

# ***Rotabroach***<sup>TM</sup>

## PANTHER MAGNETIC DRILLING MACHINE



Model No. SMARTPANTHER1,  
SMARTPANTHER3

This machine (Serial No \_\_\_\_\_ ) is CE approved.

**Rotabroach Ltd**

Imperial Works, Sheffield Road  
Sheffield, South Yorkshire  
United Kingdom  
S9 2YL

Tel: +44 (0) 114 2212 510  
Email: [sales@rotabroach.co.uk](mailto:sales@rotabroach.co.uk)

Fax: +44 (0) 114 2212 563  
Web site: [www.rotabroach.co.uk](http://www.rotabroach.co.uk)

## Other products by Rotabroach.



**Rotabroach** **MAGNETIC DRILLS**

Designed in the UK a vast range of machines are available from Rotabroach. Ensuring we have a machine to match any application.

Our range of machines includes

- Small machines Viper and Puma
- Medium machines Panther and Hawk
- Large machines Cobra and Scorpion.
- Specialist machines Pneumatic and Hydraulic.
- Rail drilling machines "The Rhino's"



**Rotabroach** **CUTTER**

Produced to a specific geometry our cutter and drills are design to give you the maximum performance every time!

A range of products are available from

- M2 tool steel cutters
- M42 tool steel cutters
- Tungsten carbide tipped cutters
- Twist drills with Weldon shank
- Titanium Nitride coated cutters
- Specialist railway Tungsten carbide tipped cutters
- Solid indexable insert cutters.
- Mini cutters designed for use in a standard ½ inch (13mm) drill chuck.

For more information please visit our website at [www.rotabroach.co.uk](http://www.rotabroach.co.uk)

Or contact our sales department on +44 (0) 114 2212 510

## Contents

	Page
1) Intended Use	3
2) General safety	4
3) Machine Specification	5
4) Operating instructions	6
5) Cutsmart™ Feature	7
6) Mounting of cutters	8
7) Remedies for hole making problems	8
8) Wiring Diagram	9
9) Speed Selection	10
10) Exploded diagram of machine	11
11) Exploded diagram of motor	13
12) Pipe adaptor Kit	15
13) Chuck conversion	16
14) Maintenance checks	16
15) Trouble shooting	18
16) Cutter selection and speeds and feeds information	19
17) Warranty	20

### 1) INTENDED USE

The magnetic drill is intended for use to drill a hole in a ferrous material. The magnet is used to hold the drill in place whilst the drill is functioning elevating the stress placed on the user and increase the low precision that would be incurred when using a hand held drill. It is designed for use in Fabrication, Construction, Railways, Petrochemical and any other application when drilling ferrous metal. Any deviation from its intended use will not be the subject of responsibility from Rotabroach.

### 2) GENERAL SAFETY RULES

**WARNING!** When using electric tools basic safety precautions should always be followed to reduce the risk of fire, electric shock and personal injury, including the following.

Read all these instructions before attempting to operate this product

Remove the power supply before carrying out any adjustment, serving or maintenance.

1. Keep work area clear cluttered areas and benches invite injuries.
2. Consider work area environment
  - Do not expose tools to rain.
  - Do not use tools in damp or wet locations.

- Keep work area well lit.
  - Do not use tools in the presence of flammable liquid or gases.
3. Guard against electric shock  
Avoid body contact with earthed or ground surfaces (e.g. pipes, radiators, cookers and refrigerators). Electric safety can be further improved by using a high-sensitivity (30 mA/0.1s) residual current device (RCD).
  4. Keep other persons away do not let persons, especially children, not involved in the work touch the tool or the extension cord and keep them away from the work area.
  5. Store idle tools when not in use, tools should be stored in a dry locked-up place, out of reach of children.
  6. Do not force the tool it will do the job better and safer at the rate for which it was intended.
  7. Use the right tool
    - Do not force small tools to do the job of a heavy duty tool.
    - Do not use tools for purposes not intended: for example do not use circular saws to cut tree limbs or logs.
  8. Dress properly
    - Do not wear loose clothing or jewellery; they can be caught in moving parts.
    - Non-skid footwear is recommended when working outdoors.
    - Wear protective hair covering to containing long hair.
  9. Use protective equipment when using this machine
    - Use safety glasses.
    - Use ear defenders.
    - Use face or dust mask if cutting operations create dust.
    - Use protective gloves
  10. Connect dust extraction equipment if device are provided for the connection of dust extraction and collecting equipment, ensure these are connected and properly used.
  11. Does not abuse the cord; never pull the cord to disconnect it from socket. Keep the cord away from heat, oil and sharp edges.
  12. Secure work where possible use clamps or a vice to hold the work. It is safer than using your hand.
  12. Do not overreach keep proper footing and balance at all times.
  13. Maintain tools with care
    - Keep cutting tools sharp and clean for better and safer performance.
    - Follow instruction for lubricating and changing accessories.
    - Inspect tool cords periodically and if damaged have them repaired by an authorized service facility.
    - Inspect extension cords periodically and replace if damaged.
    - Keep handles dry, clean and free oil and grease.
  15. Disconnect tools when not in use, before servicing and when changing accessories such as blades, bits and cutters, disconnect tools from the power supply.
  16. Remove adjusting keys and wrenches form the habit of checking to see that keys and adjusting wrenches are removed from the tool before turning it on.
  17. Avoid unintentional starting ensure switch is in "off" position when plugging in.
  18. Use outdoor extension leads when the tool is used outdoors; use only extension cords intended for outdoor use and so marked.
  19. Stay alert watch what you are doing, use common sense and do not operate the tool when you are tired.
  20. Check for damaged parts before further use of tool; it should be carefully checked to determine that it will operate property and its intended function.
  21. Warning! The use of any accessory or attachment other than one recommended in this instruction manual may present a risk of personal injury.
  22. Have your toll repaired by a qualified person  
This electric tool complies with the relevant safety rules. Qualified persons using original spare parts should only carry out repairs; otherwise this may result in considerable danger to the user.

### Foreseeable Misuse

- During operation, failure to keep the cable away from the machine body, will result in the cable damaged by drill bit, causing electric conduction and other accidental injury.
- Before operation, when plugging the power source, failure to turn all the switches to position <off>, may result in accidental start-up from the machine, causing accidental injury.
- During suspended operation, failure to tie the safety belt to fasten the magnetic drill, when power failure or power down suddenly, causing magnetic drill to get out of the work surface and resulting in the accident.

### Other risks

- During operation, wear loose clothing or jewellery, failure to wear protective hair covering to containing long hair, they can be caught in moving parts, may present an accidental injury.
- During operation, put in effort to push and press the machine, will result the magnet getting out of the work surface suddenly, causing accidental injury.
- Before mounting or removing the drill bit, failure to disconnect the supply, will result the accidental start-up, causing personal injury.

### 3) Specification

Maximum hole cutting capacity in .2/.3C steel = 40mm dia. x 52mm deep  
Arbor bore = 19.05mm (3/4") dia.

<b>Motor Unit</b> (Nominal values)	Smartpanther1	110v 50-60Hz	1100W
	Smartpanther3	230v 50-60Hz	1100W
Electro Magnet	Smartpanther1	110v 50-60Hz	45W
	Smartpanther3	230v 50-60Hz	45W
Total Normal Full Load (magnet + motor)			1145
Overall Dimensions	Height (maximum extended)		510 mm
	Width (including Hand wheel)		180 mm
	Length Overall (including Guard)		265 mm
	Magnet Footprint		165mm x 80mm
Nett Weight			14.6 kg
Stroke			85mm
No Load speed	All voltages		270-610 rpm
Tractive Force of Magnet at 20° C (25mm min. plate thickness) <b>The use on any material less than 25mm thick will progressively reduce the magnetic performance. If possible substitute material should be positioned under the magnet and work piece to equate to a suitable material thickness. If this is not possible an alternative secure method of restraining the machine MUST be used. Failure to do so may result in personal injury.</b>			800kg
Maximum hand/arm vibration magnitude (measured at handle during operation in accordance with ISO5349 using a 22mm dia. cutter through 13mm mild steel plate.			2.892 m/s <sup>2</sup>
Estimate of vibration exposure. Operation 30 holes @ 1 minute/hole.			0.13 m/s <sup>2</sup> A(8)
Average noise level during cutting at operators ear position.			L <sub>PA</sub> Max. 88.4 dB(A) L <sub>WA</sub> Max. 101.4dB(A)

Ear defenders must be worn when operating this machine.

Suitable only for a single phase 50-60 Hz A.C. power supply.

#### **DO NOT USE ON D.C. SUPPLY**

Do not use the magnetic drill on the same structure when arc welding is in progress.  
D.C. current will earth back through the magnet and cause irreparable damage.

**WARNING: THIS APPLIANCE MUST BE EARTHED!**

**NB: ANY MODIFICATIONS TO THIS MACHINE WILL INVALIDATE THE GUARANTEE.**

	List of Contents with Magnetic Dill Unit	Check List
RD4329	Safety Strap	YES/NO
RD4088	4mm A/F Tee Handled Hexagon Key	YES/NO
RD4152	3mm Hexagon key	YES/NO

## 4) Operating instructions

### Operational safety

#### READ BEFORE USING THE MACHINE

- When using electrical tools, basic safety precautions should always be followed to reduce the risk of electric shock, fire, and personal injury.
- Do NOT use in wet or damp conditions. Failure to do so may result in personal injury.
- Do NOT use in the presence of flammable liquids or gasses. Failure to do so may result in personal injury.
- BEFORE activating the machine, inspect all electrical supply cables (including extension leads), and replace if damaged.
- Only use extension cables approved for site conditions.
- BEFORE activating the machine, ALWAYS check the correct function of all operational systems, switches, magnet etc.
- BEFORE operating, the machine MUST be securely restrained to a fixed independent feature (by using safety strap RD4329, or other means), to reduce the potential free movement should the magnet become detached from the work piece. Failure to do so may result in personal injury.
- ALWAYS wear approved eye and ear protectors when operating the machine.
- Disconnect from power source when changing cutters or working on the machine.
- Cutters and swarf are sharp, ALWAYS ensure that hands are adequately protected when changing cutters, or removing swarf.
- Before operating the machine, ALWAYS ensure cutter-retaining screws are secured tightly.
- Regularly clear the work area and machine of swarf and dirt, paying particular attention to the underside of the magnet base.
- ALWAYS remove tie, ring, watches and any loose adornments that might entangle with the rotating machinery before operating.
- ALWAYS ensure that long hair is securely enclosed by an approved restraint before operating the machine.
- Should the cutter become 'fast' in the work piece, stop the motor immediately to prevent personal injury. Disconnect from power source and turn arbor to and fro. DO NOT ATTEMPT TO FREE THE CUTTER BY SWITCHING THE MOTOR ON AND OFF.
- If the machine is accidentally dropped, ALWAYS thoroughly examine the machine for signs of damage and check that it functions correctly BEFORE resuming drilling.
- Regularly inspect the machine and check that nuts and screws are tight.
- ALWAYS ensure when using the machine in an inverted position that only the minimum amount of coolant is used and that care is taken to ensure that coolant does not enter the motor unit.
- Cutting tools may shatter, ALWAYS position the guard over the cutter before activating the machine. Failure to do so may result in personal injury.
- On completion of the cut, a slug will be ejected. DO NOT operate the machine if the ejected slug may cause injury.
- When not in use ALWAYS store the machine in a safe and secure location when not in use.
- ALWAYS ensure that approved ROTABROACH™ agents conduct repairs.

#### OPERATING INSTRUCTIONS

- Keep the inside of the cutter clear of swarf. It restricts the operating depth of the cutter.
- Ensure that the coolant bottle contains sufficient cutting oil to complete the required operating duration. Refill as required.
- Occasionally depress the pilot to ensure cutting fluid is being correctly metered.
- To start the machine, first switch on the magnet by turning the rotary switch to position <I>. Then start the motor by depressing the GREEN start button.
- ALWAYS switch off the motor by depressing the RED stop button. DO NOT switch off the motor by turning the magnet switch off.
- Apply light pressure when commencing to cut a hole until the cutter is introduced into the work surface. Pressure can then be increased sufficiently to load the motor. Excessive pressure is undesirable, it does not increase the speed of penetration and will cause the safety overload protection device to stop the motor, (the motor can be restarted by operating the motor start button), and may cause excessive heat which could result in inconsistent slug ejection
- Always ensure that the slug has been ejected from the previous hole before commencing to cut the next.
- If the slug sticks in the cutter, move the machine to a flat surface, switch on the magnet and gently bring the cutter down to make contact with the surface. This will usually straighten a cocked slug and allow it to eject normally.
- Apply a small amount of light oil lubricant regularly to slide and arbor support bearing.
- Insecure anchorage, a loosely fitting slide or a worn bearing in the arbor support usually causes cutter breakage.

#### SPEED SELECTION

- The machine is equipped with a step-less variation of speed range.
- The step-less variation is adjusted by rotating the disk (which is graduated into six numerically designated segments) and is located on top of the motor.
- Before cutting holes the work piece material specification must be determined to facilitate the correct cutting speed selection (See section Cutting speeds). Site conditions, e.g. diameter and condition of cutter, material condition, material thickness, etc must also be taken into account when determining the suitable cutting speed. The speed and feed rate must continuously be monitored and adjusted to ensure that optimum cutting conditions prevail.

#### EXTENSION CABLE SELECTION

The machines are factory fitted with a 3 metre length of cable having three, 1.5mm<sup>2</sup> conductors, LIVE, NEUTRAL and EARTH. If it becomes necessary to fit an extension cable from the power source, care must be taken in using a cable of adequate capacity. Failure to do so will result in a loss of traction by the magnet and a reduction of power from the motor.

Assuming a normal AC supply of the correct voltage, it is recommended that the following extension lengths shall not be exceeded:

- For 110v supply: 3.5metres of 3 core x 1.5mm<sup>2</sup>**  
**For 230v supply: 26 meters of 3 core x 1.0mm<sup>2</sup>**

## 5) Cutsmart feature

# Rotabroach<sup>TM</sup>

## FEATURING



'CutSmart' is a new feature from Rotabroach.

Designed to help you to get the best out of your machine. It does this by way of a visual indicator. The visual indicator shows when you are using the drill correctly within its specification this is done by way of a Tri colour LED to the Right of the magnet on LED.

During operation if you are drilling correctly this will stay **GREEN**. However as you put more pressure onto the drill increasing its workload above its correct operation the LED will start to change colour to **ORANGE**. This indicates that you are putting more wear on the machine and the cutter which will eventually cause damage to your machine. If further pressure is put on the machine the LED will eventually turn **RED** and the motor will cut off and will not be allowed to be turned back on for approximately 5 seconds. This is a safety feature to protect you and the machine from damage.

Ideally to get the most out of your machine you need to keep the LED green when drilling. If it starts to turn orange release some pressure.

The panels are set to cut off when the machine reaches the maximum allowed current.

The magnet is also protected by a 2A fuse

Care must be taken when handling the PCB as they are static sensitive please ensure you are earthed. As the PCB contains some delicate components please do not flash test this equipment.

New Cutsmart indicator



Indicator turns orange when too much pressure is added on the cutter. Will turn Red and cut power to motor if machine is given too much force for the motor to cope with.



**ALWAYS DISCONNECT THE MACHINE FROM THE POWER SOURCE BEFORE CHANGING CUTTERS.****6) MOUNTING OF CUTTERS**

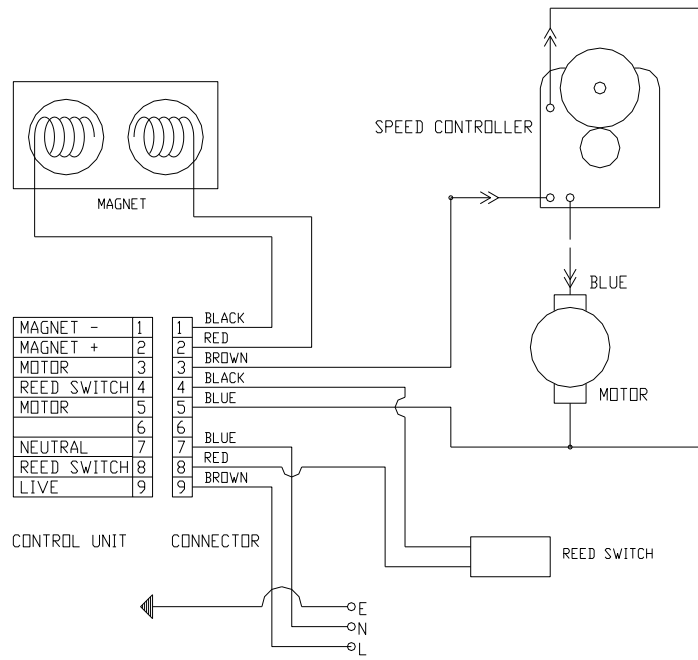
- The machine has been made to accept cutters having 19.05mm (3/4") dia. shanks.
- The following procedure is to be used when mounting cutters.
- Lay the machine on its side with feed handles uppermost, ensuring arbor is wound down to its lowest point to enable access to socket screws RD4066.
- Take appropriate pilot and place through the hole in cutter shank. Insert shank of cutter into bore of arbor, ensuring alignment of two drive flats with socket screws.
- Tighten both screws using hexagon key.

**6) REMEDIES FOR HOLE MAKING PROBLEMS**

<i>Problem</i>	<i>Cause</i>	<i>Remedy</i>
1) Magnetic base won't hold effectively	Material being cut may be too thin for efficient holding.  Swarf or dirt under magnet.  Irregularity on magnet contact or work-piece.  Insufficient current going to magnet during drilling cycles.	Attach an additional piece of metal under work-piece where magnet will be located, or mechanically clamp magnetic base to work-piece.  Clean magnet.  Use extreme care; file any imperfections flush to surface.  Confirm power supply and output from control unit, check supply cable.
2) Cutter skips out of centre-punch mark at initiation of cut	Magnetic base is not holding effectively.  Worn arbor bushing and/or ejector collar.  Too much feed pressure at start of cut.  Cutter is dull, worn, chipped or incorrectly sharpened.  Poor centre-punch mark; weak pilot spring; pilot not centred in centre-punch mark.  Worn or bent pilot, worn pilot hole.  Loose bolts on motor bushing support bracket, main casting or loose gib adjusting set screws.	See causes and remedies above.  Replace! Only a few thousandths wear permissible. New arbor bushing is needed. Light pressure only is needed until a groove is cut. The groove then serves as a stabilizer.  Replace or re-sharpen. Sharpening service is available.  Improve centre-punch and/or replace worn parts  Replace part or parts  Adjust where necessary
3) Excessive drilling pressure required	Incorrectly re-sharpened, worn or chipped cutter.  Coming down on swarf lying on surface of work-piece.  Gibs out of adjustment or lack of lubrication.  Swarf accumulated (packed) inside cutter.	Re-sharpen or replace.  Take care not to start a cut on swarf.  Adjust setscrews, and lubricate.  Clear cutter.
4) Excessive cutter breakage	Steel swarf or dirt under cutter.  Incorrectly re-sharpened or worn cutter.  Cutter skipping.  Slide-ways need adjustment.  Cutter not attached tightly to arbor.  Insufficient use of cutting oil or unsuitable type of oil.	Remove cutter, clean part thoroughly and replace.  Always have a new cutter on hand to refer to for correct tooth geometry, together with instruction sheet.  See causes and remedies (2).  Tighten sideways.  Retighten.  Inject oil of light viscosity into the coolant-inducing ring and check that oil is being metered into cutter when pilot is depressed. If not, check pilot groove and arbor internally for dirt or apply oil externally. (Even a small amount of oil is very effective).
5) Excessive cutter wear	See cause and remedy above  Incorrectly re-sharpened cutter.  Insufficient or spasmodic cutting pressure.	Refer to instructions and a new cutter for proper tooth geometry.  Use sufficient steady pressure to slow the drill down. This will result in optimum cutting speed and chip load.



## 7) WIRING DIAGRAM



## 8) CUTTING SPEEDS.

Typical cutting speeds (RPM) for various materials

Cutter dia	Surface speed.			
	9	15	30	45
12	239	398	796	1194
13	220	367	734	1102
14	205	341	682	1023
15	191	318	637	955
16	179	298	597	895
17	168	281	562	842
18	159	265	530	796
19	151	251	503	754
20	143	239	477	716
21	136	227	455	682
22	130	217	434	651
23	125	208	415	623
24	119	199	398	597
25	115	191	382	573
26	110	184	367	551
27	106	177	354	530
28	102	171	341	512
29	99	165	329	494
30	95	159	318	477
31	92	154	308	462
32	90	149	298	448
33	87	145	289	434
34	84	140	281	421
35	82	136	273	409
36	80	133	265	398
37	77	129	258	387
38	75	126	251	377

Cutter dia	Surface speed.			
	9	15	30	45
39	73	122	245	367
40	72	119	239	358
41	70	116	233	349
42	68	114	227	341
43	67	111	222	333
44	65	109	217	326
45	64	106	212	318
46	62	104	208	311
47	61	102	203	305
48	60	99	199	298
49	58	97	195	292
50	57	95	191	286
51	56	94	187	281
52	55	92	184	275
53	54	90	180	270
54	53	88	177	265
55	52	87	174	260
56	51	85	171	256
57	50	84	168	251
58	49	82	165	247
59	49	81	162	243
60	48	80	159	239
61	47	78	157	235
62	46	77	154	231
63	45	76	152	227
64	45	75	149	224
65	44	73	147	220

Material		Surface speed (M/min)
Aluminium		60-90
Cast iron	Soft	30-50
	Hard alloy	15-21
	Malleable	15-30
Steel	Mild (460 N/mm <sup>2</sup> )	24-30
	(460-770 N/mm <sup>2</sup> )	15-27
	(770-1070 N/mm <sup>2</sup> )	9-15
	1070-1230 N/mm <sup>2</sup> )	6-9
Stainless steel	Ferritic	15-18
	Austenitic	12-15
	Martensitic	9-15

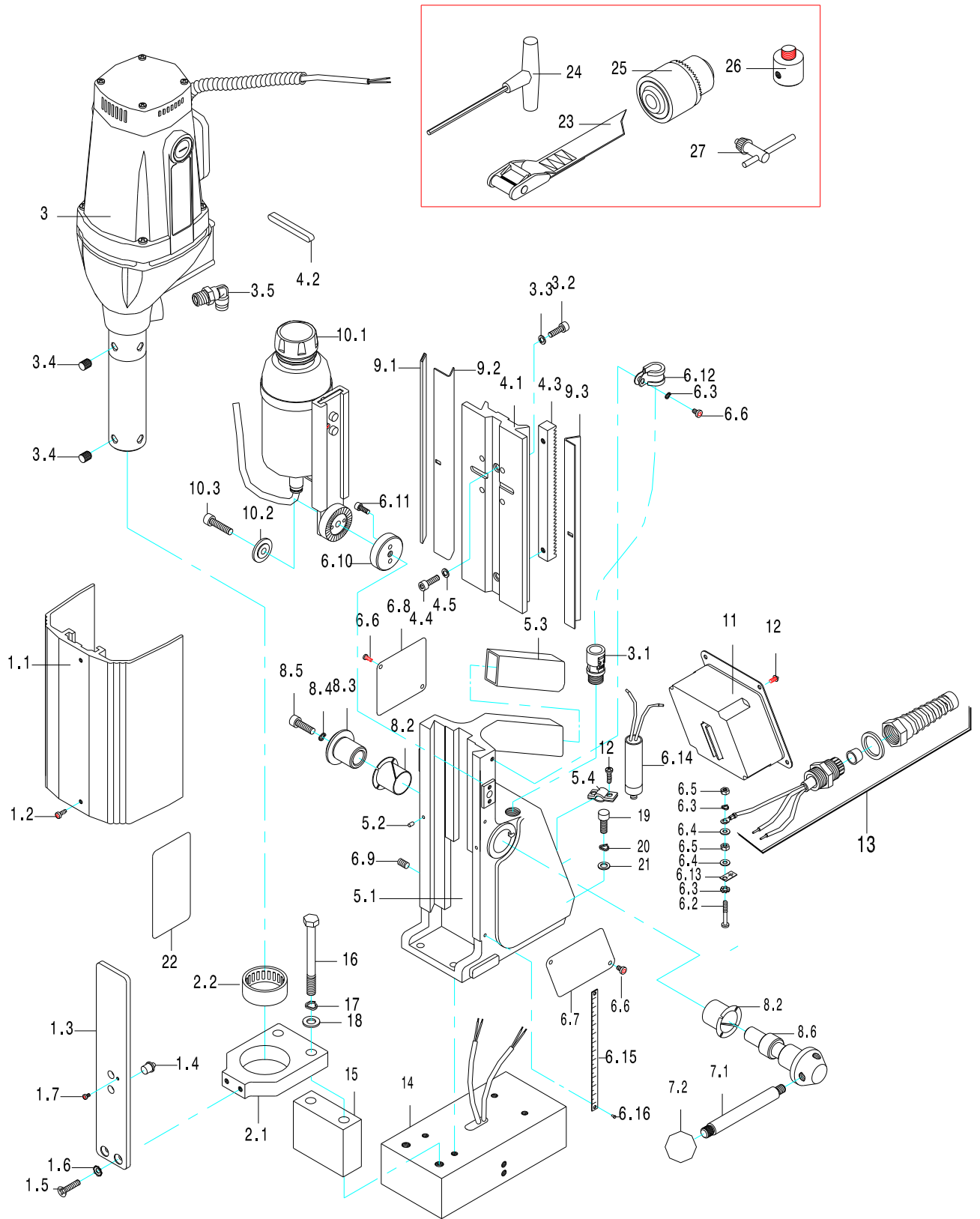
These speeds should be viewed as a suggested starting point only.  
The machine speed may require adjustment to suit the application conditions.

Possible speed selection for mild steel with ideal conditions at 30 M/min.

Speed selector Position.	Cutter diameter	Nominal RPM
<b>1</b>	<b>40</b>	<b>270</b>
<b>2</b>	<b>32</b>	<b>330</b>
<b>3</b>	<b>24</b>	<b>400</b>
<b>4</b>	<b>19</b>	<b>470</b>
<b>5</b>	<b>16</b>	<b>570</b>
<b>6</b>	<b>14</b>	<b>610</b>

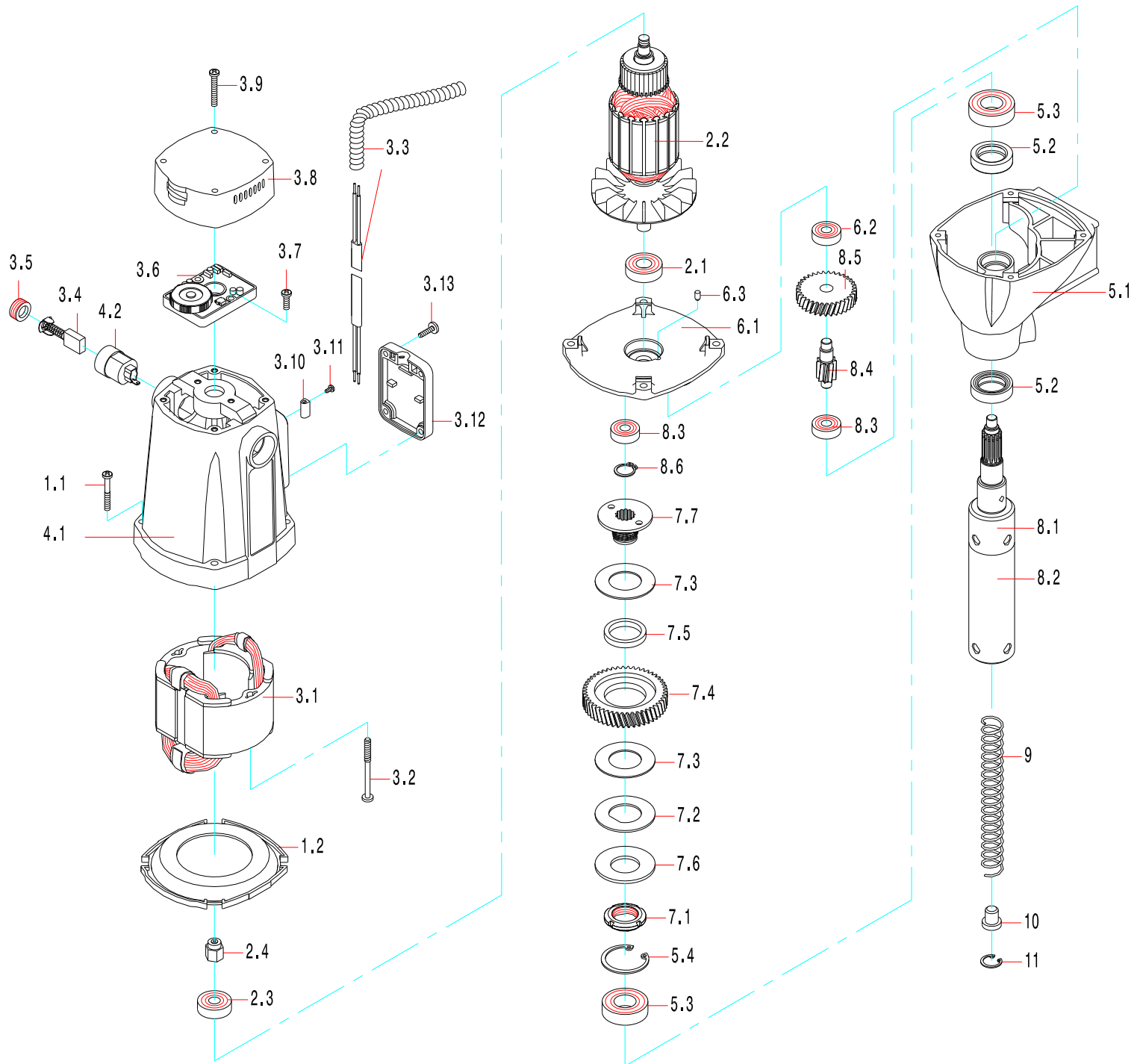
This data is presented for guidance only, and should be adjusted to suit site and material condition

### 9) Exploded view of complete machine.



Item	Part No.	Component	Quantity	Item	Part No.	Component	Quantity
1	RD23601	Guard Assembly	1	6.13	RD45604	Earth tag	1
1.1	RD33640	Guard	1	6.14	RD45606	Protection switch	1
1.2	RD4077	Panhead screw	2	6.15	RD33145	Depth Gauge	1
1.3	RD33647	Guard bracket	1	6.16	RD33146	Label plate rivet	2
1.4	RD45620	Spring plunger	1	7	RD23604	Capstan arm assembly	1
1.5	RD4347	Countersunk screw	2	7.1	RD33642	Capstan arm	3
1.6	RD45607	Washer	2	7.2	RD43091	Capstan Knob	3
1.7	RD4103	M3 Socket head screw	1	8	RD23610	Capstan assembly	1
2	RD23605	Bearing bracket assembly	1	7	RD23604	Capstan arm assembly	1
2.1	RD33635	Bearing bracket	1	8.2	RD4313	Nyliner bearing	2
2.2	RD45624	Arbor bearing	1	8.3	RD3303	Pinion shaft sleeve	1
3	RD23066	Motor & Gearbox assembly(110V)	1	8.4	RD4096	M6 shakeproof washer	1
3	RD23067	Motor & Gearbox assembly(230V)	1	8.5	RD4098	M6 socket head screw	1
3.1	RD43600	Cable connector	1	8.6	RD33643	Capstan pinion shaft	1
3.2	RD4091	M5 socket head screw	4	9	RD23612	Gib strip assembly	1
3.3	RD4092	M5 Shakeproof washer	4	9.1	RD33644	Gib support strip	1
3.4	RD4066	Cutter retaining screw	2	9.2	RD33645	Adjustable gib strip	1
3.5	RD45605	Coolant connector	1	9.3	RD33646	Fixed Gib strip	1
4	RD23608	Slide assembly	1	10	RD23603	Oil bottle assembly	1
4.1	RD33630	Slide	1	10.1	RD23617	Bottle and bracket assembly	1
4.2	RD33341	Key	1	10.2	RD33320	Tension plate	1
4.3	RD33600	Rack	1	10.3	RD4269	Socket head cap screw	1
4.4	RD4325	M5 socket head screw	2	11	RD23098	Control unit assembly (110V)	1
4.5	RD4092	M5 Shakeproof washer	2	11	RD23099	Control unit assembly (230V)	1
5	RD23619	Housing sub assembly	1	12	RD43093	Pan head screw	4
5.1	RD33632	Housing	1	13	RD25619	Mains cable assembly (110V)	1
5.2	RD45622	Tension pin	2	13	RD25620	Mains cable assembly (230V)	1
5.3	RD33144	Handle cover	1	14	RD23625	Magnet base assembly (110V)	1
5.4	RD43117	Mains Cable clamp	1	14	RD23626	Magnet base assembly (230V)	1
6	RD23609	Housing assembly	1	15	RD33148	Arbor bracket spacer assembly	1
5	RD23619	Housing sub assembly	1	16	RD43619	Arbor bracket bolt	2
6.2	RD45621	M4 screw	1	17	RD4079	Shakeproof washer	2
6.3	RD4069	M4 Shakeproof washer	2	18	RD4078	Plain washer	2
6.4	RD4070	M4 washer	2	19	RD4098	socket set screw	4
6.5	RD4068	M4 hexagon nut	2	20	RD4096	Shakeproof washer	4
6.6	RD4077	M4 pan head screw	4	21	RD4095	Flat washer M6	4
6.7	RD43083	Logo plate	1	22	RD33070	Speed Label	1
6.8	RD4302	information plate	1	23	RD4329	Safety Strap	1
6.9	RD4312	M6 tuflock screw	1	24	RD4088	4mm Allen Key	1
6.1	RD33338	Fixed ratchet wheel	1	25	RD43099	13mm Drill Chuck	1
6.11	RD4414	M4 sockethead screw	1	26	RD33153	Drill Chuck adaptor	1
6.12	RD4210	Cable clip	1	27	RD33154	Drill Chuck Key	1

# 10) EXPLODED VIEW-MOTOR AND GEARBOX



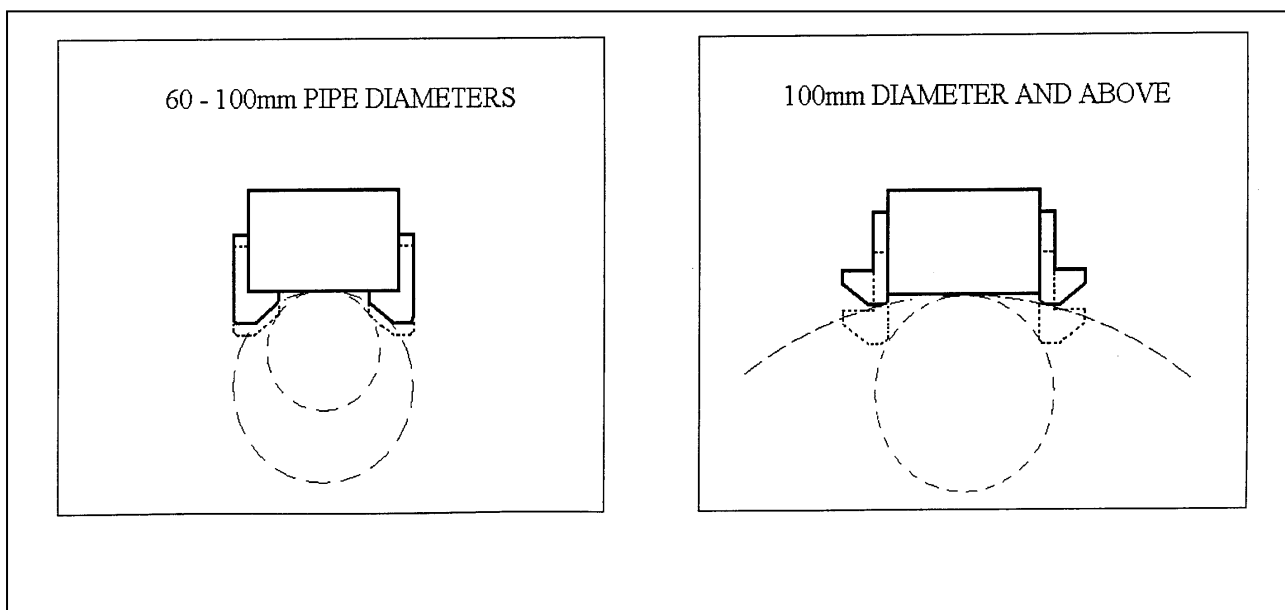
**Component parts of motor and gearbox RD23661 (110v) & RD23663 (230v)**

Item	Part No.	Component	Qty	Item	Part No.	Component	Qty
1	RD23651	Motor assembly (110v)	1	4	RD23616	Motor housing assembly	1
1	RD23653	Motor assembly (230v)	1	4.1	RD33613	Motor housing	1
2	RD23631	Armature assembly (110v)	1	4.2	RD33614	Brush holder	2
2	RD23633	Armature assembly (230v)	1	5	RD23614	Gearbox housing assembly	1
3	RD23671	Field coil & motor housing assembly (110v)	1	5.1	RD33602	Gearbox	1
3	RD23673	Field coil & motor housing assembly (230v)	1	5.2	RD43304	Seal	2
1.1	RD43624	Screw	4	5.3	RD43305	Bearing	2
1.2	RD33611	Fan guide	1	5.4	RD43306	Circlip	1
2	RD23631	Armature assembly (110v)	1	6	RD23615	Inner gearplate assembly	1
2	RD23633	Armature assembly (230v)	1	6.1	RD33609	Inner gearplate	1
2.1	RD45522	Bearing	1	6.2	RM17134	Bearing	1
2.2	RD33610	Armature 110v	1	6.3	RD45614	Bearing pin	1
2.2	RD33623	Armature 230v	1	7	RD23607	Clutch assembly	1
2.3	RD43603	Bearing	1	7.1	RD43607	Locknut	1
2.4	RD35639	Speed sensor	1	7.2	RD43608	Washer	1
3	RD23671	Field coil & motor housing assembly (110v)	1	7.3	RD33603	Brass washer	1
3	RD23673	Field coil & motor housing assembly (230v)	1	7.4	RD33604	Gear	1
4	RD23616	Motor housing assembly	1	7.5	RD43609	Clutch bush	1
3.1	RD33631	Field coil (110v)	1	7.6	RD43626	Dish washer	1
3.1	RD33633	Field coil (230v)	1	7.7	RD33606	Clutch base	1
3.2	RD43625	Screw	2	8	RD23319	Gearbox assembly	1
3.3	RD23623	Motor cable assembly	1	5	RD23614	Gearbox housing assembly	1
3.4	RD35612	Carbon brush	2	6	RD23615	Inner gear plate assembly	1
3.5	RD33616	Brush cap	2	7	RD23607	Clutch assembly	1
3.6	RD23630	Speed controller assembly (110v)	1	8.1	RD33156	Arbor spindle	1
3.6	RD23643	Speed controller assembly (230v)	1	8.2	RD33155	Arbor	1
3.7	RD45610	Screw	2	8.3	RM17134	Bearing	1
3.8	RD35615	End cap	1	8.4	RD33607	Interpinion shaft	1
3.9	RD43618	Screw	4	8.5	RD33608	Gear	1
3.10	RD35617	Terminal	2	8.6	RD43310	Circlip	1
3.11	RD45613	Screw	4	9	RA3118	Spring	1
3.12	RD35619	Terminal cover plate	1	10	RA354	Button	1
3.13	RD45612	Screw	4	11	RD4056	Circlip	1

## 11) PIPE ADAPTOR KIT RD2311

### FITTING INSTRUCTIONS

- Dependent upon the size of the pipe to be cut (see illustrations) attach adjustable angle plates RD3328 with cap screws RD4325 and washers RD4205 (4 off each) to the magnet sides. Do not tighten.
- Locate the machine on the centreline pipe taking care that the magnet is in line with the longitudinal axis of the pipe.
- Switch on the magnet and move the sliding plates down to the outside diameter of the pipe. Tighten the screws on both sides by hand then check once again that the full length of the moving plates is touching the pipe at the front and back, fasten the plate securely. Feed the safety strap through the lugs at the front of the housing, around the pipe and pull tight.
- When cutting the hole DO NOT use excessive pressure but rather let the cutter ease into the cutting surface.



## 12) CHUCK CONVERSION.

- To remove the arbour lay the machine on its side.
- Unscrew the two grub screws at the top of the arbor
- Some early machines will only have spanner flats on the arbor.
- When the arbor has become detached from the spindle this can then be removed
- Remove the arbour support bracket and guard with the arbour retained.
- Mount the chuck using the chuck adaptor RD33153.
- Replacing the chuck is the reverse sequence.

## 13) Tips for keeping your machine in correct working order.

In order to 'get the best life' out of your Rotabroach machine always keep in good working order. A well maintained machine is a happy machine.

A number of items must always be checked on Rotabroach machines.

Always before starting any job make sure the machine is in good working order and that there are no damaged or loose parts. Any loose parts must be tightened.

**Before proceeding with any maintenance work be certain that the power supply is disconnected.**

Description	Every operation	1 week	1 Month
Visual check of machine for damage	X		
Operation of machine	X		
Check brush wear		X	
Check magnetic base	X		
Check alignment of the machine			X
Check grease			X
Check Armature			X

### Visually check the machine for damage.

Machine must be checked before operation for any signs of damage that will affect the operation of the machine. Particular notice must be taken of the mains cable, if the machine appears to be damaged it should not be used failure to do so may cause injury or death.

### Check operation of the machine.

The machines operation must be checked to ensure that all components are working correctly.



**Machine Brushes** - should be checked to make sure there is no abnormal wear present this should be checked at least once a week if used frequently. If the brush has worn more than 2/3 the original length the brushes should be changed. Failure to do so may cause damage to the machine.

**Magnetic base** – before every operation the magnetic base should be checked to make sure that the base is flat and there is no damage present. An uneven magnet base will cause the magnet not to hold as efficiently and may cause injury to the operator.

#### **Adjustment of slide and bearing bracket Alignment.**

An essential requirement of the machine is that the slide can move in a smooth and controlled manner, free of lateral movement and vibration.

This situation can be maintained by periodic adjustment of the slide and is accomplished in the following manner:

1. Place the machine in an upright position and, by means of the capstan, raise the slide to its highest position. Clean the brass gib strips and apply a small amount of light machine oil to the wear surfaces.
2. Now lower the slide back to its lowest position. Bring the slide into the centre of the dovetail slide housing and loosen screws thus allowing free movement of the arbor support bracket.
3. Commencing with the middle screws, gently feed in all the screws until slight resistance is encountered.
4. Operate the slide up and down a few times to test the movement and make any further necessary adjustments. Try to ensure that all the screws are exerting a uniform pressure on the slide from top to bottom. A perfectly adjusted slide will operate freely up and down without any sideways movement.
5. Now raise the slide to its highest position. Slightly undo the arbor bearing bracket and, using fingers only, tighten the screws.
6. Place the machine on a steel plate, connect to supply and switch on magnet. Start up the motor. If the arbor is incorrectly aligned, the arbor support bracket will be seen to oscillate. Make any necessary further adjustments to the bracket to ensure correct alignment of the spindle and finally tighten the screws using a spanner. Lastly tighten the arbor bearing bracket.

#### **Check machines grease.**

The gearbox grease should be checked once a month to ensure all moving components are covered to prevent wear. The grease should be changed at least once a year to ensure you gain the best from the machine.

#### **Check Armature of the machine.**

This should be checked at least 1 per month to check that there are visual signs of damage to the body or to the commutator. Some signs of wear will be seen on the commutator over a period of time this is normal as this is the part that comes in contact with the brushes but any signs of abnormal damage and the part should be replaced.

## 14) TROUBLE SHOOTING

Magnet and motor do not function	<ul style="list-style-type: none"> <li>- The magnet switch is not connected to the power supply</li> <li>- Damaged or defective wiring</li> <li>- Defective fuse</li> <li>- Defective magnet switch</li> <li>- Defective Control Unit</li> <li>- Defective power supply</li> </ul>
Magnet does function, the motor does not	<ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Carbon brushes are stuck or worn out</li> <li>- Defective magnet switch</li> <li>- Defective On / off switch</li> <li>- Defective Control Unit</li> <li>- Defective armature and/or field</li> <li>- Defective magnet protective switch</li> </ul>
Magnet does not function, the motor does	<ul style="list-style-type: none"> <li>- Defective magnet</li> <li>- Defective Control Unit</li> </ul>
Hole cutters break quickly, holes are bigger than the hole cutter	<ul style="list-style-type: none"> <li>- Play in the guide</li> <li>- Bent spindle</li> <li>- Defective Magnet causing movement</li> <li>- Shaft extending from the motor is bent</li> <li>- Uneven work surface causing lack of magnetic adhesion.</li> <li>- Bent pilot</li> </ul>
Motor running roughly and/or seizing up	<ul style="list-style-type: none"> <li>- Bent spindle</li> <li>- Shaft extending from the motor is bent</li> <li>- Triangular guide not mounted straight</li> <li>- Dirt between spindle and triangular guide</li> </ul>
Motor making a rattling sound	<ul style="list-style-type: none"> <li>- Gear bearing (bottom of the armature) worn out</li> <li>- Gear(s) worn out</li> <li>- No grease in gear box</li> </ul>
Motor humming, big sparks and motor has no force	<ul style="list-style-type: none"> <li>- Armature burned</li> <li>- Field burned</li> <li>- Carbon brushes worn out</li> </ul>
Motor does not start or fails.	<ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Dirt in sensor of Speed Control Unit</li> <li>- Defective Speed Control Unit</li> <li>- Defective speed control or its wiring</li> <li>- Defective or loose magnet on top of armature</li> <li>- Damaged or defective brushes</li> </ul>
Guiding takes a great deal of effort	<ul style="list-style-type: none"> <li>- Guide is set too tight</li> <li>- Guide is dry</li> <li>- Guide/gear- rack/rotation system dirty or damaged</li> </ul>
Insufficient magnetic force	<ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Bottom of magnet not clean and dry</li> <li>- Bottom of magnet not flat</li> <li>- Work piece is not bare metal</li> <li>- Work piece is not flat</li> <li>- Work piece is too thin less than 10mm</li> <li>- Defective Control Unit</li> <li>- Defective magnet</li> </ul>
Motor only runs at maximum rpm	<ul style="list-style-type: none"> <li>- Defective speed switch</li> <li>- Damaged / defective wiring</li> <li>- Defective Control Unit</li> </ul>
Frame under voltage	<ul style="list-style-type: none"> <li>- Damaged / defective wiring</li> <li>- Defective magnet</li> <li>- Motor seriously dirty</li> </ul>
Fuse blows when magnet switch is turned on	<ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Wrong value fuse</li> <li>- Defective magnet switch</li> <li>- Defective Control Unit</li> <li>- Defective magnet</li> </ul>
Fuse blows when motor is started up	<ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Wrong value fuse</li> <li>- Motor running roughly</li> <li>- Defective Armature and / or Field</li> <li>- Carbon brushes worn out</li> <li>- Defective Control Unit</li> </ul>
Rotation system free stroke too long	<ul style="list-style-type: none"> <li>- Loose or defective gear-rack</li> <li>- Defective rotation system</li> </ul>

## 15) Cutter selection, Speeds and Feeds

Material	Material hardness	Cutter
Mild and Free cutting steels	<700N/mm <sup>2</sup>	SRC or SRCL
Mild and Free cutting steels	<850N/mm <sup>2</sup>	SRCV or SRCVL
Steel angle and joists	<700N/mm <sup>2</sup>	SRC or SRCL
Steel angle and joists	<850N/mm <sup>2</sup>	SRCV or SRCVL
Plate and sheet steel	<700N/mm <sup>2</sup>	SRC or SRCL
Plate and sheet steel	<850N/mm <sup>2</sup>	SRCV or SRCVL
Aluminium	<700N/mm <sup>2</sup>	SRC or SRCL
Aluminium	<850N/mm <sup>2</sup>	SRCV or SRCVL
Brass	<700N/mm <sup>2</sup>	SRC or SRCL
Brass	<850N/mm <sup>2</sup>	SRCV or SRCVL
Cast iron	<700N/mm <sup>2</sup>	SRC or SRCL
Cast iron	<850N/mm <sup>2</sup>	SRCV or SRCVL
Stainless Steel	<700N/mm <sup>2</sup>	SRC or SRCL
Stainless Steel	<850N/mm <sup>2</sup>	SRCV or SRCVL
Stainless Steel	>850N/mm <sup>2</sup>	CWC, CWCL or CWCX or SCRWC
Rail track	>850N/mm <sup>2</sup>	CWC, CWCL or CWCX or SCRWC
Tool Steel	>850N/mm <sup>2</sup>	CWC, CWCL or CWCX or SCRWC
Die steel	>850N/mm <sup>2</sup>	CWC, CWCL or CWCX or SCRWC

The data listed below is for reference purposes only, and indicate potential starting conditions. It is the responsibility of the site operation manager to determine correct application requirements.

Material to be cut	Cutting surface speed Meters/min	Cutter diameter/Material/RPM relationship													
		13		14		18		22		30		50		65	
	Lower - Upper	L	U	L	U	L	U	L	U	L	U	L	U	L	U
Aluminium	60 - 90	1469	2203	1364	2046	1061	1591	868	1302	637	955	382	573	294	441
Brass & Bronze	40 - 50	979	1224	909	1137	707	884	579	723	424	530	255	318	196	245
Iron: cast(soft)	30 - 50	734	1224	682	1137	530	884	434	723	318	530	191	318	147	245
cast(hard)	15 - 21	367	514	341	477	265	371	217	304	159	223	95	134	73	103
cast(malleable)	15 - 30	367	734	341	682	265	530	217	434	159	318	95	191	73	147
Steel: mild	24 - 30	588	734	546	682	424	530	347	434	255	318	153	191	118	147
high tensile	3 - 5	73	122	68	114	53	88	43	72	32	53	19	32	15	24
stainless (free cutting)	15 - 18	367	441	341	409	265	318	217	260	159	191	95	115	73	88
stainless (heat resisting)	6 - 13	26	318	136	296	106	230	87	188	64	138	38	83	29	64

These are only starting points. They will vary with application and work piece condition.

Material or Application Type	Feed Per Tooth (mm)
Thin Walled Workpieces Oblique Entry / Curved Surfaces Semi-Circles / Fragile Setups	.0254 / .0508 (.0762 FPT with Work Hardening Materials)
Soft / Gummy Materials	.1016 / .127
Typical / Average Applications	.0762 / .1016
Deep Holes	.1016 / .127

Difficult-to-machine materials will require reduced feed rates.



## WARRANTY STATEMENT

Rotabroach® warrants its machines to be free from faulty materials, or workmanship under normal use for a period of 12 months from initial date of purchase and 90 days for all other parts (excluding cutters), provided that the warranty registration card (or online registration) has been completed and returned to Rotabroach®, or its designated distributor within a period of (30) days from the purchase date, failure to do so will void the warranty. If the stated is adhered to Rotabroach® will repair or replace (at its option) without charge any faulty items returned.

### This Warranty does not cover:

1. Components that are subject to natural wear and tear caused by the use in accordance with the operators instructions
2. Defects in the tool caused by non-compliance with the operating instructions, improper use, abnormal environment conditions, inappropriate operating conditions overload or insufficient servicing or maintenance.
3. Defects caused by using accessories, components or spare parts other than original Rotabroach® parts.
4. Tools to which changes or additions have been made.
5. Electrical components are subject to manufacturer's warranty.

Your online registration can be submitted on [www.rotabroach.co.uk](http://www.rotabroach.co.uk)

The warranty claim must be lodged within the warranty period. This requires the submission or sending of the **complete** tool in question with the original sales receipt which must indicate the purchase date of the product. A complaint form must also be submitted prior to the return.

This can be found online at [www.rotabroach.co.uk](http://www.rotabroach.co.uk) Failure to complete this form will result in the delay of your claim. All goods returned defective must be returned pre-paid to Rotabroach®, in no event shall Rotabroach® be liable for subsequent direct, or indirect loss or damage.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, (EXPRESSED OR IMPLIED) INCLUDING ANY WARRANTY OF MECHANICALITY OR FITNESS FOR A PARTICULAR PURPOSE. ROTABROACH® RESERVE THE RIGHT TO MAKE IMPROVEMENTS AND MODIFICATIONS TO DESIGN WITHOUT PRIOR NOTICE

**Known and Trusted Worldwide for Quality, Performance and Reliability**