DRILLING AND CUTTING SOLUTIONS

OPERATOR'S MANUAL

PORTABLE MAGNETIC DRILLING MACHINE

MINIBEAST AUTO

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1. GENERAL INFORMATION

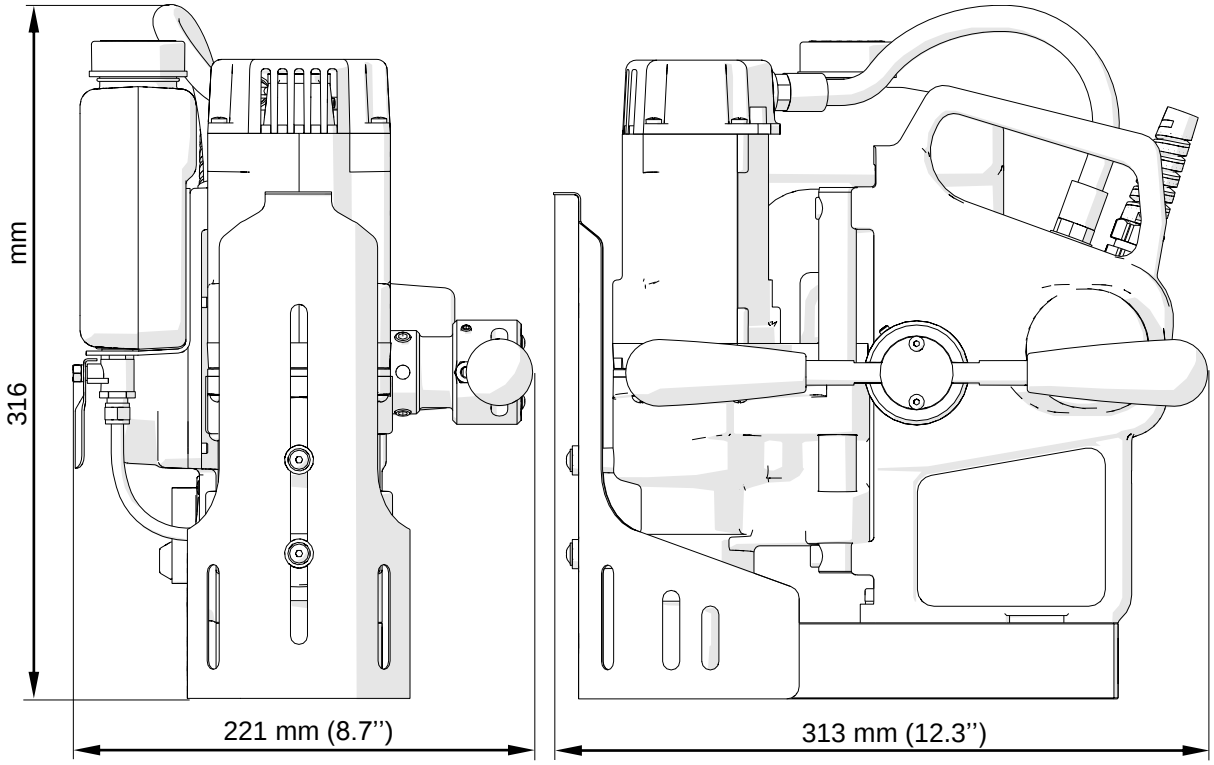
1.1. Application

The MINIBEAST AUTO is a drilling machine with electromagnetic base designed to drill holes with diameters of 12–36 mm (0.47–1.42'') to the maximum depth of 51 mm (2'') through the use of annular cutters.

The electromagnetic base allows the drilling machine to be fixed to ferromagnetic surfaces with a force that ensures user safety and proper machine operation. A safety strap protects the machine from dropping in case of a power loss.

1.2. Technical data

Voltage	1~ 110–120 V, 50–60 Hz 1~ 220–240 V, 50–60 Hz
Total power	1000 W
Motor power	920 W
Cutter holder	19 mm Weldon (0.75'')
Maximum drilling diameter	36 mm (1.42'')
Maximum drilling depth	51 mm (2'')
Electromagnetic base holding force (surface with the thickness of 22 mm and roughness R_a = 1.25)	9 300 N
Electromagnetic base dimensions	80 mm × 160 mm × 36.5 mm 3.1'' × 6.3'' × 1.4''
Slider stroke	70 mm (2.8'')
Rotational speed under load	350 rpm
Rotational speed without load	580 rpm
Minimum workpiece thickness	6 mm (0.23'')
Protection class	I
Noise level	over 85 dB
Vibration level	under 2.5 m/s^2 (≤ 8.2 ft/s^2)
Required ambient temperature	0–40 °C (32–104 °F)
Weight	13.5 kg (30 lbs)



1.3. Design

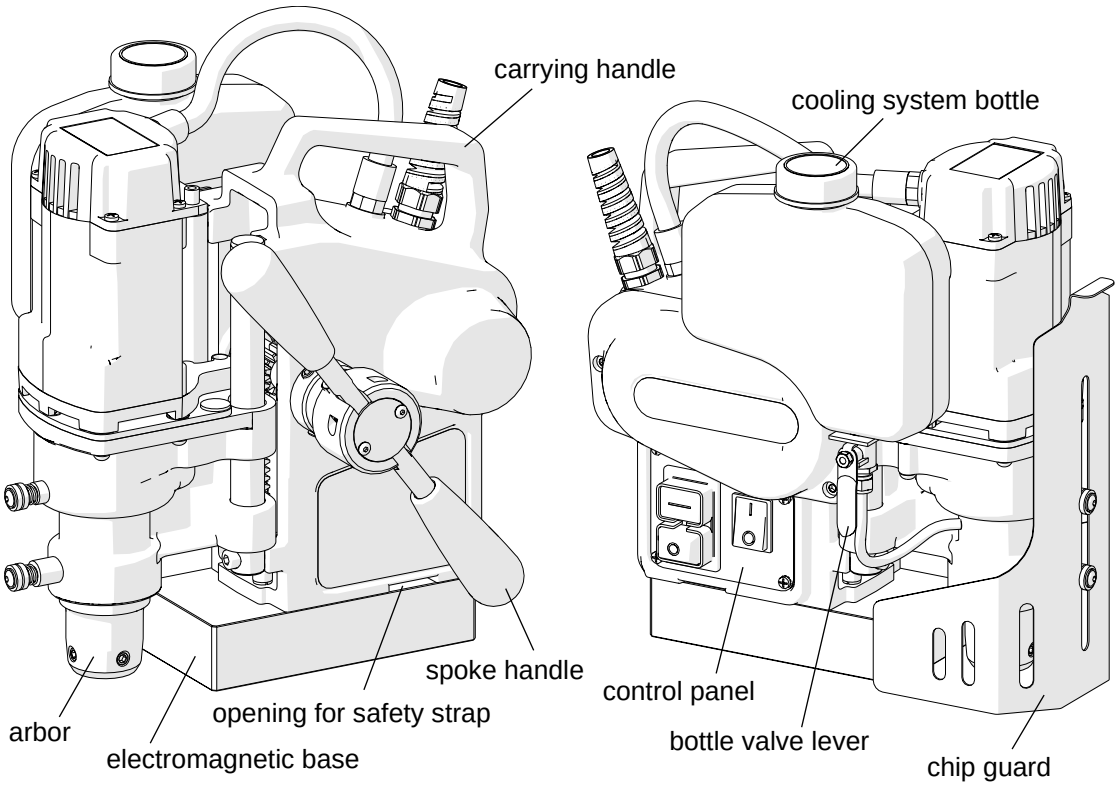


Figure 1. MINIBEAST AUTO design

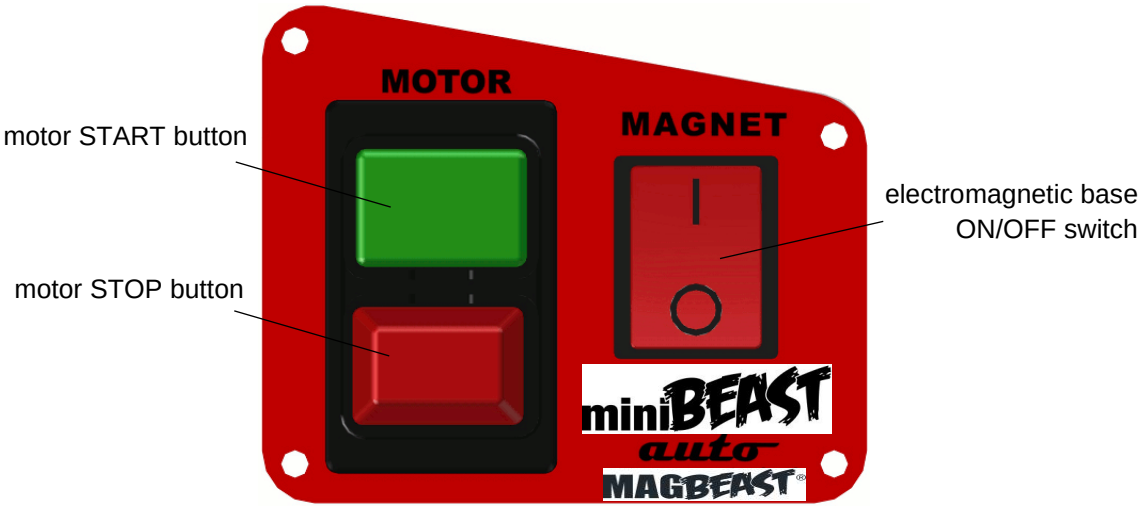


Figure 2. Control panel design

1.4. Equipment included

The MINIBEAST AUTO is supplied in a metal box with complete standard equipment. The included equipment consists of:

• Drilling machine	1 unit
• Metal box	1 unit
• Spoke handle	2 units
• Cooling system bottle	1 unit
• Chip guard	1 unit
• Safety strap	1 unit
• 4 mm hex wrench	1 unit
• Operator's Manual	1 unit

2. SAFETY PRECAUTIONS

1. Before beginning, read this Operator's Manual and complete proper occupational safety and health training.
2. The machine must be used only in applications specified in this Operator's Manual.
3. The machine must be complete and all parts must be genuine and fully operational.
4. The electrical supply specifications must conform to those specified on the rating plate.
5. The machine must be plugged into a properly grounded (earthed) socket-outlet. The electrical supply must be protected with a 16 A fuse for 230 V or a 32 A fuse for 115 V. When used on building sites, supply the machine through an isolation transformer made in II protection class.
6. Never carry the machine by the cord or pull it to disconnect the plug from the power outlet as this may damage the power cord and result in electric shock.
7. Transport and position the machine using the carrying handle, with the magnet switch set to position 'O'.
8. Untrained bystanders must not be present in the vicinity of the machine.
9. Before beginning, check the condition of the machine and electrical supply, including the power cord, plug, control panel components, and cutters.
10. Keep the machine dry. Exposure to rain, snow, or frost is prohibited.
11. Never stay below the machine placed at heights.
12. Keep the work area well lit, clean, and free of obstacles.
13. Mount the annular cutter securely using the set screws. Remove adjusting keys and wrenches from the work area before connecting the plug to the power outlet.
14. Never use dull or damaged cutters.
15. Mount and dismount cutters using protective gloves and with the power cord unplugged from the power outlet.
16. Never use annular cutters without the pilot pin except for establishing incomplete through holes.
17. Mount only annular cutters with the maximum drilling diameter of 36 mm (1.42'') and the maximum drilling depth of 55 mm (2.17'').
18. Never use the machine in the vicinity of flammable fluids or gases, or in explosive environments.

19. Using the machine on surfaces that are rusty, covered with a thick paint layer, uneven, or not stiff is prohibited.
20. Use the safety strap in all operating positions. The strap must be tight and fastened to a securely fixed element either through the opening in the machine body or by catching the strap on the carrying handle.
21. Before every use, inspect the machine to ensure it is not damaged. Check whether any part is cracked or improperly fitted. Make sure to maintain proper conditions that may affect the operation of the machine.
22. Always use eye and hearing protection and protective clothing during operation. Do not wear loose clothing.
23. Proceed with caution when machining plates with thickness lower than 10 mm (0.4'') as the adhesion force depends on material thickness and is significantly lower for thin plates.
24. The whole surface of the electromagnetic base bottom must be in full contact with the workpiece. Before every positioning, wipe the workpiece with coarse-grained sandpaper.
25. Do not touch moving parts or chips formed during milling. Prevent objects from being caught in moving parts.
26. After every use, remove metal chips and coolant remainder from the machine. Do not remove chips with bare hands.
27. Maintain the machine and tools with care. Cover steel parts with a thin grease layer to protect them against rust when not in use for any extended period.
28. Perform maintenance only with the machine unplugged from the power outlet.
29. Perform repairs only in a service center appointed by the seller.
30. If the machine falls on a hard surface, from height, is wet, or has any other damage that could affect the technical state of the machine, stop the operation and immediately send the machine to the service center for inspection and repair.
31. Never leave the machine unattended during operation.
32. Remove from the worksite and store in a secure and dry location when not in use, previously removing the cutter from the arbor.

3. STARTUP AND OPERATION

All safety precautions must be closely observed.

3.1. Mounting and operating the annular cutter

Unplug the power cord from the power outlet and raise the motor by rotating the spoke handles clockwise (*1*, Figure 3). Insert the proper pilot pin into the annular cutter (*2*), then wear protective gloves and place the cutter into the arbor (*3*) in such a way to align the flats *4* with the set screws *5*. Finally, tighten both set screws with the supplied 4 mm hex wrench. To dismount the cutter, proceed in reverse order.

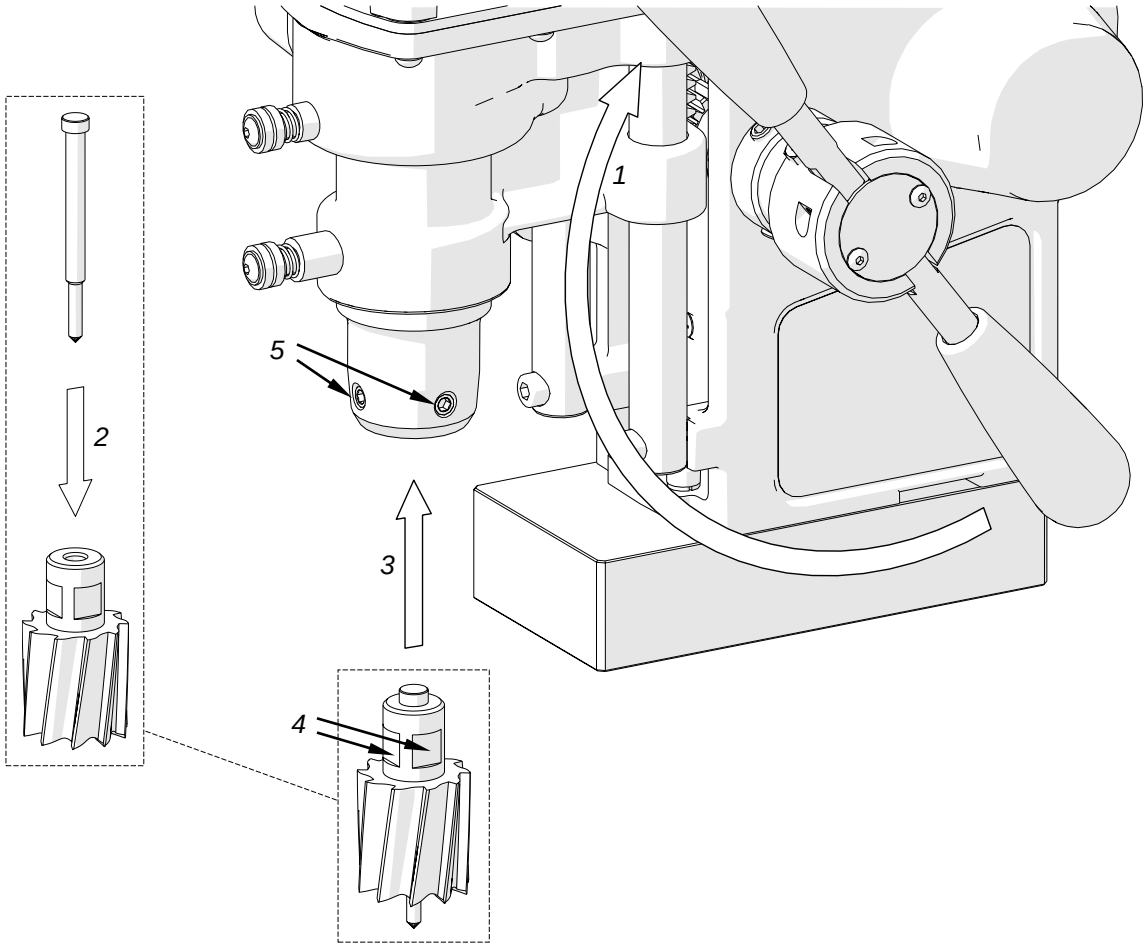


Figure 3. Mounting the annular cutter

Figure 4 shows how annular cutters operate. As the cutter penetrates the workpiece, the pilot pin recesses into the arbor and tightens the spring. As a result, after the cutter goes through the entire thickness, the slug core is expelled from the cutter.

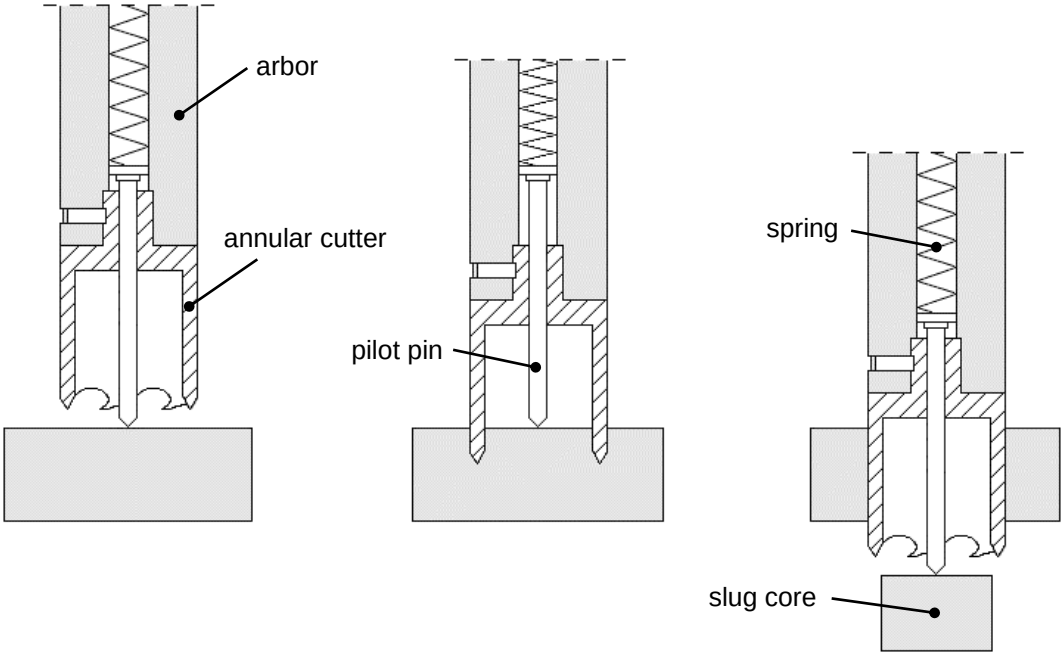


Figure 4. Annular cutters operation

Annular cutters are designed to establish only through holes shown in Figure 5. Establishing incomplete through holes requires **not using** the pilot pin.

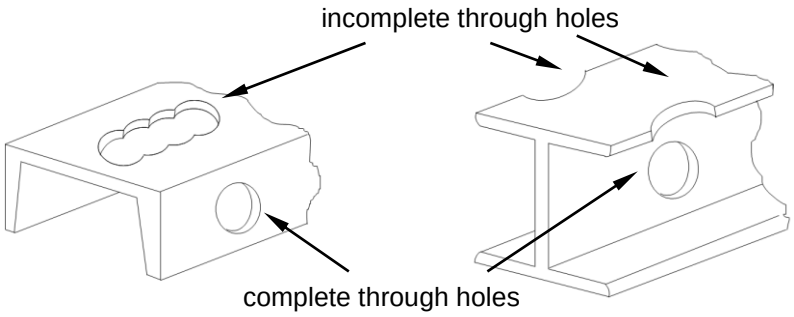


Figure 5. Types of holes to establish with annular cutters

IMPORTANT INFORMATION

Only use your Minibeast AUTO to cut through single layers of material when using standard annular cutters.

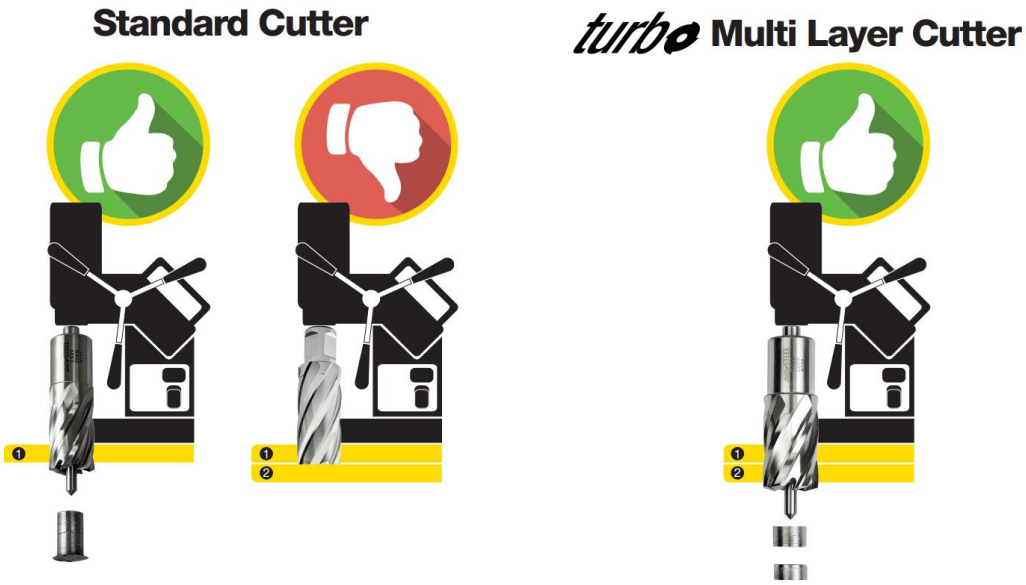
Do not attempt to cut through multiple layers/stacks/laminates of material with your (Insert Model) magnetic drilling machine using standard annular cutter. Once the first plate has been drilled, the centre slug will retain in the cutter. Attempting to continue the cutting

process will result in cutter breakage, or can cause the magnet to break away from the surface, resulting in injury. (Note – always secure the machine to the workpiece with the provided safety strap).

To achieve multiple layer cutting, please refer to JEI's multi-Layer Cutter form, available for all Turbo™ types. This will allow the solid slugs to be retained in the cutter during the cut and be safely ejected once the hole cutting process is completed.

Do not attempt this operation whilst the machine is set in automatic mode. Only carry out the multi-layer hole making process using the machine in manual setting.

Please refer to your JEI distributor for further details.



3.2. Mounting and dismounting the cooling system bottle

Hang the cooling system bottle on the screws (*1*, Figure 6) and attach the bottle hose to the coupling (*2*). Dismount in reverse order.

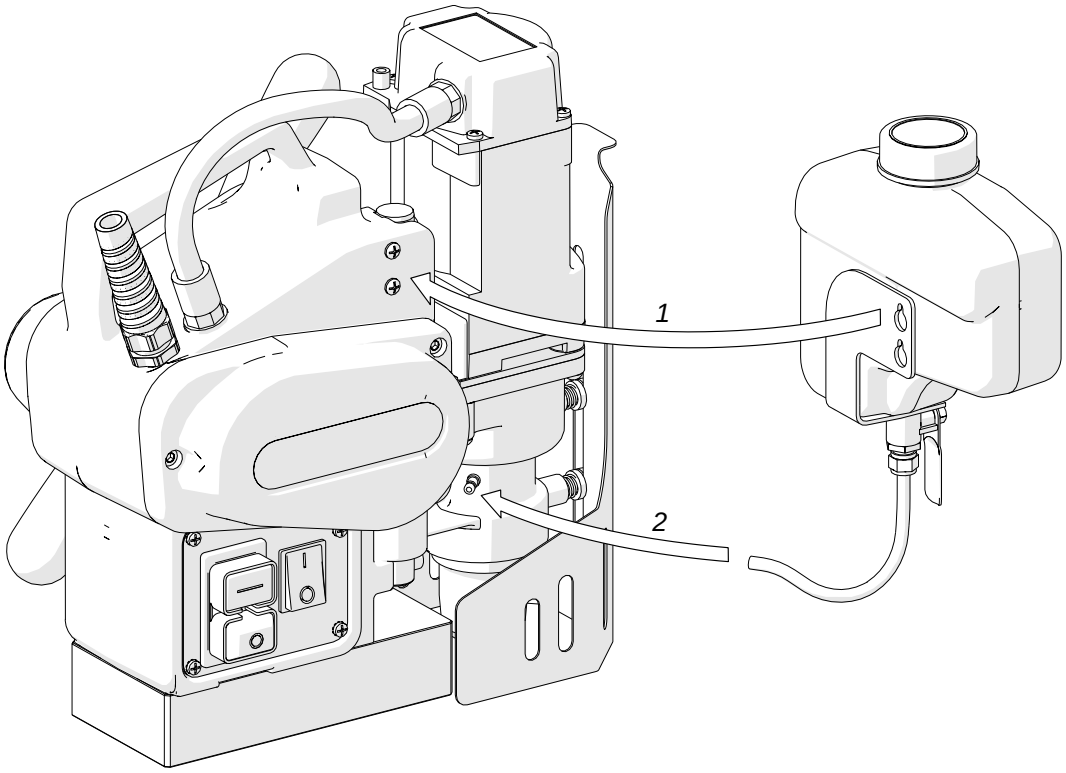


Figure 6. Mounting the cooling system bottle

3.3. Control system of the electromagnetic base holding force

The MINIBEAST AUTO drilling machine incorporates a holding force control system to monitor the adhesion force of the electromagnetic base to the surface. The force value depends on several factors, such as type, thickness, flatness, and roughness of the surface, presence of paint, rust or other contaminants, supply voltage fluctuations, and the wear of the electromagnetic base bottom. With the motor off, the base provides a fraction of the maximum holding force. Once the motor is started, the holding force rises to the maximum.

If the holding force falls below a safe operating value, the control system will not allow the machine to operate. Additionally, the system will prevent the startup of the motor if the machine is placed on a surface thinner than 5 mm (0.2'') as such thickness does not provide sufficient holding force. In such case, the adhesion force will be only about 25% of the force attained on a standard 22 mm (0.87'') flat plate.

If the motor does not continue operation after the green MOTOR button is pushed and released, it means that the control circuit is operating properly and preventing further drilling because of too low adhesion force.

3.4. Preparation

Before beginning, clean steel parts, especially the Weldon shank, from grease used to preserve the machine for storage and transport.

Mount the annular cutter into the arbor in the manner described before.

Position the machine on a flat ferromagnetic surface (some types of stainless and acid-proof steel do not conduct magnetic flux) with the thickness of at least 6 mm (0.23’’). The workpiece must be clean, without rust or paint that decrease the holding force of the electromagnetic base.

Then, connect the drilling machine to the power outlet and enable the holding force of the electromagnetic base by toggling the MAGNET switch to position ‘I’.

Protect the machine using the safety strap to prevent possible injury if the machine loses magnetic adhesion in case of a power loss. In order to do this, either mount the strap through the opening in the machine body (Figure 7a, 7b) or catch the strap on the carrying handle when working in horizontal position (Figure 7c). The strap must be tight, not twisted, and must be replaced every single time the machine hangs on the strap as a result of coming loose from steel.

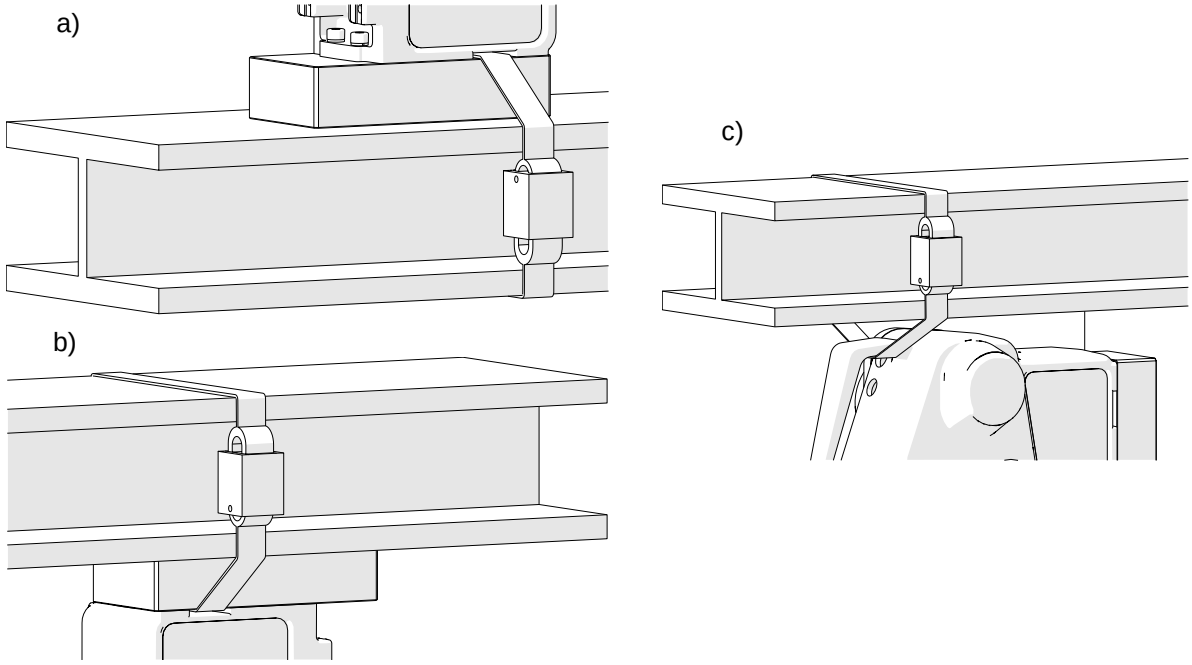


Figure 7. Securing the drilling machine using the safety strap

When working in the position from Figure 7a, mount the cooling system bottle as described before and fill it with a cutting fluid. Do not use pure water as the cutting fluid, however,

using emulsions formed from mixing water and drilling oil is also satisfactory. To check the operation of the cooling system, slightly loosen the bottle cap, open the valve using the lever, and initially apply pressure on the pilot pin by rotating the spoke handles counterclockwise. The fluid should fill the system and should begin flowing from the inside of the cutter.

The cooling system works by means of gravitation, therefore use a cooling paste when working in horizontal or inverted positions.

Enter into manual feed mode by positioning the spoke handles as shown in Figure 8a, and rotate them counterclockwise to place the tip of the pilot pin above the drilling point.

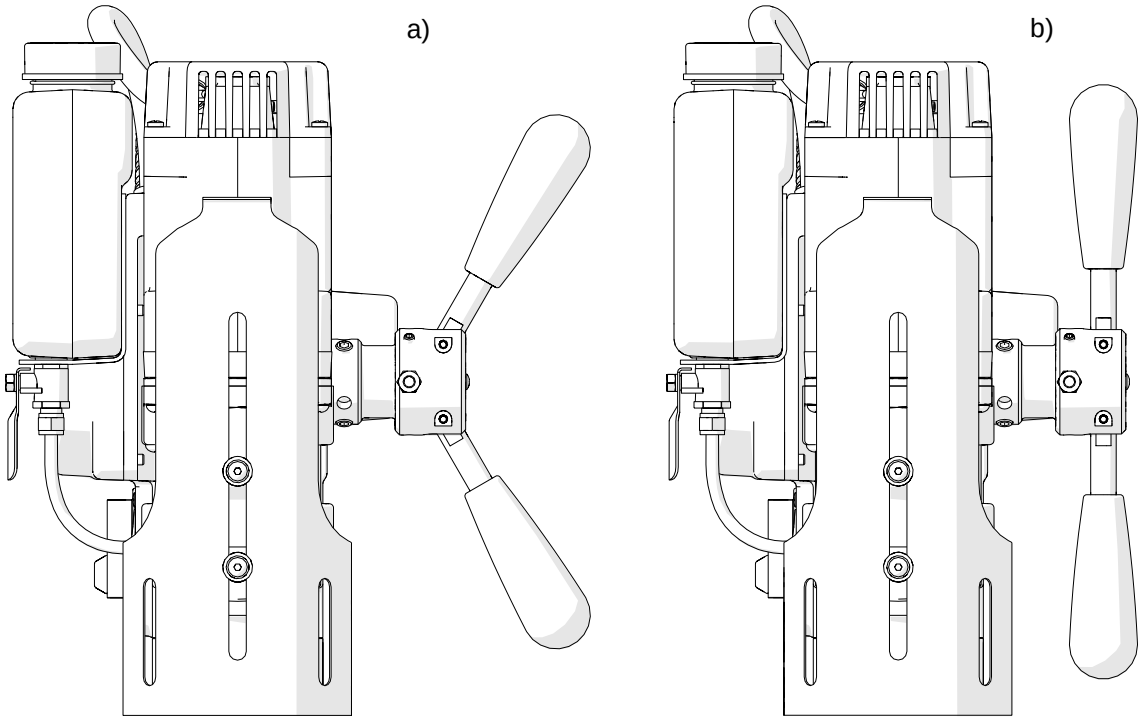


Figure 8. Configuration of the spoke handles: manual feed (a), automatic feed (b)

3.5. Drilling

Start the motor by pressing the green MOTOR button. Slowly rotate the spoke handles counterclockwise to bring the cutter close to the workpiece. Then, gently begin drilling and enter into the automatic feed mode by setting the spoke handles in the position shown in Figure 8b. The drilling machine will automatically detect the end of the drilling, which will stop the feed after the hole is accomplished, however, the motor will still be rotating.

When the cutter goes through the material, the slug core is expelled from the tool with a significant force.

Once the hole is accomplished, toggle the spoke handles into the manual feed mode (Figure 8a). Then, retract the cutter from the workpiece and stop the motor using the red MOTOR button. To move the machine to another drilling spot, first disable the electromagnetic base by toggling the MAGNET switch to position 'O'.

Once the work is finished, unplug the machine from the power outlet, clean chips and coolant remainder from the machine and cutter, and remove the machine from the worksite.

Tighten the cap of the cooling system bottle, close the valve, and press the pilot pin to expel the coolant remaining within the system. Before inserting the drilling machine into the toolbox, disassemble the cooling system bottle and remove the cutter from the arbor using protective gloves.

3.6. Replacing the motor brushes

Check the condition of the carbon brushes every 100 operational hours. If the length of the brushes is less than 5 mm (0.2''), replace them with new ones. To do this, unplug the power cord from the power outlet, and unscrew four mounting screws (*1*, Figure 9) to remove the motor cover (*2*). Then, unscrew the pressing plate *3*, remove the brush holder (*4*) and the brush (*5*). Proceed as described also for the second brush located at the opposite side of the motor. To mount brushes, proceed in reverse order. After the replacement, run the motor without load for 20 minutes.

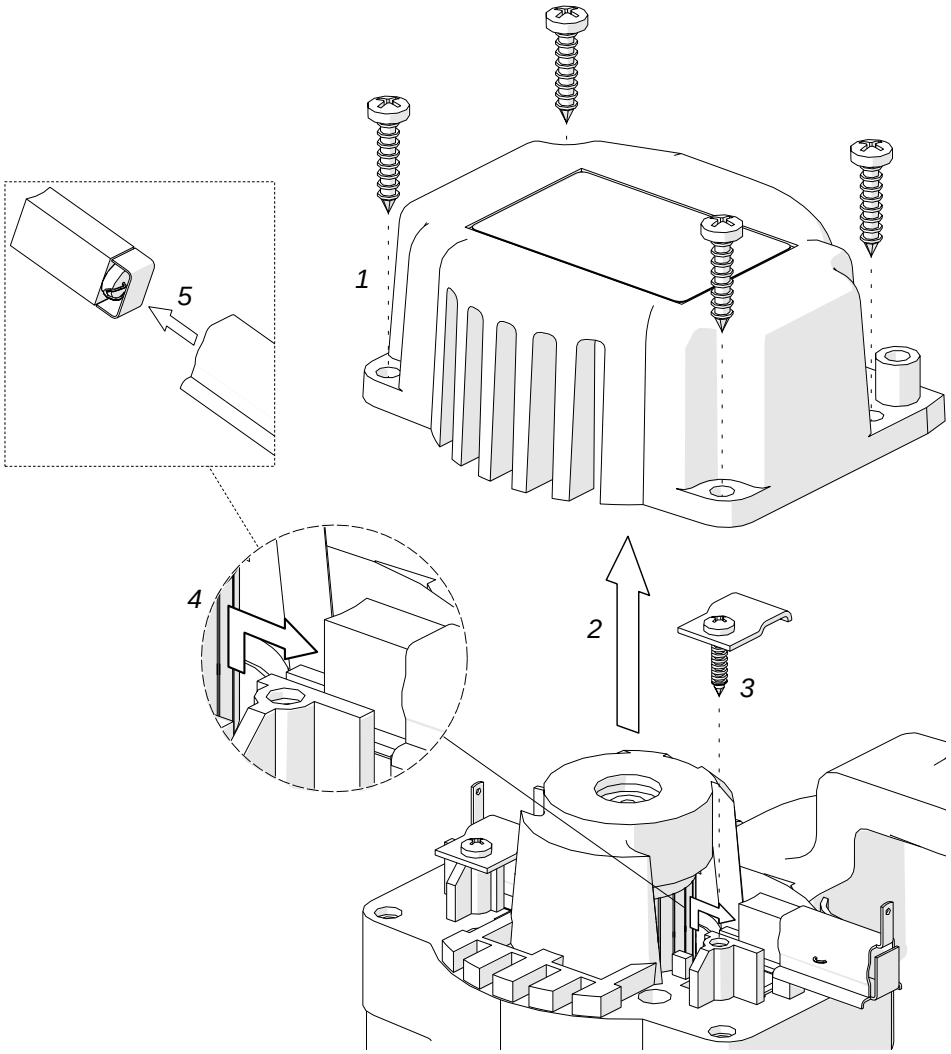
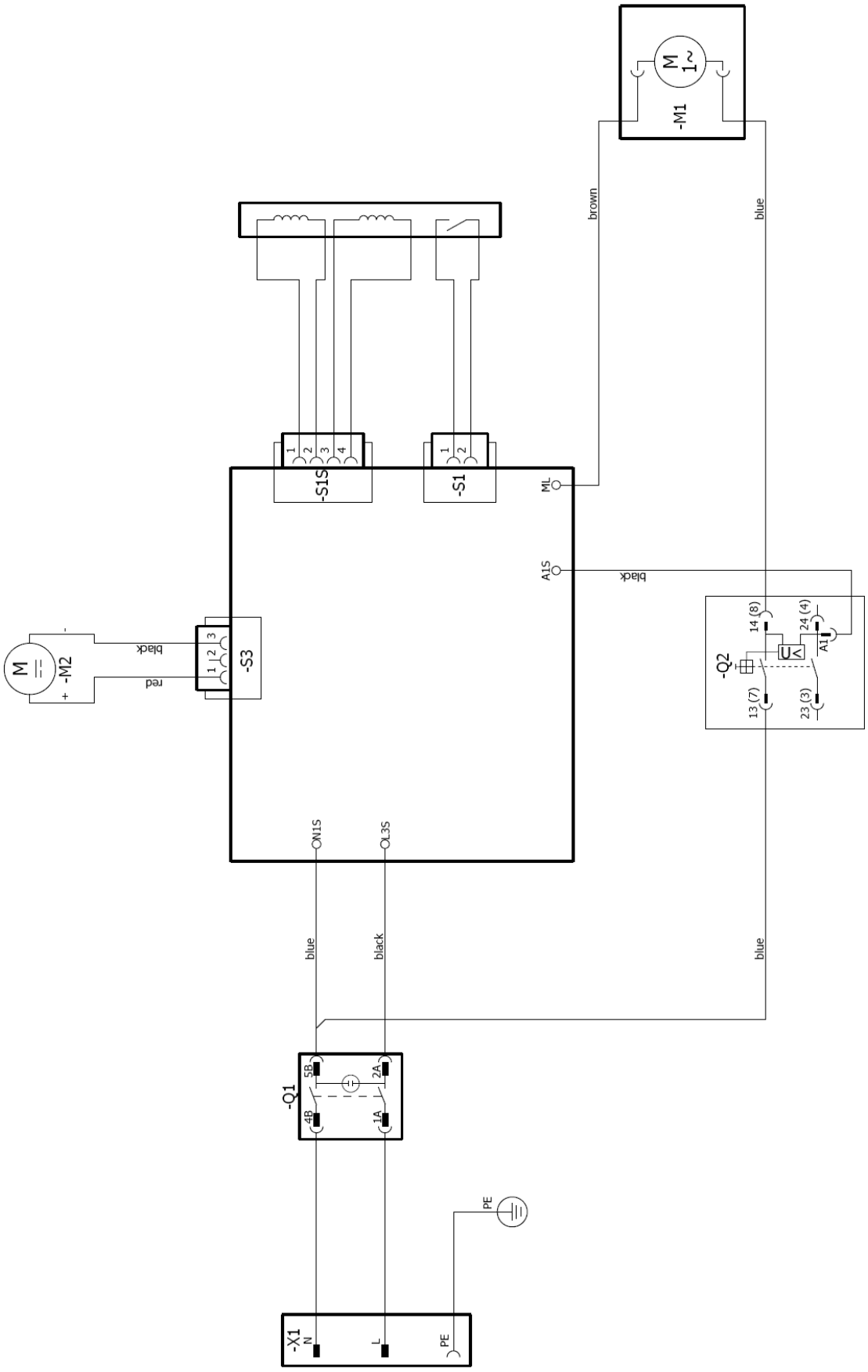


Figure 9. Replacing the brushes

4. WIRING DIAGRAM



5. DECLARATION OF CONFORMITY

EC Declaration of Conformity

We

JEI DRILLING & CUTTING SOLUTIONS LTD
UNIT 21 EMPIRE BUSINESS
ENTERPRISE WAY
BURNLEY, LANCASHIRE, BB12 6LT

Declare with full responsibility that product:

MINIBEAST AUTO Drilling Machine with Electromagnetic Base

is manufactured in accordance with the following standards:

- EN 62841-1:2015
- EN 55014-1:2017
- EN ISO 12100:2010

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

Burnley, 1ST December 2017

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David McFadden
Managing Director

6. QUALITY CERTIFICATE

Machine control card

MINIBEAST AUTO Drilling Machine with Electromagnetic Base

Serial number .....

Spindle radial runout.....

Slider to base travel perpendicularity.....

Spindle axis to base perpendicularity .....

Base holding force.....
(surface with the minimum thickness of 22 mm and roughness $R_a \leq 1.25$)

Electric test

Type of test	Result	Name of tester
Test with sinusoidal voltage (voltage 1000 V, frequency 50 Hz)		..... Date
Resistance of the protective circuit	..... Ω	..... Signature

Quality control .....

Adjustments, inspections

Quality control .....

7. WARRANTY CARD

WARRANTY CARD No.....

..... in the name of Manufacturer warrants the MINIBEAST AUTO Drilling Machine with Electromagnetic Base to be free of defects in material and workmanship under normal use for a period of 12 months from date of sale. This warranty does not cover cutters, damage or wear that arise from misuse, accident, tempering or any other causes not related to defects in workmanship or material.

Date of production .....

Serial number .....

Date of sale.....

Signature of seller .....

1.01 / 11 March 2014

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