

JC130 diesel engine



CNPC Jichai Power Company Limited

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1. Product introduction

The JC130 series diesel engine is a high-power in-line engine independently developed by Jichai, with a power range of 2000kW-3200kW. The fuel can use MGO, MDO and HFO. It can be widely used in marine propulsion, pump power output, marine and land generator sets. IMO TIER II stage.



JC130 series diesel engine



JC130 series diesel engine set

2. Features of JC130 series diesel engine

JC130 series diesel engines have the characteristics of high power density, high efficiency, light weight, compact structure, long overhaul period, and humanized design for maintenance.

2.1 Product performance characteristics

a) Strong power: The power covers a wide range, which can meet the requirements of 2000kW ~ 3200kW.

b) Good economy: the fuel consumption rate is 185g/kW.h, and the oil consumption rate is less than 0.8 g/kW.h.

c) High reliability: The unique structural design and safety control system of the engine ensure trouble-free operation of the engine and a long overhaul period.

d) Good environmental protection: meet the requirements of the International Maritime Organization (IMO) for the Tier II stage of engine emissions.

e) High safety: meet the requirements of the International Convention for the Safety of Life at Sea (SOLAS).

f) Strong applicability: The fuel has good practicability and can burn heavy oil with a viscosity of up to 700cSt/50°C; according to the operating conditions of the engine, the optimal boost matching scheme is provided, and the heavy oil can be continuously operated under various load conditions. , both have better fuel consumption and emissions.

2.2 Features of product structure

- a) The body adopts an overall rigid design, with high safety; the cylinder unit is assembled as a whole, which is convenient for loading and unloading;
- b) Using advanced turbocharger and two-stage intercooler, the air intake performance is excellent;
- c) Simplified front cover, external oil pump and water pump, with simple structure, easy disassembly, convenient maintenance;
- d) The lubrication system is designed with an integrated oil adjustment unit, which integrates functions such as oil pressure regulation, temperature regulation, and spare port.

3. Technical parameters

3.1 Technical parameters of marine propulsion

Type of engine	Unit	JC130	JC150	JC170	JC190
Power (MDO, MGO)	kW	2190	2555	2920	3285
Fuel consumption	g/kWh	191 (100%MCR) /186 (85%MCR)			
Power (HFO)	kW	2040	2380	2720	3060
Fuel consumption	g/kWh	188 (100%MCR) /185 (85%MCR)			
Type		Four-stroke, turbocharged, two-stage intercooler			
Rated speed	r/min	800			
Cylinder arrangement		In-line			
Number of cylinders		6	7	8	9
Length	mm	5197	5642	6087	6532
Width	mm	1893	1893	1893	1893
Height	mm	3715	3900	3900	3900
Displacement		130	152	174	196
Bore	mm	270			
stroke	mm	380			
average piston speed	m/s	10.1			
compression ratio		15.9: 1			
turn around		Clockwise			
(facing the flywheel end)		Air motor starts, starting air pressure is about 10bar			
Starting method	MPa	200			
Maximum combustion pressure		IMO TIER II			

3.2 Technical parameters of generator set and engine

Generator set					
Model	Unit	CCFJ-2000	CCFJ-2200	CCFJ-2500	CCFJ-2800
Rated power	kW	2000	2200	2500	2800
Voltage	V	11000/6300/660/400			
Rated speed	r/min	750/720			
Frequency	Hz	50/60			
Power factor		0.8			
cooling method		Engine dual temperature forced cooling, generator IC01 air cooling			
Connection method		Elastomeric Coupling			
Protection class		IP23			
Excitation method		Self-excited constant voltage (AVR)			
Voltage fluctuation rate		±0.5%			
Transient Voltage Regulation		-15%~+20%			
Length	mm	7550	8000	8660	9110
Width	mm	1893	1893	1893	1893
Height	mm	3715	3900	3900	3900
Net weight	t	45	51	59	65
Engine					
Engine power	kW	2080	2310	2640	2970
Cylinder No.		6	7	8	9
Emission		IMO TIER II			

4. On-site application description

4.1 Technical parameters of marine light diesel oil and marine diesel oil in operating mode

Engine cylinder No.		6L	7L	8L	9L
Environment temperature	°C	45			
Intercooler inlet cooling water temperature	°C	38			
Air pressure	bar	1			
Relative humidity	%	50			
Engine output power	kW	2190	2555	2920	3285
Rotating speed	rpm	800			
Thermal equilibrium					
Intercooler (high temperature water)	kW	716	810	897	979
Intercooler (Low temperature water)	kW	249	282	317	353
Oil cooling	kW	242	341	390	438
Water jacket cooling	kW	326	380	434	489
Engine heat radiation	kW	54	63	72	81
Flow					
High temperature water circulation	m ³ /h	58			
Low temperature water circulation	m ³ /h	58			
Lubricating oil	m ³ /h	92.5	92.5	115	115
Air parameters					
Intake air temperature after intercooling	°C	54	56	57	58
Air flow	m ³ /h	13580	15844	18107	20371
	Kg/kWh	6.79	6.79	6.79	6.79
Intake pressure after intercooling	bar	4.07			
Air volume required for heat dissipation (t2-t1=10°C)	m ³ /h	17498	20414	23330	26247
Exhaust parameters					
Volume flow (turbocharger outlet temperature)	m ³ /h	28921	33741	38562	43382
Mass Flow	t/h	15.3	17.9	20.4	23.0
turbine outlet temperature	°C	385			

Heat content	kW	896	1045	1194	1343
Allowable back pressure	mbar	<30			
Pump (external pump)					
Diesel pump (fuel inlet pressure 3.5bar)	m ³ /h	2.35			
Oil pump	m ³ /h	60	60	75	75
High temperature water cooling water pump (2.5bar)	m ³ /h	58			
Low temperature water cooling water pump (2.5bar)	m ³ /h	58			
Starting air parameters					
Air consumption	Nm ³	2.9	3.3	3.8	4.3

4.2 Cooling system

The low temperature cooling water system consists of the following parts: low temperature cooling water pump, secondary intercooler, lubricating oil cooler, low temperature water cooler, control valve, expansion tank, etc. The expansion tank must be installed above the highest point of the cryogenic cooling water system.

The high-temperature cooling water system consists of the following parts: a first-stage intercooler, a high-temperature cooling water preheater, a high-temperature cooling water pump, and a high-temperature temperature control valve. The outlet temperature of the engine cylinder cooling water needs to be adjusted to 77-86°C.

For the high temperature cooling water system, each engine needs to be used for a separate high temperature cooling water pump, expansion tank, etc. The expansion tank is used to compensate for the system volume change and water loss due to leakage, and the expansion tank must be installed above the highest point of the high-temperature cooling water system.

The piping in the system should be as short as possible in order to reduce the number of system failures, especially the piping between the

three-way mixing valve and the engine inlet (cylinder cooling), which is critical for control.

HT: The outlet water temperature of the engine is controlled at 77-86°C, and the preheating is 60-90°C before starting. 15 minutes of post-cooling is required after the engine is stopped. LT: The air temperature after intermediate cooling should be controlled at 30-40°C.

In a high temperature environment, the parallel operation of the oil heat exchanger and the low temperature heat exchanger should be considered. It is recommended to have a maintenance water tank for draining and reusing water during maintenance such as the cylinder head.

4.3 Starting system

The compressed air system of the engine consists of a starting system, a starting control system and a safety system. Furthermore, the system supplies air to the injection booster system and the brake cylinders of each fuel injection pump. The air in the starting air bottle (30bar) is reduced to 10bar by the decompression station and then supplied to the engine. The decompression station should be located as close as possible to the priming air bottle. The engine is started by an on-board air motor, which is a turbo motor with a gearbox, safety clutch and a pinion drive shaft. The starting system is fitted with a main starting valve.

The gas starting sequence is as follows:

- a) When the priming valve is open, air is supplied to the drive shaft housing of the air motor.
- b) The air pushes the piston inside the motor so that the drive pinion extends and meshes with the ring gear on the flywheel of the engine.
- c) When the pinion gears are fully engaged, control the

inflow of air, open the main start valve, and enter the air motor at the main start valve to run the engine.

d) When the speed exceeds about 158 rpm, the engine starts to ignite, the starter valve is closed, and the starter motor is disengaged.

4.4 Fuel system

Diesel from the storage tank, after being processed by the diesel separator and diesel separator, enters the fuel primary filter, and the filtered clean diesel is pressurized into the fuel filter through two fuel transfer pumps (one for use and one for standby). This filter is a double device. , to ensure non-stop cleaning of the filter. Filtered fuel enters the engine from the fuel injection pump; the engine fuel injection pump returns fuel into the fuel tank. The system is also equipped with a leaked oil collection tank, which can collect leaked oil and save costs.

4.5 Lubrication system

The JC130 series engine is equipped with an independent lubrication system. Wet oil pan is adopted, and the lubrication system is composed of external pre-supply oil pump, backup pump and other equipment together with machine-operated lubricating oil pump, automatic filter, centrifugal filter and oil cooler. The internal lubrication of the engine and supercharger is forced lubrication. In addition, the cylinder liners and valve seats are also forcibly lubricated.

The lubricating oil system includes: external accessories: pre-supply oil pump, oil tank.

Internal parts: pressure regulating valve, one-way valve, automatic oil filter, centrifugal filter, temperature regulating valve, oil cooler, oil pump and lubrication pipeline.

When the engine is working, pre-lubrication should be carried out before starting, and post-lubrication should be carried out after stopping, especially after emergency stop, and lubricating oil should be preheated in low temperature environment.

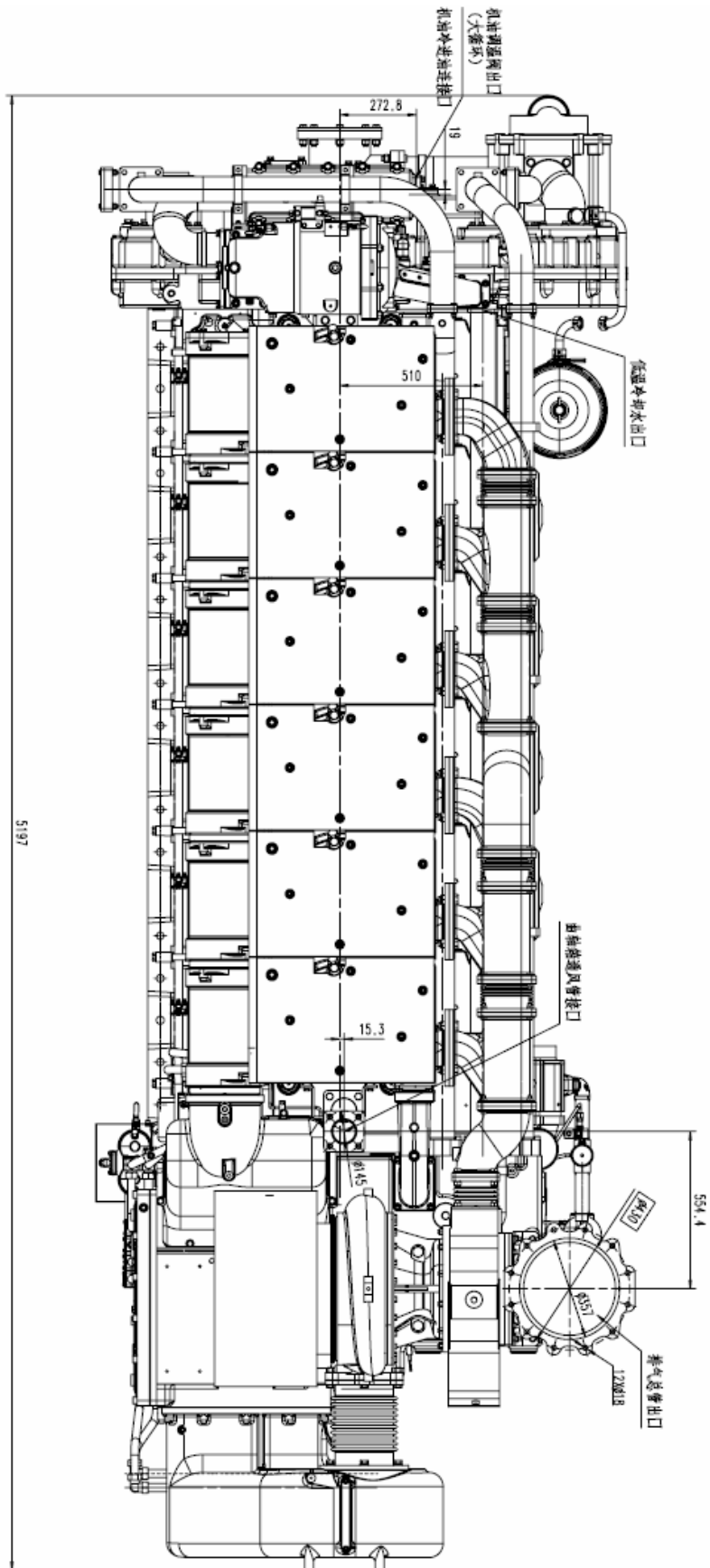
Pre-lubricate for 5 minutes before starting; lubricate for 15 minutes after stopping

The pre-oil pump is also used for supercharger lubrication after parking, and the duration of post-lubrication is 15 minutes.

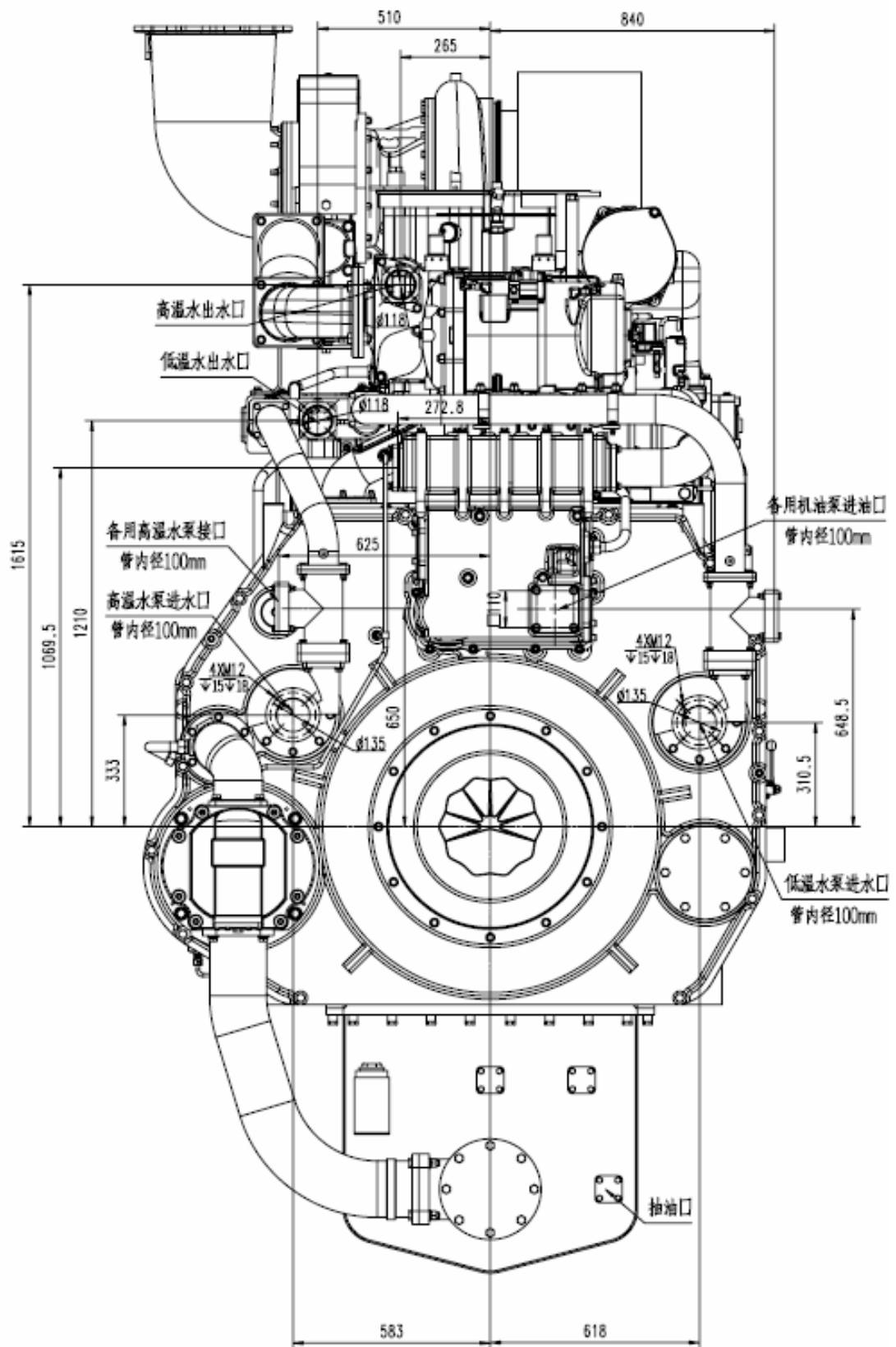
5. Scope of supply and configuration

Item	Description	Standard	Option
1	Flywheel, ring gear with reel	✓	
2	Electric turning mechanism and safety interlock device	✓	
3	Crankcase explosion-proof door	✓	
4	Main bearing temperature sensor	✓	
5	Governor	✓	
6	Diesel engine monitoring and security system	✓	
7	Fuel double filter	✓	
8	Fuel return cooler		✓
9	Fuel return back pressure valve		✓
10	Fuel transfer pump	✓	
11	Plate type oil cooler		✓
12	Oil temperature control valve	✓	
13	Oil pump	✓	
14	Electric backup oil pump		✓
15	Automatic backwash filter for lubricating oil	✓	
16	Centrifugal filter	✓	
17	High temperature water pump	✓	
18	Low temperature water pump	✓	
19	High temperature water temperature control valve	✓	
20	High temperature water temperature control valve	✓	
21	Electric high temperature water pump		✓
22	Electric low temperature water pump		✓
23	Cooling water preheating unit		✓
24	High temperature water plate cooler		✓
25	Low temperature water plate cooler		✓
26	Air bottle		✓
27	Air pressure reducing valve group with safety valve and filter		✓
28	Air starter motor	✓	
29	Supercharger	✓	
30	Two-stage intercooler	✓	

31	Supercharger Random Tool		✓
32	Turbocharger random spare parts		✓
33	Exhaust temperature sensor	✓	
34	Turbocharger outlet expansion joint	✓	
35	Muffler with spark extinguishing function		✓

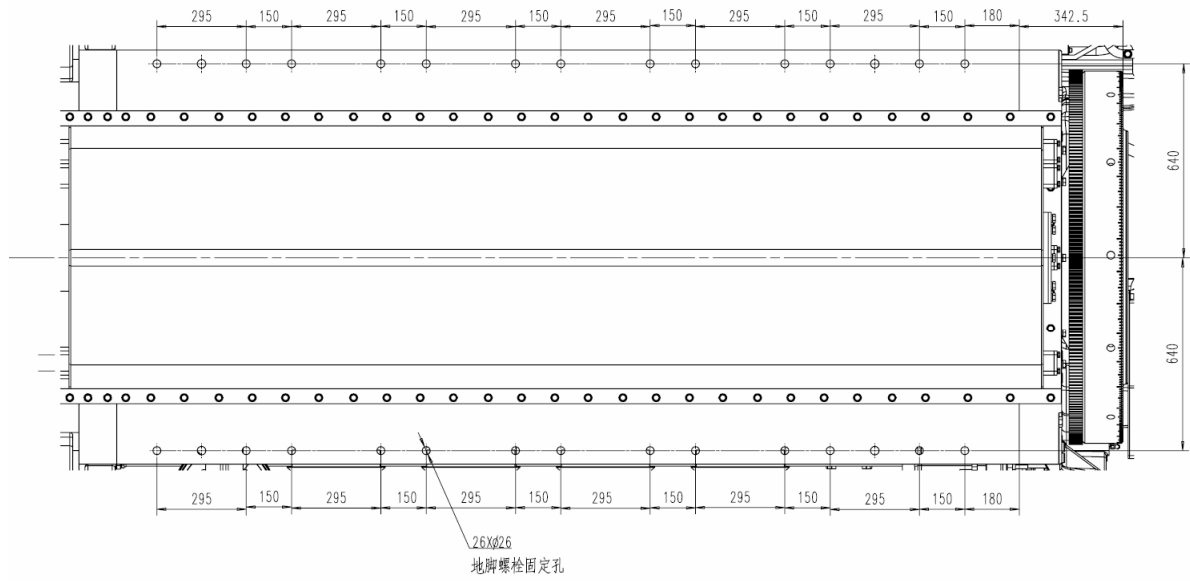


Top view of JC130

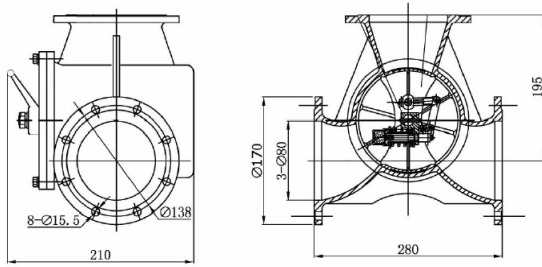


End view of JC130 shock absorber

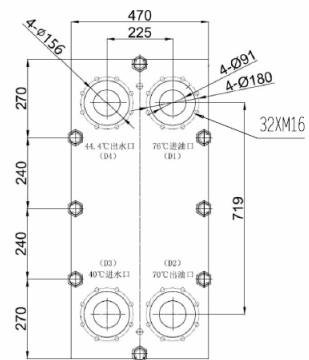
机体底面视图



高低温调温阀接口尺寸



机油冷却器接口尺寸



Bottom view of JC130 body and size of oil and water interface