

Which small 4-stroke?

Alex Bell and the PBO test team put seven small four-stroke outboard motors through their paces



It's three years since tougher EU emission regulations banned the import of carburettor-fed two-stroke outboard motors. This ban covered the small engines typically used by boat owners and, although for a period engines that had already been imported were still available, that supply has now dried up.

Manufacturers have responded and there are now six different types of four-stroke engine between 2 and 4 hp on the UK market, with some branding variations. Besides the established players of Honda, Suzuki, Tohatsu (who share their engine design with the Mercury/Mariner brand) and Yamaha, we now have Selva and Parsun.

The best advice prior to the import ban was to buy a two-stroke model. This was because two-strokes are much simpler than four-strokes, with no valve gear, no oil sumps and an oily petrol mix to lubricate the

working parts, ideal for a marine environment. They also need less maintenance than four-strokes.

Pros and cons of four-strokes

But four-stroke engines do have advantages, besides being kinder to the environment. Like four-stroke lawnmowers, there is no need to mix oil and petrol to create the correct two-stroke mixture, a significant point since the oil is expensive and it's never easy to get the precise ratio. Four-stroke engines are also more economical because all the fuel is burned on the power stroke.

Weight-wise they are heavier than two-strokes, coming in at between 15 to 20 kg, except for the Honda and Suzuki which are similar to the older engines at 12.5kg and 13kg respectively. However, they are bulkier because the cylinder head has to include the valve gear. You also have to be careful how you

handle them (Selva excepted) because, if you lay them down, they must be laid on the correct side to avoid the sump oil draining through the crankcase breather.

Advanced features

Those moving on to a small four-stroke engine from a two-stroke will notice quite a few refinements. All the engines tested have a twist throttle on the end of the tiller, allowing much safer speed control without having to reach back to a lever on the engine casing. The throttles can also be set so that they spring back to the tickover position when let go – a useful safety feature. All the engines have a kill cord attachment point which, when pushed, will also shut down the engine, although later two-strokes also had this feature. Another refinement is a neutral and forward gear, controlled either by a gear lever or by a centrifugal clutch which

automatically engages when the throttle is opened up. This is the system used on the Honda and Selva engines. Having a neutral gear means that the engines can be started without immediately powering the propeller. This is safer and should assist starting.

All the engines have pull-out chokes, which are easy to use and to see whether they are on or off. Reverse gear is simple: just turn the engine through 180°. Care is needed to keep the kill cord in place when it is attached to the tiller arm.

Starting procedures

Because four-strokes require two engine revolutions to complete one cycle it is important to pull the start cord until a strong resistance is felt. This resistance is the beginning of the compression stroke. The cord should then be let back into the recoil unit and then gently pulled out until resistance is felt again; never jerk the cord, just give it a firm pull. The choke needs to be used sparingly, unless it's a very cold day it should be disengaged as quickly as possible, but this will vary with different engines and you need to find out what your engine prefers. If the engine doesn't fire up by the third pull, check there's fuel in the tank, that the fuel tap is in the open position, and the tank air vent is open. Failing that, I always look at the spark plug lead to make sure it's firmly attached and dry.

Desirable features

- A large fuel cap with a breather valve that is easy to use with cold hands and doesn't break
- An easy-to-read fuel tap
- A clear oil level indicator
- A convenient choke control that is clearly on or off
- An easily accessible gear lever
- A twist-grip throttle with a friction adjustment
- Clamp toggles that can be locked with a padlock
- A tilt system that doesn't seize and can be accessed easily
- A comfortable carry handle
- A clear coolant tell-tale
- A sturdy hinged tiller arm
- A quiet motor so you can talk when in the dinghy
- A robust cover that can be used to tilt the engine
- Low vibration to avoid strain
- An accessible spark plug that doesn't get splashed
- A non-wearing pull cord
- An easily replaced shear pin



Bob checks the sound meter display after having taken a reading

7 Top outboard engine tips

- 1** Try to avoid laying the engine down. This will prevent water running down the exhaust pipe and entering the cylinder. If you do have to lay it down, always let the cooling water drain out first and lay it on the correct side.
- 2** Flush the engine through with fresh water after use. Some sailing clubs have freshwater flushing tanks to enable the engine to be run for a few minutes.
- 3** Always open the fuel tank vent first before opening the fuel tap.
- 4** Regularly check the oil level in the sump.
- 5** Don't overfill the lubrication oil sump as this may hinder running at low speeds.
- 6** Run the carburettor dry before laying up the engine for long periods.
- 7** To ensure the petrol is clean when filling the fuel tank, use a paper (coffee) filter in a funnel to remove any particles.



A bollard pull test gives an indication of the engine's thrust

HOW WE TESTED THEM

We tested the engines in Emsworth Marina using two identical inflatable tenders, each manned by two crew. After a few minutes to warm up, the first test was to run the engines at full throttle, using a handheld GPS to measure their maximum speed. We next noted the static 'bollard pull' by attaching the tender to a spring balance.

We also recorded the noise level each engine produced, locating the sound meter at the helmsman's head height, and attempted to measure fuel consumption by weighing the engines before and after a 10-minute run at maximum speed. However, although the results were fairly consistent across the engines, the test conditions made accurate measurements difficult. Fuel consumption will vary considerably with throttle settings: expect about a litre an hour flat out and less than half that at more gentle settings.

To check for any maintenance issues we consulted Bill Mitchell of Home Marine, an outboard specialist based in Emsworth Marina. His comments are added to the end of each review.



Weighing the engines to assess their fuel consumption

The PBO test team



Alex Bell is an ex Merchant Navy officer and a maths and engineering lecturer at Southampton Solent University.



Tony Green is an experienced sailor, an RYA instructor, engineer and retired technology teacher keen on product ergonomics.



Pam Green is a retired Technology teacher who is no stranger to product testing. Though a bit of a sailing widow, Pam enjoys day sails on sunny days.



Vicky Dalton is studying yacht manufacturing and surveying. She sails a Cobra 850 on the South Coast.



Bob Porter sailed a Flying Fifteen on inland waters and has now returned to the South Coast to broaden his cruising experience.

OUTBOARDS TESTED



Honda Marine BF2.3

PRICE: £580

Contact: www.honda.co.uk/marine

Honda use an air-cooled engine, meaning there is no water pump to fail and no salt water circulating around the cylinder head to clog up the cooling passages. The cooling system does make the top slightly more bulky, but weight-wise this engine takes the prize as the lightest on test.



The lightweight Honda is great for small boats

Another feature is a centrifugal clutch that engages when the revs are increased, and disengages as you throttle back to tickover. This can be alarming at first as you lose steerage way entirely, and can take a bit of getting used to as the helmsman's natural response is then to open up the throttle and engage the prop, often with more effect than anticipated.

The air cooling saves weight, but it also makes the Honda one of the noisiest engines on test. When off the boat it has to be laid down on feet on the opposite side to the tiller. The oil level indicator is visible outside the cover, and new versions of this engine have lockable clamp toggles.

BILL'S COMMENTS: Light build, awkward to service because air cooling cowling has to be removed to access



Mariner/Mercury F3.5M

PRICE: £609

Contact: www.marineroutboards.co.uk

Sharing its mechanics with the Mercury 2.5 and based on the Tohatsu 2.5, the Mariner is at the top end of the weight range.

Off the boat the engine is laid down on the side opposite to the tiller, and the oil level indicator is clearly visible outside the cover. Neat touches include a plug that can be removed to assist flushing the cooling passages, and an automatic decompression function that assists with starting the engine easily.

The Mariner and Tohatsu produced identical bollard pulls and maximum speeds, both the best on test.



A lusty bollard pull from the Mariner

BILL'S COMMENTS: Rugged, heavy build with good accessibility for servicing the engine

FOUR-STROKE OUTBOARDS AT A GLANCE

Make Model	Honda BF2.3SCHU	Mariner/Mercury F3.5M	Parsun F2.6BMS	Selva Sea Horse	Suzuki DF2.5	Tohatsu 2.5	Yamaha F2.5
Engine type	4 stroke OHV	4 stroke OHV	4 stroke OHV	4 stroke OHV	4 stroke OHV	4 stroke OHV	4 stroke OHV
Horsepower (kw)	2.3 (1.7)	1.8	2.6 (1.9)	2.5 (1.84)	2.5 (1.8)	2.5 (1.8)	2.5 (1.8)
Bore & stroke (mm)	45 x 36	55 x 36	54.1 x 31.5	47 x 32	48 x 38	55 x 36	54 x 31.5
Capacity (cc)	57	85.5	72	55	68	85.5	72
Full throttle rpm	6,000	5,000-6,000	5,250-5,750	5,500-6,000	5,250-5,750	4,500-5,500	5,250-5,750
Size (h x w x d) mm	945 x 410 x 280	1026 x 340 x 453	1013 x 343 x 645	1000 x 370 x 350	963 x 262 x 437	1026 x 363 x 430	1050 x 320 x 4520
Maker's dry weight kg	12.5	17	17	15	13	17	17
Fuel tank capacity (lt)	1.0	1.3	1.2	1.4	1	1.0	0.9
Lubrication system	Force splashed	Splash	Splash	Automatic fuel injection	Splash	Splash	Splash
Lube oil capacity (lt)	0.25	0.3	0.35	nil	0.3	0.3	0.4
Gear ratio	2.42:1	2.15:1	2.08:1	2.3:1	2.15:1	2.15:1	2.08:1
Trim	4 positions	4 positions	4 positions	4 positions	4 positions	4 positions	0°, 4°, 8°, 12°
Propeller	3 blade plastic	3 blade polycarbonate	3 blade aluminium	2 blade aluminium	3 blade aluminium	3 blade polycarbonate	3 blade aluminium
Dia x pitch (mm)	184 x 120	188 x 178	184 x 152	200 x 130	203 x 137	188 x 178	184 x 127-210
Propeller options	none	3	yes	yes	no	3	5
Replacement cost	£29.46	£24.66	£25.00	£29.60	£52.90	£19.50	£38.00
Transom ht short (mm)	418	381	381	381	381	381	381
Warranty*	6 yr domestic	5 yr	2 yr	3 yr	5 yr	5 yr	5 yr
Price inc VAT	£580.00	£609.00**	£396.00	£608.00	£561.96	£571.16***	£639.00
Distributor	Honda Marine	EP Barrus	Marine Imports UK	Selva Marine Sales	Suzuki GB	Tohatsu Marine	Yamaha Motor UK
Tel number	0845 200 8000	01869 363636	0161 790 7678	01202 706454	01908 336600	01590 6707887	01932 358000
Website	honda.co.uk/marine	marineroutboards.co.uk	parsunoutboards.co.uk	selvamarine.com	suzuki-marine.co.uk	tohatsu-uk.net	yamaha-motor.co.uk
Long shaft versions	yes	yes	yes	yes	no	yes	yes

* Warranty requires annual service by VAT registered dealer

**2.5hp = £509

***3.5hp = £581.37



Parsun F2.6BMS

PRICE: £396

Contact: www.parsunoutboards.co.uk



Made in China to a specification similar to the Yamaha 2.5, the Parsun has a character of its own. The carry handle is different and, unusually, the stop button is half way along the tiller arm. The oil level indicator is under the cover and the engine can be laid down on the tiller side or on its front.



Side by side: the Yamaha and Parsun engines

The test engine rattled a bit on start up, but this may have been because it was new and the valve gear needed bedding in. Otherwise it performed well and was the quietest on test. Although a little heavy, the Parsun is the least expensive engine tested and is good value for money.

BILL'S COMMENTS: Very similar to the Yamaha, but with the lower casing giving easier access to spark plug and rocker cover



4. Selva Sea Horse

PRICE: £608

Contact: www.selvamarine.com



A new engine from the Italian manufacturer, Selva's Sea Horse is unusual in that, although a four-stroke engine, the lubrication oil is automatically injected into the fuel. This means there is no necessity to lay the engine down on one side. A diaphragm carburettor removes the need for a fuel tap and avoids fuel leaks with their associated bad smell.

Like the Honda, the Selva features a centrifugal clutch and an air-cooled cylinder head. However, cooling water is pumped up to cool the exhaust as it leaves the cylinder. Lubrication oil is kept in a separate translucent bottle next to the fuel tank and requires the cover to be removed to check its level; the supply is claimed to last a season.

The engine has a carry handle both at the back and front. The propeller is held on with a nut, but has a conventional shear pin. We liked the use of conventional hex-head bolts on the leg, and the wind-up recoil start mechanism; give it three gentle pulls and the next time the spring will take some of the starting load.

This was the noisiest engine on test, but also one of the lightest. Tester Tony found the centrifugal clutch engaged rather fiercely.

BILL'S COMMENTS: Looks well put together, although in my experience spares are pricey and can be slow to obtain. Like the Honda, air cowling covers need removing to access the engine

Suzuki DF2.5

PRICE: £562

Contact: www.suzuki-marine.co.uk

Favourite with PBO's testers in our last test in 2006, the Suzuki is compact and lightweight. It has a very large carry handle at the rear and the oil level indicator is clearly visible without having to remove the cover. When off the boat the engine must be laid down on the tiller side.

A thoughtful feature is a spare split pin and shear pin located in a rubber block under the engine. There is no long shaft version.

The second lightest engine on test, the Suzuki has a distinctive cooling water telltale which spurts downwards at 45° – luckily it doesn't enter the tender when reversing!

The tilt control lever was hard to locate on the port side of the engine, and the clamp toggles could not be locked with a padlock.

BILL'S COMMENTS: The plastic cases on these scratch easily, and on older units I've noticed fade from strong sunlight



OUTBOARDS TESTED



Tohatsu 2.5

PRICE: £571

Contact: www.tohatsu-uk.net



The Tohatsu showed an excellent turn of speed

Very few 2.5hp models of the Tohatsu are sold because the 3.5hp version sells for only £10 more. Other than the extra power output, which is achieved by jet differences in the carburettor, the two engines are identical. The Tohatsu weighs in at a little under 20kg with a full oil sump and fuel tank, so it won't win friends being manhandled from the tender onto a yacht's pushpit, but as a workhorse its weight indicates its build strength, promising long service.

In joint first place for speed and bollard pulls with the Mariner, the Tohatsu is noisy flat out but quieter at more gentle revs. The carry handle is on the front, and the engine is laid down on the side opposite the tiller. The oil level is visible outside the cover, and the toggles can be locked.

BILL'S COMMENTS: As with the Mariner, I like the build quality and ease of servicing of these engines



Yamaha F2.5

PRICE: £639

Contact: www.yamaha-motor.co.uk



Well built but pricey, the Yamaha is pleasantly quiet

This is the most expensive engine tested, but some of this shows in the aluminium propeller, which is mounted on a rubber bush with no shear pin to fail.

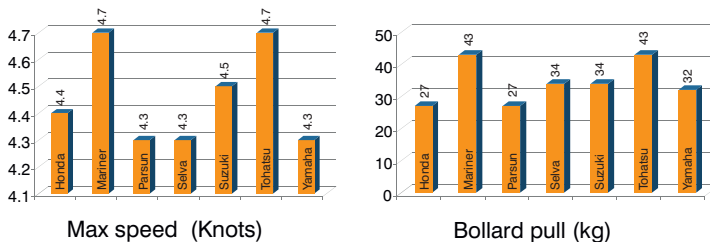
The engine comes with a substantial carry handle at the rear, and can be laid down either on the tiller or perhaps preferably, but less stably, on its front. The clamp toggles can be locked with a padlock, but the oil level indicator is located under the cover. A thoughtful device deflects the cooling telltale water from entering the boat when the engine is turned through 180° for reversing. The fuel cut-off tap was not easy to locate from inside the tender, but the tilt control lever was clearly visible. This was the second-quietest engine on test, but on the heavy side.

BILL'S COMMENTS: Good build quality, cover clips a bit flimsy and access under cover not easy as everything is tightly packed

TEST RESULTS

Engine	Honda	Mariner	Parsun	Selva	Suzuki	Tohatsu	Yamaha
Noise (dB)	88.0	88.0	84.7	92.3	87.8	88.0	85.1
Wet weight *(kg)	13.9	18.0	18.0	17.0	13.7	18.0	18.0

*Fuel tanks partially filled.



Premium Product: the Selva Sea Horse is packed with innovation

PBO VERDICT

We found a range of choices for small outboards, with quite a variation in price

The Honda and Selva offer very different technology to the other outboards with their air-cooled engines and centrifugal clutch drives. Centrifugal clutches take some getting used to and can engage with a jerk, which affects a light inflatable tender. The Selva departs even further from the norm with its oil injection system, lack of fuel tap and breather, and innovative wind-up recoil start mechanism. Both engines are at the top end of the price range, but the Selva's features and tolerance to being stored on any side earn it our Premium Product award, despite being somewhat noisy.

At the other end of the budget is the Chinese-built Parsun which offers excellent value for money and gets our Budget Buy. We

decided not to award an overall best buy as the buyer's choice will depend a lot on usage. For instance, the Honda's air cooling makes for low maintenance and its light weight will appeal to many, but those looking for a standard gear shift might prefer the Suzuki, which is only slightly heavier and is compact in size.

Yamaha's F2.5 is a well-built and quiet motor with some attractive features, but we felt it was a little overpriced.

The Tohatsu and its Mariner and Mercury variations would be my choice for heavy-duty work where little lifting or carrying is required. These engines are solidly engineered and are Bill's favourites. The Mariner 2.5 has the price advantage over the Tohatsu, but look for deals. **PBO**

THANKS ARE DUE TO: Bill Mitchell of Home Marine, Emsworth Marina, Emsworth, Hants PO10 8BP, Tel 01243 374125. Home Marine will supply most makes of outboard, but the firm's specialism is in maintenance and repair work on outboards any size. Also to EP Barrus for the loan of two SunSport AIB230 inflatable tenders: RRP £659 or packaged with a 2.5 Mariner outboard at £1,019.