



The Preferred Choice in Medium Voltage Speed Control



PowerFlex 7000 MV Drive

VAST EXPERIENCE

- Manufacturing MV Drives since 1989
- Leading global supplier of MV drives
- Over 4 Million connected motor horsepower
- Over 2500 MV Drives shipped globally
- Installations in over 70 countries in a variety of industries and applications

ADVANCED TECHNOLOGY

- SGCT power semiconductor switch with integrated gate drive is optimized for the lowest possible conduction and switching losses. (Typical efficiency 98% at full load)
- Sinusoidal motor waveforms allow use of standard induction or synchronous motors.
- 18 pulse and PWM rectifiers meet latest IEEE 519 harmonic guidelines.
- Simple, fuseless power structure
- Inherent regenerative motor braking

LOWER TOTAL COST OF OWNERSHIP

- Competitive capital cost for VFD equipment
- Complete drive package with central cabling cabinet for low installation cost
- Set-up wizard, auto tuning, and pre-programmed parameters results in 1-2 day start-up
- High efficiency (typically 98%) results in lower long term operating costs
- Low component count and easy component replacement reduces spare part costs

PRODUCT SAFETY

- Totally isolated low voltage and medium voltage compartments
- Fiber optic firing.
- Mechanical and electrical interlocks between the drive and input disconnecting means
- Double offset ventilation pattern on the drive doors to ensure operator safety.
- Emergency stop control capability

HIGH RELIABILITY

- 6500 Volt rated power semiconductor devices (SGCTs) results in low component count, fewer connections, and simple power structure.
- SGCT has low FIT (failures in time) rate of 100 per billion hrs of operation
- High speed handling of diagnostics and fault routines via field programmable gate arrays
- De-rating of electrical components for reduced stress
- Remote "dial-in" access via modem.
- > 99.9% availability

EASE OF USE

- Patented PowerCage module allows for device replacement in less than 5 minutes without any special tools.
- User friendly operator interface terminal with interactive set-up wizard results in fast start-ups, smooth operation, and less down time.
- Cable connection cubicle provides easy access to line and load cable termination points. Both top and bottom cable direction is accommodated.
- PC tools (Drive Tools, DriveExplorer) assist with programming, monitoring and troubleshooting.
- Drive identity module allows pre-programming of customer specific drive and application parameters for faster start-ups.

COMMITMENT TO TOTAL QUALITY

- ISO 9001 Certification
- Total quality for customer satisfaction (TQCS) process that stresses quality in all aspects of the way we do business
- A system to address and resolve customer complaints
- Ongoing customer satisfaction measurements.

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POWERFLEX 7000 STANDARD FEATURES

- NEMA Type 1 Enclosure with gaskets and vents (IP21)
- 6500 Volt Symmetrical Gate Commutated Thyristor (SGCT) power semiconductor switches for low component count and high reliability
- Patented PowerCage Inverter and rectifier modules for easy access to main power components and quick replacement time. (Replace power semiconductor devices in less than 5 minutes)
- Operator interface mounted on the low voltage door, complete with 16 line 40 character LCD display and setup wizard.
- Standard operator device cluster including provisions for start, stop, and emergency stop pushbuttons, local / remote selector switch, and speed pot.
- Bar type digital metering for output amps, volts, speed and load displayed on operator interface.
- Integral DC link reactor with iron core eliminates semiconductor fuses reduces nuisance trips.
- Fiber optic isolation for firing of rectifier and inverter devices.
- Fully digital control with digital signal processors (DSP) and field programmable gate arrays (FPGA) for advanced capability for fault handling, gating and diagnostics, and drive synchronization control
- Sensorless vector control. Full vector control with tachometer feedback is optional.
- Trend buffers for 8 variables (one shot or multi-shot).
- Sixteen (16) configurable digital inputs and sixteen (16) configurable digital outputs on external I/O board
- Signal conditioning boards for analog signal filtering, common mode noise rejection, voltage/current feedback, tach feedback, & test points.
- On-board programming (update firmware via laptop)
- Four (4) test modes including low voltage gating check.
- Near sinusoidal current and voltage waveforms to motor.
- 6-Pulse, 18-Pulse or PWM Rectifier for maximum flexibility in reducing line side harmonics
- Electronic drive overload protection.
- Electronic motor overload protection.
- 5 cycle ride-through (extended ride through with optional UPS).
- Regenerative motor braking.



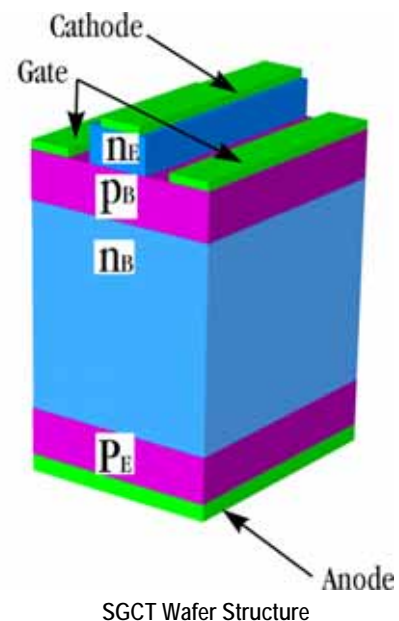
Power Cage

SYMMETRICAL GATE COMMUTATED THYRISTOR (SGCT) FEATURES

- Gate drive close to the device creates low inductance path.
- More efficient and uniform gating.
- Low conduction and switching losses.
- Low failure rate (100 failures per billion hours operation).
- Double-sided cooling for low thermal stress.
- SGCT blocks voltage in forward and reverse directions up to 6500V, current flow in one direction only.
- Non-punch-through structure
- Symmetrical pnp transistor in the wafer
- Simplification or elimination of snubber components.
- Operation at a higher switching frequency, hence reducing the size of passive components (by 50%) and improving performance of the drive.
- Reduction of component count, hence improving reliability, cost and size of the drive.



800 Amp, 6500 Volt SGCT



SGCT Wafer Structure

POWERFLEX 7000 SPECIFICATIONS

• Design Standards	CSA, UL, IEC, IEEE, NEMA, ANSI
• Inverter Type	PWM
• Inverter Switch	Symmetrical Gate Commutated Thyristor (SGCT)
• Power Rating	373-3000 kW (500-5500 hp) – Air cooled 2240-6700 kW (3000-9000 hp) – Liquid cooled
• Motor Type	Asynchronous, Synchronous
• Input Voltage Tolerance	+/- 10% of Nominal Line Voltage
• Input Frequency	50 / 60 Hz, +/- 5%
• Output Voltage Rating	0 - 2300, 0 - 3300, 0 - 4160, 0 - 6600
• Output Frequency	0 - 75 Hz
• Output Waveform	Near Sinusoidal Current and Voltage
• Rectifier Designs	6-Pulse, 18-Pulse, PWM Rectifier
• Input Protection	Metal Oxide Varistors
• Typical Efficiency	> 98.0% (with 6 & 18-Pulse Rectifier) > 97.5% (with PWM Rectifier)
• Availability	> 99.9%
• Modulation Technique	Pulse Width Modulation (PWM) / Selective Harmonic Elimination (SHE)
• Control Method	Sensorless Direct Vector (Full Vector Control Optional)
• Tuning Method	Automatic Self-Tuning Control
• Overload Capability	110% - 1 Minute / 150% - 1 Minute
• Speed Regulation	0.1% Open Loop 0.01 - 0.02% with Shaft Encoder
• Operator Interface	40-Character / 16-Line LCD
• Control Power	208 - 600V 3 Phase, 50/60 Hz
• Analog Inputs	(1) Isolated, (1) Non-isolated 4 - 20 mA / 0 - 10 V
• Analog Outputs	(1) Isolated, (7) Non-isolated 4 - 20 mA / 0 - 10 V
• External I/O	16 Digital Inputs / 16 Digital Outputs
• Communication Interface	RS - 232, Remote I/O, DeviceNet, Control Net, Ethernet, Modbus, Profibus
• Enclosure	IEC Type IP21 (NEMA 1 with Gasket & Vents) IEC Type IP42 (NEMA 12 Forced Vent) – Optional
• Ambient Temp.	0 - 40° C (32 - 104° F)
• Cooling	Forced Air
• Relative Humidity	95% Non-condensing
• Altitude	1000 m (3300 feet) above sea level 5000 m (16400 feet) above sea level (optional)
• Paint	Powder Epoxy

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