

## Medium Voltage Variable Speed Drive

**A member of CSE Global**

# Capabilities

**CSE-Uniserve Pty Ltd has been a leading supplier of Variable Speed Drives to the Australian market for the past 25 years.**

**During this period CSE-Uniserve has gained an enviable reputation for its supply and integration of engineered VSD solutions into the demanding and critical Mining, Water Utility, Manufacturing and Process Engineering industries.**

## Key Capabilities

Our prominent position has been achieved through the successful delivery of complete engineered project solutions, utilising robust and proven products and integrated system designs. This combined with the highly experienced applications, sales and service support, ensures that the CSE-Uniserve Power Conversion team is the prime partner for your next project.

CSE-Uniserve delivers more than just equipment. Our considerable experience and applications knowledge allows us to provide our valued customers with:

- Complete turnkey engineered solutions for LV and MV VSD applications, including:-
  - Project Management
  - Design
  - Manufacture
  - Installation
  - Site commissioning
  - Training
  - Servicing and repair
  - Preventative maintenance
- Harmonic studies and harmonic solutions.
- Specialised Designs for Load Sharing, System Redundancy and Synchronous Bypass Transfer.
- Complete packaged drive solutions including motor, VSD, starter, motor protection, "string testing", harmonic design and verification, and specialist custom built enclosures to suit client / site requirements.

Univerter-MV Medium® Voltage Drives are manufactured by Leader and Harvest Electric Technologies Co. Ltd, PRC to ISO9001, to the technical specifications and requirements of CSE-Uniserve Pty Limited, to comply with Australian Standards and to meet the demanding needs of Australian industry and environments.







## Leading technologies, Leading by example

### System Configuration

The CSE-Uniserve Univerter-MV® Medium Voltage Drive features a design topology that provides not only a clean power input but also a motor friendly output. The topology uses an integral phase shift transformer to achieve excellent supply harmonic performance and a multi-level output to provide a near sinusoidal output waveform to the connected motor.

#### Integral Phase Shift Transformer

The multi phase input transformer provides flexibility of input supply design from 11, 6.6 and 3.3kV (and others) independent of output requirement, providing increased design flexibility for the project designer.

Power side Harmonic disturbance is reduced due to the transformer's multiple output phase design meeting IEEE standard levels.



#### Cascade-Connected Power Cells

The CSE-Uniserve Univerter-MV® utilises cascade-connected power cells to provide not only modular construction design but the flexibility to provide the user with the output voltage levels required to match the motor voltage.

The multi cell, multi level design also provides a smooth sinusoidal output to the motor allowing longer motor cable runs and negates the need for expensive dV/dt filters.



#### Control Flexibility

The use of a high speed SCM to provide drive functionality and PWM control, an interface PLC for control connectability and a graphic colour touch-screen HMI for user programming and monitoring, ensures maximum application and communications flexibility.

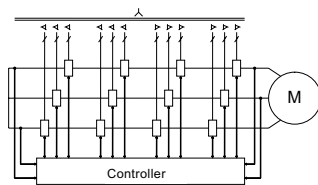


# Features

The CSE-Uniserve Univerter-MV® Medium Voltage Drive's multi-level PWM topology provides a number of features to present engineers with deliverable project design flexibility.

## Clean input power

The input transformer features a multiple phase shift secondary winding, feeding multiple series power cells. The result is a multi-phase input system of 24 pulse at 3.3kV, 36 pulse at 6.6kV and a 54 pulse at 11kV. The resulting harmonic signature of the drive is therefore very low meeting the requirements of IEEE 519-2000 harmonic standards. Costly and inefficient harmonic filters are therefore not required.



## Maintenance Friendly

- Simple design that features only three sub-systems, transformer, power cells and control.
- Power cell structure makes for low spares inventory.
- A power cell can be replaced in half an hour without special tools.
- The VME rack base controller allows easy board replacement.
- User friendly HMI interface and drive toolbox provides easy setup, monitoring and fault finding.

## Installation Flexibility

The integral transformer has the potential for direct connection to an incoming bus supply without the need for a step down transformer. Depending on your installation this can provide a significant advantage since additional switchgear can be avoided.

## Power Cell

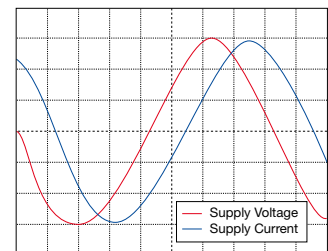
Each power cell contains all semiconductors and capacitors and makes for reduced spares holding and facilitates quick and easy replacement.



## Power Quality Friendly

The use of IGBT switching technology and an advanced integral dry-type transformer makes for a high overall drive (inverter and transformer) efficiency. Similarly the low harmonic signature of the input topology means optimum

supply usage with a power factor >0.95. With the emerging global trend toward efficient power usage the CSE-Uniserve Univerter-MV® Medium Voltage Drive is well placed to meet the challenge.





## Leading technologies, Leading by example

### Key Features

Multi Pulse input system 24, 36 and 54 pulse

Use of multi phase shift input transformer provides input voltage flexibility

Multi Level design output voltage waveform produces low dV/dt

Optional power cell bypass facility provides automatic bypassing of a faulty power cell

Optional redundant power cell facility provides a spare power cell that automatically replaces the faulty cell

Fibre optic interface to power cells

Identical power cell used in the drive system

The multiple secondary winding configuration allows standard low voltage components to be used in each power cell

### Major Benefits

Low harmonic signature does not require additional filtering to meet IEEE 519-2000

Choice of input supply voltage independent of output/motor voltage, reducing overall project cost

Standard motor can be used without enhanced insulation or derating

No dV/dt filter required or cable length restrictions

Allows continued operation of mission critical installations at **reduced load** until the plant can be shut down to perform cell replacement

Allows continued operation of mission critical installations at **full load** until the plant can be shut down to perform cell replacement

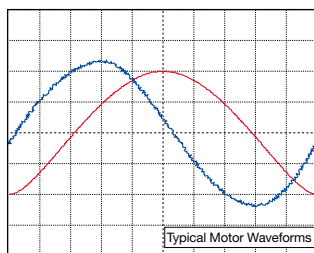
Ensures reliable interference free firing control

Interchangeability reduces drive system spares count

Power components are commonly used in low voltage drives and are readily available

### Motor Friendly Output

The power cell on each transformer secondary is connected in series to create the output voltage waveform. The series connection of the power cells provides a multi-level Pulse Width Modulated (PWM) strategy to build up an output voltage to the motor that is near sinusoidal.



### User Friendly Touch Screen HMI

The touch screen interface provides a comprehensive configuration facility, status display and local/remote control. Monitoring includes status, fault history and a waveform window. This integral HMI makes for easy setup and is completed by the drive toolbox for PC configuration.





# Specifications

CSE-Uniserve brings highly experienced and specialised engineering expertise to every project, successfully applying our technologies to achieve the key project outcomes, in conjunction with our partner's needs.

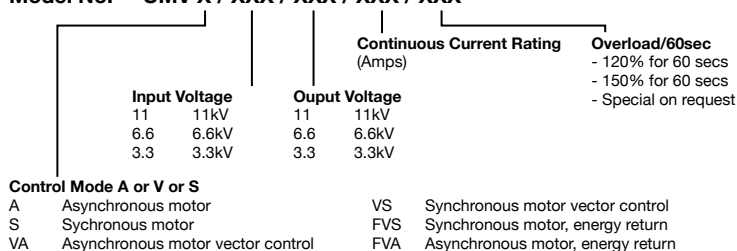
## Specifications

Model	Univerter-MV®			
Nominal Rating:	280KW- 8,000KW			
Voltage Range:	Input kV	Output kV		
	11	3.3	6.6	11
	6.6	3.3	6.6	
	3.3	3.3		
Overload Capacity:	120% for 60 seconds (VT) 150% for 60 seconds (CT) Special on request			
Control:	Digital Microprocessor Sensorless Vector or V/Hz			
Voltage Tolerance:	±10%			
Supply Frequency and Tolerance:	50/60Hz ±10%			
Technology:	Cell-cascaded multilevel PWM			
Rectifier Device:	LV Diode			
Inverter Device:	LV IGBT-H bridge			
Cell Configuration	Output kV	3.3	6.6	11
	No. Cells	12	18	27
	Input Pulse	24	36	54
	Output Levels	9	13	19
Input Power Factor:	Cos θ > 0.95			
Efficiency (Inverter & Transformer):	> 96% (at full load)			
Voltage Cut Ride Through Duration:	5 cycles			
Volt Dip:	- 30%			
Catch Spinning Load:	Yes			
Field Bus Communications:	TCP/IP, Devicenet™, Modbus, Profibus DP™			
Cooling:	Forced Air Cooled			
Enclosure Protection:	IP31 - IP41			
Ambient Temperature Maximum:	45°C (higher ambient with de-rating)			
Humidity (Non Condensing):	>90%			
Altitude (Maximum):	1,000m			
Noise At 1 Metre:	<75dB(A)			



## Univerter-MV® Model Number Definition

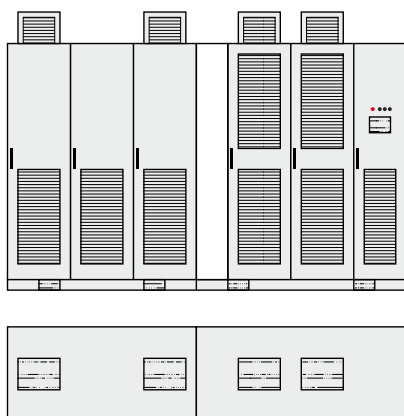
Model No. **UMV X / XXX / XXX / XXX / XXX**





# Leading technologies, Leading by example

## Dimensions and Weights



All specifications including dimensions and weights are subject to confirmation following final optioned design.

Input 3.3kV: Output 3.3kV				
Rating kW	Width mm	Depth mm	Height mm	Weight kg
250	4350	1200	2634	5000
500	4952	1200	2634	5500
750	4952	1200	2634	6500
1000	5354	1200	2634	7900
1250	6156	1200	2634	9500
1600	6456	1200	2634	9800
2000	7656	1500	2934	11000
2500	7656	1500	2934	12000

Input 6.6kV: Output 6.6kV				
Rating kW	Width mm	Depth mm	Height mm	Weight kg
280	5152	1200	2634	6000
450	5152	1200	2634	6400
710	6054	1200	2634	7300
1120	6656	1200	2634	7300
1600	6956	1200	2634	11100
2240	8762	1300	2534	14300
3250	8460	1500	2634	15900
5500	11168	1500	2934	24000

Input 11kV: Output 11kV				
Rating kW	Width mm	Depth mm	Height mm	Weight kg
315	6054	1200	2320	7400
630	6054	1200	2320	8200
1000	7256	1300	2320	9300
1600	7556	1300	2320	11200
2400	8558	1400	2320	13500
3400	10868	1500	2320	26000
5600	11168	1500	2620	33000
8800	16766	1500	2620	39000

Other ratings available on request.

## Options

### Cell Bypass

In the event of a power cell failure the failed cell can be automatically bypassed allowing continued operation at reduce power output, until maintenance can be carried out.

### Cell Redundancy

The drive system is fitted with additional cells to provide true redundancy. In the event of a power cell failure the failed cell is automatically bypassed allowing continued operation at full power output.

### Synchronised Transfer

Designed to be used for starting one or more motors, transferring them one at a time to and from the main supply using a synchronised transfer system. The motor running on the Variable Speed Drive is transferred to the direct supply by synchronising the drive system output to the direct supply and when synchronised switches the motor to the direct supply via contactors. Once the motor is running on the direct supply the Variable Speed drive output is available to be switched to control another motor.

*Note: The Synchronised Transfer can be used in conjunction with Cell Redundancy options to provide uninterrupted operation.*

### Cell Lift Truck

To comply with most OHS policies a cell lifter can be used for removal and replacement of the power cells. Please consult

CSE-Uniserve to assess whether this may be required for your installation.

### Increased Ingress Protection

The Univerter-MV® is available as standard with an ingress protection rating of IP31 designed for installation within an environmentally controlled switchroom. Where increased protection is required please consult CSE-Uniserve to assess further options or cooling alternatives.

### Alternative Supply and Output Voltages

In addition to the voltages listed the following supply and output voltages are also available 3, 4.16, 6, 10kV for both 50 and 60Hz. Please consult CSE-Uniserve to discuss your requirements.

### Alternative Cooling Systems

Air to water cooling systems can be provided to remove heat from the drive system to outside the switchroom area. Please consult CSE-Uniserve to discuss your requirements.

### Switchgear Options

Switchgear options can be provided to suit site requirements including Input Isolators, Output Isolators, Isolation Earth Switch etc.

### Increased Motor Protection

Whilst Univerter-MV® will provide basic motor protection, we are able to offer additional Motor Protection relays to provide comprehensive protection and monitoring. Please consult CSE-Uniserve to discuss your requirements.

### Motor

CSE-Uniserve are a specialist supplier of MV and HV motors and would welcome the opportunity to provide a combined motor and drive solution for your project. Please consult CSE-Uniserve to discuss your requirements.

# Contact Us

CSE-Uniserve has sales and engineering offices in locations across Australia and New Zealand:

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**Visit our website: [www.cse-uniserve.com.au](http://www.cse-uniserve.com.au)**