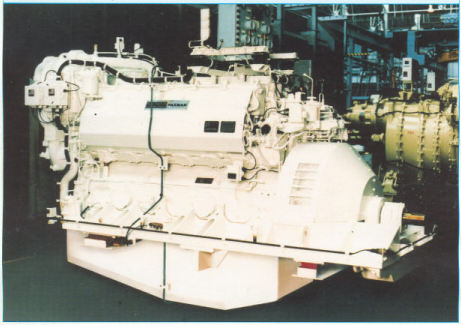
PAXMAN VALENTA

LOW MAGNETIC SIGNATURE MARINE DIESEL ENGINES

Built in factory registered to NATO Defence Standard AQAP 1, Edition 3, and to Lloyd's Register of Shipping Quality Assurance Scheme for Machinery.



CONTINUOUS PROPULSION RATINGS

Engine Type	Rating kWb (bhp) 1000 rev/min	1200 rev/min	1460 rev/min
6RP200E	560 (750)	638 (855)	755 (1012)
8RP200E	746 (1000)	850 (1140)	1007 (1350)
12RP200E	1119 (1500)	1276 (1710)	1510 (2024)

Reference Conditions
Air intake temperature 30°C. Sea Water temperature 30°C. Barometric Pressure 1 bar.

CONTINUOUS AUXILIARY RATINGS AT 1200 REV/MIN

	kWb	bhp	kWe
6RP200E	638	855	600
8RP200E	850	1140	800
12RP200E	1276	1710	1200

For kWe – 94% GENERATOR EFFICIENCY IS ASSUMED.
The marine auxiliary rating complies with Lloyd's and other classification societies unrestricted service requirements for engines.

ENGINE DATA

Engine Type:	Valenta RP200E
No. of Cylinders & Configuration:	6 in line, 8 & 12 60° Vee
Bore x Stroke:	197 x 216mm
Cycle:	4 Stroke
Compression Ratio:	13 : 1
Operating Speed Range:	600–1600 rev/min
Idling Speed:	600 rev/min (basic engine)
Mean Piston Speed:	1460 rev/min–10.5m/s 1200 rev/min–8.64m/s 1000 rev/min–7.2m/s
Direction of Rotation:	Anti-Clockwise on Flywheel End
Combustion System:	Direct Injection
Engine Thread System:	Metric
Starting System:	8.0 bar Airmotor/24V electric and alternatives
Governor:	Regulateurs Europa (standard) Alternatives available
Fuel Oil:	BS 2829: 1983 Class A1 and A2 ASTM D-975-74 Nos. 1 and 2D
Lubricating Oil:	SAE 30 to MIL-L-46152 or MIL-L-2104C, TBN 9

	6RP200E		8RP200E		12RP200E	
Pipe Size Bore:	mm	in	mm	in	mm	in
Fresh Water	76	3.0	127	5.0	127	5.0
Air Intercooler	76	3.0	76	3.0	76	3.0
Fuel	13	0.5	19	0.75	19	0.75
Oil	63	2.5	60	2.375	60	2.375
Starting Air	51	2.0	51	2.0	51	2.0
Exhaust Pipe and Silencer	305	12.0	356	14.0	406	16.0
Raw Water flow not to exceed 1.8m/s (6ft/s)						
Capacities:	m^3	imp gal	m^3	imp gal	m^3	imp gal
Sump	0.241	53.0	0.164	36.0	0.241	53.0
Water jacket	0.218	48.0	0.18	40.0	0.29	64.0
Intercooler	0.014	3.0	0.021	4.5	0.027	6.0

DEGAUSSING

Paxman Diesels Limited have a current Technical Consultancy agreement with Marconi Command and Control Systems Limited to support them in meeting international requirements for a Low Magnetic Naval Marine Diesel Engine.

Marconi have over 30 years active experience in magnetics and degaussing systems for Naval vessels. In particular Marconi have completed a computer study assessment of the degaussing requirements of the Valenta engine for low magnetic signature applications. In consequence Paxmans supported by Marconi offer an engine to meet individual customer requirements.

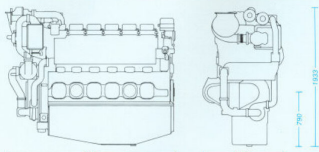
Facilities can be provided for magnetic signature ranging and certification of engines prior to despatch.

Front cover photo:

The low magnetic Valenta RP200E engines have been developed to complement the Paxman 'Delta' 9-SW propulsion engines and 9-SW pulse generation and hydraulic power engines as fitted to the British Nuvelis 'Hunt' class M.C.M.V. vessels. Pictured is the 6RP200E propulsion engine for the 'Sandown' class.

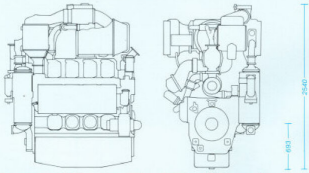
BASIC DIMENSIONS (mm)

6RP200E



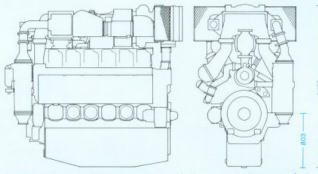
Base Engine Weight 4363kg

8RP200E



Base Engine Weight 4617kg

12RP200E



Base Engine Weight 6402kg

ENGINE SPECIFICATION

MAGNETIC CONTENT

Non ferrous or low magnetic permeable parts are used to provide low magnetic content. High permeability components are demagnetised prior to assembly.

HOUSING

The housing is manufactured from a high grade SG iron casting. The structure is fully stress relieved before machining. The under-slung crankshaft is carried in main bearing caps located against side thrust by fitting faces. Lateral bolts screwed into the caps through the housing skirt and longitudinal beam bolted to the underside of the bearing caps increase the rigidity of this assembly. The housing carries wet type steel cylinder liners, surmounted by individual cylinder heads. The underside of the housing is enclosed by an oil sump complying with classification societies' requirements of pitch and roll.

CRANKSHAFT AND MAIN BEARINGS

The forged steel nitride hardened shaft is carried in pre-finished main bearings of the steel-lead type, lined with the aluminium requiring no hand fitting. It is located by rings at the drive end of the engine. The crankshaft is flanged at the drive end for the attachment of the flywheel and driven machinery by set bolts, the drive being taken by driving pins. An additional bearing is provided to support the inboard end of driven machinery. A viscous torsional vibration damper is bolted to the flange at the free end of the crankshaft. The drive for the camshaft, governor, injection, oil and water pumps is from a train of hardened gears located at the drive end of the engine. Eight cylinder engines have a gear driven secondary balancing system.

Primary balance weights are fitted to the crankshaft of all engines. The free-end-cover is machined to S.A.E. No.2 dimensions for the attachment of power take-off drives, etc.

CONNECTING RODS AND BEARINGS

Fork and blade connecting rods are machined from steel stampings (8 and 12 cyl. engines), a one-piece rod is fitted to 6 cylinder engines. A large end block attached to the forked rod houses a replaceable steel back, tin aluminium lined bearing, which runs on the crankpin. A lead bronze lined shell in the blade rod runs on a nitride hardened outer surface on the large end block. The joint faces of the bearing block and blade rod are serrated for location purposes. The rods and bearing block are drilled for lubrication of the small ends and for piston cooling. The 6RP200E engine utilizes the same large end bearings as the forked rod of the 8 and 12 cylinder variants.

PISTONS

Aluminium alloy oil cooled pistons are each fitted with three compression and one oil control ring above the fully floating gudgeon pin which is located by circlips. The top pressure ring is fitted in an 'Alfin' bonded cast iron ring groove insert.

CYLINDER HEADS, VALVE GEAR AND LINERS

Single unit cast iron cylinder heads are fully interchangeable. With drill passages giving optimum water flow around the valve seats, each cylinder head house's two inlet and two exhaust valves seating on replaceable inserts together with a central injector. Each pair of valves are actuated by a bridge piece operated by a push rod and rocker lever. The valve gear is fully enclosed by easily removable covers; the injector is enclosed by the valve cover, but the inlet pipe is sleeved to prevent leakage into the lubricating oil system. Hard chrome plated wet type liners of seamless steel tube flanged at the end, carry copper plated steel rings above and below the flange for sealing against gas and water leakage; the lower end of the liner is sealed by two rubber rings. Water transfer from the housing jacket to the head is by ferrules sealed by rubber rings. The waterside surface of the liner is protected by chromium plating.

CAMSHAFT AND DRIVE

The camshaft is located in a trough formed by the two banks of cylinders (8 and 12 cyl.) or at the side (6 cyl. engine). It is gear driven from the crankshaft and runs in pressure lubricated bearings. A separate tappet housing for each line of cylinders is fitted above the camshaft and contains roller type cam followers for operating the tubular push rods; return springs maintain constant engagement of each cam roller with its cam.

FUEL INJECTION EQUIPMENT

Bryce single unit fuel injection pumps are operated by camshafts running in aluminium cambox housings, which are located on the side(s) of the engine and are grouped below the air inlet manifold. The fuel injection pump camshafts are lubricated from the engine system with a metered supply to the pump plungers. Fuel feed and injection pumps are driven from the gear train at the drive end. The fuel system includes a fuel reservoir and air vessel. The combustion system employs direct injection of fuel by a central multi-hole injector into an open toroidal cavity in the top of the piston. Duoline sheathed pipes of equal size and minimum length are fitted, one between each pump and injector. The double skin arrangement controls any fine risk from fuel oil in the event of a high pressure pipe failure.

GOVERNOR, DRIVE AND CONTROLS

Regulateurs Europa Governors are fitted as standard (alternative governors are available). They are driven from the engine gear train located at the drive end of the engine. The governor controls the effective stroke of the injection pump plungers through a system of rods and levers. Precision self-aligning spherical bearings are employed at the control rod ends and bearing points to minimise friction and lost motion. The governor is available for remote control (electrical, hydraulic or pneumatic).

PRESSURE CHARGING

One watercooled exhaust gas driven turbo-blower is located at the free end of 8 cyl. engines and above the vee of 8 and 12 cylinder engines. Water cooled exhaust manifolds are fitted within the vee of the vee 8 and 12 cylinder engines and along 'A' Bank cylinder head face of the 6 cylinder engine.

AIR INTERCOOLERS

The intercooler for cooling the aspiration air from the turbo-blower is mounted above the free end of the engine. Water from the sea water circuit is the cooling medium with the option of engine fresh water cooling on the 6 cylinder engine. Gunmetal waterboxes, naval brass tube plates and copper nickel tubes are standard materials used.

LUBRICATION

One engine-driven gear type lubricating oil pump (two in parallel on 12 cylinder engines) is housed inside the sump at the drive end of the engine. This pump supplies high-pressure oil to all bearing points in the engine (including water pump) via full flow filters and to the built-on oil coolers. Pressure is controlled by a single spring loaded relief valve.

EXHAUST

The fresh water cooled exhaust system is brought to a single outlet from the turbo-blower. Flexible pipes, and absorption type silencers can be supplied.

COOLING

Fresh water is circulated through the engine, intercooler (optional) and oil cooler (6 cylinder engines only) exhaust manifolds, jackets and turbo-blower cooling system with controlled flow round the injectors and valve seats, by a single pump fitted at the free end of the engine and driven from the drive end gear train by a tubular shaft. Outlets from the engine are brought together to provide a common entry to a thermostatic control valve mounted above and attached to the pump.

OIL COOLER

One engine mounted tubular oil cooler is fresh water cooled for the 6 cylinder engine and sea water cooled for the 8 and 12 cylinder engines. Gunmetal water boxes, aluminium alloy cylinders and copper-nickel tubes are standard materials used. For sea water cooled systems, a control valve (one per cooler) operated by a temperature sensitive thermostat is fitted in the oil circuit.

CRANKCASE EXPLOSION DOORS

These are fitted to all engines.

FILTERS:

Air A circular oil wetted filter is attached to the turbo-blower on the 6 cylinder engines. Two oil wetted panel type filters mounted on trunking attached to the turbo-blower inlet casings are fitted to 8 and 12 cylinder engines.

Fuel Oil Single element fuel oil filter is fitted to all engines. A coalescer is supplied for independent mounting in the vessel.

Lubricating Oil Single element, full-flow filters are inserted in the pressure circuit for mounting adjacent to the engine.

FUEL FEED PUMP

A fuel feed pump is fitted to all engines. The suction lift of the pump should not exceed 3m (10ft.).

FLYWHEEL

Open and enclosed arrangement can be provided. Housings and flywheel can be coupled to any type of driven equipment.

OVERSPEED

Built-in overspeed shutdown equipment is fitted.

INSTRUMENTS

Instruments are mounted in a panel which is supplied loose for mounting adjacent to the engine. Thermometers graduated in Centigrade and Fahrenheit for measuring the coolant and lubricating oil temperatures, oil pressure gauge calibrated in bar and lbf/in^2 and an electrically driven tachometer.

Duplicate sets of instruments for mounting in the engineer's control cubicle can be supplied. When it is required to measure the outlet temperatures of the exhaust from individual cylinders in addition to the above, complete instrumentation can be supplied at extra cost.

FLUID COUPLINGS

These can be fitted to propulsion engines to assist running at low speeds and to further reduce transmission noise and vibration through the shafting.

LOW OVERLAP CAMSHAFTS

Modified camshafts and specially adapted turboblowers can be fitted to ensure operation for long periods at low load and speed without detriment to engine performance or maintenance.

TESTING

Engines are tested to a standard schedule when power and speed stops are set and sealed; additional tests are undertaken to customer's requirements. Engine Test Certificates are supplied with each engine.

TOOLS AND SPARES FOR MAINTENANCE AND OVERHAUL

With the ease of accessibility and design simplicity, very few special tools are required for prompt maintenance and overhaul. A standard set of tools are supplied for routine maintenance work. A selected set of spares are also supplied. Maintenance and overhauls can be carried out with the engines remaining in the vessel if required.

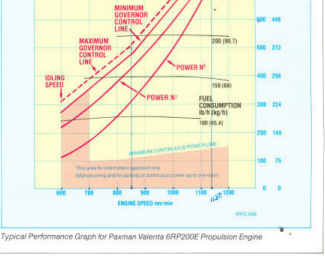
INSTRUCTION AND SPARE PARTS MANUALS

A comprehensive Instruction Manual and fully illustrated Spare Parts List are supplied with each engine.

OPTIONAL EQUIPMENT

Paxman offer a host of optional equipment to suit Customers Special Requirements. Please contact our Technical Sales Department.

VALENTA 6RP200E ENGINE
Marine Propulsion – Continuous Rating



Typical Performance Graph for Paxman Valenta 6RP200E Propulsion Engine

The 6RP200E Valenta Engine has been selected by the British Royal Navy for the Single Role Minehunter 'Sandown' Class Vessels because of its inherent simplicity in design, ease of maintenance and long periods between overhauls. This followed magnetic signature range testing by the British Ministry of Defence together with extensive sea trials and barge testing.

Information in this publication must not be taken as binding until confirmed.

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