

Magnus Power

ME1 Single Phase Frequency Converter - Manual

ME1 Single Phase Frequency Converter, Operation and Maintenance.



Magnus Power

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MAGNUS POWER
ME1 FREQUENCY CONVERTER

Installation, Operation

And Maintenance

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PERFORMANCE SPECIFICATION

Input Requirement (models with single phase input)	Single Phase + Neutral	230V 50/60Hz
	Voltage Tolerance	+/-10%
	Frequency Tolerance	+/-5%
Input Requirement (models with three phase input)	Three Phase + Neutral	400V 50/60Hz
	Voltage Tolerance	+/-10%
	Frequency Tolerance	+/-5%
Output Capability	Single Phase + Neutral	Output voltage and frequency as shown on rating plate (at rear)
	Voltage regulation	Static +/-1%
		Dynamic +/-5%, recovering to 1% within 40mS
	Frequency accuracy	+/-1%
The output neutral floats free of mains earth (ground), but it may be grounded externally if required		
Operating Environment	0 to 40 degrees, derating to 30 degrees at 2000m	
	40 to 60% RH (recommended)	
	0 to 90% RH (extreme)	
	Below 55dBA at 1m	

OPERATING RESTRICTIONS AND SAFETY ADVICE

Ensure adequate air circulation around the unit in normal operation, for correct function of the cooling fans. Allow for the dissipation of waste heat produced by the Converter, which will amount to around 10% of its output rating when operating at full load.

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

Dangerous voltages are present at numerous points within the Converter, and great care should be taken if running with any of the covers removed.

The DC Busbars are alive at 540V dc (300V dc for models with single phase input) during Converter operation. A fault current of hundreds of amps is available within the DC Circuitry, and great care should be taken if using tools in this area when there is any possibility of charge remaining. Discharge Resistors are connected across the DC Busbars, and these will take about 2 minutes to complete their task after power is removed.

INSTALLATION AND COMMISSIONING

Installation includes positioning the Converter, the provision of input and output cables and an input isolator, and connection of the input and output cables to the Converter terminals. Installation is normally carried out by the customer, prior to commissioning by Magnus Power.

Magnus Power recommends that the system is commissioned by one of their engineers, but the customer may opt to carry out this work. It consists of checks on the operating environment, the voltage of the incoming supply (and its phase rotation for models with three phase input), input and output connections at the Converter, and the earth (ground) connection. Internal plug-and-socket connections are checked for correct mating. After initial start-up of the system, its operation will be checked and any necessary adjustments made. Finally a demonstration of the operation of the system will be offered, and a commissioning status report will be prepared.

Installation Procedure

Position the Converter at the required location, and ensure that its weight is adequately supported. Allow at least 400mm clearance at the rear for air circulation, and for access to the circuit breakers (inside narrow door at rear). A similar clearance will be needed at the front, for ventilation and to allow an operator to reach the control panel. Access to the sides of the machine is not required during normal operation, and if necessary the unit may be moved on its casters for maintenance purposes.

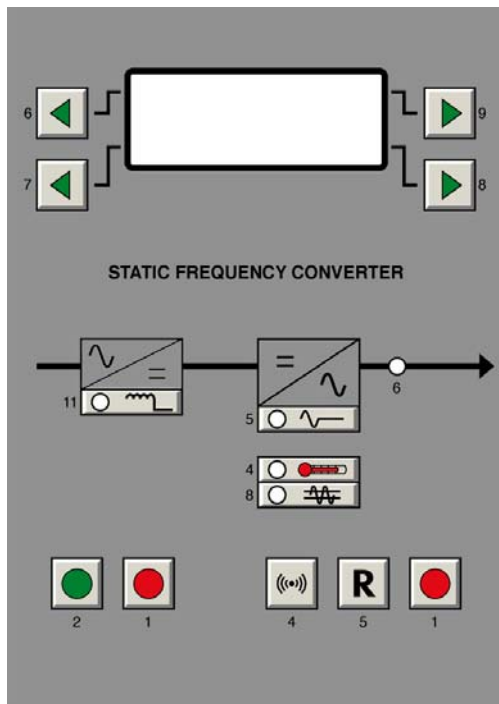
The input and output terminals are at the lower rear of the cabinet behind a removable terminal cover, which may be drilled for cable access. There are also knockouts immediately below the terminal cover.

Connect the output (load) and input (supply) cables as indicated by the terminal labels, ensuring a sound supply earth (ground) connection to the earth stud. The stud is located to the right of the termination area.

It is common practice for the input neutral to be grounded (earthed) by the supply authority at their substation, but the input and output neutrals are not connected within the Converter. If output neutral earthing is required, make the necessary connection. If the link is to be located within the Converter, it should ideally be near the input and output terminals where it can readily be seen.

When installation is complete, refit the terminal cover, to prevent casual access to the electrical connections.

CONTROL PANEL and GENERAL ARRANGEMENT



Indications are given by a mimic diagram, and a numeric display. Pushbuttons on the mimic diagram control the operation of the Converter.

During normal operation of the Converter, the mimic diagram will show the green Output On indication, and the numeric display will show the output frequency voltage and current.

Pushbutton Controls

1. Stop Output (red, press both)
2. Start Output (green)
4. Cancel Audible Alarm
1. Reset Fault Indication ("R")
- 6/9. Scroll left/right
- 7/8. Multifunction

Mimic Diagram Indicators

- 11. Supply Voltage Low (red, in left hand box on mimic diagram)
- 5. Output Off (red, in right hand box on mimic diagram)
- 6. Output On (green, at right hand side of mimic diagram)
- 4. Over Temperature (red, below right hand box on mimic diagram)
- 8. Overload (red, below overtemperature indicator)

INPUT AND OUTPUT CIRCUIT BREAKERS

To reach the Circuit Breaker Panel, open the narrow door at the rear of the Converter, to the right of the terminal cover. Setting all circuit breaker to the off position will prevent output, but various parts of the Converter will remain alive including the input terminals. To ensure that all connections are dead, isolate the Converter elsewhere and wait at least five minutes to allow stored voltages to decay before touching any internal component.

If the Input Circuit Breaker trips during normal operation, this is likely to indicate a major fault within the Converter. If resetting the circuit breaker results in a further trip, a service visit by an experienced engineer will be required.

Any overload which is beyond the capability of the Converter will be detected and dealt with by the built-in electronic protection circuits. The Output isolator is provided as a means of disconnecting the load from the Converter, if required.

NORMAL OPERATION

Standby Condition

1. Turn on “electronics switch”, the display panel should light up and the audible alarm will sound.
2. Turn on “AC Input” and wait 20-30 seconds for the DC to rise.

This is the Standby condition, in which the Converter is ready to run but is not producing any output. The audible alarm will sound, press button 4 to silence the alarm.

Starting Up

Press the green Start Output button to commence operation. The mimic diagram indication will change from Output Off to Output On (green), and if the Output Isolator is On, power will be supplied to the load.

Shutting Down

Press both of the red Stop Output buttons. The Converter will revert to the Standby condition, the mimic diagram indication will change from Output On to Output Off.

Disconnect the load (if required) by setting the Output Isolator to Off.

Remove Converter input power (if required) by setting the “AC Input” and “Electronic Switch” Circuit Breaker to Off, or by isolating elsewhere.

Restarting after a Supply Interruption

If an input power failure occurs during normal operation, then when power is restored the Converter will initialise to the Standby condition. The audible alarm will sound. Press button 4 to silence the alarm and clear any error indication.

Press the green Start Output button to commence operation. The mimic diagram indication will change from Output Off to Output On (green), and if the Output Isolator is On, power will be supplied to the load.

ALARM CONDITIONS

Overload or Short Circuit

The Overload indicator will be lit, and the audible alarm will sound.

If the magnitude or duration of the overload are beyond the capability of the Converter, it will shut down to the Standby condition. Press button 4 to silence the alarm. Investigate and if necessary remove the cause of the overload, observing any necessary safety precautions before making adjustments to wiring. Restart the Converter by pressing the green Start Output button on the mimic diagram.

Over Temperature

The Over Temperature indicator will be lit, and the audible alarm will sound. The Converter will shut down to the Standby condition.

Press button 4 to silence the alarm. Check for any obstruction of the air inlets or outlets around the Converter. If no such cause can be found, it may be that a cooling fan has failed and will require replacement.

Restart the Converter by pressing the green Start Output button.

UNREPORTED PROBLEMS

Some error conditions will cause the Converter to disconnect itself from the incoming supply, and the resulting absence of internal power will prevent the display of any message or indication. It won't be impossible to start the Converter until the problem has been solved.

The most likely cause during commissioning or after any changes to the site electrical installation is a phase rotation fault (on systems with three phase input), and other possibilities are significant undervoltage or overvoltage of the supply. Any of these causes will require remedial action either by an electrician or by the supply authority.

It is also possible that an internal fault will prevent starting, in which case a service visit by an experienced engineer will be required.

ELECTRICAL MEASUREMENTS

During normal operation, the numeric display shows the output frequency, voltage and current. Press the scroll buttons alongside the display to show other measurements.

MAINTENANCE

Preventive Maintenance

Cooling fans are mounted at the upper rear of the Converter. They draw air in through vents at the front of the unit, and discharge via further vents at the rear.

At suitable intervals, check that any visible fans are operating normally, and that the air intakes are clear of any accumulation of fluff or dust.

Corrective Maintenance

Spare parts are available from Magnus Power, and these can be fitted without the use of special tools. Provided the fault was correctly diagnosed, the Converter will return to normal operation after replacement of the defective part. In some cases, best results will be achieved by carrying out specialised adjustment procedures requiring the use of standard electronic test equipment.

For some failures, the defect and the effect may be in different places; for example a faulty output from a control printed circuit board may cause failure of one of the main power components. If only the power component is replaced, the failure will be repeated.

Because of the high MTBF of these Converters, it will be difficult for an on-site engineer responsible for only a small number of systems to become familiar with troubleshooting. The most cost-effective repair option will usually be to have the problem solved on site by an experienced field service engineer. If immediate return to service after a breakdown is a priority, then a standby unit should be held on site.

Warranty Repair

The standard Magnus Power warranty covers the cost of any repair which becomes necessary due to failure while in normal use during the specified warranty period, usually 12 months. It is unlikely that any unit will be out of order for more than 2 working days after having been reported as faulty.

MAGNUS

p o w e r

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Output Capability	Single Phase + Neutral	Output voltage and frequency as shown on rating plate (at rear)
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		Dynamic +/-5%, recovering to 1% within 40mS
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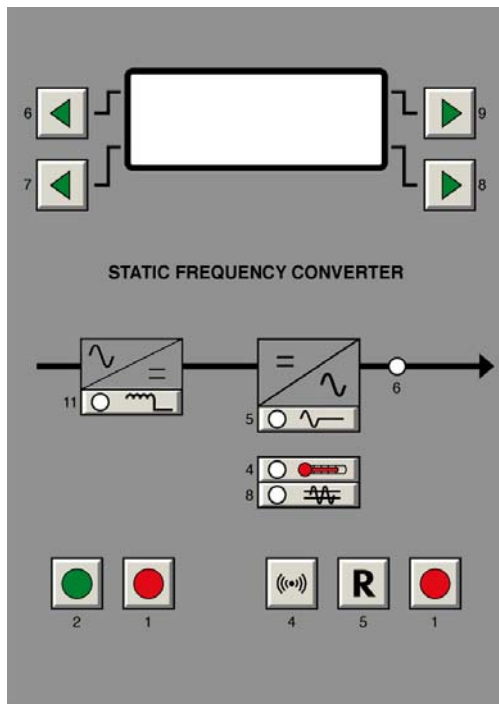
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