

# Magnus Power

*LF1-400 Frequency Converter - Manual*

## LF1-400 Frequency Converter, Operation and Maintenance



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## Introduction

*This is a condensed version of the Installation, Operation and Maintenance Manual for the LF1-400. If you prefer to read the manual later, then please read this sheet before using the converter.*

## Safety Warning – Risk of Electric Shock

Before connecting input power, ensure that the bare ends of the output cable have been either properly connected to the load (see below) or insulated.

## Product Information

If the unit has been supplied in rack-mounting form, it must be supported in the rack by a shelf, or by a bracket at each side - it must not be left to hang on its front panel fixings.

The green/yellow wire in the output cable is connected to mains earth (supply ground), and may be used to earth the load if required. The other two wires are the 115V output circuit.

The output is floating (independent of earth). If an earthed neutral is required, link one of the two output wires to earth.

The input indicator will flash during the power-up sequence.

The output is protected against over current, and an over temperature detector will operate if airflow through the unit is impeded. Either fault will be indicated on the front panel, and the output will shut down until the unit has been reset by switching input power off and then on again.

The readings given by the output voltage and output current meters are for guidance only. If accurate measurements are required, include calibrated instruments in the load circuit.

The only routine maintenance requirement is an occasional check that the fan is operating normally, and that the air vents are free of obstruction.

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## PERFORMANCE SPECIFICATION

Input Requirement	Single Phase + Neutral	115V or 230V 50/60Hz
	Voltage Tolerance	+10%/- 6%
	Automatic selection of input voltage	
Output Voltage	Single Phase + Neutral	115V
Output Frequency	400Hz	
Maximum Output	1kW (8 <sup>3</sup> / <sub>4</sub> A)	
Output Grounding	The converter output is floating (isolated from supply ground or earth). The output may be grounded externally if required.	
Output Protection	Over Current Over Temperature	
Overload Capability	120% Full Load (1.2kW) for ½ second	
Load Power Factor	0.5 Lag – Unity – 0.5 Lead	
Operating Environment	0 to 40 degrees 0 to 90% Relative Humidity (non-condensing)	
Storage Environment	-15 to +70 degrees 0 to 95% Relative Humidity (non-condensing)	
Dimensions	440 wide x 370 deep x 98 high (2U required in 19 inch rack), 10kg	

## OPERATING RESTRICTIONS

If the Converter has been stored under conditions outside its operating limits, allow it to stand within the operating environment for at least one hour before use. Ensure adequate air circulation around the unit in normal operation, for correct function of the cooling fan.

Do not attempt parallel operation of the Converter output with any other power source.

Each time input power is applied, the converter will automatically set itself for whichever one of the two rated input voltages is being received. This selection will take place only during the starting sequence, and the input voltage must not change from one value to the other during normal operation.

## INSTALLATION PROCEDURE

If the converter is to be rack mounted:

- Check that the mounting space has a shelf, or a support bracket at each side, strong enough to take the weight of the converter. Rack-mounting hardware is not supplied with the converter, as dimensions will depend on the type of rack or cabinet being used. The converter must not be left to hang on its front panel fixings.
- Make sure that there will be sufficient airflow for the converter's cooling fans to do their job. Air is drawn in at both sides, and discharged at the rear.

The output cable supplied with the converter has bare wires at one end, for connection to your load. Before connecting this cable to the converter, make sure that the bare wires are either properly connected to the load, or insulated.

The wires in the output cable are colour-coded white, blue and green/yellow. The white and Blue wires are for the 400Hz output, and if you are going to leave the output floating then it does not matter which way round they are connected. The green/yellow wire is connected to supply earth (ground) and may be connected to the casing of your load, if an earth connection is required. If the output earth is not going to be used, insulate it to prevent contact with the 400Hz output wires.

If you wish to ground the 400Hz output, link one of the white output wires to earth. You can use the green/yellow wire in the output cable, or a separate clean earth.

The pin out of the output connector at the rear of the converter is as follows:

1	400Hz Output	White
2	400Hz Output	Blue
E	Earth (ground)	Green/Yellow

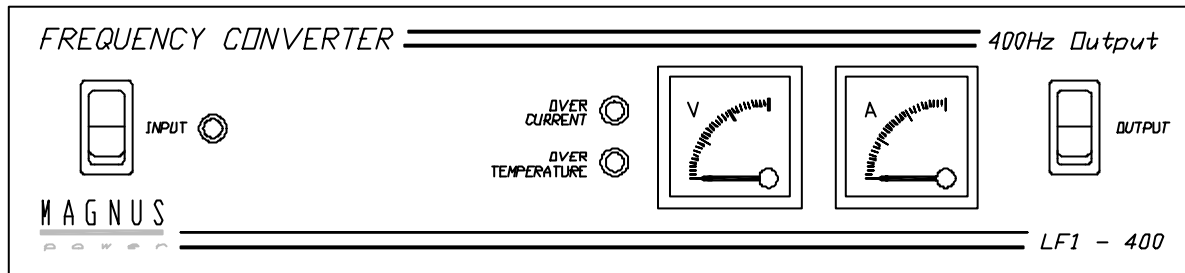
The pin shown as E above is marked on the connector with the standard triangular earth symbol, similar to an upside-down Christmas tree.

When the output cable has been properly connected to the load, connect its other end to the converter output socket.

Connect the supply cable. Under worst case conditions of applied load and low supply voltage, up to 5A may be required from the incoming supply (10A if operating from 115V supply).

Ensure a good supply earth connection. Danger of electric shock may arise, especially under fault conditions, if the converter is not properly earthed.

## ARRANGEMENT OF FRONT PANEL



Input Switch

Input Indicator

Over Current Indicator

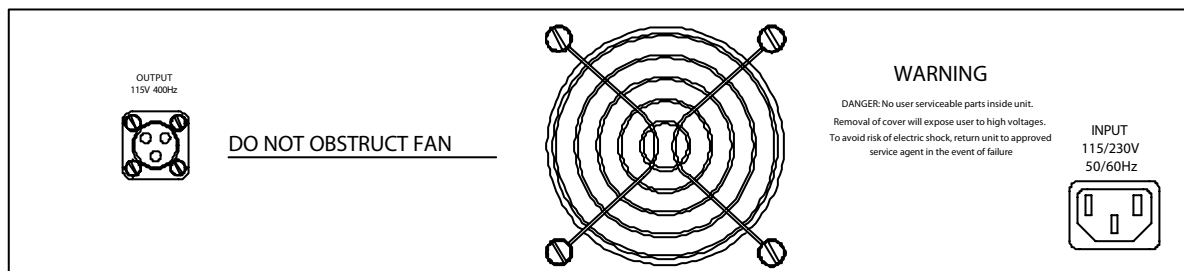
Over Temperature Indicator

Output Voltage Meter

Output Current Meter

Output Switch

## ARRANGEMENT OF REAR PANEL



Input Connector

Output Connector

Air Outlet

## NORMAL OPERATION

Connect input power, and switch on. The fan will start and the input indicator will flash for a few seconds, while the converter completes its starting sequence. During the starting sequence, the converter will automatically set itself for whichever one of the two rated input voltages is being received.

At the end of the starting sequence the input indicator will remain lit, and the output voltage will ramp up to its normal value. If the output switch is on, load current will be shown on the ammeter.

To connect full output voltage to the load, leave the output switch off until start-up has completed. To ramp up the voltage to the load, set the output switch on before connecting input power.

To stop the converter, disconnect input power or set the input switch off.

If you look through the air intake slots at one side of the converter, you may see an orange indicator light inside. This is used during testing to warn of the presence of high voltage, and it will remain lit for a few minutes after power has been disconnected.

## FAULT CONDITIONS

### Over Current

Converter output will cease, and the Over Current Indicator will flash.

Investigate the cause of the fault, and take appropriate corrective action. Restart the converter by switching input power off and then on again. If the cause of the fault has not been remedied, it will be repeated.

### Over Temperature

Converter output will cease, and the Over Temperature Indicator will flash.

Investigate the cause of the fault, which will most likely be blocked airflow or a failed fan. Restart the converter by switching input power off and then on again. If the cause of the fault has not been remedied, it will be repeated.

## MAINTENANCE

### Preventive Maintenance

At suitable intervals, check that the fan is operating normally, and that all vents are clear of any accumulation of fluff or dust.

### Corrective Maintenance

Input to the converter is taken direct to a full-wave bridge rectifier to provide the high voltage direct current required by the power modules, and energy stored within the converter will take up to 15 minutes to discharge after disconnection of input power. Most of the converter circuitry is alive at high voltage, and special test equipment and measurement techniques must be used during repairs, to avoid electric shock and damage to components. Do not attempt repair of the converter unless you are a competent person.

Because of the high MTBF of these Converters, an on-site engineer is unlikely to see faults often enough to become familiar with troubleshooting. The most cost-effective repair option will usually be to return a failed unit to Magnus Power for attention by an experienced engineer. If immediate return to service after a breakdown is a priority, consider holding a spare unit on site.





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