

# UNDERGROUND ROCK DRILL

*'Narrow Vein Rock Tools'*



## SERVICE INSTRUCTIONS AND SPARE PARTS LIST

### MODELS:

DRF 24/120

DRF 24/130

DRF 24/170



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## SAFETY PRECAUTIONS



The safety precautions listed in the manual are intended to alert operator and helpers to the possible physical dangers inherent in the various stages of operating and/or maintaining equipment of this kind. All personnel involved in operating and/or maintaining this equipment must read and thoroughly understand the operating instructions before attempting to operate, or perform maintenance on the drill machine. Non-authorized, or untrained personnel must not under any circumstances attempt to operate or maintain the machine.

- During Operation of the drill, safety shoes, safety glasses, ear protection and safety helmet are to be worn,
- Exposure to excessive noise can lead to hearing deficiency. APPROPRIATE ear protection must always be worn.
- Distraction increases danger of accident.
- Only on actual operation of drill should the operating handle be touched.
- When working with the drill, sure and firm footing is necessary.
- The drill should not be brought near to the face.
- Never place the drill on your foot.
- Never point the drill at co-workers or yourself.
- The drill should never be put into operation if it is lying on the ground or if it is not held securely in working position.
- Compressed air is dangerous! Never point a connected compressed air hose at co-workers or yourself. Avoid the habit of blowing your clothes free of dust with compressed air.
- Be sure that all hose connections are tight and sealed. A loose hose not only causes loss of air; danger exists that it comes completely off the drill, whips around injuring the operators and others in the area. Secure hoses with safety cables or ropes to prevent danger of injury in case a hose gets broken.
- Never disconnect a pressurized air hose: First shut off air from the compressor and bleed the drill.
- The drill should only be operated with a specially suitable inserted drill rod. Operate with sufficient pressure, avoid recoils. When the machine is under pressure, oilers may not be filled up and tools may not be exchanged.
- The drill should always be held with both hands during operation.
- The operator must have a firm footing. If possible the operator's feet should be so placed out of the falling range of the drill, but without the danger of losing balance. In the case of breakage of drill rod, there is danger of sudden falling of drill with protruding and broken drill rod part.
- Never operate drill astride, I.E., with one leg over the handle. In the case of breakage of the inserted drill rod, serious injuries can result.
- Ensure that no cables, pipes and the like are in area of drill operation (electric, gas, water, telephone).
- In the event of drill contacting unknown objects during operation, switch off drill immediately. Identification of object should be carried out by careful uncovering with shovel, not with the drill.
- In case a cleaning solvent is used for cleaning drill parts, make sure that this meets the current safety and health regulations and that it is used in a well-ventilated area.



**TO SERVICE THE MACHANIC**

These instructions have been written for you. Please read them carefully and observe the recommendations given. By doing so you will not only save time, but also the cost of spare parts.

**TECHNICAL DATA**

	<b>DRF 24/120</b>	<b>DRF 24/130</b>	<b>DRF 24/170</b>
<b>DIMENSIONS</b>			
<b>Weight</b>	40.9kg	41.4kg	42.1kg
<b>Retracted Length</b>	1365mm	1425mm	1605mm
<b>1<sup>st</sup> extension</b>	635mm	695mm	875mm
<b>2<sup>nd</sup> extension</b>	595mm	655mm	835mm
<b>Stroke</b>	1230mm	1350mm	1710mm
<b>Extended Length</b>	2595mm	2775mm	3315mm
<b>Drill Piston Diam</b>	80mm	80mm	80mm
<b>Drill Piston Stroke</b>	60mm	60mm	60mm
<b>Leg Piston diams</b>	78/65mm	78/65mm	78/65mm

Drive

Optimum operating air pressure: 5 – 6 bar

Air consumption at 6 bar: 4.2 m3/min

Flushing Water

Water pressure: in each instance 0.5 bar lower than operating air pressure

Recommended flushing water flow rate: approx. 7 litres per minute

Operating Principles

Sense of rotation of Rockdrill: Standard L.H Rotation

Optional R.H Rotation

Silencing: Integrated in housing

Tool Chuck Insert: 22mm x 108mm hexagon

(7/8" x 4 1/4")

Hose pipes

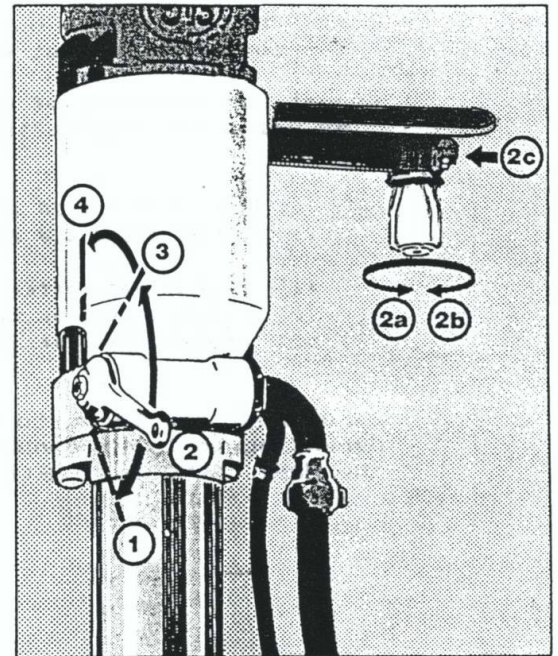
Compressed air supply: 25mm (1")

Flushing water supply: 13mm (1/2")

## OPERATION

### 1. Control Elements

- Relief:  
Operating lever in pos 1.  
The compressed air and flushing water supplies to the Rockdrill are shut. The airleg is relieved so that the stoper drill retracts thanks to its dead weight.
- Extending:  
When operating lever is set to Pos 2. Compressed air is admitted to the airleg. The adjustment of the feed is effected by means of the twist grip. By following direction 2a the feed power is increased, by following direction 2b the feed power is decreased. By pressing knob 2c the Airleg can be shortly relieved. Both the compressed air and flushing water supplies to the rockdrill are still shut.
- Collaring:  
With operation lever set to pos 3. the Rockdrill starts operating at a reduced level of performance.
- Drilling:  
By pushing the operating lever to pos 4. The Rockdrill generates its full performance.



### 2. Compressed Air and Flushing Water

- Compressed air must be dry and clean.
- Inside diameter of compressed air hoses must be at least 25mm.
- Blow compressed air hoses before connecting them to the Rockdrill.
- Inside diameter of flushing water hose must be at least 13mm.
- Flush the flushing water hoses before connecting them to Rockdrill.
- Flushing water pressure must always be 0.5 bar lower than operating air pressure.

### 3. Lubricating the Rockdrill and Airleg

When working, always fit the automatic line oiler PLO 20 or POB 15 in the compressed air feed line, at a maximum of 3-4 metres, (10 – 12ft), from the SIG.au DRF Stoper.

Check that oil oozes out of the chuck. The tool collar must be covered with oil.

Adjust the quantity of oil required for this purpose by using the regulating screw on the line oiler.

*Note: The line oiler PLO 20 interrupts the air supply to the Rockdrill and Airleg when –*

- A) It does not contain any more oil.*
- B) A leak occurs on the compressed air line between the line and oiler and the Rockdrill.*

Care should be taken to select the correct grade of oil depending on local conditions.

### 4. Tools

Drill steels used must be in accordance with ISO standards.

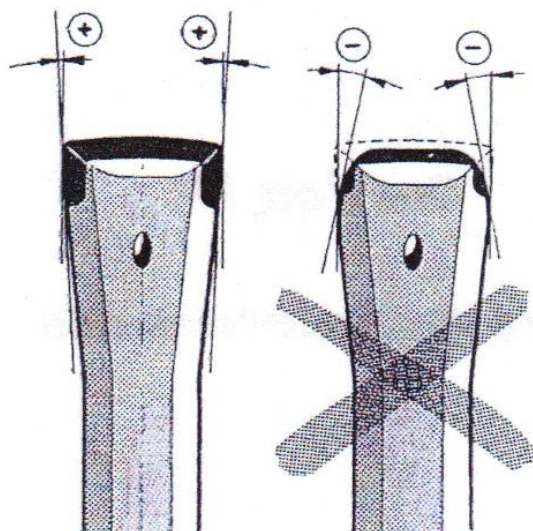
#### **Shanks:**

- Shanks must be intact and clean.
- The contact surface must be smooth and in the correct angle to the drill rod axis.
- Flushing holes must be clogged.

#### **Bits:**

- Must be correctly shaped (no inward taper).
- Flushing holes must not be clogged and have to be at the right place and of the correct size.

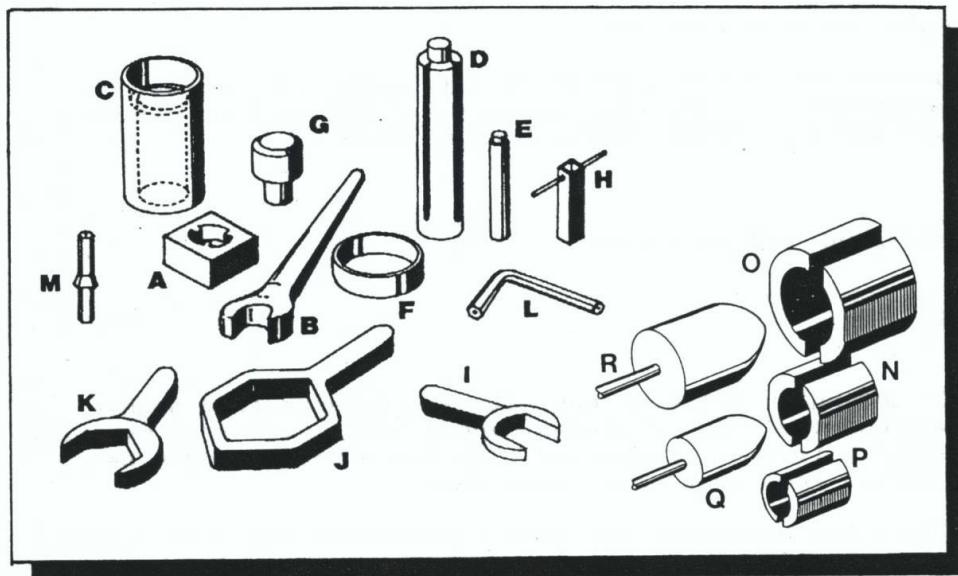
Also please comply with any specific instructions given by the drill steel manufacturer.



**MAINTENANCE**

Dismantle and clean the rock drill periodically. The air leg should be checked and where necessary, replace worn seals.

When doing so, check working parts in accordance with the section on 'SPARE PARTS, SERVICE DATA'



**SERVICING TOOLS**

ITEM	DESCRIPTION	ORDER NUMBER
A	Spanner for chuck nut	64 918 160
B	Wrench for side rod nuts	64 918 040
C	Dismantling Sleeve	64 918 110
D	Dismantling drift	64 918 141
E	Drift for distribution system	64 918 150
F	Sleeve for ratchet bush	64 918 170
G	Drift for ratchet bush	64 918 180
H	Tool for water valve screw	64 918 220
I	Airleg piston spanner	64 979 990
J	Airleg outer cap spanner	64 979 960
K	Airleg inner cap spanner	64 979 970
L	Self-made bent drill steel for chuck nut replacement	
M	Self-made short piece of steel shank for chuck insert replacement. (steels to be 7/8")	
N	Inner cylinder clamp set	Available on request
O	Outer cylinder clamp set	Available on request
P	Piston rod clamp set	Available on request
Q	Inner cylinder dolly	Available on request
R	Outer cylinder dolly	Available on request

### **DISMANTLING THE ROCKDRILL**

*To help, please unfold the exploded view at the end of this booklet.*

1. Unscrew nuts 39, using wrench B.
2. Pull out side rods 38.

Dismantling to this point is sufficient for normal maintenance of the rockdrill. For further information, see section 'SPARE PARTS, SERVICE DATA'.

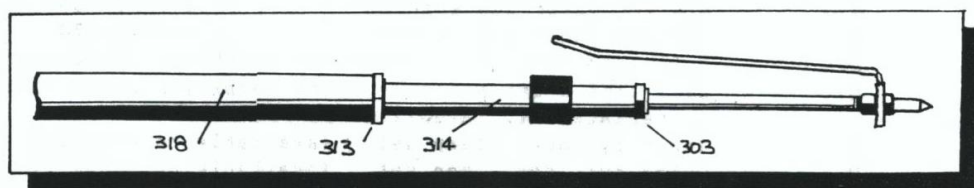
### **DISMANTLING THE AIRLEG**

#### CHECKS:

1. If the outer cylinder has not been damaged to a degree whereby the inner cylinder cannot be removed from the bottom end, it is not recommended that the outer cylinder be removed from Rockdrill backhead.
2. Check for excessive air loss from behind the lift handle control. If not excessive air loss from behind the lift handle control. If not excessive, it is not recommended to dismantle the control spool.
3. Unless it is loose or spare parts are required, it is not recommended to dismantle the foot stud from the piston rod.

#### DISMANTLING:

4. Clamp the inner cylinder 314 in a pipe vice 150mm from the cap inner front 303 and remove the cylinder cap 304, using tool K. This allows the rod assembly with foot to be removed.



5. Clamp the outer cylinder 318 in a pipe vice and remove the outer cylinder cap 313, using tool J.

CLEANING:

1. Clean all parts thoroughly with paraffin oil, particularly the components of the Rockdrill.
2. Blow out all parts with compressed air and dry with a clean cloth.

REASSEMBLY:

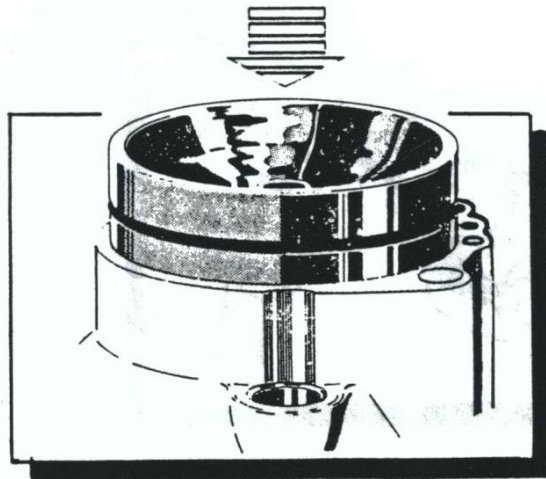
1. Replace all worn O’rings as necessary, including control assemblies if found to be excessively leaking before disassembly.
2. Before reassembly, grease all parts well with a non-resinous, acid-free grease.

*EXCEPTION – Valve plate 31 and valve chest 29 should only be oiled*

3. Reassemble the stoper in accordance with the exploded view.

NOTES

- A) *When reassembling, ensure that the distribution system of the Rockdrill, parts 29, 31, 32 and 137, is pressed vertically into the housing 84. Take care as there is a risk of tilting.*



- B) Ensure that the ratchet 333, engages the control spool 341, correctly, to maintain the fine adjustment of the Airleg in operation.
- C) Take care that all components are firmly tightened with the correct tools.

### SPARE PARTS AND SERVICE DATA

#### A) BACKHEAD MAINTENANCE

Seals 23 and 28 must be in order as otherwise there is a risk of flushing water penetrating into the inside of the Rockdrill.

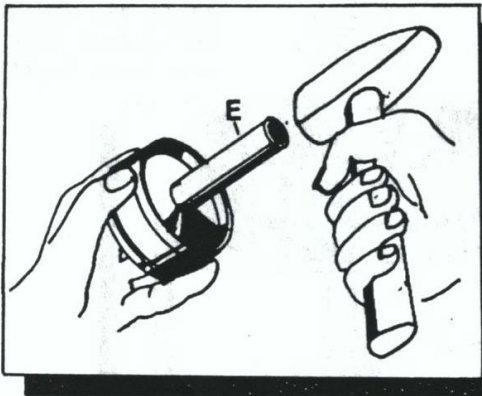
O'rings 5 on water valve pin 7 must be replaced if water trickles through at the operating lever.

Blow out excess water using compressed air.

Throttle valve 2 is changed by dismantling air connection 53 and 54, together with nut 58. Set the operating lever to position C and then pull off the throttle valve. The throttle valve is removed through the air connection.

#### B) DISTRIBUTION SYSTEM

To dismantle the distribution system 29, 31 and 32, using drift E as shown in drawing



*Use this drift only, any other tool will destroy valve plate 31 which is located inside the distribution system. When reassembling, take care to ensure that the valve plate can move when the distribution system is shaken.*

#### C) HOUSING

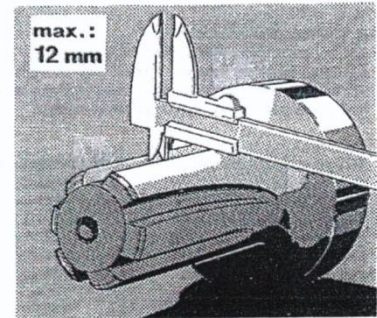
When dismantling the Rockdrill and hence housing 84, check whether the O'ring seals in the threaded side rod bores are intact. (O'rings 136)

*Before refitting deformed side rods, machine the rods flat to ensure that O'ring seals are not damaged.*

**D) Piston**

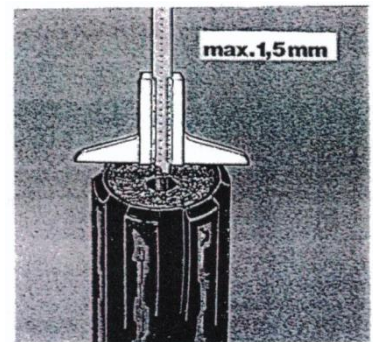
Check guide and twist grooves for wear.

Max groove width: 12mm. If worn, replace the piston.



Check the percussion surface of piston for wear.

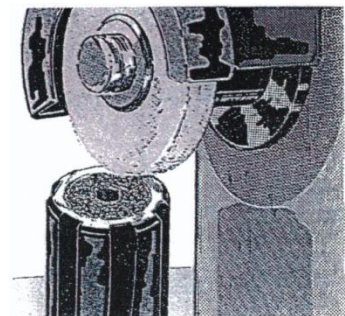
Max depth: 1.5mm. The piston may be refaced by grinding.



**Caution:**

In doing so, grind down the protruding edge only.

Under no circumstances should the surface be ground.

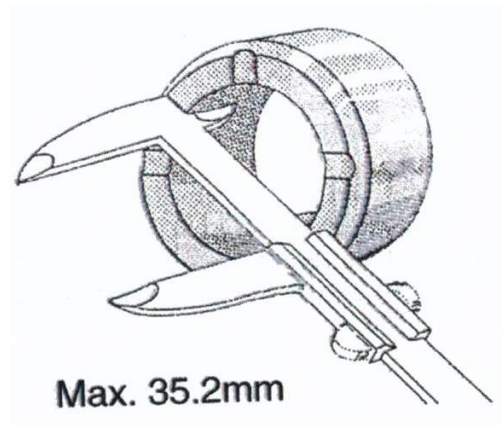


**E) Cylinder Washer Bush**

Check inside diameter for wear: Maximum inside diameter: 35.2mm. If larger, remove bush using punch 40mm diameter (can be made on site) and vice or press. Insert new bush using an old percussion piston.

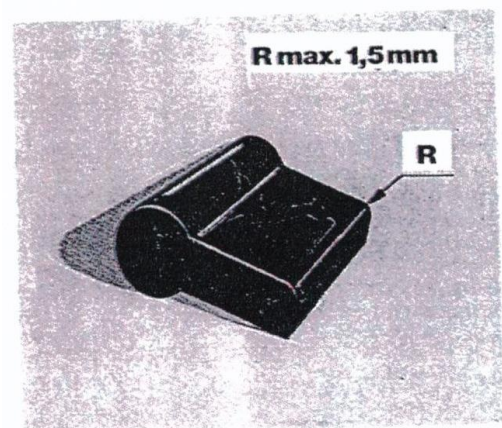
**Important:**

Radius on inside diameter must match with piston radius.



**F) Rotation Mechanism Pawls:**

Check trip edges for wear. Maximum radius of wear: 1.5mm. If larger, make use of opposite edge. Replace Pawls only when both trip edges are worn.



**F.2) Pawl Springs:**

Check from time to time that the springs are still in working order. Fatigued or defective pawl springs can lead to insufficient drill rod rotation. Never try to change shape of spring by bending it.

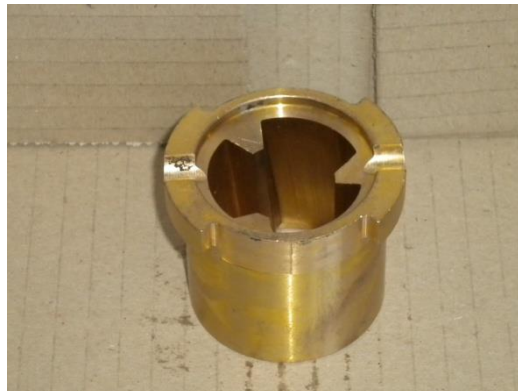
**G) Two Piece Ratchet Ring:**

Maximum wear on edge: Radius 1.5mm. After this limit, replace the ratchet ring.



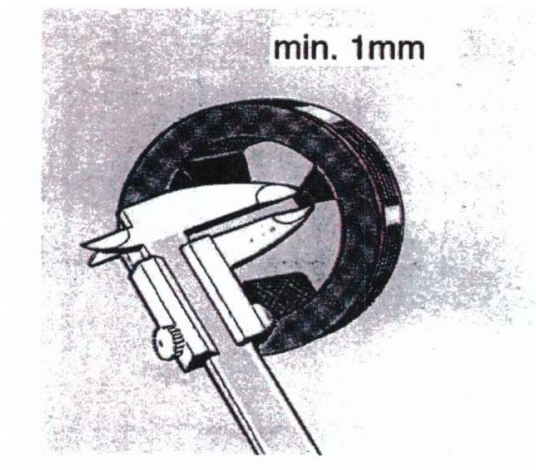
**Ratchet Bush:**

Wear on splines: Minimum Spline width 1mm. If less than 1mm, replace ratchet bush.



**H) Guide Bush:**

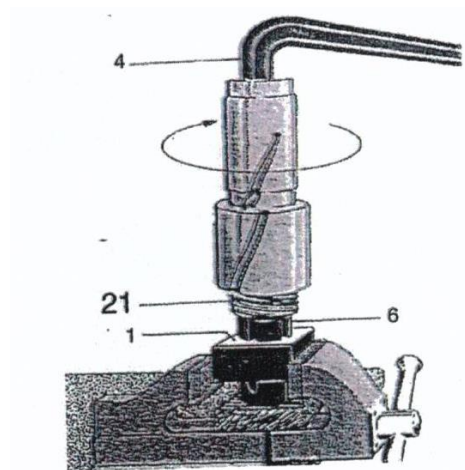
Wear on splines: minimum spline width 1mm. If less than 1 mm, replace guide bush.



**Dismantling the guide bush:**

- Secure chuck 22 using a special spanner 1 and punch 6 in vice.
- Unscrew chuck 22 from guide bush 21 using bent drill rod 4.

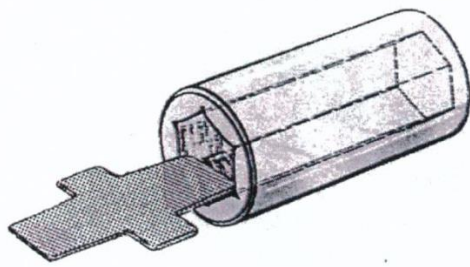
**Caution: LEFTHAND THREAD**



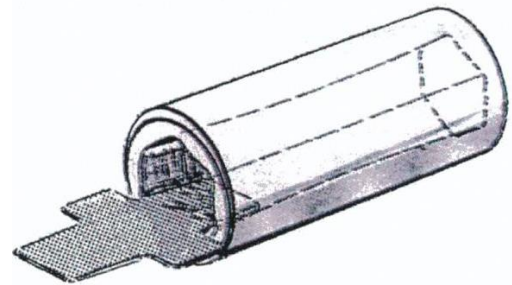
**I) Chuck Insert:**

Check the condition of the hexagon from time to time. Excessively worn chuck bushings lead to fractures of shank and piston.

Using a hexagon gauge (available from drillsteel manufacturer), check area where wear is heaviest. If the gauge runs in up to the stop, replace the chuck insert.

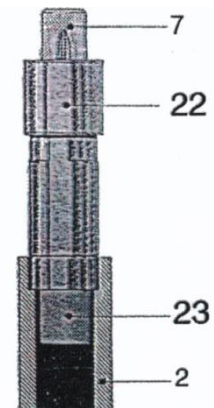


**OK!**



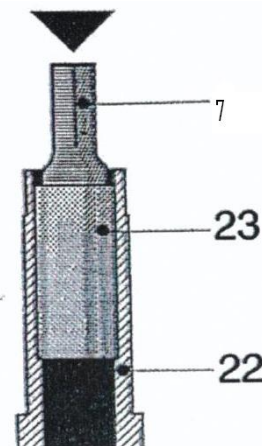
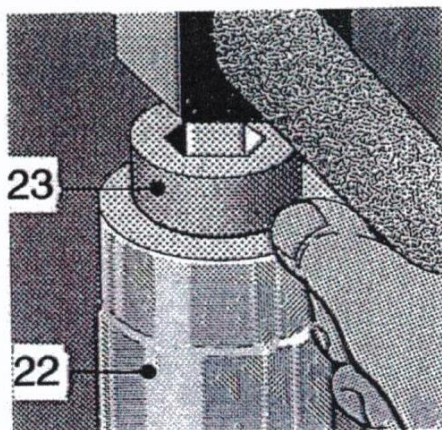
**WORN!**

- Place bush 22 in disassembly sleeve 2.
- Using punch 6 remove worn chuck insert.
- Without using excessive force, set in new chuck insert vertically.



- Then knock in chuck insert as far as possible against an anvil or iron block.

Using shank 7 cut to size; drive in chuck insert as far as stop.



### **CYLINDER LINER REPLACEMENT**

In order to maintain good air compression, it is important to check the cylinder liner bore for wear, cracks, corroded and pitted surface. If replacement is required proceed as follows:

- Use safety glasses and leather gloves to avoid injury. Place the housing vertically on the top of the open bench vice or lock the housing hard on the side of the vice on the pivoting eye section.
- As the grub screw, which locates cylinder liner, is secured with “Loctite”, it is not required to extract it from the housing when the cylinder liner requires replacement.
- Ensure that cylinder liner can be gently knocked out from the housing.
- Rapidly apply heat externally all over the alloy section for several minutes by moving the oxygen torch tip approximately 50mm away from the housing. Heat all over quickly so as to create thermal expansion on the housing. **DO NOT APPLY ANY HEAT TO THE CYLINDER LINER BOAR!**

#### **CAUTION!**

Apply only 100 – 125 degree heat to the housing. Do not apply excessive heat as this will cause the alloy to lose its heat treated properties. This can be checked either by quick hand touch or by applying a drop of water on the alloy housing. Knock out the cylinder liner with a hammer and drift.

- Inspect the surface and quickly clean if required. Re-lock the housing eye now in a vertical position. Align the locating groove on the cylinder liner with the grub screw end which protrudes in the bore, quickly slide the housing in the position and push the liner fully to the spigot end.

**\*NOTE\*** *This procedure should be completed quickly in order to ensure that the heat from the housing will not transfer to the liner and cause it to jam before it is located fully in the position. Allow to cool in air before assembling the drill. Ensure that there are no burrs or sharp points inside the cylinder bore in order to avoid irreparable damage on the piston.*

## SIG.au DRF STOPER PARTS LIST

ITEM	QTY	DESCRIPTION	PART NUMBER
1	1	BACKHEAD	64 242 351
2	1	THROTTLE VALVE	64 242 191
4	1	RUBBER SEAL	64 258 461
5	2	WATER VALVE O'RING	64 996 580
6	1	WATER VALVE SCREW	64 258 480
7	1	WATER VALVE PIN	64 258 504
8	1	SPRING	64 000 080
19	1	O'RING	64 979 300
20	1	PLUG	64 242 340
23	1	RUBBER GASKET	64 262 410
24	1	INDEX PIN	64 256 291
25	1	SPRING FOR INDEX PIN	64 256 300
26	1	WATER TUBE SLEEVE	64 258 171
27	1	WATER TUBE	64 242 420
28	1	RUBBER SEAL	64 255 170
29	1	VALVE CHEST (INCLUDES ITEM 30)	64 243 071
30	1	CYLINDRICAL PIN	64 995 180
31	1	VALVE PLATE	64 243 090
32	1	VALVE GUIDE	64 243 081
34	3	RUBBER SEAL	64 256 741
35	1	PISTON	64 258 202
36	1	CYLINDER WASHER	64 259 682
37	1	CYLINDER WASHER BUSH	64 258 420
38	2	SIDE ROD	64 262 380
39	2	NUT	64 255 451
40	2	SPRING WASHER	64 255 460
41	1	RATCHET BUSH	64 242 070
42	1	RATCHET RING	64 258 231
43	4	PAWL	64 257 111
44	4	PAWL SPRING	64 258 344
45	4	PAWL PLUNGER	64 258 352
46	1	CHUCK NUT	64 242 750
53	1	AIR CONNECTION NIPPLE	64 258 060
54	1	GOOSE NECK SWIVEL	64 262 210
55	1	WATER CONNECTION COMPLETE (ITEMS 130, 131, 132, & 133)	64 258 401
56	1	RUBBER RING	64 255 130
57	1	KEY	5610 01490 1723
58	1	NUT	64 992 070
59	1	SPRING WASHER	64 994 270
79	1	O'RING	64 996 170
84	1	HOUSING	64 259 656
92	1	OPERATING LEVER	64 242 410

115	1	FRONT HEAD	64 242 760
117	1	STEEL RETAINER	64 261 100
118	1	RUBBER MOUNTING	64 262 220
120	2	DUTY PIN	64 995 770
121	1	CHUCK INSERT	64 258 990
130	1	WATER CONNECTION NIPPLE	64 255 110
131	1	GOOSNE NECK SWIVEL	64 255 120
132	1	HOSE	64 255 610
133	1	HOSE CLAMP	64 951 723
134	1	CYLINDER LINER (122mm LONG) OLD	64 259 820
135	1	CYLINDER LINER (112mm LONG) NEW	64 259 830
136	4	O’RING	64 996 750
137	1	O’RING	64 996 160
139	1	O’RING	64 996 330
203	1	WEAR BUSH	64 262 370
204	1	TAPERED SPRING WASHER	64 242 240
206	1	NUT	64 978 200
207	1	CHUCK	64 242 740
208	1	RATCHET RING COMPLETE (INCLUDES ITEMS 41 & 42)	64 258 232-2
301	1	FOOT STUD	64 979 654
303	1	INNER CYLINDER CAP SEAL	64 979 240M
304	1	INNER CYLINDER CAP NUT	64 978 170
305	1	INNER CYLINDER CAP NUT BUSH	64 979 180
306	1	PISTON ROD	
		- DRF 24/120	64 978 420
		- DRF 24/130	64 978 210
		- DRF 24/170	64 978 330
307	1	RETAINING RING	64 978 020
308	1	PRESSURE SEAL – SMALL	64 979 101
309	1	PISTON – INNER	64 978 090
310	1	BRAKE RING	64 978 120
311	1	PISTON NUT	64 978 080
312	1	OUTER CYLINDER CAP SEAL	64 979 220
313	1	OUTER CYLINDER CAP NUT	64 979 210
314	1	INNER CYLINDER	
		- DRF 24/120	64 978 430
		- DRF 24/130	64 978 130
		- DRF 24/170	64 978 360
315	1	PISTON OUTER	64 978 110
316	1	O’RING	64 979 110
317	1	PRESSURE SEAL – LARGE	64 979 071
318	1	OUTER CYLINDER	
		- DRF 24/120	64 978 440
		- DRF 24/130	64 978 280
		- DRF 24/170	64 978 180
325	1	BRAKE RETAINER	64 978 070

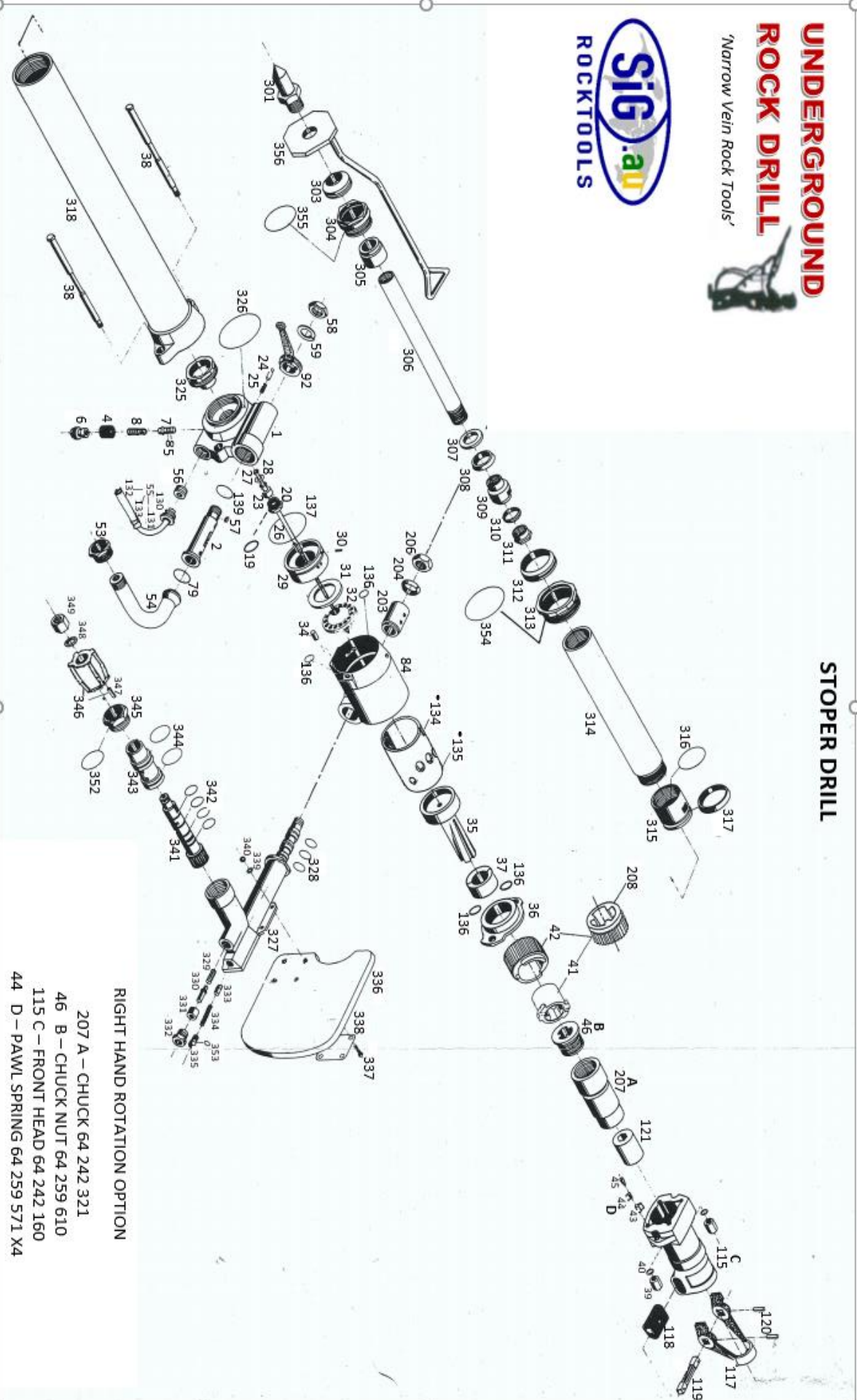
326	1	O’RING	64 996 160
327	1	AIRLEG CONTROL HOUSING	64 978 142
328	3	O’RING	64 996 090
329	1	SPRING	64 257 130
330	1	RELEASE BUTTON	64 978 041
331	1	RUBBER SEAL	64 256 690
332	1	BUTTON NUT	64 978 161
333	1	RATCHET PIN	64 979 560
334	1	SPRING	64 979 550
335	1	CAP SCREW	64 979 530
336	1	DEFLECTION SHIELD	64 978 151
337	4	BOLT	64 978 231
338	1	PLATE	64 978 300
339	4	WASHER	64 978 240
340	4	NUT	64 978 260
341	1	CONTROL SPOOL (INC. ITEM 4 X 342)	64 979 610
342	4	O’RING	64 979 310
343	1	SLEEVE CONTROL VALVE (INC. ITEM 2 X 344)	64 979 040
344	2	O’RING	64 979 300
345	1	CONTROL NUT – LARGE	64 979 280
346	1	CONTROL HANDLE (INC. ITEM 347)	64 979 600
347	1	ROLL PIN	64 979 270
348	1	WASHER	64 979 261
349	1	NYLOC NUT	64 992 920
352	1	O’RING	64 979 290
353	1	O’RING	64 979 540
354	1	O’RING	64 979 060
355	1	O’RING	64 979 200
356	1	HOOK HANDLE ASSEMBLY	64 978 320
		<b>OPTIONS</b>	
27	1	WATER TUBE 3mm X 380mm	64 258 181
		<b>RIGHT HAND ROTATION OPTION</b>	
44 D	4	PAWL SPRING	64 259 571
46 B	1	CHUCK NUT	64 259 610
115 C	1	FRONT HEAD	64 242 160 / 161
207 A	1	CHUCK	64 242 321

# UNDERGROUND ROCK DRILL

'Narrow Vein Rock Tools'



## STOPER DRILL



- RIGHT HAND ROTATION OPTION
- 207 A - CHUCK 64 242 321
  - 46 B - CHUCK NUT 64 259 610
  - 115 C - FRONT HEAD 64 242 160
  - 44 D - PAWL SPRING 64 259 571 X4