder (106).
8. Remove air cylinder mount nut from rod end of air cylinder (106).
9. Remove air cylinder from rod end mounting bracket (119).
10. Remove air cylinder from cap end mounting bracket (120).

Cleaning, Inspection and Repair

Examine disassembled components and fasteners for wear or damage. If worn or damaged, do not reuse. During reassembly all damaged and worn components should be replaced to prevent component failure which may result in injury or property damage.

Use the following procedures to clean, inspect and repair the Torque Tube and associated components.

Cleaning

Thoroughly clean all Torque Tube components in solvent. Use of a stiff bristle brush will facilitate the removal of accumulated dirt and sediments on the columns. Wipe off each part after cleaning. **Do not** allow cleaning solvents to contact side plate wear pads.

Inspection

All disassembled parts should be inspected to determine their fitness for continued use. Pay particular attention to the following:

1. Inspect all threaded items and replace those having damaged threads.

Repair

Actual repairs are limited to the removal of small burrs and other minor surface imperfections. Use a fine stone or emery cloth for this work.

1. Worn or damaged parts must be replaced. Refer to parts section for specific replacement parts information.
2. Inspect all remaining parts for evidence of wear or damage. Replace or repair any part which is in questionable condition. The cost of the part is often minor in comparison with the cost of redoing the job.
3. When fastening components, always use Loctite® 243 on capscrew threads.

Assembly

Air Cylinder Installation

1. Attach air cylinder to cap end mounting bracket (120).
2. Attach air cylinder to rod end mounting bracket (119).
3. Install air cylinder mount nut from rod end of air cylinder (106).
4. Install air cylinder exhaust vent (105) at rod end of air cylinder (106).
5. Install regulator (145) and hex nipple (36) to air cylinder (106).
6. Connect air cylinder connecting clip (114) to attachment plate (117).
7. Install the torque tool on the torque tube.
8. Connect main air supply to regulator at connector (142).
9. Turn on the main supply to the torque tube.
10. Adjust regulator (145) adjustment knob so equal effort is required to raise and lower tube. Refer to "INSTALLATION" section.

Inner Shaft

1. Using a suitable size drift punch and mallet install spring pins (110) and guide wheels (109).
2. Install bushings (112) and housing or spacer (113).
3. Install adapter plate (117).
4. Install capscrews (115) and nuts (116).

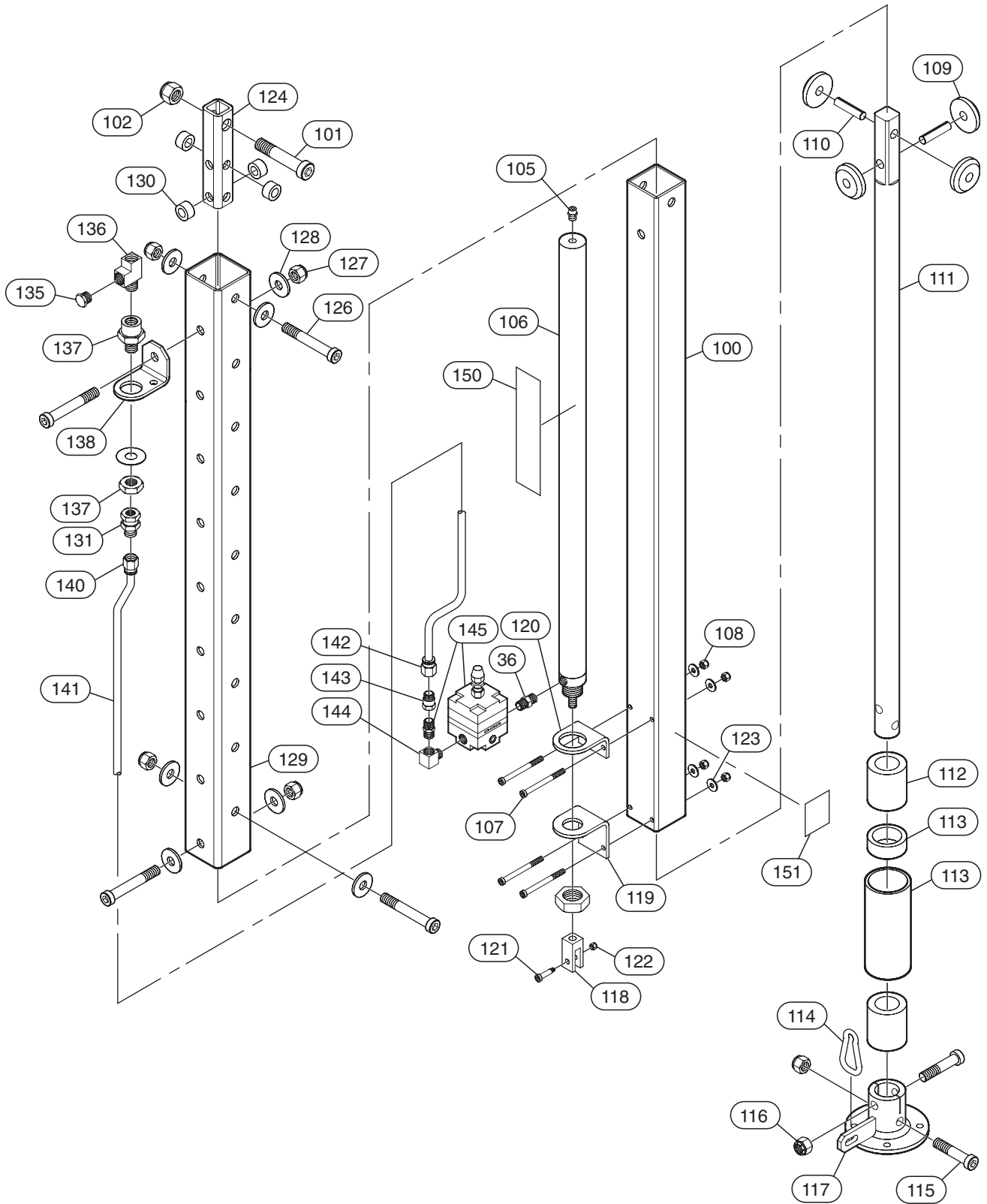
Torque Tube

Refer to Dwg. MHP2475 on page 14.

1. Install inner support tube (100) in outer support tube (129).
2. Install capscrews (126), nuts (127) and washers (128).
3. Install inner shaft assembly (109-117).
4. Install air cylinder (106).
5. Install capscrews (107), nuts (108) and washers (123).
6. Connect air cylinder connecting clip (114) to attachment plate (117).
7. Install the torque tool in the torque tube.
8. Connect main air supply to regulator at connector (142).
9. Turn on the main supply to the torque tube.
10. Adjust regulator (145) adjustment knob so equal effort is required to raise and lower tube. Refer to "INSTALLATION" section.

SERVICE NOTES

IRZ-TT-100 AND IRZ-TT-250 TORQUE TUBE ASSEMBLY DRAWING



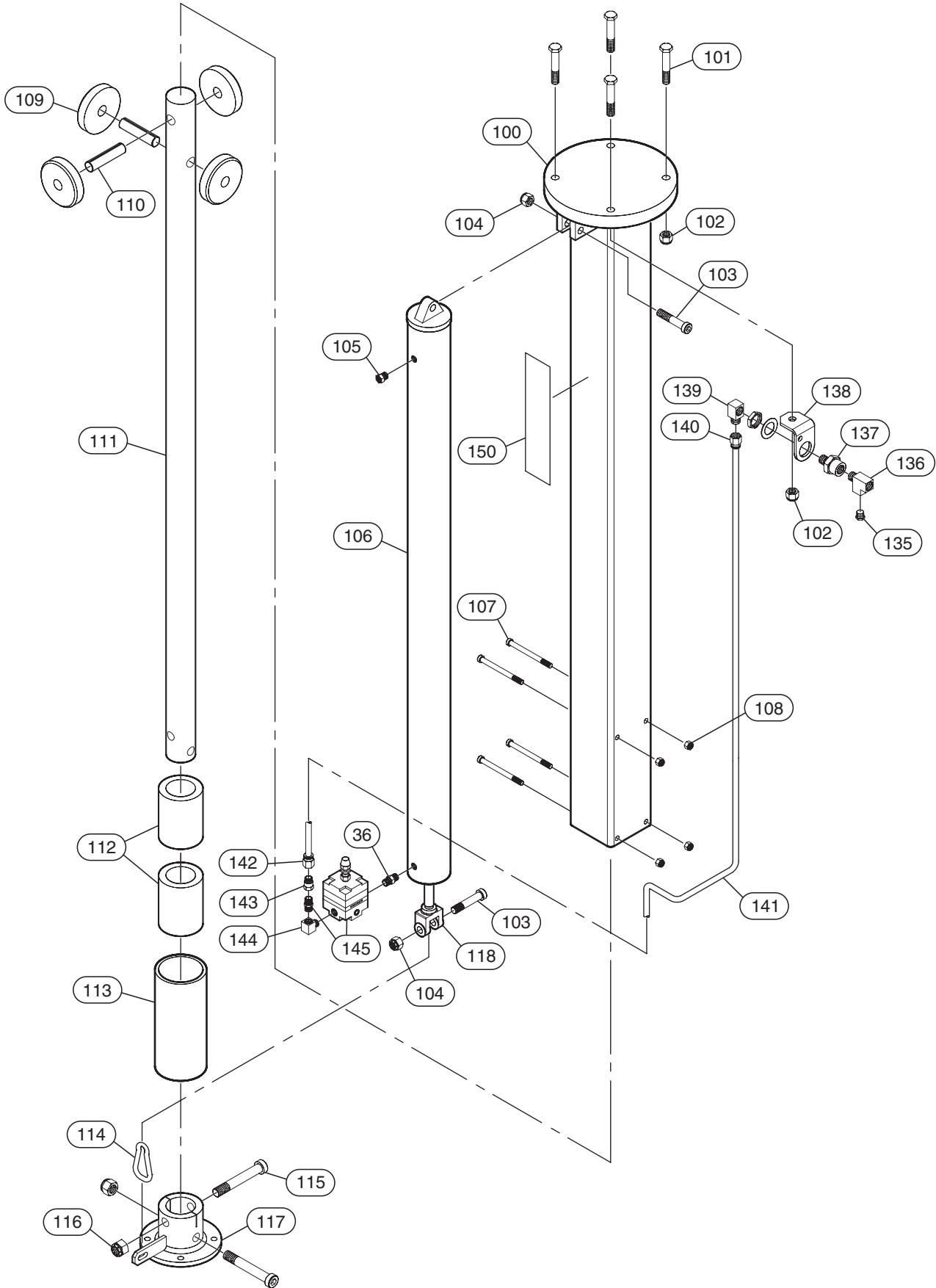
(Dwg. MHP2475)

IRZ-TT-100 AND IRZ-TT-250 TORQUE TUBE ASSEMBLY PARTS LIST

Item No.	Description of Part	Qty Total	Part Number	
			IRZ-TT-100	IRZ-TT-250
---	Torque Tube Assembly	1	54044227	54041819
---	Cylinder Air Supply Kit		90050	
100	Inner Support Tube	1	54044235	54041827
101	Capscrew	1	72646M	
102	Locknut	1	75587M	
• 105	Vent	1	90334	
• 106	Cylinder	1	54044342	54041751
107	Capscrew	4	54044376	54041926
108	Locknut	4	75528M	
109	Wheel	4	54044250	54041843
110	Pin	2	54044359	54041918
111	Shaft	1	54044292	54041884
112	Bushing	2	54044334	54041942
113	Housing	1	54044300	---
	Spacer		---	54041900
• 114	Connecting Clip	1	54041280	
115	Capscrew	2	74215	54041934
116	Locknut	2	75518M	75563M
117	Attachment Plate	1	54044268	54041850
118	Clevis	1	54041744	
119	Cylinder Bracket, Rod End	1	54044276	54041868
120	Cylinder Bracket, Cap End	1	54044284	54041876
121	Shoulder Bolt	1	70442	
122	Locknut	1	75552	
123	Washer	4	74503M	
124	Suspension Tube	1	54041892	
125	Spacer	1	54044326	
126	Capscrew	4	54044375	54044060
127	Locknut	4	75617	
128	Washer	See ()	74557 (7)	74557 (8)
129	Outer Support Tube	1	54044243	54041835
130	Spacer	4	---	54044219
131	Fitting, Reducer	1	---	10727
135	Plug	1	54044391	
136	Fitting, Tee	1	54044409	
137	Fitting, Bulkhead	1	54028204	
138	Bracket	1	54044318	
• 140	Fitting, Connector	1	54044383	93977
141	Tube, 3/8 in. Black	5 ft.	93980-B	
• 142	Fitting, Connector	1	93977	
143	Fitting, Coupling	1	10466	
144	Fitting, Elbow	1	10375	
• 145	Regulator	1	13825	
150	Label, Zimmerman	1	54033030	
151	Nameplate	1	58258733	

• Recommended Spare.

IRZ-TT-500 TORQUE TUBE ASSEMBLY DRAWING



(Dwg. MHP2476)

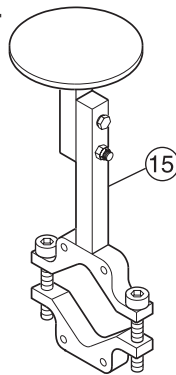
IRZ-TT-500 TORQUE TUBE ASSEMBLY PARTS LIST

Item No.	Description of Part	Qty Total	Part Number	Item No.	Description of Part	Qty Total	Part Number
---	Torque Tube Assembly	1	54044417	115	Capscrew	2	54044524
100	Support Tube	1	54044425	116	Locknut	2	75529M
101	Capscrew	4	72022	117	Attachment Plate	1	54044458
102	Locknut	4	75585	118	Clevis	1	54044508
103	Capscrew	2	72019	135	Plug	1	54044391
104	Locknut	2	75518	136	Fitting, Tee	1	54044409
• 105	Vent	1	93883	137	Fitting, Bulkhead	1	54028204
• 106	Cylinder	1	54044516	138	Bracket	1	54044318
107	Capscrew	4	54044524	139	Fitting, Elbow	1	54028212
108	Locknut	4	75616	• 140	Fitting, Connector	1	54044383
109	Wheel	4	54044441	141	Tube, 3/8 in. Black	5 ft.	93980-B
110	Pin	2	54044474	142	Fitting, Connector	1	93977
111	Shaft	1	54044433	143	Fitting, Coupling	1	10466
112	Bushing	2	54044490	144	Fitting, Elbow	1	10375
113	Housing	1	54044466	• 145	Regulator	1	
• 114	Connecting Clip	1	54044482	150	Label, Zimmerman	1	54033030

• Recommended Spare.

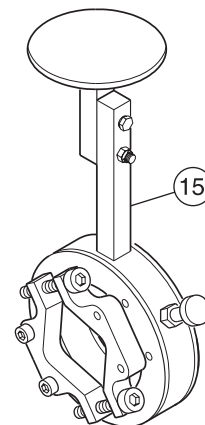
TOOL HOLDER DRAWINGS AND PARTS LIST

Two Axis Tool Holder



(Dwg. MHP1274)

Tool Holder



(Dwg. MHP1699)

Item No.	Description of Part	Qty Total	Part Number	Item No.	Description of Part	Qty Total	Part Number
15	Two Axis Tool Holder Assembly	1	52000	15	Tool Holder Assembly 360°	1	52100

PARTS ORDERING INFORMATION

The Torque Tube is designed and constructed to provide long, trouble-free service. In time it may become necessary to order and install new parts to replace those that have been subjected to wear.

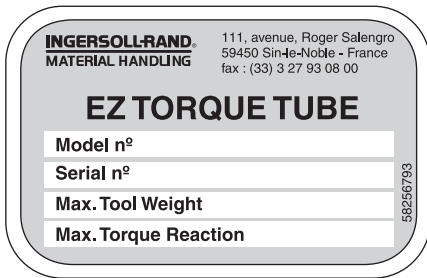
Use of replacement parts other than genuine **Ingersoll-Rand** may result in decreased performance, and may, at the company's option invalidate the warranty. For prompt service and genuine **Ingersoll-Rand** parts, provide your nearest Distributor with the following:

1. Complete unit model number.
2. Part number and part description as shown in this manual.
3. Quantity required.

For your convenience and future reference it is recommended that the following information be recorded:

Model Number _____

Date Purchased _____



Return Goods Policy

Ingersoll-Rand will not accept any returned goods for warranty or service work unless prior arrangements have been made and written authorization has been provided from the location where the goods were purchased.

NOTICE

• **Continuing improvement and advancement of design may produce changes to this unit which are not included in this manual. Manuals are periodically revised to incorporate changes. Always check the manual edition number on the front cover for the latest issue.**

Disposal

When the life of the unit has expired, it is recommended that the unit be disassembled, degreased and parts separated as to materials so that they may be recycled.

For additional information contact:

Ingersoll-Rand
Zimmerman Handling Systems
 1872 Enterprise Drive
 Rochester Hills, MI 48309
 Phone: (248) 293-5700
 Fax: (248) 293-5800

or

Ingersoll-Rand
 Douai Operations
 111, avenue Roger Salengro
 59450 Sin Le Noble, France
 Phone: (33) 3-27-93-08-08
 Fax: (33) 3-27-93-08-00

For additional information on the following products order the publication by the referenced Part/Document Number listed:

Publication	Part/Document Number	Publication	Part/Document Number
Jib Crane	MHD56209	Z-Rail System	MHD56159

WARRANTY

Limited Warranty

Ingersoll-Rand Company (I-R) warrants to the original user its Products to be free of defects in material and workmanship for a period of one year from the date of purchase. **I-R** will repair, without cost, any Product found to be defective, including parts and labor charges, or at its option, will replace such Products or refund the purchase price less a reasonable allowance for depreciation, in exchange for the Product. Repairs or replacements are warranted for the remainder of the original warranty period.

If any Product proves defective within its original one year warranty period, it should be returned to any Authorized **I-R** Material Handling Service Distributor, transportation prepaid with proof of purchase or warranty card.

This warranty does not apply to Products which **I-R** has determined to have been misused or abused, improperly maintained by the user, or where the malfunction or defect can be attributed to the use of non-genuine **I-R** parts.

I-R makes no other warranty, and all implied warranties including any warranty of merchantability or fitness for a particular purpose are limited to the duration of the expressed warranty period as set forth above. I-R's maximum liability is limited to the purchase price of the Product and in no event shall I-R be liable for any consequential, indirect, incidental, or special damages of any nature rising from the sale or use of the Product, whether based on contract, tort, or otherwise.

Note: Some states do not allow limitations on incidental or consequential damages or how long an implied warranty lasts so that the above limitations may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

Important Notice

It is our policy to promote safe delivery of all orders.

This shipment has been thoroughly checked, packed and inspected before leaving our plant and receipt for it in good condition has been received from the carrier. Any loss or damage which occurs to this shipment while enroute is not due to any action or conduct of the manufacturer.

Visible Loss or Damage

If any of the goods called for on the bill of lading or express receipt are damaged or the quantity is short, do not accept them until the freight or express agent makes an appropriate notation on your freight bill or express receipt.

Concealed Loss or Damage

When a shipment has been delivered to you in apparent good condition, but upon opening the crate or container, loss or damage has taken place while in transit, notify the carrier's agent immediately.

Damage Claims

You must file claims for damage with the carrier. It is the transportation company's responsibility to reimburse you for repair or replacement of goods damaged in shipment. Claims for loss or damage in shipment must not be deducted from the **Ingersoll-Rand** invoice, nor should payment of **Ingersoll-Rand** invoice be withheld awaiting adjustment of such claims as the carrier guarantees safe delivery.

You may return products damaged in shipment to us for repair, which services will be for your account and form your basis for claim against the carrier.

United States Office Locations

Technical Support

**Ingersoll-Rand
Zimmerman Handling
Systems**
1872 Enterprise Drive
Rochester Hills, MI 48309
Phone: (248) 293-5700
Fax: (248) 293-5800

For Order Entry and Order Status:

**Ingersoll-Rand
Global Logistics**
P.O. Box 618
510 Hester Drive
White House, TN 37188
Phone: (866) 474-8665
Fax: (615) 672-0854

Web Site:
www.irco.com

Regional Sales Offices

Annandale, NJ
P.O. Box 970
1467 Route 31 South
Annandale, NJ 08801
Phone: (908) 238-7000
Fax: (908) 238-7048

International Office Locations

Offices and distributors in principal cities throughout the world. Contact the nearest **Ingersoll-Rand** office for the name and address of the distributor in your country or write/fax to:

Canada

**National Sales Office
Regional Warehouse
Toronto, Ontario**
51 Worchester Road
Rexdale, Ontario
M9W 4K2
Phone: (416) 213-4500
Fax: (416) 213-4510
Order Desk
Fax: (416) 213-4506

Latin America Operations

Ingersoll-Rand
730 N.W. 107 Avenue
Suite 300, Miami, FL
33172-3107
Phone: (305) 559-0500
Fax: (305) 222-0864

Europe, Middle East and Africa

**Ingersoll-Rand
Douai Operations**
111, avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 3-27-93-08-08
Fax: (33) 3-27-93-08-00

Asia Pacific Operations

Ingersoll-Rand Ltd.
42 Benoi Road
Jurong, Singapore 629903
Phone: 65-861-1555
Fax: 65-862-1373

Russia

Ingersoll-Rand Co.
Presnensky Val
19, Moscow, Russia 123557
Phone: (7) 095-933-03-24
Fax: (7) 095-737-01-48

Australia

Ingersoll-Rand Ltd.
Landmark Corporate Center
Level 2
454-472 Nepean Highway
Frankston, Vic 3199
Australia
Phone: 61 3 8781 1600
Fax: 61 3 8781 1611