

# ZENER<sup>®</sup> 8000 Variable Speed Drive

*Innovative solutions engineered  
to give you confidence*



**ZENER**  
VARIDRIVE SOLUTIONS



# Benefits

Today electric motors are used everywhere and represent over 60% of total electricity consumed. Operating an electric motor when not required or at a higher speed than required is inefficient and generally means it is costing more money than it should.

The ZENER 8000 can provide a solution to lead to better control of your costs and processes.



## Process Improvements

The ZENER 8000 will lead to productivity improvements by providing the ability to:

- automate a process
- operate a process at the optimum speed and capacity
- allow customised control of a process independently
- operate as a standalone control system
- provide choice and flexibility of control
- simplify complex control systems using internal functions
- reduce waste & save power
- increase productivity
- automatically switches off when not required



## Financial Benefits

The ZENER 8000 delivers unparalleled intelligence and power to provide a more cost effective solution to solve your individual problem.

- Save on capital expenditure
- Minimise installation & setup costs
- Reduce operational costs
- Minimise waste
- Maximise production up time
- Reduce maintenance costs with less wear & tear
- Reduce power costs

Significant energy savings can be achieved with pumps & fans.

A 20% reduction in speed can result in a 50% reduction in power consumed.



## Protect Your Investment

Protect your investment from damage and financial loss with protection for the motor, load and the process.

The ZENER 8000 will:

- reduce mechanical stresses on the motor and load
- reduce electrical stresses on components & infrastructure
- protect against excessive torque on start
- provide customised or application specific protection
- 'Applications' ensure the protection available is actually configured & utilised
- protect the motor against overload or over temperature

The ZENER 8000 has inbuilt protection to guard itself from:

- motor or load related problems
- operating outside its rating
- output short circuits
- over temperature conditions



## Solution to a Problem

The ZENER 8000 can provide a solution to a number of electrical & mechanical problems.

It can be a solution to:

- match the supply to a motor
- convert single phase to 3 phase
- reduce the demand on the supply & infrastructure
- operate from a generator
- operate direct from a solar array
- overcome mismatch in speed
- eliminate water hammer problems
- eliminate damage from shock & stresses

The ZENER 8000 significantly reduces motor starting current making it ideal for rural applications or generator supplies.



## Confidence

The ZENER 8000 is an 8th generation Variable Speed Drive designed and manufactured by ZENER VARIDRIVE SOLUTIONS.

Through 40 years of experience within the industry the ZENER 8000 has been engineered to meet industry requirements and the demanding environmental conditions of Australia.

ZENER is an Australian company with local service & technical support available when you need it.

With a team of experienced design engineers with an in-depth knowledge of our product we can provide support & solutions that will give you confidence.



## Environmental

We are all concerned for the environment and reducing carbon emissions.

The ZENER 8000 provides the opportunity of reducing energy consumption and to manage resources more efficiently. It allows you to use only what is required.

The ZENER 8000 ECODRIVE allows operation direct from a solar array which completely eliminates electricity costs and the need to connect to the grid.

# ZENER<sup>®</sup> 8000

## The 8th Generation Variable Speed Drive by ZENER

*"Our design approach is to ensure installation & setup is quick & easy"*

### Quick & Easy Setup

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Intuitive plain English text display and simple menu structure for ease of navigating and programming.

- Local push buttons for manual motor control
- Text menu descriptions with coded identification
- Simple user familiar parameter descriptions

### 'Application' Macro & Menus

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'Applications' are included to minimise the setup time.

- Simplify control wiring
- Reduce programming time
- Reduce design time
- Eliminate time finding parameters
- Simplify complex controls & operations
- Ensure correct operation
- Ensure all protection is implemented

### An Integrated System

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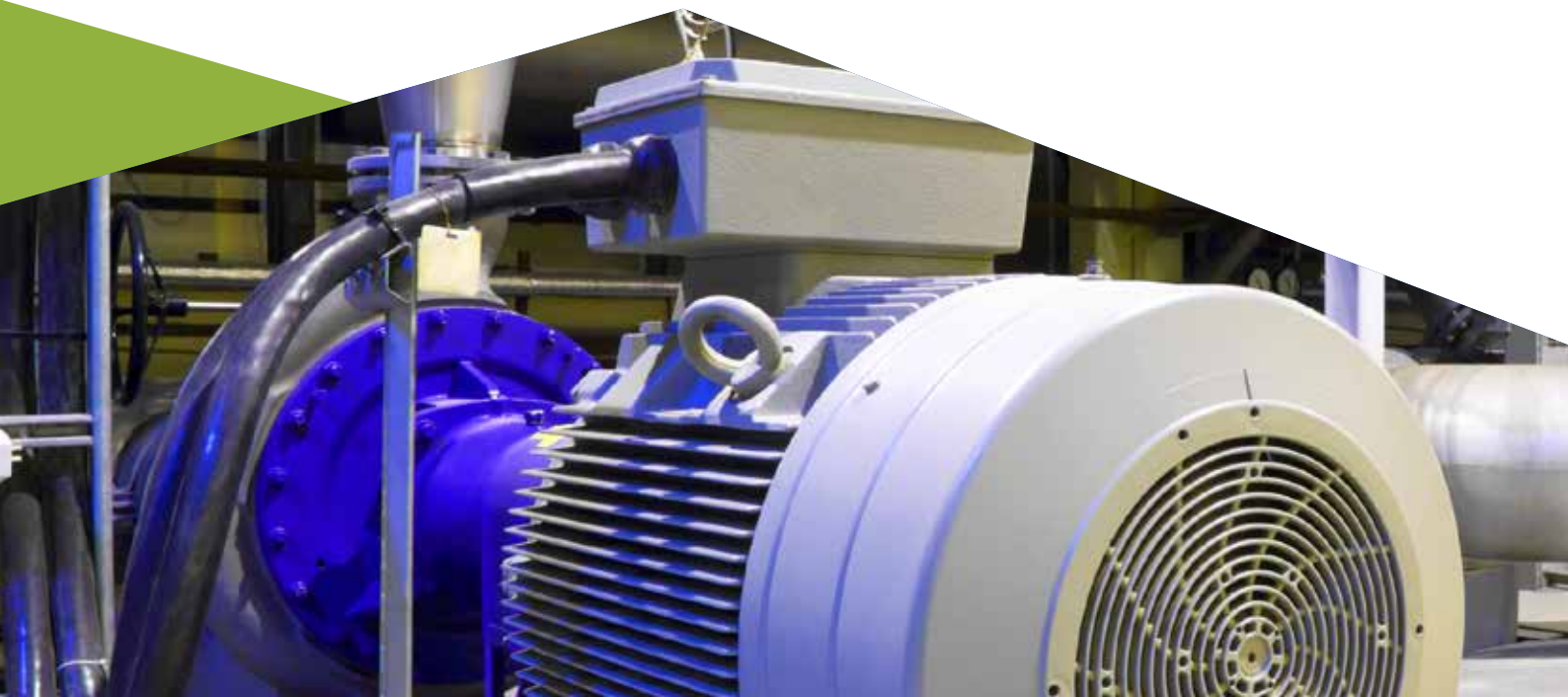
The ZENER 8000 has enormous flexibility and functionality to allow operation as a standalone and independent control system.

- Programmable Logic Controls & Functions
- Dual PID controllers
- Programmable Inputs & Outputs
- A range of options

### A Standalone Solution

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The ZENER 8000 with its IP66 steel enclosure and integral control, functions and capabilities make it a robust standalone motor control system. The efficient heat exchange system ensures maximum heat transfer is achieved allowing it to operate in high ambient conditions.





# Thinking Green...

The Ultimate Energy Saving Solution



## A 'One Drive Fits All' Approach

The ZENER 8000 is suitable for all types of loads & applications. No need to have a different drive for different applications. The ZENER 8000 includes a range of 'Application' macros and features suitable for all load types and operational needs.

## A Solution for All Load Types

The ZENER 8000 has a sophisticated motor control algorithm to ensure maximum torque is available from zero to full speed, whilst ensuring maximum energy efficiency.

## A Solution for Different Supplies

The ZENER 8000 is suitable for a wide range of electrical supply variations including:

- Standard 3 phase supplies
- Generator supplies
- 480V Single Wire Earth Return (SWER)
- 240V single phase
- DC supply from a solar array
- 41.5V (Educational)
- Other special voltages on request

## ECODRIVE

A **ZENER** VARIDRIVE SOLUTION

The ECODRIVE is a variation of the ZENER 8000 designed to also operate from the DC supply from a solar array. THE ECODRIVE includes ZENER's unique Maximum Power Point Tracking (MPPT) system to ensure maximum power and operating time is achieved.

## Eliminate Motor Energy Costs

Go completely off the Grid with the ZENER 8000 ECODRIVE series and operate your motor directly from a solar array.

## Hybrid or Blended System

Operate with an auxiliary AC supply to achieve maximum benefit from your solar investment during the shoulder periods and under low solar conditions. Automatically connect to an auxiliary supply with a seamless changeover.

## Plan for the Future

The ECODRIVE can operate as a standard drive on an AC supply and connect to solar later.

## More Information

More information on the ECODRIVE model is available on-line:

[www.zener.com.au/ecodrivesolar.php](http://www.zener.com.au/ecodrivesolar.php)



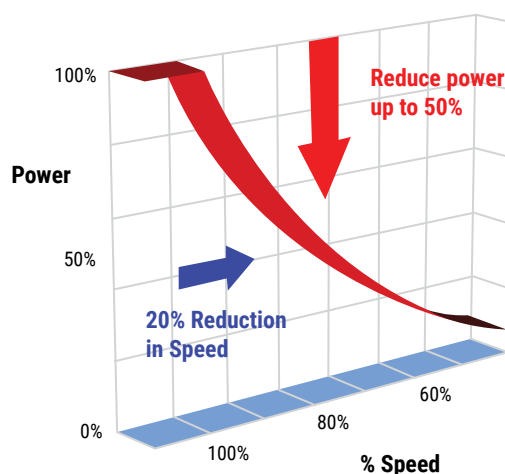
# Improving Productivity and Efficiency

- ✓ *Energy savings* ✓ *Improve process performance*
- ✓ *Reduce maintenance costs* ✓ *Reduce infrastructure & installation costs*

## Save on Energy

- Achieve significant energy savings
- Significantly reduce starting currents
- Improve power factor to near unity (>0.98 displacement)
- Eliminate peak demand charges
- Automate controls to find and operate at optimum speed
- Eliminate the need for throttling or pressure reduction valves
- Operate pumps at optimum speed, flow or pressure
- Automatically turn pumps on & off with demand
- Bypass mode to eliminate heating and harmonics

### Power Saving:



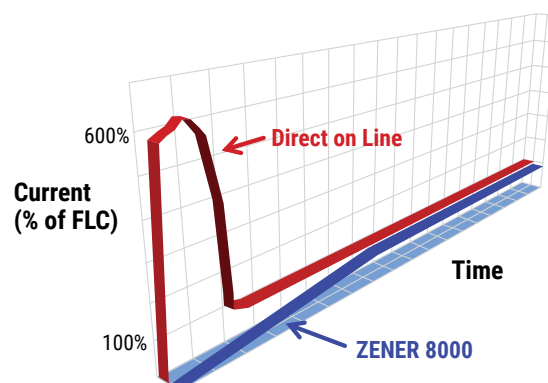
The ZENER 8000 on a pump or fan load can provide substantial energy savings.

A 20% reduction in speed can result in a 50% reduction in power consumption.

## Ultimate Control & Flexibility

- Automatic pump control using the internal PID controller
- Integral controls to switch on & off with demand
- Simplified control and wiring using internal functions & controls
- Internal programmable logic controls and programmable I/O to eliminate external devices
- Perform sophisticated control operations
- Line contactor control to isolate when not required
- I/O capability & communications for remote monitoring & control
- Easily match motor speed to process speeds
- Extend motor operating speeds

### Reduced Current:



Significantly reduce the starting current.

Reduce starting current from 600-800% to less than 100-150%.

Reduce running current at reduced operating speeds.

## Reduce Maintenance Costs & Downtime

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- Reduce wear & tear of mechanical components
- 'Idle mode' to prevent damage to pump.
- Protect & prevent costly equipment damage
- Eliminate contactor stress on start
- Achieve the perfect Soft Start & Soft Stop
- Reduce mechanical stress & shock on the motor & load
- Eliminate the noise & damage from water hammer surges
- Detect problems early
- Overcome problems associated with water hammer
- Robust & reliable equipment increasing production uptime
- Control to isolate 3 phase when not in use.

## Improved Resource Management

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- Adjust the speed to varying demands
- Manual and/or automated control
- Eliminate inefficient devices that reduce output
- Save power
- Eliminate waste
- Improve your pump control and reduce power
- Operate from a free resource - 'the sun'





# Reduce Your Installation Costs

## One Drive Suits All

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The same drive can be applied to different load types and applications. No need for dedicated drives for different applications.

## Reduce Setup Time

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Simple setup, plain English display and 'Application' selection will significantly reduce setup time and costs.

PC connectivity available for the transfer of setup files.

## Simple Installation

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Wiring can be as simple as 'power in' and 'power out'. Easily retrofit to existing installations at the motor or into existing controls.

## Install Close to the Motor

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Reduce the cost of screened cables and to allow quick & easy installation.

## Use Existing Cables & Motor

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Use the existing cables and motor. ZENER offers output filters for motors that may not be 'inverter rated', required by motor manufacturers (e.g. submersible pumps) or to eliminate the need for screened motor cables.

## Wall Mount IP66 Enclosure

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Save on the additional cost of an enclosure and achieve better heat dissipation. Provides protection against mechanical damage and contamination (dust, water, insects etc) promoting a longer operating life.

The ZENER 8000 can be mounted near the motor or at the motor isolator.

## A Complete Package

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The ZENER 8000 is an ideal package to create your own unique solution.

- Reduce external auxiliary controls
- Add operator controls
- Options to expand capabilities
- Integral EMC filter & DC bus Choke
- Advanced & integral protection
- A complete 'Pump Control System'
- ECODRIVE– A complete solar pump controller

## Self-Protected

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The ZENER 8000 provides complete protection against thermal abuse or output short circuit. Protection against power cycling provides unlimited starts per hour. The sophisticated monitoring and protection ensures an ultra-fast response & interruption against output short circuits. Thermal protection means the drive can operate to its maximum limit without damage.

## Reduced Harmonics

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The ZENER 8000 with the integral harmonic reducing filter is an effective means of harmonic mitigation. Protected within the drive enclosure makes it a practical and cost effective solution beneficial for all installations.

- Improved power factor
- Reduction of inrush currents
- AC line transient filter
- Improved EMC performance
- Compliance to AS61000.3.12:2006

## EMC Compliance and RFI

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The ZENER 8000 with the integral EMC filter as standard provides assurance for compliance to Australian EMC Framework AS61800.3 and C-tick requirements.

The steel enclosure and cable terminating arrangement promotes optimum continuity and ease of installation of motor screened cables.

Output filters are also available to eliminate the need of screened cables and RF sensitive areas.





COB PERFORMANCE

FWD REV ENDBA ENI STOP

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innovative technology  
Drive Solutions

**ZENER**

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# A Robust Solution for Australian Conditions

## Enclosures:

### Range of enclosures

Enclosures available range from IP00 to IP66 depending on the model. The Standard range is available in IP30 for switchboard mounting or IP66 for wall mounting with protection against dust & water. A stainless steel option is also available.

### IP66 Robust Enclosure

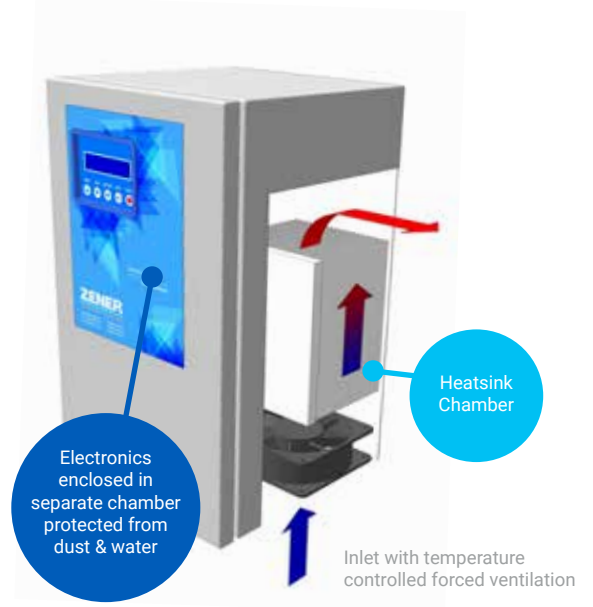
Protect your investment from damage with a robust steel enclosure designed to withstand harsh operating environments. Rated IP66 it protects the internal electronics against the ingress of dust & water. A maintenance free design without air filters to clean or replace.

### Efficient cooling system with 50°C rating

The ZENER 8000 offers an efficient cooling system to ensure continuous operation at high ambient temperatures. A design that promotes more efficient heat dissipation to ensure the drive operates at a lower temperature, significantly extending the operating life of the equipment.

### Unique Stainless Steel Enclosure

The ZENER 8000 is also available in a unique Stainless Steel IP66 enclosure for the more harsh environments.





## All Types of Voltages:

The ZENER 8000 is available in a wide range of voltages, suitable for different supply arrangements. ZENER can also engineer customised solutions for more unique voltages or requirements.

### Ideal for generator operation

The ZENER 8000 is a perfect solution for operating from a generator supply.

- Significantly reduce starting current
- DC bus choke to reduce harmonics
- Current limit function

### Special 1000V model

The ZENER 8000 is available in a unique 1000V model for mining applications.

### Single phase supplies

The ZENER 8000 can also operate from a single phase supply. The Zener 8000 will ensure maximum torque is delivered whilst significantly reducing motor currents.

### 480V Single Phase (SWER)

The ZENER 8000 with the DC bus choke has been engineered to provide a robust solution that overcomes the challenges of 480VAC Single Wire Earth Return supply & expected environmental conditions.

### Solar DC powered (ECODRIVE)

The ZENER 8000 ECODRIVE model provides the ability & choice to operate direct from a Solar Array, an auxiliary AC supply or in a blended configuration (both).

## All Types of Loads:

The ZENER 8000 is designed for all types of loads, whether it is a variable or constant torque type load. It allows one model to be used throughout a plant.

- Submersible pumps
- Bore pumps
- Slurry pumps
- Positive displacement pumps
- Dosing pumps
- Aerators
- Fans & blowers
- Macerator/cutter pumps
- Screens, crushers & mills
- Conveyors & augers

The ZENER 8000 is selected to match the motor, the torque requirements of the load and the operating & environmental conditions.

### High Torque applications

The ZENER 8000 will ensure maximum torque is delivered at all times with a sophisticated sensor-less flux vector control system. Achieve high torque and quick response even at low speeds.

### Old & New Motors

The ZENER 8000 has been engineered to provide optimum performance and maximum efficiency when operating older motors or newer high efficiency motors. Switching frequency is adjustable and output filters are available for added assurance with aged motors.

### Suitable for submersible & bore pumps

The ZENER 8000 has been engineered with these pumps in mind to ensure compliance with various manufacturer requirements. Special output filters are available where required by the manufacturer.

### Unlimited starts per hour & power cycling

The ZENER 8000 provides unlimited starts per hour and an input charge circuit designed to withstand unlimited power cycling.

### Auto recovery on Power loss & Auto restart

Configure to automatically recover & start after a loss of power or automatically restart after a trip. Prevent inconvenient lock outs.





# Application Specific Features

*The ZENER 8000 is versatile with the features required for more specific applications. These features are included in the 'one drive' so the same drive can be used across the plant.*



## Pumping & Irrigation

- Simple Setup & operation
- Robust enclosure
- Protected against dust & water (IP66)
- Complete pump control system
- Integral PID for pressure control
- 'Idle mode' operation
- Pipe Fill Mode
- Pump Protection
- User Friendly operation
- Plain English Readout of status
- High temperature rating (50°C)
- Solution for submersible/bore pumps
- Standard PID 'Application'
- SWER supply compatible
- Solar solution to eliminate power costs



## Heating, Ventilation, Air Con. & Refrig.

- ESO (Fire Mode) operation
- Robust / IP66 Enclosure
- 'Applications' for simple setup
- Starts into turning load
- Stair pressurisation
- Automatic Pump control
- Harmonic reduction
- Integral DC bus Choke
- BMS communication
- Integral EMC Filter
- Quiet Motor Operation
- Multiple input profiling
- Integral PID Controller
- Car park Exhaust system



## Water / Sewerage Pumping & Treatment

- IP66 hose proof enclosure
- 50°C rating
- Stainless Steel Option
- Customised User modes
- Reduced Harmonics
- Integral EMC Filter
- Communications
- Custom 'Applications'
- PC Upload/Download
- Unlimited Power Cycling
- Bypass Function
- Solution for EMC issues or no screened motor cables
- Customised Alarms & Warnings
- Silent Motor Operation
- 24VDC control supply option



## Heavy Industry & Mining

- Suitable for Variable & Constant Torque loads
- Robust & durable enclosure
- IP66 Protected against dust & water
- Stainless Steel option
- High Ambient operation
- High Torque at all speeds
- 1000V model available
- Protection from dust/water
- Simple installation & setup
- Customised protection
- Integral Logic & Controllers
- Internal PID controller
- Multiple input profiling
- High overload capacities



## Food, Beverage & Wine Industry

- Robust Enclosure
- Protection against water ingress
- Integral Logic & Controllers
- Standalone control system
- PC Upload/Download
- Optional custom user controls
- Stainless Steel option
- Simple setup
- Internal PID controller
- Multiple input profiling
- Programmable Inputs & Outputs
- Internal programmable Logic blocks & timers
- High torque for wine pumps
- Ideal solution for portable wine pumps
- Communications



## Original Equipment Manufacturers

- Customised opportunities
- Custom designed 'Applications'
- Custom Menus
- Robust/Durable IP66 Enclosure
- Integral Logic & Controllers
- An ideal standalone control system
- PC Upload/Download
- Optional Integral Power Supplies
- Optional custom user controls
- Custom hardware possibilities
- Custom voltage possibilities
- Multiple input profiling
- Programmable Inputs & Outputs
- Internal programmable Logic blocks & timers
- Programmable user modes

# Simplicity

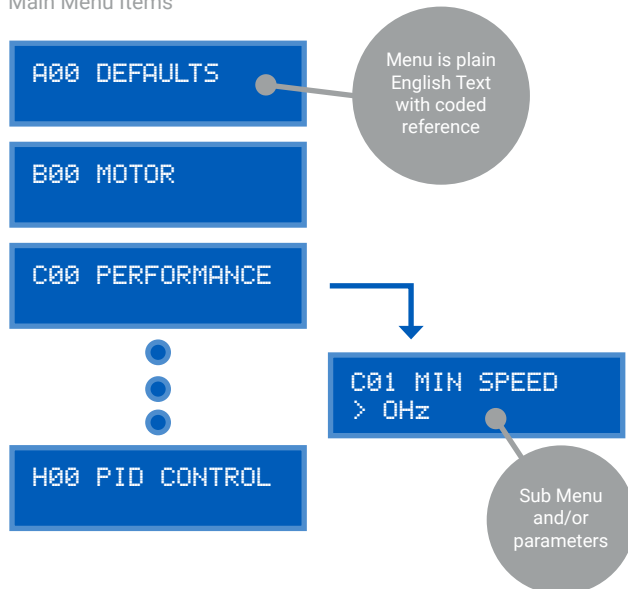
Ensuring a user friendly platform

## User Friendly Interface

### Navigate & Customise with ease

- Local or remote motor control
- Easy to follow menu structure
- Plain English menu for ease of navigation
- 'Applications' for quick setup
- Status Display with 'live' meter displays.
- User friendly units & referencing

Main Menu Items



## 'LIVE' Meter Displays

- Display various meters and operating status
- Use 'ENTER' to step through meter displays
- Set any display as default

50.0Hz 50.0Hz FWD REM	Pv500kPa Sv550 FWD REM
50.0Hz 4.2kW 62%L 7.8A	50.0Hz 0.0% 62%L 1470rpm
452kWhrs 130hours	

## Operating Modes

### 'LOCAL' Mode

Operate 'straight out of the box' in local mode using the FWD/REV/UP/DOWN/STOP push buttons. Use a digital input or use 'Enter' to switch between local & remote modes.

### 'REMOTE' Mode

Use digital inputs or internal logic to start/stop the motor and a wide range of speed reference choices.

### 'USER' programmed modes

These are user configured modes of operation selectable by a digital input or internal function. When a mode is active it displays a user set 'TEXT' Message.

### Essential Services Over-ride (ESO) or Fire mode

This mode of operation ensures the ZENER 8000 continues to operate and over-rides other control signals and alarms. This feature is critical for fire management systems and compliance with AS1668. Activated by a digital input (accepts a normally open or closed contact) with an independent speed reference(s) and ramp times.







## 'Application' Macro & Menus

An 'Application' refers to a macro instruction that automatically programs the ZENER 8000 with a predefined configuration. 'Applications' promote a quick simple installation & setup for a range of typical configurations for common applications. A step by step procedure and wiring instructions are provided for each.

- An 'Application' ensures all protection is programmed & setup correctly
- Simplifies a complex process and setup
- Significantly reduces installation & setup time
- Reduces design time
- Eliminates time to familiarise & locate parameters
- Ideal for duplicate or similar installations
- Included as standard with ZENER 8000
- 'Custom Applications' can be developed

When an 'Application' is selected the ZENER 8000 will:

### 1. Program all parameters required

- Digital inputs & outputs
- Analogue inputs & outputs
- Default settings for menu items
- Custom alarms & warnings

### 2. Create a CONFIG Menu

A unique CONFIG menu is created and then prompts for the critical parameters only. Access to this menu can be restricted.

### 3. Create a USER menu

A unique USER menu is created for future use by an operator. It contains only the parameters the operator may need to change.

Standard 'Applications' are pre-installed or others (non-standard or custom) can be loaded on request or using the PC upload/download option.

Some standard applications include:

- Basic Control
- Pump PID Control
- Stair pressurisation (external & Internal PID)
- HVAC Fan (with/without ESO)
- 4 Speed Control
- Machine /JOG

## Example: Pump PID Control (Advanced)

### Programs all necessary parameters:

- Programs the Analogue input for pressure transducer
- Programs the PID Controller
  - Set point reference
  - Units to display as kPa
  - Scale to suit transducer
  - Idle & Wake parameters
- Programs custom Alarms and protection
  - Loss of signal protection
  - Low Pressure Protection
  - High Pressure protection
  - Pipe Fill Timeout Alarm
- Programs a Logic block for Bore level protection
- Programs Digital inputs as per wiring diagram

### A CONFIG Menu is created

APP: PID PUMP 2  
CONFIG Menu

Motor Current  
> 40Amps

Transducer Scale  
> 1000kPa

Set Pressure  
> 500kPa



Low Bore Timeout  
> 600secs

### A USER Menu is created

APP: PID PUMP 2  
USER Menu

Set Pressure  
> 500kPa

# Powerful and Versatile

*A platform for your creativity*

## Programmability

The ZENER 8000 is versatile with enormous functional possibilities with inputs, outputs and internal functions.

- Analogue inputs
- Digital Inputs
- Modes of operation
- Internal functions, comparators, timers & logic blocks
- Relays & Digital Outputs
- Speed References & their Selection
- Analogue Outputs
- Alarms & Warnings

## USER Modes

There is the option to program USER modes. Each user mode has the option to select:

- Source to activate the USER mode
- Speed Reference
- TEXT to display
- Control/operation required
- Prioritisation

50.0Hz  
50.0 AUTO MODE

Example: Can be used to indicate if operating in MANUAL or AUTO MODE

50.0Hz  
50.0 Hi SPEED

Example: Can be used to indicate if operating in a 'HI' or 'LOW SPEED' of a cycle

The USER MODE TEXT Flashes on the display on all meter displays

## Digital Inputs & Function Assignment

A choice of operations or functions can be assigned to a digital input or internal logic.

- Edge or level sensitive and invert function
- Input is assigned to an operating function
- Multiple functions can be assigned to a single input
- Default, choice of standard terminal configuration or Custom configuration

100 FWD & LATCH  
> D3<4>

Example: FWD & LATCH is assigned to digital input 3, which is terminal 4

100 FWD & LATCH  
> TMR1

Example: FWD & LATCH is assigned to the output of timer 1

Operating functions include:

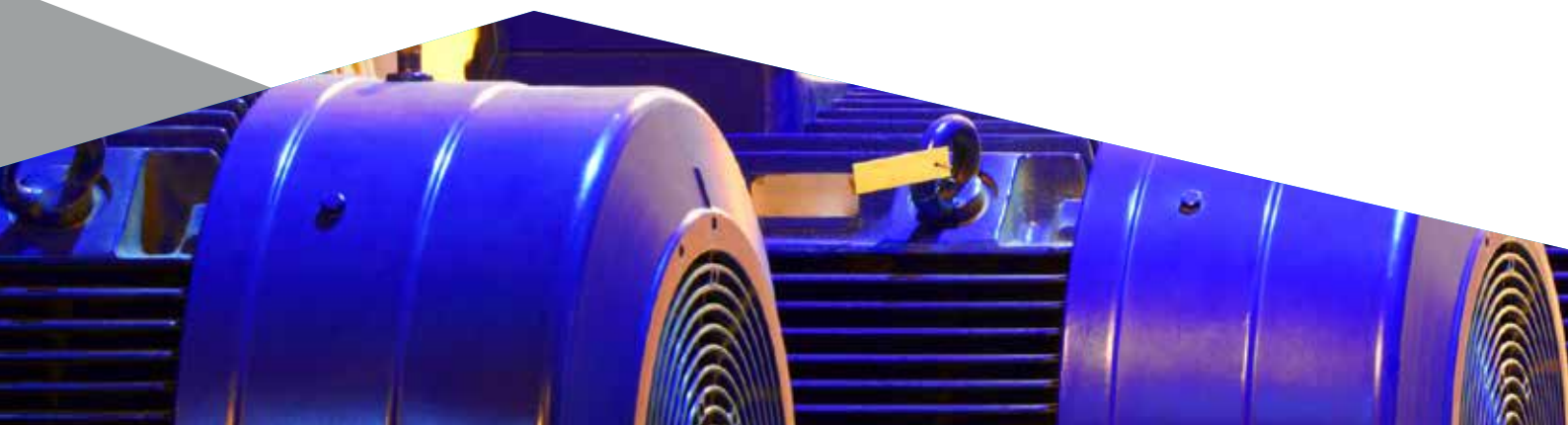
- A range of start/stop commands
- ON (to eliminate wiring)
- Timer inputs
- Logic block inputs
- Operating mode selection
- Speed Reference selection
- Alarm/warning inputs

## Reference Selection

Digital inputs can be used for speed references, preset speeds or user mode selection. The digital inputs can be interpreted using 3 methods:

1. Tally method
2. Multiplex method
3. Multi-speed method

A speed reference can come from a range of selectable external or internal sources.



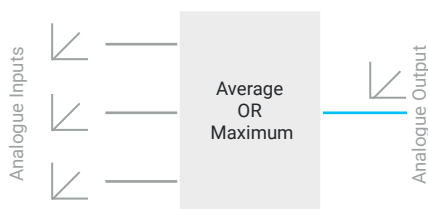
## Analogue Inputs

An analogue input can be a signal for a speed reference, a transducer or other feedback for process control or protection. The analogue signal can be used by internal functions such as: comparators, signal averaging or maximum, multi-point comparator.

- Programmable Signal type (Standard & Custom)
- Zero & Span Adjustment
- High & Low Compare functions
- Signal averaging or maximum function
- Selection using digital inputs or internal function
- Additional comparator functions

### Combining Analogue Input signals

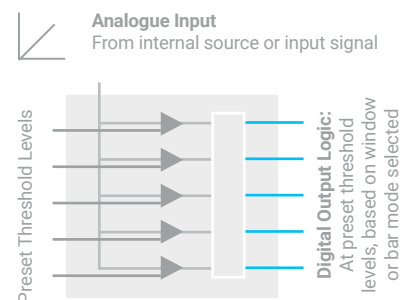
The ZENER 8000 is able to perform arithmetic functions to combine several analogue inputs into a single reference. Select either "Average" or "Maximum" to combine analogue input signals. The function block offers three inputs to combine.



### Analogue input & signal Comparators

A comparator monitors an analogue signal and offers 4 programmable threshold levels and 5 digital outputs with selectable mode (window/bar).

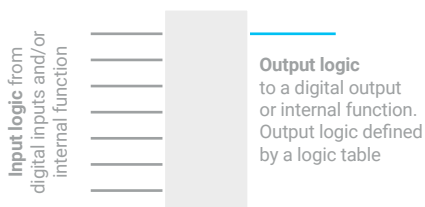
An independent high & low compare function with hysteresis adjustment is available with each analogue input.



## Internal Programmable Logic Functions & Controllers

### Logic Blocks

Create Logic blocks to simplify a complex operation. Logic blocks allow you to provide an output based on pre-configured input logic from digital inputs or internal sources.



### Timers

Timers can be assigned to a digital input, logic blocks, comparators or other sources. Timers offer multiple inputs each with a programmable logic block. Each digital output also has a delay ON & OFF function.

### User Alarms & Warnings

There are five user programmable Alarms & Warnings available. An 'Alarm' trips the ZENER 8000 and a 'Warning' indicates but does not trip.

- Selectable alarm trigger source
- Use internal logic blocks/ functions, external device or input signal to trigger
- Timer function
- Programmable 'TEXT' to display

### PID Controller(s)

Includes a fully adjustable PID controller to provide automatic control of a process using feedback directly connected to the ZENER 8000. It offers a programmable set point source, units and scale. A simple PID display provides indication of the set point & process variable.

### Idle Mode

Monitors the motor & process variable to automatically turn the motor ON or OFF based on demand.

### Pipe Fill Mode

This feature allows the pipes to fill and the pressure to build before automatically switching to PID mode.

### "Maximum Power Point Tracking"

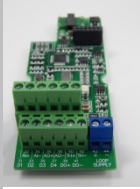
ZENER's unique MPPT controller for maximising power from a solar array whilst achieving maximum operating time. This feature is available with the ECODRIVE model only.



# ZENER 8000 Options

## Plug-in Option Boards

The Zener 8000 can accept a maximum of 2x option boards of any combination.



### Extended Features Option AQ08001

Provides additional Inputs & Outputs

- 4x Programmable digital inputs
- 1x Analogue output
- 1x Solid State digital output
- Thermistor input
- 24VDC loop power supply



### Relay Expansion Board AQ08202

Provides additional Relay Outputs

- 2x Programmable Relays with changeover contacts
- Includes invert and timer function



### Thermistor Only Board AQ08201

Provides a single thermistor input

## Communications

The standard communications provided is Modbus & BACnet RS485. Use the communication link to connect to a PLC, internet, 4G network or a gateway to allow connection to other bus systems such as Profibus or DeviceNet.



### Modbus TCP Option Board AQ08204

An option board is available for Ethernet Modbus TCP.

### IP66 Gland Plate Kits

Gland Plate kits are available to provide an external Ethernet connection. Kit includes the IP66 field housing.

## 24VDC Control Supply Option

Provides the ability to power from a 24VDC power supply to :

- Control a line contactor to remove power when not in use.
- Allow programming without the 3 phase high voltage applied.
- Interrogate service logs without the 3 phase high voltage applied.

## Remote Console

This option provides an IP66 remote console for programming, monitoring and motor control.

An external IP66 connection port is provided. Connect via a standard Cat-5 cable.



## Integral DC Bus Choke

The DC bus choke is a substantial choke that is fitted within the ZENER 8000 protective enclosure. The DC bus choke provides the following:

- Significantly reduced power line harmonics
- Compliance to AS61000.3.12:2006
- Reduction of inrush currents
- Increased immunity to AC line transients
- Improved EMC performance
- Increased tolerance to phase imbalance in the 3Phase AC supply

## Output Filters

Zener can provide standard or custom designed filters to suit a required purpose. An IP66 enclosed high performance and high efficiency output filter is available:

- High Efficiency
- Common Mode and differential filtering
- Suitable for submersible / bore pumps
- Eliminates screened motor cable
- Ultra low dv/dt for old motors with poor insulation
- Long cable runs

## Internal Aux. Power Supplies

Additional Power supply modules are available that fit within the ZENER 8000 enclosure to power peripheral equipment.

- 24VDC 20mA loop supply (included on Option Board AQ08001)
- 24VDC 250mA / 100mA
- 12VDC 200mA
- 5VDC 400mA

## Dynamic Braking Kit & Resistors

Optional dynamic Braking kits are available and resistors supplied to suit the application

## Other Options & Accessories

- Pressure Transducers for pump control systems
- Outdoor sun hoods
- ECODRIVE Solar auxiliary control panels & accessories
- Custom designed and manufactured options and controls
- Remote control stations and potentiometer kits

## PC Upload/Download

### PC Upload/Download Connection Port AF083203

This option provides an access port to allow the transfer of files to & from the ZENER 8000. Uses as standard USB cable and requires no special software. Files can be stored on a PC, emailed or transferred to other drives.



# Specification

## Supply

8R:	380 to 480Vac 3Ø, +10%, -15%,
8L:	208 to 240Vac 3Ø, +10%, -15%,
8E:	407 to 800Vdc and/or
	380 to 480Vac 3Ø +10%, -15%,
8EL:	185 to 400Vdc and/or
	208 to 240Vac 3Ø, +10%, -15%,
8V:	950 to 1100V

Other: 41.5VAC educational: 38-48VAC

Frequency:	48 to 62Hz
Power cycling:	Unlimited
Starts per hour:	Unlimited

## Single Phase Supply

The above can operate on a single phase supply within the same voltage range to provide a 3 phase output. Suitable for 240VAC single phase or 480VAC SWER supply. Suitable for 3 phase motors only. Contact Zener for selection.

## Output

Voltage:	0 to Vac <sub>max</sub> , 3 phase The output voltage cannot be higher than the input voltage
Frequency range:	0 to 200Hz
Rating:	Continuous at rated temperature (40 or 50°C)
Intermittent Amps:	Rated overload current for 60seconds at rated ambient temperature. See table for actual current ratings
Current/Torque Limit:	User adjustable from 20% to 180% of general purpose rating

## Construction

Enclosure:	Powder Coated steel or stainless Steel
IP Rating:	IP30, IP54, IP66 depending on size & model
Heatsink:	Aluminium

## Environmental

Storage temperature:	-20 to +70°C
Operating temp.:	0 to +50°C De-rating may be required above 40°C depending on load current
Relative Humidity:	5 to 95%, non-condensing
Altitude:	0 to 1000m

## Standards Compliance

Models marked with this symbol comply with the Australian EMC Framework requirements



Models marked with this symbol are listed by Underwriters Laboratories Inc and comply with UL 508C



The I<sup>2</sup>t function complies with IEC 60947-4-1 Ed. 2.0B (2000) and AS/NZS 3947.4.1:2001: Low voltage switchgear and control gear - Contactors and motor starters - Electromechanical contactors and motor starters thermal overload specification class 10A.

## Configuration

Menu/parameters:	Plain English with support reference code
Tools:	Manual using console, simple setup using standard or custom 'Applications', 'custom' file backup, file transfer using PC connection (optional).

## Control

Standard:	Self-Powered from input supply
Optional:	24VDC control supply option available
Control Logic:	Low = 0-2Vdc, High = 3-5Vdc
Reference Supply:	On board 5Vdc 40mA (Term 1) & 5mA supply (Term 8)

## Control Sources

Local:	FWD/UP, REV/ DOWN, STOP, RESET
Remote:	Programmable Inputs and outputs and internal logic functions
Internal Functions:	Programmable I/O, timers, logic blocks, comparators & PID controllers.
Communications:	Modbus RS485, BACNET and Ethernet Modbus TCP
Speed References:	Console, Analogue Inputs, Preset Speeds, PID Controller output, motorised potentiometer, analogue signal combiner output and communication link.
Solar:	ECODRIVE includes a Maximum Power Point Tracking Controller.
Pumping:	PID control, Idle function (sleep), pipe fill, bore level control, customised Protection.

## Control Inputs

Digital Inputs:	Programmable + Enable 5x Standard, Maximum of 13 possible, 0-5Vdc Logic The Option Board AQ08001 can accept max. 24VDC
Analogue Inputs:	Programmable Signal type, min & max values and comparator functions. 1x Standard, Maximum of 3 possible Maximum input 20mA or 10Vdc Differential input, max $\pm 32V$ to COM common mode range 3 input combiner (average or maximum output)
Thermistor Input:	Trip Level 3Kohms with short circuit protection Maximum of 2 possible

## Control Outputs

Digital Outputs:	Programmable source with invert & timer function
Relay Outputs:	2x Standard, up to maximum of 6 250VAC/30Vdc 5A resistive 250VAC/30Vdc 2A (1.5A) reactive C/O contacts with option Board
Solid State Output:	Up to maximum of 2, 2ohm R <sub>ON</sub> DC rating: $\pm 40V$ pk, max. 250mA RMS AC rating: 28Vac, max. 250mA RMS
Analogue Outputs:	Maximum of 2x possible Programmable Signal type, min & max adjustment

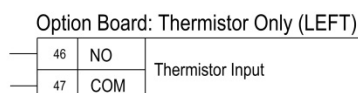
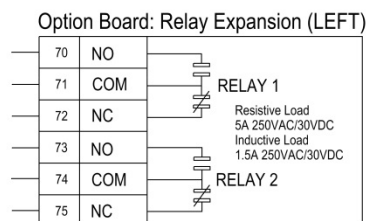
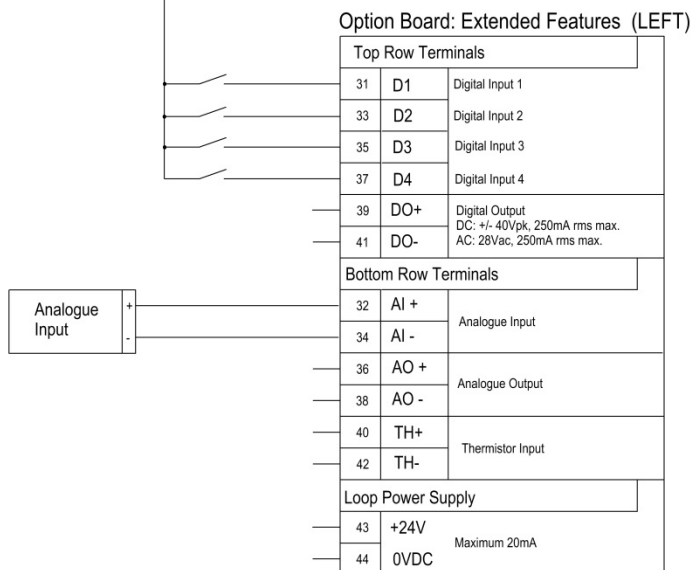
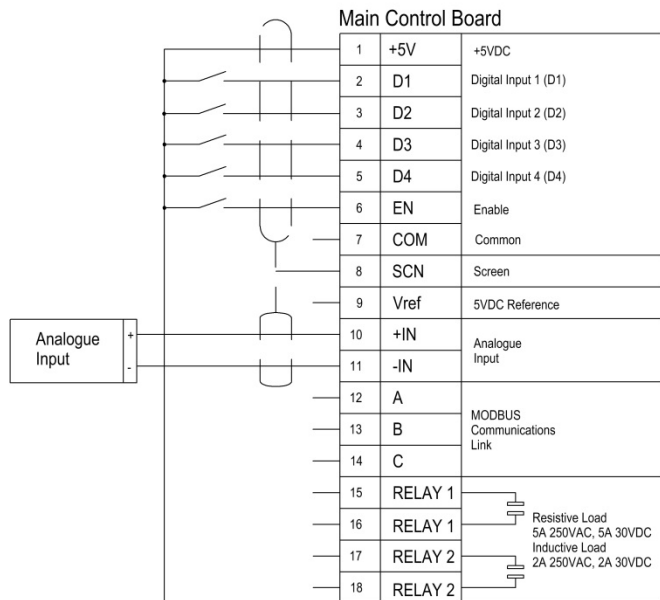
## Protection

- Output Short Circuit & Over Current
- Over Voltage & Voltage Limit
- Thermal Protection from overload condition and/or high ambient or insufficient ventilation
- Integral Motor Protection with option for thermistor protection
- Power fail and high ripple protection
- Adjustable current limit
- User customised warnings & alarms
- Customised protection for: Over/under current, Loss of signal, high pressure, low pressure, no flow, low Bore level, bearing warning etc

The above specifications may require optional hardware and may be limited by the option board configuration. See ZENER for assistance.

# Control Wiring

## Typical Wiring Interface & Option Board possibilities

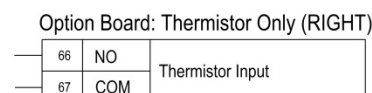
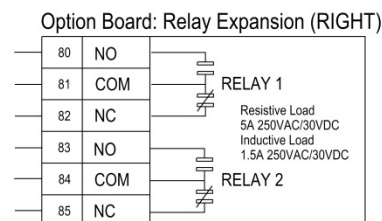
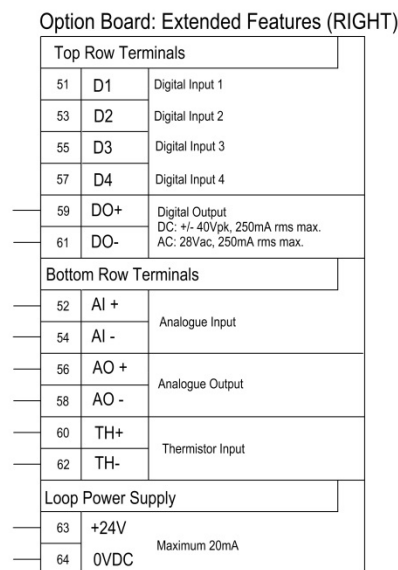


### Option boards:

Option boards are installed in either the left or right slot provided, in any combination. A maximum of any two (2) option boards may be fitted.

Option Board	Part Number
Extended Features Option Board (fitted)	AF08001
Relay Expansion Board (fitted)	AF08202
Thermistor Only Option (fitted)	AF08201
Ethernet Modbus TCP Option Board (fitted)	AF08204

It is recommended that the AF08001 option board is fitted in the left slot as required by some 'applications'.



This information should be used as a guide only and may change without notice.



# 380 – 480VAC

## Selection Guide & Product Data



### Selection & Ratings

General Purpose Amps (Cont.)	Extended Duty Amps (Cont.)	Amps (Int.)	Chassis	Part Number
2.0	2.0	4.7	A	8R001XX
3.6	3.1	4.7	A	8R003XX
5.0	4.2	6.3	A	8R005XX
7.2	6.0	9.0	A	8R007XX
10.8	8.9	13.4	A	8R011XX
16.0	13.5	20.3	A	8R016XX
22.5	19.1	28.6	B	8R023XX
30.1	25.6	38.4	B	8R030XX
40.3	34.1	51.1	B	8R040XX
57.0	48.3	72.5	B	8R057XX
82.0	69.5	104.3	C	8R082XX
109.0	92.4	138.6	C	8R109XX
140.0	118.7	178.0	C	8R140XX
170.0	132.7	199.0	C/C+	8R170XX
220.0	161.3	242.0	D	8R220XX
315.0	231.0	346.5	D	8R315XX
390.0	286.0	429.0	D	8R390XX
490.0	359.3	539.0	D	8R490XX

#### Notes:

1. Ratings are based on an ambient of 40°C. Contact ZENER for higher ambient ratings.
2. XX: refers to whether a DC bus choke is fitted and the enclosure type. This will depend on the model and what is available. Always check with ZENER.

#### 8L - 240VAC Three Phase or Single Phase

For selection and technical information relating to the 8L model and/or operating on a single phase supply contact ZENER VARIDRIVE SOLUTIONS or an authorised ZENER distributor.

### Product

**Model:** ZENER 8000 480VAC 3Phase  
**Part No. Prefix:** 8R

#### Input

Voltage: 380 to 480Vac 3Ø, +10%, -15%  
 Frequency: 48 to 62Hz  
 Power cycling: Unlimited  
 Starts per hour: Unlimited  
 SWER Supply: Contact ZENER for sizing/selection

#### Output

Voltage: 0 to 480Vac 3Ø  
 Frequency range: 0 to 200Hz  
 Rating: Continuous at 40°C (de-rate above 40°C)  
 Intermittent Amps: see table for actual current ratings

#### Construction

Enclosure: Powder Coated steel or Stainless Steel  
 IP Rating: IP30, IP54, IP66 depending on size  
 Heatsink: Aluminium

#### Environmental

Storage temperature: -20 to +70°C  
 Operating temperature: 0 to +50°C  
 De-rating may be required above 40°C depending on load current  
 Relative Humidity: 5 to 95%, non-condensing  
 Altitude: 0 to 1000m

#### Options

- Range of ZENER 8000 Option Boards
- Integral DC Bus Choke
- 24VDC control supply option
- Internal Power Supplies (5V, 12V, 24VDC)
- PC Upload/Down load connection port
- Dynamic braking
- Remote Console
- Output Filters
- Customised controls
- Floor mount kit for CHD
- Outdoor Hood

#### Accessories

- Pressure transducers
- EMC Cable Gland
- EMC Motor Cables

Option Boards	Part Number
Extended Features Option Board	AQ08001
Relay Expansion Board	AQ08202
Thermistor Only Option	AQ08201
Ethernet Modbus TCP Option Board	AQ08204

This information should be used as a guide only and may change without notice. Always consult ZENER for selection & current availability.

# 800VDC Solar

## Selection Guide & Product Data



### Selection & Ratings

General Purpose Amps (Cont.)	Extended Duty Amps (Cont.)	Amps (Int.)	Chassis	Part Number
2.0	2.0	4.7	A	8E001XX
3.6	3.1	4.7	A	8E003XX
5.0	4.2	6.3	A	8E005XX
7.2	6.0	9.0	A	8E007XX
10.8	8.9	13.4	A	8E011XX
16.0	13.5	20.3	A	8E016XX
22.5	19.1	28.6	B	8E023XX
30.1	25.6	38.4	B	8E030XX
40.3	34.1	51.1	B	8E040XX
57.0	48.3	72.5	B	8E057XX
82.0	69.5	104.3	C	8E082XX
109.0	92.4	138.6	C	8E109XX
140.0	118.7	178.0	C	8E140XX
170.0	132.7	199.0	C/C+	8E170XX
220.0	161.3	242.0	D	8E220XX
315.0	231.0	346.5	D	8E315XX
390.0	286.0	429.0	D	8E390XX
490.0	359.3	539.0	D	8E490XX

#### Notes:

- Ratings are based on an ambient of 40°C. Contact ZENER for higher ambient ratings.
- XX: refers to whether a DC bus choke is fitted and the enclosure type. This will depend on the model and what is available. Always check with ZENER.



For more information on the ECODRIVE refer to the ECODRIVE SOLAR Brochure, our website or contact ZENER VARIDRIVE for more information.

[www.zener.com.au](http://www.zener.com.au)

#### 8EL - 400VDC / 240VAC model

For selection and technical information relating to the 8EL model and/or operating on a single phase supply contact ZENER VARIDRIVE SOLUTIONS or an authorised ZENER distributor.

### Product

**Model:** ZENER 8000 ECODRIVE 800VDC  
**Part No. Prefix:** 8E

#### Input

**Voltage:**  
 Solar Array: 407 to 800VDC  
 Auxiliary Supply: 380 to 480Vac 3Ø, +10%, -15%  
**Frequency:** 48 to 62Hz  
**Power cycling:** Unlimited  
**SWER Supply:** Contact ZENER for sizing/selection

#### Output

**Voltage:** 0 to 480Vac 3Ø  
**Frequency range:** 0 to 200Hz  
**Rating:** Continuous at 40°C (de-rate above 40°C)  
**Intermittent Amps:** see table for actual current ratings

#### Construction

**Enclosure:** Powder Coated steel or Stainless Steel  
**IP Rating:** IP30, IP54, IP66 depending on size  
**Heatsink:** Aluminium

#### Environmental

**Storage temperature:** -20 to +70°C  
**Operating temperature:** 0 to +50°C  
 De-rating may be required above 40°C depending on load current  
**Relative Humidity:** 5 to 95%, non-condensing  
**Altitude:** 0 to 1000m

#### Options

- Range of ZENER 8000 Option Boards
- Integral DC Bus Choke
- 24VDC control supply option
- PC Upload/Down load connection port
- Remote Console
- Output Filters
- Customised controls
- Outdoor Hood

#### Solar Accessories

- Blocking Diodes
- Irradiance Sensor
- Aux Control Panels
- PV connectors

Option Board	Part Number
Extended Features Option Board	AQ08001
Relay Expansion Board	AQ08202
Thermistor Only Option	AQ08201
Ethernet Modbus TCP Option Board	AQ08204

This information should be used as a guide only and may change without notice. Always consult ZENER for selection & current availability.

# 1000VAC

## Selection Guide & Product Data



### Selection & Ratings

Amps (Cont.)	Amps (Int.)	Est. kW	Part Number
30.0	45.0	37	8V03020
44.0	66.0	55	8V04420
58.0	87.0	75	8V05820
66.0	100.0	90	8V06620
84.0	126.0	110	8V08420
100.0	150.0	132	8V10020
132.0	198.0	160	8V13220
168.0	252.0	220	8V16820
200.0	300.0	250	8V20020
300.0	400.0	400	8V30020

### Chassis arrangement

Part Number	Module size	No. of modules	Chokes (Input + Output)
8V03020	V1	1	1 + 1
8V04420	V1	1	1 + 1
8V05820	V1	1	1 + 1
8V06620	V1	1	1 + 1
8V08420	V2	1	1 + 1
8V10020	V2	1	1 + 1
8V13220	V1	2	2 + 2
8V16820	V2	2	2 + 2
8V20020	V2	2	2 + 2
8V30020	V2	3	3 + 3

#### Notes:

1. Some sizes are supplied as 2 or more modules required to be connected in parallel. A control cable to connect multiple modules is provided. Refer to the installation manual for more details.
2. Each modules comes with an input & output choke.

### Product

**Model:** ZENER 8000 1000V

Part No. Prefix: 8V

#### Input

Voltage: 950 to 1100Vac 3Ø, +10%, -15%  
Frequency: 48 to 62Hz  
Power cycling: Unlimited

#### Output

Voltage: 0 to 1100Vac 3Ø  
Frequency range: 0 to 100Hz  
Rating: Continuous at 50°C  
Intermittent Amps: 150% overload capacity  
(see table for actual current ratings)

\*\*The output voltage cannot be higher than the input voltage

#### Construction

Enclosure: Stainless Steel with heat exchanger.  
IP00; IP66 heat exchanger  
Choke: IP00  
Heatsink: Standard Aluminium (Copper Option)

#### Environmental

Storage temperature: -20 to +70°C  
Operating temperature: 0 to +50°C  
Relative Humidity: 5 to 95%, non-condensing  
Altitude: 0 to 1000m

#### Inclusions

- Input & Output Choke
- Remote Console
- Parallel connecting cables (if applicable)

#### Options

- Range of ZENER 8000 Option Boards
- 24VDC control supply option
- Copper Heatsink
- PC Upload/Download connection port

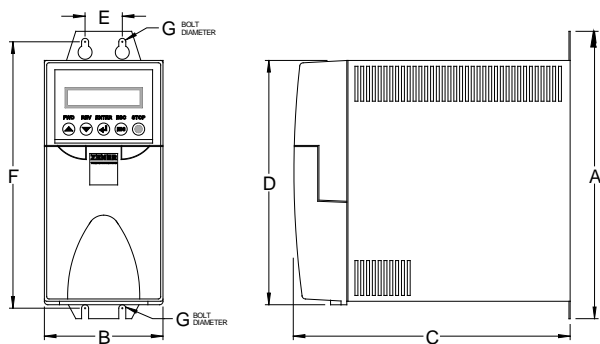
Option Board	Part Number
Extended Features Option Board	AQ08001
Relay Expansion Board	AQ08202
Thermistor Only Option	AQ08201
Ethernet Modbus TCP Option Board	AQ08204

This information should be used as a guide only and may change without notice. Always consult ZENER for selection & current availability.

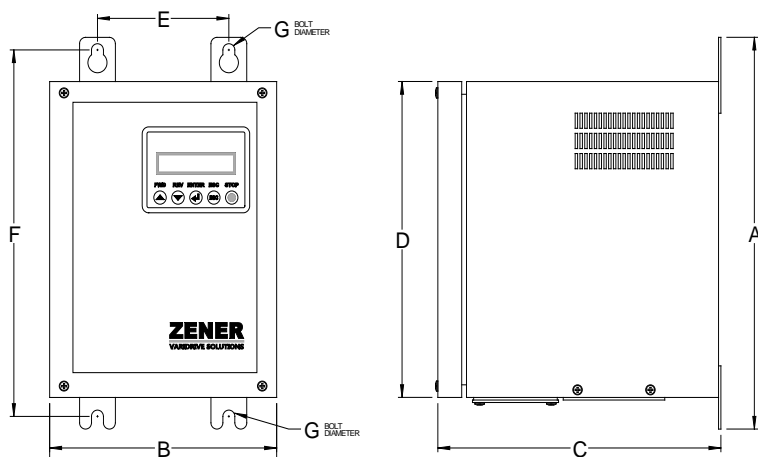
# Dimensions

## 8R/E Models

Chassis A – IP30

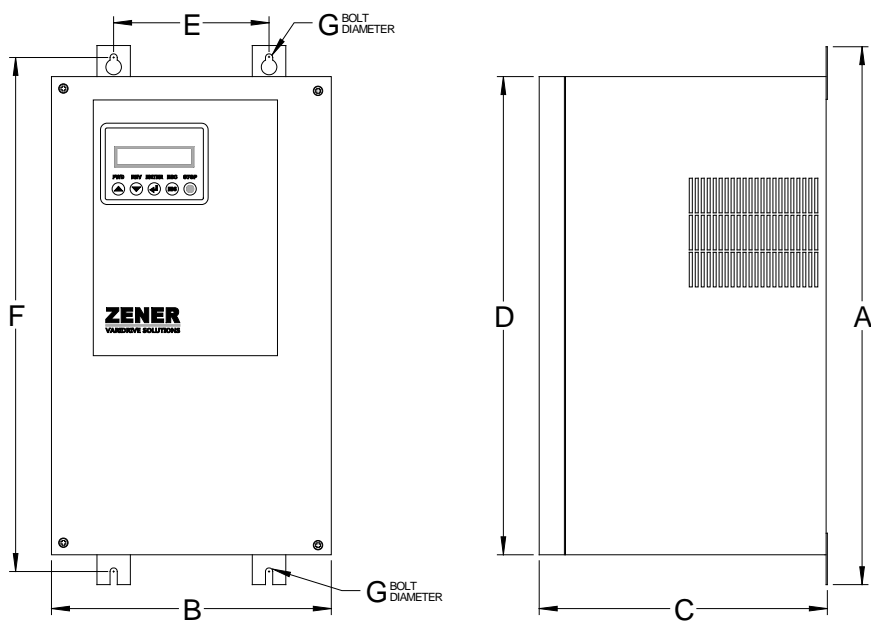


Chassis A – IP66



Allow 50mm above, below and either side of the enclosure for ventilation

Chassis B – IP30 & IP66



Allow 75mm above, below and either side of the enclosure for ventilation

Chassis	Enclosure Type	Model	A	B	C	D	E	F	G
A	IP30	8*001 to 8*011	248	102	237	208	32	230	6
A	IP66	8*001 to 8*016	310	190	236	250	108	287	6
B	IP30 & IP66	8*023 to 8*057	459	234	243	400	130	436	6

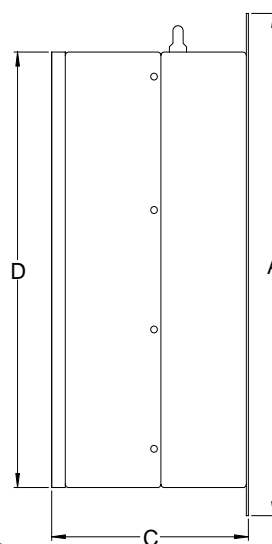
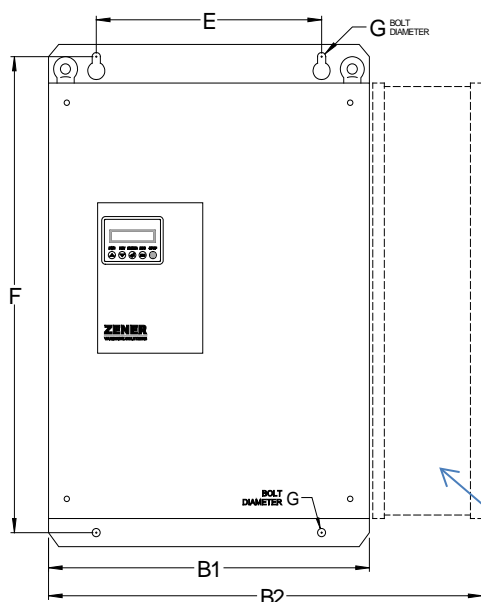
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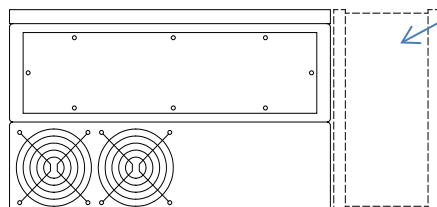
# Dimensions

8R/E

## Chassis C



## Chassis C+



The R170 IP66 includes a heat exchanger mounted to the side of the chassis.

Allow 100mm above, below and either side of the enclosure for ventilation

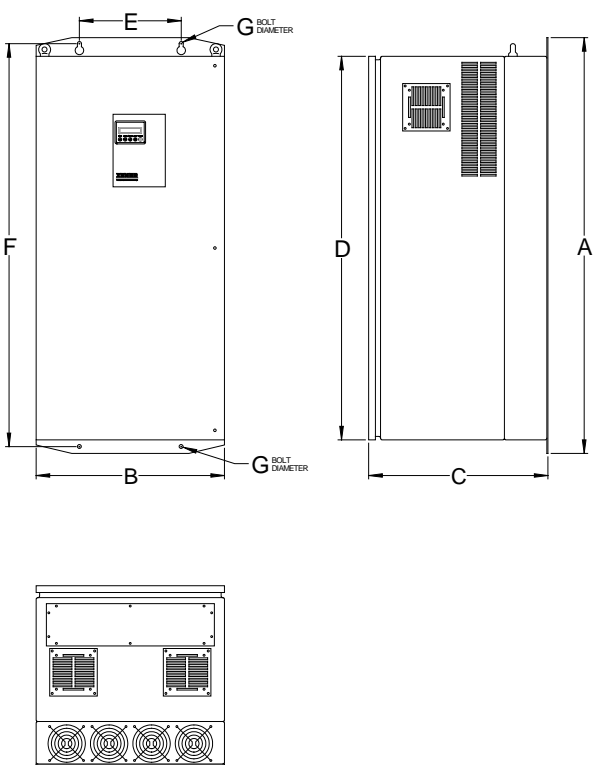
Chassis	Enclosure Type	Model	A	B1	B2	C	D	E	F	G
C	IP30/IP66	8*082 to 8*140	715	470	n/a	290	625	330	677	12
C	IP54	8*170	715	470	n/a	290	625	330	677	12
C +	IP66	8*170	715	n/a	635	290	625	330	677	12

This information should be used as a guide only and may change without notice. Always consult ZENER for selection & current availability.

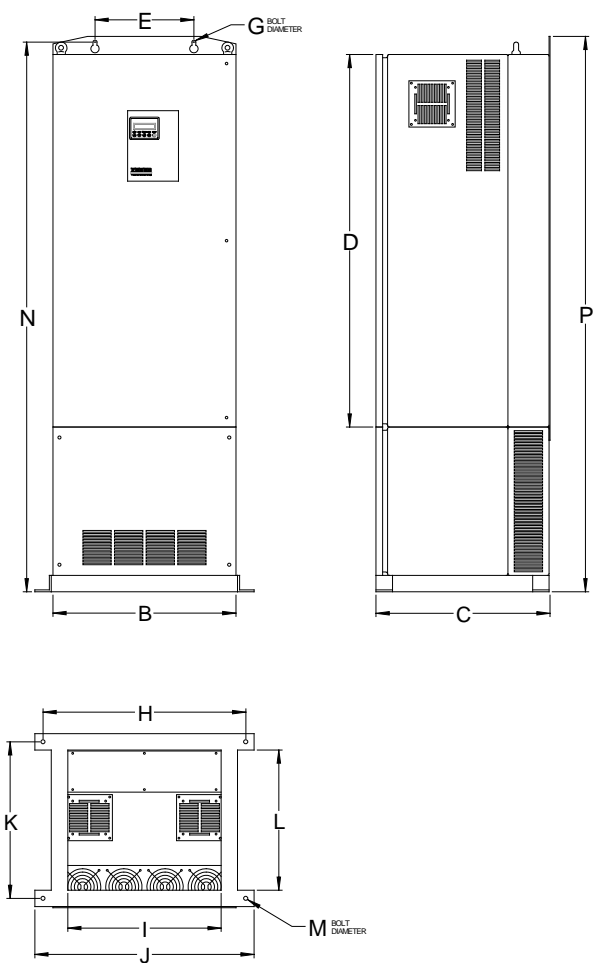
# Dimensions

8R/E model

Chassis D



Chassis D with floor mount kit



Chassis	Model	Enclosure Type	A	B	C	D	E	F	G
D	8R/E 220-490	IP30 / IP54	1225	555	525	1132	300	1185	12

Chassis	Model	Enclosure Type	H	I	J	K	L	M	N	P
D	8R/E 220-490	IP30/IP54 with Floor mount kit **	618	459	659	475	425	13	1663	1684

\*\* The floor mount kit is supplied as a separate kit.

This information should be used as a guide only and may change without notice.

# Dimensions

## 8V model

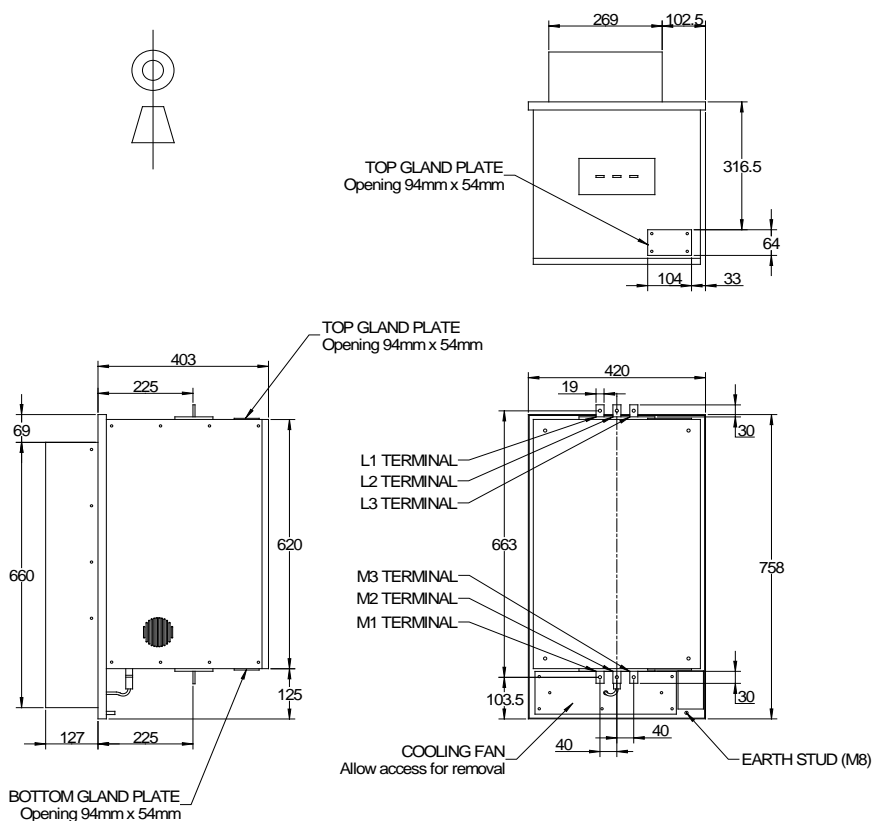
### Chassis V1:

Dimensions for the single module only.  
Dimensions for clearances & cutouts for the heat exchanger can be found in the installation manual.

Dimensions for input & output chokes may vary, contact Zener for current dimensions.

When sizing a suitable enclosure always allow for the heat loss of the drive and the chokes.

Refer to the instruction manual or contact Zener for more details.



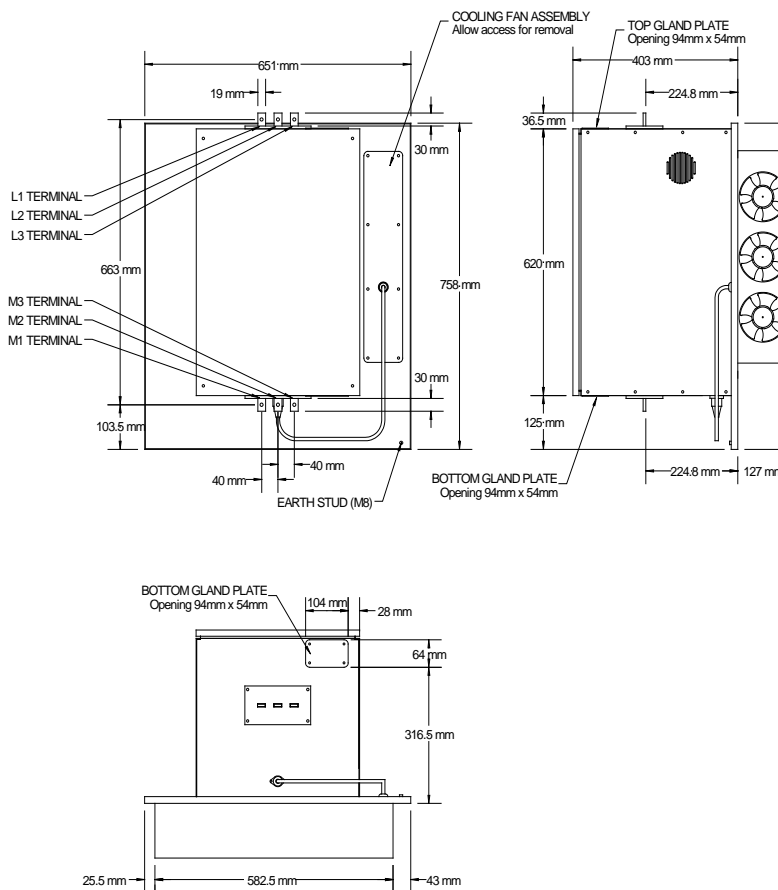
### Chassis V2:

Dimensions for the single module only.  
Dimensions for clearances & cutouts for the heat exchanger can be found in the installation manual.

Dimensions for input & output chokes may vary, contact Zener for current dimensions.

When sizing a suitable enclosure always allow for the heat loss of the drive and the chokes.

Refer to the instruction manual or contact Zener for more details.



This information should be used as a guide only and may change without notice.



# Innovative Solutions Engineered to Give you Confidence

Since 1976 Zener has been manufacturing Variable Speed Drives. A team of specialist engineers continue to develop a range of products that continue to utilise the latest technology in power electronics and motor control. Continually exploring and experimenting with new technology and methodologies to engineer innovative solutions.

## Confidence

The ZENER 8000 is a result of over 40 years of experience in the design & manufacture of Variable Speed Drives. Designed by us in Australia, we understand our product and can provide a fast response or solution.

## Product knowledge

Gain the assurance that the product is correctly selected for the application and specialist support is available to assist with wiring configuration, installation, programming and problem solving.

## Industry experience

With our product knowledge and industry experience we can best match a product to your needs to ensure maximum performance and life expectancy.

## Custom designed products

As engineers in electronic motor controls & power electronics we can provide tailored solutions to meet your individual requirements. The ZENER 8000 provides the ideal platform to create unique solutions.

## Specialist service & support

The ZENER 8000 is supported by a friendly and competent team of engineers & technicians. Local support & service ensure a prompt response or solution to your problem or concern.

## Engineering support

A team of engineers are available to assist with design or problems should they be experienced. Our design engineers can also provide custom solution to unusual problems or where a more specialised product or solution is required.

**ZENER**  
VARIDRIVE SOLUTIONS

**Zener Electric Pty Ltd**

366 Horsley Road  
Milperra NSW 2214

**1300 4 ZENER**  
(1300 493 637)

Contact Your Nearest Zener Distributor

