

POWERSAIL NEW ZEALAND LTD

Exclusive Brokers of Powersail Yachts

20m WORLD CRUISER LAYOUT DESCRIPTION AND DESIGN FEATURES (Referenced to Deck and Sail Plan illustration attached)

DESIGN OVERVIEW

The Powersail 20m is not just another production sail boat with a bigger engine. It has been innovatively designed to be a unique performance cruiser, custom-built by New Zealand craftsmen to the highest international standards. Custom building ensures that the owner's personal preferences can be accommodated thereby creating a vessel exclusively their own.

The Powersail 20m has an efficient hydro-dynamically shaped hull allowing exhilarating sailing performance in addition to the unique capability of motoring under power at 18 knots.

This achievement has been made possible by two patented design breakthroughs:

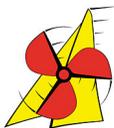
Firstly, a twin rudder design which gives the helmsman the ability to adjust the toe out angle of the rudder blades when the vessel is under motor. This transforms each blade into a hydro-foil producing sufficient vertical lift to overcome the tendency of yachts to stern squat when motoring them well above their hull speed. The beauty of this system is that it achieves lift with minimum drag, and does not require any extra underwater appendage to do so.

The second patent covers a custom designed Z drive propulsion unit utilizing spiral bevel gear technology to turn a large diameter five bladed propeller. This unit enables the required 800hp to be transmitted into the water with maximum efficiency. This would not have been possible utilizing low efficiency folding propellers due to their low blade area ratios. The uniqueness of the design is that when under sail, the Z drive unit is able to retract transversely into the hull, completely eliminating all underwater propeller drag.

The design utilizes a lifting keel and an automated water ballast system. When motoring, the keel is retracted and the water ballast is emptied, ensuring minimum wetted surface and displacement.

The Powersail 20m fulfils all of the requirements of a luxury world cruiser with its exceptionally large volume interior providing raised saloon, walk-round queen size berth staterooms with en suites, large well appointed galley, separate laundry and a cockpit layout providing a protected sailing environment as well as an ideal outdoor entertainment area. In addition on board systems allow single-handed sailing

On board systems enable a single helmsman to centrally control all sailing operations in addition to motor control, lifting keel, water ballast, anchoring, bow thruster, retractable propulsion system and rudder trim.



HULL PROFILE

PROFILE OVERVIEW

Careful balancing between the 2.4m (7'10") freeboard, rig size and cabin top profile has resulted in a well proportioned design which is both distinctive and attractive to the eye. The large sail plan ensures race boat performance while the generous freeboard guarantees a very dry boat. One metre high staunchions with safety lines provide excellent safety for crew.

Mainsail sheeting terminating from bridle on top of hard dodger ensures an unencumbered cockpit.

RETRACTABLE BOW SPRIT

Constructed from carbon fibre, the bow sprit extends 2.5m clear of the bow when activated by a control rope on the foredeck. The genaker clew can be attached to the end of the bow sprit before it is extended. The advantage of the extendable bow sprit is that it allows larger genakers to be flown ensuring superior downwind performance and the sailing of deeper wind angles when required, and is easier to operate than a spinnaker pole especially when sailing shorthanded.

HEADSAIL REEFING

A hydraulically operated forestay furling system provides reefing for the outer jib, while a manually operated furling system is used for the staysail when it is fitted. The furling control rope for the staysail can however be wound in on a hydraulically powered primary winch if required. The sheet cars for the outer jib are track mounted, allowing full adjustment of the sheeting position facilitating efficient setting of the sail when partially furled.

MAINSAIL REEFING AND SHEETING

A 'park avenue' carbon fibre boom operates with lazy-jacks and full length sail battens running on batten cars provide three point slab reefing. First and second reef points have a single line reefing system feeding to hydraulically powered primary winches in the cockpit, making reefing a one man operation. A hydraulically operated boom vang controls the boom angle and supports the boom without the need for a topping lift when the sail is furled.

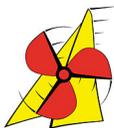
As an optional extra a hydraulically powered 'In-boom' furling system can be furnished providing infinite reefing adjustment.

The single purchase mainsheet runs from a bridle attached to the top of the spray dodger along the boom and down to the base of the mast where it runs through two sets of double sheaves. One set of sheaves is fixed at the base of the mast and the other is attached to the stem of the hydraulic cylinder. When the cylinder is actuated via a toggle switch located at the helm station the distance between the two sets of sheaves is altered and the mainsheet is shortened or lengthened at a ratio of four times the length of travel of the cylinder stem. This system provides superb control of the mainsail especially when gibing in heavy airs.

TOP DECK

DECK OVERVIEW

All halyards, control lines and head sail sheets run aft from foredeck to cockpit in concealed coaming channels both port and starboard. Generous width side decks clear of sheets or headsail tracks ensure safe passageway. Boarding platform, stern steps and cockpit sole have synthetic teak decking providing a non slip, no-maintenance finish. Six large hatches provide light and ventilation to master en suite, theatre, main saloon and spray dodger.



ANCHOR SYSTEMS

Twin plough-type anchors self-launch through custom made stainless steel bow side cheeks. Main anchor is operated via hydraulic chain windlass with warping drum from a remote control panel at helm station complete with chain length indicator and remote controlled anchor wash, or alternatively via foredeck foot switches. Spare anchor is operated using second hydraulic winch via foot switches on foredeck only. Anchor winch motors are accessed through hatches in forward sail locker. For one person to be able to control the anchoring operation from the helm is a huge advantage, especially in an emergency situation on a dark night.

FORWARD SAIL LOCKER

Provides convenient bow access and stowage of 450 sq.m. genaker complete with its choker sleeve. Can be used as a genaker launching chute. Access to anchor winch lockers provided via internal hatches.

SELF-TACKING HEADSAIL SYSTEM

This system is designed to operate with either the staysail or outer jib when the inner forestay and staysail are removed. The jib sheet can be adjusted from the cockpit, enabling optimum sailing performance to be achieved. The beauty of the system is that tacking on the wind is an automatic operation requiring no input from the crew.

COCKPIT

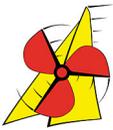
Cockpit has been designed as an ideal outdoor entertainment area and features a large table which seats eight comfortably by supplementing the fixed seating with fold-away chairs. Front of table is designed to fold back exposing hand rail to facilitate safe access between helm stations in seaway. An electric fridge is located under the transverse seat. The hard dodger gives excellent weather protection for the forward seating. The large flat area behind this seating contains spacious storage lockers and also provides ideal sunbathing areas sheltered from the wind. The two primary winches are hydraulically powered and self tacking with rope storage bins located beneath them. A Removable cockpit sun cover spanning from rear edge of hard dodger to stern arch is provided. This cover can remain in place while sailing.

HELM STATIONS

Step-up twin helm stations elevated 250mm above cockpit sole ensures excellent visibility for helmsman. Leather covered stainless wheels connect to the twin rudders using a cable system. The cable system ensures the helmsman excellent feedback of the feel of the helm. Cantilevered outboard seating or dished seating behind wheel provides maximum comfort when heeled. Hydraulic systems, operated from helm stations, control headsail and mainsail furling, vang tension, mainsheet operation, backstay tension, anchor winches, lifting keel, retractable bow thruster, retractable propulsion unit and rudder trim.

TRANSOM ARCH

The arch has multiple functions: it is structurally designed to support the termination forces of the backstay. This makes practical a larger roached mainsail whilst ensuring the backstay does not obstruct the stern area of the boat. The arch also includes built-in davits designed to lift a 3.4m inflatable tender with its 15hp outboard in addition to a mounting platform for the radar, GPS & communications dome. Boarding lights and cockpit audio speakers are mounted on each side of strut.



BOARDING PLATFORM

The twin curved stair access from the boarding platform gives the vessel a super-yacht feel. One metre high stainless steel handrails on twin staircase ensure safety when boarding. Twin 'after swim' hot & cold showers are located on each side of stern door. A folding, pull-out stainless steel swim ladder is located in pocket beneath boarding platform. Garage door opens upward with the assistance of air struts. A removable roller locates in hole on back edge of boarding platform facilitating rigid bottom inflatable to be pulled onto platform. It is also a significant safety feature in that it makes the retrieval of a 'man overboard' a much easier operation especially when shorthanded.

TWIN RUDDERS

In addition to their use as hydrofoils to overcome stern squat when motoring, twin rudders have a number of advantages over single rudders. Windward performance is enhanced. When the yacht is healing on the wind, the windward rudder comes clear of the water reducing drag, while the leeward rudder tends towards vertical increasing its steering efficiency. It is widely reported that downwind steering control is superior, especially in large quartering seas, reducing the risk of broaching. When cruising offshore, having two rudders provides additional safety and associated peace of mind. Should one rudder be damaged or lost, the boat can still be steered satisfactorily by the second rudder. Another unique feature of the Powersail twin rudder system is that the yacht can be beached for emergency repairs, in a self supporting upright position, on its lifted keel and twin rudders. Special composite shoes have been designed to fit to the bottom of each rudder, to prevent the rudder blades from sinking into the sand. These shoes have been designed to be easily fitted, prior to beaching, by a diver wearing a mask and snorkel.

UPPER DECK INTERIOR

UPPER DECK OVERVIEW

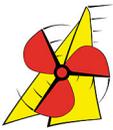
The achievement of full headroom on two deck levels, together with the large 6.4m (21') beam have resulted in an huge volume interior offering features never before combined in a 20m (66') yacht. These include: Equivalent full headroom floor area of a 26m (85') single level yacht; raised saloon seating eight; fully appointed galley; master stateroom with walk round queen-sized berth plus en suites with separate shower; elevated internal helm station and separate large screen home entertainment theatre and reading room.

MASTER EN SUITE

Features quiet operating electric fresh water toilet with air-extractor fitted to bowl to eliminate odours. Separate shower cubicle has hatch above for steam extraction. Vanity has large bench top fitted with liquid soap dispenser and storage above and beneath. Large mirror mounted on forward bulkhead.

MASTER STATEROOM

Queen-size island berth features flexible slatted base for optimum comfort and prevention of moisture entrapment under mattress. Base of berth is undercut 200mm to maximise floor space. Additional drawers are located under berth. Stateroom also features two large hanging lockers, bedside tables with drawers, dressing table, bookshelves and two-seater settee and coffee table. Large port lights provide natural lighting. Repeater instrument displaying all sailing parameters is mounted on starboard side of bed. Television and audio facilities are provided. Control panel beside berth allows adjustment of air conditioning temperature.



THEATRE – READING LOUNGE

Pull-down projector screen 1.3m wide on port side, with projector mounted on ceiling provides state of the art home entertainment theatre for TV and DVD. This area, which can be closed off from main saloon, alternatively provides a tranquil area for reading and relaxation, or a play area for children while adults are entertaining. Computer desk situated on port side of lounge.

INTERNAL HELM – NAVIGATION STATION

Navigation station has raised sole to provide excellent visibility, seat is dished for comfort when boat is heeled. Navigation and sailing instrument repeaters, autopilot control, chart stowage and electrical switch panel are located in this area.

Audio entertainment system is on starboard side of stairway leading down to reading lounge

GALLEY

Spacious fully-appointed galley featuring generous bench areas, storage drawers and cupboards, conveniently positioned lift up dinnerware storage area at rear of bench facing saloon, pull-out style range hood mounted over gimballed gas four-burner cook-top and gas oven, microwave oven, twin sinks with waste disposal unit, single drawer dishwasher, top opening rubbish bin beneath bench top, 400 litre custom built refrigerator, full height pantry with bi-fold sliding door.

PILOTHOUSE SALOON

Port dining settee on raised sole has seating for eight with 360 degree views through saloon windows while seated. Dining Table reduces to smaller size when not in use. Top of centercase does not obstruct views through front windows. Starboard cocktail/ coffee area has seating for four with table on raised sole. Liquor cabinet with top opening lid located behind navigator's seat.

LIFTING KEEL

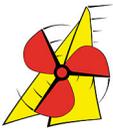
A lifting keel is a great advantage on a cruising yacht. The large draft variation of 1.5 to 4.1m (4'11" to 13'5") provides maximum up wind performance, while allowing the comfort and security of shallow anchorages

The keel is raised and lowered by a hydraulic motor rotating, via a chain and sprocket, a threaded shaft running through a bronze nut attached to the top of the keel fin. This shaft is supported by a spherical bearing mounted off the top of the centre case. This design ensures that the keel is vertically secure at all positions of its travel. Hydraulically actuated sliding wedges deflect both sides of the bottom section of the foil shaped composite centercase locking them against the fin at two vertically separate points. This technique has the advantage of making the keel and the keelson of the boat into one integral structure of immense strength. The keel is operated by a sequential control unit from the starboard helm and the helmsman is provided with a continuous indication of keel position.

LOWER DECK INTERIOR

LOWER DECK OVERVIEW

Features of the lower deck include: 1.9m (6ft 3in) minimum headroom throughout; Two guest staterooms with walk round queen-size berths plus en suites with separate showers; separate crews quarters with en suite; full size laundry; walk round engine room; large full equipped workshop; stern garage with internal access



RETRACTABLE BOW THRUSTER

This unit comprises a standard hydraulically operated bow thruster mounted within a composite custom-built box housing. The assembly is hydraulically raised and lowered within a well, guided by tracks on all four sides. A portion of the hull is mounted on the base of the retractable housing so that the hull is flush when the housing is in the raised position. The thruster is operated from the cockpit helm station.

BILGES

The yacht will carry approx. 22 cubic metres of passive flotation material in the form of closed cell foam, enclosed in the bilge compartments. With the additional buoyancy available in the foam core of the hull, deck and interior fit out, this will render the boat basically unsinkable in the event of a catastrophic holing. An additional benefit is that the foam provides excellent sound insulation ensuring virtually no sea noise below decks.

LAUNDRY

Separate laundry with full 1.9m headroom contains tumble dryer mounted above full size front loading washing machine, plus full size laundry tub with hot and cold faucet. Custom built top opening freezer is also located in this area. The freezer is of eutectic design operated by sealed electrically operated compressor system.

CREW QUARTERS AND EN SUITE

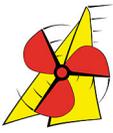
Accommodation for two crew or additional guests in full size bunks. Stowage lockers are located at foot of each berth plus twin hanging lockers give ample space for personal effects. Fresh water electric toilet, vanity and shower facilities are combined in separate en-suite.

ENGINE ROOM AND WORKSHOP

Unusually large engine room featuring all round access for easy maintenance on 800 HP Caterpillar turbo diesel engine which features underwater exhaust system for quiet operation. Spacious workshop area with 1.95m (6' 5") headroom has large work bench with numerous tool and spare part storage lockers and drawers. Access is via laundry or port side guest en suite shower cubical.

PORT AND STARBOARD WATER BALLAST TANKS

Ballast tanks on each side are divided into forward and rear compartments enabling the longitudinal trim of vessel to be adjusted while sailing. Total ballast per side is 3.3 tonnes. The loading, transferring and dumping of water is controlled from the helm stations, and the hydraulic circuits have been designed to minimise the quantity of valves, pumps and through hull fittings. All valves have manual overrides.



RETRACTABLE PROPULSION UNIT

The propulsion unit is the nucleus of the design's unique ability to motor well above the yacht's hull speed. The spiral bevel gear technology used in the Z drive is well proven and is similar in configuration to the countless outboards, stern legs and sail drives used worldwide in marine applications.

The Z drive gearbox has been conservatively designed to American Gear Manufacturing Association standards and will be manufactured in New Zealand by a company with 20 years experience in this field. The design utilizes "off the shelf" spiral bevel gears, bearings and lip seals. The unit will be test run under full load conditions prior to leaving the factory and comes with a full 12 months warranty. The unit would naturally be further tested thoroughly during sea trials of the vessel. The gearbox design also includes a sensor which provides a warning in the unlikely event of the drive overheating for whatever reason.

The retractable propulsion unit is housed within a sealed recess, integrally moulded into the yacht's composite hull. The top housing of the unit incorporates two 'bearing pivot horns' running fore and aft, which are mounted in sealed bearings fitted front and rear of this moulded recess. The input shaft runs through a bearing in the forward pivot horn to connect via a flexible coupling to the gearbox and engine. The aft pivot horn extends through its sealed bearing enabling a tiller arm to be attached to it. The unit can then be rotated around the axis of the pivot horns by attaching a hydraulic cylinder to the tiller arm taking it from its stowed to its operational position beneath the yacht.

A second hydraulic cylinder is fitted to control the opening and closing of the hinged door which closes off the recess once the propulsion unit has been deployed or stowed.

The total time required for the deployment operation would be approximately 30 seconds. A safety interlock would prevent the engine from starting until this operation was satisfactorily completed.

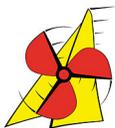
The unit is designed to be removed without difficulty from underneath the boat when it is on a dry stand. The composite fairing enclosing the unit is designed in two halves to be easily disassembled should a major service be required.

PORT AND STARBOARD GUEST EN SUITES

Electric fresh water toilet features air-extractor fitted to bowl to eliminate odours
Liquid soap dispenser is mounted in vanity top. Large mirror behind vanity
Separate shower has dorade-style ventilation through coaming for steam extraction.
Port en-suite has second doorway enabling access from saloon for day use.

PORT AND STARBOARD GUEST ROOMS

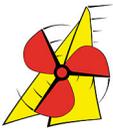
Features full 2m (6'7") headroom with walk round queen size berths. The walk round design ensures easy access for both berth users and makes bed making a breeze. Flexible slatted bed bases ensure maximum comfort and eliminate moisture build up beneath mattress. Provision is made for centre and side lee clothes on berths for ocean passage making. Television and audio facilities are provided. Two opening port lights provide natural light and ventilation. Air conditioning temperature control panel located beside berth.



STERN GARAGE – LAZERETTE

Accessed via two metre square pneumatically sealed transom door lifted by air struts, and also through internal watertight bulkhead door from starboard guest cabin. Full 2m (6'7") headroom makes for storage area for a deflated 3.4m (11'2") rigid bottom inflatable tender with 15hp outboard attached and for bulky items such as fenders, dive bottles, spare sails etc. A fold-up bench with sink basin mounted on forward bulkhead for cleaning fish. With the stern door raised this protects the boarding platform from sun or rain, making it an ideal area to fish from, with the added advantage of keeping all fishing mess away from the cockpit.

The procedure for garaging the 3.4m rigid bottom inflatable complete with its 15 hp outboard is as follows. The tender is pulled clear of water into garage by utilising the roller on boarding platform. A fixed strop from the stern arch supports the lifted stern door. A car travelling on a track mounted underneath the door has a block and tackle system suspended from it. The tender with its outboard is then raised off the boarding platform with this block and tackle system attached to its balance point. With the aid of the bow rope feeding through a pulley mounted on the starboard side of the lazaret the tender can then be manoeuvred easily by one person on the track and swivelled into its final storage position in the lazaret prior to deflating.



SUMMARY OF FEATURES

What other 20m World Cruiser currently on the market offers you the following:

- High performance sailing plus a motoring sprint speed of 18 knots
- Twin deck design gives full headroom floor area of a 26m single level yacht
- Patented retractable propulsion system eliminates drag when sailing
- Patented twin rudder adjustment system prevents stern squat under motor
- Onboard sailing systems allow easy handling by two people
- Raised saloon, with dining for eight, offering 360 degrees view
- Three cabins with queen size island berths, en suites with separate showers
- Super-yacht styled cockpit with large table seating eight for outdoor dining
- Air-conditioned interior for maximum comfort in tropical climates
- Large fully appointed galley includes dishwasher and waste master
- Separate large screen home entertainment theatre and reading room
- Elevated internal helm and navigation station offers all weather comfort
- Separate full size laundry with tub, washing machine and dryer
- Fourth cabin with twin bunks and en suite for crew or children.
- Walk round engine room incorporating workshop with full headroom
- Unsinkable design provides maximum security and peace of mind
- Retractable bow thruster for easy manoeuvring in restricted areas
- Lifting keel 1.5 to 4 m. draft – shallow anchorages & windward performance
- High stability – 6.4 m. beam – water ballast - bulb keel – deep draft
- Stern garage with full headroom and internal access for tender stowage
- Easy boarding access via twin staircase from stern platform
- 2000 Nautical miles range when motoring at 10 knots
- Designed by international award winning Craig Loomes Design Group



POWERSAIL 20m WORLD CRUISER

