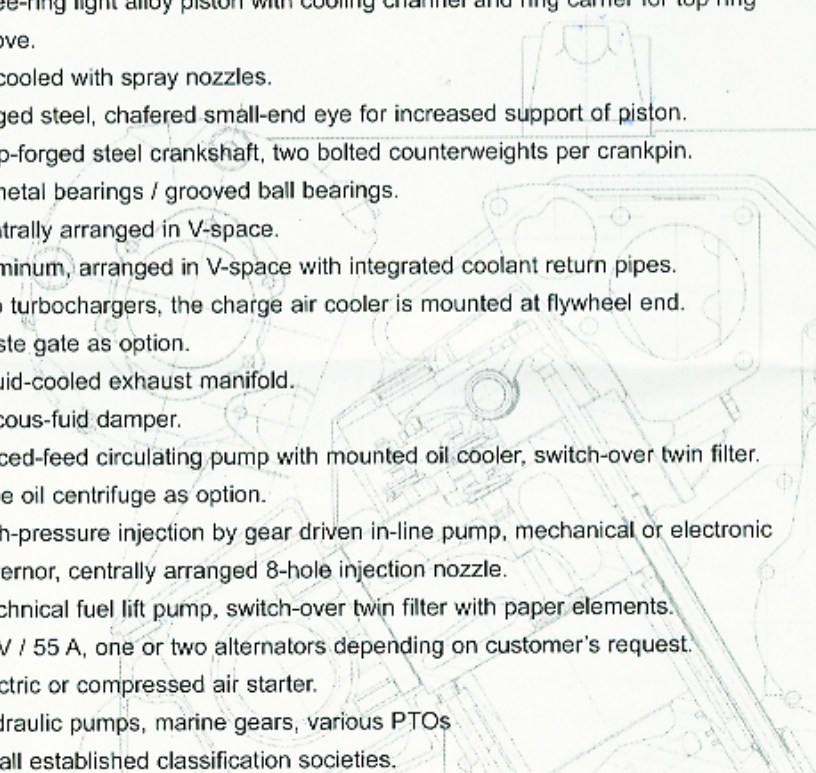


## ► Engine Description



<b>Types of cooling:</b> .....	1) Single-circuit mixed cooling as indirect cooling with engine mounted plate-type heat exchanger, coolant circulating pump, expansion tank, thermostats and raw water pump. 2) Single-circuit mixed cooling as keel-cooling with coolant circulating pump and integrated thermostats.
<b>Crankcase:</b> .....	Of gray cast iron with high rigidity.
<b>Crankcase breather:</b> .....	Closed-circuit system, vacuum controlled.
<b>Cylinder head:</b> .....	Four-valve cylinder head of gray cast iron.
<b>Valve arrangement / timing:</b> .....	Overhead valves in cylinder head, two inlet and two exhaust valves per cylinder, actuated via rocker arms and valve bridges. Inlet and exhaust ports of crossflow arrangement.
<b>Piston:</b> .....	Three-ring light alloy piston with cooling channel and ring carrier for top ring groove.
<b>Piston cooling:</b> .....	Oil cooled with spray nozzles.
<b>Connecting rod:</b> .....	Forged steel, chafered small-end eye for increased support of piston.
<b>Crankshaft:</b> .....	Drop-forged steel crankshaft, two bolted counterweights per crankpin.
<b>Crankshaft and big-end bearings:</b> .....	Bi-metal bearings / grooved ball bearings.
<b>Camshaft:</b> .....	Centrally arranged in V-space.
<b>Intake manifolds:</b> .....	Aluminum, arranged in V-space with integrated coolant return pipes.
<b>Turbocharging:</b> .....	Two turbochargers, the charge air cooler is mounted at flywheel end. Waste gate as option.
<b>Exhaust manifolds:</b> .....	Liquid-cooled exhaust manifold.
<b>Torsional vibration damper:</b> .....	Viscous-fluid damper.
<b>Lubrication system:</b> .....	Forced-feed circulating pump with mounted oil cooler, switch-over twin filter. Lube oil centrifuge as option.
<b>Injection system:</b> .....	High-pressure injection by gear driven in-line pump, mechanical or electronic governor, centrally arranged 8-hole injection nozzle.
<b>Fuel system:</b> .....	Mechanical fuel lift pump, switch-over twin filter with paper elements.
<b>Alternator:</b> .....	28 V / 55 A, one or two alternators depending on customer's request.
<b>Starting system:</b> .....	Electric or compressed air starter.
<b>Options:</b> .....	Hydraulic pumps, marine gears, various PTOs
<b>Classification:</b> .....	By all established classification societies.