

# Force Drive™ Electric Drive Solutions

## AC90 Motor with DMOC645 Controller



### Overview

The Azure Dynamics AC90 with DMOC645 Drive System features an Azure AC90 motor mounted in an axial design. Because of the linear layout, the drive unit fits into the area formerly occupied by the traditional drive shaft of delivery vans, trucks, etc., making vehicle conversions fast and easy.

### Applications & Features

In battery-EV applications, the AC90 and DMOC645 drives are designed for use in medium-duty trucks and buses weighing from 10,000 to 18,000 lbs. The motor is of a low-speed design for a typical 5-10:1 overall vehicle drive ratio.

- AC induction motor
- Air-cooled
- High-efficiency brushless design
- Compact, lightweight construction
- Low rotating losses
- Low electrical resistance
- Cost effectiveness and high reliability
- Because it is used in conjunction with an Azure DMOC motor controller, the AC90 can function as an “electronic transmission,” eliminating the need for a multi-speed gearbox in some applications, directly driving the vehicle’s wheels with a fixed ratio.

### DMOC645 Digital Motor Controller

Azure’s DMOC645 is a DSP-controlled, rugged, waterproof (except for cooling fans) inverter for controlling 3-phase AC motors and generators. Liquid-cooling is available.

- DSP-based control
- Regenerative braking
- Space Vector PWM and Field Oriented Control
- Internal contactor with pre charge circuitry
- Lightweight aluminum chassis
- Waterproof, rugged construction
- Trenchgate IGBTs for maximum efficiency
- Over voltage and under voltage protection
- Three-level over current protection:
  - > 10kHz DSP-based current control
  - > Analog over current watchdog
  - > “Desat” protection at gate level
- Inverter over temperature protection
- Motor over temperature protection
- Over speed torque limit
- Diagnostics and data visualization via Controller Area Network (CAN) or RS232
- CAN control with upper/lower torque limits and speed setpoint commands, plus DMOC status messages over CAN. (Note, customers must provide their own CAN interface for both.)

### Specifications

Peak Torque	Nm	665
Continuous Torque* at Nominal Speed	Nm	330
Nominal Speed	Rpm	1350
Maximum Mechanical Speed	Rpm	5000
Maximum Current	A rms	414
Continuous Shaft Power* at 1000-2500 rpm	kW	50
	At a voltage of	VDC
		312
Peak Efficiency	%	94
Peak Shaft Power	kW	97
	At a voltage of	VDC
		312
Weight AC90	Kg	189
Weight DMOC645	Kg	27.5
Diameter AC90	mm	394
Length AC90	mm	520
Length DMOC645	mm	585
Width DMOC645	mm	260
Height DMOC645	mm	310
Minimum Recommended Nominal Battery Voltage	VDC	312
Maximum Nominal Battery Voltage	VDC	336
Minimum Operational Voltage	VDC	100
Maximum Operational Voltage	VDC	400
Maximum Voltage “On Charge”	VDC	450
Minimum/Maximum Operating Temperatures	°C	-40 to 60

\*At 25°C

System design and application affect performance. These specifications are guidelines to help facilitate system design and application and are not guaranteed in any particular application. All specifications are subject to change without notice.



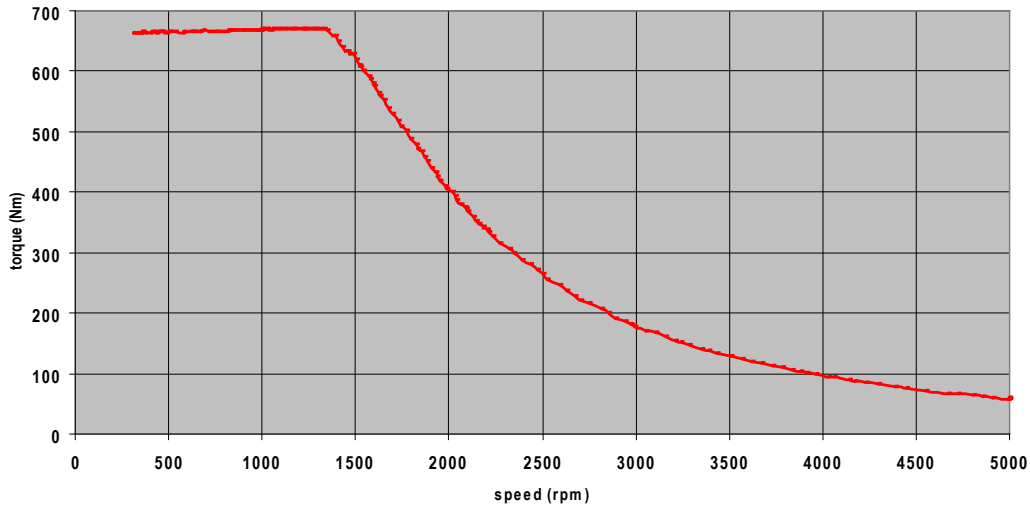
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For further information on AZD’s Force Drive Systems contact Beth Silverman, Sales Manager  
781.932.9009 Ext. 6224 sales@azuredynamics.com or call toll free 877.932.9009

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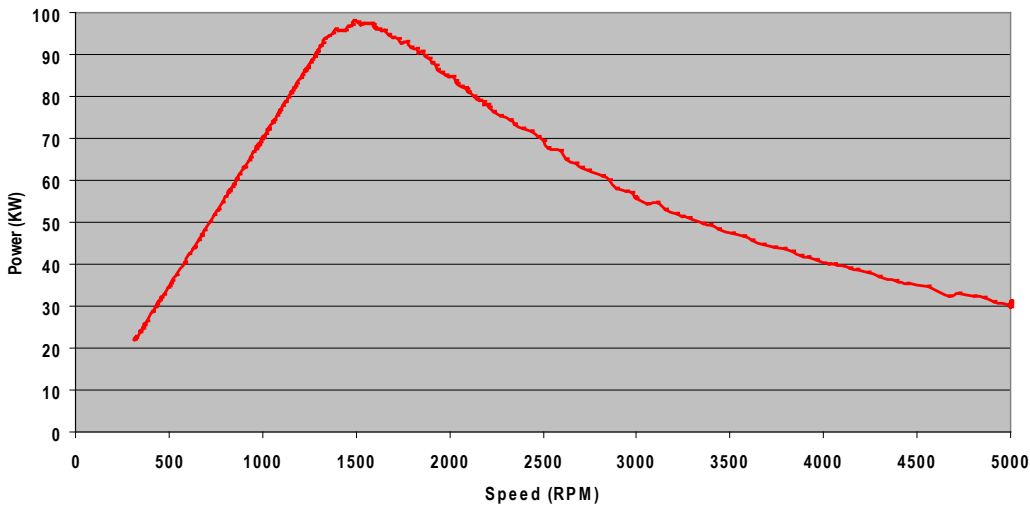
### Torque-Speed Envelope

AC90 Speed vs. Torque  
600A peak, 312VDC



### Power-Speed Envelope

AC90 Power vs. Speed  
600A peak, 312VDC



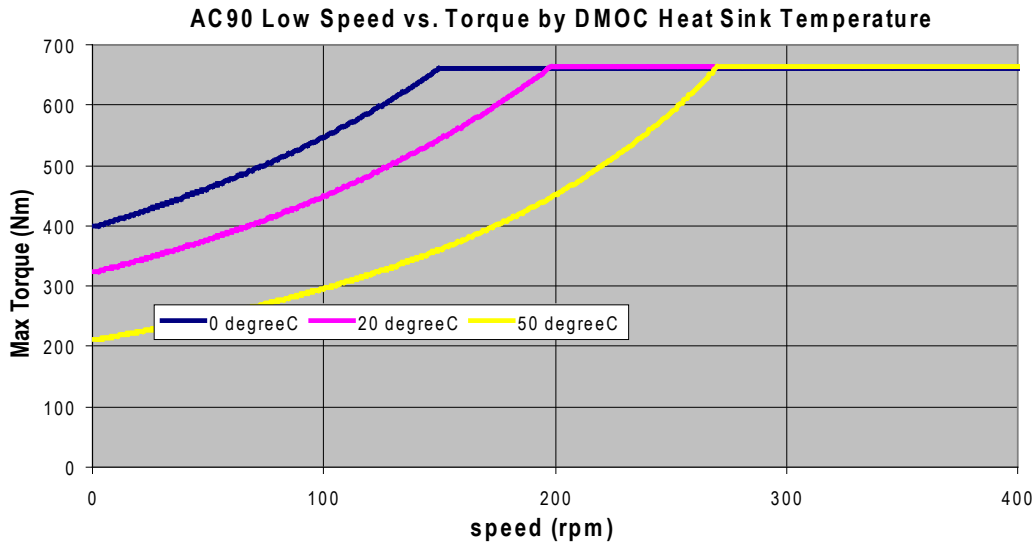
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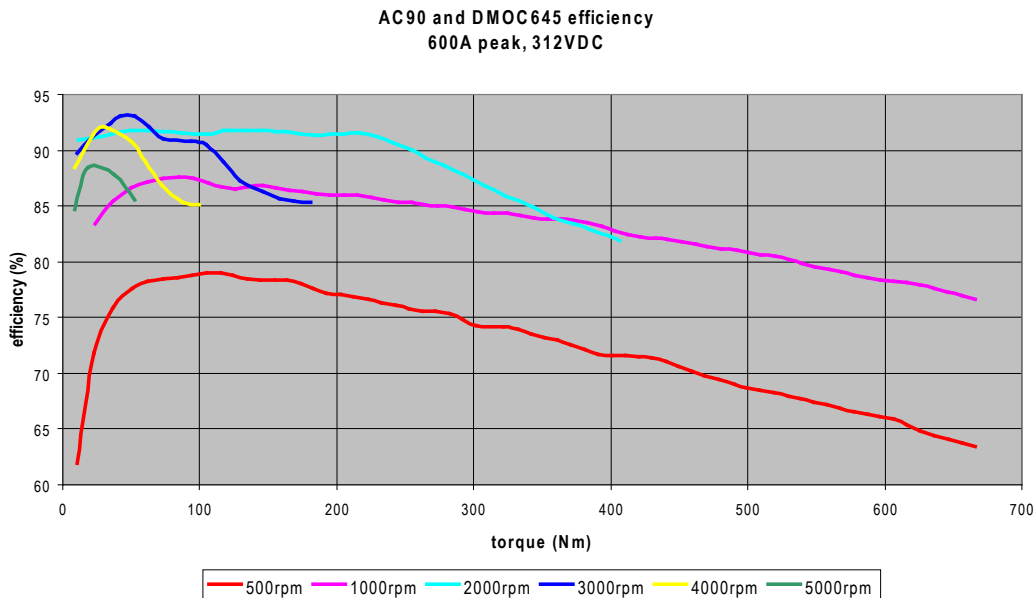
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## AC90 Motor with DMOC645 Controller

### Low Speed Torque vs. RPM



### Efficiency vs. Torque

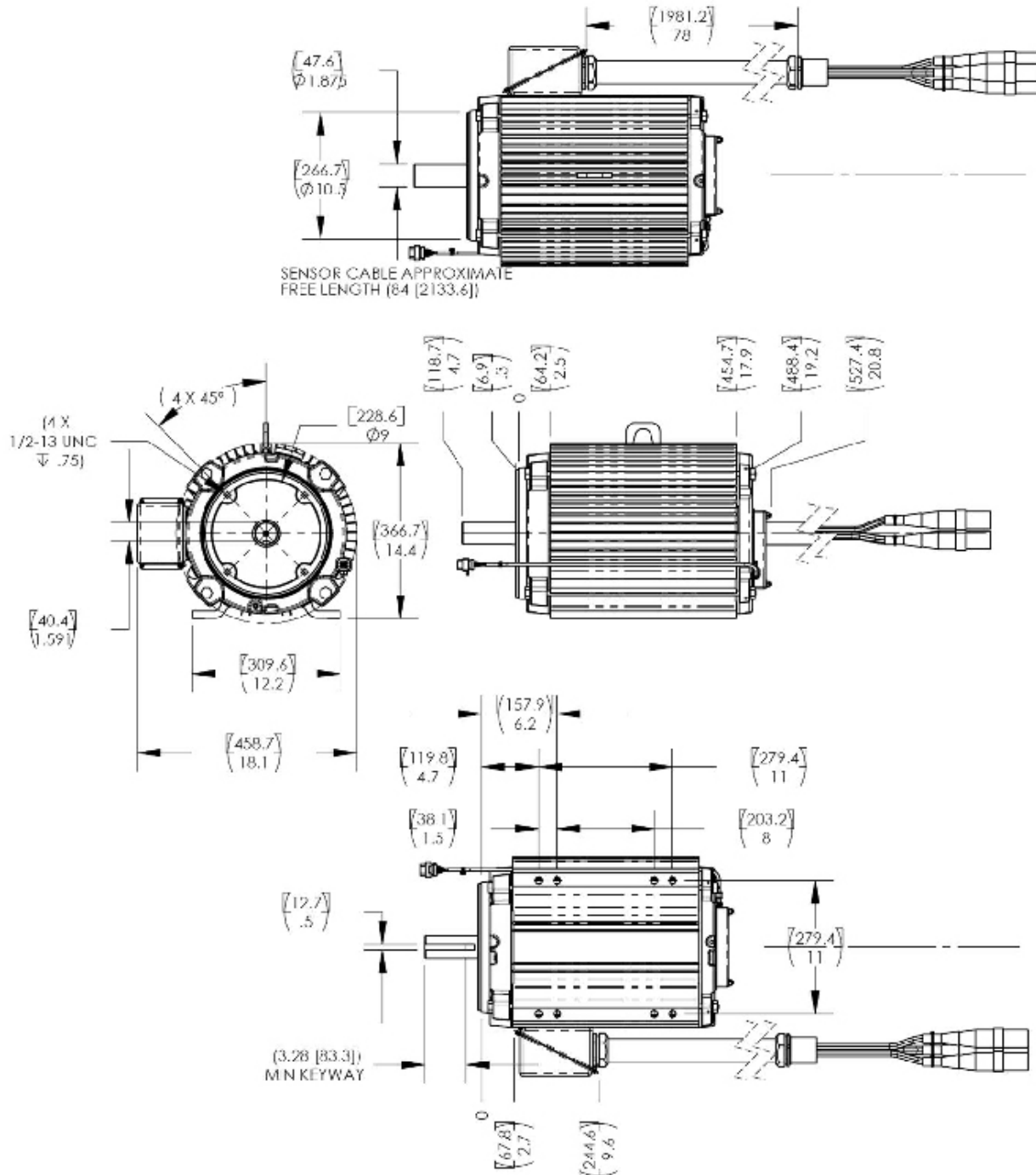


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## AC90 Motor



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## AC90 Motor

- NOTES:**
1. SPEED SENSOR / TEMPERATURE SENSOR CABLE CONNECTOR - AMP PART NUMBER 776273 1
  2. SEE TABLE FOR SENSOR CABLE PIN DESIGNATION
  3. MOTOR PHASE CONNECTOR - CROUSE-HINDS PART NUMBERS:  
 EZ1016-8354 (GREEN)  
 EZ1016-8355 (WHITE)  
 EZ1016-8356 (BLUE)
  4. SEE TABLE FOR MOTOR PHASE CONNECTION DESIGNATION
  6. SPEED SENSING PROVIDED BY QUADRATURE SENSOR - CONTREX PART NUMBER 7200 0992 AND 60 TOOTH SENSOR DISC.

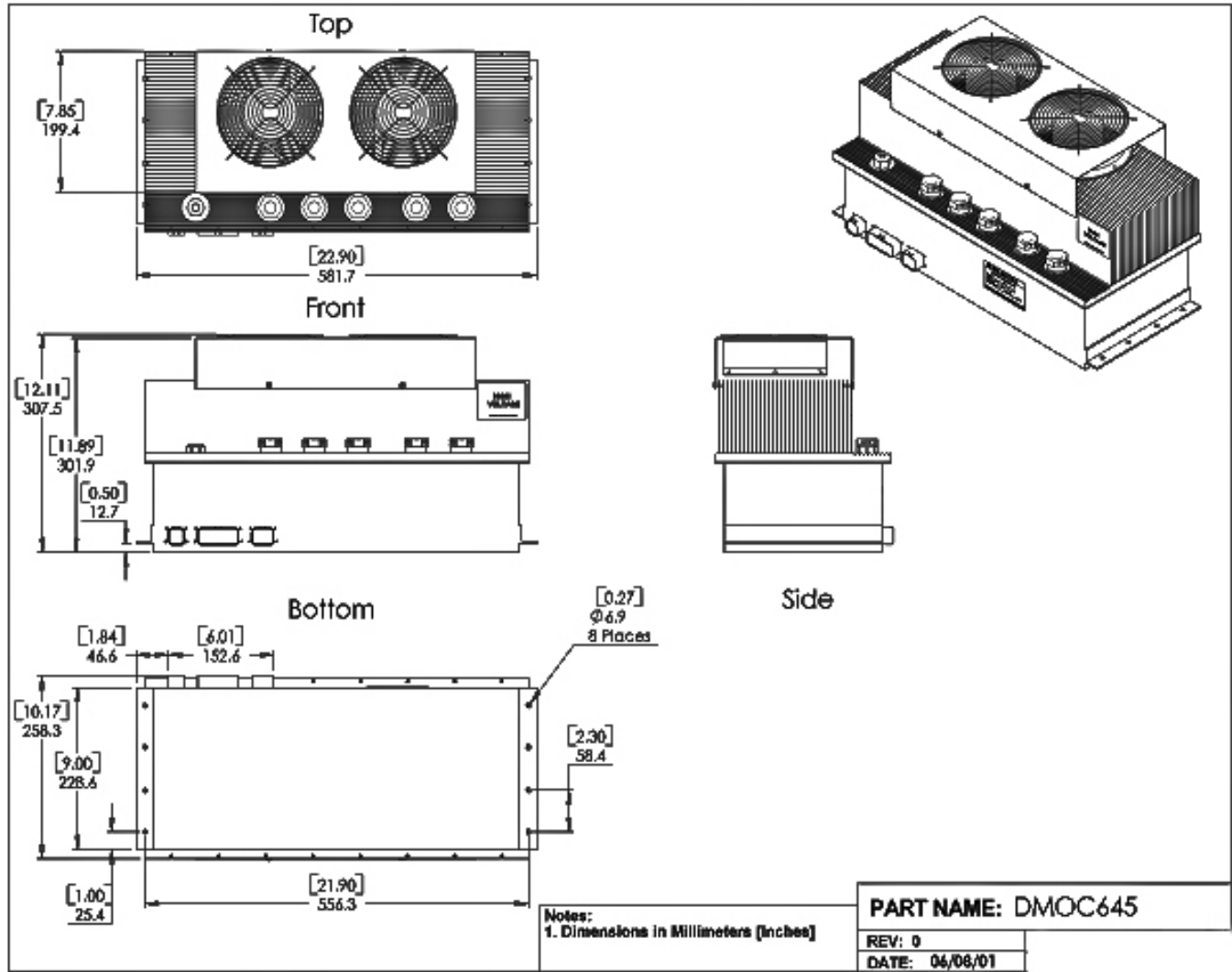
SENSOR CONNECTOR PIN	DESIGNATION
1	CHANNEL A (SENSOR BLUE WIRE)
2	CHANNEL A - (SENSOR WHITE / BLUE WIRE)
3	CHANNEL B (SENSOR BROWN WIRE)
4	CHANNEL B - (SENSOR WHITE / BROWN WIRE)
5	SPEED SENSOR SUPPLY AND SIGNAL GROUND
6	SPEED SENSOR SUPPLY VOLTAGE
7	RESERVED
8	RESERVED
9	TEMP SENSOR
10	TEMP SENSOR
11	CABLE SHIELD
MOTOR PHASE	CONNECTOR COLOR
A	BLUE
B	WHITE
C	GREEN

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## DMOC645 Controller



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