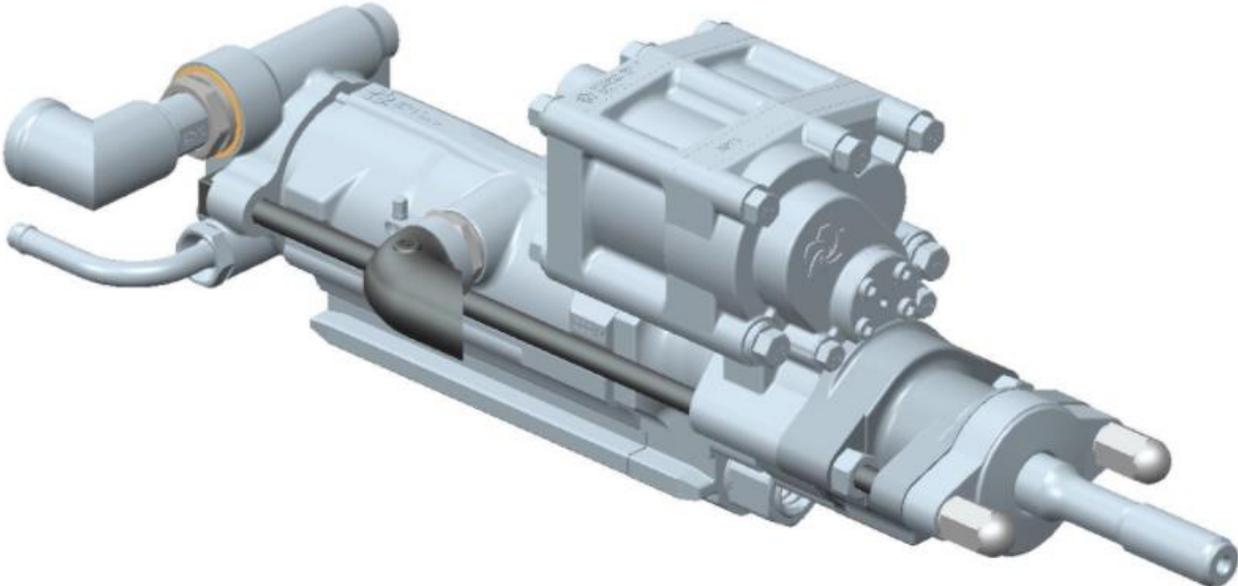
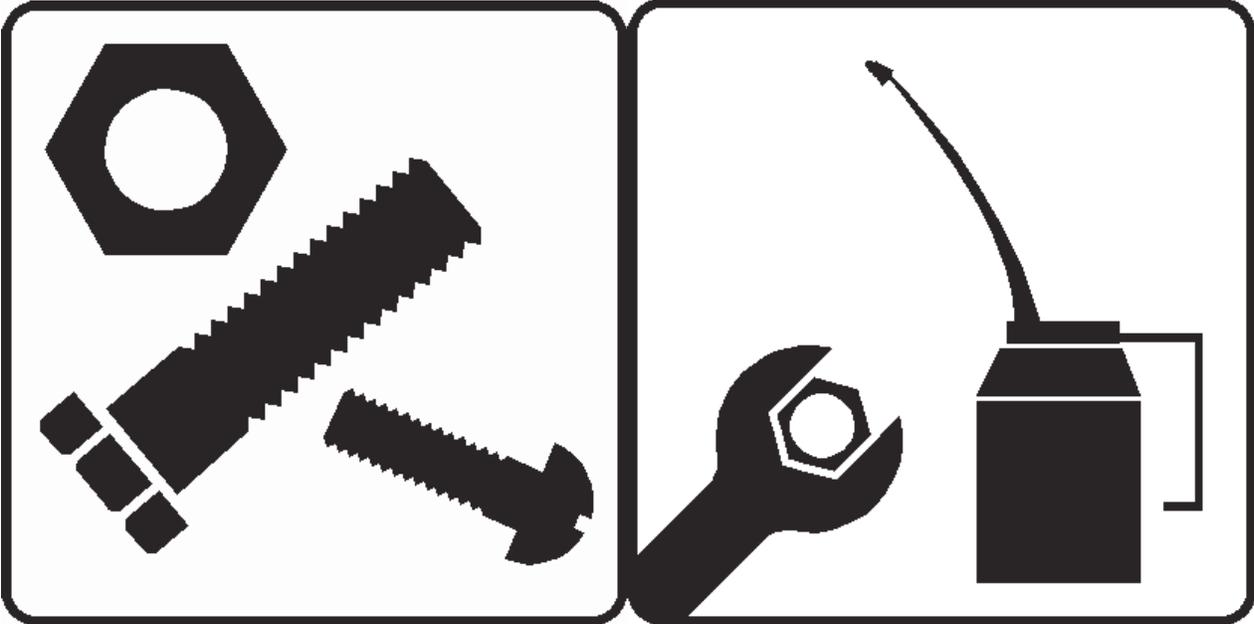


# S36 ROCKDRILL

PARTS & SERVICE MANUAL



## Certificate of Performance

Each drill is supplied with a certificate of conformance, signed by the assembly mechanic. It lists the drill's actual test results at the time of assembly. The certificate also describes the start-up and lubrication procedures and provides a brief health and safety notice.

## Important Safety Information

**DO NOT START or OPERATE THE MACHINE** until you have **READ** this manual and understand the contents.

Non-authorized personnel **MUST NOT** under any circumstances attempt to operate or repair the machine. This is a violation of warranty.

Safety precautions listed in the manual are intended to alert the operator and mechanics to physical dangers inherent in various phases of operating and maintaining drilling equipment of this kind.

Safe work procedures must always be the primary consideration of all personnel when operating or maintaining the drill rig for intended applications. Do not use in awkward or unintended applications. The Safety Precautions listed herein are not intended to be exhaustive.

### HAZARD SIGNAL WORDS AND WARNINGS:

Hazard signal words are used throughout this manual. They appear in the narrow left-hand column of several pages, and with their additional text description, are intended to alert the reader to the existence and relative degree of the hazard.



The safety alert symbol is used to warn of potential personal injury hazards.

The signs **DANGER**, **WARNING**, **CAUTION**, and **NOTICE** are defined as follows:



**Indicates an imminently hazardous situation, which if not avoided, will result in serious injury.**



**Indicates a potentially hazardous situation, which if not avoided, could result in serious injury.**



**Indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury.**



**Is used to make people aware of situations, and gives hints for operation and maintenance, which are important, but not hazard related. It generally indicates an Operational Aid.**

## **WARNING**

- The purchaser must provide proper training to ensure the safety of all operators. Failure to provide training may result in serious injury or death.
- Use only qualified service technicians. Failure to do so could cause severe damage to the machine or the operator and will void your warranty.
- Operating this piece of equipment without proper hearing protection may result in permanent hearing loss (dependent on duration of exposure). For best protection from noise, use both ear plugs and earmuffs simultaneously. A proper hearing conservation program is the only effective means of avoiding hearing damage when operating drills with percussive power greater than 1 kW.
- Drilling can result in flying particles that may cause eye injuries (always wear industrial safety glasses).
- ISOLATE all energy sources before servicing equipment.
- Apply safe lifting procedures and two-person lifts when manually handling the rockdrill.
- Ensure that the drill, accessories, and all actions always comply with applicable site and local health and safety regulations.
- Never climb on top of the machine.
- Keep clear of rotating drill steel. Never wear any loose clothing that could become entangled with the machine.
- Be aware that sliding and tilting parts can cause pinch and crush points.
- Do not operate this piece of equipment while under the influence of drugs, alcohol or medication
- Always keep your work area clean. Avoid dangerous work environments.
- Be aware of the operating zones and recommended areas for safe operation. Keep visitors a safe distance away from the work area.
- Prepare proper tools and equipment. Always use the correct tool for the job. Improper or homemade tools can cause injury or machine damage and will void your warranty.
- Use only Boart Longyear replacement parts. Failure to do so could cause severe damage to the machine or the operator and will void your warranty.
- Do not change or alter the drill, its components, optional equipment, or accessories without prior approval from Boart Longyear. Unauthorized alterations will void the warranty, render the equipment unsafe, or result in decreased performance.



## **CAUTION**

Operating a rockdrill without lubricant or with incorrect lubricant can cause **EXTENSIVE DAMAGE** to the working parts of this machine. **NO CLAIM AGAINST PRODUCT WARRANTY** will be considered by the manufacturer if these procedures have not been followed. **NO CLAIM AGAINST PRODUCT WARRANTY** will be considered by the manufacturer if Boart Longyear Replacement Parts are not used in repair. All rockdrill repairs should be performed by properly trained and equipped service technicians. Failure to adhere to these requirements will void your warranty.

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**NOTE:** We are continuously updating our product literature to provide you with the most current technical information available. Portions of this literature may contain information that may not be exactly representative of the current configuration of Boart Longyear products. Contact your nearest Boart Longyear representative or visit [www.boartlongyear.com](http://www.boartlongyear.com) for information on the latest product improvements and manual revisions.

## Introduction

The purpose of this manual is to furnish the Service Technician with detailed information to achieve the maximum operating performance from the drill. A Wall Chart with a comprehensive parts list and views to aid in ordering parts is available at [www.boartlongyear.com](http://www.boartlongyear.com).

Boart Longyear is backed by over 125 years of experience in the design, manufacture and operation of Percussive Drilling equipment. Many of the accepted practices in use today were pioneered by Boart Longyear.

To obtain the utmost in performance and life of the equipment, it should be given regular care and operated in accordance with instructions.



Ensure proper safety apparel is worn when servicing the equipment

### NOTICE

Ensure a quality lubricant is used and that consumption amounts are sufficient.

### NOTICE

Inspect and replace worn front end and chuck parts promptly.

### NOTICE

Ensure the drill is being operated correctly to avoid steel and drill rod misalignment.



Check conditions of hoses and connections for contaminants and keep the bolts on the drill tight.

### NOTICE

Read this manual carefully before attempting to operate this equipment and keep this book handy at all times for reference when any questions arise.

The purchaser must ensure safe application of this equipment for all operators. This manual is only a general guide to essential operating and maintenance procedures, safety precautions, etc. The procedures described in this manual do not relieve the purchaser and all operators of their responsibility to exercise caution and work safely. It is essential to comply with all safe working procedures and instructions relevant to the drill site at all times.

## Standard Warranty

### A. Consumables

Boart Longyear warrants for a period of one (1) year after the date of shipment of the consumable products manufactured by it, or the performance of related services, under the Contract, that such consumable products are free from defects in materials and workmanship, and such services are performed in a professional and workmanlike manner; provided, however, with respect to consumable products purchased through an authorized Boart Longyear distributor, the warranty period shall commence on the date of purchase by the end-user.

### B. Capital Equipment

Boart Longyear warrants that its capital equipment is free from defects in materials and workmanship for a period equal to the lesser of: (i) one (1) year after the date of shipment, or (ii) the initial 1,000 operating hours. Boart Longyear warrants for a period of six (6) months after the performance of related services that such services are performed in a professional and workmanlike manner.

### C. General Terms

Boart Longyear further warrants that, to the extent applicable, as of the date of shipment or performance, all goods manufactured by it and services performed shall conform to the written specifications agreed between the parties. THIS IS BOART LONGYEAR'S ONLY WARRANTY. BOART LONGYEAR MAKES NO OTHER WARRANTY, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. As a condition to Boart Longyear's warranty obligations, the Purchaser must:

- a. Contact Boart Longyear and request authorization to return any goods claimed to be defective promptly upon the Purchaser's discovery of the alleged defect,
- b. Upon receipt of an approved authorization code from Boart Longyear, return any goods claimed to be defective under the foregoing warranty, at the Purchaser's expense, to the facility designated by Boart Longyear, and
- c. With respect to consumable products purchased through an authorized Boart Longyear distributor, the party making the warranty claim must also deliver to Boart Longyear reasonable evidence of the date of purchase. Boart Longyear shall perform its

examination of the goods so returned by the Purchaser and shall report the results of its examination to the Purchaser within thirty (30) days, following its receipt of such goods from the Purchaser, or, if longer time is required to complete such examination, within such time as would be required through the exercise of reasonable diligence. As a further condition to Boart Longyear's obligations hereunder for breach of warranty, the Purchaser shall offer its reasonable cooperation, and assist Boart Longyear in the course of Boart Longyear's review of any warranty claim. If requested by the Purchaser, Boart Longyear will promptly repair or replace, at Boart Longyear's expense, goods that are confirmed to be non-conforming as a result of Boart Longyear's examination and according to Boart Longyear's warranty as set forth herein. All removal and installation of goods shall be at the Purchaser's expense; provided, however, Boart Longyear will reimburse the Customer for an amount equal to the reasonable expenses incurred by the Customer and attributable to the removal and shipment of any defective goods. Boart Longyear reserves the right to reimburse the Purchaser for an amount equal to the purchase price of any defective goods in lieu of providing repaired or replacement goods. Anything contained herein to the contrary notwithstanding, in no event shall Boart Longyear be liable for breach of warranty or otherwise in any manner whatsoever for:

- (i) normal wear and tear;
- (ii) corrosion, abrasion or erosion;
- (iii) any goods, components, parts, software or services which, following delivery or performance by Boart Longyear, has been subjected to accident, abuse, misapplication, modification, improper repair, alteration, improper installation or maintenance, neglect, or excessive operating conditions;
- (iv) defects resulting from the Purchaser's specifications or designs or those of its contractors or subcontractors other than Boart Longyear;

- (v) defects associated with consumable parts or materials, the lifetime of which is shorter than the warranty period set forth in this Section;
- (vi) defects associated with Purchaser's specifications or designs or those of its contractors or subcontractors other than Boart Longyear;
- (vii) defects resulting from the manufacture, distribution, promotion, or sale of Purchaser's own products; or
- (viii) accessories of any kind used by the Purchaser which are not manufactured by or approved by Boart Longyear;
- (ix) any indirect, incidental, special, consequential, punitive, or similar damages, or any actual or alleged lost profits, loss of data or business interruption losses.

#### **D. Sourced Goods**

If the defective parts or components are not manufactured by Boart Longyear, the guarantee of the manufacturer of those defective parts or components is accepted by the Purchaser and is the only guarantee given to the Purchaser in respect of the defective parts or components. Boart Longyear agrees to assign to the Purchaser, on request made by the Purchaser, the benefit of any warranty or entitlement to the defective parts or components that the manufacturer has granted to Boart Longyear under any contract or by implication or operation of the law to the extent that the benefit of any warranty or entitlement is assignable.

Boart Longyear Global Headquarters,  
2455 South 3600 West  
Salt Lake City, Utah 84119,  
United States of America,  
[www.boartlongyear.com](http://www.boartlongyear.com)  
Tel: +1 801-972-6430  
Fax: +1 801-977-3374

## Ordering Parts

Please contact your local authorized spare parts dealer or customer service representative. A schematic of parts can be found on the S36 Rockdrill Wall Chart, available for download at [www.boartlongyear.com](http://www.boartlongyear.com).

## Returning Parts

If you desire to return parts, whether for repairs, replacement, or warranty, please contact our order desk with the following information: quantity, part numbers, model and serial number of the product, as well as the reason for requesting return.

**Boart Longyear Inc.**  
**P.O. Box 330, 1111 Main Street West**  
**North Bay, Ontario**  
**Canada P1B 8H6**

**Phone: (705) 474-2800**  
**Fax: (705) 474-2373**

DO NOT ship parts until authorized and shipping instructions are received.

All parts returned must be shipped prepaid.

A clean workshop area equipped with all the usual fitters' tools, work benches, component cleaning tanks and a hydraulic press is required prior to beginning any work. A steam cleaner outside the workshop is also required.

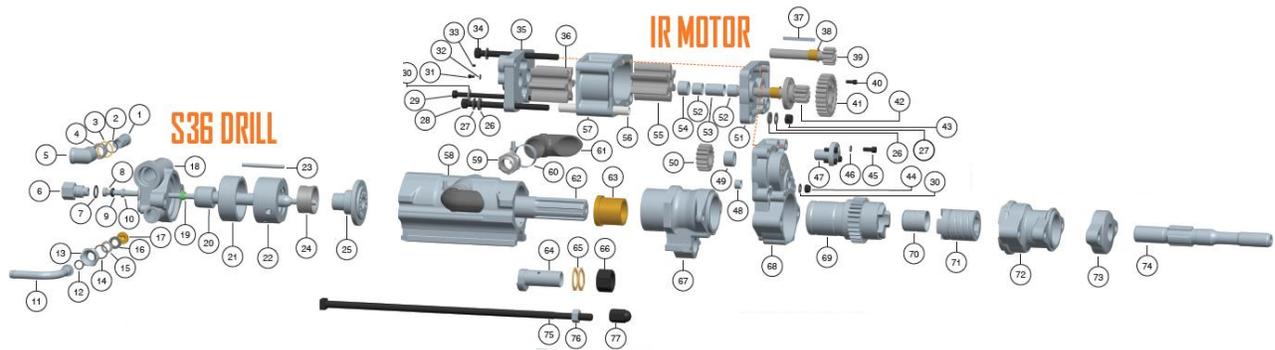
**Recommended Workshop Set-Up:**

- Work Bench - 91,4 cm x 213,4 cm (36" x 84") c/w air bulkhead (optional)
- 15,2 cm (6") Vice (not swivel) mounted on the corner of the bench
- 10,2 cm to 20,3 cm (4" to 8") Chain Vice mounted on opposite corner of bench
- Steel block for press - two 7,6 cm x 7,6 cm x 45,7 cm (3" x 3" x 18") and two 5,1 cm x 7,6 cm x 45,7 cm (2" x 3" x 18") with slider stop bars
- Cleaning Tank
- Bench Grinder (optional)
- Belt Grinder c/w piston support
- Torch Set c/w tanks
- Welder M/C (optional)
- Parts Cabinet - eight drawer
- Pin Skids
- Electric Rewind Extension Cord
- Lighting over work bench

**Recommended Tools and Equipment:**

- Torque Wrench with 12,7 mm (1/2") drive (up to 250 ft·lbs)
- Impact Wrench 12,7 mm (1/2") drive
- Pipe Wrench 61 cm (24")
- Pipe Wrench 30,5 cm (12")
- Pick Set
- Mechanic's Hammer
- Clamp c/w swing and dump
- Guide Shell 61 cm (24")
- Repair Tags and Report Sheets

### S36 Rockdrill - Exploded View



### S36 Rockdrill - Parts List

Item	Part Number	Description	Qty.
1	5601089	Air Stem	1
2	5603732	O ring	1
3	5602017	Air stem copper washer	1
4	5601090	Air stem nut	1
5	5602423	Air stem fitting	1
6	5602425	S36 water tube plug	1
7	5603787	O ring	1
8a	5604104	Tube, 14 mm water	1
8b	5603539	Tube, 11 mm water	1
9a	5602031	Seal, 14 mm water tube	1
9b	5604213	Seal, 11 mm water tube	1
10	5604100	Sleeve, 11 mm water tube	1
11	5602427	Air/water stem	1
12	5603790	O ring	1
13	5602967	Nut	1
14	5603735	O ring	1
15	5602015	Air/wtr stem rubber thr. wshr	1
16	5602999	Water stem rubber washer	1
17	5604217	Air/water stem thrust pad	1
18	5602453	Backhead	1
19a	5607579	Seal, green 14 mm rifle bar	1
19b	5605336	Seal, red 11 mm rifle bar	1
20a	5603284	Rifle bar, 14 mm dummy	1
20b	5601636	Rifle bar, 11 mm dummy	1
21	5601634	S36 backhead spacer	1
22	5609751	Valve box, S36	1
23	5604077	Valve box locating pin	1
24	5603541	Valve, S36	1
25	5607694	Valve plug	1
26	5604757	Washer	4
27	5601562	Washer, disc	10

Item	Part Number	Description	Qty.
28	5604060	Bolt, through 230mm	2
29	5603501	Bolt, M12	2
30	5601561	Washer, disc	4
31	5600806	Cap screw	3
32	5601565	Disc washer	3
33	5600906	Socket set screw	1
34	5603507	Bolt, M16 short	3
35	5602954	Air motor back plate	1
36	5602961	Gear motor rotor	1
37	5602915	Key	1
38	5603259	Bearing, needle roller	2
39	5602189	Drive pinion	1
40	5602008	Cap screw	8
41	5602186	Gear compound	1
42	5602738	Compound gear pinion	1
43	5603216	Nut, nylock	5
44	5603212	Nut, nylock	2
45	5602010	Cap screw	4
46	5605544	Washer, lock SS	4
47	5602416	Idler gear shaft	1
48	5602574	Hollow dowel	1
49	5603260	Needle roller bearing	1
50	5603503	Idler gear	1
51	5605825	Cover, front	1
52	5603258	Bearing, idle rotor	2
53	5601872	Spacer	1
54	5603259	Bearing, back plate	2
55	5602960	Air motor rotor-keyed	1
56	5604068	Locating Sleeve	2
57	5601585	Air motor housing	1

Item	Part Number	Description	Qty.
58	5602278	Cylinder, S36	1
59a	5601397	Adaptor, exhaust outlet	2
59b	5602109	Plug, exhaust outlet	Opt
60	5602491	Exhaust deflector clamp	2
61	5602211	Deflector, exhaust	2
62	5603270	Piston, 14 mm water bore	1
63	5607732	Front cylinder washer liner	1
64	5602414	Feed screw nut	1
65	5602576	Washer, lock	1
66	5602113	Nut, feed screw nut	1
67	5602950	Cylinder, front	1
68	5603000	Reduction housing	1
69	5605582	Chuck	1
70	5601640	Round chuck bush	1
71	5602725	Chuck jaw, S36	1
72	5608594	Front head	1
73	5603268	Locking plate	1
74a	450266	Shank - HM38	1
74b	450037	Shank - R38	1
74c	450212	Shank - R32	1
74d	450010	Shank - HM45	1
75	5604058	Side rod	2
76	5604215	Side rod lock nut	2
77	5604075	Side rod nut	2

## Maintenance Routine

Periodic examination and stripping of rockdrills is essential for good operation and to ensure optimum life for the components. We recommend that rockdrills are serviced on a call up basis every 20 shifts or one month, whichever is shorter, when in regular use and that a record is kept for every machine.

The maintenance of any rockdrill always follows the same set pattern: external clean, strip down, clean parts, inspect, replace, rebuild and test.

Sophisticated measuring equipment used to accurately gauge the wear on components is often not available. Consequently, wear is gauged by simple, but effective work shop practices.

## Dismantling Procedure

### Reference Exploded View and Parts List on page 8

1. Clean the outside of the machine to remove excess oil and dirt.
2. Remove side rod nuts Ref. 77 and remove the fronthead locking plate Ref. 73.
3. Remove the lock nuts Ref. 76. as the rod is removed.
4. Remove the chuck Ref. 69 from inside the fronthead Ref. 72.
5. The fronthead may now be removed.
6. The chuck gear Ref. 69 may now be removed from the front cylinder Ref. 67 complete with chuck bushing Ref. 70.
7. The rotation drive assembly can be removed from the machine as a major sub-unit.
8. The motor assembly can be removed from the mounting plate by unscrewing the seven bolts Ref. 28, 29 and 34 and removing them complete with the plain and spring washers.
9. The motor may be opened by separating the end plates Ref. 35 and 51 from the housing Ref. 57 after the locating tubes are removed. The main drive rotor Ref. 55 is keyed to the drive pinion Ref. 39 with a plain key Ref. 37. This pinion runs on needle roller bearings and a flanged bushing located in the motor end plates (ref 54 & 38).
10. The other air motor rotor Ref. 36 runs on needle bearings Ref. 52 carried by the compound gear pinion shaft Ref. 42 and separated by the spacer Ref. 53. The compound gear can be slid out of the rotor to remove the components.
11. The compound gear pinion runs in a needle roller bearing Ref. 54 and flange bushing Ref 38 located in the motor end plates. The bearing in the back plate 35 may be removed by unscrewing set screw Ref. 33 and tapping the bearing out with a small drift through the opened hole.
12. The compound gear Ref. 41 can be removed from the pinion by unscrewing the eight cap screws Ref. 40.

13. The idler gear Ref. 50 is carried on a shaft Ref. 47 secured to the reduction housing by four cap screws Ref. 45. If the screws are removed, the shaft may be withdrawn and the gear allowed to drop out of the housing complete with its bearing Ref. 49.
14. From the back of the machine the backhead Ref. 18 may be removed complete with the water tube Ref. 8 and fittings. Be careful not to bend or damage the water tube if it is not removed from the backhead initially.
15. Remove the water tube from the backhead by unscrewing the plug Ref. 6 and pushing the tube from the front. The water tube seal Ref. 9 should be removed.
16. Remove the backhead spacer Ref. 21 and the dummy rifle bar Ref. 20 with its seal Ref. 19.
17. The valve assembly may now be removed completely by pushing the piston Ref. 62 up the bore and if necessary hammering on the end of the piston with a copper mallet and suitably shaped drift. The valve box locating pin Ref. 23 will come out with the assembly.
18. The piston may now be removed from the cylinder.
19. The valve box assembly may be dismantled, by driving the plug Ref. 25 out of the valve box. This may be done easily by fitting a suitable punch into the centre hole. Hammering on the punch will drive the valve plug out of the valve box Ref. 22. The valve Ref. 24 may then be lifted off the plug.
20. The air stem Ref. 1 and the other air inlet fittings may be removed from the backhead by unscrewing the air stem nut Ref. 4.
21. The water stem Ref. 11 may be removed from the backhead by unscrewing the nut Ref. 13. Make sure that the internal components, the thrust pad Ref. 17, thrust washer Ref. 15 and rubber Ref. 16 are not lost.
22. The front cylinder Ref. 67 need only be removed from the cylinder when either of these components is to be replaced. If the front cylinder is tight, insert the piston the wrong way round into the cylinder and push it down the bore until it contacts the front cylinder. Press on the end of the piston with a hydraulic press to separate the front cylinder from the main cylinder.
23. The feed nut Ref. 64 can be removed from the front cylinder by unscrewing the nut Ref. 66.
24. The front cylinder liner Ref. 63 should be pressed out of the front cylinder if it is to be replaced. This can be done with the front cylinder still installed by turning the cylinder on end and pressing the liner out using a suitable punch.
25. The chuck bushing Ref. 70 should be pressed out of the chuck from the rearward side.

## Inspection of Components

### 1. Backhead

- Check that the water tube is of the correct type, and the water tube seals are in good condition. Replace if they are damaged.
- Check air stem and nut, excessive wear on the bearing surfaces of these components will result in the loss of air pressure to the machine. Replace one or both if necessary.

### 2. Piston

- Check the striking face of the piston, it should be flat, square to the axis and smooth. When it is dished by up to 1 mm max. it may be refaced square by grinding to restore a flat surface. This grinding must be done with care and with adequate cooling. A maximum of 2mm can be removed in these refacing operations. Ensure that the radius on the end of the spline is restored to prevent damage to the chuck nut.

### 3. Cylinder and Front Cylinder

- The wear between the piston, cylinder and front cylinder liner should be checked. Insert the piston in the cylinder and pull the stem rapidly forward from the front end, the piston should bounce on the air cushion. If it does not, check again with a new piston and replace the front cylinder liner if necessary to restore this cushion. The wear between the cylinder and piston should not exceed 0.2 mm (.008"). Check the cylinder with a new piston and the piston in a new cylinder, replace as necessary.
- If fitted, check the feed nut. This should be replaced when the threads in the bore of the nut are worn to half their original thickness. Make sure the new nut is correctly assembled and tightened. The tab washer should be correctly fitted and locked on the nut.

### 4. Valve Box Assembly

- This should be cleaned and checked for burrs on faces and bearing surfaces. Any burrs should be carefully removed.

- When reassembled the valve must be able to move freely inside the box and over the plug. Wear in the valve may be checked by blocking off the kicker port in the side of the flange on the valve with a finger. The free movement of the valve in the assembly should be restricted by the air trapped beneath the valve.

### 5. Chuck and Bushing

- The chuck will not normally show excessive wear, the clearance between the chuck and the front cover should not exceed 1 mm (.040"). The chuck should be discarded when it has worn 2.5 mm (.100") at the worst point. The chuck insert should be discarded when it has worn 1 mm (.040") oversize on the diameter.
- Excessive wear of the chuck insert will allow damage to other components, particularly the piston and striking bar. New inserts should be pressed into place - never hammered. The thrust pad should be replaced when the wear on the striking bar locating face exceeds 2 mm (.080").

### 6. Rotation Drive

The air motor components should have a long and trouble free life.

- Check the gear teeth in the rotation motor and on the outside of the chuck gear. Any slight burrs or surface damage should be cleaned off to prevent further damage. Replace the gears if the teeth are worn 50% or more.
- The needle roller bearing in the idler gear should have good life as long as it is adequately lubricated. Check to make sure the idler gear runs freely and true, if not, the bearings need replacement.
- Check the shafts to ensure minimal wear to prevent misalignment and binding. The main rotors and end plates may be checked for burrs or rubbing marks and these should be cleaned off.
- The rotors should run freely on the needle roller bearings, if they do not, the bearings should be checked and replaced if necessary.

## Assembly Guide

Before commencing assembly:

All components should be washed in a solvent and carefully dried by blowing or wiping with clean cloths. Each component should be lubricated with rockdrill oil as it is assembled. Reassemble carefully, do not 'drive' components that should be pressed together. Make sure sliding and rotating components are carefully aligned to avoid jamming.

1. Press the chuck bushing Ref. 70 into the front of the chuck gear Ref. 69.
2. Press into place the front cylinder liner Ref. 63 using the piston as a guide.
3. The feed nut Ref. 64 should be assembled into the front cylinder. Push the nut into place from the rear of the machine making sure that the flat on the flange lines up with the cylinder wall. Fit the lock washer Ref. 65 and the nut Ref. 66 on the threaded portion of the nut.
4. Insert the piston Ref. 62 into the rear of the cylinder.
5. Assemble the valve box. Carefully fit the valve Ref. 24 over the plug Ref. 25 and valve making sure the groove for the dowel is correctly aligned. When the box Ref. 22 engages the plug, press the two components together until the flange of the plug meets the front face of the box. It is important to check that the valve can move freely inside the box. If it does not move freely something is wrong and should be checked.
6. Insert the valve assembly into the rear of the cylinder using the locating pin Ref. 23 to make sure the ports line up inside.
7. Fit the dummy rifle bar Ref. 20 into the bore of the valve assembly with the seal Ref. 19 making sure it is fitted into the recess at the rear.
8. Fit the backhead spacer Ref. 21 into the rear of the cylinder making sure it is located squarely on the rear of the valve assembly and the dowel.

### 9. Rotation motor and drive sub assembly:

- (a) Fit the needle roller bearings Ref. 54 into the back plate. Fit the flange bushings Ref. 38 into the front plates.
- (b) Push the drive pinion Ref. 39 through the left hand bore in the motor front plate Ref. 51 when looking from the rear.
- (c) Fit the keyed rotor Ref. 55 and its key Ref. 37 to the drive pinion.
- (d) Assemble the compound gear Ref. 41 onto the compound gear pinion Ref. 42 using the eight cap screws.
- (e) Fit the compound gear pinion through the right hand bore in the motor front plate from the front.
- (f) Assemble the needle roller bearings Ref. 52 and the spacer Ref. 53 on the pinion shaft.
- (g) Fit the air motor housing Ref. 57 over the rotors and assemble the back plate Ref. 51 into the ends of the shafts Ref. 39 and 42.
- (h) Attach the assembled motor to the reduction housing by means of the seven bolts and nuts. Make sure the locating sleeve Ref. 56 is fitted correctly over bolts. Spring washers are fitted beneath both the head of all the bolts, and under the nuts.  
  
In addition spacer washers are fitted beneath the spring washers on the two large lower bolts Ref. 26.
- (i) Tighten all the nuts Ref. 43 to a torque of 110 Nm (81 ft-lb) and Ref. 44 to a torque of 80 Nm (59 ft-lb).
- (j) If the idler gear Ref. 50 is to be reassembled hold the gear with its bearing Ref. 49 already fitted into place inside the housing. The shaft Ref. 47 should be pushed into the housing from the front and through the bore of the bearing inside the gear. The shaft is secured with the screws and washer.

10. Fit the assembled air motor and reduction housing over the front cylinder Ref. 67 already fitted into the main cylinder Ref. 58.

11. Insert the chuck assembly Ref. 69 into the front cylinder bore and engage the gear teeth on the chuck with the idler gear.
12. The front cover Ref. 72 can now be fitted into the front bore of the reduction housing.
13. The chuck Ref. 71 should be fitted into the fronthead making sure that the dog drive at the rear end is correctly located with the dogs on the chuck gear.
14. The backhead Ref. 18 may now be fitted over the spacer and locating pin, push it firmly into position.
15. Insert the side rods Ref. 75 through the lugs in the backhead and down the machine. Fit the lock nuts Ref. 76 over the threads between the two lugs on the fronthead. Make sure the head of the side rod is located correctly on the lug of the backhead.

The lock nuts should be screwed lightly against the front cover and locked together. They are only intended to prevent the machine coming apart when the main nuts are removed.
16. Fit the correct striking bar Ref. 74 into the front of the machine and attach the fronthead locking plate Ref. 73 with the nuts Ref. 77. Tighten the nuts evenly to a torque of 260 Nm (192 ft-lb).
17. The water tube Ref. 8 should be fitted into the backhead. Make sure it is the correct type for the striking bar being used and that the rubber Ref. 9 is in good condition and pushed into place beneath the flange. Push the tube into the machine until it is seated. The water tube plug Ref. 6 should be screwed into place making sure the O-ring Ref. 7 is correctly fitted.
18. The air inlet stem Ref. 1 can be assembled into the air inlet bend Ref. 5 making sure the nut Ref. 4 is in place first. Always use a new copper washer Ref. 3 when replacing the air stem.
19. The assembly should be screwed into the threaded bore in the backhead making sure the O-ring Ref. 2 and the copper washer Ref. 3 are in place.
20. The water stem should now be fitted. The stem thrust pad Ref. 17, the stem rubber seal Ref. 16 and the stem thrust washer Ref. 15 should be fitted to the inside. The stem nut. Ref. 13 should be fitted over the stem taking care that the O-rings Ref. 12 and 14 are in place. The nut may then be threaded into the threaded hole in the backhead.

## Testing S36 Rockdrill

**NOTE: Always check that the reassembled rockdrills operate properly before they leave the workshop.**

**A test bench facility with 90 psi (620 kPa) air connection is required.**



1. Apply a small amount of oil into air inlet prior to air hook up.
2. Install proper striking bar into drill and torque side rod nuts to specification.
3. Clamp down drill in aluminum slide.
4. Slowly turn on air supply to ensure proper operation of rockdrill. **DO NOT operate rockdrill wide open on bench test.**

## Water Testing Procedure

1. Connect water and turn on.
2. Check for water leaks around water inlet. Ensure water is not leaking into the body of the rockdrill.

## Startup and Lubrication Procedures

### 1. Keep dirt out of the lubricator:

When filling or fitting a lubricator bottle, no dirt must be allowed to enter the air passages or the lubricator reservoir.

**▲ WARNING** Ensure your air supply is turned off before servicing.

### 2. Clearing hoses:

Before attaching the air hose to the machine, clear the hose of dirt. To do this, hold the open end of the air hose firmly and point in a safe direction. Rapidly open and close the air supply valve to blow dirt out of the air hose and hose fittings. (maximum of 5 seconds blow). Flush out the water line before connecting to the drill.

### 3. Hose attachments:

Ensure that the hoses and fittings used are compatible, in good condition and securely fastened. Remove the dust caps. Ensure that oil is flowing from the lubricator through the air hose before attaching to the rockdrill. Fit the water hose. The machine is now ready to run.

### 4. Running:

Open throttle and allow the drill to idle for 1 minute so oil can be distributed throughout the drill internally. Oil should be visual on the outside at the fronthead and striking bar. Water should flow out of the striking bar or through the steel if it is fitted. The drill is now ready for work.

### 5. Lubrication:

Use only genuine rock drill lubricant which is available from selected reputable suppliers. Check that the grade of lubricant used is suitable for the application. Ensure that the line lubricator bottle is full at the start of each shift and kept topped up during extended periods of use. Check and refill twice each shift.

Rockdrill Lubricating Oil

- Ultramar Ultrarok 100
- Century 763
- Shell Torcula 100
- Esso Arox EP 150
- Mobil Almo 527

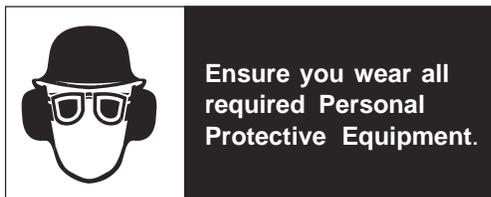
Lubricators should be checked and serviced at regular intervals. They should be thoroughly cleaned and the feed jets checked for blockages.

Problem	Reason	Repair Procedure
Will not start	<ul style="list-style-type: none"> <li>• Air line supply blocked</li> <li>• Piston stuck - no air blowing</li> <li>• Frozen exhaust parts</li> <li>• Damaged or tight front cylinder</li> </ul>	<ul style="list-style-type: none"> <li>• Check for blockage</li> <li>• Cylinder dented, rotation jammed, fronthead seized</li> <li>• Install moisture trap in air line and after compression surface check rubber seal at end of water tube</li> <li>• Check water tube for cracks</li> <li>• Hone or ream front cylinder liner to proper fit and check cushion</li> </ul>
Erratic or sluggish operation	<ul style="list-style-type: none"> <li>• Rockdrill oil too heavy for ambient temperature</li> <li>• Too much oil flowing from lubricator - check lubricator setting</li> <li>• Machine heating up</li> <li>• Dirt in machine</li> <li>• Broken parts</li> <li>• Main valve sticking</li> </ul>	<ul style="list-style-type: none"> <li>• Change type of oil - preferably mineral based</li> <li>• Reset lubrication</li> <li>• Check lubricator hose length and lubricator setting</li> <li>• Disassemble, clean, check for damage - use clean oil in lubrication. Check for oil rotted hose. Cover and place drill in clean place when blasting and moving</li> <li>• Make certain all parts are operating freely</li> <li>• Check for dirt, burrs, or nicks</li> </ul>
Drill lacks power but sounds good	<ul style="list-style-type: none"> <li>• Improper striking bar position</li> <li>• Worn or broken piston</li> <li>• Plugged kinked hose or air screen</li> <li>• Low air pressure</li> <li>• Lack of oil</li> <li>• Loss of fronthead cushion</li> </ul>	<ul style="list-style-type: none"> <li>• Check striking bar length</li> <li>• Check chuck insert condition</li> <li>• Check piston for wear and proper length</li> <li>• Clean</li> <li>• Check air lines and valves - min 90 psi (620 kPa)</li> <li>• Front of cylinder and front cylinder will be warm</li> <li>• Worn piston - replace and check for outer flange wear</li> <li>• Worn front cylinder liner- check and replace if necessary</li> </ul>

Problem	Reason	Repair Procedure
	<ul style="list-style-type: none"> <li>• Cylinder damaged</li> <li>• Damaged chuck</li> <li>• Damaged fronthead</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> </ul>
Slow drill speed	<ul style="list-style-type: none"> <li>• Low air pressure</li> <li>• Plugged air screen in lubricator or air hose</li> <li>• Cuttings not being removed from hole (poor flushing)</li> <li>• Improper alignment in hole</li> <li>• Bit not gauged properly</li> <li>• Buttons or blades missing in bits</li> <li>• Piston worn</li> <li>• Machine not assembled properly, side rods loose,</li> </ul>	<ul style="list-style-type: none"> <li>• Should be 90 psi (620 kPa) or better</li> <li>• Clean</li> <li>• Check water tube. Check plugged drill steel (blow down steel in water puddle). Check water pressure</li> <li>• Keep drill steel centred in hole</li> <li>• Check</li> <li>• Check</li> <li>• Replace</li> <li>• Tighten to 200 ft-lb (270 Nm), replace or repair</li> </ul>
Drill freezing	<ul style="list-style-type: none"> <li>• Excessive moisture in air</li> <li>• Broken or cracked water tube</li> <li>• Leaky water tube seal</li> </ul>	<ul style="list-style-type: none"> <li>• Drain air lines - install moisture traps (DO NOT HIT CYLINDER)</li> <li>• Replace</li> <li>• Replace</li> </ul>
Bogging	<ul style="list-style-type: none"> <li>• Broken or cracked water tube</li> <li>• Excessive moisture in air supply</li> <li>• Too much oil</li> <li>• Water leaking around water tube seal</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Blow air lines, install moisture traps</li> <li>• Check lubricator adjustment</li> <li>• Change water tube seal</li> </ul>
Piston chipped or broken	<ul style="list-style-type: none"> <li>• Damaged striking bar face</li> </ul>	<ul style="list-style-type: none"> <li>• Reface piston so that axis is at right angles to striking face</li> <li>• Inspect/replace striking bar</li> </ul>

<b>Problem</b>	<b>Reason</b>	<b>Repair Procedure</b>
Bronze cuttings in drill	<ul style="list-style-type: none"> <li>• Lack of lubrication</li> <li>• Rough or damaged piston</li> </ul>	<ul style="list-style-type: none"> <li>• Use proper rockdrill oil</li> <li>• Check lubricator for proper setting</li> <li>• Check lubricator hose length</li> <li>• Replace or use fine grindstone to smooth parts</li> </ul>
Excessive wear of parts	<ul style="list-style-type: none"> <li>• Faulty lubrication</li> <li>• Dirt in drill</li> </ul>	<ul style="list-style-type: none"> <li>• Replace necessary parts</li> <li>• Inspect lubricator</li> <li>• Inspect lubricator screen</li> </ul>
Broken Striking Bar	<ul style="list-style-type: none"> <li>• Incorrect rockdrill alignment while drilling</li> <li>• Worn front locking plate</li> <li>• Worn centralizer jaws</li> </ul>	

**⚠ WARNING** Never leave the machine unattended without the rods coupled to the rockdrill striking bar. If the air pressure in the centralizer cylinder is lost, the clamping power will be lost and the drill string can fall out of or into the hole.



## Collaring

1. Engage rotation to counterclockwise direction.
2. Shift the water flushing lever forward. Water should be spraying out of the end of the bit.
3. Gradually shift the feed lever forward, close the centralizer to stabilize the drill rod.
4. As the drill bit meets the rock, gradually shift the percussion lever.
5. If the surface being collared is rough or angled, a gentle, patient approach will be more successful.
6. It may require several attempts back and forth with the feed before the hole is successfully collared.

## Drilling

1. The water flushing lever should be completely forward.
2. The rotation lever should be in the counterclockwise rotation direction.
3. Increase rotation speed to match drill bit requirements. Adjust the rotation control to give a rotation speed of about 100 ~ 150 rpm. This rotation speed should be adjusted to give the best penetration speed - generally faster for small holes and softer rock and slower for larger holes and very hard rock. Keep the drill string oscillating slightly at all times while drilling.
4. Shift the percussion lever completely forward.

5. Shift the feed lever forward. The amount of movement on the feed lever will dictate the force behind the drilling bit. With experience, the sound of the drill will indicate when the feed thrust needs adjustment.

**NOTE:** Underfeeding will result in overheating of the drill string couplings, reducing component life. Overfeeding can result in hole misalignment.

**⚠ CAUTION** Periodically check the air escaping around the striking bar to confirm that it is receiving adequate lubrication. There should be a fine mist of oil exhausting during normal operation. Poor or non-existent oil flow will cause extensive damage in a very short period of time.

## Adding Steel

1. When the rockdrill has completed drilling the entire length of drill steel, move the rotation, percussion and feed levers to neutral, and turn off the water flushing.
2. Shift the centralizer control lever forward to clamp the coupling.
3. Pull the rotation lever toward you to turn the rotation clockwise.
4. Pull the feed lever toward you to simultaneously retract the feed. This prevents thread binding.
5. When the rockdrill striking bar is released from the coupling being held in the centralizer, pull completely back on the feed lever to quickly retract the rockdrill while bringing the rotation lever to neutral.
6. When the rockdrill is at the back of the feed, insert a new length of drill steel/coupling between the rockdrill striking bar and the coupling held in the centralizer.

**⚠ WARNING** Always ensure that rockdrill rotation has come to a complete stop before attempting to add or remove a drill rod.

7. Shift the feed lever forward to advance the striking bar until the new length of steel is held centered between the rockdrill and the centralizer held coupling.
8. Push the rotation lever forward to begin rotation.
9. When the threads at both ends of the new length of drill steel are fully engaged, start the water flushing, engage the percussion, and engage the feed.
10. Normal drilling will resume.
8. When the drill steel is loose, remove it and set it aside. Pay attention to rod rotation in an effort to maximize steel thread life.
9. Move the rotation lever forward to rotate the drill counterclockwise and advance the feed until the drill striking bar is engaged with the coupling held in the centralizer.
10. Open the centralizer.
11. Pull back on the feed lever to pull the rockdrill and the drill string back. When the next coupling is centered in the centralizer, move the feed lever to neutral and clamp the coupling using the centralizer.

## Rod Pulling

1. When the hole has been drilled to the required length, disengage all levers to halt all functions.
2. To rid the hole and the drill steel from any leftover flushing water, pull back on the flushing lever to blow out the hole with air.
3. Move the feed lever forward until the drill string is tight against the bottom of the hole.
4. With rotation off, engage the percussion and move the feed lever back and forth several times to loosen all of the drill string joints. Disengage the percussion when complete.
5. Pull back on the feed lever to pull the rockdrill and the drill string back. When the first coupling is centered in the centralizer, move the feed lever to neutral and clamp the coupling using the centralizer.
6. Pull back on the rotation lever to rotate the rockdrill clockwise and unthread the drill steel from the coupling, while at the same time pulling back slightly on the feed lever to prevent thread binding during uncoupling.
7. Because the drill steel is threaded at both ends, there is no way to predict which end will unthread with the rockdrill (with experience, it will become somewhat predictable). Consequently, usually at least one end of the threaded joint will have to be unthreaded by hand.
12. Repeat the above procedure until the entire drill string is removed from the hole.

**▲ WARNING** Always ensure that rockdrill rotation has come to a complete stop before attempting to add or remove a drill rod.