Hybrid Electric Power & Propulsion Systems

HybridMarine International

SHIRE

BARRUS

About Hybrid Marine

Hybrid Marine has been developing advanced hybrids since its inception in 2002. From leisurely inland canal boats to commercial barges to fast sailing catamarans our hybrids have found a home in many different applications, proving their reliability and performance.

Hybrid Marine's patented parallel systems result from extensive research and provide an efficient integrated power and propulsion solution for small marine craft. Hybrid Marine can offer quiet electric propulsion without sacrificing the full power available from the diesel engine.

The Hybrid Marine winning formula has resulted in a number of awards for its products and the vessels that are powered by them, as well as many satisfied customers since delivering it's first production hybrid in 2007. To carry on with this success in 2023 Hybrid Marine entered an agreement with E.P Barrus Ltd to create Hybrid Marine International.

This takes the 14 year partnership with Barrus to a new level. In this time Hybrid Marine and Barrus have worked together in the development of hybrid propulsion systems based on Shire and Yanmar marine diesel engines.

About Barrus

Barrus has been a major player in the marine industry for the majority of its 100-year history and, for over 21 years, we have manufactured engines for the inland waterways.

In 1998, we began production of the Shire range of inboard engines fitted to narrow boats, wide beam boats and dutch barges. In that same year, we were the first manufacturer to design and fit a genuine twin thermostat system - and still are today.

To enhance our portfolio, we have introduced Shire Hybrid packages which deliver cleaner, greener power. Two variations of the Hybrid package are available to suit various requirements on the waterways.

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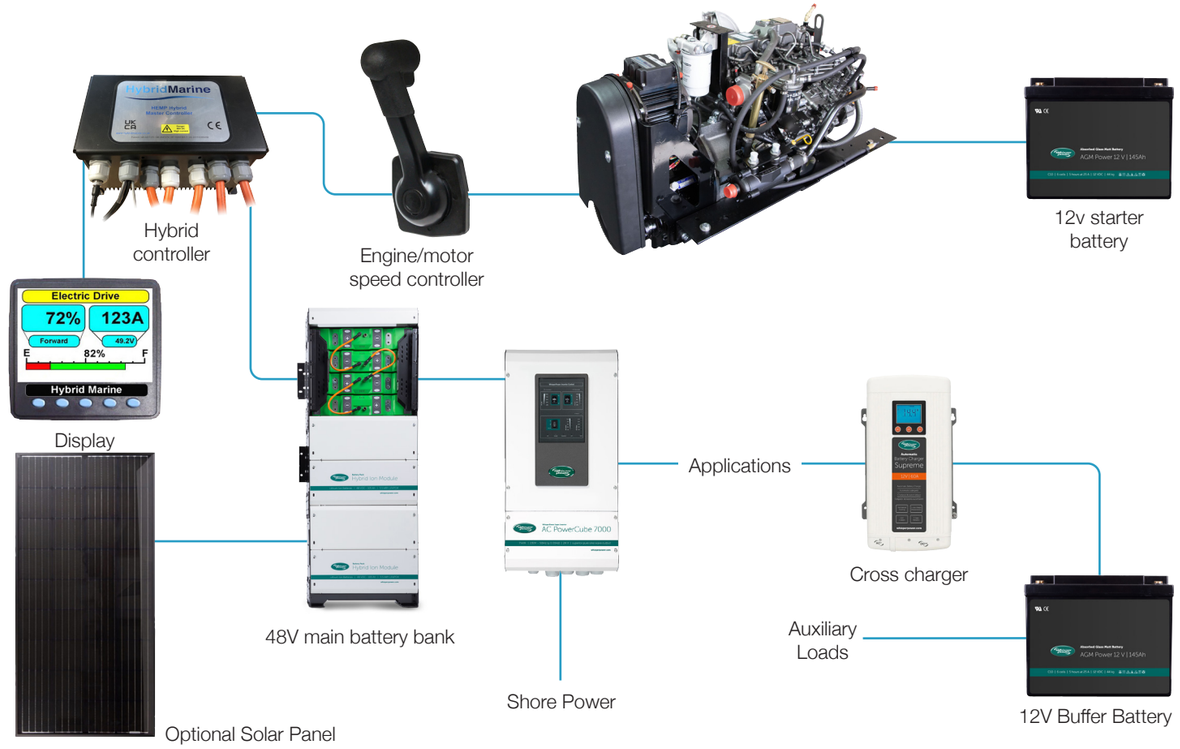
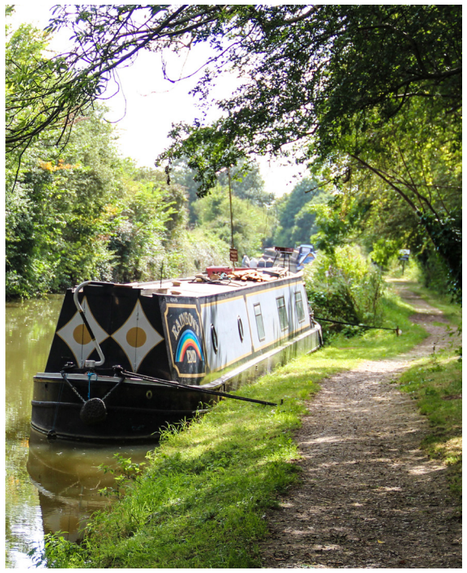
Parallel Hybrid System



System Features and Functions

- Whisper quiet electric operation, yet the vessel's standard diesel engine remains available to meet high-end power requirements.
- Systems based on Shire engines from 40hp to 90hp
- Listen to the leaves rustling in the trees and observe the wildlife as never before.
- No more idling in locks; you can breathe fresh air and hear your crew from the bottom of the lock.
- Charge with the hybrid when on the move.
- In the evening, power your entire boat in complete silence.
- No more engine charging in the morning/evening to top up substandard 12V batteries.
- Cook electric in complete silence and eliminate gas onboard.
- Significant reduction in fuel consumption and engine hours.
- Build your hybrid canal boat for very little extra.



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Why buy a Hybrid?

In the automotive world, Hybrids are sold mainly on their ability to save fuel. For a marine vessel, Hybrids have many more advantages:

With the right application, a considerable amount of fuel can be saved.

Marine craft have an increasing demand for kW's of electrical power. A Hybrid can provide this in a very compact space at a low cost. The functions of a propulsion engine and a separate generator can be combined in one unit.

Periods of whisper-quiet propulsion, entry and exit to sensitive areas with no noise or pollution (marinas, nature reserves, mother ships, etc.)

Enhanced slow-speed manoeuvring. Very slow propeller speed is possible with rapid acceleration. Large amount of power for electrical bow/stern thrusters.

Redundancy: If you have dirty fuel or the engine/gearbox fails, you can use electric drive to get you out of trouble. If the hybrid or batteries fail, you still have conventional propulsion via the engine and gearbox.

Greater engine efficiency means fewer greenhouse gasses. Regeneration under sail can reduce/eliminate the use of a generator. Solar, wind and mains power can contribute to the overall power budget.

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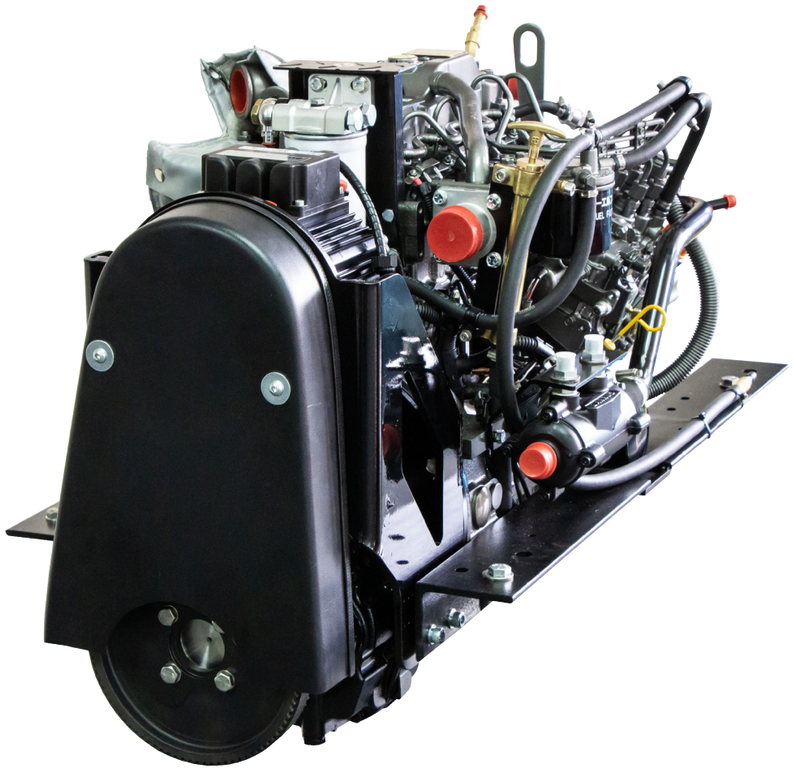
Systems Overview



It takes approximately 3 to 5kW to move an average 20T narrow beam boat at moderate canal speeds (2 to 4 MPH). The 10kW electric motor provides this with plenty to spare for normal manoeuvring. If you are operating in adverse conditions, say on a fast-flowing stretch of a river, then you will need the full power of the main engine.

Typically, the engine runs at just over tick-over speeds (1,200 to 1,400 RPM) in restricted waters. When cruising at this low engine speed, the canal boat hybrid is designed to provide 7-8 kW of power generation.

In normal calm canal conditions, you can drive on the electric motor for prolonged periods. How long you can go on an electric drive depends on the size of your batteries. A 48V / 400Ah battery bank would last around 3 to 5 hours, and a larger bank of around 48V/800Ah would last 6-10 hours. Keep in mind this is a continuous operation. If you are transiting a flight of locks, you only use electrical energy when moving. This eliminates idling the engine in locks and provides considerable savings in fuel.

When the batteries run down, you start the engine and drive in the normal way. Currently, the hybrid automatically becomes a generator to recharge the batteries. The batteries are quickly recharged at typical propulsion speeds via the powerful hybrid generator and boost alternator bank. Every hour of engine drive can store enough energy in the batteries to travel between 1 and 2 hours in electric drive.

After the batteries are recharged, you can return to the electric drive or save the energy stored for powering your electrical circuits in the evening.

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How long can I go on electric drive?

The standard battery bank sizes are 400Ah and 800Ah. It is not recommended to discharge the battery below 20% of its maximum capacity so this equates to a usable capacity of 320Ah or 640Ah respectively. With a nominal battery voltage of 48V this provides 15kWh of usable energy for the smaller bank and an enormous 30kWh for the larger bank.

When under electric drive it takes around 50A to 100A to drive a narrow boat at 3 to 4 mph in calm canal conditions (100A to 200A for a broad beam). For the smaller battery bank this gives a narrow boat 3 to 6 hours of electric drive. The larger battery bank provides 6 to 12 hours duration for a narrow boat (3 to 6 hours for a broad beam). Keep in mind this is duration for continuous operation, if negotiating a flight of locks under electric drive then you are only drawing power when actually moving. So a lengthy flight of locks may take all day but you will uses very little battery energy during this time. Dropping your speed from 4 mph to 3mph gives a greatly reduced lower power demand and considerably improves duration.

How long does it take to recharge the batteries?

When underway, at normal cruising speeds, it takes about 4 to 5 hours running the engine to charge the larger battery bank from 20% capacity to near full. In practice you will find it best to confine engine use to the open straights and end the day with a reasonable charge in your batteries.

If you moor up with a near full battery bank then you can spend many days before you have to think about recharging.

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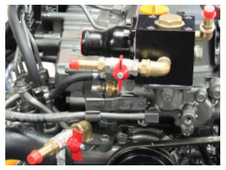
BARRUS

Shire Hybrid Range

HybridMarine International

Hybrid	Gearbox	Electric Propulsion	Hybrid Generation
Shire 40 Hybrid	PRM 150	Single electric motor producing up to 10kW	Up to 5kW
Shire 45 Hybrid	PRM 150	Single electric motor producing up to 10kW	Up to 5kW
Shire 50 Hybrid	PRM 150	Single electric motor producing up to 10kW	Up to 5kW
Shire 70 Hybrid	PRM 500	Twin electric motor producing up to 20kW	Up to 10kW
Shire 90 Hybrid	PRM 500	Twin electric motor producing up to 20kW	Up to 10kW

Shire Key Features



Faster Domestic Water Warm-Up

The Shire 50 is fitted with built-in twin thermostats capable of delivering hot water faster and maintaining the temperature as long as required.

Clean Fuel

The addition of a fuel pre-filter and water drain provides the most efficient filtration system and ensures factory quality levels are maintained throughout its life.

High Torque Levels

All models have high torque at low speed and are RCD II (Recreational Craft Directive) emission compliant.

Easy Servicing

The sump drain pump makes maintenance simple. Oil can be drained easily, particularly on the Shire 50, 70 and 90 with the additional gearbox drain pump.

Maximum Electrical Power

Twin alternators come as standard to ensure the start battery and domestic batteries are rapidly charged and on separate circuits. Excludes Shire 30DB.

Markings

All Shire engines are both CE and UKCA marked.

Extra Electrical Power

A specially designed 3.5 and 5kW 230 volt alternator can power domestic appliances including a microwave, cooker, washing machine and computer.

Peace of Mind

All major engine components have a 5 year warranty. Electrical components and accessories 1 year. All other components, 3 years / 2000 hours.

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Hybrid Canal 05/2024

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