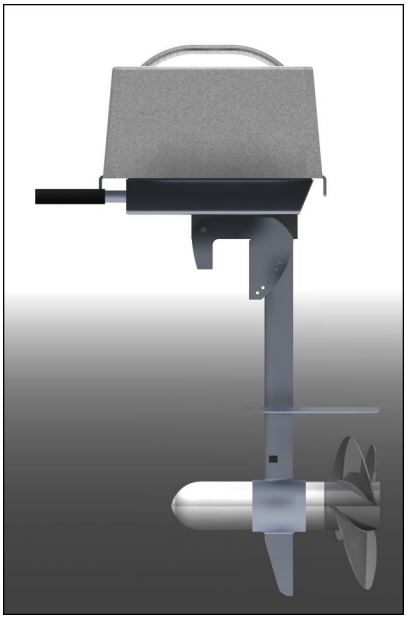
GRAND MARINE LTD.

PISCES E5

INTRODUCTION:



One of the most serious challenges today is global warming and the most obvious way in which we contribute to global warming is through transportation. Over the past several years, there has been restrictions on the use of conventional combustion engines on an increasing number of waterways. Therefore, Grand Marine Ltd is striving to provide zero emission and high performance outboards. With technological advancements in manufacturing processes and battery chemistry, Grand Marine Ltd combined high energy density, cost effective batteries with high performance electric motor and high efficient propeller. There are many advantages associated with an electric outboard and these include:

1. Zero Emissions
    - Electric outboards produces zero carbon dioxide and can be charged via solar panels eliminating our dependence on fossil fuels.
2. High Efficiency
    - Electric motors are extremely efficient. Efficiency of 90% and can be easily achieved. In contrast, average combustion engine are around 30% efficient. This low efficiency is associated with the large amount of energy lost that is dissipated by heat and sound.
3. High Reliability
    - Fewer moving parts relates to fewer chances for wear and tear. Since electric motors have minimal moving parts, it results in a high reliability. Also, new lithium cells do not need to maintained.
4. Low Noise / Low Vibration
    - Electric motors emit virtually zero noise and minimal vibrations.
5. High Torque
    - Electric motors provide more than 80% of its max torque already at 0 RPM.
6. Ease of Use
    - The electric motor reacts at the touch of a button. There is no need to manually pull the starter cord or prime the fuel system.
    - The battery can be separated from the outboard. This allows the user to clamp the outboard easier and safer.
7. Lightweight Aluminum Construction

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TYPES OF BATTERY CHEMISTRY:

	Nickel Metal hydride	Lead - acid	Lithium iron phosphate
Energy Density (Wh/kg)	45-80	30-50	90-120
Cycle life	1500	200-300	>1000
Fast charge time	1h	8-16h	1h or less
Self Discharge/month	20%	5%	<10%
Load current	20C	5C	>30C
Maintenance Requirements	30 - 60 days	3 - 6 months	None

TECHNICAL SPEIFICATIONS:

GENERAL:

Estimate total weight:	100 lbs
Shaft length:	25 inch

BATTERY:

Voltage:	25.6V
Protection:	Overcharge Over discharge Over drain Short circuits Cell Balancing
Energy Density:	73.1 Wh/kg
Weight:	14 kg (31.0 lbs)
Estimated Run Time:	1 hour (Full throttle)
Estimated Charge Time:	3.75 hours

MOTOR:

Maximum thrust:	80 lbs
Voltage:	24V
Power Type:	DC

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