MARINE GENSETS DIESEL ENGINE

General Catalog





Next Stage

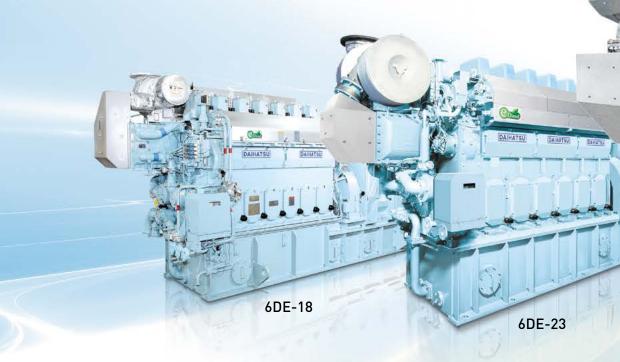
Advancing toward a New Horizon

Our clean and powerful "e-Diesel" is packed with top-level quality and technologies that Daihatsu Diesel has accumulated and refined over many years since the foundation of the company in 1907.

Daihatsu Diesel's history is marked by relentless challenges toward achieving the engine performance demanded by the changing times and meeting new needs.

This challenging spirit is unchanged today and will continue into the future.

Daihatsu's e-Diesel is constantly advancing in order to deliver the ultimate performance that only a continually evolving company can attain.



DAIHATSU DIESEL Since 1907









V







8DE-33







Certified by eight classification societies in the world

ABS(American Bureau of Shipping)
BV(Bureau Veritas)
CCS(China Shipping Classification Association)
DNV·GL(Det Norske Veritas·Germanischer Lloyd)
KR(Korean Register of shipping)
LRS(Lloyd's Register of Shipping)
NK(Nippon Kaiji Kyokai)
RS(Russian Maritime Register of Shipping)

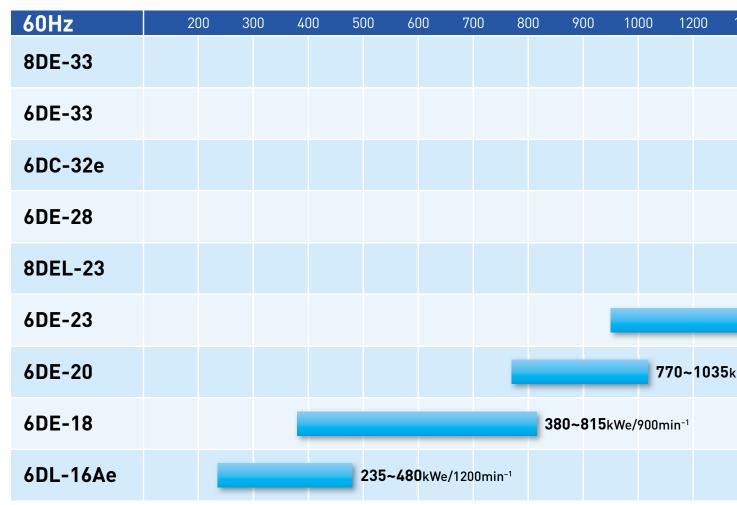


Clean & Powerful

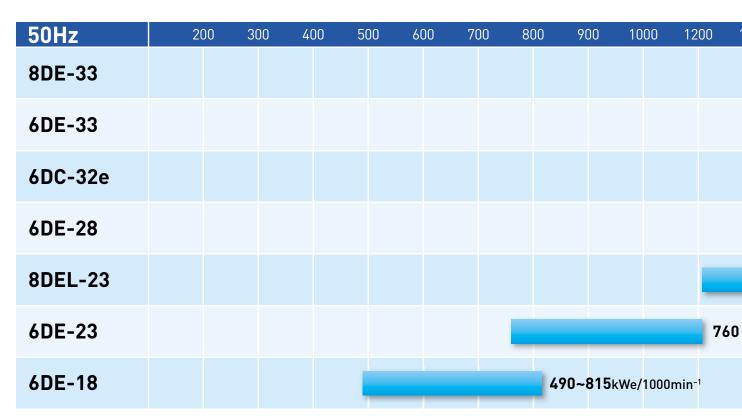
e-Diesel engines are gentle to the earth's environment.

They boast reduced NOx emissions as well as high fuel efficiency for reduced CO2 emissions.

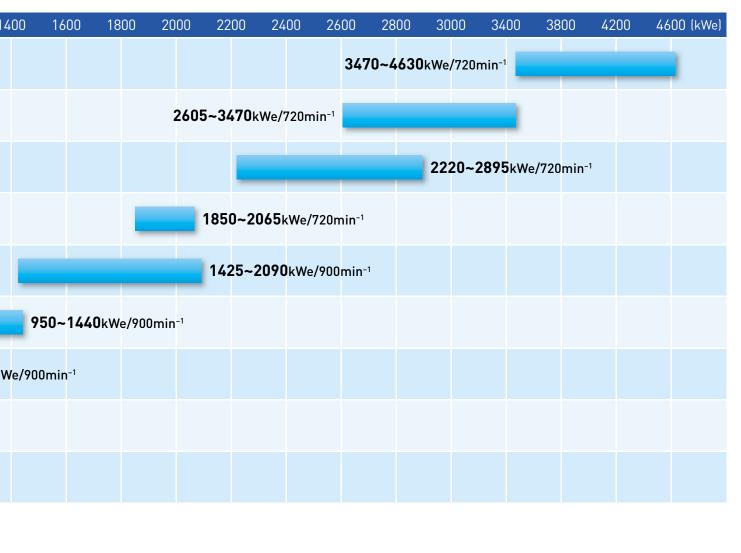
■ Engine output chart



Information on series other than the above is listed on page 10.



Information on series other than the above is listed on page 10.





DE-18

Main data

Cylinder bore : 185mm Piston stroke : 280mm No. of cylinder: 6 Pme : 2.5MPa

Piston speed: 8.4m/sec.(at 900min⁻¹)

9.33m/sec.(at 1000min⁻¹)

Fuel oil : MD0~up to $700 \text{mm}^2/\text{s}/50^\circ\text{C}$ HF0



Main specifications

Model			Output		
Mouel	Engine speed	(min ⁻¹)	900	1000	
6DE-18	Engine	kWm	400~860	520~860	
ODE-10	Generator	kWe	380~815	490~815	

The generator output values are based on power generation efficiency of approximately 95%.

DE-20

Main data

Cylinder bore : 205mm Piston stroke : 300mm No. of cylinder: 6 Pme : 2.45MPa

Piston speed: $9.0 \text{m/sec.} (\text{at } 900 \text{min}^{-1})$ Fuel oil: MD0~up to $700 \text{mm}^2/\text{s}/50^{\circ}\text{C}$ HF0



Main specifications

Model		Output	
Model	Engine speed	900	
6DE-20	Engine	kWm	811~1090
	Generator	770~1035	

The generator output values are based on power generation efficiency of approximately 95%.

DE-23

Main data

Cylinder bore: 230mm Piston stroke: 320mm No. of cylinder: 6 Pme : 2.5MPa

Piston speed: 9.6m/sec.(at 900min⁻¹)

8.0m/sec.(at 750min⁻¹)

Fuel oil: MD0~up to 700mm²/s/50°C HF0



Main specifications

Model			Output		
Model	Engine speed	(min ⁻¹)	750	900	
6DE-23	Engine	kWm	800~1280	1000~1516	
ODE-23	Generator	kWe	760~1215	950~1440	

The generator output values are based on power generation efficiency of approximately 95%.

DEL-23

Main data

Cylinder bore: 230mm Piston stroke : 350mm No. of cylinder: 8 Pme : 2.52MPa

Piston speed: 10.5m/sec.(at 900min⁻¹)

8.75m/sec.(at 750min⁻¹) Fuel oil : MDO~up to 700mm²/s/50°C HFO



Main specifications

Model			Output		
Model	Engine speed	(min ⁻¹)	750	900	
ODEL 22	Engine	kWm	1280~1750	1500~2200	
8DEL-23	Generator kWe		1215~1660	1425~2090	

The generator output values are based on power generation efficiency of approximately 95%.

DE-28

Main data

Cylinder bore: 285mm Piston stroke: 390mm No. of cylinder: 6 Pme : 2.43MPa

Piston speed: 9.36m/sec.(at 720min⁻¹)

9.75m/sec.(at 750min⁻¹)

Fuel oil: MD0~up to 700mm²/s/50°C HF0



Main specifications

Model		Output	
Model	Engine speed	720/750	
6DE-28	Engine	kWm	1921~2140
	Generator	kWe	1850~2065

The generator output values are based on power generation efficiency of approximately 95.5%.

DE-33

Main data

Cylinder bore: 330mm Piston stroke: 440mm No. of cylinder: 6, 8 Pme : 2.66MPa

Piston speed: 10.56m/sec.(at 720min⁻¹)

11m/sec.(at 750min⁻¹) Fuel oil : MDO~up to 700mm²/s/50°C HFO



Main specifications

Model			Output
Model	Engine speed	720/750	
6DE-33	Engine	kWm	2700~3600
ODE-33	Generator	kWe	2605~3470
8DE-33	Engine	kWm	3600~4800
	Generator	kWe	3470~4630

The generator output values are based on power generation efficiency of approximately 96.5%.

DC-32e

Main data

Cylinder bore : 320mm Piston stroke : 400mm No. of cylinder: 6 Pme : 2.59MPa

Piston speed: 9.6m/sec.(at 720min⁻¹)

10m/sec.(at 750min⁻¹)

Fuel oil: MD0~up to 700mm²/s/50°C HF0



Main specifications

Model			Output		
Model	Engine speed	(min ⁻¹)	720	750	
6DC-32e	Engine	kWm	2300~3000	2300~2905	
6DC-32e	Generator	kWe	2220~2895	2220~2800	

The generator output values are based on power generation efficiency of approximately 96.5%.

DL-16Ae

Main data

Cylinder bore : 165mm Piston stroke : 210mm No. of cylinder: 6 Pme : 1.97MPa

Piston speed: 8.4m/sec.(at 1200min⁻¹)

Fuel oil : MD0



Main specifications

Model			Output
Model	Engine speed	1200	
DL-16Ae	Engine	kWm	260~530
	Generator	kWe	235~480

The generator output values are based on power generation efficiency of approximately 91%.

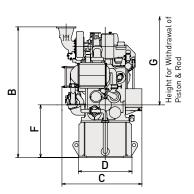
Specifications / Dimensions and Mass

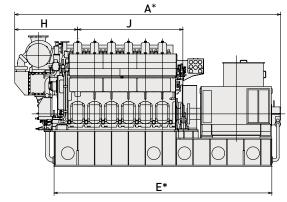
60Hz

		Engine revs.	Output	Output	Bore	Stroke
Engine model En		min-1	kWm	kWe	mm	mm
	ADE-18 900		400 ~ 860	380 ~ 815	185	280
	9DE-19	720	375 ~ 700	355 ~ 665	160	200
	6DE-20	900	811 ~ 1090	770 ~ 1035	205	300
es	6DE-23	900	1000 ~ 1516	950 ~ 1440	230	320
series	ODE-23	720	800 ~ 1280	760 ~ 1215	230	320
	8DEL-23	900	1500 ~ 2200	1425 ~ 2090	230	350
DE	ODEL-23	720	1280 ~ 1750	1215 ~ 1660	230	330
	6DE-28	720	1921 ~ 2140	1850 ~ 2065	285	390
	6DE-33 720		2700 ~ 3600	2605 ~ 3470	330	440
	8DE-33			3470 ~ 4630	330	440
	M5	1800	185 ~ 310	165 ~ 280	145	160
	MO	1200	147 ~ 220	130 ~ 200	145	100
	6DL-16Ae	1200	260 ~ 530	235 ~ 480	165	210
	6DK-20e	900	600 ~ 1060	570 ~ 1005	200	300
S	0DK-20E	720	580 ~ 800	550 ~ 760	200	300
series	6DK-26e	720	1200 ~ 1850	1155 ~ 1785	260	380
Sel	6DK-28e	720	1460 ~ 2130	1405 ~ 2055	280	390
e	8DK-28e	720	1915 ~ 2800	1845 ~ 2700	280	390
Other	6DK-36e	600	2950 ~ 3500	2845 ~ 3375	360	480
	8DK-36e	600	4400 ~ 4650	4245 ~ 4485	360	480
	12DK-36e	600	5830 ~ 6660	5625 ~ 6425	360	460
	6DC-32e	720	2300 ~ 3000	2220 ~ 2895	320	400
	8DC-32e	720	2750 ~ 4000	2650 ~ 3860	320	400
	16DC-32e	720	5500 ~ 7720	5305 ~ 7450	320	400

50Hz

En	gine model	Engine revs.	Output kWm	Output kWe	Bore mm	Stroke mm
	/DE 10	1000	520 ~ 860	490 ~ 815	105	200
	6DE-18	750	375 ~ 700	355 ~ 665	185	280
eries	6DE-23	750	800 ~ 1280 760 ~ 1215		230	320
Sel	N 3512 13 700		1280 ~ 1750	1215 ~ 1660	230	350
DE	6DE-28	750	1921 ~ 2140	1850 ~ 2065	285	390
_	6DE-33 750		2700 ~ 3600	2605 ~ 3470	330	440
	8DE-33	750	3600 ~ 4800	3470 ~ 4630	330	440
	6DK-20e	750	580 ~ 800	550 ~ 760	200	300
	6DK-26e	750	1200 ~ 1850		260	380
ın	6DK-28e	750	1460 ~ 2130	1405 ~ 2055	280	390
series	6DK-26e 750 1200 ~ 18 6DK-28e 750 1460 ~ 21		1915 ~ 2800	1845 ~ 2700	280	390
Sel	6DK-36e	600	2950 ~ 3500	2845 ~ 3375	360	480
e	8DK-36e	600	4400 ~ 4650	4245 ~ 4485	360	480
Other	12DK-36e	600	5830 ~ 6660	5625 ~ 6425	360	460
J	6DC-32e	750	2300 ~ 2905	2220 ~ 2800	320	400
	8DC-32e	750	3000 ~ 4000	2895 ~ 3860	320	400
	16DC-32e	750	6000 ~ 7720	5790 ~ 7450	320	400





No. of	Dimension mm								Dry Mass*	
cylinders	Α	В	С	D	Е	F	G	Н	J	ton
6	4850	2400	1540	1070	3820	900	1400	1200	1810	13
6	5480	2890	1800	960	4430	1000	1575	1240	2035	16
6	6100	2840	1780	1020	5040	1150	1660	1400	2300	23
8	7390	2860	1900	1110	6140	1150	1780	1440	3050	30
6	6825	3710	2235	1230	6100	1300	2065	1095	2580	35
6	9110	3950	2410	1780	7520	1350	2570	2050	3270	69
8	10390	4150	2410	1780	8800	1350	2570	2050	4330	84
6	3210	1710	1135	840	2550	720	1130	628	1125	4.2
6	3700	1800	1230	960	3260	750	1195	645	1418	5.9
6	5480	2890	1800	960	4430	1000	1575	1240	2035	16
6	6465	3310	1990	1190	5400	1200	1970	1580	2470	30
6	6825	3710	2235	1230	6100	1300	2065	1095	2580	35
8	7865	3830	2235	1230	6780	1300	2065	1095	3440	46
6	7500	3818	3360	2300	7400	1800	2930	1965	3445	73
8	9430	4280	2500	2300	7900	1800	2930	1965	4575	95
12	11728	4280	2500	2300	5065 Eng	1325	2710	2764	4074	85 Eng
6	8295	3820	2345	1350	7275	1350	2295	1685	3040	58
8	9580	4020	2345	1350	8700	1350	2295	1685	4040	67
16	12000	4735	2400	1480	8950 Eng	1550	2830	3000	5000	90 Eng

No. of		Dimension mm								Dry Mass*
cylinders	Α	В	С	D	E	F	G	Н	J	ton
6	4850	2400	1540	1070	3820	900	1400	1200	1810	13
6	6100	2840	1780	1020	5040	1150	1660	1400	2300	23
8	7390	2860	1900	1110	6140	1150	1780	1440	3050	30
6	6825	3710	2235	1230	6100	1300	2065	1095	2580	35
6	9110	3950	2410	1780	7520	1350	2570	2050	3270	69
8	10390	4150	2410	1780	8800	1350	2570	2050	4330	84
6	5480	2890	1800	960	4430	1000	1575	1240	2035	16
6	6465	3310	1990	1190	5400	1200	1970	1580	2470	30
6	6825	3710	2235	1230	6100	1300	2065	1095	2580	35
8	7865	3830	2235	1230	6780	1300	2065	1095	3440	46
6	7500	3818	3360	2300	7400	1800	2930	1965	3445	73
8	9430	4280	2500	2300	7900	1800	2930	1965	4575	95
12	11728	4280	2500	2300	5065 Eng	1325	2710	2764	4074	85 Eng
6	8295	3820	2345	1350	7275	1350	2295	1685	3040	58
8	9580	4020	2345	1350	8700	1350	2295	1685	4040	67
16	12000	4735	2400	1480	8950 Eng	1550	2830	3000	5000	90 Eng

The values above are reference values. *Actual dimensions and mass may vary depending on the specifications of the generator unit.

DF series

High Environmental Performance through Precise and Detailed Control

Dual-fuel engines that operate on both environmentally friendly natural gas and conventional petroleum fuel require precise control and must offer high safety and durability. Daihatsu Diesel has incorporated the results of extensive research on the internal combustion engine into the development of our dual-fuel engines.

Daihatsu Diesel dual-fuel engines offer accurate and stable operation on natural gas while incorporating the excellent environmental performance inherited from the company's diesel engines, which boast features such as a fuel injection system with high control precision, superb fuel efficiency, and outstanding engine durability.

- 1 Complies with IMO NOx Tier III emissions regulations (when operating on gas fuel)
 - Complies with IMO NOx regulation Tier III in gas operation, and Tier II in diesel operation.
- 2 No change to engine rotation speed when switching to gas mode or diesel mode
 - Output is not interrupted when switching to either gas or diesel.
- 3 Utilizes a variable valve timing mechanism
 - Optimal control of valve open/close timing maintains stable output.
- 4 Utilizes twin nozzles
 - Fine fuel injection control achieves high combustion efficiency.



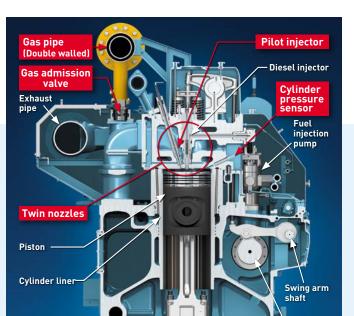
Type approval certificate

Engine output chart

Eng	gine model	Bore × Stroke(mm)	Rotation speed(min-1)	500) 10	00 15	500 20	000 25	300
6D	E20DF	Ф205×300	900		63	3 0~820 kWe	2		
6D	E23DF	Ф230×320	900			850~	1140 kWe		
6D	E28DF	Ф280×390	720/750				1250	~1650kWe	
80	E28DF	Ф280×390	720/750					1660	0~2200 kWe
6D	E35DF	Ф350×440	720						
80	E35DF	Ф350×440	720					2950~	3940kWe

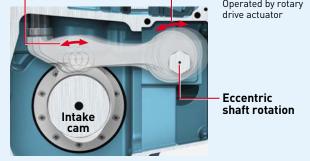
Main Specifications

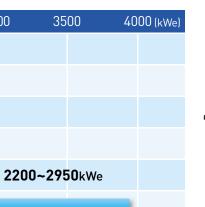
Engine model		6DE20DF	6DE23DF	6DE28DF	8DE28DF	6DE35DF	8DE35DF	
Bore x Stroke	mm	Ф205×300	Ф230×320	Φ280×390		Ф350×440		
Number of cylinders	_	6	6	6	8	6	8	
Rotation speed	min ⁻¹	900	900	720/750		720		
Max. engine output	kWm	890	1200	1730	2300	3060	4080	
Max. generator output	kWe	840	1140	1660	2200	2950	3940	
NOx emission rate	_	≦ Tier III (gas mode) / ≦ Tier II (diesel mode)						
Fuel	_	Natural gas (gas mode) / MDO, MGO, HFO (diesel mode)						
Pilot fuel (gas mode)	Pilot fuel (gas mode) – MDO or MGO (approx. 1% of total heating value)							

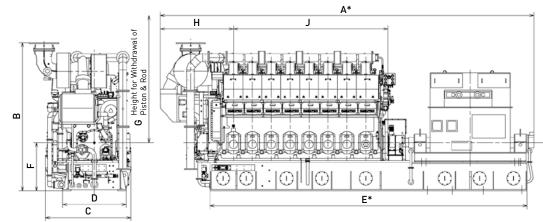


* The parts indicated with the red background [] are designed exclusively for the DF engine; other parts are modified from existing parts of conventional diesel engines.

Variable valve timing mechanism Change in roller position Swing arm shaft Operated by rotary drive actuator







Dimensions and Mass

Engine	Dimensions (mm)									
model	Α	В	С	D	Е	F	G	Н	J	(ton)
6DE20DF	5395	3245	1885	1035	4380	1000	1530	1240	2035	17
6DE23DF	6205	3330	1925	1170	5420	1150	1645	1460	2300	27
6DE28DF	7195	3995	2040	1300	5530	1300	2065	2020	2580	36
8DE28DF	9100	4055	2040	1300	7300	1300	2065	2210	3440	47
6DE35DF	9065	4150	2395	1780	7460	1350	2555	2050	3270	81
8DE35DF	10470	4150	2395	1780	8895	1350	2555	2050	4330	98

Camshaft

 $^{^{}st}$ Actual dimensions and mass may vary depending on the specifications of the generator unit.

SCR System Patented

The DAIHATSU-DEC Marine SCR System engineered to achieve the highest levels of space saving and running cost reduction

Marine diesel engines installed on ocean navigating ships must be gentle to the global environment at all times. Daihatsu SCR system decomposes NOx contained in the engine exhaust gas using chemical reaction and makes the exhaust gas clean. Daihatsu Diesel adopted a patented bypass-integrated structure and optimized the electronic control and operation devices to enable easy onboard installation, save installation space and reduce running cost.

1 NOx removal performance compliant with IMO NOx Tier III standards

Compact design for easy onboard installation

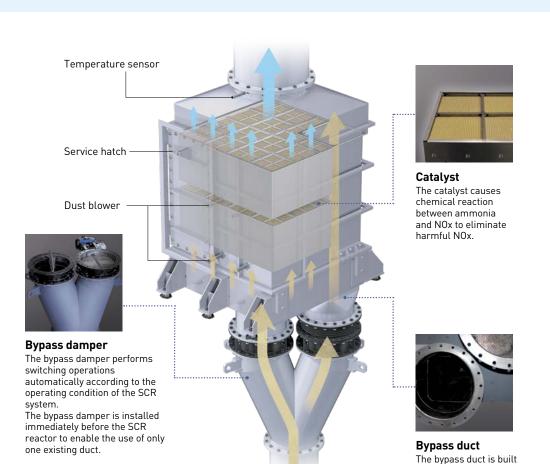
- The SCR reactor can be mounted vertically or horizontally. (*Horizontal mounting is possible for models up to SCR81B.)
- A unique nozzle sprays urea aqueous microparticles to reduce the vaporization distance.
- A built-in auto-switching bypass damper reduces duct connection to only two locations: inlet and outlet.

Low running cost

The unique nozzle and electronically controlled auto-operation optimize the amount of urea aqueous spraying.

High vibration resistance

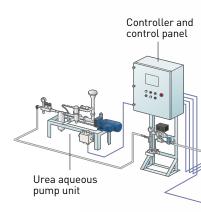
Anti-vibration support for the SCR reactor.





of single duct to SCR

> Urea aqueous spraying nozzle



into the SCR reactor so

that only one exhaust

duct needs to be connected.



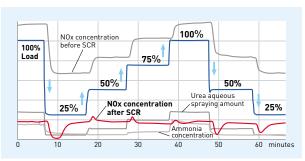
Aqueous urea spraying pump unit



Controller and control panel

Low running cost

The unique aqueous urea nozzle and electronically controlled autooperation optimize the amount of aqueous spraying and maintain NOx below the regulation value at all times.



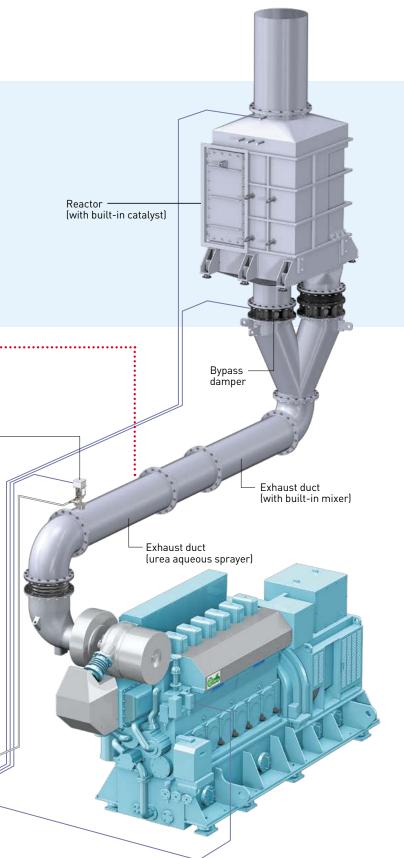
SCR Model Selection Table for **Gensets Engine**

Engine model	Engin	SCR model	
	min ⁻¹	kWm	
6DL-16Ae	1200	442~530	25B
6DE-18	720/750	375~700	30B
052 10	900	400~660	
6DE-18	900	661~860	36B
6DE-20	900	811~1,090	49B
/DE 22	720/750	800~1,280	//D
6DE-23	900	1,000~1,516	64B
0DEL 00	750	1,280~1,750	1000
8DEL-23	900	1,500~2,200	100B
6DE-28	720/750	1,921~2,140	100B
6DE-33	720/750	2,700~3,600	169B
8DE-33	720/750	3,600~4,800	240B
6DC-32e	720/750	2,300~3,000	144B
8DC-32e	720/750	3,000~4,000	169B
	720/750	580~800	(2D
6DK-20e	900	600~810	42B
	900	811~1,060	49B
/DI/ 0/ -	720/750	1,200~1,710	81B
6DK-26e	720/750	1,711~1,850	100B
/DI/ 00	720/750	1,460~1,700	81B
6DK-28e	720/750	1,701~2,130	100B
8DK-28e	720/750	1,915~2,800	144B
6DK-36e	600	2,950~3,500	169B
8DK-36e	600	4,400~4,650	196B

Compatible models are added from time to time. For gensets engine models/ specifications not listed in the above table, please contact our company.

Please inquire separately for propulsion engine models with SCR compatibility.

Even when the SCR system is in non-operational (bypass operation), air supply is still used at a rate of 0.1 to 0.3 Nm3/h for the cooling of the spraying nozzle while the engine is running.



AUS Generator

AUS: AQUEOUS UREA SOLUTION



Inboard production of high-purity urea water from urea powder and pure water

A device that produces on-board the aqueous urea solution that is required as a reducing agent for the SCR (Selective Catalytic Reduction) system has been developed. Since it generates only the necessary amount of aqueous urea solution at the necessary time from pure water and urea powder, there are no concerns about degradation, and a solution of consistently stable quality can be supplied. Also, because there is no need for large tanks to store the solution in liquid form, it offers space-saving storage, and the procurement of urea powder is economical.

1 Dispense with large, space-consuming AUS storage tanks

- Large on-board tanks storing the entire voyage's quota of AUS are no longer needed.
 Although a buffer tank will be required to provide AUS this tank is far smaller than the aforementioned storage tanks.
- The space of urea powder up less than half the space of AUS.

2 Save money on your AUS

AUS produced from urea powder is cheaper than buying AUS already in its liquid form.

3 Loading urea powder is easier than loading AUS

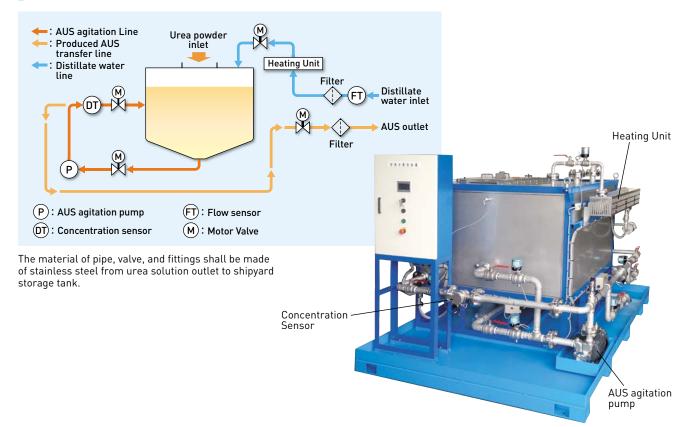
 In order to load AUS, an Intermediate Bulk Container (IBC) and pump are required to transfer the AUS from the container to the tank. With powder these are not needed.

The same high quality AUS every time

 Storing AUS for extended periods risks exposing it to temperature fluctuations that decrease its quality and shelf-life.

Producing AUS from powdered urea when it is needed maintains the AUS quality and helps to prevent the SCR's catalyst from becoming stained or obstructed.

Structure



Cloud-based engine condition monitoring and diagnostic solution

CMAXS LC-A is an abnormality diagnosis and maintenance assist system with a multiple capability for monitoring the main engine, power generator and auxiliary equipment in the main engine room. It achieves early detection of abnormal trends and prevents malfunctions by promoting proper maintenance. By utilizing cloud services, it makes it possible to grasp engine conditions at sea or on land.



1 Self-contained onboard engine support

- Early identification of potential faults through continuous engine diagnosis prevents serious engine failures.
- Troubleshooting guides assist with the customer's own maintenance work.

2 Simple and easy operation

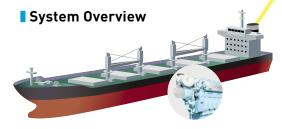
- Integrated operation of the main engine, auxiliary engine and auxiliary devices.
- User-friendly operation through photographs, graphs, image data, alarm monitoring functions and an intuitive user interface.

3 Onboard and onshore engine "visualization"

- Fleet overviews and targeted vessel monitoring through the CMAXS Web Service.
- Ascertain a vessel's condition and activate any measures necessary via the onshore "Ship Data Center".
- Retrieve a target vessel's data at any time thanks to safe Cloud storage.

4 A total support solution

- Direct analysis of engine data allows DAIHATSU to provide quick and relevant support.
- Periodic diagnostic reports provide reassurance for customers.

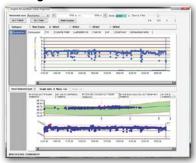


Data is obtained from sensors mounted to the engines and used to automatically diagnose the engine condition. This allows appropriate maintenance to be provided quickly to prevent engine trouble.



Manuals

Diagnosis function



Check details of an engine's condition via the diagnosis screen.

Troubleshooting function



Displays the part that is most likely to have caused a failure, as well as measures to be taken.

CMAXS Web Service

The CMAXS Web Service home page can be accessed over the internet, enabling the ship's status to be determined from virtually anywhere in the world.



CMAXS provides service as a member of the NK-CMAXS Alliance

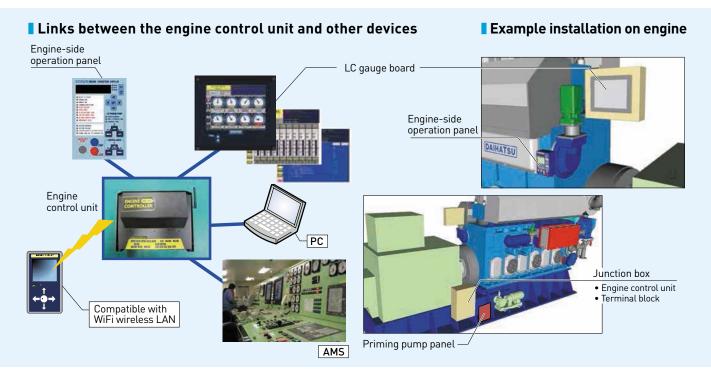
CMAXS LC-A/e-GICSX alliance members: ClassNK Consulting Service Co., Ltd., Ship Data Center Co., Ltd., Diesel United Ltd., MES TECHNOSERVICE Co., Ltd., MAKITA Corporation, Hitachi Zosen Corporation, Naniwa Pump Mfg. Co., Ltd., and DAIHATSU DIESEL MFG. CO., LTD. (As of February 1, 2017.)

Engine Controller

Improving engine reliability An engine safety/control system for next-generation engines

The engine safety/control system ensures safe and reliable engine operation based on the control/safety sequence verified by Daihatsu. The circuits are protected so as to prevent faulty operation even if a mistake is made in the installation. The system automatically saves the record of engine control device operations (events) and the trend data. This enables accurate understanding of symptoms when engine trouble occurs, thus allowing swift and efficient investigation of the problem causes.

Since the product was developed for a long-term use, there is no need for replacement parts.



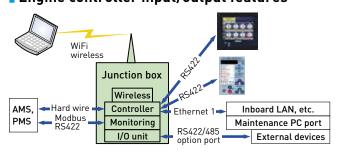
Pursuit of safety, security, and ease of use for the owner and the crew

- 1. Ease of operation and safety circuits ensure security during engine operation.
- 2. If a problem occurs with the controller, recovery is simple and quick. Simply replace the main assembly and insert a new memory card.
- 3. A web server is provided as a standard feature. Connect a browser to the server for easy checking of the engine condition.
- 4. Engine condition data can be downloaded easily in the event of an engine problem. Sending the data to Daihatsu allows our service personnel to conduct a preliminary investigation before visiting the site.

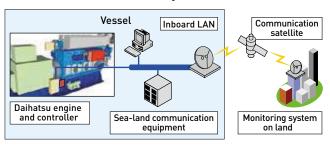
Meeting the users' needs

- The engine controller has an industry standard Modbus-RTU/RS422 communication port to connect to the Alarm Monitoring System (AMS) to reduce wiring.
- 2. The priming pump control panel is engine-mounted as a standard feature to eliminate the need for separate procurement.
- 3. The safety and control functions provided on the engine controller simplify commissioning. Simplified generator panels cut costs and reduce the installation space required.
- 4. An Ethernet port is provided as a standard feature to flexibly meet future needs of shipbuilders, such as connection with onboard LAN and server and interaction with sea-land communication systems.

Engine controller input/output features



Connection to inboard system

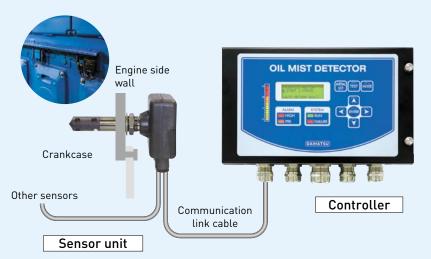


MD-SX

Oil mist detector

MD-SX (Sensor type)

Oil mist detectors for crankcase monitoring are required by classification societies as devices for the protection of internal combustion engines. Daihatsu Diesel's MD-SX oil mist detector is type-approved by NK, DNV GL, BV, LR, ABS, CCS, KR and LINA. The MD-SX responds better and is easier to install and maintain than the conventional pipe type. The standard model can be connected with up to 16 sensor points. The MD-SX II (connection of up to 9 sensor points) is designed exclusively for 4-stroke engines and provides excellent protection using a fewer sensor units.



MD-SX II

This product estimates the mist level in a crankcase not installed with a sensor unit from the data obtained from the sensors installed in the adjacent crankcases on both sides. Since it is highly responsive even with a reduced number of sensor units, installation costs can be minimized. The MD-SX II is also equipped with a self-diagnosis function to facilitate maintenance and provide extra safety assurance.

The optional sensor checker enables confirmation of the effectiveness of cleaning during maintenance and

verification of proper operation of sensors. It is also possible to add a logging function to record oil mist concentration. Consequently, the MD-SX oil mist detector not only raises an alarm in a conventional manner when the oil mist concentration increases, but also enables the diagnosis and prediction of failure using log data.



Oil mist monitor

DOMM

The DOMM installed in an engine room detects oil mist leakage at an early stage.

It helps prevent fire resulting from the ignition of oil mist and also helps keep inboard environment safe and clean by preventing oil mist from adhering to equipment and walls to cause oil stains.

The International Organization for Standardization (ISO) established the inspection standard for inboard oil mist detectors, "Atmospheric oil mist detectors for ship," in August 2012.







The DOMM can also be used any place in a ship where oil mist is generated. Since the sensors and controller are equipped with a self-diagnosis function just like our oil mist detector, the DOMM facilitates maintenance and provides extra safety assurance.



Sensor unit



Moriyama Factory

From Moriyama and Himeji to the world

Daihatsu Diesel's Moriyama Factory manufactures products using a production system that takes full advantage of our expertise and experience accumulated over many years, in order to assure high levels of quality and performance in engines that will set out on journeys around the world. On the environmental front, we take all possible environmental measures commensurate with our environmentally friendly engines, such as the use of gas engines for generating the electricity used inside the factory and complete recycling of factory water. The high quality of the factory underlies the high quality of our products. The same quality has been inherited by a new factory in Himeji that faces the Seto Inland Sea and is being crowned as Daihatsu Diesel's Himeji Factory.



Photovoltaic power generation (Moriyama Factory)



Technology Development Center (Moriyama Factory)



Logistics Center (Moriyama Factory)



A view of the factory (Himeji Factory)

The Training Center — Supporting Our Technologies

Mechanics in Training Centers worldwide conduct training in environments that allow trainees to disassemble and assemble actual engines in response to customer requests.



Training Scene (Moriyama Second Factory)



Reduction Gear (Moriyama Second Factory)



Training Room (Moriyama Second Factory)



Training Center (Him



Himeji Factory





Shipping Port (Himeji Factory)



Trial Area (Himeji Factory)



Assembly Shop (Himeji Factory)



Painting Area (Himeji Factory)



eji Factory)



Singapore Training Center

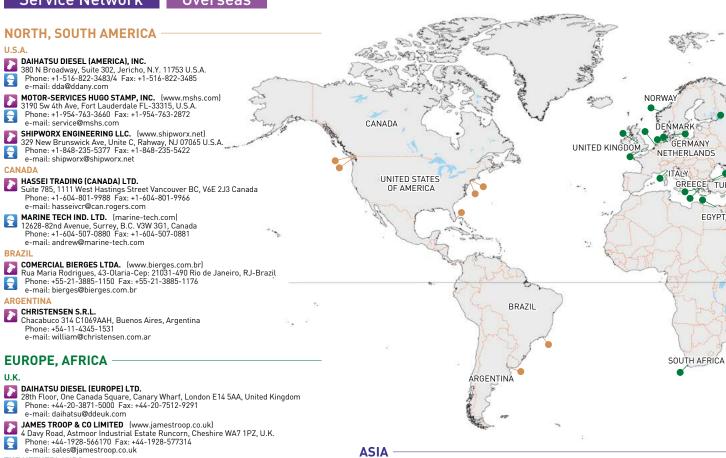


Hamburg / Germany Training Center



Dubai / UAE Training Center

Service Network Overseas



THE NETHERLANDS

GOLTENS ROTTERDAM B.V. (www.goltens.nl)
Lorentzweg 29, 3208 LJ, Spijkenisse, The Netherlands
Phone: +31-181-465100
e-mail: petra.engel@goltens.com

DENMARK

MARCO MARINE A/S (www.marcomarine.com) Hoejvangen 2, DK-3480 Fredensborg, Denmark Phone: +45-4913-6902 e-mail: denmark@marcomarine.com

SKAMEK POWER AS (www.skamek.com)
Sorenskriver Bullsgt 9C 6002 Alesund, Norway [P.O.Box 2041 - 6028 Alesund, Norway]
Phone: 447-7010-1930 [24/7 Stand By] +47-9921-1930 Fax: +47-7010-1931
e-mail: power@skamek.no

GERMANY

DAIHATSU DIESEL (EUROPE) LTD. HAMBURG LIAISON OFFICE Witternstrasse 20, 21107 Hamburg, Germany Phone: +49-40-317 948 30 Fax: +49-40-317 948 29 e-mail: daihatsu@ddeuk.com

WILHELM RUMP KG (GmbH & Co.) (www.rump-kg.de)

Witternstrasse 20, 21107 Hamburg, Germany Phone: +49-40-3178420 Fax: +49-40-3194841 e-mail: spares@rump-kg.de

DAIHATSU DIESEL (EUROPE) LTD. GREEK BRANCH

12, Karaoli Dimitriou Street Neo. Faliro, Piraeus 185 47 Greece Phone: +30-210-453-1744 Fax: +30-210-451-4350

e-mail: daihatsu@ddeuk.com

MRINE INDUSTRIAL & COMMERCIAL LTD. (www.micltd.eu)
12, Karaoli Dimitriou Street Neo. Faliro, Piraeus 185 47 Greece
Phone: +30-210-4526912 Fax: +30-210-4285900

e-mail: spares@micltd.eu

ITALY

ZEPHYR TRADING S.R.L. (www.zephyrtrading.com)
Via Privata Oto 10, 19136 La Spezia Italy
Phone: +39-0187-502341 Fax: +39-0187-503335
e-mail: info@zephyrtrading.com

VESMEC LTD. (www.vesmec.com)
Aydintepe Mahallesi, Akyildiz Cikmazi Sokak, No:3, Icmeler-Tuzla/Istanbul 34947,Turkey
Phone: +90 216 4932973 Fax: +90 216 4932962

e-mail: info@vesmec.com

NORDWEG JSC (www.nordweg.ru)
16, Building 2, Dvinskaya Street, St. Petersburg, 198035, Russia (P.O.Box 119, 198035.
St-Petersburg, RUSIA)
Phone: +7-812-320-2771 Fax: +7-812-320-2770

e-mail: shiprepair@nordweg.ru

FGYPT

ALEXANDRIA MARITIME CONSULTATIVE OFFICE (AMCO) (www.amcoeg.com) 10 Ahmed Yehya Pasha St., Gleem, Alexandria, Egypt (P.O.Box 1424 Alexandria) Phone: +20-3-5858570 Fax: +20-3-5828587

e-mail: amco.alex@amcoeg.com, a.alyan@amcoeg.com

SOUTH AFRICA

HESPER ENGINEERING (www.hesper.co.za)
5 Verbena Street, Paarden Eiland, Cape Town, 7405, South Africa
Phone: +27-21-506-4301

ASIA

SINGAPORE

DAIHATSU DIESEL (ASIA PACIFIC) PTE. LTD.

16 Collyer Quay, Income at Raffles #29-02, Singapore 049318
Phone: +65-6589-9510 Fax: +65-6536-4964
e-mail: ddap@dds.com.sg

DAIKAI ENGINEERING PTE. LTD. (www.daikai.com)
128 Pioneer Road, Singapore 639586
Phone: +65-6863-2856 Fax: +65-6863-2876
e-mail: sales@daikai.com.sg

DAIKAI INTERGRASI SDN BHD
Suite C-10-10, Tower C, The Scott Garden, 289 Jalan Kelang Lama, 58100 Kuala

Lumpur, Malaysia
Phone: +60-3-7986-0922 Fax: +60-3-7986-0522

DAIHATSU DIESEL PHILIPPINES CORPORATION
Warehouse 2 Dowjones Compound, KM 19 West Service Road, Sucat Paranaque,
Philippines 1700
Phone: +63-7-8362-4441 Ferrico Constitution

Phone: +63-2-8362-4461 Fax: +63-2-8817-1285

Phone: +63-2-8302-4461 Fax: +63-2-8817-1285

DAIKAI PHILIPPINES CORPORATION (www.daikai.com)

Warehouse 2 Dowjones Compound, KM 19 West Service Road, Sucat Paranaque, Philippines 1700

Phone: +63-2-8351-0323 Fax: +63-2-8817-1285

e-mail: sales@daikai.com

INDONESIA

P.T. OYAMA LTD.
 JI. Gajah Meda No.115-116, Jakarta-11130, Indonesia
 Phone: +62-21-6297838 Fax: +62-21-639447 e-mail: yama-115@dnet.net.id

DAIKAI ENGINEERING PTE. LTD. VIETNAM OFFICE (www.daikai.com)
Room 704, TD Business Center, No. 4&5 Lot 20A, Le Hong Phong Street, Ngo
Quyen District, Haiphong, Vietnam
Phone: +84-2253-826767 Fax: +84-2253-826777
e-mail: sales@daikai.com

DAIKAI ENGINEERING (THAILAND) PTE., LTD. (www.daikai.com)
Unit 11B, 11th Floor, President Tower 971, 973, Ploenchit Road, Kwaeng
Lumphini, Khet Pathumwan, Bangkok 10330, Thailand
Phone: +66-85247-8477 Fax: +66-2181-4179
e-mail: sales@daikai.com

BANGLADESH

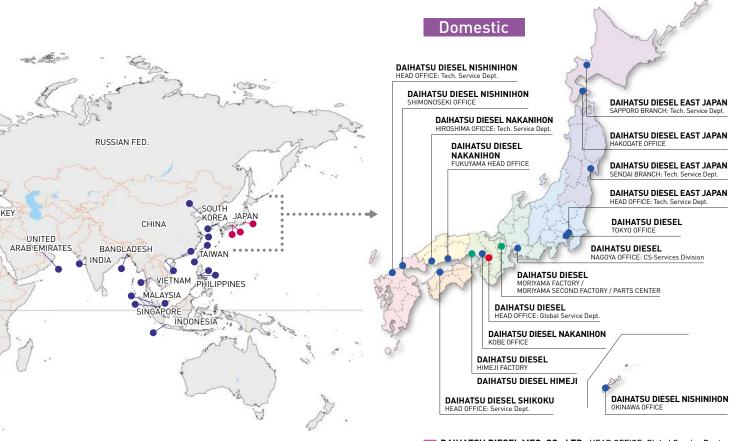
DAIKAI ENGINEERING PTE. LTD
House#56(5th Floor), Kazi Nazrul Islam Avenue, Kawran Bazar, Dhaka-1215,

Bangladesh Phone: +88-02-48112046 Fax: +88-02-48112047

DAIKAI ENGINEERING (INDIA) PVT. LTD. (www.daikai.com)

Sagar Tech Plaza, B-902, 9th Floor, Andheri-Kurla Road, Sakinaka. Andheri (E)
Mumbai-400072. India
Phone: +91-22-2850-9686 Fax: +91-22-2850-9713
e-mail: india@daikai.com

KEITOKU MIDDLE EAST LLC.
Al Quoze Industrial Area, Office No.2, P.O.Box 115226 Dubai, U.A.E.
Phone: +971-4-3479181 Fax: +971-4-3406518
e-mail: sales@keitoku.com



DAIHATSU DIESEL (SHANGHAI) CO., LTD.

Room A-B, Floor 14, Huamin Empire Plaza, No.728, Yanan Rd.(W.), Shanghai,

200050, China

Phone: +86-21-6225-7876/7 Fax: +86-21-6225-9299 e-mail: ddc0017@daihatsu-diesel.cn

DAIHATSU DIESEL (SHANGHAI) CO., LTD. DALIAN OFFICE
Room 1103, 11th Floor, Business Tower, Dalian International Hotel,
No.9 Renmin Road, Zhongshan District, Dalian, Liaoning, China
Phone: 486-411-8259-5751 Fax: 486-411-8259-5753
e-mail: zhang.bo@daihatsu-diesel.cn

DAIHATSU DIESEL (SHANGHAI) CO., LTD. GUANDONG OFFICE Unit 2702, Diwang Center, No. 303 Chengqing South Road, Changan Town, Dongguan, Guangdong, China Phone: +86-769-8115-8926 Fax: +86-769-8176-6496

TAIWAN

KIND JOHN TRADING CO., LTD.
Tai Chi Building, 5th Floor 10, Chungking S. RD. Sec. 1, Taipei, Taiwan
Phone: +886-2-2311-4651 Fax: +886-2-2314-4625
e-mail: kindjohn@ms22.hinet.net

MARINE TECHNICAL & INDUSTRIES CO., LTD.

No.14 Tai-Tang RD. Lin-Hai Industrial Zone, Kaohsiung, 812 Taiwan Phone: +886-7-802-1212 Fax: +886-7-801-9179

7

JONGHAP MARITIME ENGINEERING INC. 188-38, Dongsam-dong, Youngdo-ku, Busan, Kor Phone: +82-51-403-2381 Fax: +82-51-403-2409 e-mail: swlee@jonghap-jme.co.kr

DAIHATSU DIESEL MF6. CO., LTD. HEAD OFFICE [www.dhtd.co.jp] 1-30, Oyodo Naka 1-chome, Kita-ku, Osaka 531-0076 Japan Phone: +81-6-6454-2345/6 Fax: +81-6-6454-2680/1 [Service Div]

DAIHATSU DIESEL HIGASHINIHON CO., LTD.

1-13, Higashiueno 2-chome, Taito-ku, Tokyo 110-0015 Japan
Phone: +81-3-5828-3524 Fax: +81-3-5828-3520 [Tech. Service Dept.] e-mail: info@ddh.co.ip

FUJI TRADING CO., LTD. 6, Fukaehamamachi, Higashinada-ku, Kobe 658-0023 Japan Phone: +81-78-413-2620 Fax: +81-78-411-3841 e-mail: fukaday@fujitrading.co.jp





- DAIHATSU DIESEL MFG. CO., LTD. HEAD OFFICE: Global Service Dept. 1-30, Oyodo Naka 1-chome, Kita-ku, Osaka, 531-0076 Japan Phone: +81-6-6454-2345 Fax: +81-6-6454-2681 http://www.dhtd.co.jp
- DAIHATSU DIESEL MFG. CO., LTD. TOKYO OFFICE
- 2-10, Nihonbashi-Honcho 2-chome, Chuo-ku, Tokyo, 103-0023 Japan Phone: +81-3-3279-0807 Fax: +81-3-3245-0395
- DAIHATSU DIESEL MFG. CO., LTD. NAGOYA OFFICE: CS-Services Division
- 47-1, Nagono 1-chome, Nakamura-ku, Nagoya, 450-0001 Japan Phone: +81-52-561-1311 Fax: +81-52-561-1315

DAIHATSU DIESEL MFG. CO., LTD.
MORIYAMA FACTORY / MORIYAMA SECOND FACTORY / PARTS CENTER / HIMEJI FACTORY

DAIHATSU DIESEL HIMEJI MFG.CO.,LTD.

- DAIHATSU DIESEL EAST JAPAN CORPORATION. HEAD OFFICE: Tech. Service Dept.
- 1-13, Higashiueno 2-chome, Taito-Ku, Tokyo, 110-0015 Japan Phone: +81-3-5828-3524 Fax: +81-3-5828-3520 e-mail: info@ddh.co.jp http://www.ddh.co.jp
- DAIHATSU DIESEL EAST JAPAN CORPORATION. SAPPORO BRANCH: Tech. Service Dept.
- 10, Kita1-jonishi 6-chome, Chuo-ku, Sapporo-city, Hokkaido, 060-0001 Japan Phone: +81-11-210-0070 Fax: +81-11-210-0072
- DAIHATSU DIESEL EAST JAPAN CORPORATION. SENDAI BRANCH: Tech. Service Dept.
- 2-3, Honcho 2-chome, Aoba-ku, Sendai-city, Miyagi, 980-0014 Japan Phone: +81-22-262-4908 Fax: +81-22-265-6514
- DAIHATSU DIESEL EAST JAPAN CORPORATION. HAKODATE OFFICE i-26 Ugaura-cho, Hakodate-city, Hokkaido, 040-0023 Japan Phone: +81-138-32-7400 Fax: +81-138-32-7421
- DAIHATSU DIESEL NAKANIHON CO.,LTD. FUKUYAMA HEAD OFFICE 1-21 Higashisakuramachi, Fukuyama-city, Hiroshima, 720-0065 Japan Phone: +81-84-920-8006 Fax: +81-84-920-8020
- DAIHATSU DIESEL NAKANIHON CO.,LTD. KOBE OFFICE
- 2-3, Kaigandori 2-chome, Chuo-ku, Kobe-city, Hyogo, 650-0024 Japan Phone: +81-78-393-8511 Fax: +81-78-393-8512
- DAIHATSU DIESEL NAKANIHON CO.,LTD. HIROSHIMA OFICCE: Tech.
 - Service Dept. 5-4 Motoujinamachi, Minami-ku, Hiroshima-city, Hiroshima, 734-0012 Japan Phone: +81-82-253-5021 Fax: +81-82-253-5021
- DAIHATSU DIESEL SHIKOKU CO.,LTD. HEAD OFFICE: Service Dept.
- 6-42, Chikamicho 3-chome, Imabari-city, Ehime, 794-0007 Japan Phone: +81-898-23-6724 Fax: +81-898-31-5756 -mail: INF0@DDSHIK0KU.CO.JP http://www.ddshikoku.co.ip
- DAIHATSU DIESEL NISHINIHON CO.,LTD. HEAD OFFICE: Tech. Service
- Dept.
 3-1, Tanotsu 2-chome, Higashi-ku, Fukuoka-city, Fukuoka, 813-0034 Japan Phone: +81-92-622-1289 Fax: +81-92-622-3210 e-mail: INFO@DDNI.CO.JP
- DAIHATSU DIESEL NISHINIHON CO.,LTD. OKINAWA OFFICE
- 1-16, Minatomachi 1-chome, Naha-city, Okinawa, 900-0001 Japan Phone: +81-98-868-4627 Fax: +81-98-864-1315
- DAIHATSU DIESEL NISHINIHON CO.,LTD. SHIMONOSEKI OFFICE
- 2-8, Yamatomachi 1-chome, Shimonoseki-city, Yamaguchi, 750-0067 Japan Phone: +81-83-266-1772 Fax: +81-83-266-0877



DAIHATSU DAIHATSU DIESEL MFG.CO.,LTD.

www.dhtd.co.jp

Head Office

1-30, Oyodo Naka1-chome, Kita-ku, Osaka, 531-0076 Japan TEL: +81-6-6454-2393 FAX: +81-6-6454-2682

Tokyo Office

2-10, Nihonbashi-Honcho 2-chome, Chuo-ku, Tokyo, 103-0023 Japan TEL: +81-3-3279-0827 FAX: +81-3-3245-0359

Moriyama Division

45 Amura-cho, Moriyama-city, Shiga, 524-0035 Japan TEL: +81-77-583-2551 FAX: +81-77-582-5714

Daihatsu Diesel Himeji Mfg. Co.,Ltd.

12-8, Fuji-cho, Hirohata-ku, Himeji-city, Hyogo, 671-1123 Japan

Daihatsu Diesel (EUROPE) Ltd.

28th Floor, One Canada Square, Canary Wharf, London E14 5AA, United Kingdom

TEL: +44-20-3871-5000 FAX: +44-20-7512-9291

Daihatsu Diesel (AMERICA), Inc.

380 N Broadway, Suite 302, Jericho, N.Y. 11753 U.S.A. TEL: +1-516-822-3483/4 FAX: +1-516-822-3485

Daihatsu Diesel (ASIA PACIFIC) Pte.Ltd.

16 Collyer Quay, Income at Raffles #29-02, Singapore 049318 TEL: +65-6589-9510 FAX: +65-6536-4964

Daihatsu Diesel (SHANGHAI) Co.,Ltd.

Room A-B, Floor 14, Huamin Empire Plaza, No.728, Yanan Rd.(W.), Shanghai, 200050, China

TEL: +86-21-6225-7876/7 FAX: +86-21-6225-9299

All information contained in this pamphlet is correct at the time of printing, but may be subject to change without notice.