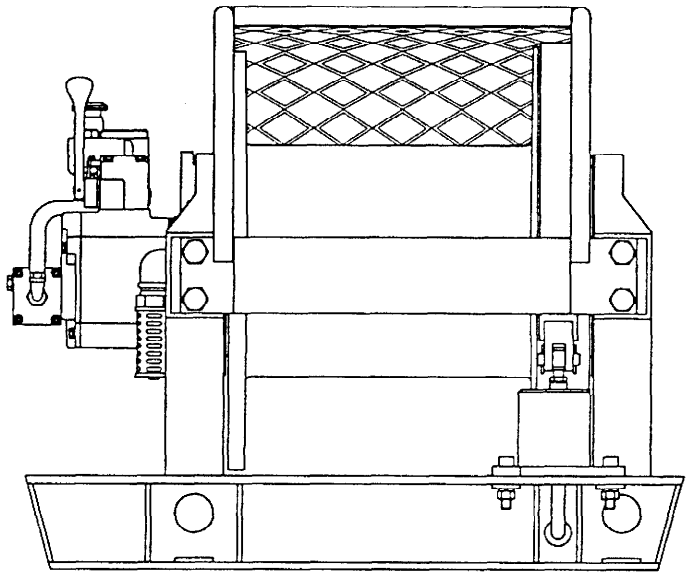
OPERATION AND MAINTENANCE MANUAL

FOR THE

AIR POWERED MAN-RIDING WINCH

LIFTSTAR 150 RLP



READ THIS MANUAL BEFORE USING THESE PRODUCT. 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 product.

WARNING

"As regards man-riding winches, it is the responsiblity of the owner or user of the winch to determine whether the winch conforms with local regulations for personel use"

Always operate, inspect and maintain this winch in accordance with National Standards Safety Code of the country where the material is used and respect the other applicable safety codes and particular regulations.

Refer all communications to the nearest IR/SAMIIA Material Handling Products Office or Distributor.

Form SAM0082
Edition 1
July 1995

INGERSOLL-RAND®
PRODUCTION EQUIPMENT

TABLE OF CONTENTS

SAFETY INFORMATION

This manual provides important **information for all personnel involved with the safe installation, operation and proper maintenance of this product.** Even if you feel you are familiar with this or similar equipment, **you must read understand this manual before operating the product.**
Training must be done by a qualified person to any personnel involved with an air powered man-riding winch

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

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

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

CAUTION Caution is used to indicate the presence of a hazard which *will* or *can* cause *minor* personnal 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.

CAUTION

"MAN-LIFTING with this winch is STRICTLY LIMITED to off-shore marine applications specifically approved by maritime regulatory bodies. Regulatory bodies, not manufacturer, have determined suitable use. DO NOT USE FOR MAN-LIFTING applications not specifically approved by regulatory bodies.

The use of a winch to lower, lift or suspend personnel should be permitted only when other means of reaching the worksite, such as ladders, stairways, aerial (bucket-type) lifts or scaffolds, are not feasible because of site conditions.

Presently *Man-Riding* winches are available built to specifications published by :
Det Norske Veritas : Winches type approved and/or certified by Det norske Veritas (DNV) to meet Norwegian Maritime Directorate (NMD) or Norwegian Petroleum Directorate (NPD) requirements.

In furnishing customers Man-Riding winches, Ingersoll-Rand does not warrant the suitability of these winches for any particular use. It is the owner and user's responsibility to determine the suitability of a Man-Riding winch for a particular application. Further, it is the owner and user's responsibility to check and satisfy all local, state, federal and country requirements pertaining to the lifting and lowering of persons.

WARNING

Many agencies require additional redundant safety devices on winches that IR/SAMIIA does not furnish. Additional devices are often required to bring the system up to elevator code standards.

Winches manufactured by IR/SAMIIA as an approved Man-Riding to DEn and/or NMD/NPD requirements are furnished with limitations ; approval for use in Man-Riding applications automatically terminates for any of the following reasons :

1 - Winch does not meet other applicable codes or standards.
2 - Winch is not part of an approved system.
3 - Winch is not properly maintained in a new condition with all parts intact and properly adjusted.
4 - Winch is used in applications not approved by codes and regulations, or applications inconsistent with manufacturer's operating and maintenance manual.
5 - Changes in DEn or NMD/NPD standards or regulations after Ingersoll-Rand's initial shipment of the product.
6 - More than one winch is used to attach to a common load.

WARNING

Be sure to check all regulations, local and country, that may apply to the use of a winch or winch system for lifting and lowering people before using a Man-Riding winch.

7 - The personel platform shall be designed by a properly qualified engineer competent in this area.

NOTICE

Using other than genuine IR/SAMIIA Material Handling parts will result in the void of warranty.

SAFE OPERATING INSTRUCTIONS

WARNING

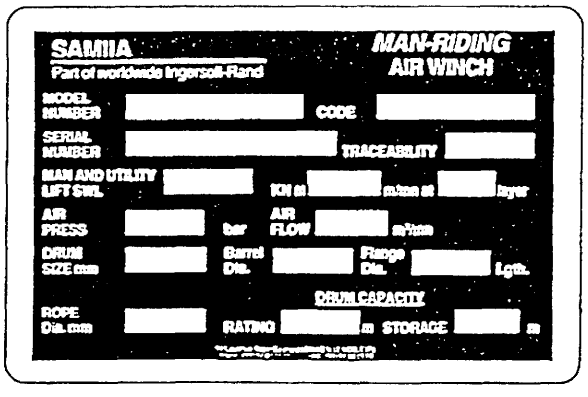
Failure to folow these rules will result in termination of all applicable warranties. IR/SAMIIA assumes no liability for any loss or damage resulting from operation of Man-Riding winches if these operating instructions are not followed.

1 - Winch operator must be in a position to always see the personnel from transfer point to landing area.
2 - Personnel operating the winch or being transferred are to have sufficient instruction/training concerning that operation before any movement takes place.
3 - Lifting and lowering of personnel should be carried out above the open sea whenever possible. All personnel should wear life jackets approved by the appropriate regulatory agency and a standby vessel should be in the vicinity of the transfer.
4 - Hoisting of personnel by means of a winch should only take place when other means of accomplishing this work are not practical.
5 - The winch installation must be specially arranged and accepted for personnel handling.
6 - Prior to any personnel movement, the entire system should be inspected by the person in charge. It is that individual's responsibility to instruct and appoint the winch operator.
7 - The lifting apparatus (basket, etc...) shall be inspected and certified for personnel lifting prior to use.
8 - Do not operate without a surveyor's site approval.
9 - Do not overload.
10 - Do not operate without testing. (See "Inspection and Testing" procedures)
11 - Do not operate winch in a damaged condition.
12 - Do not operate winch that has not been properly maintained or equipped.
13 - Do not attach winch to unsafe foundation. All bolts and foundations for winch attachment should have a higher load carrying capacity than the wire rope on the winch.
14 - Do not operate winch with any personnel near the line of force or capable of coming into contact with moving parts.
15 - All signs and warning notices must be posted permanently on the winch.
16 - Always maintain three or more wraps of wire rope on the drum.
17 - Never leave an unattended load suspended.
18 - Wire rope must spool off drum from the top away from the operator.

LABELLING - MARKING

The maximal lifting rated capacity of the winch is noticed on one part of the winch.

On every air powered man-riding winch a sheet is clinched as this model :



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

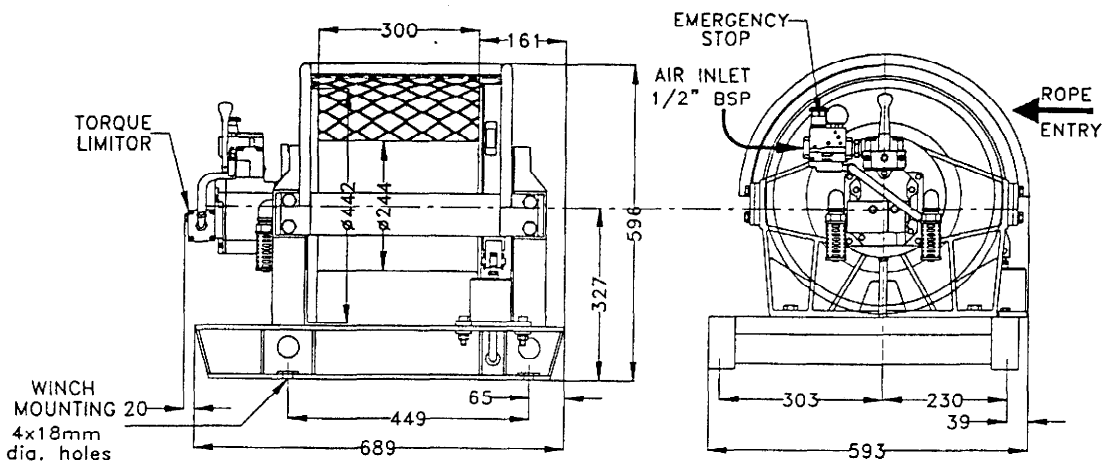
MAN-RIDING WINCH WARNING

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

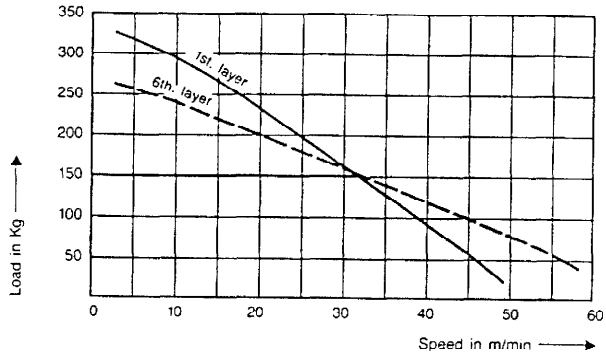
- Do not operate this winch before reading operation and maintenance manual.
- It is responsibility of the owner or user to determine whether the winch conforms with local regulations for personnel use
- Do not lift more than rated load
- Do not allow less than three wraps of wire rope to remain on drum at all times.
- Do not operate a damaged or malfunctioning winch.
- Do not remove or obscure warning labels

SAMIIA
Part of worldwide Ingersoll-Rand

SPECIFICATIONS



Performance at 6.3 bar - Rope 10 mm dia.



SPECIFICATIONS									
Rated working load - 6th layer (metric ton)						150			
Motor power (hp)						2			
Working pressure (bar)						6.3			
Average hoisting speed at rated load (m/min)						0 to 30			
Average lowering speed at rated load (m/min)						0 to 60			
Free air consumption (m³/min)						0 to 2.2			
Weight without rope (Kg)						250			
Recommended rope diameter (mm)						10			
Minimum breaking load (Kg)						1500			
CAPACITY (with 10 mm dia. rope)									
Number of layers	1	2	3	4	5	6	7	8	9
Capacity (m)	22	46	71	99	128	159	192	226	262

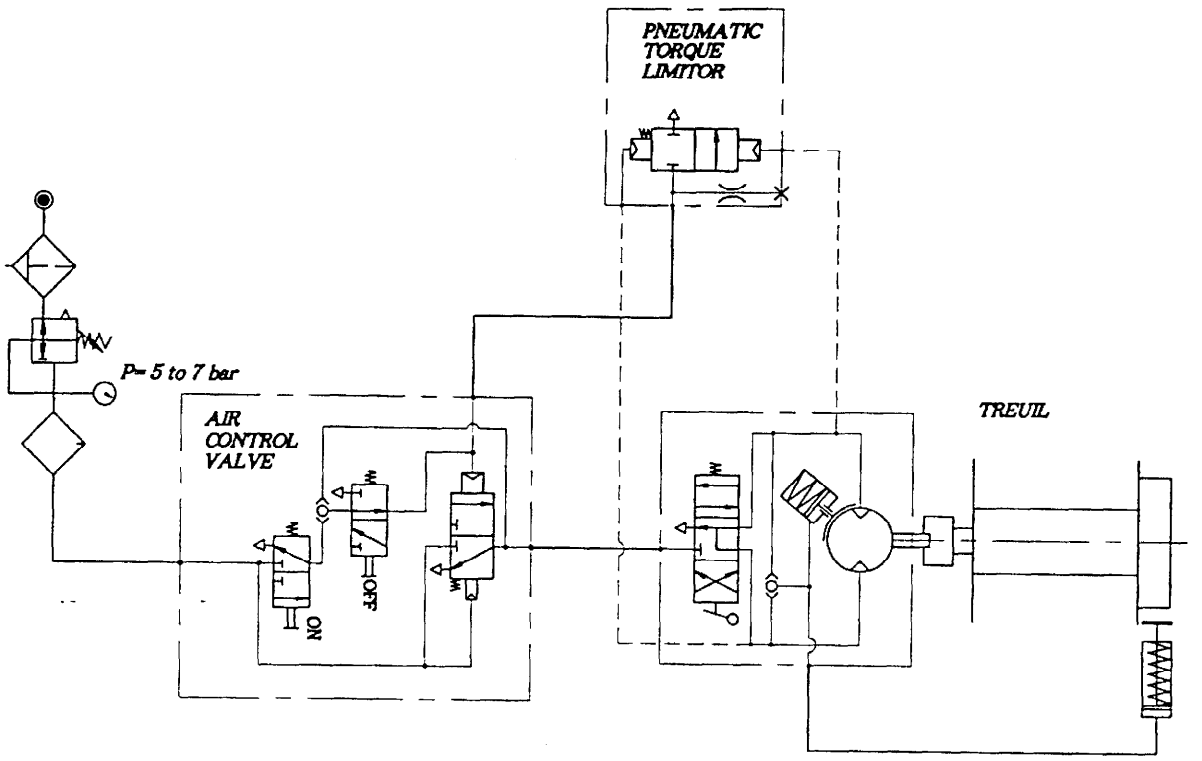
Rating limit

DESCRIPTION

The "Man-riding" winches have been designed and built for the "oil and offshore" industry and more specifically to conform with specifications asked for the Norwegian Oil Ministry and the British Department of Energy.
There are no norms for the use of "Man-riding" except those currently demanded by the offshore industry.
Thus it is the responsibility of the user to determine the adaptability of this material for specific use and to ensure that it conforms to any rules which may be applicable.

Nomenclature of winch : FEM 4 M (ISO M 7) - Safety load of stress FEM 2 (ISO L 2)
This winch is supplied with a Tracability list for the main parts which are under load together with a DNV "Type Approval Certificate" S-1024
Construction : the winch has 4 constituent parts designed for the most difficult tasks :
a) an engine block
b) a brake-control reducer block within the drum
c) a frame constructed mainly of two strutted flanges
d) a drum
Motor : Air motor with two ways of rotation
Reducer : rotary gear system with gears of specially treated high grade steel mounted on roller bearings.
Brake : disc in large oil bath ensuring constant control of the load when lowering. It works by decompression thus ensuring automatic function of the brake in case of air failure. This "wet brake" ensures a constant level of braking and is unaffected by exterior conditions.
Brake : direct on to a large drum ensuring constant control of the load while lifting or lowering. It works by decompression thus ensuring automatic function of the brake in case of air failure.
Drum : made of steel with cable fixing by a wedged box.
Frame : made of two strutted flanges.
Air supply to motor : by one hole ø 1/2" BSP located on the distributor
Control : the winch is controlled by a single lever on the winch distributor which allows any speed varifation determined by the operator. This lever returns automatically to zero thus stopping the load in the event of failure of the operator.
Chassis skid : made of welded steel with 4 x 18 diameter fixing holes and 4 x 40 diameter holes for handling.

AIR CONNECTION DRAWING



INSTALLATION

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

CAUTION

Owner and users are advised to examine specific, local or other regulations, which may apply to a particular type of use of this product before installing or putting winch to use.

Mounting

1 - If product 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.

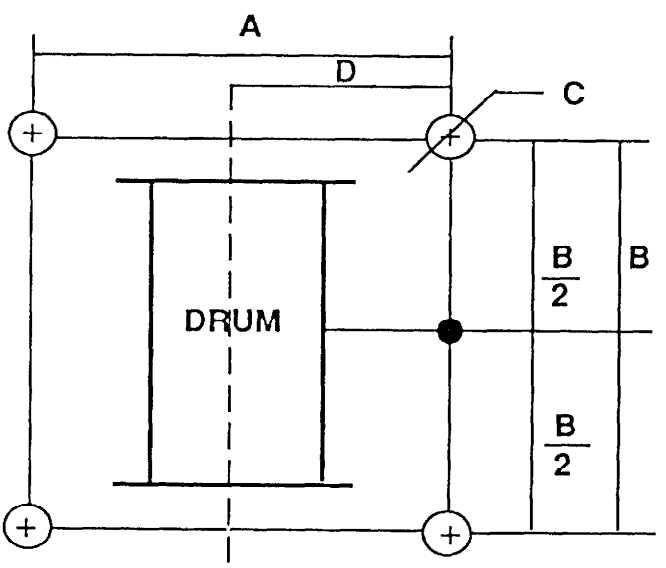
2 - Make sure the mounting surface is flat to within 1/32 inch (0,8 mm). Shim if necessary

3 - Mounting bolts must be 5/8 in. (16 mm) diameter, Grade 8.8 (classe 8.8) or better. Use self-locking nuts or nuts with lockwashers.

4 - Torque mounting bolts evenly.

5 - Maintain a fleet angle between the sheave and winch of no more than 1-1/2 degrees. For every inch of drum lengh, 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



(Dwg. D6150001)

Bolt Hole Dimensions (SKID FRAME)

"A" 29.99 in. (533 mm)
"B" 8,838 in. (224,5 mm)
"C" 0.71 in. (18 mm)
"D" 9.02 in. (229 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 overwind 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 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 3/8 in. (10 mm) imperative.

Installing Wire Rope

1 - Cut wire rope to length in accordance with the wire rope manufacturers 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 - Truck 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.

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 allow for uneven spooling and decrease in line pull capacity as the drum fills up, use as short a cable 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 manufacturers 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 must not have be smaller than 5/8" in. (15,9 mm) for flexible lines and 1/2" in. (12,7 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.

CAUTION

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

The air line lubricator should be replenished daily and set to provide 5 to 6 drops per minute of GRADE ISO68 oil (minimum viscosity 61,2 Cst at 40°C).

Motor

For optimum performance and maximum durability of parts, operate air motor at 90 PSI at 81 scfm (6,3 bar/630 kpa at 2,2 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.
a) When first running the motor some light oil should be injected into the inlet connection to allow good lubrication.
b) When first operating the winch it is recommended that the motor be driven slowly in both directions for a few minutes.

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

1 - Pour a small amount of gasoline fluid in the motor inlet port.
2 - Operate the motor fot 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 qualified people 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

"As regard manriding winches, it is responsibility of the owner or user of the winch to determine wether the winch conforms with local regulations for personnel use"

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.

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.

LUBRICATION

Wire rope
Refer the wire rope manufacturers recommendations. At a minimum observe the following :

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

CAUTION

- **Do not use an acid-based solvent 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
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 oil from the factory. Use only high quality lubricants in the reduction gear assembly such as high grade EP type oil or their equivalents. Fill the reduction gear assembly until the working rim is covered.
Oil capacity : 3 litres.

Recommended oil :
GRADE SAE 80 W 90 - Kinematic
Viscosity : 145 mm2/s at 40°C

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.

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 qualified personnel. Careful inspection on a regular basis will reveal potentially dangerous conditions while still in the early stages, allowing corrective action to be taken before the condition becomes dangerous.
Any deficiency revealed through inspection must be reported to an appointed person. A determination must be made as to whether a deficiency constitutes a safety hazard before resuming operation of the 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 to authorized personnel.

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 wireis 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 return to neutral when released.

Periodic Inspection

Accordind to ANSI/ASME B30.7, frequency of periodic inspection depends on the severity of usage : NORMAL, yearly ; HEAVY, semiannually ; 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.

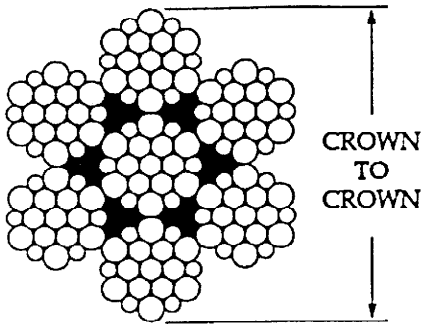
3 - DRUM AND SHEAVES. Check for damage or excessive wear. Replace if necessary.

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 rope diameter. Measure the diameter from crown-to-crown. If nominal diameter of wire rope has decreased more than 1/64 in. (0.4 mm) replace the wire rope.
(see Dwg.D6310012)



(Dwg D6310012)

7 - FOUNDATION. Check for the continued ability to sustain 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 semiannually in accordance with the requirements of "Frequent Inspection". If adnormal operating conditions apply, winches may require a more frequent inspection.

TROUBLESHOOTING

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

SYMPTOM	TROUBLE	POSSIBLE 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 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. Please contact your nearest IR/SAMIIA agent
	Brake is not releasing	Check brake release pilot hole is not restricted Check seals on cylinder piston are not damaged
	Insufficient air supply	Check air supply
	Air overload protection is disturbed or the using conditions of the winch are not respected	Check overload protection and make its adjustment if necessary. See "MAINTENANCE" section
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.
	Worn or damaged motor.	Inspect motor. Please contact your nearest IR/SAMIIA agent.
	Improper lubrication or dirt building up in the motor	Lubricate as instructed under "LUBRICATION" if this does not help flush the motor as instructed in the "INSTALLATION" Section
Motor does not operate smoothly		Inspect motor. Please contact your nearest IR/SAMIIA agent.

⚠ 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 qualified service presonnel 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.

Motor

Use the following procedure to remove the motor.

1. Disconnect and tag the air lines.
2. Position several blocks fo wood on the work bench and stand the winch in a vertical position with the motor end up. Make sure the weight of the winch does not rest on the free wheel handle or cause damage to the free wheel parts.
3. Remove the four capscrews which connect the air motor to the end bracket and remove the motor.

Brake

It is recommended that the brake assembly be removed for maintenance and inspection once each year.

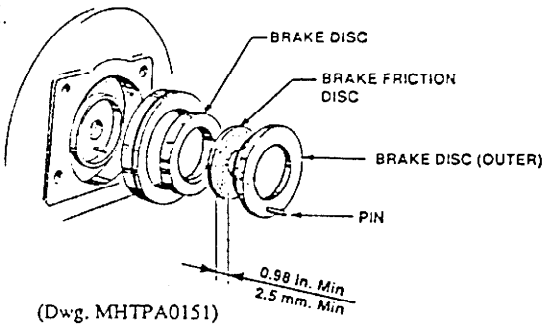
Adjustment

No brake adjustment is required.

Use the following procedure to remove the brake.

1. Disconnect and tag the air lines.
2. Set the winch in a vertical position with the motor end up.
3. Remove the four capscrews (34) which connect the air motor to the end bracket and remove the motor.
4. Remove the coupling sleeve (5), plate (26), brake disc (27) and cylinder piston (25).

No further disassembly is required if only the brake is to be serviced.



(Dwg. MHTPA0151)

(Dwg. D6180004)

Inspect the brake disc for wear. If brake disc thickness is less than 0.01 in. (2,5 mm) replace brake disc.

NOTICE

- **Original brake disc thickness is 0.126 in. (3,2 mm)**

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 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.

Winch disassembly

Direct Brake on Drum

1. Disassembly of band brake
   1.1 - Remove the nuts (16) on fixed point sides
   1.2 - Remove the pin (11) and expel the axle (5)
   1.3 - Remove the band brake (4)

2. Disassembly of the cylinder
   2.1 - Remove the screws (14) the wedgesbevel (12) the screws and washers (18 and 13)
   2.2 - Loosen the screw (15) and remove the eyelet screw (2)
   2.3 - Remove the screws (17) and strip down the cylinder bottom (3)
   2.4 - Strip down the piston (6) and the spring (7) and remove the joints (9 and 10)

⚠ CAUTION

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

1. Inspect all the axles. All external diameter damage require their replacement

2. Inspect the brake bands
   - nominal thickness of linings = 5 mm
   - Minimum thickness = 2 mm

If this dimension is lower, change the brake band Item 4

3. Inspect brake cylinder joints and the internal diameter surface condition of wrapper cylinder - replace them if necessary.

4. Check the spring condition Item 7 - If after a large period of use an important diminution of its efficiency is established, make its replacement.
   (F theoretical = 75 daN under deflection f = 48 mm)

Winch disassembly

1. Remove the four screws (13) see (dwg D6180016)
2. Remove the motor brake gear assembly and set to one side for further disassembly if needed.
   2.1 - Remove pinion (23) and toothed wheel (25)
3. Disassembly winch on skid frame
   3.1 - Remove nut (21), washer (20) and screws (19)
4. Remove screws (14) and washers (15) from distance piece (26)
   4.1 - Remove screws (16) and washers (15)
   4.2 - Remove front flage (9)
   4.3 - Strip down screws (7) and remove stop (8)
   4.4 - Remove front bearing (10)
   4.5 - If necessary,
   - Remove circlips (3) and (4)
   - Expel bearing (5) from rolling bearing (22) and front bearing (10)
   - Remove joint (6)
5. Dismantling of rear side of winch. Dismantling of rear side of winch is separate from the rest of the dismantling of the winch.
   5.1 - Remove screws (14) and washer (15) from distance piece (26)
   5.2 - Remove screws (16) and washers (15) from rear flange (8) and remove rear flange
   5.3 - Strip down the rear bearing (28)
   5.4 - Remove joint (35)
   5.5 - Remove ball bearing (34)
   5.6 - If necessary, remove screws (32) washers (33) blind washer (31)

Motor brake gear disassembly

Remove the four screws (2) (see dwg D6180017) which connect the control valve to the motor and remove control valve and o'ring set the control valve to one side for further disassembly if needed.

1. Remove the screws (7) and (9) (see dwg D6180018) which connect the air motor to the motor housing and remove the motor , joint (18)and o'ring (28). Set the motor to one side for further disassembly if needed.
2. Remove screws (16) and washers (17)
3. Remove motor housing (14), springs (26), joint (12), o'ring (31), coupling sleeve (22), needle bearing (24) and washer (19).
4. Remove the coupling sleeve (22), retainer ring (20), brake disc (25) and cylinder piston (33), o'ring (28).

Reduction Gear Assembly

Disassembly

1. Stand the reduction gear assembly in a vertical position so the output shaft is down.
2. Remove the capscrews (11)
3. Remove the flange (9) and 'O'ring (32)
4. Carefully for the reduction gear assembly oil into a suitable container.
5. Remove the drum shaft (7) from the gear housing by tapping gently a soft hammer on the shaft spindle (45).
6. If necessary remove bearing (34), oil seal (29) and fixed annular gear (4) from the drum shaft (7)
7. Remove the retainer ring (41)
8. Remove satellites support output annular gear end shaft spindle assembly, by tapping gently with a soft hammer on the output shaft (46).
9. Remove bearings (49, 44) and oil seal (50) from gear housing (51).
10. Remove the retainer rings (5, 47), the shaft spindle (45) and bearing (3)
11. Push out satellite axles (40) and remove satellites (37), bearings (39) and spacers (38).
12. Remove the retainer ring (41).
13. Remove the bearing (43) and output annular gear (2).

Cleaning, Inspection and Repair

Use the following procedures to clean, inspect, and repair the components of the winch.

Cleaning

⚠ CAUTION

• A bearing that appears loose or rotates roughly must be replaced. Failure to observe this precaution will result in bearing and/or winch component damage.

Clean all winch component parts in solvent (except for the brake friction disc). The use of a stiff bristle brush will facilitate the removal of accumulated dirt and sediments in the drum and reduction assembly. Dry each part using low pressure, filtered compressed air. Clean the brake friction disc using a wire brush or emery cloth. Do not wash the brake friction disc in liquid. If the brake friction discs are oil soaked, they must be replaced.

Inspection

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

1. Inspect all gears for worn, cracked, or broken teeth.
2. Inspect all bushings for wear, scoring, or galling.
3. Inspect 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 the brake stationary plates and friction disc for oil. If the friction discs have become oil-soaked, replace them. If the stationary plates have become glazed, sand them lightly using fine emery cloth and a flat surface as backing. Inspect the remaining brake parts for warpage or other damage, and replace damaged parts as necessary. Replace the input pinion shaft oil seal.

Measure the thickness of the brake friction disc. The brake friction disc must show an even wear pattern. If the brake friction disc is 0.01 in. (2,5 mm) or less, replace the disc.

Inspect drum bushings (47) for wear, if thickness is less than 0.039 in. (1 mm), replace drum bushings.

Repair

Actual repairs are limited to the removal of small burrs and other minor surface imperfections from gears and shafts. Use a fine stone or emery cloth for this work. Do not use steel wool.

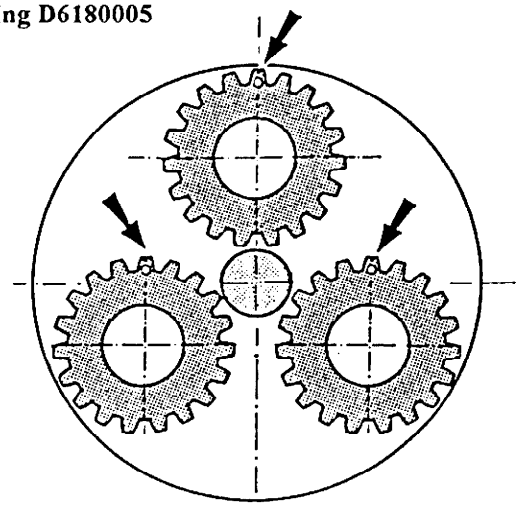
1. Worn or damaged parts must be replaced. Refer to the applicable Parts Listing for specific replacement parts information.
2. Inspect all remaining parts for evidence of damage. Replace or repair any part which is in questionable condition. The cost of the part is often minor in comparison with the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

Winch Assembly

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

⚠ CAUTION

• For assembly of planet gears, each planet gear must be positioned with the timing mark as shown on drawing D6180005



(Dwg. D6180005)

1. After assembly of satellite support (2) with the output annular gear (42) and the shaft spindle (45), check for good indexing of planet gears and repeat the above operation if necessary.
2. When reassembling the motor on the winch beware of the positionning of the coupling sleeve and the pin (27)
   - position the ring (19) with the pin at the bottom.
   - mount the motor housing assembly without the spring.
   - Remove the motor housing assembly.
   - Put the spring in their housing.
   - Reassemble the motor housing assembly with springs.
   - Check for correct assembly by compressing the springs.
   - Screws (11 and 13) will be fixed and tightened with blue Loctite ® 243.
   - Screws (16) from front flange (9) will have to be tightened with 4.83 mkg torque. (see Dwg D6150020)
   - Screws (14) from distance piece (26), will have to be tightened to torque 4,83 mkg only after winch has been put on skid frame. (see Dwg D6150020).

NOTICE

• Periodic lubrication of drum bushings can be done by grease nipple on the front end-cover

Carefully clean disc (25) with petroleum and compressed air.

Fill up the gear box with oil SAE 80W90
kinematic viscosity 145 mm²/s at 40°C (104°F)
capacity of gear box

Control Valve Disassembly (ref. Dwg. D6180017)

1. Remove screws (2) and lock washers (3).
2. Remove the valve assembly from the motor.
3. Tap out the pin (10).
4. Extract the control lever (7).

5. Remove screws (4).
6. Remove stop (11).
7. Remove the spring (8).
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 (8).
Screws (4) must be secured with Loctite ® No. 243.

Air Gear Motor removal (ref. Dwg. D6180018)
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 (7) (9)and lock washers (6).
2. Remove the motor.
   2.1 - Remove the gaskets (5).
3. Remove screws (18).
4. Remove the motor cover (8). If necessary, remove bearings (10), 'O' rings (15-16) and pins (2).
5. Remove the motor housing (3) ; remove the distance tube (14), stopper (13), spring (20), rear stops (21) and the 'O' rings (19).
6. Immobilize the motor rotors with an axle between the teeth and remove nuts (24).
7. Remove the motor rotors (4, 17) ; remove the shaft segments (11) and internal ring.
8. Remove the screw (22) and the washer (23).
9. Remove ball bearings (25).

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 smoth and all nicks or burrs

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

NOTICE

- Before assembly lubricate bearing with grade 2 grease.

- After mounting of ball bearings, the marking of this bearings must appear.

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

- The screws (18) the nuts (24) must be secured with Loctite ® 243.

Drum brake assembly

1. Assembly of pressure cylinder
   1.1 - The reassembling of the pressure cylinder has to be carried out in the opposite direction to the one used for dismantling.

NB :- the cylinder bottom (3) will made by « LOCTITE FREIN FILET 243 »
- before closing the brake cylinder, full in the spring housing will oil SP 150 type (about 25 ml)

2. Assembly of band brake
   Reassembly will have to be carried out in the opposite direction to the one used for dismantling

NB : Grease all axles

3. Adjusting of band brake
   The adjusting dimensions are pointed out on the winch assembly drawing.
   - dimension 7 mm has to be adjusted before mounting of the brake band (4) on the eye screw (2)
   - dimension 20 mm is adjusted by tightening the nut (16) after having unscrew the counternuts (15)

(Dwg. D6150003)

4. Connect all air hoses as described in pneumatic sheme.

TESTS

Testing

Operational Tests

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

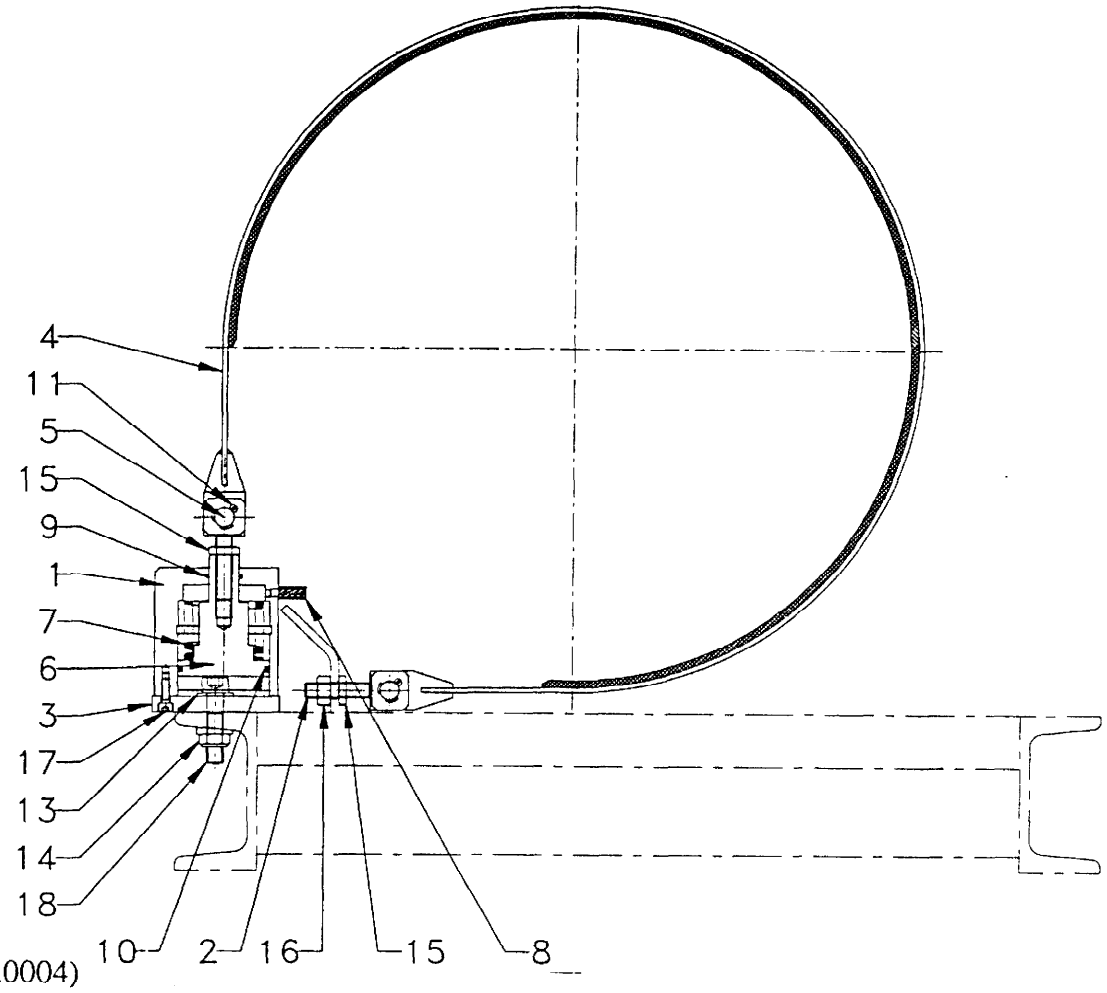
1 - Operate winch in both directions with no load.
2 - Check operation of free wheel and brake.
3 - Check operation of limit switches and other safety devices when provided.
4 - Check all winch mounting bolts are secure.

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 be more than 125 % of the rated line pull.

NOTES

EXTERNAL BAND BRAKE DRAWING AND PART LIST

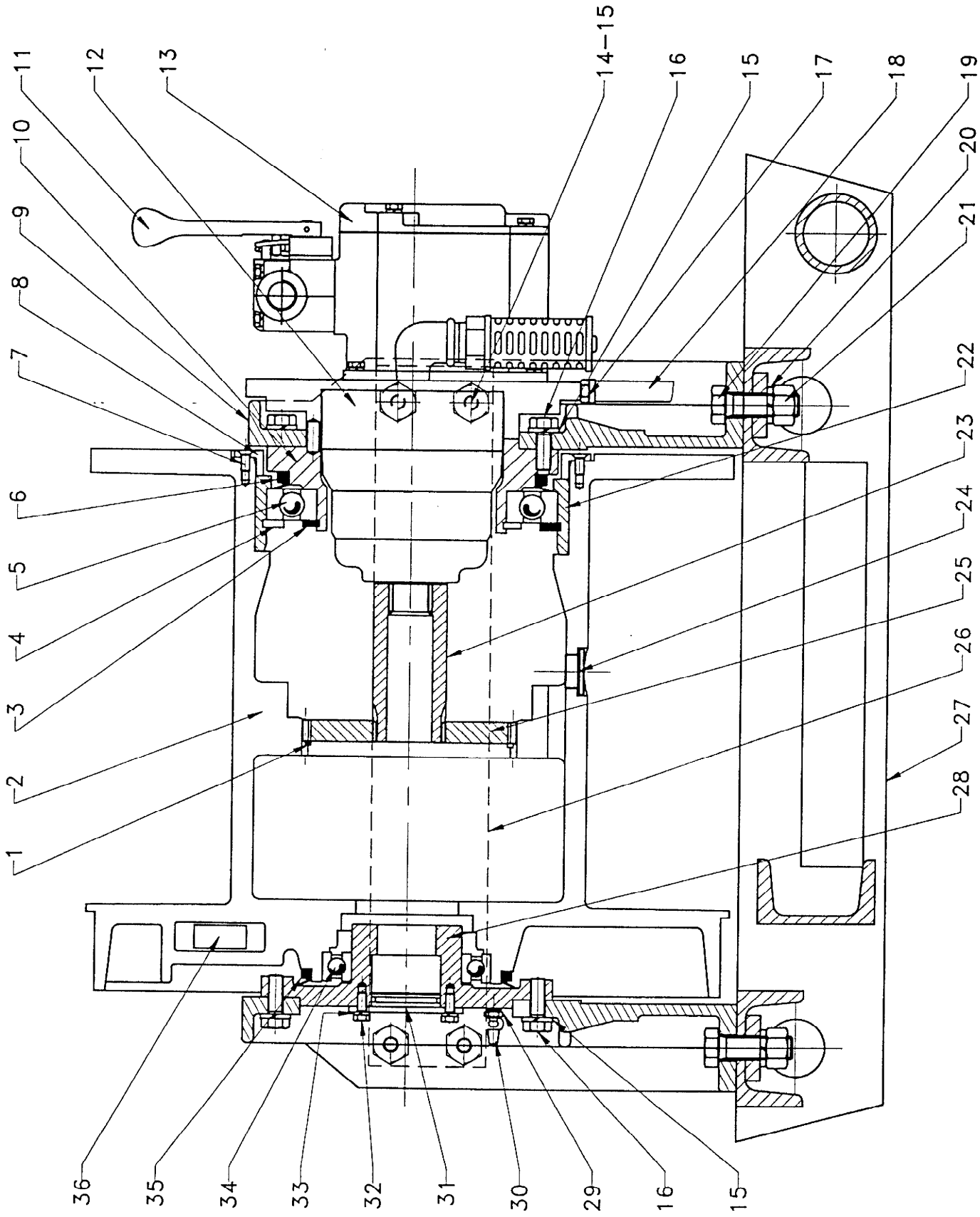


(Dwg. D615A0004)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.	CPN
1	Jack casing	1	9615-0171	38539151
2	Eyelet screw	2	9615-7172	38539169
3	Cylinder bottom	1	9615-0173	38539177
4	Brake band	1	9615-8174	38539185
5	Axle	2	9615-7175	38541108
6	Piston	1	9615-7176	38539201
7	Spring	1	6919-8132	38539219
8	Muffler	1	6848-9232	38529996
9	'O' ring	1	5822-2829	38524435
10	'O' ring	1	5821-7129	38539227
11	Split pin	4	4630-2019	38539235
13	Washer	2	4500-1110	38539250
14	Lock nut	2	4370-6411	38539268
15	Thin nut	2	4320-2112	38530416
16	Nut	1	4300-6911	38539284
17	Screw	6	4132-2906	38531562
18	Screw	2	4132-3206	38539292

☐ Recommended spare

WINCH ASSEMBLY PARTS LIST



(Dwg.D6150020)

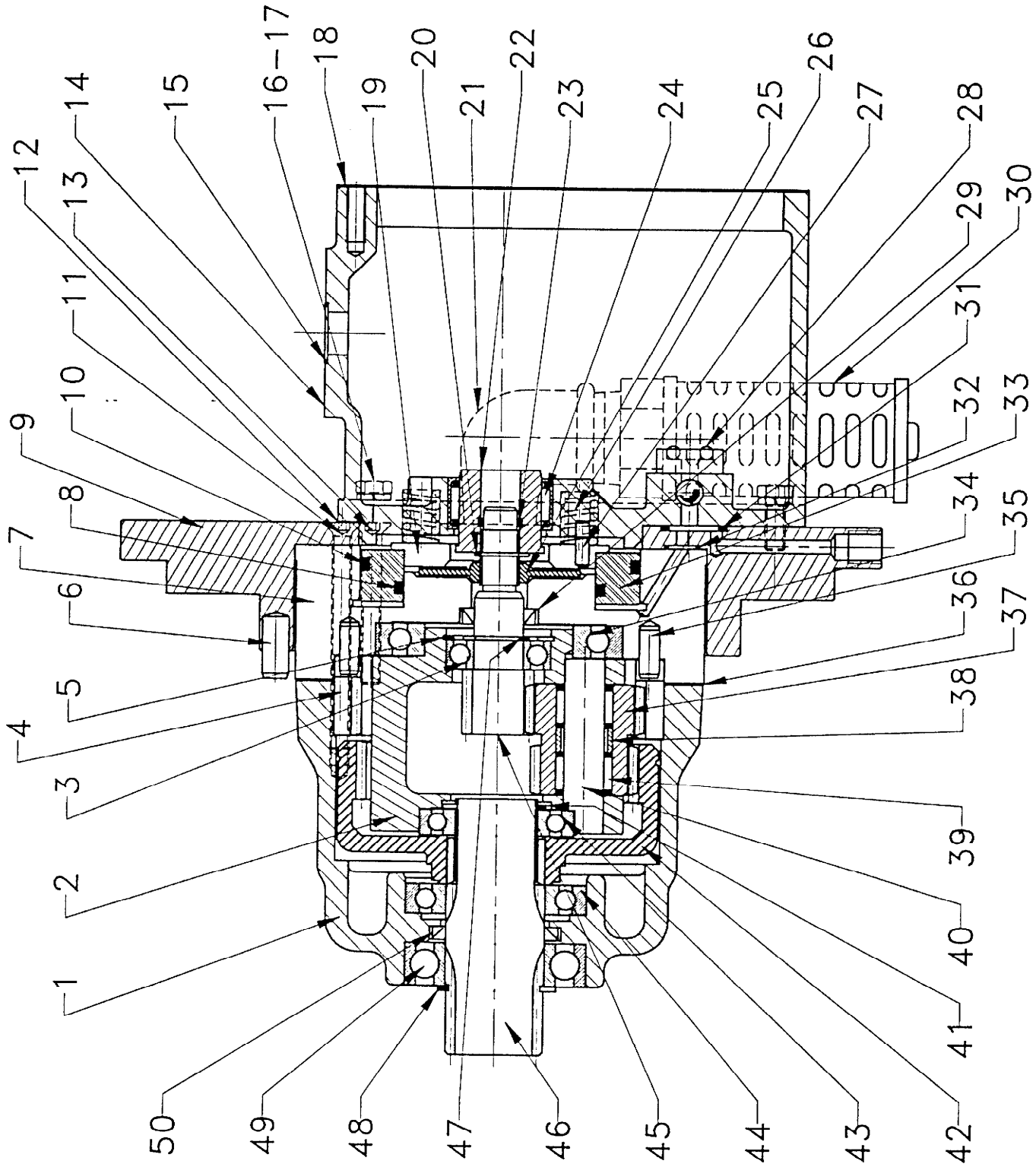
WINCH ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY	PART NO.
1	Expensive ring	1	47847832
2	Drum	1	96157001
3	Circlips	1	47700130
4	Circlips	1	47703200
5	Ball bearing	1	50800026
• 6	Joint	1	58405831
7	Screw	6	41101603
8	Stop	1	96150051
9	Flange	2	96157002
10	Front bearing	1	96150246
11	Air control valve	1	36180022
12	Brake gear	1	36180077
13	Motor	1	36180047
	Motor (winch equiped with torque limitor)	1	36180076
14	Screw	8	41006701
15	Washer	23	45200010
16	Screw	15	41000401
17	Butt-end	1	61652632
18	Hose	0.67m	68024232
19	Screw	4	41003901
20	Washer	4	45200016
21	Nut	4	43001011
22	Ring	1	96150247
23	Pinion	1	96150248
24	Plug	2	65160932
25	Toothed wheel	1	96150249
26	Distance ring	2	96150005
27	Skid frame	1	96158086
28	Rear bearing	1	96158089
29	Greaser	1	67301727
30	Plug	1	61017128
31	Blind washer	1	96190013
32	Screw	3	41000201
33	Washer	3	45200006
34	Ball bearing	1	50050015
• 35	Joint	1	58404831
36	Wedge	1	96150117

• Recommended Spare

(Bom.N6150020)

BRAKE GEAR ASSEMBLY DRAWING



(Dwg.D6180016)

BRAKE GEAR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY	PART NO.
1	Gear housing	1	96180005
2	Satellite support	1	96180041
3	Ball bearing	1	50000002
4	Ring gear	1	96090038
5	Circlips	1	47703032
6	Pin	3	46000416
7	Bearing	1	96180057
• 8	O'ring	1	58232229
9	Flange	1	96150250
• 10	O'ring	1	58232329
11	Screw	4	41103903
• 12	Paper joint	1	96180065
13	Screw	4	41103703
14	Motor housing	1	96180015
• 15	O'ring	3	58220929
16	Screw	4	41000201
17	Washer	4	45200006
• 18	Paper joint	1	96180066
19	Washer	1	96180012
20	Circlips	1	47700012
21	Elbow	2	61330832
22	Coupling sleeve	1	96180014
• 23	O'ring	1	58218229
24	Needle bearing	1	56323225
• 25	Brake disc	1	96090049
26	Spring	4	69165532
27	Pin	1	46406118
• 28	O'ring	2	58224929
• 29	Sealing ring	1	58019830
30	Muffler	2	68497432
• 31	O'ring	1	58218129
• 32	O'ring	1	58212529
33	Cylinder piston	1	96090113
34	Ball bearing	1	50800009
35	Pin	2	46001116
• 36	Paper joint	1	96180042

• Recommended Spare

(Bom.N618A016)

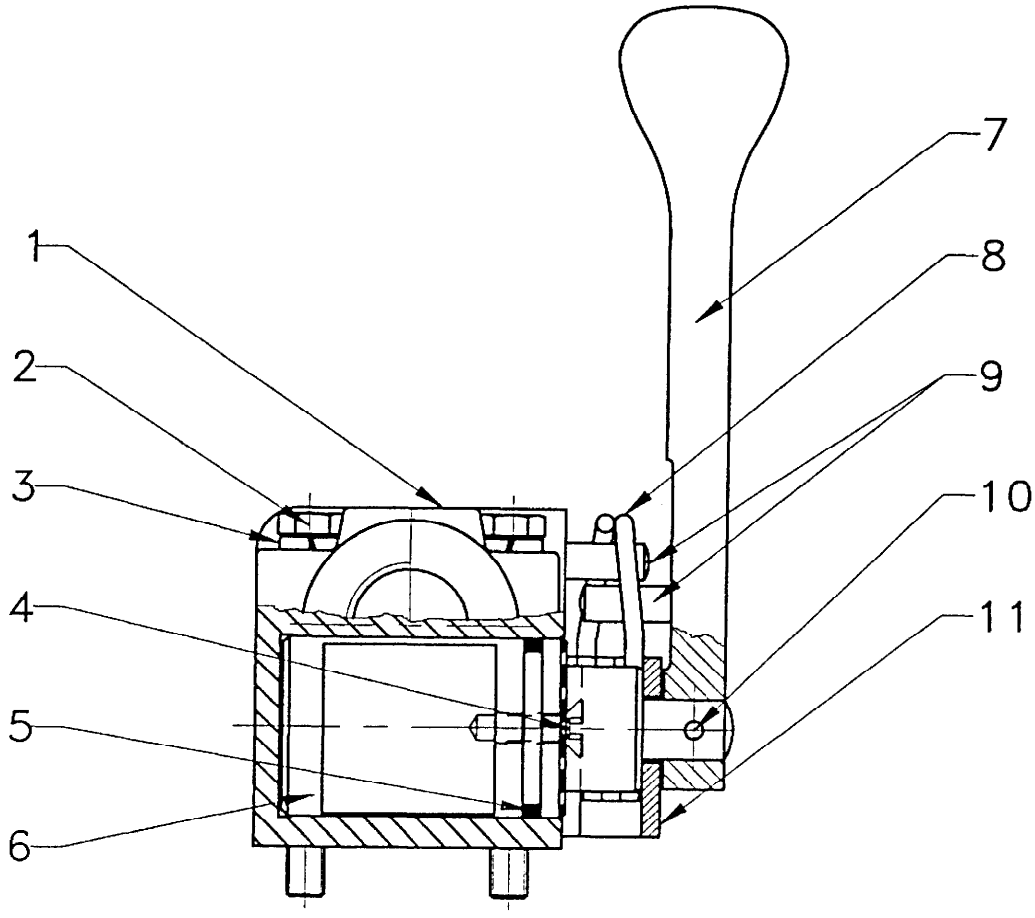
BRAKE GEAR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY	PART NO.
37	Satellite	3	96180045
38	Distance piece	3	96090026
39	Needle bearing	6	56501713
40	Satellite axle	3	96090039
41	Circlips	1	47802139
42	Ring gear	1	96180044
43	Ball bearing	1	50800005
44	Ball bearing	1	50800006
45	Shaft spindle	1	96180011
46	Output shaft	1	96180061
47	Circlips	1	47700015
48	Circlips	1	47700029
49	Ball bearing	1	50050006
50	Sealing ring	1	96180005

Recommended Spare

(Bom.N618A016)

AIR CONTROL VALVE ASSEMBLY DRAWING AND PARTS LIST



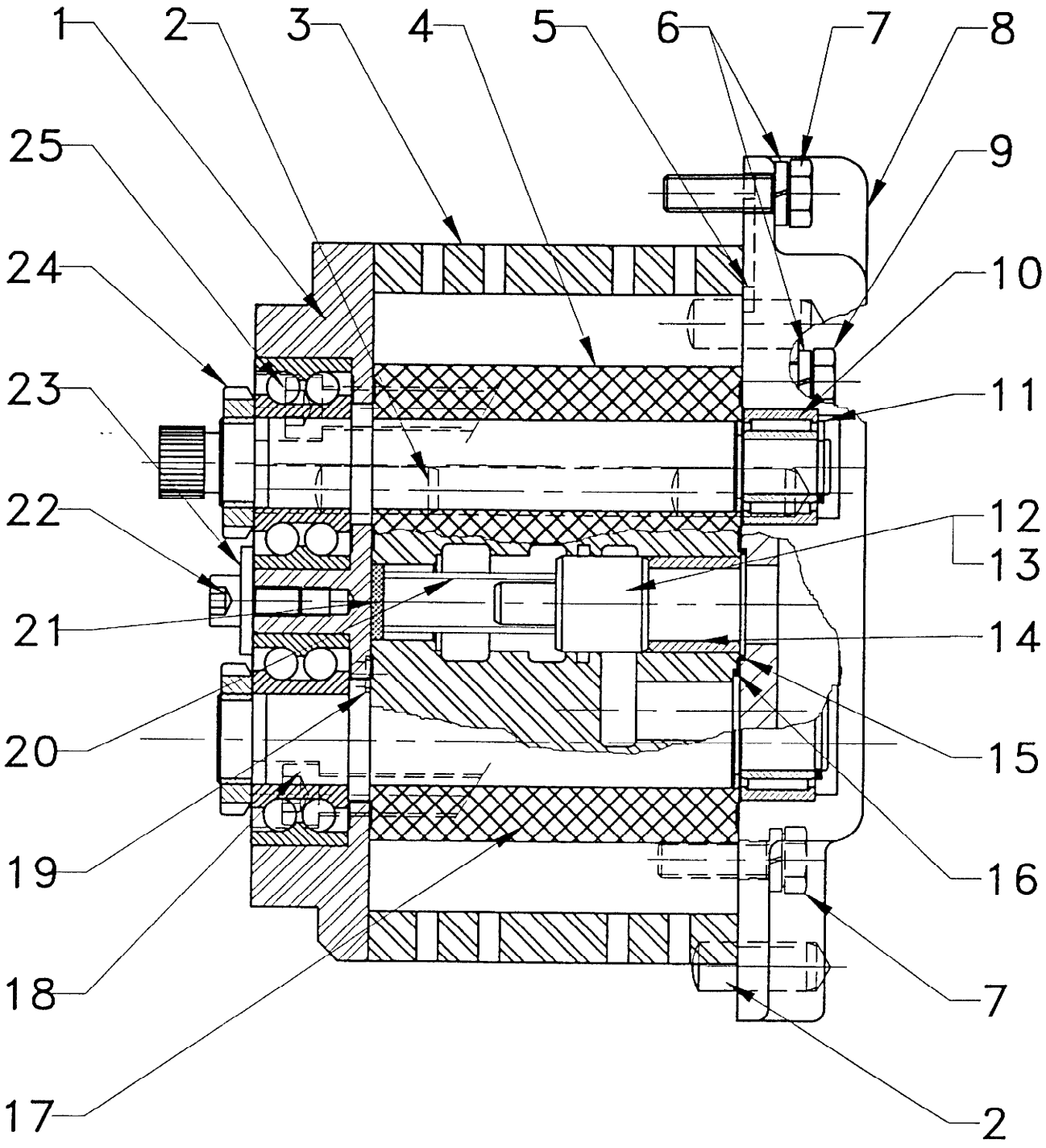
(Dwg.D6180017)

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY	PART NO.
1	Valve housing	1	96180032
2	Screw	4	41016601
3	Washer	4	45200006
4	Screw	2	41103403
• 5	O'ring	1	58217629
6	Rotary valve	1	96180033
7	Control lever	1	96180031
8	Spring	1	96180035
9	Pin	2	46001216
10	Pin	1	46507220
11	Stop	1	96180034

• Recommended Spare

(Bom.N6180017)

AIR GEAR MOTOR ASSEMBLY DRAWING



(Dwg.D6180018)

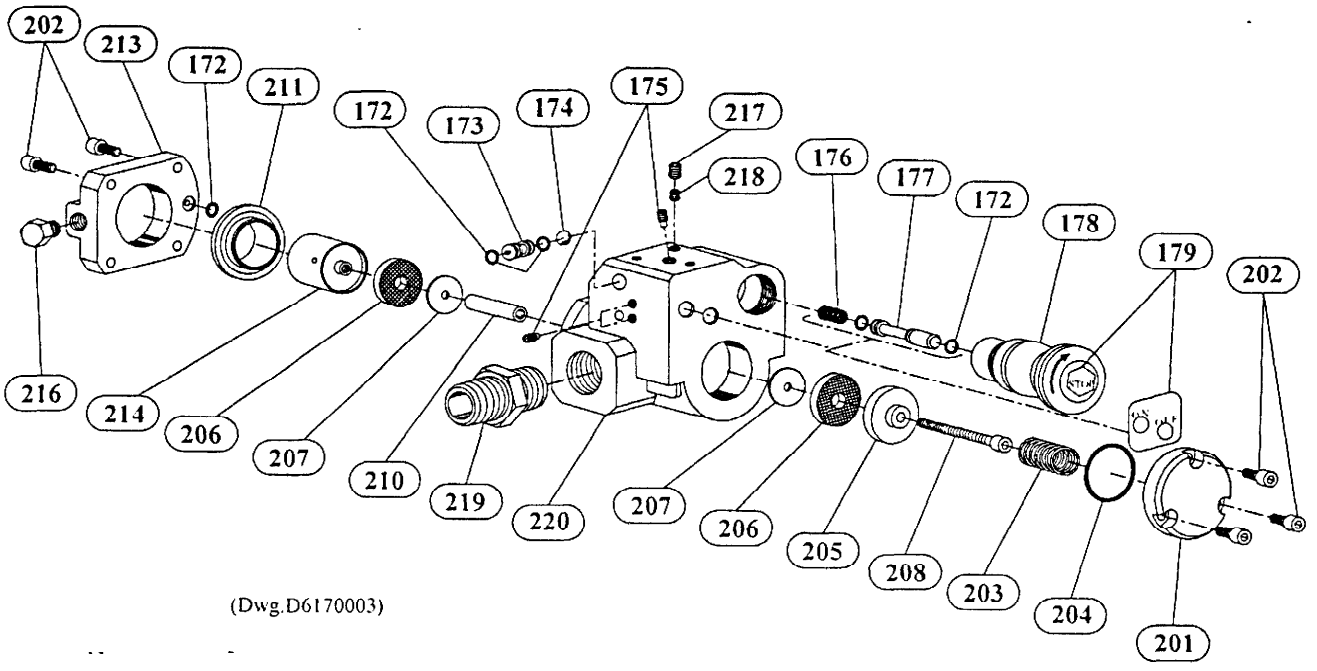
AIR GEAR MOTOR ASSEMBLY PARTS LIST

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY	PART NO.
1	Motor front plate	1	96090008
2	Pin	6	46000416
3	Motor housing	1	96090007
4	Motor rotor assembly	1	96090031
• 5	Gasket	1	96180030
6	Lock washer	9	45200006
7	Screw	3	41000101
8	Motor cover (motor 36180047)	1	96180029
	Motor cover (motor 36180076)	1	96180115
9	Screw	2	41007501
10	Bearing	2	56461912
• 11	Shaft segment	2	47801339
12	Stopper	1	96180038
13	washer	1	96180037
14	Spacer	1	96180039
• 15	O'ring	2	58220929
• 16	O'ring	2	58205029
17	Rotor asembly	1	96090030
18	Screw	4	41300806
• 19	O'ring	2	58222329
20	Spring	1	69143932
21	Rear stop	1	94120030
22	Screw	1	41306706
23	Washer	1	96090032
• 24	Nut	2	57000002
25	Bearing	2	50600002

• Recommended Spare

(Bom.N6180018)

CONTROL VALVE ASSEMBLY DRAWING AND PARTS LIST

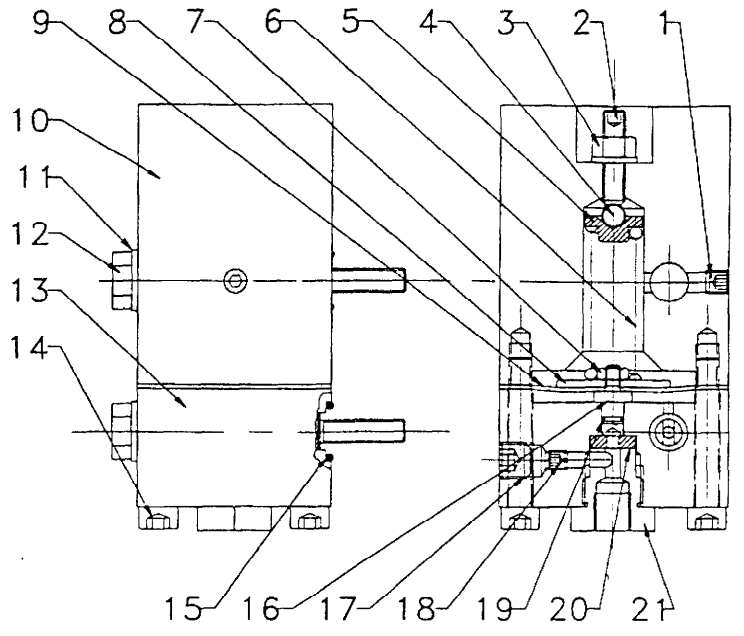


(Dwg.D6170003)

ITEM NO	DESIGNATION OF PART	QTY TOTAL	PART NUMBER	
			1/2 BSP	3/4 BSP
• 172	'O' Ring	9	5821-4829	
173	Shuttle Valve Stop	1	9579-0098	
174	Ball	1	6940-1625	
175	Setscrew	3	4200-8207	
176	Spring	3	6911-3941	
177	Spool	3	9579-0085	
178	Emergency Stop Bottom	1	6859-8632	
179	Label Kit	1	9579-0099	
201	Cover	1	9617-0059	
202	Screw	7	4130-6706	
203	Spring	1	6915-8732	
• 204	'O' Ring	1	5821-4829	
205	Valve Cone	1	9617-0053	
• 206	Joint	2	9617-0056	
207	Washer	2	4570-0005	
208	Screw	1	4130-8206	
210	Distance Ring	1	9617-0055	
211	Diaphram	1	6771-6341	
213	Cover	1	9617-0052	
214	Valve Cone	1	9617-0054	
216	Plug	1	6517-2032	
217	Setscrew	1	4200-7407	
218	Nozzle	1	9617-0071	
219	Nipple	1	6133-0732	
220	Body	1	9617-0069	9617-0068
221	Control Valve Assembly (incl's item 172 through 220)	1	3617-0017	3617-0018

• Recommended Spare.

TORQUE LIMITOR ASSEMBLY DRAWING AND PARTS LIST



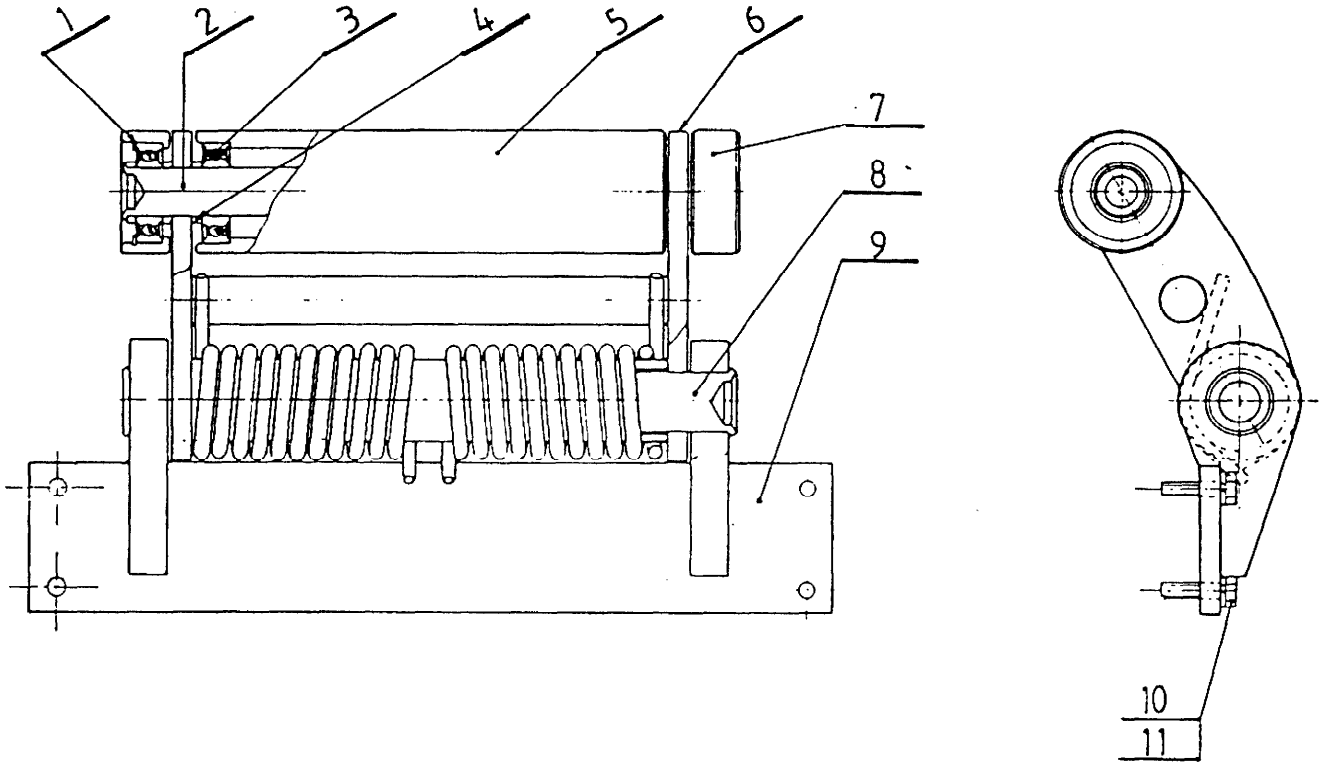
(Dwg.D6360004)

ITEM NO.	DESCRIPTION OF PART	TOTAL QTY	PART NO.
1	Screw	1	42007407
2	Screw	1	42001607
3	Nut	1	43007811
4	Ball	1	69400125
5	Spring seat	1	96360023
6	Spring	1	69118541
7	Nut	1	43001111
8	Washer	1	96360019
9	Diaphragm	1	96360020
10	Cover	1	96360015
• 11	Joint Usit-ring	2	58409731
12	Screw	2	96360028
13	Body	1	96360016
14	Screw	4	41314906
• 15	O'ring	2	58210729
16	Valve	1	96360017
17	Plug	1	65172032
18	Nozzle	1	96170071
• 19	O'ring	1	58222329
20	Joint	1	96360021
21	Screw	1	96360018

• Recommended Spare

(Bom.N6360004)

OPTION PRESS-ROLLER DRAWING AND PARTS LIST



(Dwg. D6150015)

ITEM NO.	DESCRIPTION OF PART	QTY TOTAL	PART NO.	CPN
1	Circlips	2	4770-3047	38523403
2	Roller axle	1	9615-0091	38528931
3	Ball bearing	4	5015-0004	38524351
4	Distance ring	6	9506-0135	38528881
5	Main roller	1	9615-0089	38528915
6	Rollers arm	1	9615-0087	38528899
7	Side roller	2	9513-0130	38541199
8	Axle	1	9615-0090	38528923
9	Distance piece	1	9615-0088	38528907
10	Screw	4	4100-4701	38528949
11	Washer	4	4520-0010	38522223

NOTES

NOTES

HOIST AND WINCH LIMITED WARRANTY

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

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

This warranty does not apply to Products which I-R has determined to have misused or abused, improperly maintained by the user, or where the malfunction of 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 and implied warranty lasts so that the above limitations may not apply to you.

This warranty gives you specific legal 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 Sping Dr.
Milwaukee, WI 53225
Phone: (414) 461-0973

Philadelphia, PA
P.O. Box 425
900E. 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, Abberta
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

Latin America Operations
Ingersoll-Rand
Production Equipment
Group
730 N.W. 107 Avenue
Suite 300, Miami, FL
33172-3107
Phone: (305) 559-0500
Telex: 441617TLS UI
Fax: (305) 559-7505

Europe, Middle East and Africa
Ingersoll-Rand Equipements de Production S.A.
111, avenue Roger
Salengro
59450 Sin le Noble, France
Phone: (33) 27.93.08.08
Fax: (33) 27.93.08.00

Asia - Pacific Operations
Ingersoll-Rand (Japan) Ltd.
Kowa Bldg. No. 17
2-7 Nishi-Azabu 1-chome
Minato-ku, Tokyo 106,
Japan
Phone: (03) 3403-0641/7
Fax: 81 3 3401-2049

Russia
Ingersoll-Rand Company
World Trade Center
Office 1101
Krasnopresnenskaya
Nab.12
Moscow, Russia 123610

Printed in Sin-le-Noble
(France)

IR/SAMIIA
BP 59
59500 SIN LE NOBLE
TEL: (33) 27.93.08.08
FAX: (33) 27.93.08.00
TELEX: 820 221

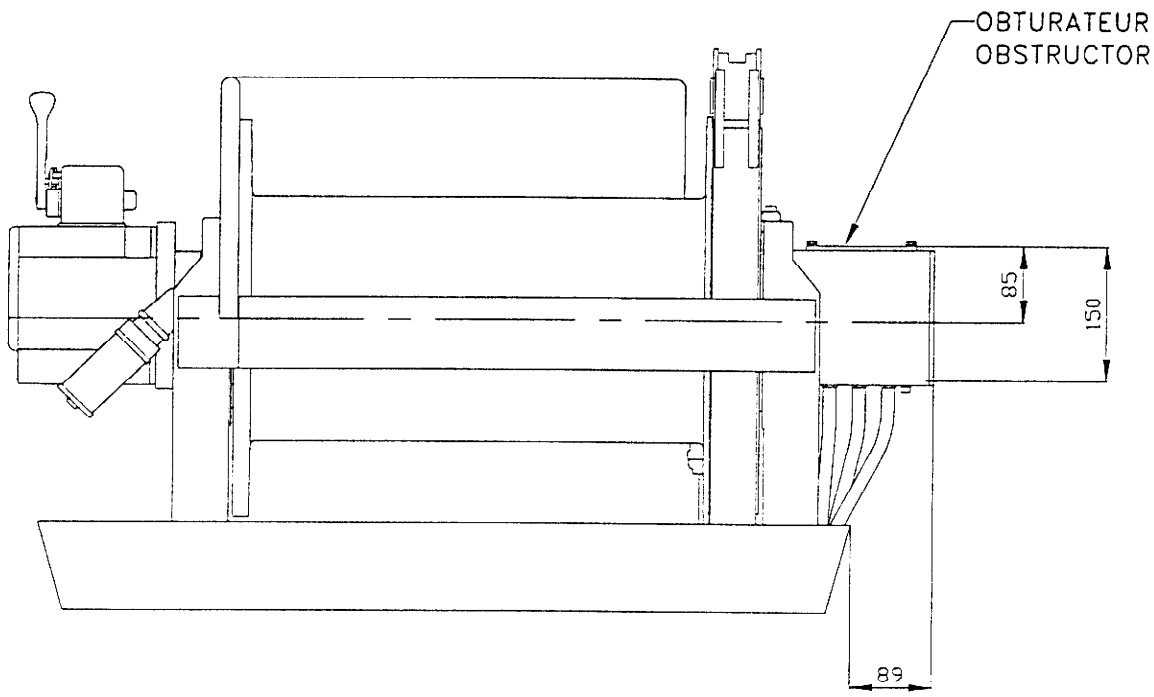
FIN DE COURSE PNEUMATIQUE

PNEUMATIC LIMIT SWITCH

NUMERO DE NOMENCLATURE
L615
NUMERO DU DOCUMENT
95/09/06 A 1/2

Ph. Demeersa

Le chef du bureau d'études



(DWG.D6150029)

FONCTION
Ce dispositif permet de limiter la course de travail du treuil en deux points dont la position peut être réglée à volonté. Il permet également de garantir les 3 tours morts de sécurité sur le tambour et d'immobiliser le treuil lorsque la position la plus haute des crochets est atteinte.

FUNCTION
This device allonws to limit the winch running within two points,the position of which can be adjusted at will. It also allows to guarantee the 3 « dead » safety windings on the drun and to stop the winch when the highest position of hooks is reached.

DESCRIPTION
Deux distributeurs à commande mecanique pilotent deux distributeurs qui commandent la fermeture de la valve d'arrêt d'urgence. Les contacts sont actionnés par un mécanisme réducteur. Le tout protègé par un coffret métallique monté sur le palier arriére, il est lié à la rotation du tambour.

DESCRIPTION
Two mechanical remote control valves pilot 2 main control valves which close the emergency stop valve. The contacts are acted by a gear mechanism. The whole is protected by a metallic box, mounted on the rear bearing. The gear is bound to the drum rotation.

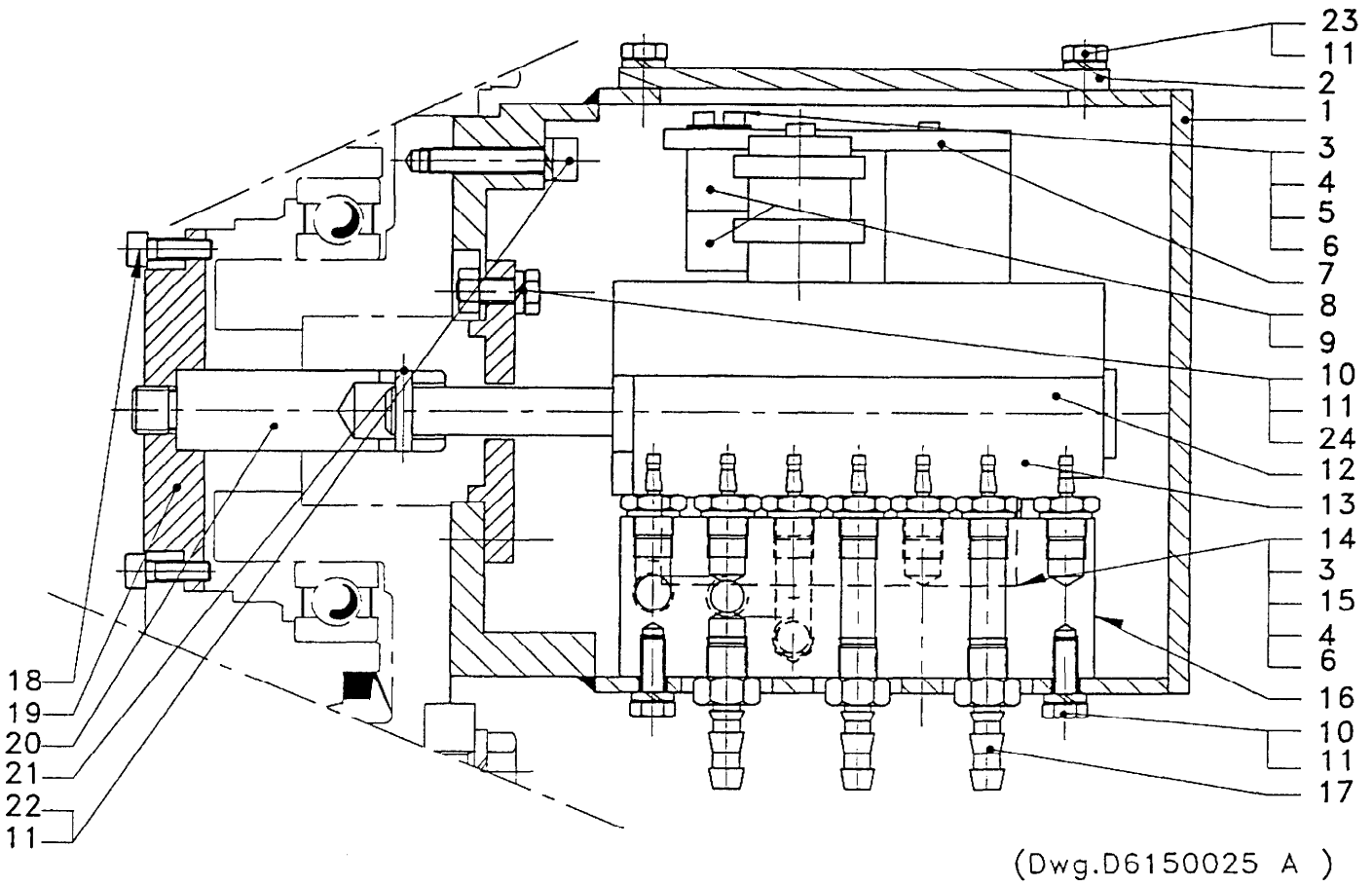
REGLAGE
Afin de régler le dispositif de fin de course, enlever l'opturateur (rep. 2) situé sur la partie supérieure du coffret métallique.
Desserrer la vis centrale.
Pour limiter la course en sens montée (réglage du point haut), visser la vis de réglage repérée 2, de même pour limiter la course en sens descente, (réglage du point bas), dévisser la vis repérée 1, rebloquer la vis centrale après le réglage.

ADJUSTMENT
To adjust the limit switch device :
- remove the closing plate (rep. 2) from the top, loosen the central screw.
- to limit the stroke on the upward direction (adjustment of the top limit) screw on the adjusting screw 2
- Also to limit the strake on the downward direction (adjustment of the bottom limit) , unscrew the adjusting screw 1
- then tighten the central screw to secure the above adjustments.

SAMIIA
B.P 59
59450 SIN LE NOBLE FRANCE
TEL. (33) 27.93.08.08
TELEX 820 221
TELEFAX (33) 27.93.08.00

FIN DE COURSE
LIMIT SWITCH

NUMERO DE NOMENCLATURE
615
NUMERO DU DOCUMENT
95-09-06 A 2/2
Ph. Demeese
LE CHEF DU BUREAU D'ETUDES



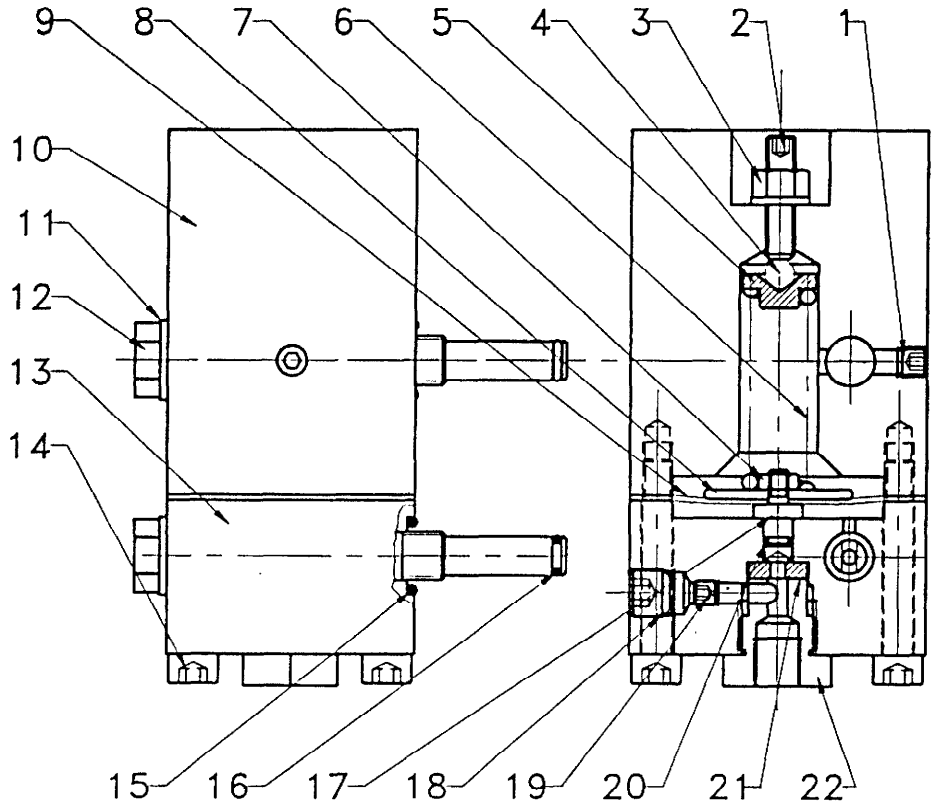
(Dwg.D6150025 A)

REPERE ITEM	DESIGNATION	DESCRIPTION	QUANTITE QUANTITY	CODE PART NO.
1	Coffret	Box	1	96150254
2	Obturateur	Blind washer	1	96150261
3	Vis	Screw	2	41307606
4	Rondelle	Washer	4	45200004
5	Rondelle	Washer	4	45000104
6	Ecrou	Nut	4	43001111
7	Support de distributeur	Support	1	96150255
8	Distributeur	Valve	2	68523641
9	Flexible	Hose	1m	68094832
10	Vis	Screw	5	41000201
11	Rondelle	Washer	7	45200006
12	Fin de course	Limit switch	1	95060150
13	Raccord cannelé	Butt-end	10	61694932
14	Distributeur	Valve	1	68523441
15	Rondelle	Washer	2	45000105
16	Bloc de connection	Connection block	1	96150256
17	About	Butt-end	3	61652632
18	Vis	Screw	4	41308706
19	Rondelle	Washer	1	96150147
20	Axe de liaison	Axle linking	1	96150258
21	Goupille	pin	1	46503420
22	Vis	Screw	2	41300406
23	Vis	Screw	4	41007601
24	Ecrou	Nut	3	43000711

SAMIIA
B.P 59
59450 SIN LE NOBLE FRANCE
TEL. (33) 27.93.08.08
TELEX 820 221
TELEFAX (33) 27.93.08.00

TORQUE LIMITOR ASSEMBLY DRAWING AND PART LIST

NUMERO DE NOMENCLATURE
636
NUMERO DU DOCUMENT
95-10-01 1 / 1
LE CHEF DU BUREAU D'ETUDES



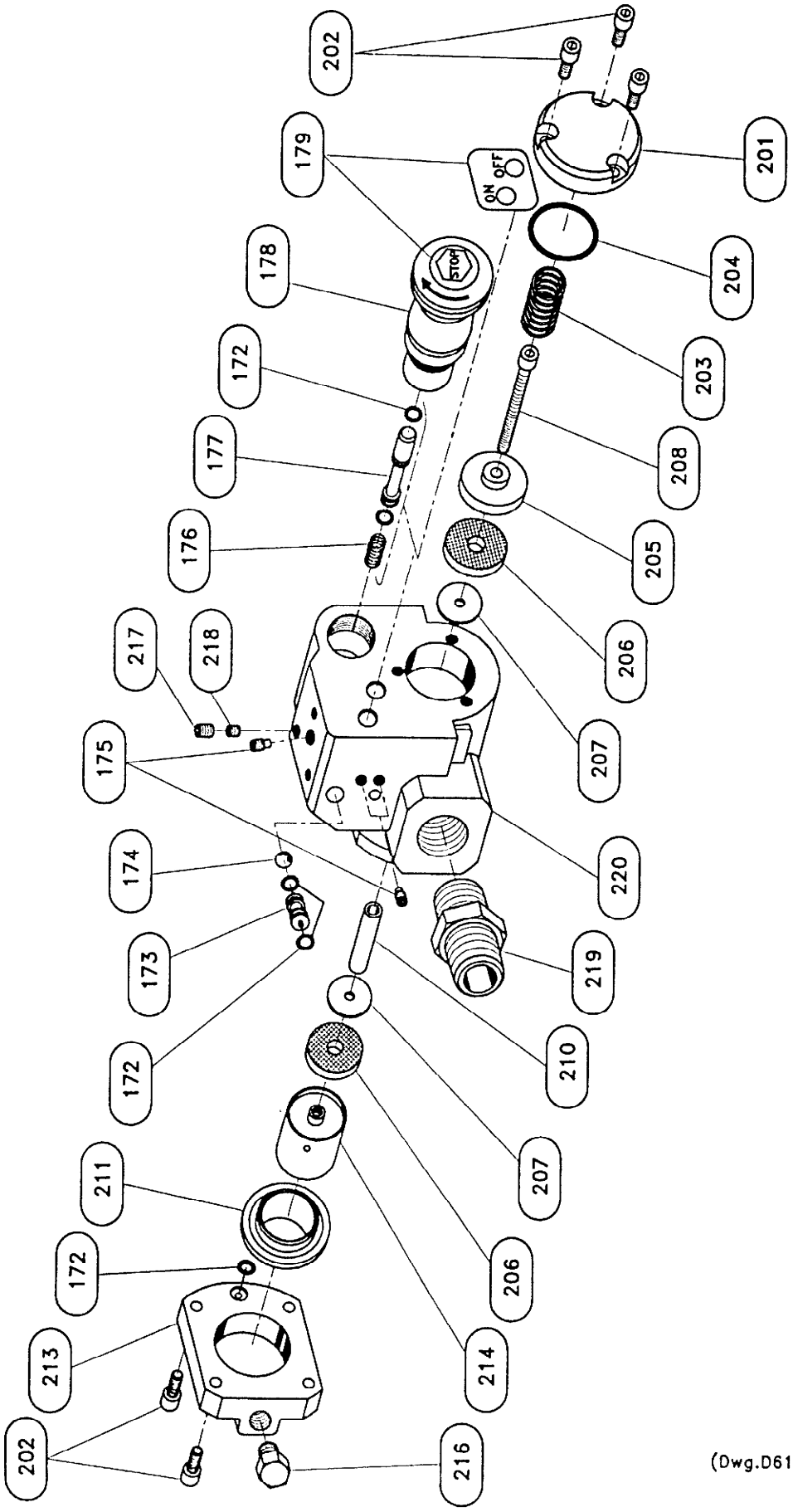
ITEM NO	DESCRIPTION OF PART	QTY TOTAL	PART NUMBER
	Torque limitor (incl's item 1 through 22)	1	36360001
1	Screw	1	42007407
2	Screw	1	42001607
3	Nut	1	43007811
4	Ball	1	69400125
5	Spring seat	1	96360023
6	Spring	1	69118541
7	Nut	1	43001111
8	Washer	1	96360019
9	Diaphragm	1	96360020
10	Cover	1	96360015
11	Joint Usit-ring	2	58409731
12	Screw	2	96360022
13	Body	1	96360016
14	Screw	4	41314906
15	O'ring	2	58210729
16	O'ring	2	58209229
17	Valve	1	96360017
18	Plug	1	65172032
19	Nozzle	1	96170071
20	O'ring	1	58222329
21	Joint	1	96360021
22	Screw	1	96360018

SAMIIA ®
B.P 59
59450 SIN LE NOBLE FRANCE
TEL. (33) 27.93.08.08
TELEX 820 221
TELEFAX (33) 27.93.08.00

EMERGENCY STOP VALVE ASSEMBLY DRAWING

NUMERO DE NOMENCLATURE
617
NUMERO DU DOCUMENT
95-10-02 1 / 2

Ph. Demeese
LE CHEF DU BUREAU D'ETUDES



(Dwg.D6170003)

IR/SAMIIA
BP 59
59500 SIN LE NOBLE
TEL: (33) 27.93.08.08
FAX: (33) 27.93.08.00
TELEX: 820 221

EMERGENCY STOP VALVE ASSEMBLY PARTS LIST

NUMERO DE NOMENCLATURE
617
NUMERO DU DOCUMENT
95-10-02 2/2

Ph. Demeese
Le chef du bureau d'études

TEM NO	DESIGNATION OF PART	QTY TOTAL	PART NUMBER	
			1/2 BSP	3/4 BSP
• 172	'O' Ring	9	5821-4829	
173	Shuttle Valve Stop	1	9579-0098	
174	Ball	1	6940-1625	
175	Setscrew	3	4200-8207	
176	Spring	3	6911-3941	
177	Spool	3	9579-0085	
178	Emergency Stop Bottom	1	6859-8632	
179	Label Kit	1	9579-0099	
201	Cover	1	9617-0059	
202	Screw	7	4130-6706	
203	Spring	1	6915-8732	
• 204	'O' Ring	1	5821-4829	
205	Valve Cone	1	9617-0053	
• 206	Joint	2	9617-0056	
207	Washer	2	4570-0005	
208	Screw	1	4130-8206	
210	Distance Ring	1	9617-0055	
211	Diaphram	1	6771-6341	
213	Cover	1	9617-0052	
214	Valve Cone	1	9617-0054	
216	Plug	1	6517-2032	
217	Setscrew	1	4200-7407	
218	Nozzle	1	9617-0071	
219	Nipple	1	6133-0732	
220	Body	1	9617-0069	9617-0068
221	Emergency stop Valve Assembly (incl's item 172 through 220)	1	3617-0017	3617-0018

• Recommended Spare.