ECLIPSE MAGNETICS

# E.S.P.M. MAGNET SYSTEM

# USER HANDBOOK

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# ESPMCv1 CONTROLLER

## The Controller

Eclipse Magnetics Ltd magnets use an 'Electro-Permanent' magnet design which requires power only when magnetising or demagnetising. The ESPMCv1 Controller is a microprocessor based power control unit designed to deliver the short, high current pulses required to operate these powerful magnets. The controller is suitable for 110V or 240V power supplies and will function on either 50 or 60Hz mains frequencies.
The new Eclipse Magnetics range of circular espm magnets are purpose designed to be modular in use and to suit many engineering and industrial applications direct from stock, they are manufactured to operate on a 110v standard industrial power supply but can be custom made on enquiry to suit 240v domestic supply.

## Features:

- Internal current sensing checks to check for full magnetic saturation.
- Illuminated door mounted push buttons to switch the magnet on/off.
- Output interlock relay can prevent machine operation until the magnet is magnetised.
- Fail-safe system means the magnet remains fully magnetised in the event of a power failure.
- Optional remote handset allows operation from the most convenient location.
- Can be controlled from a PLC for integration in an automated system.
- Multiple magnets can be connected to the one controller.

## Model types.

Two versions of the controller are currently available, these are :-

1. A complete control system mounted in an IP55 protected enclosure complete with door buttons for magnet on/off, interface terminals, protective fusing and a mains filter – part number M24388.
2. Controller pcb card only, supplied to install inside the customers own electrical panel, this board is complete ready to operate, however we would recommend that the customer fits adequate fusing and noise filters to suit. This option also requires a set of remote switching buttons to be provided or alternately, a set of switching signals from an external source, ie. a machine control plc. Te part number for this pcb card is CB24388.

## Typical Applications

Electronically Switch able Magnets and this type of controller are now used extensively for:

- Robotic pick and place systems
- Transfer machinery
- Quick release systems
- Automated welding cells
- Jigging and tooling
- Remote handling
- Nuclear industry
- Magnetic conveyor beds
- Work holding for milling, drilling and grinding machines

Unlike electro-magnets, permanent magnets use electricity only for the hold/release switching, a process that takes less than 0.5 seconds and can be controlled via push buttons on the controller door, an optional remote handset or by a plc interface.

**Once energised the magnets will hold their hold indefinitely and are not affected by failure or interruption of the mains power supply.**

These failsafe features offer real benefits to a design engineer.

# Magnet Details

The magnets are supplied in a range of four stock sizes; 75, 100, 125 and 150mm diameter, this size being the diameter of the actual contact face and on some models it may be found that the maximum outer body diameter is slightly larger than this size. Refer to outline drawings for dimensional detail.

Standard magnets fitted with fixed wiring may be used in ‘wet’ applications and are rated to IP65, however when a non-standard hirshmann connector is used we would recommend the application is kept dry as the water tightness of these connectors is not guaranteed.

The magnets are supplied with a pattern of tapped holes on the rear face allowing the unit to be bolted direct to end effectors, lifting frames etc or to be fitted with a suspension eye arrangement as required to suit the individual application.

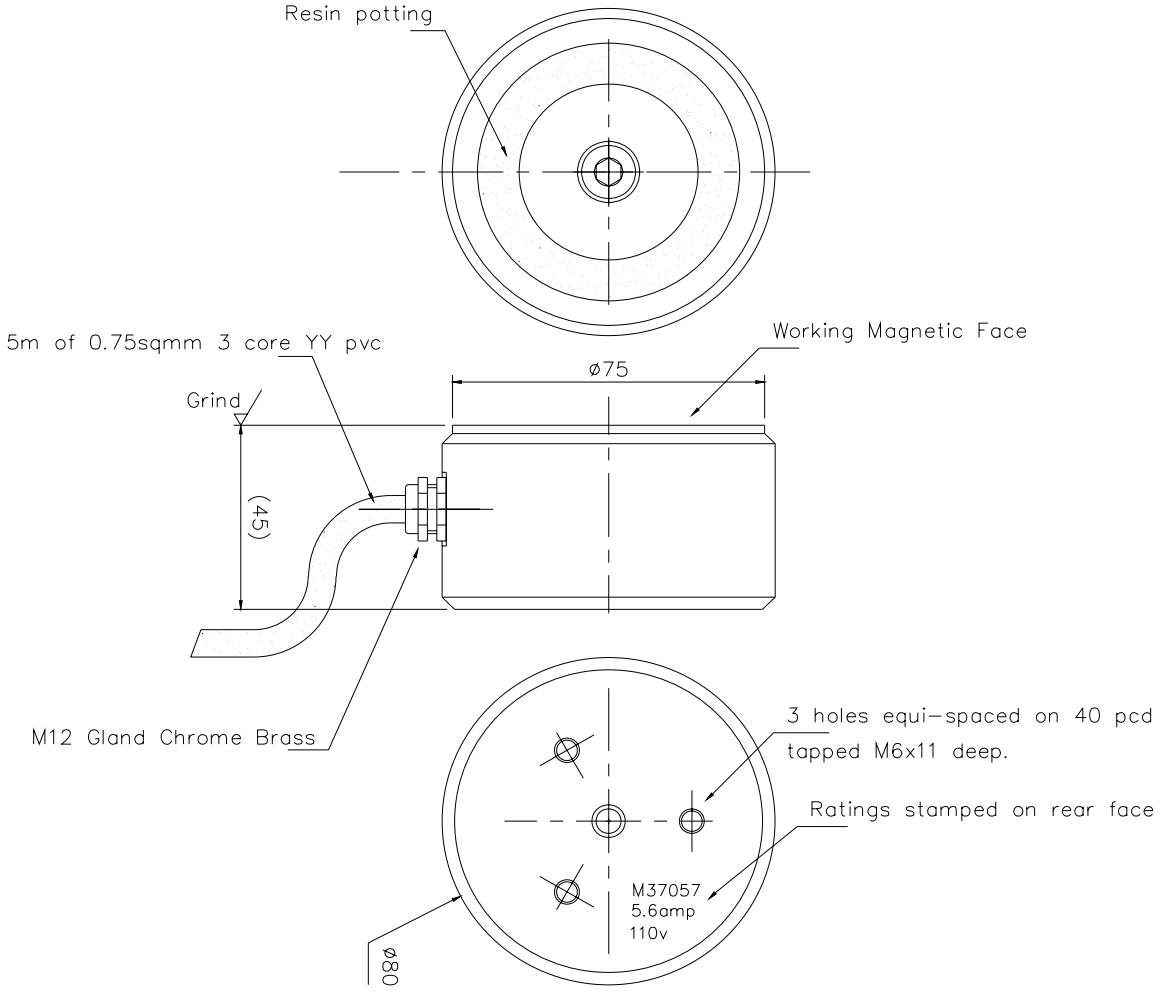
The working face of the magnet is supplied ground smooth and true, this is to ensure intimate contact with the item to be clamped/lifted and therefore obtain the maximum magnetic efficiency. To maintain this magnetic efficiency, the pole feet must be maintained in good order with no deep scuffing or heavy burrs and if found necessary, this face can be occasionally ground smooth using a normal medium hardness open texture wheel on a surface grinder. The magnet must be in the ‘off’ state to undertake this operation and if it is the standard type fitted with a fixed cable and gland, then coolant may be used. If however the magnet is fitted with a plug and socket then the re-grind must be undertaken dry.

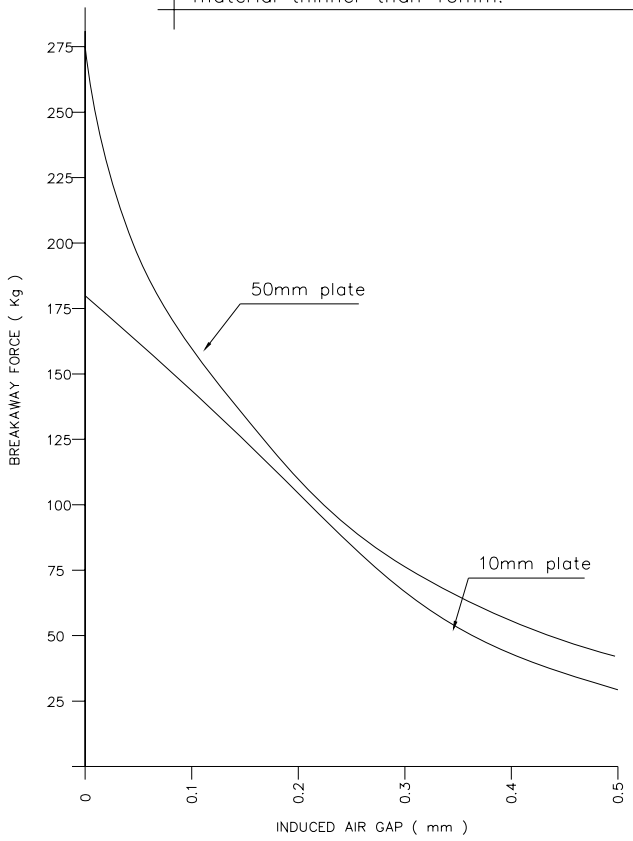
This working face may be drilled/tapped by the customer to fit pole extensions or fixturing locations if desired. The only limitations are that;

A. The depth of drilling is limited to 25mm deep.
B. The area directly above the cable gland is avoided where the wiring enters.
C. An allowance in reduction of performance is understood as pole area is removed.

| JOB No. | NO. OF ASSEMBLIES | QTY. PER ASSEMBLY | MATERIAL: – | FINISH: – | ISSUE | DATE | AMMENDMENT | AUTH. |
|---|---|---|---|---|---|---|---|---|
| | | | BDMS | Bzp + Gold Passivate | 1 | | | |

Operating voltage – 110v
Switching current in closed circuit – 5.6amp
Pull force on clean 50mm plate – 275kg
Pull force on clean 10mm plate – 180kg
Magnet self weight – 1.5 Kg
Minimum switching frequency – 20 seconds
Stray magnetism may be present on material thinner than 10mm.




Graph of performance/induced air gap

ECLIPSE MAGNETICS APPLIED MAGNETIC SYSTEMS

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DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

DRAWN KN
CHECK
DATE 19-1-04

TITLE: –

Assembly Drawing
Dia 75mm espm

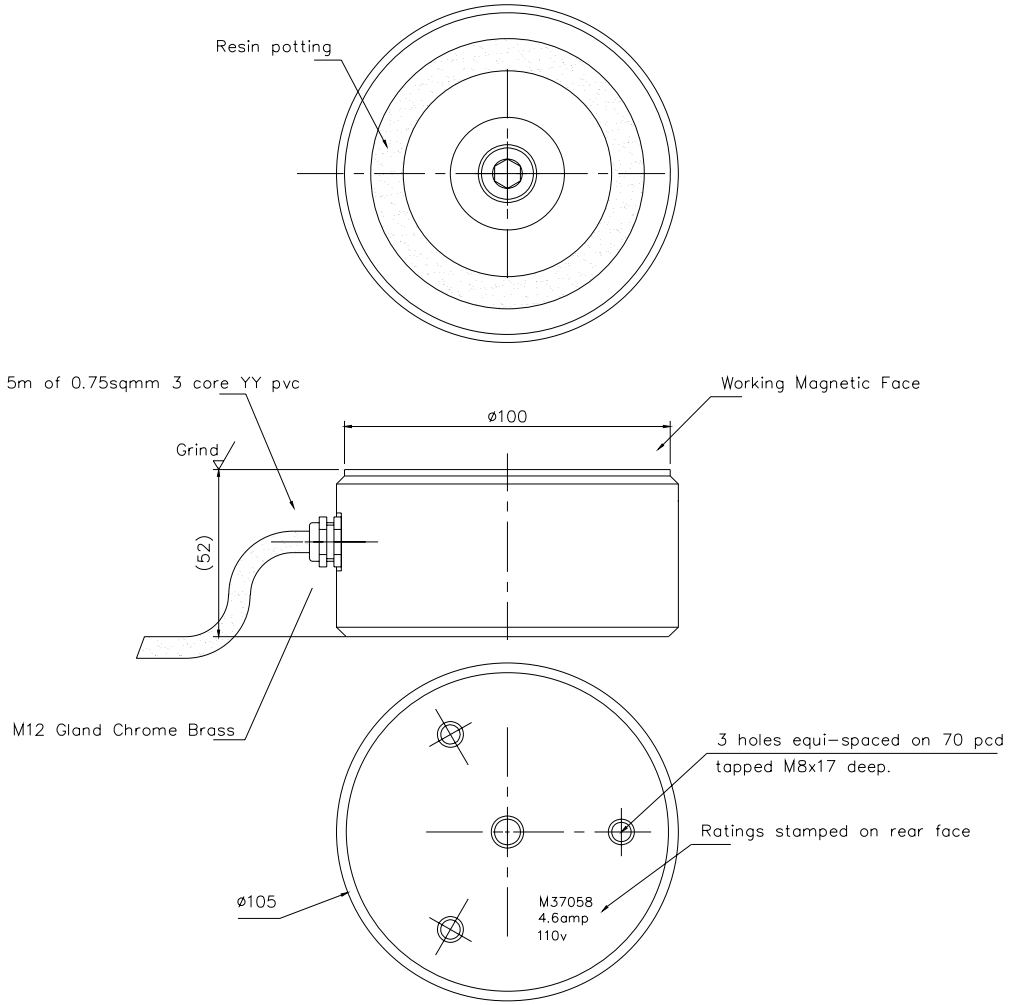
SCALE

GENERAL TOL. ±
LIN.

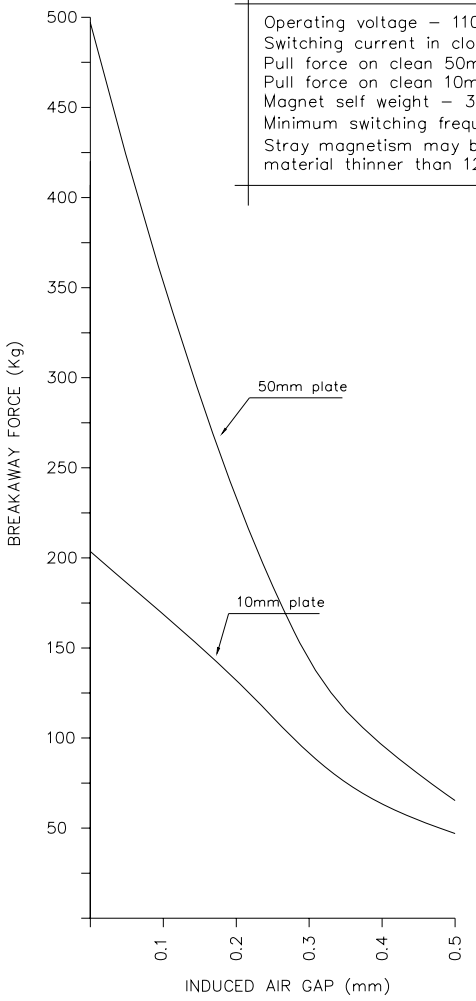
SHEET No.
OF SHEETS

DRG.No.
M37057 -4c

| JOB No. | NO. OF ASSEMBLIES | QTY. PER ASSEMBLY | MATERIAL: – | FINISH: – | ISSUE | DATE | AMMENDMENT | AUTH. |
|---|---|---|---|---|---|---|---|---|
| | | | BDMS | Paint Bright Red | 1 | | | |




Operating voltage – 110v
Switching current in closed circuit – 4.6amp
Pull force on clean 50mm plate – 495kg
Pull force on clean 10mm plate – 203kg
Magnet self weight – 3.0 Kg
Minimum switching frequency – 20 seconds
Stray magnetism may be present on material thinner than 12mm.

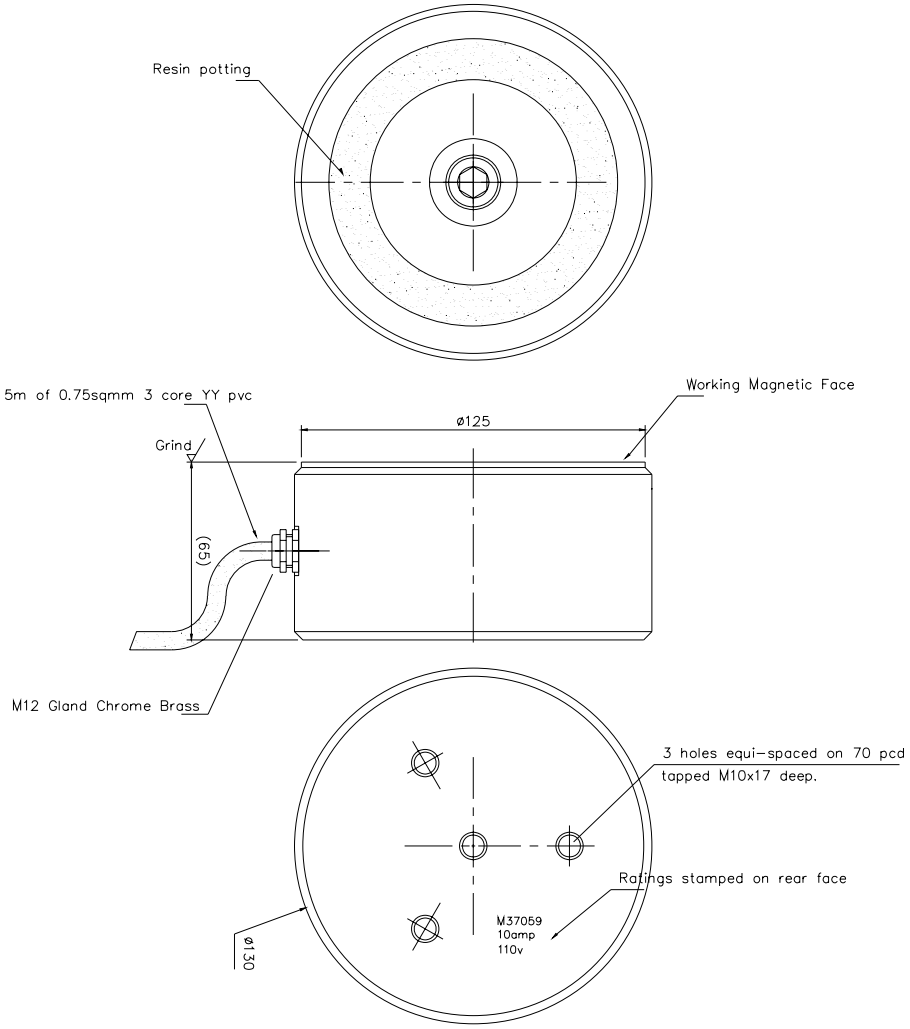


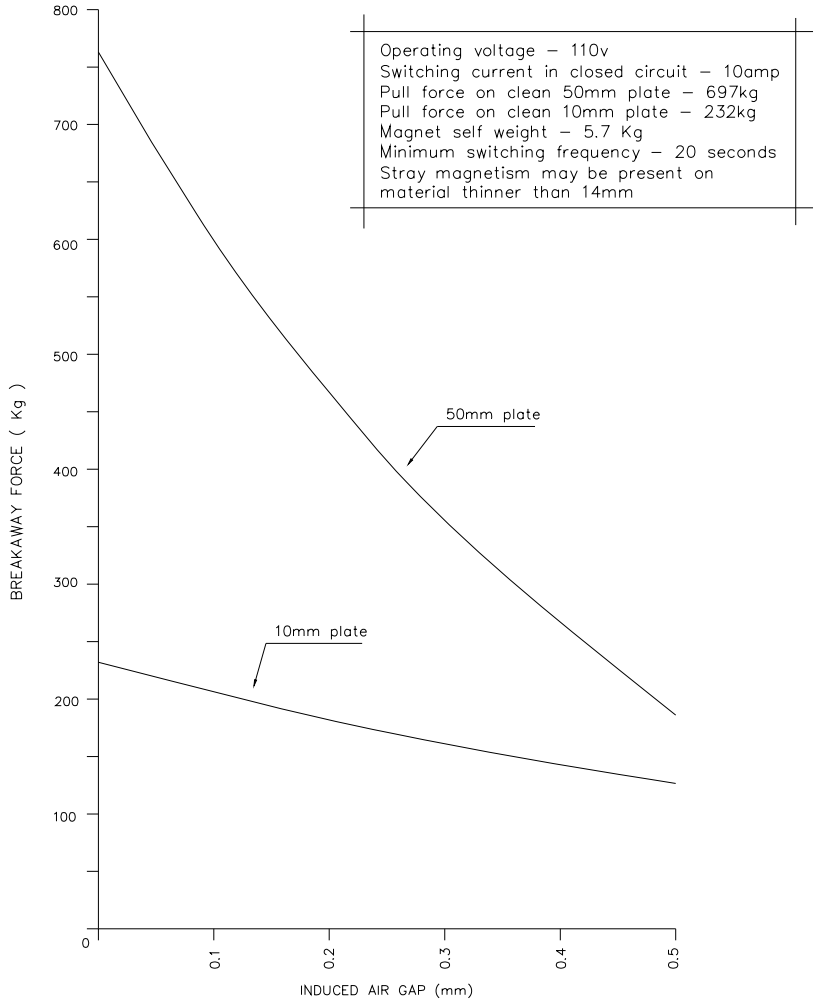

Graph of performance/induced air gap

| ECLIPSE MAGNETICS APPLIED MAGNETIC SYSTEMS | | | TITLE: – | SCALE | SHEET No. OF SHEETS |
|---|---|---|---|---|---|
| COPYRIGHT CLAIMED. THIS DRAWING MUST NOT BE LENT OR REPRODUCED IN ANY FORM WITHOUT PRIOR WRITTEN CONSENT | | DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED | Assembly Drawing Dia 100mm espm | GENERAL TOL. LIN. ± | DRG.No. M37058 –4c |
| | | DRAWN KN<br>CHECK<br>DATE 23-10-03 | | | |

| JOB No. | NO. OF ASSEMBLIES | QTY. PER ASSEMBLY | MATERIAL: – | FINISH: – |
|---|---|---|---|---|
| | | | BDMS | Paint Bright Red |

| ISSUE | DATE | AMMENDMENT | AUTH. |
|---|---|---|---|
| 1 | | | |




Operating voltage – 110v
Switching current in closed circuit – 10amp
Pull force on clean 50mm plate – 697kg
Pull force on clean 10mm plate – 232kg
Magnet self weight – 5.7 Kg
Minimum switching frequency – 20 seconds
Stray magnetism may be present on material thinner than 14mm

Graph of performance/induced air gap

ECLIPSE MAGNETICS APPLIED MAGNETIC SYSTEMS

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DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

DRAWN KN
CHECK
DATE 23-10-03

TITLE: –

Assembly Drawing
Dia 125mm espm

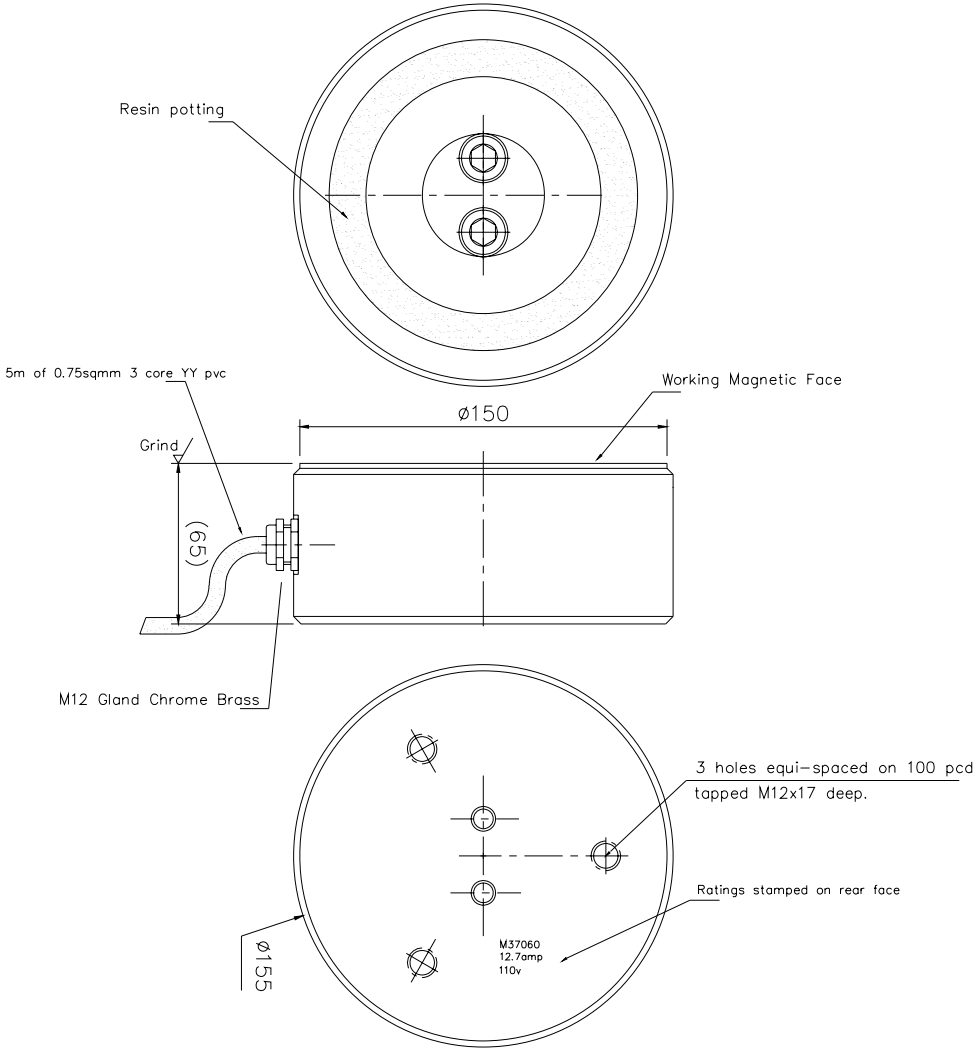
SCALE

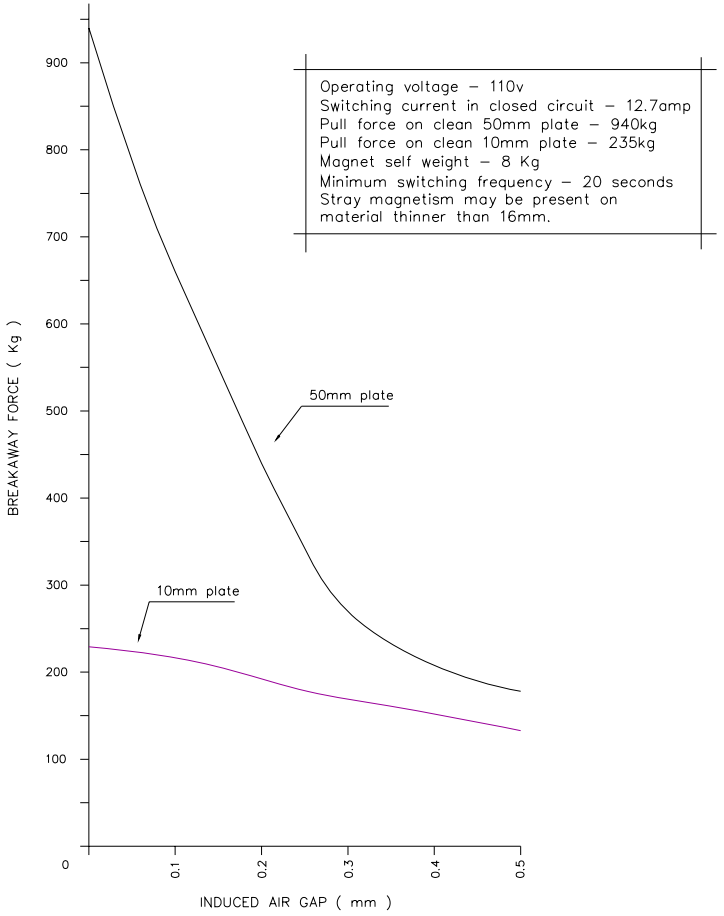
SHEET No. OF SHEETS

GENERAL TOL. LIN. ±

DRG.No. M37059 –4c

| JOB No. | NO. OF ASSEMBLIES | QTY. PER ASSEMBLY | MATERIAL: – | FINISH: – | ISSUE | DATE | AMMENDMENT | AUTH. |
|---|---|---|---|---|---|---|---|---|
| | 1 | | BDMS | Paint Bright Red | 1 | | | |




Graph of performance/induced air gap

ECLIPSE MAGNETICS APPLIED MAGNETIC SYSTEMS

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DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED

DRAWN KN
CHECK
DATE 23-10-03

TITLE: –

Assembly Drawing

Dia 150mm espm

SCALE

GENERAL TOL. LIN. ±

SHEET No. OF SHEETS

DRG.No. M37060 –4c

# The Espm Principle – how do the magnets work ?

**The magnets** –
The Electronically Switch able Permanent Magnets have steel poles and the magnet elements are sandwiched between them. The poles can be drilled/tapped by the customer if required to facilitate the fitting of pole extensions or indeed specially profiled pole shoes.
Each magnet has a series of metric tapped holes in its rear face to allow for suitable mounting or suspension.
The standard range of magnets supplied are fitted with a fixed 5m length of pvc flexible cable and sealing gland, however a Hirchmann 3 pin plug and socket can be fitted on special order at additional cost, allowing the cable to be removed when required.

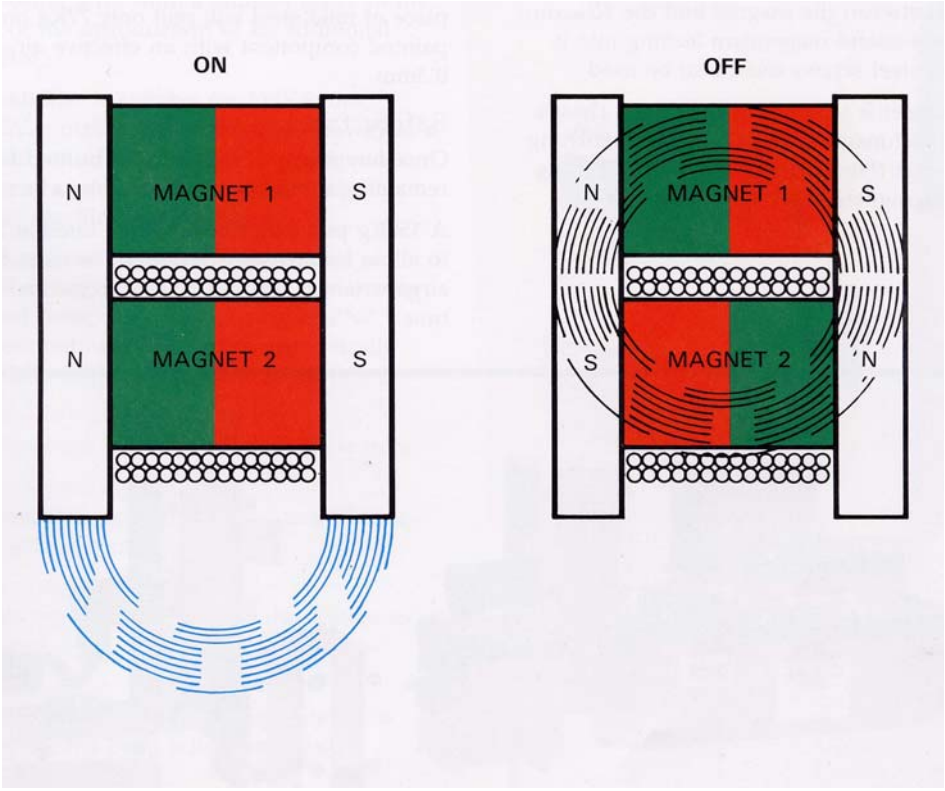
**Performance –**
Each magnet contains extremely powerful Neodynium Iron Boron that provides an excellent power to weight ratio.
All magnets are however influenced by air gaps between the poles and the contact surface, ie. Dirt, rust, paint etc. and a performance to air gap graph is available for all standard magnets that clearly illustrate this down rating of capacity. Ie. A magnet that pulls 146kg on a smooth flat surface may only pull 77kg on a painted component with an effective air gap of 0.3mm.

**Safety Factor when used for lifting applications –**
Once any air gaps have been accounted for, the remaining performance should then be down rated by a factor of 3:1 to produce an s.w.l. Limit and to allow for any surface deviations, shock loads etc that may be encountered.

**How do they operate –**

Each magnet has two steel outer poles (North & South) and sandwiched between these are two sets of permanent magnets of different types that magnetically 'balance' each other.
One set of magnets are permanently polarised in one direction.
The other set of magnets have an electrical coil around them and can be polarised in either direction (i.e. North or South) by passing a short electrical current through this coil.

When both sets of magnets have **like polarity** they **compliment** each other and the full magnetic power is achieved i.e. the magnet is '**On**'.
When the sets of magnets have **opposite polarity**, they **cancel** each other out and the magnet is '**off**'.




## Electrical Specifications

## Mains Supply Voltage:

**Voltage options:** 110 or 220/240 single phase (or 1 phase + neutral from a 3 phase supply )

The controller has an intelligent power supply module that automatically senses the input voltage used and feeds the control circuitry accordingly, no internal adjustments or settings are required.

*** The controller supply voltage must match the voltage requirement of the magnet.**

The new Eclipse Magnetics range of circular espm magnets are purpose designed to be modular in use and to suit many engineering and industrial applications direct from stock, they are manufactured to operate on a **110v standard** industrial power supply but can be custom made on special order to suit 240v domestic supply.

## Mains Supply Current:

**Mains Frequency:** 50/60Hz

**Standing Current :** 45mA @ 110Va.c. - 20mA @ 240Va.c.

**Surge Current :** 50A rms maximum for 0.5 secs to switch the magnet.
(The magnet may draw a lower surge current depending on its size and voltage - see Test Certificate for details)

**Supply Rating:** Unless otherwise stated:
13A fitted with 13A anti-surge fuse and isolator switch.
Supply conductors and protective earth conductor should be >=1.5mm$^2$.

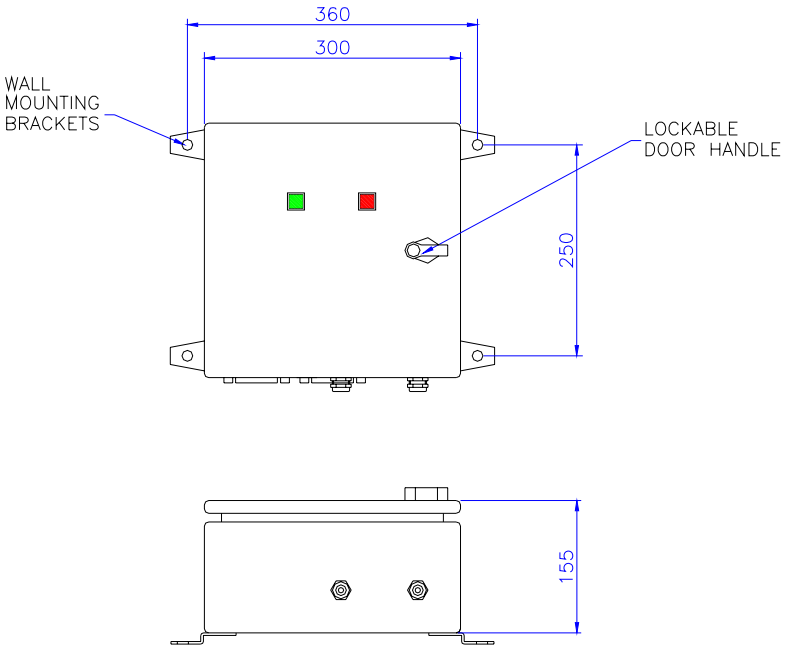
**Supply Rating:** IP55 when supplied in enclosure mounted format.

## Control Signals :

**Inputs :** 24Vdc, 5mA
**Lamp/Outputs:** 24Vdc, 65mA max. ( door lights take up 40mA of this )
**O/P Interlocks:** Volt-free normally open relays
**Output interlocks:** Relays rated at 5A, 30Vdc, 250Vac.

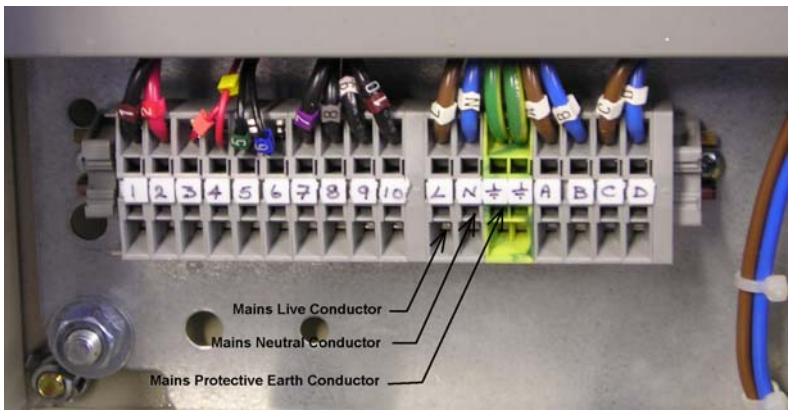
# Installation

**Mounting:**
The controller should be bolted to a solid, vibration free vertical surface such as a wall or pillar using the external fixing brackets provided. The enclosure is rated to IP55 but should be protected from excessive moisture and heat.

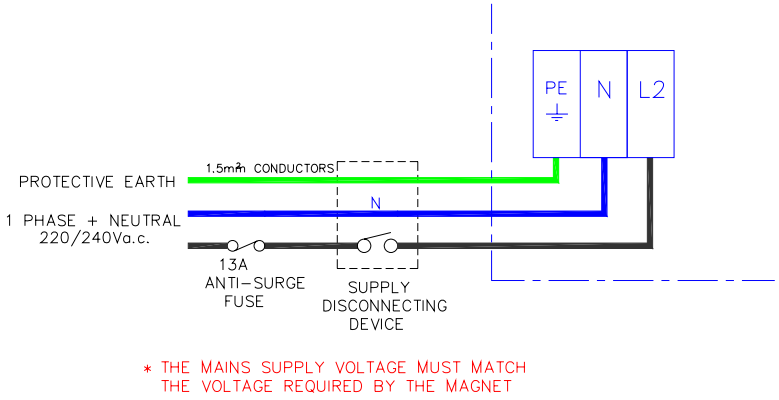



**Mains Supply:**
The incoming mains supply should be fitted with a hand-operated supply-disconnecting device to isolate the controller when required. The two supply conductors should be connected to the input terminals of the terminal rail (**L,N**). Connect the external protective conductor ('Earth wire') to the Protective Earth terminal (**PE**).

**INSTALL IN ACCORDANCE WITH LOCAL WIRING REGULATIONS.**



Mains Wiring –




**Magnet:**

- **The controller has the facility to be used as a single or double output device, in its standard supplied form it will be fitted with a 'single' programme chip allowing a range of magnets to be connected in parallel to its single output. However if the current draw of the magnet selection required exceeds the capacity of the controller, then the magnet selection can be split into two circuits (again each circuit wired in parallel) and a special 'double' programme chip purchased enabling the controller to operate both circuits simultaneously from one control card.**

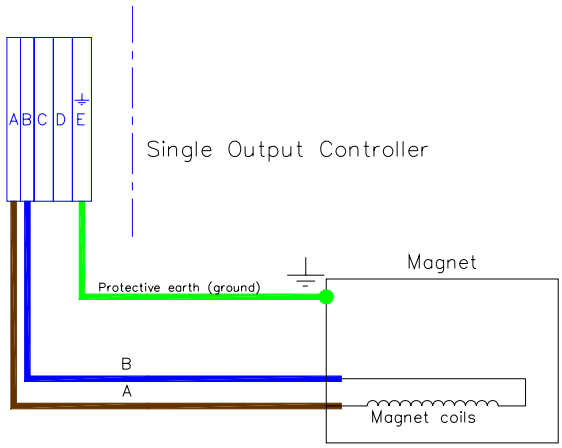
- **Note – Each size of magnet supplied has a rating number stamped on its body, this figure relates to the current draw when switched. When connecting multiple magnets in one circuit, these ratings must be added together up to a maximum sum figure of 60 ( this being the maximum 60amp rating allowance per controller output )**

- **For a selection of magnets where the sum of the rating figures exceed the maximum rating figure of 60, the magnets must be split into two sets and switched from two individual controllers or alternatively a 'double' programme chip can be purchased and fitted to allow the one controller to output on two circuits as described above.**

**Standard ‘single circuit’ connection**.

Connect the magnet **power conductors** (A is brown ‘feed’ and B is blue ‘return’) to their corresponding **terminals A & B**.
If more than one magnet is to be used, they must be connected in parallel circuit using suitably rated and environmentally sealed external junction boxes supplied by the customer.

Connect the **Magnet Protective Earth conductor** to the **PE terminal**.



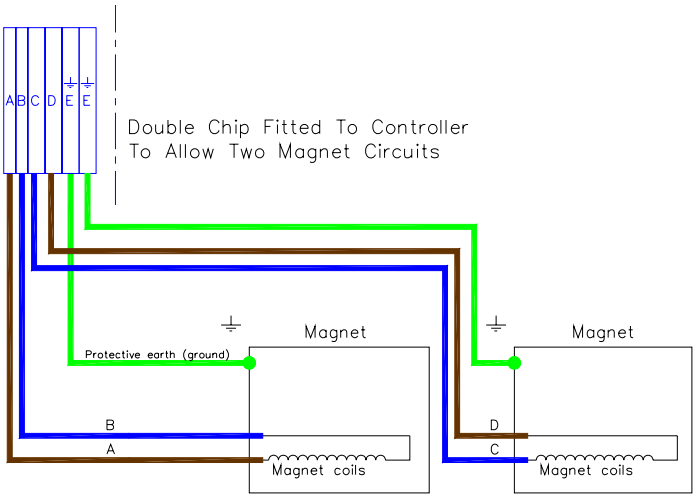

**Non-standard ‘two circuit’ connection with ‘double’ chip fitted.**

Connect the first circuits feed and return conductors to **terminals A & B**. (A is brown ‘feed’ and B is blue ‘return’)

Connect the second circuits feed and return conductors to **terminals C & D**. (C is blue ‘feed’ and D is brown ‘return’)

**You will note that on the second circuit the conductors are configured in reverse to the first circuit, this is because the first circuit uses the positive part of the mains waveform and the second circuit uses the negative part, effectively switching the magnet in reverse.**

If more than one magnet is to be used in each circuit, they must be connected in parallel form using suitably rated and environmentally sealed external junction boxes supplied by the customer.
Connect the **Magnets Protective Earth conductor** to the **PE terminal**



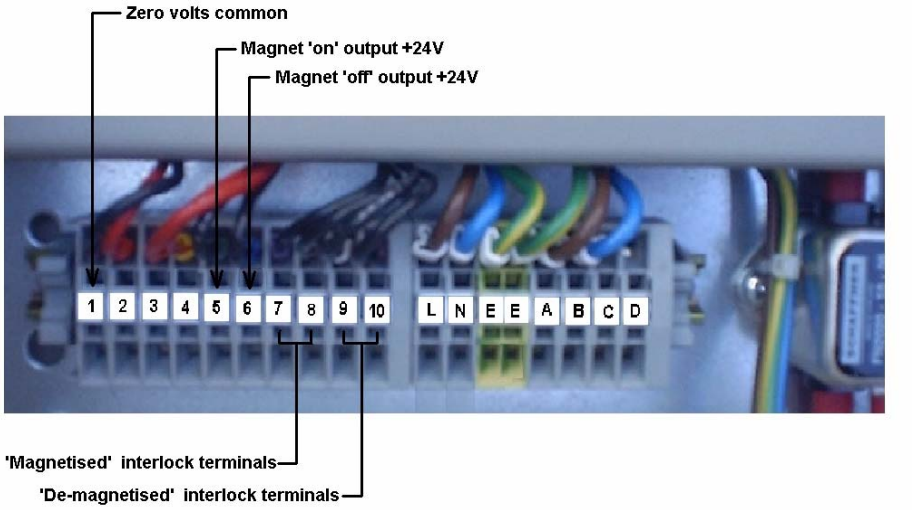
If the magnet is connected via a plug and socket make sure that the plug is securely attached to the socket mounted on the magnets body and that it is clipped or screwed into place.

**Output Interlocks:**
Two Volt Free Normally Open Relays (rated at 5A, 30Vd.c.,250Va.c.) are provided on the PCB and can be interfaced at the terminal rail.
The **MAGD** interlock relay (**terminals 7 & 8** ) closes when the magnet is magnetised.
The **DEMAGD** interlock relay (**terminals 9 & 10** ) closes when the chuck is demagnetised.

A typical application would be to use the MAG'D interlock to prevent a machine running unless the magnet 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.

**Outputs :**

**Magnets 'on' –** terminal **5** will go high ( +24V dc)
**Magnets 'off' –** terminal **6** will go high ( +24V dc)
These signals can be used to power remote indicators or as inputs to a plc system providing that the output current demand is kept within the allowed limit of 25mA – see electrical specification. (If necessary the door lights can be disconnected to allow a slightly higher current draw, taking the allowance up to 65mA max.)
The **0V** on terminal **1** provides a **common.**



# Setting Up The Controller For Use

When the controller is supplied the current sensing circuit is not pre-set, this setting must be calibrated after installation, as a change in voltage, frequency or even a longer cable run can change the threshold setting on the current sensing circuit.
This sensing circuit compares the current flow to the magnet against a calibrated threshold setting to give an indication that the function of magnetising or demagnetising has been successful. If the current sensing circuit deems either function to be un-successful due to a current or voltage starvation (caused by damaged cable or magnet, power supply problem etc) the current sensing circuit will stop the relevant light and interlock from giving an output, therefore letting the operator know that all is not well.

After installing the magnets and controller as previously advised, it is usual to find that the magnets switch on and off but the lights on the door and the output interlocks are not functioning, this is because the threshold level on the current sensing circuit has not been calibrated correctly, it is usually too 'high'.

Please follow the setting instructions below.

1. *Check that both bulbs work by switching off the power supply then turning it back on, both lights at this point should flash on and then go off again.*

To decrease the current sensing threshold, the two potentiometers must be adjusted on the controller circuit board, these are situated on the top left corner of the pcb, and are marked P1 and P2.

1. *Turn pot P1 one half turn clockwise.*
2. *Turn pot P2 one half turn ant-clockwise.*
3. *Switch magnets on and off , checking for light indication.*
4. *If lights do not illuminate, repeat procedure turning half a turn at a time until lights function*.

Once the door lights are functioning, the output interlocks should now function correctly as these are driven from the same sensing circuit.

---

If the predicted switching current of the magnets is actually known then the pots can be more accurately set with the use of a voltmeter by following the instructions below: -

The pcb must have mains power supply connected at 110 or 240V and you will require a voltmeter set on a 2-volt scale.

1. *Locate the black edge connector with three terminals sat next to the two potentiometers.*
2. *Calculate the pot voltage setting by multiplying the predicted current of the magnet by a factor of 0.0264.*
3. *Place the meter probes on the left hand common pin and centre pin and adjust the pot below the centre pin to read the calculated voltage on the meter.*
4. *Move the meter probe from the centre pin to the right pin and adjust the pot below it to give the calculated setting figures on the volt meter.*

With these settings, the lights should now function when the magnet is switched. If at this setting, they do not illuminate, this is probably due to a slight error in the predicted current used in the calculation, use this setting as a base point and fine tune by using the procedure at the start of this page.
The bulbs on these door lights can be replaced in the event of failure by carefully prising off the lens and removing the old wedge base bulb with a small pair of tweezers, the new bulb and the lens then simply snap push back into place. See spare parts list at the end of this handbook for part numbers.

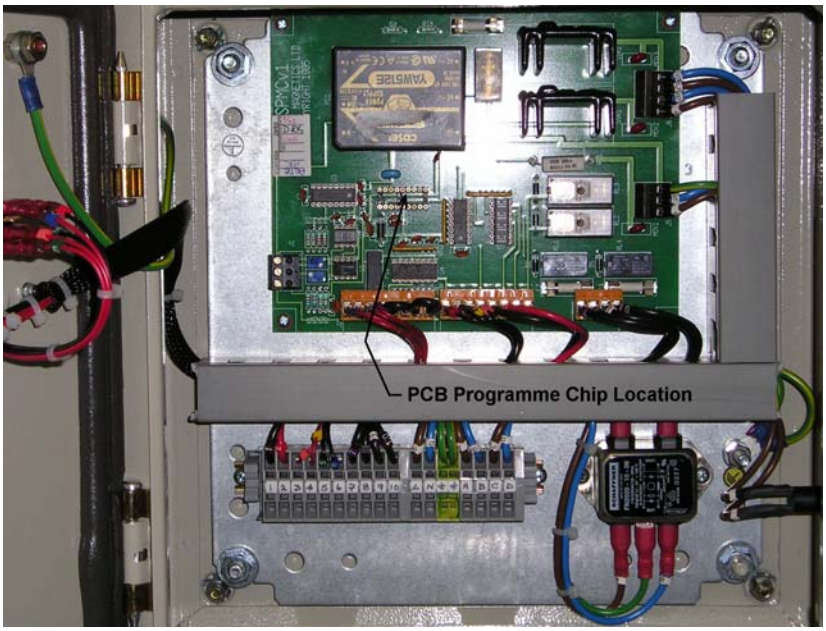
**Program Chip**

Located centrally on the printed circuit board of the controller is the microprocessor chip that manages the inputs and outputs of the system and dictates the type of magnetic pulse discharge that is emitted. Two types of programs are used, these being burnt onto an industry standard 'Pic' chip, the program type being dependant upon the application that the controller and magnet are intended to be used for. For successful switching of any magnet system it is imperative that the correct type of program chip is fitted.

The two types are: -

1. Single chip – this is the standard chip used when the controller only uses one of its outputs, i.e. Magnets are only connected to output terminals A and B.
2. Double chip – this is used when the current demand of the magnet selection required, exceeds the capacity of one control output and hence, both of the controllers output terminals must be used, i.e. When magnets are connected to output terminals A, B, C, and D.

The pic chip type utilised is common to all types, hence the controller can be set up to switch almost any type of small Eclipse Magnetics Ltd magnets.



# Operating The Controller

*** TO MAGNETISE THE MAGNET ***

PRESS AND RELEASE THE GREEN 'ON' BUTTON

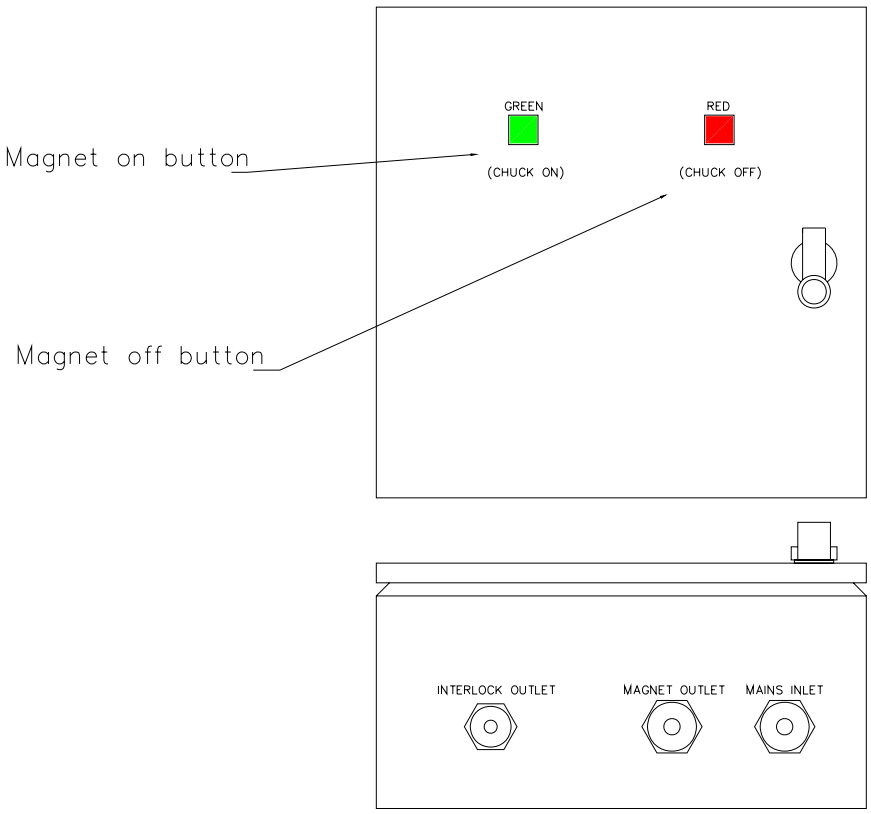
THE 'ON' BUTTON SHOULD ILLUMINATE (GREEN)

*** TO DEMAGNETISE THE MAGNET ***

PRESS AND RELEASE THE RED 'OFF' BUTTON

THE 'OFF' BUTTON SHOULD LIGHT UP (RED)

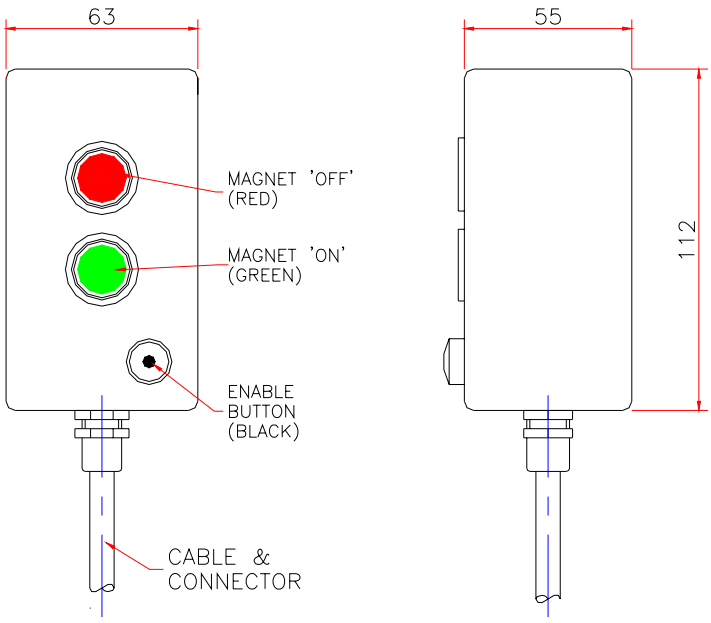
## Control Panel Diagram



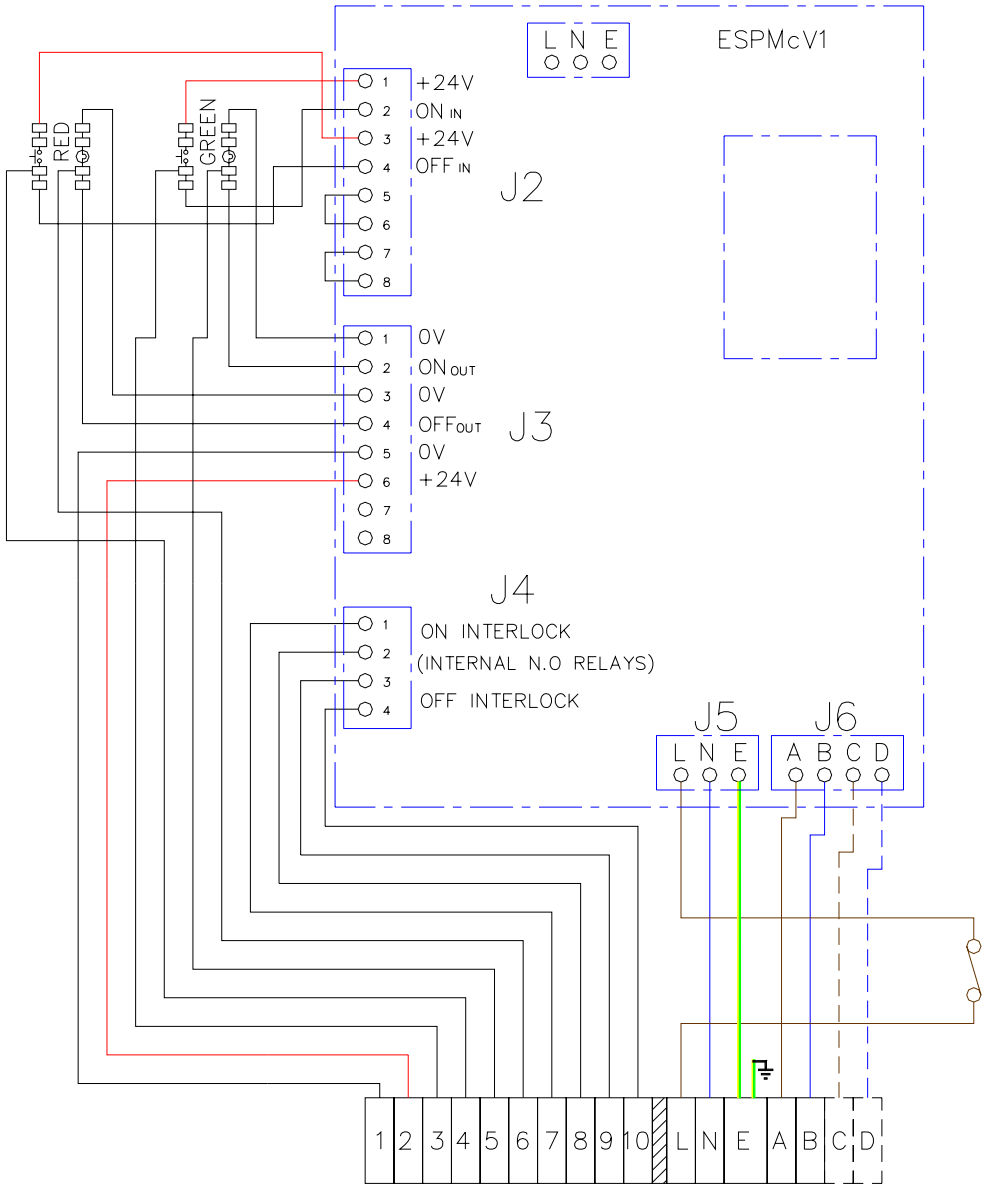
## Optional remote handset

Available as an optional extra is a wired remote handset, allowing control of the magnet up to 6m away from the control cabinet (longer lengths on request).
This remote handset allows the operator to switch the magnet whilst being in the close vicinity of the work piece allowing a higher degree of control, with this in mind, to ensure complete operator safety Eclipse Magnetics Ltd have incorporated a safety enable button to the circuit, thus ensuring that the operator must use both hands to operate the magnet and therefore eliminating any risk of entrapment. This small black button must be held down whilst either the on or off buttons are pressed to allow the controller to function.

### Remote Handset Diagram




# Internal Wiring Schematic



# PLC Control

PLC control may be used in place of the buttons or handset in automated systems.

Connection is required via the connections on the ten way terminal rail within the controller.

The inputs are 24Vdc, 5mA and have a common -ve connection.
The outputs are 24Vdc, 25mA.

**To use the controller's internal 24Vd.c. supply.**

Terminal **1** supplies the zero volts common.
Terminal **2** supplies the +24V supply to the plc switch relays.
Magnetise output from the plc should feed terminal **3**.
Demagnetise output from the plc should feed terminal **4**.
Terminal **5** will go high when the magnet is magnetised.
Terminal **6** will go high when the magnet is demagnetised.

If the controller's 24v feedback to the plc from terminals 5 & 6 cannot be used, an external power supply or the plc's own 24V supply can be fed through the two-volt free interlock relays to determine the magnets status.

Terminals 7 & 8 will connect when the magnets are 'on'
Terminals 9 & 10 will connect when the magnets are 'off'

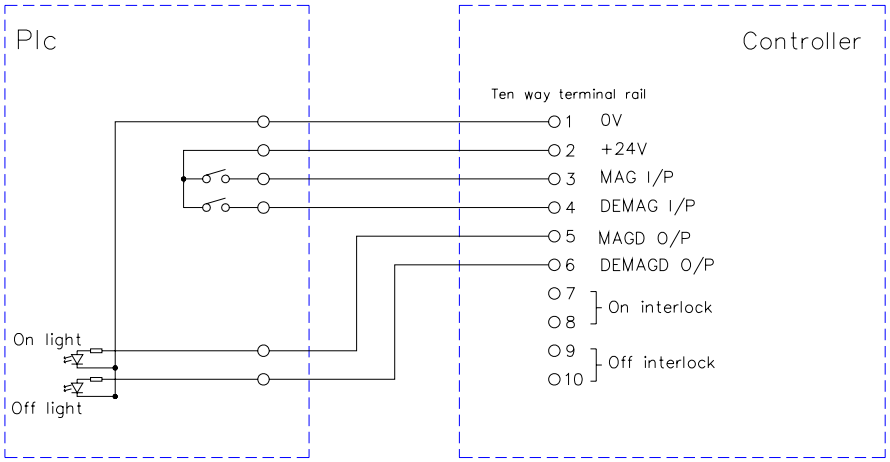
*** DO NOT COMMON THE PLC SUPPLY WITH THE CONTROLLER SUPPLY.**

Inputs should where possible mimic the momentary action push buttons on the handset, i.e. they should be pulses of >100ms duration. The controller looks for a 'no input' state before it will operate and so if signals are maintained there must be a delay of at least 100ms between removing one signal and applying another. If two or more inputs are applied simultaneously they will be ignored.

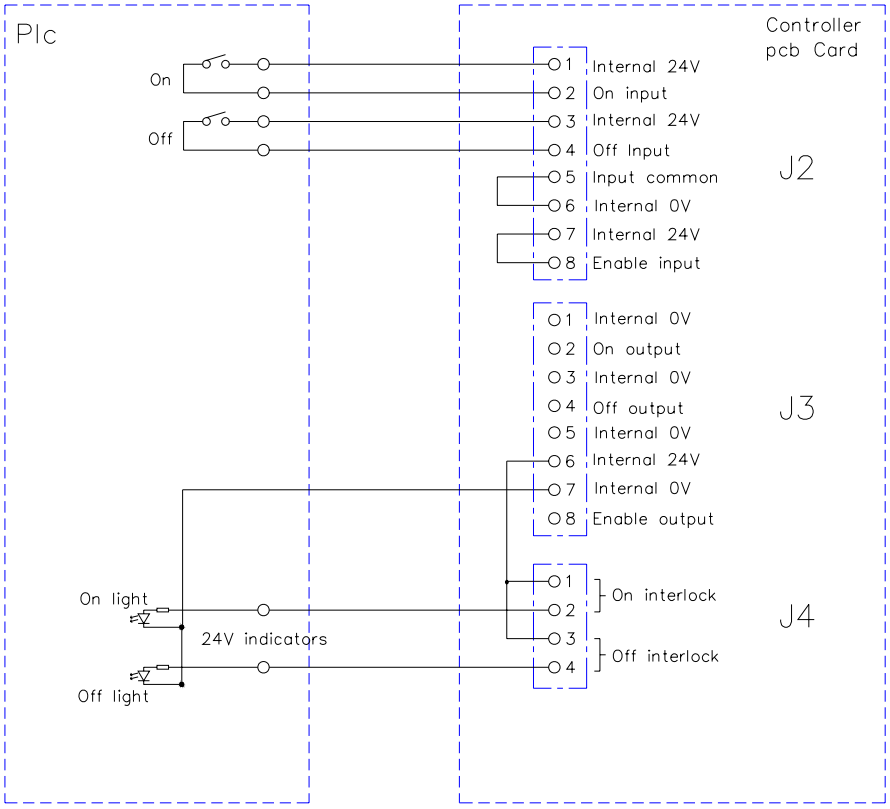
The output signals are continuous, but note that during a switching operation the state of the chuck is undetermined and so no output signals will be present.

# PLC Wiring - Using Internal 24Vdc Supply
## (Same circuit for remote handset)

Plc wiring – for the complete controller using internal 24V power supply



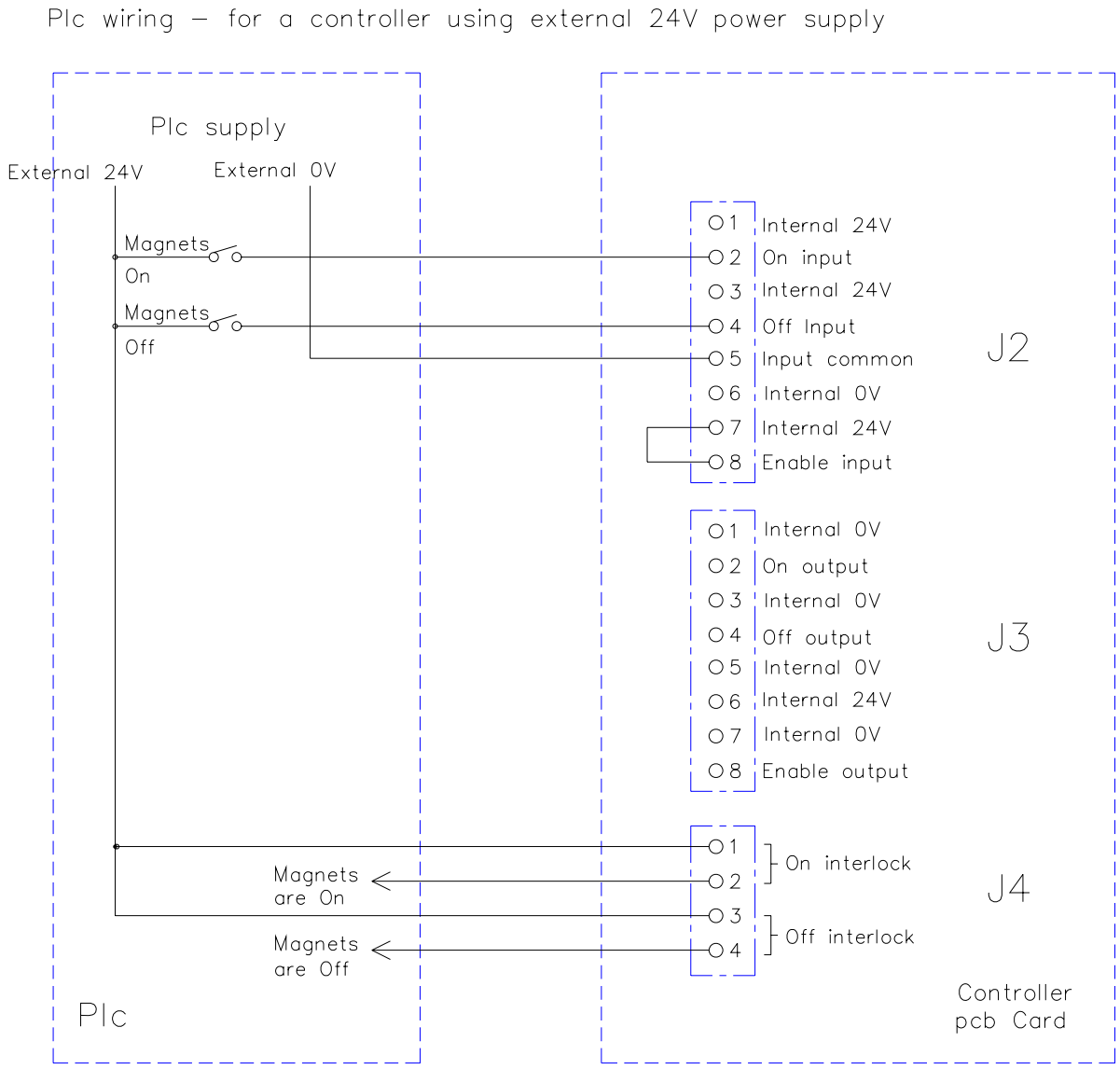

Plc wiring – for a controller pcb card using internal 24V power supply



# PLC Wiring - Using External 24Vdc Supply

If the controller must be operated from an external power supply (i.e. The plc's own 24V) then the following modifications must be made.

1. Disconnect the pushbuttons from the internal 24V supply by removing the wires from terminals J2/1 and J2/3.
2. Remove the link between J2/5 and J2/6 and then connect J2/5 to the external 0V. This may be done by removing the wire from J3/5, connecting it to J2/5 and then connecting the external 0V to terminal 1 on the ten way terminal strip.
3. You can now switch the magnets by applying +24V to terminal **3** to turn 'on' and termnal**4** to turn 'off'.




## Fault Finding

The Eclipse Magnetics Ltd magnet and controller system has been designed to serve you for many years. However, some problems may occur when using the system. The following table gives a simple cross check
to possible problems. If problems continue, please contact our technical department.

**The controller does not respond when the buttons are operated.**

1. **To check the controller**

- Check the mains supply to the controller
- Check that all the conditions necessary to enable the controller are met. .
- Check that the mains voltage is present at **J5 –** if not check the mains supply and the main fuse.
- With the power **on** check that **+24V** is present between terminals **J3/5** and **J3/6**, if not then check fuse **F1**, if replacing this does not work then the power supply on the pcb has failed and the board will need replacing. Fuse **F1** is rated at **T1A**.
- When the board is first powered up, both interlock relays should briefly close and open, as they do so, switching on and off both door lights. Try turning on and off the mains and observe if the lights flash or not.
- Ensure that there is a program chip fitted in socket **U5** next to the power supply.
- With the mains on, try operating the buttons whilst observing the power relay **RL2** – the relay should close briefly then open again when a button is pressed.
- Ensure that the link is in place between **J2/7 and J2/8**.
- If all these checks fail and the magnet checks out Ok, then the controller must be returned to Eclipse Magnetics Ltd for inspection and repair.

2. **To check the magnet**

- If the magnet is connected via a plug and socket it must be plugged in.
- If the magnet is hardwired make sure all connections between the magnet and controller are good.
- Disconnect the magnet from the controller and measure the resistance between the two wires, ensure that this reading matches the design resistance (this figure is stamped on the body as a rating number). If the resistance is correct then check the connections to the controller and magnet plug (where fitted) and inspect all cables for damage
- Using a high voltage Mega, check the insulation between the magnet conductors and the earth conductor; it should be greater than 5ohm at 500V.
- If the insulation resistance is low then first inspect all wiring for damage. If the fault appears to lie in the magnet itself then consult Eclipse Magnetics.

**If the magnet appears to switch but the door lights do not work.**

With these symptoms, it is likely that the current sensing circuit is not correctly set or that there has been a change in circuit current. If the pots have been previously set and then the outputs suddenly stopped working, check the wiring and magnet insulation/resistance as outlined above prior to re-adjusting the pots.
To set the current sensing circuit – refer to the detailed instructions listed under 'Setting up the controller'.
If adjusting the pots does not work, check the door light bulbs, these can be replaced as described under 'Setting up the controller'.
If indication cannot be returned to working order after following these procedures then the system must be returned to Eclipse Magnetics Ltd for inspection and repair.

| Problem | Possible Cause | Action |
|---|---|---|
| Work piece will not hold on chuck | Work piece is not magnetic | Check magnetic properties of work piece |
| | Material is not thick enough to absorb the available magnetism | |
| | Work piece is not positioned over a minimum of two poles i.e. North & South | Check correct positioning of the work piece. |
| | There are air gaps between the work piece and chuck. | Check cleanliness of chuck and work piece. Check surface finish of work piece |
| The magnet appears to operate correctly but the green/red push buttons on the front panel indicators do not illuminate. | The current sensing threshold set by the potentiometers on the circuit board may be too high for the magnet. | Turn off the mains power and open the control enclosure. Follow instructions under 'Setting up the controller' |

# Spare Parts List

Details of the serviceable components of the controller are listed below. For further information or technical assistance please contact Eclipse Magnetics.

| Qty | Part | Manufacturer |
|---|---|---|
| **1** | **CB24388**<br>**Main circuit board with microcontroller** | **Eclipse Magnetics** |
| **1** | **Door light bulb RS 2073347 or 2280399** | **Radio Spares** |
| **1** | **Mains fuse T10A 240V RS 419 820** | |
| **3** | **Internal fuse T1A 240V RS 419 763** | |

# TECHNICAL HELP AND SUPPORT CONTACTS

**ECLIPSE MAGNETICS** have a team of technical support engineers available to help in the event of queries or to give additional advice.

Please contact the following for expert assistance

## CONTACTS and DIRECT NUMBERS

Mr Kevin Martin - Engineering Director – Eclipse Magnetics Ltd 0114 2250567
Mr Keith Newman - Engineering Manager – Applied Magnetic System 0114 2250510
Mr Steve Mott - Projects Manager – Applied Magnetic Systems 0114 2250543

**ECLIPSE MAGNETICS LIMITED**
**Unit 1, Vulcan Road**
**Sheffield**
**S9 1EW**

**Tel: 0114 2250 600**
**Fax: 0114 2250 660**

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## ADDITIONAL INFORMATION

**Electronic controller – Design Standards**

The Eclipse Electronic controllers are designed and manufactured to comply fully with the following European Standards.

**EN 50-081-2 : 1993**
Electromagnetic compatibility – Generic Emission Standard
Part 2 : 1993 : Industrial.

**EN 50-082-2 : 1995**
Electromagnetic compatibility – General Immunity Standard
Part 2 : 1995 : Industrial.

Conformity criteria for immunity to Electromagnetic interference:
The controller shall continue to operate as intended. It shall not change the state of the magnetic chuck or stop indicating the state of the chuck under the influence of electromagnetic interference.

**EN 61-010-1 : 1993**
Low voltage directive 73/23/EEC

The Eclipse Electronic controller also conforms to the protection requirements of **Council Directives 89/336/EEC and 73/23/EEC.**

# CE Declaration Of conformity

## Product Description:

**Electronically switch able permanent magnet control board**

## Product Identification: M24387/24388

## Manufactured by:

**ECLIPSE MAGNETICS LTD.**
**Units 1-4 Vulcan Rd**
**Sheffield**
**S9 1EW**
**ENGLAND**

## Applicable Standards:

**EN 50-081-2 : 1993**
**Electromagnetic Compatibility - Generic Emission Standard**
**Part 2 : 1993 : Industrial**
**EN 50-082 -2 : 1993**
**Electromagnetic Compatibility - Generic Immunity Standard**
**Part 2 : 1995 : Industrial**

**(Conformity Criteria for Immunity to Electromagnetic Interference:**
**The controller shall continue to continue to operate as intended. It shall not change the state of the magnet or stop indicating the state of the magnet under the influence of Electromagnetic Interference)**

**EN 61-010-1 : 1993**
**Low Voltage Directive 73/23/EEC**
**I certify that the apparatus above conforms to the protection requirements of Council Directives 89/336/Eec and 73/23/EEC.**

**Signed:** *Kevin Martin*
**Kevin Martin**
**Engineering Director**
**Eclipse Magnetics Ltd.**