

## PARALLEL HYBRID SOLUTIONS



Leader in parallel hybrid and electric propulsion solutions designed for a wide range of vessels in both commercial and pleasure marine segments.

**NO NOISE  
NO VIBRATION  
NO EMISSIONS**



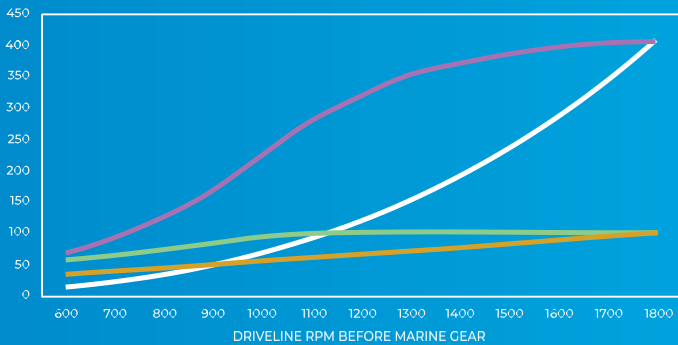
## PHT

vs. # in-line hybrid & hybrid without ratio

### Hybrid Power Curve

Diesel Engine 405kW

100kW E-motor with PHT ratio 1.7 vs 100kW E-motor no ratio



— prop 405kW theoretic demand exp 3

— 100kW/1800rpm E-power without PHT no ratio

— 405kW/1800rpm

— 100kW/1800rpm E-power PHT ratio 1,7

Shiptec AG, Diamant

**LONG RANGE  
CRUISING  
AT SLOW  
& MEDIUM  
SPEEDS**



## **PARALLEL HYBRID WITH ESCO POWER'S PHT vs IN-LINE HYBRID & HYBRID WITHOUT RATIO ADVANTAGE**

- Parallel Hybrid provides the advantage of two completely independent source of powers; while in-line hybrid pose risk to completely block the driveline by the EM
- Possible to BOOST and optimizing the use of two power sources, EM slow and medium speeds, combustion engine top speeds, charging, power generation
- Thanks to the ratio the EM torque increases at the driveline eliminating the need to oversize E-machine as it is a case In-line hybrid or Hybrid without ratio
- In-line hybrid requires much larger Emachines only to accept Diesel engine torque passing through them in Diesel mode, increasing size and weight of the driveline
- Parallel Hybrid translates to better power to weight ratio and much better power to price ratio

# PHT – PARALLEL HYBRID TRANSMISSION

There is no other like Esco Power's Parallel Hybrid Transmission (PHT) with the clear benefits of integrated ratio.

**Diesel engine**

- Range 150kW – 1700kW
- SAE standard housings and couplings
- Built-in electromagnetic clutch



**pto/pti for Electric machine**

- Range 20kW – 350kW, max 1500Nm
- Flange connection
- Built-in ratio



**Marine gear**

- SAE standard housings and FW connections



- heavy duty design
- increases operation redundancy thanks to two truly parallel and independent drivelines
- built in ratio increases torque to driveline while in electric mode
- swift changes between diesel and electric thanks to electromagnetic clutch
- ideal for retrofits and new designs thanks to sae standard input and output connections
- vertical and horizontal installation possibility for the best fit in the engine compartment

	PHT300A	PHT300A-HD	PHT420A	PHT700A	PHT700B	PHT900A
<b>Max. input torque</b>	1500 Nm	2000 Nm	2100 Nm	3100 Nm	5200 Nm	7000 Nm
<b>EM Clutch Voltage</b>	DC 24V	DC 24V	DC 24V	DC 24V	DC 24V	DC 110V
<b>Max. PTO/PTI torque</b>	1500 Nm					
<b>Ratio to PTO/from PT</b>	1,27 - 1,47 - 1,70					

## PARALELL HYBRID SYSTEM ALLOWS FOR

- Meeting stricter emission standards
- Reducing carbon footprint
- Reducing fuel costs
- Reducing maintenance costs, service downtime, increasing engine lifetime,
- Reducing noise and vibrations
- Capturing and storing energy that would be wasted
- Increasing the overall vessel redundancy and reliability by having not only two source of powers but independent drivelines.

**LOW FUEL  
CONSUMPTION  
ULTRA LONG  
RANGE**

North Offshore Services,  
Northern Skagerrak



# HESP – HYBRID ELECTRIC SOLUTION PACKAGE

consisting of:

- Efficient electric machines
- Complete control and command system
- All the necessary hybrid propulsion hardware and software

to benefit from modes:  
Diesel | Electric | Automatic | Generation | Boost | Cross-feed | Back-up



Command Screen



Command Lever

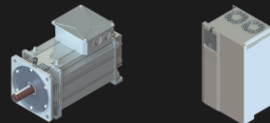


Mode selection panel

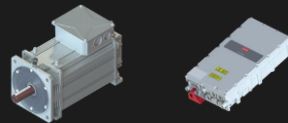
- ✓ **DIESEL MODE**
  - fast speeds
  - power generation
- ✓ **ELECTRIC MODE**
  - drive as slow as wished
  - save fuel and more
- ✓ **AUTOMATIC MODE**
  - drive slow as wished with easy and fast access to full diesel power

- ✓ **GENERATION**
  - fast and feasible way to recharge battery storage system
- ✓ **BOOST MODE**
  - add electric power if needed
  - downsize diesel engine
- ✓ **CROSS-FEED**
  - choose which driveline is driven by e-power and which by diesel engine
- ✓ **BACK-UP**

**HESP standard packages**  
with Electric Power 20kW-158kW  
Asynchr 400VAC machine – Air Cooled FD



**HESP X packages**  
with Electric Power 100kW-158kW  
Asynchr 400VAC machine – Liquid Cooled FD



**HESP D packages**  
with Electric Power 100kW-350kW  
PM 500VAC machine – Liquid Cooled FD



## EPB – BATTERY SYSTEMS

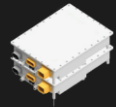
Minimum capacity:

- 68,3kWh for HESP Standard and HESP X
- 77,3kWh for HESP D
- Safe lithium iron phosphate (LFP) cell technology
- Robust and reliable modular battery design
- Add as many battery racks as required
- LFP battery cells do not catch fire in case of thermal runaway, over-charge, short-circuit or mechanical damage.
- Compared to NMC or NCA, LFP comes without the heavy-metal cobalt, making the system environmentally friendly



## EPBCH – SHORE CHARGERS

- Available in sizes: 22-44-88 kWh



## CONDA CONVERTERS AC/DC, DC/AC

- Available in sizes: 40-70-150kW



**ESCO POWER**

## **ESCO POWER SRL**

part of the Belgian ESCO Group, is Belgium based manufacturer of the PHT - Parallel Hybrid Transmissions and Hybrid Electric Solution Packages designed for marine and industrial heavy-duty use in applications where combining two sources of power, diesel and electric, is beneficial.

After over 75 years' experience in manufacturing of high torque couplings, distribution and sales of marine and industrial drive components, Esco Power designed and validated its innovative and unique parallel hybrid solution, the emerging hybrid market had been longing for in their stride to achieve their decarbonization goals.

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