

Medium Voltage Drive 180 - 11,400 kVA

The TMdrive-MVG 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-MVG is available with four voltage classes:

- 3.3 kV Voltage Class: 3,000 - 3,300 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 |
|--|---|
| <ul style="list-style-type: none"> • Conservative design using 1700 V IGBTs | <ul style="list-style-type: none"> • Highly reliable operation, expected 12-year drive MTBF |
| <ul style="list-style-type: none"> • High energy efficiency approximately 97% | <ul style="list-style-type: none"> • Considerable energy savings |
| <ul style="list-style-type: none"> • Diode rectifier ensures power factor greater than 95% in the speed control range | <ul style="list-style-type: none"> • Capacitors not required for power factor correction |
| <ul style="list-style-type: none"> • Multi-pulse converter rectifier and phase shifted transformer: <ul style="list-style-type: none"> 3.3 kV Class: 18 pulse 6.6 kV Class: 36 pulse 10 kV Class: 54 pulse 11 kV Class: 30 pulse | <ul style="list-style-type: none"> • No harmonic filter required to provide lower harmonic distortion levels than IEEE-519-1992 guidelines |
| <ul style="list-style-type: none"> • Multiple level drive output waveform to the motor (seven levels for the 6.6 kV inverter) | <ul style="list-style-type: none"> • No derating of motor for voltage insulation or heating is required due to motor friendly waveform |
| <ul style="list-style-type: none"> • Synchronous transfer to line option with no interruption to motor current | <ul style="list-style-type: none"> • Allows control of multiple motors with one drive • No motor current or torque transients when the motor transitions to the AC line |
| <ul style="list-style-type: none"> • Input isolation transformer included in drive package | <ul style="list-style-type: none"> • Better motor protection • Less total space required • Simplifies design and installation |
| <ul style="list-style-type: none"> • Direct drive voltage output level | <ul style="list-style-type: none"> • No output transformer required, saving cost, mounting space, and energy |

Dimensions and Weights

| | kVA | Height* mm | Width mm | Depth mm |
|-------|--------------|---------------|-------------|-------------|
| 3.3kV | 200 - 400 | 3040 | 1800 | 900 |
| | 600 - 800 | 3040 | 2400 | 900 |
| | 950 - 1500 | 3040 | 2600 | 1100 |
| | 1800 - 2200 | 3040 | 3800 | 1200 |
| | 2400 - 3000 | 3040 | 4800 | 1300 |
| 6.6kV | 400 - 800 | 3040 | 2800 | 900 |
| | 1200 - 1600 | 3040 | 4300 | 900 |
| | 1900 - 3000 | 3040 | 5000 | 1000 |
| | 3600 - 4400 | 3040 | 5700 | 1200 |
| | 4800 - 6000 | 3040 | 6000 | 1300 |
| 10kV | 600 - 1200 | 3040 | 5400 | 1400 |
| | 1800 - 2425 | 3040 | 7000 | 1400 |
| | 3000 - 4550 | 3040 | 7500 | 1400 |
| | 7200 - 9000 | 3040 | 12000 | 1500 |
| 11kV | 650 - 1330 | 3040 | 5400 | 1400 |
| | 2000 - 2650 | 3040 | 7000 | 1400 |
| | 3300 - 5000 | 3040 | 7500 | 1400 |
| | 8000 - 10000 | 3040 | 12000 | 1500 |

Preliminary data

*Height = panel(2300)+Base(150)+Fan(590)

Control I/O

| Control Area | Specifications |
|------------------------------|--|
| Analog Inputs | (2) ± 10 V or 4-20 mA, configurable, differential |
| Analog Outputs | (4) ± 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, ISBus, DeviceNet™, TOSLINE [®] -S20, or Modbus RTU |
| Motor Temperature Sensor | High-resolution torque motor temperature feedback: 1 K Ohm platinum resistor or 100 Ohm platinum RTD (uses analog input with signal conditioner) |

Display and Diagnostics

| | Specifications |
|---------------------------|--|
| PC Configuration | Control System Drive 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"> Parameter editing Four configurable bar graphs Drive control |
| 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 Harmonic Data

- 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
- 125% Overload (OL) for 60 seconds; other OL ratings available
- Frequency: 50 Hz or 60 Hz, ±5%
- Displacement power factor (PF): 0.95 lag
- True PF: greater than 0.95 lag over 40-100% speed range
- Exceeds the IEEE 519-1992 standard for harmonics, without filters
- Top or bottom cable entry

Converter Type

- AC fed multi-pulse diode using phase shifted transformer


Transformer

- Dry type transformer
- Class H insulation
- Multi LV windings

Inverter

- Multi-level inverter cells:
 - three in series for 3.3 kV inverter
 - six in series for 6.6 kV inverter
 - nine in series for 10 kV inverter
 - ten in series for 11 kV inverter

Applicable Standards

- IEC60146, JIS, JEC, JEM,  (option)
- 0-66 Hz, up to 120 Hz
- Multi-level output for motor-friendly waveform
- Top or bottom cable entry

Operating Environment and Needs

- Temperature: 0° to +40°C
- Humidity: 85% maximum, non condensing
- Altitude: Up to 1000 m (3300 ft) above sea level:
- Fan/Pre-charge Power (by user): 380/400/440 Vac, 3 phase, 50 Hz or 60 Hz
- Control Power (by user): 220 Vac, 3 phase, 60Hz or 200 Vac, 3 phase, 50 Hz

Cooling

- Air-cooled with fans on top

Sound

- Less than 80 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

Vector Control Accuracy and Response

- Speed regulator: 20 rad/sec
- Speed regulation without speed sensor ± 0.5%
- Torque response: 500 rad/sec
- Torque accuracy: ± 3% with temp sensor, ± 10% without

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 (Option: ANSI 61 gray, RAL7032 etc.)