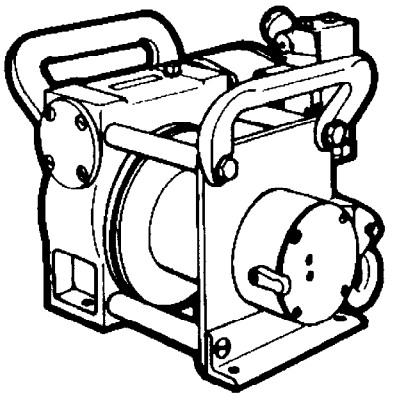
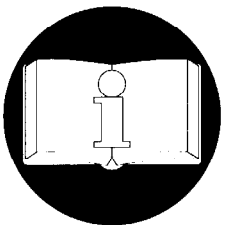
Form MHD56020

PARTS, OPERATION AND MAINTENANCE MANUAL
for
DINKY TUGGER AIR WINCH MODELS

1000P60-5
1000 lb (454 kg)

1000P60-12
1000 lb (454 kg)





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 (ANSI B30.7) and any other applicable safety codes and regulations.

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

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Edition 3
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INGERSOLL-RAND®
MATERIAL HANDLING

SAFETY INFORMATION

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

Danger, Warning, Caution and Notice

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

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

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

⚠ CAUTION Caution is used to indicate the presence of a hazard which ***will*** or ***can*** cause ***minor*** 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 cranes 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 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 with the owner/employer, not the manufacturer. Many OSHA requirements are not concerned or connected with the manufactured product but are, rather, connected with the final installation. It is the owner's responsibility and user's responsibility to determine the suitability of a product for any particular use. 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 can not know of, nor 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 personal injury or property damage.

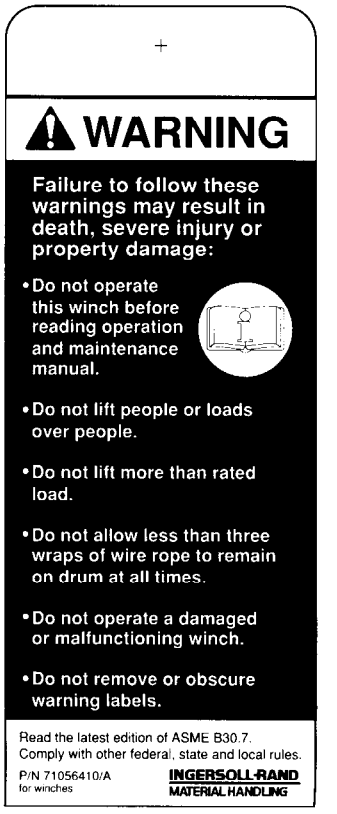
Ingersoll-Rand recognizes that most companies who use winches have a safety program in force in their plants. In the event that some conflict exists between a rule set forth in this publication and a similar rule already set by an individual company, the more stringent of the two should take precedence.

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 instructed in safety and operation of this winch to operate and maintain the winch.
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, do not operate the winch until the sign has been removed by designated personnel.
4. Before each shift, check 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. See warning labels and tags attached to winch.
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 tipload the hook as this leads to spreading and eventual failure of the hook.
10. Do not "side pull" or "yard".
11. Make sure everyone is clear of the load path. 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 suspend a load for an extended period of time.
16. Never leave a suspended load unattended.
17. Pay attention to the load at all times when operating the winch.
18. After use, properly secure winch and all loads.
19. The operator must maintain an unobstructed view of the load at all times.
20. Never use the wire rope as a sling.

WARNING TAG AND LABELS

Each winch is supplied from the factory with the warning tag and labels shown. If the tag or labels are not attached to your winch, order new ones and install them. See the parts section for the part numbers. Read and obey all warnings and other safety information attached to this winch. Tag and labels may not be shown actual size.



SPECIFICATIONS

Model No.	Drum Length (in)	ANSI Rating 3.5:1				Hoist Duty 5:1				Horsepower
		Line Pull		Line Speed		Line Pull		Line Speed		
		lb	kg	fpm	m/min	lb	kg	fpm	m/min	
1000P60-5	5	1250	567	40	12	1000	454	60	18	3
1000P60-12	12									
		Drum Capacities ft. (m)								Net Weight*	
		3/16 in.	5 mm	1/4 in.	6 mm	5/16 in.	8 mm	3/8 in.	10 mm	lb	kg
1000P60-5	5	340	86	162	52	82	25	49	14	76	35
1000P60-12	12	835	211	401	128	204	62	124	36	84	38

* Winch without wire rope

** Based on ANSI standards which require the top layer to be at least 1/2 in. (13 mm) below the drum flange diameter. Capacities shown may vary from those published elsewhere.

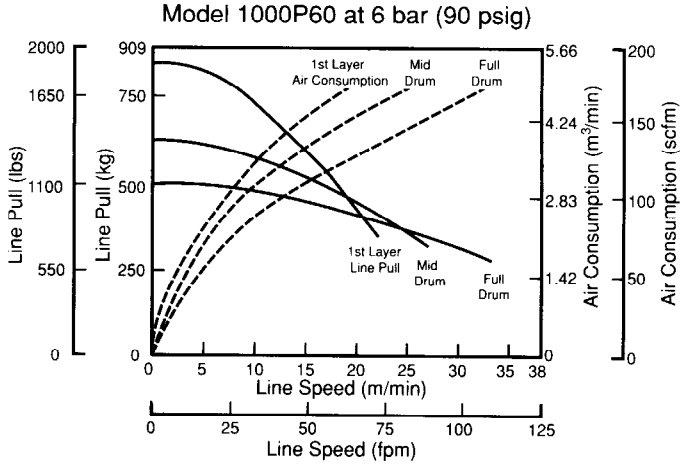
Description

The Dinky Tugger air winch consists of a vane motor bolted to the gear housing which contains a worm gear drive reduction. The output from the vane motor drives the worm gear reduction which in turn powers the wire rope drum through a free spool clutch located on the side frame. The winch control valve is conveniently mounted on the air vane motor.

Performance

Performance is based on operating the winch with 90 psi (6.2 bar) and 125 CFM.

Performance Graph



(Dwg. MHTPA0575)

Model Code Explanation

Model Code Example **1000P60-5-PT**

Series

1000P60 = Dinky Tugger Air Winch 1,000 lb (454 kg)

Drum Length (measured between drum flanges)

5 = 5 in. (127 mm)

12 = 12 in. (305 mm)

Options

PT = Remote Pilot Pendant Throttle 10 ft (3 m) standard, 40 ft (12 m) max length

RC = Remote Full Flow Lever Throttle 10 ft (3 m) standard, 15 ft (4.5 m) max length

For additional information contact your nearest **Ingersoll-Rand** Material Handling office or distributor.

Prior to installing the winch, carefully inspect it for possible shipping damage.
Winches are supplied fully lubricated from the factory. Before operation check all 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.

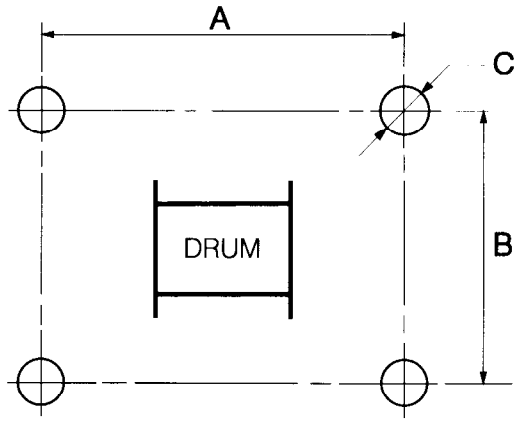
Mounting

Care must be taken when moving, positioning or mounting the winch. Lifting handles have been provided to assist in handling the winch.
Mount the winch so the axis of the drum is horizontal.

1. If the winch is to be mounted in one position be sure the mounting surface is flat and of sufficient strength to handle the rated load and prevent possible winch damage resulting from distortion or twisting of the winch frame.
2. Make sure the mounting surface is flat to within 1/16 inch (2 mm). Shim if necessary.
3. Mounting bolts must be 1/2 in. (12 mm) Grade 5 or better. Use self-locking nuts or nuts with lockwashers.
4. Tighten mounting bolts evenly. Torque to 75 lb ft (100 Nm) dry or 55 lb ft (74 Nm) lubricated.
5. Maintain a fleet angle between the sheave and winch of no more than 1-1/2 degrees. The lead sheave must be on a center line with the drum and for every inch (25 mm) of drum length, be at least 1.6 feet (0.5 m) from the drum.
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. Do not weld to any part of the winch.
8. Make sure vent plug (15) is located at the highest position on the gear case (1).

Mounting Bolt Hole Dimensions
(Ref. Dwg. MHTPA0124)

Model No.	"A"		"B"		"C"	
	in.	(mm)	in.	(mm)	in.	(mm)
1000P60-5	16-9/16	421	7	179	17/32	13
1000P60-12	23-9/16	598	7	179	17/32	13



(Dwg. MHTPA0124)

Wire Rope

⚠ CAUTION

• Maintain at least 3 wraps of wire rope on the drum at all times.

• Install the wire rope to come off the drum for the correct direction of rotation to suit the control valve operation.

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 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 winch cable drum, sheaves and method of reeving. The minimum recommended wire rope diameter is 3/16 in. (5 mm). Maximum wire rope diameter is 3/8 in. (10 mm). The maximum wire rope diameter is limited by the size of the wire rope anchor hole.

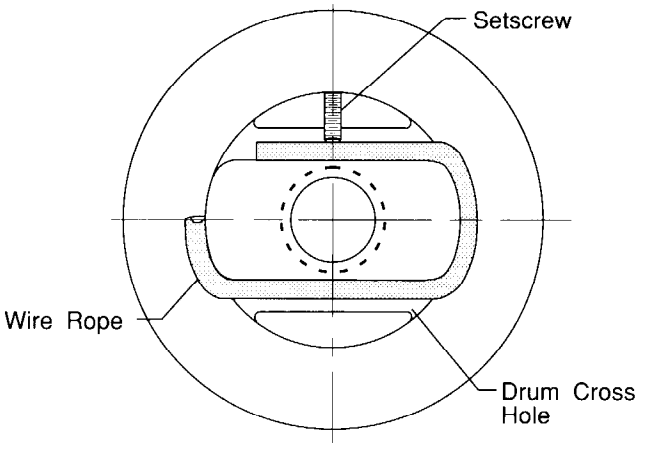
⚠ WARNING

• Check wire rope diameter provides an adequate safety factor.

Installing Wire Rope

(Ref. Dwg. MHTPA0176)

1. Cut wire rope to length and fuse the ends in accordance with the wire rope manufacturers instructions.
2. Feed the end of the wire rope through the drum cross hole and back through the wire rope clamping hole.
3. Position wire rope end just inside of drum barrel surface and tighten set screw.



(Dwg. MHTPA0176)

⚠ CAUTION

• Make sure the first wrap of wire rope is flush against the drum flange.

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 first layer is tight.

Wire Rope Spooling

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

Rigging

Make sure all wire rope blocks, tackle and fastenings have sufficient safety margin to handle the required load. 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 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. Always maintain at least three full wraps of wire rope on the drum.

Air Supply

The air supply must be clean and free from moisture.

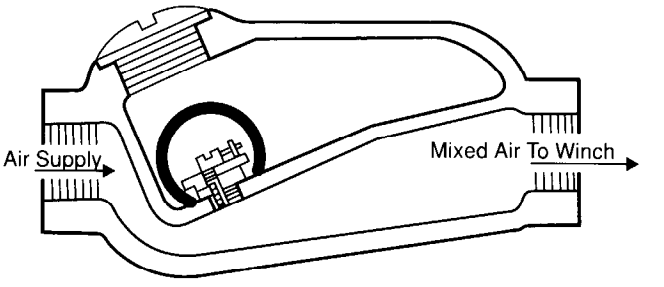
Air Lines

The inside diameter of the winch air supply lines must not be smaller than 1 in. (25 mm). Since the diameter of the supply line determines the volume of air which will pass through it, supply lines smaller than those recommended will not permit the motor to develop its maximum power. Where more than one motor is to be operated from a common supply line, the diameter of the main line should be increased to insure that sufficient volume and pressure is available at the motor end of the transmission line.

Before making final connections, all air supply lines should be purged before connecting to system inlet. Supply lines should be as short and straight as installation conditions will permit. The motor should be installed as near as possible to the compressor or air receiver. Long transmission lines and excessive use of fittings, elbows, tees, globe valves etc. cause a reduction in pressure due to restrictions and surface friction in the lines.

Air Line Lubricator

Always use an air line lubricator with these motors. The lubricator should be installed so the compressed air will flow in the direction of the arrows (see dwg. MHTPA0175). It is advisable to keep the lubricator as near as possible.



(Dwg. MHTPA0175)

Automatic lubrication is immediately effective once the lubricator is installed in the air line and the pressure is turned on. This pressure backs up through the feeder via the breather line into the oil reservoir where it is equalized. When operation of the winch begins, the pressure momentarily drops, the back pressure in the reservoir forces a fog of oil into the air line. This fog of oiled air which is suspended in the line provides a perfect lubrication without oil sticking to the hose wall. The lubricator only operates under pressure from the line, so oil is taken into the air line only when the winch is in use.

The lubricator insures lubrication as long as any oil remains in the reservoir. The leak-proof, pressure-proof window reveals actual oil supply.

The normal setting of the feeder for average summer conditions is 5 when using 10W oil. Increasing the opening may be necessary for lower temperatures. When adjusting the feeder, open until it is at the point where a light film of oil can be felt on the hand when held over the exhaust. This adjustment enables the lubricator to be operated under a variety of climatic conditions. The use of a lubricator assures that the rotary valve and rotary valve bushing will receive adequate lubrication and the oil vapor carried into the motor will help to lubricate the cylinder walls.

⚠ CAUTION

• Lubricator must be located no more than 10 ft. (3 m) from the motor.

The air line lubricator should be replenished daily.

Air Line Filter

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

Moisture in Air Lines

Moisture that reaches the air motor through the supply lines is the chief factor in determining the length of time between service overhauls. Moisture traps, installed at low points in the transmission lines can help to eliminate moisture and other methods, such as an air receiver which collects moisture before it reaches the motor or an aftercooler at the compressor that cools the air prior to distribution through the supply lines, are also helpful.

Motor

For optimum performance and maximum durability of parts, operate air motor with 90 psig at 125 scfm (6.2 bar/ 620 kpa at 3.5 cu.m/min) air supply. The air motor should be installed as near as possible to the compressor or air receiver.

Compressor and Air Receiver

Motors which are to be operated continuously at maximum horsepower must obviously be used with a compressor of sufficient capacity to deliver the volume of air required. In many applications, however, these motors are used intermittently at slow speeds and under these conditions a smaller compressor can be used, especially when an air receiver is installed to provide storage for a reserve supply of compressed air.

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.

a. When first running the motor some light oil should be injected into the inlet connection to allow good lubrication.
b. When first operating the winch it is recommended that the motor be driven slowly in both directions for a few minutes.

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

1. Pour a small amount of 10W oil in the motor inlet port.
2. Operate the motor for 10 seconds in each direction to flush out any impurities.
3. The winch is now ready to work.

The four most important aspects of winch operation are:

1. Follow all safety instructions when operating the winch.
2. Allow only people instructed in safety and operation of this product to operate the winch.
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.

The spring loaded manual throttle control valve is supplied mounted to the motor. Optional remotely mounted controls are available. The valve provides control over the speed of the motor and the direction of drum rotation.

⚠ WARNING

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

Winch Controls

Winch Mounted Throttle

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 pay out wire rope.

When viewed from the air motor end move the control throttle handle 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.

Remote Pilot Pendant Throttle (optional)

The pendant control throttle is equipped with two separate levers for winch operation. Direction of drum rotation is controlled by whichever lever is depressed.

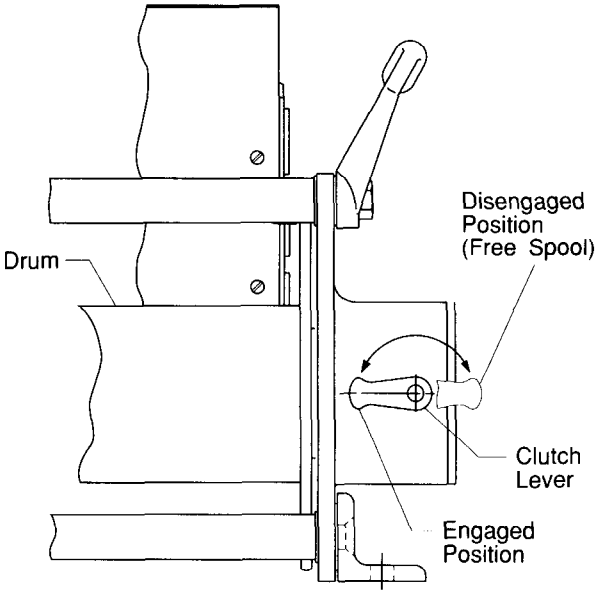
Free Spool Clutch

⚠ WARNING

• Never disengage the clutch with tension on the wire rope or if the drum is moving.

To disengage the clutch (free spool) rotate the clutch lever clockwise until the clutch lever is in a horizontal position pointing away from the side frame.

To engage the clutch rotate the clutch lever counterclockwise until the clutch lever is in a horizontal position pointing towards the side frame.



(Dwg. MHTPA0177)

Run In Period

Maximum efficiency of the worm gear is obtained after a "run-in" period. The length of time required will depend on the load applied and will be two to four hours at rated load and considerable longer at lighter loads. (overloading will not further decrease the "run-in" time and it may damage the worm gear.)

During "run-in" higher than normal temperature rise, and lower efficiency and output torque can be expected.

After "run-in" worm gears are designed to operate with a maximum temperature rise of 100° F (38° C) in the oil bath providing they are operated within limits of catalog rating of input horsepower, output torque and have the recommended oil level of the proper lubricant.

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.

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.

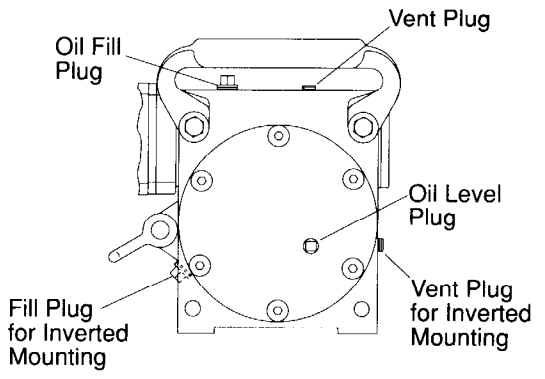
INTERVAL	LUBRICATION CHECKS
Start of each shift	Check flow and level of air line lubricator.
Monthly	Clean air line filter. Check the oil level in the winch gear housing.
6 months	Drain and refill the oil in the winch gear housing.

Gear Housing

The gear housing is filled at the factory and shipped with the proper amount of oil, a non-toxic, rust inhibiting worm gear oil AGMA #7 compound that is suitable for an ambient temperature of 50° F to 125° F (10° C to 52° C).

Before placing the winch in operation, make certain that the vent plug (15) is located at the highest position on the gear housing (1).

Lubrication Points



(Dwg. MHTPA0550)

After the first 10 hours of operation, the oil should be changed. Thereafter it should be changed every 100 hours of service or every 6 months whichever occurs first. The oil is drained by removing pipe plug (74) located in the side of the gear housing (1). It will be necessary to tilt the winch slightly to remove all of the oil. The oil should be changed, using one of the recommended lubricants or its equivalent.

Lubrication Chart

Temperature Range	Recommended Lubricant
50° to 125° F (10° to 52° C)	AGMA #7 EP
-10° to 50° F (-23° to 10° C)	AGMA #5 EP

Fill gear housing up to the level plug (73) hole in the gear housing (1). The gear housing oil capacity is approximately 1 qt. (0.95 lts.)

Seals, Bearings and Clutch

If the winch is disassembled, clean all parts thoroughly and coat bearings, seals and clutch parts with clean grease. Use sufficient grease to provide a good protective coat. For temperatures -20° to 50° F (-29° to 10° C) use a multipurpose lithium-based EP 1 grease. For temperatures 30° to 120° F (0° to 49° C) use a multipurpose lithium-based EP 2 grease.

Air Supply

Air supply should have a filter and an air line lubricator. Use SAE 10W oil or equivalent, one pint every eight hours of operation. The air line lubricator (156) has a 18 cu in. (0.29 lts.) oil capacity.

The strainer should be cleaned occasionally by removing the plug and turning on the air for a few moments to blow out accumulated dirt.

Drain the air receiver at least once a day.

Wire Rope

Refer to wire rope manufacturer's recommendations. At a minimum observe the following:

1. Clean with a brush or steam if there is dirt, rock dust or other foreign material on the surface of the rope.

⚠ CAUTION

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

2. Apply a wire rope lubricant, **Ingersoll-Rand** LUBRI-LINK® or SAE 30W oil.
3. Brush, drip or spray lubricant weekly, or more frequently, depending on severity of service.

Inspection information is based in part on American National Standards Institute 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 defective.

Frequent and periodic inspections should be performed on equipment in regular service. Frequent inspections are visual examinations performed by operators or personnel trained in safety and operation of this equipment and include observations made during routine equipment operation. Periodic inspections are thorough inspections conducted by personnel trained in the safety, operation and maintenance of this equipment. ASME B30.7 states inspection intervals depend upon the nature of the critical components of the equipment and the severity of usage.

Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.
Deficiencies revealed through inspection, or noted during operation, must be reported to designated personnel instructed in safety, operation and maintenance of this equipment. A determination as to whether a condition constitutes a safety hazard must be decided, 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 a winch in continuous service, frequent inspection should be made at the beginning of each shift. In addition, visual inspections should be conducted during regular service for any damage or evidence of malfunction.

1. OPERATION. Check for visual or abnormal noises which could indicate a defect. Do not operate a winch unless the wire rope feeds onto the winch drum smoothly. If wire rope binds or jumps, clean and lubricate the wire rope. If problem persists, replace the wire rope. Do not operate the winch until all defects have been corrected.
2. AIR SYSTEM. Check air lines, valves and other components for leakage. Repair if necessary.
3. WIRE ROPE. Wire rope is a consumable item which must be replaced when worn. The following list is a guide to the accepted standards by which wire rope must be judged and is not presented as a substitute for an experienced inspector:
   a. Damage, such as birdcaging, kinking, core protrusion, crushing and main strand displacement.
   b. Corrosion and nicking.
   c. Wear of crown wires. Replace at 1/3 wear of the original diameter of any crown wire.
   d. Broken wires or strands, particularly at connections. Replacement is necessary if one wire is broken at a connection; six wires broken within one lay; three wires broken in one strand within one lay.
   e. Lubrication.

   Replace wire rope if any doubt exists as to wire rope serviceability.
4. WIRE ROPE REEVING. Check reeving and ensure wire rope is properly secured to the drum.
5. LUBRICATION. See "LUBRICATION" section for recommended procedures.
6. CONTROLS. Check that controls function properly and return to neutral when released.

Periodic Inspection

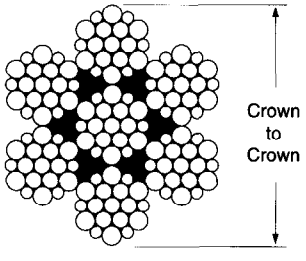
Periodic inspection intervals for winch use under various conditions is listed below:

NORMAL	HEAVY	SEVERE
yearly	yearly	quarterly

Disassembly may be required for HEAVY or SEVERE usage. Keep accumulative records of periodic inspections to provide a basis for continuing evaluation. Inspect all the items in a frequent inspection plus the following:

1. FASTENERS. Check capscrews, nuts, pins and other fasteners on winch and air system. Replace if missing or tighten and secure if loose.

2. ALL COMPONENTS. Inspect for wear, damage, distortion, deformation and cleanliness. If external evidence indicates the need, disassemble. Check gears, shafts, bearings, springs and covers. Replace worn or damaged parts. Clean, lubricate and reassemble.
3. DRUM AND SHEAVES. Check for damage or excessive wear. Replace if necessary.
4. CLUTCH. Check operation of clutch lever and that it locks into the engaged position.
5. LABELS AND TAGS. Check for presence and legibility. Replace if necessary.
6. WIRE ROPE.
   Besides the items in a frequent inspection, inspect for the following:
   a. Build-up of dirt and corrosion. Clean if necessary.
   b. Loose or damaged end connection. Replace if loose or damaged.
   c. Check wire rope anchor is secure.
   d. Changes in the size of the wire rope diameter. Periodically measure the diameter of the wire rope from crown-to-crown throughout the life of the wire rope. The actual diameter should be recorded when the wire rope is under equivalent loading and in the same operating section. If the actual diameter of the wire rope has decreased more than 1/64 in. (0.4 mm) a through examination of the wire rope should be conducted by an experienced inspector to determine the suitability of the wire rope to remain in service. (Ref. Dwg. MHTPA0056).



(Dwg. MHTPA0056)

7. FOUNDATION. Check for the continued ability to sustain the imposed loads.
8. CONTROL VALVE. It is recommended that the control valve be disassembled yearly for lubrication, cleaning and inspection.

Winches Not in Regular Use

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

A winch which has been idle for a period of over six months shall be given a complete inspection conforming with the requirements of "Periodic Inspection".

Standby winches shall be inspected at least semi-annually in accordance with the requirements of "Frequent Inspection". If abnormal operating conditions apply, winches may require a more frequent inspection.

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 problems, probable causes and solutions.

PROBLEM	CAUSE	SOLUTION
Winch will not operate.	No air supply to winch.	Check connections and hoses in air supply lines.
	Winch is overloaded.	Reduce load to within rated capacity.
Load continues to move when winch is stopped.	Winch is overloaded.	Reduce load to within rated capacity.
Winch does not provide rated line pull and speed performance.	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.	Check air supply.
	Improper hose or fitting sizes.	Check fittings, connections and hoses for correct size and length. Replace parts that may cause restricted air flow.
	Motor shaft seal is damaged.	Noticeable air escaping from the gear housing breather plug. Replace motor shaft seal (44).
	Motor out of alignment.	Check motor alignment as described in the "MAINTENANCE" section.
Throttle lever moves but winch does not operate.	Motor may be damaged.	Remove, disassemble and clean motor as described in the "MAINTENANCE" section. Examine all parts and replace any that are worn or damaged.
	Insufficient air supply.	Check air supply. Increase the air pressure to provide 90 psig (6.2 bar/620 kpa).
	Winch is overloaded.	Reduce load to within rated capacity.
Winch runs hot or makes excessive noise during operation.	Low oil level.	Check oil level in the housing and top up if required.
	Improper lubrication.	Check oil is type recommended in the "LUBRICATION" section.

⚠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 personnel trained in service and repair on this winch to perform maintenance.
• After performing any maintenance on the winch, test winch to 110% of its rated capacity before returning to service.
• Turn off air system and depressurize air lines before performing any maintenance.

General Disassembly

The following instructions provide the necessary information to disassemble, inspect, repair, and assemble the winch. Parts drawings of the winch and related components are provided in the Parts Section.
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 on a sturdy work bench 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.

In general, the winch is designed to permit easy disassembly and assembly. The use of heat or excessive force should not be required.

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 and 'O' rings should be discarded once they have been removed. New seals and 'O' rings should be used when assembling the winch.
6. When grasping a part in a vise, always use leather-covered or copper-covered vise jaws to protect the surface of the part and help prevent distortion. This is particularly true of threaded members 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 or pipe which contacts the bearing must be square. Protect bearings form dirt by keeping them wrapped in clean cloths.

Winch Disassembly

(Ref. Dwg. MHTPC0178)

1. Remove the wire rope from the drum.
2. Relieve pressure in the air lines by operating the winch control several times after the air supply has been turned off.

⚠WARNING

• Shut off, bleed down and disconnect the air supply line before performing any disassembly procedures.

3. Disconnect and tag the air lines.
4. Remove the winch from its mounting and take to a suitable work area before beginning disassembly.
5. Remove the drain plug (74) in the gear housing (1) and allow the oil to drain into a suitable container. Loosen the fill cap (15) to vent the gear housing (1).
6. Remove any guards or other externally mounted winch attachments.
7. Remove capscrews (62) which secure the motor assembly to adapter (8). Pull the motor straight away from the winch. Refer to motor section if motor disassembly is required.
8. Remove anchor assemblies (39) from the gear housing (1) and side frame (2).
9. Remove handle capscrews (61) and carry handle (34) from gear housing (1).
10. Drive clutch pin (67) out of clutch handle (30) and remove clutch handle (30) from clutch cam (28).
11. Remove the four screws (58) which secure clutch housing cover (31) to side frame (2) and carefully remove clutch housing cover.
12. Remove screws (60) and separate clutch cam bracket (29), clutch cam spring (49) and ball (66).
13. Remove screws (58) and pull out clutch slider cap (24). Tap out clutch pin (67) and remove the clutch cam link collar (27) and clutch cam link (26).
14. Remove frame screws (52) and foot bracket (17) from side frame (2).
15. Remove capscrews (16), carry handle (34) and top spacer bars (5) from side frame (2) and gear housing (1).

16. Remove housing capscrews (53) and bottom spacer bars (4) from gear housing (1).
17. Carefully tap on the side frame (2) to remove it from the drum (3). Tap bearing (38) out of side frame (2) if it is being replaced.
18. Remove clutch slider (23) from drum (3) and gear and drum shaft (14).
19. Slide drum (3) off of the gear and drum shaft (14).
20. Remove screws (55) from input shaft cover (10) and remove input shaft cover (10) and gaskets (50) from gear housing (1).
21. Carefully pull worm assembly from gear housing (1).
22. Remove screws (55), adapter (8) and gaskets (50) from the motor side of gear housing (1).
23. Tap bearing cup (40) out of the motor side of the gear housing (1).
24. Remove cover screws (55), output shaft cover (11) and output shaft gaskets (13) from gear housing (1).
25. Pull worm gear and drum shaft assembly from gear housing (1).
26. Slide seal sleeve (9) off gear and drum shaft (14).
27. Press bearing cones (41) off gear and drum shaft (14). Remove both bearing spacers (25).
28. Press worm gear (7) off gear and drum shaft (14) and remove gear keys (21).
29. Remove cover screws (55), output shaft cover (12) and output shaft gasket (13) from gear housing (1).

Motor and Valve Disassembly

1. Remove capscrews (78) and separate control valve (79) from motor assembly (175).
2. Remove capscrews (56) and (62) from cover (20).
3. Remove covers (19) and (20) from cylinder (36).
4. Slide shaft and rotor assembly (72) from cylinder (36). Be careful not to drop or damage vanes (35) during this operation.
5. Remove capscrews (63) and cap (33) from the cover (20).

Cleaning, Inspection and Repair

⚠ CAUTION

• If bushings (45) are loose, worn or rotate in the drum they must be replaced. Failure to observe this precaution will result in additional component damage.

Clean all winch component parts in solvent. The use of a stiff bristle brush will facilitate the removal of accumulated dirt and sediments on the housings, frame and drum. Dry each part using low pressure, filtered compressed air.

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. Original bore size of bushings (45) is 1.377 in. (35 mm). If bore size is more than 1.430 in. (36.3 mm) replace bushings.
3. Inspect shafts for ridges caused by wear. If ridges caused by wear are apparent on shafts, replace the shaft.
4. Inspect all threaded items and replace those having damaged threads.
5. Inspect motor end cover and rotor for scoring.

Repair

Actual repairs are limited to the removal of small burrs and other minor surface imperfections from 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 which is in questionable condition. The cost of the part is often minor in comparison with 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.

Motor and Valve Assembly

1. Install seal (44) in cover (19) so seal (44) is flush with cover face. Seal lip must face towards motor.
2. Install seal (47) in cover (19) so seal lip faces towards the motor.
3. Apply a small amount of Loctite® 609 on the outside diameter of bearings (46). Install bearings (46) in covers (19) and (20). Pack grease between seal (44) and bearing (46) in cover (19) filling the cavity.
4. Install cap (33) on cover (20) with capscrews (63).
5. Apply gasket sealant to the motor cylinder (36) surface for cover (19). Use a minimal amount but enough to create a total seal. Install motor cover (19) to motor cylinder (36).
6. Install dowels (71) to align cover (19) with motor cylinder (36).

NOTICE

• Replacement rotors and cylinders must be supplied as matched sets in order to maintain the proper end running clearance of .002 to .004 in. (0.05 - 0.1 mm).

7. Apply a film of 10W oil to the cylinder wall. Install motor rotor (32) in cylinder (36). Place one vane in each rotor slot so that the long straight vane edge is towards the cylinder wall.

8. Apply gasket sealant to the motor cylinder (36) surface for cover (20). Use a minimal amount but enough to create a total seal. Install motor cover (20) to motor cylinder (36). Align cover with dowel pin (71) holes and carefully tap cover (20) into position until flush with the cylinder (36).
9. Install dowel pins (71) in cover (20) and cylinder (36). The relationship of the motor end covers (19) and (20) with the motor cylinder (36) is very critical. In order to provide proper running clearance for the rotor, the rotor has to run exactly parallel with the cylinder (36) and perpendicular to the covers. Dowel pins (71) are used to locate these parts within 0.007 in. (0.18 mm) of correct alignment.
10. Install capscrews (56). On double bearing motors, the correct alignment is established by snugging down the capscrews (56) which retain the covers to the cylinder and checking the motor shaft for free turning. If any drag is noted, tap around the edges of the motor covers until the shaft turns freely. Tighten capscrews to 30 in. lbs. (0.35 kg.m) and recheck drag.
11. Tap shaft key (64) into the keyway on shaft (18).
12. Position spacers (82) between the control valve (79) and cover (80). Attach cover (80) to control valve (79) with screws (83).
13. Place one valve adapter (76) in each hole of the clamp plate (77). Screw the valve adapters (76) into the control valve (79) ports using a small amount of Loctite® Pipe Sealant with Teflon on the threads. Place a straight edge across the valve adapter (76) 'O' ring faces and adjust the valve adapters (76) until the 'O' ring faces are level.
14. Lubricate and install 'O' rings (84) in the grooves on the valve adapters (76).
15. Apply a small amount of Loctite® 242 on capscrew (78) threads. Install valve assembly on the motor with capscrews (78) and torque to 6 lb. ft. (0.8 kg.m).

Winch Assembly

(Ref. Dwg. MHTPB0178)

1. Press one bearing cup (41) into each output shaft cover (11 and 12).
2. Place output shaft gasket (13) on output shaft cover (12) and assemble output shaft cover (12) to gear housing (1) with cover screws (55).
3. Press worm gear keys (21) into gear and drum shaft (14). Check that worm gear keys are fully seated.
4. Press worm gear (7) onto gear and drum shaft (14) being careful to line up the keyway slots in the worm gear (7) with the worm gear keys (21).
5. Install bearing spacers (25) on either side of worm gear (7). Press bearing cones (41) onto gear and drum shaft (14) so they are fully seated against the bearing spacers (25).
6. Slide seal sleeve (9) onto gear and drum shaft (14).
7. Install worm gear shaft assembly into gear housing (1).
8. Position output shaft gaskets (13) on output shaft cover (11) and assemble to gear housing (1) with screws (55). Tighten screws (55) evenly to prevent damage to bearings (41).
9. Press bearing cones (40) onto worm (6) so they are fully seated against the worm shoulder.
10. Press bearing cup (40) into gear housing (1) on the motor side.
11. Install adapter (8) on gear housing (1). Secure in position with screws (55).
12. Install worm assembly in gear housing (1) so bearing cone locates in bearing cup (40).
13. Position input shaft shims (50) on input shaft cover (10) and assemble to gear housing (1) with screws (55). Rotate worm to check for tight spots. Ensure backlash is between 0.002 - 0.005 in. (0.05 - 0.13 mm). Adjust shims (50) until correct backlash is achieved.
14. Lubricate and install seal (42) in bore of adapter (8) so lip is toward the worm (6).
15. Lubricate and install seal (43) over sleeve (43) into the bore of output shaft cover (11) with seal lip toward the worm gear (7).
16. Press a bushing (45) into each end of drum (3).
17. Install drum (3) on gear and drum shaft (14).
18. Tap shaft keys (21) into position in gear and drum shaft (14). Install wire rope anchor screw (54) in drum (3). Refer to installation section for wire rope installation.
19. Install clutch slider (23) on gear and drum shaft (14). Check that clutch slider (23) moves freely back and forth over shaft keys (21).
20 Tap bearing (38) into side frame (2) then install side frame (2) with bearing (38) onto drum (3).
21. Secure bottom spacer bars (4) onto gear housing (1) with housing capscrews (53).
22. Install carry handle (34) against side frame (2) and top spacer bars (5) between gear housing (1) and side frame (2) with capscrews (16).
23. Secure foot bracket (17) and spacer bars (4) to side frame (2) with screws (52).
24. Insert clutch cam link (26) through the center hole in the clutch slider cap (24). Align pin hole and slide clutch cam link collar (27) on clutch cam link and install clutch pin (67).
25. Install clutch cam (28) through the hole in side frame (2).
26. Install assembled clutch slider cap (24) on clutch slider (23) with screws (58).
27. Install clutch cam ball (66) followed by clutch cam spring (49) in the center bore of the clutch cam bracket (29).
28. Carefully keeping the clutch cam ball and spring in position secure clutch cam bracket (29) to clutch housing cover (31) with screws (60).
29. Install clutch housing cover assembly to side frame (2) with screws (58).
30. Install pipe plug (72) in clutch housing cover (31).

31. Install clutch handle (30) on clutch cam (28). Rotate clutch handle (30) so pin hole is lined up and install clutch pin (67).
32. Attach carry handle (34) to gear housing (1) with handle capscrews (61).
33. Install anchor assemblies (39) on gear housing (1) and side frame (2).
34. Install motor and valve assembly on adapter plate (8) with capscrews (62). Align key (64) with keyway in worm (6).
35. Install remaining pipe plugs (15) and (73) in gear housing (1).

Control Valve

(Ref. Dwg. MHTPA0195)

The in-line lubricator will help to extend the service life of the control valve. Clean all metal parts with a non-flammable solvent, and wash all rubber parts with soap and water. Rinse thoroughly and blow dry with a low-pressure air jet. When applicable, check the internal pilot ports in the valve body (100) to make sure the passages are open. Replace any parts that are damaged or worn, giving particular attention to the seal rings (114) on the valve spool (107).

Disassemble and reassemble the valve, using dwg. MHTPA0195 as a reference. No special tools are required. When reassembling the valve portion, one new spacer (115) should be installed in the stack of spacers (115) and seal rings (114) to make the necessary compression in the post sockets and assure a tight seal stack. Place the new spacer (115) in the center of the valve body (100), with seal rings (114) and spacers (115) added on each side as assembly of the stack proceeds. Lubricate each seal ring (114) before installing. Tilt the seal rings (114) as they are inserted into the valve body (100) to avoid cutting or damage from sliding over port openings.

Remote Control Assembly

(Ref. Dwg. MHTPA0183)

If movement produced by the controls is opposite of what is desired, interchange the two hoses (162) which go to the relay valves (151).

Preventative Maintenance Tips

In some installations, due to atmospheric conditions or because moisture has not been eliminated in supply lines, fogging or freezing may occur at exhaust ports. Fogging can be corrected by attaching a length of hose or pipe to the valve exhaust port to carry the exhaust air away from the motor. Freezing can generally be eliminated by insuring that the air supply is as dry as possible before it is used by the motor.

Testing

Operational Test

Prior to initial use, all new, altered or repaired winches shall be tested to ensure proper operation.

a. Check oil level in gear housing is correct.
b. If motor is new or has had a major overhaul run winch slowly for several minutes in both directionswith no load.
c. Check operation of clutch.
d. Check operation of limit switches, and locking or safety devices when provided.
e. Check all tie-downs are secure.
f. Install guards and warning labels.

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 service and repair of this winch, and a written report furnished confirming the rating of the winch. Test loads shall not be more than 110% of the rated line pull.

To test the winch at 110% of the rated load apply a load of 1375 lb (624 kg) with the wire rope on the second layer of the drum.

Reference Information Only

For single bearing (old style) motors, first make certain that the worm shaft roller bearings are adjusted properly in the gearbox (end play should not exceed .005 in. (0.13 mm) at 100 lb. (45 kg) axial load), then install motor. Lightly snug up 10-32 screws and 1/4 NC motor mounting bolts. Install control valve, lubricator and filter. Connect to air supply. Run motor at full speed and tap around edge of motor end cover until maximum motor rpm is realized. Tighten 1/4 NC motor bolts to 65 in. lbs. (0.75 kg.m) and machine screws to 30 in. lbs. (0.35 kg.m)

PARTS ORDERING INFORMATION

The use of other than **Ingersoll-Rand** Material Handling replacement parts may invalidate the Company's warranty. For prompt service and genuine **Ingersoll-Rand** Material Handling parts, provide your nearest Distributor with the following:

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

The nameplate provides winch model and serial number information. The nameplate is located on the winch side frame at the clutch end.

For your convenience and future reference please take a few moments to add the following information:

Winch Model Number_____

Winch Serial Number_____

Date Purchased_____

Return Goods Policy

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

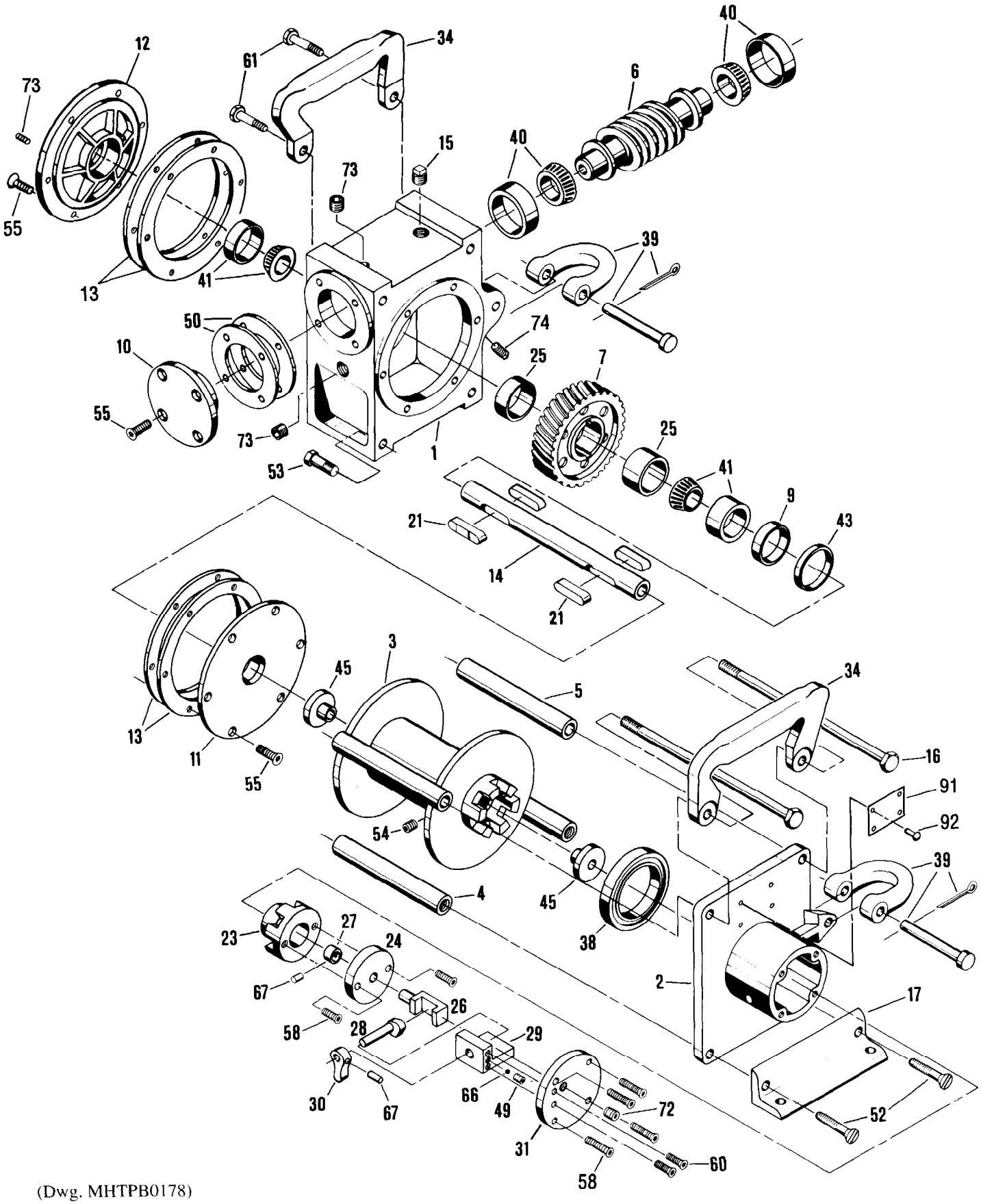
NOTICE

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

When the life of the winch has expired, it is recommended that the winch be disassembled, degreased and parts separated as to materials so that they may be recycled. For additional information contact:

Ingersoll-Rand Material Handling
2724 Sixth Avenue South
Seattle, Wa 98124 USA
Phone: (206) 624-0466
Fax: (206) 624-6265
or
Ingersoll-Rand Material Handling
Samiia, Douai Operations
111, avenue Roger Salengro
59450 Sin Le Noble, France
Phone: (33) 27-93-08-08
Fax: (33) 27-93-08-00

GEAR, FRAME AND DRUM ASSEMBLY DRAWING



(Dwg. MHTPB0178)

GEAR, FRAME AND DRUM ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
1	Gear Housing	1	B-5060
2	Side Frame	1	3996
3	Drum (5 in. long)	1	3707
	Drum (12 in. long)		3707-12
4	Spacer Bar (5 in. long drum)	2	3107-1
	Spacer Bar (12 in. long drum)		3107-2
5	Spacer Bar (5 in. long drum)	2	3108-1
	Spacer Bar (12 in. long drum)		3108-2
6	Worm	1	3829
7	Worm Gear	1	3830
9	Seal Sleeve	1	3114
10	Input Shaft Cover	1	3115
11	Output Shaft Cover	1	3116
12	Output Shaft Cover	1	3117
• 13	Output Shaft Gasket	2 sets	3118
14	Gear and Drum Shaft (5 in. long drum)	1	3112-1
	Gear and Drum Shaft (12 in. long drum)		3112-2
15	Fill/Vent Plug	1	6671
16	Spacer Capscrew (5 in. long drum)	2	71069512
	Spacer Capscrew (12 in. long drum)		4265-2
17	Foot Bracket	1	3672
21	Worm Gear Key	4	3667
23	Clutch Slider	1	3121
24	Clutch Slider Cap	1	3122
25	Bearing Spacer	2	4147
26	Clutch Cam Link	1	3124
27	Clutch Cam Link Collar	1	3668
28	Clutch Cam	1	3669
29	Clutch Cam Bracket	1	3670
30	Clutch Handle	1	3671
31	Clutch Housing Cover	1	3169
34	Carry Handle	2	3997
• 38	Bearing	1	51849
39	Anchor Assembly	2	51850
• 40	Bearing Cone	2 sets	71073415
	Bearing Cup		
• 41	Bearing Cone	2 sets	71073407
	Bearing Cup		

• Recommended Spare

GEAR, FRAME AND DRUM ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
• 43	Seal	1	51578
• 45	Bushing	2	51851
49	Clutch Cam Spring	1	51852
• 50	Input Shaft Shim 0.005 in. (qty. 3) Input Shaft Shim 0.007 in. (qty. 3) Input Shaft Shim 0.020 in. (qty. 1)	1 set	6550-50
52	Frame Screw	2	53504
53	Housing Capscrew	2	50827
54	Wire Rope Anchor Setscrew	1	53505
55	Cover Screw	20	51596
58	Screw	6	52269
60	Screw	2	53422
61	Handle Capscrew	2	50178
66	Clutch Cam Ball	1	6550-66
67	Clutch Pin	2	71060636
72	Pipe Plug	1	52270
73	Pipe Plug	1	52271
74	Pipe Plug	2	51467
91	Nameplate	1	71106991-R
92	Drive Rivet	4	71028849

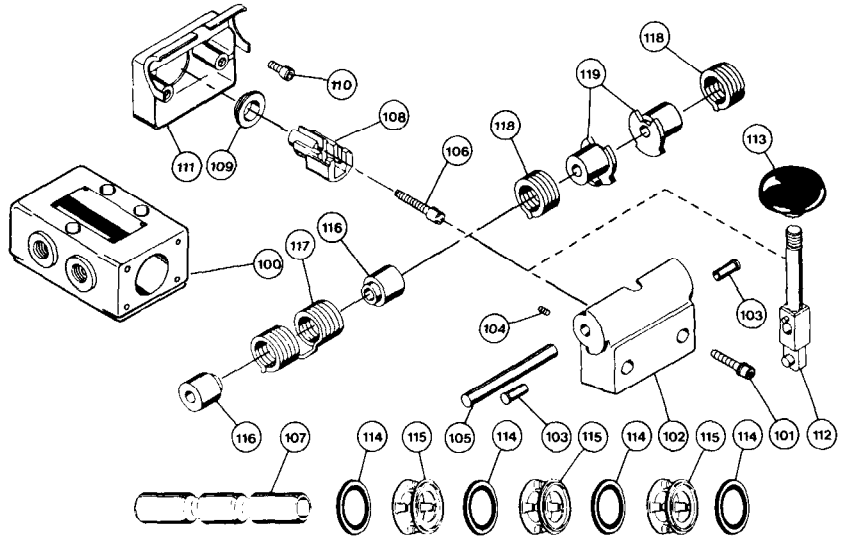
Optional Parts

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
81*	Filter	1	F03-06-000
88*	Drum Guard (5 in. long drum)	1	6618-5
	Drum Guard (12 in. long drum)		6618-12
89	Remote Control Assembly	1	6700-1
90*	Muffler	2	52104

• Recommended Spare

* Not Shown

CONTROL VALVE ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHTPA0195)

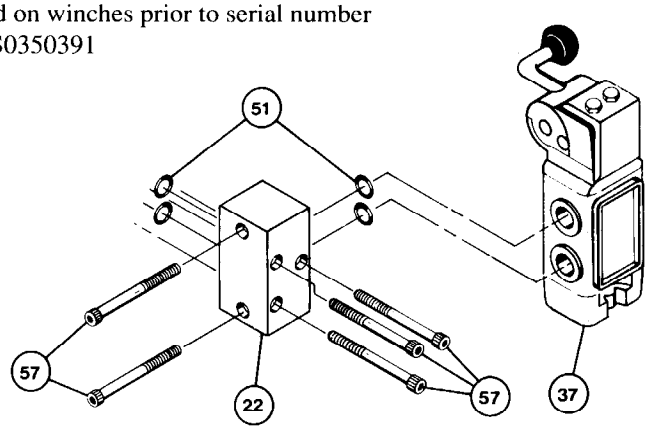
ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
79	Valve Assembly (incl's items 100 thru 119)	1	50400
100	Valve Body	1	Order 50400 (item 79)
101	Capscrew	2	P49656
102	Cover	1	P57708
103	Pin	2	P57684
104	Setscrew	1	P49751-0004
105	Pin	1	P49877-0020
106	Capscrew	1	P49604-0096
107	Spool	1	Order 50400 (item 79)
108	Link	1	P57640
109	Adapter	1	P57719
110	Capscrew	4	P49604-0014
111	Body	1	P57709
112	Lever	1	P57654-0002
113	Knob	1	P57662
• 114	Seal Ring	4	P5175-0003
• 115	Spacer	3	P57707
116	Mandrel	2	P57655
117	Spring	1	P57696
118	Spring Center	2	Order Kit 71059745
119	Stop	2	Order Kit 71059745

• Recommended Spare

VANE AIR MOTOR ASSEMBLY DRAWING

Old style Control Valve Assembly

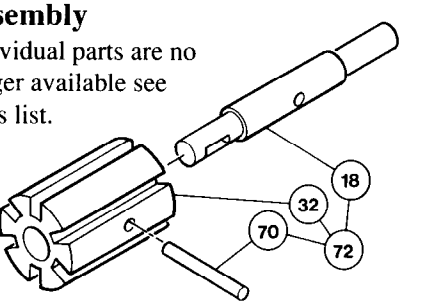
Used on winches prior to serial number DBS0350391

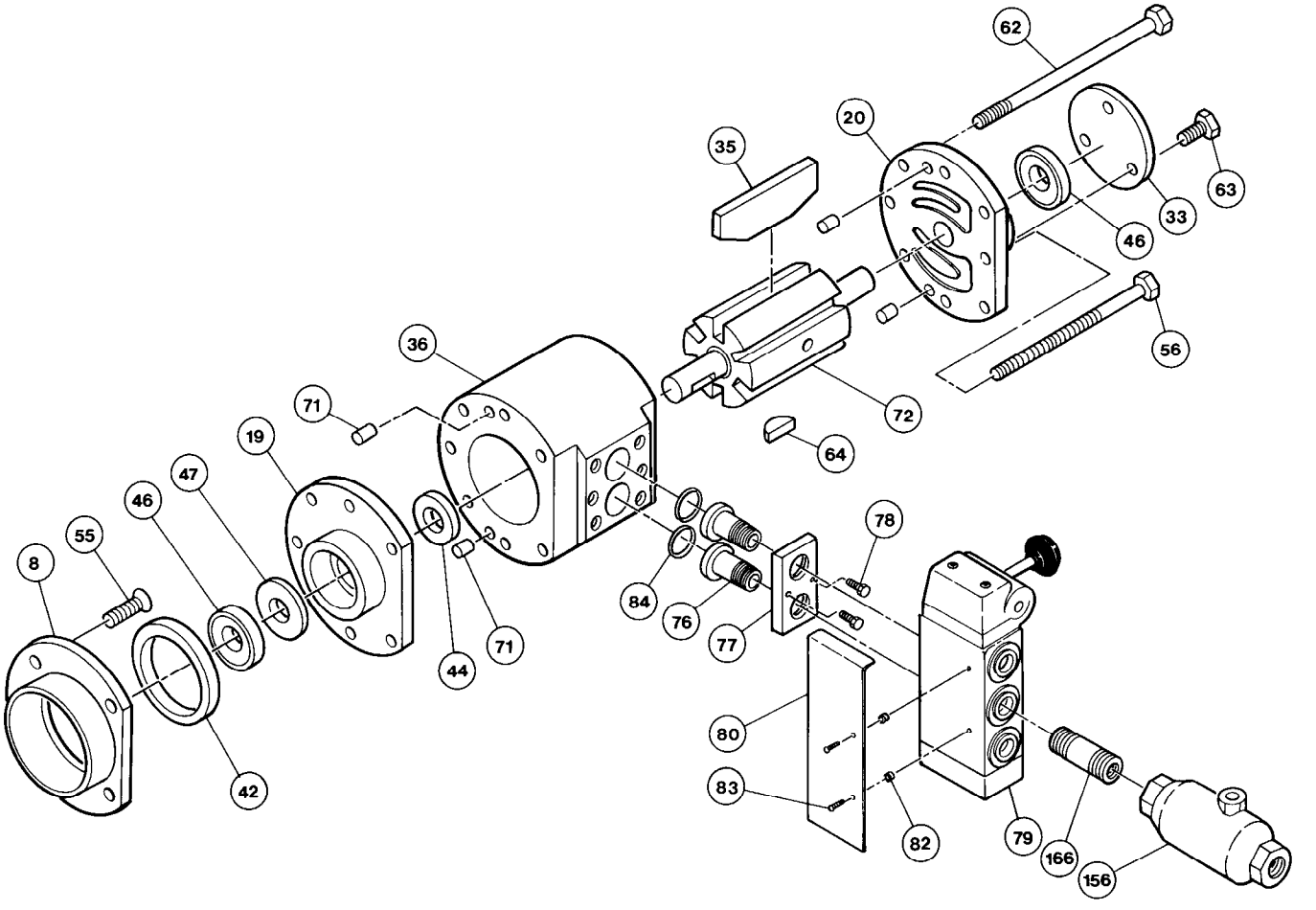


(Dwg. MHTPA0193)

Old style Shaft and Rotor Assembly

Individual parts are no longer available see parts list.





(Dwg. MHTPB0194)

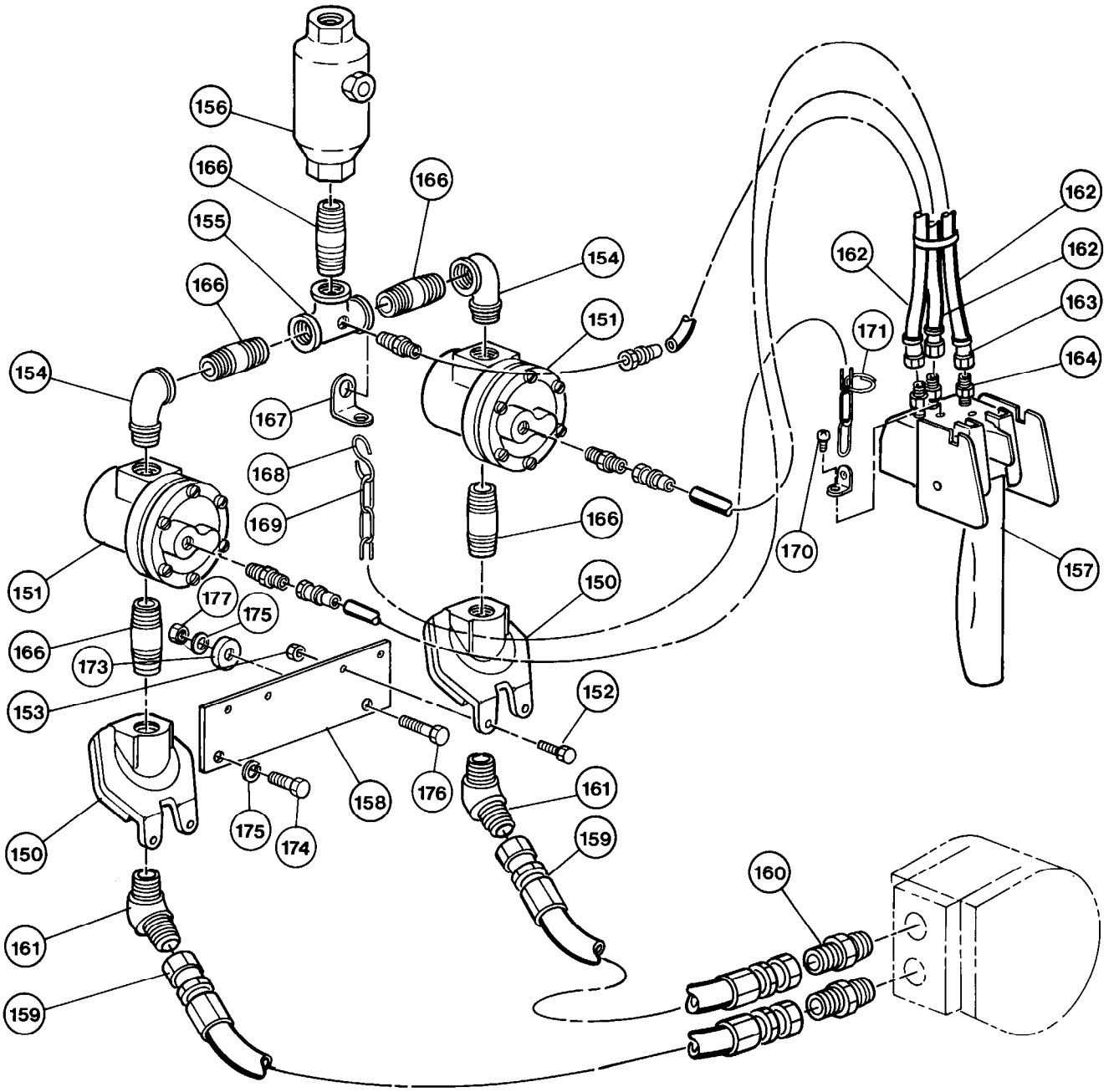
VANE AIR MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
175	Motor Assembly (incl's items 18, 19, 20, 32 thru 36, 44, 46, 47, 62, 63, 70, 71 and 72)	1	4864
	Motor Assembly (Threaded Ports)		21706
8	Adapter	1	6553
18	Shaft (old style)	1	Order 4333-A (item 72)
19	Cover	1	6554
20	Cover	1	3761
22	Valve Manifold	1	Order Valve Kit 20283
32	Rotor (old style)	1	Order 4333-A (item 72)
33	Cap	1	4334
• 35	Vanes	6	4335-6
36	Cylinder	1	3131
	Cylinder (Threaded Ports)		19283
37	Control Valve	1	Order Valve Kit 20283
• 42	Seal	1	51283
• 44	Seal	1	51591
• 46	Bearing	2	51074
• 47	Seal	1	50840
• 51	'O' Ring (old style valve only)	4	50264
55	Capscrew	20	51596
56	Capscrew	4	51078
57	Capscrew (old style valve only)	5	51079
62	Capscrew	4	51080
63	Capscrew	3	51081
64	Shaft Key	1	50273
70	Rotor Pin	1	Order 4333-A (item 72)
71	Dowel (old style)	4	51084
72	Shaft and Rotor Assembly (one piece assembly)	1	4333-A
76	Adapter	2	20210
77	Clamp Plate	1	20197
78	Capscrew	2	53374
79*	Control Valve	1	50400
80	Cover Plate	1	20211
82	Spacer	2	71067987
83	Screw	2	71067862
• 84	'O' Ring	2	71067870
166	Fitting, Nipple	1	51062
180	Valve Kit (incl's items 76 thru 80 and 82 through 84)	As req'd	20283

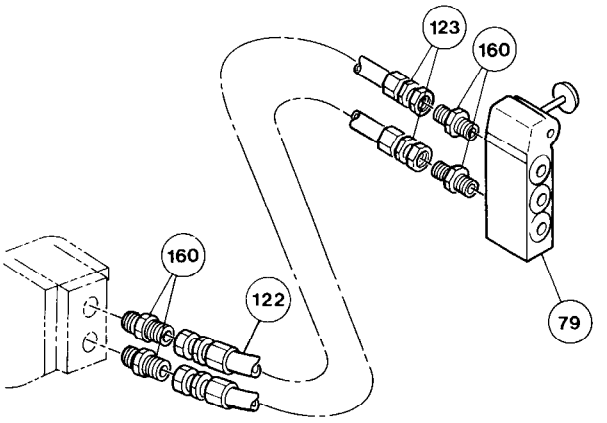
* Valve Assembly item 79 is used on Dinky Tugger winches serial number DBS0350391 and up.

• Recommended Spare

REMOTE CONTROL ASSEMBLY DRAWING (OPTIONAL FEATURE)



(Dwg. MHTPA0183)



(Dwg. MHTPA0572)

REMOTE CONTROL ASSEMBLY PARTS LIST (OPTIONAL FEATURE)

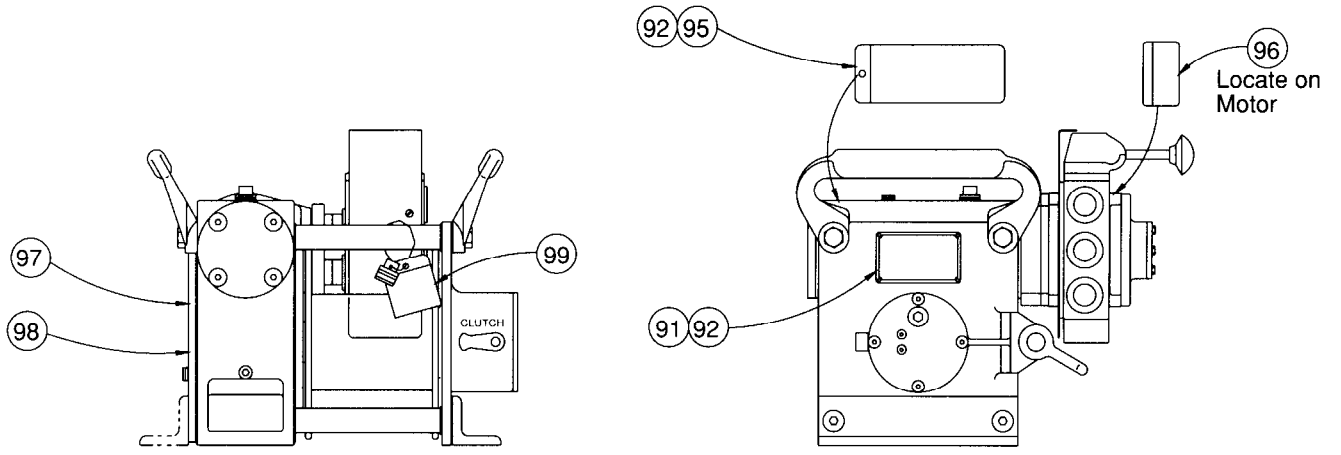
ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
89	Remote Control Assembly 10 ft. (3 m) (incls items 150 through 170)	1	6700-1
	Remote Control Assembly 15 ft. (4.5 m) (incls items 150 through 170)		6700-1-15
150	Dump Valve	2	51848
151	Relay Valve	2	50404
152	Screw	4	50175
153	Nut	4	50170
154	Fitting, Pipe Elbow	2	52190
155	Fitting, Tee	1	53173
156	Lubricator	1	50611
157	Pendant	1	MLK-A269A
158	Mounting bracket	1	6689
159	Hose Assembly	2	52095
160	Fitting, Nipple	2	52094
161	Fitting, 45° Elbow	2	52093
162	Hose	3 (specify length)	50923
163	Fitting	6	51029
164	Fitting, Nipple	3	52092
165	Fitting	3	51814
166	Fitting, Nipple	5	51062
167	Bracket	1	8909
168	'S' Hook	2	52120
169	Chain	1 (specify length)	50041
170	Screw	2	HRE20A-68
171	Cord Ring	4	50040
172	Quick Exhaust	2	71047898
173	Spacer	2	3754
174	Capscrew	1	50827
175	Lockwasher	2	50181
176	Capscrew	1	52008
177	Nut	1	50171

Remote Live Air Control (optional feature)

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
122	Hose	2 (specify length)	50930
123	Fitting	4	50932
160	Fitting	4	52094

For Remote Live Air Control, ports in cylinder item 36 must be threaded for 3/4 - 14 NPT. (order cylinder part no. 19283)

LABELS AND TAGS



(Dwg. MHTPA0549)

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY.	PART NO.
91	Nameplate	1	71106991-R
92	Drive Rivet	5	71028849
95	Warning Tag (shown on page 3)	1	71056410
96	Warning Label (shown on page 3)	1	71107130
97	Ingersoll-Rand Logo Label	1	71106231
98	Product Label	1	71109490
99	Notice Tag (shown on page 3)	1	71107155

Order Tag and Label Kit 22263 when replacing any of the above

REPAIR KITS AND ACCESSORIES

ITEM NO.	DESCRIPTION OF PART	PART NO.
130	Tune-Up Kit (incl's items 131 thru 133)	1000P60-TK
131	Vane Motor Kit (incl's items 35, 42, 44, 46, 47, 56, 62, 63 and 71)	1000P60-VMK
132	Control Valve Kit (incl's items 51, 57, 114 and 115)	1000P60-CVK
133	Gearbox Kit (incl's items 13, 38, 40, 41, 43, 45, 50 and 55)	1000P60-GBK
134	Tag and Label Kit	22263
135	Touch-Up Paint	MHD-OR
136	Lubricant	LUBRI-LINK
180	Valve Kit (incl's items 76 through 80, 82, 83 and 84)	20283

Repair kits may contain additional parts not required on some models.

HOIST AND WINCH LIMITED WARRANTY

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

If any Product proves defective within its original one year warranty period, it should be returned to any Authorized Hoist and Winch Service Distributor, transportation prepaid with proof of purchase or warranty card.

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