

## Medium Voltage Drive Up to 19,000 kVA at 11 kV






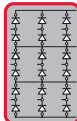




The TMdrive-MVG2 is a medium voltage, ac fed drive designed for high-efficiency and power-friendly operation in a broad range of industrial applications.

High reliability, low harmonic distortion, and high power factor operation are designed into the drive.

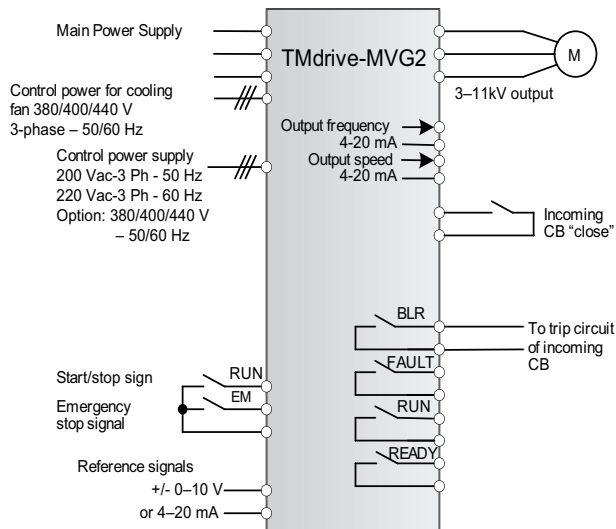
The TMdrive-MVG2 is available with the following voltage classes:

3.0 / 3.3 kV: 3,000 - 3,300 V ac      10 kV: 10,000 V ac  
4.0 / 4.16 kV: 4,000 - 4,160 V ac      11 kV: 11,000 V ac  
6.0 / 6.6 kV: 6,000 - 6,600 V ac



Design Feature	Customer Benefit
 <ul style="list-style-type: none"> <li>Conservative design using 1700 V IGBTs</li> </ul>	<ul style="list-style-type: none"> <li>Highly reliable operation, expected 15+ year drive MTBF</li> </ul>
 <ul style="list-style-type: none"> <li>Dry film type capacitors, not electrolytic type</li> </ul>	<ul style="list-style-type: none"> <li>High reliability, 20 year+ capacitor life</li> <li>Frequent capacitor replacement or reforming periodically tasks are eliminated</li> </ul>
 <ul style="list-style-type: none"> <li>High energy efficiency of approximately 97%</li> </ul>	<ul style="list-style-type: none"> <li>Considerable energy savings</li> </ul>
 <ul style="list-style-type: none"> <li>Diode rectifier ensures line-side power factor greater than 95% in the speed control range</li> </ul>	<ul style="list-style-type: none"> <li>Capacitors not required for power factor correction</li> </ul>
 <ul style="list-style-type: none"> <li>Input isolation transformer included in drive package</li> </ul>	<ul style="list-style-type: none"> <li>Better motor protection, elimination of common mode voltage</li> <li>Provides galvanic isolation of drive from power system</li> <li>Simplifies design and installation</li> <li>High BIL rating</li> </ul>
 <ul style="list-style-type: none"> <li>Multi-pulse converter rectifier and phase shifted transformer: 3.3 kV Class: 18 pulse      10 kV Class: 48 pulse 4.16 kV Class: 24 pulse      11 kV Class: 54 pulse 6.6 kV Class: 30 pulse</li> </ul>	<ul style="list-style-type: none"> <li>No harmonic filter required to provide lower harmonic distortion levels than IEEE-519 guidelines</li> </ul>
 <ul style="list-style-type: none"> <li>Multiple level drive output waveform to the motor, 9 levels for 4.16kV class (0-peak)</li> </ul>	<ul style="list-style-type: none"> <li>No derating of motor for voltage insulation or heating is required due to friendly output voltage waveform and near max sinusoidal current waveform</li> </ul>
 <ul style="list-style-type: none"> <li>Synchronous transfer to line option with no interruption to motor current</li> </ul>	<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> <li>Bumpless, make-before-break transfer</li> </ul>
 <ul style="list-style-type: none"> <li>Direct drive voltage output up to 11kV</li> </ul>	<ul style="list-style-type: none"> <li>No output transformer required, saving cost, mounting space, and energy</li> </ul>
 <ul style="list-style-type: none"> <li>Designed to keep running after utility supply-transient voltage dropouts – up to 300 msec.</li> </ul>	<ul style="list-style-type: none"> <li>Uninterrupted service for critical loads</li> </ul>

## Standard Connections



## Control I/O

Control Area	Specifications
Analog Inputs	(2) $\pm 10$ V or 4-20 mA, configurable, differential
Analog Outputs	(4) $\pm 10$ V, 8-bit, configurable, 10mA max
Digital Inputs	(2) 24-110 V dc or 48-120 V ac; (6) 24 V dc, configurable
Digital Outputs	(6) 24 V dc open collector 50 mA
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, Ethernet IP, Ethernet EGD, DeviceNet™, TOSLINE®-S20, or Modbus RTU
Motor Temp. Sensor	High-resolution torque motor temp. feedback: 100 Ohm platinum RTD (uses analog input with signal conditioner)

## 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>• Parameter editing</li> <li>• Optional multilingual display</li> <li>• Drive control</li> </ul>
<b>RCM</b> ®	<b>Remote Connectivity Module</b> Fanless industrial computer in the VFD with proprietary fault upload software for troubleshooting and diagnostics

For specifications not mentioned here, contact TMEIC.

## Additional specifications

### Power System Input and Harmonic Data

- Voltage: up to 11 kV, 3-phase, +10%/-10%
- 13.8 kV input available for select frames
- Tolerates power dips up to 25% without tripping, complete power loss ride through of 300 msec
- 125% Overload (OL) for 60 seconds; other OL ratings available
- Frequency: 50 Hz or 60 Hz,  $\pm 5\%$ , 60 Hz for 4.16 kV only
- Power factor (PF): 0.95 lag
- True PF: greater than 0.95 lag over 40-100% speed range
- Exceeds the IEEE 519 standard for current harmonics, without filters
- Bottom cable entry, top entry as option (may require extra width)

### Converter Type

- AC-fed multi-pulse diode using phase shifted transformer
- 18 pulse for 2.4 and 3.3 kV, 24 pulse for 4.16 kV, 30 pulse for 6 kV, 48 pulse for 10kV, and 54 pulse for 11 kV

### Transformer

- Dry type aluminum or copper wound, 140°C rise
- Air-cooled type
- Multiple phase shifted LV windings

### Inverter

- Multilevel inverter cells for smooth output to motor:
  - three in series for 2.4 and 3.3 kV inverter
  - four in series for 4.16 kV inverter
  - five in series for 6.6 kV inverter
  - eight in series for 10 kV inverter
  - nine in series for 11 kV inverter
- Up to 120 Hz, for 6/6.6 kV and below
- For 10/11 kV, maximum frequency 72 Hz
- Multilevel output for motor-friendly waveform

### Applicable Standards

- IEC61800-4, JIS, JEC, JEM, IEEE519

### Operating Environment and Needs

- Temperature: 0° to +40°C
- Humidity: 85% maximum, noncondensing
- Altitude: Up to 1000 m (3300 ft) above sea level:
- Fan: 380/400/440 Vac, 3 phase, 50 Hz or 60 Hz
- Control Power (by user): 120 Vac, 3 phase, 60 Hz or 220 Vac, 3 phase, 50 Hz

### Cooling

- Air-cooled with fans on top

### Typical Noise

- Approx. 79 dB(A) @ 50 Hz, at 3.1 ft (1 m) from enclosure
- Approx. 83 dB(A) @ 60 Hz, at 3.1 ft (1 m) from enclosure

### Control

- Nonvolatile memory for parameters and fault data
- Vector control with or without speed feedback, or Volts/Hz
- Designed to keep running after utility supply transient voltage dropouts of 300 ms
- Synchronous transfer to line option
- Synchronous motor control (option)

### Vector Control Accuracy and Response

- Maximum speed regulator response: 20 rad/sec
- Speed regulation without speed sensor  $\pm 0.5\%$
- Maximum torque current response: 500 rad/sec
- Torque accuracy:  $\pm 3\%$  with temp sensor,  $\pm 10\%$  without
- Speed control range, 5-100%

### Major Protective Functions

- Inverter overcurrent, overvoltage
- Low or loss of system voltage
- Motor ground fault
- Motor overload
- Cooling fan abnormal
- Over-temperature
- CPU error

### Enclosure

- IP30 except for fan openings (IEC 60529), NEMA1 gasketed equivalent
- Color: Munsell 5Y7/1 *For specifications not mentioned here, contact TMEIC*

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