Marine Heat Exchanger

There are three methods employed for water-cooled marine petrol and diesel engines: direct, heat exchanger and keel cooling. Direct cooling of the cylinders and heads by seawater is unsatisfactory, because the engine
– which was probably originally designed for radiator cooling – will run too cold and the sea-water will eventually ruin the cylinder block and heads. Keel cooling is suitable for small boats operating in shallow weedy water, but the need for pipework external to the hull is a severe limitation. Heat exchanger cooling is the most common method, the seawater being isolated in components which can be designed to withstand its corrosive affect. The closed fresh-water circuit can be thermostatically controlled so that the engine operates at its design temperature. Bowman heat exchangers are high-quality products incorporating both the best materials and the latest technical features. The tube stack is fully floating, thus minimizing thermal stresses, and it can easily be removed should cleaning be necessary. Bowman heat exchanger header tanks prevent aeration of the engine water circuit which must be designed so that the system is self-venting on initial filling. It is usual for all the components in the seawater circuit to be in series, the gearbox-oil and engine-oil coolers being on the suction side of the sea-water pump and the heat exchanger and any sea-water-cooled exhaust manifolds being on the discharge side. In the case of turbocharged engines the charge air cooler should receive the sea-water first so that the lowest possible air temperature is obtained. The sea-water outlet from the heat exchanger should be from the end cover equipped with the upper connection, this ensures that the tube stack is always full of water. The gearbox cooler size will depend on the type of transmission used, but it will usually be a size smaller than the engine-oil cooler. If preferred, the oil coolers can be fresh-water-cooled; these will need to be larger owing to the higher water temperature but need not be suitable for sea-water and can be taken from our leaflet ENGINE AND TRANSMISSION OIL COOLERS.

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A water-jacketed exhaust manifold is necessary on marine engines to reduce the temperature of the engine-room air space and the exhaust pipe. If the exhaust manifold is in the sea-water circuit it should be installed with the sea-water inlet at the back and the outlet at the front on the top to ensure that it operates completely full of sea-water. If the manifold is in the fresh-water circuit a small by-pass hole must be provided in the thermostat to ensure that some water is circulating through the manifold at ail times. A Bowman development is to combine a water jacketed exhaust manifold with the heat exchanger and header tank. This arrangement is particularly suitable for small seriesproduced engines; the manifold is cooled by fresh water and as a result a keel-cooled engine can be made by omitting the heat exchanger tube stack and the sea-water pump. On installation the fresh-water outlet from the manifold would be connected to the keel pipes and the return taken back to the engine fresh-water pump. Alternative type numbers are listed for these assemblies on pages 24/25. Heat exchanger/manifold assemblies are heavier than ordinary marine manifolds and must therefore be supported on the underside using the fixing lugs provided. When automotive engines are being converted for marine use the existing centrifugal-type pump should be retained for the fresh-water circuit and an additional pump fitted for the sea-water circuit. The sea water pipe bore should be chosen so that the velocity does not exceed 2 m/sec on the suction side and 3 m/sec on the discharge side of the pump. If the engine is being used to drive auxiliary equipment in a ship and the sea water supply is taken from the ship's main, ensure that the recommended flow rate cannot be exceeded.

typical arrangement showing the position of the heat exchanger, sea water cooled exhaust manifold and oil coolers on a marine engine.

Design Parameter

Max. working pressure on engine water side: 15 bar
Max. working pressure on sea water side: 15 bar Max.
working temperature：200°C
We produce customized applications on different working pressure and temperature.

Linan Beta Mechanical & Electrical Co., Ltd.
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Marine Heat Exchanger

Suitable for engine brands:

We produces various oil coolers for different brands. The brands includes:

CUMMINS, Land Rover, FORD, BRITISH LEYLAND, GARDNER, GENERAL MOTORS, MITSUBISHI, NEW HOLLAND, GENESIS, PERKINS, VW, PEUGEOT, VOLVO and so on.

Also, we provided customized products for customers.

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Performance data of marine oil coolers

Type	Sea water pipe (mm)	Engine Water Pipe	Engine power	
			kW	HP
DC 50	20/25	Rc 3/8" or 1/2"	30	40
DC 60	20/25	Rc 3/8" or 1/2"	40	54
DC 90	20/25	Rc 3/8" or 1/2"	60	80
DC120	20/25	Rc 3/8" or 1/2"	80	107
EC 80-E	32/40	Rc 1/2"	60	80
EC100-E	32/40	Rc 1/2" or 3/4"	90	120
EC120-E	32/40	Rc 1/2" or 3/4"	120	160
EC140-E	32/40	Rc 3/4"	150	200
FC100-E	65	Rc 1"	135	180
FC120-E	65	Rc 1"	180	240
FC140-E	65	Rc 1"	225	300
FC160-E	65	Rc 1"	270	360
FG100-E	Rc 2 1/2"	Rc 1 1/4"	225	300
FG120-E	Rc 2 1/2"	Rc 1 1/4"	270	360
FG140-E	Rc 2 1/2"	Rc 1 1/4"	360	480
GL140-E	Rc 2"	Rc 1 1/2"	360	480
GL180-E	Rc 2"	Rc 1 1/2"	450	600
GK190-E	100	Rc 2"	700	940
GK250-E	100	Rc 2"	950	1270
GK320-E	100	Rc 2"	1200	1608
GL140-H	Rc 1 1/2"	Rc 2"	180	240
GL180-H	Rc 1 1/2"	Rc 2"	250	335
GL240-H	Rc 1 1/2"	Rc 2"	320	428
GK190-E	Rc 2"	Rc 2 1/2"	360	428
GK250-E	Rc 2"	Rc 2 1/2"	450	600
GK320-E	Rc 2"	Rc 2 1/2"	550	737
JK190-E	Rc 2 1/2"	80	550	737
JK250-E	Rc 2 1/2"	80	700	938
JK320-E	Rc 2 1/2"	80	850	1140
PK190-E	Rc3"	100	700	938
PK320-E	Rc3"	100	950	1273
PK350-E	Rc3"	100	1200	1608
PK400-E	Rc3"	100	1400	1876

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