TMdrive
AC/DC DRIVE Series
New Drive Generation for All Applications
TMEIC (Toshiba Mitsubishi-Electric Industrial Systems Corporation) as a new global leader in the field of electrical products and engineering has developed drive products under the TMdrive trademark by integrating leading technology and service capability of Toshiba Corporation and Mitsubishi-Electric Corporation. Based on more than a century of their experience in converting electrical power into productive performance, TMEIC offers the best drive system solution with peak performance, reliable quality and optimum profitability.

**Innovative Concepts of TMdrive**

1. **State-of-the-art Power Device Technology**
   - High-tech large power devices with two options (IEGT\(^1\), GCT\(^2\), IGBT, GCT)
   - Extraordinary expertise in application of large power devices

2. **Compliance to Global Standards**
   - Global standard voltages (460/575/690V, 2.3/3.3/4.16/6.6/11kV)
   - Global rules (IEEE, UL, cUL, CSA & IEC/CE)

3. **Merged Intelligent Technology**
   - High power quality: High efficiency, little high-harmonics
   - High performance: High performance 32 bit micro-processor (Model PP7), Autotuning
   - Open communication: Global/Defacto standard LAN systems (ProBus, Modbus, DeviceNet, USB, TC-net, MELPLAC)

**Technology Migration**

- **Power Devices**: IEGT, GCT, IGBT
- **Power Bridge**: Device cooling, Multi-stage Insulation
- **Control PWM/Vector Autotuning Simulation**

---

**AC Drives for System Application**

- **TMdrive-10e2**: A flexible LV IGBT inverter applicable up to 690V and 2,400kVA.
- **TMdrive-30/50**: A mid range MV inverter with 1250/3000V output voltage. This is suitable for metal processing line, mining and marine.
- **TMdrive-70e2**: A large water-cooled up-to-date IEGT inverter. These were awarded as Excellent Power-saving Products in 2002.

**AC Drives for General Application**

- **DuraBilt 5i**: 2.3/4.16kV MV inverter directly connected to MV motor (in North America).
- **TMdrive-MVG2/Me2**: 2.0/3.3/4.16/6.6/10/11kV MV inverter directly connected to MV motor.
- **TMdrive-XL55**: Water cooled IGBT inverter for general purpose applications up to 7.2MVA.
- **TMdrive-XL75**: IEGT inverter for large compressor or other large capacity applications up to 92MVA.
- **TMdrive-XL80**: GCT inverter for large compressor or other large capacity applications up to 15MVA.
- **TMdrive-XL85**: Extra large GCT inverter for large compressor or other large power application up to 120MVA.

---

\(^{1}\): IEGT: Injection Enhanced Gate Transistor  \(^{2}\): GCT: Gate Commutated Turn-off Thyristor  \(^{3}\): IGBT: Insulated Gate Bipolar Transistor
<table>
<thead>
<tr>
<th>Product</th>
<th>LV AC Drive</th>
<th>MV AC Drive</th>
<th>Durability for North America</th>
</tr>
</thead>
<tbody>
<tr>
<td>LV AC Drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-10e2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-10e2/10A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MV AC Drive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-P10e2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-P10/T10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-P10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-P50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-P50/50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical View</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line side converter</td>
<td>Common converter with IGBT(P), thyristor(T)</td>
<td>Common converter with IGBT(P), thyristor(T)</td>
<td>Common converter with IGBT(P)</td>
</tr>
<tr>
<td>Inverter</td>
<td>2 level PWM, 3 level PWM-NPC</td>
<td>3 level PWM-NPC</td>
<td>IGBT-based multi-level converter</td>
</tr>
<tr>
<td>Device inverter</td>
<td>IGBTs, IGBTs</td>
<td>IGBTs, IGBTs</td>
<td>IGBTs, IGBTs</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Heatpipe air cooled</td>
<td>Heatpipe air cooled</td>
<td>Forced air cooled</td>
</tr>
<tr>
<td>Output voltage</td>
<td>440/480/575/690V</td>
<td>3.3kV</td>
<td>3.3/6/10/11kV</td>
</tr>
<tr>
<td>Maximum capacity</td>
<td>1,750kVA/440V, 2,400kVA/690V</td>
<td>4kVA, 6000kVA/6000kVA</td>
<td>3.3/4.16/6.6/10/11kV</td>
</tr>
<tr>
<td>Overload</td>
<td>150%-60sec., 150%-60sec.</td>
<td>150%-60sec., 120Hz</td>
<td>100%-60sec., 120%-60sec.</td>
</tr>
<tr>
<td>Max output freq</td>
<td>120Hz</td>
<td>60Hz</td>
<td>60Hz/120Hz (3.3/6.6kV)</td>
</tr>
<tr>
<td>Speed control</td>
<td>Vector control, Sensorless vector control</td>
<td>Vector control, Sensorless vector control</td>
<td>Sensorless vector control, V/f control</td>
</tr>
<tr>
<td>Motor Type</td>
<td>Induction motor, Permanent magnet synchronous motor</td>
<td>Induction motor, Synchronous motor</td>
<td>Induction motor, Synchronous motor</td>
</tr>
<tr>
<td>Major application</td>
<td>Metal processing, Paper machine, Crane, Conveyor, Dynamo Motor</td>
<td>Metal processing, Marine, Mining</td>
<td>Pump, Fan, Blower, Exhauster, Mixer</td>
</tr>
<tr>
<td>Features</td>
<td>-10e2: max. 8 stages, 10A: max. 12 stages</td>
<td>High efficiency, low-input harmonics, compact, Regeneration supported, Reactive power control</td>
<td>Reduction of power supply harmonics, driving of standard electric motors, no velocity sensor required, Regeneration supported, space-saving, Commercial synchronizer, Reactive power control</td>
</tr>
<tr>
<td>Circuit diagram</td>
<td>TMdrive-P10e2, -10e2</td>
<td>In case of IGBT converter</td>
<td>Clean AC power, No sensor required for most application</td>
</tr>
</tbody>
</table>

- TMdrive-10e2: IGBT converter
- TMdrive-P10: Thyristor converter
- 1 PWM: Pulse Width Modulation
- 2 IGBT
- 3 NPC: Neutral Point Clamped
- 4 V/f: Voltage/Frequency
- 5 NPC: Neutral Point Clamped
- 6 24 pulse diode converter
- 7 Multi-level converter
- 8 3 level PWM-NPC
With extraordinary expertise in power conversion and an integrated approach worldwide, TMEIC offers drive solutions for all industrial applications where drives are essential.

**Application**

- **Power Utility**
  - Blower
  - Feed pump
  - Circulating pump

- **Marine**
  - Propulsion
  - Winch

- **Mining, Ore processing Industries**
  - Winder
  - Pump
  - Conveyor
  - Kiln

- **Material handling, Transportation**
  - Crane
  - Conveyor
  - Lift
  - Ropeway

- **Chemical & Petrochemical Industries**
  - Compressor
  - Pump
  - Extruder
  - Mixer

- **Iron & Steel Industries**
  - Rolling mill
  - Process line
  - Boiler

- **Pulp & Paper Industries**
  - Paper machine
  - Process line
  - Blower

---

**Specifications**

<table>
<thead>
<tr>
<th>Product</th>
<th>MV AC Drive</th>
<th>DC Drive</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMdrive-XL55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-XL75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-XL80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-XL85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMdrive-DC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Typical View**

- **Line-side converter**
  - 36 pulse diode converter
  - 36 pulse diode converter
  - 12 or 24 pulse diode converter
  - 36 pulse diode converter
  - Thyristor (THY)

- **Inverter**
  - 5 level PWM
  - 5 level PWM
  - 3 level PWM-NPC
  - 5 level PWM
  - —

- **Device in inverter**
  - 10kA
  - 85kA
  - 60kA
  - 50kA
  - —

- **Cooling system**
  - Water cooled
  - Water cooled
  - Water cooled
  - Water cooled
  - Water cooled

- **Output voltage**
  - 6.6kV
  - 6.6kV
  - 3.3kV
  - 7.2kV
  - 440/500/600/1200V

- **Maximum capacity**
  - 7.3MVA
  - 90MVA (4x22.5MVA)
  - 15MVA
  - 120MVA (4x30MVA)
  - 855kW/440V
  - 18,240kW/1,200V

- **Overload**
  - 110%-60 sec.
  - 110%-60 sec.
  - 110%-60 sec.
  - 150%-60 sec.

- **Max output freq**
  - 60/250Hz
  - 60/250Hz
  - 60/200Hz
  - 60/200Hz
  - DC

- **Speed control**
  - V/f control (Fixed pulse pattern PWM control)
  - V/f control (Fixed pulse pattern PWM control)
  - V/f control (Fixed pulse pattern PWM control)
  - V/f control (Fixed pulse pattern PWM control)
  - Speed control & Voltage current control

- **Motor Type**
  - Induction motor
  - Synchronous motor
  - Induction motor
  - Synchronous motor
  - Induction motor
  - Synchronous motor
  - DC motor

- **Major application**
  - Compressor, Pump, Wind- and hydro-powered machines, Extruder, Mixer
  - Large-capacity compressor, General large-capacity single-unit applications
  - Induction motor, Synchronous motor
  - Large-capacity compressor, General large-capacity single-unit applications
  - Induction motor, Synchronous motor
  - Large-capacity compressor, Various application

- **Features**
  - Low input harmonics, Commercial synchronizer, Low-torque ripple
  - Higher efficiency, higher power factor and lower harmonics than LCI and cycloconverters, Commercial synchronizer, Selectable 15MVA model, Low-torque ripple
  - Low input harmonics, Commercial synchronizer, Low-torque ripple
  - Higher efficiency, higher power factor and lower harmonics than LCI and cycloconverters, Commercial synchronizer, Low-torque ripple
  - Performance improvement through upgrading of an existing DC driver

**Circuit diagram**

- Transformer TMdrive-XL55
- Transformer TMdrive-XL75
- Transformer TMdrive-XL80
- Transformer TMdrive-XL85
- Non-regen. Regen.
To users of our inverters:

PRECAUTIONS

- Read the entire “Instruction Manual” carefully for important information about safety, handling, installation, operation, maintenance, and parts replacements.
- When using our inverters for equipment such as nuclear power control equipment, aviation and space flight control equipment, traffic equipment, and safety equipment, and there is a risk that any failure or malfunction of the inverter could directly endanger human life or cause injury, please contact our headquarters, branch, or office printed on the front and back covers of this catalogue. Such applications must be studied carefully.
- When using our inverters for critical equipment, even though the inverters are manufactured under strict quality control, always fit your equipment with safety devices to prevent serious accident or loss should the inverter fail (such as failure to issue an inverter trouble signal).

- TMdrive is a trademark of Toshiba Mitsubishi-Electric Industrial Systems Corporation
- DeviceNet is a registered trademark of ODVA (Open Device Net Vender Association Inc.)
- Profinet is a registered trademark of PROFINET User Organization
- Modbus is a registered trademark of Schneider Electric
- IEC 61131-3 is a trademark of IEC (International Electrotechnical Commission)
- MELPLAC is a trademark of Toshiba Mitsubishi-Electric Industrial Systems Corporation
- All other registered trademarks are the property of their respective companies.
- All specifications in this document are subject to change without notice.