ORIGINAL INSTRUCTIONS

A GUIDE TO GOOD DRILLING PRACTICE

To get the best possible performance from your new Magnetic Drilling Machine, please read this carefully BEFORE using the drill.

FR Instructions originales
DE Ursprüngliche Anweisungen
NE Originele instructies

HB500
Magnetic Drilling Machine

WARNING:
For your personal safety, READ and UNDERSTAND before using.
SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE.

BEFORE YOU START

To help you get the best possible performance from your new Magnetic Drilling Machine, this guide contains simple, sensible pointers for the safe, effective and long term use of the equipment.
Please read it carefully BEFORE using the drill.
• Ensure that you have observed all the general and specific safety procedures.

Explanation of the pictograms on the specification plate of the Makita HB500

DANGER!
Indicates an imminent danger or risk to life and health of a general nature.

ELECTRICAL DANGER!
This means a direct pending danger or risk to life due to electricity.

CAUTION!
Indicates a possible danger or risk of slight injury or damage to property.

WEAR EYE & EAR PROTECTORS

USE SAFETY STRAP!
to attach the tool to the workpiece.

RECYCLING
In observance of European Directive 2002/96/EC on waste electrical and electronic equipment and its implementation in accordance with national law, electric equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility.
WEEE Compliance Certificate:- on request
All magnetic drilling systems are fully compliant with ROHS regulations.

CONTENTS

CE

EC Declaration of Conformity
We the Makita Corporation as the responsible manufacturer declare that the following Makita machine:
Designation of Tool: ***Magnetic Drilling Machine***
Model No./ Type: ***HB500***
conforms to the following European Directives:
2006/42/EC, 2004/108/EC
and has been designed in compliance with:
EN 55014-1:2006, EN 55014-2:1997 + A2:2008, EN 61029-1:2009, EN 61029-2-6:2010, EN 61000-3-2 & EN 61000-3-3, and with the essential Health & Safety requirements.
And is manufactured in accordance with the following standards or standardised documents:
EN60745.

Makita International Europe Ltd,
Michigan Drive, Tongwell,
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30th July 2011

Tomoyasu Kato
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HB500 SPECIFICATIONS

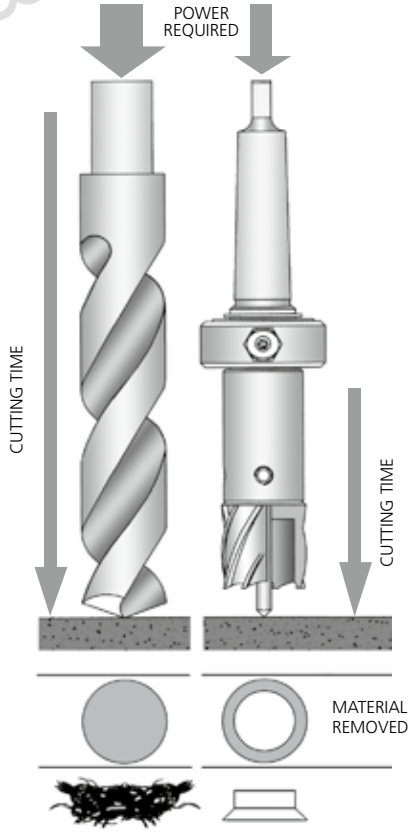
Cutter capacity	- 12 – 50mm
Chuck Capacity	- 5/8" (with adapter)
'No load' speed	- 350/650 rpm
Power consumption	- 1150w
Clamping force	- 9300N (950kg)
L x H x W (mm)	- 290 x 450 x150
Weight	- 18.5 kg
Voltage	- 110/230v

INCLUDES: Warranty, Carrying case, Hex Wrenches, Safety strap & guard, Cutting Oil

• Due to our continuing programme of research and development, these specifications are subject to change without notice.

THE BROACH CUTTING CONCEPT

If you are unfamiliar with the use of annular (or broaching) cutters, take a few minutes to read this guide - you will benefit from the better performance and longer life of the tool if you understand the concept.
Annular cutters only cut material at the periphery of the hole, rather than converting the entire hole to shavings. As a result the time and energy required to make the hole is lower than for a traditional twist drill.
The broaching capacity of a machine is therefore greater than the twist drill capacity. The slug ejected after the cut also has a higher scrap value than shavings.



GENERAL POWER TOOL SAFETY INSTRUCTIONS

1. KNOW YOUR POWER TOOL

Read and understand the owner's manual and labels fixed to the tool. Learn its application and limitations as well as the potential hazards .

2. EARTH ALL TOOLS

Ensure that (where applicable) suitable earthed cords and plugs are used and correctly connected.

3. KEEP GUARDS IN PLACE (where applicable), in working order and in correct adjustment and alignment.

4. REMOVE ADJUSTING KEYS AND WRENCHES.

Form a habit of checking to see that keys and adjusting wrenches are removed from tool before turning it on.

5. KEEP WORK AREA CLEAN

Cluttered areas and benches invite accidents.

Floor must not be slippery due to oils, or dust.

6. AVOID DANGEROUS ENVIRONMENT

Don't use power tools in damp or wet locations or expose them to rain. Keep work area well lighted. Provide adequate surrounding work space.

7. MAKE WORKSHOP SAFE

Use padlocks, master switches, remove keys. Visitors should be a safe distance from work area

8. DON'T FORCE TOOL

It will do the job better and more safely at the rate for which it was designed.

9. USE CORRECT TOOL

Don't force tool or attachment to do a job it was not designed for.

10. WEAR PROPER APPAREL

Do not wear loose clothing, gloves, neckties or jewellery (rings, wristwatches) which may get caught in moving parts. NONSLIP footwear is recommended.

Wear protective hair covering to contain long hair. Roll long sleeves above the elbow.

11. USE SAFETY GOGGLES (Head Protection)

Wear approved safety goggles at all times.

Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses. Also, use face or dust mask if cutting operation is dusty, and ear protectors during extended periods of operation.

12. SECURE WORK

Use clamps or a vice to hold work when practical. It's safer and frees both hands to operate tool.

13. DON'T OVERREACH

Keep proper footing and balance at all times.

14. MAINTAIN TOOLS WITH CARE.

Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.

15. DISCONNECT TOOLS

When not in use, before servicing and when changing accessories such as bits and cutters, disconnect tools from the power supply.

16. USE RECOMMENDED ACCESSORIES

Consult owners manual for recommended accessories. Follow the instructions that accompany the accessories. The use of improper accessories may cause hazards.

17. CHECK DAMAGED PARTS

Before further use of the tool, a guard or other part that is damaged should be carefully checked to ensure that it will operate properly and perform its intended function. Check for alignment of moving parts, binding of moving parts, breakage of parts, mounting, and any other conditions that may affect operation. A guard or other part that is damaged should be properly repaired or replaced.

18. NEVER LEAVE TOOL RUNNING UNATTENDED.

Turn power off. Don't leave the tool until it comes to a complete stop.

MAGNETIC DRILL SAFETY INSTRUCTIONS

- Always inspect the whole unit before use.
- Regular maintenance is essential - check nuts, screws etc. for tightness before each use.
- Check cable and plug for damage.
- Never use blunt or damaged cutters.
- Never use a larger diameter cutter than specified for the machine
- Always use the safety guards (where fitted) and ensure they are operating correctly.
- Always wear goggles and gloves
- Remove rings, watches, ties etc. that could tangle in the moving parts.
- Secure the unit with the safety strap before drilling.
- The machine is for use on steel from 6 mm thick, with no air gap between the magnet core and the workpiece. Curvature, paint and surface irregularities create an air gap. Keep the air gap to a minimum.
- Keep the magnet and workpiece clean & free of debris and swarf.
- Do not start the motor before ensuring that the magnetic stand is clamped firmly to the workpiece.
- Only use a general, non-oil-based metal cutting coolant diluted with water.
- While drilling vertically or overhead, use a cutting paste or an appropriate coolant spray.
- Always disconnect from the power source before changing cutters or working on the machine.
- In the event of a jammed cutter, disconnect from the power supply, and free the jam before reconnecting the tool.
- On swivel machines, ensure that the swivel base is locked in the required position.
- Do not attempt to change speed while the drill is running.
- Only use accessories recommended by the manufacturer.
- Never lift or carry the unit by the power cord, always use the handle.
- Never modify the tool in any way.

MAINTENANCE INSTRUCTIONS

- Occasionally apply a few drops of oil to the rack toothing.
- The bearings of the feed shaft are self-lubricating and must not be greased
- Grease the sliding surface of the carriage with MOLYCOTE grease.
- When not in use or being transported the unit should be kept in the case supplied.
- After use ensure unit is clean of swarf and dirt.
- Parts that are worn or damaged should be replaced immediatley with genuine manufacturer's replacements.
- Ensure all cutting edges are sharp when in operation. Using blunt cutting tools may lead to an overload of the motor.
- After every 30 minutes running, it is recommended that the machine is laid on its side to permit grease to run across the gear train.
- After repeated use, the cradle may become loose. This is remedied by adjusting the tension screws on the side of the body. Put 2.5mm hex wrench into head of cradle retaining nuts, using 8mm Spanner undo the locking nuts anti-clockwise, holding the hex wrench without moving grub screws.

Using the hex wrench gently tighten screws in series until the cradle moves freely in the slide but does not allow the motor to wobble.

When adjustment is complete re-tighten locking nuts clockwise, ensuring the grub screws do not move from their new positions.

IMPORTANT! – TO PREVENT DAMAGE TO THE CIRCUITRY, NEVER USE ELECTROMAGNETIC DRILLING MACHINES AND WELDING EQUIPMENT ON THE SAME WORKPIECE SIMULTANEOUSLY.

MATERIAL AND CUTTING SPEEDS

• The ease with which material can be drilled is dependant on several factors including tensile strength and abrasion resistance. Whilst hardness and/or strength is the usual criterion, wide variations in machinability can exist among material showing similar physical properties.

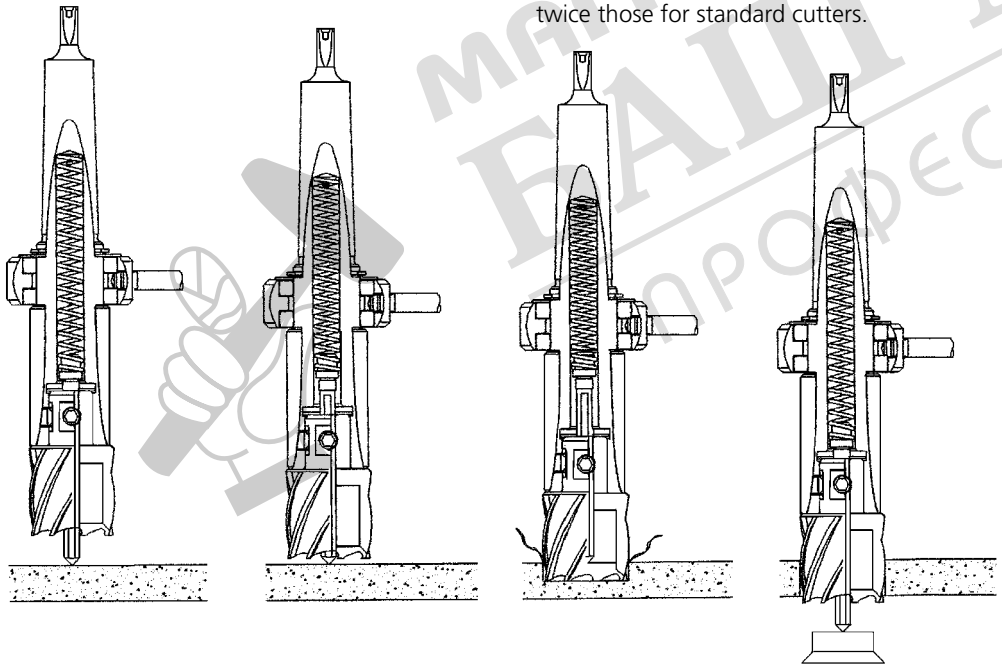
• The cutting conditions can be dependent upon requirements for tool life and surface finish and further restricted by the rigidity of the tool and work piece, lubrication and machine power available.

• The harder the material the lower the cutting speed. Some materials of low hardness contain abrasive constituents leading to rapid cutting edge wear at high speeds. Feed rates are governed by rigidity of set up, volume of material to be removed, surface finish and available machine power.

• It is preferable to set and maintain a constant surface speed (RPM) for a given material and vary the feed rate within defined limits.

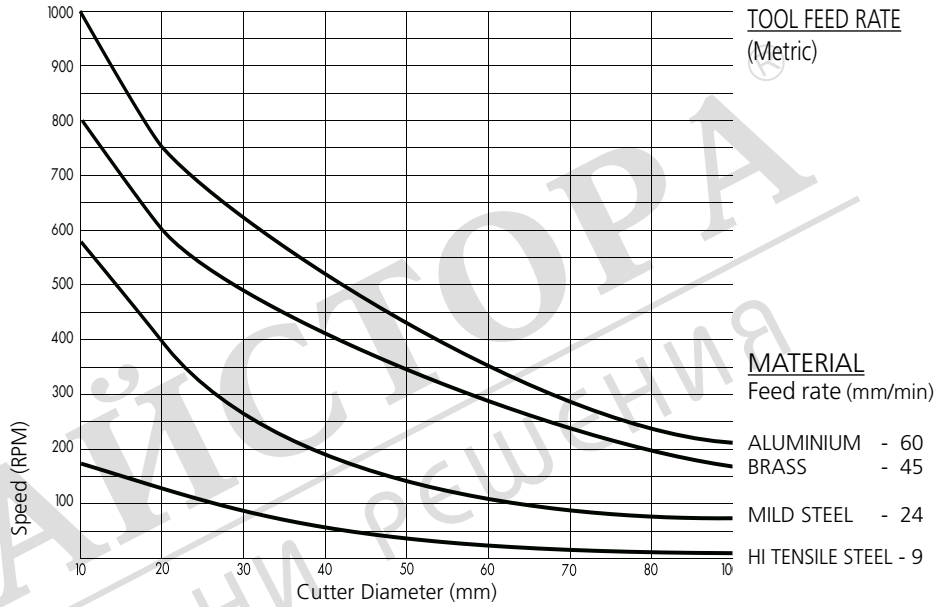
• Machine feed is measured in inches or millimetres per minute and is the product of RPM x number of teeth in the cutter x feed per tooth. Too light or excessively high feed rates will both cause premature cutter failure. Heavy feeds on hard materials will cause chipping of the cutting edge and excessive heat generation.

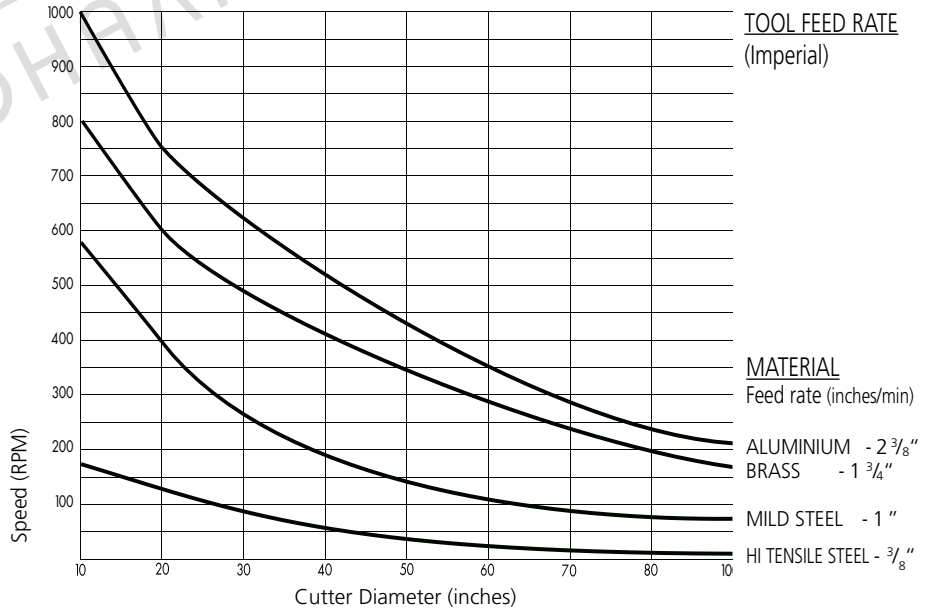
• Slender and long shanked cutters are restricted in feed rate due to deflection, and wherever possible the largest and most robust tool must be used. This is important for harder materials. Steel up to 400 HB is the potential limit for conventional M2 HSS tools.
Above 300 HB, cobalt alloy cutters should be considered for increased tool life. In softer grades of material, cobalt alloy cutters may give increased output by increasing speeds and feed rates by up to 50%. Tungsten Carbide cutters permit surface speeds and feed rates up to twice those for standard cutters.



FEEDS AND SPEEDS

CUTTING SPEEDS Suggested speed rates for varying cutter sizes/materials





PLEASE NOTE: These figures are quoted as a starting point. Actual performance will be dictated by material type, thickness and hardness, application and cutter condition.

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FITTING THE SAFETY GUARD

DRILL GUARD INSTRUCTIONS
Ensure drill unit is isolated from power supply.

Two screws to support the guard in position, one either side of the drill.
If necessary press the plastic guard guides into their locating holes on ether side of the motor cradle
Fit guard to drill as shown.
Secure guard to drill with screws and washers supplied. DO NOT overtighten the fixing screws, these should be loose enough to allow the guard to rise when required. Lower guard to drilling surface.
When drilling, the guard should always be in contact with the surface being drilled. As the drill is lowered, the guard will rise in relation to the drill.

FITTING THE OIL BOTTLE

The cutting oil bottle is held in a sprung bracket attached to the top of the drill body. Fit the bracket by removing one of the cap screws from the top plate and replace the bolt through the fixing lug on the bottle bracket, tightening the bolt enough to allow some radial movement of the bracket. The coolant tube is a push fit into the self-seal gland at the base of the tap and a similar fitting on the lower arbor bracket.

FITTING THE SAFETY STRAP

The supplied safety strap should be used wherever possible as a safety precaution in the event of a power failure releasing the magnet; particularly in situations where the machine is clamped onto a vertical surface or in an inverted position.

SAFETY STRAP INSTRUCTIONS
When the machine has been clamped to the workpiece in the correct position for drilling, the strap should be fed through the channel between the body of the drill and the magnet, then passed around a substantial part of the workpiece. The free end should then be passed through the buckle, pulled tight and locked.

Once the cut is complete, the strap should be released and the machine supported before the magnet is disengaged.

FITTING THE CUTTER

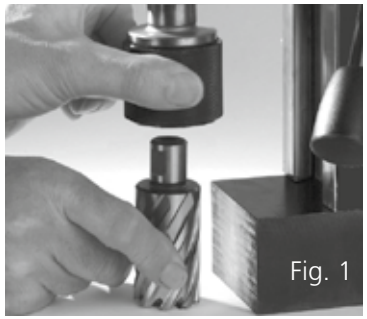
Fig. 1


Fig. 2


Fig. 3


Fig. 4

ENSURE POWER IS OFF BEFORE WORKING ON THE MACHINE
Insertion of pilot pin
• The pilot pin is used to both centre the cutter and to eject the slug on completion of the cut. It has a flat side to allow coolant to run down to reach the centre of the cut where the heat is greatest. Slide the pin through the hole in the centre of the cutter shank.

FITTING THE CUTTER
• The Quickhitch™ arbor will accept any cutter with a 19mm diameter shank having one or more flats.
To fit a cutter, align it below the Quickhitch™ and twist the arbor sleeve clockwise against its spring and hold, Fig. 1.
Insert shank of cutter into arbor, push it home and release the sleeve, Fig.2.
Twist the cutter in the arbor to ensure the flat is engaged in the locking mechanism, Fig.3.
Turn the sleeve fully anti-clockwise to complete the locking operation, Fig.4.
To remove the cutter, simply twist the sleeve clockwise against the spring, the cutter will be ejected.
Mark the position of the hole
• Make sure the workpiece is clean and flat and position the machine with the pilot over the centre of the hole to be cut.

FIT THE SAFETY STRAP.

APPLYING COOLANT
• Cutting oil ensures longer cutter life and enables the slug to be ejected cleanly. A 500 ml bottle is included with every machine.
• Oil will be automatically delivered to the cutter when the cut commences
• When cutting on vertical surfaces or upside down, cutting paste, gel or foam is recommended. It is best applied inside the cutter before drilling.
• Plug the machine into the power socket and the red LED on the electronic control panel will flash.

N.B. Safety strap and guards have been omitted from the photo's for clarity.

STARTING THE CUT

POWER UP THE MACHINE

ENERGISE THE MAGNET

• To POWER UP THE MACHINE, press and release the red button Fig. 5
• To ENERGISE THE MAGNET, press and release the yellow button - the yellow LED will light Fig. 6.

RECHECK the pilot is still centred on the hole position - energising the magnet can sometimes cause the unit to move slightly from the centre mark, reposition if necessary.
• The magnet will hold on all ferrous materials from a minimum of 6mm (1/4") thickness.

STARTING THE CUT
• ALWAYS lower the safety guard.
• START THE MOTOR by pressing and releasing the green button - the green LED will light Fig. 7.
• Wind the cutter gently down to the surface of the work and apply light pressure until the cutter has made the initial groove in the surface. Increase the pressure until the motor is loaded Fig. 8.
• Maintain steady pressure throughout the rest of the cut. Too much pressure will not speed the cut, it will reduce the life of the cutter and may cause damage to the motor. If the shavings become blue add more oil.

START THE MOTOR

START THE CUT

• TO STOP THE MOTOR,
PRESS & RELEASE GREEN BUTTON.
• If the cutter jams in the workpiece, STOP THE MOTOR and gently raise the cutter out of the workpiece before re-starting.
• If the power is interrupted during the cut, the machine must be reset before the motor will restart.
• At the end of the cut, the slug will be ejected. Withdraw the cutter from the work piece and stop the motor.
• To disengage the magnet, press and release the yellow button - the magnet will not disengage immediately, there will be a 3 second delay before the magnet disengages along with a continuous beep.

INCORRECT START UP OR SHUT DOWN SEQUENCE:-
• A single beep will be heard for all operations carried out in the correct sequence. A continuous beep will sound for any incorrect sequence.
• Neither drill nor magnet can be operated until red power button is activated.
• When the red power button is activated, the motor will not run until the magnet is activated.

N.B. Safety strap has been omitted from the photo's for clarity.

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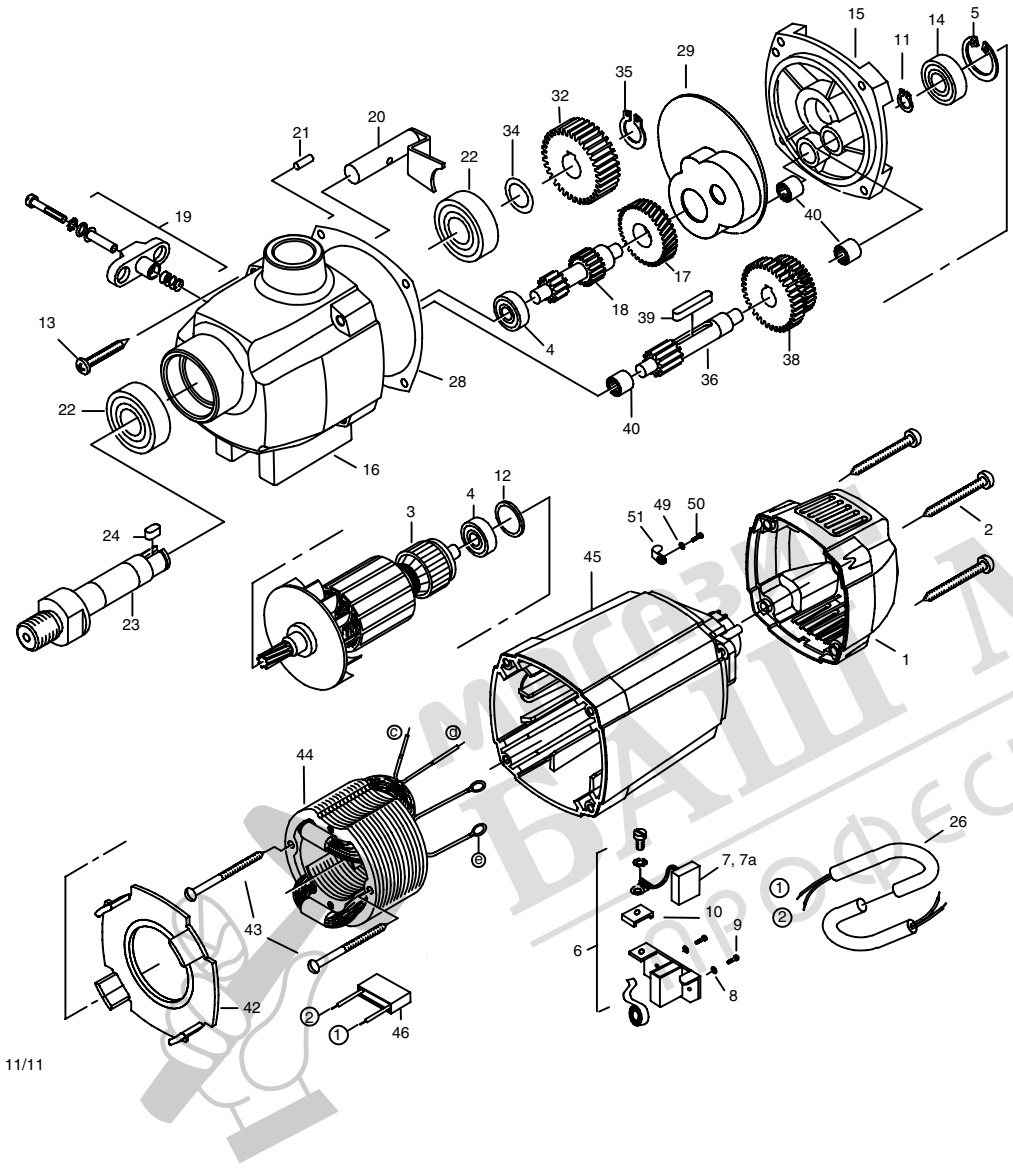
HB500 MOTOR PARTS



D 5000 motor - 230v

Nr.	Description	Qty	Part No
1	Cap, blue	1	EIB202
2	Self tapping screw HC 4,8x38	4	EIB101
3	Rotor cpl.	1	EIB102-2
4	Grooved ball bearing 608 2Z	1	UDC022
5	Circlip 28/1,2	1	EIB042
6	Brush holder cpl.	2	EIB105
7	Pair of brushes. (A) 6,3x10x18	1	EIB106C
8	Spring washer B4	4	EIB172
9	Self tapping screw ZM4x12	4	EIB108
10	Contact Washer	2	EIB152
11	Circlip 11/1	1	EIB143
12	O-ring 22x2,5	1	EIB111
13	Self tapping screw HC 4,8x50	4	EIB157
14	Grooved ball bearing 6001 2Z	1	UDC023
15	Gearbox end shield, grey	1	EIB205
16	Gearbox housing, grey	1	EIB204
17	Intermediate gear 34 Z.	1	EIB117
18	Two pinion shaft 11/17 Z.	1	EIB007
19	Gear changer cpl.	1	EIB017
20	Coupling bolt cpl.	1	EIB008
21	Dowel pin 4x12	1	EIB120
22	Grooved ball bearing 6203 RS	2	UDC014
23	Output shaft	1	EIB122
24	Woodruff key A5x5x12	1	EIB034A

Nr.	Description	Qty	Part No
26	Two core cable	1	EIB125
28	Gearbox seal	1	EIB126
29	Grease compartment barrier	1	EIB083
30			
31			
32	Spindle gear 45 Z.	1	EIB004
33			
34	Locking washer 15/22x0,2	1	EIB076
35	Circlip 15/1	1	EIB130
36	Gearbox shaft 13 Z.	1	EIB131
37			
38	Double gear 34/40 Z.	1	EIB132
39	Woodruff key A5x5x28	1	EIB034
40	Needle bearing HK 0810	3	UDC020
42	Fan Cover	1	EIB135
43	Self tapping screw HC 3,9x60	2	EIB136
44	Stator cpl.	1	EIB137-B
45	Motor housing, blue	1	EIB203
46	Capacitor	1	EIB139
49	Washer 3,2	1	EIB206
50	Self tapping screw HC 2,9x9,5	1	EIB153
51	Cable clip	1	EIB085

D 5000 motor - 110v

3	Rotor cpl.	1	EIB102-1		44	Stator cpl.	1	EIB137-A

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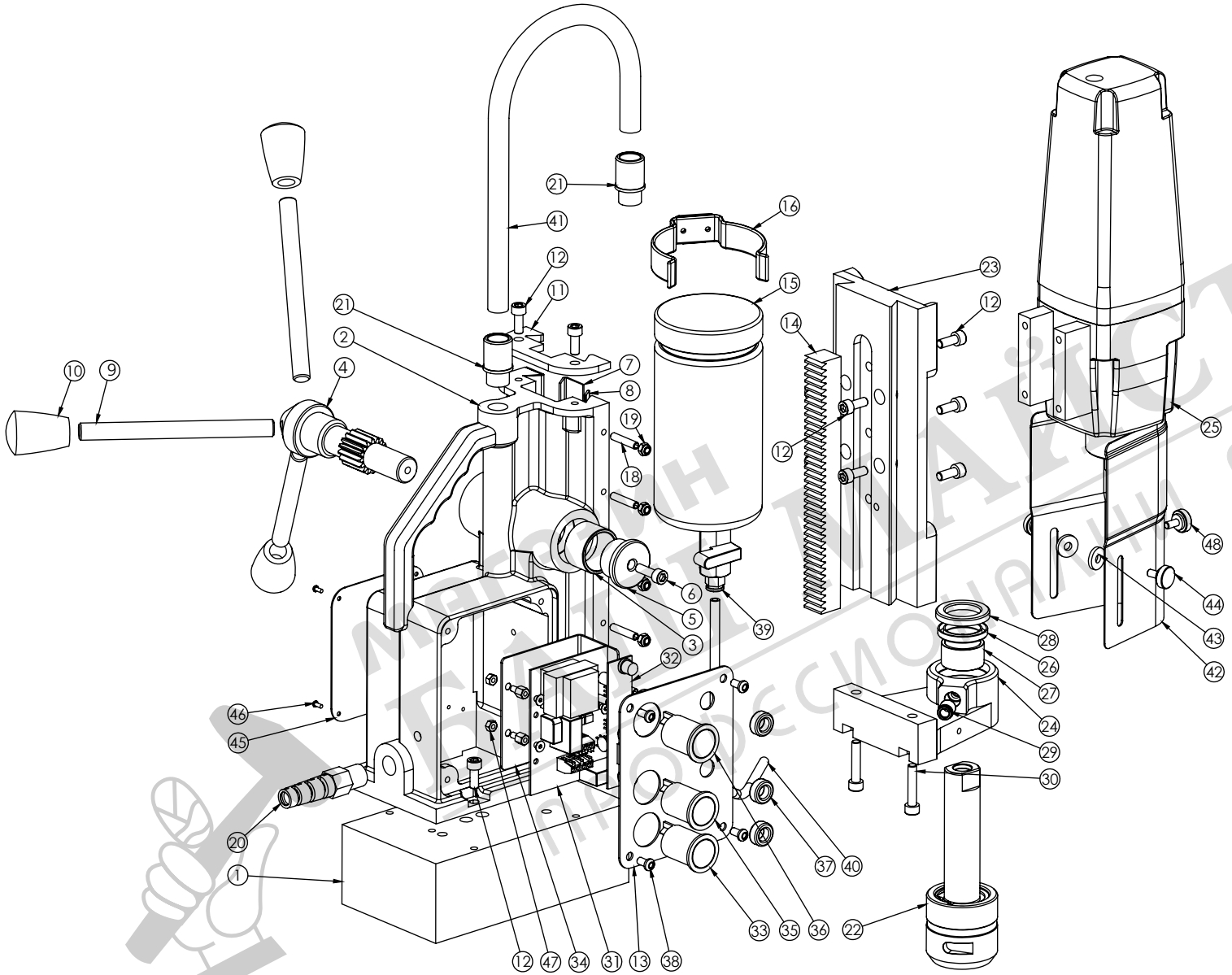
HB500 STAND PARTS



ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	M0034	MAGNET BASE (MIDI)
2	1	20348	BODY
3	2	M0081	PINION BUSH
4	1	M0042	LARGE PINION
5	1	M0072	PINION END CAP (DEEP)
6	1	SC620CAP	M6x20 CAPSCREW
7	2	60100A	BRASS STRIP
8	1	20389	GFS MINIBOR
9	3	10081	HANDLE (12mm SMALL)
10	3	10082	HANDLE KNOB
11	1	10084	TOP PLATE
12	13	SC615CAP	M6x15 CAPSCREW
13	1	20305M	HB500 SWITCH PLATE
14	1	10215	RACK
15	1	30046A	SMALL OILCUP C/W TAP (BLACK CAP)
16	1	10076C	OILCUP RETAINING CLIP
17	-	-	-
18	6	10085A	M5x25 GRUBSCREW
19	6	10085B	M5 NYLOC NUT
20	1	10231	M16 STRAIN RELIEF GLAND
21	2	40026	M16 GLAND
22	1	BD062	QUICK RELEASE ARBOR COMPLETE
23	1	M0167	HB500 D5000 SLIDE
24	1	M0516	HB500 D5000 STEADY
25	1	EIB21 / EIB22	D5000 DRILL MOTOR 110v / 240v
26	1	M0050-2	INTEGRAL COOLANT SEAL
27	1	M0521	STEADY BUSH
28	1	M0050-1	INTEGRAL COOLANT SEAL
29	1	M0066	6mm PUSH FIT FITTING
30	2	SC630CAP	M6x30 CAPSCREW
31	1	MM1-5E / MM1-5G	PCB BOARD 110v / 240v
32	1	MM1_4M	LED BOARD MAKITA
33	1	MM1_22	GREEN LATCHING SWITCH
34	1	MM1-17	P.C.B BACK PLATE
35	1	MM1_1	MM1 MAGNET BUTTON - YELLOW
36	1	MM1_10	MM1 POWER BUTTON - RED
37	3	MM1-3	MM1 L.E.D GROMMET
38	4	SC510BUT	M5x16 BUTTON HEAD SCREW
39	1	50015C	1/8 BSP-6MM BLACK PUSH FIT
40	1	BD029	6MM OIL PIPE
41	1	M0443	CONDUIT LARGE 12MM
42	1	VISO15	DRILL GUARD
43	3	10094	M6 GUARD SPACER
44	3	BD068	M5x10 GUARD THUMBSCREW
45	1	NWP-04	WARNING PLATE
46	4	Rivet 2mm	BRASS HAMMER DRIVE RIVET
47	3	BD046	P.C.B BRASS SUPPORT
48	1	Torx	TORX SECURITY SCREW/WASHER