



PowerPhase[®] 100 Traction System

For Electric, Hybrid Electric, and Fuel Cell Powered Vehicles



A powerful design that incorporates:

- ◆ **550 N-m Peak Torque**
- ◆ **100 kW Peak, 55 kW Continuous Motor Power**
- ◆ **100 kW Peak, 85 kW Continuous Generator Power**
- ◆ **Regenerative Braking**
- ◆ **Full power @ 250-400 VDC Input**



SR286 Brushless PM Motor/Generator		
Dimensions		
Length	9.49 in	241 mm
Diameter	15.94 in	405 mm
Weight	190 lb	86 kg
Performance		
Motoring power (peak)	133 hp	100 kW
Motoring torque (peak)	405 lbf-ft	550 N-m
Regeneration power (peak)	133 hp	100 kW
Regeneration torque (peak)	368 lbf-ft	500 N-m
Maximum speed	5000 RPM	
Maximum efficiency	90%	
Power density (based on 100 kW)	0.71 hp/lb	1160 W/kg
CD40-400L Inverter/Controller		
Dimensions		
Length	14.96 in	380 mm
Width	14.37 in	365 mm
Height	4.69 in	119 mm
Weight	35.0 lb	15.9 kg
Operating Voltage		
Nominal input range	270 to 336 VDC	
Operating voltage input range	250 to 400 VDC	
Minimum voltage limit	180 VDC (with derated power output)	
Input current limitation	300 A	
Inverter Type		
Control type - PWM & Phase Advance, 3-Phase Brushless PM		
Maximum current	475 A peak	
Power device	IGBT module half bridge x 3	
Switching frequency	20 kHz	
Standby power consumption	17 W (inverter and microprocessor)	
Liquid Cooling System		
Minimum coolant flow	8 l/min (50/50 water/glycol mix)	
Max. inlet temp of controller	131 °F	55 °C
Inner diameter of hose	5/8 in	16 mm
Max. inlet pressure	10 psig	0.7 bar
EVPH332 Microprocessor (internally packaged)		
Nominal input voltage	12 VDC	
Input supply voltage range	8 to 15 VDC	
Input supply current range	0.3 to 0.5 A	

Key Features

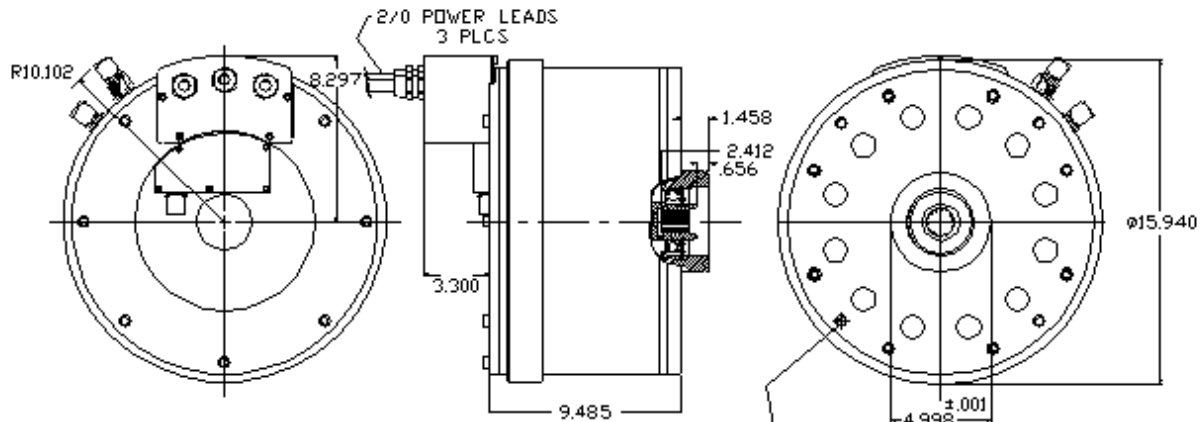
- EV/HEV traction drive or HEV starter/generator system
- 100 kW / 550 N-m
- Efficient, power dense, brushless permanent magnet motor
- Wheel hub configuration
- Compact package
- Microprocessor- controlled inverter with phase advance
- CAN bus compatible (option)
- Liquid cooling
- User/application-friendly interface
- Light weight

Drive Electronics Incorporate...	
Serial communication	Temperature sensing/alarm
CAN bus compatibility	Speed sensing
Diagnostic capability	Charger port and parking brake interlocks
Digital "power-up" control signals	Coolant fan control
Software controlled, four quadrant operation	IGBT power switches
Operation tailorable for battery management	
Features	Benefits
Torque based traction control	Smooth vehicle operation
Phase advance control	Eliminates gear change requirements
Regenerative braking (selectable)	Improved braking and extended range
Rugged, weatherproof enclosure	Suitable for automotive applications
Liquid cooling	Enhanced thermal management
Vehicle control software	Customized (optional)

(All data subject to change without notice)

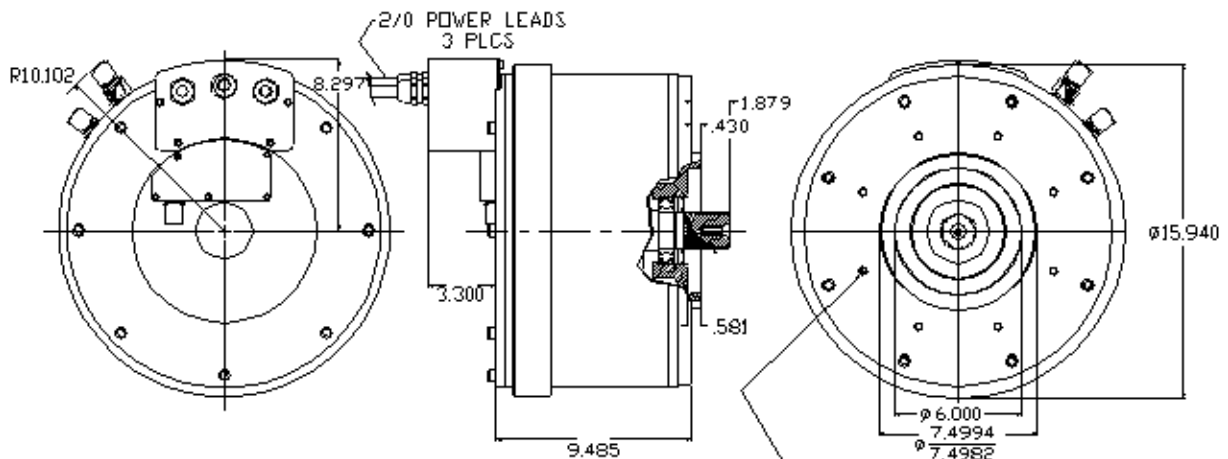


SR286 Motor/Generator – Internal Spline Output Shaft



INTERNAL SPLINE DATA	
ANSI 92.1-1970 - CLASS 5	FLAT ROOT SIDE FIT
NUMBER OF TEETH	14
PRESSURE ANGLE	30°
DIAXIAL PITCH	15.24
MAJOR DIAMETER	1293 MAX
MINOR DIAMETER	1087-1092
INVOLUTE TOP DIAMETER	1254 MIN
CIRCULAR SPACE WIDTH	1309 MIN EFFECTIVE
MEASUREMENT OVER WIRES	1529 MAX ACTUAL
WIRE DIAMETER	9582-9509
TOOTH PARALLELISM	0.02 A-B
PITCH DIAMETER	Ø .002 A-B

SR286 Motor/Generator – External Spline Output Shaft



EXTERNAL SPLINE DATA	
ANSI 92.1-1970	FILLET ROOT SIDE FIT
NUMBER OF TEETH	27
PRESSURE ANGLE	30 DEG
DIAXIAL PITCH	18.27
MAJOR DIAMETER	1745-1750 ADD A-B
MINOR DIAMETER	1545 MIN
INVOLUTE TOP DIAMETER	1627 MAX
CIRCULAR TOOTH THICKNESS	.0982 MAX EFFECTIVE
MEASUREMENT OVER WIRES	.0953 MIN ACTUAL
WIRE DIAMETER	1.200
TOOTH PARALLELISM	//.000 A-B
PITCH DIAMETER	Ø .002 A-B

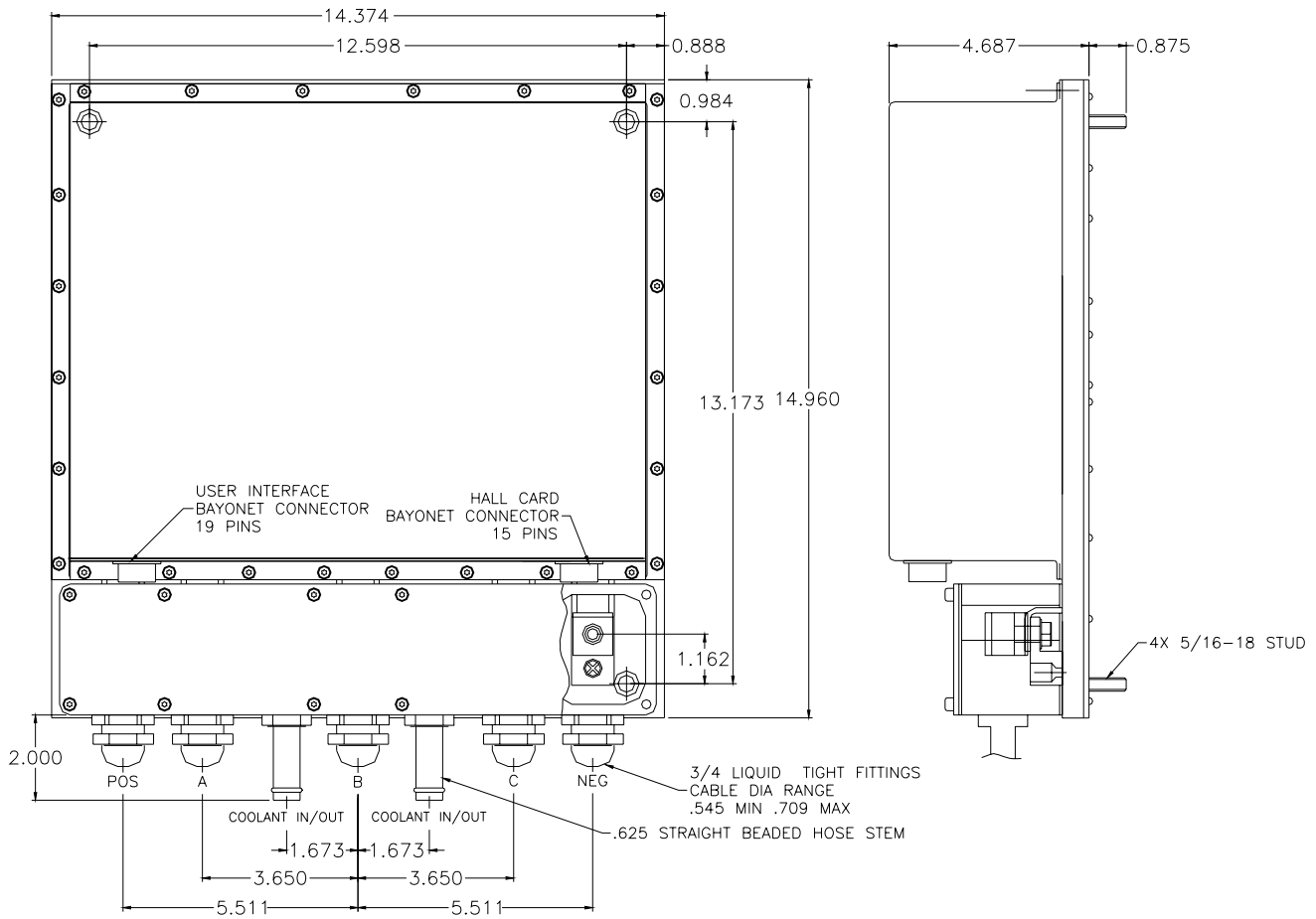
UQM Technologies, Inc.

7501 Miller Drive Frederick CO 80530 Tel: 303-278-2002 Fax: 303-278-7007

www.uqm.com sales@uqm.com



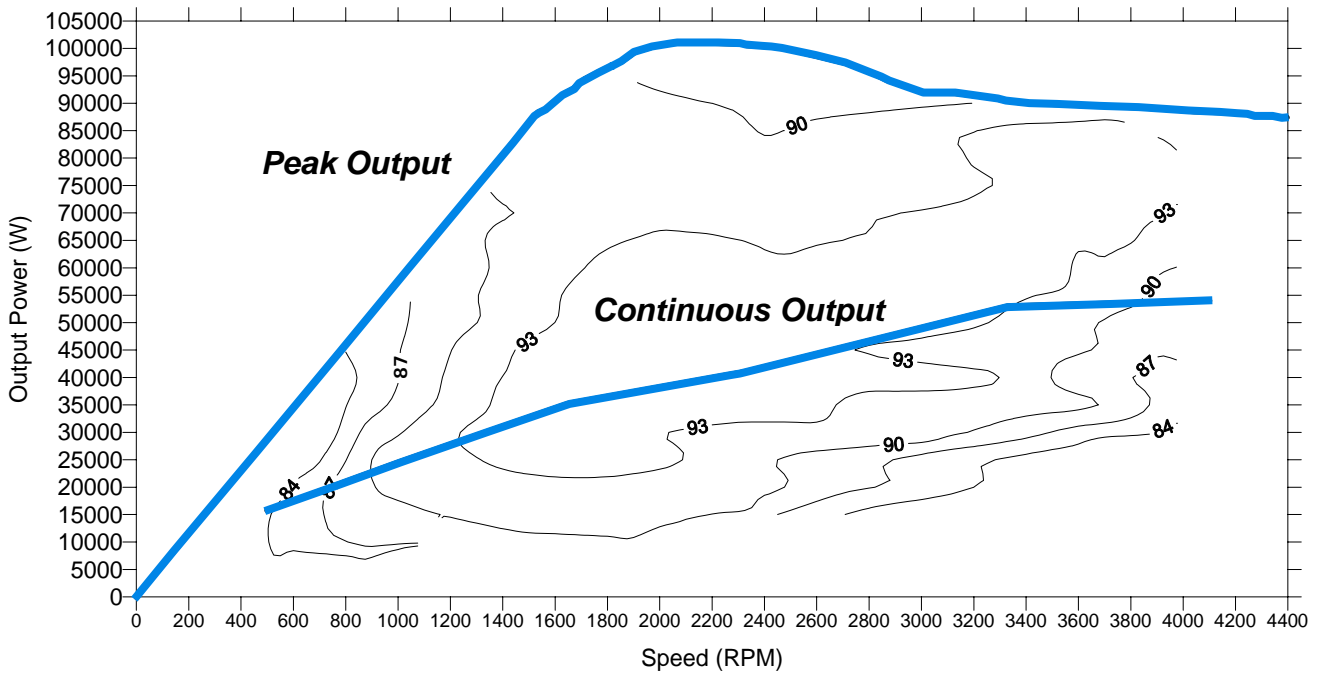
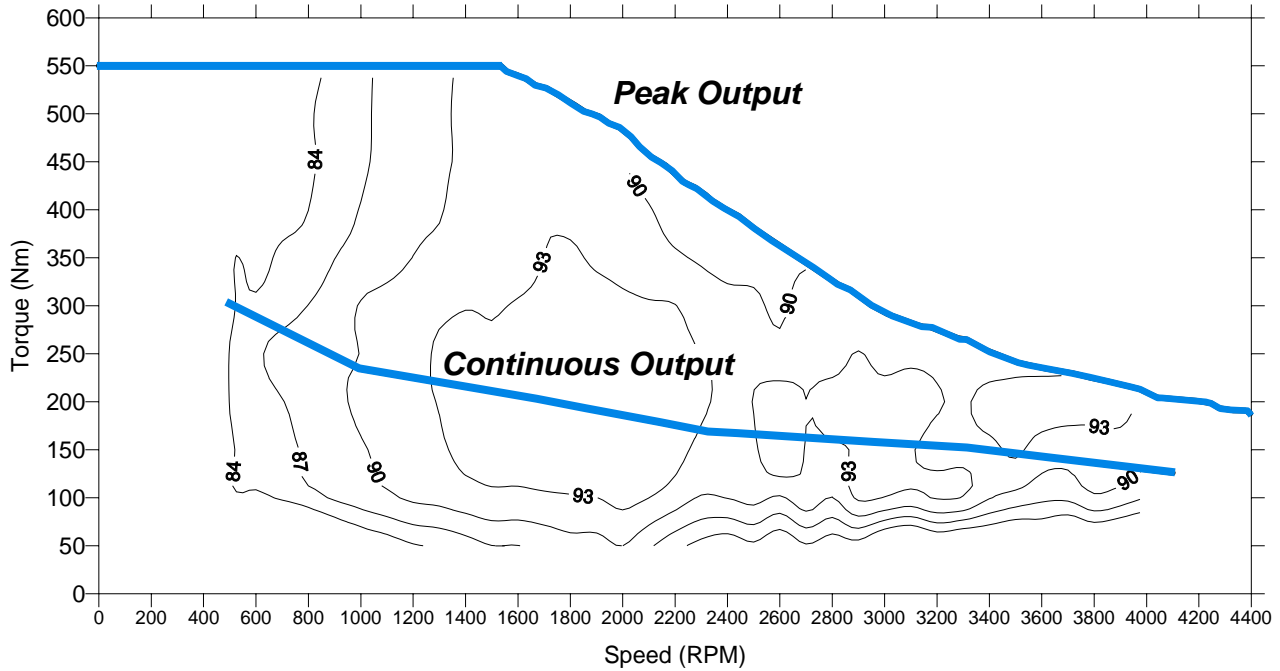
CD40-400L Inverter-Controller



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PowerPhase[®] 100 System Efficiency Maps Motoring Mode (From Test Data)



Testing Conditions

Continuous Output: 300 VDC input, 50 °C coolant

Peak Output: 300 VDC input, 50 °C coolant, duration 45-60 seconds

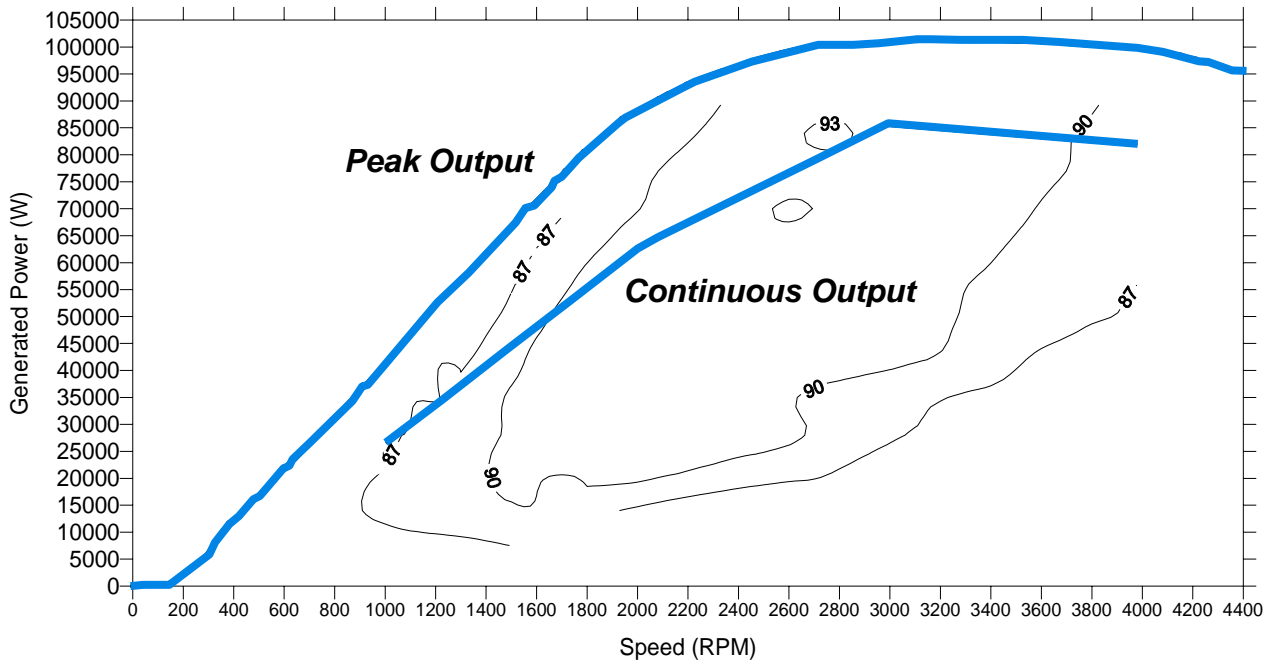
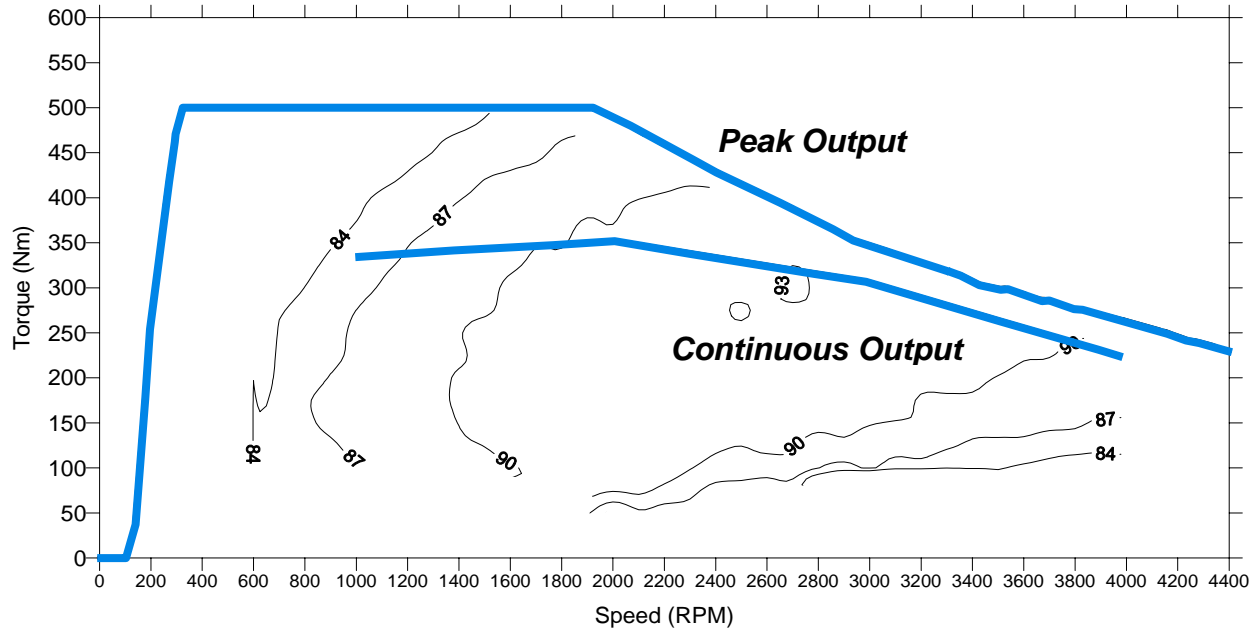
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PowerPhase[®] 100 System Efficiency Maps Regeneration Mode (From Test Data)



Testing Conditions

Continuous Output: 300 VDC input, 50 °C coolant

Peak Output: 300 VDC input, 50 °C coolant, duration 45-60 seconds

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