TMEIC
We drive industry

# Dura-Bilt5i MV 4000 Series

## Medium Voltage Drive
## 400 - 10,000 HP*
## *(298 - 7,457 kW*)*

The Dura-Bilt5i MV series of medium voltage ac fed drives deliver simple operation in a robust and compact design, providing a cost effective solution for a broad range of applications.

The Dura-Bilt5i MV delivers value through low cost of ownership and high reliability.

The Dura-Bilt5i MV product has a series designation appropriate for the outgoing motor voltage:

**2000 Series: 2000–2400 V ac**
**3000 Series: 3000–3400 V ac**
**4000 Series: 4000–4200 V ac**


| Design Feature | Customer Benefit |
|---|---|
| • Compact design | • Smaller equipment rooms and easier layout |
| • Control System Toolbox configuration with tuneup wizards, trending, and simulator | • Common configuration tool across TMEIC's family of drives<br>• Lower cost startups, ease of maintenance |
| • Graphic keypad with drive control | • No operator training required |
| • Integral medium voltage disconnect option | • No added space needed up to 7.2 kV |
| • Inverter power modules with medium voltage IGBTs | • Fewer devices for higher reliability |
| • 24-pulse ac to dc diode converter | • Power-system friendly, IEEE 519 compliant |
| • Heat pipe air-cooled inverter *(Frame 2 and above)* | • Extends IGBT life and saves space |
| • Multilevel output voltage waveform | • Motor-friendly |
| • Sensorless vector control | • Matches drive to process needs |
| • Roll-out inverter power modules | • Fast repair and maintenance |
| • Copper wound transformer included as standard | • Cooler operation in a smaller package |
| • Transformer electrostatic shield and lightning arrestors included as standard | • Reliability and power disturbance tolerance |

* 115% Overload (OL) for 60 seconds; other OL ratings available.

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## Dimensions and Weights

| HP (kW) | Height Inches (mm) | Width Inches (mm) | Depth Inches (mm) | Est. Weight Pounds (kg) |
|---|---|---|---|---|
| 400-900 (298-671) | 104 (2642) | 74 (1880) | 44 (1118) | 7500 (3409) |
| 1000-2000 (746-1492) | 104 (2642) | 122 (3099) | 44 (1118) | 11500 (5227) |
| 2250-2700 (1679-2014) | 104 (2642) | 164 (4166) | 50 (1270) | 18000 (8182) |
| 3000-3500 (2238-2611) | 104 (2642) | 174 (4420) | 50 (1270) | 22500 (10227) |
| 4000-6000 (2984-4474) | 104 (2642) | 222 (5639) | 50 (1270) | 32500 (14773) |
| 7000 (5222) | 104 (2642) | 308 (7823) | 60 (1524) | 42000 (19091) |
| 8000-10000 (5966-7454) | 104 (2642) | 403 (10237) | 60 (1524) | 56800-64800 (25765-29393) |

## Control I/O

| Control Area | Specifications |
|---|---|
| Analog Inputs | (2) ± 10 V or 4-20 mA, configurable, differential |
| Analog Outputs | (3) ± 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) 50 V dc open collector 50 mA; (5) are usually provided with interposing relays |
| Speed Feedback Encoder Input | High-resolution tach, 125 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/Ethernet |
| Motor Temperature Sensor | High-resolution torque motor temperature feedback: 1 K Ω platinum resistor or 100 Ω platinum RTD (uses analog input with signal conditioner) |

## Display and Diagnostics

| | Specifications |
|---|---|
| PC Configuration | Control System Toolbox 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<br>• Parameter editing<br>• Four configurable bar graphs<br>• Drive control |
| Instrumentation Interface | Two analog outputs dedicated to motor current feedback, five analog outputs can be mapped to variables for external data logging and analysis |
| Power Sensor Test | Tests each medium voltage sensor. At the conclusion of the test, status of any failed sensor is displayed. |

## Additional Specifications

**Power System Input and Harmonic Data**
- Voltage: up to 7.2 kV, 3-phase, +10%/-10% continuous (Up to 14.4 kv available)
- Tolerates power dips up to 30% without tripping, complete control power loss ride through of 100 msec
- Frequency: 60 Hz or optional 50 Hz
- Displacement power factor (PF): 0.95 lag
- True PF: greater than 0.95 lag from 10% to 100% load
- ≤ 3% THD (current distortion)
- Meets IEEE 519-1992 standards without filters
- Lightning arrestors included as standard
- Top or bottom cable entry

**Converter Type**
- AC fed 24-pulse diode, non-regenerative

**Transformer**
- Copper winding
- Electrostatic shield
- 115˚C rise
- Insulation class: 220˚C
- Cooling: forced air
- Optional fan power secondary winding

**Inverter**
- NPC (Neutral-Point-Clamped) configuration
- 3300 V IGBTs for margin, minimum parts count
- Control optically isolated from MV circuits for safety
- Roll-out phase modules for fast maintenance and repair

**Applicable Standards**
- CUL, CE, UL 347A, NEMA ICS 6, NEMA ICS 7,

**Safety Features**
- Integral MV disconnect option, door mechanically interlocked
- Door electrical interlocks included as standard

**Output**
- 0-120 Hz, 3% or less motor current harmonic distortion
- Five-level output for motor-friendly waveform
- Optional integrally mounted output filter
- Top or bottom cable entry

**Operating Environment and Needs**
- Temperature: 0˚ to +40˚C no derating; Up to +50˚C with derating
- Altitude: Up to 3300 ft/1000 m a.m.s.l. no derating: Up to 10,000 ft/3280 m a.m.s.l. with derating
- Fan Power (by user): 460 V, 3-phase, 60 Hz, 3.5-10 kVA (or from optional main transformer auxiliary winding)

**Cooling**
- Air-cooled with redundant fan option
- Separate converter and inverter cooling paths
- Inverter utilizes heat pipe technology for long IGBT life (most ratings)

**Sound**
- Less than 79 dBA, at 3.1 ft (1m) from enclosure

**Control**
- Non-volatile memory for parameters and fault data
- Vector control with or without speed feedback
- Motor simulation mode allows functional testing of system (PLC, LAN interface, and drive I/O)
- Automatic (power loss) restart function for remote applications

**Vector Control Accuracy and Response**
- Speed regulator: 20 rad/s
- ± 0.01% speed regulation with speed sensor, ± 0.5% without
- Torque response: 500 rad/s
- Torque accuracy: ± 3% with temp sensor, ± 10% without

**Protective Functions**
- Inverter overcurrent, overvoltage
- Loss of phase and low/loss of system voltage
- Motor ground fault
- Loss of dc link
- Motor overload
- Over-temperature