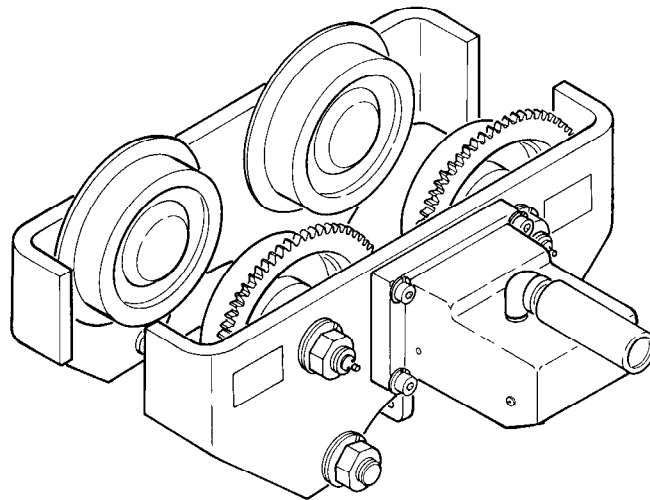


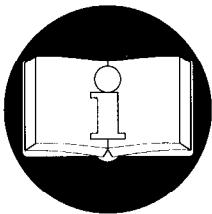
# **PARTS, OPERATION AND MAINTENANCE MANUAL\***

for

## **PALAIR PLUS SERIES HOIST MODELS TA2E and TA2N AIR POWERED TROLLEYS**



\* This manual is a supplement to, and must be accompanied by, INGERSOLL-RAND Palair Plus Hoist manual (Form MHD56043) to make up a complete hoist and trolley manual for Models TA2E and TA2N.



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

### **! WARNING**

**Do not use this trolley for lifting, supporting, or transporting people or lifting or supporting loads over people.**

**Always operate, inspect and maintain this trolley in accordance with American National Standards Institute safety code (ASME B30.16) and any other applicable safety codes and regulations.**

**Refer all communications to the nearest Ingersoll-Rand Material Handling Products Office or Distributor.**

Form MHD56059

Edition 1

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**INGERSOLL-RAND®**  
**MATERIAL HANDLING**

## 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 must read and understand 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* personal 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* personal 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 *minor* personal 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

#### WARNING

- Do not use this trolley or attached equipment for lifting, supporting, or transporting people or lifting or supporting loads over people.
- The supporting structures and load-attaching devices used in conjunction with this trolley must provide an adequate safety factor to handle the rated load, plus the weight of the trolley and attached equipment. This is the customer's responsibility. If in doubt, consult a qualified structural engineer.

The National Safety Council, Accident Prevention Manual for Industrial Operations, Eighth Edition and other recognized safety sources make a common point: Employees who work near suspended loads or assist in hooking on 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 or pulling 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.

To our interpretation, **INGERSOLL-RAND Material Handling** trolleys are manufactured in accordance with the latest ASME standards.

However, contrary to common belief, the Occupational Safety and Health Act of 1970, as we understand it, generally places the burden of compliance with the user, not the manufacturer. Many OSHA requirements are not concerned or connected with the manufactured product but are, rather, associated with the final installation: "It is the owner's responsibility and user's responsibility to determine the suitability of a product for any particular use. Check all applicable industry, trade association, federal, state and local regulations. Read all operating instructions and warnings before operation."

**Rigging:** It is the responsibility of the operator to exercise caution, use common sense and be familiar with proper rigging techniques. See ANSI/ASME B30.9 for rigging information, American National Standards Institute, 1430 Broadway, New York, NY 10018.

#### NOTICE

- **INGERSOLL-RAND Replacement Parts** are specifically designed to ensure optimum performance of your equipment. Use of other than genuine **INGERSOLL-RAND Material Handling** parts may adversely affect safe operation and will invalidate the warranty.

## SAFE OPERATING INSTRUCTIONS

The following warnings and operating instructions have been adapted in part from American National (Safety) Standard ASME B30.16 (Overhead Hoists) and are intended to avoid unsafe operating practices which might lead to personal injury or property damage.

**INGERSOLL-RAND** recognizes that most companies who use hoists and trolleys have a safety program in force at their facility. In the event 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.

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.

Refer to the hoist manual for additional precautions and instructions.

1. Only allow qualified people (trained in safety and operation) to operate the trolley.
2. Only operate a trolley if you are physically fit to do so.
3. When a "DO NOT OPERATE" sign is placed on the trolley controls, do not operate the trolley until the sign has been removed by designated personnel.
4. Before each shift, the operator should inspect the trolley for wear or damage.
5. Never use a trolley that inspection indicates is defective.
6. Periodically, inspect the trolley thoroughly and replace worn or damaged parts.
7. Lubricate the trolley regularly.
8. Using the hoist, only lift loads less than or equal to the lower rated capacity of the trolley or hoist.
9. Only attach a hoist having a rated capacity equal to or less than the capacity of the trolley.
10. When using two hoists to suspend one load, select two trolleys each having a rated capacity equal to or more than the load. This provides adequate safety in the event of a sudden load shift or failure of one trolley.
11. Never place your hand inside the throat area of a hook.
12. Only operate a trolley when the load is centered under the trolley. Do not "side pull" or "yard."
13. Pay attention to the load at all times when operating the trolley.
14. Make sure all people are clear of the load path. Do not lift a load over people.
15. Never use the trolley for lifting or lowering people, and never allow anyone to stand on a suspended load.
16. Do not swing a suspended load.
17. Never suspend a load for an extended period of time.
18. Never leave a suspended load unattended.
19. Never weld or cut a load suspended by the trolley.
20. Always rig the load properly and carefully.
21. Remove all loads before performing any maintenance.
22. Avoid collision or bumping of trolley.
23. After use, properly secure trolley and all loads.

## WARNING LABEL

### NOTICE

- Trolley warning label is located on sideplate.

Each trolley is supplied from the factory with the warning label shown. If the label is not attached to your unit, order a new label and install it. See the parts list for the part number. Label is shown larger than actual size.

**WARNING**  
**DO NOT**  
**USE FOR**  
**HUMAN**  
**TRANSPORT**

## SPECIFICATIONS

<b>Maximum Load Capacity</b>		2200 lbs	1000 kg
<b>Beam Size</b>	<b>Minimum Width</b>	3-1/4 in	83 mm
	<b>Maximum Width</b>	5-1/2 in	140 mm
	<b>Minimum Height</b>	6 in	152 mm
<b>Minimum Turning Radius</b>		4 ft	1.2 m
<b>Working Pressure *</b>		70 - 100 psig	5 - 7 bar/500 - 700 kpa
<b>Trolley Travel Speed **</b>	<b>Rated Load</b>	62 ft/min	19 m/min
	<b>No Load</b>	70 ft/min	21 m/min
<b>Maximum Air Consumption</b>		42 scfm	1.2 cu. m/min

The following air supply specifications should be maintained at the trolley air motor:

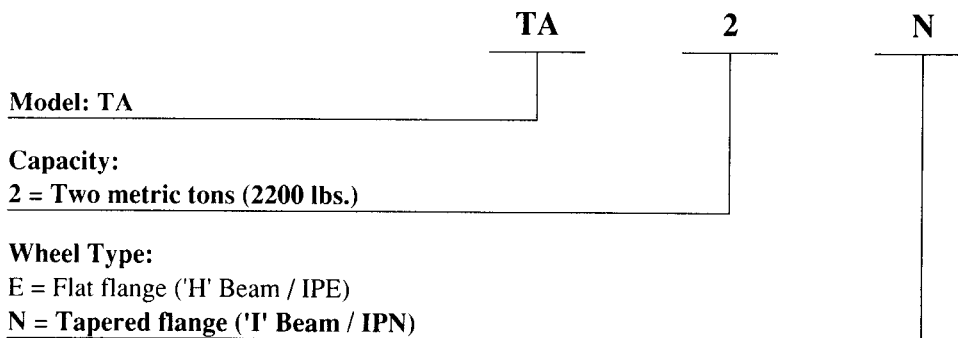
<b>Air Pressure</b>	90 psig	6.2 bar / 620 kpa
<b>Air Filtration</b>	50 micron	50 micron
<b>Hose Size</b>	1/2 inch I.D.	13 mm I.D.

\* Recommended operating pressure: 90 psig (6.2 bar/620 kpa).

\*\* Speed variable depending on pressure supplied to the PHS pendant.

**Model Code:**

**Example - TA2N**



# INSTALLATION

## ! WARNING

- Before installing read “SAFETY INFORMATION.”
- Make sure trolley wheels are compatible with the beam. Tapered wheels are for use only with "I" beams (IPN); flat tread wheels are for use only with "H" type beams (IPE).
- To avoid an unbalanced load which may damage the trolley, the spacers (207) must be installed equally between side plates (205, 206) and hoist bracket (213) to ensure hoist is centered on trolley. If side plates (205, 206) can be spread further apart, install additional spacers (207) as necessary on the outside of side plates (205, 206).

## NOTICE

- Trolley wheels ride on the top of the lower flange of the beam.
- During assembly lubricate gears, nuts, capscrews, and all machined threads with applicable lubricants. Use of antiseize compound and/or thread lubricant on capscrew and nut threaded areas prevents corrosion.

### Trolley Installation Over the Open End of the Beam

1. Preadjust trolley for installation using Table 1, Dwg. MHTPA0354 and the following instructions.
2. Insert suspender shafts (208) through hoist bracket (213).
3. Using Table 1 install an equal number of adjusting spacers (207) to each side of hoist bracket (213), on suspender shafts (208).
4. Install side plates (205, 206) by sliding on suspender shafts (208).
5. Install remaining adjusting spacers (207) equally to the outside of side plates (205, 206) on suspender shafts (208).

**Table 1**

Beam Size		Spacer Arrangement	
inches	mm	Between each side plate and hoist bracket.	Outside of each side plate.
3 - 1/4	82.5	1	9
3 - 1/2	89	2	8
3 - 3/4	95	3	7
4	101	4	6
4 - 1/4	108	5	5
4 - 1/2	114	6	4
4 - 3/4	120	7	3
5	127	8	2
5 - 1/4	133	9	1
5 - 1/2	139	10	0

6. Loosely install lockwashers (203) and nuts (212) on suspender shafts (208). Do not tighten nuts to final torque.
7. Remove the rail stop and slide assembled trolley onto the rail.
8. Torque nuts (212) to 25 - 30 ft.lbs. (34 - 40 N.m.).

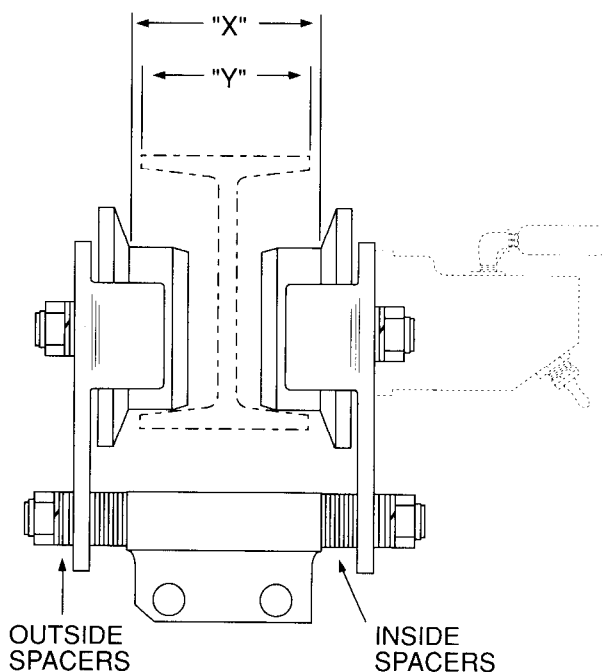
## NOTICE

- The total clearance between the beam and the trolley wheel flanges is 3/32 to 5/32 inches (2 to 4 mm) when trolley is installed correctly. As shown in Dwg. MHTPA0354, the difference between dimensions X and Y equals the total clearance.

9. Verify trolley flange to beam total clearance.
10. Upon completion of installation, conduct initial operating checks as described in "OPERATION" section.

### Trolley Installation from Underneath the Beam

1. Preadjust trolley for installation using Table 1, Dwg. MHTPA0354 and the following instructions.
2. Insert suspender shafts (208) through hoist bracket (213).
3. Install an equal number of adjusting spacers (207) to each side of hoist bracket (213), on suspender shafts (208).
4. Install geared side plate (206) by sliding on suspender shafts (208).
5. Install one-half of the remaining adjusting spacers (207) to the outside of the geared side plate (206), on suspender shafts (208).



(Dwg. MHTPA0354)

6. Install lockwashers (203) and nuts (212) to the outside of the geared side plate (206), on the suspender shafts (208).
7. Support the assembled portion of trolley on the rail track.
8. Install plain side plate (205).
9. To the outside of the plain side plate (205) place the remaining adjusting spacers (207) in equal numbers, the lockwashers (203) and nuts (212) on the suspender shafts (208).
10. Torque nuts (212) to 25 - 30 ft.lbs. (34 - 40 N.m.).
2. Secure power unit to trolley by installing capscrews (225) and lockwashers (224) through plate (222) and into geared side plate (206).
3. To connect pendant air hoses to hose adapters (259), slide hose fully over hose adapter (259) barbed fittings.



- **To avoid damaging the pendant hose, make sure the strain relief cable, not the pendant hose, is supporting the weight of the pendant.**

## NOTICE

• **The total clearance between the beam and the trolley wheel flanges is 3/32 to 5/32 inches (2 to 4 mm) when trolley is installed correctly. As shown in Dwg. MHTPA0354, the difference between dimensions X and Y equals the total clearance.**

11. Verify trolley flange to beam total clearance.
12. Upon completion of installation, conduct initial operating checks as described in "OPERATION" section.

## Hoist Installation

### NOTICE

• **This manual is a supplement to, and must be accompanied by, INGERSOLL-RAND Palair Plus Hoist manual (Form MHD56043) to make up a complete hoist/trolley manual for models TA2E and TA2N. Capscrews (item 35A) are supplied with hoist for installation of hoist to trolley. Reference hoist manual Dwg. MHTPA0235, trolley manual Dwg. MHTPB0327 and "TROLLEY ASSEMBLY PARTS LIST" section for identification of parts.**

1. Remove top hook assembly:
  - a. Remove nuts (44) and capscrews (35).
  - b. Remove top hook assembly (110).
2. Install hoist to trolley:
  - a. Support hoist below trolley and align holes in hoist housing to trolley hoist bracket (213).
  - b. Install capscrews (35A) and nuts (44) to attach hoist to trolley bracket.

## Power Unit Installation

### NOTICE

• **To prevent damage to the power unit, install trolley to beam and hoist to trolley before installing power unit to trolley.**

1. Align trolley assembly geared wheels (201) and pinion gear (214). Liberally coat pinion gear (214) and geared wheel (201) teeth with ARO 33153 grease (EP #1).

## Air System Requirements

### Air Lines

The inside diameter of the hoist air supply hoses must not be smaller than 1/2 in. (13 mm) and 7/16 in. (11 mm) for hose fittings. Before making final connections, all air supply lines should be purged with moisture-free air before connecting to trolley power unit inlet. 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.

### Air Line Lubricator (optional)

The use of an air line lubricator is not required for the Palair Plus series. If lubrication of the air is desired, use a lubricator having an inlet and outlet size at least as large as the inlet size to the trolley power unit. Install the lubricator as close to the air inlet on the trolley power unit as possible.

### Air Line Filter

If this trolley is to be used in corrosive or moist atmospheres it is recommended that an air line strainer/filter be installed within 3 feet (1 meter) of the motor to prevent dirt from entering the motor. The strainer/filter should provide 50 micron filtration and include a moisture trap. Clean strainer/filter periodically to maintain its operating efficiency.

### Moisture in Air Lines

Moisture that reaches the trolley power unit 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 trolley power unit, or an aftercooler at the compressor that cools the air prior to distribution through the supply lines, are also helpful.

### Power Unit (air motor)

For optimum performance and maximum durability of parts, operate the trolley power unit within the operating ranges provided in the "SPECIFICATIONS" section.

## OPERATION

The **four most important** aspects of trolley operation are:

1. Follow all safety instructions when operating trolley.
2. Allow only qualified people to operate equipment.
3. Subject each trolley to a regular inspection and maintenance procedure.
4. Be aware of the hoist and trolley capacity and weight of load at all times.

### **⚠ WARNING**

• **Severe injury can be caused by:**

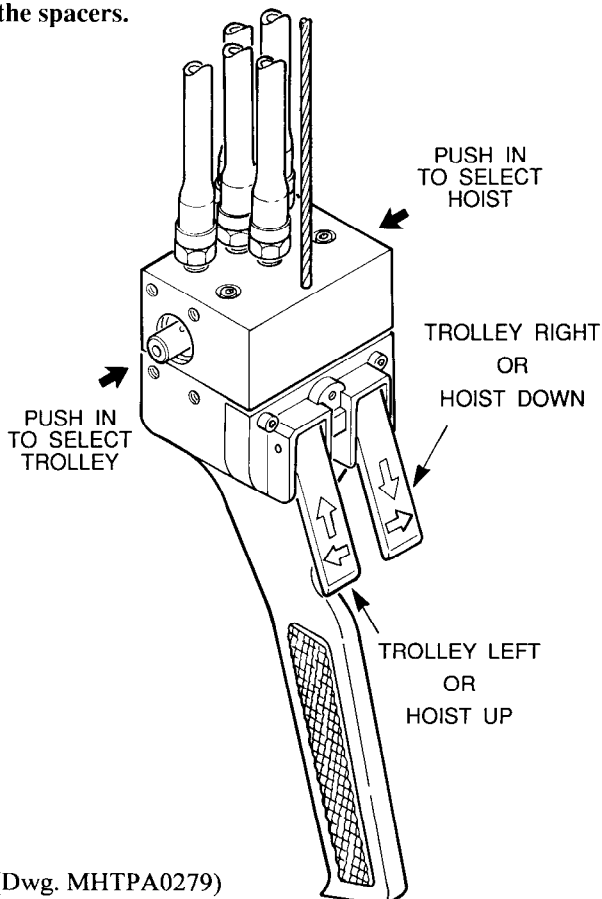
1. **Falling under a moving load.**
2. **Being caught between a moving load and an object.**
3. **Tripping over an unseen object.**

To avoid injury:

1. **Operate the trolley from a position that allows you to observe the load and the intended path of movement of the load.**
2. **Do not walk in the path of a moving trolley, or walk backwards when moving a trolley.**

Following these rules will allow you to stay out of the path of the load and also look in the direction you are moving.

• To avoid an unbalanced load which may damage the trolley, the hoist must be centered under the trolley. Ensure hoist bracket (213) is centered under trolley by the spacers.



(Dwg. MHTPA0279)

### **Initial Operating Checks**

1. After installation, ensure the hoist is centered below the trolley.
2. Check for air leaks in supply hose and fittings to pendant and power unit.
3. Raise a load equal to the lower of the rated capacities of either the trolley or hoist a few inches (cm) off the floor.
4. Operate the trolley along the entire length of the beam.
5. Inspect trolley performance when raising, moving and lowering test load(s). Trolley must operate smoothly and at rated specifications prior to being placed in service for general use.
6. Check that trolley movement complies with the pendant lever arrows.

### **Pendant Operation**

#### **Two lever with button selector pendant:**

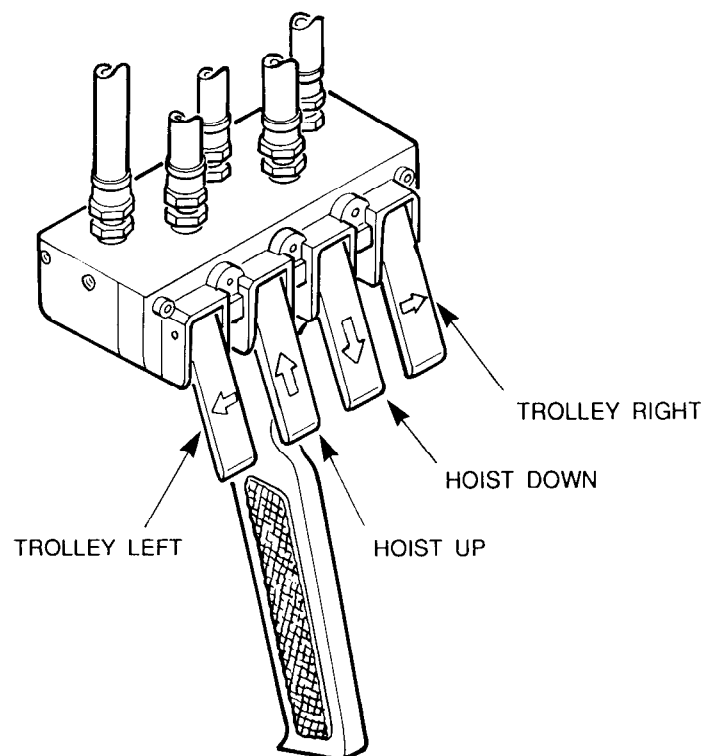
(Ref. Dwg. MIITPA0279)

1. This pendant will only perform one function at a time (i.e., operate the hoist or trolley as determined by the button selector).
2. Shift button to select hoist or trolley operation.
3. Operate levers to raise or lower hoist or move trolley as indicated by direction arrows.

#### **Four lever type pendant:**

(Ref. Dwg. MHTPB0254)

1. Operate levers to raise or lower hoist and move trolley as indicated by direction arrows.



(Dwg. MHTPB0254)

There are two types of inspection: the frequent inspection performed by the operator and periodic inspections performed by qualified personnel.

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.

Any deficiency revealed through inspection must be reported to an appointed person. A determination must be made as to whether a deficiency constitutes a safety hazard before resuming operation of the trolley or hoist.

## Records and Reports

Some form of inspection record should be maintained for each trolley, listing all points requiring periodic inspection. A written report should be made quarterly on the condition of the critical parts (c.g. wheels, bearings, gears, side plates and hoist suspender) of each trolley. These reports should be dated, signed by the person who performed the inspection, and kept on file where they are readily available to authorized personnel.

### NOTICE

**• During assembly/disassembly visually inspect each component for distortion, wear and damage. Replace items indicating damage, distortion and/or excessive wear. Proper use, inspections and maintenance will increase the life and usefulness of your INGERSOLL-RAND equipment.**

## Frequent Inspection

On trolleys in continuous service, frequent inspection should be made at the beginning of each shift. In addition, visual inspections should be conducted during regular service for any damage or evidence of malfunction.

1. **OPERATION.** Operate the trolley so that it travels a few feet (1 meter). During the few feet (1 meter) of travel, check for visual signs or abnormal noises which could indicate a defect. Check for smooth operation. Do not operate the trolley until all defects have been corrected.
2. **AIR SYSTEM.** Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks found.
3. **CONTROLS.** During operation of trolley, verify trolley response to pendant use is quick and smooth. If trolley responds slowly or movement is unsatisfactory, do not operate the trolley until all defects have been corrected.

## Periodic Inspection

According to ASME B30.16 (Overhead Hoists), frequency of periodic inspection depends on the severity of usage:

<b>NORMAL</b>	<b>HEAVY</b>	<b>SEVERE</b>
yearly	semi-annually	quarterly

Disassembly may be required for HEAVY or SEVERE usage. Keep accumulative 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.** Check retainer rings, split pins, capscrews and nuts. Replace if missing or damaged and tighten if loose.
2. **ALL COMPONENTS.** Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check gears, shafts and bearings. Replace worn or damaged parts. Clean, lubricate and reassemble.
3. **SUPPORTING STRUCTURE.** Check for distortion, wear and continued ability to support load.
4. **WHEELS.** Check that the trolley wheels track the beam properly and total clearance between wheels and beam equals 3/32 to 5/32 in. (2 to 4 mm). Repair as necessary.
5. **SIDEPLATES.** Check side plates for spreading due to bending. Replace if spreading has occurred.
6. **AIR MOTOR.** Check that loaded and unloaded operation of trolley is within specifications. Verify air connections do not leak, and hoses are in good condition. Verify that trolley air motor operates smoothly, and responds quickly to pendant commands.
7. **LABELS.** Check for presence and legibility. Replace if necessary.

## Trolleys Not in Regular Use

A trolley which has been idle for a period of one month or more, but less than six months, shall be given an inspection conforming with the requirements of "Frequent Inspection".

A trolley which has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of "Periodic Inspection". Standby trolleys shall be inspected at least semi-annually in accordance with the requirements of "Frequent Inspection". If abnormal operating conditions apply trolleys may require more frequent inspections.



## NOTICE

• **Proper use, inspections and maintenance increase the life and usefulness of your INGERSOLL-RAND equipment. During assembly lubricate gears, nuts, capscrews and all machined threads with applicable lubricants. Use of antiseize compound and/or thread lubricant on capscrew and nut threaded areas prevents corrosion and allows for ease of disassembly of component.**

### Trolley Wheel Shafts

During assembly lubricate trolley wheel shafts with an antiseize compound or thread lubricant as applicable to prevent corrosion.

### Trolley Wheel Bearings

Grease fittings are attached to the trolley wheel shafts for lubricating the wheel bearings with ARO 33153 (EP #1) grease. Inject 2 to 3 strokes of grease through each grease fitting (210) on a quarterly basis.

### Geared Trolley Wheels

Lubricate exposed trolley drive pinion and wheel teeth. Brush with grease as often as necessary to keep teeth liberally covered. If the grease becomes contaminated with sand, dirt or other abrasive materials, clean off old grease and brush on new. For temperatures -20° to 50° F (-29° to 10° C) use EP 1 grease or equivalent. For temperatures 30° to 120° F (-1° to 49° C) use EP 2 grease or equivalent.

## ⚠ CAUTION

• **When greasing pinion and geared wheels make sure excess grease is cleaned off trolley wheel riding surface and track or beam. Failure to keep track and wheel contact surfaces clean could affect the safe operation of the trolley.**

### Power Unit (air motor)

The Palair Plus Hoist series does not require lubrication of the air.

If an air lubricator is installed it should be replenished daily and set to provide 2 to 3 drops per minute of SAE 10W oil. Refer to "ACCESSORIES" section for lubricator and air filter information.

## ⚠ CAUTION

• **Shut off air supply before filling air line lubricator.**

## TROUBLESHOOTING

This section provides basic information for troubleshooting this trolley. Determination of specific causes to problems are best identified by thorough inspection. The chart below provides a brief guide to common trolley problems, probable causes and solutions.

PROBLEM	CAUSE	SOLUTION
Trolley will not operate.	Trolley is overloaded.	Reduce load to within rated capacity.
	Trolley wheel bearings are damaged.	Replace trolley wheels (bearings cannot be replaced separately).
	Pinion shaft damaged.	Replace pinion shaft.
	Geared wheel(s) damaged.	Replace geared wheel(s).
	Motor damaged.	Disassemble, inspect and repair or replace defective air motor parts.
	Low supply air pressure.	Check air supply line pressure. 90 psig at 42 scfm (6.2 bar / 620 kpa at 1.2 cubic m/min) required for efficient operation.
	Loose hose connections.	Check all hose fitting connections. Repair all leaking connections and damaged hose sections.
	Pendant malfunction.	Troubleshoot and repair or replace defective pendant parts.
Trolley won't stop or trolley wheels slip.	Oil or grease on track or beam.	Clean track and trolley wheels.
	Damaged brake lining.	Disassemble air motor and replace brake lining.
	Pendant malfunction.	Troubleshoot and repair or replace defective pendant parts.
Poor motor performance or loss of power.	Low supply air pressure.	Check air supply line pressure. 90 psig at 42 scfm (6.2 bar / 620 kpa at 1.2 cubic m/min) at trolley power unit required for efficient operation.
	Loose hose connections.	Check all hose fitting connections. Repair all leaking connections and damaged hose sections.
	Worn or broken rotor blades.	Disassemble power unit and motor assembly. Repair or replace motor or rotor blades.
	Worn or broken motor rotor bearings.	Disassemble power unit and motor assembly Replace bearings.
	Foreign contaminants building up in motor.	Disassemble power unit, clean parts carefully and reassemble. If dirt or foreign material is common in the air supply, install a 50 micron filter to protect the air motor.

## ⚠ WARNING

- Never perform maintenance on the trolley while it is supporting a load. A falling load can cause injury or death of personnel and damage to property.
- Before starting maintenance, tag controls:  
**DANGER - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.**
- Only allow qualified service personnel to perform maintenance.
- Disconnect air supply from trolley and hoist prior to conducting maintenance.

## NOTICE

- Proper use, inspections and maintenance increase the life and usefulness of your Ingersoll-Rand equipment. During assembly lubricate gears, nuts, capscrews and all machined threads with applicable lubricants. Use of antiseize compound and/or thread lubricant on capscrew and nut threaded areas prevents corrosion and allows for ease of disassembly of component.

### General Assembly / Disassembly Instructions

1. During assembly/disassembly steps for installation and/or repair visually inspect components for distortion, wear and damage. Replace any item indicating damage, distortion and/or excessive wear.
2. **Do not** disassemble further than required to accomplish repair. A good part can be damaged during the course of disassembly.
3. **Do not** use excessive force to remove or install parts. Use proper tools for the installation of press fit parts. During disassembly, use a soft hammer to tap around the outside of parts that are stuck together due to corrosion.
4. **Do not** use a flame to heat a part for ease in installation. During disassembly, only use flame to heat a part that is damaged beyond repair; use a procedure that will not result in damage to other parts; and, use this option only after all other reasonable measures have been attempted.
5. **Always** use leather or copper-covered vise jaws to protect threaded and machined surfaces of parts being placed in the vise.
6. When installing bearings, **only** press on the bearing race contacting the component to be installed into. For shafts, press on the inner bearing race; for housings, press on the outer bearing race.
7. **Do not** damage seating surfaces during gasket and 'O'-ring removal. Use wood, plastic or brass removal tools to prevent scoring of machined sealing surfaces.
8. **Always** use only genuine **INGERSOLL-RAND** replacement parts. When ordering specify part number, part description, unit model and serial number.
9. **Do not** perform repairs to trolleys in place. It is recommended that trolleys be removed and repaired in a clean, safe work area.
10. Purge the air system with moisture-free air after any air system repair. Ensure air lines are disconnected from the trolley power unit and hoist during purge.

### Power Unit Disassembly

1. Disconnect air hoses from power unit.
2. Remove capscrews (225) and lockwashers (224).
3. Remove power unit assembly from geared side plate (206).
4. Remove capscrews (220) and lockwashers (221).
5. Remove plate (222). Remove keys (218) from spindle shaft (217).
6. Remove gears (226, 227, 229), washers (223) and thrust race (228) from motor housing (254).

Spindle assembly (214 thru 219) should not be removed from plate (222) unless repair is required.

7. To remove spindle assembly from plate:
  - a. Remove retaining ring (219).
  - b. Tap end of spindle shaft (217) to remove from plate (222).
8. To disassemble spindle assembly:
  - a. Remove retaining ring (219), pinion gear (214), keys (218) and bearing (216) from spindle shaft (217).
9. To remove motor assembly (items 239 thru 251):
  - a. Remove capscrews (238) from brake cone (237).
  - b. Grasping pinion shaft (231) pull assembly free of motor housing (254).
10. To disassemble motor assembly (items 239 thru 251):
  - a. Remove nut (230) and separate components (231 thru 251) using Dwg. MHTPB0328 as a guide.

## Power Unit Assembly

1. Slide end plate (249) on rotor (244) shaft.
2. Install bearing (251) on rotor (244) shaft.

Lubricate gears liberally with ARO 33153 grease (EP #1). Coat rotor blades (245) and inside of cylinder (243) with ARO 29665 spindle oil.

### NOTICE

- **During assembly make sure housing and components are clean.**
- **During installation of bearings (239 & 251) on rotor (244) shaft, press only on the inner race of bearing.**

3. Insert rotor blades (245) into blade slots of rotor (244). Insert with blade straight side facing out.
4. Slide cylinder (243) over rotor (244). Align air inlet slots of cylinder (243) and end plate (249).
5. Install spacer (241) and end plate (240) to rotor (244).
6. Install bearing (239) on rotor (244) shaft.

Lubricate gears liberally with ARO 33153 grease (EP #1).

7. Check motor assembly (items 239 thru 251) operation. Rotor should turn easily in cylinder without binding. If rotor binds, tap splined end lightly to loosen.
8. Install locating pin (250) to end plate (240) and install motor assembly in motor housing (254). Align the locating pin (250) with groove in housing (254).
9. Install brake cone (237) in motor housing (254) and secure with capscrews (238).
10. Install brake lining (236) to brake cone (237).
11. Install spacer (if required) (232), washer (233) and O-ring (234) on pinion shaft (231).

### NOTICE

• **A torque of 2 to 3 inch-lbs. (0.225 - 0.34 N. m.) to rotate spindle in both directions is required for proper installation of brake components. The use of the 0.010 inch (0.25 mm) spacer (232) may or may not be necessary to achieve required torque.**

12. Install finger spring (235). Assemble with fingers facing out (toward pinion shaft (231) splines).
13. Slide pinion shaft (231) over rotor (244) shaft and secure with nut (230).

Lubricate needle bearings in plate (222) with ARO 33153 grease (EP #1) prior to installing gears. Lubricate gears liberally with ARO 33153 grease (EP #1).

14. Install washers (223), thrust race (228) and gears (226, 227, 229) into motor housing (254).
15. If required, reassemble spindle components as follows:
  - a. Install bearing (216), key (218), pinion gear (214) and retaining ring (219) on spindle shaft (217).

Lubricate pinion gear with ARO 33153 grease (EP #1).

16. Install spindle assembly in plate (222). Lock in place with retaining ring (215).
17. Install key (218) on spindle shaft (217).
18. Slide gear (227) onto spindle shaft (217).

Make sure key (218) is properly installed on spindle shaft (217) to hold gear (227).

19. Install plate (222) to motor housing (254) and secure with lockwashers (221) and capscrews (220).
20. Install power unit assembly to trolley geared side plate (206). Secure with lockwashers (224) and capscrews (225).
21. Test trolley and hoist operation as described in the "Testing" section prior to returning to general use.

## Trolley Disassembly

### NOTICE

- **Trolley wheels (200, 201) cannot be disassembled to replace bearings. If bearings are damaged and require replacement, the entire wheel assembly must be replaced.**
  - **Prior to disassembly note the installation of the adjusting spacers (207). Install adjusting spacers (207), during assembly, in the same configuration recorded during disassembly to ensure track flange width and hoist position are retained.**
  - **Prior to disassembly of trolley, first remove trolley power unit and then remove hoist.**
1. Remove nuts (212), lockwashers (203) and adjusting spacers (207) placed on outside of side plates (205, 206).
  2. Remove adjusting spacers (207), suspender shafts (208) and hoist bracket (213).
  3. Remove side plate (205, 206) assemblies from beam track.
  4. To replace trolley wheels remove wheel nuts (204), lockwashers (203) and spacers (202). Remove wheels (200, 201).

If wheel is difficult to remove, gently tap wheel shaft with soft hammer to loosen.

5. Re-assemble trolley as described in the "INSTALLATION" section.
6. Test trolley and hoist operation as described in the "Testing" section prior to returning to general use.

## Testing

Prior to initial use all new, extensively repaired, and altered trolleys shall be tested by, or under the direction of, a qualified person. Document testing by written report confirming the rating of the tested equipment.

### Trolley Operational Test

To ensure proper operation of the trolley conduct the following:

1. Verify that pendant to trolley hoses are properly attached and that trolley movement agrees with the pendant lever arrows.
2. Operate trolley **without** a load. Verify trolley operates smoothly along entire length of the beam.
3. Operate trolley **with** a load. Verify trolley operates smoothly along entire length of the beam.

### Trolley Load Test

### NOTICE

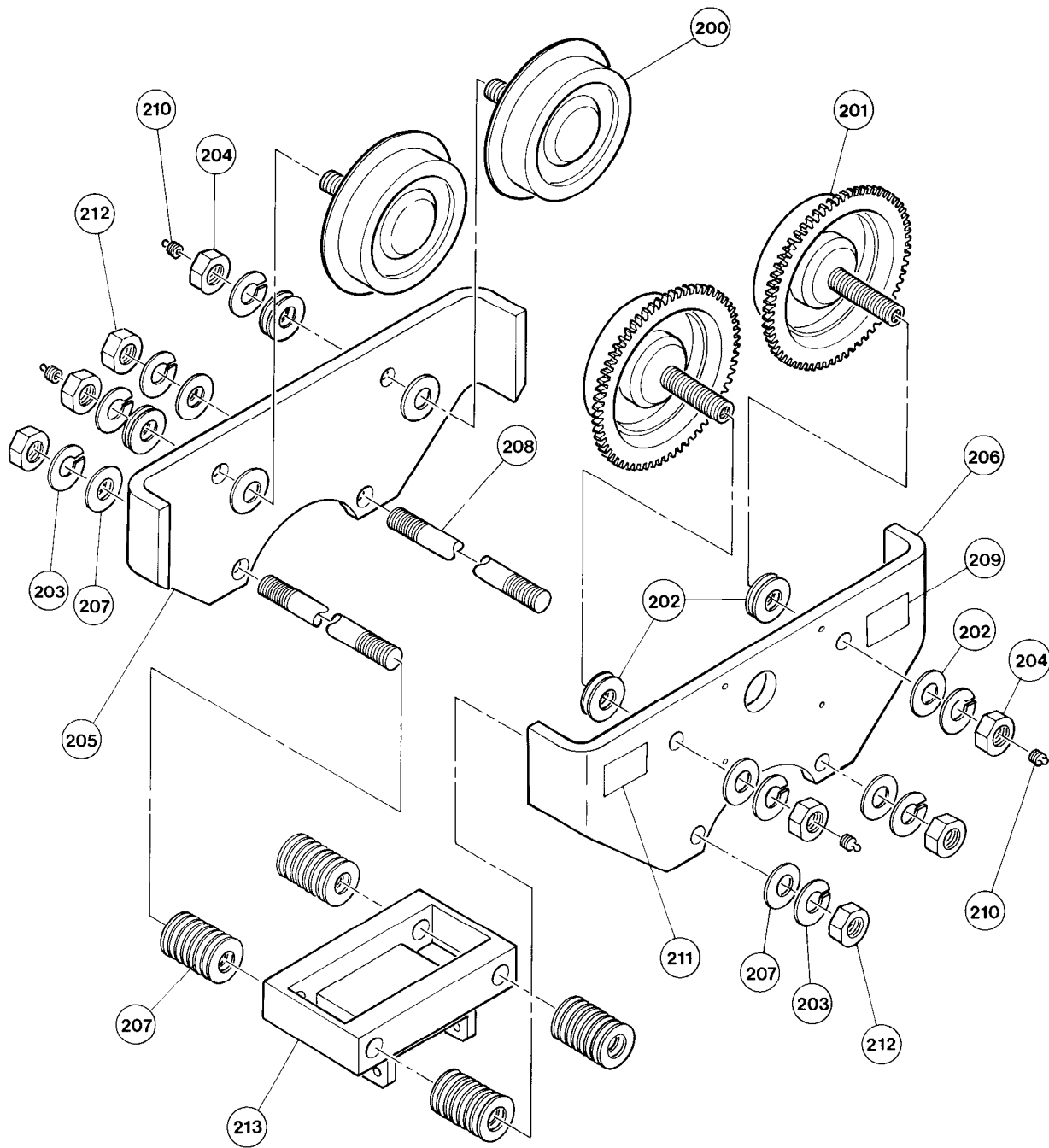
• **Conduct load test with Palair Plus hoist attached to trolley. Refer to "SPECIFICATIONS" section in the Palair Plus hoist manual (Form MHD56043) for applicable maximum hoist load capacity.**

1. With the Palair Plus hoist properly attached, conduct a load test to 125% of the **rated hoist capacity**.

### NOTICE

• **Test specifications of applicable regulations in your area may not agree with those stated in this manual. In the case of a conflict between this manual and any applicable regulation, rule or specification contact the factory or nearest INGERSOLL-RAND Distributor.**

# TROLLEY ASSEMBLY PARTS DRAWING



(Dwg. MHTPB0327)

## TROLLEY ASSEMBLY PARTS LIST

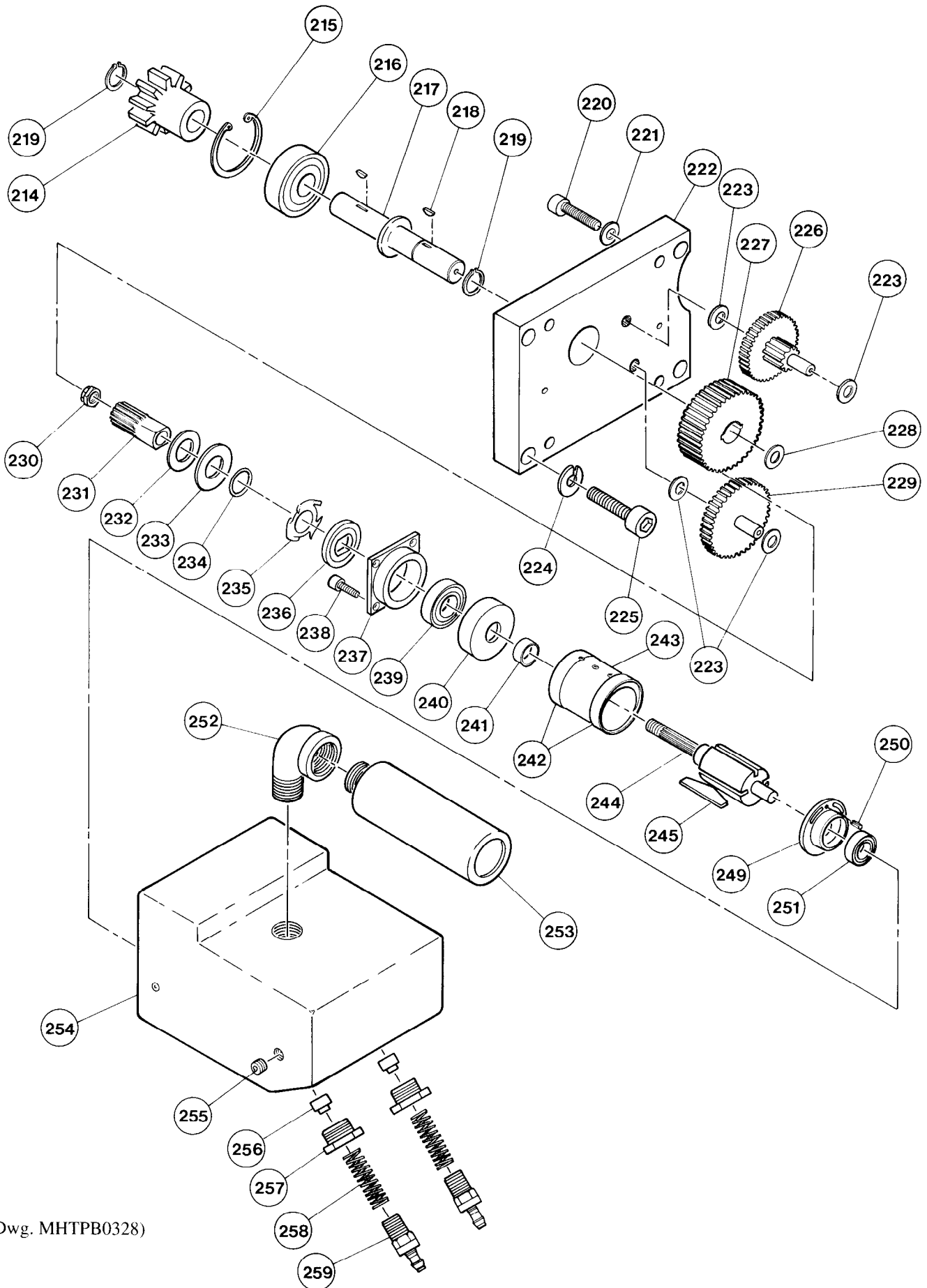
ITEM NUMBER	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
200	Plain Wheel (Tapered track , "I" beam/IPN)	2	45623
	Plain Wheel (Flat track, "H" beam/IPE)		45738
201	Geared Wheel (Tapered track , "I" beam/IPN)	2	45622
	Geared Wheel (Flat track, "H" beam/IPE)		45735
202	Spacer	12	41022
203	Lockwasher	8	Y14-750
204	Wheel Nut	4	Y12-12
205	Side Plate (Plain)	1	45611
206	Side Plate (Geared)	1	45610
207	Adjusting Spacer	40	43014
208	Suspender Shaft	2	43009
209	Warning Label	1	71107130
210	Grease Fitting (included with 200 & 201)	1	6069
211	Nameplate	1	71079859
212	Nut	4	46049
213	Hoist Bracket	1	45591-3
35A*	Capscrew	2	71109318

\* Replace capscrews (item 35 of Palair Plus hoist manual Form #MHD56043) with these capscrews to install hoist to trolley. Capscrews (35A) are provided with hoist. Capscrews are not shown on drawing.

## ACCESSORIES

DESCRIPTION	PART NUMBER
Lubricant	Lubri-Link
Grease	ARO 33153
Spindle Oil	ARO 29655
Lubricator (1/2 inch NPT inline)	L20-04-000
Lubricator (1/2 inch BSP inline)	L26-04-A29
Air Filter (50 micron / NPT)	F20-04-000
Air Filter (50 micron / BSP)	F26-C4-A29

# POWER UNIT ASSEMBLY PARTS DRAWING



(Dwg. MHTPB0328)



## POWER UNIT ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	PART NO.
---	Power Unit Assembly (items 214 thru 259)	1	45615
---	Motor Assembly (items 239 thru 251)	1	45612
214	Pinion Gear	1	45624
• 215	Retaining Ring	1	Y147-16
• 216	Bearing	1	39163
217	Spindle Shaft	1	45606
218	Key	2	37142
219	Retaining Ring	2	Y145-18
220	Capscrew	4	Y99-42
221	Lockwasher	4	Y14-416-C
222	Plate	1	45614
223	Washer	4	Y48-14
224	Lockwasher	4	Y14-516-C
225	Capscrew	4	Y99-53
226	Gear	1	44768
227	Gear	1	44020-1
228	Thrust Race	1	42384
229	Gear	1	44767
230	Nut	1	Y192-1-Z
231	Pinion Shaft	1	45608
232	Spacer	1	37128
233	Washer	1	73473

ITEM NO.	DESCRIPTION OF PART	QTY. TOTAL	PART NO.
• 234	O-Ring	1	Y325-13
• 235	Finger Spring	1	30297
• 236	Brake Lining	1	45619
237	Brake Cone	1	45617
238	Capscrew	4	Y154-52
• 239	Bearing	1	30469
240	End Plate	1	45620
241	Spacer	1	30437
242	Roll Pin - included with cylinder, item 243	2	Y178-20
243	Cylinder - includes roll pin, item 242	1	37683
244	Rotor	1	45605
• 245	Rotor Blades	4	30741
248	Label Plate *	1	71079867
249	End Plate	1	31601
250	Pin	1	32814
• 251	Bearing	1	Y65-7
252	Elbow	1	Y43-3-C
253	Muffler	1	43874-1
254	Motor Housing	1	45613
255	Pipe Plug	2	Y227-2
256	Piston	2	45603
257	Inlet Adapter	2	45609
• 258	Spring	2	45793
259	Hose Adapter	2	22124

• Recommended spare.

\* Label plate not shown on drawing.

## PARTS ORDERING INFORMATION

The use of other than **INGERSOLL-RAND Material Handling Products** replacement parts will invalidate the Company's warranty.

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

Trolley Model Number \_\_\_\_\_

Trolley Serial Number \_\_\_\_\_

Air Motor Serial Number \_\_\_\_\_

Date Purchased \_\_\_\_\_

When ordering replacement parts, please specify the following:

1. Complete model number and serial number as it appears on the nameplate.
2. Part number(s) and part description as shown in this manual.
3. Quantity required.

Continuing improvement and advancement of design may cause changes to this trolley 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.

### 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

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

For additional information contact:

#### **Ingersoll-Rand Material Handling**

P.O. Box 24046  
2724 Sixth Avenue South  
Seattle, WA 98124-0046 USA  
Phone: (206) 624-0466 Telex: 328795  
Fax: (206) 624-6265

or

#### **Ingersoll-Rand Material Handling Samia, Douai Operations**

111, Avenue Roger Salengro  
59450 Douai, France  
Phone: (33) 27-93-08-08  
Fax: (33) 27-93-08-00

## TROLLEY AND AIR MOTOR LABELS

### NOTICE

- **Trolley label is located on side plate. Air motor label is located on air motor housing.**

Each trolley is supplied from the factory with the trolley and air motor label shown. If a label is not attached to your unit, order a new label and install it. See the parts list for the part numbers. Labels may not be shown actual size.

#### Trolley Air Motor Label:

Model No.	<input type="text"/>
Serial No.	<input type="text"/>
<b>INGERSOLL-RAND</b> MATERIAL HANDLING	
Material Handling Division Ingersoll-Rand Company	
710/9867	

#### Trolley Label:

<b>Air Motor Trolley</b>	
Model No.	<input type="text"/>
Serial No.	<input type="text"/>
Fits Flange Width 3-1/4 to 5-1/2"	
Trolley Capacity 2 ton Max.	
<b>INGERSOLL-RAND</b> MATERIAL HANDLING	
Material Handling Division Ingersoll-Rand Company	
710/9859	

## HOIST AND WINCH LIMITED WARRANTY

Ingersoll-Rand Company (I-R) warrants to the original user its Hoists and Winches (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 Hoist and Winch 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

### For Order Entry and Order Status:

#### Ingersoll-Rand Distribution Center

P.O. Box 618  
510 Hester Drive  
White House, TN 37188  
Phone: (615) 672-0321  
Telex: 786573  
Fax: (615) 672-0801

#### Ingersoll-Rand Material Handling Technical Support

P.O. Box 24046  
2724 Sixth Avenue South  
Seattle, WA 98124-0046  
Phone: (206) 624-0466  
Telex: 328795  
Fax: (206) 624-6265

#### Regional Sales Offices

##### Atlanta, GA

111 Ingersoll-Rand Drive  
Chamblee, GA 30341  
Phone: (404) 936-6230

##### Detroit, MI

23192 Commerce Drive  
Farmington Hills, MI 48335  
Phone: (313) 476-6677  
Fax: (313) 476-6670

##### Houston, TX

Suite 150  
2500 East T.C. Jester  
Houston, TX 77008  
Phone: (713) 864-3700

##### Los Angeles, CA

5533 East Olympic Blvd.  
Los Angeles, CA 90022  
Phone: (213) 725-2826

##### Milwaukee, WI

12311 W. Silver Spring Dr.  
Milwaukee, WI 53225  
Phone: (414) 461-0973

##### Philadelphia, PA

P.O. Box 425  
900 E. 8th Ave., Suite 103  
King of Prussia, PA 19406  
Phone: (215) 337-5930

## 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:

#### Ingersoll-Rand Material Handling

P.O. Box 24046  
2724 Sixth Avenue South  
Seattle, WA 98124-0046  
USA  
Phone: (206) 624-0466  
Telex: 328795  
Fax: (206) 624-6265

#### Canada

##### National Sales Office Regional Warehouse

**Toronto, Ontario**  
51 Worcester Road  
Rexdale, Ontario  
M9W 4K2  
Phone: (416) 675-5611  
Fax: (416) 675-6920

#### Regional Sales Offices

##### Calgary, Alberta

333 11th Avenue S.W.  
Calgary, Alberta  
T2R 0C7  
Phone: (403) 261-8652

##### Montreal, Quebec

3501 St. Charles Blvd.  
Kirkland, Quebec  
H9H 4S3  
Phone: (514) 695-9040

##### British Columbia

201-6351 Westminster Hwy  
Richmond, B. C.  
V7C 5C7  
Phone: (604) 278-0459

##### British Columbia Regional Warehouse Technical Support

123 Bowser Avenue  
North Vancouver, B. C. V7P  
3H1  
Phone: (604) 985-4470  
Fax: (604) 985-0160

##### Latin America Operations Ingersoll-Rand Production Equipment Group

730 N.W. 107 Avenue  
Suite 300, Miami, FL  
33172-3107  
Phone: (305) 559-0500  
Telex: 441617TLS UI  
Fax: (305) 559-7505

##### Europe, Middle East and Africa

##### Ingersoll-Rand Material Handling

**Samiia, Douai Operations**  
111, Avenue Roger Salengro  
59450 Douai, France  
Phone: (33) 27-93-08-08  
Fax: (33) 27-93-08-00

##### Asia Pacific Operations Ingersoll-Rand (Japan) Ltd

Kawa Bldg. No. 17  
2-7 Nishi-Azabu  
1-chrome  
Minato-ku, Tokyo 106  
Japan  
Phone: (03) 3403-0641/7  
Fax: 81 3 3401-2409