

Magdrive1000

User manual

SAFETY

General safety

Be aware that the Magdrive1000 power supply is a High-Voltage Generator. **It should be handled with the same care as You would handle a 5 kV power line!**

Use high-quality connectors and Hi-Voltage wires when You connect the Magdrive1000 to the magnetron.

Recommended connector type: Molex 190.06.0011

Recommended Hi-Volt Wire: Siltek Style 3239. 1,3 mm², 15 kV.

Make sure that the Hi-Volt Cover always is in place before power-up.

Only operate the equipment, and the high voltage wires, behind grounded and locked enclosures. See SS-EN 60519-1 and SS-EN 60519-6

Electrical and environmental data

Input

Voltage: 230V AC

Current: 6,5 A

Frequency: 50/60 Hz

Connection: Cable, 3 x 1,5 mm², length 1m. Connector CEE - 7/XVII .

Output

Output power: 100 – 1320W changeable via serial communication port

Nominal Anode Voltage: 4,3 kV (magnetron dependent)

Nominal filament current: 5-10A changeable via serial communication port

Recommended magnetron: Panasonic 2M244

Connector: 6,3 x 0,8 mm spade connector

Environment

Enclosure: Metal enclosure with forced cooling.

Protection degree: 1

Pollution degree: 2

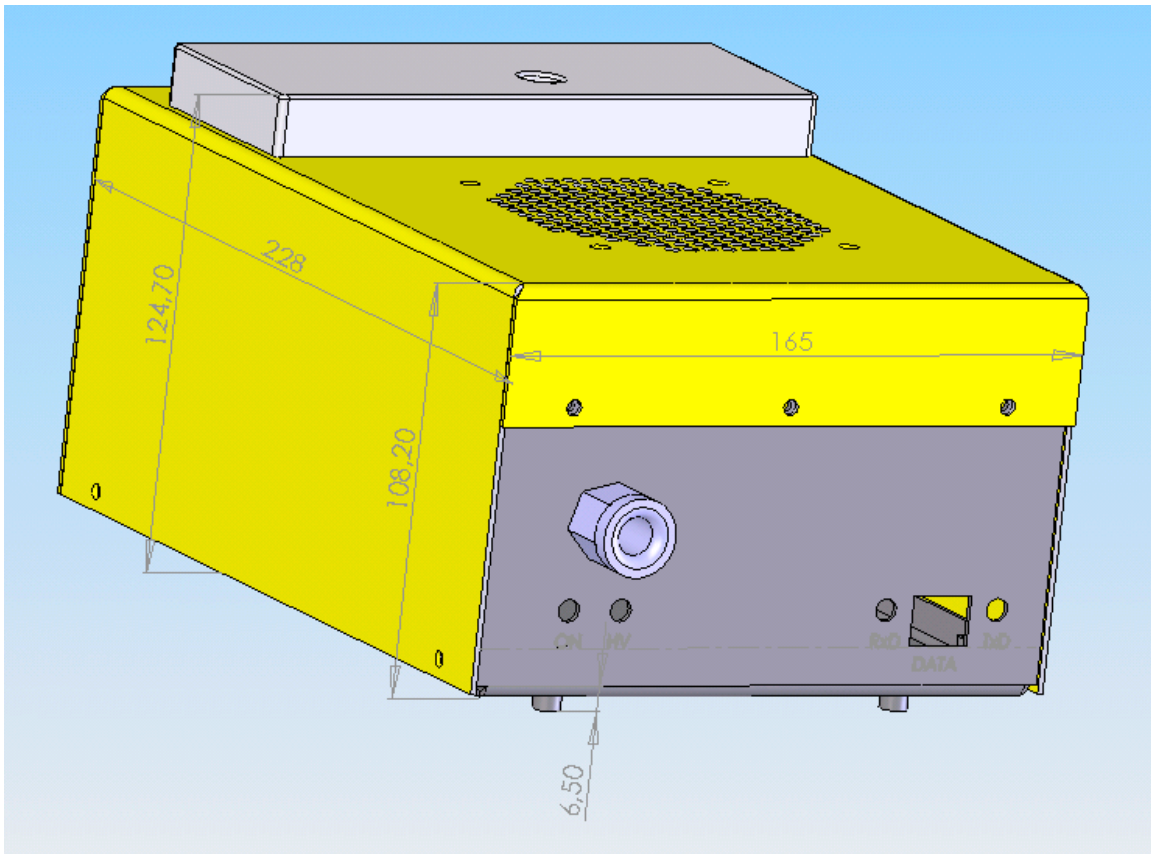
Temperature range: 5-40°C, 80% RH

Mechanical data

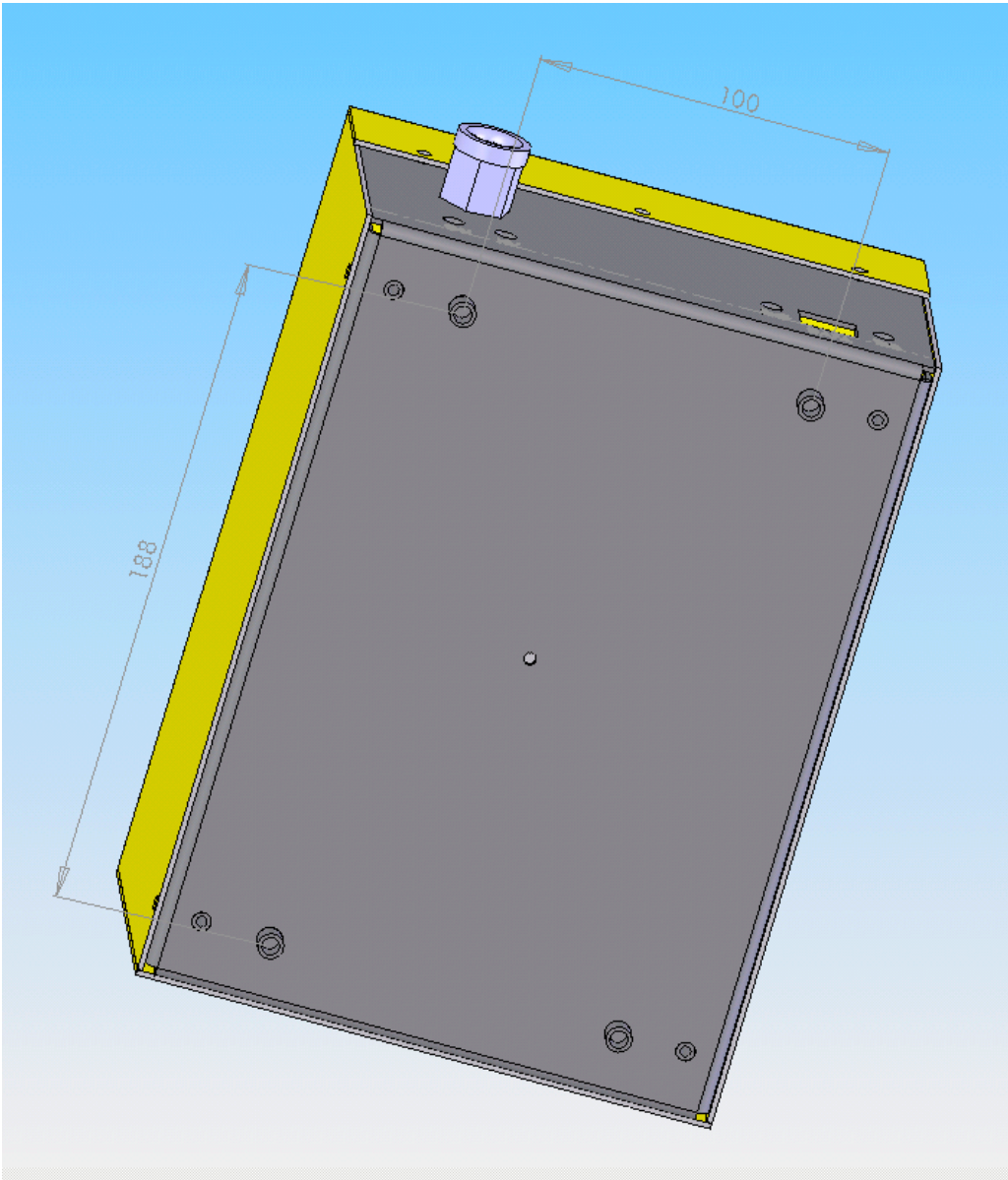
Measures

Weight: 2,5 kg

W x D x H: 165 x 230 x 130 mm (excl power inlet)



Mounting footprint W x D: 100 x 188 mm. M5 Captive nut on Magdrive1000.



INDICATORS

ON: Green LED indicating 230VAC and Internal power

HV: Red LED indicating Hi-Voltage output active and/or filament active.

RxD: Yellow LED indicating communication from an external control system

TxD: Yellow LED indication communication from the MagDrive1000

Note: When connecting 230VAC to the Magdrive1000, the fan and the HV Led activates for some few seconds for fail-checking purpose. No HighVoltage is produced during this fail-check.

Communication

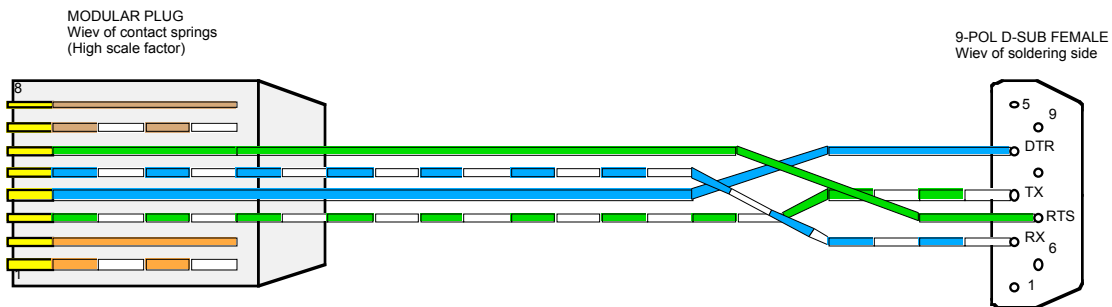
Modified RS-232 using RxD, TxD, RTS and DTR signals, connected to a modular 8-pin connector.

The communication setting should be: Baudrate 2400, 8 data bits, 1 stop bit, No parity, RTS always set at high state, DTR always set at low state.

The communication ports can be paralleled, thereby making it possible to control up to three Magdrives from one serial port.

Each unit can be addressed 1 to 255 individually. Address "0" is a broadcast adress that all units listen to.

A communication cable can easily be assembled, using a standard PC Patch cable and a 9-pol D-sub female connector, as follows:



Communication protocol

Write commands

Send data				Recieve data from Magdrive				
Command	Byte 0	Byte 1	Byte 2	Byte 3	Byte 0	Byte 1	Byte 2	Comment
Power off	128	37	0	165	37	0	37	Power off on unit Byte 2 = 0->7
Power level 80W	128	37	8	173	37	8	45	
Power level 90W	128	37	9	174	37	9	46	
Power level 100W	128	37	10	175	37	10	47	
Power level 200W	128	37	20	185	37	20	57	
Power level 300W	128	37	30	195	37	30	67	
Power level 400W	128	37	40	205	37	40	77	
Power level 500W	128	37	50	215	37	50	87	
Power level 800W	128	37	80	245	37	80	117	
Power level 1kW	128	37	100	265	37	100	137	
Power level 1.3kW	128	37	130	295	37	130	167	

Note : To set power levels between values presented above change Byte 2 according to following formula

Byte 2 = P(W)/10

Byte 3 = Byte 0 + Byte 1 + Byte 2

Byte2 > 130 rejected by Magdrive

Byte 2 < 8 shutdown command

Read commands

XX : Requested value returned by Magdrive

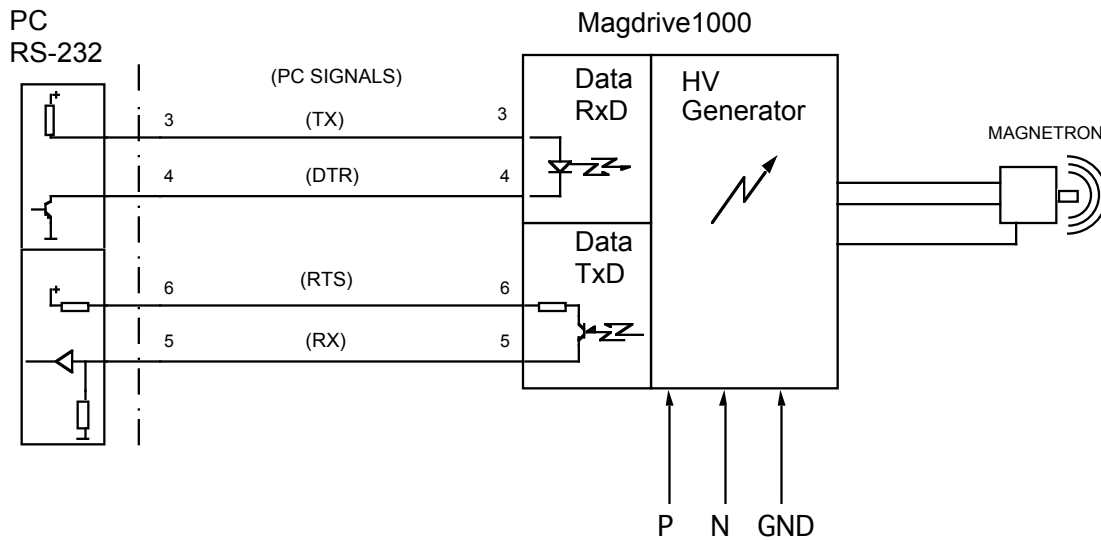
YY : Checksum = Byte 0 + Byte 1

Send data				Recieve data from Magdrive				
Command	Byte 0	Byte 1	Byte 2	Byte 3	Byte 0	Byte 1	Byte 2	Comment
Read power level	0	37	0	37	37	XX	YY	Return power level setting
Read alarm	64	24	0	88	24	XX	YY	Return alarm status
Read temp	0	43	0	43	43	XX	YY	Return temperature (sign char)
Read fil. current	0	59	0	59	59	XX	YY	Return filament current x 10

Alarm register byte

Bit 0 :	Filament control failiure
Bit 1 :	Anode power control failiure
Bit 2 :	Temperature control failiure
Bit 3 :	N.C.
Bit 4 :	Temperature regulation in progress
Bit 5 :	PFC control failiure
Bit 6 :	N.C.
Bit 7 :	Unit disabled due to alarm

Electrical function of the data communication



The DTR-signal from the PC sinks current via the opto-coupler in the Magdrive1000. Keying the TX-signal sends data from the PC to the Magdrive. The current loop goes back to the PC via the DTR-signal that should be set low. Setting the RTS-signal high makes it possible for the Magdrive to send signals via the opto-coupler back to the PC via the RX-signal wire.

ELECTRICAL CONNECTION

Connection and On/Off switching

The Magdrive1000 is to be connected to a standard outlet. As the Magdrive1000 has no on/off-switch, make sure that the power connector is un-plugged before moving or disconnecting the unit. Allow at least 1 minute for the reservoir capacitors to discharge.

If the Magdrive1000 is permanently connected to fixed terminals, make sure that a power switch or similar device is used to disengage the unit. The switch must have a clear visible marking of its on/off state.

Internal fusing

An internal fuse, 10A slow blow, protects the power line if the Magdrive1000 malfunctions.

Recommended internal fuse: Ceramic 5x20 mm. 10A Slow-Blow. High breaking capacity (1500A).

External fusing

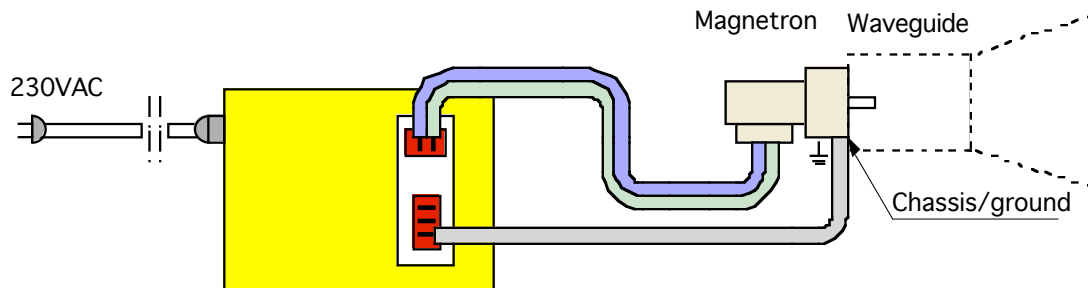
The radiated microwave power from the magnetron (Panasonic 2M244) is 1kW. This requires 1300W to be delivered from the Magdrive1000. Make sure that the external fusing is capable of 8-10A.

Power and Protective ground

The Magdrive1000 must always be connected to a grounded outlet.

Hi-Volt Wiring

Three Hi-Volt wires should be used to connect the magnetron;
Two wires carries the filament current and the (negative) cathode power.
One wire carries the anode return current



Chassis Ground

The magnetron must always be connected to a metallic structure carrying the microwave. As the magnetron anode is part of the metallic body of the magnetron, the anode return current might flow through the metallic structure, back to the Magdrive1000. This is not a functionality problem, but **for safety reason the magnetron chassis must always be connected with a separate cable from the magnetron chassis to the Magdrive1000.**

Service

The Magdrive1000 has no user serviceable parts inside.

Any erroneous, unqualified repair, might create lethal danger!

Always return the Magdrive1000 to the supplier, if service is needed.

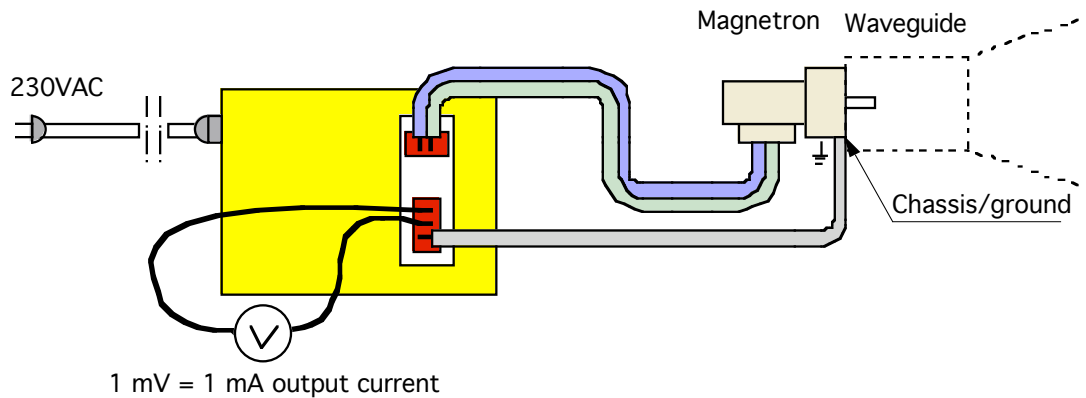
On site testing

The function of the magnetron may be tested by checking the magnetron anode current.

The cathode current MAY NEVER be measured by inserting an instrument into the Hi-Volt wiring. Instead, use the testing pins on the Magdrive1000 to read the anode current.

Example:

A 2M244 magnetron has approx 4,3 kV working voltage. A test instrument indicating a voltage of 300 mV (=300 mA) at the test points gives at hand that the electrical output power is (4,3 kV x 0,3 A) = 1,3 kW.



Declaration of Conformity

ROHS

Magdrive1000, rev H and onwards, fulfils the ROHS-demands

WEEE

Magdrive1000 shall be treated as "electronics" in case of disposal.

CE 73/23/EEG

This Magdrive1000 meets the following certifications and compliances as of 73/23 EEG

Emission and immunity :

IEC 61326 EMC requirement for control and laboratory equipment

Electrical safety:

EN 61010 Electrical safety for control and laboratory equipment

Power line harmonics:

EN 61000-3-2

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