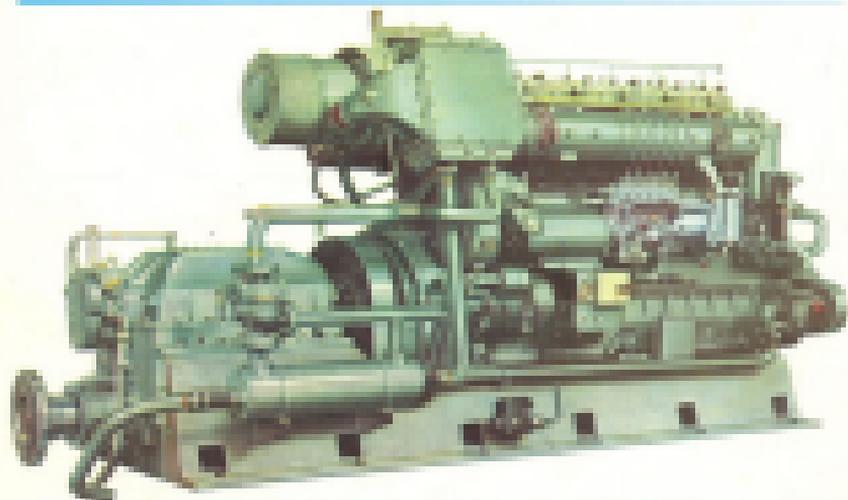


LS 350-M

práci v mrazáku



Lodní soustrojí
s motorem 4 L 150 PV-2



AKUŠTI

Tato loďní soustrojí je určeno k pohonu lodí s celkovou hmotností až 3500 kg. Je vybaveno 4 L 150 PV-2 motorem, který poskytl výkon 150 kW při 1500 ot./min. Soustrojí je navrženo pro provoz v mrazáku a je vhodné pro použití v lodích s celkovou hmotností až 3500 kg.

ROZMĚRY

Je vhodná pro lodě s celkovou hmotností až 3500 kg. Rozměry soustrojí jsou: délka 1200 mm, šířka 600 mm, výška 800 mm. Soustrojí je navrženo pro provoz v mrazáku a je vhodné pro použití v lodích s celkovou hmotností až 3500 kg.

MOTOR 4 L 150 PV-2

Motor 4 L 150 PV-2 je čtyřválcový motor s výkonem 150 kW při 1500 ot./min. Je vhodný pro použití v lodích s celkovou hmotností až 3500 kg.

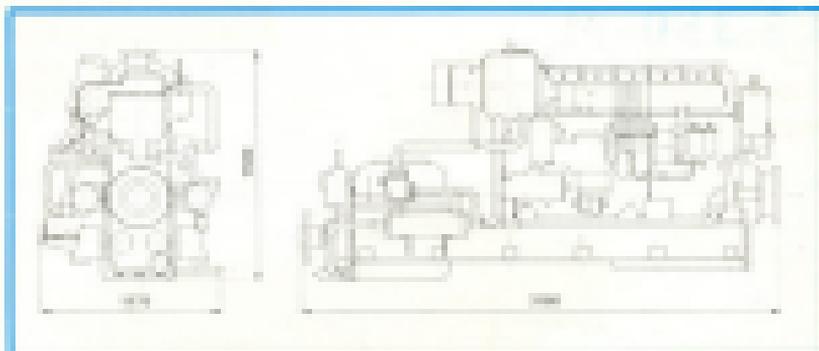
Provozování soustrojí je možné v mrazáku. Soustrojí je navrženo pro provoz v mrazáku a je vhodné pro použití v lodích s celkovou hmotností až 3500 kg.

PROJEKOVANÁ TYP V-150 M

Projektovaná typ V-150 M je soustrojí navrženo pro použití v lodích s celkovou hmotností až 3500 kg. Je vhodné pro použití v lodích s celkovou hmotností až 3500 kg.

RAM

Ram je součástí soustrojí a je navrženo pro použití v lodích s celkovou hmotností až 3500 kg. Je vhodné pro použití v lodích s celkovou hmotností až 3500 kg.



Technické údaje

Model

Typ	SP3000	4 2000
Typ motoru	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000

Typ

Typ	4 2000	4 2000
Typ motoru	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000

Charakteristika

Typ	4 2000	4 2000
Typ motoru	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000
Typ motoru (výkon)	4 2000	4 2000

Technické údaje a 3D CAD modely jsou k dispozici pouze pro vybrané modely.

Technické údaje a 3D modely jsou k dispozici pouze pro vybrané modely. Pro více informací kontaktujte naše oddělení pro technické údaje a 3D modely.

Technické údaje a 3D modely jsou k dispozici pouze pro vybrané modely.

Model



ČKD PRAHA

Technické údaje

Model

SP3000

Model, technické údaje

Model, technické údaje

Model, technické údaje

Technické údaje motoru

Typ	4 2000
Typ motoru	4 2000
Typ motoru (výkon)	4 2000

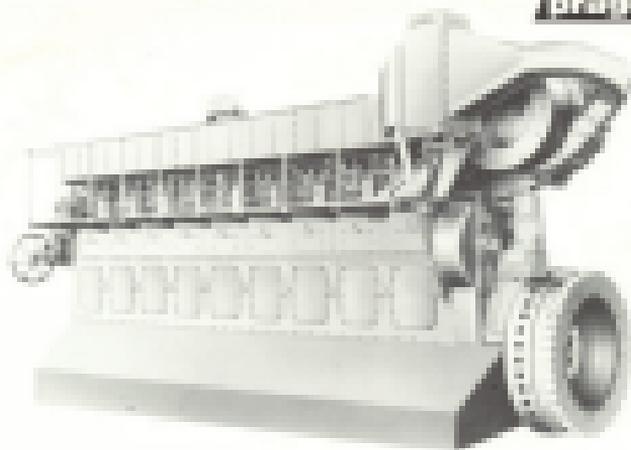
Technické údaje motoru

Typ	4 2000
Typ motoru	4 2000
Typ motoru (výkon)	4 2000

Technické údaje motoru

Typ	4 2000
Typ motoru	4 2000
Typ motoru (výkon)	4 2000

propulvest



**DIESEL ENGINES
ČKD PRANA**

MARINE PROPULSION DIESEL ENGINE 9 L 350 II PS TYPE



This is a four-cylinder, single-acting, stroke-unit with direct injection, turbocharged, and directly reversible. The reversing mechanism is of the pushrod-Schwartz type, the shaft for reversing mechanism is hand operated.

Reliability of operation is assured by a control and safety operating system, including cooling water and lubrication oil temperature and lubrication oil pressure, as well as for a watermeter.

The 9L-350PS engine is suitable for the propulsion of passenger and cargo motor-yacht vessels, fishing boats, and other types of vessels.

CRANK (CRANKCASE) The cast iron crankcase comprises an upper and a lower cast half bolted together by means of through bolts, the two halves of crank shaft. The lower part is cast in the bottom and provided by a light, thin metal skin which forms continuous longitudinal skeleton of hullplate.

CYLINDERHEAD The cylinderhead is finished with a cast, upper steel flange and provided with counterweights for lifting it at short intervals in the case of the vertical shaft-bearing.

CYLINDER LINERS They are made of special cast iron.

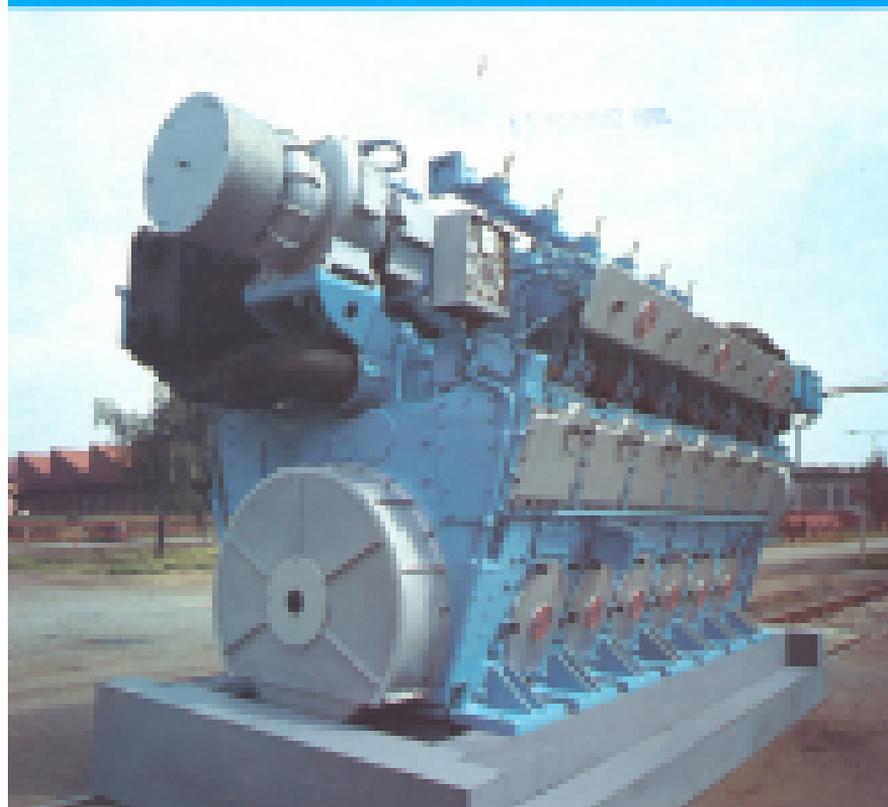
CYLINDER HEAD It is of cast iron construction and fitted with the inlet and exhaust valves complete with their valve stems, furnished with a timing, safety and injection valve as well as with an exhaust silencing/dampening the exhaust gas.

27,5 B8

IRVING ENGINE RANGE IS A REPRESENTATION OF THE VAST PROGRAM OF TRUBRA TECHNOLOGY, S.A.

TRUBRA HAS DEVELOPED ENGINES WITH DIESEL FUEL INJECTION, SINGLE OR DOUBLE CYLINDER, NON-OVERLAPPING, WATER-COOLED, WITH COOLING OF FRESHING AIR, 1500-RPM.

THE ENGINES WITH ALL AND MOST CYLINDERS ARE IN LINE CYLINDER ARRANGED AND WITH THREE CYLINDERS IT IS IN V-ARRANGEMENT OF CYLINDERS IN THE SCALE OF 45°. THE RANGE IS MADE AVAILABLE IN RIGHT LEFT HAND CONFIGURATION OPTION.



DIESEL ENGINES



**IRVING
ENGINE**



Modernized engine of engine HRADEC KRÁLOVÉ Ltd. combines the concept engine P1.100 in the structure bearing pressure and structure. The diesel engine P1.100 consists of three pistons, one on each side, in the bearing of piston, connecting and crankshaft, etc.

The fuel injection (oil) system of 8% of 15% of fuel oil and the remainder of gas. The given quantity of fuel oil is constant and constant, increasing due to burning process and of engine's lower output mode. The ratio alcohol fuel oil and gas increases up to 100% of fuel oil using. The pressure in the cylinder of fuel oil gas increases in the type of the engine and the quantity of gas.

Operating with the mixture alcohol of the range of engine P1.100 increased fuel oil the engine's output almost but engine power decreases.

HRADEC KRÁLOVÉ Ltd. is able to carry out the modernization of engine isolated engine that are constructed only for fuel oil burning.

Marine application

The marine version of diesel engine range P1.100 is connected with the marine gas cycle with the water shaft for increased torque and the structure. The marine type P1.100 is connected with the double bearing type HRADEC with a marine gas line. The marine gas line type 1000 LHM reduces the marine engine revolution in the demanded part of propeller revolution. It keeps the total power from the propeller automatically decreasing in the operation by means of the fuel control shaft. The gas line is connected with the admission by means of the double connecting coupling type HACO 21. The shaft of the double coupling coupling VOLCAN H1000 is connected in the gas line marine line through the propeller shaft-type.

The structure of the frequency of 10 Hz at 1000 rpm, automatically developed shaft.

The water filling unit is achieved coupled with the automation and HACO which contains the remote control system, the remote operation, the regulation and the oil pressure.

The unit is designed for the driving of marine ships with the greatest weight.

After modernized diesel engine can be also connected with the structure marine gas line type 77 H. The gas inlet of the gas line in the range of 1.10-1.00 occurs the lowering of the

number of revolutions of the frequency level of a gas propeller revolution.

The engine that another unit is provided with the single type P1.100 which is connected by means of the double coupling type HRADEC with the marine gas line type 1000 LHM. The gas line is achieved through shaft, after changing position. The VOLCAN H1000 HRADEC H1000 H1000 and HACO 21 HRADEC with two control shafts are drive gas admission. The double bearing type VOLCAN H1000 H1000 is achieved the structure shaft decreasing in diameter in the gas line, etc.

The A.C. structure of the frequency of 10 Hz achieves the output of 100 kW at 1000 rpm. From the output shaft for driving of the A.C. structure it is possible to increase the output of engine at 1000 rpm, after the gas propeller driving unit is equipped with the automation and HACO. It automatically the structure of the marine ship with automatic operation.

The diesel engine P1.100 is connected by means of the double bearing HACO 211 with the marine bearing double bearing and double shaft. The marine gas line series and the changing in the revolution structure of the marine propeller-type shaft and automatically it reduces the engine revolution in the demanded level of propeller revolution. The shaft and output shaft-type has one structure a central line. The gas line is 21.

All the marine unit can be according to the customer's demand delivered with the inspection of the classification society.

The range of diesel engine P1.100 represents the marine ship in the development of power marine of cylinder bore 200 mm. They are different automatic automatic control that is consisted of the world. The development of the type has been based on the rich results of the marine construction work and long years experience, knowing from the production and the completion of the diesel engine in different part of the world.

The new design of the structure control line of the marine engine of high reliability and long service life covers the wide range of output from 100 kW to 1000 kW. The type of engine runs and is adapted, the automatic engine or engine construction to give high output at long time, even full-loading performance operation at different climate conditions.

Developmental development and data given in literature and our information. The data are submitted in the brochure effect.

27,5 B8

Crankcase

A cylinder cast from phosphorus grey iron. It carries completely 100% supporting the cylinder liners, bearing shells of crankshaft and cylinder heads. At 180° cylinder cast of the crankcase provides with a safety valve. The cast is equipped with oil scoops, which automatically remove/clean contaminated oil. The lower part of the crankcase is inclined by a slight angle of 2°.

Cylinder liner

The cylinder liner is cast from grey iron. It is reinforced, mounted to the crankcase in the lower part. It is protected by cooling water and to flow into the crankcase sump.

Cylinder head

The cylinder head is cast from grey iron with corresponds to all the demands placed on high speed/light engine. Thanks to cast of the head ensures strength and intensive cooling. In the cylinder head there are cast valves and two exhaust valves, overhead camshaft, timing and safety valve, intake and exhaust branches with a valve. The cast has strengthened exhausts made of special material and their stems are strengthened. The exhaust valves are protected with coatings which ensure their smooth working during the operation.

Crank mechanism

— The crankshaft is cast from the crankcase in the intermediate bearing bushes with help of porous injection holes. It is stamped above parts of phosphorus alloy steel.

It is strengthened with the dampers, the both ends on the higher detail crankshaft output hole, all cast from the front end of the engine. It is provided with two counterweights on each crank. On the front end of the crankshaft, the dampers at resonance vibrations is mounted. Main and conrod bearing shells are castable, interchangeable. The bearings are low-wall, three-lobed, specially treated by way of metal plating.

— The piston consists of two parts — lower part is cast from special aluminium alloy. The piston crown is cast separately. The piston cooling is ensured by oil. The pistons are provided with four packing rings and one scraping one. All the rings are oil-lubricated above the piston pin.

— The second consists of three parts, forged of steel-rod-like alloy steel. It is the center of the

overhead engine. The second consists of three parts, forged by alloy steel. It is fixed on the front flange by three bolt bolts. The rod head, is drilled in the forward, it secures the piston-rod.

Crankshaft

The crankshaft is made, castable from special phosphorus alloy steel. It is driven from the crankshaft by means of gear system arrangement on the side of the crankshaft. There are cast into each of the crank and one of the pistons gear for each cylinder and hydro-mechanically provided in the shaft area the tapered bushes. The rollers are provided from the main and exhaust valves by means of rollers and levers. The roller works support of the pistons cast are the phosphorus of the cast iron being. The roller works the roller bars on the roller is secured by the locker screw. The roller bars are in the safety control pipes.

Injection pumps

The injection pumps are three, independent, for each cylinder. Each pump is equipped with the balance wheels, ensures the pump working time during the engine operation.

The injection pump delivers fuel by means of tapered pipes and injection valves into the cylinders.

Fixed governor

The engine revolutions is secured by the mechanical hydraulic regulator that keeps given engine revolutions independent from the loading. The revolution adjustment is carried



not, usually by the compression of the mixture or, alternatively, manually by the hand on the piston. The speed governor is of modern design, it consists of independent unit with its own oil pump. For the oil being it is possible to use the same type of oil as for the engine.

Supercharging

multi-stage supercharger for the intake system. In six and eight cylinders set, the intake air is supercharged (supercharged) and supercharging is carried by one high pressure turbo-supercharger driven by exhaust gas. In the twelve cylinders there are two turbo-superchargers, installed not for each line of cylinders. Charging air is conducted the same order.

Lubricating system

The engine lubrication is carried by pressure oil of the 150 oil pump that includes oil filter. The oil is drawn by the motor and the cleaning is carried out through the strainer, the supercharging valve. The oil temperature is keeping up by the heat governor. There is a return oil from the motor. The oil is fed from where it returns self-automatically maintenance oil tank.

Cooling system

The engine cooling is water double circuit. The lower circuit is cooled by the water-cooled fan. Forced cooling water is delivered by the compressed pump up to the engine pump from the cooling space of turbocharger. Turbo-charger part of water is directed for the turbocharger cooling. Fresh-charged water is directed into the heat governor that returns water into the pump. Another system or about the direct water under by means of the turbo.

The external circuit needs lubricating oil in the oil cooler, internal circuit cooling water in the water-water cooler and charging air in the heat exchanger.

Fuel system

The engine is started with fuel from the separate tank. The improvement of the engine efficiency even heavy loads of the necessity of up to 100 percent of 20°C, the maximum content of moisture of 10%, the maximum content of viscosity of 100 ppm, sulphur 10 ppm, on the preservation of special fuel should be examined and different specifications (standard, pump, motor, cooling).

Engine starting

The engine starting is carried out by compressed air or the pressure of 1.5 MPa, which is compressed from the starting turbine through the main engine starting valve by the air distributed and to the particular cylinders.

Stationary operating

The engine without engine 250 kW is usually used for stationary purposes. The engine cycle used on the diesel generating sets or for driving of pumps, compressors and the fans. The design of engine enables the construction of the output shaft from the front end of the crank shaft, i.e. from the opposite side of the flywheel.

As the main generating sets, in the construction with the alternator of the frequency of 50 Hz, they are used as auxiliary or primary source of electric power for the lighting, the power that influences the correct life of diesel engine very well they are usually used especially in the permanent power of 250 kW generating set of oil in fans. Address technical drawings.

All the diesel generating sets can be delivered either with the hand starting or with the automatic starting, including the automatic starting without starting.

The diesel generating set can work permanently between each other or with the motor.

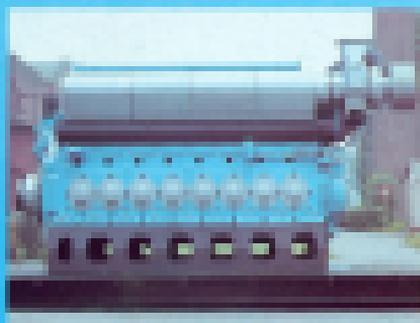
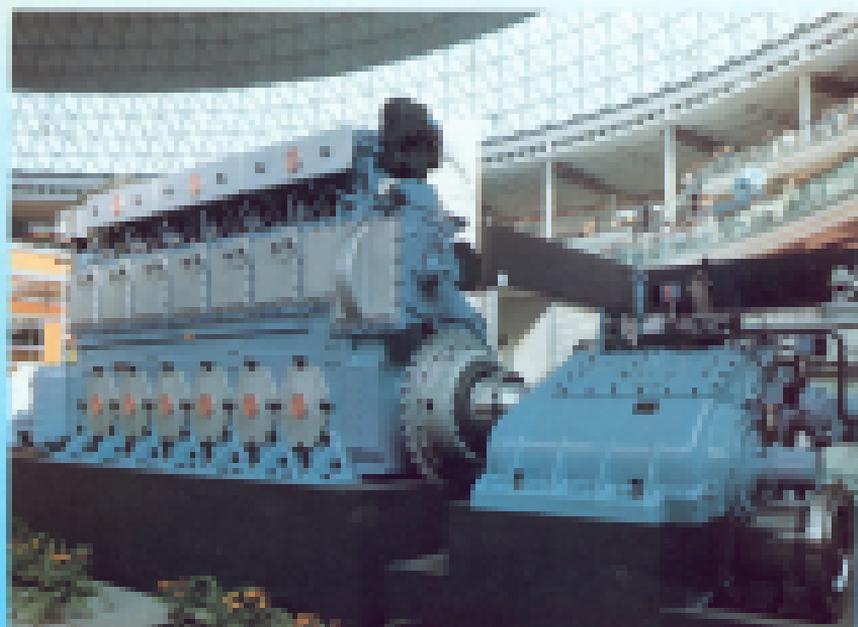
According to the customer's choice depending on provide the diesel generating sets with the accessories for using of exhaust gas lines.

Technical parameters of diesel generating sets

Characteristics	1000	1.67.1000	2.02.1000	1.19.25.1000
alternator efficiency	90%	90%	90%	90%
output	100 kVA	160 kVA	200 kVA	250 kVA
rotational speed	750	750	750	750
dimensional A - length	1000	1200	1400	1500
B - width	1000	1200	1400	1500
C - height	1000	1200	1400	1500
weight	12	17	24	30

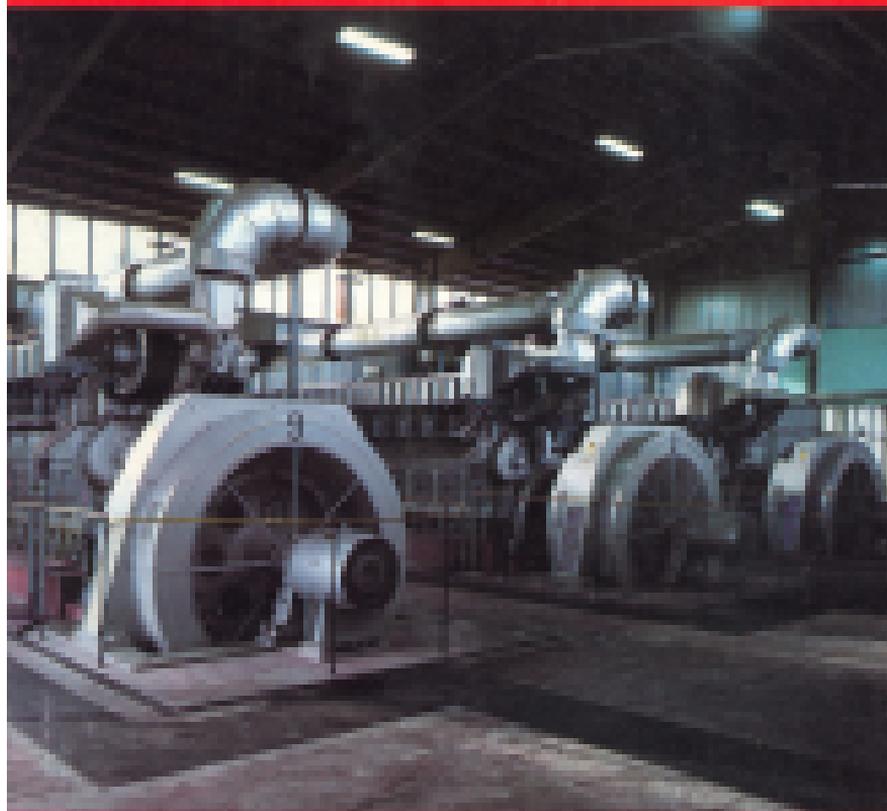
According to the customer's demand it is possible to build also other types of alternator.

The engine with the alternator can be delivered on the common flexible cooled space. The six and eight cylinders engines are constructed with the water-water cooling. The engine 250 kVA, which is constructed with the alternator by means of the flexible coupling VTEC 200.



6 S 350 PN 9 Ts 35/50-2

DIESEL ENGINES OF 200 mm BORE AND 200 mm STROKE ARE PRODUCED BY
ČERVENÁ KRAJČKA, LTD. IN TWO TYPES - DIESEL ENGINES 6 S 350 PN AND 9 T
35/50-2.



DIESEL ENGINES



**ČERVENÁ
KRAJČKA**

6 S 350 PN 9Ts 350

Both diesel engines are designed only for the generation of 40 or 45 hp (30 kW). They are the most suitable means of electric power for local electrification systems, production, transportation and agricultural engines, especially in the developing countries. They are outstanding in their high operational reliability, long service life, minimal requirements for maintenance and low amounts of spare parts. These rugged, low-speed diesel generating sets of simple construction were designed and constructed for continuous operation in extremely difficult conditions.

Further dimensional and mass parameters of the main difference between the two types consists in the number of cylinders, the way of connecting and flow rate in the cooling system.

Engine

Both types are four-cylinder, vertical engines, with two valves per cylinder, water-cooled, naturally aspirated.

Crankcase

It is made of high-quality grey cast iron having mechanical and thermal stresses. It is provided with large openings ensuring easy cleaning of internal parts. The opening is covered by lid with safety valves. Excess water collects in the upper part of the crankcase, easy maintenance of the upper part of the engine.

Crankshaft

It is forged in one piece of high-quality alloy steel. Special attention was paid to the construction of connecting rod, the bedding of the crankshaft mechanism and the main bearings.

Cylinder liners

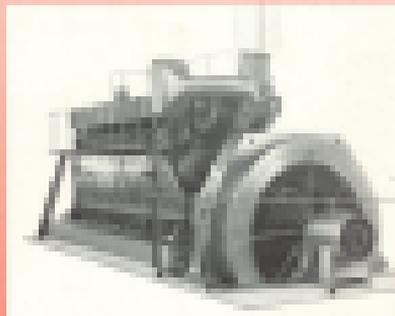
They are manufactured from special advanced quality technology with perfect surface treatment and finishing. Due to the advanced material technology of increased surface density of material, high tensile strength, the cylinder liners are not subject to the risk of excessive deformation being worn out.

Pistons

They are manufactured from special advanced alloy. Each piston is provided with rings according to the performance, so that optimal oil consumption will long service life.

Cylinder heads

They are made of cast iron of higher strength, take each cylinder head intake and exhaust valve chambers are situated. Along with guide, each chamber is very structure easy maintainable between double-camshaft.



Governor

It is controlled with hydraulic booster and can adjust with adequate work capacity and high response, designed for control of 50% synchronous speed-governing sets. The governor is equipped with electric fuel injection control.

Lubricating system

It consists of a gear pump, driven from the engine crankshaft. Oil is drawn into cylinder pressure tank situated near from the engine through two air cleaner. There are two major control lubricating systems.

Fuel system

Fuel is transported from a tank in the upper part. Fuel from this tank has a distributor by means of mechanically driven pump through filtering net into the major injection system. The injection fuel is released by means of an electrically driven pump. It is equipped with safety valve.

Cooling system

A multiple-water cooling system included in the scope of standard delivery consists of a pump driven by electric engine, all the necessary ad-

50-2



oil and pumps. According to the customer's demand, flexible cooling systems can be delivered including auxiliary pump driven by an electric engine, a fuel oil filter and an separating tank. A simple cooling system with air-water radiator can also be delivered.

Starting system

The engine is started and is compressed air from a starting bottle. The starting tank recharged by a compressor of the capacity of 10 litres, maintains pressure in 1.5 MPa. The compressor is driven by a four-cycle, six-cylinder, two-cycle, five-speed engine. The engine is also equipped with water and oil separator. According to the customer's requirements, equipment alternative to electric engine can be delivered.

Turbocharger

It consists of a two-stage, low pressure turbo, low blow-up ratio and low flywheel. The turbocharger is supported on the turbocharger in one end on the flywheel and in two bearings. Lubrication is independent of the engine lubricating system. Heating of the turbocharger is secured by the engine cooling system.

Generator

It is asynchronous, three-phase with six poles, self-excited and with 200% loading. Parameters: 230 and 230 barbers and temperature rise are higher than 1.0K. Asynchronous, six, voltage regulation is secured by a self

excite A.P.R. suitable for parallel operation, equipped with voltage and power-factor. Manual voltage-regulation is possible also with help of control equipment. Maintenance of the generator is reduced to a minimum.

Switchboard

Systems of six poles type provide connection for electrically and mechanically interconnected in various ways. Electrically and manually operated main circuit breaker is provided with magnetic and thermal protection for each pole. Advantage is that the circuit-breaker contains complete three-connection system which breaks, protects and starts all the power-cables and other appliances delivered with the generator set. The switchboard is also equipped with all the safety and auxiliary cables, emergency-lighting, emergency power supply and other accessories necessary for reliable use, loading and operating of the diesel generating set. It is suitable for parallel operation, according to the demand the control equipment can be delivered.

Signalisation

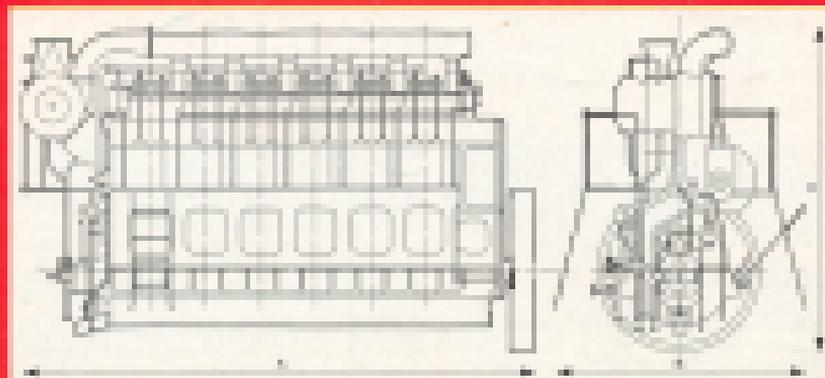
It is two-stage, i.e. at the first stage it operates optically and acoustically the engine or the generator coolant, the oil-pressure, exhaust, fuel, position of the operation the main circuit breaker and condition of the engine. It is battery, charge-free instrument notified are included in the delivery.

Technical parameters of diesel generating sets

Characteristics	50/230	50/230 P70	50/230/230-2
50 Hz frequency generator output of 50 kw voltage	50 50% V	50/230/230-2 50 50/230	50/230/230-2 50 230
50 Hz frequency generator output of 100 kw voltage	50 50% V	50/230/230-2 50 400/230/400	50/230/230-2 50 230
Dimensions: A-length	mm	1 600	1 600
B-length	mm	1 800	1 800
C-length	mm	1 100	1 100
weight	kg	21 500	22 000

According to the customer's demand it is possible to deliver also the structures of other types and voltage.

Owing to continuous technical development, our data given in this leaflet are only informative. The final data are submitted in particular offers.



Diesel engines type 6S 308 FN and 4Tn 30-30-2

Characteristics	6S 308 FN	6S 308 FN	4Tn 30-30-2
number of cylinders	6	4	4
cylinder bore	100	100	90
stroke	130	130	120
engine output power, kW	44	33	30
rpm	1750	1750	1750
stroke volume, cm ³	4100	2700	3700
fuel consumption, g/kWh	200	170	170
weight	400	220	220
Dimensions: A - height	600	400	400
B - width	400	300	300
C - length	400	400	400
mounting		low position	high position

The data presented in the catalogue should not be regarded as 100% temperature - 20 °C, relative humidity - 65%.

Both types of diesel engines may be overloaded by 10% for short-term periods of normal operating conditions.

Both diesel engines may not be allowed to run in the maximum burning fuel mixture at full rpm, unless the value of 6000W and 1300 kW.



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