

# Powerbor®

## POWERBOR - PB70FRV Magnetic drilling machine

Model Number  
18P110, 18P230

This machine is CE approved.



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Part	Description	Quantity
W18XC533	RATCHET STRAP / HOOK ASSEMBLY	1
W18XC535	HOOK / STRAP PLAIN	1
RD23603	OIL BOTTLE ASSEMBLY	1
W18XC527	ALLEN KEY 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!** When using electric tools basic safety precautions should always be followed to reduce the risk of fire, electric shock and personal injury, including the following.

Read all these instructions before attempting to operate the machine.

Remove the power supply before carrying out any adjustment, servicing or maintenance.

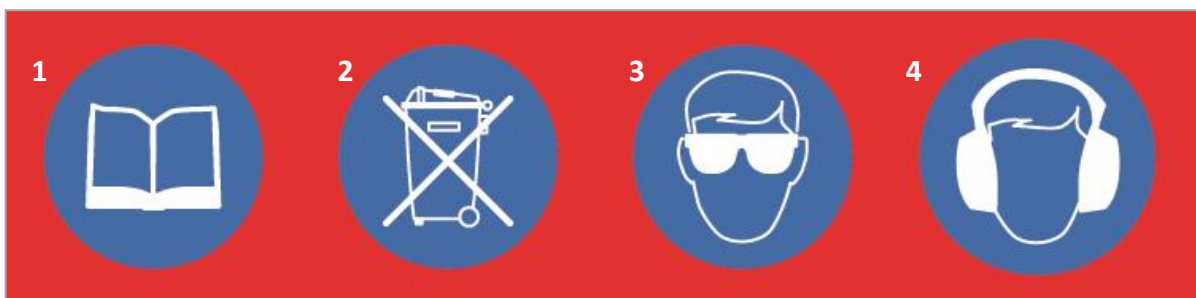
1. Keep work area clear - cluttered areas and benches invite injuries.
2. Consider work area environment;
  - Do not expose tools to rain.
  - Do not use tools in damp or wet locations.
  - Keep work area well lit (500 Lux recommended).
  - Do not use tools in the presence of flammable liquid or gases.
  - Ensure there is adequate space to gain access to the plug, mains and motor on/off switches.
3. Guard against electric shock:

Avoid body contact with earthed or ground surfaces (e.g. pipes, radiators, cookers and refrigerators). Electric safety can be further improved by using a high-sensitivity (30 mA/0.1s) residual current device (RCD).
4. Keep other persons away! DO NOT let untrained persons, especially children, touch the tool or the extension cord and keep them away from the work area.
5. Store idle tools when not in use. All tools should be stored in a dry locked-up place, out of reach of children.
6. Do not force the machine. It will do the job better and safer at the rate for which it was intended.
7. Use the right tool;
  - Do not force small tools to do the job of a heavy duty tool.
  - Do not use this tool for purposes not intended: e.g. do not use the magnetic drill to cut tree logs.
8. Dress properly;
  - Do not wear loose clothing or jewellery; they can be caught in moving parts.
  - Non-skid footwear is recommended when working outdoors.
  - Wear a protective hair covering to contain long hair. This will reduce the risk of entanglement.
9. Use protective equipment when using this machine;
  - Use safety glasses to prevent debris from damaging eyes.
  - Use ear defenders or ear plugs for hearing protection.
  - Use face or dust masks if cutting operations create dust.
  - Use protective gloves to prevent swarf or debris cutting the skin.
10. When using the drill, always ensure a safe operating distance from any swarf and do not reach into the cutting area, or near the cutter, when the machine is running.
11. Connect dust extraction and collecting equipment, if devices are provided, ensuring these are properly connected and used.
12. Do not abuse the cord; never pull the cord to disconnect it from the socket. Keep the cord away from heat, oil and sharp edges.
13. Secure work where possible, use clamps or a vice to hold the work. It is safer than using your hand.

14. Do not overreach! Keep proper footing and balance at all times.
15. Maintain tools with care;
  - Keep cutting tools sharp and clean for better and safer performance.
  - Regularly check the machine for any wear or damage.
  - Ensure the machine is clean and free from debris prior to use.
  - Remove from the mains prior to any maintenance.
  - Follow instructions for lubricating and changing accessories.
  - Inspect tool cords periodically and if damaged have them repaired by an authorized Powerbor service facility.
  - Inspect extension cords periodically and replace if damaged.
  - Keep handles dry, clean and free from oil and grease.
16. Disconnect tools when not in use, before servicing and when changing accessories such as cutters, disconnect tools from the power supply.
17. Form the habit of checking to see that keys and adjusting wrenches are removed from the tool before turning it on.
18. Avoid unintentional starting. Ensure the magnet is OFF before plugging the machine in.
19. Use extension leads only intended for outdoor use when the tool is used outdoors.
20. **WARNING!** The vibration emissions during actual use can differ from the declared total value depending on the ways in which the tool is being used.
21. Stay alert! Watch what you are doing, use common sense and do not operate the tool when you are tired. **DO NOT** operate the machine when under the influence of alcohol or ANY illegal substances.
22. Check for damaged or missing parts before use of the tool; it should be carefully checked to determine that it will operate properly for its intended function.
23. Warning! The use of any accessory or attachment, other than ones recommended in this instruction manual, may present a risk of personal injury.
24. Have your machine repaired by a qualified Powerbor technician.

This electric tool complies with the relevant safety rules. Qualified persons using original spare parts should only carry out repairs, otherwise this may result in considerable danger to the user.
25. Never operate the machine if parts are missing or damaged.
26. Never direct jets of water or flammable liquids over the drill.
27. Operator must be physically able to handle the weight of the machine.
28. Operator should be trained in the use of the machine.

### 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 = 70mm dia. x 50mm deep

Arbor bore = 19.05mm (3/4") dia.

<b>Motor Unit</b>				
Voltages	110V 50-60Hz		230V 50-60Hz	
Normal full load	17.8 A	1800 W	8.7 A	1800 W
<b>Electro Magnet</b>	0.68 A	75W	0.33 A	75W
Size	200 mm long 100 mm wide			
Holding Force at 20°C with 25mm minimum plate thickness <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>	15000N			
<b>Total Load (magnet + motor)</b>	1875W		1875W	
<b>Overall Dimensions</b>				
Height - minimum	440mm			
Width (without Capstan fitting)	160mm			
Length Overall (including Guard)	310mm			
<b>Nett Weight</b>	22 kgs			
Vibration total values (triax vector sum) in accordance with EN61029-1:	Vibration emission value 2.5 m/s <sup>2</sup>			
Level of sound pressure in accordance with EN61029-1:	86 dBA			

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 2 metre length of cable having three conductors 1.5mm<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.

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

**For 110v supply: 3.5 yards of 3 core x 1.5mm<sup>2</sup>**

**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 19.05mm (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) TAPPING

The PB70 FRV, in addition to drilling with annular cutters, is designed to allow the tapping of screw threads.

The tapping capacity of the PB70 FRV is M6 to M24.

This machine has variable speed and both forward and reverse spindle rotation.

Magnetic based drills are normally used for cutting through holes with annular cutters, the tapping facility of this drill is for tapping through holes.

If tapping of blind holes is required then an automatic reversing tapping chuck should be used for best results.

To tap a hole first set up the machine as for drilling with annular cutters in previous chapters. Ensure the machine is secure before commencing any drilling operation.

### Combi Drill/Tap

Drill the hole to the recommended tapping size for the thread to be cut. Without disengaging the magnet replace the drill with the tap.

Set the spindle speed to the required tapping speed, apply tapping or cutting compound.

Start the drill spindle in the forward direction and feed the tap into the hole until it begins to cut. Once cutting the tap will feed itself through, only gentle pressure on the feed handles should be necessary.

Once the tap has threaded through the plate the drill should be stopped immediately.

The drill spindle should then be switched to reverse and the tap can be fed back out of the hole.

When using a 2 - IN - 1 Drill Tap, this type of tap is restricted to plate thicknesses of the diameter of the tapping size. ie: M24 = 24mm plate. This is due to the length of the plain portion of the shank after the threaded portion.

If the plate to be drilled is thicker than the diameter of the thread to be cut, the Combi type drill and tap should be used.

Position the drill and ensure the security of the magnet on the work piece.

Set the spindle speed to the required speed, drill the hole with the drill portion of the cutter, it may be necessary to slow the speed (depending on size) before tapping.

Always use tapping compound or cutting paste for best results and prolonged cutter life.

Allow the tap the feed through with little or no feed pressure, once the threaded section of the tap is through the drill will stop feeding and just rotate.

Stop the spindle, switch to reverse, help the tap to begin feed up with very light upward pressure on the feed handles.

Once the tap is out of the hole the machine can be removed.

**IMPORTANT** when tapping NEVER switch the machine from forward to reverse without allowing the motor to stop first. Switching directly from forward to reverse can damage the motor and switchgear.

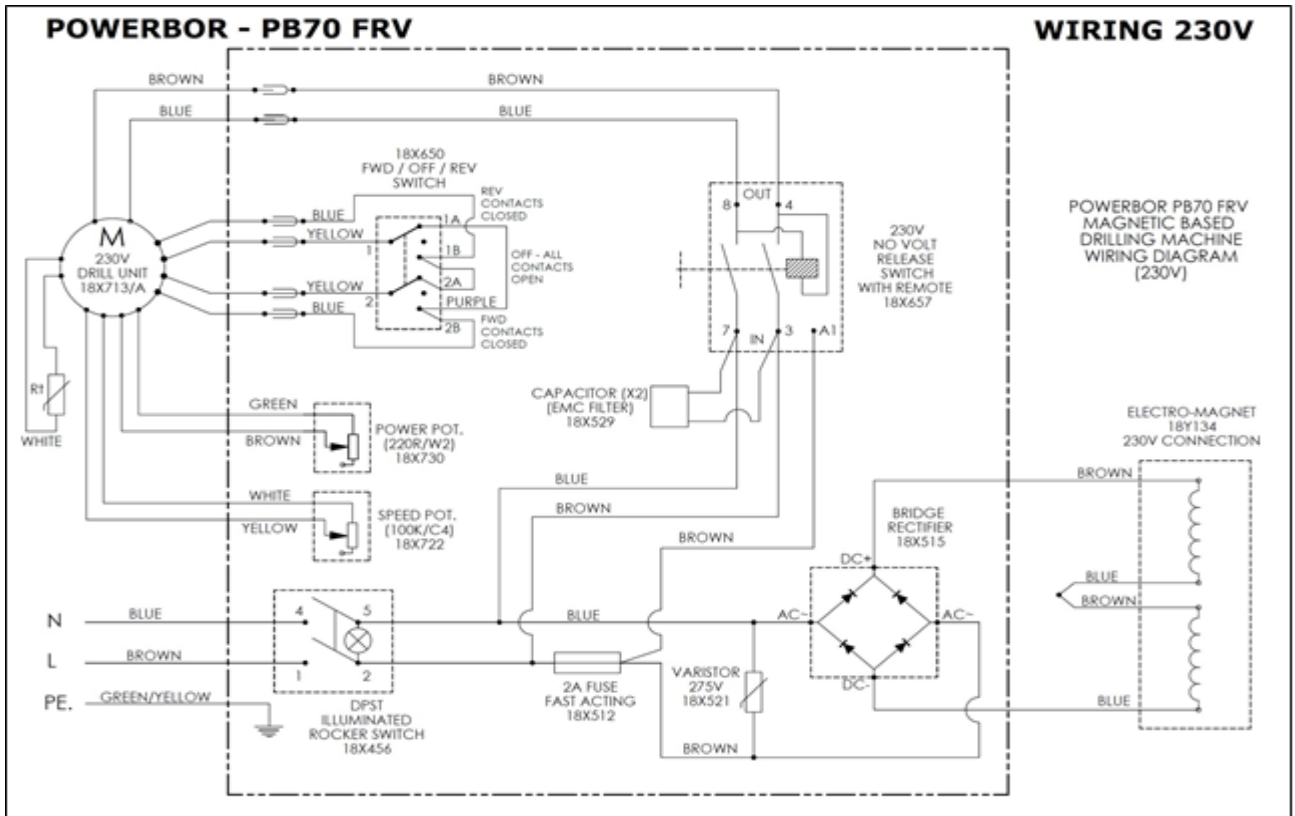
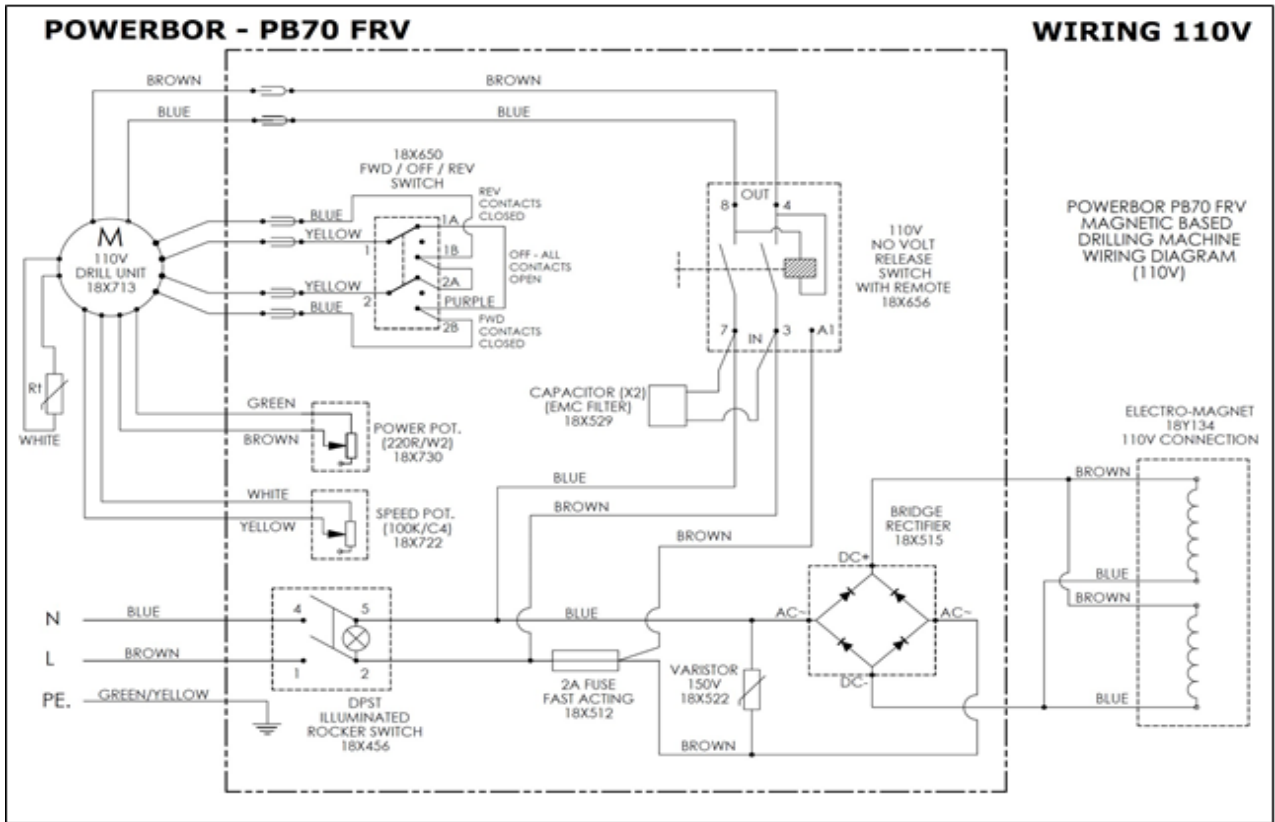
## 10) REMEDIES FOR HOLE MAKING PROBLEMS

<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.  Swarf or dirt under magnet.  Irregularity on magnet contact or work-piece.  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.  Clean magnet.  Use extreme care; file any imperfections flush to surface.  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.  Worn arbor bushing and/or ejector collar.  Too much feed pressure at start of cut.  Cutter is dull, worn, chipped or incorrectly sharpened.  Poor centre-punch mark; weak pilot spring; pilot not centred in centre-punch mark.  Worn or bent pilot, worn pilot hole.	See causes and remedies above.  New arbor bushing is needed.  Light pressure only is needed until a groove is cut. The groove then serves as a stabilizer.  Replace or re-sharpen. Sharpening service is available.  Improve centre-punch and/or replace worn parts  Replace part or parts
3) Excessive drilling pressure required	Incorrectly re-sharpened, worn or chipped cutter.  Coming down on swarf lying on surface of work-piece.  Swarf accumulated (packed) inside cutter.	Re-sharpen or replace.  Take care not to start a cut on swarf.  Clear cutter.
4) Excessive cutter breakage	Steel swarf or dirt under cutter.  Incorrectly re-sharpened or worn cutter.  Cutter skipping.	Remove cutter, clean part thoroughly and replace.  Always have a new cutter on hand to refer to for correct tooth geometry, together with instruction sheet.  See causes and remedies (2).

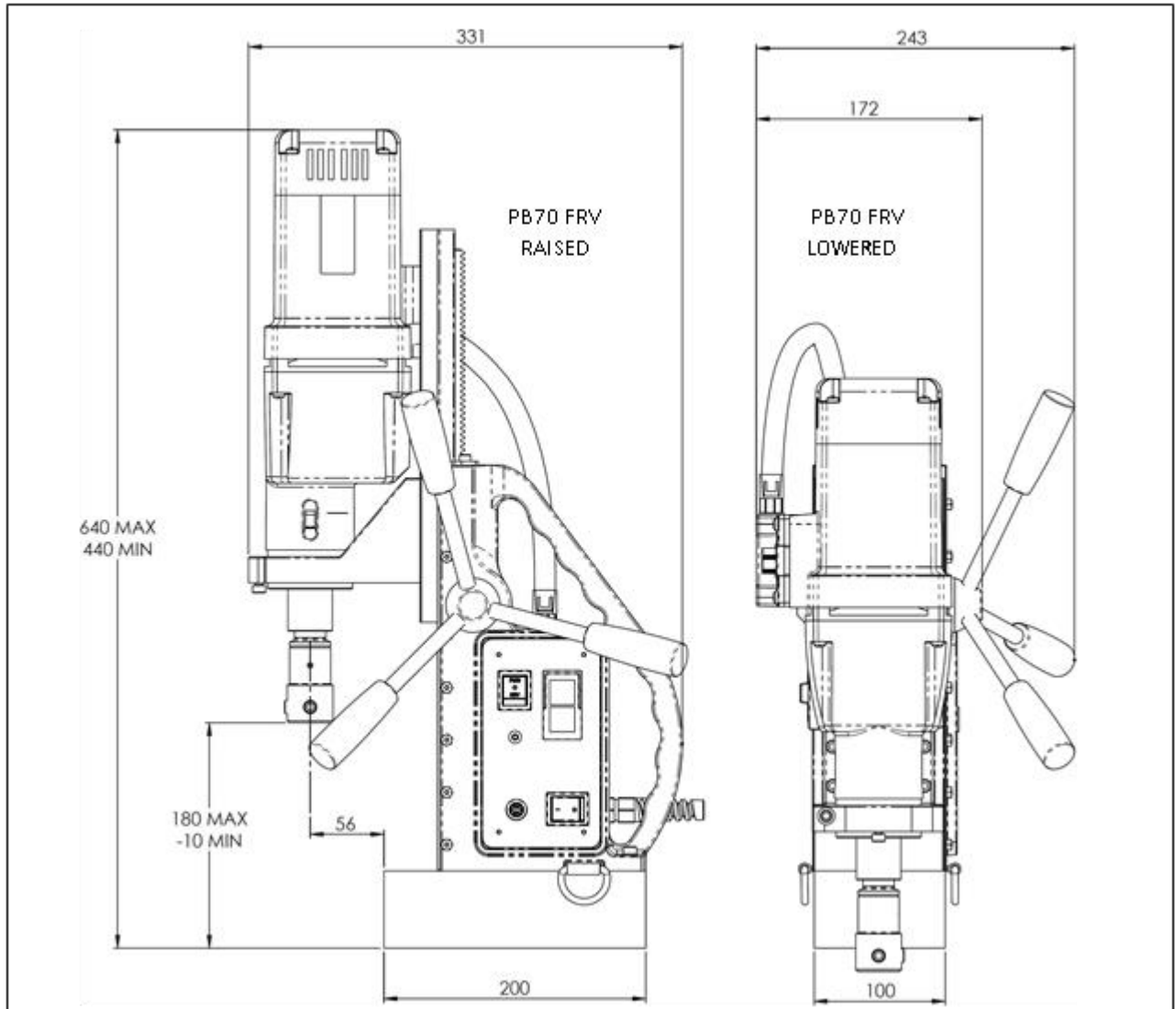


	<p>Cutter not attached tightly to arbor.</p> <p>Insufficient use of cutting oil or unsuitable type of oil.</p> <p>Incorrect speed</p>	<p>Retighten.</p> <p>Inject oil of light viscosity into the coolant-inducing ring and check that oil is being metered into cutter when pilot is depressed. If not, check pilot groove and arbor internally for dirt or apply oil externally. (Even a small amount of oil is very effective).</p> <p>Ensure correct speed is use for the cutter.</p>
5) Excessive cutter wear	<p>See cause and remedy above</p> <p>Incorrectly re-sharpened cutter.</p> <p>Insufficient or spasmodic cutting pressure.</p>	<p>Refer to instructions and a new cutter for proper tooth geometry.</p> <p>Use sufficient steady pressure to slow the drill down. This will result in optimum cutting speed and chip load.</p>

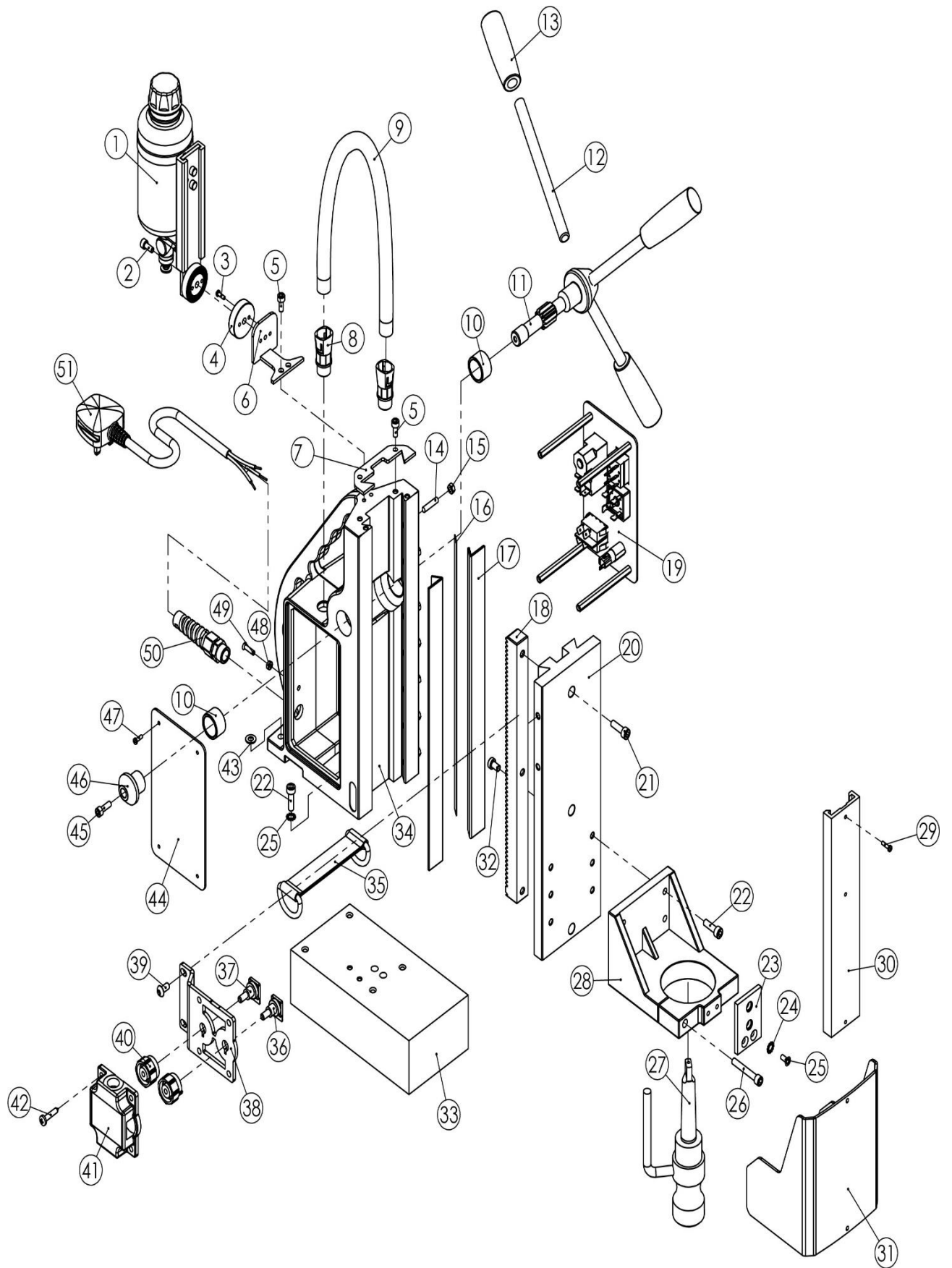
11) WIRING DIAGRAM



12) MACHINE LAYOUT



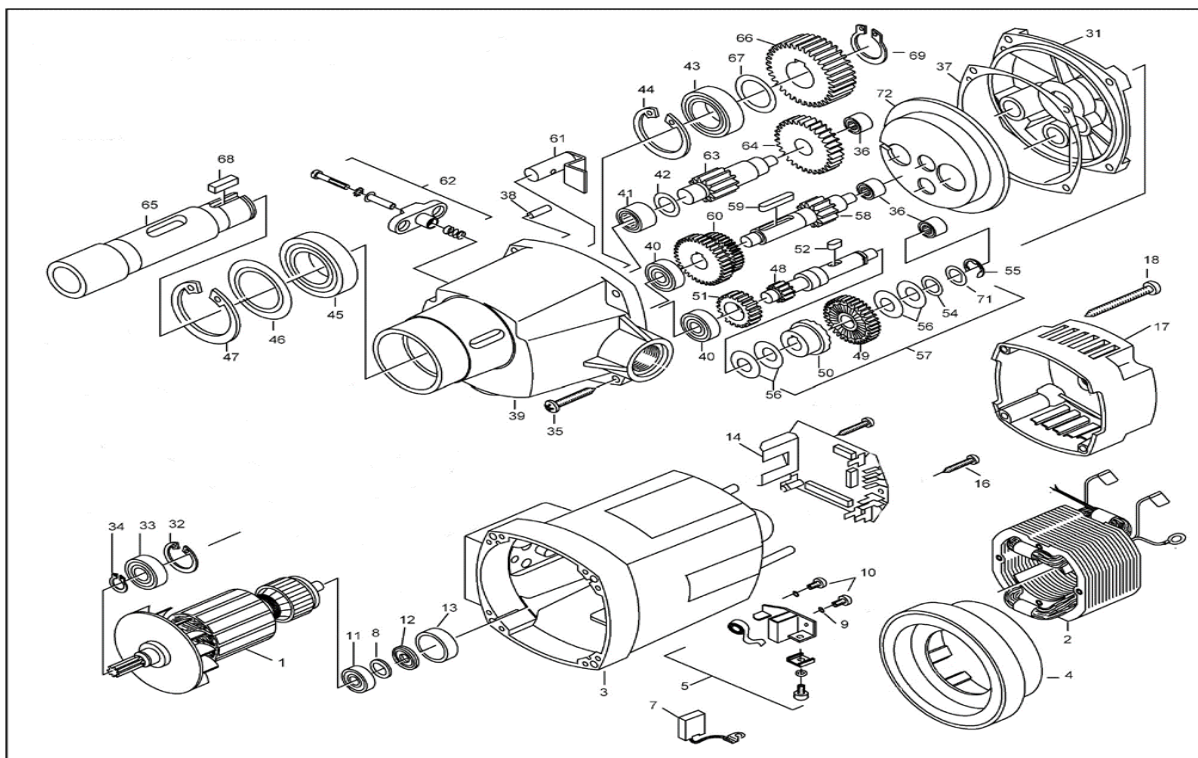
13) EXPLODED VIEW OF MACHINE



No.	Part	Description	Qty
1	RD23603	COOLANT BOTTLE ASSEMBLY	1
2	RD4269	M6×25 SOCKET CAP HEAD SCREW	1
3	RD4414	SCREW M4 X 10	2
4	RD33338	FIXED RATCHET WHEEL	1
5	W18XC209	SCREW	2
6	18Y3008	COOLANT BRACKET	1
7	W18XC612	RETAINING BRACKET	1
8	W18XC723	GLAND AL16/M16/A	2
9	18Y177	CONDUIT ASSEMBLY	1
10	W18XC502	20 X 20 X 15 BUSH (INCLUDED IN ITEM 34)	2
11	W18XC710	PB70 PINION	1
12+13	W18Y156	HANDLE & KNOB ASSEMBLY	1
14	W18XC220	M5 X 25 GRUB SCREW (INCLUDED IN ITEM 34)	7
15	W18XC219	M5 STEEL NUT (INCLUDED IN ITEM 34)	7
16	W18XC346	SHIM STRIP	1
17	W18XC716	BRASS GUIDE	2
18	W18XC625	RACK	1
19	18Y310/CS	CONTROL PANEL ASSEMBLY 230V	1
19	18Y311/C2	CONTROL PANEL ASSEMBLY 110V	1
20	W18XC717	DOVETAIL SLIDE	1
21	W18XC201	M6 X 20 CAPHEAD SCREW	3
22	W18XC201	M6 X 20 CAPHEAD SCREW	4
23	RDA3032	GUARD SUPPORT	1
24	W18XC214	M6 SCHNORR WASHER	2
25	RD4347	M5 X 15 C/SNK SKT HEAD SCREW	2
26	W18XC222	M6 X 50 CAPHEAD SCREW	1
27	W18Y102	MT3 COOLANT ARBOR	1
28	18Y3006	MOTOR SUPPORT BRACKET	1
29	RDA4021	M4 X 14 BUTTON HEAD SCREW	2
30	18Y3002	SLIDE CHANNEL	1
31	18Y3003	GUARD	1
32	W18XC212	M6 X 10 CAPHEAD SCREW	1
33	W18Y173	MAGNET BASE ASSEMBLY	1
34	W18Y172	MAIN HOUSING	1
35	W18XC531	D RING STRAP	1
36	18X730	POWER POTENTIOMETER	1
37	18X722	SPEED POTENTIOMETER	1
38	W18XC1083	SIDE BRACKET	1
39	W18XC732	M6 X 16 BUTTON HEAD SOCKET SCREW	2
40	18X731	CONTROL WHEEL	2
41	18X1082	SPEED CONTROL HOUSING	1
42	W18XC567	NO.12 X 1 PAN HEAD SELF TAPPING SCREW	4
43	W18XC227	M6 STEEL WASHER	2
44	W18XC1026	REAR PLATE	1

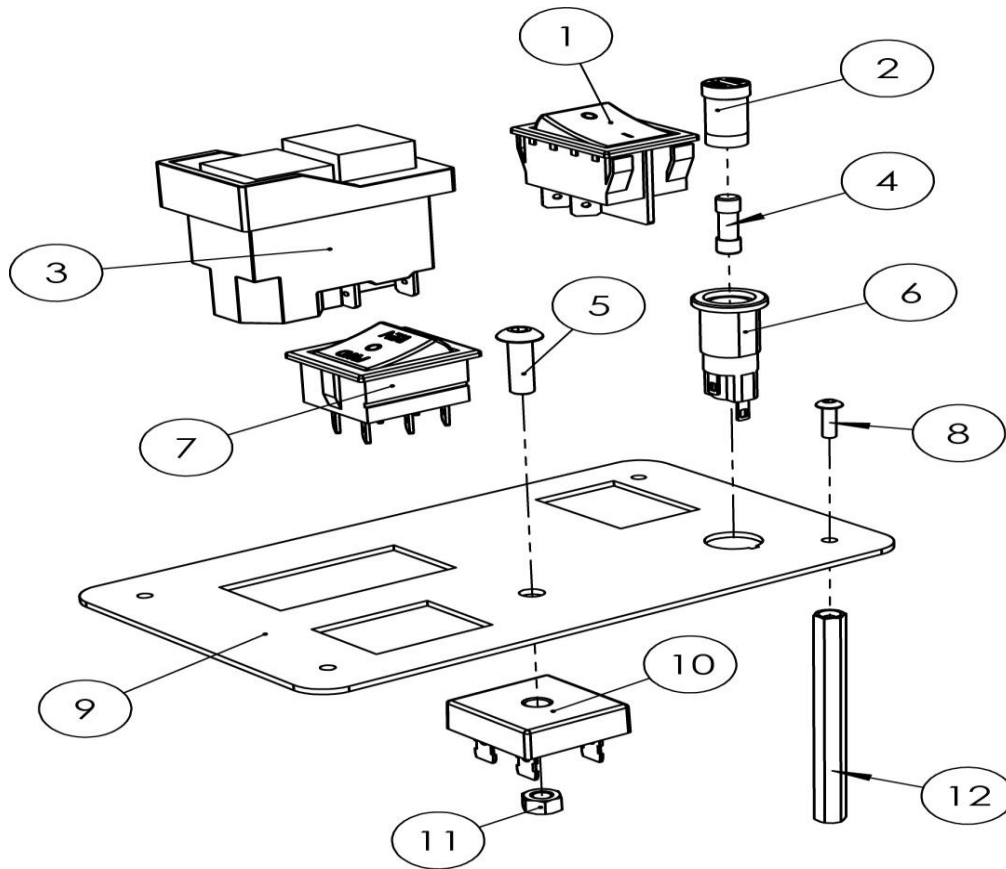
45	W18XC221	M5 X 16 CAPHEAD SCREW	1
46	W18XC524	PINION END CAP	1
47	W18XC252	M3 X 12 SCREW	8
48	W18XC238	M4 BRASS NUT	1
49	W18XC240	M4 X 20 MC SCREW	1
45	W18Y181	LEAD & PLUG ASSEMBLY 110V	1
	W18XC503	MAINS CABLE UK PLUG 230V	1
	W18XC503/EU	MAINS CABLE EURO PLUG 230V	1
	W18XC503/AU	MAINS CABLE AUSTRALIAN PLUG 230V	1

14) MOTOR BREAK DOWN



Item No.	Part Number	Description	Item No.	Part Number	Description
1	18ZD01	ARMATURE - 110V - EIB 7152H100	42	18ZD42	WASHER - EIB 71740717
1a	18ZD01A	ARMATURE - 230V - EIB 7152H100/A	43	18ZD43	DEEP GROOVE BEARING 6205-2RS
2	18ZD02	FIELD COIL - 110V - EIB 7142B150	44	18ZD44	INT CIRCLIP 47x1.75
2a	18ZD02A	FIELD COIL - 230V - EIB 7142B150/A	45	18ZD45	DEEP GROOVE BEARING 6006-2RS
3	18ZD03	MOTOR HOUSING - EIB 7742A200	46	18ZD46	WASHER - EIB 71540426
4	18ZD04	AIR GUIDE RING - EIB 71540140	47	18ZD47	INT CIRCLIP 55x2
5	18ZD05	BRUSH HOLDER - EIB 80201199	48	18ZD48	INTERMEDIATE SHAFT 1 - EIB 71521490
6	18ZD06	CONTACT WASHER - EIB 73320210	49	18ZD49	COUPLING WHEEL - EIB 74326550
7	18ZD07	SET CONTACT BRUSHES - EIB 80700021	50	18ZD50	COUPLING HALF - EIB 71540560
8	18ZD08	WASHER - EIB 73320999	51	18ZD51	INTERMEDIATE GEAR 1 - EIB 71521470
9	18ZD09	SPRING WASHER - EIB 80201385	52	18ZD52	KEY - EIB 71540495
10	18ZD10	SCREW - EIB 80201180	53	18ZD53	WASHER - EIB 80200502
11	18ZD11	DEEP GROOVE BEARING 6000-2Z	54	18ZD54	WASHER - EIB 71540607
12	18ZD12	RING MAGNET - EIB 80701002	55	18ZD55	WASHER - EIB 80201361
13	18ZD13	BEARING CAP - EIB 73320315	56	18ZD56	WASHER - EIB 80200713
14	18ZD14	CIRCUIT BOARD - 110V - EIB 714B280	57	18ZD57	GEAR COUPLING ASSY - EIB 74326493
14a	18ZD14A	CIRCUIT BOARD - 230V - EIB 714B280/A	58	18ZD58	INTERMEDIATE SHAFT 2 - EIB 71521500
16	18ZD16	CIRCUIT BOARD SCREW - EIB 80201260	59	18ZD59	KEY - EIB 80200602
17	18ZD17	MOTOR HOUSING CAP - EIB 7152B240	60	18ZD60	GEAR CLUSTER - EIB 71521440
18	18ZD18	MOTOR CAP SCREW - EIB 80201267	61	18ZD61	GEAR SELECTOR - EIB 71521520
31	18ZD31	GEAR CAP - EIB 7152B610	62	18ZD62	GEAR SELECTOR ASSY - EIB 71540545
32	18ZD32	INT CIRCLIP - EIB 80201333	63	18ZD63	INTERMEDIATE SHAFT 3 - EIB 71521510
33	18ZD33	DEEP GROOVE BEARING 6001-2RS	64	18ZD64	INTERMEDIATE GEAR 2 - EIB 71521480
34	18ZD34	EXT CIRCLIP 11x1	65	18ZD65	INTERNAL SPINDLE - EIB 71540420
35	18ZD35	GEAR HOUSING SCREW - EIB 80201292	66	18ZD66	SPINDLE WHEEL - EIB 71540430
36	18ZD36	NEEDLE BEARING HK0810	67	18ZD67	WASHER - EIB 80200509
37	18ZD37	GEAR BOX SEAL - EIB 74429620	68	18ZD68	KEY - EIB 80200604
38	18ZD38	PIN - EIB 80200280	69	18ZD69	SAFETY RING - EIB 80201324
39	18ZD39	GEAR BOX HOUSING - EIB 71521400	71	18ZD71	EXT CIRCLIP 20x1.2
40	18ZD40	DEEP GROOVE BEARING 6000	72	18ZD72	GEARBOX COVER - EIB 7152B625
41	18ZD41	NEEDLE BEARING RNA 4900			

## 15) CONTROL PANEL AND PARTS LIST



1	W18XC456	MAGNET SWITCH	1
2+6	W18XC511	FUSE HOLDER	1
3	W18XC656	MOTOR SWITCH 110V	1
3	W18XC657	MOTOR SWITCH 230V	1
4	W18XC512	FUSE	1
5	W18XC568	M5 X 20 C/SNK SCREW	1
7	W18XC650	FWD/REV SWITCH	1
8	W18XC252	M3 X 12 SCREW	4
9	W18XC1076	COVER PLATE	1
10	W18XC515	BRIDGE RECTIFIER	1
11	W18XC219	M5 STEEL NUT	1
14	18Y3010	RELAY BRACKET	1
16	W18XC523	CLIP	1
17	W18XC513	RELAY 110V	1
17	W18XC514	RELAY 230V	1
18	W18XC509/G	BACK PANEL COMPOSITE N/C	1
19	W18XC509/F	BACK PANEL COMPOSITE N/O	1



## 16) 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.

## 17) 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>

## 18) 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



## 19) WARRANTY AND CE STATEMENTS

Powerbor™ warrants its machines to be free from faulty materials, under normal usage of machines, for a period of 12 months from initial date of purchase. All other parts (excluding cutters) are under warranty for 90 days, provided that the warranty registration card (or online registration) has been completed and returned to Powerbor™ or its designated distributor within a period of (30) days from the purchase date. Failure to do so will void the warranty. If the stated is adhered to Powerbor™ will repair or replace (at its option) without charge any faulty items returned.

### This Warranty does not cover:

1. Components that are subject to natural wear and tear caused by the use not in accordance with the operators instructions
2. Defects in the tool caused by non-compliance with the operating instructions, improper use, abnormal environment conditions, inappropriate operating conditions overload or insufficient servicing or maintenance.
3. Defects caused by using accessories, components or spare parts other than original Powerbor™ parts.
4. Tools to which changes or additions have been made.
5. Electrical components are subject to manufacturer's warranty.

The warranty claim must be logged within the warranty period. This requires the submission or sending of the **complete** tool in question with the original sales receipt which must indicate the purchase date of the product. A complaint form must also be submitted prior to the return.

All goods returned defective must be returned pre-paid to Powerbor™, in no event shall Powerbor® be liable for subsequent direct, or indirect loss or damage.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, (EXPRESSED OR IMPLIED) INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. POWERBOR™ RESERVE THE RIGHT TO MAKE IMPROVEMENTS AND MODIFICATIONS TO DESIGN WITHOUT PRIOR NOTICE

**Known and Trusted Worldwide for Quality, Performance and Reliability**

## CE Declaration of Conformity

On our sole responsibility we declare that this product, the Powerbor PB70 FRV Drill, is in conformity with the following standards and standard documents :-

- EN61029-1:2009 - Safety of Transportable Motor Operated Electric Tools
- EN61000-6-2:2005 - Electromagnetic Compatibility (EMC). Generic standards. Immunity standard for industrial environments
- EN61000-6-4:2007 - Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments

According to the regulations :-

- 2006/95/EC - Low Voltage Directive
- 2004/108/EC - EMC Directive
- 2006/42/EC - Machinery Directive
- 2011/65/EU - RoHS Directive (RoHS2)

Signed..... Date... 18.03.15  
(P.D.Edwards - Managing Director)

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### WARRANTY REGISTRATION

Thank you for purchasing your Powerbor® magnetic based drilling machine, to ensure any warranty claim can be processed promptly, please register now at :-

<http://www.gjhall.co.uk>  
Click on the button "POWERBOR WARRANTY REG"

