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OPERATION MANUAL

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RAM WINCH HOIST™

Instructions, Parts and Maintenance Manual

AIR WINCH

MODEL K5U & K5UL

Warning!

Review "WINCH OPERATING PRACTICES" *Prior to use.*

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.

This winch is only a component of the lifting system, which must be designed by qualified personnel

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WARNING TAG

Read the latest edition of ASME B30.7. Comply with all Federal, State and local rules.

It is the customer's responsibility to use this winch with adequate factors of safety for the rated load, plus the weight of the winch and attached equipment.

A registered structural engineer should review handling procedures.

! WARNING !

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

- *Do not operate this winch before reading the operation and maintenance manual.*
- *Do not lift more than rated load.*
- *Do not allow less than three wraps of wire rope to remain on drum at all times. Operator must stay in view of the winch drum at all times to ensure this.*
- *Do not operate a damaged or malfunctioning winch.*
- *Do not remove or obscure warning labels.*
- *Any labels that become obscured or removed should be replaced as soon as possible.*

GENERAL GUIDELINES FOR SAFE OPERATION

The following warnings and precautions should be taken to ensure safe operating conditions.

Failure to remain alert and keep equipment in good operating condition could result in personal injury or death. To avoid such please read and understand this manual as well as all applicable laws and requirements for safe operation.

Keep a copy of this manual with the equipment at all times.

Be certain all operators of the equipment have been properly trained in the use of the equipment and have read the owners manual thoroughly.

!!WARNING!!

Keep hands, feet and any loose clothing away from rotating or moving parts. Never operate the equipment with any guards or safety equipment removed from winch. Failure to do so may result in injury or death.

When maintaining the equipment be sure to tag *Out of Service* on power supply to prevent accidental operation or activation.

Do not alter or modify the equipment in any way without first contacting RAM Winch & Hoist Engineering Department as to the alteration type or extent. Failure to do so could result in damage to the equipment or injury to personnel.

WINCH OPERATING PRACTICES

1. Read the manufacturer's instructions before operating the winch.
2. Always inspect, test maintain and operate this winch in accordance with American National Standards Institute Safety Standards B30.7.
3. Never Lift a load greater than the rated line pull of the winch.
4. Use the recommended size wire rope for load to be handled.
5. Never use the wire rope as a sling.
6. Always stand clear of the load.
7. Unless the winch is designed for personnel handling, never use this winch for lifting or lowering people, and never stand on a suspended load.
8. Never carry loads over people.
9. Never disengage the clutch with a load applied to the winch.
10. Never engage the clutch with the winch motor running.
11. Always rig the winch properly and carefully, making certain the wire rope is properly anchored to the drum.
12. Before each shift, check the winch for wear or damage. Check the brakes, wire rope, hooks, guides, mounting bolts, etc. Lift a capacity load or a near capacity load a few inches off the floor and check the ability of the braking system to stop and hold the load without excessive drift, if the winch is being used for lifting.
13. Never operate a winch with a twisted, kinked or damaged wire rope.
14. Periodically inspect the winch thoroughly and replace worn or damaged parts. Keep accurate records of all inspections and repairs.
15. Follow the lubrication instructions provided by the manufacturer.
16. Do not attempt to repair the wire rope or hooks. Replace hooks when there is a 15% increase in the throat opening or when there is a 10% bend as shown by inspection records.
17. Keep the rope clean and well lubricated. Replace wire rope that is frayed.
18. Ease the slack out of the wire rope when starting. Do not jerk the winch.
19. If the drum is exposed to personnel walkways, place a guard over the drum.
20. Do not use your hands to guide the rope onto the drum when winding in the wire rope.
21. Be certain there are no objects in the way of the load or hook when operating the winch.
22. Do not use higher air pressure than recommended by the manufacturer.
23. Use compressed air carefully. Be sure the hose couplings are secure, and make certain a safety chain is provided to avoid hose whip if the coupling fails.
24. Wear proper clothing to avoid entanglement in rotating machinery.
25. Be certain the air supply is shut off before performing maintenance on the winch.
26. Properly secure a winch before leaving it unattended.
27. Do not leave a load suspended for any extended period of time. Never leave a suspended load unattended.
28. Do not allow unqualified personnel to operate a winch.
29. Do not operate a winch if you are not physically fit to do so.
30. Do not divert your attention from the load while operating a winch.
31. Be certain the load is properly seated in the saddle of the hook. Do not tip load the hook as this leads to spreading and eventual failure of the hook.
32. Do not force a hook into place by hammering.
33. Never operate a winch beyond the point where less than four wraps of wire rope remain on the drum.
34. Do not use the wire rope as a ground for welding. Do not attach a welding electrode to a winch or sling.
35. Never operate a winch that makes excessive mechanical noise. Report the problem immediately.

Post at Operating Station

1.0 General Information

1.1 User Responsibility and Safety Precautions

This equipment will perform in conformity with the description thereof, contained in this manual, its accompanying labels and/or inserts when it is installed, operated, maintained and repaired according to the instructions provided. This equipment must be checked periodically.

Deficient equipment should not be used. Parts that are broken, missing, plainly worn, distorted or contaminated should be replaced immediately. Should such repair or replacement become necessary, we recommend that a telephone or written request for service be made to **RAM Winch & Hoist**.

This equipment or any of its parts should not be altered without prior written approval of **RAM Winch & Hoist.** The user of this equipment shall have the sole responsibility for any malfunction that results from improper use, faulty maintenance, damage, improper repairs or alterations made by anyone other than **RAM Winch & Hoist**.

1.2 Introduction

1.2.1 Purpose

The purpose of this manual is to provide operating instructions and maintenance procedures for your **RAM Winch & Hoist** Air Winch.

1.2.2 Model Number, Serial Number and Options

This manual covers the winch built by **RAM Winch & Hoist** for your particular unit.
The model number and serial number are listed on the nameplate attached to the unit.

1.2.3 Warranty

See standard warranty certificate.

1.3 Equipment Description

1.3.1 Capabilities and Limitations

The winch is an air, gear reducer driven cable-handling unit with manual release or auto release band brake designed for use in the marine or industrial environment.

1.3.2 **Specification and Descriptive Data**

Working Line Pull	5,000 lbs. SWL mid-drum at 90 psig(utility rating).
	!! WARNING !! ***Exceeding recommended operating pressure of 90 psig might result in damage to winch and severe injury or death to personnel.***
Cable Capacity	See performance charts
Line Speed	The line speed is variable from creep to full speed, see performance charts
Construction	All steel with steel hardware.
Finish	Sandblasted to near white metal. Primer coated with inorganic zinc to 2-3 mils DFT. Top coated with Carboline marine coating system.
Bearings	See winch parts list and illustration drawing.
Drive System	A piston-type air motor, coupled to a spur gear reducer.
Controls	Integral to air motor. (See winch parts illustration drawing.)
Braking System	Manually operated band brake type or spring applied pressure release auto band brake.
	!! WARNING !! ***Do not leave loads suspended on winch without operator present. Do not manually release the brake if a load is held suspended by the winch without operator or trained personnel present.***
Performance	Bare drum rating as indicated on winch nameplate is the maximum allowable load.

2.0 Functional Description

2.1 Major Assemblies

The winch consists of the following major assemblies:

a. Drive assembly
b. Frame and drum assembly

2.1.1 Drive Assemblies

The drive assemblies consist of:

a. Air motor to gear reducer assembly
b. Gear reducer to drum assembly

3.0 Installation Instructions

3.1 Site Selection

The winch should be installed in a location that meets the following requirements:

⇒ Firm foundation that allows the unit to be welded or bolted down to withstand a minimum of 5 times the maximum winch line pull.

⇒ Accessibility for the operator.

⇒ Protection from heavy falling objects.

⇒ Near an adequate air supply source.

⇒ As far as possible from the first turn sheave.

⇒ Out of the way of other operations.

3.2 Handling

Lifting the unit with a soft strap on drum or under the frame structure will accommodate standard lifts.

3.3 Installation Procedures

3.3.1 Welding / Bolting Down

When the winch is at or near the desired location, remove the shipping protection and position it exactly. If the winch is to be welded down, a qualified welder should be used. All exposed metal surfaces should be painted immediately after welding to inhibit rust.

You must have a qualified engineer determine the amount of weld required to securely hold the winch. If the unit is bolted down, be sure to use the proper size and a minimum of Grade 5 bolts and torque to the proper setting.

7/8-9 UNC Diameter SAE Grade 5 Bolts (Quantity 6)

Torque Values	
Dry Threads	**Lubricated Threads**
430 ft-lbs	260 ft-lbs

These specifications are the recommended assembly torque for grade 5 threaded fasteners with the following qualifications:

1. The torque values shown are for turning the NUT while holding the head of the bolt with a wrench. If the application demands tightening by the bolt head, increase the value shown by 20% (multiple by 1.20). This will allow for the natural torsional twist of the bolt shank.
2. Torque values are calculated at 75% of proof load. This provides a safety factor.
3. All dry torque values are based on the use of through hardened flat washers.
4. Lubricated torque values are calculated based on applying Anti-Seize Compound to the threads before assembly.

The above specifications are referenced from the following organizations: SAE, ASTM, General Motors, Military and Federal Standards.

**** CAUTION ****

Extreme care should be taken to ensure the center of the winch drum exactly perpendicular to the cable running to the first sheave. This can be done by average sightings along the flat surface of the winch sidewall, drum flanges or with the help of a square to find the true perpendicular centerline. If it is not properly aligned, cable-laying problems may create difficulties and possibly damage the cable, winch and/or personnel.

3.3.2 Requirements Prior to Start Up

Fill air motor to proper level with oil. Be certain all hoses and fittings are tightened and not leaking. *See Section 5.0 Preventative Maintenance for Lubrication Schedule.* Check lubricator on air supply line for proper oil level. If low, then fill with 30-wt. oil.

3.4 Installation Checkout

3.4.1 Phase 1 - Installation Inspection

⇒ Check all bolts and fasteners to ensure that they are tightened properly.

⇒ Grease all bearings.

⇒ Test manual brake release / set with no load on the drum to ensure operating properly.

WARNING: *Lubricate the motor before operating the winch*. To avoid leakage during shipment the oil is drained from the motor. A sufficient quantity of oil for filling each unit is packed with the winch. Make certain the proper lubricant is used for each unit. Make certain the oil level plugs and drain plugs are securely threaded in place. Remove the vent cap and oil level plug. Pour the recommended oil into the motor case until it starts to come out the level plug hole. Replace the level plug and vent cap.

3.4.2 Phase 2 - Start Up and Preliminary Tests

⇒ Leaks - All fittings and hoses have been inspected for leaks at the factory prior to shipment. If leakage is noticed, tighten or replace as required to correct.

⇒ Using correct valve, operate unit to rotate drum and inspect for automatic brake release and free movement of the drum.

3.5 Cable Installation

3.5.1 Cable Termination on Drum

A cable lead-in hole is in the drum to allow termination. There are two (2) set screws placed in the drum feed thru hole to constrain the cable.

**** CAUTION ****

The set screws are not intended to take a full line pull on the cable. Three or more full wraps of cable must remain on the drum at all times and at any load case.

3.5.2 Spooling Cable onto Drum

Bring the cable under/over the drum and through the slot in the drum wall. Position the cable through the hole and secure the set screws. Handling and wrapping cable on the drum must be attended by a gloved operator to make certain that the cables lie on the drum properly.

The cable must not stack up above the drum flanges or it will fall off the side of the drum and possibly damage the cable. Whenever the equipment is being raised, the winch operator must watch for the end of the cable markings or the equipment itself. Before the equipment gets near the sheave, the operator should stop the winch.

**** CAUTION ****

Spooling of the cable must be done very carefully. To prevent injury, keep hands, clothing and anything that could catch on or get caught in the cable clear when the drum is rotating. This would pull the item or person into the cable spooling on the drum. Since spooling of the cable requires at least two people, an operator and someone to guide and control the cable, they must stay alert and maintain visual contact with each other at all times. We strongly recommend qualified and experienced personnel complete this procedure.

For units with Levelwind, refer to spooling device instructions.

4.0 Operating Instructions

4.1 Operator Start Up

⇒ Ensure the control valve handle is in mid position.

⇒ Check that the air supply is on and functioning properly.

⇒ Open the band brake if the unit has one. If brake is automatic then normal operation of control handle will operate brake.

⇒ Move the control valve handle in the direction of desired operation (payout/retrieve).

When lifting loads, the band brake should be used to help secure the load after lifting.

When lowering the load, the control valve should be operated in the payout direction slightly while loosening the band brake. The band brake will help control the descent rate by the amount of drag allowed.

4.2 Shutdown / Turn Off

⇒ Release winch control handle (The valve handle should return to center or neutral positions.)

⇒ Shut off air supply.

⇒ Tighten band brake.

⇒ Do not shut the unit down with a suspended load that relies on the winch as the only support.

4.3 Brake Release Valve (If Auto Band Brake is supplied)

The brake release valve operates from the Reverse Valve Spool. When the control valve handle is shift off center, pilot air is allowed to flow out to the brake for release. When the handle is returned to neutral or center position, pilot air is shut off and allows pilot release pressure to dump or exhaust, allowing the brake to set.

There is a bleeder valve adjustment on the side of the housing that holds the release valve. The valve is set at the factory, but after time and with continuous use, the valve may require some adjustment. This bleeder valve sets the rate at which the brake is released. This gives the winch precise spotting control in the payout mode with rated load.

When the valve handle is in the center position, there should be no air coming out of the release valve to the brake. If there is even a small amount going to the brake, this will prevent the quick exhaust from exhausting the brake air and allowing the brake to set. This is trial and error and should be done in small increments. If it is adjusted too far, the brake will not release or will release too fast.

5.0 Preventative Maintenance

5.1 Introduction

This section gives necessary information for periodic and preventive maintenance, and for some repairs or replacements. For further information, service assistance or problems, call **RAM Winch & Hoist** Service Department.

5.2 Maintenance Plan

5.2.1 Lubrication Schedule

Under normal operating conditions on a permanent installation, the following lubrication schedule is recommended:

1. The gear reducer is filled with grease (Lubriplate 1300AA) at the factory. After 500 hours of operation, remove 1 ¼" plug on gear case and check. If unit needs more grease then add thru this hole.

2. Lubricate the bearings with Lubriplate 130AA or equivalent at 50 hour intervals.

3. **Motor Lubrication**

   Check oil daily and maintain level with opening in the side of the motor case. If the winch is being used more than four (4) hours per day, it may be necessary to check the level more often.

When the winch is subject to temperatures above freezing: After the winch has been idle for several hours or overnight, loosen the drain plug located at the bottom of the motor case and allow the accumulated water to drain out. After draining the water, tighten the plug in the bottom and remove a similar plug on the side of the motor case. Unscrew the vent cap and pour a sufficient quantity of the recommended oil through this opening to bring the oil level up to the side opening.

When the winch is subject to freezing temperatures: Allow the winch to remain idle long enough for the water content in the motor case to separate from the oil, but not long enough for it to freeze. Drain the water and replenish the oil as above. Should this procedure be impractical, drain the entire contents for the motor case immediately after operation ceases, and pour the oil back into the motor case before resuming operation. If not drained, a sufficient quantity of water will eventually accumulate and the oil splasher will freeze fast.
For temperatures 30° to 80°F (-1.1° to 26.6°C) use SAE 20 or 20W motor oil.
For temperatures below 30°F (-1.1°C) use SAE 10 or 10W motor oil.
For temperatures below 80°F (26.6°C) use SAE 30 motor oil.

**** CAUTION ****
DO NOT LUBRICATE WHILE UNIT IS OPERATING

4. Check the air supply lubricator prior to running and during operation. Do not operate without oil in the lubricator as this may damage the air motor. The lubricator should be set at about 10-15 drops per minute.

LUBRICATION SCHEDULE

LOCATION	TYPE OF LUBRICANT	REPLACEMENT SCHEDULE
Gear Reducer	Grease	Once per Year
Air Motor	Oil SAE 30 Wt	As required by usage
Outboard Drum Bearing	Grease	Every 200 hours of operation
Air Motor Lubricator	Oil SAE 10 Wt	Daily or as required for heavy use

5. Check oil weekly in the throttle valve, insert a small amount of grease into the Grease fittings (15), which is located on the Valve Chest (11). Use 1 to 2 strokes from a standard grease gun per fitting. Do not excessively grease, may cause damage to motor.

5.2.2 Cleaning

The winch will last longer and easier to maintain if it is kept relatively free of oil, dirt and rust. Rinsing as often as possible with fresh water will help minimize corrosion.

5.2.3 Cables and Hoses

All hose assemblies in service should be checked periodically for leaks, abrasions, kinks, cover blister or other damage. Assemblies showing signs of wear or damage must be replaced before they cause failure or create a hazard.

5.2.4 Brake Adjustment

To adjust the brake, remove the Brake Shoe Long Pin (131) and Brake Shoe Pin Cotter (132), rotate the Brake Adjusting Screw (130) into the Brake Yoke (129). Threading the screw into the yoke tightens the brake; backing the screw out of the yoke loosens the brake.

When replacing a Motor Shaft (76), press the damaged shaft from the Rope Drum (67) by inserting a suitable rod through the cored hole in the small-seal end of the rope drum. Press in the new shaft, wide-beveled end first, until the trailing face of the shaft is 2 49/64" from the face of the shaft boss in the rope drum.

When installing any needle-type Bearing (71, 79 or 80), always press the stamped end of the bearing shell.

5.2.5 General Inspection

Frequent inspections should be conducted if the winch is in consistent service. This should be done by operators or personnel trained or qualified to conduct safety, operation and maintenance inspections on the equipment. The equipment should be inspected quarterly for the following:

Fasteners

Check all bolts, nuts, springs, pins, screws, etc. Replace if worn, corroded or broken. Torque all bolts or nuts to proper values according to ASME standards.

Frames, Drum, Bracket and Base

The frames, drums, brackets and base should be inspected for deformation, cracks, corrosion, damage or wear. It may be necessary to disassemble the unit to find additional damage if there is deformation of the frames, base, drum, or flanges of the drum. Replace any of the above items if excessive wear is noticed.

Brakes

Replace the brake band if the lining is worn down to the head of the rivets. Failure to do so could result in a malfunction of the brake and possible damage to the winch, to personnel or to equipment.

Wire Rope

The wire rope should be inspected after each use. Inspect and replace according to the wire rope manufacturer's guidelines.

5.2.6 Bushing Replacement

To replace a Reverse Valve Bushing (14) or a Rotary Valve Bushing (13) use the following instructions:

1. Remove the Valve Chest Cover Cap Screws (18), Valve Chest Cap Screws (19) and Throttle Valve Cap (24).

2. Withdraw the Throttle Valve (21) and Throttle Ball (23). The Throttle Ball may be lifted out with a quantity of sticky grease placed on the end of a rod.

3. Withdraw the Reverse Valve (25) and Rotary Valve (26). A bolt can be threaded into the tapped hole in the valve face to serve as a handle. The Reserve Valve is tapped 1/2" - 13 thread. The Rotary Valve is tapped 5/8" - 11 thread.

4. Thread a HU-932 Valve Chest Jack Bolt, or any 5/8" - 11 thread bolt having at least 4" of thread into the tapped hole in the lug on each side of the Valve Chest (11). Thread the bolt until it contacts the Motor Case (1). Tighten each bolt a fraction of a turn at a time, until the Valve Chest is removed from the Motor Case.

5. Support the face of the Valve Chest that contacts the Motor Case; using an arbor that will clear the Bushings Keys (12), press out the old bushings.

6. Turn the Valve Chest over so that the face that contacts the Motor Case is up.

7. Align the groove in the new Reverse Valve Bushing with the Bushing Key that protrudes into the small bore of the Valve Chest, press in the new Bushing until its leading face is flush with the supported face of the Valve Chest.

8. Align the groove in the new Reserve Valve Bushing with the Bushing Key that protrudes into the large bore of the Valve Chest, press in the new Bushing until its leading face is flush with the supported face of the Valve Chest.

9. Insert the No. 49265 Throttle Valve Stem Reamer or a .627" diameter reamer into the throttle valve chamber and ream the hole through the bushing wall where the Throttle Valve Ball (23) operates.

10. Check the fit of the Reverse Valve (25) in the Reverse Valve Bushing. If tight, ream the Bushing 2.250". **Caution:** ***The Reverse Valve is chrome plated; do not lap.***

11. Check the fit of the Rotary Valve in the Rotary Valve Bushing. If the Valve is tighter than a good fit, lap it in with a mild, fine-grain lapping compound. If the Valve is too tight to lap, ream the Bushing to 2.875".

12. Align the cam groove on the Reverse Valve with the hole through the wall of the Bushing where the Throttle Valve Ball operates.

13. Apply a few drops of light oil to the Throttle Valve Ball and to the stem of the Throttle Valve. Insert the Ball, Valve and Throttle Valve Spring (22) into the valve chamber and retain them with the Throttle Valve Cap (24).

14. Place the Throttle Lever Spring (37) on the Control Arm (29) so that the coil encircles the protruding hub. Rotate the Spring until its lower leg contacts the Throttle Spring Stop Pin (30) which projects from the Control Arm.

15. Install the Throttle Control Arm so that its square socket slides over the square shank of the Reverse Valve, and the Spring legs are on opposite sides of the Stop Pin on the Valve Chest.

6.0 Component Removal / Replacement

Maintenance of the winch consists of determining the defective part and removing and repairing or replacing that component. All work should be done only after the air supply is shut off and tagged *Out of Service*. If needed, consult with **RAM Winch & Hoist** or its nearest trained representative for service.

APPENDICES

Personnel Rating Performance Characteristics
K5U Utility Rating Performance Characteristics
K5U General Assembly Drawing
K5U Air Motor Assembly Drawing
K5U Air Motor Parts List
K5U Parts Illustration Sheet 1
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K5U Remote Control Parts Illustration
K5U Drum Guard Arrangement Drawing
K5U Parts List

RAM AIR WINCH PARTS

When ordering parts, please have the model number and serial number for your unit. If possible, please supply us with the original purchase order number.

See the following pages for part ordering information.

Please call (281) 999-8665 or fax an order to (281) 999-8666.

RAM
WINCH AND HOIST

Winch Model	K5U							
Line Pull	5000.0	Line Speed	129.0					
Wire Rope dia	1/2	Length, ft	775	No. of Layers	11.0			
K Factor	0.9	Drum Dia., in	8.625	Flange Dia	19.0			
Drum Width	10.0			Drum Rpm	36.6			
				No. of Wraps	20			

Layer No.	Capacity (ft)	Accumulated Capacity (ft)	Pitch Dia (in)	MAX Hp		Flange Clearance	Stall Line Pull (lbs.)	Start Line Pull (lbs.)
				Line pull (lbs)	Speed (fpm)			
1	48	48	9.1	7374	87.5	4.7	13146	10271
2	52	100	10.0	6735	95.8	4.3	12006	9380
3	57	157	10.9	6197	104.1	3.8	11048	8631
4	61	218	11.7	5739	112.4	3.4	10231	7993
5	66	284	12.6	5344	120.7	3.0	9527	7443
6	70	355	13.5	5000	129.0	2.5	8914	6964
7	75	430	14.3	4698	137.3	2.1	8375	6543
8	80	509	15.2	4430	145.6	1.7	7897	6169
9	84	593	16.1	4190	153.9	1.2	7471	5836
10	89	682	16.9	3976	162.2	0.8	7088	5538
11	93	775	17.8	3782	170.5	0.6	6743	5268

RAM
WINCH AND HOIST

Winch Model	K5U							
Line Pull	5000.0	Line Speed	129.0					
Wire Rope dia	5/8	Length, ft	437	No. of Layers	8.0			
K Factor	0.9	Drum Dia., in	8.625	Flange Dia	19.0			
Drum Width	10.0			Drum Rpm	33.6			
				No. of Wraps	16			

Layer No.	Capacity (ft)	Accumulated Capacity (ft)	Pitch Dia (in)	MAX Hp		Flange Clearance	Stall Line Pull (lbs.)	Start Line Pull (lbs.)
				Line pull (lbs)	Speed (fpm)			
1	39	39	9.3	7928	81.4	4.6	12969	10132
2	43	82	10.3	7097	90.9	4.0	11609	9070
3	48	130	11.4	6423	100.4	3.5	10508	8209
4	52	182	12.5	5867	109.9	2.9	9597	7498
5	57	239	13.6	5399	119.5	2.4	8832	6900
6	61	301	14.7	5000	129.0	1.9	8179	6390
7	66	366	15.7	4656	138.5	1.3	7617	5951
8	71	437	16.8	4356	148.1	0.8	7127	5568

RAM
WINCH AND HOIST

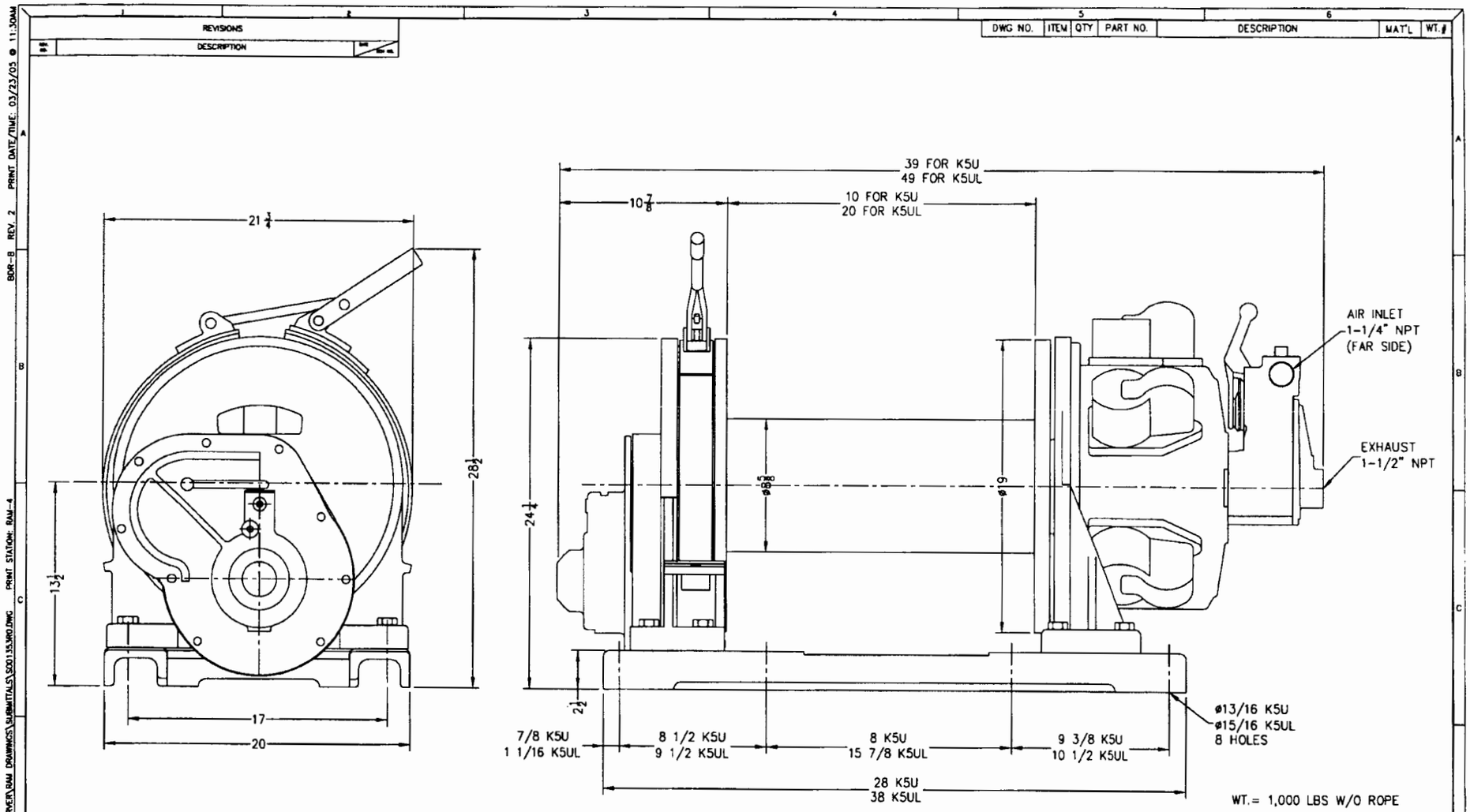
Winch Model	K5UL							
Line Pull	5000.0	Line Speed	129.0					
Wire Rope dia	1/2	Length, ft	1550	No. of Layers	11.0			
K Factor	0.9	Drum Dia., in	8.625	Flange Dia	19.0			
Drum Width	20.0			Drum Rpm	36.6			
				No. of Wraps	40			

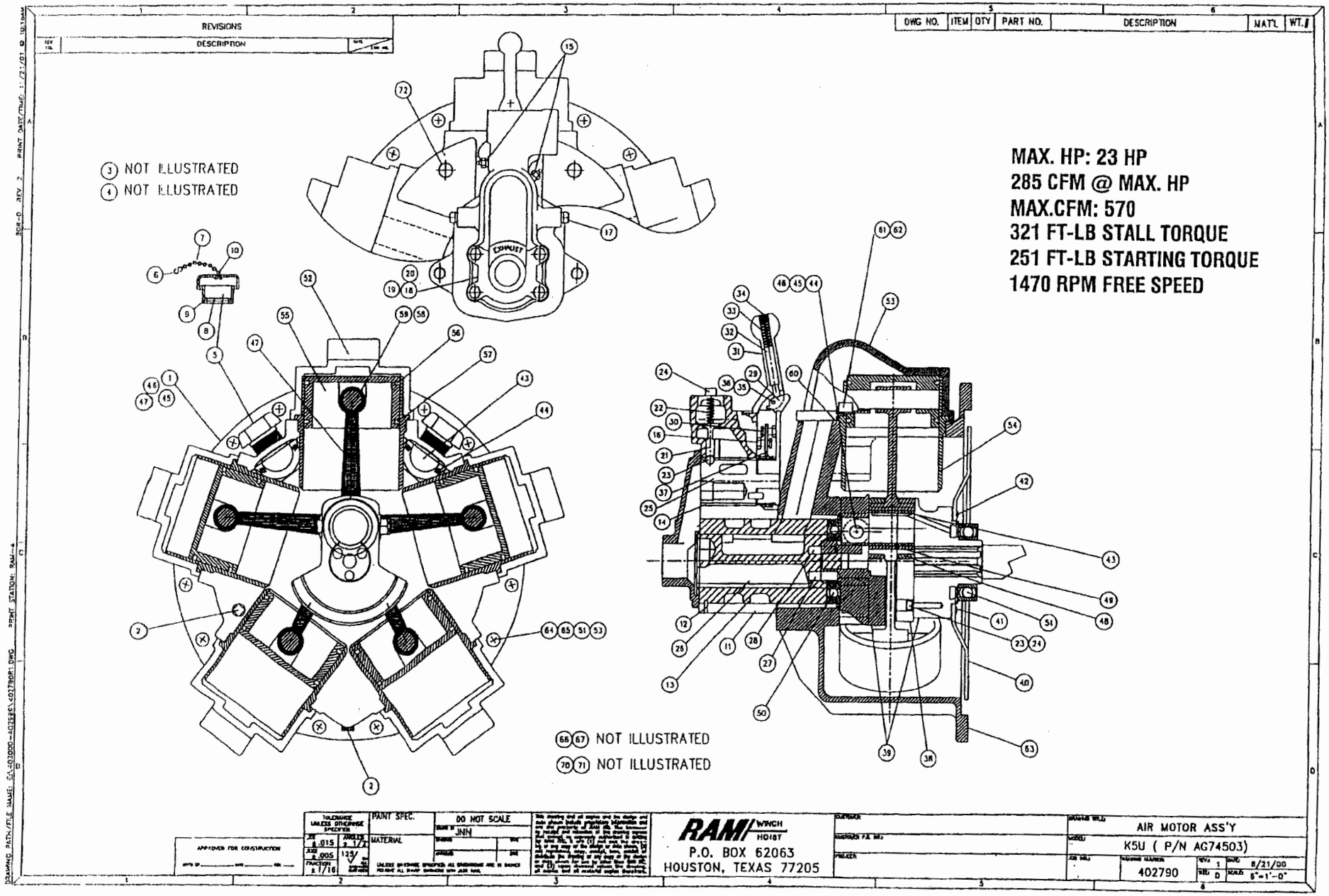
Layer No.	Capacity (ft)	Accumulated Capacity (ft)	Pitch Dia (in)	MAX Hp		Flange Clearance	Stall Line Pull (lbs.)	Start Line Pull (lbs.)
				Line pull (lbs)	Speed (fpm)			
1	96	96	9.1	7374	87.5	4.7	13146	10271
2	105	200	10.0	6735	95.8	4.3	12006	9380
3	114	314	10.9	6197	104.1	3.8	11048	8631
4	123	437	11.7	5739	112.4	3.4	10231	7993
5	132	568	12.6	5344	120.7	3.0	9527	7443
6	141	709	13.5	5000	129.0	2.5	8914	6964
7	150	859	14.3	4698	137.3	2.1	8375	6543
8	159	1018	15.2	4430	145.6	1.7	7897	6169
9	168	1187	16.1	4190	153.9	1.2	7471	5836
10	177	1364	16.9	3976	162.2	0.8	7088	5538
11	186	1550	17.8	3782	170.5	0.6	6743	5268

RAM
WINCH AND HOIST

Winch Model	K5UL							
Line Pull	5000.0	**Line Speed**	129.0					
Wire Rope dia	5/8	**Length, ft**	874	**No. of Layers**	8.0			
K Factor	0.9	**Drum Dia., in**	8.625	**Flange Dia**	19.0			
Drum Width	20.0			**Drum Rpm**	33.6			
				No. of Wraps	32			

Layer No.	**Capacity (ft)**	**Accumulated Capacity (ft)**	**Pitch Dia (in)**	**MAX Hp**		**Flange Clearance**	**Stall Line Pull (lbs.)**	**Start Line Pull (lbs.)**
				Line pull (lbs)	**Speed (fpm)**			
1	77	77	9.3	7928	81.4	4.6	12969	10132
2	87	164	10.3	7097	90.9	4.0	11609	9070
3	96	260	11.4	6423	100.4	3.5	10508	8209
4	105	364	12.5	5867	109.9	2.9	9597	7498
5	114	478	13.6	5399	119.5	2.4	8832	6900
6	123	601	14.7	5000	129.0	1.9	8179	6390
7	132	733	15.7	4656	138.5	1.3	7617	5951
8	141	874	16.8	4356	148.1	0.8	7127	5568

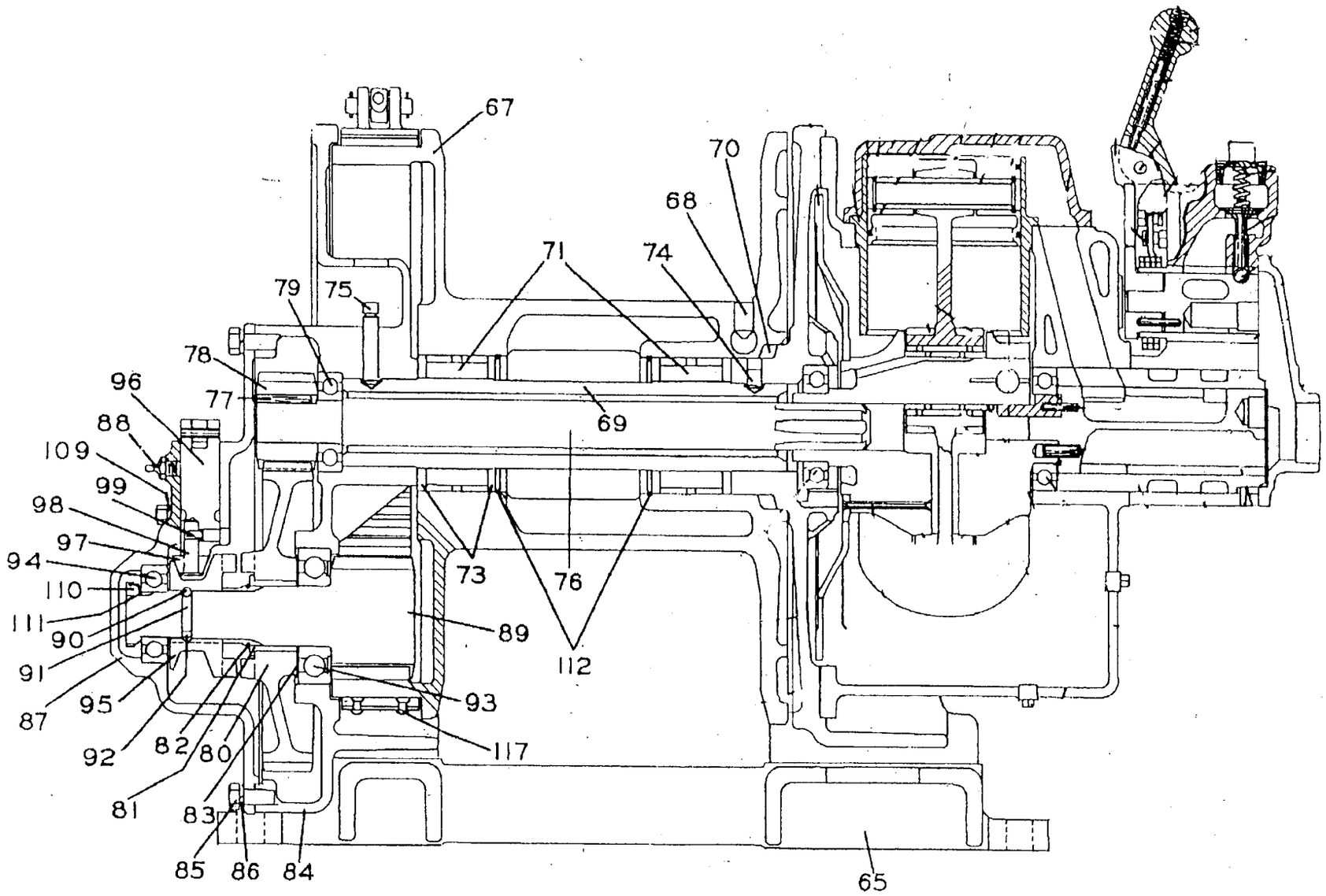

REVISIONS
DESCRIPTION
DWG NO. | ITEM | QTY | PART NO. | DESCRIPTION | MAT'L | WT.
21 1/4
28 1/2
13 1/2
17
20
39 FOR K5U
49 FOR K5UL
10 7/8
10 FOR K5U
20 FOR K5UL
AIR INLET
1-1/4" NPT
(FAR SIDE)
EXHAUST
1-1/2" NPT
24 1/4
ø8 5/8
ø19
2 1/2
7/8 K5U
1 1/16 K5UL
8 1/2 K5U
9 1/2 K5UL
8 K5U
15 7/8 K5UL
9 3/8 K5U
10 1/2 K5UL
ø13/16 K5U
ø15/16 K5UL
8 HOLES
28 K5U
38 K5UL
WT.= 1,000 LBS W/O ROPE
TOLERANCE UNLESS OTHERWISE SPECIFIED
.XX ± .015
.XXX ± .005
FRACTION ± 1/16
ANGLES ± 1/2°
125
PAINT SPEC.
MATERIAL
DO NOT SCALE
Drawn By NMP
CHECKED
APPROVED
DATE
UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES
REMOVE ALL SHARP CORNERS WITH .03R MAX.
This drawing is the property of RAM ITC. The design and data shown includes proprietary information that theentrance RAM ITC products. The borrower by receipt and retention of this drawing agrees that except as expressly authorized in writing by RAM ITC., it will (1) only use the drawing or the design and data shown for the the purposes intended by RAM ITC; (2) not loan, reproduce, sell-sell or distribute this drawing or any copy or the design or data shown for use by other than RAM ITC, and (3) upon demand return this drawing, all copies and all material copies therefrom.
RAM WINCH HOIST
P.O. BOX 62063
HOUSTON, TEXAS 77205
CUSTOMER:
CUSTOMER P.O. NO.:
PROJECT:
DRAWING TITLE:
WINCH GENERAL ASSEMBLY
MODEL:
K5U/K5UL
JOB NO.:
DRAWING NUMBER:
S001353
REV.: 0
SIZE: B
DATE: 12/1/03
SCALE:
DRAWING PATH/FILE NAME: \\RAMSERVER\RAM DRAWINGS\SUBMITALS\S001353.SRO.DWG PRINT STATION: RAM-4
BOR-B REV. 2 PRINT DATE/TIME: 03/23/03 @ 11:30AM


REVISIONS
DESCRIPTION
DWG NO. | ITEM | QTY | PART NO. | DESCRIPTION | MAT'L | WT.
3 NOT ILLUSTRATED
4 NOT ILLUSTRATED
MAX. HP: 23 HP
285 CFM @ MAX. HP
MAX.CFM: 570
321 FT-LB STALL TORQUE
251 FT-LB STARTING TORQUE
1470 RPM FREE SPEED
66 67 NOT ILLUSTRATED
70 71 NOT ILLUSTRATED
EXHAUST
APPROVED FOR CONSTRUCTION
TOLERANCE UNLESS OTHERWISE SPECIFIED
XX ±.015
XXX ±.005
FRACTIONS ±1/16
ANGLES ± 1/2°
125 V
PAINT SPEC.
DO NOT SCALE
DRAWN BY JNN
MATERIAL
RAM WINCH HOIST
P.O. BOX 62063
HOUSTON, TEXAS 77205
AIR MOTOR ASS'Y
K5U (P/N AG74503)
402790
REV 1
SIZE D
DATE 8/21/00
SCALE 6"=1'-0"

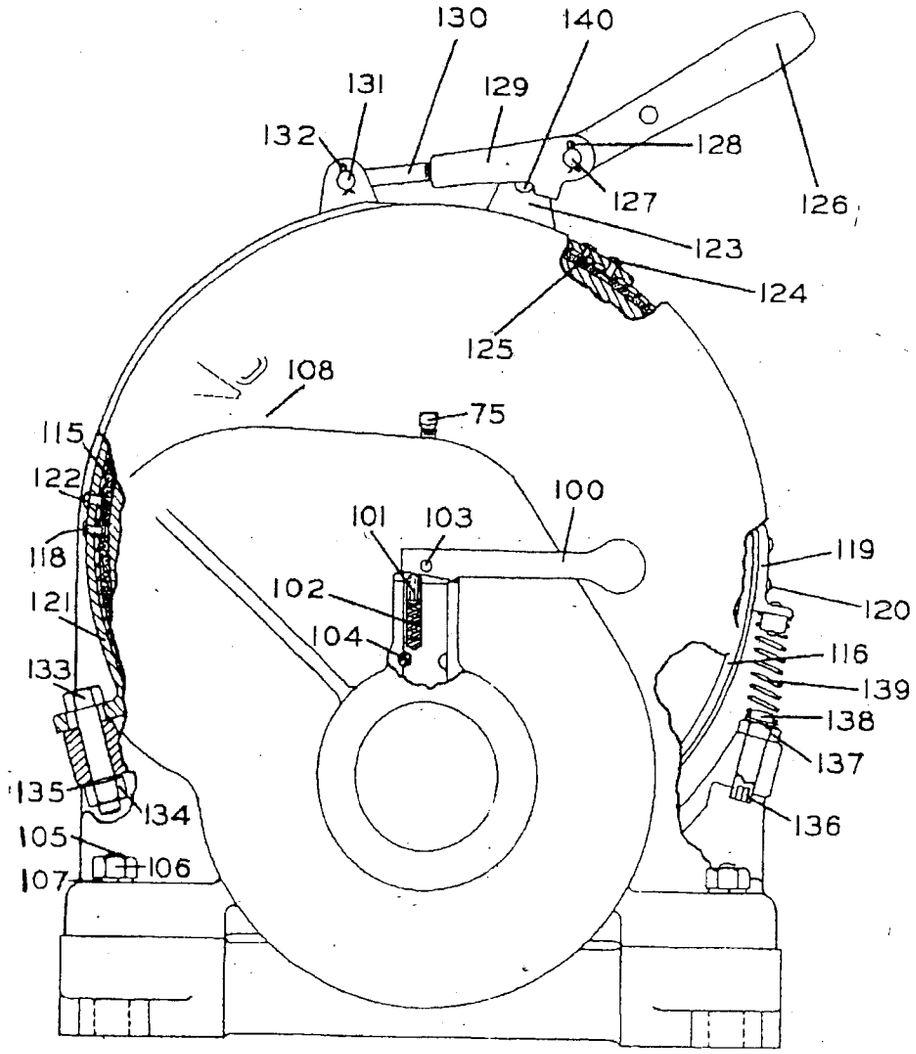
Motor Parts Listing

No.	Part Number	Qty. (each)	Description
1	K5M-501	1	Motor Case
2	D02-402	2	Drain Plug
3	KU-888	1	Motor Eyebolt (2 for K5U or K5UL)
4	E5UD-947	1	1-1/4” Pipe Plug for K5U or K5UL
5	D02-303A	1	Vent Cap
6	D02-421	1	S-Hook
7	D02-891	1	Vent Cap Chain
8	D02-889	1	Vent Cap Screen
9	6CND-233-1/2	1	Vent Cap Screen Retainer
10	D02-893	1	Vent Cap Cotter
11	KK5UM-545	1	Valve Chest for K5U or K5UL
12	HU-538	2	Bushing Key
13	K5M-525S	1	Rotary Valve Bushing
14	KU-945S	1	Reverse Valve Bushing
15	23-188	2	Grease Fitting
16	D02-553	1	Throttle Lever Spring Stop Pin
17	D02-402	2	Brake Inlet Plug
18	KU-546A	1	Valve Chest Cover
19	KU-548	4	Valve Chest Screw
20	D10-322	4	½ Lock Washer
21	KU-940	1	Poppet Throttle Valve
22	HU-942	1	Poppet Throttle Valve Spring
23	D10-322	4	Poppet Throttle Valve Ball
24	KU-943	1	Poppet Throttle Valve Cap
25	KU-K744A	1	Reverse Valve for Winch with automatic brake
26	KU-526A	1	Rotary Valve for over winding Winch
27	KU-527	1	Large Valve Drive Pin
28	HU-527	2	Small Valve Driver Pin
29	KU-555A	1	Throttle Control Arm
30	D02-553	1	Throttle Lever Spring Stop Pin
31	HU-556	1	Throttle Lever
32	HU-869	1	Throttle Lever Latch
33	HU-567	1	Throttle Lever Latch Spring
34	HU-842	1	Throttle Lever Set Screw
35	HU-870	1	Throttle Lever Pin
36	D02-524	2	Throttle Lever Pin Cotter
37	K6U-412	1	Throttle Lever Spring
38	K5M-A516	1	Crank Assembly for K5U or K5UL

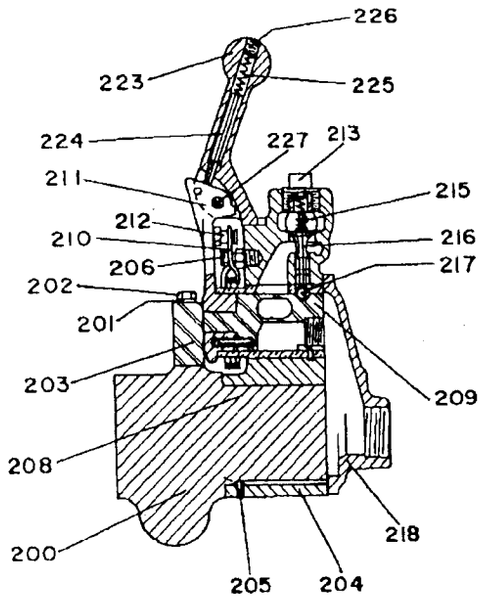
39	KU-516	1	Crank Bare (consists of 2 matched parts which are not sold separately)
40	KU-540	1	Oil Splasher
41	KU-541	2	Oil Splasher Long Rivet
42	KU-542	2	Oil Splasher Short Rivet
43	KU-519	1	Crank Pin Sleeve
44	KU-520	1	Crank Lock Pin
45	D02-317	1	Crank Lock Pin Nut
46	D02-330	1	Crank Lock Pin Cotter
47	K5M-509	5	Connecting Rod for K5U or K5UL
48	KU-510	2	Connecting Rod Ring
49	KU-511	1	Connecting Rod Bushing
50	KU-518	1	Crank Valve End Bearing
51	KU-895	1	Crank Pin End Bearing
52	KU-A505A	1	Cylinder Assembly (5 for K5U or K5UL)
53	PD5-H505A	1	Cylinder Head
54	KU-L505A	1	Cylinder Sleeve
55	K5W-A513A	1	Piston Ring (5 for K5U or K5UL)
56	KU-337-5	1	Piston Ring (1 for each Piston)
57	KU-338-5	1	Oil Regulating Ring (1 for each Piston)
58	ILA902A9-589	1	Wrist Pin Retaining Ring (2 for each Piston)
59	K5W-514	1	Piston Wrist Pin (5 for K5U or K5UL)
60	K5W-507	1	Cylinder Gasket (5 for K5U or K5UL)
61	215-13	1	Cylinder Cap Screw (4 for each Cylinder)
62	KU-504	1	Cylinder Cap Screw Washer
63	K5M-592	1	Motor Case Gasket for K5U or K5UL
64	215-36	1	Cylinder Cap Screw (4 for each Cylinder)
65	A-67	1	5/8: Lock Washer (10 for K5U or K5UL)
66	K5W-99R	1	Motor Nameplate
67	R4K-302	4	Nameplate Screw
68	DU-301R	1	Winch Nameplate
69	R4K-302	4	Nameplate Screw
70	TA-147A	1	Caution Plate
71	R4K-302	4	Caution Plate Screw
72	K5UR-553	2	Throttle Lever Stop



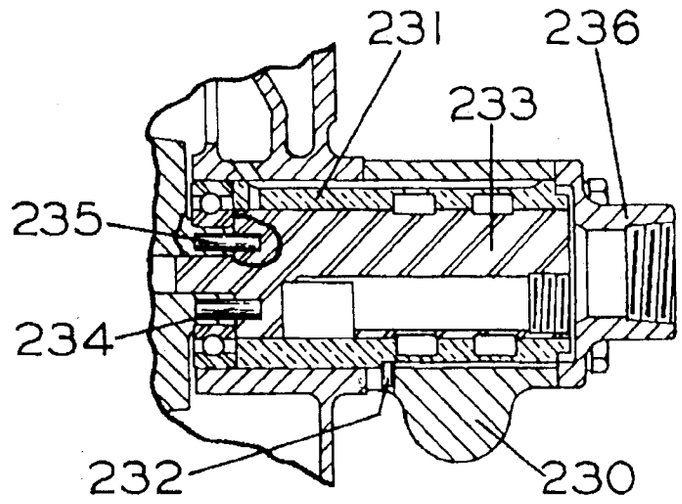
PARTS ILLUSTRATION SHEET 1



PARTS ILLUSTRATION SHEET 2

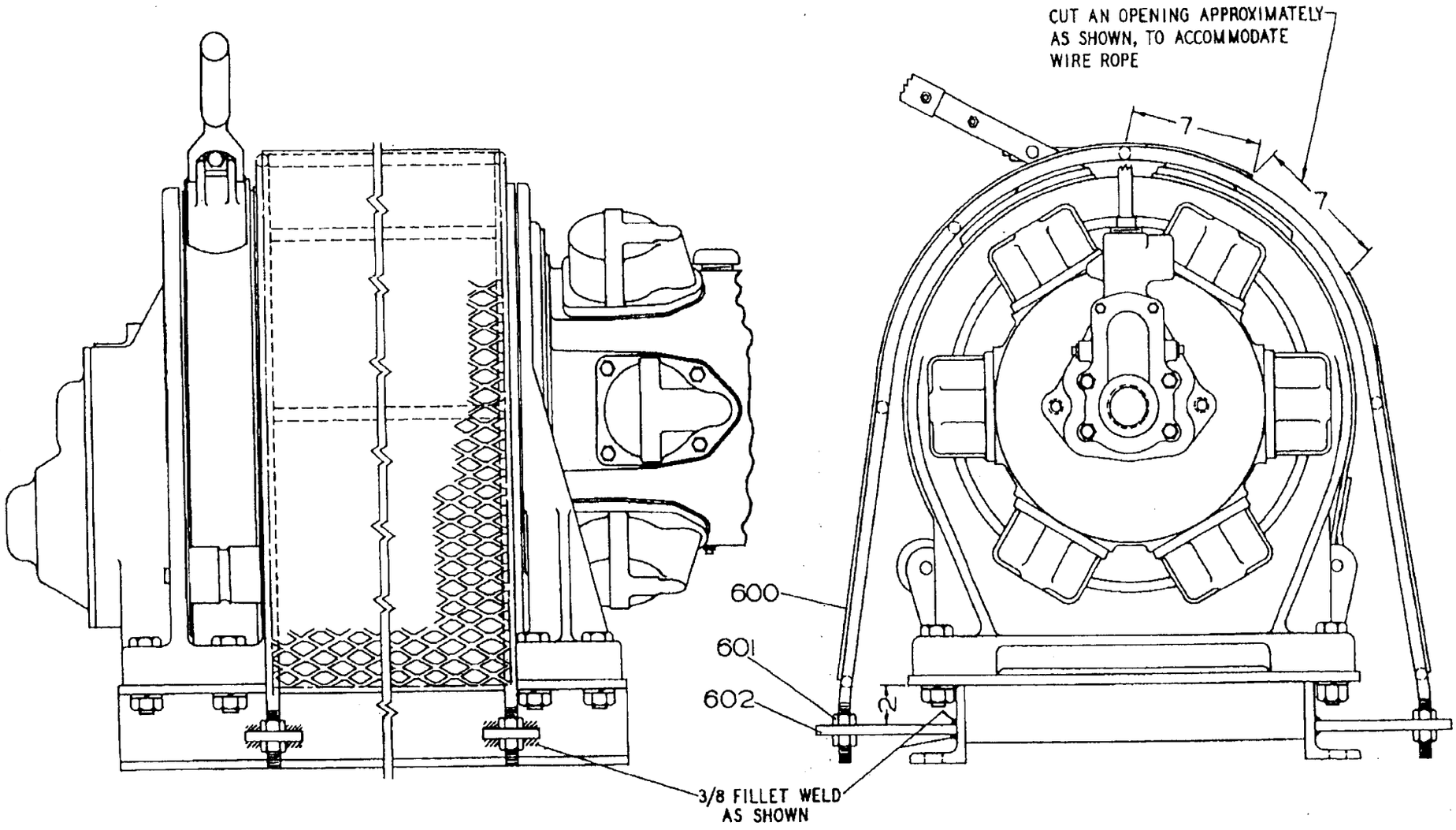


Remote Control Block Assembly



Remote Control Valve Chest Assembly

REMOTE CONTROL PARTS ILLUSTRATION DRAWING



DRUM GUARD ARRANGEMENT DRAWING

K5U/K5UL PARTS LIST

Item No.	Description of Part	Unit Total	Part Number
65	Base		
	For K5U		K4U-564A
	For K5UL		K4UL-564A
67	Rope Drum		
	For K5U		K5U-324
	For K5UL		K5UL-324
68	Wire Rope Set Screws	2	215-140
69	Drum Shaft		
	For K5U		K4U-459
	For K4UL-459		
*	Drum Shaft Oil Seal	2	K4UL-271
70	Drum Packing		207-136
71	Drum Bearing	2	K4U-466
73	Drum Bearing Plate	4	K4U-469
74	Drum Shaft Short Set Screw		HU-867
75	Drum Shaft Long Set Screw		HU-868
76	Motor Shaft		K4UL-316C
	For K5U		K4U-316C
	For K5UL		K4UL-316C
77	Motor Pinion Key		EEG-768
78	Motor Shaft Pinion		K4U-319B
79	Motor Shaft Bearing		K4U-598B
*	Moor Shaft Bearing Seal		R10V-310
80	Intermediate Gear		K4U-364
81	Intermediate Gear Bushing		K4U-363
82	Intermediate Gear Bushing Retainer		K4U-362
83	Fiber Washer		K4U-871
84	Gear Case		K4U-K353A
85	Gear Case Screw	10	215-148
86	Lock Wash	10	D10-322
87	Gear Cover		K4U-352
88	Grease Fitting		23-188
89	Drive Shaft		K4U-358
90	Clutch Jaw Lock Bail		G601-65
91	Clutch Jaw Lock Spring		K4U-863
92	Clutch Jaw Lock Plug		HU-864
●93	Drive Shaft Inner Bearing		2325-41
●94	Drive Shaft Outter Bearing		215-52
95	Clutch Jaw		K4U-568
96	Clutch Eccentric Shaft		HU-K857
97	Clutch Eccentric Roller		HU-858
98	Clutch Eccentric Pin		HU-859

* Not Illustrated

● To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (●) for every four tools in service.

K5U/K5UL PARTS LIST

Item No.	Description of Part	Unit Total	Part Number
99	Eccentric Pin Lock Screw		HU-860
100	Clutch Lever		HU-565
101	Clutch Latch		HU-566
102	Latch Spring		HU-567
103	Clutch Lever Pin		HU-861
104	Eccentric Shaft Lock Screw		HU-865
105	Base Bolt	8	K6U-775
106	Base Bolt Nut	8	DU-562
107	Base Bolt Lock Nut Washer	8	D01-692
108	Grease Plug	2	22SR-165
109	3/8” Lock Washer		D02-321
110	Drive Shaft Nut		215-73
111	Drive Shaft Nut Lock		215-74
112	Drum Bearing Retainer	2	K4U-340
115	Brake Band Assembly		K5U-A152A
116	Brake Lining		K4U-K155
117	Brake Lining Short Rivet	16	K4U-156
118	Brake Lining Long Rivet	17	235-98
119	Brake Support Spring Bracket		K4U-161A
120	Spring Bracket Rivet	2	107-153
●121	Brake Shoe (Not Sold Separately)		
122	Brake Shoe Rivet		
123	Brake Lever Bracket (Not Sold Separately)		
124	Brake Lever Bracket River	5	107-153
125	Brake Lining Long Rivet	5	235-98
●126	Brake Handle		107-151
127	Brake Handle Pin		107-149
128	Brake Handle Pin Cotter	2	107-146
129	Brake Yoke		107-159
130	Brake Adjusting Screw		107-158
131	Brake Shoe Long Pin		107-147
132	Brake Shoe Pin Cotter	2	D02-330
133	Brake Anchor		K4U-206
134	Brake Anchor Nut		HU-776
135	Brake Anchor Lock Washer		A-67
136	Brake Support Screw		K4U-162
137	Brake Support Screw Jam Nut		G7-18
138	Brake Support Screw Washer		K4U-343
139	Brake Support Spring		T03-119

* Not Illustrated

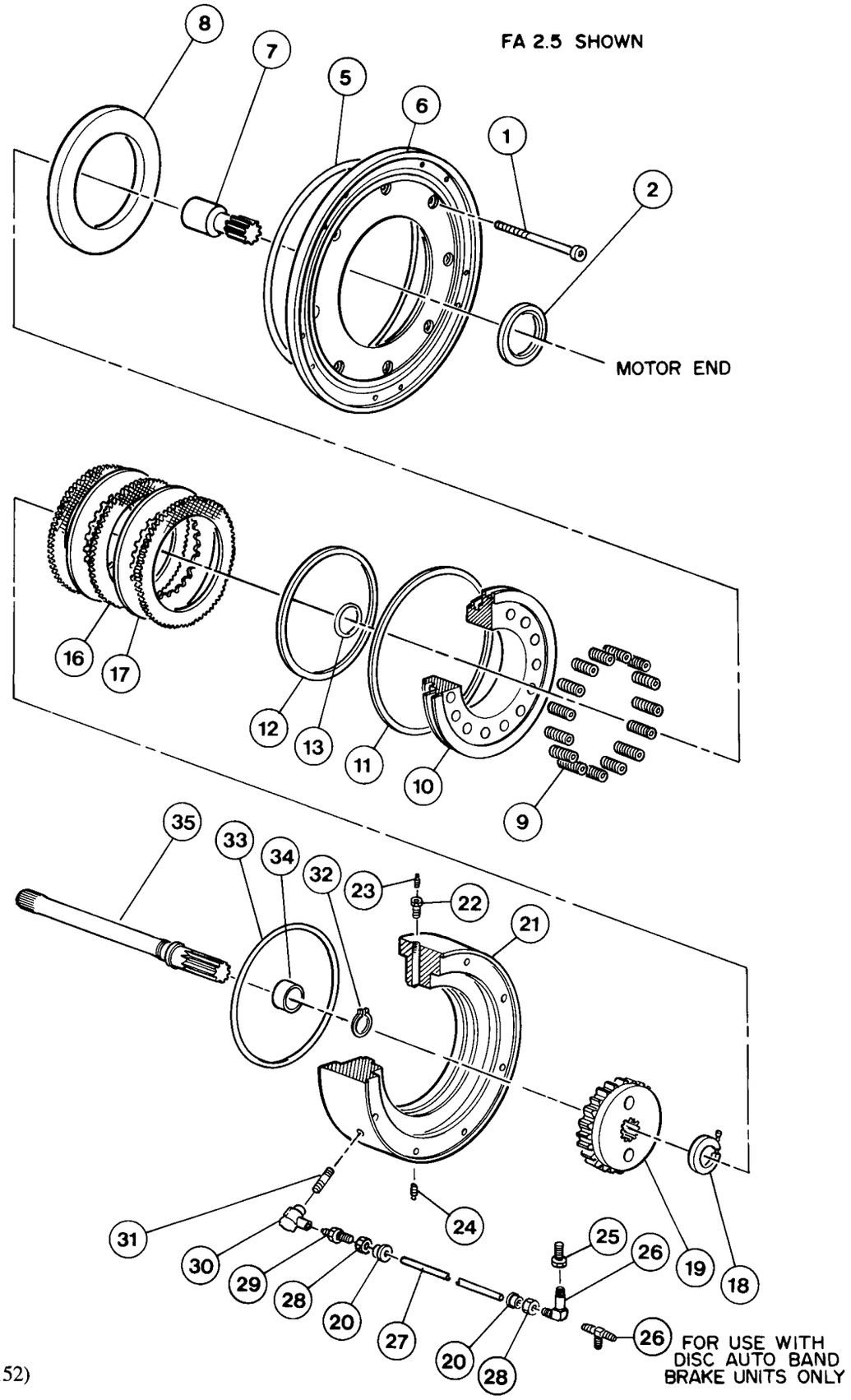
● To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (●) for every four tools in service.

Item No.	Description of Part	Unit Total	Part Number
140	Brake Lever Bracket Pin		107-148
*	Bracket Pin Cotter		107-146
*	Motor Nameplate		K5W-99
*	Nameplate Screw	4	R4K-302
*	Winch Nameplate		DU-301
*	Nameplate Screw	4	R4K-302
*	Caution Plate		TA-147A
*	Caution Plate Screw	4	R4K-302

* Not Illustrated

● To keep downtime to a minimum, it is desirable to have on hand certain repair parts. We recommend that you stock one (pair or set) of each part indicated by a bullet (●) for every four tools in service.

DISC BRAKE ASSEMBLY DRAWING



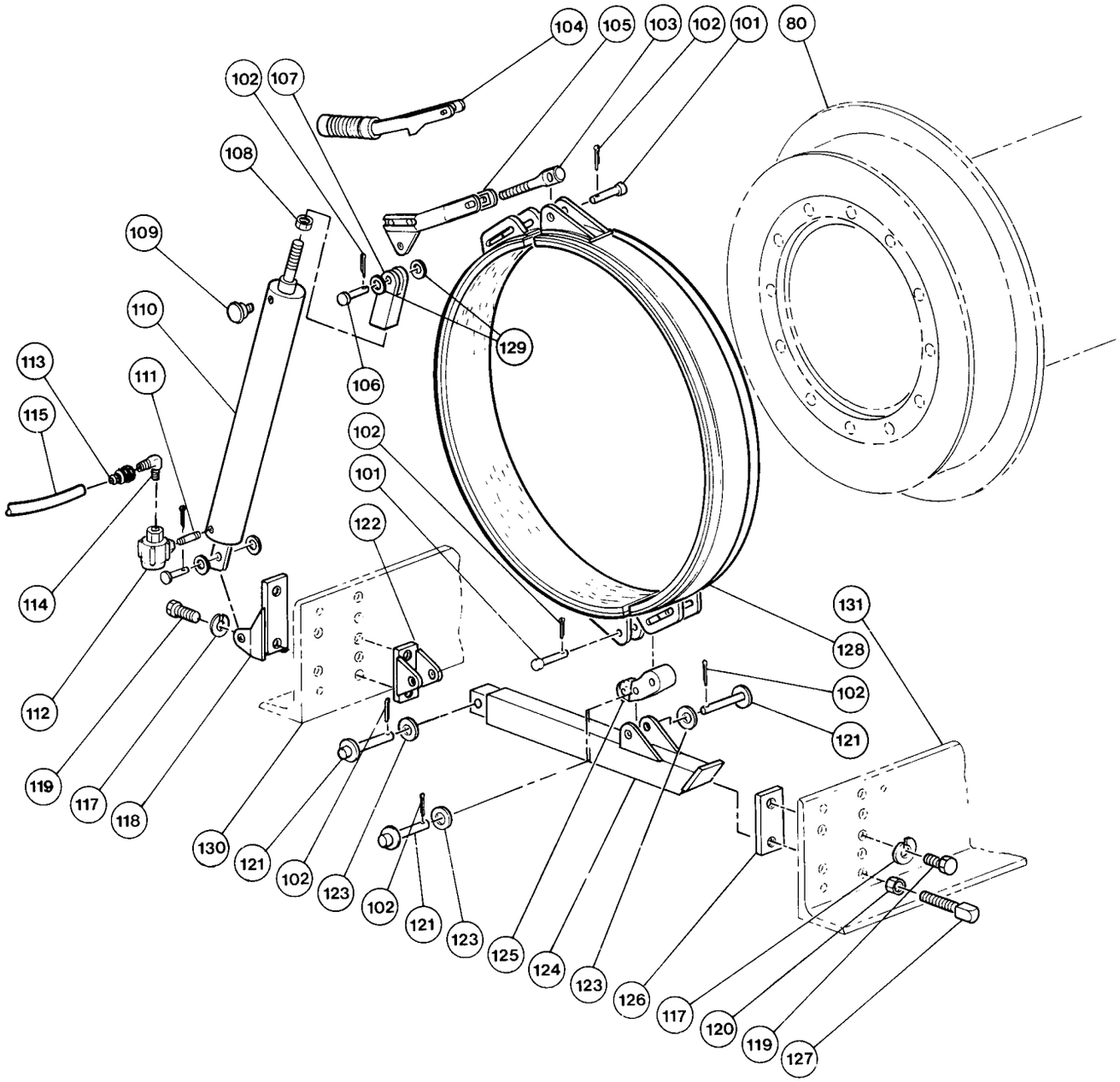
(Dwg. MHTPA0152)

DISC BRAKE ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER	
			FA2	FA2.5
1	Capscrew (with Disc Brake)	See ( )	51448 (5)	51471 (8)
• 2	Oil Seal	1	52223	54463
• 5	'O' Ring	1	51484	51459
6	Motor Adapter	1	10361	14227
7	Shaft Extender	1	11104	10594
8	Brake Reaction Plate	1	- - -	10597
• 9	Spring	See ( )	50751 (12)	50751 (15)
10	Brake Piston	1	15453	15437
• 11	Seal	1	51483	51462
• 12	Seal	1	51482	51461
15	Seal Adapter	1	- - -	16354
• 16	Friction Plate	See ( )	51481 (2)	50772 (3)
• 17	Drive Plate	See ( )	51480 (1)	50773 (2)
18	Collar	1	- - -	71039333
19	Splined Hub	1	11136	10600
20	Sleeve, Fitting	2	55014	
21	Brake Housing	1	11324	11322
22	Fitting	1	51803	
• 23	Breather	1	51857	
24	Pipe Plug	1	50801	
25	Fitting	1	52182	
26	Elbow Fitting	1	71056972	
	Tee Fitting (for units with auto drum band brake and disc brake only)	1	52181	
27	Tubing	1	52520	
28	Nut, Fitting	2	55013	
29	Vented Fitting	1	51814	
• 30	Dump Valve	1	50276	
31	Fitting	1	51034	50859
32	Retainer Ring	1	52227	50904
• 33	'O' Ring	1	51460	
34	Spacer	1	- - -	18683
35	Shaft	1	11095	10579

• Recommended spare.

DRUM BRAKE ASSEMBLY DRAWING



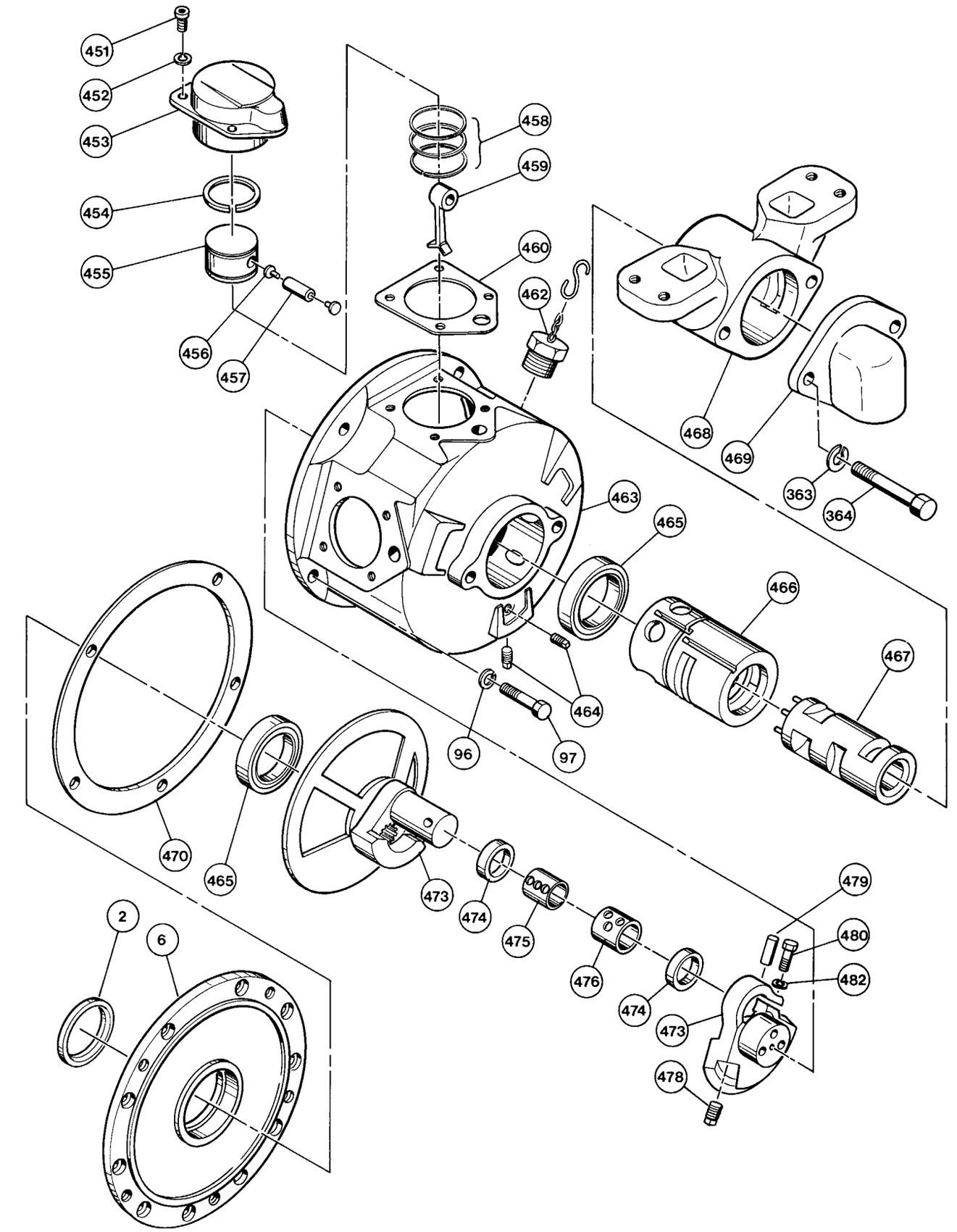
(Dwg. MHTPB0209)

DRUM BRAKE ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER	
			MANUAL BRAKE	AUTOMATIC BRAKE
80	Drum (8 inch long)	1	11354-1	
	Drum (10 inch long)		11354-2	
	Drum (16 inch long)		11354-3	
	Drum (24 inch long)		11354-5	
101	Pin	2	4303-S	
102	Cotter Pin	See ( )	51937 (5)	51937 (7)
103	Link Stud	1	2448	
104	Handle	1	2329	- - -
105	Brake Lever	1	- - -	11498
106	Pin	2	- - -	8609
107	Clevis	1	- - -	6237-2
108	Nut	1	- - -	50159
109	Breather	1	- - -	52384
110	Cylinder	1	- - -	4575-1
111	Fitting	1	- - -	52006
• 112	**Dump Valve**	**1**	**- - -**	**51954**
113	Fitting	2	- - -	52385
114	Elbow	1	- - -	52330
115	Hose	1	- - -	50923
116	Capscrew	3	- - -	50873
117	Lockwasher	3	50181	
118	Bracket	1	- - -	11493
119	Capscrew	3	50973	
120	Nut	See ( )	50171 (1)	50171 (2)
121	Pin	3	3704-S	
122	Pivot Bracket	1	11146	
123	Washer	As Req'd	50890	
124	Arm	1	11147	
125	Connecting Link	1	11144	
126	Stop Plate	1	11145	
127	Screw	1	52226	
• 128	**Brake Band**	**1 Set**	**10724 (Set)**	
	Brake Band Lining Kit	**1 Kit**	**10724-BLK**	
129	Washer	5	52914	
130	Side Rail (8 inch long drum)	1	11357-1	
	Side Rail (12 inch long drum)		11357-2	
	Side Rail (16 inch long drum)		11357-3	
	Side Rail (24 inch long drum)		11357-5	
131	Side Rail (8 inch long drum)	1	11358-1	
	Side Rail (12 inch long drum)		11358-2	
	Side Rail (16 inch long drum)		11358-3	
	Side Rail (24 inch long drum)		11358-5	

• Recommended spare.

FA2 MOTOR ASSEMBLY DRAWING



(Dwg. MHTPB0210)

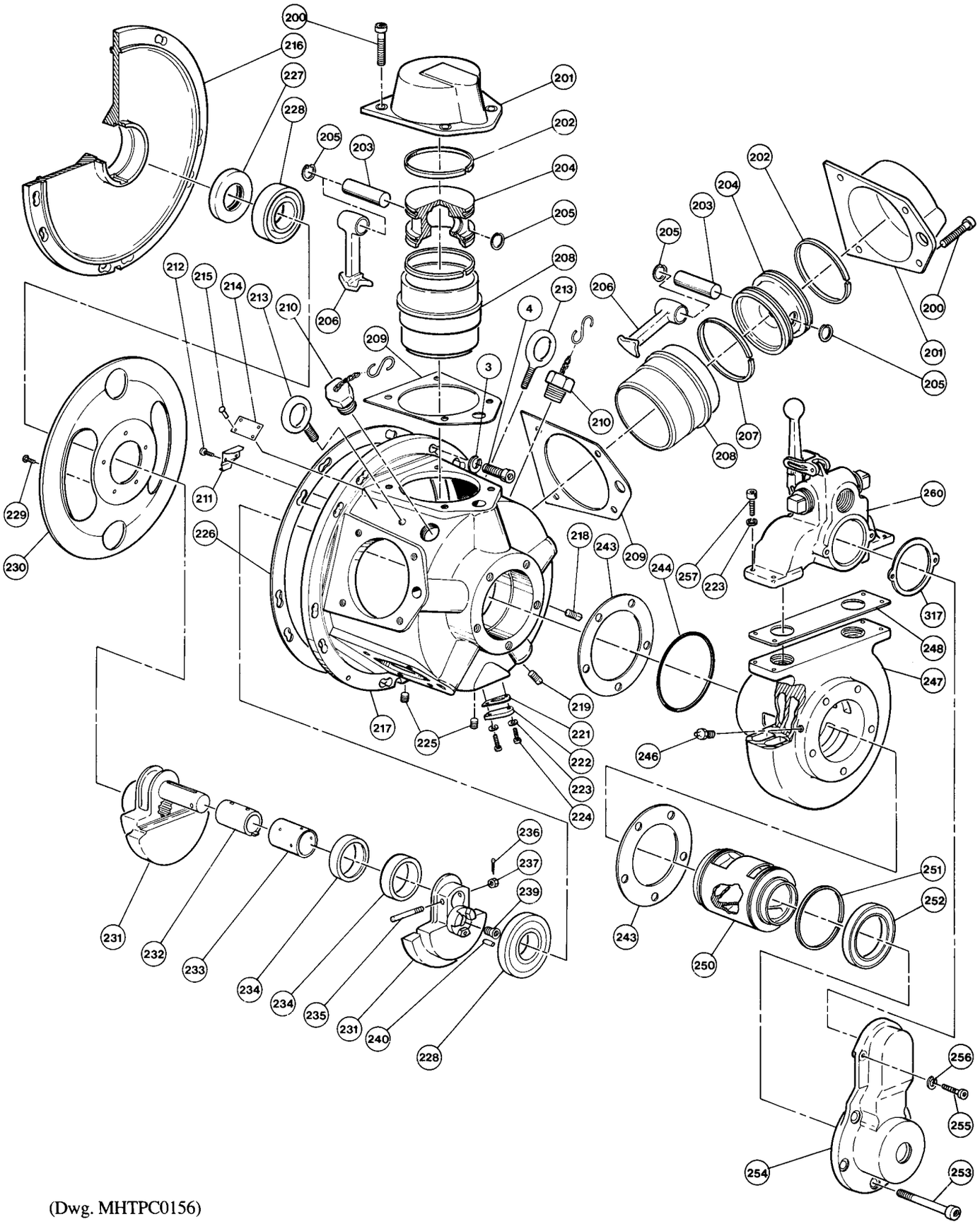
FA2 MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
*	Motor Assembly	1	50259-1
• 2	Oil Seal	1	52223
6	Motor Adapter	1	10361
96	Lockwasher	5	50200
97	Capscrew	5	50829
363	Lockwasher	2	51486
364	Capscrew	2	54840
451	Capscrew	20	50871
• 452	Copper Washer	1 Set	94-027-20
453	Cylinder	5	94-024
• 454	Compression Ring	5	Order Kit 94-RS
455	Piston Assy (Incl's items 454, 457, & 458)	5	94-010A
456	Plug	10	Order 94-011-1A (Item 457)
457	Wrist Pin Assembly (Incl's item 456)	5	94-011-1A
• 458	Oil Ring	5	Order Kit 94-RS
459	Connecting Rod	5	94-009
• 460	Gasket	1 Set	94-025-5
462	Vent Cap Assembly	1	94-018
463	Motor Housing	1	94-014
464	Pipe Plug	2	94-015
465	Bearing	2	50944
• 466	Rotary Bushing	1	10986
• 467	Rotary Valve	1	94-019
468	Adapter Valve	1	10987
469	Exhaust Cap	1	21-1
• 470	Gasket	1	94-029
473	Crank Shaft Assembly	1	94-001
474	Connecting Rod Ring	2	94-008
475	Sleeve	1	94-007
476	Bushing	1	94-006
478	Setscrew	1	94-005
479	Pin	1	94-004
480	Capscrew	1	51712
482	Lockwasher	1	50200

• Recommended spare.

* Motor Assembly includes items listed above.

FA2.5 MOTOR ASSEMBLY DRAWING



(Dwg. MHTPC0156)

FA2.5 MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
- - -	Motor Assembly	1	K5B-546
3	Lockwasher	10	50201
4	Capscrew	10	14227
200	Capscrew	20	52317
201	Cylinder Head	5	K5B-H505
• 202	Compression Ring	5	K5B-337-47
203	Wrist Pin	5	HU-514A
204	Piston	5	Not Sold Separately
205	Retainer Ring	10	902A45-632
206	Connecting Rod	5	K5B-509
• 207	Oil Ring	5	K5B-338-47
208	Cylinder Liner	5	K5B-L505-47
• 209	Head Gasket	5	K5B-507
201	Vent Cap Assembly (Oil fill cap)	2	K5B-A303
211	Baffle	2	K5B-528
212	Screw	4	J-376
213	Eye Bolt	2	KU-888
214	Nameplate	1	K5B-301
215	Drive Screw	4	R4K-302-12
216	Mounting Flange	1	K5B-502
217	Motor Housing	1	K5B-501
218	Pipe Plug (Oil level)	1	ROH-377
219	Pipe Plug	1	TC-368
• 221	Gasket	1	K5B-1002
222	Cover Plate	1	K5B-1001
223	Lockwasher	6	D02-321-10
224	Capscrew	2	119A2A202
225	Pipe Plug (Drain)	3	GA57-95
• 226	Gasket	1	K5B-592
• 227	Oil Seal	1	K5B-270
228	Crank Bearing *	2	Not sold separately
229	Button Head Screw *	5	Not sold separately
230	Oil Slinger *	1	Not sold separately
231	Crank Assembly	1	K5B-A516
232	Sleeve *	1	Not sold separately
233	Connecting Rod Bushing *	1	Not sold separately
234	Connecting Rod Ring *	1	Not sold separately

• Recommended spare.

FA2.5 MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
235	Lock Pin *	1	Not sold separately
236	Cotter Pin *	1	Not sold separately
237	Pin Nut *	1	Not sold separately
239	Flat Head Screw	1	139A2A266
240	Roll Pin	1	WF171-15
• 243	Gasket	2	K5B-928
• 244	'O' Ring	1	20A11CM248
246	Grease Fitting	1	23-188
247	Rotary Valve Housing	1	K5B-545
• 248	Gasket	1	K5B-547
250	Rotary Valve	1	K5B-526
• 251	Seal Ring	1	K5B-607
• 252	Bearing	1	K5B-97
253	Capscrew	5	51471
254	Exhaust Flange	1	K5B-276
255	Capscrew	2	119A2A200
256	Lockwasher	2	D02-321-10
257	Capscrew	4	51766
260	Valve Assembly	1	K5B-REMOTE
317	Gasket	1	K5B-275

• Recommended spare.

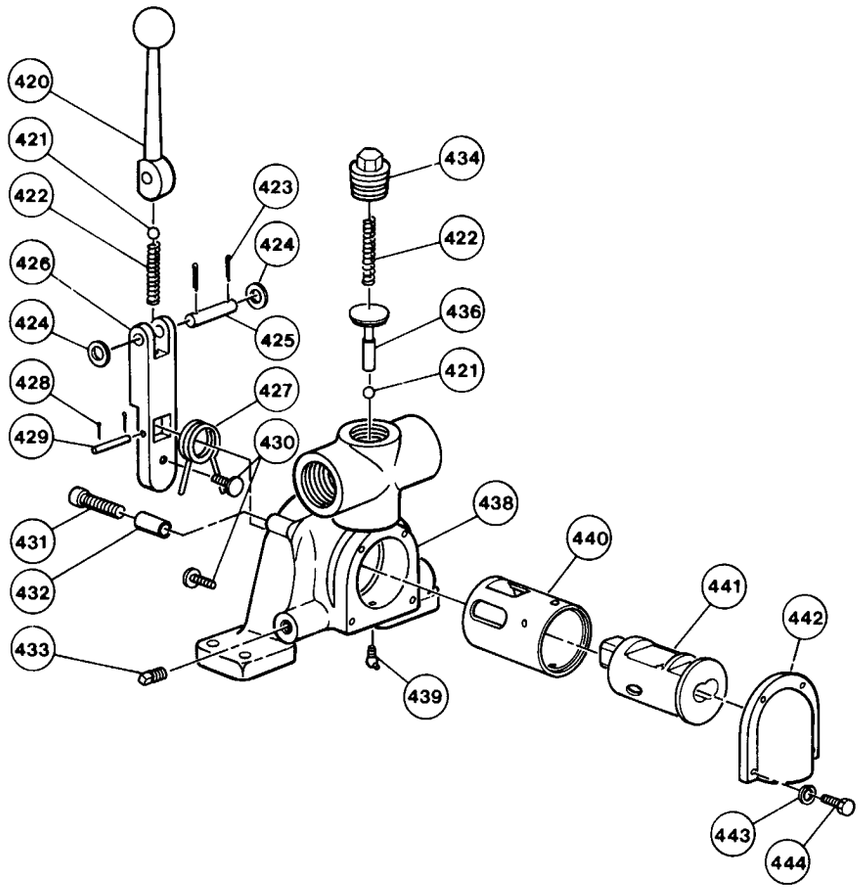
* Parts not sold separately. Refer to the "FA2.5 Motor Assembly Kit List."

** Motor Assembly consists of items 200 through 260 and 317.

FA2.5 Motor Assembly Kit List:

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
231	Crank Assembly (Incl's items 206 and 228 through 237)	1	K5B-A516
261	Piston Assembly (Incl's items 202 through 205 and item 207)	1	K5B-A513-47
262	Cylinder Assembly (Incl's items 201 and 208)	1	K5B-A505-47

FA2 LIVE AIR CONTROL VALVE ASSEMBLY DRAWING AND PARTS LIST



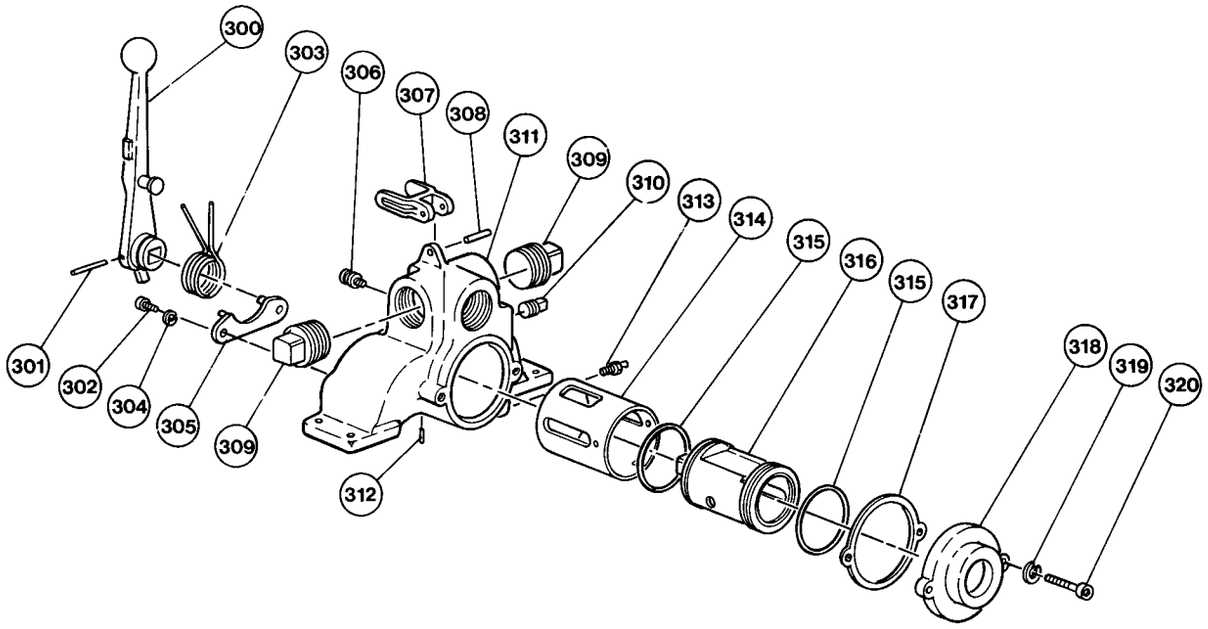
(Dwg. MHTPA0203)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
260	Valve Assembly (Incl's items 420 through 444)	1	51710
420	Handle	1	11882
• 421	Ball	2	71077119
• 422	Spring	2	11862
423	Pin	2	71077101
424	Washer	2	52914
425	Pin	1	11860
426	Handle Bracket	1	11878
• 427	Spring	1	11880
428	Pin	2	52161
429	Pin	1	11861
430	Screw	2	11884
431	Capscrew	2	51025
432	Sleeve	2	71077473
433	Pipe Plug	1	51599
434	Pipe Plug	1	11886
436	Poppet Valve	1	11879
438	Housing	1	*
439	Grease Fitting	1	50192
• 440	Valve Bushing	1	11883
• 441	Valve	1	11865
442	Exhaust Cover	1	11881
443	Lockwasher	4	51801
444	Capscrew	4	51770
444	Capscrew	4	51770

• Recommended spare.

* Not sold separately. Order Valve Assembly 51710 (item 260).

FA2.5 LIVE AIR CONTROL VALVE ASSEMBLY DRAWING AND PARTS LIST

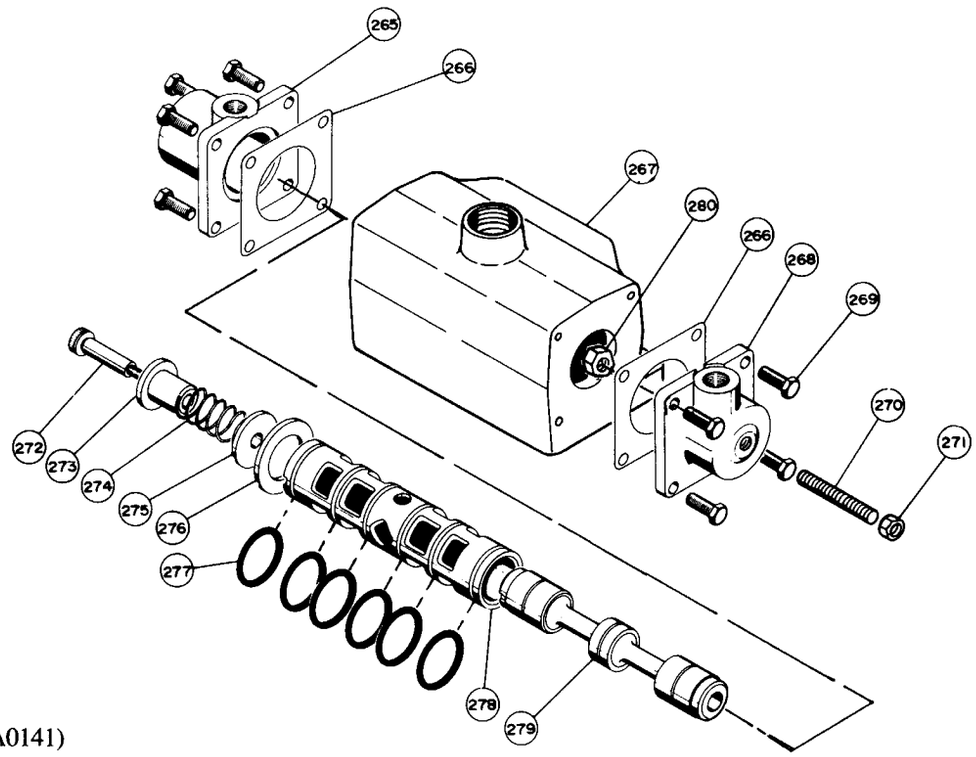


(Dwg. MHTPA0165)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER	ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
260	Valve Assembly (Includes items 300 through 320)	1	K5B-REMOTE	311	Valve Housing (matched set with item 314)	1	K5B-1101
300	Handle	1	K5B-556	312	Roll Pin	1	25A13C92
301	Roll Pin	1	K5B-1115	313	Grease Fitting	1	23-188
302	Capscrew	2	50853	314	Valve Bushing (matched set with item 311)	1	K5B-1101
• 303	Spring	1	K5B-412				
304	Lockwasher	2	50200				
305	Valve Body Retainer	1	K5B-1110	• 315	Seal Ring	2	K5B-606
				316	Valve Body	1	K5B-944
306	Spring Retainer	1	K5B-553	317	Gasket	1	K5B-275
307	Latch	1	K5B-869	318	Flange	1	KK5B-276S
308	Roll Pin	1	HLK-20	319	Lockwasher	2	D02-321-10
309	Pipe Plug	2	E5UD-947	320	Capscrew	2	50853
310	Pipe Plug	1	71026025				

• Recommended spare.

PILOT AIR CONTROL VALVE (OPTIONAL) ASSEMBLY DRAWING AND PARTS LIST



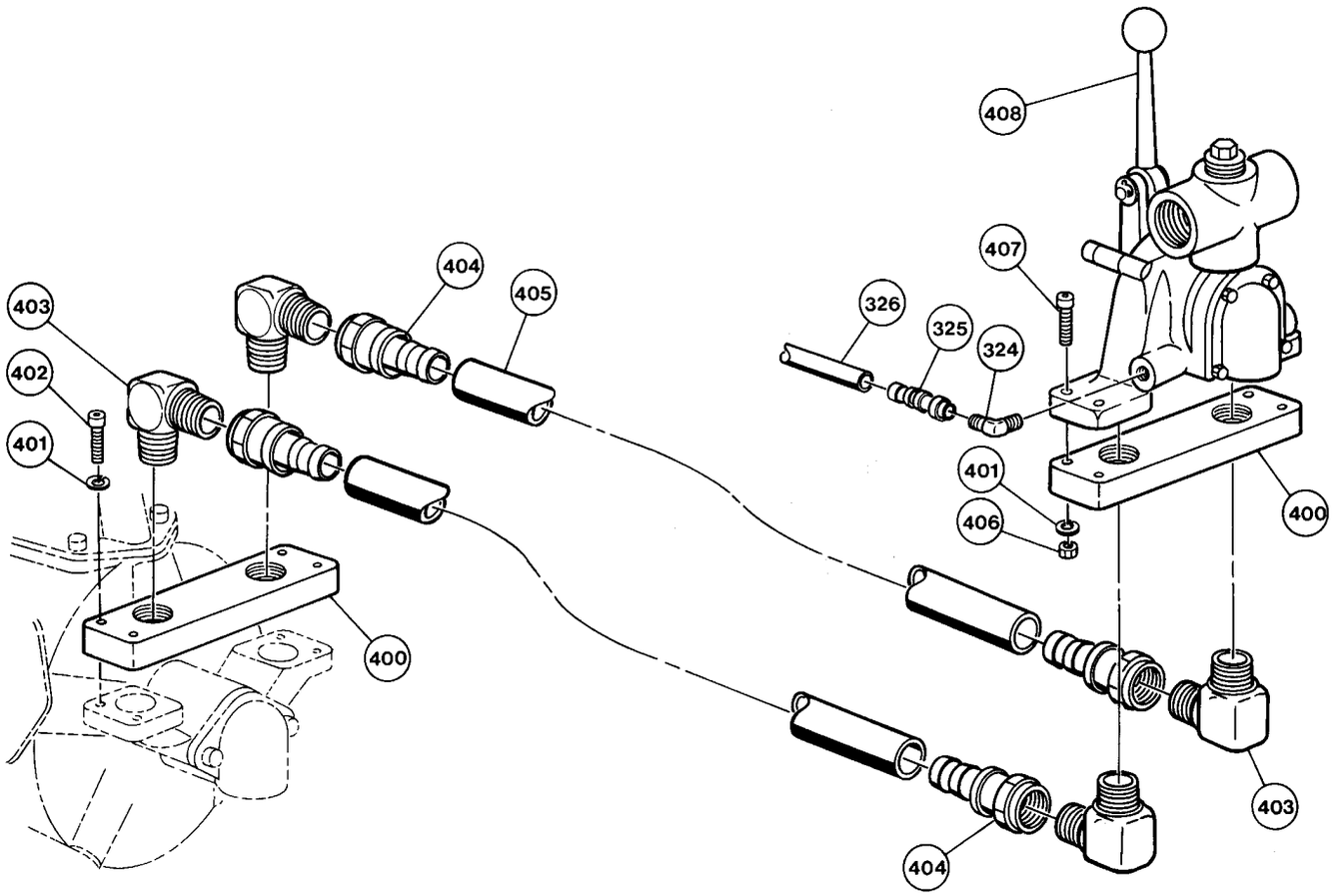
(Dwg. MHTPA0141)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER		
			FA2	FA2.5	
			310 size *	410 size *	510 size *
355	Valve Assembly (Incl's items 265 through 280)	1	20991	20992	20993
265	End Cap	1	52241		321-064
• 266	Gasket	2	52457		521-066
267	Valve Body	1	Not sold separately, order item 355		
268	End Cap (Inlet Side)	1	11778		
269	Capscrew	8	52234		
270	Adjusting Screw	1	71083968		
271	Nut	1	52265		
272	Shoulder Screw	1	817-002		
273	Guide	1	52233		321-071
274	Spring	1	52240		814-019
275	Washer	1	52239		321-072
276	Spacer	1	52238		321-068
• 277	'O' Ring	6	51632		808-013
278	Valve Sleeve	1	Not sold separately, order item 355		
279	Valve Spool	1	Not sold separately, order item 355		
280	Stop	1	11777		

• Recommended spare.

* Consult the nearest Ingersoll-Rand office or distributor for technical assistance in determining the correct valve.

FA2 REMOTE AIR CONTROL (OPTIONAL) ASSEMBLY DRAWING AND PARTS LIST

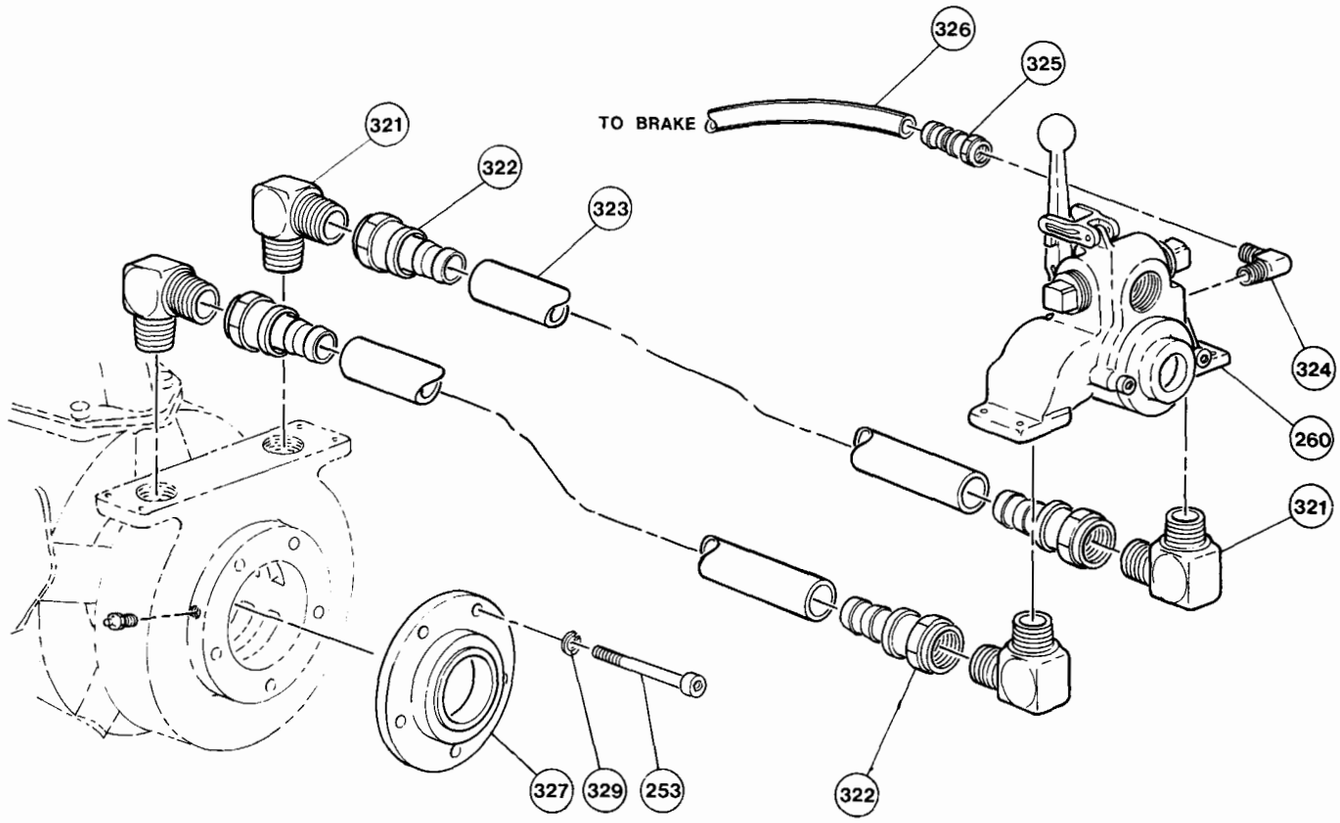


(Dwg. MHTPA0204)

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
408	Control Valve Assembly	1	51710
324	Elbow Fitting	1	52182
325	Hose End	2	51029
326	Hose	1	50923-*
400	Adapter Manifold	2	17851
401	Lockwasher	8	50200
402	Capscrew	4	54240
403	Elbow Fitting	4	71015457
404	Hose End	4	54125
405	Hose	2	50766-*
406	Nut	4	50170
407	Capscrew	4	51931

* Add hose length (feet/metres). Maximum length = 20 feet (6 metres). Contact Technical Sales for information on control applicability for lengths greater than 20 feet (6 metres).

FA2.5 REMOTE AIR CONTROL (OPTIONAL) ASSEMBLY DRAWING AND PARTS LIST

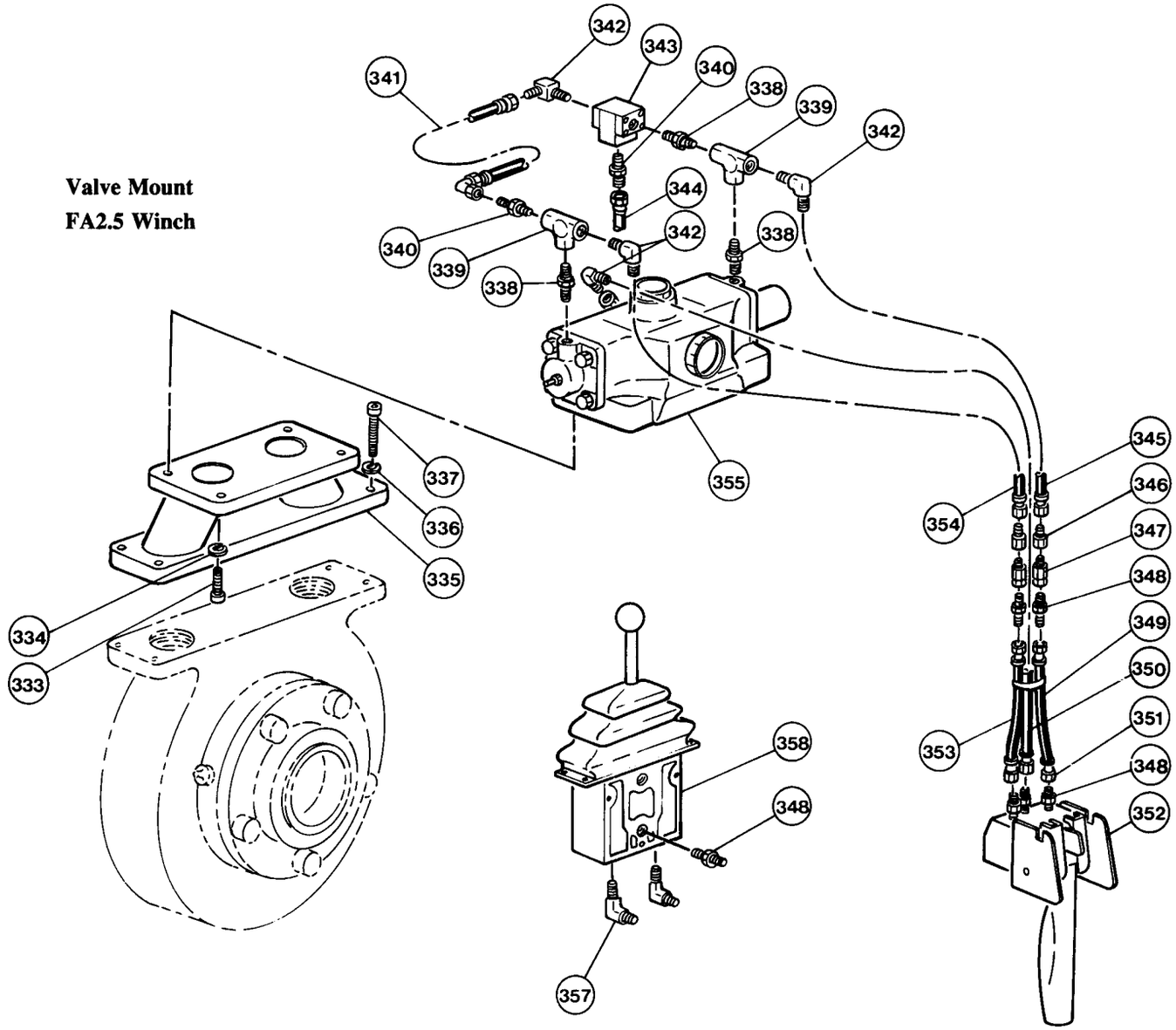


(Dwg. MHTPA0161)

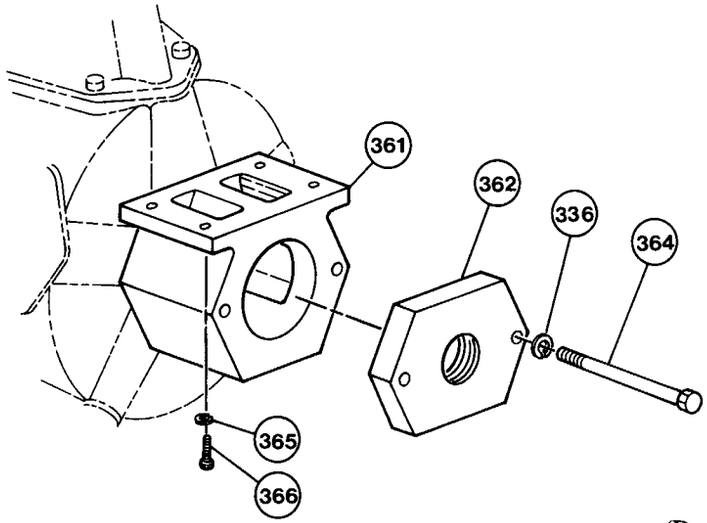
ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
260	Control Valve Assembly	1	K5B-REMOTE
253	Capscrew	5	119A2A267
321	Elbow Fitting	4	54270
322	Hose End	4	54738
323	Hose	2	54737-*
324	Elbow Fitting	1	52182
325	Hose End	2	51029
326	Hose	1	50923-*
327	Exhaust Cover	1	KK5B-276M
329	Lockwasher	5	50181

* Add hose length (feet/metres). Maximum length = 20 feet (6 metres). Contact Technical Sales for information on control applicability for lengths greater than 20 feet (6 metres). Metres are for reference only; order quantities in feet.

Valve Mount
FA2.5 Winch



(Dwg. MHTPA0167)



Valve Mount
FA2 Winch

(Dwg. MHTPA0211)

Remote Pilot Pendant Throttle Control

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER			
			10 ft (3 m)	20 ft (6 m)	30 ft (9 m)	40 ft (12 m)
324	Elbow Fitting	4	52182			
325	Hose End Fitting	See ( )	51029 (6)	51029 (10)		51029 (14)
333	Capscrew	4	54681			
334	Lockwasher	4	50893			
335	Manifold	1	13881			
336	Lockwasher (FA2)	2	51486			
	Lockwasher (FA2.5)	4				
337	Capscrew	4	50829			
338	Nipple Fitting	3	54274			
339	Pipe Tee Fitting	2	54678			
340	Adapter Fitting	2	51814			
341	Hose Assembly	1	17073-6			
• 343	Shuttle Valve	1	50277			
344	Hose Assembly (Brake)	1	17073-10			
345	Hose	See ( )	50923-(132)	50923-(242)	50923-(233)	50923-(245)
346	Adapter Fitting	As Req'd	- - -	71048284		
347	Exhaust Valve*	As Req'd	- - -	20417		
348	Adapter Fitting	As Req'd	71048268			
349	Hose	See ( )	- - -	50923-(6)	50923-(123)	50923-(6)
350	Hose	See ( )	50923-(123)	50923-(252)	50923-(372)	50923-(492)
352	Control Pendant	1	MLK-A269A			
353	Hose	See ( )	- - -	50923-(6)	50923-(135)	50923-(6)
354	Hose	See ( )	50923-(120)	50923-(230)	50923-(233)	
355	Valve Assembly (FA2)	1	20991			
	Valve Assembly (FA2.5)		20992			
356	Hose **	See ( )	- - -	- - -	- - -	50923-(233)
361	Rotary Valve	1	9148			
362	Cover	1	11543			
364	Capscrew	2	54840			
365	Lockwasher	4	51013			
366	Capscrew	4	52906			

• Recommended spare.

* Must be installed at 20 foot (6 metre) intervals. Part number 20417 includes items 346 and 348.

** Not shown. Install between exhaust valves. ( ) = Quantity in inches.

Remote Pilot Lever Throttle Valve Associated Components

Note: Requires item #'s 325, 333 through 344 (Reference "Remote Pilot Pendant Throttle Control") plus the following parts.

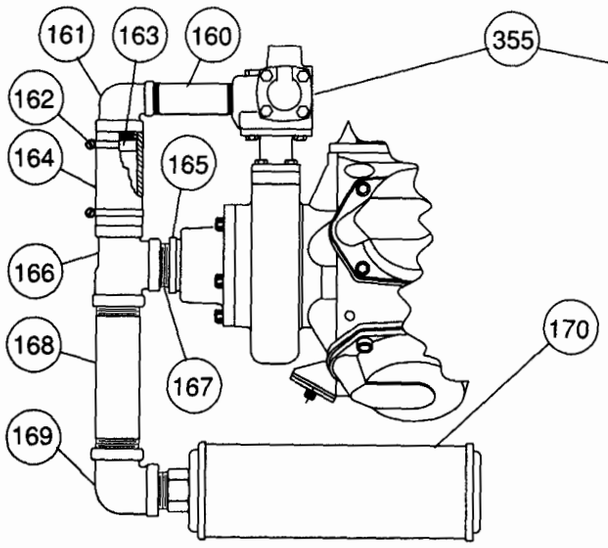
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
345	Hose	See ( )	50923-(233)
346	Adapter Fitting	2	71048284
347	Exhaust Valve **	2	71047898
348	Adapter Fitting	1	71048268
349	Hose	See ( )	50923-(135)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
350	Hose	See ( )	50923-(372)
353	Hose	See ( )	50923-(123)
354	Hose	See ( )	50923-(233)
357	Elbow Fitting	2	51281
358	Pilot Lever Throttle	1	71069561

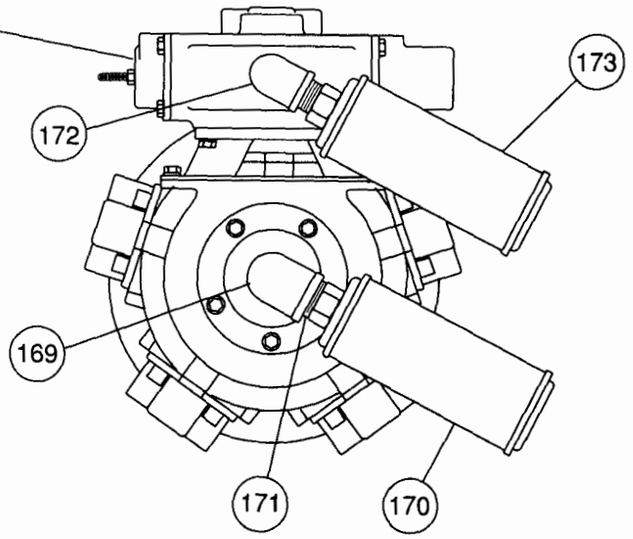
* Part numbers and quantities are for a 30 foot (9 metre) hose assembly. ( ) = Quantity in inches.

MUFFLER ASSEMBLY DRAWINGS

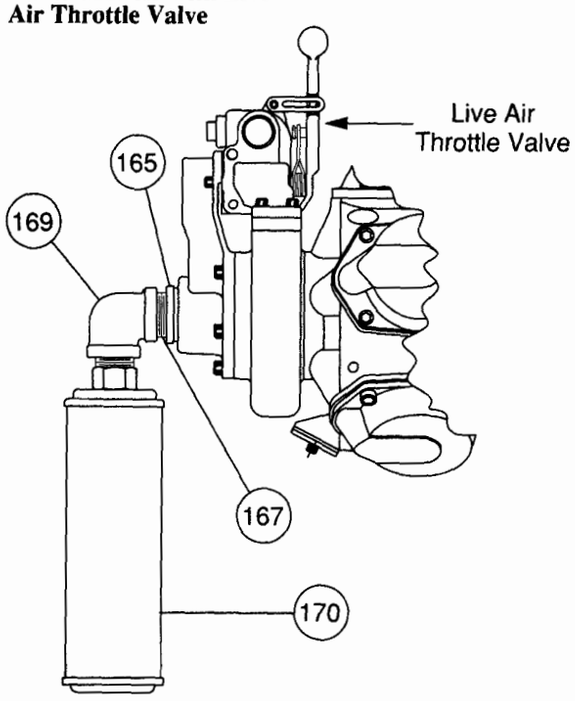
FA2.5 Muffler with Remote Actuated Pilot Control Valve (Old Style)



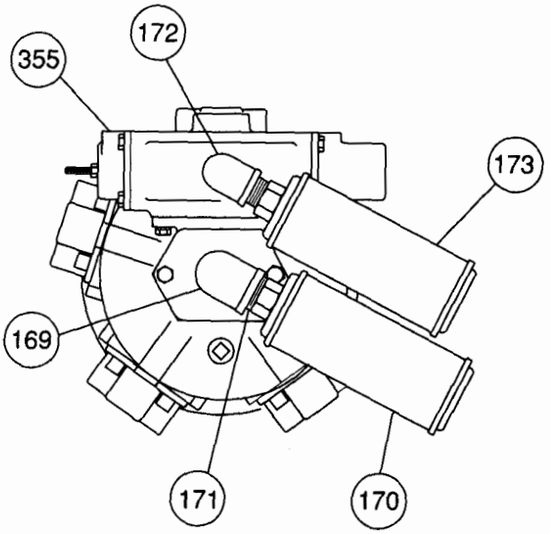
FA2.5 Mufflers with Remote Actuated Pilot Control Valve (New Style)



FA2.5 Muffler with Live Air Throttle Valve



FA2 Mufflers with Remote Actuated Pilot Control Valve



(Dwg MHTPA0515)

MUFFLER ASSEMBLY PARTS LIST

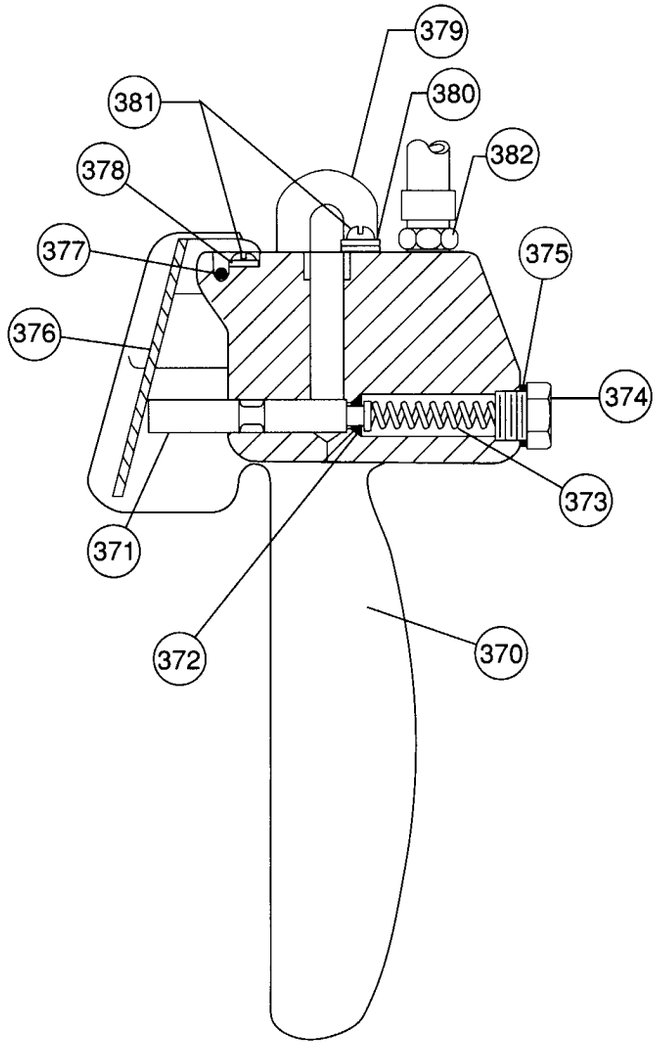
ITEM NUMBER	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
FA2 with Live Air Throttle Valve			
169	Pipe Elbow	1	52103
170	Muffler	1	52465
171	Pipe Nipple	1	51704

FA2 with Remote Actuated Pilot Valve			**Old Style**	**New Style**
169	Pipe Elbow	1	53368	52103
170	Muffler	1	50592	52465
171	Pipe Nipple	1	- - -	51704
172	Pipe Elbow	1	52190	53368
173	Muffler	1	52104	50592
FA2.5 with Live Air Throttle Valve				
165	Reducer Bushing	1	71057459	
167	Pipe Nipple	1	71057467	
169	Pipe Elbow	1	71057434	
170	Muffler	1	50594	

FA2.5 with Remote Actuated Pilot Valve			**Old Style**	**New Style**
160	Pipe Nipple	1	71057491	- - -
161	Pipe Elbow	1	71033450	- - -
162	Hose Clamp	2	71033500	- - -
163	Pipe Nipple	2	71057483	- - -
164	Hose	1	71033492	- - -
165	Reducer Bushing	1	71057459	- - -
166	Pipe Tee	1	71057442	- - -
167	Pipe Nipple	1	71057467	
168	Pipe Nipple	1	71057475	- - -
169	Pipe Elbow	1	71057434	
170	Muffler	1	50594	
171	Pipe Nipple	1	- - -	51704
172	Pipe Elbow	1	- - -	52103
173	Muffler	1	- - -	52465

Note: Reference the "PILOT AIR CONTROL VALVE ASSEMBLY DRAWING AND PARTS LIST" section for Pilot Valve Assembly (355) component part numbers

PENDANT CONTROL ASSEMBLY (OPTIONAL) DRAWING AND PARTS LIST



(Dwg. MHTPA0168)

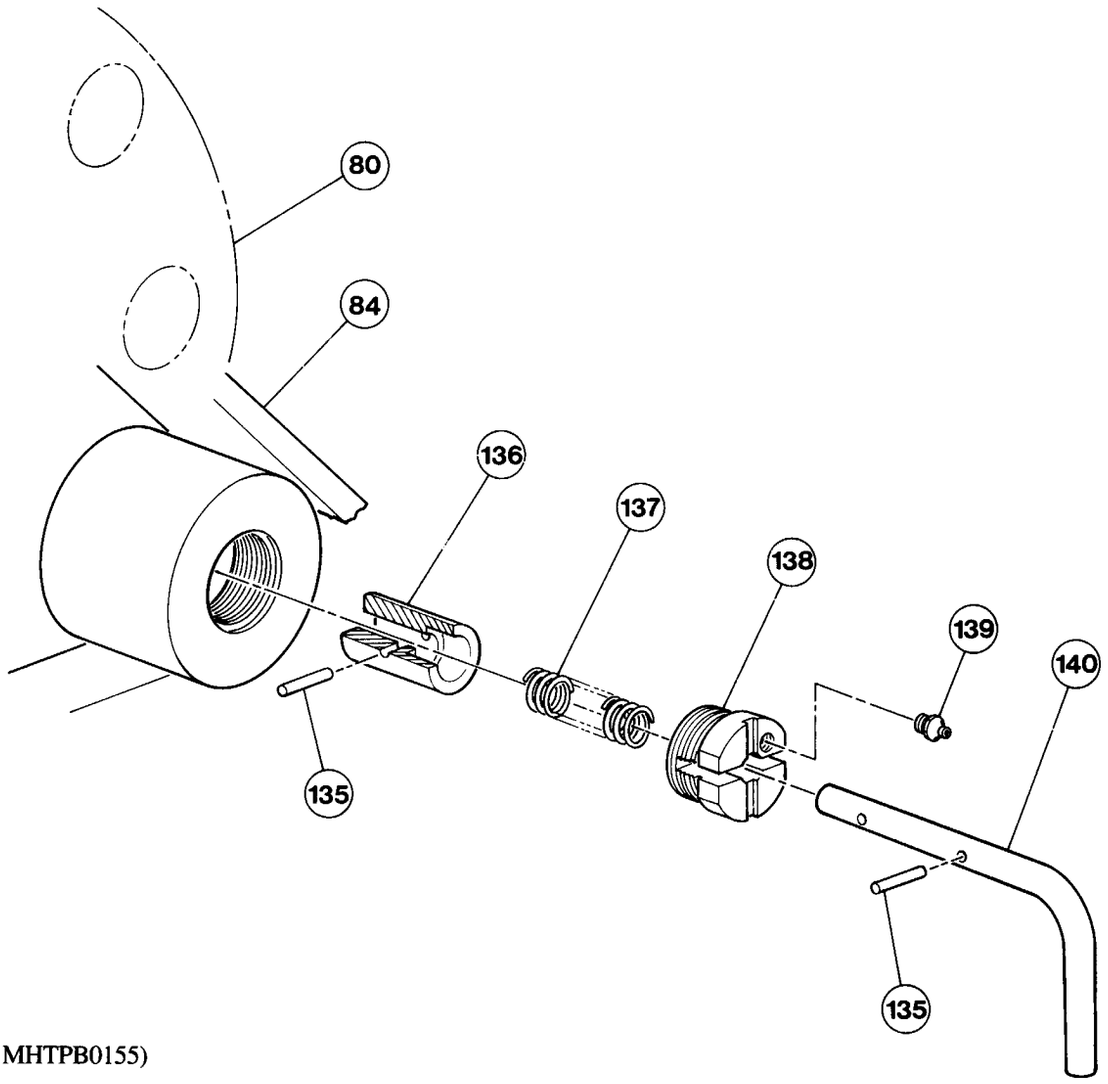
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
352	Pendant Assembly *	1	MLK-A269A
370	Pendant Handle	1	MLK-269
371	Throttle Valve	2	MLK-K264A
372	Throttle Valve Face	2	R000BR1C-2
• 373	Spring	2	MKL-51A
374	Throttle Valve Cap	2	MLK-266A
• 375	Valve Cap Gasket	2	MLK-504

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
376	Lever	2	MLK-273
377	Throttle Lever Pin	1	DLC-120A
378	Pin Lock Washer	2	D02-138
379	Support	1	MLK-450
380	Lockwasher	2	H54U-352
381	Handle Screw	4	HRE20A-68
382	Hose Fitting	3	52092

• Recommended spare.

* Assembly includes items 370 thru 381.

DRUM LOCKING PIN (OPTIONAL) ASSEMBLY DRAWING AND PARTS LIST

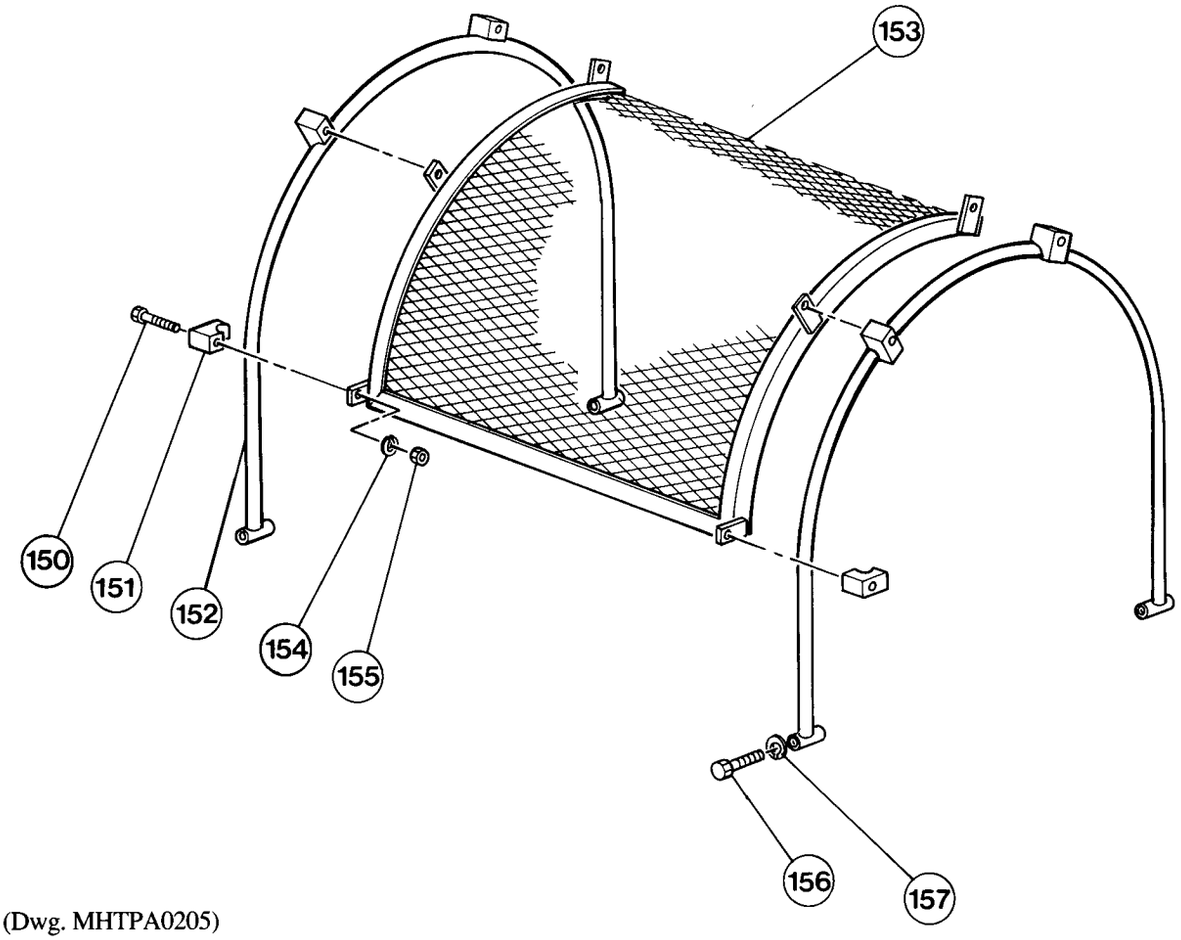


(Dwg. MHTPB0155)

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
80	Drum (without band brake)	1	16330*
	Drum (with band brake)		16331*
84	Outboard Upright	1	16327
135	Pin	2	51933
136	Lock Pin	1	16328
137	Spring	1	54453
138	Gland	1	16329
139	Grease Fitting	1	53498
140	Pull Rod	1	16310

* Part numbers reference the drawings required for information on drilling holes in the drum flange for locking pin installation. Contact Ingersoll-Rand Technical Sales or the factory for assistance.

DRUM GUARD ASSEMBLY DRAWING AND PARTS LIST

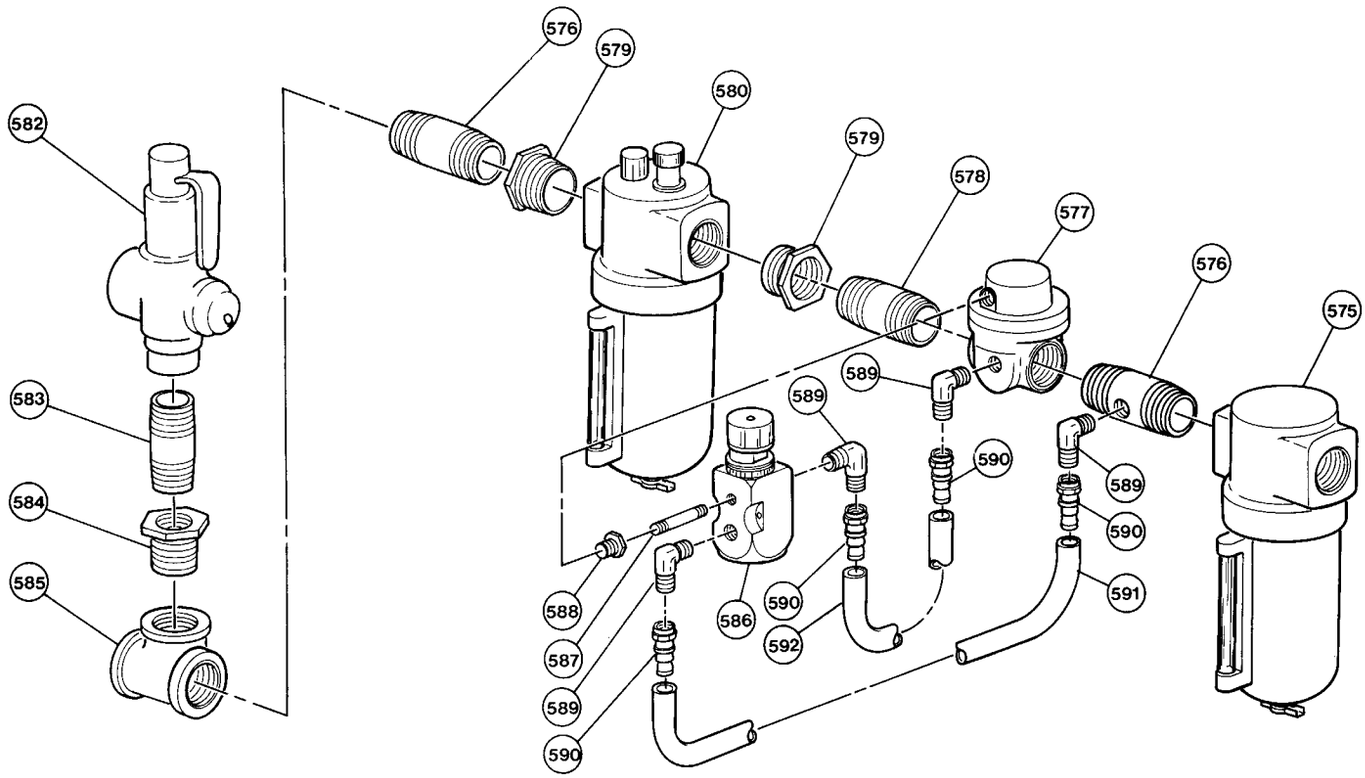


(Dwg. MHTPA0205)

ITEM NO.	DESCRIPTION OF PART	QUANTITY TOTAL	PART NUMBER
*	Drum Guard Assembly (8 inch long drum)	1	11283-1
	Drum Guard Assembly (12 inch long drum)		11283-2
	Drum Guard Assembly (16 inch long drum)		11283-3
	Drum Guard Assembly (24 inch long drum)		11283-5
150	Capscrew	4	71072243
151	Clamp	4	10399
152	Support	2	10400
153	Drum Guard (8 inch long drum)	1	11259-1
	Drum Guard (12 inch long drum)		11259-2
	Drum Guard (16 inch long drum)		11259-3
	Drum Guard (24 inch long drum)		11259-5
154	Lockwasher	4	51580
155	Nut	4	71061584
156	Capscrew	4	53391
157	Washer	4	50182

* Drum Guard Assemblies include items 150 through 157.

AIR PREPARATION ASSEMBLY DRAWING AND PARTS LIST



(Dwg. MHTPA0223)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
*	Air Preparation Assembly	1	10389
575	Filter	1	F42-0A-000
576	Pipe Nipple	2	51670
577	Regulator	1	R30-0A-G00
578	Pipe Nipple	1	51704
579	Pipe Bushing	2	51706
580	Lubricator	1	L40-0A-G00
582	Relief Valve	1	51702
583	Pipe Nipple	1	50933

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
584	Pipe Bushing	1	51705
585	Pipe Tee	1	51707
586	Regulator	1	51802
587	Pipe Nipple	1	51804
588	Pipe Bushing	1	51803
589	Pipe Elbow	4	51805
590	Hose End	4	51806
591	Hose	( )	51807-(8)
592	Hose	( )	51807-(11)

* Air Preperation Assembly for 1-1/4 inch system.

( ) = Quantity in inches.

PARTS ORDERING INFORMATION

Use of other than **Ingersoll Rand** replacement parts may adversely affect the safe operation and performance of this product.

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

Model Number _____

Serial Number _____

Date Purchased _____

When ordering replacement parts, please specify the following:
1. Complete model number and serial number as it appears on the nameplate.
2. Part number(s) and part description as shown in this manual.
3. Quantity required.

The nameplate is located on the winch outboard upright.

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.
• The use of other than genuine Ingersoll Rand replacement parts may result in safety hazards, decreased performance and increased maintenance and invalidate all warranties.

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 it be disassembled, degreased and parts separated as to materials so that they may be recycled.

For additional information contact:

Ingersoll Rand
2724 Sixth Avenue South
Seattle, WA 98134 USA
Phone: (206) 624-0466
Fax: (206) 624-6265

or

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

LIMITED WARRANTY

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

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

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

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

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

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

IMPORTANT NOTICE

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

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

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

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

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

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