TMdrive®-MVe2 Medium Voltage Drive

Medium Voltage Drive
200 - 5,000 kVA

The TMdrive-MVe2 is a medium voltage, ac fed, variable frequency drive designed for the most demanding industrial applications.

Safety, reliability and efficiency are designed into the drive.

The TMdrive-MVe2 is available in five voltage classes:

3.3 kV Voltage Class: **3,000 - 3,300 V ac**
4.16 kV Voltage Class: **4,000 - 4,160 V ac**
6.6 kV Voltage Class: **6,000 - 6,600 V ac**
10 kV Voltage Class: **10,000 V ac**
11 kV Voltage Class: **11,000 V ac**

Design Feature	Customer Benefit
• Active line side converter	• Unity (1.0) power factor across entire speed range • Line side harmonics exceed IEEE 519-2014 expectations • Inherent regeneration capability
• Conservative design using 1200 V IGBTs and dry film type capacitors	• Highly reliable operation, expected 10-year drive MTBF • High reliability, 20 year+ capacitor life
• Multiple level drive output voltage waveform	• No derating of motor for voltage insulation or heating is required • Applies easily to existing motors without expensive output filter • Eliminates the need for special “VFD rated” cables
• Input isolation transformer included in drive package	• Simplifies design and installation • Less total space required • Better motor protection • Acts as a shock absorber from power strikes
• Power conversion module in a single drawer-type package	• Reduction in spare parts • Minimal personnel training for maintenance • 30 mintues* MTTR (mean time to repair)
• Synchronous transfer to line option with no interruption to motor current	• Allows control of multiple motors with one drive • No motor current or torque transients when the motor transitions to the AC line
• High energy efficiency of approximately 97%	• Reduces HVAC cooling requirements

*Assuming spare parts onsite and all LOTO procedures are followed and permits granted to access.

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Control I/O

Control Area	Specifications
Analog Inputs	(2) ± 10 V or 4-20 mA, configurable
Analog Outputs	(4) ± 10 V, 12-bit, configurable, 1mA max
Digital Inputs	(2) 24 V dc for internal use; (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, ISBus, DeviceNet™, TOSLINE®-S20, or Modbus RTU
Motor Temperature Sensor Option	High-resolution temperature protection relay: 100 Ohm platinum RTD

Display and Diagnostics

	Specifications
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 • Parameter editing • Four configurable bar graphs • Drive control • Optional multilanguage display
Instrumentation Interface	Two analog outputs dedicated to motor current feedback, plus five analog outputs that can be mapped to variables for external data logging and analysis

Additional Specifications

Power System Input and line side performance
- Voltage: up to 11 kV, 3-phase, +10%/-10%
- Tolerates power dips up to 25% without tripping, complete power loss ride through of 300 msec
- 110% Overload (OL) for 60 sec; other OL ratings available
- Frequency: 50 Hz or 60 Hz, ±5%
- True PF: Unity (1.0) across entire speed range
- Exceeds the IEEE 519-2014 standard for harmonics, without filters
- Bottom cable entry, top as option (may require extra width)

Converter Type
- AC fed active front end

Transformer
- Dry type transformer; aluminium wound; H-type

Inverter
- Multi-level inverter power conversion module (cells):
  - 2 in series for 3.3 kV inverter
  - 2 in series for 4.16 kV inverter
  - 3 in series for 6.6 kV inverter
  - 5 in series for 10 kV inverter
  - 5 in series for 11 kV inverter
- 0-72 Hz, up to 120 Hz for 3kV/4kV/6kV inverters
- Multi-level output for motor-friendly wave form
  - 9-level output (ov-peak) for 3kV/4kV inverter
  - 13-level output (ov-peak) for 6kV inverter
  - 21-level outout (ov-peak) for 10kV/11kV inverter
- Bottom cable entry, top as option

Applicable Standards
- IEC61800-4, JIS, JEC, JEM: 3.3kV, 6.6kV, 10/11kV only
- CSA, CUL

Operating Environment and Needs
- Temperature: 0˚ to +40˚C, 50˚C with derating
- Humidity: 85% maximum, non condensing
- Altitude: Up to 1000 m (3300 ft) above sea level, to 5000 m with derating
- Fan Power (by user): 380V-400 V, 50 Hz
400V-460 V, 60 Hz
- Control Power: internal

Cooling
- Air-cooled with fans on top, air intake on the front
- For 10/11kV inverter, air intake at the rear also

Sound
- Approximately 76-83 dBA, at 3.1 ft (1m) from enclosure

Control
- Non-volatile 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 drop outs of 300 ms
- Synchronous transfer to line (option)
- Synchronous motor control (option)

Vector Control Accuracy and Response
- Speed response: 20 rad/sec
- Speed regulation without speed sensor ± 0.5%
- 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

Enclosure
- IP30 except for fan openings (IEC 60529), NEMA1 gasketted equivalent
- Color: Munsell 5Y7/1 (Option: ANSI 61 gray)