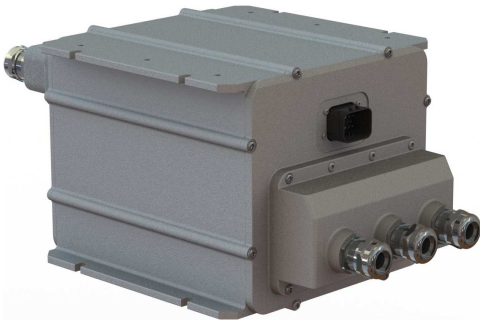


## PRODUCT DATASHEET

Clean Wave Technologies offers a range of electric drive system products that are specialized for electric and hybrid electric vehicle traction drive applications. Electric drive systems include an advanced electric traction motor and matched power electronic Drive Control Unit (DCU), comprising a variable frequency AC inverter drive with integrated digital and analog electronics, proprietary adaptive machine controls, embedded system controls, and CAN communication interface.

PowerFlow™ electric drive systems provide industry leading performance and power density, producing higher power at considerably lower weight and smaller size than any other commercially available products.

<b>Product Name</b>	<b>PowerFlow™ Electric Drive System</b>
<b>Model Number</b>	<b>M20A2-1X1</b>



**Drive Control Unit (DCU)**



**Electric Traction Motor**

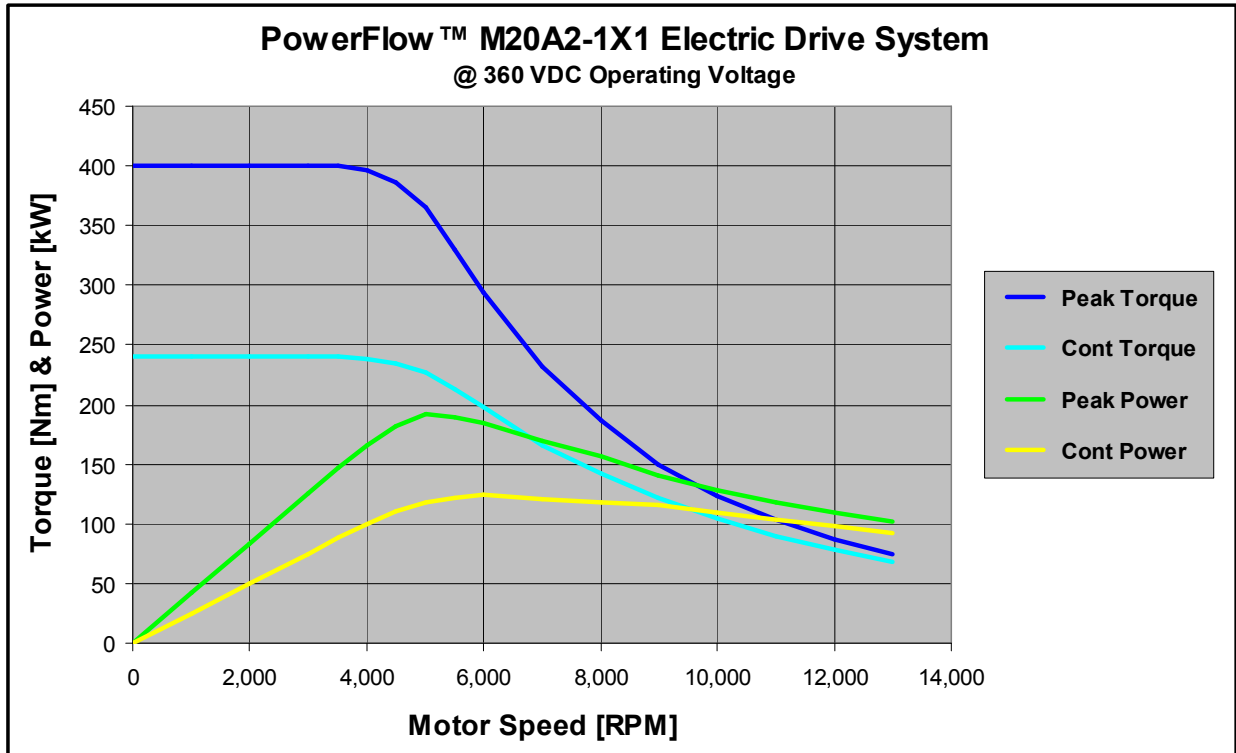
### PowerFlow™ M20A2-1X1 Electric Drive System

System Specifications	
<b>Operating Voltage, Nominal</b>	360 VDC
<b>Operating Voltage, Range</b>	50 to 450 VDC
<b>Power, Peak</b>	190 kW
<b>Power, Continuous</b>	120 kW
<b>Torque, Peak</b> (duration 6 seconds minimum)	400 Nm / 0 to 3,500 RPM
<b>Torque, Peak</b> (duration 30 seconds minimum)	350 Nm / 0 to 3,500 RPM
<b>Torque, Continuous</b>	240 Nm / 0 to 3,500 RPM
<b>System Efficiency, Peak</b>	93 %
<b>Environmental Protection Rating</b>	IP67
<b>Regenerative Braking</b>	Adjustable Profiles & Levels

<b>Electric Traction Motor Specifications</b>	
<b>Model Number</b>	M20A2
<b>Motor Type</b>	3-Phase AC Induction
<b>Speed, Maximum</b>	13,000 RPM
<b>Motor Efficiency, Peak</b>	95 %
<b>Ambient Operating Temperature</b>	-40 to +85 °C
<b>Cooling System</b>	Fluid
<b>Cooling Fluid</b>	Standard ATF
<b>Cooling Fluid Flow Rate</b>	10 LPM
<b>Cooling Fluid Pressure Drop through Motor</b>	60 kPa
<b>Inlet Cooling Fluid Temperature</b>	-40 to +85 °C
<b>Weight</b>	58 kg

<b>Drive Control Unit (DCU) Specifications</b>	
<b>Model Number</b>	1X1
<b>Drive Type</b>	3-Phase Variable Frequency AC Inverter
<b>Drive Efficiency, Peak</b>	98 %
<b>Control Voltage, Nominal</b>	12 VDC
<b>Control Voltage, Range</b>	9 to 16 VDC
<b>Control Current, Typical Continuous</b>	2.5 A
<b>Communication Interface</b>	CAN 2.0 A or 2.0 B
<b>Ambient Operating Temperature</b>	-40 to +75 °C
<b>Cooling System</b>	Fluid
<b>Cooling Fluid</b>	50/50 EGW or PGW
<b>Cooling Fluid Flow Rate</b>	10 LPM
<b>Cooling Fluid Pressure Drop through DCU</b>	10 kPa
<b>Inlet Cooling Fluid Temperature</b>	-40 to +75 °C
<b>Weight</b>	11 kg

### Torque & Power Performance



### System Efficiency

