

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

## **SCORPION MAGNETIC DRILLING MACHINE**



**Model No. CM/500/1 CM/500/3**

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

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**Thank you for purchasing our Scorpion magnetic drill.  
We would really like your feedback on the machine.**

***Other Products by Rotabroach:***



**Thank you for your purchase of our product.**

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## 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 from 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.

## 2) SPECIFICATION

Maximum hole cutting capacity in .2/.3C steel = 100mm dia. x 100mm deep  
Arbor bore = 19.05mm (3/4") dia.

<b>Motor Unit</b>				
Voltages	110v		230v	
normal full load	18 A	1900 W	9 A	1900 W
<b>Electro Magnet</b>	0.35A	69W	0.35A	69W
Size	230mm long 110mm wide			
Tractive Force at 20°C with 25mm minimum 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.</b>	30000N			
<b>Overall Dimensions</b>				
Height - maximum extended	708mm			
Height - minimum	453mm			
Width (including Hand wheel)	285mm			
Length Overall (including Guard)	340mm			
<b>Nett Weight</b>	28.2kgs			
Stroke	255mm			
Maximum hand/arm vibration magnitude (measured at handle during operation in accordance with ISO5349, using a 22mm cutter through 13mm MS plate)	2,5 m/s <sup>2</sup>			
Estimate of likely daily vibration exposure. Operation 30 holes @ 2 minute/hole.	0,8 m/s <sup>2</sup>			

Ear defenders and Eye protection must be worn when operating this machine.

These tools are 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**

	List of Contents with Magnetic Drill Unit	Check List
RD46111	Carry Case	YES/NO
RD40525	Safety Chain	YES/NO
RD46112	Drift	YES/NO
RD40080	2.5mm Allen Key	YES/NO
RD4153	5mm Allen Key	YES/NO
RD4230	6mm Allen Key	YES/NO
RMT3	3MT Arbor attachment	YES/NO
RA3122	Pilot for CWCX 3/4" Shank	YES/NO
RD46113	Coolant Bottle Assembly	YES/NO

## READ BEFORE USING THE MACHINE

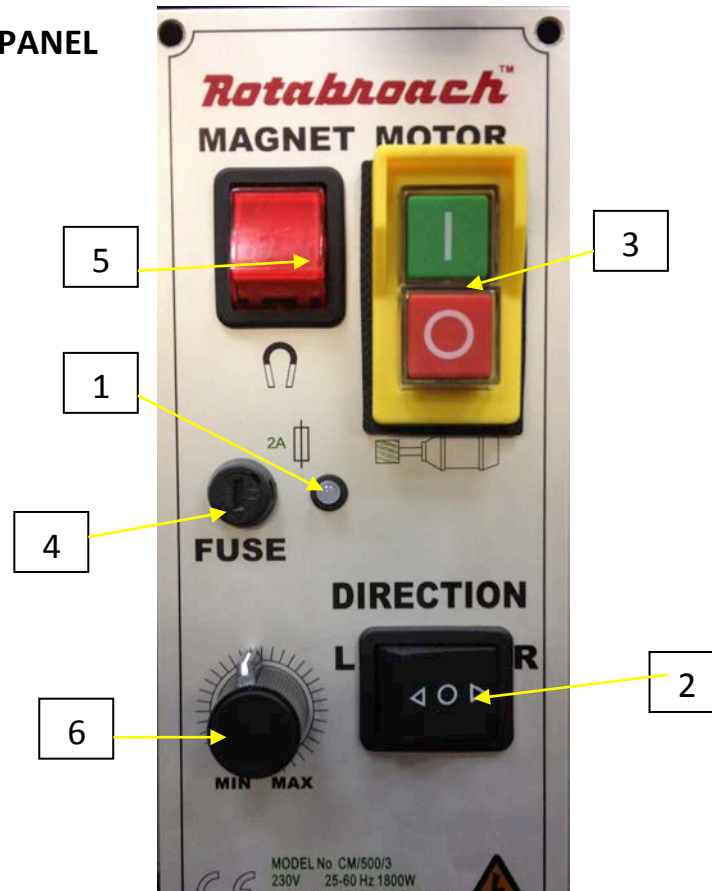
### 3) OPERATIONAL SAFETY PROCEDURES

- The CM/500 is specifically designed for drilling holes/ tapping and countersinking in steel. The CM/500 may not be adapted and/or used for applications other than those it has been designed for.
- 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 gases. Failure to do so may result in personal injury.
- ALWAYS SECURE THE MACHINE WITH THE SAFETY CHAIN BEFORE STARTING TO OPERATE - for the user's protection in case of power failure or the magnet's breaking loose whilst in use. Failure to do so may result in personal injury.
- ALWAYS WEAR APPROVED EYE AND EAR PROTECTION WHEN THE EQUIPMENT IS IN OPERATION. Failure to do so may result in personal injury.
- Disconnect from the power source when changing cutters, arbors or working on the machine.
- When changing cutters, or removing swarf, ALWAYS wear approved gloves.
- ALWAYS ENSURE CUTTER RETAINING SCREWS ARE SECURE - they sometimes vibrate loose when the machine is in continuous use.
- Regularly clear the work area and machine of swarf and dirt, paying particular attention to the underside of the magnet base.
- With a gloved hand, and after switching off, remove any swarf which might have gathered around the cutter and arbor before proceeding with the next hole.
- Before operating the machine, always remove tie, rings, watches and any loose adornments which might entangle with the rotating machinery. Failure to do so may result in personal injury.
- Should the cutter become 'fast' in the work piece, stop the motor immediately to prevent personal injury. Disconnect from the 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 trying to drill a hole.
- 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 or use suitable cutting paste. Care is to be taken to ensure that coolant does not drip on to the motor unit.
- Cutting tools may shatter; always ensure that you are wearing appropriate eye protection 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.

#### 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 rocker 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 pressing the magnet switch to zero.
- Always ensure both magnet coils are on the work surface. Incorrect adhesion will result in poor holding force.
- Always ensure that there is a least 10mm thickness of material for the magnet to adhere to for the magnet to work best.
- Do not connect any other machines to the electrical outlet the drill is plugged into, as this may result in the loss of magnetic force.
- 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) and 5 litre (RD229).
- When using the machine drill vertically or upside down, avoid metal burrs from getting into the unit. We will not repair any damage done to the machine by such action under the coverage of our warranty.

#### 4.1) THE CONTROL PANEL



##### 1. The magnet indicator.

This indicator shows if the magnet is working effectively. The indicator light turns green if there is sufficient magnetic force. If it lights up red the magnet is not generating sufficient attachment force. **Note this is only an indicator and not a certainty that the magnet will not release the material. Rotabroach accepts no liability ensuing from the magnet indicator not functioning or functioning poorly.**

##### 2. The forward / reverse switch.

This rocker switch is used to determine the direction of rotation of the electric drill.

##### 3. The Motor Switch

This switch is used to turn the motor on or off.

##### 4. The fuse holder.

Houses a 2 Amp glass fuse 5x20.

##### 5. The Magnet Switch.

To turn the magnet on and off. This needs to be on before the motor switch can work

##### 6. The Speed control.

Rotate to alter the speed.



## 4.2) Speed and Torque adjustment.

### Gear Selection – Gear positions when seen facing the machine

Gear	Speed	RPM (no load)	Cutting Diameter
1: ↓(L) ↑(R)	1 - 6	42 - 46	
	6 - 12	46 - 54	
	12 - 18	54 - 68	90mm-100mm
	18 - 24	68 - 88	85mm-90mm
	24 - 31	88 - 110	70mm-80mm
2: ↓(L) ↓(R)	1 - 6	68 - 74	
	6 - 12	74 - 90	
	12 - 18	90 - 110	75mm-80mm
	18 - 24	110 - 142	60mm-70mm
	24 - 31	142 - 190	45mm-50mm
3: ↑(L) ↑(R)	1 - 6	142 - 158	
	6 - 12	158 - 188	
	12 - 18	188 - 228	40mm - 45mm
	18 - 24	228 - 296	30mm-40mm
	24 - 31	296 - 396	25mm - 30mm
4: ↑(L) ↓(R)	1 - 6	228 - 250	
	6 - 12	250 - 302	
	12 - 18	302 - 368	25mm -30mm
	18 - 24	368 - 474	18mm -25mm
	24 - 31	474 - 636	12mm - 17mm

## SPEED SELECTION (1)

The machine is equipped with 4 gear ranges which can produce speeds up to 416 rpm. Do not change the gear while the motor is in motion.

The speed range for this gear is changed by the rotary change switch located on the Control panel.

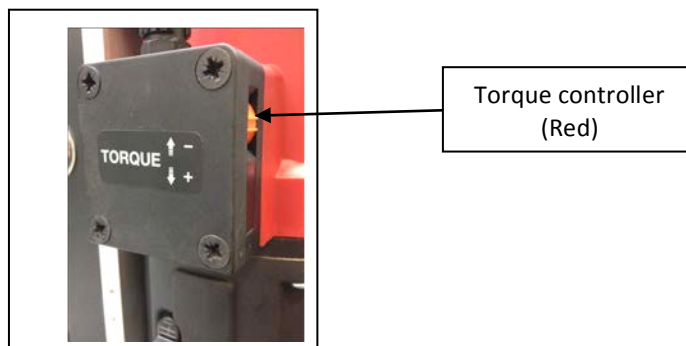


- The speed controller is adjusted by rotating the black dial located on the control panel.
- During normal operation please use recommended speed.
- Before cutting holes ensure that the correct speed and gear are chosen for the material and cutter.
- Conditions, e.g. cutter diameter, condition of cutter, material condition, material hardness and material thickness, 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.

In general the faster output speeds would be used for smaller cutters and the slower more torque gears for larger cutters.

## TORQUE ADJUSTMENT (2)

The CM/500 is also fitted with a variable torque control which can alter the torque of the motor electronically. This reduces or increase the motors electronic cut off point so that more or less current can be drawn by the motor before it cuts off. For all cutters this should be set to a low range and only increased as required.



**ALWAYS DISCONNECT THE MACHINE FROM THE POWER SOURCE WHEN CHANGING CUTTERS.**

## 5) 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.

Take top piece of and place through hole in shank of cutter' fit the bottom to the top part inside the cutter bore. Insert shank of cutter into

3/4" dia. bore of arbor, ensuring alignment of two drive flats with socket screws

Tighten both screws using hexagon key 5mm.

## 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) ARBOR ATTACHMENTS

The CM/500 has been design so that a number of 3 Morse taper attachments can be used with this machine.

### Arbors for cutters

Currently available from Rotabroach are a number of various arbors for fitting our range of cutters, available with the standard 19.05mm Weldon shank attachment and also are available with a 32mm Weldon shank.

Part Number	Morse Taper	Shank	Depth Of Cut
CA130	3	19.05mm	50mm
CA1375	3	19.05mm	75mm
CA13100	3	19.05mm	100m
CA330	3	32mm	50mm
CA3375	3	32mm	75mm
CA3310	3	32mm	100mm

### Twist drills

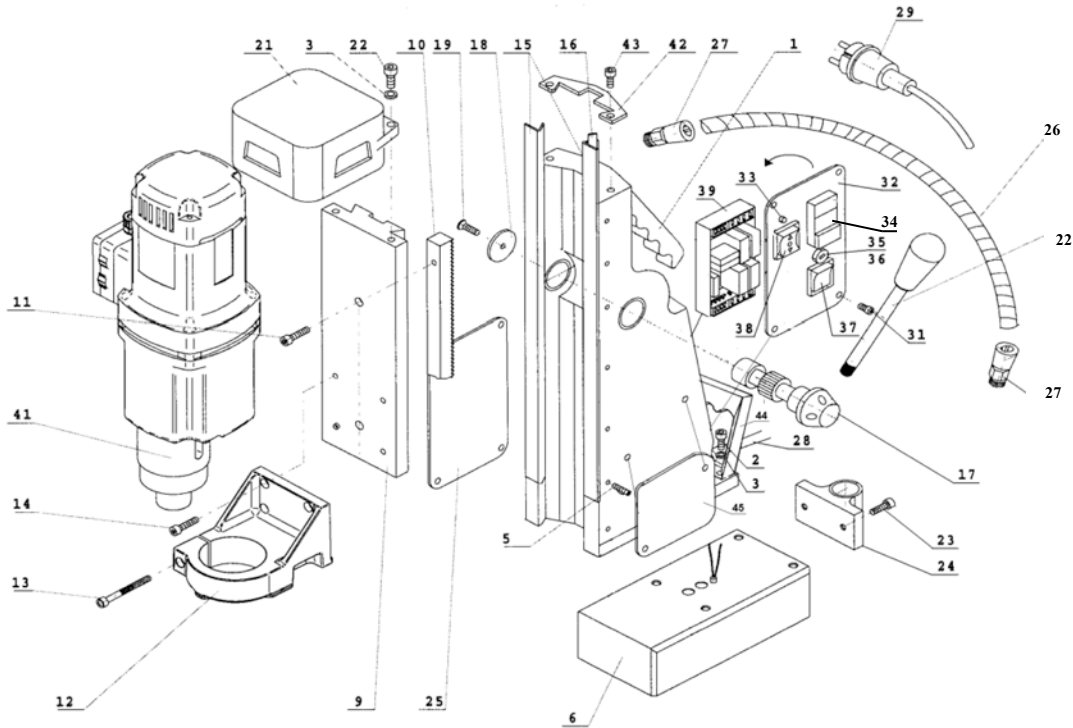
It is possible to also use twist drills with this machine. These can either be 3MT twist drills or a using a suitable drill chuck. Please contact our sale department for further details. Max size twist drill that can be used with this machine is 32mm.

### Tap and Tap holders

Again as with the Twist drills this machine can also allow you to tap through holes. Using a suitable tap or tap holder they can be connected to the 3MT output shaft.

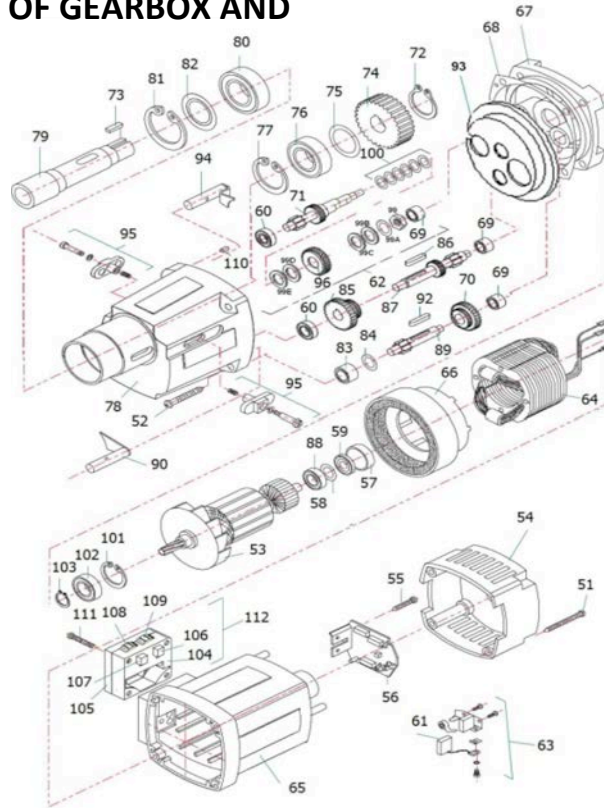
The machine is suitable for tapping up to M30. Please contact our sales department for further details and our available product.

### 8) EXPLODED VIEW OF COMPLETE MACHINE



Item	Part No.	Component	Qty	Item	Part No.	Component	Qty
1	RD3638	Housing	1	24	RD4632	Magnet Spring ball	1
2	RD4613	Screw M8 x 25	4	25	RD4502	Information plate	1
3	RD4614	Washer M8	4	26	RD4637	Motor Cable	1
4	RD4615	Nut M5	7	27	RD4634	Connector	2
5	RD46215	Setting screw	7	28	RD4635	Mains cable fixing	1
6	RD46216	Magnet	1	29	RD4636	Mains cable complete	1
7	RD46217	Sensor	1	30	RD46224	Screw Nut Washer for Earthing	
8		N/A		31	RD4638	M4 x 8 Panel screw	4
9	RD46218	Slide	1	32	RD3642	Front Plate 110V	1
10	RD46219	Rack	1		RD3639	Front Plate 230V	1
11	RD4620	M6 x 55 Screw	2	33	RD46225	LED Indicator	1
12	RD4621	Motor Holder	1	34	RD4640	Motor On/ off Switch	1
13	RD46220	M6 x 30 Screw	1	35	RD4641	Fuse Holder	1
14	RD4623	M6 x 16 Screw	4	36	RD4642	Fuse 20 x 5 F2A	1
15	RD46221	GIB strip	1	37	RD4643	Magnet Switch	1
16	RD46222	Adjustment plate	1	38	RD4644	L/R switch	1
17	RD4626	Capstan Hub assembly	1	39	RD4645	Control Unit 110V	1
18	RD4627	End Plate	1		RD4646	Control Unit 230V	1
19	RD4628	M6 x 20 End Screw	1	40	RD46226	Panel Plate assembly	
20	RD4629	Capstan Arm	3	41	RD46227	Motor Unit 230V 1800W	1
21	RD4630	Motor fixing top	1		RD46228	Motor Unit 110V 1800W	1
22	RD4631	M8 x 35 Screw	2	42	RD4649	Top Plate	1
23	RD46223	Magnet Spring ball Screw	2	43	RD4650	Screw for top plate	2
				44	RD3640	Carry Handle	1
				45	RD3641	Name Plate	1

### 9) EXPLODED VIEW OF GEARBOX AND MOTOR UNITS



Item	Part No.	Component	Qty	Item	Part No.	Component	Qty
51	RD46229	Screw	4	83	RD46264	Needle bearing	1
52	RD46230	Screw	4	84	RD46265	Washer	1
53	RD46231	Armature assembly (230v)	1	85	RD46266	Double gear 1	1
53	RD46232	Armature assembly (110v)	1	86	RD46267	Key	1
54	RD46233	End Cover	1	87	RD46268	Axle 2	1
55	RD46234	Screw	2	88	RD46269	Bearing	1
56	RD46235	Speed Control Unit 230V	1	89	RD46270	Axle 3 13T	1
56	RD46236	Speed control Unit 110V	1	90	RD46271	Clutch shaft 2 (L-type)	1
57	RD46237	Rubber fitting Ring	1	92	RD46272	Key 3 (L)	1
59	RD46239	Armature speed disk	1	93	RD46273	Plate for Gear Casing	1
60	RD46240	Bearing	1	94	RD46274	Clutch shaft 1	1
61	RD46241	Carbon brush	2	95	RD46275	Gear switch	1
62	RD46242	Friction Clutch Complete	1	96	RD46276	First gear	1
63	RD46243	Carbon brush assembly	2	99	RD46279	Nut	1
64	RD46244	Field coil 110v	1	99A	RD46280	Washer	1
64	RD46245	Field coil 230v	1	99B	RD46281	Friction Disk 1	1
65	RD46246	Motor housing	1	99C	RD46282	Brass Disk 1	1
66	RD46247	Baffle	1	99D	RD46283	Brass Disk 2	1
67	RD46248	Inner Gear Plate	1	99E	RD46284	Friction Disk 2	1
68	RD46249	Gasket	1	100	RD46285	Shell 28	1
69	RD46250	Needle bearing	1	101	RD46286	Circlip	1
70	RD46251	Double Gear 2	1	102	RD46287	Bearing	1
71	RD46252	Axle 1	1	103	RD46288	Circlip	1
72	RD46253	Circlip	1	104	RD46289	T/S Switch housing Red/Blue	1
73	RD46254	Key spindle	1	105	RD46290	T/S Switch Cover	1
74	RD46255	Spindle gear (38T)	1	106	RD46291	Speed Potentiometer 100K	1
75	RD46256	adaptor ring	1	107	RD46292	Torque Potentiometer 1K	1
76	RD46257	Bearing	1	108	RD46293	Red wheel	1
77	RD46258	Circlip	1	109	RD46294	Blue wheel	1
78	RD46259	Gear Casing	1	110	RD46295	Casing Pin	1
79	RD46260	Spindle Drive shaft	1	111	RD46296	Screw 6 x 45	4
80	RD46261	Bearing	1	112	RD46297	T/S Switch Housing complete	1
81	RD46262	Circlip	1				
82	RD46263	Adaptor Ring	1				

## 10) MAINTENANCE CHECKS

In order to 'get the best life' out of your Rotabroach machine always keep in good working order.

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.
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.

**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.



## 11) 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>

## 12) CUTTER SELECTION AND SPEEDS

Material	Material Hardness	Cutter
Mild and free cutting steels	<700N/mm <sup>2</sup>	RAP or RAPL
Mild and free cutting steels	<850N/mm <sup>2</sup>	SRCV or SRCVL
Steel angle and joists	<700N/mm <sup>2</sup>	RAP or RAPL
Steel angle and joists	<850N/mm <sup>2</sup>	SRCV or SRCVL
Plate and sheet steel	<700N/mm <sup>2</sup>	RAP or RAPL
Plate and sheet steel	<850N/mm <sup>2</sup>	SRCV or SRCVL
Aluminium	<750N/mm <sup>2</sup>	RAP or RAPL
Aluminium	<850N/mm <sup>2</sup>	SRCV or SRCVL
Brass	<700N/mm <sup>2</sup>	RAP or RAPL
Brass	<850N/mm <sup>2</sup>	SRCV or SRCVL
Cast iron	<700N/mm <sup>2</sup>	RAP or RAPL
Cast iron	<850N/mm <sup>2</sup>	SRCV or SRCVL
Stainless steel	<700N/mm <sup>2</sup>	RAP or RAPL
Stainless steel	<850N/mm <sup>2</sup>	SRCV or SRCVL
Stainless steel	>850N/mm <sup>2</sup>	CWC to CWCX
Rail track	>850N/mm <sup>2</sup>	SCRWC or SCRWCL
Tool steel	>850N/mm <sup>2</sup>	CWC to CWCX
Die Steel	>850N/mm <sup>2</sup>	CWC to CWCX

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.

Rotabroach <sup>®</sup>	Cutting surface speed Meters/min	Cutter diameter/Material/RPM relationship													
		13		14		18		22		30		50		65	
Material to be cut	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.

**NOTES:**

**NOTES:**



### 13) 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 MERCHANTABILITY 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**