

**BOHRMASTER**

# **BHM35**

**magnetic drilling machine**

Annular cutters	Ø 12 – 35 mm	Ø 7/16 – 1 3/8"
Twist drills	Ø 1 – 13 mm	Ø 1/16 – 1/2"
Countersinking	Ø 10 – 35 mm	Ø 3/8 – 1 3/8"
Length	275 mm	10 13/16"
Width	175 mm	6 7/8"
Height	293 – 383 mm	11 9/16 – 15 1/16"
Stroke	90 mm	3 9/16"
Weight	8.5 kg	18.7 lbs
Magnet (l x w x h)	160 x 81 x 36 mm	6 5/16 x 3 1/8 x 1 7/16"
Magnetic force	1,000 kg	2,205 lbs
Motor power	850 W	7.7 A
Total power	900 W	8.2 A
Speed (no load)		750 rpm
Speed (loaded)		400 rpm
Spindle weldon	19.05 mm	3/4"
Power source	110 - 120V AC 60 Hz 220 - 240V AC 50 - 60 Hz	





Magnetic drilling machine

**BHM.35**

Serial number:

Date of purchase:

/ /

Congratulations on your purchase of the BHM.35 portable magnetic drilling machine. Your model is designed to produce superior holes quickly and efficiently.

Before operating your new magnetic drilling machine, please read all instructions first. These include the Operators Manual and warning label on the unit itself. With proper use, care and maintenance your model will provide you with years of effective hole drilling performance.

**TO REDUCE THE RISK OF INJURY USER MUST READ AND UNDERSTAND ALL INSTRUCTIONS**

The original manual has been produced in the English language. If any discrepancies should occur in translations, reference must be made to the original version for clarification.

# Table of contents

<b>BHM.35.....</b>	<b>1</b>
Table of contents.....	3
1. Safety.....	4
1.1 General safety instructions	4
1.2 Specific safety information	6
2. Description.....	8
2.1 Intended use	8
2.2 Description and features	8
2.3 Case content	8
2.4 Serial number	9
2.5 Technical data	9
2.6 Symbols	10
2.7 Environmental	10
3. Preparation & adjustment .....	11
3.1 Assembly	11
3.2 Prior to use	12
4. Using the machine .....	13
4.1 Control panel	13
4.2 Electromagnet	14
4.3 Switching motor on and off	15
4.4 Tool lubrication	15
5. Working with operation tools .....	16
5.1 Annular cutters	16
5.2 Twist drills	17
5.3 Step drills and countersinks	17
6. Maintenance.....	18
7. Trouble shooting.....	20
8. Exploded views & spare parts list.....	22
8.1 Exploded views	22
8.2 Spare parts list	25
8.3 Wiring diagram	25

# 1. Safety

## 1.1 General safety instructions

Do not use this magnetic drilling machine before you have thoroughly read and completely understood this manual, specifically the “General safety instructions” and “Specific safety information” , including the figures, specifications, safety regulations and the signs indicating DANGER, WARNING and CAUTION.



**WARNING:** When using electrical tools basic safety precautions should always be followed to reduce the risk of fire, electrical shock and personal injury.

Please also observe the relevant national industrial safety regulations. Non-observance of the safety instructions can lead to an electric shock, burns and/or severe injuries.

This manual should be kept for later use and enclosed with the magnetic drilling machine, should it be passed on or sold.

### Work area

1. Keep your work area clean and well lit. Cluttered and dark work areas increase the chance of accidents;
2. Do not operate a magnetic drilling machine in explosive atmospheres, such as in the presence of flammable liquids, gases or dust. A magnetic drilling machine may create sparks which could ignite the dust or fumes;
3. Keep bystanders, children and visitors away while operating a magnetic drilling machine. Distractions can cause you to lose control.

### Electrical safety

1. A magnetic drilling machine plug must match the outlet. Never modify the plug in any way. Do not use any adapter plugs;
2. Avoid body contact with grounded surfaces such as pipes, radiators, ranges and refrigerators. There is an increased risk of electric shock if your body is grounded;
3. Do not expose the magnetic drilling machine to rain or wet conditions. Water entering a machine will increase the risk of electric shock;
4. Do not abuse the cord. Never use the cord to carry the magnetic drilling machine or pull the plug from an outlet. Keep the cord away from heat, oil, sharp edges or moving parts. Replace damaged cords immediately. Damaged cords increase the risk of electric shock;
5. When operating a magnetic drilling machine, use an extension cord suitable for outdoor use, this reduces the risk of electric shock;
6. If operating a magnetic drilling machine in a damp location is unavoidable, use a residual current device (RCD), this reduces the risk of electric shock.

## Personal safety

1. Stay alert, watch what you are doing and use common sense when using a magnetic drilling machine. Do not use the machine while tired or under the influence of drugs, alcohol, or medication. A moment of inattention while operating a magnetic drilling machine may result in serious personal injury;
2. Dress properly. Do not wear loose clothing or jewelry. Keep your hair, clothing and gloves away from moving parts. Loose clothes, jewelry or long hair can be caught in moving parts;
3. Avoid accidental starting. Be sure the switch is off before plugging the machine in. Carrying a magnetic drilling machine with your finger on the switch or plugging in a magnetic drilling machine that has the switch on increases the chance of accidents;
4. Never place hands, fingers, gloves or clothing near drilling area or rotating machine parts;
5. Remove adjusting keys or switches before turning the machine on. A wrench or a key that is left attached to a rotating part of the machine may result in personal injury;
6. Do not overreach. Keep proper footing and balance at all times. Proper footing and balance enables better control of the magnetic drilling machine in unexpected situations;
7. Use safety equipment. Always wear eye protection. Dust mask, non-skid safety shoes, hard hat and hearing protection must be used for optimal safety;
8. Always use supplied safety chain during any work on non-horizontal surfaces. Magnetic drilling machine can release from surface.



**WARNING:** Wear ear and eye protection when using this machine.

## Machine use and care

1. When using the machine on non-horizontal surfaces, you must use cutting paste. Do not use oil because the oil can drip into the motor unit;
2. While operating the machine, the annular cutter must be cooled and lubricated with high quality cutting lubricants;
3. Always remove the slug from the annular cutter after each hole.



**WARNING:** The metal slug can be sharp and very hot!

4. Use clamps or other practical solutions to secure and support the workpiece to a stable platform. Holding the workpiece by hand or against your body is unstable and may lead to loss of control;
5. Do not use the machine when the switch does not turn it on or off. Any machine that cannot be controlled with the switch is dangerous and must be repaired;
6. Disconnect the plug from the power source before making any adjustments, changing accessories or storing the tool. Such preventive safety measures reduce the risk of starting the tool accidentally;
7. Store your magnetic drilling machine out of reach for children and other untrained persons. Tools are dangerous in the hands of untrained users;
8. Maintain your machine with care. Keep cutting tools sharp and clean. Properly maintained tools, with sharp cutting edges are less likely to break and are easier to control;
9. Check for misalignment of moving parts, breakage of parts and any other condition that may affect the machine's operation. If you detect damage have the machine serviced before use. Many accidents are caused by poorly maintained tools;

10. Only use accessories that are recommended for your machine model. Accessories that are suitable for one machine may become hazardous when used on another machine.

## Service

1. Tool service must be performed only by qualified repair personnel. Service or maintenance performed by unqualified personnel could result in risk of injury;
2. When servicing a tool, use only identical replacement parts. Follow instructions in the maintenance section of this manual. Use of unauthorised parts or failure to follow maintenance instructions may create a risk of electric shock or injury.

## 1.2 Specific safety information

- Keep your fingers away from the drilling area;
- Avoid touching the slug that is automatically ejected by the pilot pin when the working procedure is finished. Contact with the slug when it is hot, or if it falls, can cause personal injuries;
- Always use the safety guard. Before switching on the machine ensure that the guard is closed securely;
- Always use the safety chain;
- The magnetic drilling machine is suitable for use on steel with a thickness starting from 6 mm, with zero air gap between the magnet core surface and the mounting surface. Curvature, coats of paint and surface irregularities will create an air gap. Keep the air gap to a minimum;
- Always place the machine on a flat surface;
- Do not clamp the magnetic drilling machine on small or irregular shaped objects;
- Always place the machine on a surface that is clear of shavings, chips, swarf and surface dirt;
- Keep the magnet clean and free of debris and swarf;
- Do not switch on the machine before checking whether the magnetic stand has been tightened firmly to the mounting surface;
- Adjust the machine so cutter does not extend into the workpiece before drilling. Do not perform any design, assembly or construction activities on the workpiece while the machine is switched on;
- Before switching on the machine, make sure all accessories have been mounted correctly;
- Do not switch on the machine until it has been mounted and installed according to all above mentioned instructions;
- Always use the recommended speed for the accessories and material you are working with;
- Do not use the machine on the same workpiece on which electric welders are working;
- Only use an appropriate cutting lubricant. We offer a wide range of well-considered cooling and lubrication products to match your requirements;
- Do not use liquid cutting fluids while drilling vertically or overhead. Dip the cutter in cutting paste or apply an appropriate spray for these applications;
- Do not pour cutting fluid into the reservoir while it is mounted in the bracket. Do not allow cutting fluid to enter the drill motor;
- Before use, ensure movable safety guard operates properly;
- In case of a jammed cutter, turn off the machine, disconnect the machine from the power supply and then remove the reason for the jam before turning on the machine.

## Residual risk

In spite of following the relevant safety regulations and their implementation, certain residual risks cannot be avoided. These are:

- Impairment of hearing;
- Risk of personal injury from flying particles;
- Risk of burns due to accessories becoming hot during operation;
- Risk of personal injury due to prolonged use.

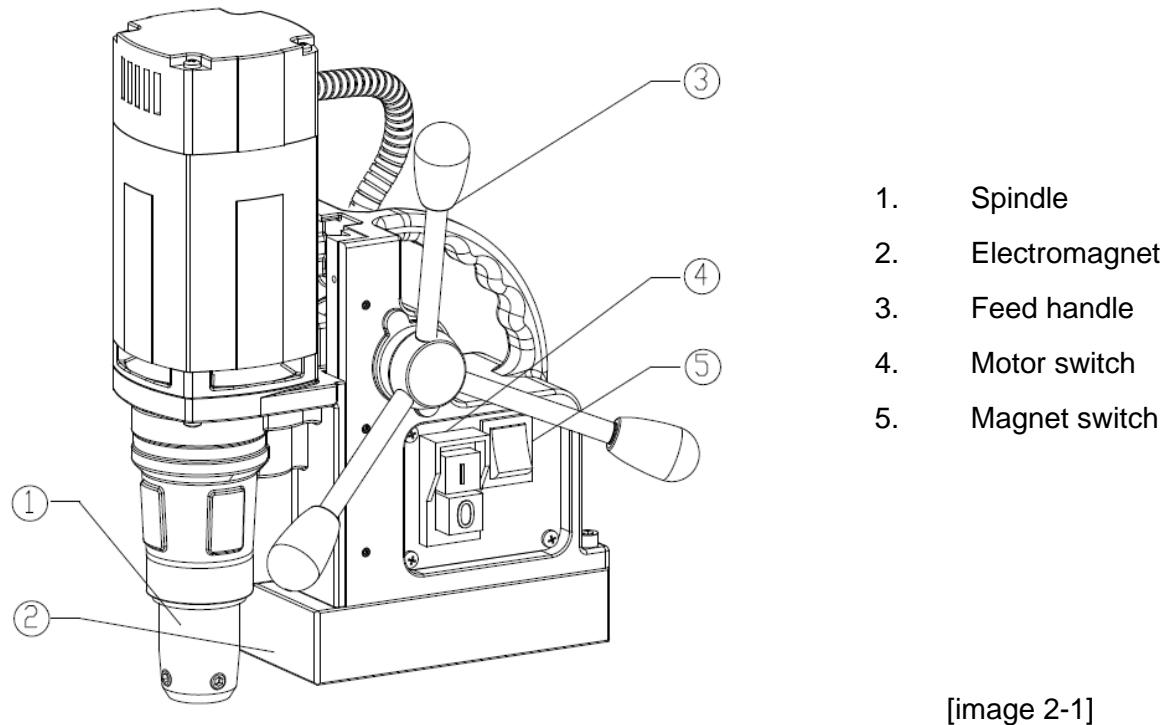
Always try to reduce these risks as much as possible.

## 2. Description

### 2.1 Intended use

This magnetic drilling machine is intended for commercial use as a drilling machine for drilling materials with a magnetisable surface using annular cutters and twist drills, and for countersinking in a weather-protected environment using application tools and accessories. The magnetic drilling machine can be used horizontally, vertically or overhead.

### 2.2 Description and features



### 2.3 Case content

1 x BHM.35 Magnetic drilling machine  
1 x safety guard  
3 x handles  
1 x hex key 2.5 mm  
1 x hex key 3 mm  
1 x hex key 4 mm  
1 x hex key 5 mm  
1 x lubrication system  
1 x safety chain  
1 x user manual

## 2.4 Serial number

The serial number is mentioned on the machine 3 times: engraved on the frame and magnet, plus on the serial no. sticker on the motor housing. Additional serial no. stickers are provided with the machine for your administration.

The serial number will help you and your sales point validate and identify the machine.

As example:

0352101001

breaks down to:

035    21    01    001

Machine series  
Year of manufacture  
Month of manufacture  
Identification number

## 2.5 Technical data

	Metric	Imperial
Annular cutting	Ø 12 - 35 mm	Ø 7/16 - 1 3/8"
Twist drilling	Ø 1 - 13 mm	Ø 1/16 - 1/2"
Threading	-	-
Countersinking	Ø 10 - 35 mm	Ø 3/8 - 1 3/8"
Length	275 mm	10 13/16"
Width	175 mm	6 7/8"
Height	293 - 383 mm	11 9/16 - 15 1/16"
Stroke	90 mm	3 9/16"
Weight	8,5 kg	18.7 lbs
Magnet (l x w x h)	160 x 81 x 36 mm	6 5/16 x 3 1/8 x 1 7/16"
Magnetic force	1,000 kg	2,205 lbs
Motor power	850 W	7.7 A
Total power	900 W	8.2 A
Speed (no load)		750 rpm
Speed (loaded)		400 rpm
Spindle (Weldon)	19.05 mm	3/4"
Voltage	220 - 240V AC / 50 - 60 Hz	110 - 120V AC / 60 Hz

## 2.6 Symbols

Symbol	Term, meaning	Explanation
	Read documentation	Be absolutely sure to read the enclosed documentation such as the Instruction Manual and the General Safety Instructions
	Wear ear protection	Use ear protection during operation
	Wear eye protection	Use eye-protection during operation
	Danger/warning/caution	Observe the information in the adjacent text!
	European conformity symbol	Confirms the conformity of the power tool with the directives of the European Community
	Class of protection I	Product with basic insulation and exposed (touchable), conductive parts additionally connected to the protective earth conductor
mm	millimetre	Unit of measure for the dimensions
"	inch	Unit of measure for the dimensions
kg	kilogram	Unit of measure for the mass
lbs	pound	Unit of measure for the mass
V	Volt	Unit of measure for the electric voltage
A	Ampere	Unit of measure for electric current intensity
W	Watt	Unit of measure for the output
rpm	revolutions per minute	Unit of measure for motor speed

## 2.7 Environmental



Separate collection. This product must not be disposed of with normal household



Separate collection of used products and packaging allows materials to be recycled and used again. Re-use of recycled materials helps prevent environmental pollution and reduces the demand for raw materials.

Local regulations may provide for separate collection of electrical products from the household, at municipal waste sites or by the retailer when you purchase a new product.

### 3. Preparation & adjustment

#### 3.1 Assembly



**WARNING:** To reduce the risk of injury, turn unit off and disconnect machine from power source before installing and removing accessories, before adjusting or changing set-ups or when making repairs. Be sure all switches are in the OFF position. An accidental start-up can cause injury.

##### FITTING THE FEED HANDLES

1. Fit each of the three feed handles by screwing them into the hub in clockwise directions;
2. Tighten firmly by hand.

The handles are supposed to face slightly outward. Be careful not to cross-thread any of the components.

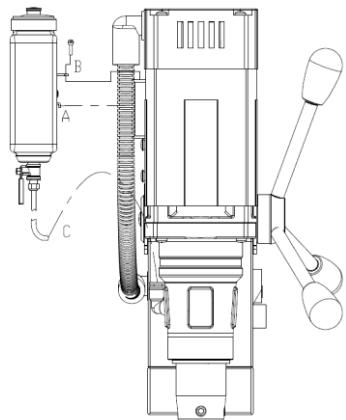
##### MOUNTING THE DRILL GUARD

The guard protecting against chippings and accidental contact must always be mounted during operation.

1. Hold the guard in front of the magnet, aligning the slots in the guard with the holes in the magnet;
2. Fit the screws into the hole located in the side of the magnet.



**WARNING:** Always use the safety guard.



##### FITTING THE LUBRICATION SYSTEM

The lubrication system can be used for horizontal drilling applications (the drill being used vertically).

1. Hang the tank (A) on the tank holder
2. Position and tighten the attachment pin (B)
3. Connect the hose (C) to the fitting on the gearbox. Make sure the hose is connected fully and tightly.
4. To disconnect the hose, press the blue ring on the connection and gently pull out the hose

[image 3-1]

##### FITTING THE SAFETY CHAIN

1. Wrap the chain around the work piece and machine frame handle
2. Ensure the chain is taut
3. Securely close the chain using the lock



**WARNING:** Always use the safety chain when using machine vertically. For safety reasons we advise against using the machine upside-down in overhead applications

### 3.2 Prior to use

Please make sure that the contacting surface for the magnet is level, clean and rust-free. Remove any varnish or primer. When working on materials that are not magnetisable, suitable fixation devices, obtainable as accessories, e.g. suction plate, vacuum plate or pipe-drilling device must be used. When work on steel materials with a material thickness of less than 5 mm, the work piece must be reinforced with an additional steel plate in order to guarantee the magnetic holding power.

Check the machine for possible damage; Before using the machine, you must carefully check protective devices or slightly damaged components to ensure they are operating perfectly and as intended. Check that moving are in perfect working order and do not jam and check whether parts are damaged. All parts must be correctly installed and fulfill all conditions necessary to ensure perfect operation of the machine. Damaged protective devices and parts must be repaired or replaced according to specifications by the dealer.

DO NOT use under wet conditions or in presence of flammable liquids or gases. This magnetic drilling machine is a professional power tool.

DO NOT let children come into contact with the machine. Supervision is required when inexperienced operators use this machine.

#### ELECTRICAL SAFETY

The electric motor has been designed for one voltage only. Always check that the power supply corresponds to the voltage on the rating plate.

Your magnetic drilling machine is designed in class I (grounded) according to EN 61029-1. Earth wire is required.

If the supply cord is damaged, it must be replaced by a specially prepared cord available through the service organisation.

#### EXTENSION CABLE

If an extension cable is required, use an approved 3-core extension cable suitable for the power input of this tool (see technical data). The minimum conductor size is 1.5 mm<sup>2</sup> (for 220V) or 14 AWG (Amperage Wire Gauge for 110V). The maximum length is 30 metre (± 100 ft).



WARNING: When using a reel, always unwind the cable completely!

**TRY A FEW SIMPLE PROJECTS USING SCRAP MATERIAL UNTIL YOU DEVELOP A “FEEL” FOR THE MACHINE.**

**LET THE MACHINE RUN IN FOR A PERIOD OF 8-10 HOURS BEFORE STARTING WITH BIG OPERATIONS. DO NOT LOAD THE MACHINE TOO MUCH DURING RUN-IN PERIOD.**

**NEVER USE THE MACHINE IN SERIOUS OVERLOAD.**

**KEEP THE MACHINE CLEAR FROM MOISTURE AT ALL TIMES TO PROTECT THE MACHINE, YOURSELF AND OTHERS.**

## 4. Using the machine



WARNING: Always observe the safety instructions and applicable regulations.

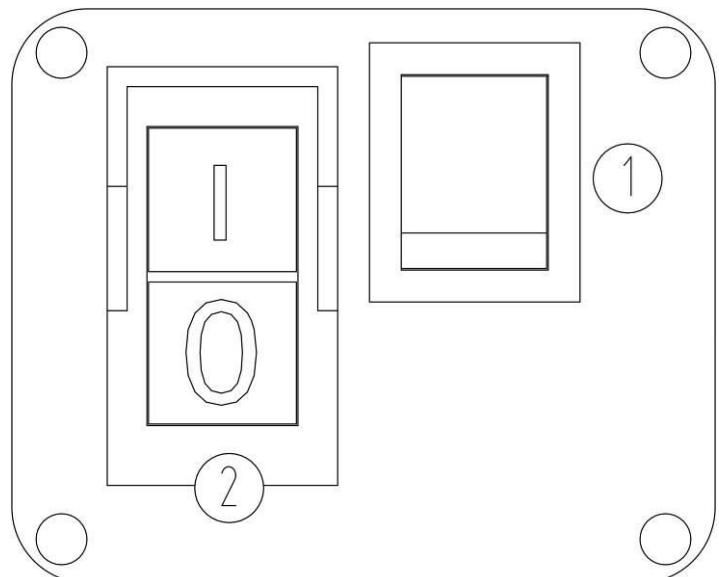


WARNING: To reduce the risk of serious personal injury, turn tool off and disconnect tool from power source before making any adjustments or removing/installing attachments or accessories.

### 4.1 Control panel

The control panel is designed for maximum operating facility and safety.

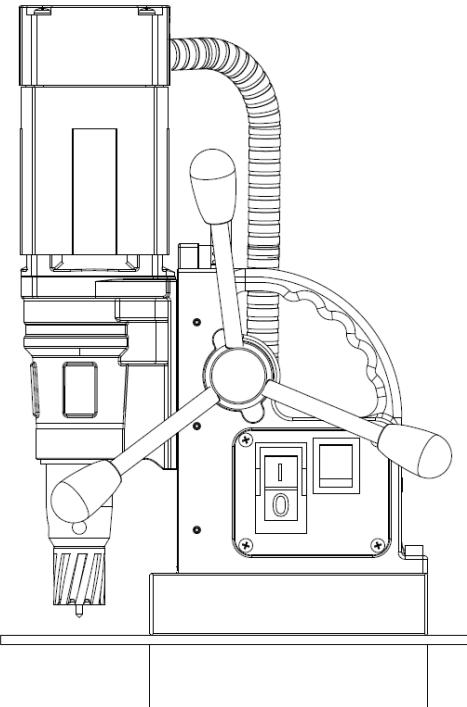
1. Magnet switch
2. Motor switch



## 4.2 Electromagnet

Make sure the magnetic drilling machine is placed on a smooth, clean, level and solid surface without any objects or debris in between to guarantee maximum adhesion.

The workpiece must be at least 6 mm (1/4") thick for the magnet to stick, but minimal 3 mm (1/8") thick to hold the weight of the machine and to drill safely. In case the workpiece is between 3 mm (1/8") and 6 mm (1/4"), make sure to make a proper base to create a good magnetic field as shown below.



[image 4-2]

The electromagnet will work best on surfaces of at least 10 mm (3/8") thickness.

The electromagnet may not be able to create a good enough magnetic field. Causes may be:

- Surface not flat
- Workpiece not magnetisable (e.g. aluminium or stainless steel)
- Workpiece coated or painted
- Workpiece not thick enough

Make sure to solve any of these matters before proceeding in any way and creating unsafe situations.

1. Connect the machine to the mains/work piece;
2. To activate the magnet, press the red magnet switch. It will be lit;
3. To deactivate the magnet, press the same switch again.

It is not a certainty that the magnet will not release from the material. We accept no liability in case the magnet does not function or functions poorly.

Make sure that the magnet attaches tightly to the work piece before turning on the motor unit of the magnetic drilling machine. Our magnets have 2 coils; make sure that both coils are in contact with the material. Do not connect any other machines to the electrical outlet the magnetic drilling machine is plugged into, as it may result in the loss of magnetic force.

Always use the safety chain included. Drilling above your head is extremely dangerous and is not recommended. For the use of magnetic drilling machines on pipes, not-flat or non-magnetic materials, you may refer to vacuum tightening systems, pipe clamping systems and machines with permanent magnets for steel tubes.

### 4.3 Switching motor on and off

The motor unit can only be switched ON when the magnet is activated. To switch the motor ON, press the green button with marking “I”. To switch the motor OFF, press the red button with marking “O”.

### 4.4 Tool lubrication

#### HORIZONTAL APPLICATIONS

In order to use the lubrication system, the tank must be filled with a cutting fluid or oil

1. Make sure the flow regulator is closed;
2. Unscrew the cap;
3. Fill the container with cutting fluid or oil;
4. Screw the cap back on.

- Adjust the fluid flow as required using the flow regulator;
- Add more cutting fluid if the shavings (metal chips) become blue.

#### VERTICAL APPLICATIONS

Dip the cutter in cutting paste or apply an appropriate spray.



WARNING: Do not use the lubrication system in vertical drilling applications. Instead use cutting paste or spray

Make sure to use only suitable cutting oil or fluid. Proper lubrication will help you create better and faster results, and extend the lifetime of your tools.

# 5. Working with operation tools

## 5.1 Annular cutters

Annular cutters only cut material at the periphery of the hole, rather than converting the entire hole to shavings. As a result, the energy required to make a hole is lower than for a twist drill. When drilling with an annular cutter, it is not necessary to drill a pilot hole.



**WARNING:** Do not touch the cutter or the parts close to the cutter immediately after operation, as they may be extremely hot and cause burns to the skin. Ensure nobody is in the work area where the metal core is ejected.

### DRILLING CONDITIONS

The ease with which material can be drilled depends 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.

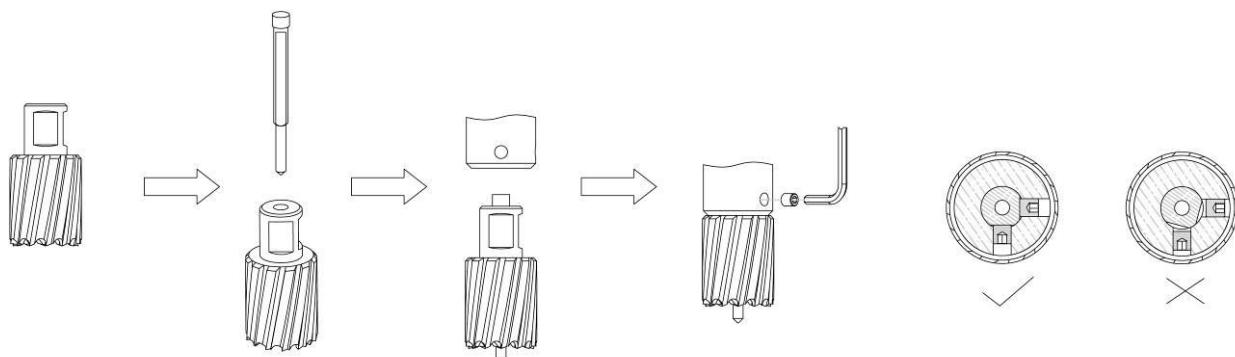
The drilling conditions are dependent on requirements for tool life and surface finish. These conditions are further restricted by the rigidity of the tool and the work piece, lubrication and machine power available. The harder the material, the lower the cutting speed.

Some materials of low hardness contain abrasive substances 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.

### DRILLING A HOLE

Now that you have read the explanatory information and safety recommendations above, you are ready to actually start drilling. Follow these 12 steps for best drilling result:

1. Install the annular cutter
  - Place the pilot pin into the cutter;
  - Align the flat faces on the cutter shank with the screws in the tool holder;
  - Make sure the cutter shank is entered fully and correctly ;
  - Tighten the screws



[image 5-1]

2. Precisely mark the centre of the hole;
3. Use the pilot pin to position the machine and in the correct position, with the tip of the pilot pin to meet the marked center of the hole;

4. Switch on the magnet and verify that the drill is in the right position and that the machine is pushed tight against the work piece;
5. If your machine is equipped with a lubrication system, put open the valve to release the oil. If your machine does not have such a system, fill the holes of the spindle with oil;
6. Switch the motor on at and allow it to run at the required speed;
7. Turn the arms to start drilling. Apply only a slight pressure when the annular cutter touch the metal. Do not push the annular cutter with force into the metal;
8. Apply a regular pressure while drilling. The drilling performance does not improve by putting more pressure on the tool. Too much pressure will overload the motor and your annular cutter will be worn sooner.

A continuous, non-discoloured iron swarf is a sign of correct drilling speed and a well-cooled, sharp cutter. Let the cutter do the job and give it time to cut the metal!!!

9. Adjust the oil supply when necessary, if your drill does not have a lubrication system, stop drilling regularly, refill the holes of the spindle and continue drilling;
10. Apply less pressure when the drill cuts through the material. The slug will be pushed out of the cutter by the pilot pin;
11. Turn the arms to put the motor in highest position and switch off the motor unit;
12. Remove the burrs, metal chips and clean the cutter and surface without getting injuries.

Caution: The slug can be sharp and very hot!!

## 5.2 Twist drills

Use twist drills with 19.05 mm (3/4") Weldon shank. Align the flat faces on the cutter shank with the screws in the spindle. Make sure the shank is entered fully and correctly. Fasten the screws with the provided Allen key.

## 5.3 Step drills and countersinks

Use step drills for reaming or countersink drills for countersinking with 19.05 mm (3/4") Weldon shank and follow the steps mentioned in the previous paragraphs.

## 6. Maintenance

Your power tool has been designed to operate over a long period of time with a minimum of maintenance. Continuous satisfactory operation depends upon proper tool care and regular cleaning.



**CAUTION:** To reduce the risk of injury, turn unit off and disconnect machine from power source before installing and removing accessories, before adjusting or changing set- ups or when making repairs. Be sure the switch is in the OFF position. An accidental start-up can cause injury.

Just as every magnetic drilling machine with moving parts, your magnetic drilling machine also needs regular maintenance service. A few recommendations follow :

### 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.

### CLEANING

- Clean all dirt, dust, metal chips and burrs of your magnetic drilling machine;
- Blow dirt and dust out of the main housing with dry air as often as dirt is seen collecting in and around the air vents. Wear approved eye protection and an approved dust mask;
- Never use solvents or other harsh chemicals for cleaning the non-metallic parts of the tool. These chemicals may weaken the materials used in these parts. Use a cloth dampened only with water and mild soap. Never let any liquid get inside the tool; never immerse any part of the tool into a liquid.

### OPERATION OF THE MACHINE

The machines operation must be checked to ensure that all components are working correctly. Replace any defective parts immediately. This prevents properly function parts from being damaged.

### CHECK 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. When the machine us put out of use for a longer period, apply a small amount of machine oil to the underside of the magnetic base for rust protection. Clean the magnetic base again with next use.

### CHECK MACHINE 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.

### CARBON BRUSHES

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 carbon brush has worn more than 2/3 the original length both brushes should be replaced simultaneously. Failure to do so may cause damage to the machine.

## CHECK ARMATURE

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.

## ADJUSTMENT OF SLIDE

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 aluminum rails and apply a small amount of light machine oil to the wear surfaces;
2. Gently feed in setting screw with supplied Allen key 2.5 until slight resistance is encountered. Follow your way down adjusting all setting nuts and screws;
3. 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.

## LUBRICATING THE FEED TRAVEL

The feed travel should be lubricated periodically with grease to ensure smooth operation.

- Raise the motor unit to the highest position possible;
- Lubricate the dove-tail guide way at both sides;
- Lubricate the gear rack.

After repeated use, the gear rack may become loose. If necessary, adjust the self-locking set screws at the left side. Tighten screws in series until the gear rack moves freely in the dove-tail guide but does not allow the motor to wobble.

## REPAIR, MODIFICATION AND INSPECTION

Repair, modification and inspection of magnetic drilling machines must be done by the manufacturer or an authorised dealer. The spare parts list will be helpful if presented with the machine to the dealer for service when requesting repair or other maintenance.

Our machines are constantly being improved and modified to incorporate the latest technological advancements. Accordingly, some parts (i.e. part numbers and/or design) may be changed without prior notice. Also, due to our continuing program of research and development, the specifications of machines are subject to change without prior notice.



**WARNING:** If accessories have not been tested with this product, use of such accessories with this tool could be hazardous. To reduce the risk of injury, only recommended accessories should be used with this product.

Consult your dealer for further information on the appropriate accessories.

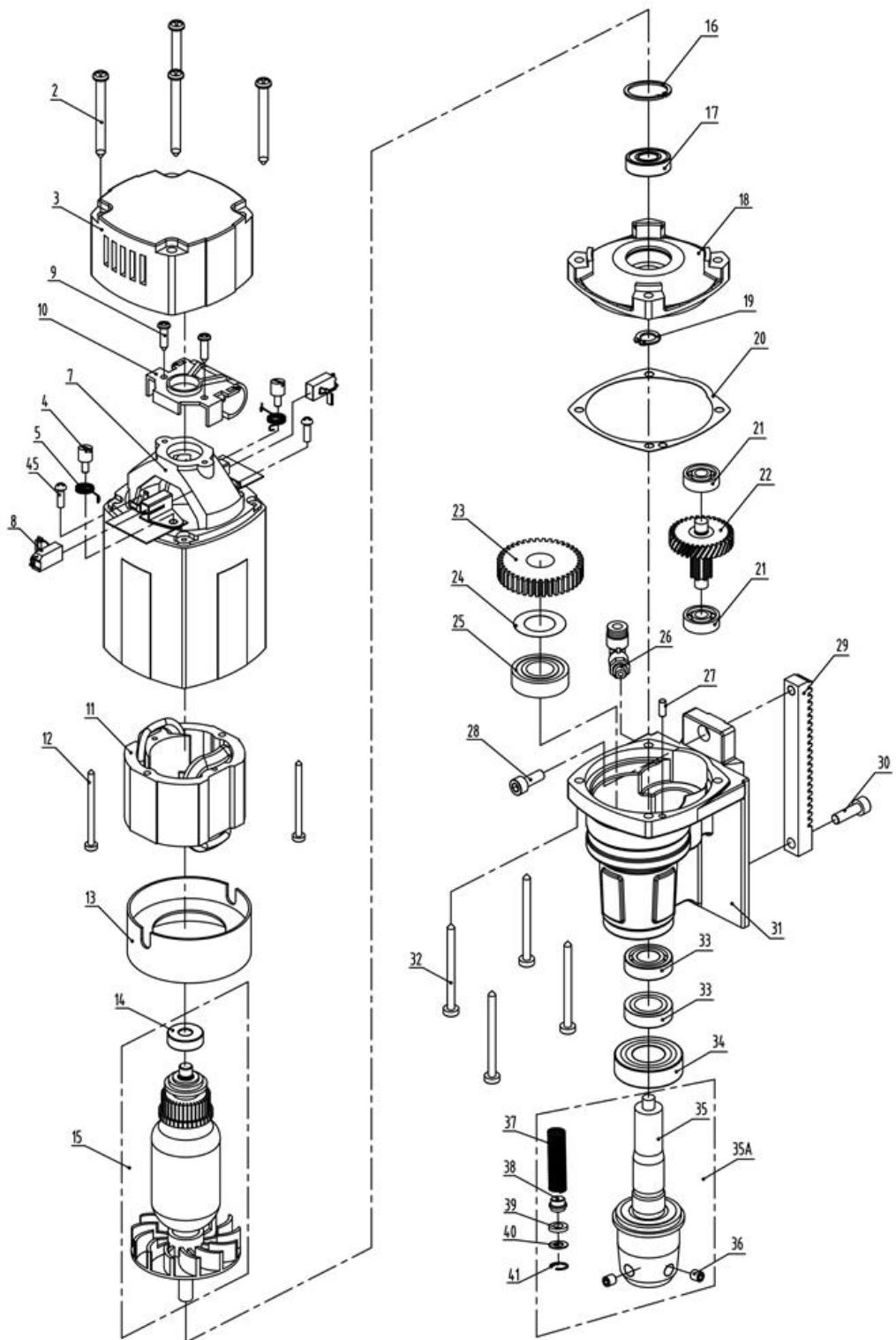
## 7. Trouble shooting

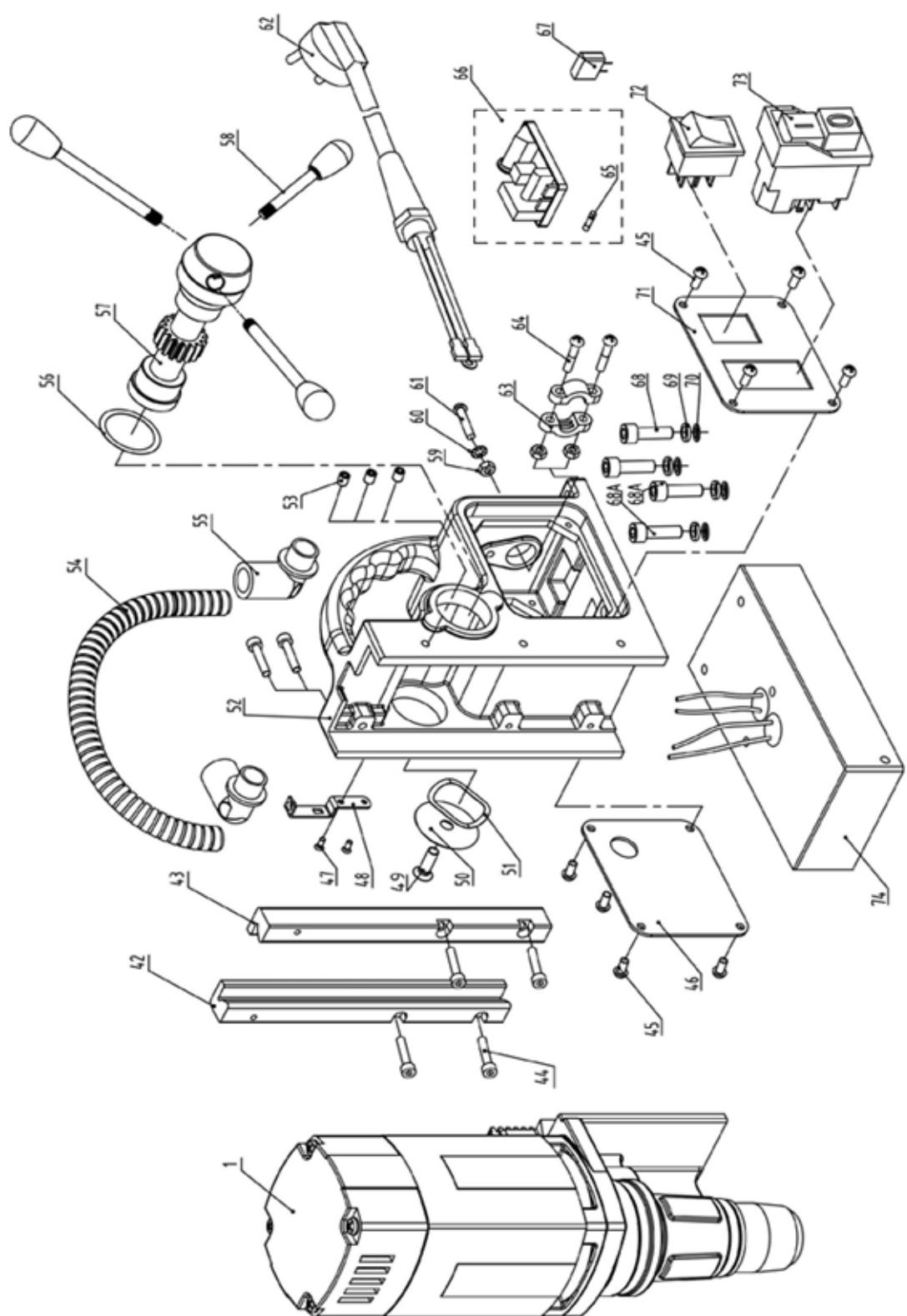
Magnet and motor do not function	<ul style="list-style-type: none"> <li>- The magnet switch is not connected to the power supply</li> <li>- Damaged or defective wiring</li> <li>- Defective fuse</li> <li>- Defective magnet switch</li> <li>- Defective control unit</li> <li>- Defective power supply</li> </ul>
Magnet does function, the motor does not work	<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> </ul>
Magnet does not function, the motor does	<ul style="list-style-type: none"> <li>- Defective magnet</li> <li>- Defective wiring of magnet</li> <li>- Defective control unit</li> </ul>
Annular cutters break quickly, holes are bigger than the hole cutter	<ul style="list-style-type: none"> <li>- Clearance in the guide</li> <li>- Bent spindle</li> <li>- Shaft extending from the motor is bent</li> <li>- Bent pilot pin</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 starts running when magnet switch is turned on	<ul style="list-style-type: none"> <li>- Damage or defective relay in control unit</li> </ul>
Motor making a rattling sound	<ul style="list-style-type: none"> <li>- Gear ring (bottom of the armature) worn out</li> <li>- Gear(s) worn out</li> <li>- No grease in gearbox</li> </ul>
Motor humming, big sparks and motor has no force	<ul style="list-style-type: none"> <li>- Armature damaged (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 speed control unit</li> <li>- Defective or loose magnet on top of armature</li> <li>- Damaged or defective (sensor) speed control unit</li> <li>- Damage to armature or field coil</li> <li>- Damaged or defective carbon 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, needs to be greased</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 clean or flat</li> <li>- Work piece is less than 10 mm (too thin)</li> <li>- Defective control unit</li> <li>- Defective magnet</li> </ul>

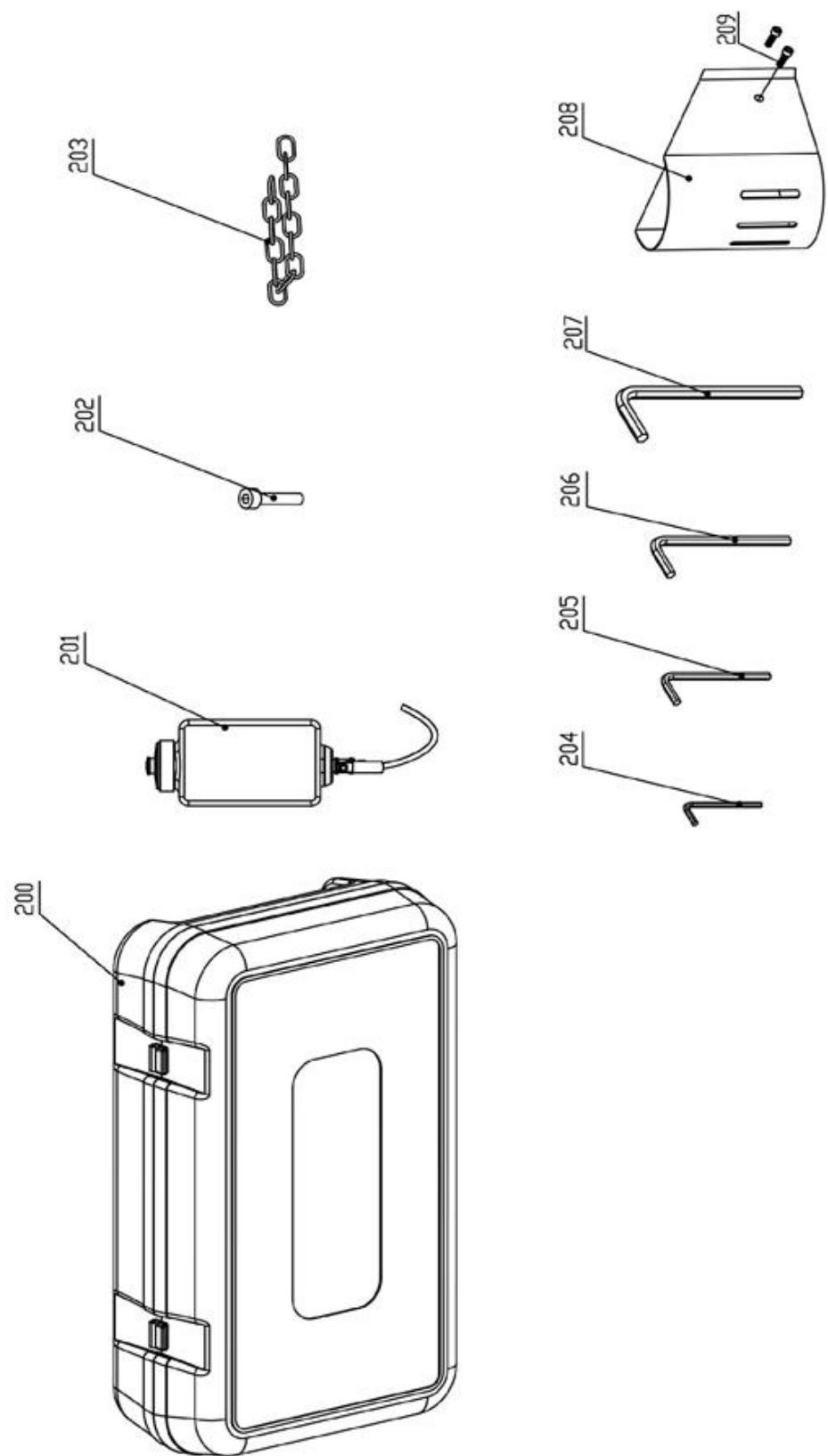
Frame under voltage	<ul style="list-style-type: none"> <li>- Damaged / defective wiring</li> <li>- Defective magnet</li> <li>- Motor seriously dirty</li> </ul>
Fuse blows when magnet switch is turned on	<ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Wrong value fuse</li> <li>- Defective magnet switch</li> <li>- Defective control unit</li> <li>- Defective magnet</li> </ul>
Fuse blows when motor is started	<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>

## 8. Exploded views & spare parts list

### 8.1 Exploded views







## 8.2 Spare parts list

No.	Part no.	Description	Qty
1	035.1001	Motor unit 220V	1
	035.1001A	Motor unit 110V	
2	036.0043	Torx screw M4.8 x 55	4
3	032.0111	End Cover	1
4	032.0136	Screw for spring	2
5	032.0141	Spring	2
7	032.0241	Housing incl. carbon brush holder	1
8	032.0146-1	Carbon brush 220V	2
	032.0146A-1	Carbon brush 110V	
9	032.0116	Screw M4 x 16	2
10	032.0131-1	Adapter ring cap	1
11	032.0151-02	Field 220V	1
	032.0152-1	Field 110V	
12	032.0156	Screw BK 4 x 55	2
13	032.0161	Baffle	1
14	032.0126	Bearing 608ZZ 8 x 22 x 7	1
15A	032.1017-1	Armature 220V	1
	032.1018-1	Armature 110V	
16	100.0571	Circlip 471 11 x 1	1
17	032.0171	Bearing 6001ZZ 12 x 28 x 8	1
18	032.0236HX	Inner gear plate Rotabroach Hawk	1
19	032.0166	Circlip 472/28/1.2	1
20	032.0237	Gasket small	1
21	032.0221	Bearing 608 8 x 22 x 7	2
22	032.1014E	Gear set	1
23	032.0186E	Spindle gear	1
24	032.0237	Gasket small	1
25	032.0196	Bearing 6003 17 x 35 x 10	1
26	KSP.S	Coolant connector Quick (blue ring)	1
27	050.0025	Pin 4 x 10	1
28	030.0012	Screw motorhousing	1
29	030E.5029	Rack	1
30	020.0156	Bolt M6 x 20	1
31	030.0008HX	Gear box 110 - 220 Volt	1
32	032.0216	Screw BK 5 x 40	4
33	030E.5033	Seal	2
34	030E.5034	Bearing nsk 6004 ddu	1
35A	030E.5035	Spindle inc. spring set	1
36	020.0136	Grub screw M8 x 8	2

No.	Part no.	Description	Qty
37	030E.5037	Spring set	1
38			
39			
40			
41			
42	030E.5042	Guide rail Aluminium left ECO.30	1
43	030E.5043	Guide rail Aluminium right ECO.30	1
44	020.0086/S	Rail screw for Mark II frame SS M4 x 20	6
45	020.0101	Panel screw BKVZ M4 x 8	10
46	035.0005	Rear panel 220V	1
	035.0005A	Rear panel 110V	
47	020.0063	Screw M5 x 20	2
48	KSP.M/4	Tank holder ECO.30(S) (frame side)	1
49	020.0081	End screw BKVZ M6 x 16	1
50	020.0077	Ender cover	1
51	030E.5051	Spring washer	1
52	035.1002	Frame SMART.35	1
53	020.0231	Screw M5 x 6	3
54	360.1040	Motor cable cover	1
55	030E.5055	Coupling nut angle	2
56	030.0027	Washer	1
57	020.0061/X	Capstan hub assembly	1
58	030.1003	Arm for capstan	3
59	020.0182	Grounding screw/washer/nut	1
60			
61			
62	020.0036	Main cable 220V EU	1
	020.0036/AU	Main cable 220V AU	
	020.0036/UK	Main cable 220V UK	
	020.0036/UK 110-16A	Main cable 110V UK 16A	
	020.0036/USA	Main cable 110V USA	
63	020.0037	Coupling nut PG11 (main cable)	1
64			
65			
66	020.0001/3	Control unit 220V with PCB box	1
	020.0001/31	Control unit 110V with PCB box	

No.	Part no.	Description	Qty
67	020.0257	Capacitance	1
68	020.0146	Screw M6 x 25	2
68A	020.0156	Bolt M6 x 20	2
69	020.0111	Washer M6 DIN7980	4
70	020.0112	Washer M6	4
71	035.0004	Front panel SMART.35	1
72	020.0011-1	Magnet switch	1
73	030E.0091/Y	Motor switch 220V (5-pin) YELLOW	1
	030E.0092/Y	Motor switch 110V (5-pin) YELLOW	
74	030.1005E	Magnet 220V	1
	030.1005AE	Magnet 110V	

No.	Part no.	Description	Qty
200	CAS.100/7	Case SMART.35	1
201	KSP.Q2	Coolant tank Quick Connect 2015	1
202	020.0223	Screw M5 x 10	1
203	SAF.400	Safety chain (1 mtr) with lock	1
204	IMB.US2.5	Allen key 2.5 mm	1
205	IMB.US3	Allen key 3.0 mm	1
206	IMB.US4	Allen key 4.0 mm	1
207	IMB.US5	Allen key 5.0 mm	1
208	SAF.MDMS	Safety guard small	1
209	020.0511	Bolt M5 x 10	2

### 8.3 Wiring diagram

