

ST58 *Electric Wheel*®

DataSheet



Solomon Technologies Inc. ST58 Electric Wheel™ is a revolutionary device that combines variable torque and variable RPM in a small package. The torque produced far exceeds that of traditional motor technologies of equivalent power ratings and can be achieved for continuous duty cycle operation. The Electric Wheel™ technology is scalable and can be applied to a wide variety of applications where power and efficiency are required.

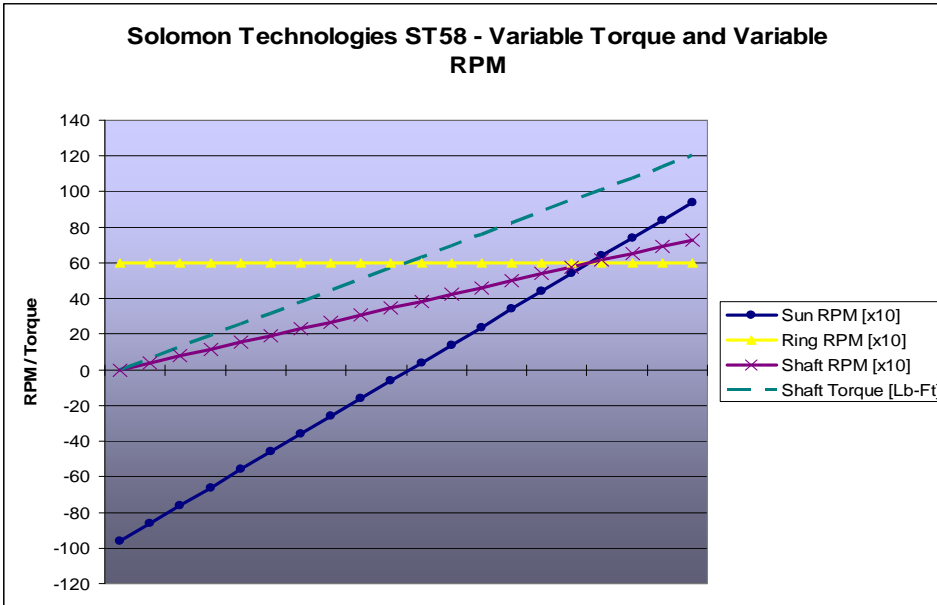
- Protected by US Patent Number: 5,067,932
- Brushless DC Permanent Magnet (Neodymium Iron Boron) Technology

HP	12	HP
Nominal Voltage DC	144	Volt
Power	9	kW
Torque _{MAX} (Sun _{RPM} ≠ Ring _{RPM})	150	Lb-Ft
Torque _{Continuous} (Sun _{RPM} ≠ Ring _{RPM})	120	Lb-Ft
Torque _{MAX} (Sun _{RPM} = Ring _{RPM})	90	Lb-Ft
Torque _{Continuous} (Sun _{RPM} = Ring _{RPM})	74	Lb-Ft
RPM _{MAX} Unloaded	1000	RPM
Duty	24	Hr
Ambient	40	°C
Service Factor	1.0	
Enclosure	TE	
Insulation	C1.H	
Weight	168	Lbs

Note: Torque_{MAX} is sustained for short time durations. Torque_{Continuous} is sustained for 24Hr durations.

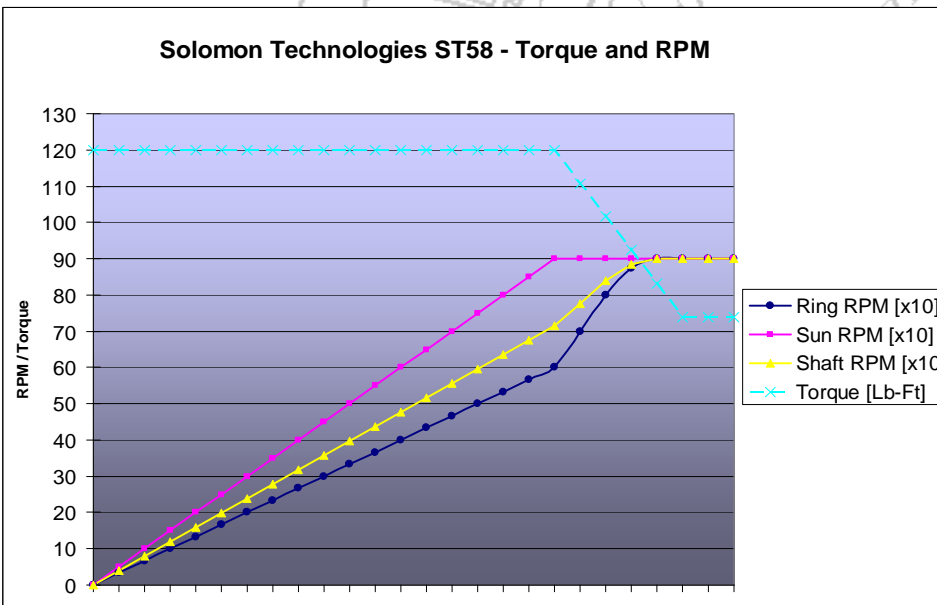
Modes of Operation:

The ST58 Electric Wheel[™] can be operated in a few different modes of operation. Each unique mode can be quickly and efficiently implemented on the fly without the need for shifting or hardware reconfiguration.



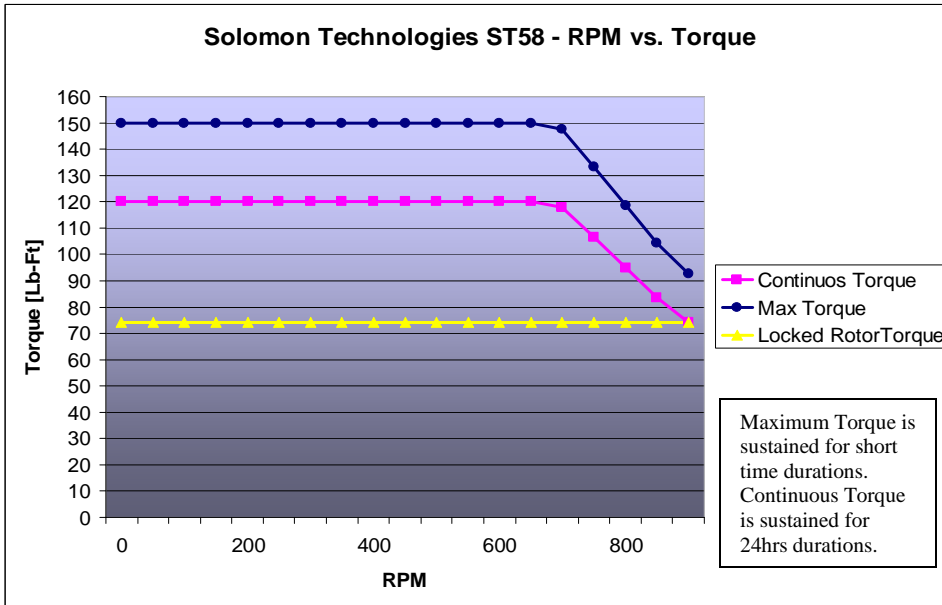
Variable Torque and Variable RPM Mode ($Sun_{RPM} \neq Ring_{RPM}$)

The ST58 Electric Wheel[™] has the ability to vary torque and RPM throughout a range to provide seamless power transfer to the output shaft. This occurs when the Sun RPM and Ring RPM have different ratios, and utilizes a planetary gear set as a torque developing device. Variable Torque and RPM allow for smooth soft start applications as well as complex torque changing applications.



Continuous Torque and Variable RPM Mode

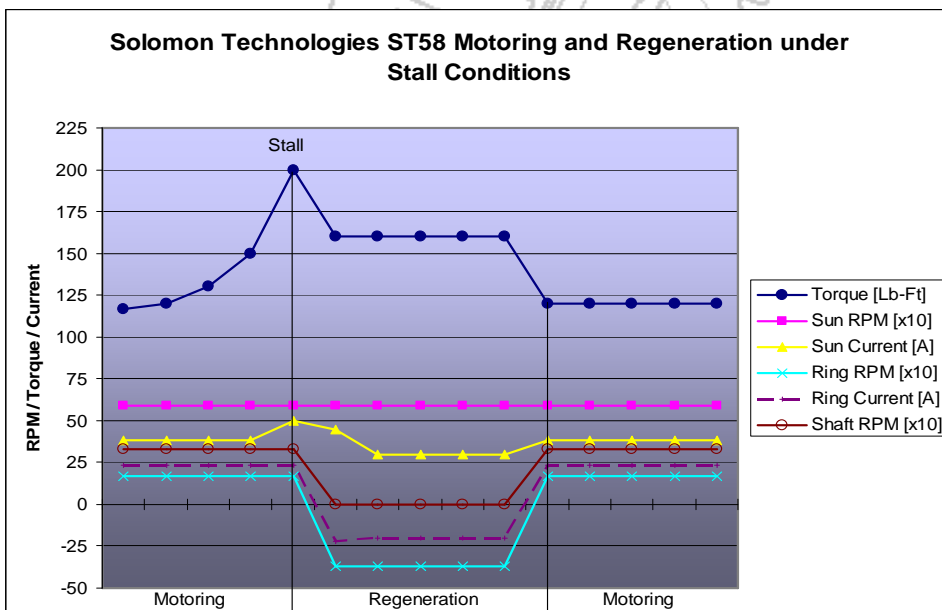
The ST58 Electric Wheel[™] can achieve continuous torque over varying RPM in two ways. The first continuous torque method occurs when the Sun RPM is marginally different than the Ring RPM ($Sun_{RPM} \neq Ring_{RPM}$). This allows the planetary gear set to be used to multiply available torque. When the planetary gear set is being used, the continuous shaft torque is 120 Lb-Ft from fractional RPM to 725 RPM for 100% duty cycle.



The second continuous torque method occurs when the Sun RPM is equal to the Ring RPM ($Sun_{RPM} = Ring_{RPM}$). This locks the Sun and Ring rotors and neglects the planetary gear set, and the unit acts as a dual rotor electric motor with 74 Lb-Ft of continuous torque. This continuous torque mode has a range from fractional RPM to 925 RPM for 100% duty cycle.

Although the planetary gear set provides increased torque for a 100% duty cycle, some applications may only require significantly greater torque for short portions of time. After this torque demand is accomplished, the torque can be reduced by synching the Sun

RPM and Ring RPM, neglecting the planetary gear set. This provides better efficiency and reduced stress on the planetary gear set of the ST58.

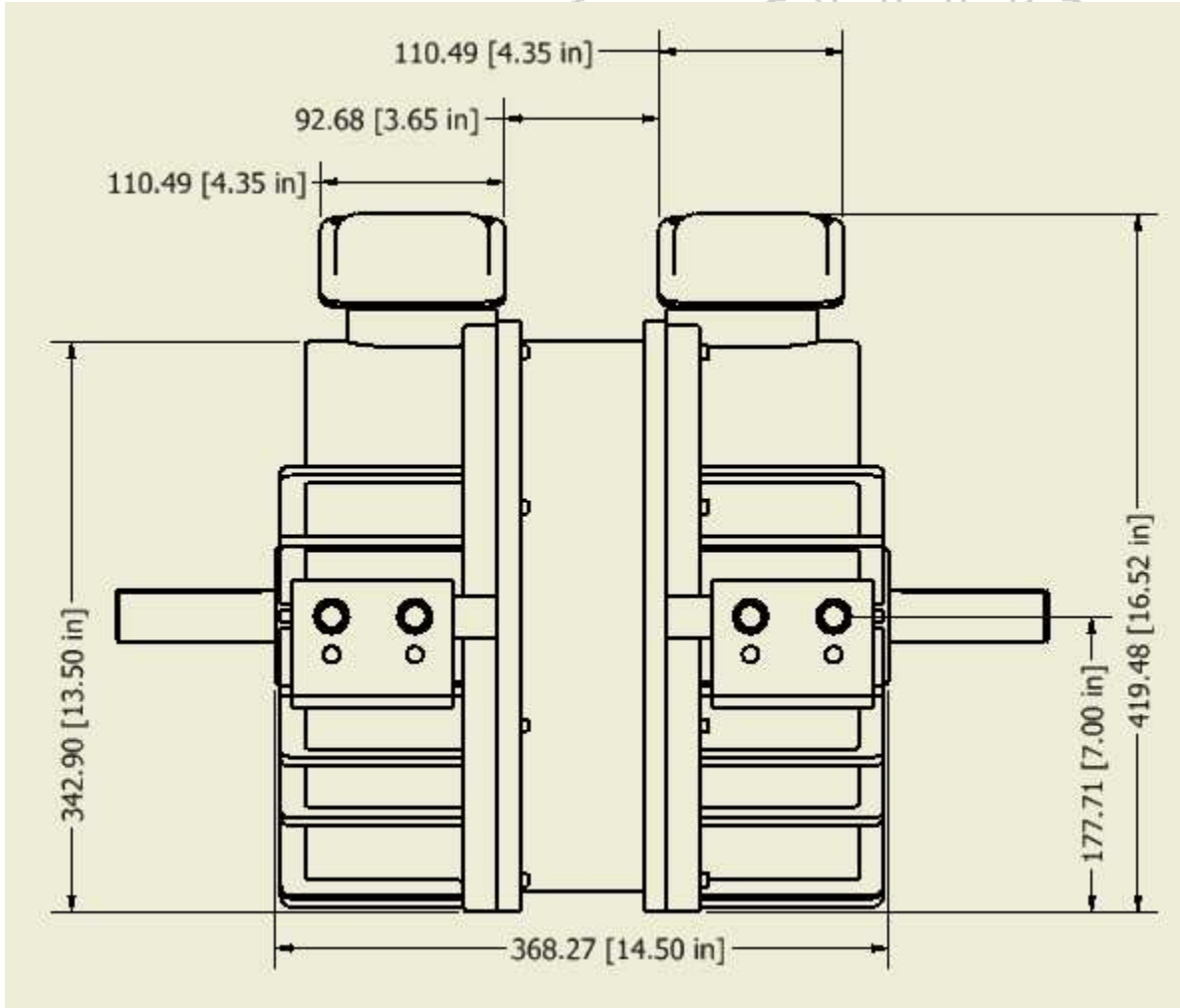


Regeneration

The ST58 Electric Wheel™ incorporates regenerative properties normally found in brushless DC permanent magnet motors. However, the ST58 Electric Wheel™ has a unique feature that allows it to stand out from normal brushless DC motors. In applications where the shaft is stalled or instantaneous inertial based torque is required, the ST58 Electric Wheel™ converts the remaining energy back to electricity through regeneration. This is more efficient in that it produces less heat, saves the motor from damage, and provides instant power from the inertia within the motor. The output

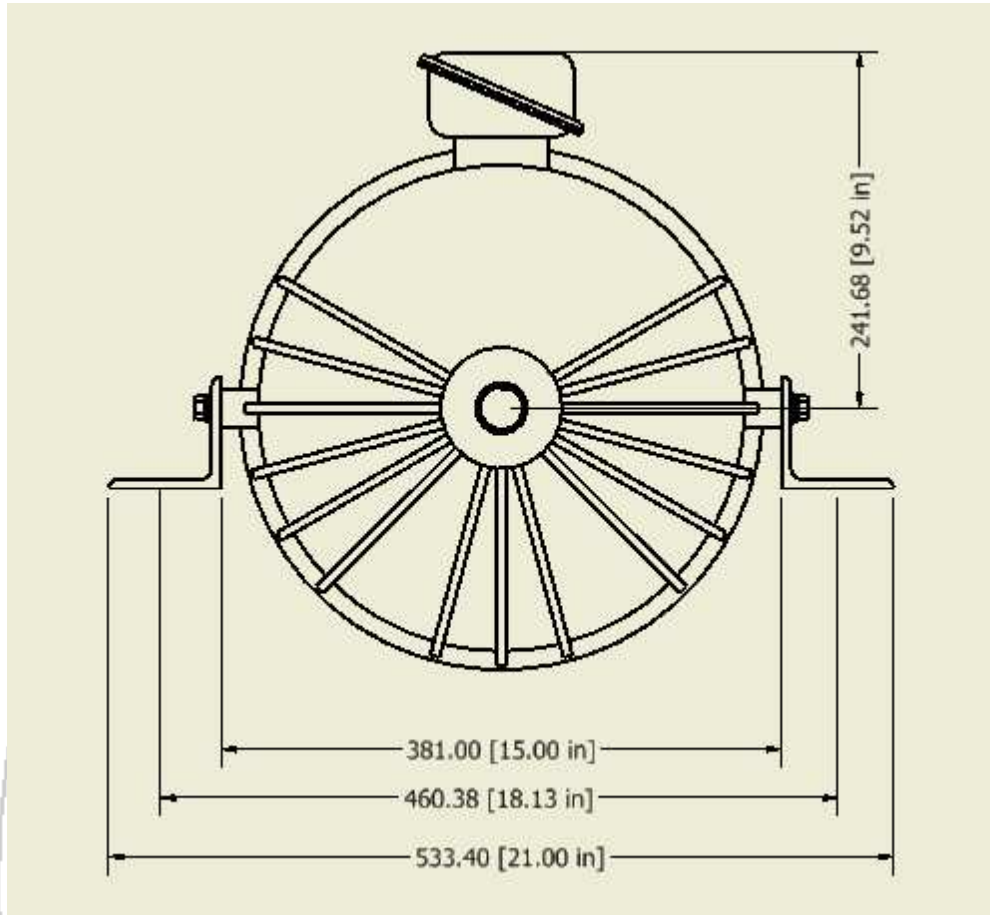
power converted from regeneration never exceeds the amount of input power.

Dimensions



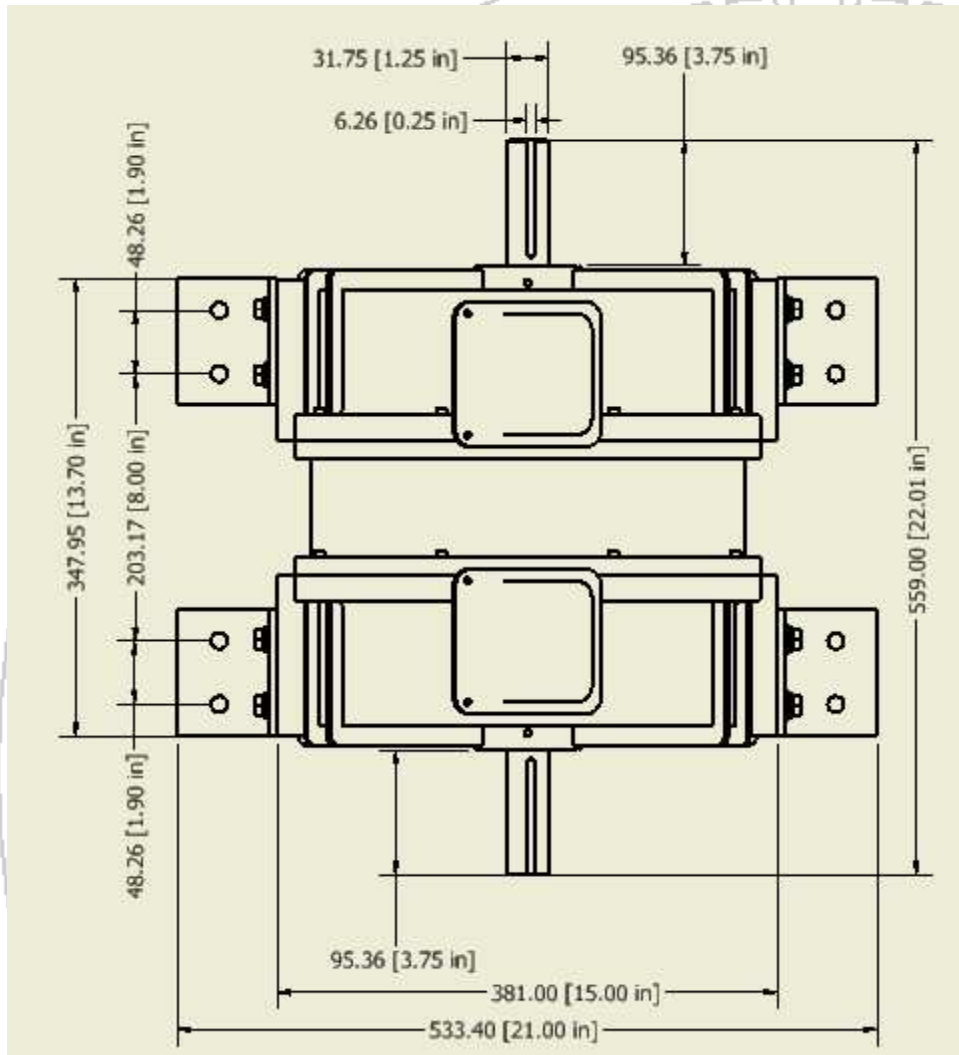
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www.solomontechnologies.com

1224 Mill Street, Building B

East Berlin, CT 06023

(727) 859-4447