



## TMdrive<sup>®</sup>-MVe2 Product Application Guide

Medium Voltage Multilevel IGBT Drive  
Up to 5,500 HP (5,000 kVA), 3.3 kV to 11 kV

metals

cranes

mining

testing

oil & gas

renewable  
energy

power  
generation

cement

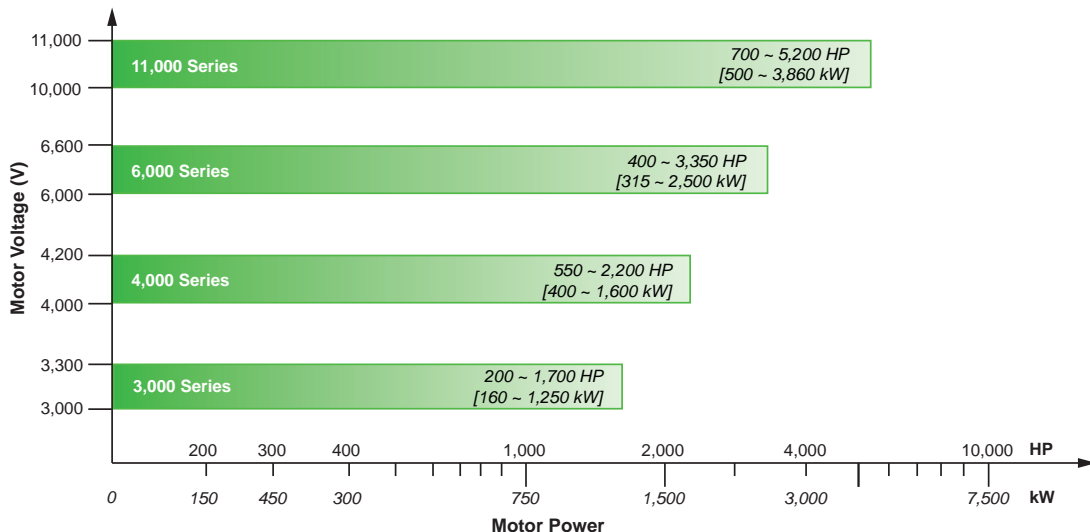
The TMdrive®-MVe2 is an enhancement to the family of TMEIC medium voltage general purpose drives offering:

- Regeneration
- Smaller footprint
- Unity line-side power factor
- Reduced part-count
- High availability



Design Feature	Customer Benefit
Active line side converter	<ul style="list-style-type: none"> <li>• Unity (1.0) power factor across entire speed range</li> <li>• Line side harmonics much lower than IEEE 519-2014</li> <li>• Standard regenerative braking</li> </ul>
Conservative electronic design & dry film-type capacitors	<ul style="list-style-type: none"> <li>• Highly reliable operation, expected 16-year MTBF</li> <li>• No need for periodic capacitor replacement</li> </ul>
Multilevel drive output voltage waveform	<ul style="list-style-type: none"> <li>• No derating of motor for voltage insulation or heating required</li> <li>• Applies easily to existing motors without the need for an expensive output filter</li> <li>• Eliminates the need for special VFD rated cables</li> <li>• No Neutral Shift</li> </ul>
Input isolation transformer with static shield included in drive package	<ul style="list-style-type: none"> <li>• Simplifies design and installation</li> <li>• Less total space required, plus easy integration in MCC building</li> <li>• Better motor protection than transformerless design</li> <li>• High frequency transients are attenuated</li> </ul>
Power conversion module in a single drawer type package	<ul style="list-style-type: none"> <li>• Reduction in spare parts</li> <li>• Minimal personnel training for maintenance</li> <li>• 30 minutes Mean Time to Repair (MTTR)</li> </ul>
Synchronous bumpless transfer of the motor to the utility line	<ul style="list-style-type: none"> <li>• Allows control of multiple motors with one drive</li> <li>• No motor current or torque transients when the motor transitions to the AC line</li> </ul>

### Covering a broad range of medium voltage drive applications



# Designed for the most demanding applications

## Oil & Gas

For Oil and Gas applications, the MVe2 family of variable frequency drives seamlessly integrates with the rest balance of process with a choice of 3/3.3 kV, 4.16 kV, 6/6.6 kV, 10kV or 11 kV options. The MVe2 can be applied to existing motors and cabling, making them an excellent option in modernization/retrofit applications, including:

- Oil pumps
- Expanders
- Gas compressors
- Extruders
- Fans
- Mixers



## Power Generation

Traditional mechanical methods of controlling flow are inefficient and require considerable maintenance. In the Power Generation/Utilities industry, the MVe2 provides more reliable, accurate and energy-efficient control of flow while eliminating the maintenance associated with dampers, vanes or valves for:

- Induced and forced draft fans
- Primary and secondary air fans
- Boiler feed water pumps
- Condensate extraction pumps

## Mining

Accurate torque control is a key in controlling large conveyors. The MVe2's flux vector algorithm provides the accuracy and response for constant torque applications. Mining applications include:

- Raw material conveyor
- Grinding mills
- Pumps
- Crushers
- Shredders
- Hoists



## Industrial

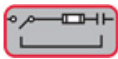
Regardless of the torque profile, MVe2 drives are designed to meet motor control needs in a variety of industries:

- Steel
- Water & wastewater treatment
- Rubber & plastics
- Test stands
- Agriculture
- Paper & pulp
- Recreational/Entertainment

# A Look Inside

## Differentiating Features

- Compact design saves valuable floor space making retrofits of old equipment easier
- Compartmentalized panels provide voltage class segregation and top or bottom cable feeds
- Integral isolation transformer provides reliable operation and simplifies installation.
- Significant reduction in parts, reducing spare parts requirements



### Input Power Disconnect Option†

- A visible, bolted pressure, isolation switch offers mechanical interlocking to allow for maintenance personnel to service the drive.
- The fused (Class E rated) vacuum contactor provides critical fault current protection to the drive.

### Main Power Input

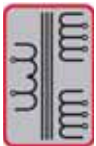
Four voltage levels are available:

- 3-3.3 kV, 3-phase, 50/60 Hz
- 4-4.16 kV, 3-phase, 50/60 Hz
- 6-6.6 kV, 3-phase, 50/60 Hz
- 10-11 kV, 3-phase, 50/60 Hz



### Internal Pre-Charge AC Reactor\*

An ac reactor and medium voltage contactor mitigate the transformer magnetizing inrush current, minimizing stress on the fusing and power components.



### Input Isolation Transformer Standard.

The input transformer has multiple secondary windings to feed IGBT inverters (cell inverters). This design provides galvanic isolation between the power system and the motor-inverter system. Electrostatic shield is standard.

### Kirk Key Interlocks†

For additional safety, Kirk key locks are provided standard on all drives.



### Filtered Air Intake

Washable input air filters have front access for periodic maintenance.

\* Available in select frame sizes

†For 4 kV drive, CSA listed in U.S. and Canada only.

# ...Beautifully Packaged.



### Blower Assemblies

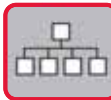
Quiet (<80 dB(A) at 1m), fans circulate air throughout enclosures pulling air from the front filter assemblies and venting it out the top of the cabinets. Redundant fan assemblies can be provided as an option.



### Control

Single 32-bit microprocessor-based control board combines several key drive functions:

- Power semiconductor gating
- Speed and torque regulation
- Motor and drive protection
- I/O mapping
- Diagnostic functions
- High speed data capture buffering
- Hosting of optional LAN interface
- Drive is configured from the TDrive-Navigator



### Communications

An optional communications card can be provided to connect the VFD to the DCS/SCADA system.



### Application Specific Controls

Each drive is matched to project requirements with custom control components.



### Remote Connectivity Module Standard.

On-board Windows® based computer provides access to live variables, parameters & historical fault data.



### Power & Motor Cabling Terminations

Conveniently located power cable terminations can be accessed from the front or rear. A metal cover prevents exposure to live parts when drive is running.

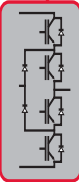


### Lightning Arrestors†

Incoming power is protected by distribution class lightning arrestors for suppression of transient surges.

### Control & Power Cables

Gland plates are provided to enable cable entry. Top and bottom entry options are selectable onsite.



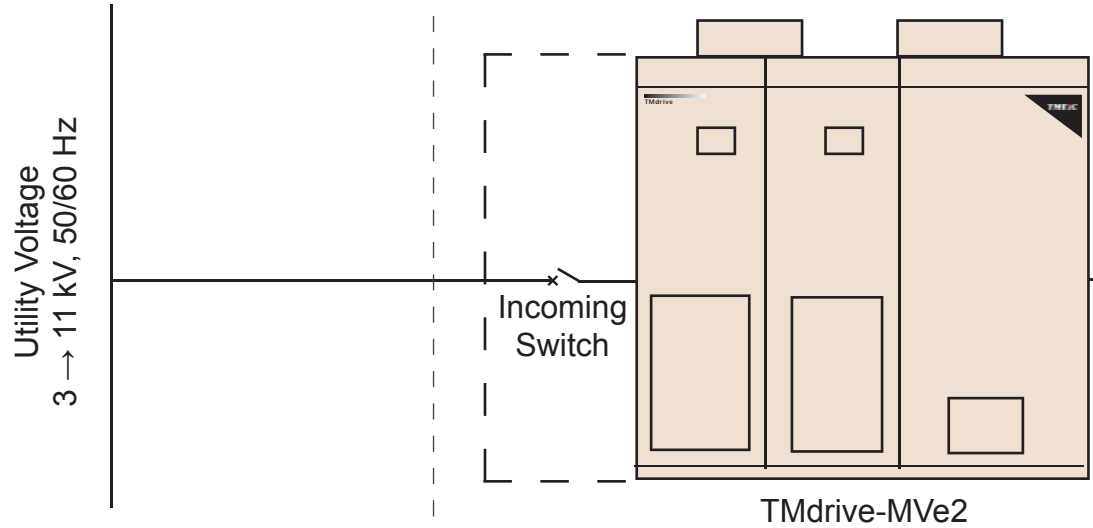
### Inverter/Converter Phase-Leg Assemblies

Each modular phase leg assembly includes:

- Robust IGBTs
- Gate driver circuit board
- DC bus capacitors, dry-film type for long life
- Fiber optic link interface circuit board

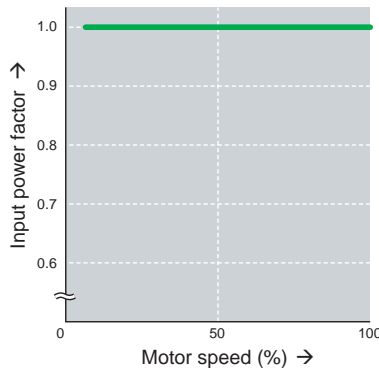
A phase leg assembly can be easily racked out and replaced in 30 minutes in case of failure.

# Utility & Motor



## High Input Power Factor. Reduced Electricity Charges.

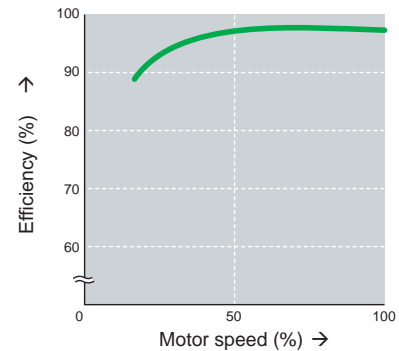
The PWM converter maintains a unity power factor across the entire speed range eliminating the need for correction equipment and utility penalties.



Example of the actual load test result of the standard 4-pole motor

## High Efficiency. Reduced HVAC Costs.

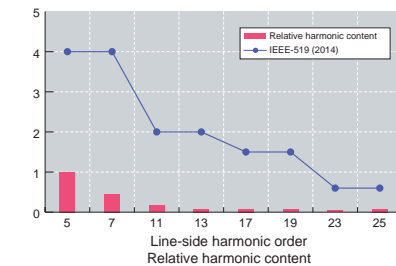
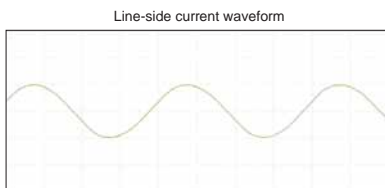
The MVe2 has a full load efficiency of 96.5%, including auxiliaries and isolation transformer. As an option the input isolation transformer can be mounted outdoors, reducing the heat load by 50%.



\* Example of the actual load test result of the standard 4-pole motor

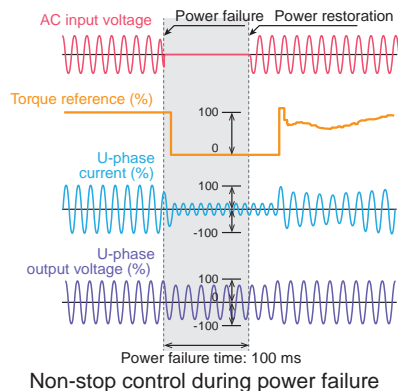
## Extremely Low Harmonics. No line-side filter required.

The MVe2 line side harmonics are much lower than IEEE 519-2014 requirements. Less than 2% current distortion is seen by utility.



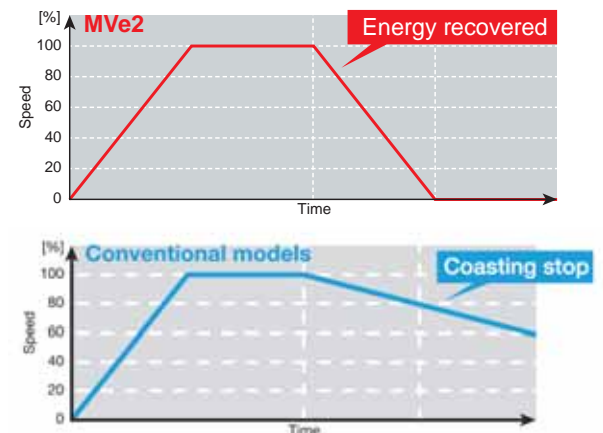
## Utility Interruption Protection.

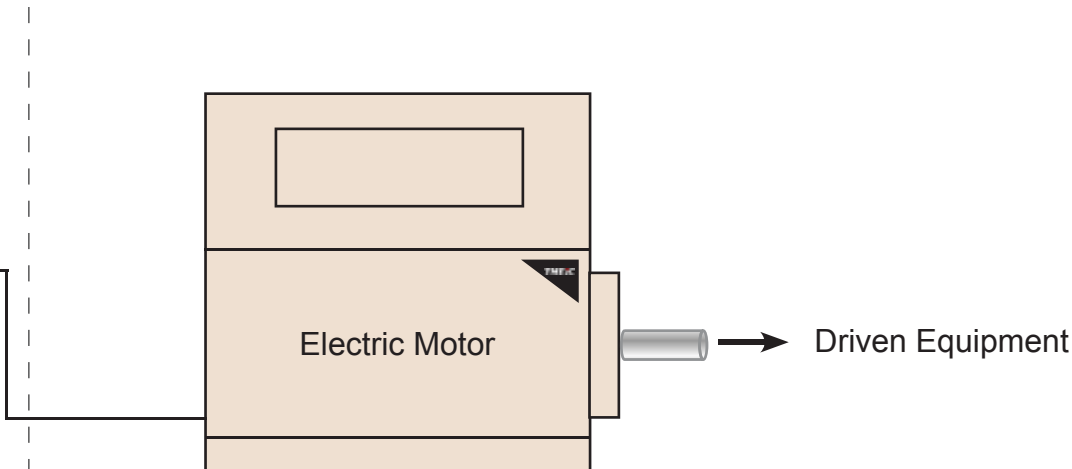
Momentary power loss & voltage unbalances can cause harmful effects to a motor. The MVe2 VFD control remains active during instantaneous power loss for up to 2 seconds. For power outages longer than 2 seconds, the VFD can regain motor control of a spinning load.



## Utility Energy Return

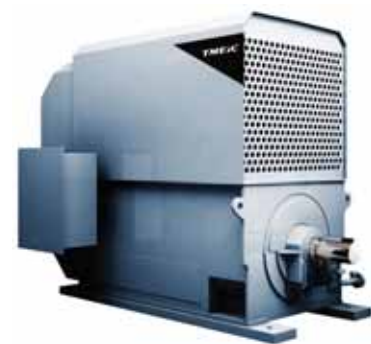
The power regeneration function enables stopping of large inertia loads in a short time. During deceleration the rotational energy is returned to the power supply. This reduces energy consumption and electricity costs versus conventional models that can only provide for a coasting stop.





**Engineered Motor-Drive Packages. Single point of contact.**

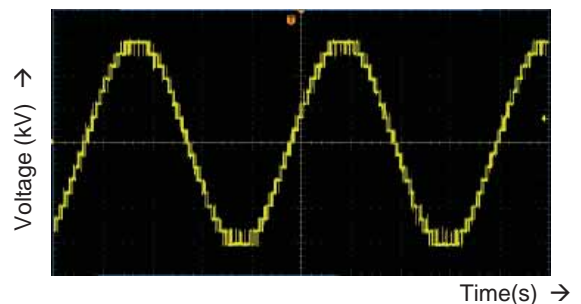
Through TMEIC's extensive application expertise, we deliver motor-drive solutions that support your technical and commercial needs from concept to decommissioning.



**Apply to Existing Motors**

The multilevel PWM output waveform approximates a sine wave, reducing dv/dt. Less than 2%  $I_{THD}$  and  $V_{THD}$ .

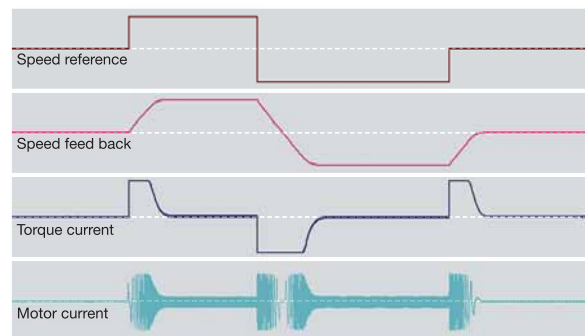
- 3-4.16kV: 9 levels (0 to peak) / 17 levels (peak to peak)
- 6-6.6 kV: 13 levels (0 to peak) / 25 levels (peak to peak)
- 10-11 kV: 21 levels (0 to peak) / 41 levels (peak to peak)

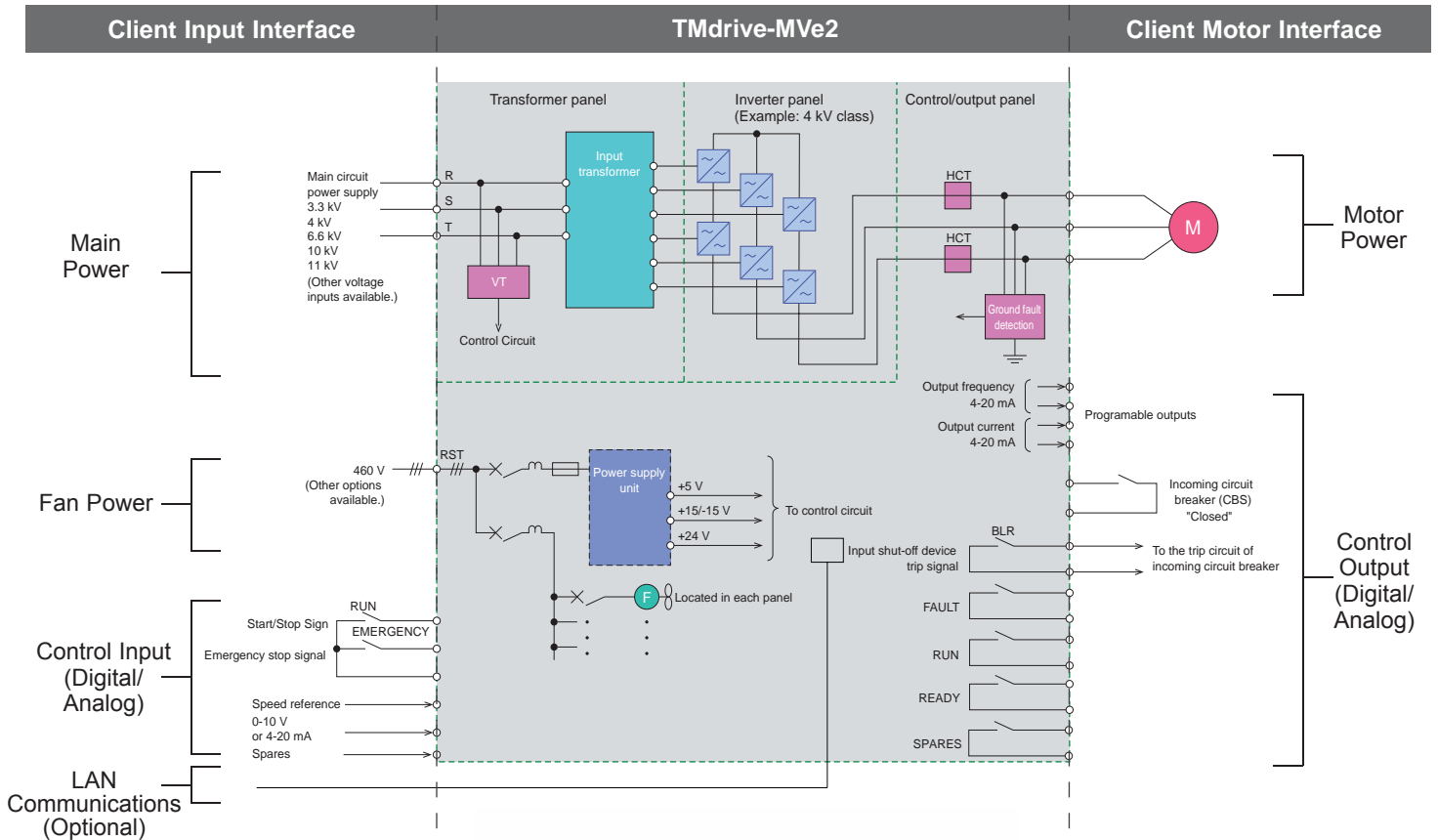


\*Example of the actual test result of the standard 4.16 kV VFD

**Rapid Acceleration / Deceleration**

The standard regenerative braking function provides for rapid acceleration and deceleration with quick speed response.





Control I/O terminals



Door-mounted HMI



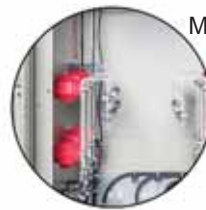
Low voltage fan input terminals



Incoming power terminals



Motor lead terminals







An optional lifter cart enables the operator to quickly rack-in/out the power modules.



Drawer type cell inverters shorten MTTR to 30 minutes



A convenient isolation switch kills the main power to the VFD to allow for safe servicing.



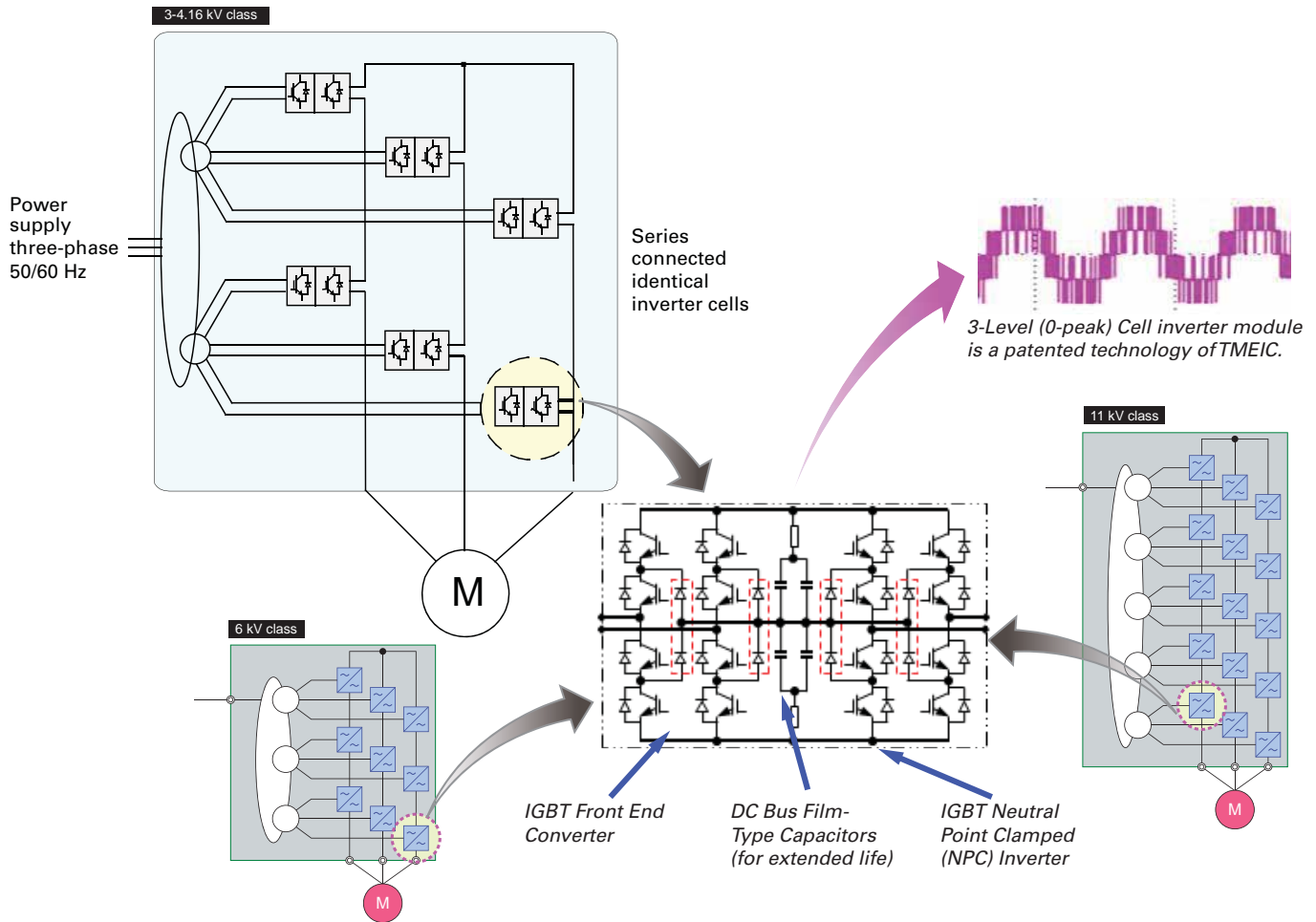
Aluminum mesh air filters can be removed and cleaned while the VFD is running.

## System configurations

...flexible and scalable.

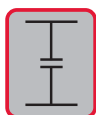
The MVe2 can be applied to your process in flexible configurations.

<p>Running duty</p>		<p>When appropriately rated, the MVe2 can be applied for continuous duty applications providing:</p> <ul style="list-style-type: none"> <li>• Speed/process control</li> <li>• Unity line side pf</li> <li>• Quick deceleration</li> <li>• Constant/variable torque</li> <li>• Reduction in in-rush current</li> </ul>
		<p>TMEIC provides integrated packing of:</p> <ul style="list-style-type: none"> <li>• Industrial Control Building</li> <li>• Output/Bypass Switchgear</li> <li>• Motor Control Centers</li> <li>• Control Systems</li> </ul>
<p>Running and/or starting duty</p>		<p>The MVe2 can be rated either for starting duty and/or running duty. With the appropriate switchgear lineup, the MVe2 control can automatically accelerate the connected motor to match the incoming utility voltage, frequency and phase. The load can then be bumplessly transferred to power source with no surges in torque or current. This allows for sequential starting of multiple motors with a single VFD. In a redundant arrangement, any motor can be started with either VFD, or can be configured as a hot-standby.</p>



## Rack In-Rack Out

...in 30 minutes.



### DC Link Long Life Capacitors

Dry film type capacitors eliminate need for replacement (no electrolytic capacitors)



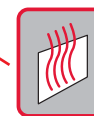
### Switching Devices

Switching devices are insulated gate bipolar transistors (IGBT)



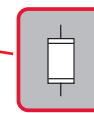
### Easy Rack-Out

Convenient handles enable easy removal of power modules



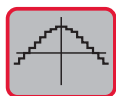
### Cooling Heat Sink

Heat is transferred from the switching device to the heat sink



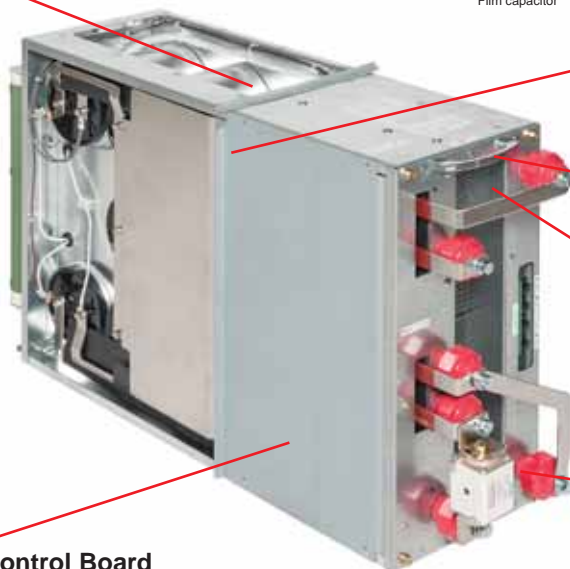
### Input Fuse

Fused inputs to converter



### Control Board

- Board passes pulse width modulated control signal to gate drivers
- Gate driver circuit boards connect directly to IGBTs



# Frame Sizes to Fit Your Application

4-4.16 kV <sup>†</sup>					
VFD Outline	Maximum Weight lbs. (kg)	Approximate Motor Shaft HP (kW) at 4.16 kV	Rated Output Current (A) I phase AC*	Inverter kVA output at 4.16 kV	
	Frame 100	9,300 (4,218)	536 (400)	69	500
		Frame 200	9,300 (4,218)	1,085 (810)	138
	Frame 300	14,285 (6,480)	1,500 (1,120)	191	1,380
		Frame 400	14,285 (6,480)	2,145 (1,600)	262

3-3.3 kV					
VFD Outline	Maximum Weight lbs. (kg)	Approximate Motor Shaft HP (kW) at 3.3 kV	Rated Output Current (A) I phase AC*	Inverter kVA output at 3.3 kV	
	Frame 100	8,400 (3,800)	220 (164)	35	200
			330 (246)	53	300
			440 (328)	70	400
	Frame 200	8,800 (4,000)	660 (492)	105	600
			880 (656)	140	800
	Frame 300	11,700 (5,300)	1,040 (776)	166	950
			1,200 (895)	192	1,100
	Frame 400	12,350 (5,600)	1,400 (1,044)	227	1,300
			1,650 (1,230)	263	1,500

\* 1: 110% OL for 60 sec. Panel heights include cooling fans. VFD capable of 80% regeneration at nominal voltage at unity power factor.  
<sup>†</sup> Applicable for CSA listed VFD in U.S. and Canada. Frame designation indicates power cell rating for replacement parts and other purposes.

# Frame Sizes to Fit Your Application

6-6.6 kV				
VFD Outline	Maximum Weight lbs. (kg)	Approximate Motor Shaft hp (kW) at 6.6 kV	Rated Output Current (A) I phase AC*	Inverter kVA output at 6.6 kV
	Frame 100 8,400 (3,800)	440 (328)	35	400
		660 (490)	53	600
		880 (656)	70	800
	Frame 200 10,360 (4,700)	1,320 (985)	105	1,200
		1,760 (1,312)	140	1,600
	Frame 300 15,000-15,800 (6,750-7,150)	2,085 (1,555)	166	1,900
		2,400 (1,790)	192	2,200
	Frame 400 15,000-15,800 (6,750-7,150)	2,850 (2,126)	227	2,600
		3,300 (2,460)	263	3,000

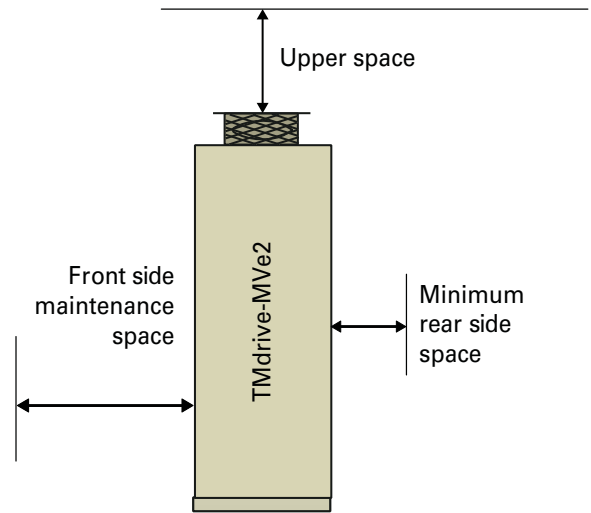
\* 1: 110% OL for 60 sec. Panel heights include cooling fans. VFD capable of 80% regeneration at nominal voltage at unity power factor. Frame designation indicates power cell rating for replacement parts and other purposes.

10-11 kV				
VFD Outline	Maximum Weight lbs. (kg)	Approximate Motor Shaft HP (kW) at 11 kV	Rated Output Current (A) I phase AC*	Inverter kVA output at 11 kV
	Frame 100 16,500 - 17,600 (7,800 - 8,000)	700 (522)	35	660
		1,100 (820)	53	990
		1,400 (1,044)	70	1,320
	Frame 200 16,500 - 17,600 (7,800 - 8,000)	2,200 (1,640)	105	2,000
		2,900 (2,160)	139	2,640
	Frame 300 29,500 - 29,800 (13,350 - 13,500)	3,400 (2,536)	162	3,080
		4,000 (2,984)	191	3,630
	Frame 400 29,500 - 29,800 (13,350 - 13,500)	4,700 (3,500)	226	4,290
		5,500 (4,100)	263	5,000

\*1: 110% OL for 60 sec. Panel heights include cooling fans VFD capable of 80% regeneration at nominal voltage at unity power factor. Frame designation indicates power cell rating for replacement parts and other purposes.

## Cabinet Minimum Clearance Space

Drive	Frame	Front Side Space	Rear Side Space	Upper Space
3-3.3 kV class	1, 2	1,700 mm (5.6 ft / 67 in)	–	300 mm (1 ft / 11.8 in)
	3, 4	1,700 mm (5.6 ft / 67 in)	–	210 mm (0.68 ft / 8.3 in)
4-4.16 kV class	1, 2, 3, 4	1,700 mm (5.6 ft / 67 in)	–	220 mm (0.72 ft / 8.7 in)
6-6.6 kV class	1, 2	1,700 mm (5.6 ft / 67 in)	–	300 mm (1 ft / 11.8 in)
	3, 4	1,700 mm (5.6 ft / 67 in)	–	210 mm (0.68 ft / 8.3 in)
10-11 kV class	1, 2	1,900 mm (6.2 ft / 75 in)	1,000 mm (3.3 ft / 40 in)	300 mm (1 ft / 11.8 in)
	3, 4	1,900 mm (6.2 ft / 75 in)	1,000 mm (3.3 ft / 40 in)	210 mm (0.68 ft / 8.3 in)



## Application Notes

- Inverter Power (kVA) =  $\frac{\text{Motor Shaft Power (kW)}}{\text{Motor pf} \times \text{Motor Eff}}$   
 Rated Output Current =  $\frac{\text{Inverter Power (kVA)}}{1.732 \times \text{Motor Voltage}_{(L-L)}}$ 
  - Ratings based on motor pf = 0.87, Motor Eff = 0.94, ambient temperature is 32°F–104°F (0°C–40°C)
  - Ratings based on a variable torque load (fans, pumps, centrifugal compressors)
  - For constant to secure load consult TMEIC.
  - Altitude above sea level is 0-3300 ft (1-1000 m).
- Optional bypass circuit can be separately mounted.
- Redundant cooling fans available as an option.
- No rear access required except for 10-11 kV VFDs or 13.8 kV VFDs.
- Incoming power cabling and motor cabling are bottom entry, top entry is standard for CSA design, option for IEC
- Air is pulled through the filters in the cabinet doors and vented out top.
- Available options include motor cooling fan control, cabinet space heater, sync motor control, smooth transfer to and from utility, motor space heater control, RTD, monitor redundant fans, output sine wave filters, and others.
- For conservative sizing of HVAC equipment, use 3kW of heat rejection per 100 hp of motor power.
- The panels include channel bases attached to the cabinets before shipment.
- This table presents only a sample of voltages and horsepower ratings. Other options such as 13.8 kV input are available.

# Specifications



## VFD Power Input

Mains input voltage	<ul style="list-style-type: none"> <li>Up to 13.8 kV, 3-phase, <math>\pm 10\%</math></li> <li>Complete power loss ride-thru of 300 ms.</li> </ul>
Input frequency	<ul style="list-style-type: none"> <li>50/60 Hz</li> <li><math>\pm 5\%</math></li> </ul>
Power factor	<ul style="list-style-type: none"> <li>Unity at all loads and speed</li> </ul>
Harmonics	<ul style="list-style-type: none"> <li>Lower than IEEE 519-2014 standard</li> <li>No line-side filters required, <math>&lt; 2\% I_{THD}</math></li> </ul>
Converter type	<ul style="list-style-type: none"> <li>AC fed active front end</li> </ul>
Power semiconductor technology	<ul style="list-style-type: none"> <li>Low loss IGBT</li> </ul>
Transformer	<ul style="list-style-type: none"> <li>Dry type, aluminum wound, H-type</li> </ul>
Auxiliary power	<ul style="list-style-type: none"> <li>Control power (internal)</li> <li>Fan power: 380V-690V (external)</li> </ul>



## VFD Power Output

Output Voltage	<ul style="list-style-type: none"> <li>3/3.3 kV, 4.16 kV, 6/6.6 kV, 10/11 kV</li> </ul>
Output Frequency	<ul style="list-style-type: none"> <li>0-120 Hz for 3/3.3 kV, 4.16 kV, 6/6.6 kV</li> <li>0-72 Hz for 10/11 kV inverters</li> </ul>
Output Voltage Levels	<ul style="list-style-type: none"> <li>9/17-levels for 3/3.3 kV, 4.16 kV</li> <li>13/25 levels for 6/6.6 kV</li> <li>21/41 levels for 10/11 kV</li> </ul>
Number of cell modules in series per phase	<ul style="list-style-type: none"> <li>2 for 3/3.3 kV and 4.16 kV</li> <li>3 for 6/6.6 kV, 5 for 10/11 kV</li> </ul>
Overall Efficiency	<ul style="list-style-type: none"> <li><math>&gt; 96.5\%</math></li> <li>Including auxiliaries &amp; isolation transformer</li> </ul>
Power Semiconductor Technology	<ul style="list-style-type: none"> <li>Low loss IGBT</li> </ul>



## Control I/O

Digital Input	Qty. (5)
Dedicated Function Input	Qty. (1)
Configurable (programmable) Function Input	Qty. (4)
Digital Relay Output	Qty. (8)
Digital 24V Outputs	Qty. (4)
Speed feedback encoder input	High resolution tach, 10 kHz, 5 or 15 V DC diff. input, A quad B, with marker
LAN interface options	Profibus-DP, DeviceNet™, or Modbus RTU, TC-Net I/O, CC-link. Others available.
Motor temperature sensor option	High resolution temperature protection relay: 100 Ohm platinum RTD, 14 channels



## Display and Diagnostics

PC Configuration	TMdrive-Navigator for configuration, local and remote monitoring, animated block diagrams, dynamic live and capture buffer based trending, fault diagnostics, commissioning wizard, and regulator tune-up wizards. Ethernet 10 Mbps point to point or multi-drop, each drive has its own IP address.
Keypad and Display	Backlit LCD, animated displays <ul style="list-style-type: none"> <li>Four configurable bar graphs</li> <li>Optional multilingual display</li> <li>Parameter editing</li> <li>Drive control</li> </ul>
<b>RCM</b>	<i>Remote Connectivity Module</i> Fanless industrial computer in the VFD with proprietary fault upload software for troubleshooting and diagnostics

For specifications not mentioned here, contact TMEIC.




## Environmental

Operating Temperature	<ul style="list-style-type: none"> <li>0° to 40°C (32° to 104°F) at rated load</li> <li>Up to 50°C with derating</li> </ul>
Storage Temperature	<ul style="list-style-type: none"> <li>-25° to +70°C, indoor storage only</li> </ul>
Relative Humidity	<ul style="list-style-type: none"> <li>Up to 85%, non-condensing</li> </ul>
Altitude	<ul style="list-style-type: none"> <li>Up to 1000m (3300 ft)</li> <li>Higher altitude available with derating</li> </ul>
Vibration	<ul style="list-style-type: none"> <li>0.3G max</li> <li>2Hz&lt;f&lt;9Hz: Half amplitude sine wave is within 0.9m</li> <li>9Hz&lt;f&lt;100Hz: Vibration acceleration is <math>&lt; 3m/s^2</math></li> </ul>
Cooling	<ul style="list-style-type: none"> <li>Air-cooled with fans on top and air intake on front</li> <li>For 10/11kV inverter, air intake in rear also</li> </ul>



## Mechanical

Enclosure	<ul style="list-style-type: none"> <li>NEMA 1, Gasketed</li> <li>IP 30, except fan opening</li> <li>Color: Munsell 5Y7/1</li> </ul>
Cable Entrance	<ul style="list-style-type: none"> <li>Top or bottom</li> <li>Selectable on-site</li> </ul>
Noise	<ul style="list-style-type: none"> <li>~76-80 dBA at 3.1 ft from enclosure</li> </ul>
Mean Time To Repair (MTTR)	<ul style="list-style-type: none"> <li>30 minutes to replace power module</li> </ul>
Mean Time Between Failure (MTBF)	<ul style="list-style-type: none"> <li>16 years</li> </ul>
Code conformance	<ul style="list-style-type: none"> <li>Applicable IEC, JIS, JEM, UL, CSA and NEMA standards</li> </ul>
Equipment marking	<ul style="list-style-type: none"> <li> 4.16 kV variant only</li> </ul>



## Motor Control and Protection

Vector Control Accuracy	<ul style="list-style-type: none"> <li>Speed response: 20 rad/sec</li> <li>Speed regulation without speed sensor <math>\pm 0.5\%</math></li> <li>Speed Control Range: 5 - 100%</li> </ul>
Control	<ul style="list-style-type: none"> <li>Non-volatile memory for parameters and fault data</li> <li>Vector control with/without speed feedback, or Volts/Hz</li> <li>Designed to keep running after utility supply transient voltage drop outs of 300 ms</li> <li>Synchronous transfer to line (option)</li> <li>Synchronous motor control (option)</li> </ul>
Major Protective Functions	<ul style="list-style-type: none"> <li>Inverter overcurrent, overvoltage</li> <li>Cooling fan abnormal</li> <li>Motor ground fault</li> <li>Low or loss of system voltage</li> <li>Over-temperature</li> <li>DC bus voltage</li> <li>Voltage/current unbalance</li> <li>5/20 min. overload</li> <li>Loss of speed reference</li> <li>Input Voltage phase loss</li> <li>VFD output open</li> <li>Transformer overheat</li> </ul>

# Empower Your Crew: Local and Remote Control



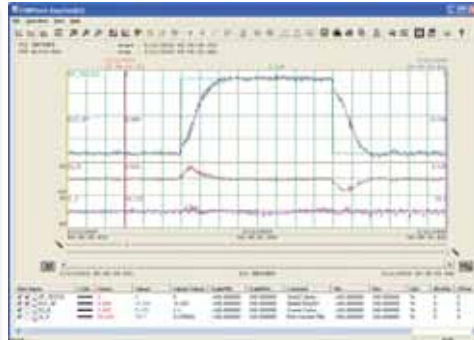
## TMdrive Navigator

The MVe2 keypad, coupled with the Windows® based TMdrive Navigator brings productivity to your commissioning and maintenance activities.

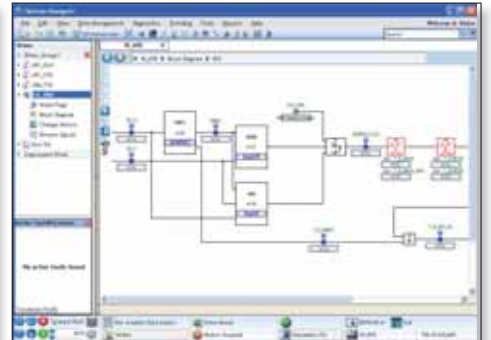


The Navigator tool helps maintain TMEIC drives in the field. Any user can easily access current drive expertise & know-how.

Compatible with OS Windows 7 and Professional 32-bit



High speed data is automatically captured and saved in the event of a drive fault. Users can capture high speed data based on their own trigger conditions or perform high resolution real-time trending.



Live block diagrams provide a real-time graphical view of drive functions. Functions can be configured directly from the graphical view.

Product documentation is integrated into tool. Users can capture their own notes to benefit future troubleshooting.



## Operator Keypad (Standard)

### High Function Display

- LCD backlight gives great visibility & long life
- Bar graphs, icons, menus, and digital values combine to provide concise status information, often eliminating the need for traditional analog meters

RJ-45 Ethernet port is used for the TMdrive Navigator



Easy to understand navigation buttons allow quick access to information without resorting to a PC based tool

Switch to local mode to operate the equipment from the keypad

### Instrumentation Interface

- Two analog outputs are dedicated to motor current feedback
- Five analog outputs are mapped to variables for external data logging and analysis

Interlock button disables the drive



## Multilingual Keypad (Optional)

An optional touch screen display is available with 9 languages built in. The graphic display is easy to read and understand and contains all of the same functions as the standard keypad.

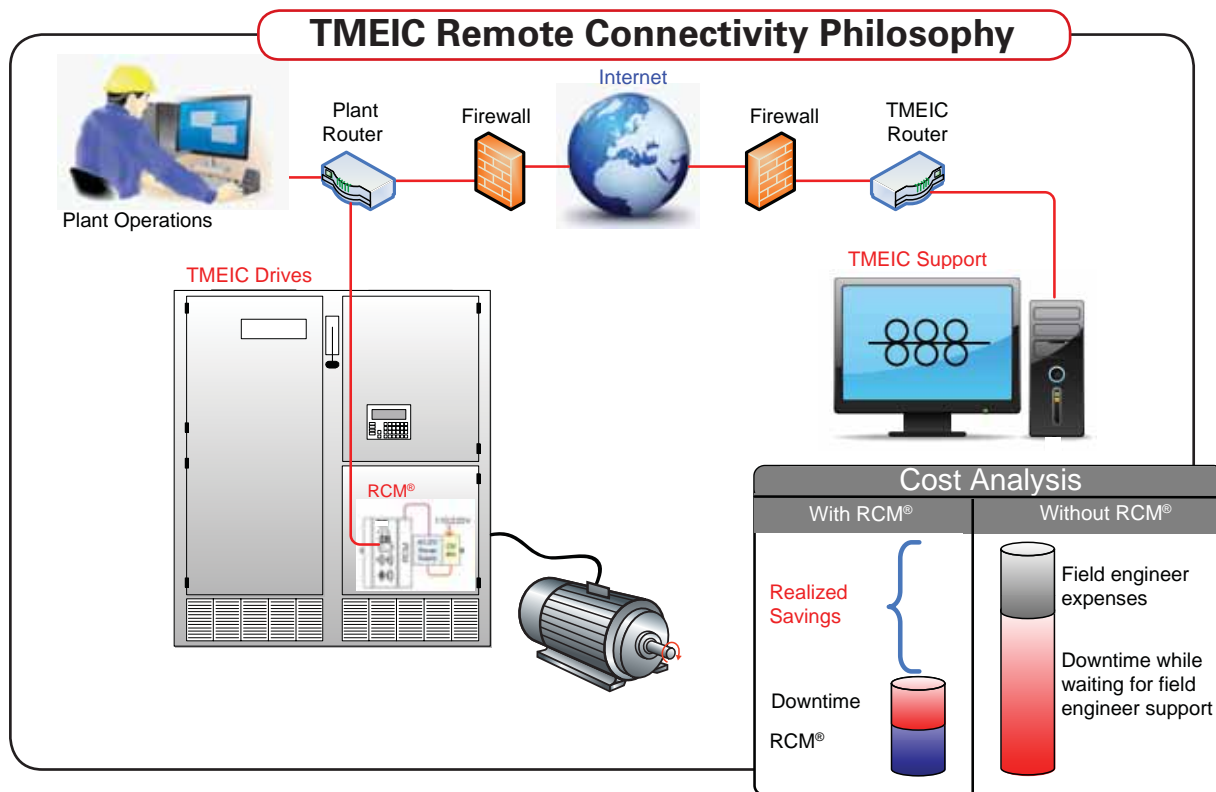


# Remote Connectivity **RCM<sup>®</sup>**

At TMEIC, we provide highly reliable automation systems, additionally TMEIC offers remote connectivity with RCM<sup>®</sup>.

Protection for your investment, by reducing downtime and lowering repair costs.

Remote drive connectivity requires an internet connection between your facility and TMEIC for retrieval of fault logs and files for diagnosing drive upsets. The RCM<sup>®</sup> enables seamless integration between drives and support engineers.



Features	Benefits
<ul style="list-style-type: none"> <li>• <b>Reduced downtime &amp; mean-time-to-repair</b></li> </ul>	<p><b>Quick support saves thousands in lost production</b> TMEIC engineers can quickly connect to the drive and diagnose many issues in minutes.</p>
<ul style="list-style-type: none"> <li>• <b>Secured connection</b></li> </ul>	<p><b>Customer-controlled access</b> All remote activity is conducted with permission of the customer. Drive start/stop is not permitted remotely.</p>
<ul style="list-style-type: none"> <li>• <b>Fault upload utility</b></li> </ul>	<p><b>Proprietary fault upload software</b> RCM<sup>®</sup> can monitor key real-time parameters. Historical drive faults are pushed automatically to the computer. This enables TMEIC engineers to analyze the issue resulting in the fault and provide a more coherent solution.</p>
<ul style="list-style-type: none"> <li>• <b>Industrial computer</b></li> </ul>	<p><b>Rugged computer for the most demanding applications</b> Fanless computer withstands high vibration and temperature ranges in a small DIN-rail mounted footprint</p>
<ul style="list-style-type: none"> <li>• <b>Multiple ethernet/serial ports</b></li> </ul>	<p><b>Flexible connectivity</b> The module can be connected to two separate LANs along with a host of serial talking USB devices.</p>



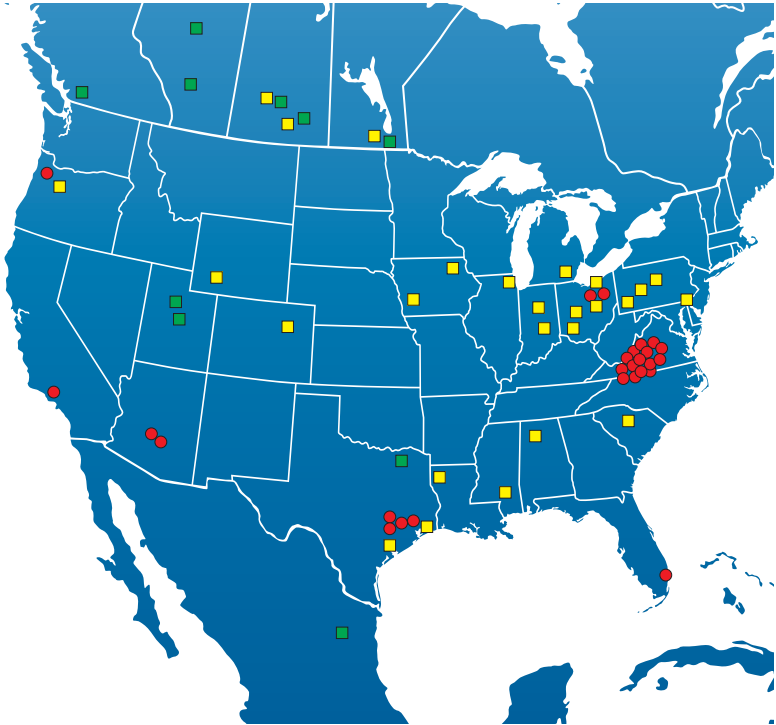
# Customer Service

## North American Sales and Service Network

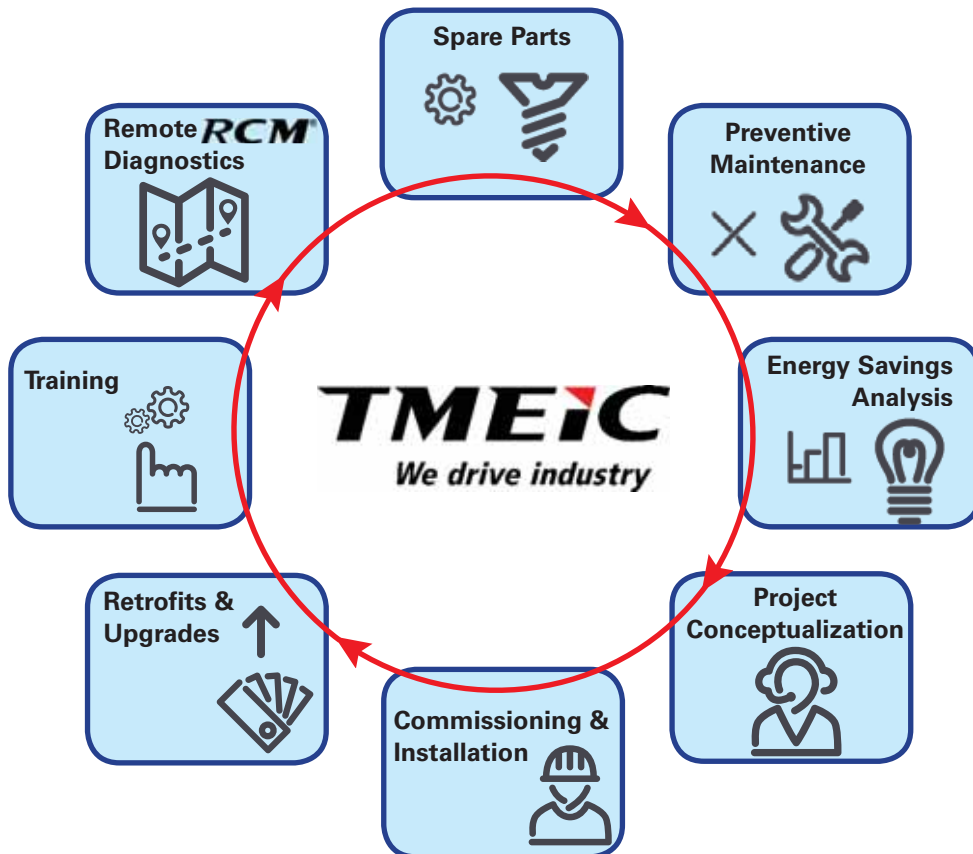
Whether the equipment is up and running or experiencing downtime, live help from TMEiC is a phone call away. With bases in North America and around the world, regional TMEiC companies and TMEiC motor service shops provide reliable support whenever needed.

- 77 TMEiC VFD Service Engineers
- 25 Motor service locations
- Authorized VFD service providers

**TMEiC**  
For Service or Parts, call  
1-877-280-1835  
INTERNATIONAL:  
+1-540-283-2010  
24 Hours / 7 days

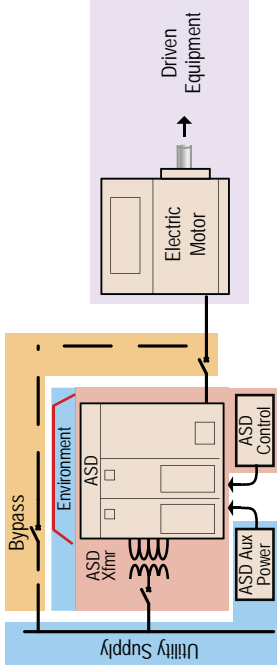


Service 24/7 – Talk to a service engineer, we’re available when you need us



## Quote Contact Information

Customer Reference: \_\_\_\_\_ Quote Due Date: \_\_\_\_\_  
 Project Name: \_\_\_\_\_ Equipment Delivery Date: \_\_\_\_\_  
 Contact Name: \_\_\_\_\_ # of Units Required: \_\_\_\_\_  
 Contact Number: \_\_\_\_\_ TMEiC Representative: \_\_\_\_\_  
 \*Please complete one request for each unique motor rating



## Driven Equipment & Motor Details

\*Type of load:  Fan  Pump  Compressor  
 Other (specify): \_\_\_\_\_  
 Torque profile:  Variable  Constant  
 Other (specify): \_\_\_\_\_  
 Gear box ratio:  \_\_\_\_\_ to \_\_\_\_\_  None  
 Speed range: \_\_\_\_\_ Hz to \_\_\_\_\_ Hz  
 Load torque/speed curve provided:  Yes  No  
 Ref: \_\_\_\_\_  
 Regeneration:  Yes  No  
 Breakaway torque:  
 0% - 100%  101% - 150%  >150%  
 % Overload Rating for 1 minute: \_\_\_\_\_  
 \*Motor power (HP): \_\_\_\_\_  
 \*Motor voltage (V): \_\_\_\_\_  
 \*Motor full load (A): \_\_\_\_\_  
 \*Motor Speed (RPM): \_\_\_\_\_  
 New Motor  Existing Motor  
 Service factor: \_\_\_\_\_  
 Motor space heater (Control):  By ASD  By Others  
 Motor RTD: Qty. \_\_\_\_\_ Type \_\_\_\_\_  To ASD  
 To others (specify): \_\_\_\_\_  
 Encoder:  Yes  No  
 Cable distance from motor to ASD: \_\_\_\_\_ ft  
 Inverter duty motor:  Yes  No  
 Motor rated to start direct-on-line:  Yes  No

Note:  
 \*Required fields for budgetary quotation.  
 Download more copies  
 (<http://tinyurl.com/ASDchecklistTMEiC>)

## Utility Supply & Environment

\*System Voltage:  
 2400V  3300V  4160V  6900V  
 13800V  Other: \_\_\_\_\_ V ± \_\_\_\_\_ %  
 Power System One-line Diagram Provided:  Yes  No  
 Ref: \_\_\_\_\_  
 \*Line frequency:  60 Hz  50 Hz  
 ASD auxiliary three-phase power:  
 End user supplied or  Internal to ASD  
 Control power:  
 End user supplied or  Internal to ASD  
 UPS:  Yes  No;  By TMEiC  By others  
 \*Site location: \_\_\_\_\_  
 Elevation: \_\_\_\_\_ meters above sea level  
 ASD enclosure  NEMA 1 or  NEMA 3R  
 Electrical room provided by:  TMEiC  Others  
 Elec. room max. ambient: \_\_\_\_\_ °C  
 Humidity: \_\_\_\_\_ % (non-cond.)  
 Elec. room min. ambient: \_\_\_\_\_ °C  
 Humidity: \_\_\_\_\_ % (non-cond.)  
 Outdoor contamination (eg: corrosive gases): \_\_\_\_\_  
 ASD cabinet space heater?  Yes  No

**ASD Design/Requirements Performance**

**ASD Design Standards**

- UL347A or  IEC61800-5-1
- Other/National/Local: \_\_\_\_\_

**ASD Cooling Method**

- Air-cooled  Water cooled

Site cooling water for ASD use:  Yes  No

**\*Input ASD Switchgear**

- TMEiC or  Others

If other, provide detail: \_\_\_\_\_

Cable entry:  Top  Bottom

\*ASD Duty Cycle  Continuous duty  Starting only

Bypass operation

- Direct-on-line starter
- Solid state starter
- Synchronous transfer by ASD
- Synchronous transfer by ASD

Number of motors \_\_\_\_\_

Bypass gear  By TMEiC  By Others

If others, provide gear details: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Testing**

- ASD standard client witness test
- ASD witness client test with dynamometer
- ASD/Motor combined test at external test facility

Other tests \_\_\_\_\_

\_\_\_\_\_

**Motor Protection**

(Not necessary for continuous ASD operation)

- 6 channel RTD RELAY
- MULTILIN 369
- MULTILIN 469

**Spares**

Spare parts kit:  Yes  No

Spare Power Module:  Yes  No

**ASD Controls and Indications**

**Control Strategy**

- Volts/Hz speed control  Master-follower
- Sensorless vector  0.5% without tachometer
- Closed loop vector control  0.01% with tachometer
- Other \_\_\_\_\_

**Communication Options**

- EGD  DEVICENET
- PROFIBUS  ACU Cond.
- MODBUS RTU/PLUS OTHER \_\_\_\_\_

**Indications**

- ASD fault indication  Local/remote selector switch
- ASD alarm indication  ASD run indication
- Start  ASD ready indication
- Emergency stop button  Stop push button
- Fault clear button  Other \_\_\_\_\_

**Options**

Kirk key interlocks:  Yes  No

4-20mA Isolated Analog Outputs  Yes  No

- Speed  Current  Voltage
- Load  Other \_\_\_\_\_

Redundant fan  Yes  No

Additional controls  Yes  No (attach control schematic)

Additional notes \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Get Quote from TMEiC**

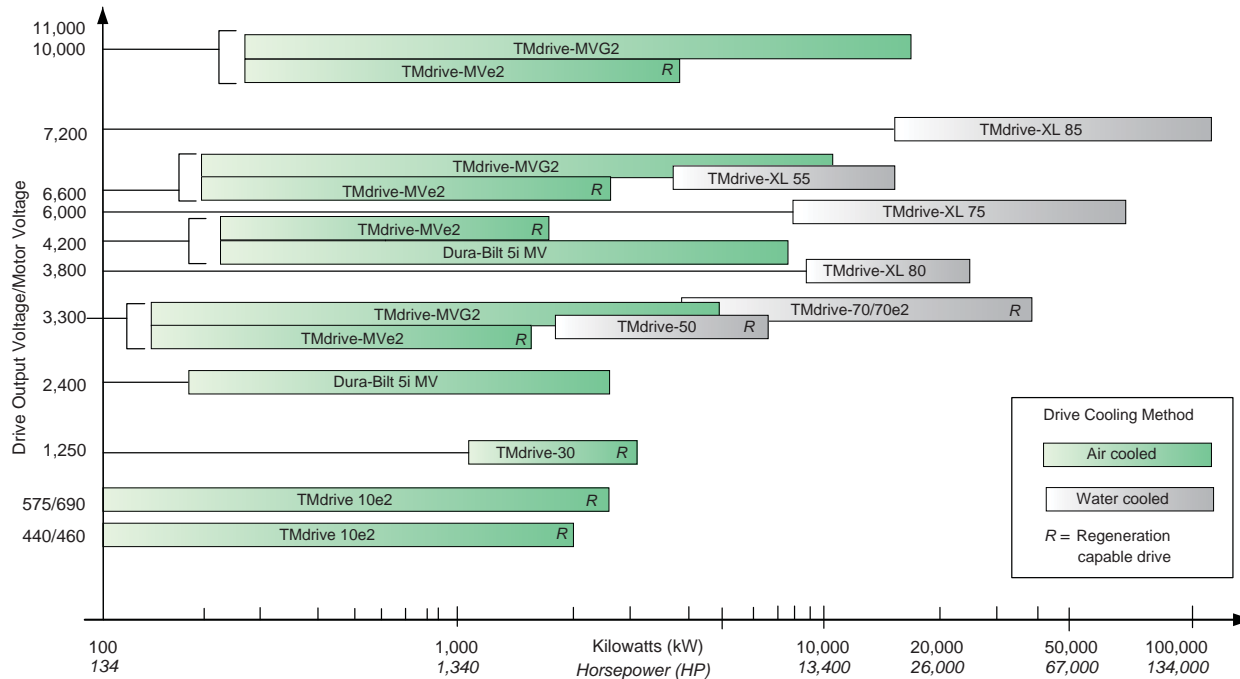


**Customer Success. Every Project, Every Time.**

Note: All TMEiC ASDs are manufactured with standard digital I/Os, Analog I/Os, push buttons, and indications as specified in the Application Guide.



# TMEIC AC Drives Offer Complete Coverage



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