TMEiC
We drive industry



TMdrive®-MVe2 Product Application Guide

Medium Voltage Multilevel IGBT Drive
Up to 8,000 HP (7,350 kVA), 3.3 kV, 4.16 kV, to 11 kV

metals | cranes | mining | testing | oil & gas | renewable energy | power generation | cement

Reliability and Performance ...*Delivered*

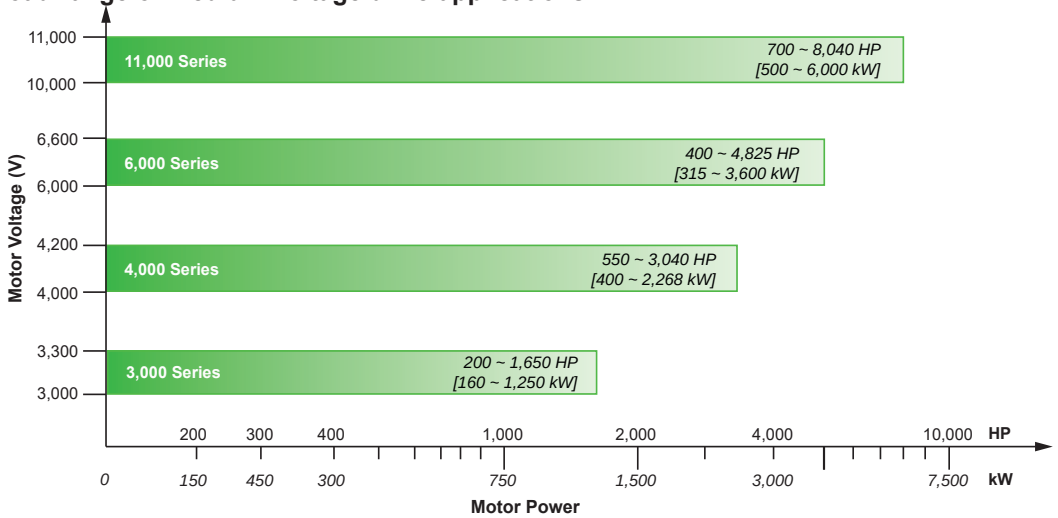
The TMdrive®-MVe2 is an enhancement to the family of TMEIC medium voltage general purpose drives offering:

- Regeneration
- Dynamic Reactive Power Compensation
- Unity line-side power factor
- Reduced part-count
- High availability



Design Feature	Customer Benefit
Active line side converter	• Unity (1.0) power factor across entire speed range • Line side harmonics much lower than IEEE 519-2014 • Standard regenerative braking • **Reactive power control**
Conservative electronic design & dry film-type capacitors	• Highly reliable operation, expected 16-year MTBF • No need for periodic capacitor replacement (15-year life)
Multilevel drive output voltage waveform	• No derating of motor for voltage insulation or heating required • Applies easily to existing motors without the need for an expensive output filter • Eliminates the need for special VFD rated cables • No Neutral Shift
Input isolation transformer	• Simplifies design and installation • Less total space required, plus easy integration in MCC building • Better motor protection than transformerless design • High frequency transients are attenuated
Power conversion module in a single drawer type package	• Reduction in spare parts • Minimal personnel training for maintenance • 30 minutes Mean Time to Repair (MTTR)
Synchronous bumpless transfer of the motor to the utility line	• Allows control of multiple motors with one drive • No motor current or torque transients when the motor transitions to the AC line • Dynamic VAR compensation for the synced motor

Covering a broad range of medium voltage drive applications



Higher power ratings are available. Please see pages 10 through 13 for details.

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

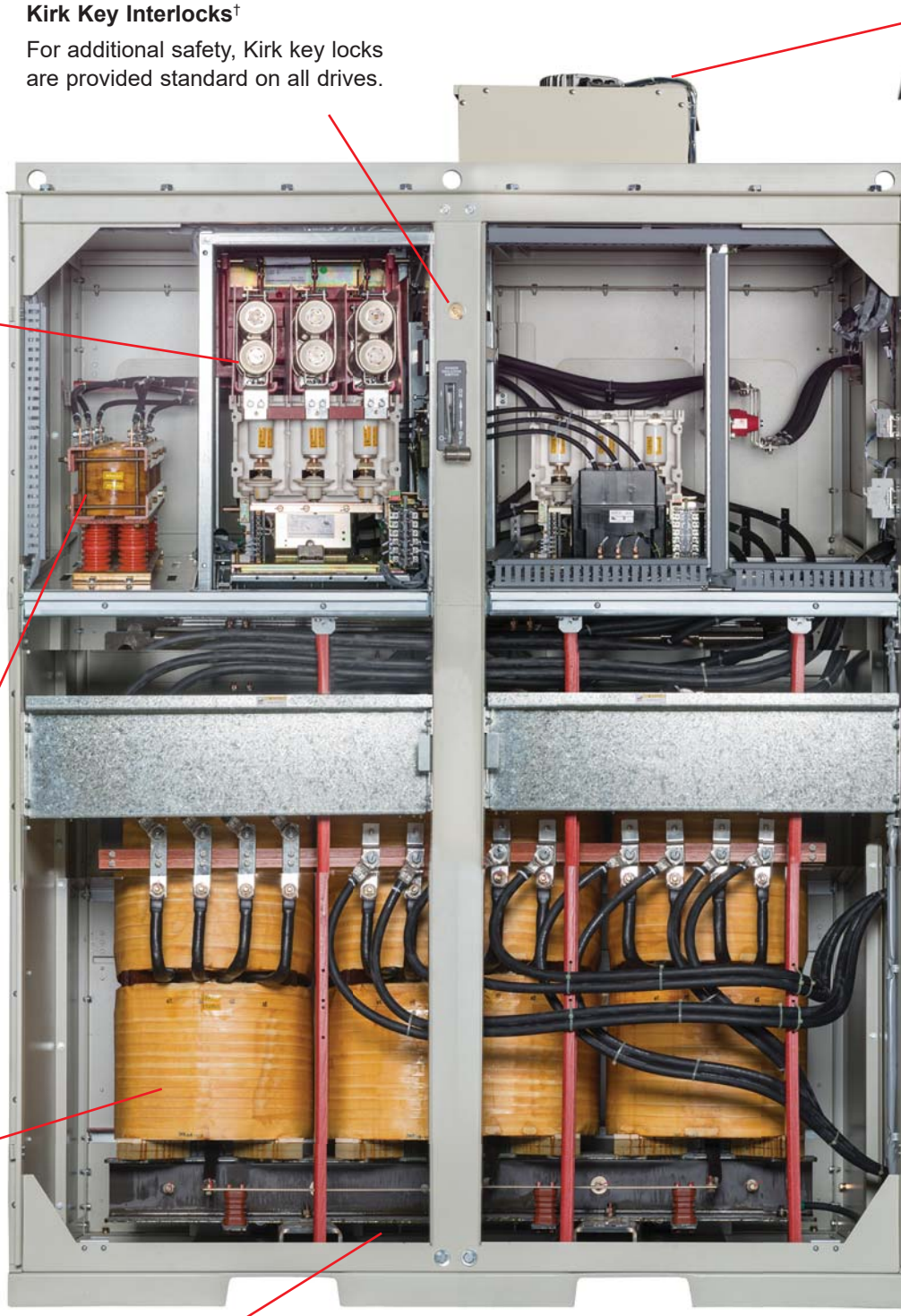
A Look Inside

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

Kirk Key Interlocks†

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



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.

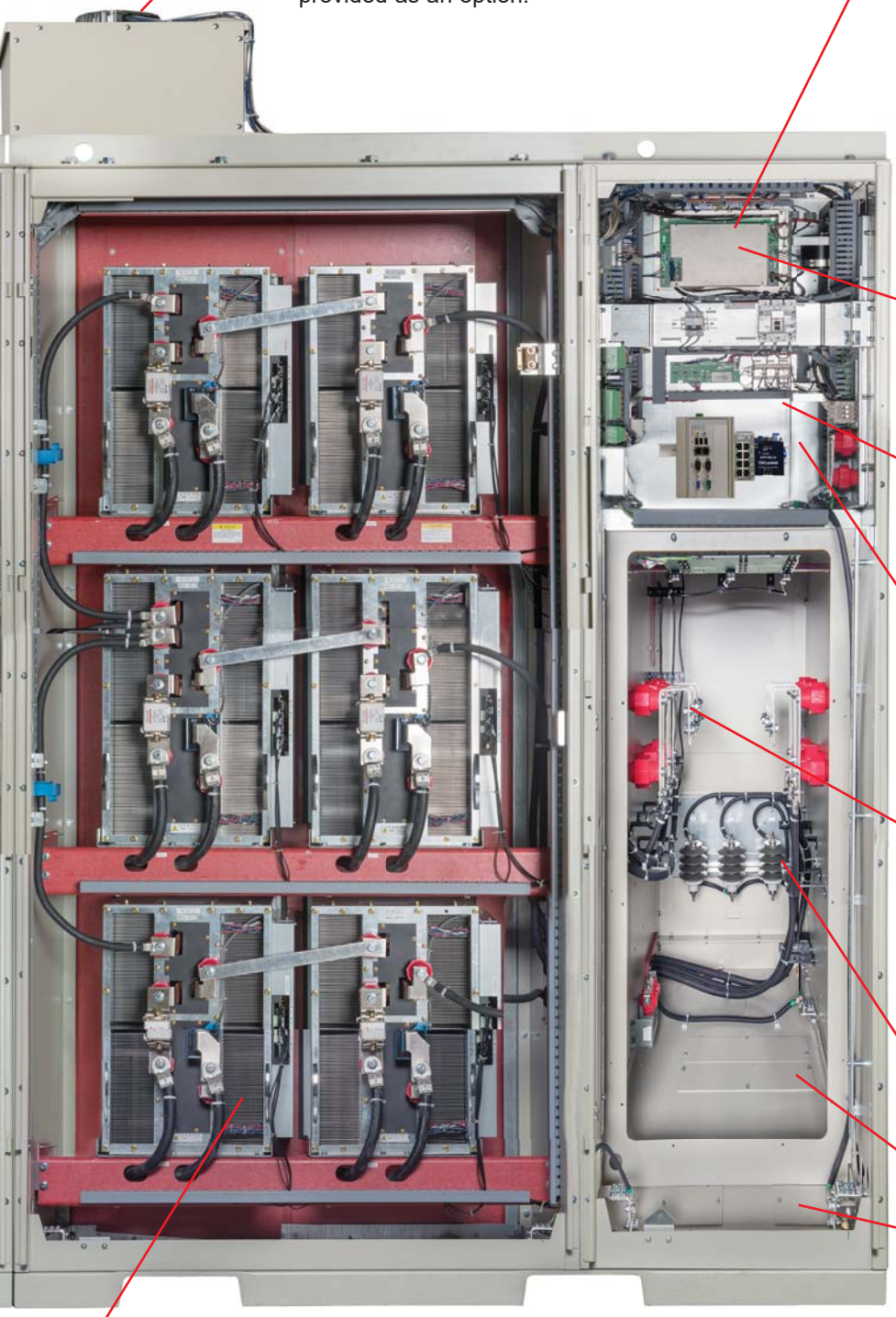
The input transformer has multiple secondary windings to feed IGBT inverters (cell inverters). This design provides galvanic isolation between the power system and the motor-inverter system.



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.



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 TMdrive-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

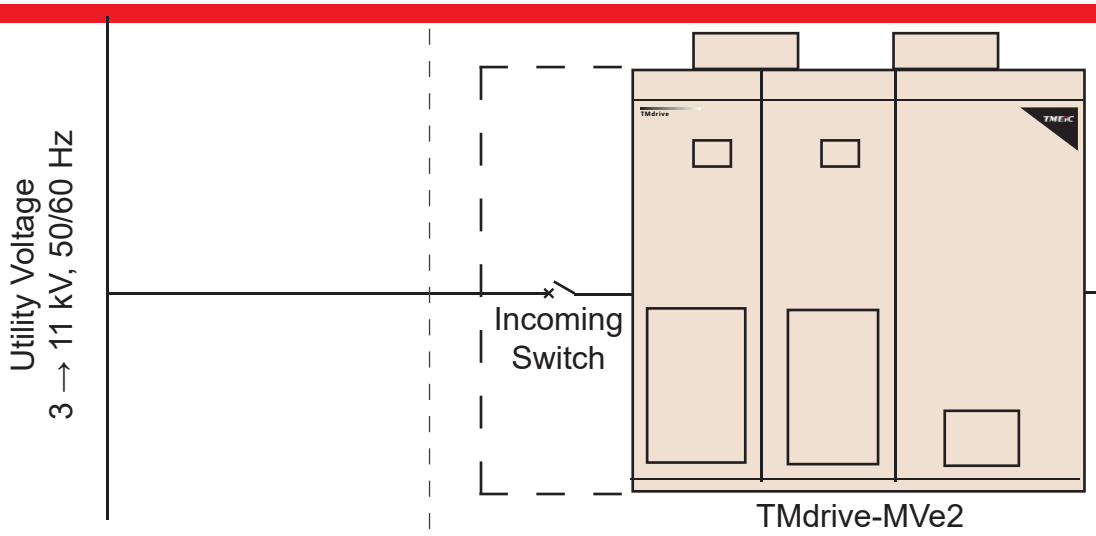
Gland plates are provided to enable cable entry. Top and bottom entry options are selectable onsite.

Inverter/Converter Phase-Leg Assemblies

Each modular phase leg assembly includes:

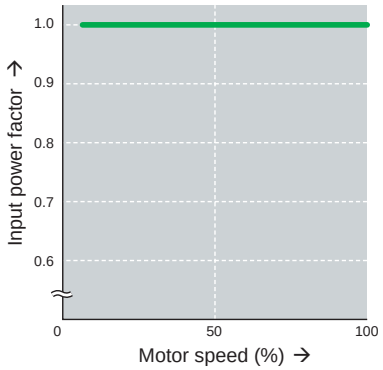
- Robust IGBTs
- Gate driver circuit board
- DC bus capacitors, dry-film type for long life
- Fiber optic link interface circuit board

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



High Input Power Factor. *Reduced Electricity Charges.*

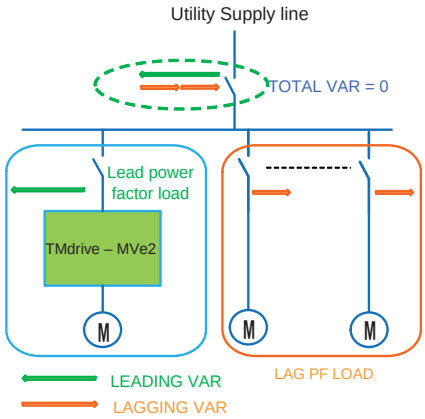
The PWM converter maintains a unity power factor across the entire speed range eliminating the need for correction equipment and utility penalties.



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

Improved Power Factor.

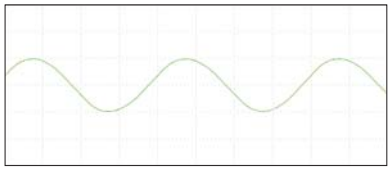
Due to active front end converter and intelligent control, the TMdrive-MVe2 can be sized and configured to supply leading reactive power (VAR) back to the utility to compensate for the other lagging loads on the same bus, or at the point of common coupling, thereby significantly improving the power factor as seen by the utility.

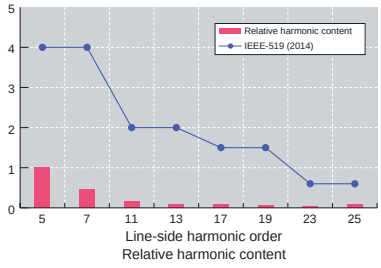


Extremely Low Harmonics. *No line-side filter required.*

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

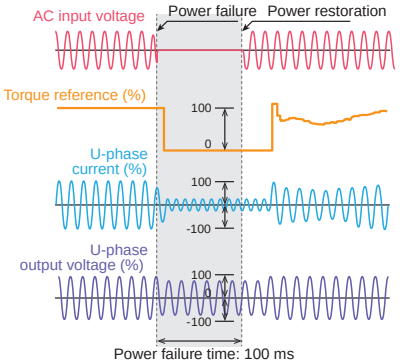
Line-side current waveform





Utility Interruption Protection.

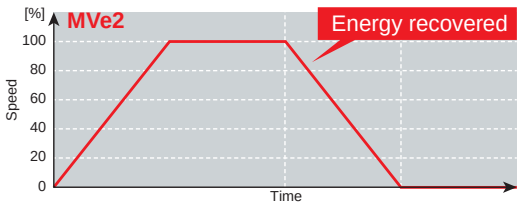
Momentary power loss & voltage unbalances can cause harmful effects to a motor. The MVe2 VFD control remains active during instantaneous power loss for up to 2 seconds. For power outages longer than 2 seconds, the VFD can regain motor control of a spinning load.

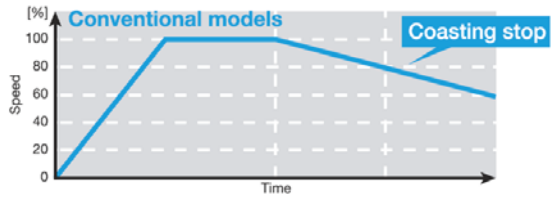


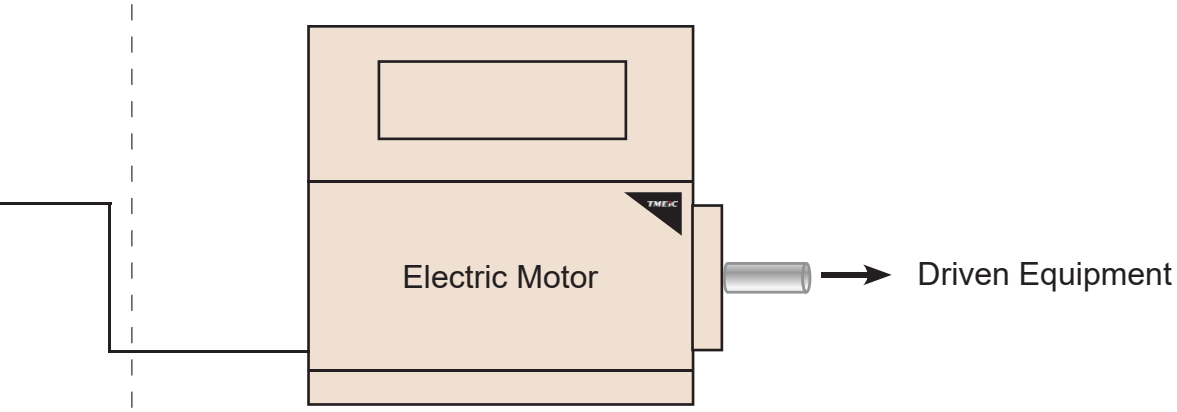
Non-stop control during power failure

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.*

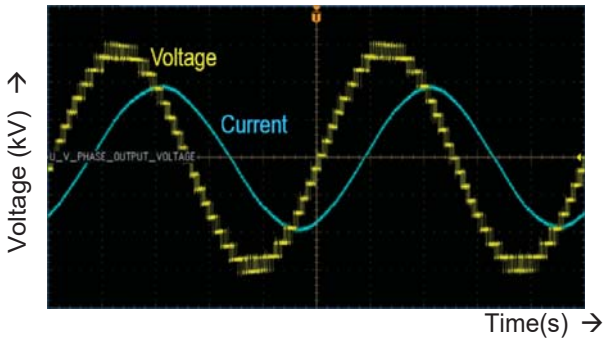
Through TMEIC's extensive application expertise, we deliver motor-drive solutions that support your technical and commercial needs from concept to decommissioning.



Apply to Existing Motors

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

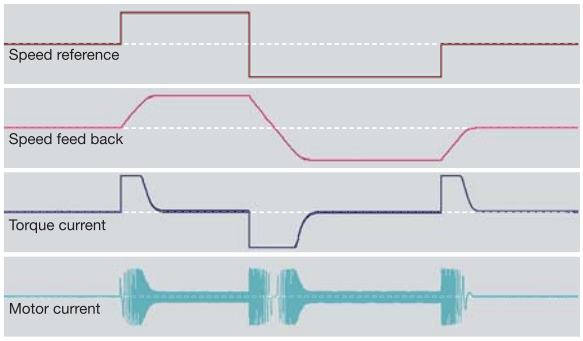
- 3-4.16kV: 9 levels (0 to peak) / 17 levels (peak to peak)
- 6-6.6 kV: 13 levels (0 to peak) / 25 levels (peak to peak)
- 10-11 kV: 21 levels (0 to peak) / 41 levels (peak to peak)



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

Rapid Acceleration / Deceleration

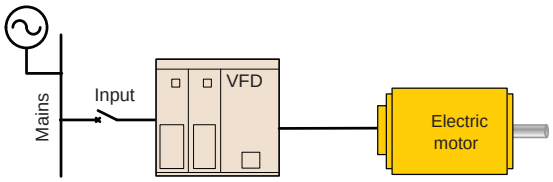
The standard regenerative braking function provides for rapid acceleration and deceleration with quick speed response.



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

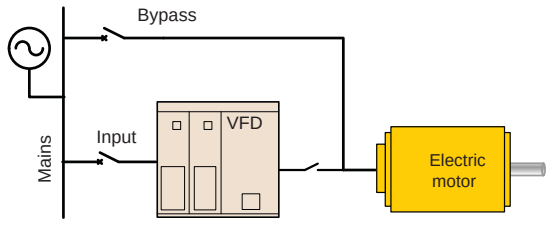
TMdrive-MVe2 as a soft starter

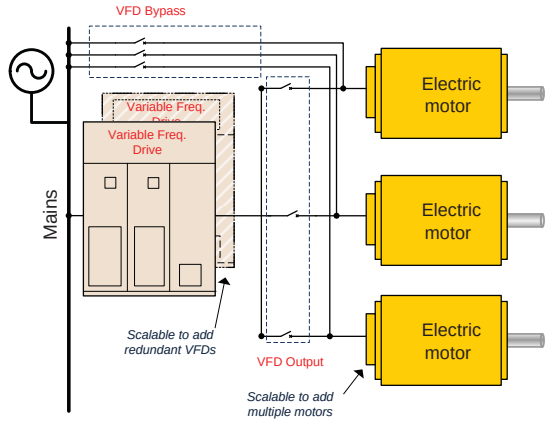
Running duty



When appropriately rated, the MVe2 can be applied for continuous duty applications providing:
- Speed/process control
- Unity line side pf
- Quick deceleration
- Constant/variable torque
- Reduction in in-rush current

Running and/or starting duty



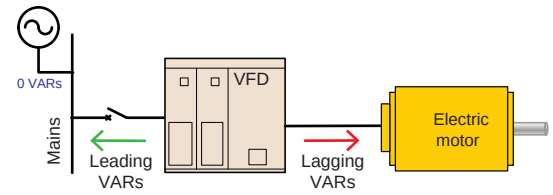


TMEIC provides integrated packing of:
- Industrial Control Building
- Output/Bypass Switchgear
- Motor Control Centers
- Control Systems

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. Alternatively, the VFD can also capture the motor from the utility line and regain speed control.

TMdrive-MVe2 for Reactive Power Compensation

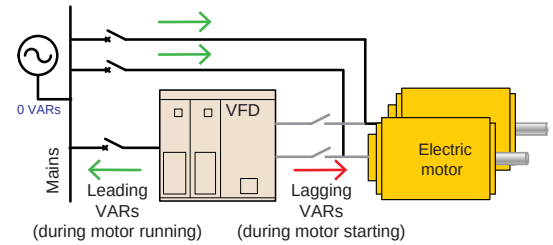
Single motor, single drive



The TMdrive-MVe2 line side converter can be configured in two modes, providing VAR control within the limits of its current capacity.

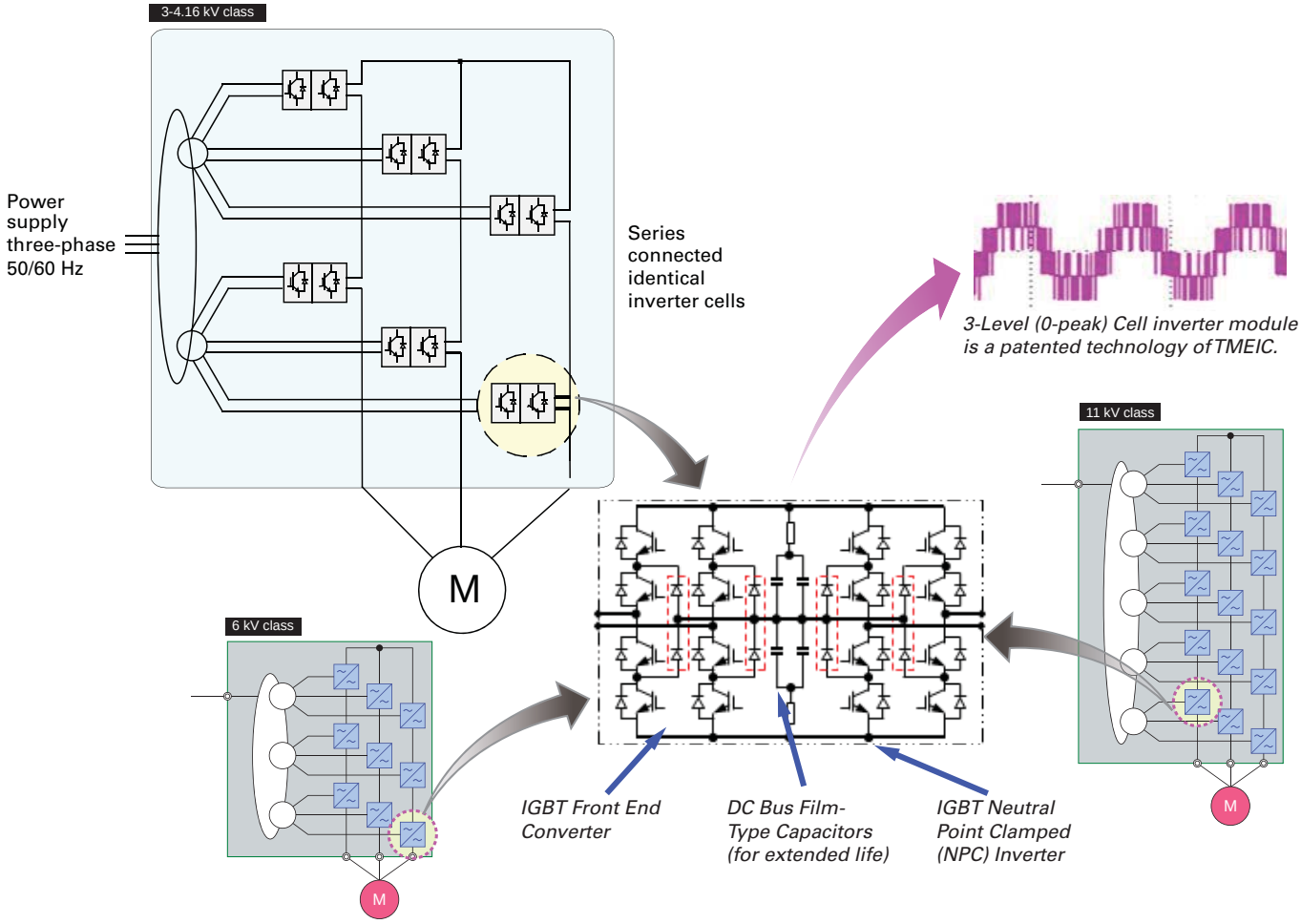
One mode is the conventional PWM type normally set to hold unity power factor for all load conditions.

Multiple motors, single/multiple drives



Another mode is the VFD providing voltage stability. The PWM converter stabilizes the line voltage by providing leading VAR's when the line voltage is low. This feature of the TMdrive-MVe2 enables it to compensate for the lagging VARs on the bus which would otherwise need conventional capacitor banks for power factor correction.

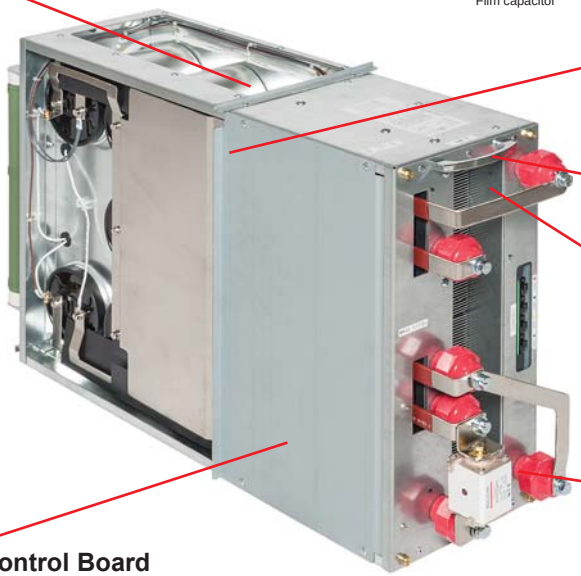
TMdrive-MVe2 Architecture ...Simplified.



Rack In-Rack Out ...in 30 minutes.

DC Link Long Life Capacitors
Dry film type capacitors eliminate need for replacement (no electrolytic capacitors)


Film capacitor



Switching Devices
Switching devices are insulated gate bipolar transistors (IGBT)

Easy Rack-Out
Convenient handles enable easy removal of power modules

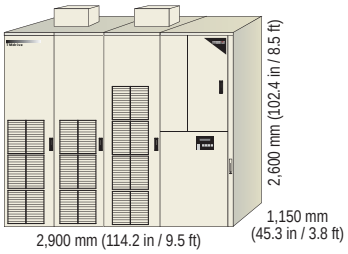
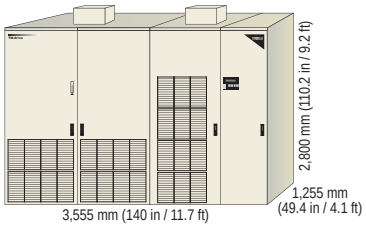
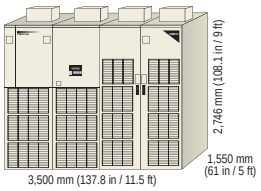
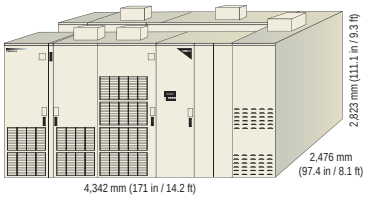
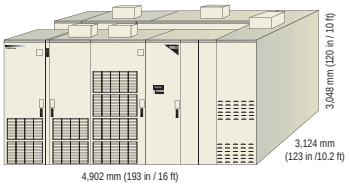
Cooling Heat Sink
Heat is transferred from the switching device to the heat sink

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

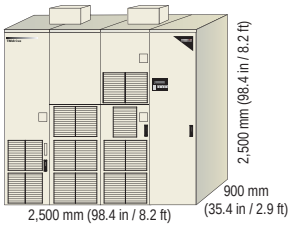
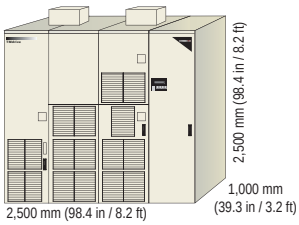
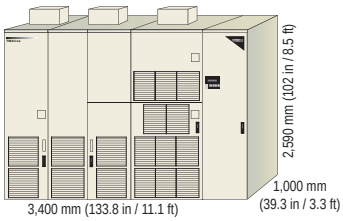
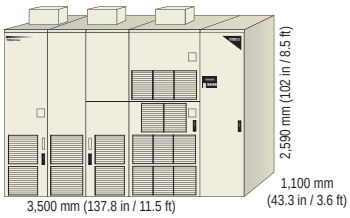
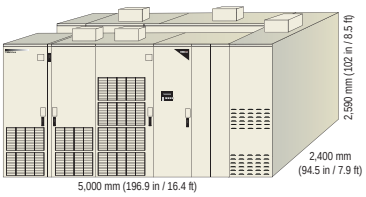
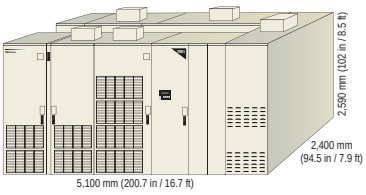
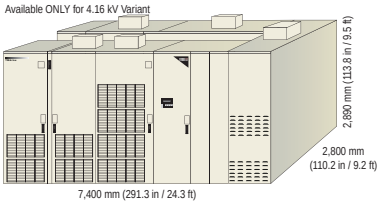
4-4.16 kV† UL/CSA

VFD Outline		Max. 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	1,000
	Frame 300	14,285 (6,480)	1,500 (1,120)	191	1,380
	Frame 400	14,285 (6,480)	2,145 (1,600)	262	1,890
	Frame 600	18,960 (8,600)	3,040 (2,268)	385	2,770
	Dual Frame 400	Consult TMEIC	3,950 (2,946)	500	3,602
	Dual Frame 600	Consult TMEIC	5,778 (4,310)	732	5,271

* 1: 110% OL for 60 sec. Panel heights include cooling fans. VFD capable of 80% regeneration at nominal voltage at unity power factor.
† 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

3-3.3 kV/4.16 kV (non UL/CSA)

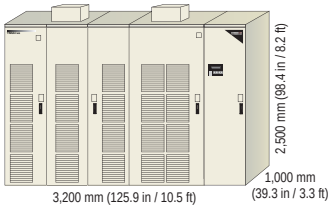
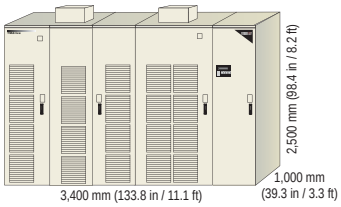
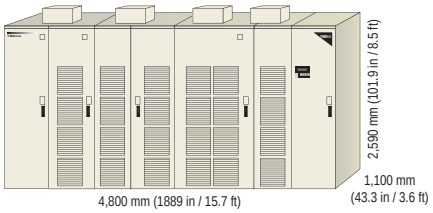
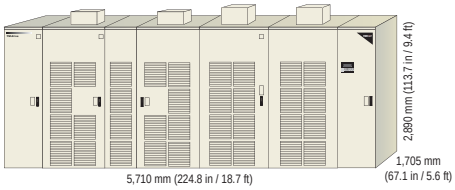
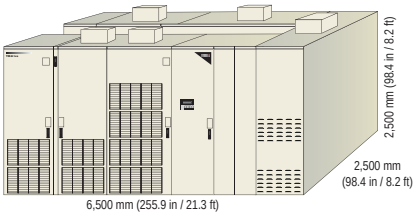
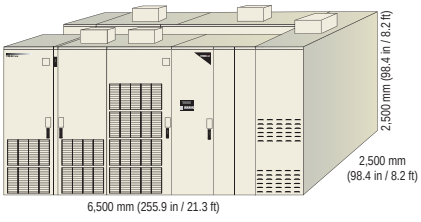
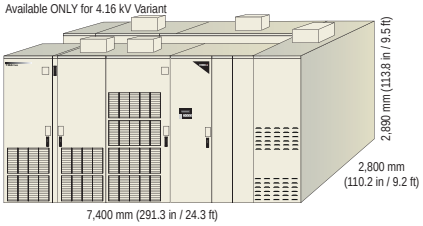
VFD Outline		Max. Weight lbs. (kg)	Approximate Motor Shaft HP (kW) at 3.3 kV	Rated Output Current (A) I phase AC*	Inverter kVA output at 3.3 kV
	Frame 100	8,400 (3,800)	220 (164)	35	200
			330 (246)	53	300
			440 (328)	70	400
	Frame 200	8,800 (4,000)	660 (492)	105	600
			880 (656)	140	800
	Frame 300	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
	Dual Frame 300	Consult TMEIC	2,291 (1,709)	365	2,090
			2,871 (2,142)	365	2,620 (For 4.16kV only)
	Dual Frame 400	Consult TMEIC	3,123 (2,330)	499	2,850
			3,936 (2,936)	499	3,590 (For 4.16kV only)
	Dual Frame 600	Consult TMEIC	5,765 (4,301)	730	5,260

* 1: 110% OL for 60 sec. Panel heights include cooling fans. VFD capable of 80% regeneration at nominal voltage at unity power factor.

† 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

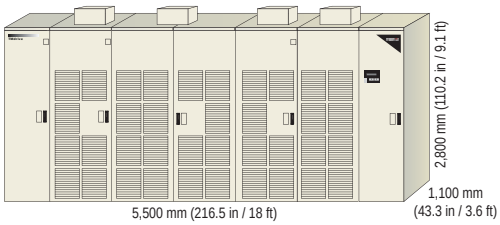
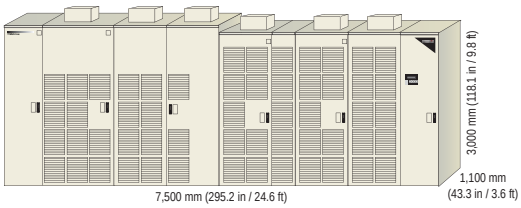
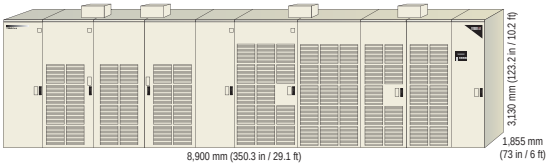
6-6.6 kV

VFD Outline		Max. 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
	Frame 600	23,148 (10,500)	3,947 (2,944)	315	3,600
			4,825 (3,600)	385	4,400
	Dual Frame 300	Consult TMEIC	4,574 (3,412)	365	4,180
	Dual Frame 400	Consult TMEIC	6,253 (4,665)	499	5,700
Available ONLY for 4.16 kV Variant 	Dual Frame 600	Consult TMEIC	9,160 (6,834)	731	8,360

* 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.

Frame Sizes to Fit Your Application

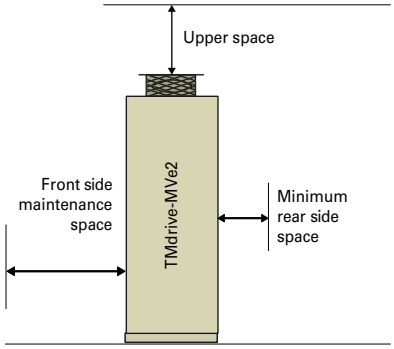
10-11 kV

VFD Outline		Max. Weight lbs. (kg)	Approx. Motor Shaft HP (kW) at 11 kV	Rated Output Current (A) I phase AC*	Inverter kVA output at 11 kV
	Frame 100	17,200 - 17,600 (7,800 - 8,000)	700 (522)	35	660
			1,100 (820)	53	990
			1,400 (1,044)	70	1,320
	Frame 200	17,200 - 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
	Frame 600	40,785 (18,500)	6,580 (4,908)	315	6,000
			8,040 (6,000)	385	7,350

*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	100, 200	1,700 mm (5.57 ft / 66.92 in)	–	300 mm (.98 ft / 11.81 in)
	300, 400	1,700 mm (5.57 ft / 66.92 in)	–	210 mm (0.68 ft / 8.26 in)
3-3.3 KV class/4.16 kV (non-UL/CSA)	2x300, 2x400	1,700 mm (5.57 ft / 66.92 in)	–	210 mm (0.68 ft / 8.26 in)
	2x600 (4.16 kV only)	1,900 mm (6.23 ft / 74.80 in)	–	210 mm (0.68 ft / 8.26 in)
4-4.16 kV class (UL/CSA)	100, 200, 300, 400	1,700 mm (5.57 ft / 66.92 in)	–	220 mm (0.72 ft / 8.66 in)
	600	1,700 mm (5.57 ft / 66.92 in)	–	310 mm (1.01 ft / 12.2 in)
	2x400	1,700 mm (5.57 ft / 66.92 in)	–	200 mm (.65 ft / 7.87 in)
6-6.6 kV class	100, 200	1,700 mm (5.57 ft / 66.92 in)	–	300 mm (.98 ft / 11.81 in)
	300, 400	1,700 mm (5.57 ft / 66.92 in)	–	210 mm (0.68 ft / 8.26 in)
	600	1,900 mm (6.23 ft / 74.80 in)	–	910 mm (2.9 ft / 35.8 in)
	2x300, 2x400	1,700 mm (5.57 ft / 66.92 in)	–	210 mm (0.68 ft / 8.26 in)
	2x600	1,700 mm (5.57 ft / 66.92 in)	–	210 mm (0.68 ft / 8.26 in)
10-11 kV class	100, 200	1,900 mm (6.23 ft / 74.80 in)	600 mm (1.96 ft / 23.62 in)	300 mm (.98 ft / 11.81 in)
	300, 400	1,900 mm (6.23 ft / 74.80 in)	600 mm (1.96 ft / 23.62 in)	210 mm (0.68 ft / 8.26 in)
	600	1,900 mm (6.23 ft / 74.80 in)	600 mm (1.96 ft / 23.62 in)	870 mm (2.85 ft / 34.25 in)



Frame Sizes to Fit Your Application

Application Notes

1. Inverter Power (kVA) = $\frac{\text{Motor Shaft Power (kW)}}{\text{Motor pf x Motor Eff}}$

   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 torque load consult TMEIC.
   - Altitude above sea level is 0-3300 ft (1-1000 m).
2. Optional bypass circuit can be separately mounted.
3. Redundant cooling fans available as an option.
4. No rear access required except for 10-11 kV VFDs or 13.8 kV VFDs.
5. Incoming power cabling and motor cabling are bottom entry, top entry is standard for CSA design, option for IEC
6. Air is pulled through the filters in the cabinet doors and vented out top.
7. 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.
8. The panels include channel bases attached to the cabinets before shipment.
9. This table presents only a sample of voltages and horsepower ratings. Other options such as 13.8 kV input are available.



Cell Inverter Frame Size	Approximate Weight lbs (kg)
100	99 (45)
200	132 (60)
300	220 (100)
400	243 (110)
600	198 (90)

*These weights are estimates. Actual TBD.

Specifications

VFD Power Input

Mains input voltage	• Up to 13.8 kV, 3-phase, ±10% • Complete power loss ride-thru of 300 ms.
Input frequency	• 50/60 Hz • ±5%
Power factor	• Unity at all loads and speed
Harmonics	• Lower than IEEE 519-2014 standard • No line-side filters required, <2% I_{THD}
Converter type	• AC fed active front end
Power semiconductor technology	• Low loss IGBT
Transformer	• Dry type, aluminum wound, H-type
Auxiliary power	• Control power (internal) • Fan power: 380V-690V (external)

VFD Power Output

Output Voltage	• 3/3.3 kV, 4.16 kV, 6/6.6 kV, 10/11 kV
Output Frequency	• 0-120 Hz for 3/3.3 kV, 4.16 kV, 6/6.6 kV • 0-72 Hz for 10/11 kV inverters
Output Voltage Levels	• 9/17-levels for 3/3.3 kV, 4.16 kV • 13/25 levels for 6/6.6 kV • 21/41 levels for 10/11 kV
Number of cell modules in series per phase	• 2 for 3/3,3 kV and 4.16 kV • 3 for 6/6.6 kV, 5 for 10/11 kV
Power Semiconductor Technology	• Low loss IGBT

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 • Four configurable bar graphs • Parameter editing • Optional multilingual display • Drive control
RCM®	*Remote Connectivity Module* Fanless industrial computer in the VFD with proprietary fault upload software for troubleshooting and diagnostics

For specifications not mentioned here, contact TMEIC.

Environmental

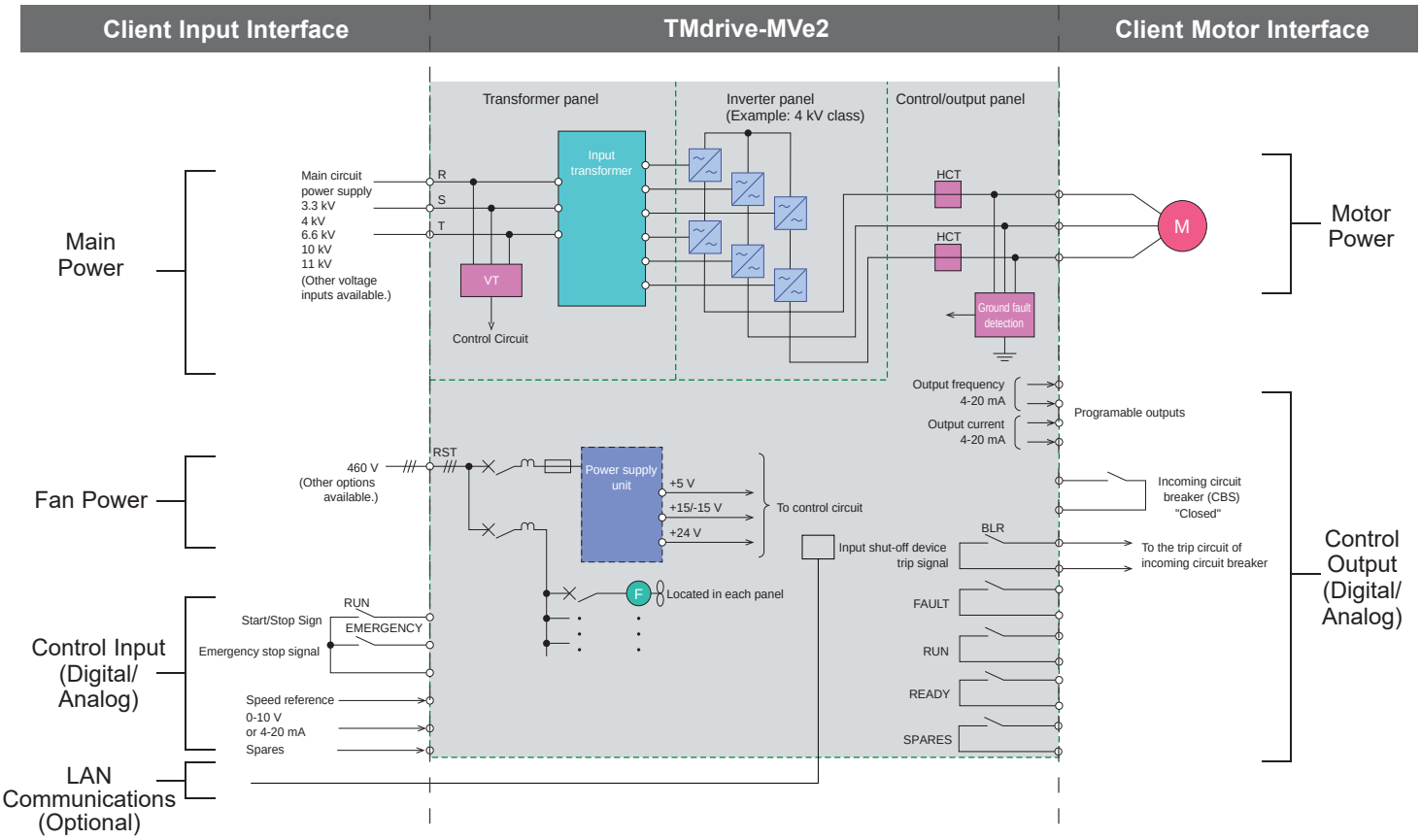
Operating Temperature	• 0˚ to 40˚C (32˚ to 104˚F) at rated load • Up to 50˚C with derating
Storage Temperature	• -25˚ to +70˚C, indoor storage only
Relative Humidity	• Up to 95%, non-condensing
Altitude	• Up to 1000m (3300 ft) • Higher altitude available with derating
Vibration	• 0.3G max • 2Hz<f<9Hz: Half amplitude sine wave is within 0.9m • 9Hz<f<100Hz: Vibration acceleration is <3m/s^2
Cooling	• Air-cooled with fans on top and air intake on front • For 10/11kV inverter, air intake in rear also

Mechanical

Enclosure	• NEMA 1, Gasketed • IP 30, except fan opening • Color: Munsell 5Y7/1
Cable Entrance	• Top or bottom • Selectable on-site
Noise	• ~76-80 dBA at 3.1 ft from enclosure
Mean Time To Repair (MTTR)	• 30 minutes to replace power module
Mean Time Between Failure (MTBF)	• 16 years
Code conformance	• Applicable IEC, JIS, JEM, UL, CSA and NEMA standards
Equipment marking	• c SP us 4.16 kV variant only

Motor Control and Protection

Vector Control Accuracy	• Speed response: 20 rad/sec • Speed regulation without speed sensor ± 0.5% • Speed Control Range: 5 - 100%
Control	• Non-volatile memory for parameters and fault data • Vector control with/without speed feedback, or Volts/Hz • Designed to keep running after utility supply transient voltage drop outs of 300 ms • Synchronous transfer to line (option) • Synchronous motor control (option)
Major Protective Functions	• Inverter overcurrent, overvoltage • Cooling fan abnormal • Motor ground fault • Low or loss of system voltage • Over-temperature • DC bus voltage • Voltage/current unbalance • 5/20 min. overload • Loss of speed reference • Input Voltage phase loss • VFD output open • Transformer overheat



Maintenance ...quick and safe.



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 (option) kills the main power to the VFD to allow for safe servicing.

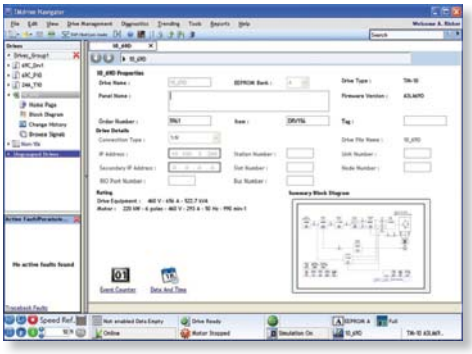


Aluminum mesh air filters can be removed and cleaned while the VFD is running.

Empower Your Crew: Local and Remote Control

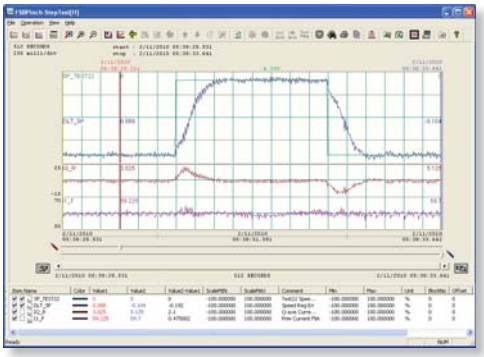
TMdrive Navigator

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

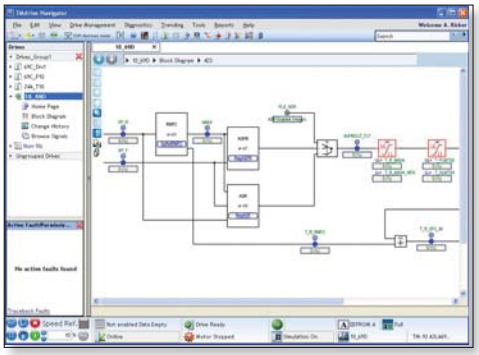


The Navigator tool helps maintain TMEIC drives in the field. Any user can easily access current drive expertise & know-how.

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

Local indicator of DC Bus status advises when it is safe to open the VFD cabinet.

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

Switch to local mode to operate the equipment from the keypad

Multilingual Keypad (Optional)

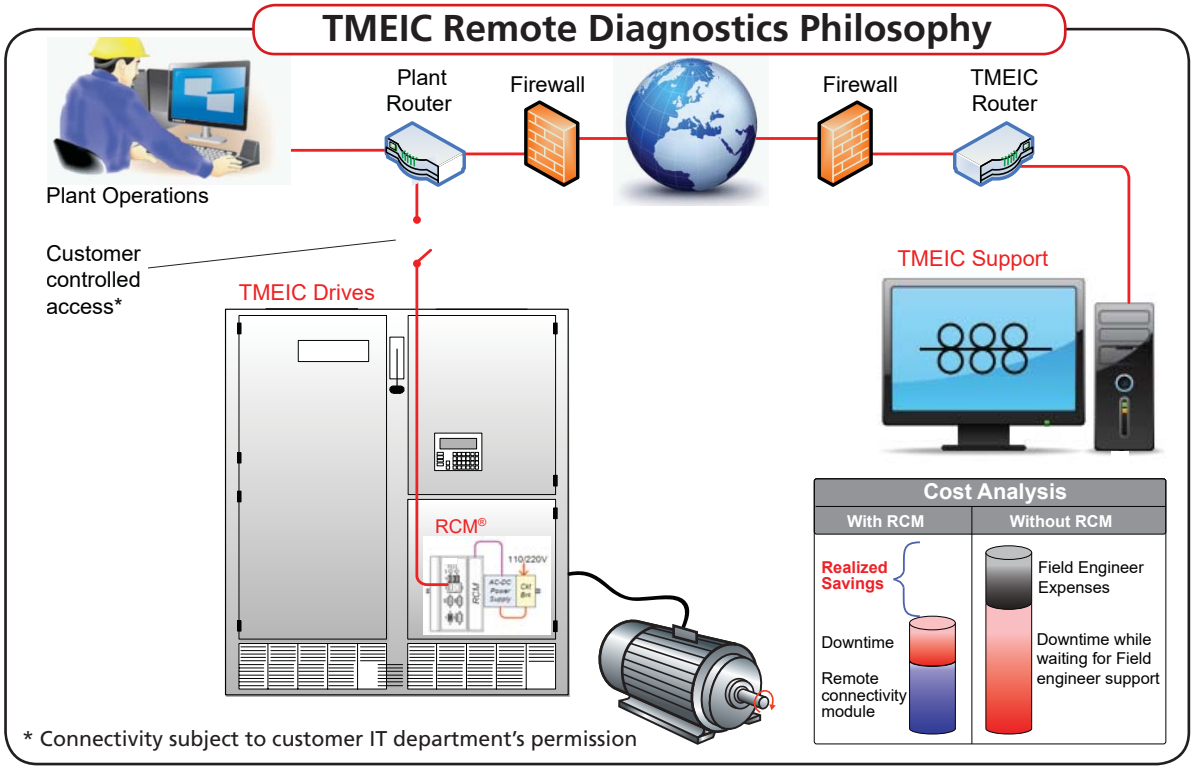
An optional touch screen display is available with 9 languages built in. The graphic display is easy to read and understand and contains all of the same functions as the standard keypad.



Remote Diagnostics RCM®

At TMEIC, we provide highly-reliable automation systems. Sometimes even the best systems can experience faults. For events we can't foresee, TMEIC offers remote diagnostics with RCM® - protection for your investment, by reducing downtime, lowering repair costs and providing peace of mind.

Remote drive connectivity requires an internet connection between your plant and TMEIC for retrieval of fault logs and files for diagnosing drive problems. The RCM® enables seamless integration between your drives and our support engineers.



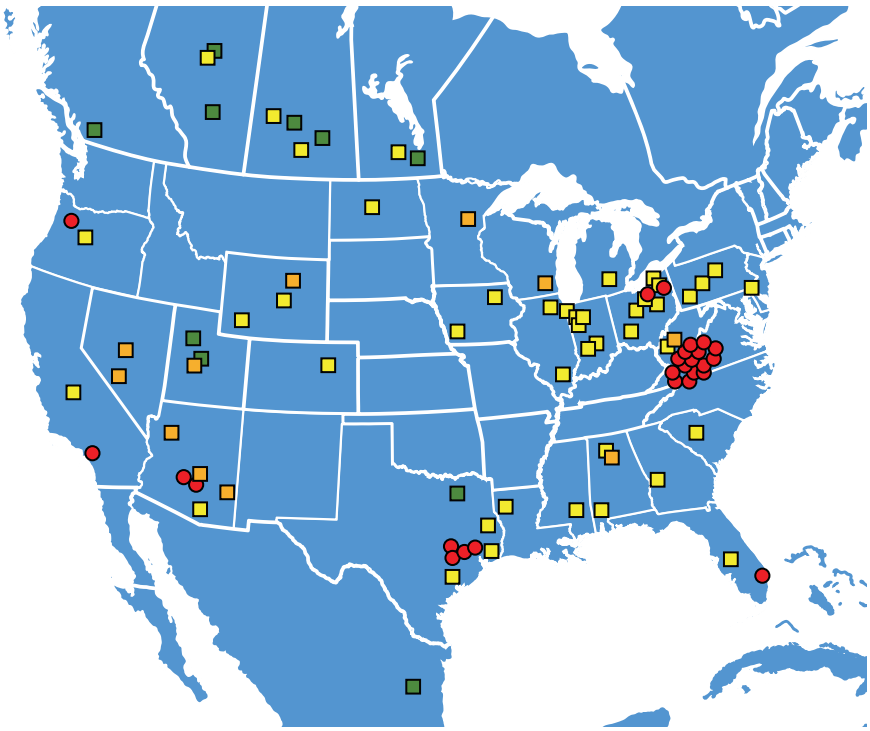
Features	Benefits
• Reduced downtime and Mean-Time-to-Repair	Quick support saves thousands of $ in lost production TMEIC engineers can quickly connect* to the drive and diagnose many issues in a matter of minutes.
• Secured connection*	Customer-controlled access All remote activity is conducted with permission of the customer. Drive start/stop is not permitted remotely.
• Auto Upload via TMdrive-Navigator	Proprietary Traceback Upload TMdrive-Navigator's auto upload capability can save traceback data to the RCM exclusively. This enables TMEIC engineers to analyze the issue resulting in the fault and provide a more coherent solution.
• Industrial computer	Ruggedized computer for the most demanding applications Fan-less computer withstands high vibration and temperature ranges in a small DIN-rail mounted footprint
• Multiple ethernet/serial ports	Flexible connectivity The module can be connected to two separate LAN's along with a host of serial-talking/USB devices.

Customer Service

North American Sales and Service Network

Whether the equipment is up and running or experienceing 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
- 43 Motor service locations
- Authorized VFD service providers
- Authorized MV Motor Repair Technicians

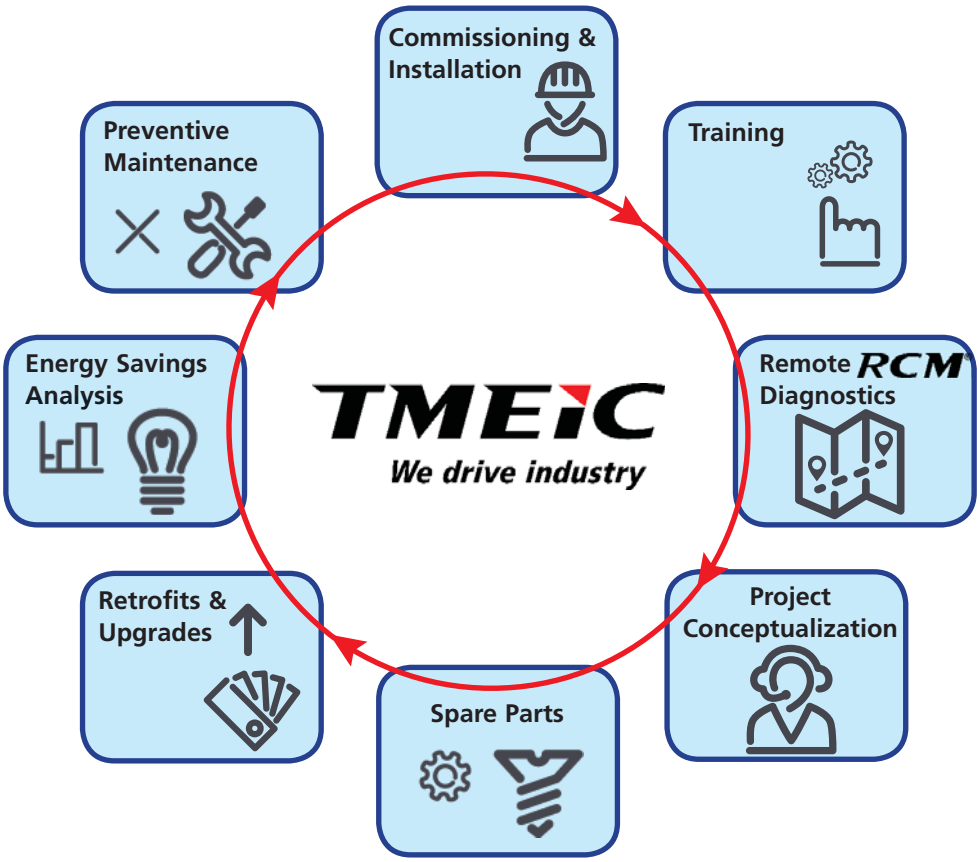


TMEIC

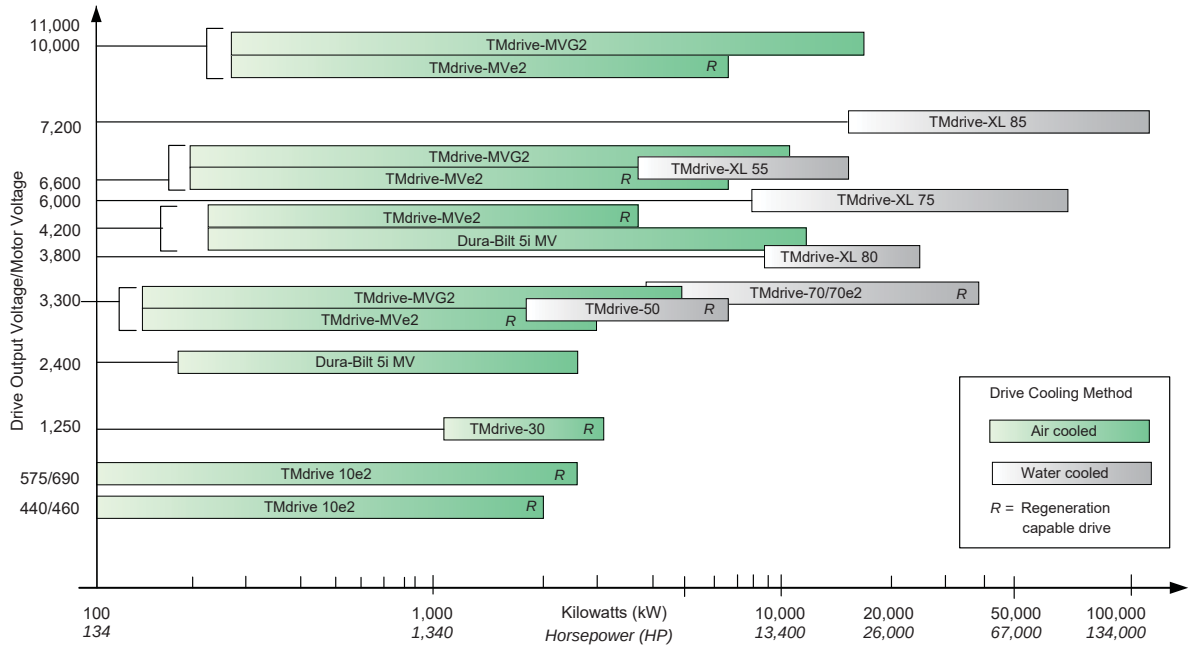
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24 Hours / 7 days

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



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