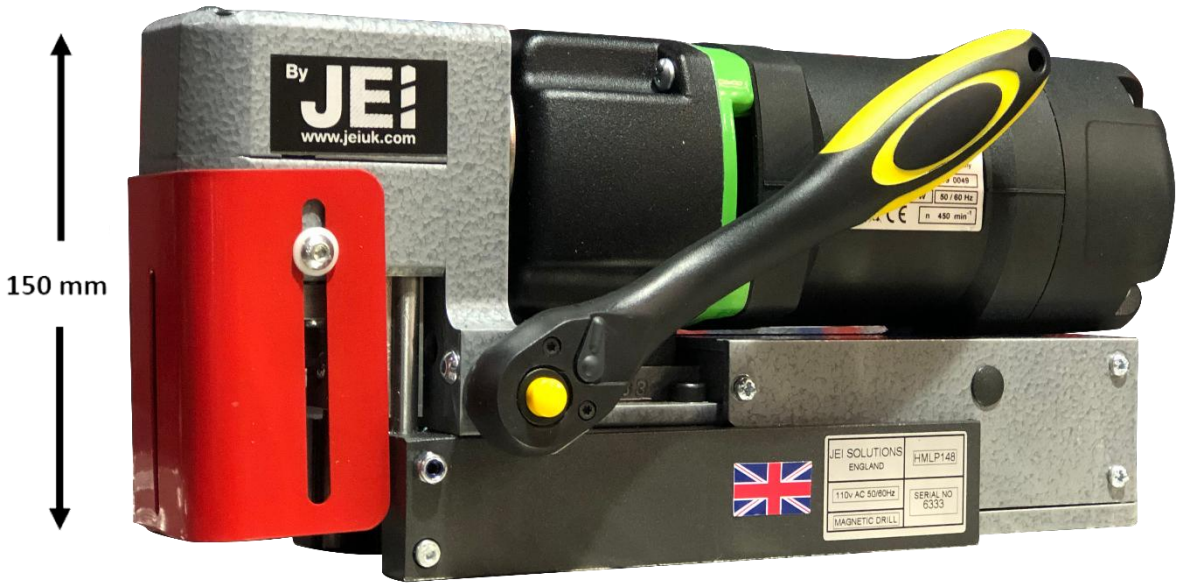
# SAFETY INSTRUCTIONS AND OPERATORS' MANUAL FOR DRILLING MACHINE

# MAGBEAST ULP35

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# CONTENT



⚠ **BEFORE YOU START WORK WITH THE MACHINE,**
**PLEASE READ THESE INSTRUCTIONS CAREFULLY**
**AND USE ALL RECOMMENDATIONS.**

# 1. GENERAL INFORMATION

Portable drilling machines with electromagnetic bases are fast becoming very universal power tools not only at steel fabricating workshops or steel building sites but also at every factory maintenance workshop, truck manufacture & repair company, military equipment service, onboard ship maintenance shop etc.

But full advantages of electromagnetic drilling machines can only be achieved with optimal tooling. Milling cutters are designed and manufactured specifically for use with these machines and offer a whole range of advantages such as 3 inch diameter holes through more than 2 inch steel, in one pass and with precision not otherwise attainable without heavy stationary equipment.

The MAGBEAST ULP35 machine is capable of drilling 35 mm holes 35mm plate what is totally unique for an electromagnetic drill of that size and weight. The MAGBEAST ULP35 is equipped with a powerful verified for many years of exploitation drive and electromagnet with field control system.

**Before you start work with the machine, please read these instructions carefully. Take special note of safety recommendations.**

# 2. GENERAL SAFETY ADVICE

## Drilling machine must not be used when:

1. The operator has not read the Operator's Manual.
2. The work to be done is not in agreement with the recommendations in this
3. Drilling machine is not complete or has been repaired with non-original parts.
4. Power supply parameters do not conform to those stated on the motor's plate.
5. Machines operator has not checked condition of the drilling machine, condition of power cable, control panel or cutter.
6. Power supply socket is not equipped with a protection circuit.
7. Machine is not secured with safety chain as a protection from falling down especially when used at heights or in vertical or upside-down positions.
8. Bystanders are present in the immediate vicinity of machine.

**⚠ Warning!**

**Read and save all instruction for future reference!**

## Important rules of safe use of drilling machine

1) Before attempting to work with the machine check condition of electrics including power cord and plug.
2) The drilling machine should be connected to an installation equipped with protection circuit (neutral or ground) and protected with a 16 A fuse for 220V and 32 A fuse for 120V. **When used on building sites, it must be supplied through a separation transformer made in the second class of protection**
3) Machine can be used outdoors, but is not weatherproof. Do not expose to rain, snow or frost.
4) Machine should not be used on: rusty surfaces, steel plates covered with thick paint, uneven surfaces, or next to a welding machine.
5) In all cases always use a safety chain/strap /see drawing 1/. The safety chain mustn't be loose! To avoid this situation the safety chain should be wrapped around the element it is hooked to.

*Drawing 1.*
*Examples how safety chain should be fastened..*

⚠ **Safety chain can also secure the drill through the handle.**

6) Do not use the machine in explosive environmental areas.
7) Do not start work if the machine has excessive play on guide slides.
8) Always wear safety goggles and ear protection.
9) Do not remove metal chips with bare hands.
10) Do not touch the spindle and the cutter during work.
11) Tools must be fastened firmly. When a milling cutter is used, check before start of work if tool holding screws are screwed tight.
12) It is not permitted to use blunt of damaged tools.
13) Do not use milling cutter without pilots, and arbors without ejection spring.

⚠ **Do not touch or replace the tool with power source on – while electromagnetic base is being used.**

14) Use tools recommended in Operator's Manual only.
15) After use, always clean drilling machine from metal chips and coolant.
16) Always unplug machine from power supply during any work on the machine.
17) Before each use the machine should be checked for the presence of damage and the proper and consistent use. Check whether any of the parts are broken and that all the parts are fastened properly. Make sure to maintain proper conditions affecting work of the machine.

18) In the case that the machine falls on a hard surface, from a height, is wet or is subjected to other unfortunate events that could affect its technical state - work should be terminated immediately and the machine should be sent to service for inspection as soon as possible.

**Caution should be taken when machining plates with thickness lower than 10 mm (0.4'') because adhesion force depends on material thickness and is significantly lower for thin plates. The whole surface of machine base must stick to working material. Before every positioning, wipe working surface with coarse-grained sandpaper.**

 **Please keep all recommendations.**

## 3. STANDARD EQUIPMENT

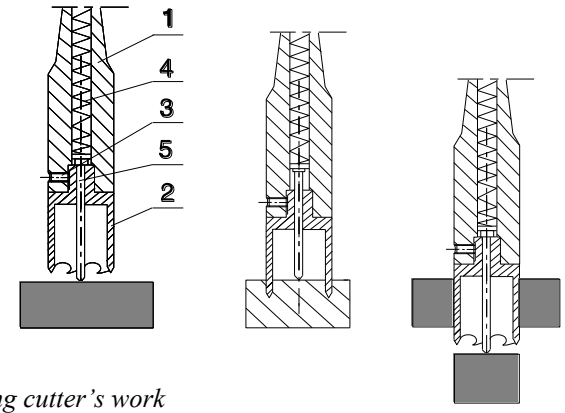
**MAGBEAST ULP35 comes in a standard equipment set which consists of:**

| | |
|---|---|
| metal box | - 1 pc |
| drilling machine | - 1 pc |
| cooling system | - 1 pc |
| 2.5 Allen Key | - 1 pc |
| 3 Allen Key | - 1 pc |
| 4 Allen Key | - 1 pc |
| 8 mm flat wrench | - 1 pc |
| spoke handles | - 3 pcs |
| safety chain with snap hook | - 1 pc |
| operator's manual | - 1 pc |
| plastic box | - 1 pc |

# 4. START UP AND OPERATION

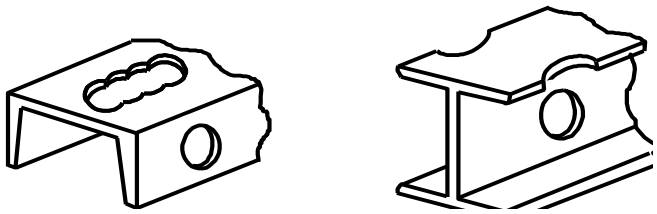
## 4.1 Cutters and optional equipment features.

This drilling machine's spindle has a Weldon Shank type socket 3/4" or 19,05 mm and is specifically designed for use with milling cutters.




*Drawing 2.*
*Principle of milling cutter's work*

Milling cutter (2) is located inside arbor body (1) and is fastened with screws (3). While fastening the cutter in the socket, be aware that screws should be screwed tight so that they could not come unscrewed. It is important to position the cutter in relation to the socket in such a way that fixing flats on the cutter shank are positioned opposite to the fixing screws (3). Both fastening screws(3) should be used to fasten the cutter. Pilot (5) is located inside the cutter. It makes it easier to position milling cutter over centre of a planned hole. During drilling as the cutter goes deep into steel, the pilot moves back into the arbor body and tightens discharge spring (4). That spring ejects slug which is a by-product of milling a hole with a centre free cutter.



*Drawing 3.*
*A few types of holes that can be done with a milling cutter*

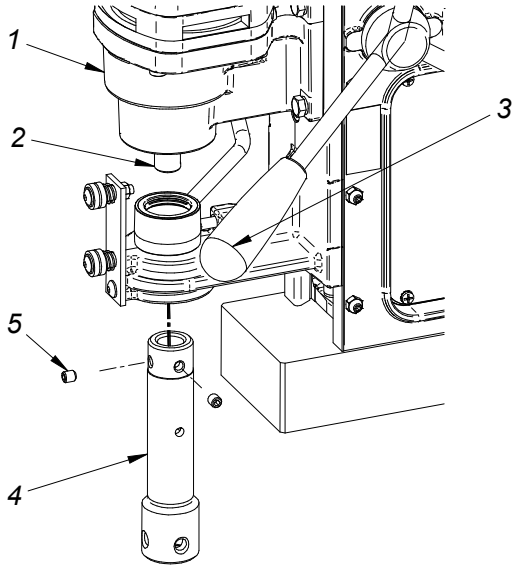
Basically milling cutters are designed to make through holes. On occasions when there is a need for an overlapping hole pilot should not be used.

### 4.1.1 Installing and uninstalling the arbor

⚠ **The arbor installation and uninstallation should be carried out when the machine is turned off and disconnected from the power grid!**

**<u>Installing</u> the arbor:**

a) Raise the drive and the slide (1) up using the lever (3);
b) Raise the guard,
c) Clean the spindle (2) using a cotton cloth,
d) Before mounting, clean off the lubricant from the new arbor (4),
e) Place the arbor on the spindle, so that the flat sides of the spindle are found facing the screws (5)
f) Tighten the screws securely (5)




**<u>Uninstalling</u> the arbor:**

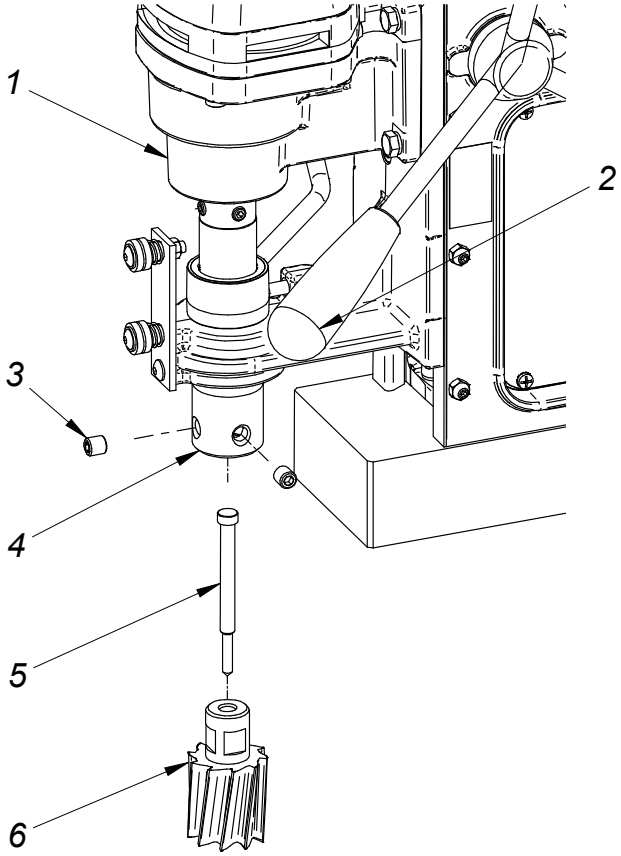
a) Raise the drive and the slide (1) up using the lever (3);
b) Raise the guard in order to attain access to the arbor (4) screws (5).
c) Loosen the screws (5);
d) Remove the arbor (4).

### 4.1.2 Installing and uninstalling the milling cutter

⚠ **Milling cutter installation and uninstallation should be carried out when the machine is turned off and disconnected from the power grid!**

**<u>Installing</u> the milling cutter:**

1. Raise the drive and the slide (1) up using the lever (2);
2. Raise the guard in order to attain access to the arbor (4) screws (3);
3. Insert the appropriate type of pilot (5) into the milling cutter (6);
4. Position the milling cutter (6) with the cutter facing up, so that the flat sides of the milling cutter are found facing the screws (3)
5. Put the milling cutter (6) into the arbor socket (4);
6. Tighten the screws securely (3).




**<u>Uninstalling</u> the milling cutter:**

1. Raise the drive and the slide (1) up using the lever (2);
2. Raise the guard in order to attain access to the arbor (4) screws (3).
3. Loosen the screws (3);
4. Remove the milling cutter (6) and the pilot (5) from the arbor socket (4).

### 4.2 Operating instructions

The machine is supplied in a plastic box. Check if all parts listed in paragraph 3 are included. Steel elements of the drilling machine are protected for transit and storing with grease film. Before first startup of the machine all grease should be removed. Before each use all spoke handles should be screwed into pinion.

**Control panel,**

Control elements include:

- 2-position main switch Magnet
- START-STOP switch

a) In order to start the machine press the main switch on “I“ button. Now you can start the motor by pressing green button “I”.

b) Stopping the motor is executed with red button O” (then the motor is switched OFF but the electromagnetic base is still ON).

c) To move machine into next drilling spot, stop the motor as described above and push the mains switch to the position.

## CAUTION: READ THE WHOLE INSTRUCTION MANUAL BEFORE ATTEMPTING TO START UP

**4.3 Before you cut**

Before positioning the machine on the work piece always make sure that:

- work piece is made of steel;
- thickness of work piece is at least 3/8" (10 mm)
- surface of steel under the magnet is flat
- wipe, brush or sand down clean surface where you intended to place the drilling machine, so that you remove rust, paint, dirt etc which would reduce adhesive power of the electromagnetic base.

Install drill bit, milling cutter or other tooling such as tap or reamer in the machine before plugging it into mains. Then plug it in and position where you wish to use it. Place the machine so that the tool is over the center of the hole you intend to make and turn the magnetic base ON.

**Prior to use always make sure that the machine is secured from falling down with original chain (as described in paragraph 4 "Important rules of safe use of drilling machine").**

**4.4 Cutting**

- Cutting lubricant is highly recommended when cutting with twist drill and annular cutters.

It's allowed to use of emulsions formed from a mixture of water and drilling oil.

⚠ **Do not use clean water for cooling and cutting lubricant.**

The cooling system is an integral part of the machine and should always be used. (see point 4.9)

**Warning: The cooling system can only be used when drilling machine is in vertical position. In other positions additional external source of cooling should be used, for example: a coolant bottle with a long nozzle or JEI Turbo Endurance + spray/paste**

- Check working condition of cooling system. Open coolant reservoir's tap and apply pressure on the pilot by turning spokes counter clockwise. As the pilot starts to sink into the cutter, the cutting lubricant should start to run down cutters inner wall. If there is no liquid flowing down check if the tap is fully opened. It may take a few seconds for cooling liquid to fill the whole system.

- Turn the motor on.

***Bring the cutter gently into contact with the work piece and slowly start to apply pressure on the cutter.***

Making a hole with a milling cutter should ideally be done in one pass. It makes the cutter work better and easier to eject the slug after the hole is completed. If you experience slugs getting stuck inside a cutter after hole is complete try to reduce pressure on the cutter or use different coolant. Do not allow excessive swarf build up around the cutter and arbor.

***WARNING: when the milling cutter goes through the material the slug can be pushed out often with considerable strength. Pay attention to avoid injury.***

- After a hole is made the cutter should be withdrawn back and both the motor and the electromagnet should be switched OFF.
- When work with the machine is finished the power cord should be disconnected from the power source, the machine should be cleaned up from swarf, coolant etc and the cutter should be removed and cleaned.
- The tool should be removed from drill chuck before inserting to the toolbox.

### 4.5. Types of a ground material

As shown on the graphs [Drawing 6] magnetic clamping force of the electromagnetic base to the ferromagnetic ground depends on its magnetic properties. Steel with increased carbon content and some other alloying ingredients has lower magnetic permeability, what causes a decrease in the clamping force. Also a thickness of a work piece, on which the drill is placed, is significant.

**Maximum clamping force of the electromagnetic base to a 5 mm thick work piece surface is only about 25% of a clamping force obtained from a smooth, plane, 22 mm thick standard plate.**

**If such thin ground material does not bow, one can try to carry out drilling of a hole, although with keeping the strictest precautions. Particularly a magnitude of a pushing force on a feed handle should be very limited.**

Appropriate rpm should be adjusted depending on if drilling would be carried out with a drill bit, or with trepan type metal cutter and a metal cutter's diameter. A drive is equipped in mechanical 1-step reducing gearbox of a motor rpm. A general dependence between drilling diameter and drilling speed is shown in drawing 7, detailed guide is supplied by manufacturer of used drilling tools. The graph is just a general guide and the shown dependence applies to average structural steel. One

should remember that during the drilling a cooling has to be used in a form of oil emulsion in a titer of 5 -10%.

Cooling agent is fed gravitationally from a coolant bottle through an arbor to an inside of the metal cutter. For horizontal and overhead positions special cooling pastes have to be used.

### 4.6 Electromagnetic base clamping force control system

This system for security reasons is an integral part of each drill type MAGBEAST. It works by constant monitoring of the electromagnetic force base adhesion value to the substrate. In the case of fall the force value below to guarantee safe operation of the machine, the system automatically switches off the drive drill. It also does not allow to enable drive which does not guarantee the proper clamping force.

Clamping force depends on: type and thickness of substrate, thick coatings on the substrate, rust or other contaminants, lack of flatness of the substrate, excessive roughness of the surface, excessive wear of the lower part of the electromagnetic base.

If there's a problem to enable drive after turn on of the electromagnetic base so drive works only after START button is pressed, and after release the drive is off - it means that system works properly. The system didn't allow to for further work due to insufficient clamping force drills.

### 4.7 How to use the special functions

There are many causes which can reduce magnet holding force. These can be: insufficient work piece thickness, paint coating, rust or dirt, uneven and rough surfaces, extensive wear of the magnets bottom surface etc.

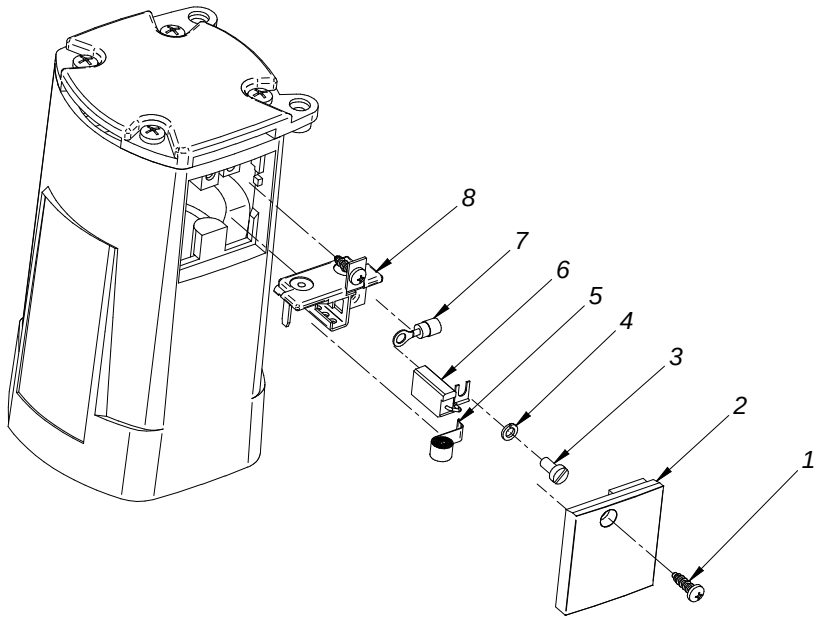
**If after turning drills electromagnet ON the motor would not start it can be caused by machines safety system which had detected insufficient magnets holding power. Motors operation can then be executed by holding the green Start "I" button pressed continuously. After release of the Start button the motor will stop. To eliminate this situation it is necessary to improve magnetic properties of the work piece or recondition the magnetic base.**

To operate this machine you should push on the main switch in position "I". Then you should turn on the green button "I" to turn on the motor. To stop the motor you should push on red button "O" (It causes the motor off, the magnet still holds). To move on the machine to drill in another place you should stop the motor and then push on the main switch in position "I".

## 4.9 Replacement of motor brushes:

For the MAGBEAST ULP35 drill, the state of the carbon brushes should be monitored every 100 working hours.

⚠ Replacement of motor brushes should take place when the machine is turned off and the power cable is disconnected from the power grid!




1. Unscrew 2 screws (1) fastening brush housing (2).
2. Loosen M4x6 screw (3) clamping the pressure plate (5) of the brush holder (8).
3. Pull out the brush's terminal clamping tip (6) from under the pressure plate (4).
4. Bend off the bush plate's pressure spring (5) and take out the brush(6) carefully.
5. Examine a length of the brush – if it is smaller than 5 mm it has to be replaced with a brand new original piece.
6. Follow above steps in reverse order to re-assemble the motor unit.

ATTENTION: During the process of mounting terminal clamping tip (6) of the brush, pay attention to position of the motor's wire (7), which un-insulated part should be permanently pressed down with the pressure plate (4) of the brush holder.

After replacement, new brushes should be Grinded in for about 20 minutes on idle gear. Replacement of engine brushes is possible without removing the drive from the drill.

# 5. MAINTENANCE AND SERVICE

To avoid accidents the drill stand, power cable, wiring, plug connectors, and switches must be regularly inspected for damage.

- Perform adjustment of the machine play guides every 50 hours or as necessary performed by the regulation screws. Slide guide loose is correct if the drive can be moved smoothly by using the lever. It's not accepted to automatically slide down under its own weight. (see point 4.10)
- Every 100 hours of work check condition of carbon brushes. If their length is less than 5 mm they should be replaced for original new ones. After replacement new brushes should be run-in without load for about 20 min. Other repair work should be done only by authorized service points, appointed by distributor. Replacement of brushes is possible without removal motor unit from the unit. (see 5.2)
- Lubricate regularly brass slide guide inserts with grease as well as the rack and pinion.
- To prevent the machine from rusting (especially when used outdoors) all steel parts should be covered with thin layer of grease film
- Damaged machine parts to be exchanged only to original parts.
- New spare parts order: required to enter the code or send the damage part with information about type of drilling machine and power supply.

**Caution:**

**In the case that the machine falls on a hard surface, from a height, is wet or is subjected to other unfortunate events that could affect its technical state - work should be terminated immediately and the machine should be sent to service for inspection as soon as possible.**

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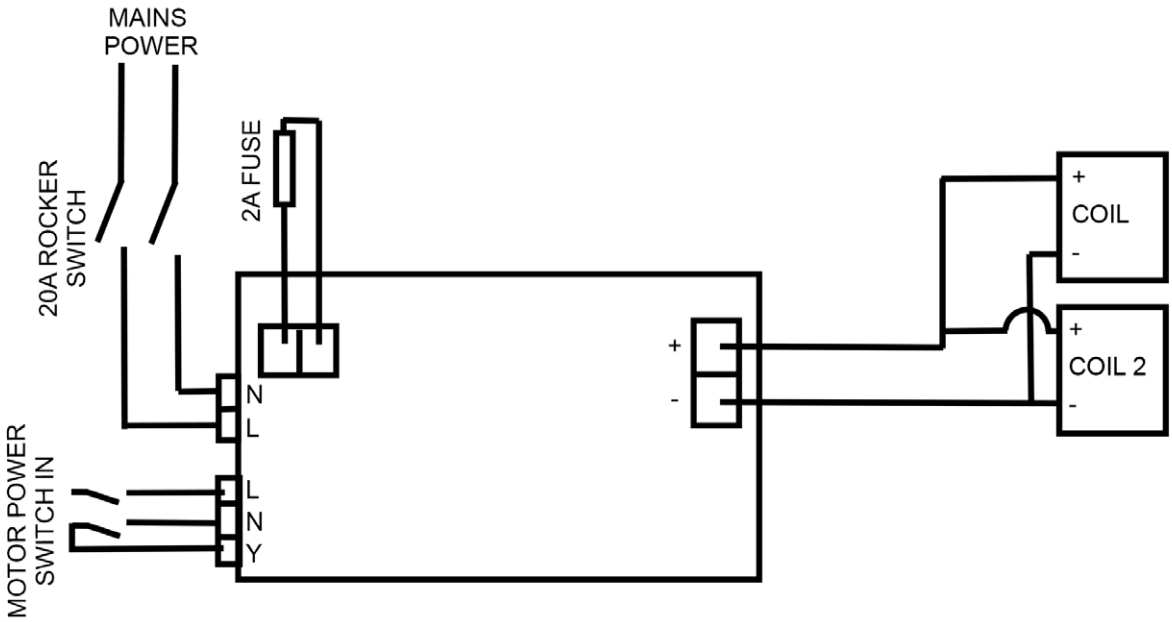
Built for Industry


## ULTRA LOW PROFILE DIAGRAMS COMPLETE

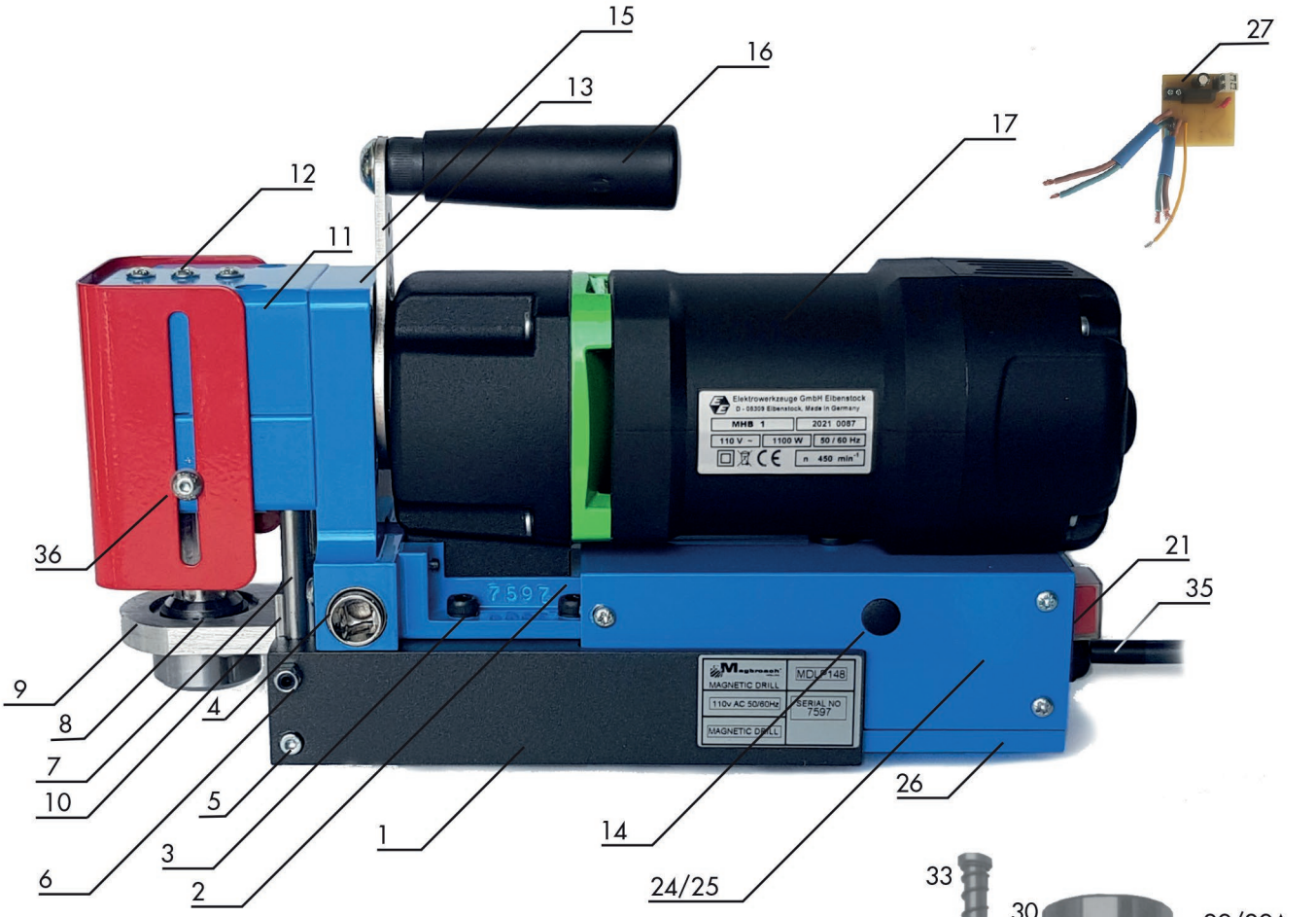


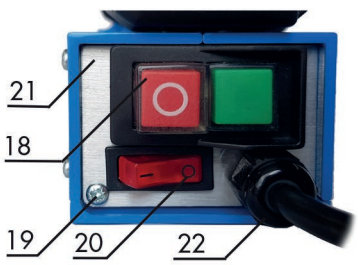
JEI

| no | Parts list | |
|---|---|---|
| 1 | MAGNET BASE | ULP-01 |
| 2 | MOTOR MOUNT BLOCK | ULP-02 |
| 3 | BLOCK FIXING BOLTS M6 x 12 (4) | AIR35-29 |
| 4 | PINION DRIVE | LP45-04 |
| 5 | M4 RAIL FIXING BOLT | HM50-03A |
| 6 | M5 RAIL ADJUSTMENT SCREW AND LOCKNUT | HM50-11 |
| 7 | RAILS (2) | ULP-07 |
| 8 | ARBOR COMPLETE WITH LOCKING SCREWS AND SPRING | ULP-08 |
| 9 | ARBOR SUPPORT BRACKET & BEARING | ULP-09 |
| 10 | SLIDE AND RACK | ULP-10 |
| 11 | GEARBOX COMPLETE | ULP-11 |

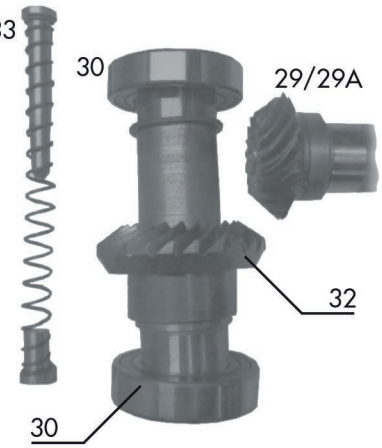
| no | | |
|---|---|---|
| 12 | BEARING REMOVAL SCREWS | ULP-12 |
| 13 | GEARBOX CONNECTING PLATE | ULP-13 |
| 14 | FUSE HOLDER | HM50-07 |
| 15 | HANDLE BRACKET | LP45-14 |
| 16 | HANDLE COMPLETE W/FIXING BOLT | LP45-15 |
| 17 | MOTOR UNIT COMPLETE | HM40.EX MC/1 |
| 18 | MOTOR NO VOLT SWITCH | 22709.3-110 |
| 19 | SWITCH PLATE BOLTS | LP45-21 |
| 20 | MAGNET/POWER SWITCH | LP45-19 |
| 21 | SWITCH PLATE | ULP-21 |
| 22 | M16 DOME GLAND | ULP-22 |

| no | | |
|---|---|---|
| 24 | RIGHT HAND COVER PLATE | ULP-24 |
| 25 | LEFT HAND COVER PLATE | ULP-25 |
| 26 | BOTTOM COVER PLATE | ULP-26 |
| 27 | PCB BOARD | ULP-PCB |
| 28 | INTERNAL SPLINED SHAFT | ULP-28 |
| 29 | BEVEL GEAR 16t/29A DRIVE SHAFT | LP45-29 |
| 30 | BEARING x2 | LP45-30 |
| 31 | 25MM CIRCLIP | LP45-32 |
| 32 | SPIRAL BEVEL GEAR 24t | LP45-SPD |
| 33 | SPRING/PLUNGER ASSEMBLY | ULP-33 |
| 34 | RATCHET HANDLE | LP45-RH |
| 35 | MAINS CABLE | 0012180 |
| 36 | GUARD & FIXING SCREWS | ULP-36 |

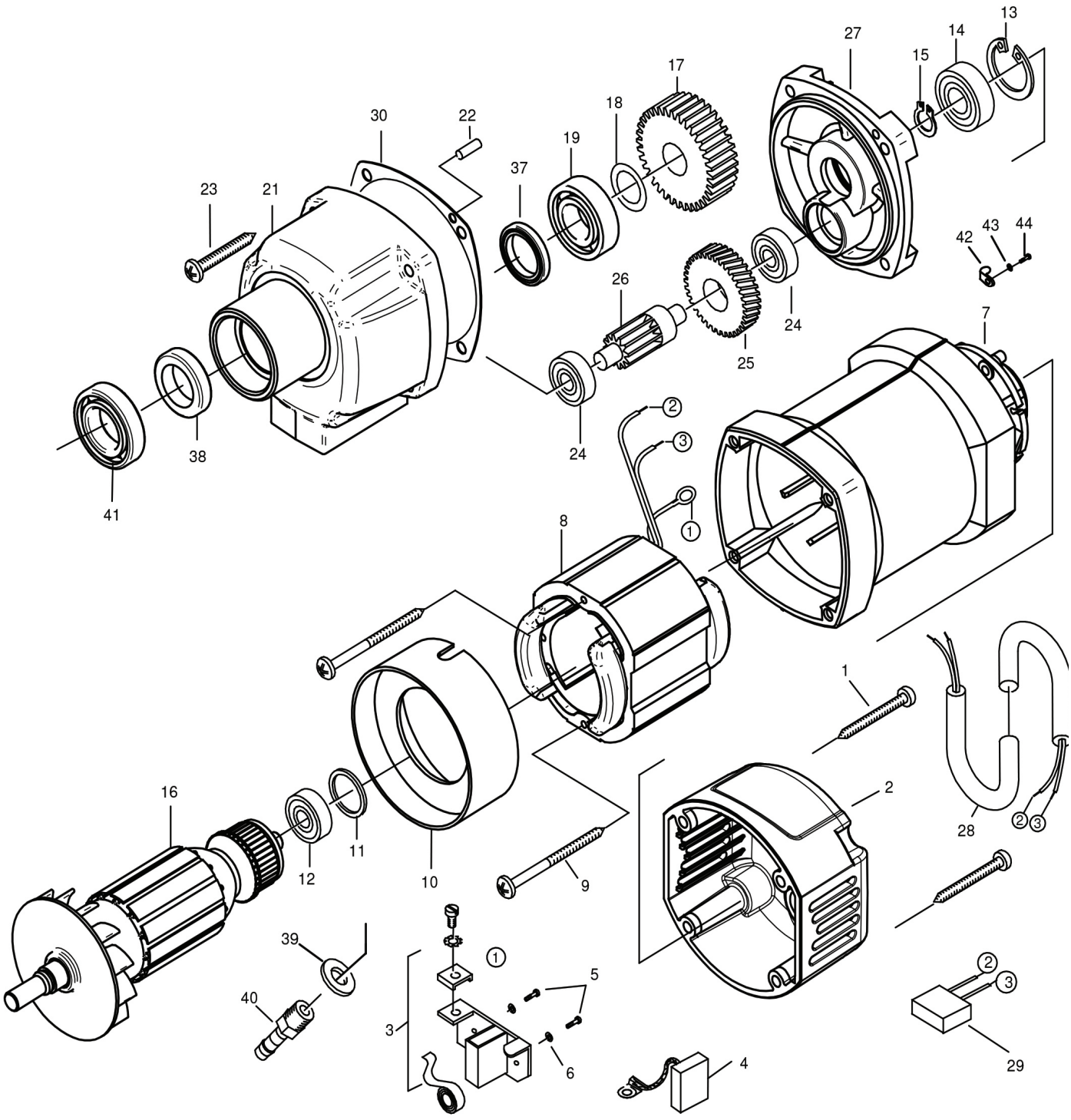






## MOTOR DIAGRAM.



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## MOTOR DIAGRAM PARTS LIST.

| No | DESCRIPTION | PART NUMBER | PIECES |
|---|---|---|---|
| 1 | Cap Screws HC 4, 8x50 | HM40.EX-01 | 4 |
| 2 | Motor Top Cap | HM40.EX-02 | 1 |
| 3 | Brusholder Assembly | HM56 | 2 |
| 4 | Carbon Brush 6,3,10x18 | HM57 | 2 |
| 5 | Brusholder Mount Screw ZM4x12 | HM111 | 4 |
| 6 | Washer | HM109 | 4 |
| 7 | Motor Housing | HM40.EX-07 | 1 |
| 8 | Field Coil | HM40.EX08 (220V) / HM40.EX08/1 (110V) | 1 |
| 9 | Screw | HM543 | 2 |
| 10 | Fan Ring | E55611 | 1 |
| 11 | O-Ring 22x2.5 | HM512 | 1 |
| 12 | Bearing 608 2Z | HM40.EX-12 | 1 |
| 13 | Circli/Locking Ring 28/1.2 | HM121 | 1 |
| 14 | Bearing 6001 2Z | HM40.EX-14 | 1 |
| 15 | Circlip | E55633EX | 1 |
| 16 | Armature | HM40.EX16 (220V) / HM40.EX16/1 (110V) | 1 |
| 17 | Spindle Gear | HM40.EX-17 | 1 |
| 18 | Shim Washer | HM40.EX-18 | 1 |
| 19 | Bearing 6003 2RS | HM40.EX-19 | 1 |
| 20 | Spindle: Weldon 19mm | HM40.EX-20 | 1 |
| 21 | Gearbox Housing | HM40.EX-21 | 1 |
| 22 | Dowel Pin 4x12 | HM511 | 1 |
| 23 | Screw HC 4.8x38 | HM541T | 4 |
| 24 | Bearing 608 | HM40.EX-24 | 2 |
| 25 | Gear | HM40.EX-25 | 1 |
| 26 | Gear Shaft | HM40.EX-26 | 1 |
| 27 | Back Plate HM40/HM50 | HM50BP | 1 |
| 28 | Cable Flex | HM40.EX-28 | 1 |
| 29 | Surpressor | HM113 | 1 |
| 30 | Gasket | HM40.EX-30 | 1 |
| 31 | Spring 1x9x107 | HM40.EX-31 | 1 |
| 32 | Piston | HM40.EX-32 | 1 |
| 33 | Circlip/ Gearbox Gasket | HM40.EX-33 | 1 |
| 34 | O-Ring | HM40.EX-34 | 1 |
| 35 | Washer | HM40.EX-35 | 1 |
| 36 | Secure Screw | HM40.EX-36 | 3 |
| 37 | Seal D20/28/4 | HM40.EX-37 | 1 |
| 38 | Seal D20/30/7 | HM40.EX-38 | 1 |
| 39 | Washer 1/8" | HM40.EX-39 | 1 |
| 40 | Hose Tail 1/8" | HM40.EX-40 | 1 |
| 41 | Bearing 6904 2RS | HM40.EX-41 | 1 |

MAGBEAST®

# *EC Declaration of Conformity*

We

***JEI Drilling & Cutting Solutions Ltd***
***Unit 21, Empire Business Park,***
***Enterprise Way,***
***Burnley, Lancashire, UK, BB12 6LT***

Declare with full responsibility that product:

## MAGBEAST ULP35 DRILLING MACHINE WITH ELECTROMAGNETIC BASE

which the declaration applies to is in accordance with the following standards:
EN 62841-1:2015, EN 55014-1:2017, EN ISO 12100:2010,

and satisfies safety regulations of guidelines:
2014/30/EU, 2014/35/EU, 2006/42/EC, 2011/65/EU, 2012/19/EU

.

Burnley, 31/12/2022

David McFadden
Managing Director

# 8.MACHINE TEST CERTIFICATE

## Machine control card

**ULP35/110V ULP35/220V**

Serial No. _____

Date of test: _____

Electric test results:

| Test | Result |
|---|---|
| Test with sinusoidal voltage of 1000 V and frequency 50 Hz | |
| Resistance of the protective circuit [Ω] | |

The above-mentioned product meets the requirements of safe usage as prescribed in standard IEC-745

Name of tester _____

Quality Control _____

# 9. WARRANTY CARD

## WARRANTY CARD No.....

…….. in the name of Manufacturer warrants the Drilling Machine to be free of defects in material and workmanship under normal use for a period of 12 months from date of sold.

This warranty does not cover cutters, damage or wear arises from misuse, accident, tempering or any other causes not related to defects in workmanship or material.

Date of Production ..... Serial No .....

Quality Control: ……

Date of Purchase: .....

Signature of Seller: ……..