

TOSHIBA

TOSHIBA INTERNATIONAL CORPORATION

MEDIUM VOLTAGE DRIVES

T300MV2[®]



**MEDIUM
VOLTAGE**

SMALL FOOTPRINT LARGE SAVINGS

Toshiba's T300MV2® medium voltage adjustable speed drive incorporates advanced technology with a simplified design to deliver an innovative solution to maximize productivity and efficiency for industrial and commercial applications.



Three Cables In, Three Cables Out	Control and Cooling fan power are derived internally, eliminating the need for secondary power sources and simplifying installation.
Input Control Disconnect	Improves system safety through pad-lockable input disconnect switch interlocked with a vacuum contactor. A viewing window allows verification of switch in disconnect position, helping to ensure safe access.
Integrated Isolation Transformer	Phase shifting transformer reduces overall harmonics to meet or exceed IEEE 519-2014 standards. Integral transformer simplifies design and reduces overall footprint.
Multi-Level Output Waveform	Eliminates the need for additional output filters or specialty VFD rated cables. Additive multi-level Pulse width modulation output eliminates Neutral Point Shift.
Oil Filled Capacitors	Rated for a 20 year life expectancy minimizing overall costs of life cycle replacements.
Pre-Charge Circuit	Reduces inrush current to the transformer and capacitors, which reduces stress on components and prevents a reduction in their life expectancy.
Versatile Control Interface	Offers 10 digital inputs and outputs, 3 analog inputs and outputs. Analog outputs are expandable up to 8 outputs. Inputs and outputs can be programmed for a variety of functions for ultimate flexibility.
Synchronous Motor Transfer	Allows for control of multiple motors with a single drive. Transients due to current and torque are eliminated during transitions between the drive and utility power.

INDUSTRIES SERVED

- Oil & Gas
- Mining & Minerals
- Chemical
- Water & Wastewater

APPLICATIONS

- Pumps
- Fans
- Compressors
- Centrifuges
- Conveyors
- Mixers
- Pump Jacks
- Crushers
- Cranes
- Hoists



T300MV2

T300MV2

2400 V

MODEL RANGE	300 to 500 HP					600 to 1000 HP					1250 to 2000 HP				2250 to 3000 HP**		
Voltage Rating	2400 V																
Dimensions (H x W x D)	103.7 x 48 x 48 in.					103.7 x 74 x 43.4 in.					103.7 x 122 x 43.4 in.				103.7 x 222 x 49.5 in.		
Weight	4,500 lbs.					8,600 lbs.					12,800 lbs.				33,000 lbs.		
Current Rating (A):	64	75	88	97	107	129	150	172	183	215	289	322	378	430	483	537	645
Nominal HP* (2400 V)	300	350	400	450	500	600	700	800	900	1000	1250	1500	1750	2000	2250	2500	3000
POWER REQUIREMENTS																	
Input Tolerance	Voltage: ±10%; Frequency: ±5%																
Main Circuit	Three-Phase 2400 V; Integrated 24-Pulse Copper-Wound Isolation Transformer; Multi-Level NPC Medium Voltage IGBT Output																
Control Circuit	Integral to Main Transformer; Includes 460 V for Cooling Fans & PT for 120 V Control																
CONTROL SPECIFICATIONS INPUT																	
Control Method	Three-Level Pulse-Width Modulation (PWM) Output Control with Neutral-Point Clamping (NPC)																
V/Hz Control	V/Hz, Sensorless Vector Control, Variable Torque, Closed-Loop Vector Control, & Constant Torque																
Output Frequency	0 to 90 Hz																
PWM Carrier Frequency	Fixed at 2 kHz																
Frequency Setting	4 to 20 mA, 0 to 10 VDC Serial Communication Input, & Rotary Encoder Integrated into EOI																
Speed Regulation	Open Loop: Up to 0.5%; Closed Loop: Up to 0.1%																
Main Protective Functions	Current Limit, Overcurrent, Overload, Undervoltage, Overvoltage, Ground Fault, CPU Error, & Soft Stall																
Overload Current Rating	100% Continuous; 115% for One Minute Every 20 Minutes																
CONTROL INTERFACE																	
Digital Input	Ten Discrete Inputs with Programmable Functions																
Digital Output	Ten Available Digital Programmable Outputs																
Analog Input	Three Selectable Inputs Either Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC)																
Analog Output	Three Selectable Outputs Current (0/4 to 20 mA) or Voltage (0 to 10 VDC) (Optional up to Eight Maximum)																
Communication Ports	Profibus, Modbus RTU & TCP, TOSLINE-S20, TCNet, Ethernet Global Data (EGD), DeviceNet & EtherNet/IP																
SAFETY FEATURES																	
	Standard Pad-Lockable Input Fuse Disconnect Switch with Vacuum Contactor, Interlocked Doors, & Viewing Window																
ELECTRONIC OPERATOR INTERFACE (EOI)																	
Display	4-Digit, 7-Segment LED Display and 4x20 Character Graphical Plain English Back-Lit LCD Display for Programming, Monitoring & Diagnostics																
LED Indicators	Run (Red)/Stop (Green) & Local (Green)																
Keys	Local/Remote, Enter, Mon/Prg, Esc, Run, & Stop/Reset																
Monitoring	Frequency Command Screen; Multiple Parameters Displayed: Motor Current, Motor Speed, Motor Voltage, DC Voltage, Input Voltage, Output Voltage, Run Time, Output Power, Motor kW, Motor kWh, Motor kVAH, Motor kVAR, & On-Time Control Power																
CONSTRUCTION																	
Enclosure	ANSI-61 Gray; NEMA 1 Ventilated, & IP20 Per IEC-60529; Gasket & Filter; Free-Standing; Front-Access Only																
Power Cables	Top/Bottom Access for Input/Motor Cables																
Cooling	Forced-Air Cooled (Redundant Fan Option)																
Standards & Compliances	NEC, NEMA, UL, cUL, ANSI, & American Recovery & Reinvestment Act Compliant																
AMBIENT CONDITIONS																	
Ambient Temperature	0 to 40°C (50°C Option Available)																
Altitude	3,281 ft. Above Sea Level (Up to 14,764 ft. Option Available With Derate)																
Humidity	95% Maximum (Non-Condensing)																
Installation	Indoor; No Direct Sunlight																

*Typical HP Rating of a 4-Pole Motor; Contact Factory for Applications on Constant Torque Loads

** Consult Factory on UL status for 3000 HP model



T300MV2 - 2400 V

MODEL RANGE	300 to 600 HP	700 to 1000 HP	1250 to 2000 HP	2250 to 3000 HP	3000 to 4000 HP	4000 to 6000 HP	7000 to 8000 HP	8000 to 11000 HP**
Voltage Rating	4160 VAC							
Dimensions (H x W x D)	103.7 x 48 x 48 in.	103.7 x 60 x 48 in.	103.7 x 90 x 48 in.	103.7 x 154 x 49.5 in.	103.7 x 174 x 49.5 in.	103.7 x 222 x 49.5 in.	103.7 x 307.5 x 60 in.	103.7 x 402.5 x 60 in.
Weight	6,000 lbs.	7,600 lbs.	11,200 lbs.	18,800 lbs.	23,300 lbs.	33,000 lbs.	47,000 lbs.	68,500 lbs.
Current Rating (A):	37 50 62 74 87 99 112 124*	155 188 217 248*	279 310 372*	372 434 496* 496	558 620 682 744*	868 992*	992 1110 1240 1364	
Nominal HP*** (4160 V)	300 400 500 600 700 800 900 1000*	1250 1500 1750 2000*	2250 2500 3000 3000	3500 4000 4000	4500 5000 5500 6000	7000 8000	8000 9000 10000 11000	

POWER REQUIREMENTS

Input Tolerance	Voltage: ±10%; Frequency: ±5%
Main Circuit	Three-Phase 4160 V; Integrated 24-Pulse Copper-Wound Isolation Transformer; Multi-Level NPC Medium Voltage IGBT Output
Control Circuit	Integral to Main Transformer; Includes 460 V for Cooling Fans & PT for 120 V Control

CONTROL SPECIFICATIONS INPUT

Control Method	Five-Level Pulse-Width Modulation (PWM) Output Control with Neutral-Point Clamping (NPC)
V/Hz Control	V/Hz, Sensorless Vector Control, Variable Torque, Closed-Loop Vector Control, & Constant Torque
Output Frequency	0 to 120 Hz
PWM Carrier Frequency	Fixed at 2 kHz
Frequency Setting	4 to 20 mA, 0 to 10 VDC Serial Communication Input, & Rotary Encoder Integrated into EOI
Speed Regulation	Open Loop: Up to 0.5%; Closed Loop: Up to 0.1%
Main Protective Functions	Current Limit, Overcurrent, Overload, Undervoltage, Overvoltage, Ground Fault, CPU Error, & Soft Stall
Overload Current Rating	100% Continuous; 115% for One Minute Every 20 Minutes (1000 HP, 2000 HP, 3000 HP, 4000 HP, 6000 HP, & 8000 HP 110% for One Minute)

CONTROL INTERFACE

Digital Input	Ten Discrete Inputs with Programmable Functions
Digital Output	Ten Available Digital Programmable Outputs
Analog Input	Three Selectable Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC) Input Signals
Analog Output	Three Selectable Outputs Current (0/4 to 20 mA) or Voltage (0 to 10 VDC) (Optional up to Eight Maximum)
Communication Ports	Profibus, Modbus RTU & TCP, TOSLINE-S20, TCNet, Ethernet Global Data (EGD), DeviceNet & EtherNet/IP

SAFETY FEATURES

	Standard Pad-Lockable Input Fuse Disconnect Switch with Vacuum Contactor, Interlocked Doors, & Viewing Window
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ELECTRONIC OPERATOR INTERFACE (EOI)

Display	4-Digit, 7-Segment LED Display and 4x20 Character Graphical Plain English Back-Lit LCD Display for Programming, Monitoring & Diagnostics
LED Indicators	Run (Red)/Stop (Green) & Local (Green)
Keys	Local/Remote, Enter, Mon/Prg, Esc, Run, & Stop/Reset
Monitoring	Frequency Command Screen; Multiple Parameters Displayed: Motor Current, Motor Speed, Motor Voltage, DC Voltage, Input Voltage, Output Voltage, Run Time, Output Power, Motor kW, Motor kWh, Motor kVAh, Motor kVAR, & On-Time Control Power

CONSTRUCTION

Enclosure	ANSI-61 Gray; NEMA 1 Ventilated, & IP20 Per IEC-60529; Gasket & Filter; Free-Standing; Front-Access Only
Power Cables	Top/Bottom Access for Input/Motor Cables
Cooling	Forced-Air Cooled (Redundant Fan Option)
Standards & Compliances	NEC, NEMA, UL, cUL, ANSI, & American Recovery & Reinvestment Act Compliant

AMBIENT CONDITIONS

Ambient Temperature	0 to 40°C (50°C Option Available)
Altitude	3,281 ft. Above Sea Level (Up to 14,764 ft. Option Available With Derate)
Humidity	95% Maximum (Non-Condensing)
Installation	Indoor; No Direct Sunlight

*110% Overload for One Minute Every 20 Minutes

**Models not UL Listed Presently

***Typical HP Rating of a 4-Pole Motor; Contact Factory for Applications on Constant Torque Loads



T300MV2

T300MV2

6600 V

MODEL RANGE	300 to 800 HP**								900 to 1500 HP**				1750 to 3000 HP**				3500 to 4000 HP		4500 to 5000 HP		5500 to 7000 HP			8000 to 9000 HP		
Voltage Rating	6600 VAC																									
Dimensions (H x W x D)	103.7 x 108 x 48 in.								103.7 x 138 x 48 in.				103.7 x 176 x 48 in.				103.7 x 234 x 60 in.		103.7 x 265 x 60 in.		103.7 x 305 x 60 in.			103.7 x 379 x 60 in.		
Weight	9,700 lbs.								12,600 lbs.				18,400 lbs.				26,800 lbs.		31,500 lbs.		36,000 lbs.			44,750 lbs.		
Current Rating (A):	23	27	31	35	39	47	55	63	70	78	98	117	137	156	176	195	234	273	313	352	391	430	469	547	625	703
Nominal HP* (6600 V)	300	350	400	450	500	600	700	800	900	1000	1250	1500	1750	2000	2250	2500	3000	3500	4000	4500	5000	5500	6000	7000	8000	9000

POWER REQUIREMENTS

Input Tolerance	Voltage: ±10%; Frequency: ±5%																							
Main Circuit	Three-Phase 6600 V; Integrated >24-Pulse Copper-Wound Isolation Transformer; Multi-Level NPC Medium Voltage IGBT Output																							

CONTROL SPECIFICATIONS INPUT

Control Method	Seven -Level Pulse-Width Modulation (PWM) Output Control with Neutral-Point Clamping (NPC)																							
V/Hz Control	V/Hz, Sensorless Vector Control, Variable Torque, Closed-Loop Vector Control, & Constant Torque																							
Control Circuit	Integral to Main Transformer; Includes 460 V for cooling fans & PT for 120 V Control																							
Frequency Setting	4 to 20 mA, 0 to 10 VDC Serial Communication Input, & Rotary Encoder Integrated into EOI																							
Speed Regulation	Open Loop: Up to 0.5%; Closed Loop: Up to 0.1%																							
Main Protective Functions	Current Limit, Overcurrent, Overload, Undervoltage, Overvoltage, Ground Fault, CPU Error, & Soft Stall																							
Overload Current Rating	100% Continuous; 115% for One Minute Every 20 Minutes																							

CONTROL INTERFACE

Digital Input	Ten Discrete Inputs with Programmable Functions																							
Digital Output	Ten Available Digital Programmable Outputs																							
Analog Input	Three Selectable Inputs Either Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC)																							
Analog Output	Three Selectable Outputs Current (0/4 to 20 mA) or Voltage (0 to 10 VDC) (Optional up to Eight Maximum)																							
Communication Ports	Profibus, Modbus RTU & TCP, TOSLINE-S20, TCNet, Ethernet Global Data (EGD), DeviceNet & EtherNet/IP																							

SAFETY FEATURES

	Standard Pad-Lockable Input Fuse Disconnect Switch with Vacuum Contactor, Interlocked Doors, & Viewing Window																							
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ELECTRONIC OPERATOR INTERFACE (EOI)

Display	4-Digit, 7-Segment LED Display and 4x20 Character Graphical Plain English Back-Lit LCD Display for Programming, Monitoring & Diagnostics																							
LED Indicators	Run (Red)/Stop (Green) & Local (Green)																							
Keys	Local/Remote, Enter, Mon/Prg, Esc, Run, & Stop/Reset																							
Monitoring	Frequency Command Screen; Multiple Parameters Displayed: Motor Current, Motor Speed, Motor Voltage, DC Voltage, Input Voltage, Output Voltage, Run Time, Output Power, Motor kW, Motor kWh, Motor kVAH, Motor kVAR, & On-Time Control Power																							

CONSTRUCTION

Enclosure	ANSI-61 Gray; NEMA 1 Ventilated, & IP20 Per IEC-60529; Gasket & Filter; Free-Standing; Front-Access Only																							
Power Cables	Top/Bottom Access for Input/Motor Cables																							
Cooling	Forced-Air Cooled																							
Standards & Compliances	NEC, NEMA, UL, cUL, ANSI, & American Recovery & Reinvestment Act Compliant																							

AMBIENT CONDITIONS

Ambient Temperature	0 to 40°C (50°C Option Available)																							
Altitude	3,281 ft. Above Sea Level (Up to 14,764 ft. Option Available With Derate)																							
Humidity	95% Maximum (Non-Condensing)																							
Installation	Indoor; No Direct Sunlight																							

*Typical HP Rating of a 4-Pole Motor; Contact Factory for Applications on Constant Torque Loads
 ** Consult Factory for UL Status



T300MV2 - 6600 V

MODEL RANGE	7000 to 10,000 HP			
Voltage Rating	6900 VAC			
Dimensions (H x W x D)	103.6 x 376.5 x 58.25			
Weight	41,500 lbs			
Current Rating (A):	523	598	672	747
Nominal HP* (6900 V)	7,000	8,000	9,000	10,000
POWER REQUIREMENTS				
Input Tolerance	Voltage: $\pm 10\%$; Frequency: $\pm 5\%$			
Main Circuit	Three-Phase 6600 V; Integrated >36-Pulse Copper-Wound Isolation Transformer; Multi-Level NPC Medium Voltage IGBT Output			
CONTROL SPECIFICATIONS INPUT				
Control Method	Five-Level Pulse-Width Modulation (PWM) Output Control with Neutral-Point Clamping (NPC)			
V/Hz Control	V/Hz, Sensorless Vector Control, Variable Torque, Closed-Loop Vector Control, & Constant Torque			
Control Circuit	Integral to Main Transformer; Includes 460 V for cooling fans & PT for 120 V Control			
Frequency Setting	4 to 20 mA, 0 to 10 VDC Serial Communication Input, & Rotary Encoder Integrated into EOI			
Speed Regulation	Open Loop: Up to 0.5%; Closed Loop: Up to 0.1%			
Main Protective Functions	Current Limit, Overcurrent, Overload, Undervoltage, Overvoltage, Ground Fault, CPU Error, & Soft Stall			
Overload Current Rating	100% Continuous; 115% for One Minute Every 20 Minutes			
CONTROL INTERFACE				
Digital Input	Ten Discrete Inputs with Programmable Functions			
Digital Output	Ten Available Digital Programmable Outputs			
Analog Input	Three Selectable Inputs Either Currents (0/4 to 20 mA) or Voltage (0 to 10 VDC)			
Analog Output	Three Selectable Outputs Current (0/4 to 20 mA) or Voltage (0 to 10 VDC) (Optional up to Eight Maximum)			
Communication Ports	Profibus, Modbus RTU & TCP, TOSLINE-S20, TCNet, Ethernet Global Data (EGD), DeviceNet & EtherNet/IP			
SAFETY FEATURES				
	Standard Pad-Lockable Input Fuse Disconnect Switch with Vacuum Contactor, Interlocked Doors, & Viewing Window			
ELECTRONIC OPERATOR INTERFACE (EOI)				
Display	4-Digit, 7-Segment LED Display and 4x20 Character Graphical Plain English Back-Lit LCD Display for Programming, Monitoring & Diagnostics			
LED Indicators	Run (Red)/Stop (Green) & Local (Green)			
Keys	Local/Remote, Enter, Mon/Prg, Esc, Run, & Stop/Reset			
Monitoring	Frequency Command Screen; Multiple Parameters Displayed: Motor Current, Motor Speed, Motor Voltage, DC Voltage, Input Voltage, Output Voltage, Run Time, Output Power, Motor kW, Motor kWh, Motor kVAh, Motor kVAR, & On-Time Control Power			
CONSTRUCTION				
Enclosure	ANSI-61 Gray; NEMA 1 Ventilated, & IP20 Per IEC-60529; Gasket & Filter; Free-Standing; Front-Access Only			
Power Cables	Top/Bottom Access for Input/Motor Cables			
Cooling	Forced-Air Cooled			
Standards & Compliances	NEC, NEMA, UL, cUL, ANSI, & American Recovery & Reinvestment Act Compliant			
AMBIENT CONDITIONS				
Ambient Temperature	0 to 40°C (50°C Option Available)			
Altitude	3,281 ft. Above Sea Level (Up to 14,764 ft. Option Available With Derate)			
Humidity	95% Maximum (Non-Condensing)			
Installation	Indoor; No Direct Sunlight			

*Typical HP Rating of a 4-Pole Motor; Contact Factory for Applications on Constant Torque Loads



T300MV2 - 6900 V

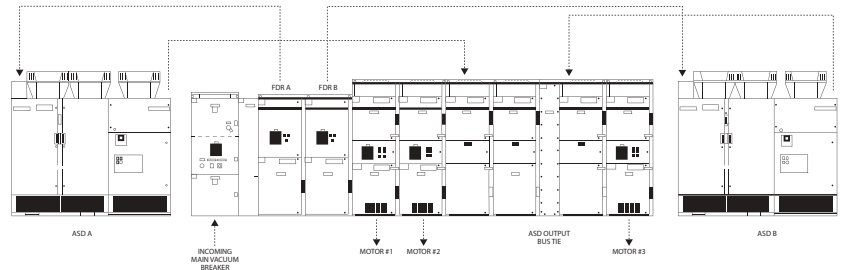
ADVANCED DESIGN

TRUSTED RELIABILITY

Sync-Xfer is a solution that combines the proven reliability of a Toshiba medium voltage adjustable speed drive (ASD) with the precision of Toshiba controlgear. With Sync-Xfer, an applicable Toshiba medium voltage ASD can determine characteristics of the utility line and transfer motor supply power from variable speed to utility power via Toshiba vacuum contactors or vacuum circuit breakers. Alternatively, such ASD can capture a motor from utility power and return it to variable speed. Sync-Xfer can therefore have a significant impact by lowering a system's cost with respect to applications in which multiple motors are controlled by one or more ASDs, including those used for starting duty only.

SYNC-XFER CAPABILITIES

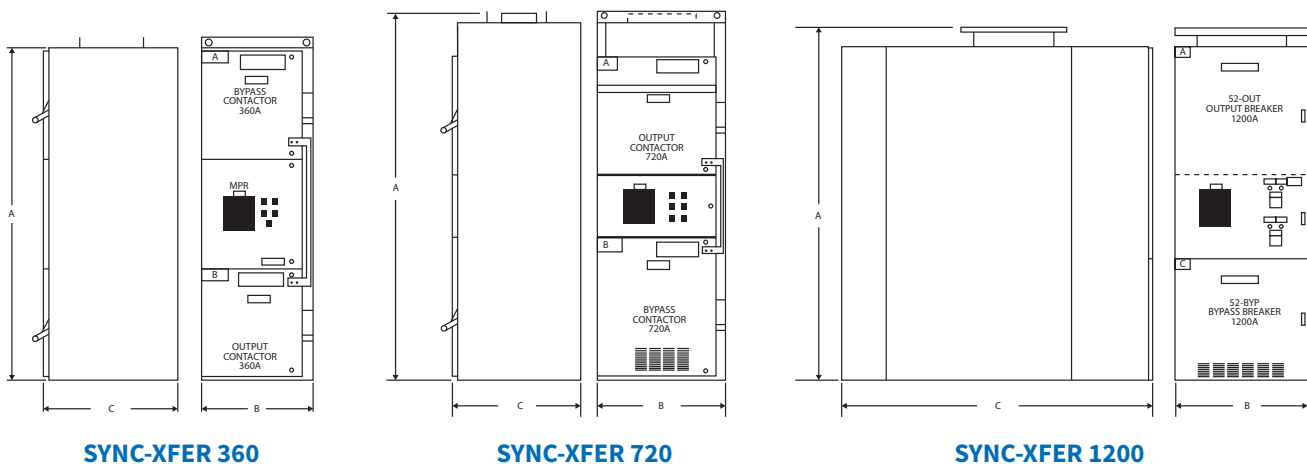
TIC controlgear and their availability of multiple configurations help every TIC customer meet or exceed their project requirements in a timely manner. Whether a project requires one or more motors and/or Toshiba ASDs (including redundant drives), a combination of Toshiba ASDs and controlgear systems can be designed to fit the ever-evolving needs of the customer.



An illustration of the capability of a combined Toshiba T300MV2 ASD and controlgear solution is shown above.

The above illustration shows a dual ASD redundant Sync-Xfer 720 (720A) design. For short circuit protection, utility power is connection to an incoming vacuum circuit breaker. Feeder A (FDR A) provides three-phase power to the first adjustable speed drive (ASD A) and Feeder B (FDR B) provides three-phase power to the second adjustable speed drive (ASD B). During normal operation, ASD A transfers supply power for Motors #1 and #2 from variable speed to utility power and ASD B transfers supply power for Motor #3 from variable speed to utility power. In the event of an emergency or otherwise abnormal circumstances that render either ASD A or ASD B unfit for operation, the ASD OUTPUT BUS TIE vacuum contactor can be closed to allow either ASD A or ASD B to transfer supply power for Motors #1, #2 and #3 from variable speed to utility power, offering redundancy for critical applications.

DIMENSIONS



SYNC-XFER 360

SYNC-XFER 720

SYNC-XFER 1200

MODEL	Height A (in.)	Width B (in.)	Depth C (in.)
Sync-Xfer 360	90	30	36
Sync-Xfer 720	104	36	36
Sync-Xfer 1200	95	36	84

COMMUNICATION OPTIONS

The T300MV2 drive offers a wide array of easily installed option boards. These boards allow the user to communicate with a wide variety of systems. Options include:

- DeviceNET
- Ethernet/IP
- Modbus RTU
- Modbus TCP
- PROFIBUS
- TOSLINE-S20
- TCNet
- Ethernet Global Data (EGD)

ADDITIONAL OPTIONS

The T300MV2 can be supplied with additional options to expand control, allow greater flexibility, or provide better protection for a user's application. These Options include:

- Redundant Fans
- Door-Mounted Equipment: Meters, Pilot Lights, Speed Potentiometer, and Switches
- dV/dT (2400 V & 4160 V) or Sinewave Output Filters (4160 V)
- Sync-Xfer/Capture (Multiple Motors Synchronize Transfer & Capture)
- High Voltage Input Up to 15 kV (4160 V & 6600 V)
- Common AC Bus (Drives Rated Up to 2000 HP)
- Synchronous Motor Control (AC Brushless/ DC Brush Type)
- Power Metering
- Power I/O Cabinets (Input and Output power termination 4160 V & 6600 V)
- Drive & Motor Space Heater (External Power)

OTHER SPECIAL FEATURES

- Voltage Source Inverter (VSI) with Simple & Reliable V/f Control and PID Control
- Air-Cooled Solutions from 300 to 11,000 HP
- Induction Motor Sensorless Vector Control, Synchronous Motor Sensorless Vector Control, Closed Loop Vector Control (Using Pulse Generator Encoder or Resolver)

