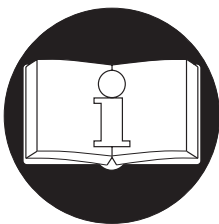
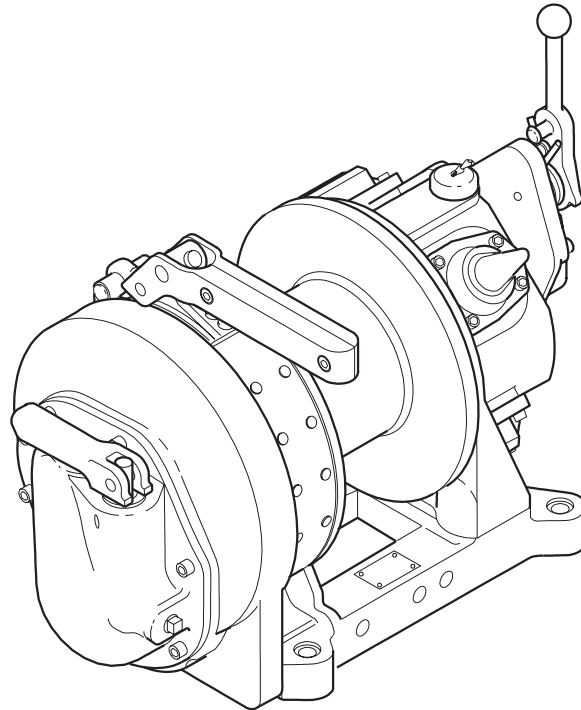


# PARTS, OPERATION AND MAINTENANCE MANUAL for MODEL BU7A AIR WINCH



**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 winch for lifting, supporting, or transporting people or lifting or supporting loads over people.**

**Always operate, inspect and maintain this winch in accordance with American National Standards Institute Safety Code (ASME B30.7) and any other applicable safety codes and regulations.**

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

Form P5710  
Edition 14  
July 1997  
03523115  
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**INGERSOLL-RAND**  

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**MATERIAL HANDLING**

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## 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 winch.

### 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

#### WARNING

- **Do not use this winch 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 winch must provide an adequate safety factor to handle the rated load, plus the weight of the winch and attached equipment. This is the customer's responsibility. If in doubt, consult a registered 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.

**Ingersoll-Rand** Material Handling winches are manufactured in accordance with the latest ASME B30.7 standards.

The Occupational Safety and Health Act of 1970 generally places the burden of compliance on 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 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.

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

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 like 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 mechanics 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 have been adapted in part from American National (Safety) Standard ASME B30.7 and are intended to avoid unsafe operating practices which might lead to injury or property damage.

**Ingersoll-Rand** recognizes that most companies who use winches 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.

1. Only allow personnel trained in safety and operation of this winch to operate and maintain this product.
2. Only operate a winch if you are physically fit to do so.
3. When a **“DO NOT OPERATE”** sign is placed on the winch, or controls, do not operate the winch until the sign has been removed by designated personnel.
4. Before each shift, the operator should inspect the winch for wear and damage. Never use a winch that inspection indicates is worn or damaged.
5. Never lift a load greater than the rated capacity of the winch. Refer to **“SPECIFICATIONS”** section.
6. Keep hands, clothing, etc., clear of moving parts.
7. Never place your hand in the throat area of a hook or near wire rope spooling onto or off of the winch drum.
8. Always rig loads properly and carefully.
9. Be certain the load is properly seated in the saddle of the hook. Do not support a load on the tip of a hook.
10. Do not **“side pull”** or **“yard”**.
11. Make sure everyone is clear of the load path and there are no objects in the way of the load. Do not lift a load over people.
12. Never use the winch for lifting or lowering people, and never allow anyone to stand on a suspended load.
13. Ease the slack out of the wire rope when starting a lift or pull. Do not jerk the load.
14. Do not swing a suspended load.
15. Never leave a suspended load unattended.
16. Pay attention to the load at all times when operating the winch.
17. After use or when in a non-operational mode, the winch should be secured against unauthorized and unwarranted use.
18. The operator must maintain an unobstructed view of the load at all times.
19. Never use the winch wire rope as a sling.
20. Never operate a winch with twisted, kinked or damaged wire rope.
21. Shut off air supply before leaving winch unattended.
22. Do not do anything you believe may be unsafe.
23. Never splice a sling chain by inserting a bolt between links.
24. Do not force a chain or hook into place by hammering. Do not insert the point of the hook into a chain link.
25. Do not expose the sling chain to freezing temperatures, and do not apply sudden loads to a cold chain.

## WARNING TAGS

Each unit is shipped from the factory with the warning tags shown. If the tags are not attached to your unit, order new tags and install them. Refer to the parts list for the part number. Tags are shown smaller than actual size.



**WARNING**

**Failure to follow these warnings may result in death, severe injury or property damage:**

- Do not operate this winch before reading operation and maintenance manual.
- Do not lift people or loads over people.
- Do not lift more than rated load.
- Do not allow less than three wraps of wire rope to remain on drum at all times.
- Do not operate a damaged or malfunctioning winch.
- Do not remove or obscure warning labels.

Read the latest edition of ASME B30.7. Comply with other federal, state and local rules.

P/N 71056410/A for winches

**INGERSOLL-RAND**  
MATERIAL HANDLING

# SPECIFICATIONS

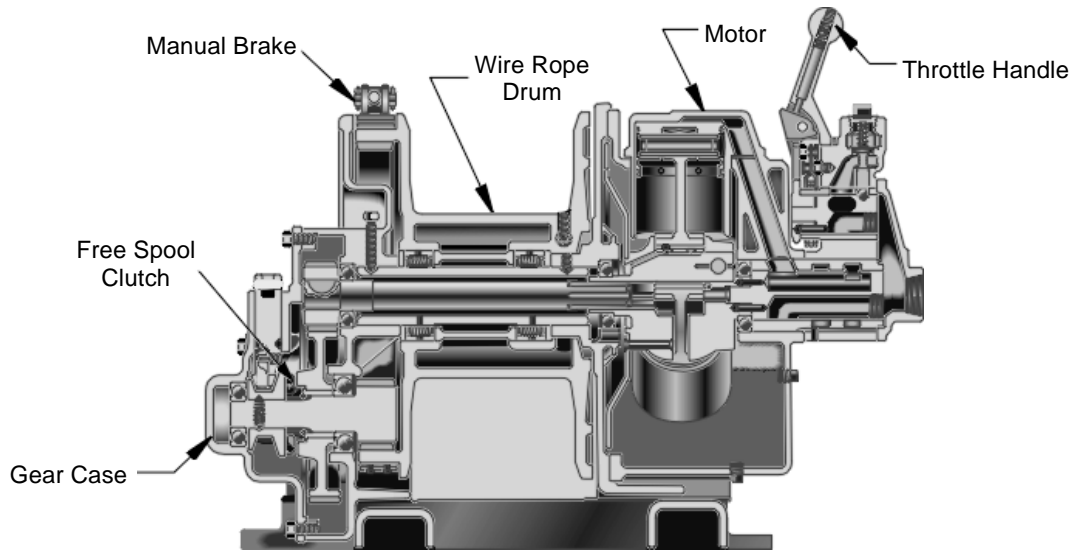
## Description

The BU7A winch is powered by a radial piston air motor. The output from the motor is transferred through the drum by the drive shaft. The drive shaft rotates a series of connected spur gears which form a reduction assembly. Output from the reduction assembly drives the wire rope drum. Spur gears are not inherently self-locking as other types of gears are, therefore the brake must be applied whenever there is a load attached to the load line. The winch is also equipped with a free spool feature.

## ⚠ CAUTION

- **The free spool feature must only be used with a manual brake. Use of a manual brake is the only way to maintain control of the load line.**

The free spool feature consists of a spring detented clutch jaw connecting the final drive shaft and final spur gear in the reduction assembly. When the clutch jaw is disconnected, the drum becomes disconnected from the reduction gear assembly and motor and is free to rotate in either direction.



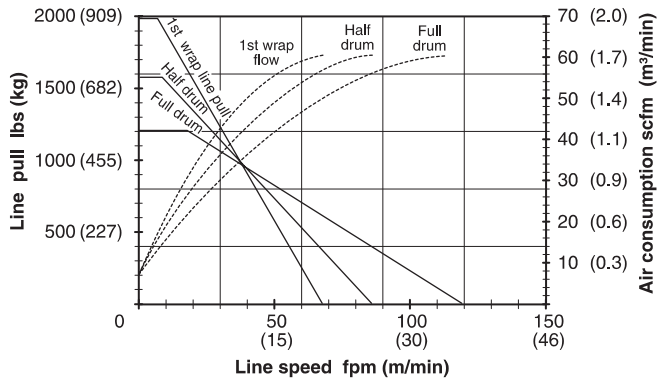
(Dwg. MHP1286)

## Model Code Explanation

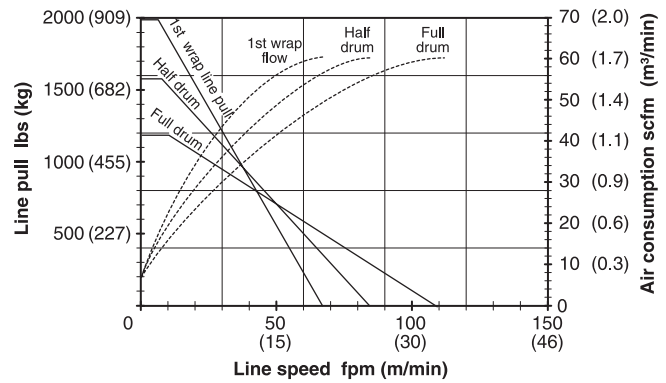
	<b>Example:</b>	<b>BU7APTAB</b>	<b>BU7A</b>	<b>PTAB</b>
<b>Series</b>	=	<b>BU7A</b>		
<b>Options</b>				
	AB	= Automatic Brake		
	RC	= Remote Control		
	RCAB	= Remote Control and Automatic Brake		
	<b>PTAB</b>	= <b>Remote Pendant Control and Automatic Brake</b>		
	ZP	= Zinc-plated		
	-E	= Compliance with the European Machinery Directive		

## Performance Graphs

### BU7A



### BU7APTAB



General Specifications		Model				
		BU7A		BU7APTAB		
Air System	Rated Operating Pressure	90 psig (6.3 bar)				
	Consumption Volume (at rated pressure)	50 scfm	1.4 cu. m/min	50 scfm	1.4 cu. m/min	
Rated Performance (at rated pressure/volume)	Mid Drum Line Pull	1,000 lbs	454 kgs	1,000 lbs	454 kgs	
	Mid Drum Line Speed	45 fpm	14 m/min	30 fpm	9 m/min	
	Max Stall Pull - 1st Layer	1,950 lbs	886 kgs	1,950 lbs	886 kgs	
Net Weight		75 lbs	34 kgs	108 lbs	49 kgs	
Air Motor Pipe Inlet Size		1/2 inch	13 mm	1/2 inch	13 mm	
Air System Hose Size		3/4 inch	19 mm	3/4 inch	19 mm	
Wire Rope Anchor Hole Diameter		11/32 inch	8.7 mm	11/32 inch	8.7 mm	
Drum Flange Diameter		8-1/2 inch (216 mm)				
Drum Length (between flanges)		4-1/2 inch (114 mm)				
Motor HP		1.6				
Drum Wire Rope Storage Capacity * (feet/metres)		Wire Rope Diameter				
		1/4 inch **	6 mm **	5/16 inch	8 mm	
		228 ft	70 m	132 ft	40 m	
Factors for determining STALL and LINE PULL at various air pressures. To obtain performances at operating pressures other than 90 psi, select the load or speed rating required from the applicable performance graph and multiply that value by the factor corresponding to the operating pressure from the table. Example: Model BU7A at 750 lbs with 70 psi and drum half full. To determine speed from curve: 50 fpm x 0.72 = 36 fpm.		Air Pressure (psi)	Stall Factor		Wire Rope Speed Factor	
		60	0.67		0.58	
		70	0.78		0.72	
		80	0.89		0.86	
		90	1.00		1.00	
		100	1.11		1.14	

\* Based on ASME B30.7 standards which require the top layer to be at least 1/2 in. (13 mm) below the drum flange diameter. Recommended drum working storage capacity is 80% of values shown.

\*\* Recommended wire rope size.

## INSTALLATION

Prior to installing the winch, carefully inspect it for possible shipping damage. Winches are supplied from the factory drained of oil. Add oil prior to winch operation. Check oil levels and adjust as necessary. Use the proper type of oil as recommended in the "LUBRICATION" section.

### ⚠ CAUTION

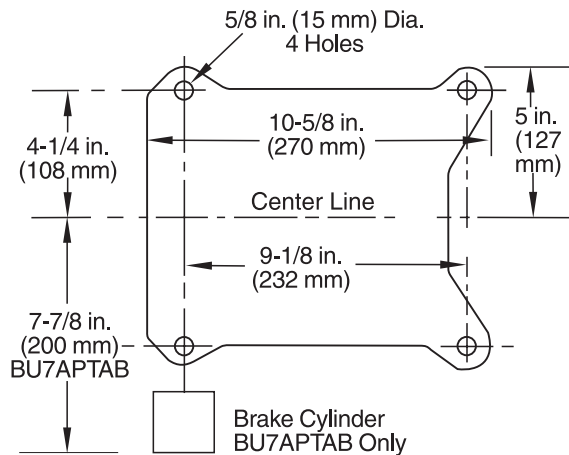
• Owners and users are advised to examine specific, local or other regulations, including American National Standards Institute and/or OSHA Regulations which may apply to a particular type of use of this product before installing or putting winch to use.

#### Mounting

Mount the winch with the longitudinal center line horizontal and the vent cap (25) at top vertical center. The winch will not function properly if the longitudinal center line is tilted more than 10° or if the winch is rotated so that the vent cap is more than 20° off top vertical center.

For mounting on a vertical surface or for inverted mounting, the motor case (28) can be rotated on the motor mounting bracket (79) to any one of four different positions. This feature allows the motor assembly to be positioned with the vent cap (25) on top. To change the position of the motor assembly, drain the oil from the motor case, unscrew the eight motor case capscrews (29) and rotate the motor assembly to suit the mounting. Refer to Dwg. MHP0548.

#### Bolt Hole Dimensions

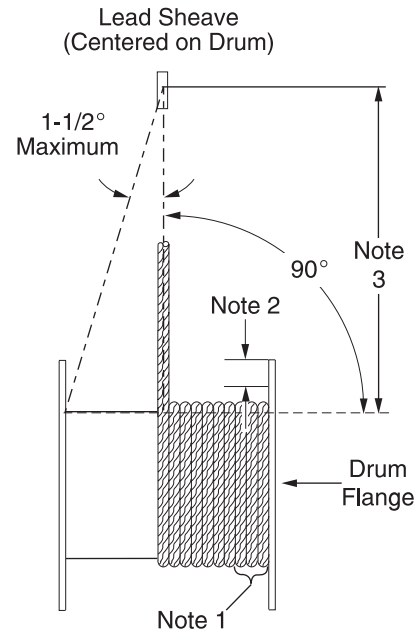


(Dwg. MHP0548)

1. Do not weld to any part of the winch.
2. The winch mounting surface must be flat and of sufficient strength to handle the rated load plus the weight of the winch and attached equipment. An inadequate foundation may cause distortion or twisting of the winch resulting in winch damage.
3. Make sure the mounting surface is flat to within 1/16 inch (2.0 mm). Shim if necessary.
4. Mounting bolts must be 1/2 inch - NC (14 mm) Grade 8 or better. Use self-locking nuts or nuts with lockwashers.

5. Tighten mounting bolts evenly and torque to 110 ft lbs (15.2 kg m) for dry thread fasteners. If the fasteners are plated, lubricated or a thread locking compound is used, torque to 80 ft lbs (11.0 kg m).
6. When a lead sheave is used, it must be aligned with the center of the drum. The diameter of the lead sheave must be at least 18 times the diameter of the wire rope.
7. Maintain a fleet angle between the sheave and winch of no more than 1-1/2°. Refer to Dwg. MHP0498. The lead sheave must be on a center line with the drum and be at least 7.2 feet (2.2 metres) from the drum. Refer to Dwg. MHP0498, Note 3.

#### Wire Rope and Fleet Angle Installation



(Dwg. MHP0498)

#### Notes:

1. Maintain a minimum of 3 tight wraps of wire rope on the drum at all times.
2. For pulling applications, ensure top layer of wire rope is at least 1/2 in. (13 mm) below edge of drum flange.
3. For correct fleet angle, maintain a minimum of 1.6 feet (0.5 metre) per inch of drum length. Example: for a 7 inch drum length, locate the lead sheave at least 11.2 feet (3.5 metres) from drum.

#### Wire Rope

### ⚠ CAUTION

• Maintain at least 3 tight wraps of wire rope on the drum at all times. Refer to Dwg. MHP0498 Note 1.

#### Wire Rope Selection

Consult a reputable wire rope manufacturer or distributor for assistance in selecting the appropriate type and size of wire rope and, where necessary, a protective coating. Use a wire rope which provides an adequate safety factor to handle the actual working load and that meets all applicable industry, trade

association, federal, state and local regulations. When considering wire rope requirements the actual working load must include not only the static or dead load but also loads resulting from acceleration, retardation and shock load. Consideration must also be given to the size of the wire rope drum, sheaves and method of reeving. Wire rope construction must be 6 X 19 or 6 X 37 Extra Improved IWRC right lay to permit correct installation of wire rope anchor. Refer to Table 1 for minimum and maximum recommended wire rope diameters.

**Table 1**

Minimum and Maximum Wire Rope Sizes						
Model	Minimum		Maximum			
	inch	mm	inch	mm		
BU7A	1/4	6	5/16	8		
	* Breaking Strength (in.)		** Recommended safe working load			
Rope Size (in.)	2000 lb tons	Wt/ft (lbs)	Pulling 3.5:1		Lift/Lower 5:1	
			lbs	kg	lbs	kg
1/4 (0.25)	2.94	0.11	1680	762	1176	533
5/16 (0.31)	4.58	0.18	2616	1187	1832	831

\* Base on improved plow steel wire rope with independent wire rope core.

\*\* ASME B30.7 requires a minimum of 3.5:1 design factor with 15:1 wire rope pitch diameter to drum diameter for most applications ( e.g. pulling/hauling and anchor handling). For lifting and lowering, a 5:1 design factor with an 18:1 wire rope pitch diameter to drum diameter is required.

For winches used in **lifting** applications, ensure that the top layer of the wire rope is a distance from the top of the drum flange that is equal to at least twice the diameter of the wire rope. For example: the top layer of a 8 mm wire rope must be at least 16 mm below the drum flange edge. Refer to Dwg. MHP0498, Note 2. As a general rule for **lifting** applications, a minimum of 5:1 wire rope design factor is required with an 18:1 wire rope to drum diameter ratio. For **pulling** applications, a 3:1 wire rope design factor is required with a 15:1 wire rope to drum diameter ratio.

**Safe Wire Rope Handling Procedures**

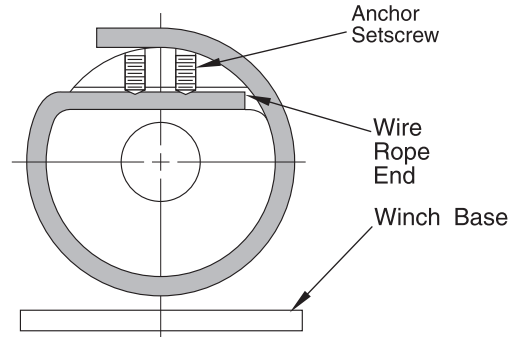
1. Always use gloves when handling wire rope.
2. Never use wire rope which is frayed or kinked.
3. Never use wire rope as a sling.
4. Always ensure wire rope is correctly spooled and the first layer is tight against the drum.
5. Always follow wire rope manufacturer’s recommendations on use and maintenance of wire rope.

**Installing Wire Rope**

Refer to Dwg. MHP1288.

1. Cut wire rope to length and fuse end to prevent fraying of strands in accordance with the wire rope manufacturer's instructions.
2. Feed the fused end of the wire rope into the wire rope anchor hole, past the two anchor screws, and position the end just beneath the drum surface.
3. Apply the wire rope so that it winds over the top when the drum is rotated in a direction that is clockwise when facing the gear end of the winch. This is indicated by an arrow on the gear case.

4. Secure by tightening both anchor screws. Make sure the anchor screws are below the surface of the drum when tightened.



(Dwg. MHP1288)



- Ensure the first wrap of wire rope is tight and lies flush against the drum flange.
- The wire rope should be applied to the drum so that it overwinds when the drum rotates in a clockwise direction when facing the gear end of the winch. This is indicated by an arrow on the gear case.

**Wire Rope Spooling**

To compensate for uneven spooling and the decrease in line pull capacity as the drum fills up, use as short a wire rope as practical. When rewinding apply tension to the end of the wire rope to eliminate line slack. This helps achieve level winding and tight spooling.

**Rigging**

Make sure all wire rope blocks, tackle and fasteners have a sufficient safety margin to handle the required load under all conditions. Do not allow wire rope to contact sharp edges or make sharp bends which will cause damage to wire rope, **use a sheave**. Refer to the wire rope manufacturer’s handbook for proper sizing, use and care of wire rope.

**Safe Installation Procedures**

1. Do not use wire rope as a ground (earth) for welding.
2. Do not attach a welding electrode to winch or wire rope.
3. Never run the wire rope over a sharp edge. Use a correctly sized sheave.
4. When a lead sheave is used, it must be aligned with the center of the drum. Refer to Dwg. MHP0498. The diameter of the lead sheave must be at least 18 times the diameter of the wire rope.
5. Always maintain at least three full, tight wraps of wire rope on the drum.

**Air Supply**

The air supply must be clean, free from moisture and lubricated to ensure optimum motor performance. Foreign particles, moisture and lack of lubrication are the primary causes of premature motor wear and breakdown. Using an air filter, lubricator and moisture separator will improve overall winch performance and reduce unscheduled downtime.

The air consumption is 50 scfm (1.4 cu.m/min.) at rated operating pressure of 90 psig (6.3 bar/630 kPa) at the winch motor inlet. If the air supply varies from what is recommended, winch performance will change.



### Air Lines

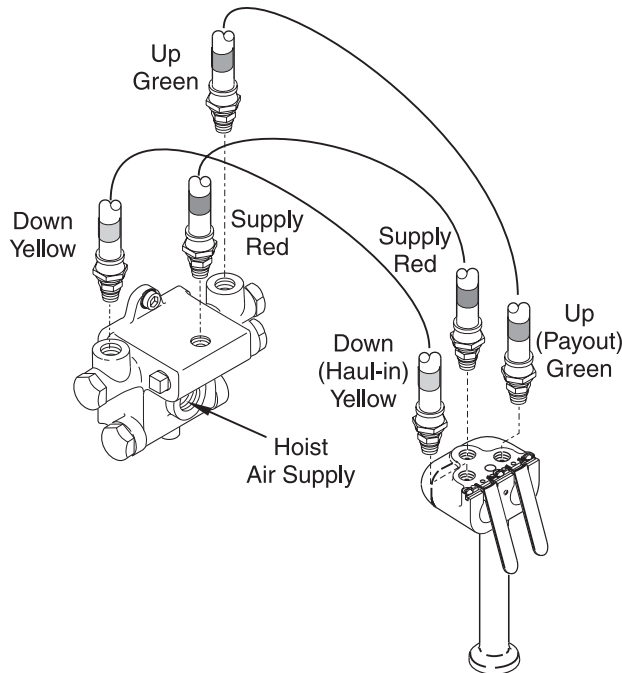
The inside diameter of the winch air supply lines must not be less than the size shown in Table 2. Prior to making final connections, all air supply lines should be purged with clean, moisture free air or nitrogen before connecting to winch inlet. Supply lines should be as short and straight as installation 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.

Table 2

Minimum Allowable Air Supply Line Sizes		
Model	inch	mm
BU7A	3/4	19

### Remote Control (Optional Feature)

Refer to Dwg. MHP1241 for hose connection positions.



(Dwg. MHP1241)

### Air Line Lubricator

Refer to Dwg. MHP0191.

Always use an air line lubricator with these motors. The lubricator must have an inlet and outlet at least as large as the inlet on the motor. Install the air line lubricator as close to the air inlet on the motor as possible.



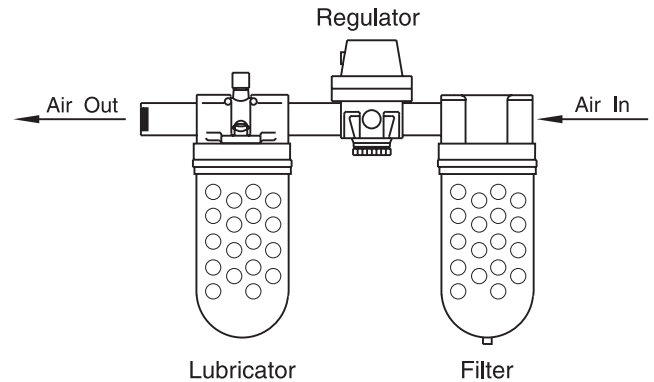
- Lubricator must be located no more than 10 ft. (3 m) from the motor.
- Shut off air supply before filling air line lubricator.

The air line lubricator should be replenished daily and set to provide 6 to 9 drops per minute of ISO VG 32 (10W) oil. A fine mist will be exhausted from the throttle control valve when the air line lubricator is functioning properly.

### Air Line Filter

Refer to Dwg. MHP0191.

It is recommended that an air line strainer/filter be installed as close as practical to the motor air inlet port, but before the lubricator, to prevent dirt from entering the motor. The strainer/filter should provide 20 micron filtration and include a moisture trap. Clean the strainer/filter periodically to maintain its operating efficiency.



(Dwg. MHP0191)

### Moisture in Air Lines

Moisture that reaches the air motor through air supply lines is a primary 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 motor, an aftercooler at the compressor that cools the air to condense and collect moisture prior to distribution through the supply lines are also helpful.

### Motor

For optimum performance provide an air supply of 90 psig at 50 scfm (6.3 bar/630 kPa at 1.4 cu.m/min) for BU7A winches. The air motor should be installed as near as possible to the compressor or air receiver. Recommended pressures and volumes are measured at the point of entry to the air motor.

### Initial Operating Checks

Winches are tested for proper operation prior to leaving the factory. Before the winch is placed into service the following initial operating checks should be performed.

1. Refer to the "LUBRICATION" section to ensure correct oil level in air motor.
2. When first running the motor, inject some light oil into the inlet connection to provide initial lubrication.
3. When first operating the winch it is recommended that the motor be driven slowly in both directions for a few minutes.

### Start-Up Procedures

For winches that have been in storage for a period of more than one month, the following start-up procedure is required:

1. Refer to the "LUBRICATION" section to ensure correct oil level in air motor.
2. Give the winch an inspection conforming to the requirements listed in "Winches Not in Regular Use" in the "INSPECTION" section.
3. Pour a small amount of ISO VG 32 (10W) oil in the motor inlet port.
4. Operate the motor for 10 seconds in both directions to flush out any impurities.
5. The winch is now ready for normal use.

## OPERATION

The four most important aspects of winch operation are:

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

### ⚠ CAUTION

• **To avoid damage to the rigging, the structure supporting the rigging and the winch, do not “two-block”\* the end of the wire rope.**

\* Two-blocking occurs when the winch wire rope is multi-reeved using two separate sheave blocks which are allowed to come into contact with each other during winch operation. When this occurs, extreme forces are exerted on the wire rope and sheave blocks, which may result in equipment and/or rigging failure.

### ⚠ WARNING

• **The winch is not designed or suitable for lifting, lowering or moving persons. Never lift loads over people.**

Operators must be physically competent and have no health condition which might affect their ability to act. They must have good hearing, vision and depth perception. The winch operator must be carefully instructed in his duties and must understand the operation of the winch, including a study of the manufacturer's literature. The operator must thoroughly understand proper methods of hitching loads and must have a good attitude regarding safety. It is the operator's responsibility to refuse to operate the winch under unsafe conditions.

### Winch Controls

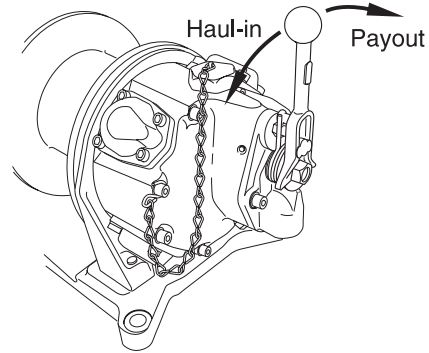
A spring loaded, motor mounted, manual throttle control valve is supplied as a standard feature of this winch. Optional motor throttle controls are available. Refer to the model code on the winch nameplate and compare it to the “SPECIFICATIONS” section of this manual to determine your configuration. The throttle control provides operator control of the winch motor speed and direction of drum rotation.

### Winch Mounted Live Air Throttle (standard feature)

The spring loaded manual control throttle mounts to the air motor.

When viewed from the air motor end move the control throttle handle to the right (clockwise) to payout wire rope and to the left (counterclockwise) to haul-in wire rope.

To ensure smooth operation of the winch sudden movements of the control valve should be avoided.



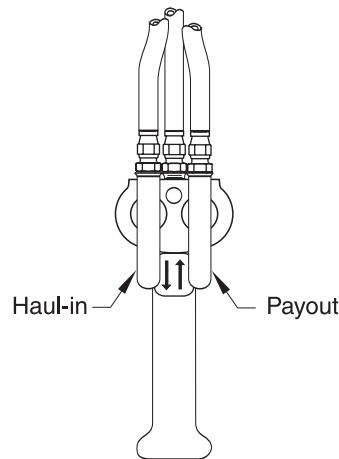
(Dwg. MHP1239)

### Remote Live Air Pendant Throttle (optional feature)

Refer to Dwg. MHP1319.

Provides for remote winch control at distances of up to \*15 feet (4.5 metres) away from the winch. The pendant control throttle is a two lever movable control station for winch operation. The winch control valve, located on the winch motor, controls the motor speed and direction of drum rotation. Direction of rotation is determined by the pendant lever depressed.

\* For distances greater than 15 feet (4.5 metres) contact Technical Sales for control acceptability.



(Dwg. MHP1319)

### Winch Brakes

#### Manual Drum Brake

The manual drum brake may be applied by pushing down on the handle (55) and released by pulling up. If the handle is pushed down fully, it should lock in that position and prevent drum rotation until released by the operator. The brake must be kept properly adjusted to hold the required load. Refer to the “MAINTENANCE” section for brake adjustment.

### Automatic Drum Brake

The brake band is operated by a spring loaded air cylinder. When the control valve is actuated in any direction, air is applied to the brake cylinder causing the brake rod to extend and release the brake band. When the control valve is returned to neutral, there is no air supply to the brake cylinder so the internal spring will retract the brake rod causing the brake lever to lock the brake band in position.

For winches equipped with an automatic brake, always ensure that clutch jaw spacer (143) is installed.

### Free Spool Clutch



- Do not engage clutch when motor is running or drum is spinning, as this produces a severe strain on parts.
- Do not disengage clutch when winch is loaded. Be sure clutch is fully engaged before operating winch.

A jaw type clutch connects the gearing and drum. The function of the clutch is to disengage the rope drum from the motor so that the wire rope can be unwound from the drum by hand

without working against the gearing and the compression of the motor. The clutch is engaged or disengaged by the clutch lever (54) which is located on the top of the gear case cover (76). When clutch is engaged the lever is locked by a detent to prevent disengagement. Detent is released by pressing down (toward base) on lever, after which the end can be swung outward from the winch, disengaging the clutch jaws. When clutch is in disengaged position it can be engaged by moving end of lever toward winch. It may be necessary to open the throttle a slight amount to position the jaws for engagement.



- Do not use free spool clutch feature in combination with automatic brake. Use of winches with free spool clutch and automatic brake can result in severe injury, death or property damage.

Inspection information is based in part on American National Standards Institute Safety Codes (ASME B30.7).

## ⚠ WARNING

- **All new, altered or modified 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 winch that inspection indicates is damaged.**

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 winch operation. Periodic inspections are thorough inspections conducted by personnel trained in the safety, operation and maintenance of this equipment.

ASME B30.7 states inspection intervals depend upon the nature of the critical components of the equipment and the severity of usage. The inspection intervals recommended in this manual are based on intermittent operation of the winch eight hours each day, five days per week, in an environment relatively free of dust, moisture and corrosive fumes. If the winch is operated almost continuously or more than the eight hours each day, more frequent inspections will be required.

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 review.

### Wire Rope Reports

Records should be maintained as part of a long-range wire rope inspection program. Records should include the condition of wire rope removed from service. Accurate records will establish a relationship between visual observations noted during frequent inspections and the actual condition of wire rope as determined by periodic inspections.

### Frequent Inspection

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

1. **WINCH.** Prior to operation, visually inspect winch housing, control, brake and drum for indications of damage. Any discrepancies noted must be reviewed and inspected further by authorized personnel instructed in the operation, safety and maintenance of this winch.
2. **WIRE ROPE.** Visually inspect all wire rope which can be expected to be in use during the day's operations. Inspect for wear and damage indicated by distortion of wire rope such as kinking, "birdcaging," core protrusion, main strand displacement, corrosion, broken or cut strands. If damage is evident, do not operate winch until the discrepancies have been reviewed and inspected further by personnel knowledgeable on wire rope safety and maintenance procedures.

## NOTICE

- **The full extent of wire rope wear cannot be determined by visual inspection. At any indication of wear or damage inspect the wire rope in accordance with instructions in "Periodic Inspection."**

3. **WIRE ROPE REEVING.** Check reeving and ensure wire rope is properly secured to the drum. Do not operate the winch unless the wire rope feeds onto the drum smoothly.
4. **AIR SYSTEM.** Visually inspect all connections, fittings, hoses and components for indication of air leaks. Repair any leaks or damaged components found.
5. **BRAKE.** During winch operation, test the brake. The brake must be capable of supporting the load without slipping. The automatic brake must release when the winch throttle is operated. If the brake does not hold or does not release properly, the brake must be adjusted or repaired.
6. **LUBRICATION.** Refer to "LUBRICATION" section for recommended procedures.
7. **MANUAL THROTTLE LEVER.** Ensure operation of manual throttle lever is smooth and winch is responsive to lever movement. Lever must return to neutral when released. If winch responds slowly or movement is unsatisfactory, do not operate until all problems have been corrected.
8. **PENDANT (optional feature).** Ensure operation of pendant levers is smooth and that the winch is responsive to pendant control. Pendant levers must spring back to their starting position when released.
9. **MOTOR.** Check oil level. Place a suitable container below the motor and carefully open the level plug to remove any accumulated water. Check oil level in motor and add oil as necessary to maintain correct level. Ensure lubricated air supply provides 6 to 9 drops of ISO VG 32 (10W) oil. Operate motor slowly in both directions to verify operation.

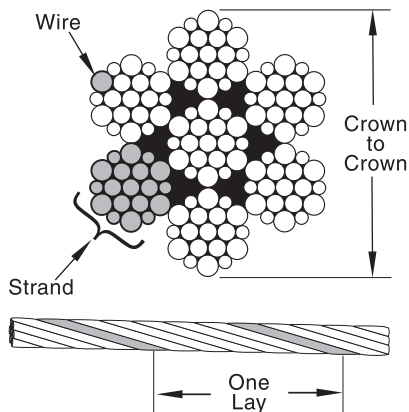
## Periodic Inspection

Periodic inspection intervals for winch use under various conditions is listed below:

NORMAL yearly	HEAVY semiannually	SEVERE quarterly
------------------	-----------------------	---------------------

Disassembly may be required as a result of frequent inspection findings or in order to properly inspect the individual components. Disassembly steps are described in the "MAINTENANCE" section. Maintain written records of periodic inspections to provide an accumulative basis for continuing evaluation. Inspect all items listed in "Frequent Inspection." Also inspect the following:

1. FRAMES, CASES AND BRACKETS. Check for deformed, cracked or corroded main components. Replace damaged parts.
2. FASTENERS. Check retainer rings, split pins, capscrews, nuts and other fasteners on winch, including mounting bolts. Replace if missing or damaged and tighten if loose.
3. DRUM AND SHEAVES. Check for cracks, wear or damage. Replace if necessary.
4. WIRE ROPE. In addition to "Frequent Inspection" requirements, also inspect for the following:
  - a. Build-up of dirt and corrosion. Clean with steam or a stiff wire brush to remove dirt and corrosion if necessary.
  - b. Loose or damaged end connection. Replace if loose or damaged.
  - c. Check wire rope is anchored securely in drum.
  - d. Verify wire rope diameter. Measure the diameter of the wire rope from crown to crown throughout the life of the wire rope. Recording of the actual diameter should only be done with the wire rope under equivalent loading and in the same operating section as accomplished during previous inspections. If the actual diameter of the wire rope has decreased more than 1/64 inch (0.4 mm) a thorough examination of the wire rope should be conducted by an experienced inspector to determine the suitability of the wire rope to remain in service. Refer to Dwg. MHP0056.



(Dwg. MHP0056)

5. ALL COMPONENTS. Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates damage, disassemble as required to conduct a detailed inspection. Inspect gears, shafts, bearings, sheaves, springs and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.
6. BRAKE. Test brake to ensure proper operation. Brake must hold a 125% rated load with full drum without slipping. If indicated by poor operation or visual damage, disassemble and repair brake. Check all brake surfaces for wear, deformation or foreign deposits. If brake lining thickness is less than minimum as described in the "MAINTENANCE" section replace brakes. Clean and replace components as necessary. Refer to the "MAINTENANCE" section for adjustment information.
7. SUPPORTING STRUCTURE. Check for distortion, wear and continued ability to support winch and rated load. Ensure winch is firmly mounted and that fasteners are in good condition and tight.
8. LABELS AND TAGS. Check for presence and legibility of labels. Replace if damaged or missing.
9. DRUM GUARD (optional feature). Verify fasteners are tight and in good condition. Ensure guard is in good condition.

## Winches Not in Regular Use

1. Equipment which has been idle for a period of one month or more, but less than six months, shall be given an inspection conforming to the requirements of "Frequent Inspection" before being placed in service.
2. Equipment which has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of "Periodic Inspection" before being placed in service.
3. Standby equipment shall be inspected at least semiannually in accordance with the requirements of "Frequent Inspection." In abnormal operating conditions equipment should be inspected at shorter intervals.

# INSPECTION AND MAINTENANCE REPORT

## Model BU7A Air Winch

<b>Model Number:</b>	<b>Date:</b>
<b>Serial Number:</b>	<b>Inspected By:</b>

<b>Reason for Inspection: (Check Applicable Box)</b>	
1. Scheduled Periodic Inspection: ___ Quarterly ___ Semiannually ___ Yearly 2. Discrepancy(ies) noted during Frequent Inspection 3. Discrepancy(ies) noted during maintenance 4. Other: _____	Operating Environment:  Normal ___ Heavy ___ Severe ___

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	
Case, Frame & Motor Mounting Bracket					
Drum Band Brake (125% Load Test)					
Drum Band Brake (Visual Inspection)					
Motor					
Controls					
Air System					
Fasteners					
Reduction Gears					
Clutch					
Labels and Tags			---		
Shafts					
Wire Rope			---		
Guards					
Other Components (list in NOTES section)					

TESTING	Pass	Fail	NOTES
Operational (No Load)			
Operational (10% Load)			
Operational (Maximum Test Load *)			

\* Maximum test load is 125% of rated line pull

This form may be copied and used as an inspection/maintenance record.

# LUBRICATION

To ensure continued satisfactory operation of the winch, all points requiring lubrication must be serviced with the correct lubricant at the proper time interval as indicated for each assembly.

The lubrication intervals recommended in this manual are based on intermittent operation of the winch eight hours each day, five days per week. If the winch is operated almost continuously or more than the eight hours each day, more frequent lubrication will be required. Also, the lubricant types and change intervals are based on operation in an environment relatively free of dust, moisture, and corrosive fumes. Use only those lubricants recommended. Other lubricants may affect the performance of the winch. Approval for the use of other lubricants must be obtained from your **Ingersoll-Rand** distributor. Failure to observe this precaution may result in damage to the winch and/or its associated components.

INTERVAL	LUBRICATION CHECKS
Start of each shift	Check flow and level of air line lubricator (approximately 6 to 9 drops per minute required at maximum motor speed).
	Check oil level in motor.
Monthly	Inspect and clean or replace air line filter.
Yearly	Replace grease in gear case.
	Drain and refill the oil in the winch motor.

## Motor

Correct lubrication is one of the most important factors in maintaining efficient winch operation. The motor is splash lubricated by the oil in the motor housing and has no other means of lubrication. It is therefore important to use only high quality, Extreme Pressure (EP) rust and oxidation inhibiting gear oils or non-detergent motor oils to ensure maximum performance and minimum downtime for repairs. Refer to Table 3. Allow oil to settle before topping off. Oil capacity for the BU7A winch motor is 1/2 pint (0.24 litres). Pour sufficient oil into the vent cap opening to bring the oil in the motor case to the level of the upper oil plug hole. Add oil slowly to prevent spilling.

**Table 3**

Ambient Temperature	Recommended Oil Type
Below 32° F (0° C)	ISO VG 32 (10W)
30° to 80° F (0° to 26° C)	ISO VG 68 (20W)
Above 80° F (26° C)	ISO VG 100 (30W)

The oil level in the motor should be checked daily or at the start of each shift after accumulated water has been drained off. When motors are operated in temperatures below freezing, wait long enough at end of shift for water to separate from oil but not long enough for it to freeze. Failure to drain the water when the winch is to remain idle for a protracted period at low temperatures may result in the oil splasher freezing fast. Drain the water then refill to the level plug. If desired, all the oil may be drained at the end of the shift and the motor refilled with new oil.

## Gear Case

Check the grease in the gear chamber weekly by removing the lower grease plug (75) in the gear case cover (76). If the grease is below this opening, remove the grease plug from the top of the gear case cover and add a sufficient quantity of **Ingersoll-Rand** Heavy Gear Grease No. 70 to bring the grease level in the chamber up to the side opening. **Ingersoll-Rand** Light Grease No. 28 or a soda- or mixed-base grease of No. 2 consistency may be used as a substitute.

## Seals and Bearings

If winch is disassembled, clean all parts thoroughly and coat bearings and seals with clean grease. Refer to Table 4. Use sufficient grease to provide a good protective coat.

**Table 4**

Ambient Temperature	Recommended Grease Type
-20° to 50° F (-30° to 10° C)	EP 1 multipurpose lithium-based
30° to 120° F (-1° to 49° C)	EP 2 multipurpose lithium-based

## Wire Rope

Follow the wire rope manufacturer's instructions. At a minimum, observe the following guidelines.

1. Clean with a brush or steam to remove dirt, rock dust or other foreign material on the surface of the wire rope.



• Do not use an acid-based solvent. Only use cleaning fluids and lubricants specified by the wire rope manufacturer.

2. Apply a wire rope lubricant, LUBRI-LINK-GREEN® or ISO VG 100 (30W) oil.
3. Brush, drip or spray lubricant weekly, or more frequently, depending on severity of service.

## 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 common winch symptoms, probable causes and remedies.

SYMPTOM	CAUSE	REMEDY
Winch will not operate.	No air supply to winch.	Check air supply line connections and hoses. Ensure the air pressure at the winch inlet is at least 90 psig (6.3 bar/630 kPa) at rated volume.
	Winch is overloaded.	Reduce load to within rated capacity.
	Drum brake is not released.	Disengage manual drum brake or refer to "Automatic Drum Brake" below.
Load continues to move when winch is stopped.	Drum brake is slipping.	Check drum brake adjustment and brake band lining wear.
Winch does not lift or pull load.	Motor may be damaged.	Remove and disassemble motor as described in the "MAINTENANCE" section. Examine all parts and replace any that are worn or damaged.
	Insufficient air supply.	Verify air supply pressure and volume at winch inlet meets requirements listed in the "SPECIFICATIONS" section. Clean air line filter.
	Winch is overloaded.	Reduce load to within rated capacity.
Throttle (or pendant) lever moves but winch does not operate.	Motor may be damaged.	Disassemble and clean the motor and replace any broken or damaged parts.
	Insufficient air supply.	Ensure the air pressure at the winch inlet is at least 90 psig (6.3 bar/630 kPa) at rated volume. Clean air line filter.
Motor runs hot or makes excessive noise during operation.	Low oil level.	Check oil level in the motor. Drain or add oil as required to obtain the proper level.
	Improper lubrication.	Replace oil with type recommended in the "LUBRICATION" section applicable to the operating environment. Set lubricator to provide a minimum of 6 drops per minute. Check oil level in lubricator.
	Water in oil.	Drain and refill with oil. Operate winch with no load slowly, in both directions. If excessive noise is present or motor overheats, disassemble and repair motor.
	Damaged or broken piston or connecting rod.	Disassemble and repair motor.
Winch runs slow.	Improper hose or fitting sizes.	Check fittings, connections and hoses for correct size and length. Replace parts that may cause restricted air flow. Inspect air line filter.
	Motor may be damaged.	Remove and disassemble motor as described in the "MAINTENANCE" section. Inspect all parts and replace any that are worn or damaged.
Air lines freeze.	Water in air supply.	Install or drain air system moisture traps, moisture collecting air receivers and compressor aftercoolers. After corrective actions have been taken, disconnect lines at winch inlet and purge with clean, dry air or nitrogen prior to reattaching and operating winch.

### Automatic Drum Brake:

Brake cylinder will not release.	Drum brake out of adjustment.	Adjust drum brake to maintain correct cylinder stroke.
	Damaged cylinder seals.	If air is noticed escaping from the cylinder breather when attempting to release brake, replace or repair cylinder.
	Dirty filter in air supply.	Clean or replace filter.
	Exhaust port plugged.	Clear foreign material out of exhaust port. Air should exhaust when control valve handle is in neutral.



## MAINTENANCE

### ⚠ WARNING

- Never perform maintenance on the winch while it is supporting a load.
- Before performing maintenance, tag controls:  
**DANGER - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.**
- Only allow service personnel trained in safety and service on this winch to perform maintenance.
- After performing any maintenance on the winch, test winch to 125% of its rated capacity before returning to service.
- Turn off air system and depressurize air lines before performing any maintenance.

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 easy disassembly of components.

### Maintenance Intervals

The Maintenance Interval Chart below is based on intermittent operation of equipment for eight hours each day, five days per week. If the equipment is in operation for more than eight hours a day or is operated in severe applications or environments, more frequent maintenance should be performed.

INTERVAL	MAINTENANCE CHECK
Start of each shift  (Operator or Maintenance Personnel)	Make a thorough visual inspection of the winch for damage. Do not operate the winch if damaged.  Operate the winch at low RPM in both directions. Winch must operate smoothly without sticking, binding or abnormal noises. Check the operation of the brake.
3 Months  (Maintenance Personnel)	Inspect the brake linings. Clean or replace parts as required. Adjust brake as necessary.
Yearly  (Maintenance Personnel)	Inspect the gearing, shafts and bearings for wear and damage. Repair or replace as necessary.  Check all the supporting members, including the foundation, fasteners, nuts, sheaves and rigging, etc. for indications of damage or wear. Repair or replace as necessary.

### ⚠ CAUTION

- Before adjusting brake, remove any load from load line to prevent injury or property damage.

### Adjusting Manual Brake

Keep the brake adjusted so that considerable pressure is required to force the lever past the high point. Never adjust the brake so tight that the lever cannot be moved to the locked position.

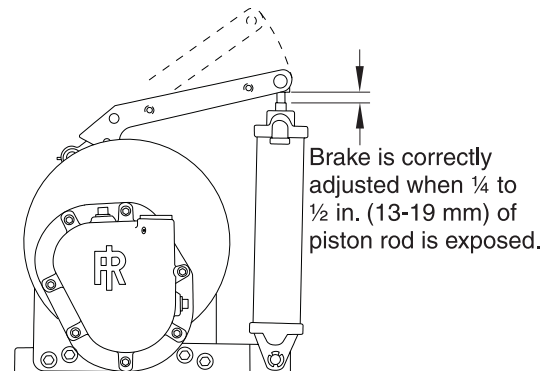
If the brake does not hold the rated load, disassemble and repair.

1. Lift up brake lever (55) to remove tension on brake band.
2. Remove brake lever screws, separate halves and set aside.
3. Spread brake band apart and measure the thickness of the metal band and lining together. When the brake band and lining together measure less than 0.203 inches (5.2 mm) in any location, the brake band assembly (61) must be replaced.
4. Rotate brake trunnion (56) half a turn clockwise when facing the gear end of the winch.
5. Insert brake trunnion into brake lever and assemble with screws. Place brake lever halves into brake band bracket.
6. Press lever down. This should be difficult until lever goes "over center" and locks.
7. Actuate throttle lever in both directions. Drum should not rotate.
8. If drum rotates, remove brake lever, tighten trunnion clockwise another half turn and test again. Repeat until drum does not rotate when lever is locked and throttle is activated.

### Adjusting Automatic Brake

If the brake assembly is removed or repaired, ensure that the breather is installed and located at the top of the brake cylinder during reassembly.

1. Remove cotter pin (134) and press down on brake lever (130). This will remove the pressure on the brake lever pin (133), which can then be pushed out.
2. Lift up brake lever to remove tension on brake band.
3. Remove screws (131) from brake lever, separate halves and set aside.
4. Spread brake band apart and measure the thickness of the metal band and lining together. When the brake band and lining together measure less than 0.203 inches (5.2 mm) in any location, the brake band assembly (61) must be replaced.
5. Rotate brake trunnion (56) half a turn clockwise when facing the gear end of the winch.
6. Insert brake trunnion into brake lever and assemble with screws. Place brake lever halves into brake band bracket.
7. Press lever down until holes in lever align with air cylinder clevis and insert brake pin. Retain with cotter pin.
8. Attach test load to load line and lift load 6 to 9 inches (150 to 220 mm). When throttle lever is in neutral position (centered), the load should not move.
9. The brake is correctly adjusted when 1/4 to 1/2 in. of the piston rod is exposed. Refer to Dwg. MHP1211. If load does move, tighten trunnion a further half turn and test again. Repeat until load does not move when throttle lever is in neutral position.



(Dwg. MHP1211)

### Motor

1. Drain and replace oil in the motor and reduction gear after the first 50 hours of initial winch operation. Thereafter, drain and replace oil according to the intervals recommended.
2. Always inspect removed oil for evidence of internal damage or contamination (metal shavings, dirt, water, etc.). If indications of damage are noticed, investigate and correct before returning winch to service.
3. After winch operation, allow oil to settle before topping off.
4. Always collect lubricants in suitable containers and dispose of in an environmentally safe manner.

### Gear Case Assembly

Check the grease in the gear case as recommended in the "LUBRICATION" section. If it is low, replenish it. The grease should be changed once a year.

### Disassembly

#### General Disassembly Instructions

The following instructions provide the necessary information to disassemble, inspect, repair, and assemble the winch. Parts drawings are provided in the parts section. In general, the winch is designed to permit easy disassembly and assembly. The use of heat or excessive force should not be required. If a winch is being completely disassembled for any reason, follow the order of the topics as they are presented. It is recommended that all maintenance work on the winch be performed in a clean dust free work area.

In the process of disassembling the winch, observe the following:

1. Never disassemble the winch any further than is necessary to accomplish the needed repair. A good part can be damaged during the course of disassembly.
2. Never use excessive force when removing parts. Tapping gently around the perimeter of a cover or housing with a soft hammer, for example, is sufficient to break the seal.
3. Do not heat a part with a flame to free it for removal, unless the part being heated is already worn or damaged beyond repair and no additional damage will occur to other parts.
4. Keep the work area as clean as practical, to prevent dirt and other foreign matter from getting into bearings or other moving parts.
5. All seals, gaskets and 'O' rings should be discarded once they have been removed. New seals, gaskets and 'O' rings should be used when assembling the winch.
6. When grasping a part in a vise, always use leather- or copper-covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members, machined surfaces and housings.
7. Do not remove any part which is a press fit in or on a subassembly unless the removal of that part is necessary for repairs or replacement.
8. When removing ball bearings from shafts, it is best to use a bearing puller. When removing bearings from housings, drive out the bearing with a sleeve slightly smaller than the outside diameter of the bearing. The end of the sleeve which contacts the bearing must be square. Protect bearings

from dirt by keeping them wrapped in clean cloths.

## NOTICE

- **Special attention should be given to the installation of needle bearings. Direct pressure on the bearing itself may result in the distortion or fracture of its thin shell, with subsequent early failure as a result.**
- **Bearings should be pressed in with a bearing insertion tool that is shaped to properly contact the bearing face.**
- **Do all pressing on the stamped face of the bearing.**

The construction of the BU7A winch allows for the motor to be removed, repaired and replaced without removing the gears. Alternatively, the gears can be removed and replaced without disturbing the motor.

The following instructions cover the complete disassembly of the winch. For sub-assemblies where it is obvious that no new parts are required, do not disassemble. Even for complete reconditioning, disassembly should proceed only far enough to allow thorough inspection and replacement of worn or damaged parts.

### Brake Band Replacement

For winches with automatic brake, remove cotter pin (134) and brake lever pin (133). Then the following steps apply to all winches:

1. Remove brake lever screws, separate handle and set aside.
2. Remove four capscrews (69) and lockwashers (71).
3. Pull gear case assembly away from drum.
4. Remove brake band assembly (61) from drum.
5. Remove retainer (58) from brake band pin (59). Push pin out of brake band. Set aside brake adjusting screw (57) and trunnion (56).

### Motor Disassembly

1. Unscrew the two valve chest cover capscrews (5) and remove the cover (7) with assembled parts from the motor case (28).
2. Using a 7/16 in. -14 thread bolt, remove the rotary valve (15) from the rotary valve bushing (14).
3. Unscrew the eight motor case capscrews (29) and remove motor case (28) containing assembled motor from motor mounting bracket (79).
4. Unscrew the four cylinder capscrews (21) from any one of the four cylinder heads (23) and remove the cylinder head, cylinder sleeve (19) and gasket (24).
5. Rotate the crank (44) until the piston (17) is at top dead center. Push piston wrist pin (18) out of piston, freeing piston from connecting rod (39). Repeat until all four cylinders and pistons have been removed freeing the crank (44) and assembled parts.
6. Using two screw drivers, pry the crank pin sleeve (36) from the crank and remove the connecting rod rings (38), connecting rods (39) and connecting rod bushing (37).
7. Remove crank bearing (78) (only if replacement is necessary) by supporting the inner ring of the bearing and pressing on face of the motor pinion.
8. If the pinion on the crankshaft (44) is damaged or worn, it will be necessary to replace the entire crankshaft.
9. Unscrew the four oil wall screws (35) and remove the oil wall (33). Removal of the oil wall is seldom necessary unless the reverse valve bushing (12) is to be removed.
10. The rotary valve bushing (14) and reverse valve bushing (12) are press fits in the motor case and should never be removed unless replacement is necessary. To remove, heat

bushings to 450° F (232° C) to loosen Loctite®. Support the face of the motor case that contacts the valve chest cover, and, with a suitable arbor inserted into the motor case and against the face of the bushing, press the bushing out while it is hot.

## CAUTION

- Use an arbor that will clear the bushing keys (30) that project into each bushing bore in motor case. Pressing bushings out in the opposite direction or using an arbor that will not clear the bushing keys will result in the keys being sheared off.

### Gear Case Disassembly

1. Remove lower grease plug (75) from gear case cover (76). Tip winch on its side and drain grease.
2. Unscrew the eccentric shaft bushing lock screw (77) with No. 201 setscrew wrench, and by pulling on clutch lever (54) remove the assembled eccentric shaft bushing (49) from the gear case cover.
3. Unscrew the seven gear case cover capscrews (5) and remove the cover (76) from the gear case (66).
4. Grasp the intermediate gear (70) and drive gear (99) and withdraw them simultaneously from the gear case. The complete drive shaft assembly will come out with the gear.
5. Support the clutch jaw (101) and press the drive shaft (93) out of the outer bearing (72), freeing the clutch jaw, clutch jaw lock balls (95) and clutch jaw lock spring (94). Care should be taken so that these latter parts, which are small, will not be lost.
6. With two small screw drivers, spread the gap in the drive gear washer retainer (98) and remove it from groove in drive shaft.
7. Slide washer (97) and drive gear (99) from drive shaft.
8. The drive shaft bearing, inner (96) should be removed only if replacement is necessary. If necessary, support the bearing and press shaft from its inner ring.

### Wire Rope Drum Removal

1. Unscrew and remove from the bottom of base (87), the four base capscrews (69) that retain the motor mounting bracket (79). Use No. 331 base capscrew wrench.
2. Pull complete motor and wire rope drum assembly as one unit away from the gear end of the winch, sliding it along the base until the crank assembly is clear.
3. Lift off brake band (61) and assembled parts.
4. Slide wire rope drum from drum shaft (62).

## NOTICE

- The two drum bearings (84), one located at each end of the drum, and the motor pinion bearing (63) located in the drum shaft are needle type bearings that are usually destroyed by removal. Therefore, they should be removed only if replacement is to be made. Likewise, grease seals are usually destroyed if removed, so the drum grease seal (82), located in the motor end of the drum, should not be removed except for replacement.

5. If replacement of either drum bearing is necessary, stand the drum on end, with the bearing to be removed at the bottom. Using a long punch or rod that is small enough to

pass through the upper bearing at a sufficient angle to contact the shell of the lower bearing, drive the bearing out.

6. If replacement of the motor pinion bearing (63) is necessary, unscrew the two drum shaft setscrews (77) and remove the drum shaft (62) from the motor mounting bracket (79). Using a small, sharp chisel, collapse the bearing and withdraw it from the shaft.

### Cleaning, Inspection and Repair

#### Cleaning

Clean all winch component parts in solvent (except the drum brake band). The use of a stiff bristle brush will facilitate the removal of accumulated dirt and sediments on the housing, frame and drum. If bushings have been removed, it may be necessary to carefully clean out old Loctite® from the bushing bores. Dry each part using low pressure, filtered compressed air. Clean the drum brake band using a wire brush or emery cloth. Do not wash the drum brake band in liquid. If the drum brake band lining is oil-soaked, it must be replaced.

#### Inspection

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

1. Inspect all gears for worn, cracked, or broken teeth.
2. Inspect all bushings for wear, scoring, or galling.
3. Inspect shafts for ridges caused by wear. If such ridges are apparent on shafts, replace the affected shafts.
4. Inspect all threaded items and replace any with damaged threads.
5. Inspect the drum band brake lining for oil, grease and glazing. If the drum band brake lining is oil-soaked, replace the brake band. Remove glazed areas of band brake lining by sanding lightly with a fine grit emery cloth.
6. Measure the thickness of the drum brake band and lining. If the drum brake band and lining together measure less than 0.203 inches (5.2 mm) thick anywhere along the edges, replace the brake band (61).

#### Repair

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

1. Worn or damaged parts must be replaced. Refer to the applicable parts listing for specific replacement parts information.
2. Inspect all remaining parts for evidence of damage. Replace or repair any part that is in questionable condition. The cost of the part is often minor in comparison to the cost of redoing the job.
3. Smooth out all nicks, burrs, or galled spots on shafts, bores, pins, or bushings.
4. Examine all gear teeth carefully and remove nicks or burrs.
5. Polish the edges of all shaft shoulders to remove small nicks which may have been caused during handling.
6. Remove all nicks and burrs caused by lockwashers.

#### Assembly

##### General Instructions

1. Use all new gaskets, 'O' rings and seals.
2. Replace worn parts.
3. Assemble parts using match marks attached during disassembly. Compare replacement parts with originals to identify installation alignments.
4. Lubricate all internal parts with a mixture of half ISO VG 68 (20W) oil and half molybdenum disulfide lubricant

compound (e.g. STP®).

### Motor Assembly

1. Place the motor case (28) on a flat table surface with the face of the motor perpendicular with the table. Apply a coating of Loctite® 609 Retaining Compound (as directed by Loctite® instructions) to the rotary valve bushing (14) and the motor case bore. Align the keyway in the rotary valve bushing with the bushing key in the bore of the motor case. Start the bushing squarely in the bore and gently press it (by hand) flush with the top face of the case. Once the bushing has been installed allow the Loctite® to cure for 10 minutes. Full cure requires 24 hours.
2. Repeat the procedure for the reverse valve bushing (12). Note the keyway in the bushing may not extend the entire length, so it must be inserted with the open end first.

### NOTICE

• **Some of the first BU7A winches contain a reverse valve bushing with the keyway running the entire length of the bushing so that it does not determine into which end the bushing should first be installed. On these winches, always start the bushing into the case, external beveled end first. The bevel in the bore of the bushing will then be toward the valve chest cover.**

3. Check fit of rotary valve (15) in bushing. It must be a good running fit. Lap if necessary using a mild, fine grain, lapping compound. If bushing has closed in sufficiently to make lapping impossible, ream to 1.000 in. (25.4 mm) diameter.
4. Check the fit of the reverse valve (10) in its bushing. If it is tight, ream the bushing to 1.000 in. (25.4 mm) diameter.
5. Place the oil wall (33) in the motor case and retain with the four oil wall screws (35) and lockwashers (34).
6. Support the inner ring of the shielded side of the crank bearing (78) and press crank (44) into bearing until shoulder on crank contacts inner ring.
7. Slide the connecting rod bushing (37) onto the crank pin sleeve (36). Place one connecting rod ring (38), straight face first, over connecting rod bushing until it contacts the flange on the crank pin sleeve. Enter the feet of the four connecting rods (39) into the space between bushing and ring. Slide the second ring, beveled face first over feet of rods.
8. Ensure that the three oil holes, visible in the bore of the crank pin sleeve, are aligned with the oil groove running lengthwise in the crank pin. Slide the crank pin sleeve, small end first, along with the parts assembled on it, onto the crank pin. Tap sleeve onto crank pin until it seats, making sure to maintain the alignment between the notch in the sleeve flange and this groove on the end of the crank pin.

### NOTICE

• **Ensure the sleeve remains in position on the crank pin until it is locked in place by the tang on the rotary valve on final assembly.**

9. Install the piston rings (16) so that the face marked with a dot is toward the top (closed) end of the piston (17). Do not

expand the ring more than is necessary to slip it over the piston.

10. Insert the crank assembly into the motor case, centralizing it as well as possible and positioning the connecting rods so that one leads to each cylinder hole in case. Rotate crank until one rod protrudes far enough to allow installation of piston (17) and piston wrist pin (18).
11. Place piston rings (16) into grooves in piston (17). Compress lower ring with **Ingersoll-Rand** tool D01-933.
12. Slide sleeve (19) over piston and place this assembly over the connecting rod (39). Align holes in piston with connecting rod and insert wrist pin (18).
13. Push sleeve down over piston until fully seated into motor case. Sleeve will push **Ingersoll-Rand** tool D01-933 off piston.
14. Place gasket (24) over sleeve, aligning holes.
15. Insert capscrews (21) and washers (22) through cylinder head (23). Place this assembly over the cylinder assembly and tighten. Repeat until all cylinders have been installed.
16. Examine the end of the crank pin and crank pin sleeve (36) by looking through the bore of the rotary valve bushing (14). Position the rotary valve (15) so that the tang will enter both the groove in the end of the crank pin and the notch in the flange on the sleeve and insert the rotary valve into the rotary valve bushing. Positioning the rotary valve before inserting is important, as it is possible to install it incorrectly with the tang contacting the edge of the sleeve flange.
17. Place the throttle lever spring (3) over the small boss on the valve chest cover, seating one leg of the spring against one side of the throttle spring stop pin (6) and forcing the other leg over the pin so that it seats against the opposite side. Ensure that the spring is positioned so that forcing the second leg over the pin will cause the spring to be wound more tightly - not unwound. Place the hub of the throttle control arm into the spring coil, entering the stop pin on the control arm between the legs of the spring.
18. Note that an arrow is stamped on the face of the valve chest cover (7) and that a line is scribed on the shank of the reverse valve (10). Turn the reverse valve until the line and arrow are in alignment and slide the stem of the valve into the valve chest cover, entering the square shank in the square hole in the control arm. Apply reverse valve nut (1) to threaded end of reverse valve.
19. Make sure reverse valve seal (9) and 'O' ring (8) are in position in their respective grooves in reverse valve, then slide valve into bushing. Position valve chest cover and retain with valve chest cover screws.
20. Install a new motor case gasket (32) on the shoulder of the motor mounting bracket (79). Enter pinion end of crank in bore of drum shaft (62) and slide motor into position on shoulder of motor mounting bracket, entering the crank bearing (78) in its bore in the bracket. Rotate motor slightly, if necessary, to mesh pinion with intermediate gear. Retain with motor case capscrews.

### Gear Case Assembly

1. Press one intermediate gear bearing (72) onto each hub of the intermediate gear (70).
2. Support the inner ring of the drive shaft bearing (96) and press the drive shaft (93) into it as far as possible.
3. Slide the drive gear (99), jaw side outward, onto the drive shaft and against the bearing.
4. Slide the drive gear washer (97) over shaft and against the drive gear. Install drive gear retainer (98) in shaft groove.
5. Place the two clutch jaw lock balls (95) and clutch jaw lock spring (94) into the cross hole in shaft so that the spring lies between the balls.

6. While holding the lock balls in place, slide the clutch jaw (72), jaw side first, onto the shaft and over the lock balls.
7. Support the outer ring of the drive shaft bearing (72) and press shaft into it up to the shoulder.
8. Mesh the smaller of the intermediate gears (70) with the drive gear (99) and install them simultaneously in the gear case, entering the bearings of each in their respective bores while meshing the larger of the intermediate gears with the motor pinion and the gear on drive shaft with the internal gear in the wire rope drum (86).
9. Slide the clutch jaw along drive shaft until it is in the engaged position.
10. Apply gear case cover (76) and retain with lockwashers (4) and capscrews (5).
11. Rotate the clutch eccentric shaft (47) within the eccentric shaft bushing (49) until the lug on shaft engages the notch in the bushing.
12. Align lock screw hole in the bushing with the one in the gear case cover and insert assembly into opening in gear case cover. After making sure setscrew hole in bushing is in direct alignment with the tapped hole in the cover, screw eccentric shaft bushing lock screw (77) into place with No. 201 setscrew wrench.

#### Wire Rope Drum Assembly

1. Install motor pinion bearing (63) in counterbored end of drum shaft (62).
2. Slide shaft over crank (44), aligning the two small holes in the shaft with the two tapped holes in the motor mounting bracket (79). Screw the setscrews (77) into these holes, using No. 201 setscrew wrench.
3. Install drum bearings (84) in wire rope drum (86).
4. Place drum thrust plate (83) in motor end of wire rope drum until it contacts shoulder in bore. Install drum grease seal (82), lip side first, in motor end of wire rope drum. Start seal in bore squarely and drive into position using a large, flat-faced arbor that will not damage seal.
5. After making sure that there are no nicks or burrs on the hub surface of the motor mounting bracket (79) on which the grease seal revolves; apply a thin coat of grease to this surface. Place a small quantity of light grease in each needle bearing and slide drum onto drum shaft.
6. Place brake band assembly (61) in position making sure that lug on brake band assembly enters the space between the brake anchor (91) and the pad on the base. Install cotter pins (92) and bend ends apart.
7. Slide motor and drum assembly into position on base, entering the drum shaft in the gear case and meshing the

motor pinion and the intermediate gear. Retain with base capscrews (69) and lockwashers (71).

#### Brake Band Assembly

1. Screw brake trunnion (56) onto brake adjusting screw (57) until about 1/4 inch (6 mm) of thread is exposed.
2. Insert this assembly into the middle of the loop on the brake band (61) (not the bracket).
3. Insert the brake band pin (59) into the loop and secure with retainer (58). Pin should be centered in loop. If it is not centered, move retainer to the other side of the brake adjusting screw.
4. Place brake band assembly onto the drum (86) with the loop and bracket at the top of the drum.
5. Place the tab on the lower left side of the brake band between the brake anchor and the raised portion of the base. Insert cotter pins (92) into brake anchor (91) and bend ends apart.
6. Tilt the winch over onto the motor and support. The drum opening should be facing straight up.
7. Lower the gear case assembly onto the drum.

### NOTICE

- **Ensure that the spline teeth on the crankshaft assembly do not damage bearing or become nicked.**

8. If necessary, rotate gear assembly to allow splines on crankshaft to mesh with gear (70).
9. Ensure that tab on brake band is between brake anchor and base.
10. Align bolt holes in gear case with base and insert capscrews (69) and lockwashers (71). Tighten.
11. Place lugs on brake lever into holes in bracket on brake band. Place trunnion into hole in brake lever and screw halves of brake lever together.

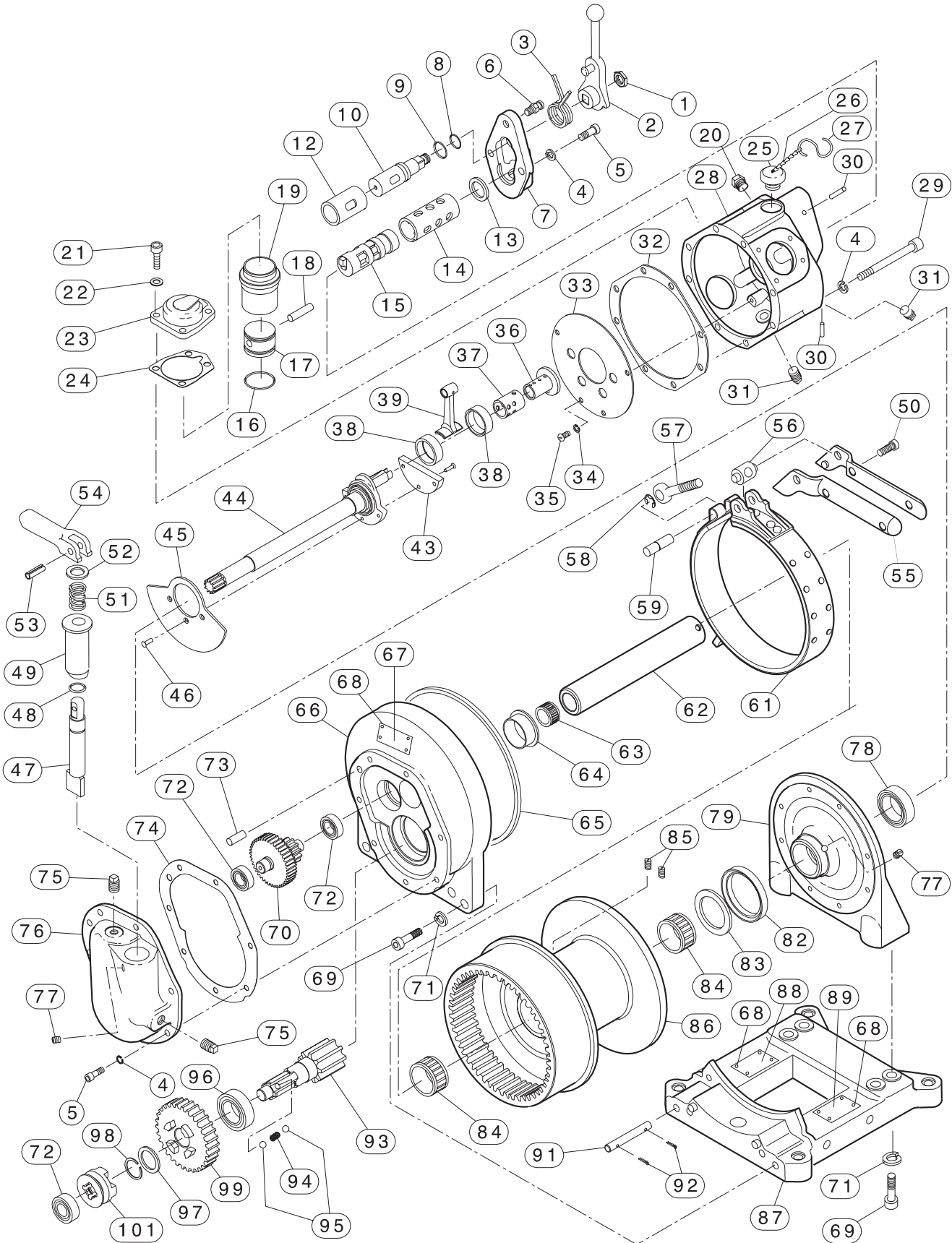
#### Load Test

Prior to initial use, all new, extensively repaired, or altered winches shall be load tested by or under the direction of a person trained in safety and operation of this winch, and a written report furnished confirming the rating of the winch. Test loads shall not be less than **100%** of the rated line pull at mid drum and should not exceed **125%** of the rated line pull at mid drum.

### NOTICE

- **Testing to more than 125% of rated line pull may be required to comply with standards and regulations set forth in areas outside the USA.**

# WINCH ASSEMBLY PARTS DRAWING



(Dwg. MHP1207)

## WINCH ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
1	Reverse Valve Nut	1	23A4C5
• 2	Throttle Lever	1	BU-555/556A
3	Throttle Lever Spring	1	BU-412
4	Lockwasher	17	T11-58
5	Capscrew	9	52333
6	Throttle Spring Stop Pin	1	BU-553
7	Valve Chest Cover	1	BU-K546A
• 8	'O' Ring	1	BU-948
9	Reverse Valve Seal	1	410-283
10	Reverse Valve Assembly (incl's items 1, 8 and 9)	1	BU-K944A
12	Reverse Valve Bushing	1	BU7A-945
13	Rotary Valve Thrust Washer	1	BU-552A
14	Rotary Valve Bushing	1	BU7A-525
15	Rotary Valve	1	BU-526
• 16	Piston Ring	8	D01-337-8
17	Piston Assembly (incl's item 16)	4	D01-A513B
18	Piston Wrist Pin	4	TC-389B
19	Cylinder Sleeve	4	D01-L505A
20	Inlet Bushing	1	BU-38
21	Capscrew	16	34U-150
22	Washer (Copper)	16	D01-504
23	Cylinder Head	4	D01-H505A
• 24	Cylinder Gasket	4	D01-507
25	Vent Cap Assembly (incl's items 26 and 27)	1	DLC-303
26	Vent Cap Chain	1	D02-891
27	'S' Hook	1	D02-421
28	Motor Case Assembly (incl's items 12, 14, 20, 30 and 31)	1	BU-501A
	Motor Case Assembly (Model BU7APTAB only)		BU7ARC-501
29	Capscrew	8	71126908
30	Bushing Key	2	N00-15
31	Oil Plug	2	D02-402
• 32	Gasket	1	BU-592
33	Oil Wall	1	BU-500
34	Lockwasher	4	F-58
35	Screw	4	J-376
36	Crank Pin Sleeve	1	BU-519
37	Bushing	1	D01-511A
38	Ring	2	D01-510
39	Connecting Rod	4	D01-509A
43	Crank Counterweight	1	BU-515
44	Crank Assembly (incl's items 43, 45 and 46)	1	BU7A-A516A
45	Oil Splasher	1	BU-540
46	Rivet	3	D02-541

• Recommended Spare

## WINCH ASSEMBLY PARTS LIST (CONT'D)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
47	Clutch Eccentric Shaft (Manual brake models only)	1	BU-857A
• 48	'O' Ring	1	PS3-67
49	Bushing	1	BU-964
	Bushing (Model BU7APTAB only)		BU7A-728
50	Brake Lever Screw	2	51014
• 51	Clutch Lever Spring (Manual brake models only)	1	H02-81C
52	Clutch Lever Washer (Manual brake models only)	1	BU-962
53	Clutch Lever Pin (Manual brake models only)	1	BU-870A
54	Clutch Lever (Manual brake models only)	1	BU-556B
• 55	Brake Lever (incl's items 50 and 56)	1	BU7A-718
56	Brake Trunnion	1	BU-159
57	Brake Adjusting Screw	1	BU-158A
58	Retainer	1	BU7A-118
59	Brake Band Pin	1	BU-147A
• 61	Brake Band Assembly	1	BU-A152
62	Drum Shaft Assembly (incl's item 63)	1	BU7A-A459
63	Motor Pinion Bearing	1	R2H-606
64	Drum Thrust Sleeve	1	BU-468
65	Drum Seal	1	BU7A-137
66	Gear Case Assembly (incl's items 64, 65 and 73)	1	BU7A-A353
67	Nameplate	1	BU-301-R
68	Screw	12	R4K-302-12
69	Capscrew	8	54662
	Capscrew (Model BU7APTAB only)	6	
70	Intermediate Gear	1	BU-364
71	Lockwasher	8	D10-322-5
72	Bearing	3	TB-394
73	Dowel	1	D10-527
• 74	Gasket	1	BU-931
75	Grease Plug	2	T1SE-368-3/8
76	Gear Case Cover (incl's item 75)	1	BU-352
77	Setscrew	3	R3SM-574
78	Crank Bearing	1	58-96
79	Motor Mount Bracket	1	BU-502
82	Grease Seal	1	BU-866
83	Thrust Plate	1	BU-469
84	Bearing	2	BU-466
85	Setscrew	2	BU-381
86	Drum Assembly (incl's items 82 thru 85)	1	BU7A-A324
87	Base	1	BU-564A
*	Warning Tag	1	71056410

\* Illustrated on Page 4

• Recommended Spare



## WINCH ASSEMBLY PARTS LIST (CONT'D)

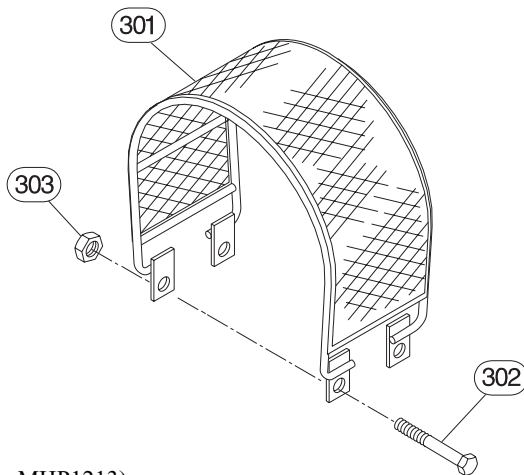
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
88	Warning Plate	1	TA-WELD
89	Caution Plate	1	TA-147A
91	Brake Anchor	1	BU-206
92	Pin, Cotter	2	53456
93	Drive Shaft	1	BU-358
94	Clutch Jaw Lock Spring (Manual brake models only)	1	533-664
95	Clutch Jaw Lock Ball	2	4U-722
96	Inner Bearing	1	BU-359
97	Washer	1	BU-363A
98	Retainer	1	50810
99	Drive Gear	1	BU-357
*	Inlet Plug (Model BU7APTAB only)	1	D02-351
101	Clutch Jaw	1	BU-568A

\* Not Illustrated

## KITS, SPECIAL TOOLS AND ACCESSORIES

DESCRIPTION	PART NUMBER
Piston Ring Compressor to compress Piston Rings (16) on Cylinder (19)	D01-933
Touch-up Paint (Yellow) 12 oz Spray Can	FAP-237Y
Wire Rope Lubricant 13 oz Spray Can	LUBRI-LINK-GREEN
Brake Lining Repair Kit	BU-K155
Drum Guard Kit	BU7A-K298A
Air Strainer	EU-A267
Lubricator	L30-06-000
Filter	F30-06-000
Exhaust Muffler	D02-674A

## DRUM GUARD ASSEMBLY DRAWING AND PARTS LIST

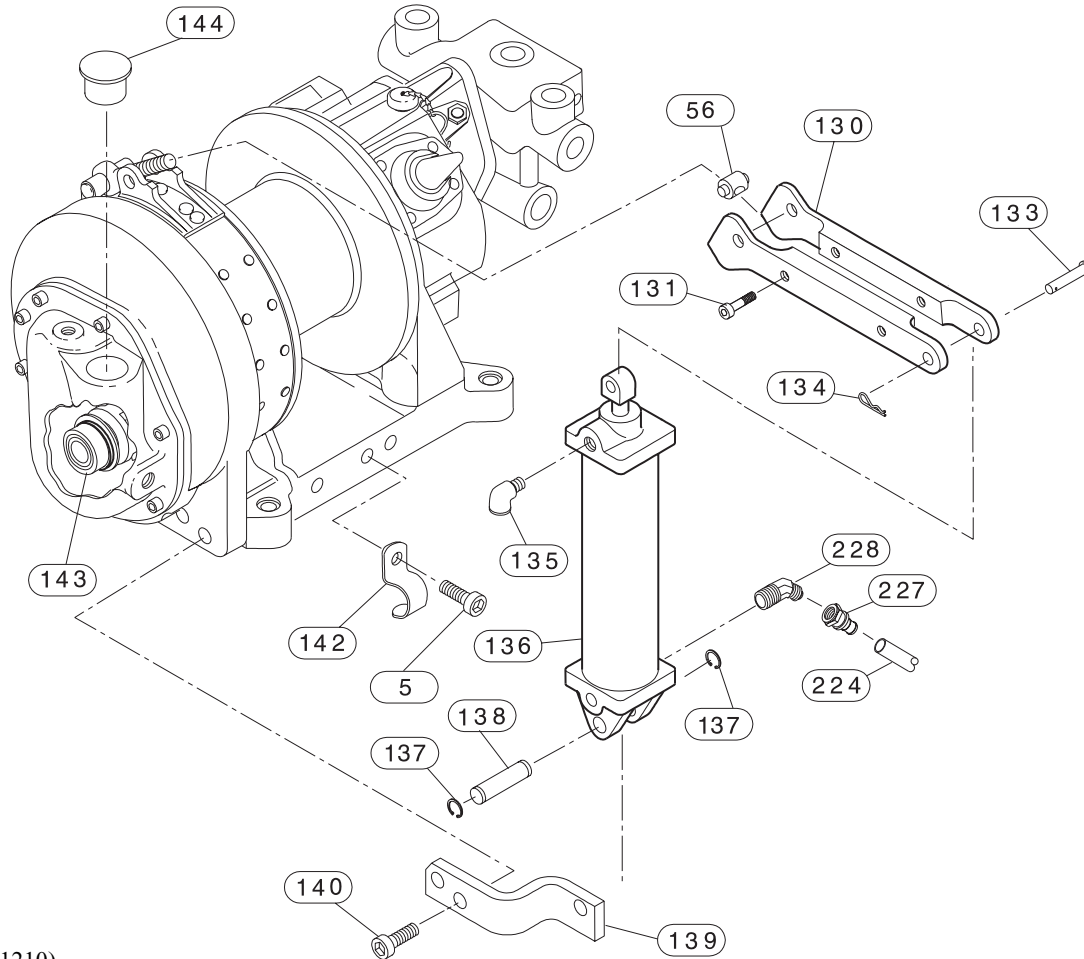


(Dwg. MHP1213)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
301	Drum Guard	1	BU7A-298A
302	Capscrew	2	71329833
303	Nut	2	50171

Note: Remove the minimum amount of mesh from the drum guard to provide clearance for wire rope departure.

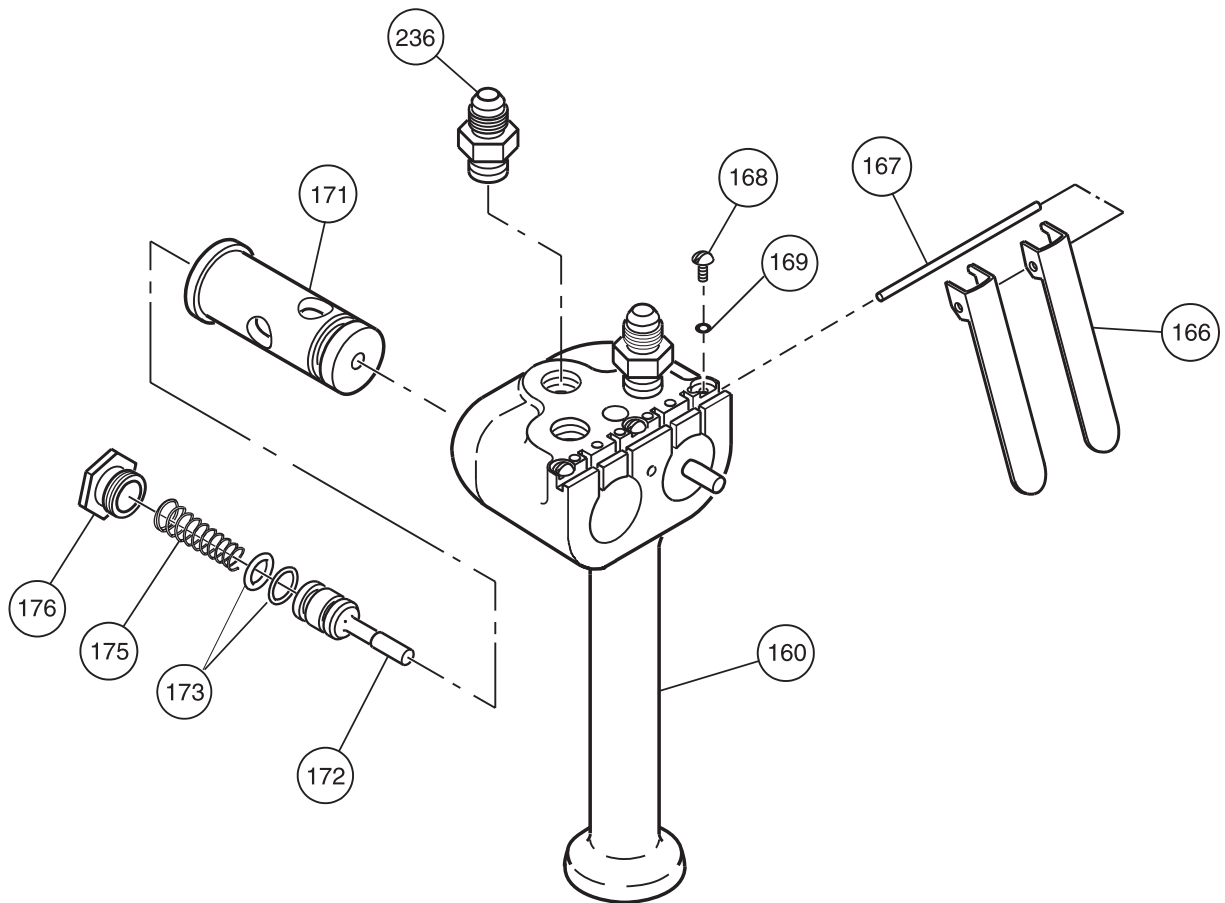
# AUTOMATIC BRAKE ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHP1210)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
5	Capscrew	1	52333
56	Brake Trunnion	1	BU-159
130	Brake Lever Assembly	1	BU7A-718
131	Capscrew	2	51014
133	Pin	1	UWB-1569
134	Cotter Pin	1	53456
135	Exhaust Elbow	1	HUS-912
136	Brake Cylinder	1	BU7A-720
137	Retainer	2	Included with Item 138
138	Pin	1	71327688
139	Brake Cylinder Mounting Bracket	1	BU7A-721
140	Screw	2	52379
142	Hose Clamp	1	D6100A-727
143	Clutch Jaw Spacer	3	TRD-1625
144	Plug	1	BU7ARC-945
224	Hose	Specify Length	53245
227	Connector Fitting	2	53954
228	Elbow Fitting	1	EL45-4B437

# REMOTE PENDANT THROTTLE HANDLE DRAWING AND PARTS LIST



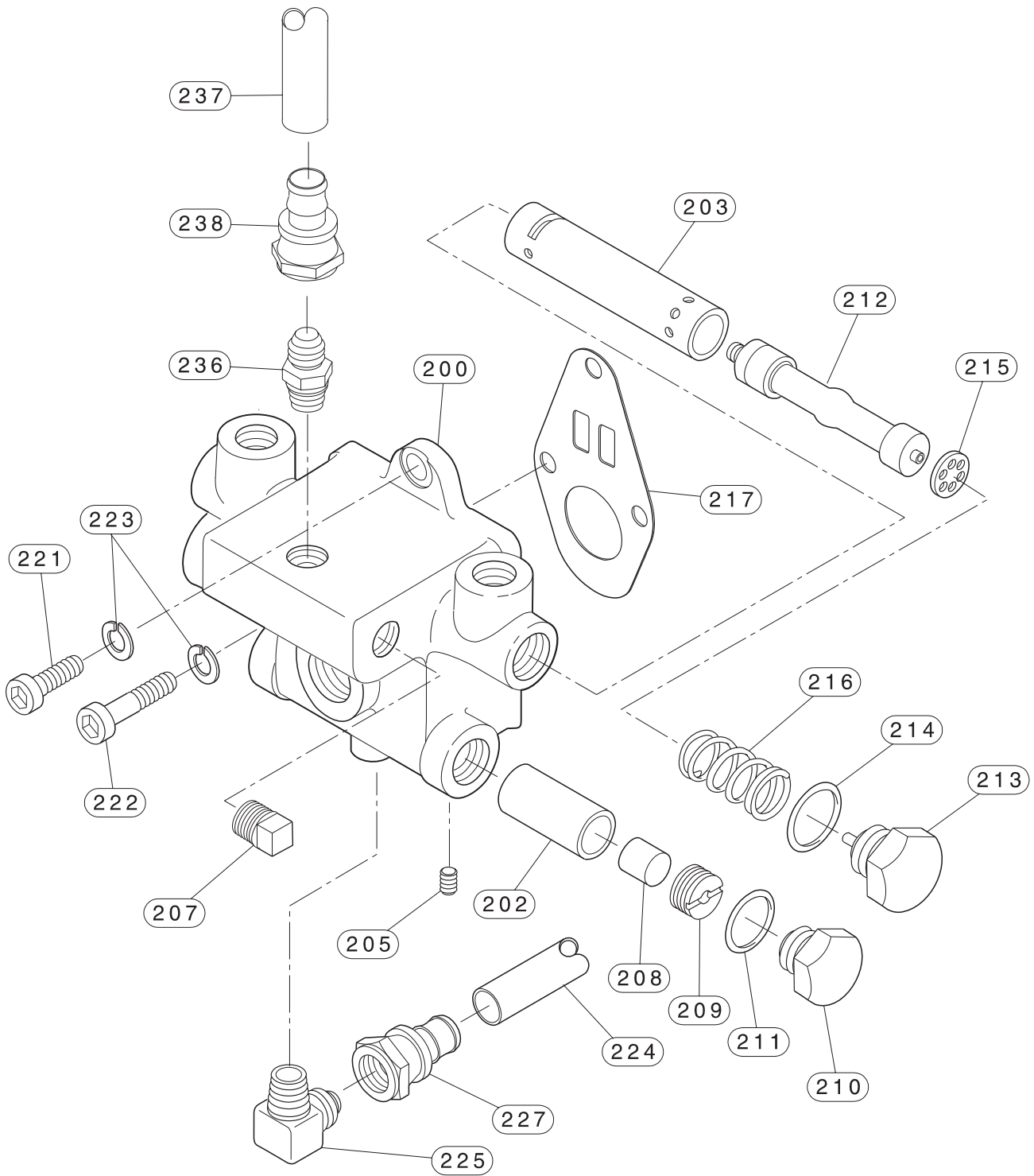
(Dwg. MHP1072)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
160	Pendant Assembly (incl's all items below)	1	MR-269C
166	Throttle Lever	2	MR-273
167	Throttle Lever Pin	1	DLC-120A
168	Screw	3	MLK-SR662
169	Lockwasher	3	D02-138
171	Bushing	2	D02-263A
172	Throttle Valve	2	MR-264
• 173	Throttle Valve Seal Ring	4	AF120-289
• 175	Throttle Valve Spring	2	D01-51A
176	Valve Cap	2	D02-180A
236	Connector Fitting	3	71009815
237	Hose*	Specify Length	53245
238	Hose End Fitting*	3	53954

\* Illustrated on Page 28.

• Recommended Spare

# SHUTTLE VALVE CHEST ASSEMBLY DRAWING



## SHUTTLE VALVE CHEST ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
---	Shuttle Valve Chest Assembly (incl's items 200 thru 216)	1	BU7A-A245
200	Shuttle Valve Chest	1	BU7A-245
202	Brake Valve Bushing	1	D01-63
203	Shuttle Valve Bushing	1	26069
205	Pipe Plug	2	502-95
207	Air Inlet Plug	1	D02-351
208	Brake Valve	1	D01-62A
209	Brake Valve Seat	2	D01-65
210	Brake Valve Cap	2	D01-943
211	Brake Valve Cap Gasket	2	D01-946
212	Shuttle Valve	1	D01-246
213	Shuttle Valve Cap	2	DLC-238
214	Shuttle Valve Cap Gasket	2	G601-411
215	Shuttle Valve Washer	2	DLC-248
216	Shuttle Valve Spring	2	DLC-268
217	Valve Chest Gasket	1	BU7A-547
221	Capscrew	1	R44H-490A-4
222	Capscrew	2	R4810-68
223	Lockwasher	3	T11-58
224	Brake Hose	Specify Length	50923
225	Brake Pipe Elbow	1	52182
227	Swivel Fitting	2	UWD-162
236	Connector Fitting	3	71009815
237	Control Hose	Specify Length	53245
238	Hose End Fitting	3	53954

## WINCH UPGRADES

### Winch Upgrades

#### **BU7A-A516 Crankshaft Assembly**

On BU7A winches the BU7A-A516 crankshaft has been redesigned to include the pinion as part of the shaft. The pinion is now machined as an integral part of the crankshaft, thus eliminating the old style crankshaft, motor pinion (BU-319), lockwasher (F-58) and motor pinion screw (BU-20).

Order a new Crankshaft Assembly by specifying the following part number and communication number.

DESCRIPTION OF PART	COMMUNICATION NUMBER	PART NUMBER
Crankshaft Assembly	03811155	BU7A-A516A

Old-style parts such as the Motor Pinion (BU-319), Lockwasher (F-58) and Motor Screw (BU-20) are available as spares on a limited basis.

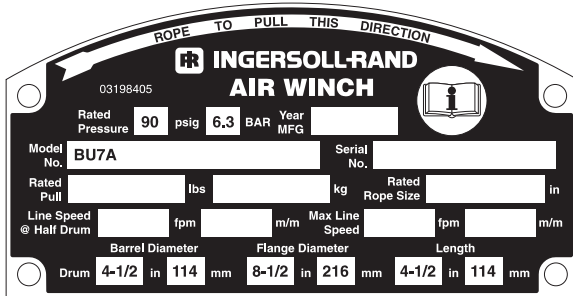
# PARTS ORDERING INFORMATION

The BU7A winch 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.

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

The model and serial number plate is located on the gear case housing at the clutch end.



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

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

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

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

## NOTICE

- **Continuing improvement and advancement of design may cause changes to this equipment 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.**
- **Sections of this manual may not apply to your winch.**

### 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.

Winches which have been modified without **Ingersoll-Rand** approval, mishandled or overloaded will not be repaired or replaced under warranty. A printed copy of the warranty which applies to this winch is provided inside the back cover of this manual.

### Disposal

When the life of the unit has expired, it is recommended that the it 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  
 Fax: (206) 624-6265

or

### Ingersoll-Rand Material Handling Douai Operations

111, Avenue Roger Salengro  
 59450 Sin Le Noble, France  
 Phone: (33) 03-27-93-08-08  
 Fax: (33) 03-27-93-08-00

# WARRANTY

## 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 en route 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  
Fax: (615) 672-0801

### For Technical Support

**Ingersoll-Rand**  
P.O. Box 24046  
2724 Sixth Ave South  
Seattle, WA 98124-0046  
Phone: (206) 624-0466  
Fax: (206) 624-6265

### Regional Sales Offices

**Chicago, IL**  
888 Industrial Drive  
Elmhurst, IL 60126  
Phone: (630) 530-3800  
Fax: (630) 530-3891

**Detroit, MI**  
23192 Commerce Drive  
Farmington Hills, MI 48335  
Phone: (810) 476-6677  
Fax: (810) 476-6670

**Houston, TX**  
450 Gears Road  
Suite 210  
Houston, TX 77067-4516  
Phone: (218) 872-6800  
Fax: (218) 872-6807

**Los Angeles, CA**  
11909 E. Telegraph Road  
Santa Fe Springs, CA 90670  
Phone: (310) 948-4189  
Fax: (310) 948-1828

**Philadelphia, PA**  
P.O. Box 425  
900 E. 8th Ave., Suite 103  
King of Prussia, PA 19406  
Phone: (610) 337-5930  
Fax: (610) 337-5912

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

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

### Regional Sales Offices

**Calgary, Alberta**  
44 Harley Road S.E.  
Calgary, Alberta  
T2V 3K3  
Phone: (403) 252-4180  
Fax: (403) 252-4462

**Edmonton, Alberta**  
1430 Weber Center  
5555 Calgary Trail N.W.  
Edmonton, Alberta  
T6H 5G8  
Phone: (403) 438-5039  
Fax: (403) 437-3145

**Montreal, Quebec**  
3501 St. Charles Blvd.  
Kirkland, Quebec  
H9H 4S3  
Phone: (514) 695-9040  
Fax: (514) 695-0963

**British Columbia**  
201-6351 Westminster Hwy  
Richmond, B. C.  
V7C 5C7  
Phone: (604) 278-0459  
Fax: (604) 278-1254

**Latin America Operations  
Ingersoll-Rand  
Production Equipment Group**  
730 N.W. 107 Avenue, Suite  
300 Miami, FL 33172-3107  
USA  
Phone: (305) 559-0500  
Fax: (305) 559-7505

**Europe, Middle East and Africa  
Ingersoll-Rand**  
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 (Japan) Ltd.**  
Shin-Yokohama Square Bldg.  
(5th Floor)  
2-3-12 Shin-Yokohama,  
Kouhoku-Ku,  
Yokohama-shi, Kanagawa  
Pref. 222 Japan  
Phone: 81-45-476-7800  
Fax: 81-45-476-7806

**Russia  
Ingersoll-Rand Company**  
Kuznetsky Most, 21/5  
Moscow, 103895  
Russia.  
Phone: 7-501-921-53-21  
7-501-923-91-34  
Fax: 7-501-924-46-25