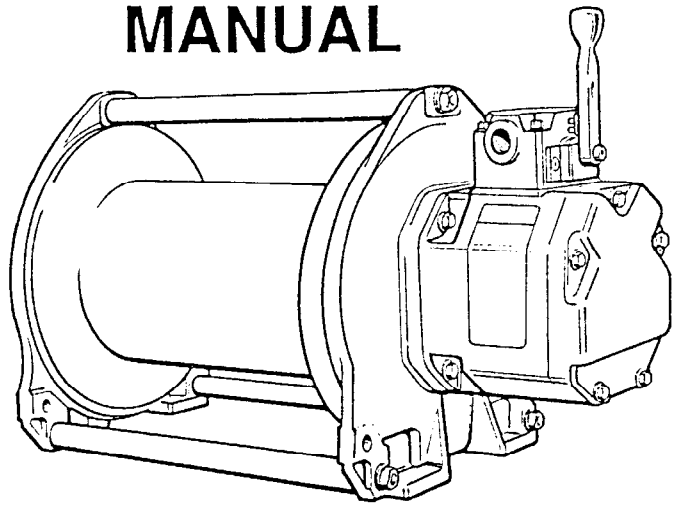
"LIFTSTAR" AIR WINCHES FG 1500/CN SERIES

PARTS, OPERATION AND MAINTENANCE MANUAL



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

⚠ WARNING

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

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

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

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INGERSOLL-RAND®
MATERIAL HANDLING

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SAFETY INFORMATION

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

Danger, Warning, Caution and Notice
Throughout this manual there are steps and procedures which, if not followed, may result in injury. 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 supporting loads over people.
• The supporting structures and load-attaching devices used in conjunction with this winch must provide and 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 qualified registered 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.

NOTICE

• Using other than genuine INGERSOLL-RAND Material Handling parts will void the warranty.

SAFE OPERATING INSTRUCTIONS

The following warnings and operating instructions have been adapted in part from American National (Safety) Standard ANSI B30.7 and are intended to avoid unsafe operating practices which might lead to injury or property damage.

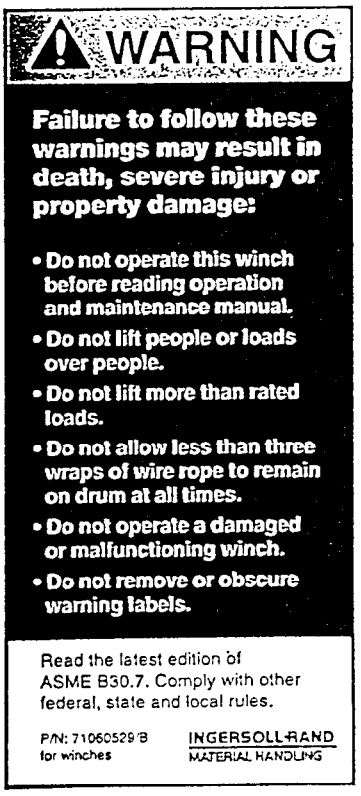
INGERSOLL-RAND recognizes that most companies who use winches have a safety program in force in their plants. In the event that some conflict exists between a rule set forth in this publication and a similar rule already set by an individual company, the more stringent of the two should take precedence.

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.

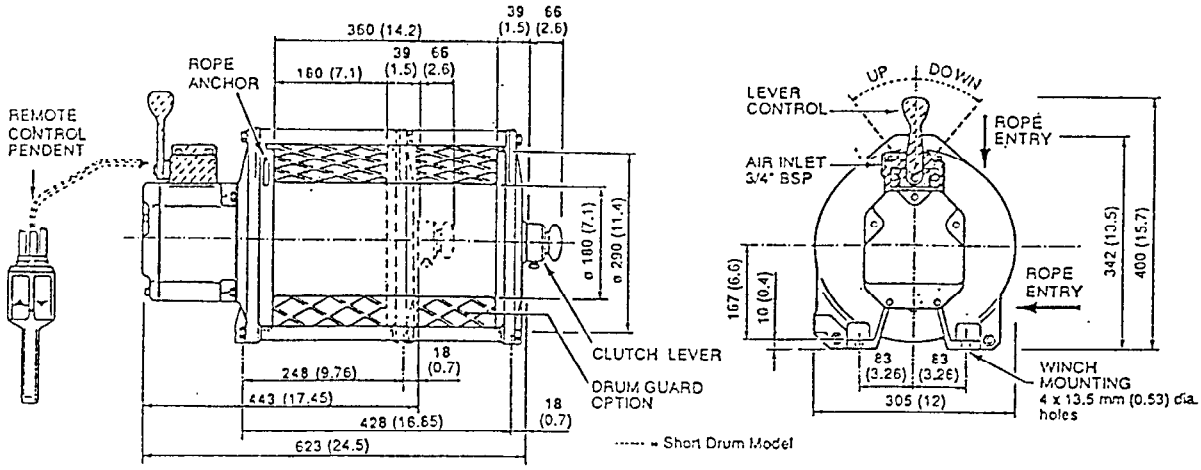
1. Only allow personnel trained in safety and operation to operate and maintain a winch.
2. Only operate a winch if you are physically fit to do so.
3. When a "DO NOT OPERATE" sign is placed on the winch, do not operate the winch until the sign has been removed by designated personnel.
4. Before each shift, check the winch for wear or damage.
5. Never lift a load greater than the rated capacity of the winch. See warning labels 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 in the vicinity of the wire rope as it spools onto the 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 vener allow anyone to stand on a suspended load.
13. Ease the slack out of the wire rope when starting a lift. 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 winch wire rope as a sling.

WARNING TAG

Each winch is supplied from the factory with the warning tag shown. If the tag is not attached to your unit, order a new tag and install it. See the parts list for the part number. Read and obey all warnings and other safety information attached to this winch. Tag may not be shown actual size.



SPECIFICATIONS



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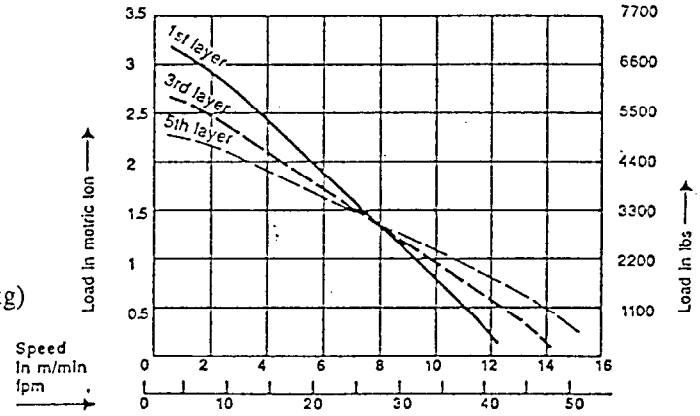
Air Pressure : 90 psig (6.3 bar)
Air Flow : 124 scfm (3.5 cu.m/min)
Drum Size :
Barrel dia. 7-3/32 in. (180 mm)
Flange dia. 11-13/32 in. (290 mm)
Length Between Flanges : 14-3/16 in. (360 mm) :
Long drum model
Length Between Flanges : 7 - 1/16 in. (180 mm) :
Short drum model
Drum Wire Rope Storage Capacity :
3/8 in. (10 mm) wire rope : 398 ft. (121 m) :
Long drum model
3/8 in. (10 mm) wire rope : 191 ft. (58m) :
Short drum model
Line Pull Hoisting :
Maximum full drum line pull 3,300 lbs (1500 kg)
(5:1 safety factor)
Line Pull Pulling :
Maximum pulling capacity at 1st layer 5,250 lbs (2400 kg)
(3.5:1 safety factor)
Line Speed :
Maximum speed with no load 49 fpm (15 m/min).
with 3,300 lbs (1500 kg) - 23 fpm (7 m/mn) at 3rd layer.
with 5,250 lbs (2400 kg) - 13 fpm (4 m/mn) at 1st layer.
Winch Weight :
Without wire rope 155 lbs (70.5 kg) : Long drum model
Without wire rope 132 lbs (60 kg) : Short drum model

Performance at 90 psi - 3/8 in. (10 mm) wire rope



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HOW TO ORDER

Example: FG1500L-PH4M-CN
3300 lbs capacity, with 4 m of control pendent, and drum guard.

Series	Ratings	Drum	-	Control	Pendent Hose Length	-	Clutch	-	Options
FG	1500	L	- -	PH	4M	-	CN	-	GP

FG

L = Long Drum
No letter = Short Drum

1500 = 1500 kg

No letter = Lever throttle on winch
PH = Remote control pendent handle (aluminum)
PHR = Brass pendent handle

2M = 2 meters (std.)
XXM = Specify length in meters

CN = Clutch fitted as standard

G = Drum Guard
P = Marine paint
Z = Sand blast, and primer

DESCRIPTION

The FG 1500/CN is an air powered planetary winch designed for lifting and pulling applications. The winch utilizes a multi-disc brake which is automatically applied if there is a lack of air pressure. The output from the externally mounted air gear motor is transmitted through a first stage reduction gear and shaft to the planetary reduction. The planetary reduction drives a ring gear which is connected to the wire rope drum through the output shaft. The brake is spring applied and released by pilot air pressure when the winch is operated. In the event of a loss of air pressure the brake automatically applies.

The FG 1500/CN is equipped with a manually operated free wheel clutch. The free wheel clutch permits unloaded wire rope to be pulled from the drum by hand.

INSTALLATION

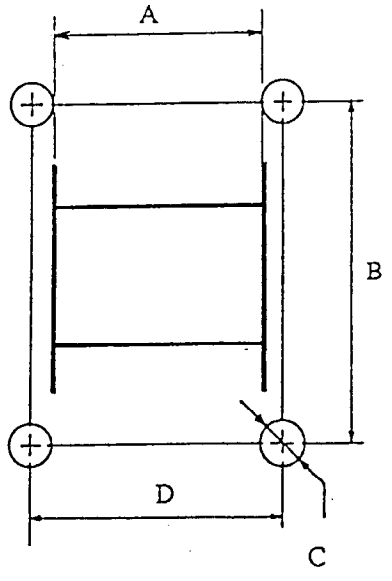
Prior to installing the winch, carefully inspect it for possible shipping damage.

⚠ CAUTION

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

Mounting

1. If winch is to be mounted in one position be sure the mounting surface is even and of sufficient strength to handle the rated load and prevent possible binding of the winch.
2. Make sure the mounting surface is flat to within 1/32 inch (0.8 mm). Shim if necessary.
3. Mounting bolts must be 1/2 in. (12 mm) diameter, Grade 8 or better. Use self-locking nuts or nuts with lockwashers.
4. Tighten mounting bolts evenly and torque to 30 lb.ft. (40N-m) dry. If the fasteners are plated, lubricated or a thread locking compound is used torque to 23 lb. ft. (31N-m).



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5. Maintain a fleet angle between the sheave and winch of no more than 1-1/2 degrees. For every inch of drum length, the lead sheave must be at least 1.6 feet (0.5 m) from the drum.
6. Do not weld to any part of the winch

Bolt Hole Dimensions

	with std long drum	with short drum
"A"	14-3/16 in. (360 mm)	7-1/16 in. (180 mm)
"B"	6-17/32 in. (166 mm)	6-17/32 in. (166 mm)
"C	17/32 in. (13.5 mm)	17/32 in. (13.5 mm)
"D"	16.85 in. (428 mm)	9.76 in. (248 mm)

Wire rope

⚠ CAUTION

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

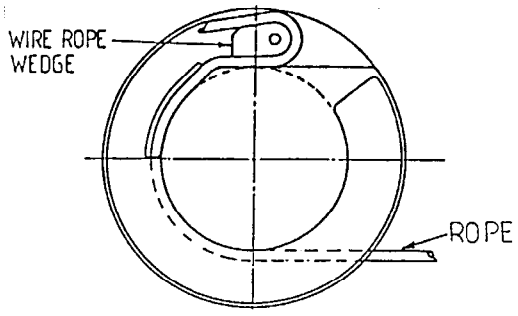
• Install the wire rope to come off the drum in an underwind position as indicated on the direction of rotation tag.

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, 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 wire rope drum, sheaves and method of reeving. Wire rope diameter for lifting is 3/8 in. (10 mm). Maximum wire rope diameter is limited by the wire rope anchor.

Installing Wire Rope

1. Cut wire rope to length in accordance with the wire rope manufacturer's instructions.
2. Feed the end of the wire rope into the smaller anchor hole in the wire rope drum and pull through approximately one foot (0.3 m) of wire rope.
3. Tuck the end of the wire rope back into the wire rope anchor pocket forming a loop in the wire rope.
4. Insert the wire rope anchor and pull the wire rope through the slot tightening the wire rope around the wire rope anchor.



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⚠ CAUTION

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

5. Pull the wire rope anchor into position in the drum anchor pocket.

Wire Rope Spooling

To compensate 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.

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.

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 for welding.
2. Do not attach a welding electrode to winch or wire rope.
3. Never run the wire rope over a sharp edge. Use a correctly sized sheave.
4. When a lead sheave is used, it must be aligned with the center of the drum. The diameter of the lead sheave must be at least 18 times the diameter of the wire rope.
5. Always maintain at least three full 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 should not be smaller than 3/4 in. (19 mm) for flexible lines and 5/8 in. (17 mm) for connectors. 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. 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 line lubricator with these motors. Use a lubricator having an inlet and outlet at least as large as the inlet on the motor. Install the lubricator in the air line just ahead of the motor.

NOTICE

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

The air line lubricator should be replenished daily and set to provide 2 to 3 drops per minute of SAE 30W oil (minimum viscosity 135 Cst at 104° F (40°C)).
Winches are delivered with the gear box filled with oil.

Motor

For optimum performance and maximum durability of parts, operate air motor at 90 psi at 70 scfm (6.3 bar/630 kpa at 3.5 cu.m/min) air pressure and volume. The winch should be installed as near as possible to the compressor or air receiver.

Initial Operating Checks

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

1. When first running the motor some light oil should be injected into the inlet connection to allow good lubrication.
2. 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 recommended.

1. Pour a small amount of gasoline fluid in the motor inlet port.
2. Operate the motor for 10 seconds to flush out any impurities.
3. Pour small amount of oil in the motor air inlet port.
4. Operate the motor for an additional 2 to 3 seconds. The winch is now ready to work.

OPERATION

The four most important aspects of winch operation are :

1. Follow all safety instructions when operating the winch.
2. Allow only people trained in safety and the operation of this winch 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.

⚠ WARNING

• The FG 1500/CN Winch is not designed or suitable for lifting, lowering or moving persons. Never lift loads over people.

Winch Control

The winch spring loaded manual control throttle is mounted 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 control valve should be avoided.

Remote Pilot Pendant Throttle (optional)

The pendent control throttle is equipped with two separate levers for winch operation. Pilot pressure from the pendant throttle activates the winch control valve. Direction of drum rotation is controlled by whichever lever is depressed.

⚠ 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.

Free Wheel Clutch

To disengage the free wheel clutch pull out the spring loaded plunger until it clears the groove in the handle shaft. Maintain a hold on the plunger knob and pull out the free wheel clutch handle. Release the spring loaded plunger so it locks back into the shaft groove. Gently pull and push on the free wheel chutch handle to check plunger is engaged.

⚠ WARNING

• Never disengage clutch with a load on the wire rope.
• Winch controls must be in the neutral position before operating the free wheel clutch.

To engage the free wheel clutch pull out the spring loaded plunger until it clears the groove in the handle shaft. Maintain a hold on the plunger knob and push in the free wheel clutch handle. Release the spring loaded plunger so it locks back into the shaft groove. Gently pull and push on the free wheel clutch handle to check plunger is engaged. It may be necessary to rotate the durm slowly by hand to allow the clutch drive shaft to engage.

LUBRICATION

Wire Rope
Refer the 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 wire rope

⚠ CAUTION

• Do not use an acid-based solvent or other cleaning fluid.

2. Apply a wire rope lubricant or SAE 30W oil.
3. Brush, drip or spray lubricant weekly, or more frequently, depending on severity of service.

Reduction Gear Assembly
Winches are delivered with the gear box filled with oil. Replace the oil in the reduction housing at least once every year. If the winch is used at a normal frequency, the oil in the reduction housing is suitable for one years operation without changing. However, when the winch is used at a high frequency, the oil may need to be changed on a more frequent basis.

To ensure correct performance, highest efficiency and long life, it is essential that the lubricating oil be maintained at the correct level. The recommended grade of oil must be used at all times since the use of unsuitable oil may result in excessive temperature rise, loss of efficiency and possible damage of the gears.

The reduction gear assembly is filled and shipped with SAE 80W90 oil having a kinematic viscosity of 145 mm2/s at 40°C (104°F) from the factory. Use only high quality lubricants in the reduction gear assembly such as high grade EP type oil or the equivalent.

Fill the reduction gear assembly until the oil is level with the working rim.
Oil capacity : 0.13 gall (0.5 Ltrs)

Below 32°F (0°C)	SAE 50W	EP4
32° to 80°F (0° to 27°C)	SAE 90	EP4
Above 80°F (27°C)	SAE 140	EP4

Drum Bushings
Lubricate grease fittings monthly with 2 or 3 pumps of a grease gun. Rotate the drum slowly as grease is being applied. For temperatures -20° to 50°F (-29° to 10°C) use a multipurpose lithium-based EP1 grease. For temperatures 30° to 120°F (-1° to 49°C) use a multipurpose lithium-based EP2 grease.

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

Free Wheel Clutch
If winch is disassembled, apply a light coating of grease to the plunger and clutch handle shaft.

Storage
For exchange winches or winches that will not be operated for extended periods pour a small amount oil into the motor inlet port or supply line. Operate the motor for 2 to 4 seconds to lubricate the motor parts then plug the air inlet port.

INSPECTION

There are two types of inspection, the frequent inspection performed by the operator while using the winch and periodic inspections performed by personnel trained in the operation and maintenance of this winch. Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.
Any deficiency revealed through inspection must be reported to an appointed person. A determination must be made as to whether a deficiency constitutes a safety hazard before resuming operation of the winch.

Records and Reports
Some form of inspection record must be maintained for each winch, listing all points requiring periodic inspection.

A written report should be made monthly on the condition of the critical parts of each winch. These reports should be dated, signed by the person who performed the inspection, and kept on file where they are readily available for review.

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 bird cages, kinking, core protrusion, crushing, heat damage, and main strand displacement.
   b. Corrosion and nicking.
   c. Wear of crown wires. Replace at 1/3 wear 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. CONTROLS. See that controls function properly and control handle returns to neutral center when released.

Periodic Inspection

According to ASME B30.7, frequency of periodic inspection depends on the severity of usage : NORMAL, yearly; HEAVY, semi-annually; SEVERE, 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, capscrew, nuts, pins and other fasteners on winch and air system. Replace if missing and tighten or 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.

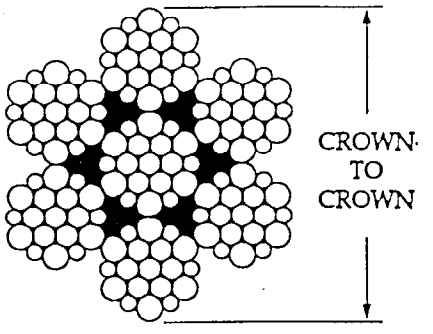
3. DRUM AND SHEAVES. Check for damage or excessive wear. Replace if necessary.

4. BRAKE. Perform functional load test on winch. Check ability of the brake to hold rated load.

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 thorough examination of the wire rope should be conducted by an experienced inspector to determine the suitability of the wire rope to remain in service.
   (ref. Dwg. D6310012)



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7. FOUNDATION. Check for the continued ability to handle the imposed loads.

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 the information necessary for troubleshooting this winch. The troubleshooting guide provides a general outline of problems which could be experienced with normal use of this winch. It lists the symptom, the possible cause, and the possible remedy for the trouble being experienced.

SYMPTOM	CAUSE	REMEDY
Winch will not operate.	No air supply to winch.	Check connections and hoses in air supply line.
	Winch is overloaded.	Reduce load to within rated capacity.
Load continues to move when winch is stopped.	Brake is slipping.	Check brake friction discs and springs See "MAINTENANCE"section.
	Winch is overloaded.	Reduce load to within rated capacity.
Winch will not lift load or does not lift rated capacity.	Winch is overloaded.	Reduce load to within rated capacity.
	Motor may be damaged.	Inspect motor. See "MAINTENANCE" section.
	Brake is not releasing.	Check brake release pilot hole is not restricted. Check seals on brake piston are not damaged.
	Insufficient air supply.	Check air supply pressure and volume.
Oil leaks from drum bushing area.	Reduction assembly is leaking.	Disassemble winch and inspect reduction assembly seals.
Low power.	Low air pressure at the inlet.	Check air pressure at the inlet while winch is running.
	Worn or damaged motor gears.	Inspect motor. See "MAINTENANCE" section.
	Improper lubrication or dirt building up in the motor.	Lubricate as instructed in "LUBRICATION" section. If this does not help, flush the motor as instructed in the "INSTALLATION" section.
	Winch binds during operation.	Check winch mounting surface is flat and does not distort during winch operation.
Motor does not operate smoothly.	Worn or broken rotor bearings.	Examine each bearing. Install new bearings as necessary.

⚠ WARNING

- **Never perform maintenance on the winch while it is supporting a load.**
- **Before performing maintenance, tag controls : DANGER - DO NOT OPERATE - EQUIPMENT BEING REPAIRED.**
- **Only allow service personnel trained in the operation and service of this winch to perform maintenance.**
- **After performing any maintenance on the winch, test winch to 125% of its rated capacity before returning to service.**
- **Do not use Trichloroethylene to clean parts.**

Disc Brake (ref. Dwg. D6310008)

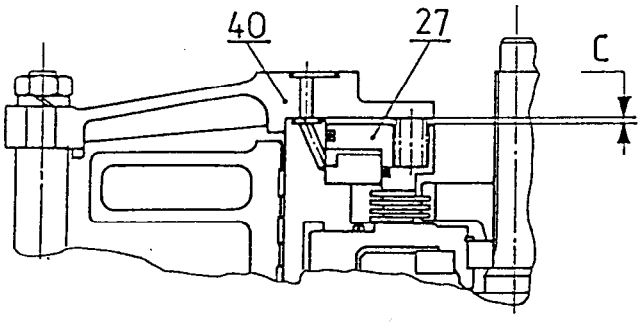
Adjustment

No brake adjustment is required.

Inspection

If brake slippage occurs during tests prior to placing winch in service or during normal use of the winch, the following procedure is required.

1. Turn off air system, depressurize air lines and disconnect the air hose.
2. Move the winch to a suitable repair area and stand in a vertical position so rear end cover (65) is down.
3. Remove the four screws which secure the motor assembly (31) to the mounting flange (32) and pull off the motor straight away from the winch.
4. Remove the four screws (33) which secure the mounting flange (32) to the front end cover (40). Remove the mounting flange using two jacking screws HM6-25 metric thread length one inch (25 mm) to extract the mounting flange.
5. Remove the gear wheel (39).
6. Check dimension "C" from the brake piston (27) to the front end cover (40) as shown in Dwg. D6310003. If this dimension is greater than 0.16 in. (4 mm), the brake discs (21 and 22) must be replaced by following the winch disassembly procedure.



(Dwg. D6310032)

General Disassembly Procedures

The following instructions provide the necessary information to disassemble, inspect, repair, and assemble the winch. Refer to the winch assembly drawing 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 bench in a clean dust free 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 press fit in or on a subassembly unless the removal of that part is necessary for repairs or replacement.

Disassembly Instructions

Winch Disassembly (ref. Dwg. D6310008)

1. Disconnect and tag the air lines.
2. Remove winch from its mounting and set in a clean work area on a sturdy work bench.
3. Position the winch vertically with the motor end down.
4. Remove the nuts (2) and lock washers (3).

5. Remove the rear end-cover (65):
   5.1 Unscrew the handle (75) and pull the plunger (80) to remove axle (74), clutch (69) and the spring (73).
   5.2 If necessary remove retainer rings (77 and 78) to remove clutch (69) and bearing (79) from axle (74).
   5.3 Remove screws (71), plunger body (70) and the plunger (80).
   5.4 Extract the exhaust washers (66) and the rings (67).
   5.5 Pull bearing (68) from rear end cover (65).
6. Pull the drum (64) from the winch.
   6.1 Remove the spacer (76).
   6.2 Remove the drum bushings (47) if they require replacement.
7. Remove the reduction gear and brake assembly from the drum.
8. Remove the oil drain plug (6) and drain the oil from the gear casing.
9. Remove the four screws which secure the motor (31) to the mounting flange (32) and pull off the motor straight away from the winch. For disassembly of the motor and the valve, follow the corresponding procedure.
10. Remove the gasket (37) and the 'O' ring (29) and drain the oil from the brake through the mounting flange bore.
11. Remove the three nuts (2) and lock washers (3) and remove the three tie rod spacers (4).
12. Remove the gearbox and brake assembly from the output shaft (5).
13. Disassembly of the front end-cover (40):
   13.1 Remove screws (33).
   13.2 Remove the mounting flange (32). Extract the oil seal (36), bearing (35) and the pins (28).

NOTICE

The oil seal has been installed with Loctite ® 460 on the backside of the seal.

   13.3 Remove the gasket (38) and the 'O' ring (29).
   13.4 Remove the gear wheel (39) and the spacer (44).
   13.5 Remove the screws (42).
   13.6 Remove the front end cover (40).

14. Disassembly of the brake:
   14.1 Remove the 'O' ring (26).
   14.2 Remove the springs (49).
   14.3 Extract the brake piston (27) by using low pressure compressed air in brake release port.
   14.4 Remove the 'O' rings (24 and 25).
   14.5 Remove screws (43).
   14.6 Extract the stop ring (23) by using jacking screws in the three M6 threated holes.

NOTICE

Stop ring (23) has been installed with Loctite ® Instajoint 574.

   14.7 Remove friction discs (21), steel discs (22) and stop ring (46).

15. Disassembly of the gear box:
   15.1 Remove screws (55) and lock washers (56).
   15.2 Extract the gear box cover by using jacking screws in the two M4 threated holes.
   15.3 Press out the output shaft (5) and the output annular gear (58).
   15.4 Remove the bearings (59 and 61), oil seal (60) and the 'O' ring (9).
   15.5 Remove the bearing (10), spring washer (57) and the output annular gear (58).
   15.6 Remove the satellite support assembly.
   15.7 Push out the satellite axles (11).
   15.8 Remove the satellites (15), bearing studs (12) and stop rings (13).
   15.9 Remove the needle bearings (14) and the spacers (16).
   15.10 Disassembly of the fixed annular gear (19):
      - compress the 'O' ring (20) by using the special tool M6313400.
      - remove the retainer ring (17).
      - push out the fixed annular gear (19).
      - remove the 'O' ring (9).
      - remove the pins (28).
      - remove the 'O' ring (20).
   15.11 Disassembly of the shaft spindle (18):
      - remove the retainer ring (45).
      - push out the shaft spindle (18) and remove the coupling sleeve (51).
   15.12 Remove the retainer ring (48).
   15.13 Remove the bearing (52).

Inspection

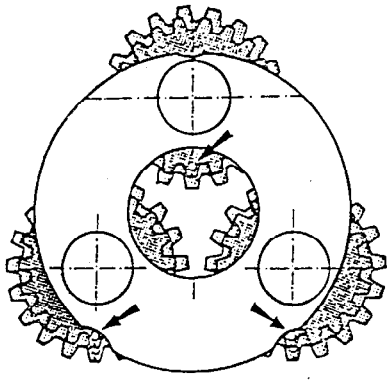
1. Inspect all gears for worn, cracked, or broken teeth.
2. Inspect all bushings for wear, scoring, or galling.
3. Inspect all bearings for play, distorded races, pitting and roller or ball wear or damage. Inspect bearings for freedom of rotation.
4. Inspect shafts for ridges caused by wear. If ridges caused by wear are apparent on shafts, replace the shaft. Inspect all surfaces on which oil seal lips seat. These surfaces must be very smooth to prevent damage to the seal lip.
5. Inspect all threaded items and replace those having damaged threads.
6. 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.
7. Smooth out all nicks, burrs, or galled spots on shafts, bores, pins, or bushings.
8. Examine all gear teeth carefully, and remove nicks or burrs.

9. Polish the edges of all shaft shoulders to remove small nicks which may have been caused during handling.
10. Remove all nicks and burrs caused by lockwashers.
11. Replace all gaskets, oil seals, and 'O' rings any time the winch is disassembled for repair.
12. Inspect drum bushings (47) for wear, if thickness is less than 0.039 in. (1 mm), replace drum bushings.
13. Inspect brake discs (21 and 22) for wear, if thickness less than 0.354 in. (9 mm), replace them.

Winch Assembly
Assembly of the gear box is the same as disassembly in opposite order.

⚠ CAUTION

• For correct assembly of planet gears, each planet gear must be positioned with the timing mark as shown on drawing D6310013.



(Dwg. D6310013)

1. After assembly of satellite support (54) with the fixed annular gear (19) and the shaft spindle (18) , check for good indexing of planet gears and repeat the above operation if necessary.
2. Stop ring (23) assembly:
   2.1 On the face of the stop ring (23) which makes contact with the gear box (53) apply a bead of Loctite ® instajoint No. 574 around the fixing holes and the external diameter.
3. Oil seal (36) assembly:
   3.1 Clean the mounting flange (32) bore and apply a bead of Loctite ® No. 460 on the backside of the oil seal. Install oil seal.
4. Drum bushing (47) assembly:
   4.1 Scrape old Loctite ® from the drum bushing bore and apply a bead of Loctite ® 406 on the smooth face of drum bushings (47).
   4.2 Install drum bushing in drum bushing bore by taking care to adjust the gaps of the drum bushings to 3.9 ins. (100 mm) do not allow any clearance between drum bushings and drum.
   4.3 Lubricate drum bushings with grease.
   4.4 Install the drum on the gear box assembly.
   4.5 Lift out the drum to check for good positioning of drum bushings.

NOTICE

• Periodic lubrication of drum bushings can be done by applying grease through nipple (28) at the bottom of motor casing.

Carefully clean exhaust washers (66)with petroleum and compressed air.
Fill up the gear box with oil SAE 80W90
kinematic viscosity 145 mm^2/s at 40°C (104°F)
capacity of gear box : 0.13 gall (0.5 Ltrs)

Control Valve Disassembly (ref. Dwg. D6310006)

1. Remove screws (10) and lock washers (11).
2. Remove the valve assembly from the motor.
3. Tap out the pin (8).
4. Extract the control lever (1).
5. Remove screws (7).
6. Remove stop (9).
7. Remove the return spring (4).
8. Pull out the rotary valve (6).

NOTICE

• Localize the mounting position of the rotary valve in the valve housing.

9. Remove 'O' ring (5).

Inspection
Worn or damaged parts must be replaced, polish the edges of rotary valve to remove small nicks if necessary.

Control Valve Assembly
Assembly of control valve is the same as disassembly in opposite order.

NOTICE

• Mounting of rotary valve must be done carefully to avoid damage. Lubricate rotary valve before assembly.

Lubricate spring (4).
Screws (7) must be installed with Loctite ® No. 243.

Air Gear Motor Removal (ref. Dwg. D6310005)
1. Stand winch in a vertical position on the rear end cover.
2. Remove the 4 screws which secure the motor to the mounting flange.
3. Remove motor and control valve assembly.
4. Remove the 4 screws which secure the control valve to the motor and remove the control valve.

Air Gear Motor Disassembly
1. Remove the screws (1) and lock washers (2).
2. Remove the motor housing (27).
3. Remove the 'O' ring (16).
4. Remove the gasket (15).

5. Remove screws (26).
6. Remove the motor cover (14).
   - remove the 'O' rings (9).
   - remove the exhaust washer (7) and the plug (8).
   - remove the needle bearings (5 and 11) if they have to be changed.
   - remove pins (3).
7. Immobilize the motor rotors with an pin between the teeth and remove nuts (18 and 23).
8. Remove the motor rotors (13 and 4) .
   - remove the shaft segment (6) and the internal ring.
9. Remove the screw (21) and the washer (20).
10. Remove ball bearings (17 and 24).
11. Remove the spacer (12).
12. Remove the stopper (25), the spring (19) and the rear stop (22).

Inspection
- inspect gears and remove nicks or burrs
- inspect and replace bearings if necessary
- inspect motor body and smooth out all nicks or burrs
- inspect the valve and smooth out all nicks or burrs

Air Gear Motor Assembly
Assembly of motor is the same as disassembly in opposite order.

NOTICE

• To correctly assemble the exhaust washer, spacer, valve and the spring, carefully follow instructions:

- Take the motor body and put it in the same position as mounting on the winch and view from the backside of the motor body, stopper, spring, valve and the spacer must be mounted in the left bore. Check for good functioning of the valve.

- The exhaust washer must be mounted on the same side as the valve in the left bore.

- Before assembly lubricate bearing with grade 2 grease.

- Install ball bearings so markings on bearing remain visable.

- After assembly of the air motor, it must turn smothly in both direction.

- The screws (21 and 26) the nuts (18 and 23) must be secured with LOCTITE ® 243, secure the nuts with a center punch.

Valve Disassembly Optional Remote Control
(ref. Dwg. D6310026)

1. Remove screws (3).
2. Remove the valve assembly from the motor.
3. Remove the cover (4) from the valve body (10).

NOTICE

• The cover (4) has been installed with Loctite ® instajoint No. 574.

4. Remove screws (1) and lock washers (2)
5. Remove the end caps (7) and and the rear stops (8).
6. Remove the slide valves (9) and return spring (5).
   6.1 Remove the quad rings (12).
7. Remove the quad rings (6) from the valve body.

Valve Assembly Optional Remote Control
Assemby of optional valve assembly is the same as disassembly in opposite order.

NOTICE

• Screws (3) must be secured with Loctite ® No. 243.

Pendant Control Disassembly (Ref. Dwg. D6310027)
1. Remove the male fittings (1) and the ring (9).
2. Remove the retainer ring (2).
3. Put out the rear covers (4) with the 'O' ring (5).
4. Remove the springs (3).
5. Remove the "slide valve assemblies" (6) with the quad ring (8).
6. Remove the springs (7).
7. Remove the valve cone assemblies (10).
8. Remove the screws (12).
9. Take out the pin (11) in order to remove the levers (13).

Pendant Control Assembly (ref. Dwg. D6310027)
1. Assembly of the pendant control is the same as disassembly in opposite order.
2. Adjustment
   2.1 Connect the inlet of the pendant to 100 psi (7 bar) pressure air supply.
   2.2 Connect a manometer at the outlet of the lever to be adjusted.
   2.3 Put some Loctite ® No. 243 on the adjustment screw.
   2.4 Tighten the adjustment screw to obtain a pressure of 15 psi (1 bar) without actioning the lever.
   2.5 Release the adjustment screw by a half turn (pressure must fall down to zero).
   2.6 Push the lever.
   Check that pressure reaches $93^{\pm 7}$ psi ($6.5^{\pm 0.5}$ bar).
   Check that there is no leak at exhaust.
   2.7 Release the lever, exhaust must occur by rapid pressure reduction.
   2.8 Repeat operations "2.6 and 2.7" from 2 to 3 times.
   2.9 Disconnect the manometer. Check that there is no leak when the lever is not actuated.
   2.10 Repeat the operations from 2.1 to 2.9 with each lever.

Testing

Operational Tests

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

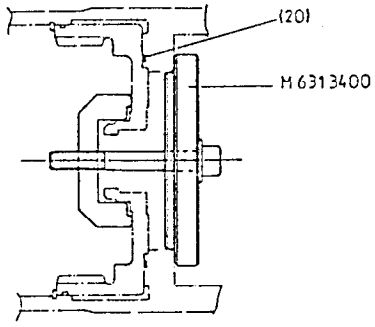
1. Operate winch in both directions with no load.
2. Check operation of free wheel and brake.
3. Check operation of limit switches and other safety devices when provided.
4. Check all winch mounting bolts are secure.

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 the operation and service of this winch, and a written report furnished confirming the rating of the winch. Test loads shall not be more than 125% of the rated line pull.

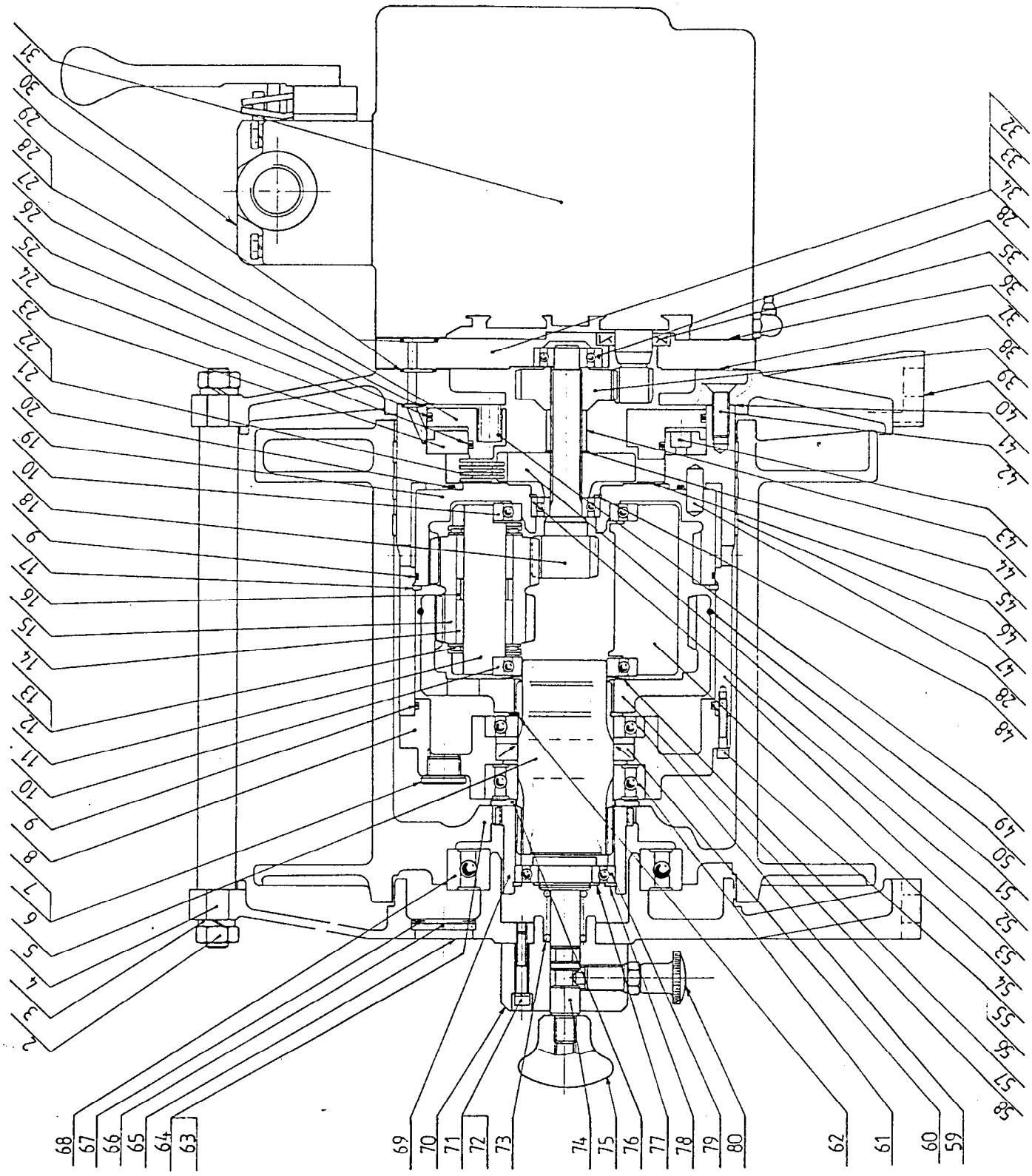
ACCESSORIES

Tooling installation M6313400
(Dwg. D6310031)



SERVICE NOTES

WINCH ASSEMBLY DRAWING



(Dwg. D6310008 A)

WINCH ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
2	Nut	6	4300-0211
3	Lock washer	6	4520-0010
4	Tie rod spacer (14-3/16 in. lg drum)	3	9631-0052
	Tie rod spacer (7-1/16 in. lg drum)		9631-0008
5	Output shaft	1	9631-0026
• 6	Plug	2	6511-9732
7	Copper joint	2	5840-3431
8	Gear box cover	1	9631-0005
• 9	'O' ring	2	5823-1129
10	Bearing	2	5080-0008
11	Satellite axle	3	9620-0060
12	Bearing stud	6	5605-3520
13	Stop ring	6	5731-9832
14	Needle bearing	6	5650-2620
15	Satellite	3	9620-0075
16	Spacer	3	9619-0024
• 17	Retainer ring	1	4784-7832
18	Shaft spindle	1	9631-0009
19	Fixed annular gear	1	9620-0030
• 20	'O' ring	1	5821-0929
21	Friction disc	4	6305-9932
22	Steel disc	3	6306-0032
23	Stop ring	1	9631-0072
• 24	'O' ring	1	5823-0929
• 25	'O' ring	1	5821-2829
• 26	'O' ring	1	5821-2529
27	Brake piston	1	9631-0073
28	Pin	8	4600-0416
• 29	'O' ring	2	5822-6629
30	Air control valve	1	
31	Air gear motor	1	
32	Flange	1	9631-0074
33	Screw	4	4130-0206
34	Plug	1	6517-2032
35	Bearing	1	5010-0001
• 36	Oil seal	1	5802-0030
• 37	Gasket	1	9631-0076
• 38	Gasket	1	9631-0046
39	Gear wheel	1	9631-0069
40	Front end cover	1	9631-0002
• 41	Gasket	1	9631-0077
42	Screw	6	4110-2203
43	Screw	3	4131-6706
44	Spacer	1	9631-0075
• 45	Retainer ring	1	4770-0015
■ 46	Stop Ring	1	9631-0071
47	Bushing	3	9631-0014
• 48	Retainer ring	1	4770-3032
49	Spring	11	6916-5532

■ Item cancelled from Serial number: 93-07-09

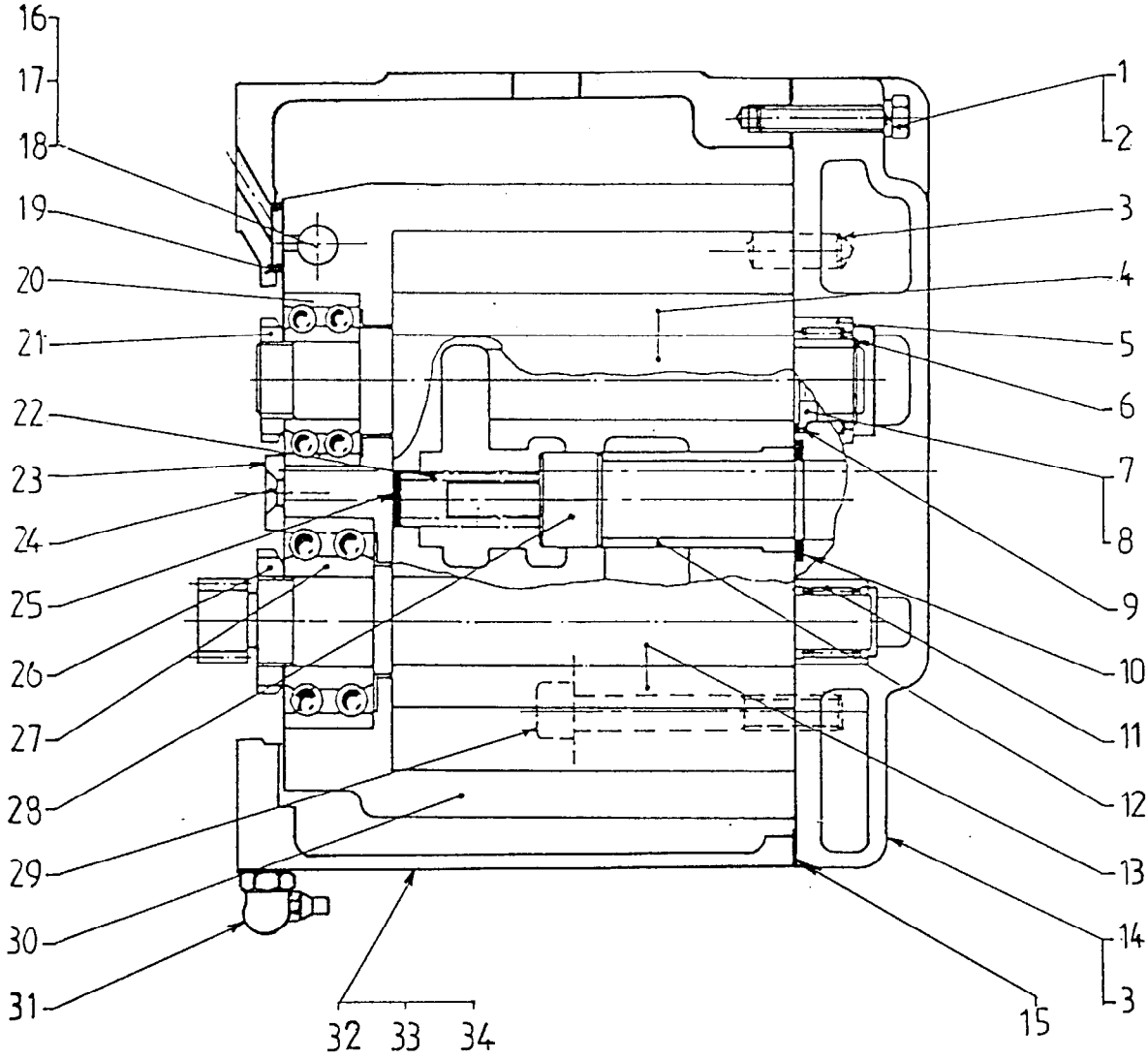
WINCH ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
• 50	'O' ring	1	5820-7129
51	Coupling sleeve	1	9631-0070
52	Bearing	1	5000-0002
53	Gear box	1	9631-0004
54	Satellite support	1	9620-0010
55	Screw	6	4131-1106
56	Lock washer	6	4520-0004
57	Spring washer	1	6917-2132
58	Output annular gear	1	9620-0031
59	Bearing	1	5080-0009
• 60	Oil seal	1	5801-2130
61	Bearing	1	5005-0009
62	Retainer ring	1	4770-0045
63	Wipe rope wedge	1	9631-0023
64	Drum (14-3/16 in. long 360 mm)	1	9631-0051
	Drum (7-1/16 in. long 180 mm)		9631-0028
65	Rear end-cover	1	9631-0027
• 66	Exhaust washer	9	6760-0303
• 67	Ring	9	4780-0639
68	Bearing	1	5005-0014
69	Clutch	1	9631-0029
70	Plunger body	1	9618-0060
71	Screw	3	4130-7906
72	Washer	3	4520-0005
73	Spring	1	6918-8932
74	Axle (drum long 14-3/16 in.360 mm)	1	9631-0053
	Axle (drum long 7-1/16 in. 180 mm)		9631-0037
75	Handle	1	6956-6232
76	Spacer	1	9631-0007
77	Retainer ring	1	4770-0025
78	Retainer ring	1	4770-3047
79	Bearing	1	5080-0005
80	Plunger	1	6628-8132
81*	Drum guard (14-3/16 in. long drum)	1	7631-0010
	Drum guard (7-1/16 in. long drum)		7631-0009
82*	Steel lubricator 3/4" BSP	1	7397-1909
83*	Steel air filter 3/4" BSP	1	7428-2079
84*	Filter - Lubricator (F.L.) 3/4" BSP	1	7999-0067
85*	Filter - Regulator - Lubricator (F.R.L.) 3/4" BSP	1	7999-0066
86*	Galvanized wire rope • 9 mm Ø - Break load 7330 kg - Per m.	1	6972-0009
87*	• 10 mm Ø - Break load 9070 kg - Per m.	1	6972-0010
88*	• 10 mm Ø - Break load 9800 kg - Per m.	1	6975-0010
89*	Thimble mount on rope	1	6972-9999
90*	Hook mounted on thimble	1	6972-9998
91	Warning tag	1	7106-0529
92	Nameplate	1	7106-7003
93	IR Logo	1	7110-6322

• Recommended spare

* Optional parts and accessories not shown on drawing

AIR GEAR MOTOR ASSEMBLY DRAWING



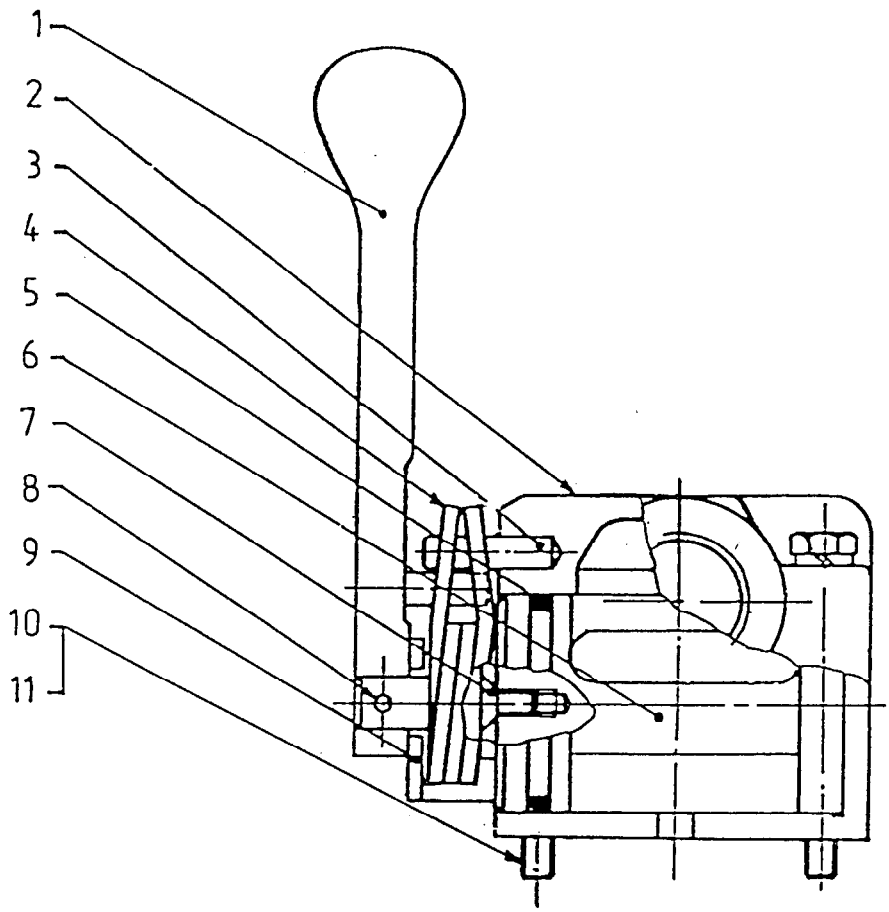
(Dwg. D6310005B)

AIR GEAR MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
1	Screw	5	4101-9001
2	Lock washer	5	4520-0006
3	Pin	4	4600-0416
4	Repulsion rotor	1	9620-0026
5	Bearing	1	5646-2813
• 6	Shaft segment	1	4783-6732
7	Exhaust washer	1	9620-0045
8	Plug	1	9631-0049
• 9	'O' ring	2	5822-5929
10	Rear stop	2	9620-0069
11	Bearing	1	5649-2213
12	Spacer	1	9631-0018
13	Motor rotor assembly	1	9620-0093
14	Motor cover	1	9631-0042
• 15	Gasket	1	9631-0045
16	Selector Stop	1	9609-0223
• 17	Ball	1	6940-1625
• 18	'O' ring	1	5821-2229
• 19	'O' ring	1	5822-1729
20	Bearing	1	5060-0003
• 21	Nut	1	5700-0003
22	Spring	1	6914-3932
23	Washer	1	9631-0054
24	Screw	1	4110-3403
25	Rear stop	1	9412-0030
• 26	Nut	1	5700-0004
27	Bearing	1	5060-0004
28	Stopper	1	9631-0017
29	Screw	4	4130-2206
30	Motor housing	1	9620-0008
31	Grease nipple	1	6710-2227
32	Motor housing	1	9631-0078
33	Screw	4	4100-0101
34	Lock washer	4	4520-0006

[•] Recommended spare

CONTROL VALVE ASSEMBLY DRAWING AND PARTS LIST

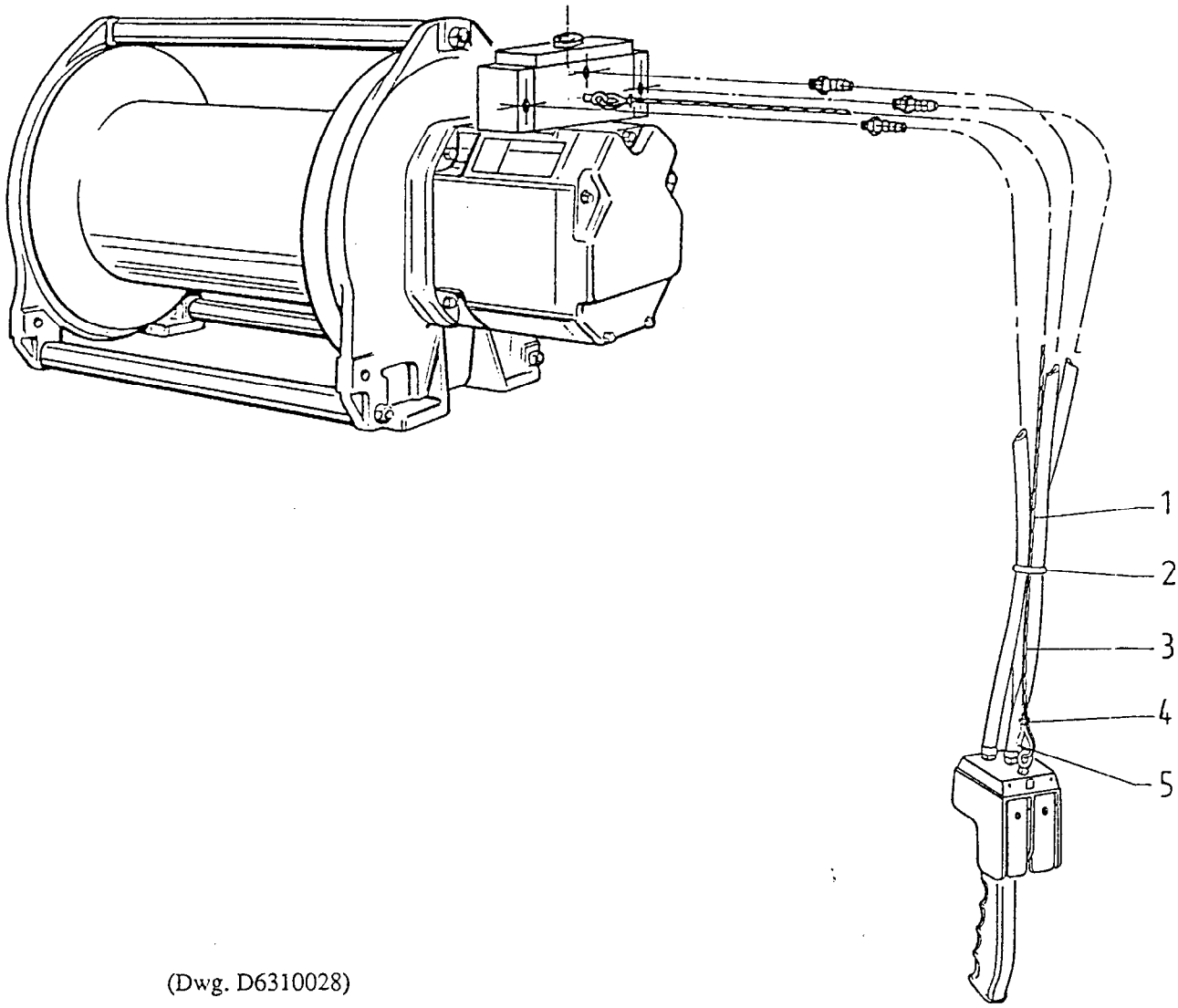


(Dwg. D6310006)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
1	Control lever	1	9618-0031
2	Valve housing	1	9631-0021
3	Pin	2	4600-1216
4	Return spring	1	9618-0035
• 5	'O' ring	1	5821-0229
• 6	Rotary valve	1	9631-0022
7	Screw	2	4110-3403
8	Pin	1	4650-7220
9	Stop	1	9618-0034
10	Screw HM	4	4101-6601
11	Lock washer	4	4520-0006

• Recommended spare

OPTIONAL CONTROL ASSEMBLY DRAWINGS AND PARTS LIST

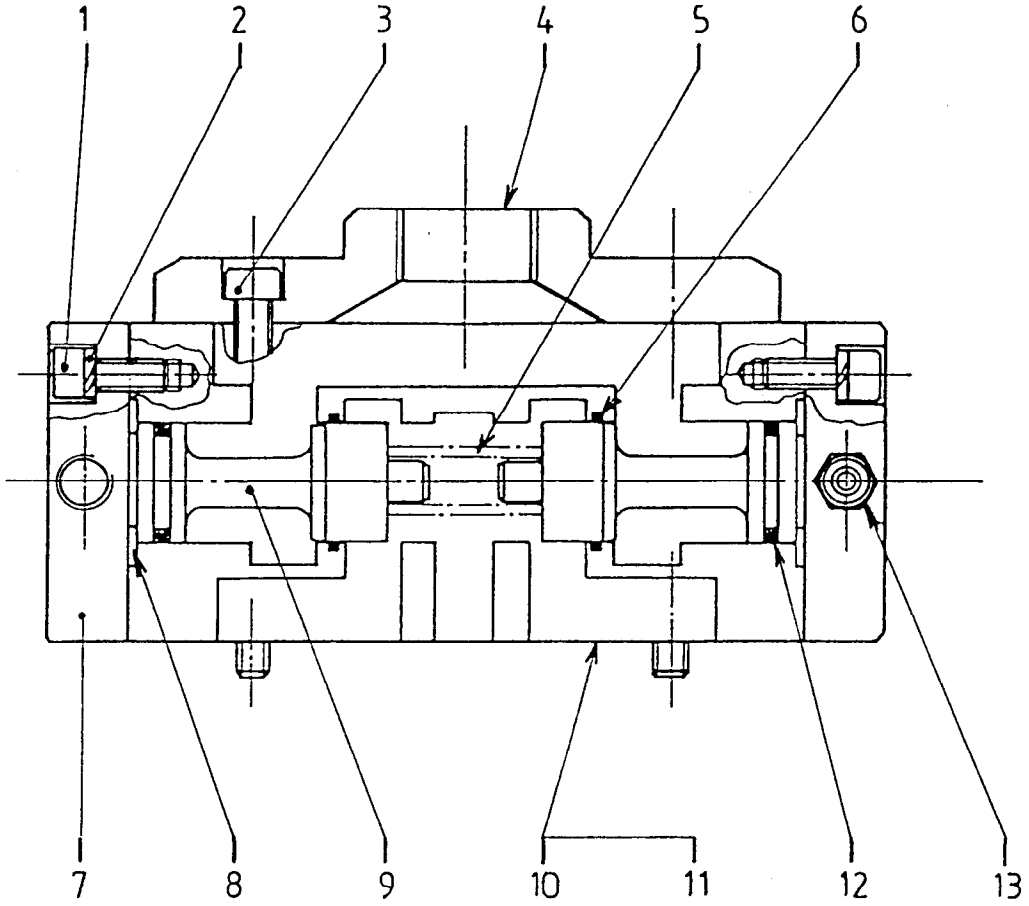


(Dwg. D6310028)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
1	Hose	* 1,1	6802-4232
2	Clamp collar	* 1	6112-5132
3	Rope	* 0,35	6972-0004
4	Clamp collar	4	6112-5032
5	Thimble	2	6932-5332

* Quantity to be multiplied by the number of feet of remote control

OPTIONAL VALVE ASSEMBLY DRAWING AND PARTS LIST

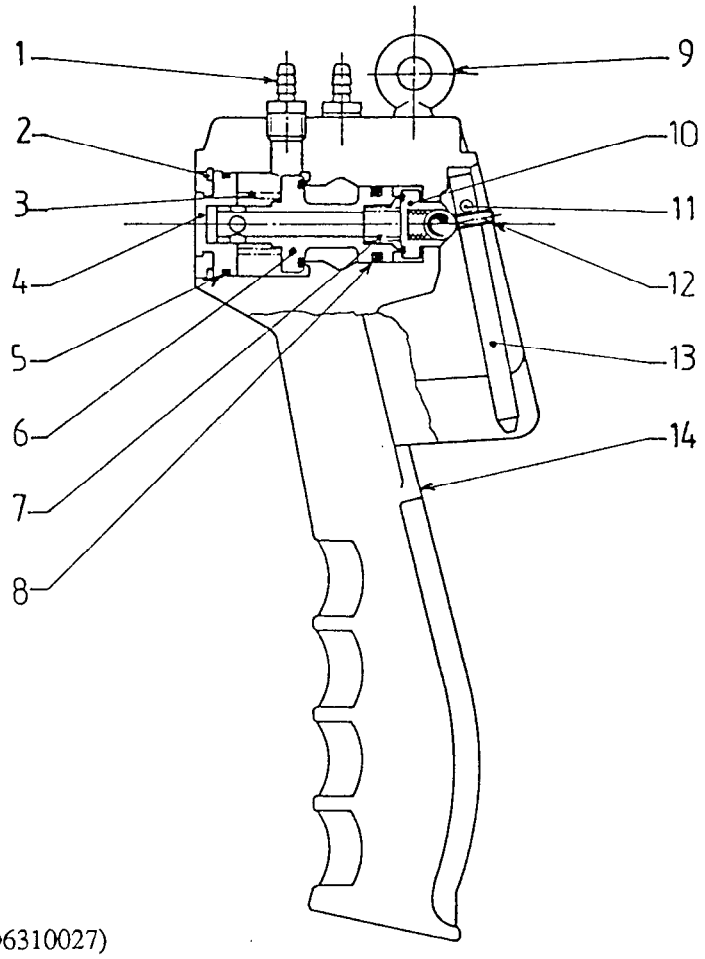


(Dwg. D6310026)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
1	Screw	8	4130-0206
2	Lock washer	8	4520-0006
3	Screw	4	4130-5906
4	Cover	1	9617-0050
5	Return spring	1	9412-0289
• 6	Quad ring	2	5823-2429
7	End cap	2	9617-0049
8	Rear stop	2	9412-0031
9	Slide valve	2	9617-0047
10	Valve body	1	9617-0046
11	Ring	1	6422-2332
• 12	Quad ring	2	5822-9029
13	Fitting	3	6165-2632

• Recommended spare

PENDANT CONTROL ASSEMBLY DRAWING AND PARTS LIST



(Dwg. D6310027)

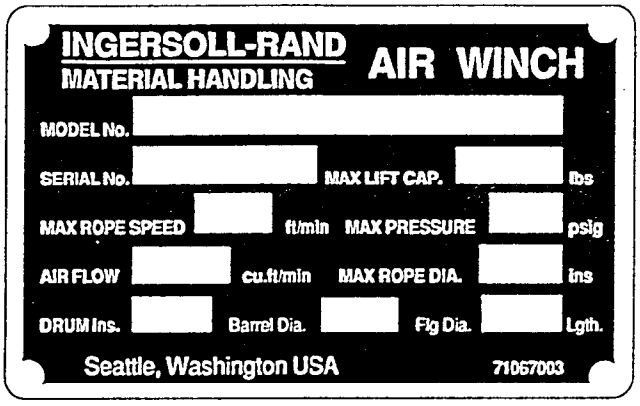
ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.
1	Fitting	3	6165-2632
2	Retainer ring	2	4770-3028
3	Spring	2	6915-8732
4	Rear cover (aluminium version)	2	9579-0037
	Rear cover (bronze version)	2	9579-005
• 5	'O' ring	2	5820-3729
• 6	Sfide valve assy (aluminium version)	2	9579-0035
	Side valve assy (bronze version)	2	9579-0051
7	Spring	2	6915-8632
• 8	Quad ring	2	5823-0229
9	Ring	1	6422-2332
• 10	Valve cone assy (aluminium version)	2	9579-0036
	Valve cone assy (bronze version)	2	9579-0052
11	Pin	1	9579-0040
12	Screw	2	4200-7407
13	Lever	2	9579-0038
14	Valve casing (aluminium version)	1	9579-0034
	Valve casing (bronze version)	1	9579-0050

• Piéce de rechange recommandée

PARTS ORDERING INFORMATION

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

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



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

Winch Model Number .....

Winch Serial Number .....

Date Purchased .....

Return Goods Policy

Ingersoll-Rand will not accept 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.

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

NOTICE

• Mineral based oils are recyclable, however, some oils such as glycols may be extremely toxic and must be identified and disposed of at an approved waste or disposal site in accordance with all local, state and federal laws and regulations.

HOIST AND WINCH LIMITED WARRANTY

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

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

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

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

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

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

IMPORTANT NOTICE

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

VISIBLE LOSS OR DAMAGE

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

CONCEALED LOSS OR DAMAGE

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

DAMAGE CLAIMS

You must file claims for damage with the carrier. It is the transportation company's responsibility to reimburse you for repair or replacement of goods damaged in shipment. Claims for loss or damage in shipment must not be deducted from the Ingersoll-Rand invoice, nor should payment of Ingersoll-Rand invoice be withheld awaiting adjustment of such claims as the carrier guarantees safe delivery. You may return products damaged in shipment to us for repair, which services will be for your account and form your basis for claim against the carrier.

United States Office Locations

For Order Entry and Order Status :

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

For Technical Support:

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

Regional Sales Offices

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

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

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

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

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

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

International

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

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

Canada
National Sales Office
Regional Warehouse
Toronto, Ontario
51 Worcester Road
Rexdale, Ontario
M9W 4K2
Phone: (416) 675-5611
Fax: (416) 675-6920
Order Desk
Fax: (416) 674-6549

Regional Sales Offices

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

Edmonton, Alberta
1340 Weber Center
5555 Calgary Trail N.W.
Edmonton, Alberta
T6H 5G8
Phone: (403) 438-5039
Fax: (403) 437-3145

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

British Columbia
201-6351 Westminster Hwy
Richmond, B.C.
V7C 5C7
Phone: (604) 278-0459
Fax: (604) 278-2519

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730 N.W. 107 Avenue
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33172-3107
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Ingersoll-Rand Equipements de production S.A
111, avenue Roger Salengro
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