

RotabroachTM

COBRA MAGNETIC DRILLING MACHINE



Model No. CM/200/1 CM/200/3

This machine (Serial No _____) is CE approved.

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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

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

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

1) 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 properly 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 tool 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.

[2] SPECIFICATION

Maximum hole cutting capacity in .2/.3C steel = 65mm dia. x 50mm deep

Arbor bore = 19.05mm (3/4") dia.

Motor Unit				
Voltages	110v		230v	
normal full load	14 A	1400 W	6 A	1400 W
Electro Magnet	0.6A	69W	0.3A	69W
Size	180mm long 90mm wide			
Tractive Force at 20°C with 25mm minimum plate thickness 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.	1200kgs			
Total Load (magnet + motor)	1469 W		1469 W	
Overall Dimensions				
Height - maximum extended	550mm			
Height - minimum	470mm			
Width (including Hand wheel)	200mm			
Length Overall (including Guard)	270mm			
Nett Weight	16kgs			
Maximum hand/arm vibration magnitude (measured at handle during operation in accordance with ISO5349, using a 22mm cutter through 13mm MS plate)	0.82 m/s ²			
Estimate of likely daily vibration exposure. Operation 30 holes @ 2 minute/hole.	0.29m/s ² A(8)			
Average noise level during cutting at operators ear position.	89dB(A)			

Ear and eye defenders must be worn when operating this machine

These tools are UK designed, and manufactured with globally sourced components and conform with the requirements of EEC Document HD.400.1 and BS.2769/84

Suitable only for a single phase 25-60Hz A.C. power supply

DO NOT USE ON D.C. SUPPLY

Do not use your 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

[3] OPERATIONAL SAFETY PROCEDURES

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.

[4] 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 <1>. 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 to zero.
- 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 may 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.
- Cutter breakage is usually caused by insecure anchorage, a loosely fitting slide or a worn bearing in the arbor support. (Refer to routine maintenance instructions).
- Only use approved cutting fluid. Rotabroach cutting fluid has been specially formulated to maximise the cutters performance. It is available in 1 litre (RD208), 5 litre (RD229), and 25 litre (RD220) containers.

SPEED SELECTION

The machine is equipped with two speed ranges, High, and Low, and a step less variation of each range.

The speed range is changed by the rotary change switch located on the gearbox side. Do not change gear while the motor is in motion.

The stepless variation is adjusted by rotating the disk located on top of the motor. The disk is graduated into six numerically designated segments.

Before cutting holes the work piece material specification must be determined to facilitate the correct cutting speed selection (See section 13 Cutting speeds). Site conditions, eg 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 optimum cutting conditions prevail.

[5] EXTENSION CABLE SELECTION

The machines are factory fitted with a 3 metre length of cable having three conductors 1.5mm² 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 1.5mm² For 230v supply: 26metres of 3 core x 1.5mm²

ALWAYS DISCONNECT THE MACHINE FROM THE POWER SOURCE BEFORE CHANGING CUTTERS.

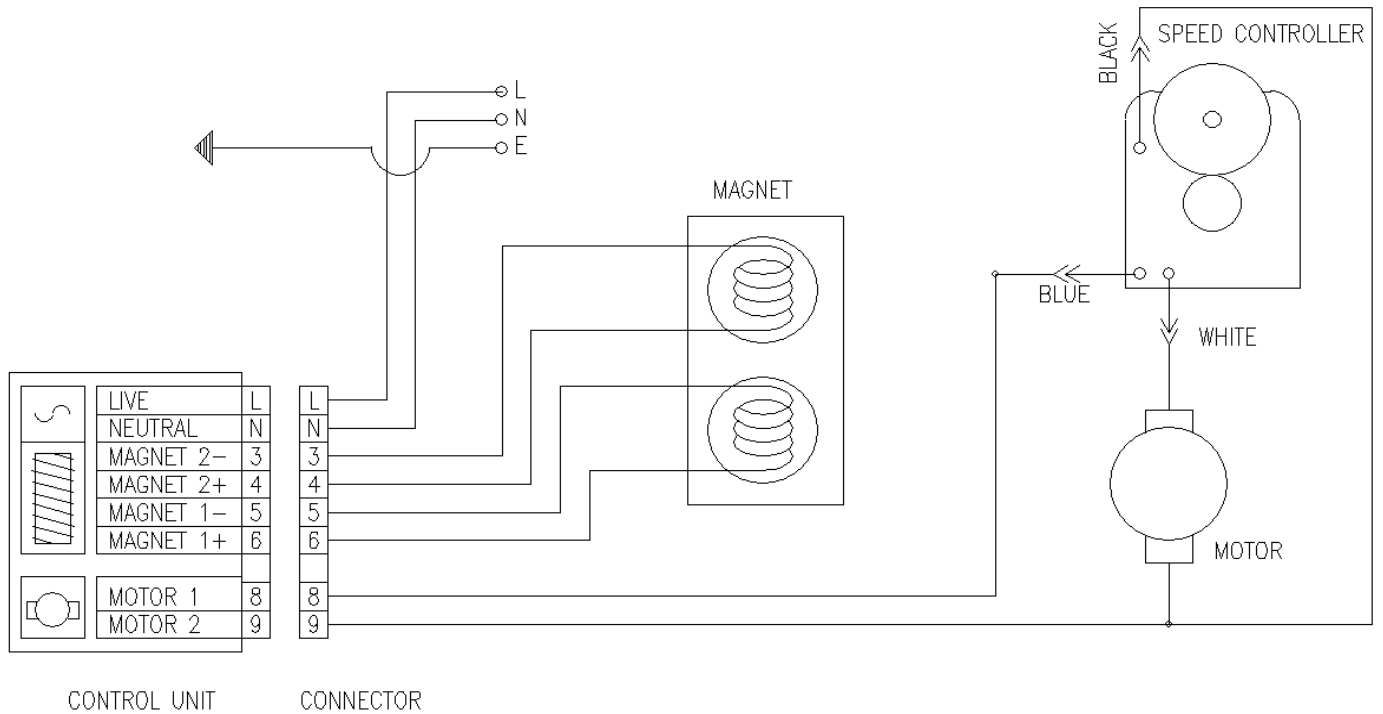
[6] MOUNTING OF CUTTERS

- 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.

[7] 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.

[8] WIRING DIAGRAM



[9] Speed Selection

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 ²)	24-30
	(460-770 N/mm ²)	15-27
	(770-1070 N/mm ²)	9-15
Stainless steel	1070-1230 N/mm ²)	6-9
	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.

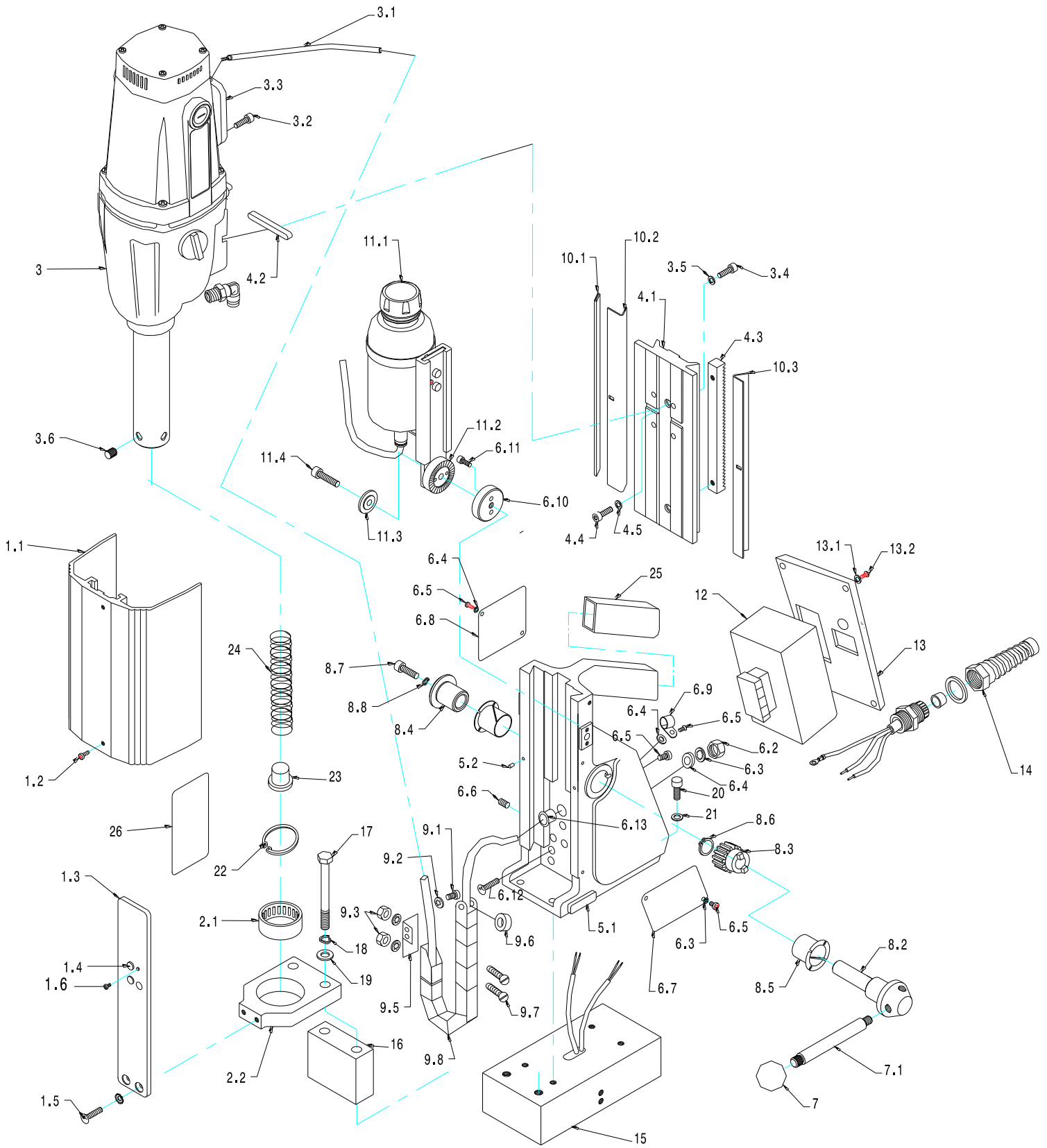
Possible speed selection for mild steel with ideal conditions at 30 M/min.

Cutter diameter and speed relationship

High gear.			Low gear.		
Selector No	RPM	Cutter Dia.	Selector No	RPM	Cutter Dia.
1	300	32	1	150	62
2	360	26	2	180	52
3	430	22	3	215	46
4	500	19	4	250	38
5	600	16	5	300	32
6	650	14	6	330	30

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

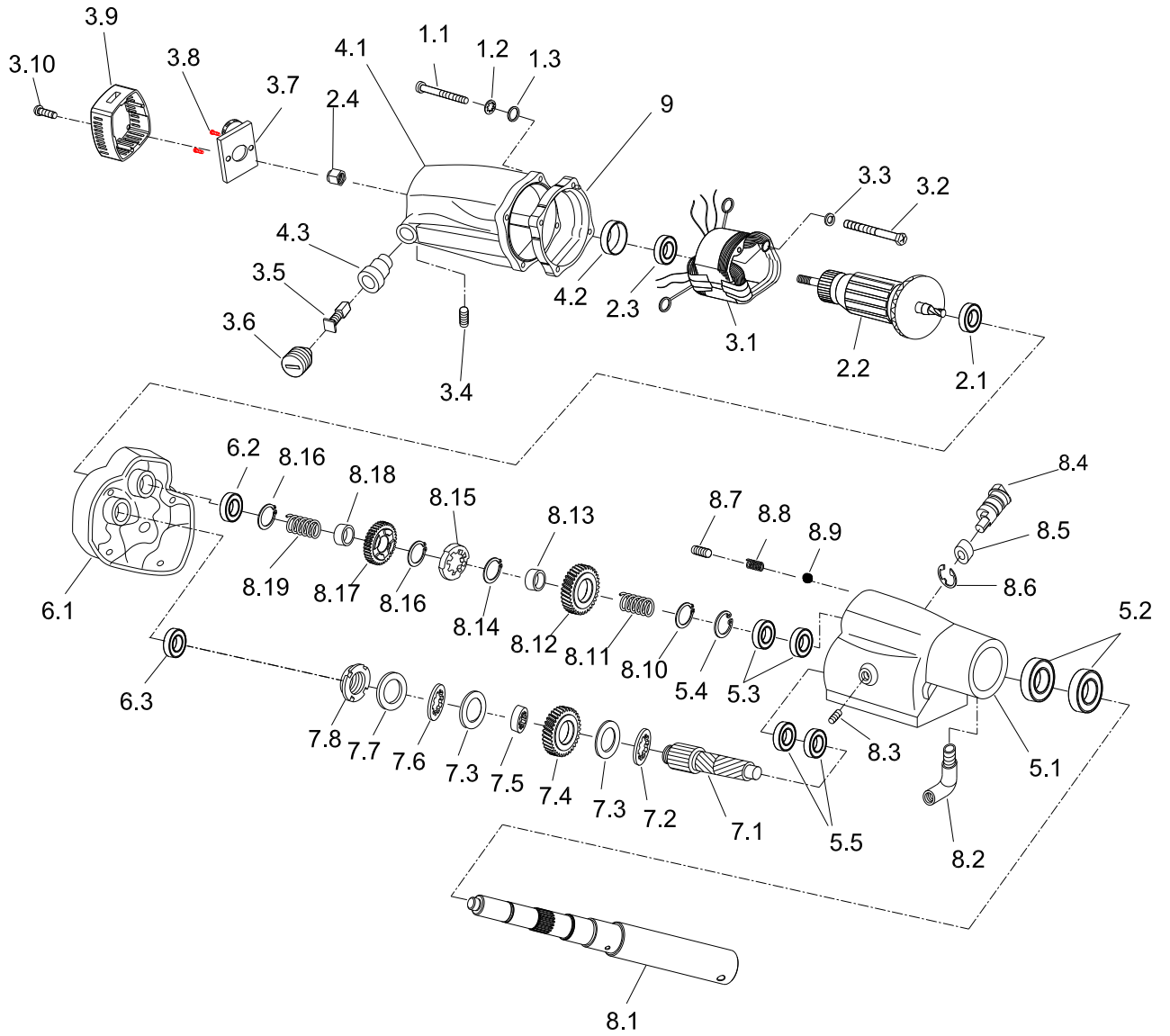
[10] EXPLODED VIEW OF COMPLETE MACHINE



[10] Parts list for CM/200/1 & CM/200/3

Item	Part No.	Component	Qty	Item	Part No.	Component	Qty
1	RD25501	Guard assembly	1	7	RD25504	Capstan arm assembly	1
1.1	RD35522	Guard	1	8.2	RD2506	Capstan hub assembly	1
1.2	RD4077	Pan head screw	2	8.3	RD4049	Pinion	1
1.3	RD3246	Guard bracket	1	8.4	RD3502	Pinion shaft collar	1
1.4	RD4346	Spring plunger	2	8.5	RD403	Pinion bearing	2
1.5	RD4347	Countersunk screw	2	8.6	RM22876	Pinion circlip	1
1.6	RD4252	M3 screw	1	8.7	RD4098	Socket head cap screw	1
2	RD25503	Bearing bracket assembly	1	8.8	RD4207	Spring washer	1
2.1	RD43301	Arbor bearing	1	9	RD2505	Cable chain assembly	1
2.2	RD35535	Bearing bracket	1	9.1	RD4414	Socket head cap screw	2
3	RD25551	Motor & gearbox assembly (110v)	1	9.2	RD4069	Shakeproof washer	2
3	RD25553	Motor & gearbox assembly (230v)	1	9.3	RD4250	Hex nut	2
3.1	RD25502	Motor cable assembly	1	9.4	RD4045	Washer	2
3.2	RD4418	Countersunk screw	4	9.5	RD3515	Chain fixing bracket	1
3.3	RD33321	Cable cover	1	9.6	RD4521	Chain bush	1
3.4	RD4091	Socket head cap screw	4	9.7	RD4018	Countersunk set screw	2
3.5	RD4092	Washer	4	9.8	RD3558	Chain	1
4	RD25505	Slide assembly	1	10	RD25510	Gib strap assembly	1
4.1	RD35521	Slide	1	10.1	RD3505	Gib support strip	1
4.2	RD35536	Key	1	10.2	RD3504	Adjustable gib strip	1
4.3	RD4048	Rack	1	10.3	RD3503	Static gib strip	1
4.4	RD4091	Socket head cap screw	2	11	RD23303	Oil bottle assembly	1
4.5	RD4092	Washer	2	11.1	RD23317	Bottle & bracket	1
5	RD2507	Housing sub assembly	1	11.2	RD33319	Adjustable ratchet wheel	1
5.1	RD3500	Housing	1	11.3	RD33320	Tension plate	1
5.2	RD3026	Tension pin	2	11.4	RD4269	Socket head set screw	1
6	RD25508	Housing assembly	1	12	RD25511	Control unit assembly (110v)	1
5	RD2507	Housing sub assembly	1	12	RD25513	Control unit assembly (230v)	1
6.1	RD3027	Aluminum scale	1	13	As required	Fascia plate	1
6.2	RD4068	Hex nut	1	13.1	RD4069	Shakeproof washer	4
6.3	RD4069	Internal washer	7	13.2	RD4077	Pan head screw	4
6.4	RD4070	Washer	1	14	RD271	Mains cable assembly (110V)	1
6.5	RD4077	Pan head screw	6	14	RD273	Mains cable assembly (230V)	1
6.6	RD4312	Socket set screw	5	15	RD3557	Magnet base assembly	1
6.7	RD4503	Name plate	1	16	RD3507	Arbor space bracket	1
6.8	RD4502	Information plate	1	17	RD4517	Arbor bracket bolt	2
6.9	RD4753	Cable clip	1	18	RD4079	Shakeproof washer	2
6.10	RD33338	Fixed ratchet wheel	1	19	RD4078	Plain washer	2
6.11	RD4414	Socket head cap screw	2	20	RD4098	Magnet fixing screw	4
6.12	RD4046	Pan head screw	2	21	RD4096	Shakeproof washer	4
6.13	RD4079	Bush	1	22	RD4056	Circlip	1
7	RD25504	Capstan arm assembly	1	23	RA354	Button	1
7.1	RD3014	Capstan arm	3	24	RA355	Compression spring	1
7.2	RD4101	Capstan ball	3	25	RD45536	Rubber handle	1
8	RD25509	Capstan assembly	1	26	RD3556	Speed label	1

[11] EXPLODED VIEW OF GEARBOX AND MOTOR UNITS



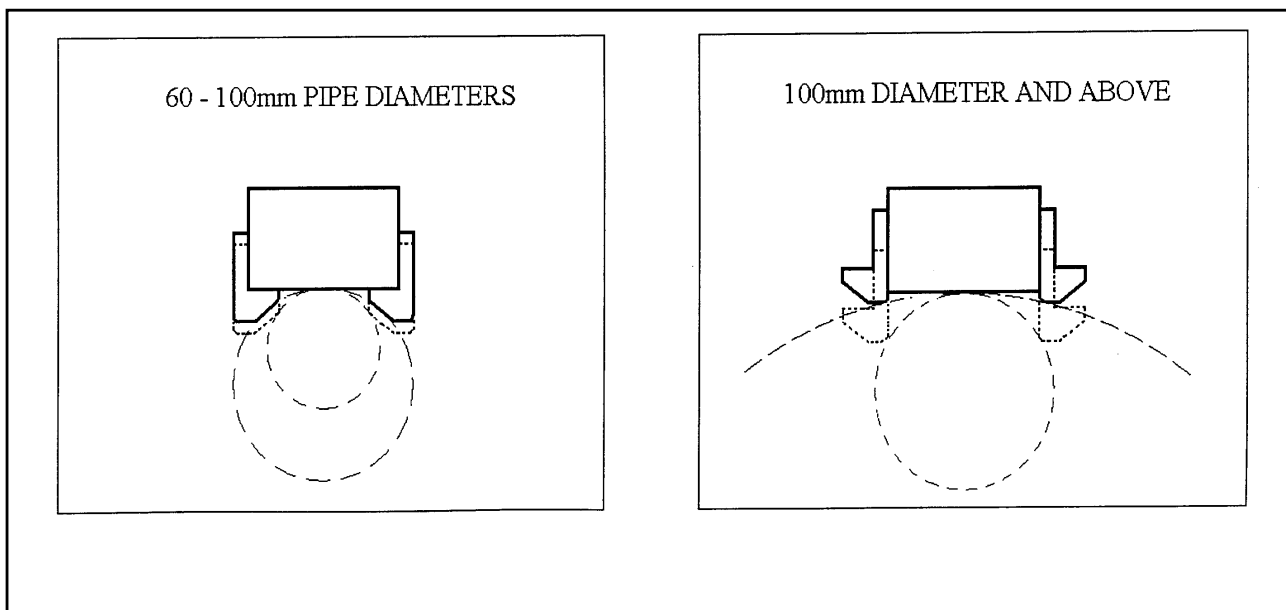
Part list of motor & gearbox(Cobra)

Item	Part No.	Component	Qty	Item	Part No.	Component	Qty
1	RD25521	Motor Assembly (110V)	1	6	RD25514	Inner gearplate assembly	1
1	RD25523	Motor Assembly (230V)	1	6.1	RD35511	inner gearplate	1
2	See below	Armature assembly	1	6.2	RD45522	Bearing	1
3	See below	Field coil and motor housing assembly	1	6.3	RD45507	Bearing	1
1.1	RD45530	Socket head cap screw	4	7	RD25507	Clutch assembly	1
1.2	RD4092	Shakeproof washer	4	7.1	RD35505	Interpinion shaft	1
1.3	RD4205	Washer	4	7.2	RD45504	Washer	1
2	RD25531	Armature assembly (110v)	1	7.3	RD45505	Thrust washer	2
2	RD25533	Armature assembly (230v)	1	7.4	RD35503	Gear	1
2.1	RD45517	Bearing	1	7.5	RD35502	Bush	1
2.2	RD35510	Armature (110V)	1	7.6	RD35504	Washer	1
2.2	RD35523	Armature (230V)	1	7.7	RD45506	Disk spring	1
2.3	RD45526	Bearing	1	7.8	RD45503	Lock nut	1
2.4	RD33317	Speed Sensor	1	8	RD25506	Gearbox assembly	1
3	RD25561	Field coil & motor housing assembly (110V)	1	5	RD25515	Gearbox housing assembly	1
3	RD25563	Field coil & motor housing assembly (230V)	1	6	RD25514	inner gearplate assembly	1
4	RD25512	Motor housing assembly	1	7	RD25507	Clutch assembly	1
3.1	RD35531	Field coil (110V)	1	8.1	RD35501	Arbor spindle	1
3.1	RD35553	Field coil (230V)	1	8.2	RD43324	Coolant elbow	1
3.2	RD45525	Screw	2	8.3	RD45510	Screw	1
3.3	RD4092	Shakeproof washer	2	8.4	RD35530	Gearselector	1
3.4	RD43317	Socket head set screw	2	8.5	RD45521	bush	1
3.5	RD35518	Carbon brush	2	8.6	RD45513	circlip	1
3.6	RD35519	Brush cover	2	8.7	RD45524	Socket set screw	1
3.7	RD23330	Speed controller assembly (110V)	1	8.8	RD45516	Spring	1
3.7	RD23343	Speed controller assembly (230V)	1	8.9	RD45515	Steel ball	1
3.8	RD45501	Screw	2	8.10	RD45509	Circlip	1
3.9	RD35520	End cap	1	8.11	RD45514	Spring	1
3.10	RD45529	Screw	4	8.12	RD35507	Gear	1
4	RD25512	Motor Housing assembly	1	8.13	RD35514	Bush	1
4.1	RD35516	Motor Housing	1	8.14	RD45518	Circlip	1
4.2	RD35532	Bush	1	8.15	RD35509	Gear selector ring	1
4.3	RD35517	Brush holder	2	8.16	RD45519	Snap	2
5	RD25515	Gearbox housing assembly	1	8.17	RD35512	Gear	1
5.1	RD35506	Gearbox	1	8.18	RD35508	Bush	1
5.2	RD45508	Seal kit	2	8.19	RD45520	Spring	1
5.3	RD45511	Bearing kit (arbor spindle)	2	9	RD35513	Inner cap	1
5.4	RD45512	Circlip	1				
5.5	RD45502	Bearing Kit (inter pinion shaft)	2				

[12] 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.



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

[15] Cutter selection, Speeds and Feeds

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

Notes:



WARRANTY STATEMENT

Rotabroach® warrants its machines to be free from faulty materials, or workmanship under normal use for a period of 6 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

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 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

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