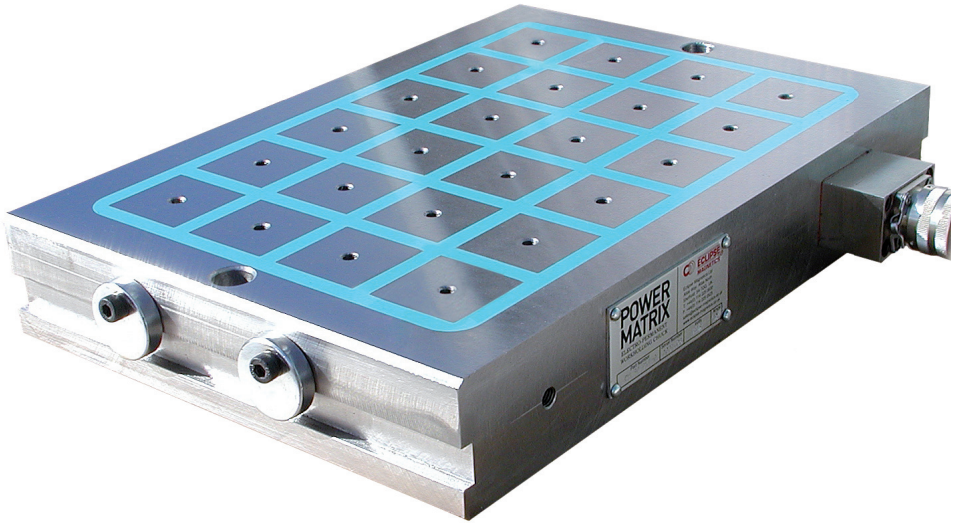
ECLIPSE MAGNETICS



POWER MATRIX SYSTEM

including CONTROLLER

USER HANDBOOK

CONTENTS

INTRODUCTION

Power Matrix systems are the most powerful, versatile and easy to use magnetic workholding systems available.

This booklet will help you get the maximum service from your Power Matrix system, provide you with an appreciation of the principles and effectiveness of magnetic workholding, and give you a thorough understanding of the Power Matrix system, its capabilities, installation and operating procedures.

This booklet will help you solve many everyday workholding problems but should you need assistance please contact our technical department who will be happy to advise you on the best solutions.

WARNING!

DO NOT USE THE POWER MATRIX SYSTEM UNTIL YOU HAVE READ THIS MANUAL

ANYONE WHO USES A HEART PACEMAKER MUST KEEP AT LEAST 300mm AWAY FROM THE POWER MATRIX WHEN IT IS MAGNETISED

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1 HEALTH & SAFETY

The Power Matrix system has a clamping force of over 1200 tonnes per square metre. If it is misused in any way it can pose a serious threat to the health and safety of anyone in its vicinity. For maximum safety it is important that the following guidelines are strictly adhered to.

Ensure the magnetic properties of any component are suitable for use on the Power Matrix system before positioning on the chuck (*see page 16*).

Always ensure that workpieces are positioned with equally large areas in contact with the north and south poles of the chuck face.

Always ensure that any other operator is aware that the chuck is activated. The green button on the hand pendant and the green light on the control panel will light up when the chuck is magnetised. The red button and lights will light up when the chuck is de-magnetised.

Once magnetised, always be aware of the dangers of handling any ferrous objects near the chuck's working surface. An object could be attracted to the surface in a split second. This could result in serious injury if fingers or hands are between the object and the chuck.

Always ensure that the Power Matrix system is de-magnetised when placing a component onto it. If the chuck is magnetised, the component will be clamped in an instant. Not only will you be risking serious injury, you will also be risk seriously damaging the chuck face.

In the event of a power failure, the Power Matrix system will remain in the same state as it was immediately before the power failure. If magnetised, never attempt to remove a component from the chuck. You risk serious damage to both yourself and the chuck face.

Do not operate the hand pendant whilst holding the charge / discharge cable. This is purely a precautionary measure.

Never push any instrument into the plug attached to the charge / discharge cable.

Never push any instrument other than the plug or socket cover into the charge / discharge socket on the chuck.

Always ensure that the socket cover on the chuck is replaced once a charge / discharge signal has been given.

In the event of a systems failure, isolate the control unit before carrying out any inspection.

Keep all credit cards, laptop computers and computer disks away from the chuck. Magnetism will wipe any information on them.

2 CONTROLLER FEATURES & TYPICAL APPLICATIONS

Eclipse Magnetics chucks use an 'electro-permanent' magnet design which requires power only when magnetising or de-magnetising. The PMCONT controller is a microprocessor based power control unit designed to deliver the short, high current pulses required to operate magnetic chucks.

2.1 CONTROLLER FEATURES

- Internal current sensing checks for full magnetic saturation of the chuck
- Output interlock relay can prevent machine operation until the chuck is magnetised
- Fail-safe system means the chuck remains magnetised in the event of a power failure
- Remote handset allows operation from the most convenient location

Unlike electro-magnets, permanent magnets use electricity only for the hold / release switching, a process that takes less than 1 second and can be controlled via push buttons on the remote handset or by a PLC interface.

Once energised the magnets will remain activated indefinitely and are not affected by failure or interruption of the mains power supply.

3 ELECTRICAL SPECIFICATION

3.1 MAINS SUPPLY VOLTAGE

Voltage options

- 380 / 415/ 460 V AC (2 phases + Earth) 50/ 60 Hz
- Other voltages may require an external power transformer (consult Eclipse Magnetics)

WARNING !
The controller supply voltage must match the voltage requirement of the chuck.

3.2 MAINS SUPPLY CURRENT

Standing Current 20mA @ 415V AC

Surge Current 50A rms maximum for 1 second to magnetise the chuck.
50A rms maximum for 1 second plus additional current surges at a reduced level to de-magnetise the chuck. (The chuck may draw a lower surge current depending on its size and voltage - see *Test Certificate* for details).

Supply Rating Unless otherwise stated:
32A fitted with 32A time-delay / anti-surge fuses and isolator switch.
Supply conductors and protective earth conductor should be >=2.5mm^2.

4 INSTALLATION

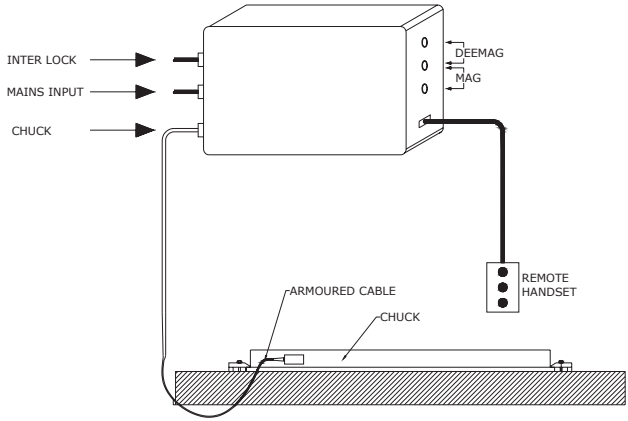
4.1 MOUNTING

The controller should be mounted on a solid, vibration free, vertical ferro-magnetic surface with the magnetic strips on its back. The enclosure is rated to IP55 but should be protected from excessive moisture and heat.

4.2 MAINS SUPPLY

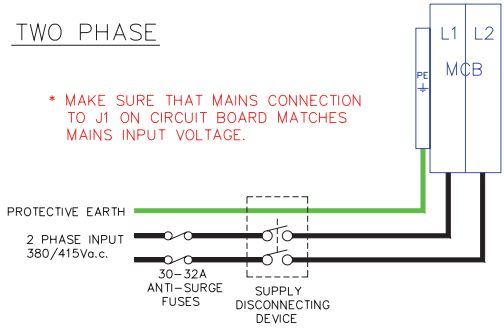
The incoming mains supply should be fitted with a hand-operated supply disconnecting device to isolate the controller when required. The two supply conductors should be connected to the input terminals of the terminal block. Connect the external protective conductor ('earth wire') to the Protective Earth terminal (PE).

Typical magnet and controller installation



Mains wiring connnections

The mains supply voltage must match the voltage required by the chuck.



4 INSTALLATION (CONTD)

4.3 INSTALL IN ACCORDANCE WITH LOCAL WIRING REGULATIONS

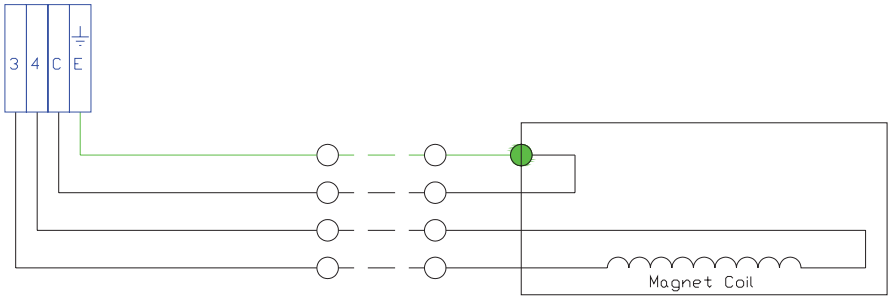
4.3.1 Chuck:

Connect the chuck power conductors 3, 4, C and E to their corresponding terminals 3, 4, C and E.

If the chuck is 'hardwired' to the controller then link terminal C to the terminal E – the controller can not be enabled if this is not done.

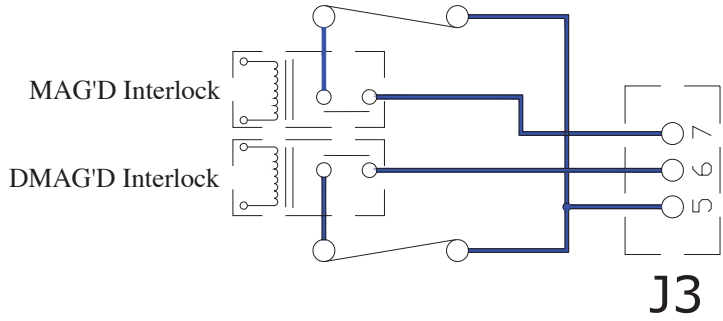
If the chuck is connected via a plug and socket make sure there is no link from terminal C to E and then connect the safety conductor C to terminal C. The controller can now only be enabled when the chuck is plugged in – the link between C and earth being made inside the socket of the chuck.

Chuck wiring



4.3.2 Output Interlocks:
Two Volt Free Normally Open Relays (rated at 1A, 30V DC / 250V AC) are provided on the PCB and connected via terminals 5, 6 and 7.
The MAGD interlock relay (5 and 7) closes when the chuck is magnetised.
The DEMAGD interlock relay (5 and 6) closes when the chuck is de-magnetised.

A typical application would be to use the MAGD interlock to prevent a machine running unless the chuck is on. The interlock only operates if the current sensor inside the controller detects that sufficient current has been supplied to the chuck to fully magnetise it.



4.3.3 Handset:
Plug the Handset into the REMOTE IN socket and secure it with the jackscrews provided.

5 OPERATION

WARNING
ENSURE THAT THE HANDSET IS PROPERLY CONNECTED TO THE 'REMOTE IN' SOCKET OF THE CONTROLLER.

5.1 TO MAGNETISE THE CHUCK
Press the MAG and COMMON button together. The MAG switch should illuminate **green**.

5.2 TO DE-MAGNETISE THE CHUCK
Press the MAG and COMMON button together. The MAG switch should illuminate **red**.

WARNING
Do not magnetise / de-magnetise the chuck without waiting at least 30 seconds between switches. Do not magnetise / de-magnetise the chuck more than five times consecutively. This will cause the chuck to overheat and can cause irreparable damage to the chuck

4.2.1 Pendant Unit

6 SETTING UP THE CONTROLLER FOR USE

6.1 PROGRAM CHIP

The microprocessor chip manages the inputs and outputs of the system and dictates the type of magnetic pulse discharge that is emitted. It is located centrally on the printed circuit board of the controller.

The controller is programmed for use with single strength ON /OFF magnet systems e.g. magnets for milling, clamping or pick and place systems.

6.2 PRINTED CIRCUIT BOARD

The PCB, which controls the magnetising and de-magnetising cycle is in the control panel. SCRs are mounted on the PCB., minimising wiring.

6.2.1 Sequence of Operation of the P.C.B.

The PCB is based on a PIC microcontroller.

The auxiliary step down transformer (AXT) provides the power supply of the PCB. The input supply from secondary auxiliary transformer (T2) is rectified with the help of the bridge Rectifier (D1-D4) and filtered with capacitor C1 & C2. A 5 mm red LED indicates the presence of 12 V DC in the PCB. A part of this supply is regulated by IC7805 to +5V for power supply to the micro-controller and the rest is used to drive the relay/ pulse transformers, push switches and indicators.

In the primary side of the transformer, one 9V tap is used for zero crossing detector. This circuit makes the positive half cycle of input AC to high (+5V) and negative half cycle to low (0V) and sends the signal to the micro-controller input via optical isolation.

Output magnetising current is sensed by a closed loop current sensor which senses current flow in the coils of the chuck. If there is no current flow the magnetising signal (green LED) in the push switches will not light.

The user keypad switches is optically isolated and display unit is electrically isolated from the micro-controller to protect it from high voltage surges.

After successful operation of mag / de-mag, the micro-controller indicates the end of process by either red or green LED. These LEDs are controlled by operating latch relay L1. The glowing of the blue LED on the Switches indicates that the mag / de-mag process is happening.

When switching is made the safety relay turns on and remains latched for a time (longer than mag / de-mag duration). This relay switches on the power relay which delivers power to the coils of the chuck.

6 SETTING UP THE CONTROLLER FOR USE
(CONTD)

There the micro-controller detects the proper input phase generated and drives the pulse transformer.

6.2.2 Test Point

The test points provided in the board are as follows:

- TP1 is reference ground (0V)
- TP2 is +12V DC
- TP3 is +5V regulated power supply

6.4 LED FUNCTION

LED		Indicates
Large	**Red**	presence of 12 V from transformer
	Yellow	presence of 9 V from transformer
	Green	mag or de-mag cycle is activated
Small	**Green**	micro-controller has responded to button push
	Yellow	full power has reached the chuck
	Red	current has flowed during the mag process
	White	bayonet top has been connected to the chuck and the push switches can now be activated

6.5 DIAGRAMS

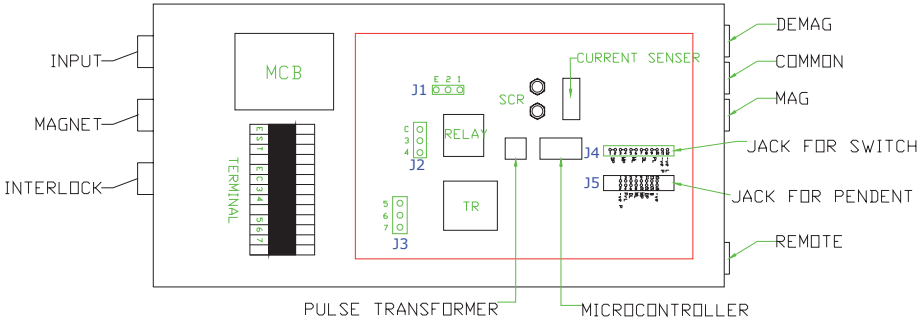
The controller

Control panel interior

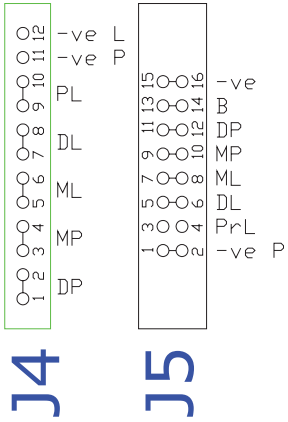
6 SETTING UP THE CONTROLLER FOR USE

(CONTD)

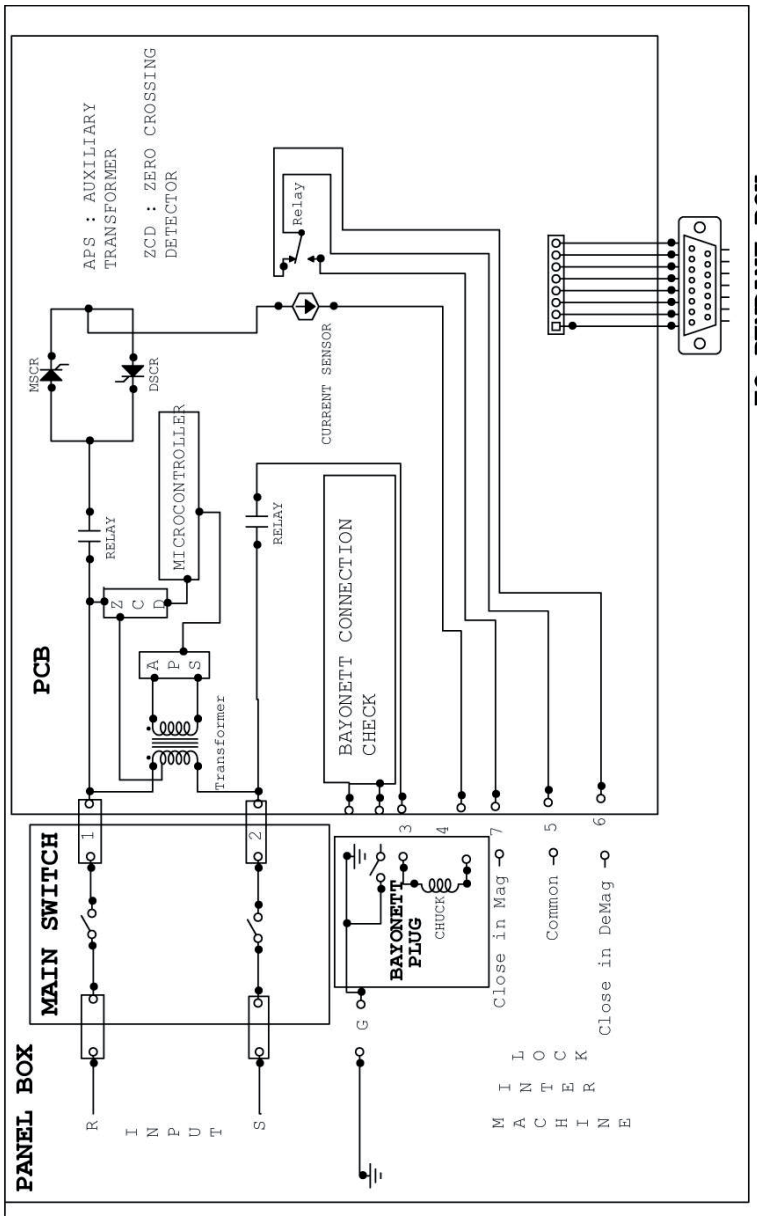
6.5.2 Internal layout of panel



6.5.3 Layout J4 & J5

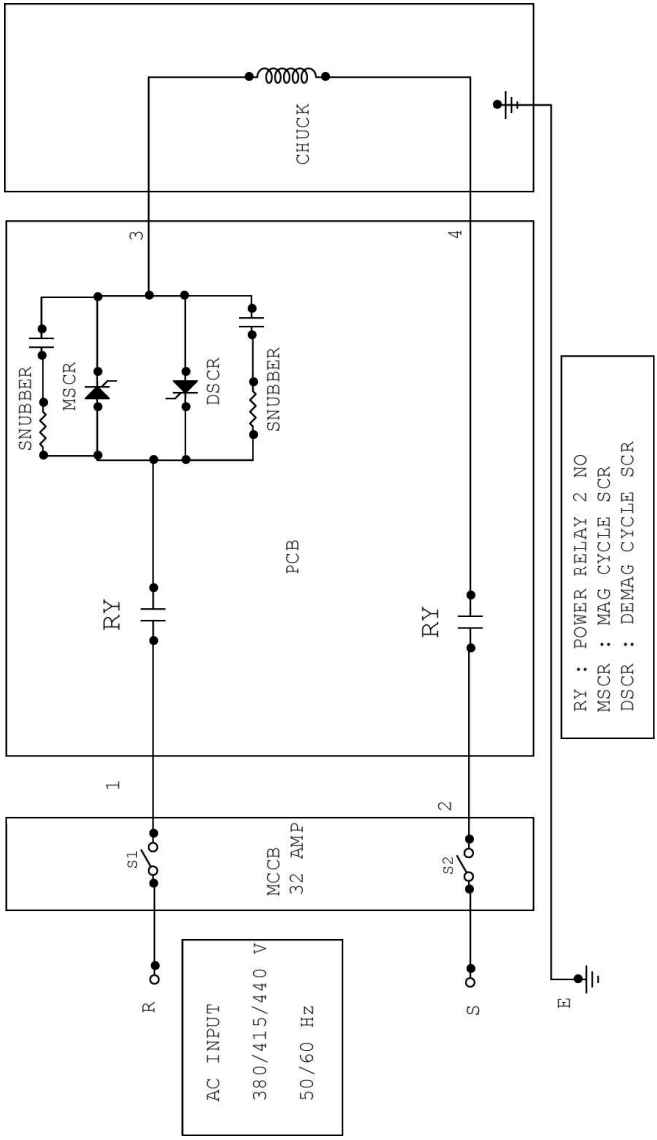


6.5.4 Electrical circuit diagram

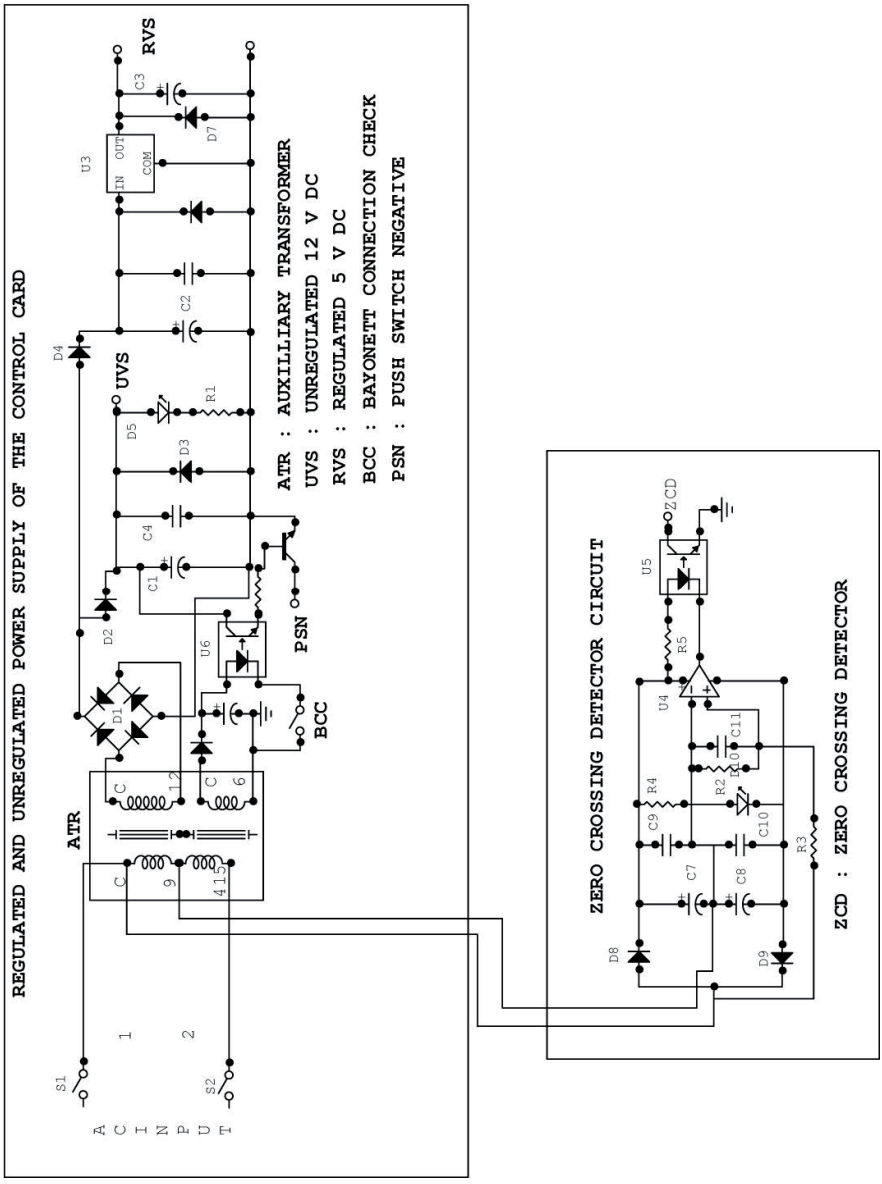


6 SETTING UP THE CONTROLLER FOR USE
(CONTD)

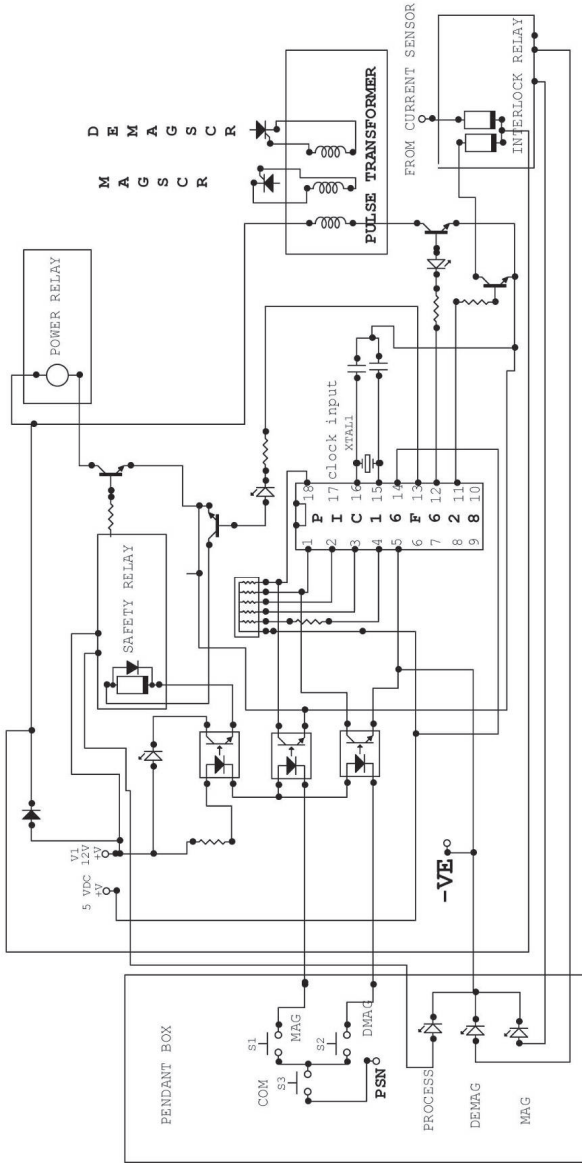
6.5.5 Power circuit diagram



6.5.6 Regulated & unregulated power supply of control card

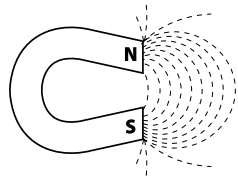


6.5.7 Control circuit diagram

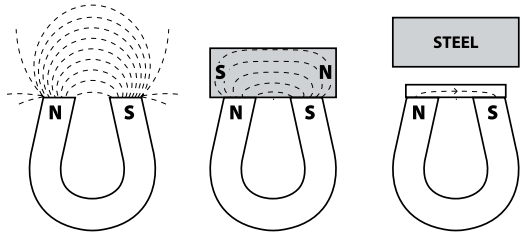


7 THE BASIC PRINCIPLES OF MAGNETIC WORKHOLDING

Magnetic lines of force (flux) exist between the north and south poles of a magnet.



This flux can be used to attract and hold ferrous components. When placed in a flux field the ferrous components have poles induced into them of opposite polarity to the magnet. The attraction or pull of the magnet becomes stronger as the gap between the workpiece and the magnet reduces until contact occurs.



The amount of magnetic flux induced in the workpiece (flux density) determines how well it can be held magnetically. For maximum hold as much magnetic flux as possible must be induced in the workpiece.

FACTORS DETERMINING THE EFFECTIVENESS OF MAGNETIC WORKHOLDING

The pull of a magnet is proportional to:

- The square of the flux density in the contact face of the workpiece
- The area of the workpiece in contact with the chuck poles up to the point of saturation of the workpiece

i.e. if the contact area is doubled the amount of magnetic pull is doubled. If the flux density is reduced by 10% the pull is reduced by 19%. If the flux density is halved the pull is reduced by 75%.

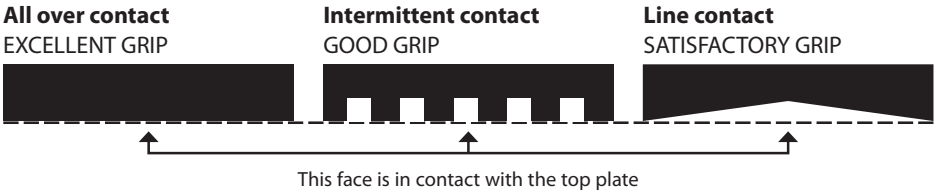
Reductions in flux density occur when the flux encounters a magnetic resistance (reluctance) e.g. air gaps, which are non-magnetic and therefore are of high reluctance.

7 THE BASIC PRINCIPLES OF MAGNETIC WORKHOLDING (CONTD)

Five main factors affecting the flux density and hold on any given size of workpiece:

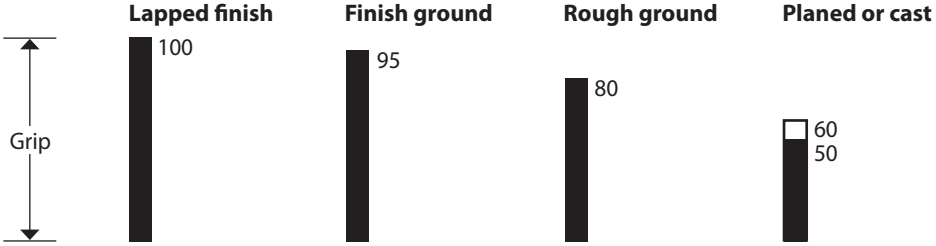
1 CONTACT AREA

For highest resistance to machining forces, air gaps should be kept to a minimum and there should be a large area of continuous contact between workpiece and chuck. Least resistance occurs where there is a large air gap and very limited contact area. However, the Power Matrix system has been designed to provide reliable clamping forces within these extremes.



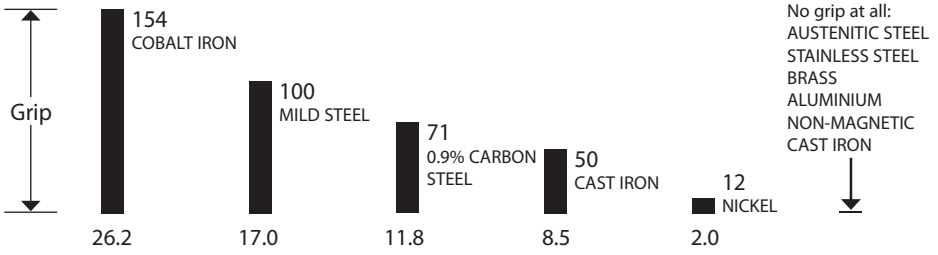
2 SURFACE FINISH

A finish ground component with few air gaps has the best surface for magnetic workholding. A coarse surface with many air gaps has the worst.



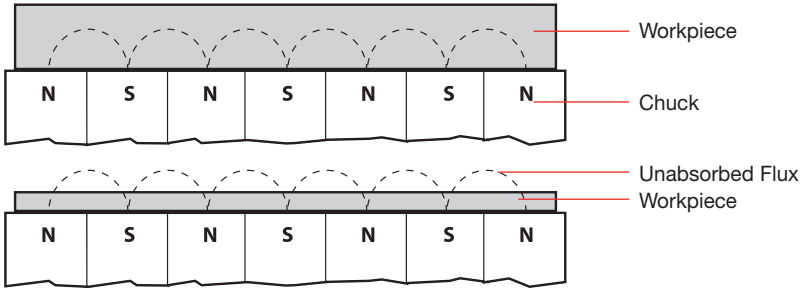
3 WORKPIECE MATERIAL

It is possible to induce higher values of flux (and therefore high attraction forces) in some materials more than in others. Magnetic conductivity generally decreases with greater alloy content. Mild steel is more conductive than cast iron etc. In some materials (brass and aluminium) no flux at all can be induced. These are known as non-magnetic materials.



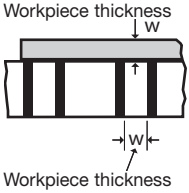
4 WORKPIECE THICKNESS

The flux path within a workpiece forms a semi-circle from the centre of one chuck pole to the centre of the next.

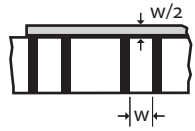


If the workpiece is thinner than this radius it cannot absorb all the flux and some passes through. The resultant pull is lower than it would be if all the flux was contained within the workpiece.

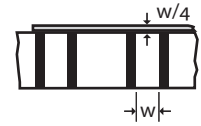
EXCELLENT GRIP



GOOD GRIP



SATISFACTORY GRIP



5 CONDITION OF MATERIAL

The heat treatment of a metal affects its physical structure and ability to absorb flux. Annealed materials are best. Hardened materials do not absorb flux as easily and tend to retain some magnetism when the chuck is turned off, sometimes making it difficult to remove the workpiece from the chuck.

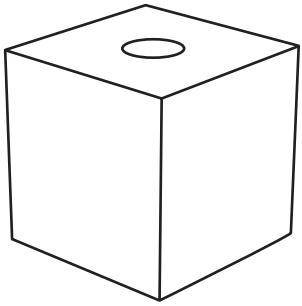
Mild steel (reference standard) = 100% hold

Material	Composition	State of heat treatment	Percentage hold
Oil hardened Tool Steel BS 4659-1989BO1	1% C 1% Cr	Annealed	84%
		Hardened	44%
		Hardened and tempered	49%
High Duty Die Steel BS 4659-1989BD3	2% C 12%Cr	Annealed	52%
		Hardened	28%
		Hardened and tempered	31%

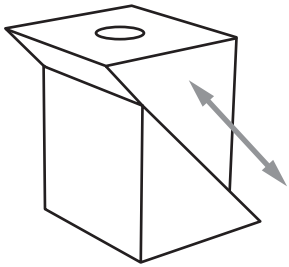
8 SPECIAL TOOLING ACCESSORIES

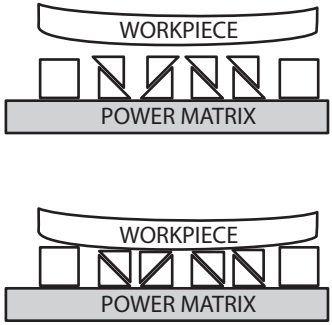
In order to machine accurately, or to prevent damage to the chuck face by cutters, some workpieces may require additional top tooling accessories. Some workpieces can also be difficult to hold or only a small area which can make direct contact with the chuck face. To machine such components Eclipse Magnetics special tooling is recommended.

Mild Steel Pole Extensions
Pole extensions are a versatile piece of tooling. They are ideal for profile machining and through drilling/boring. They are used to transmit the magnetism from the chuck to exactly where you need it. These extensions prevent the cutters from damaging the chuck surface by raising the workpiece above the chuck to provide enough clearance for the cutters. The pole extensions fit onto the chuck with the use of cap screws into pre-drilled and tapped holes in the chuck's poles.



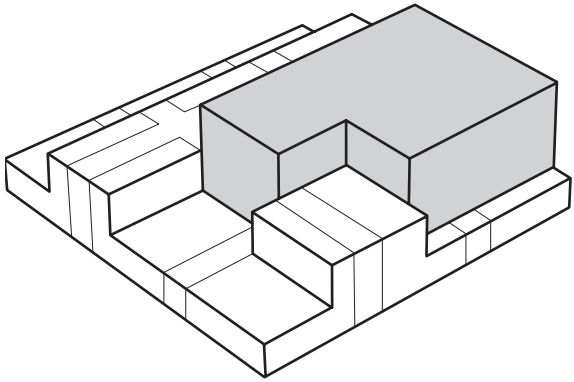
Moving Pole Extensions
Some workpieces may not be flat due to distortion or surface blemishes. The moving pole extension is designed to transfer magnetism to the workpiece rather than pull the workpiece flat onto the magnet. Holding the workpiece in its natural state will prevent further distortion and allow a component to be milled flat and accurate. The moving pole extensions fit onto the face of the chuck with cap screws into pre-drilled holes.





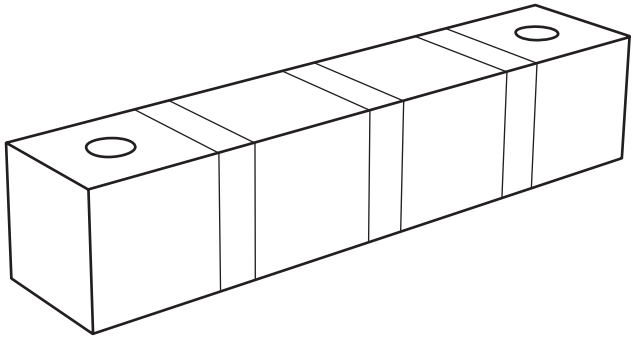
Additional top plates

When machining some components it may be necessary to provide clearances, locations or nesting arrangements for cutters within the chuck face. An adaptor plate can be provided to match the face of the Power Matrix , shaped with the necessary locations, clearances etc. The plate permits magnetic transfer and provides reliable accuracy and usage whilst protecting the chuck's top face. The additional top plate fits using cap screws into pre-drilled holes.

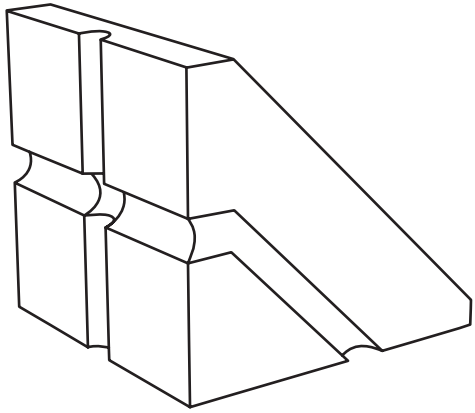


8 SPECIAL TOOLING ACCESSORIES (CONTD)

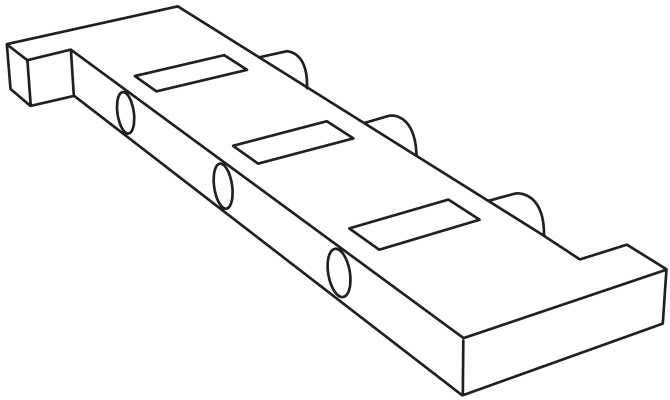
Magnetic Side Stop
A series of pole extensions connected together in order to form a very accurate datum or back stitch for many components. It can be used to square smaller components and is ideal for round bar machining. The magnetic side stop is fixed to the chuck face using cap screws.



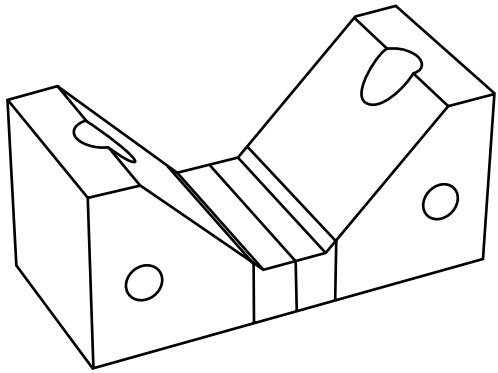
Right Angled Squaring Plate
A series of pole extensions connected together which transmit the magnetism from the chuck face through 90°. It provides a very accurate datum or back stitch for many components and is ideal for squaring up components on a vertical machining application. The right angled square is fixed to the chuck face using cap screws.



Two Way End Stop
Some components may be too small to bridge across the Power Matrix's magnetic poles. This tool is specifically designed to permit the secure holding of such components in multiple small blocks. It's simple rigid design not only bridges the Power Matrix magnetic poles, but provides a two point stop location and also permits a magnetic side stitch.



Vee Blocks
The vee block is designed to provide a secure hold for round workpieces but can also be used on its side for the positioning of smaller compnents which need to be held at 90° to the chuck.
Each vee block contains both a north and south pole and is therefore a self-contained gripping unit. A minimum of two units should always be used so this product is always supplied in pairs.



8 SPECIAL TOOLING ACCESSORIES (CONTD)

MODEL	DIMENSIONS (mm)		
FIXED SINGLE POLE EXTENSIONS			
PFS 50/30	50	50	30
PFS 50/54	50	50	54
PFS 75/30	75	75	30
PFS 75/75	75	75	75
FIXED DOUBLE POLE EXTENSIONS			
PFD 50/30	104	50	30
PFD 50/54	104	50	54
PFD 75/30	160	75	30
PFD 75/75	160	75	75
MOBILE SINGLE POLE EXTENSIONS			
PMS 50/54	50	50	40
PMS 75/75	75	75	75
COMBINED DOUBLE POLE EXTENSION			
PDC 50/54	104	50	54
PDC 75/75	160	75	75
VEE BLOCKS			
VB2/50 (PAIR)	106	50	50
VB2/75 (PAIR)	160	75	75
FIXED SINGLE POLE EXTENSIONS WITH STOP			
PFB 50/40	50	50	40
PFB 75/40	75	75	40

MODEL	DIMENSIONS (mm)		
BACK PARALLELS			
BP 50/04	216	50	50
BP 50/06	332	50	50
BP 75/04	340	75	75
BP 75/06	520	75	75
MAGNETIC RIGHT ANGLES			
SMO 50/04	102	109	102
SMO 50/06	159	109	102
SMO 75/04	159	165	155
SMO 75/06	259	165	155
MATRIX TOP PLATE			
SPQ 50	Dimensions available on request		
SPQ 75			
TWO WAY JAWS			
TWJ 4/50	50 wide × 4 pole		
TWJ 4/75	75 wide × 4 poles		

9 STOCK REMOVAL CALCULATIONS

With over 50 years of expertise in the field of magnetic workholding, Eclipse Magnetics have developed simple calculations for you to determine a maximum and safe stock removal rate.

As stated in **7 Basic principles of magnetic workholding** (p16), the characteristics of the workpiece are as important as the machining application itself. You must therefore ensure that your workpiece meets the following criteria prior to calculating the maximum metal removal rates:

1 WORKPIECE MATERIAL
This variance is included in the calculations.

2 WORKPIECE CONTACT SURFACE
The workpiece is reasonably flat over its length. If not there is danger that holding power will be reduced or the workpiece will be distorted. (General workpiece finish is included in the calculation.)

3 WORKPIECE CONTACT AREA
The cross-sectional area of the workpiece in contact with the chuck is at least 110mm^2 for the K1-50 series and 160mm^2 for the K1-75 and K2-75 series chucks.

4 WORKPIECE THICKNESS
The workpiece must be at least:

- 12mm for K1-50 series chucks
- 20mm for K1-75 series chucks
- 30mm for K2-75 series chuck

…and no greater than the width of the workpiece.

ALL THE ABOVE CRITERIA MUST BE MET BEFORE A WORKPIECE CAN BE MACHINED.

10 MAXIMUM STOCK REMOVAL

Step by step calculations

1 CALCULATE THE AREA OF THE WORKPIECE IN CONTACT WITH THE POWER MATRIX

2 DETERMINE THE MACHINING COEFFICIENT (Δ) FROM THE TABLE
This is determined by:
- Type of chucks being used
- Workpiece material
- Workpiece surface finish (machined/rough)
- Whether stops are being used or the component is free?

Coefficient	**Δ/mm**	**QS.K1–75**		**QS.K1–50**		**QS.K2–75**	
Part position	Material	Machined	Rough	Machined	Rough	Machined	Rough
Against stops	Mild steel	10	5	11	6	12	10
	Hard steel	6	3	7	3.7	7.5	6
	Cast iron	7.5	3.8	8.5	4.5	9	7.5
Free	Mild steel	3.7	2	4	2.2	4.5	3.7
	Hard steel	2.5	1.3	2.8	1.7	3	2.5
	Cast iron	3	1.5	3.2	2	3.7	3

Once the coefficient Δ is established, multiply the area of the workpiece with coefficient Δ

Area $mm^2 \times \Delta$ = maximum metal removal rates (V max)
V max - mm^3/min

3 OTHER CALCULATIONS
Maximum feed rate (A)
Maximum depth of cut (D)
Maximum width of cut (W)

$$\text{Maximum feed rate mm / min} = \frac{\mathbf{V\ max}}{\mathbf{D \times W}}$$

$$\text{Maximum depth of cut mm} = \frac{\mathbf{V\ max}}{\mathbf{A \times W}}$$

$$\text{Maximum width of cut} = \frac{\mathbf{V\ max}}{\mathbf{A \times D}}$$

NOTE
In many cases this figure will be far in excess of either your machine's capabililties or that of sound engineering practice. You should always run the machine within the boundaries of the weakest link i.e. machine / tooling / holding force.

11 FORCES GENERATED BY MILLING

The Power Matrix system can generate up to 120 tonnes / sq metre pulling force so it is very unlikely that a workpiece will lift away from the chuck face. However, resistance to sideways movement is approximately five times less than the downward pull, therefore, when the chuck is being taken to its limit, the workpiece can slide in the direction of the forces exerted upon it.

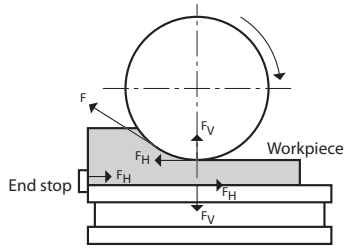
In every case, when it is feasible, we strongly recommend the use of side and end stops. Not only do they provide an increase in metal removal rates but they can also serve as excellent location datums for production work.

HORIZONTAL MILLING

Up-Cut Milling (From milling) 100% V Max

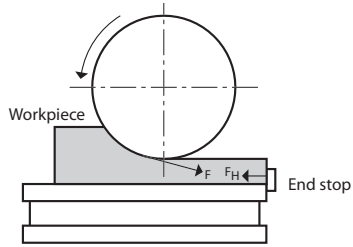
The cutter tries to pull the work up and push it along the chuck. The machining force F is tangential to the cutter, as shown below. The horizontal force FH is resisted by the end stop to the left and the friction between the workpiece and the chuck face.

The vertical force FV is resisted by the downward pull of the chuck.



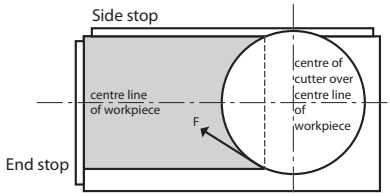
Down-Cut Milling (Climb milling) 100% V Max

The machining force F is downwards towards the chuck and to the bottom right hand corner of the workpiece, so the end stop should be placed at the end where the cut starts. As the cut proceeds, the machining force works with the magnetic chuck. This means that much heavier cuts can be taken during climb milling than in up-cut milling.



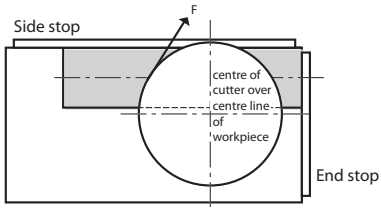
VERTICAL MILLING
Face Milling (On centre) 100% V Max
Slot Milling

During the on-centre face or slot milling operations, as a general rule, the major machining force F is generated at 45° to the direction of travel, as shown below.



FACE MILLING (OFF CENTRE) 100% V Max

The machining forces F during off-centre milling can vary in direction. This is dependent on the proportion of the cutter that is being used and its position on the workpiece. As can be seen below, forces F act between 100° – 150° to the direction of travel of the cutter. This means that if stops are to be used they should be in the positions shown.



11 FORCES GENERATED BY MILLING (CONTD)

EDGE MILLING/PORCUPINE CUTTING. GENERAL RULE 20% V Max

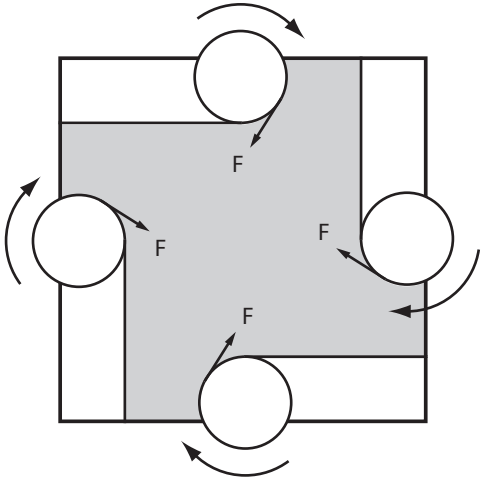
The machining forces F during edge milling are of a much greater magnitude than those of any other form of milling. Machining all around a workpiece will apply force to it over the full 360°. Because of this we recommend:

- Only completely profile larger components, 300mm × 300mm and above, in a single set-up
- Give additional support to smaller items: hold by clamping using pole extensions on two sides giving extra magnetic stitching

  OR

  Use material which is 5–10mm thicker than required. Produce a complete profile, then turn over and face mill the excess material away

If in doubt call Eclipse Magnetics for additional information and technical support.



The Eclipse Magnetics Power Matrix system has been designed to serve you for many years, however some problems may occur when setting up the system.

The following information gives a simple cross check to possible problems. If problems continue, please contact our technical department.

The controller does not respond when the handset is operated.

- Check the mains supply to the controller
- Check that all the conditions necessary to enable the controller are met
- If the chuck is connected via a plug and socket it must be plugged in
- If the chuck is hardwired make sure terminal C is linked to the Earth terminal

12 TROUBLESHOOTING

Please ensure that power is available to the controller.

Problem	Possible Cause	Action
Workpiece will not hold chuck.	Workpiece is not magnetic.	Check magnetic properties of workpiece.
There is insufficient clamping force on the workpiece.	Material is not thick enough to absorb the magnetism.	Put side supports on the chuck to increase the magnetic area in contact with the workpiece.
	Workpiece is not positioned over a minimum of four poles which include north and south.	Position work correctly.
	There are air gaps between the workpiece and the chuck.	Check cleanliness of chuck and workpiece. Check surface finish of workpiece.
The controller is magnetised but the chuck will not magnetise or de-magnetise and the red light on the HANDSET ENABLE remains on.	The wiring inside the chuck or between the chuck and controller may be damaged.	Turn off mains power to the controller. Measure the resistance between terminals 3 and 4. It should be > 1 ohm (see Test Certificate for exact value). If it reads 'open circuit' then check the connections to the controller and the chuck and inspect all cables for damage . If the fault appears to be inside the chuck then consult Eclipse Magnetics. Disconnect the chuck from the controller and, using a high voltage insulation tester, check the insulation resistance between terminal 4 and EARTH. If it is low then first inspect all wiring for damage. If the fault appears to lie in the chuck itself then consult Eclipse Magnetics.
The push switches are not active.	Plug and socket power connection are not connected.	Connect plug and socket.
	If the chuck is hardwired terminal C may not be linked to the correct terminal.	Make sure terminal C is linked to the earth terminal.

Problem	Possible Cause	Action
The magnetic power is not sufficient.	Improper input power supply.	The chuck drives a very high current, around 32-50A for a short duration of time. If the connection is taken from any available power source, the voltage drop would be very high and proper amount of current will not pass through the chuck, resulting in reduced power. It is recommended that the input to the chuck should be taken from the main line going to the machine.
The MAG/DEMAG button is pressed but nothing happens.	Correct operating procedure has not been followed.	To magnetise the chuck press the MAG and COMMON button together. To de-magnetise press the DEMAG and COMMON button together.

Further assistance

Should you require further assistance please contact:

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