

# Powerbor®

## ***LOWPROFILE 50***

**Magnetic drilling machine**

**Model Number  
PB50 LOW PROFILE 1**

This machine (Serial Number ..... ) is CSA approved.



## Powerbor®

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| Part    | Description          | Quantity |
|---------|----------------------|----------|
| RDF4030 | 4mm Hexagonal Wrench | 2        |
| RDF4031 | Coolant Bottle       | 1        |
| RDF4032 | Ratchet Handle       | 1        |
| RD4329B | Safety Strap         | 1        |
| RDF4033 | Safety Goggles       | 1        |
| RDF3005 | Carbon Brush Set     | 1        |

## 1) INTENDED USE

The intended use of this magnetic drill is to drill holes in ferrous metals. The magnet is used to hold the drill in place whilst the drill is functioning. It is designed for use in fabrication, construction, railways, petrochemical and any other applications when drilling ferrous metal.

Any deviation from its intended use will not be covered by warranty.

## 2) GENERAL SAFETY RULES

**WARNING!** Read and understand all instructions. Failure to follow all instructions listed below, may result in electric shock, fire and/or serious personal injury.

**SAVE THESE INSTRUCTIONS.**

### Work area

1. **Keep your work area clean and well lit.** Cluttered benches and dark areas invite accidents.
2. **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.** Power tools create sparks which may ignite the dust or fumes.
3. **Keep bystanders, children and visitors away while operating a power tool.** Distractions can cause you to lose control

### Electrical safety

1. **Grounded tools must be plugged into an outlet properly installed and grounded in accordance with all codes and ordinances. Never remove the grounding prong or modify the plug in any way. Do not use any adaptor plugs. Check with a qualified electrician if you are in doubt as to whether the outlet is properly grounded.** If the tool should electrically malfunction or break down, grounding provides a low resistance path to carry electricity away from the user.
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. **Don't expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.
4. **Do not abuse the cord. Never use the cord to carry the tools or pull the plug from an outlet. Keep 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 power tool outside, use an outdoor extension cord marked "W-A" or "W".** These cords are rated for outdoor use and reduce the risk of electric shock.

### Personal safety

1. **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use tool while tired or under the influence of drugs, alcohol, or medication.** A moment of inattention while operating power tools may result in serious personal injury.
2. **Dress properly. Do not wear loose clothing or jewelry. Contain long hair. 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 switch is off before plugging in.** Carrying tools with your finger on the switch or plugging in tools that have the switch on invites accidents.
4. **Remove adjusting keys or switches before turning the tool on.** A wrench or a key that is left attached to a rotating part of the tool may result in personal injury.
5. **Do not overreach. Keep proper footing and balance at all times.** Proper footing and balance enable better control of the tool in unexpected situations.
6. **Use safety equipment. Always wear eye protection.** Dust mask, non-skid safety shoes, hardhat, or hearing protection must be used for appropriate conditions.

### Tool use and care

1. **Use clamps or other practical way to secure and support the workpiece to a stable platform.** Holding the work by

hand or against your body is unstable and may lead to loss of control.

**2. Do not force tool. Use the correct tool for your application.** The correct tool will do the job better and safer at the rate for which it is designed.

**3. Do not use tool if switch does not turn it on or off.** Any tool that cannot be controlled with the switch is dangerous and must be repaired.

**4. 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.

**5. Store idle tools out of reach of children and other untrained persons.** Tools are dangerous in the hands of untrained users.

**6. Maintain tools with care. Keep cutting tools sharp and clean.** Properly maintained tools, with sharp cutting edges are less likely to bind and are easier to control.

**7. Check for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using.** Many accidents are caused by poorly maintained tools.

**8. Use only accessories that are recommended by the manufacturer for your model.** Accessories that may be suitable for one tool, may become hazardous when used on another tool.

#### Service

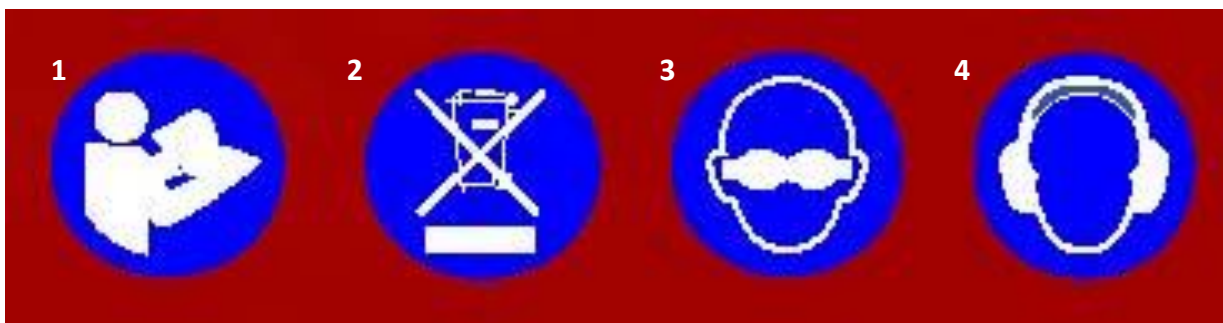
**1. Tool service must be performed only by qualified repair personnel.** Service or maintenance performed by unqualified personnel could result in a risk of injury.

**2. When servicing a tool, use only identical replacement parts. Follow instructions in the Maintenance section of this manual.** Use of unauthorized parts or failure to follow Maintenance Instructions may create a risk of electric shock or injury.

#### WARNING!

**Always use safety chain.** Mounting can release.

### 3) INFORMATION PLATE SYMBOLS



1. Refer to the user manual for operational and safety issues with regard to this machine.
2. Dispose of the machine and electrical components correctly.
3. Eye protection must be worn when operating the machine.
4. Ear defenders must be worn when operating the machine.

## 4) SPECIFICATION

Maximum hole cutting capacity in .2/.3C steel = 2" dia. x 2" deep

Arbor bore = 3/4" dia.

| <b>Motor Unit</b>   |                              |                          |
|---|------------------------------|--------------------------|
| Voltages  | 120V 50-60Hz                 | 230V 50-60Hz             |
| Normal full load  | 10 A                         | 6 A                      |
| <b>Electro Magnet</b>   | 0.53 A                       | 0.28 A                   |
| Size  | 7 -9/16" long<br>3-1/8" wide |                          |
| Holding Force at 20°C with 25mm minimum plate thickness<br><b>The use on any material less than 25mm thick will progressively reduce the magnetic performance. If possible, substitute material should be positioned under the magnet and work piece to equate to a suitable material thickness. If this is not possible, an alternative secure method of restraining the machine MUST be used.</b> | 2250 lbs                     |                          |
| <b>Overall Dimensions</b>   |                              |                          |
| Height - minimum  | 7 – 1/16"                    |                          |
| Width (including Capstan fitting)   | 3 – 15/16"                   |                          |
| Length Overall (including Guard)  | 13 – 1/8"                    |                          |
| <b>Nett Weight</b>  | 24 lbs                       |                          |
|   | PB50 LOW PROFILE<br>1        | PB50 LOW PROFILE<br>3    |
| Vibration total values (triax vector sum) in accordance with EN62841-1:   | Vibration emission value     | Vibration emission value |
| Level of sound pressure in accordance with EN62841-1:   |                              |                          |

Ear and eye defenders must be worn when operating this machine. Wear gloves to protect hands when operating the machine.

These tools are UK designed and manufactured with globally sourced components and conform to the requirements of EEC Document HD.400.1 and BS.2769/84

**Suitable only for a single phase 50-60Hz A.C. power supply**

**DO NOT USE ON D.C. SUPPLY**

**Do not use your magnetic drill on the same structure when arc welding is in progress.  
D.C. current will earth back through the magnet and cause irreparable damage.**

**WARNING: THIS APPLIANCE MUST BE EARTHED!**

**NB: ANY MODIFICATIONS TO THIS MACHINE WILL INVALIDATE THE GUARANTEE**

## 5) OPERATIONAL SAFETY PROCEDURES

### READ BEFORE USING THE MACHINE

- When using electrical tools, basic safety precautions should always be followed to reduce the risk of electric shock, fire, and personal injury.
- Ensure the magnet is OFF before plugging in the machine.
- Do NOT use in wet or damp conditions. Failure to do so may result in personal injury.
- Do NOT use in the presence of flammable liquids, gases or in high risk environments. Failure to do so may result in personal injury.
- BEFORE activating the machine, inspect all electrical supply cables (including extension leads), and replace if damaged. DO NOT use if there are any signs of damage.
- Only use extension cables approved for site conditions.
- BEFORE activating the machine, ALWAYS check the correct function of all operational systems, switches, magnet etc.
- BEFORE operating, the machine MUST be securely restrained to a fixed independent feature (by using safety strap RD4329B, or other means) to reduce the potential free movement, should the magnet become detached from the work piece. Failure to do so may result in personal injury.
- ALWAYS wear approved eye protectors, ear defenders and recommended PPE at ALL times when operating the machine.
- Disconnect from power source when changing cutters or working on the machine.
- Cutters and swarf are sharp, ALWAYS ensure that hands are adequately protected when changing cutters or removing swarf. Use a tool or brush where necessary to remove any swarf or the cutter from the arbor.
- Before operating the machine, ALWAYS ensure cutter-retaining screws are secured tightly.
- Regularly clear the work area and machine of swarf and dirt, paying particular attention to the underside of the magnet base.
- ALWAYS remove tie, rings, watches and any loose adornments that might entangle with the rotating machinery before operating.
- ALWAYS ensure that long hair is securely enclosed by an approved restraint before operating the machine.
- Should the cutter become stuck in the work piece, stop the motor immediately to prevent personal injury. Disconnect from power source and turn arbor to and fro. DO NOT ATTEMPT TO FREE THE CUTTER BY SWITCHING THE MOTOR ON AND OFF. Wear safety gloves to remove the cutter from the arbor.
- If the machine is accidentally dropped, ALWAYS thoroughly examine the machine for signs of damage and check that it functions correctly BEFORE resuming drilling.
- Regularly inspect the machine and check for any damaged or loose parts.
- ALWAYS ensure when using the machine in an inverted position that only the minimum amount of coolant is used, and that care is taken to ensure that coolant does not enter the motor unit.
- Cutting tools may shatter, ALWAYS position the guard over the cutter before activating the machine. Failure to do so may result in personal injury.
- On completion of the cut, a slug will be ejected. DO NOT operate the machine as the ejected slug may cause injury.
- When not in use ALWAYS store the machine in a safe and secure location.
- ALWAYS ensure that approved POWERBOR™ agents conduct repairs.

## 6) OPERATING INSTRUCTIONS

- Keep the inside of the cutter clear of swarf. It restricts the operating depth of the cutter.
- Ensure that the coolant bottle contains sufficient cutting oil to complete the required operating duration. Refill as required.
- Occasionally depress the pilot to ensure cutting fluid is being correctly metered.
- To start the machine, follow the control panel operation instructions.
- ALWAYS switch off the motor by depressing the MOTOR stop button. DO NOT switch off the motor by depressing the MAGNET switch.
- Apply light pressure when commencing the cut of a hole until the cutter is introduced into the work surface. Pressure can then be increased sufficiently to load the motor. Excessive pressure is undesirable, it does not increase the speed of penetration and will cause the safety overload protection device to stop the motor, (the motor can be restarted by operating the motor start button), and may cause excessive heat which may result in inconsistent slug ejection
- Always ensure that the slug has been ejected from the previous hole before commencing to cut the next.
- If the slug sticks in the cutter, move the machine to a flat surface, switch on the magnet and gently bring the cutter down to make contact with the surface. This will usually straighten a cocked slug and allow it to eject normally.
- Apply a small amount of light oil lubricant regularly to the slide and arbor support bearing.
- Cutter breakage is usually caused by insecure anchorage, a loosely fitting slide or a worn bearing in the arbor support. (Refer to routine maintenance instructions).
- Only use approved cutting fluid.

## 7) EXTENSION CABLE SELECTION

The machines are factory fitted with a 2yard length of cable having three conductors 2.08mm<sup>2</sup> LIVE, NEUTRAL and EARTH. If it becomes necessary to fit an extension cable from the power source, care must be taken in using a cable of adequate capacity. Failure to do so will result in a loss of traction by the magnet and a reduction of power from the motor.

If the replacement of the supply cord is necessary, this has to be done by the manufacturer or an approved agent in order to avoid a safety hazard.

Assuming a normal AC supply of the correct voltage, it is recommended that the following extension lengths shall not be exceeded:

**For 120v supply: 3.5metres of 3 core x 2.08mm<sup>2</sup>(14AWG)**

**For 230v supply: 26 yards of 3 core x 1.5mm<sup>2</sup>**

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

## 8) MOUNTING OF CUTTERS

- The machine has been made to accept cutters having 3/4" dia. Weldon shanks.

The following procedure is to be used when mounting cutters:

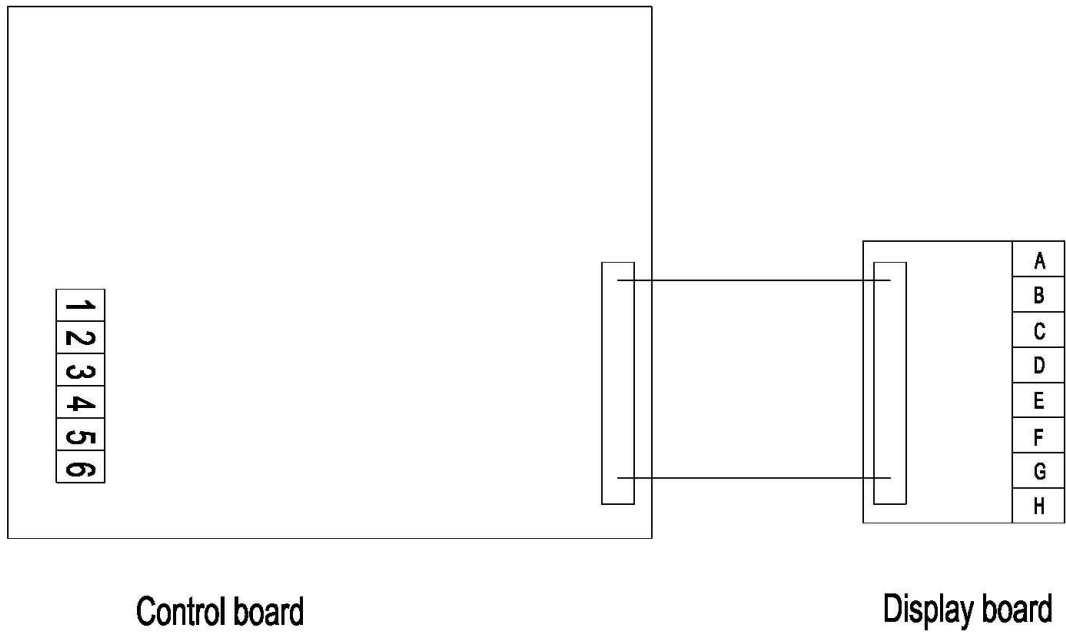
- Lay the machine on its side with feed handles uppermost, ensuring arbor is wound down to its lowest point to enable access to socket screws.
- Take appropriate pilot and place through the hole in cutter shank. Insert shank of cutter into bore of arbor, ensuring alignment of two drive flats with socket screws.
- Tighten both screws using hexagon key.

## 9) REMEDIES FOR HOLE MAKING PROBLEMS

| <i>Problem</i>  | <i>Cause</i>   | <i>Remedy</i>  |
|---|--|--|
| 1) Magnetic base won't hold effectively                       | Material being cut may be too thin for efficient holding.<br><br>Swarf or dirt under magnet.<br><br>Irregularity on magnet contact or work-piece.<br><br>Insufficient current going to magnet during drilling cycles.  | Attach an additional piece of metal under the magnet, or mechanically clamp magnetic base to work-piece.<br><br>Clean magnet.<br><br>Use extreme care; file any imperfections flush to surface.<br><br>Confirm power supply and output from control unit, check supply cable.  |
| 2) Cutter skips out of centre-punch mark at initiation of cut | Magnetic base is not holding effectively.<br><br>Worn arbor bushing and/or ejector collar.<br><br>Too much feed pressure at start of cut.<br><br>Cutter is dull, worn, chipped or incorrectly sharpened.<br><br>Poor centre-punch mark; weak pilot spring; pilot not centred in centre-punch mark.<br><br>Worn or bent pilot, worn pilot hole. | See causes and remedies above.<br><br>New arbor bushing is needed.<br><br>Light pressure only is needed until a groove is cut. The groove then serves as a stabilizer.<br><br>Replace or re-sharpen. Sharpening service is available.<br><br>Improve centre-punch and/or replace worn parts<br><br>Replace part or parts   |
| 3) Excessive drilling pressure required                       | Incorrectly re-sharpened, worn or chipped cutter.<br><br>Coming down on swarf lying on surface of work-piece.<br><br>Swarf accumulated (packed) inside cutter.   | Re-sharpen or replace.<br><br>Take care not to start a cut on swarf.<br><br>Clear cutter.  |
| 4) Excessive cutter breakage                                  | Steel swarf or dirt under cutter.<br><br>Incorrectly re-sharpened or worn cutter.<br><br>Cutter skipping.<br><br>Cutter not attached tightly to arbor.<br><br>Insufficient use of cutting oil or unsuitable type of oil.<br><br>Incorrect speed  | Remove cutter, clean part thoroughly and replace.<br><br>Always have a new cutter on hand to refer to for correct tooth geometry, together with instruction sheet.<br><br>See causes and remedies (2).<br><br>Retighten.<br><br>Inject oil of light viscosity into the coolant-inducing ring and check that oil is being metered into cutter when pilot is depressed. If not, check pilot groove and arbor internally for dirt or apply oil externally. (Even a small amount of oil is very effective).<br><br>Ensure correct speed is use for the cutter. |
| 5) Excessive cutter wear                                      | See cause and remedy above<br><br>Incorrectly re-sharpened cutter.<br><br>Insufficient or spasmodic cutting pressure.  | Refer to instructions and a new cutter for proper tooth geometry.<br><br>Use sufficient steady pressure to slow the drill down. This will result in optimum cutting speed and chip load.   |



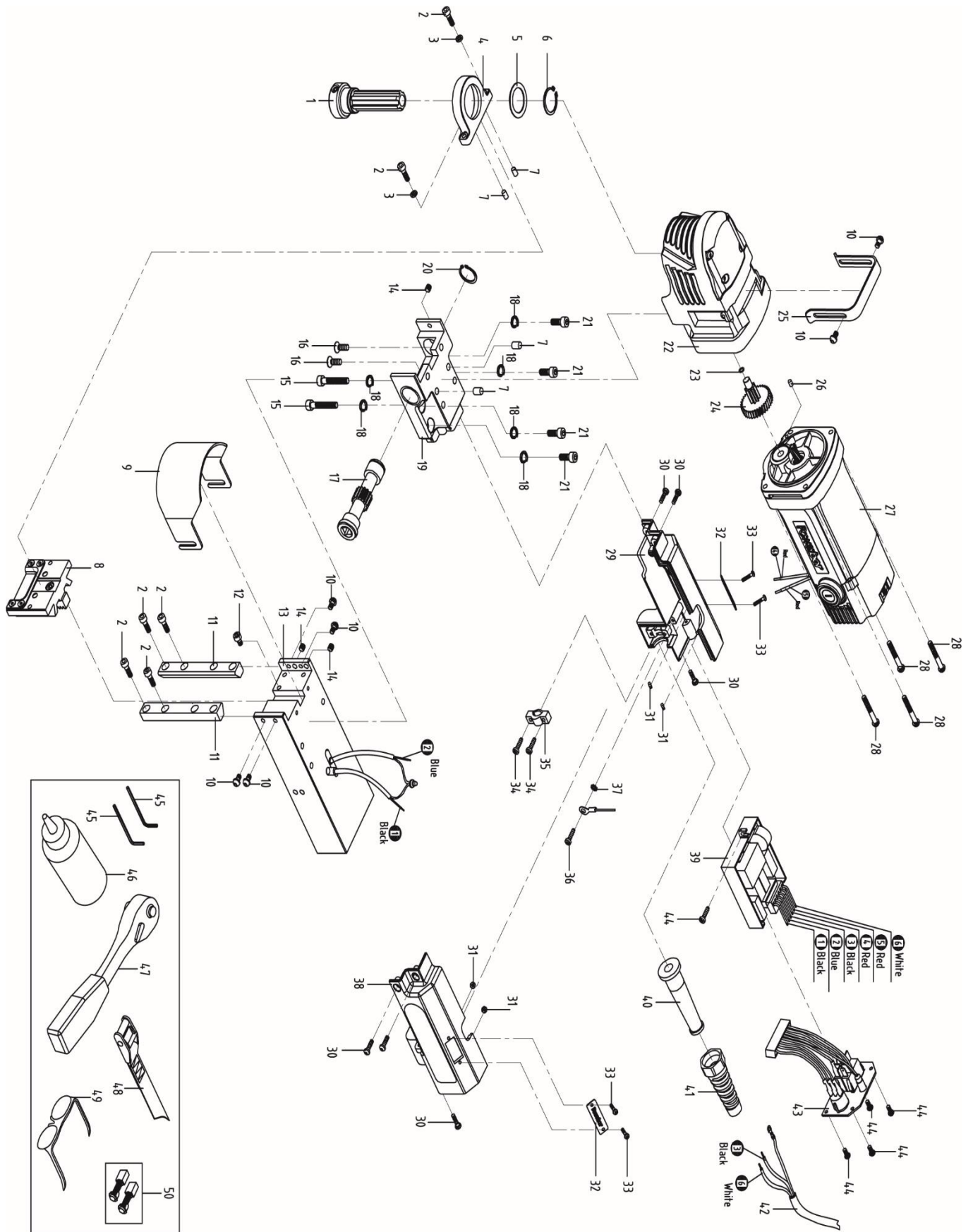
10) WIRING DIAGRAM



| No | Function               | Wire Colour |
|----|------------------------|-------------|
| 1  | Magnet Negative Output | Black       |
| 2  | Magnet Positive Output | Red         |
| 3  | Mains Neutral Input    | White       |
| 4  | Motor Neutral Output   | Red         |
| 5  | Motor Live Output      | Red         |
| 6  | Mains Live Input       | Black       |

| No | Function                 | Wire Colour  |
|----|--------------------------|--------------|
| A  | Magnet Switch +12V       | White        |
| B  | Magnet LED +12V          | White        |
| C  | Magnet Switch And LED 0V | White        |
| D  | Motor Switch 0V          | White        |
| E  | Motor Switch +5V         | White        |
| F  | Current 'ON' LED 0V      | White+ Red   |
| G  | Current 'ON' LED 0V      | White+ Green |
| H  | Current 'ON' LED +5 V    | White+Brown  |

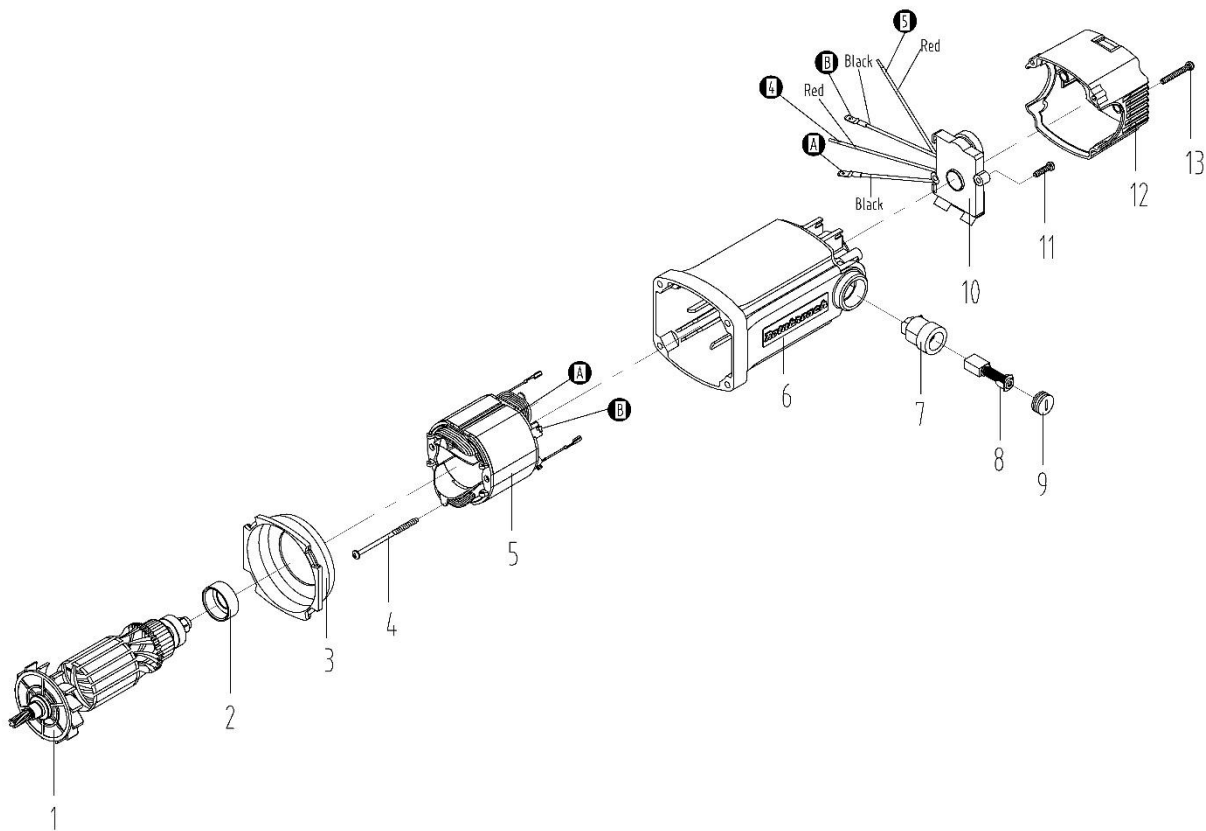
11) EXPLODED VIEW OF MACHINE



| Item# | Powerbor P/N | Description                   | Qty/pcs |
|-------|--------------|-------------------------------|---------|
| 1     | RDF2000      | Spindle assembly              | 1       |
| 2     | RDF4000      | Screw                         | 6       |
| 3     | RDF4001      | Circlip                       | 2       |
| 4     | RDF3000      | Bearing bracket               | 1       |
| 5     | RDF4002      | Gear Shaft Washer             | 1       |
| 6     | RDF4003      | Circlip                       | 1       |
| 7     | RDF4004      | Straight Pin                  | 4       |
| 8     | RDF2001      | Slide assembly                | 1       |
| 9     | RDF3006      | Guard                         | 1       |
| 10    | RDF4005      | Screw                         | 6       |
| 11    | RDF3002      | Guide Bar                     | 2       |
| 12    | RDF4006      | Screw                         | 1       |
| 13    | RDF2002/1    | Magnet assembly 120v          | 1       |
|       | RDF2002/3    | Magnet assembly 230v          | 1       |
| 14    | RDF4007      | Screw                         | 3       |
| 15    | RDF4008      | Screw                         | 2       |
| 16    | RDF4009      | Screw                         | 2       |
| 17    | RDF3003      | Capstan spindle               | 1       |
| 18    | RDF4010      | Circlip                       | 6       |
| 19    | RDF2003      | Connected base assembly       | 1       |
| 20    | RDF4011      | Circlip                       | 1       |
| 21    | RDF4012      | Screw                         | 4       |
| 22    | RDF2012      | Gear Box assembly             | 1       |
| 23    | RDF4013      | Gear Shaft Washer             | 1       |
| 24    | RDF2005      | Shaft gear assembly           | 1       |
| 25    | RDF3004      | Handle                        | 1       |
| 26    | RDF4014      | Straight Pin                  | 1       |
| 27    | RDF2013/1    | Motor assembly 120v           | 1       |
|       | RDF2013/3    | Motor assembly 230v           | 1       |
| 28    | RDF4015      | Screw                         | 4       |
| 29    | RDF2014      | Right cover shell subassembly | 1       |
| 30    | RDF4016      | Screw                         | 6       |

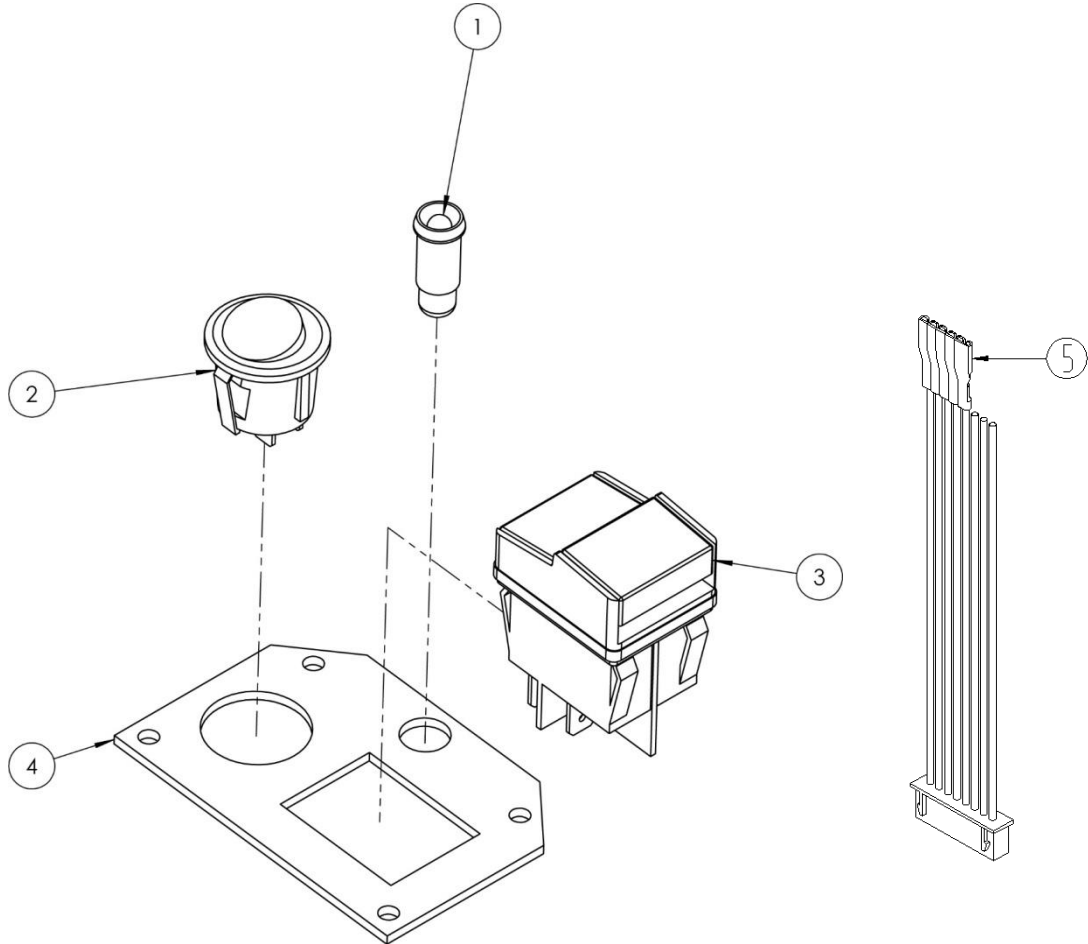
|    |            |                                   |   |
|----|------------|-----------------------------------|---|
| 31 | RDF4017    | Nut                               | 4 |
| 32 | RDF3007    | Indicator light plate             | 2 |
| 33 | RDF4019    | Screw                             | 4 |
| 34 | RDF4020    | Screw                             | 2 |
| 35 | RDF4023    | Cable Clamp                       | 1 |
| 36 | RDF4024    | Screw                             | 1 |
| 37 | RDF4025    | outer sawtooth washer             | 1 |
| 38 | RDF2023    | Left cover shell subassembly 120v | 1 |
|    | RDF2015/3  | Left cover shell subassembly 230v | 1 |
| 39 | RDF2016/2  | PCB panel subassembly 120v        | 1 |
|    | RDF2016/3  | PCB panel subassembly 230v        | 1 |
| 40 | RDF4027    | Cable jacket                      | 1 |
| 41 | RDF4028    | Jacket                            | 1 |
| 42 | RDF2024    | Cable Plug Assembly 120v          | 1 |
|    | RDF2010/3  | Cable Plug Assembly 230v          | 1 |
|    | RDF2010/3P | Cable Plug Assembly 230v BS       | 1 |
| 43 | RDF2018    | Panel subassembly                 | 1 |
| 44 | RDF4029    | Screw                             | 5 |
| 45 | RDF4030    | Hexagon spanner                   | 2 |
| 46 | RDF4031    | Coolant bottle                    | 1 |
| 47 | RDF4032    | Ratchet handle                    | 1 |
| 48 | RD4329     | Safety rope                       | 1 |
| 49 | RDA3105    | Goggles                           | 1 |
| 50 | RDF3005/1  | Spare Brush 120v                  | 1 |
|    | RDF3005/3  | Spare Brush230v                   | 1 |

12) MOTOR BREAKDOWN



| No. | Part      | Description                    | Qty |
|-----|-----------|--------------------------------|-----|
| 1   | RDF2021/1 | Armature Assembly 120v         | 1   |
|     | RDF2021/3 | Armature Assembly 230v         | 1   |
| 2   | RDF3014   | Bearing Sleeve                 | 1   |
| 3   | RDF3009   | Field Coil Baffle              | 1   |
| 4   | RDF4038   | Field Coil Screws              | 2   |
| 5   | RDF2019/1 | Field Coil Assembly 120v       | 1   |
|     | RDF2019/3 | Field Coil Assembly 230v       | 1   |
| 6   | RDF3015   | Motor Frame                    | 1   |
| 7   | RDF3011   | Brush Holder                   | 2   |
| 8   | RDF3005/1 | Carbon Brush Set 120v          | 1   |
|     | RDF3005/3 | Carbon Brush Set 230v          | 1   |
| 9   | RDF3012   | Brush Caps                     | 2   |
| 10  | RDF2020/1 | Speed Controller Assembly 120v | 1   |
|     | RDF2020/3 | Speed Controller Assembly 230v | 1   |
| 11  | RDF4040   | Speed Controller Screws        | 2   |
| 12  | RDF3016   | End Cap                        | 1   |
| 13  | RDF4039   | End Cap Screws                 | 2   |

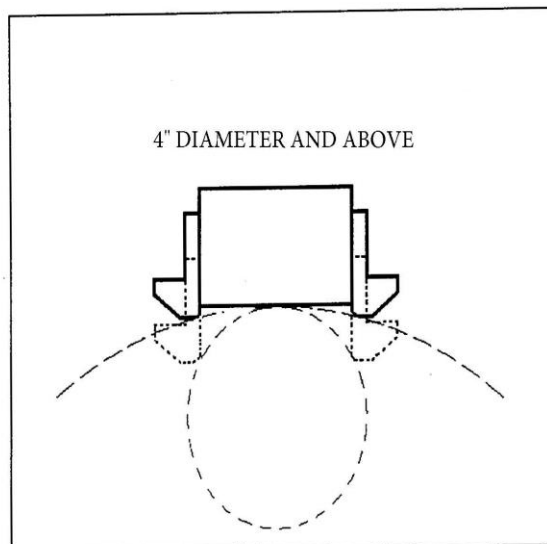
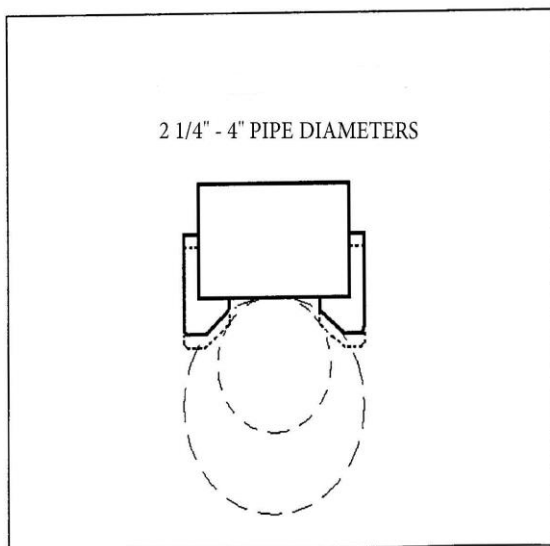
**13)CONTROL PANEL AND PARTS LIST**



|   |         |                 |   |
|---|---------|-----------------|---|
| 1 | RDC4092 | Red/Green LED   | 1 |
| 2 | RDF4036 | Magnet Switch   | 1 |
| 3 | RDF4037 | Motor Switch    | 1 |
| 4 | RDF3008 | Facia Plate     | 1 |
| 5 | RDF3017 | Connection Line | 1 |

**14) PIPE ADAPTOR KIT RD2311****FITTING INSTRUCTIONS**

- Dependent upon the size of the pipe to be cut (see illustrations) attach adjustable angle plates RD3328 with cap screws RD4325 and washers RD4205 (4 off each) to the magnet sides. Do not tighten.
- Locate the machine on the centreline of the pipe taking care that the magnet is in line with the longitudinal axis of the pipe.
- Switch on the magnet and move the sliding plates down to the outside diameter of the pipe. Tighten the screws on both sides by hand then check once again that the full length of the moving plates is touching the pipe at the front and back, fasten the plate securely. Feed the safety strap through the lugs at the front of the housing, around the pipe and pull tight.
- When cutting the hole DO NOT use excessive pressure but rather let the cutter ease into the cutting surface.



## 15) MAINTENANCE

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

A number of items must always be checked on Powerbor machines.

Always before starting any job make sure the machine is in good working order and that there are no damaged or loose parts. Any loose parts must be tightened.

**Before proceeding with any maintenance work be certain that the power supply is disconnected.**

| Description                        | Every operation | 1 week | 1 Month |
|------------------------------------|-----------------|--------|---------|
| Visual check of machine for damage | X               |        |         |
| Operation of machine               | X               |        |         |
| Check brush wear                   |                 | X      |         |
| Check magnetic base                | X               |        |         |
| Check grease                       |                 |        | X       |
| Check armature                     |                 |        | X       |

### Visually check the machine for damage.

The machine must be checked before operation for any signs of damage that will affect the operation of the machine. Particular notice must be taken to the mains cable, if the machine appears to be damaged it should not be used, failure to do so may cause injury or death.

### Check operation of the machine.

The machines operation must be checked to ensure that all components are working correctly.

**Machine Brushes** - should be checked to make sure there is no abnormal wear present (this should be checked at least once a week if used frequently). If the brush has worn more than 2/3 the original length the brushes should be changed. Failure to do so may cause damage to the machine.

**Magnetic base** – before every operation the magnetic base should be checked to make sure that the base is flat and there is no damage present. An uneven magnet base will cause the magnet not to hold as efficiently and may cause injury to the operator.

### Check machines grease.

The gearbox grease should be checked once a month to ensure all moving components are covered to prevent wear. The grease should be changed at least once a year to ensure you gain the best from your machine.

### Check Armature of the machine.

This should be checked at least once a month to check that there are no 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, but this is normal (this is the part that comes into contact with the brushes) however, if there are any signs of abnormal damage the part should be replaced.



## 16) 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 magnet switch</li> <li>- Defective control unit</li> <li>- Defective power supply</li> </ul>  |
| Magnet does function, the motor does not                          | <ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Carbon brushes are stuck or worn out</li> <li>- Defective magnet switch</li> <li>- Defective on / off switch</li> <li>- Defective control unit</li> <li>- Defective armature and/or field</li> </ul>  |
| Magnet does not function, the motor does                          | <ul style="list-style-type: none"> <li>- Defective magnet</li> <li>- Defective control unit</li> </ul>  |
| Hole cutters break quickly, holes are bigger than the hole cutter | <ul style="list-style-type: none"> <li>- Play in the guide</li> <li>- Bent spindle</li> <li>- Shaft extending from the motor is bent</li> <li>- Pilot bent</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> </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 gear box</li> </ul>  |
| Motor humming, big sparks and motor has no force                  | <ul style="list-style-type: none"> <li>- Armature damaged</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>- Damage to armature or field coil</li> <li>- Damaged or defective brushes</li> </ul>   |
| Insufficient magnetic force                                       | <ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Bottom of magnet not clean and dry</li> <li>- Bottom of magnet not flat</li> <li>- Work piece is not bare metal</li> <li>- Work piece is not flat</li> <li>- Work piece is too thin less than 10mm</li> <li>- Defective control unit</li> <li>- Defective magnet</li> </ul> |
| Frame under voltage   | <ul style="list-style-type: none"> <li>- Damaged / defective wiring</li> <li>- Defective magnet</li> <li>- Motor seriously dirty</li> </ul>   |
| Fuse blows when magnet switch is turned on                        | <ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- Wrong value fuse</li> <li>- Defective magnet switch</li> <li>- Defective control unit</li> <li>- Defective magnet</li> </ul>  |
| Fuse blows when motor is started up                               | <ul style="list-style-type: none"> <li>- Damaged or defective wiring</li> <li>- 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>   |

## 17) CUTTER SELECTION



| <b>Material</b>              | <b>Material Hardness</b> | <b>Cutter</b> |
|------------------------------|--------------------------|---------------|
| Mild and free cutting steels | <700N/mm <sup>2</sup>    | M2            |
| Mild and free cutting steels | <850N/mm <sup>2</sup>    | M42           |
| Steel angle and joists       | <700N/mm <sup>2</sup>    | M2            |
| Steel angle and joists       | <850N/mm <sup>2</sup>    | M42           |
| Plate and sheet steel        | <700N/mm <sup>2</sup>    | M2            |
| Plate and sheet steel        | <850N/mm <sup>2</sup>    | M42           |
| Aluminium                    | <750Nmm <sup>2</sup>     | M2            |
| Aluminium                    | <850N/mm <sup>2</sup>    | M42           |
| Brass                        | <700N/mm <sup>2</sup>    | M2            |
| Brass                        | <850N/mm <sup>2</sup>    | M42           |
| Cast iron                    | <700N/mm <sup>2</sup>    | M2            |
| Cast iron                    | <850N/mm <sup>2</sup>    | M42           |
| Stainless steel              | <700N/mm <sup>2</sup>    | M2            |
| Stainless steel              | <850N/mm <sup>2</sup>    | M42           |
| Stainless steel              | >850N/mm <sup>2</sup>    | TCT           |
| Rail track                   | >850N/mm <sup>2</sup>    | M42           |
| Tool steel                   | >850N/mm <sup>2</sup>    | TCT           |
| Die Steel                    | >850N/mm <sup>2</sup>    | TCT           |

## 18) ADDITIONAL WARNINGS

- **Markings**
- **Marquage**

**AVERTISSEMENT.** Afin de réduire le risque de blessures, l'utilisateur doit lire et bien comprendre le mode d'emploi. Following is a list of acceptable French translations of the instructions specified in this Standard.

- **Instructions**
- **RÈGLES DE SÉCURITÉ GÉNÉRALES**
- **AVERTISSEMENT! Vous devez lire et comprendre toutes les instructions.** Le nonrespect, même partiel, des instructions ci-après entraîne un risque de choc électrique, d'incendie et/ou de blessures graves.

### CONSERVEZ CES INSTRUCTIONS

- **Aire de travail**
- **Veillez à ce que l'aire de travail soit propre et bien éclairée.** Le désordre et le manque de lumière favorisent les accidents.
- **N'utilisez pas d'outils électriques dans une atmosphère explosive, par exemple en présence de liquides, de gaz ou de poussières inflammables.** Les outils électriques créent des étincelles qui pourraient enflammer les poussières ou les vapeurs.
- **Tenez à distance les curieux, les enfants et les visiteurs pendant que vous travaillez avec un outil électrique.** Ils pourraient vous distraire et vous faire une fausse manoeuvre.
- **Sécurité électrique**
- **Les outils mis à la terre doivent être branchés dans une prise de courant correctement installée et mise à la terre conformément à tous les codes et règlements pertinents. Ne modifiez jamais la fiche de quelque façon que ce soit, par exemple en enlevant la broche de mise à la terre. N'utilisez pas d'adaptateur de fiche. Si vous n'êtes pas certain que la prise de courant est correctement mise à la terre, adressez-vous à un électricien qualifié.** En cas de défaillance ou de défectuosité électrique de l'outil, une mise à la terre offre un trajet de faible résistance à l'électricité qui autrement risquerait de traverser l'utilisateur. S'applique aux outils de classe I (mis à la terre) seulement.
- **Les outils à double isolation sont équipés d'une fiche polarisée (une des lames est plus large que l'autre), qui ne peut se brancher que d'une seule façon dans une prise polarisée. Si la fiche n'entre pas parfaitement dans la prise, inversez sa position; si elle n'entre toujours pas bien, demandez à un électricien qualifié d'installer une prise de courant polarisée. Ne modifiez pas la fiche de l'outil.** La double isolation [! SYMBOLE!] élimine le besoin d'un cordon d'alimentation à trois fils avec mise à la terre ainsi que d'une prise de courant mise à la terre. S'applique aux outils de classe II seulement.
- **Évitez tout contact corporel avec des surfaces mises à la terre (tuyauterie, radiateurs, cuisinières, réfrigérateurs, etc.).** Le risque de choc électrique est plus grand si votre corps est en contact avec la terre.
- **N'exposez pas les outils électriques à la pluie ou à l'eau.** La présence d'eau dans un outil électrique augmente le risque de choc électrique. Cette consigne est facultative pour les outils classés étanches à l'eau ou à l'épreuve de l'éclaboussement.
- **Ne maltraitez pas le cordon. Ne transportez pas l'outil par son cordon et ne débranchez pas la fiche en tirant sur le cordon. N'exposez pas le cordon à la chaleur, à des huiles, à des arêtes vives ou à des pièces en mouvement. Remplacez immédiatement un cordon endommagé.** Un cordon endommagé augmente le risque de choc électrique. · Lorsque vous utilisez un outil électrique à l'extérieur, employez un prolongateur pour l'extérieur marqué « W-A » ou « W ». Ces cordons sont faits pour être utilisés à l'extérieur et réduisent le risque de choc électrique.
- **Sécurité des personnes**
- **Restez alerte, concentrez-vous sur votre travail et faites preuve de jugement. N'utilisez pas un outil électrique si vous êtes fatigué ou sous l'influence de drogues, d'alcool ou de médicaments.** Un instant d'inattention suffit pour entraîner des blessures graves.
- **Habillez-vous convenablement. Ne portez ni vêtements flottants ni bijoux.**

**Confinez les cheveux longs. N'approchez jamais les cheveux, les vêtements ou les gants des pièces en mouvement.** Des vêtements flottants, des bijoux ou des cheveux longs risquent d'être happés par des pièces en mouvement.

- **Méfiez-vous d'un démarrage accidentel. Avant de brancher l'outil, assurez-vous que son interrupteur est sur ARRÊT.** Le fait de transporter un outil avec le doigt sur la détente ou de brancher un outil dont l'interrupteur est en position MARCHE peut mener tout droit à un accident.
- **Enlevez les clés de réglage ou de serrage avant de démarrer l'outil.** Une clé laissée dans une pièce tournante de l'outil peut provoquer des blessures.
- **Ne vous penchez pas trop en avant. Maintenez un bon appui et restez en équilibre en tout temps.** Une bonne stabilité vous permet de mieux réagir à une situation inattendue.
- **Utilisez des accessoires de sécurité. Portez toujours des lunettes ou une visière.** Selon les conditions, portez aussi un masque antipoussière, des bottes de sécurité antidérapantes, un casque protecteur et/ou un appareil antibruit.
- **Utilisation et entretien des outils**
- **Immobilisez le matériau sur une surface stable au moyen de brides ou de toute autre façon adéquate.** Le fait de tenir la pièce avec la main ou contre votre corps offre une stabilité insuffisante et peut amener un dérapage de l'outil.
- **Ne forcez pas l'outil. Utilisez l'outil approprié à la tâche.** L'outil correct fonctionne mieux et de façon plus sécuritaire. Respectez aussi la vitesse de travail qui lui est propre.
- **N'utilisez pas un outil si son interrupteur est bloqué.** Un outil que vous ne pouvez pas commander par son interrupteur est dangereux et doit être réparé.
- **Débranchez la fiche de l'outil avant d'effectuer un réglage, de changer d'accessoire ou de ranger l'outil.** De telles mesures préventives de sécurité réduisent le risque de démarrage accidentel de l'outil.
- **Rangez les outils hors de la portée des enfants et d'autres personnes inexpérimentées.** Les outils sont dangereux dans les mains d'utilisateurs novices.
- **Prenez soin de bien entretenir les outils. Les outils de coupe doivent être toujours bien affûtés et propres.** Des outils bien entretenus, dont les arêtes sont bien tranchantes, sont moins susceptibles de coincer et plus faciles à diriger.
- **Soyez attentif à tout désalignement ou coincement des pièces en mouvement, à tout bris ou à toute autre condition préjudiciable au bon fonctionnement de l'outil. Si vous constatez qu'un outil est endommagé, faites-le réparer avant de vous en servir.** De nombreux accidents sont causés par des outils en mauvais état.
- **N'utilisez que des accessoires que le fabricant recommande pour votre modèle d'outil.** Certains accessoires peuvent convenir à un outil, mais être dangereux avec un autre.
- **RÉPARATION**
- **La réparation des outils électriques doit être confiée à un réparateur qualifié.** L'entretien ou la réparation d'un outil électrique par un amateur peut avoir des conséquences graves.
- **Pour la réparation d'un outil, n'employez que des pièces de rechange d'origine. Suivez les directives données à la section « Réparation » de ce manuel.** L'emploi de pièces non autorisées ou le non-respect des instructions d'entretien peut créer un risque de choc électrique ou de blessures.
- Les lames de scie circulaire au carbure, les plateaux porte-disque, les meules et les brosses métalliques doivent porter un marquage permanent indiquant leur vitesse maximale admissible, « \_\_\_/min ».
- Les brosses métalliques doivent porter un marquage permanent libellé comme suit: « Porter des lunettes ou une visière ».
- Le message suivant doit figurer sur l'emballage d'une brosse métallique ou dans les instructions qui l'accompagnent: « Laissez la brosse métallique tourner à la vitesse de service pendant au moins 1-minute avant de vous en servir. Pendant cette période, personne ne doit se trouver vis-à-vis la brosse. »