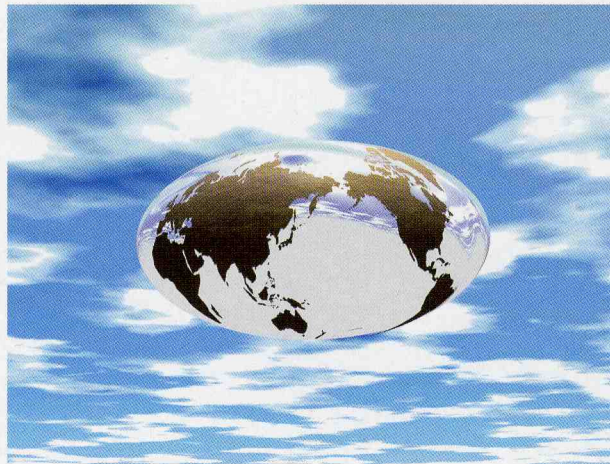


DAIHATSU POWER PLANT & CO-GENERATION SYSTEM



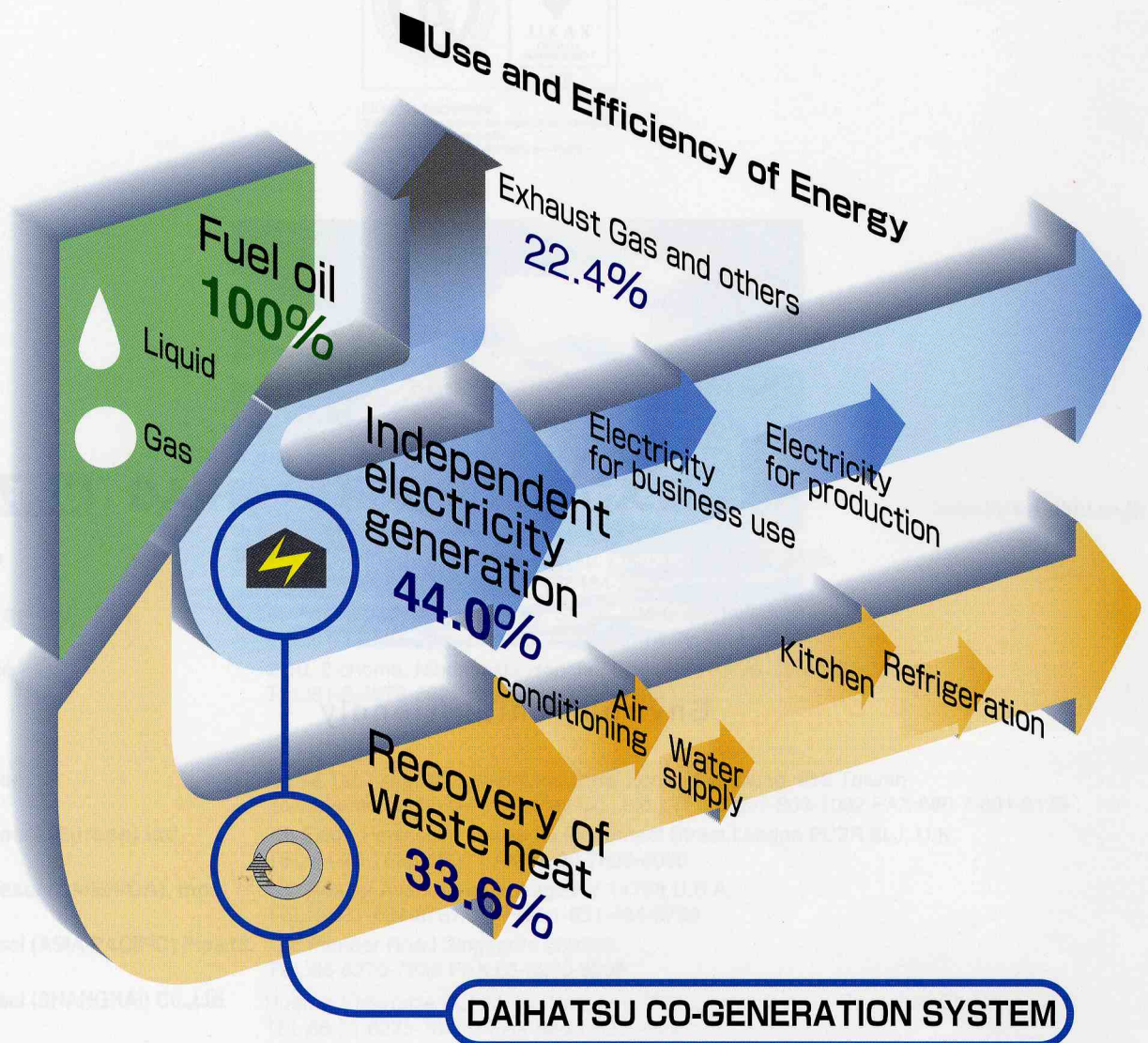
Environmental friendly

THE DAIHATSU CO-GENERATION SYSTEM,

which generates electricity and heat energy at the same time will, CONTRIBUTE

The Daihatsu Co-Generation system is an environment-protective type electricity and heat generating system that effectively utilize an independent generating plant which is powered by our diesel engine or gas engine, and its waste heat.

- The Daihatsu Diesel engine has a wide output range up to 5,500kw per engine.
- As the prime mover, either our diesel engine or gas engine can be used according to the circumstances.

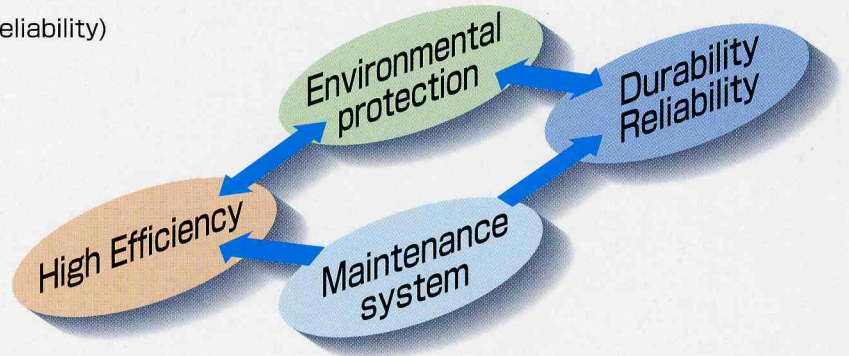


TO ENERGY SAVING AS WELL AS ENVIRONMENTAL PROTECTION

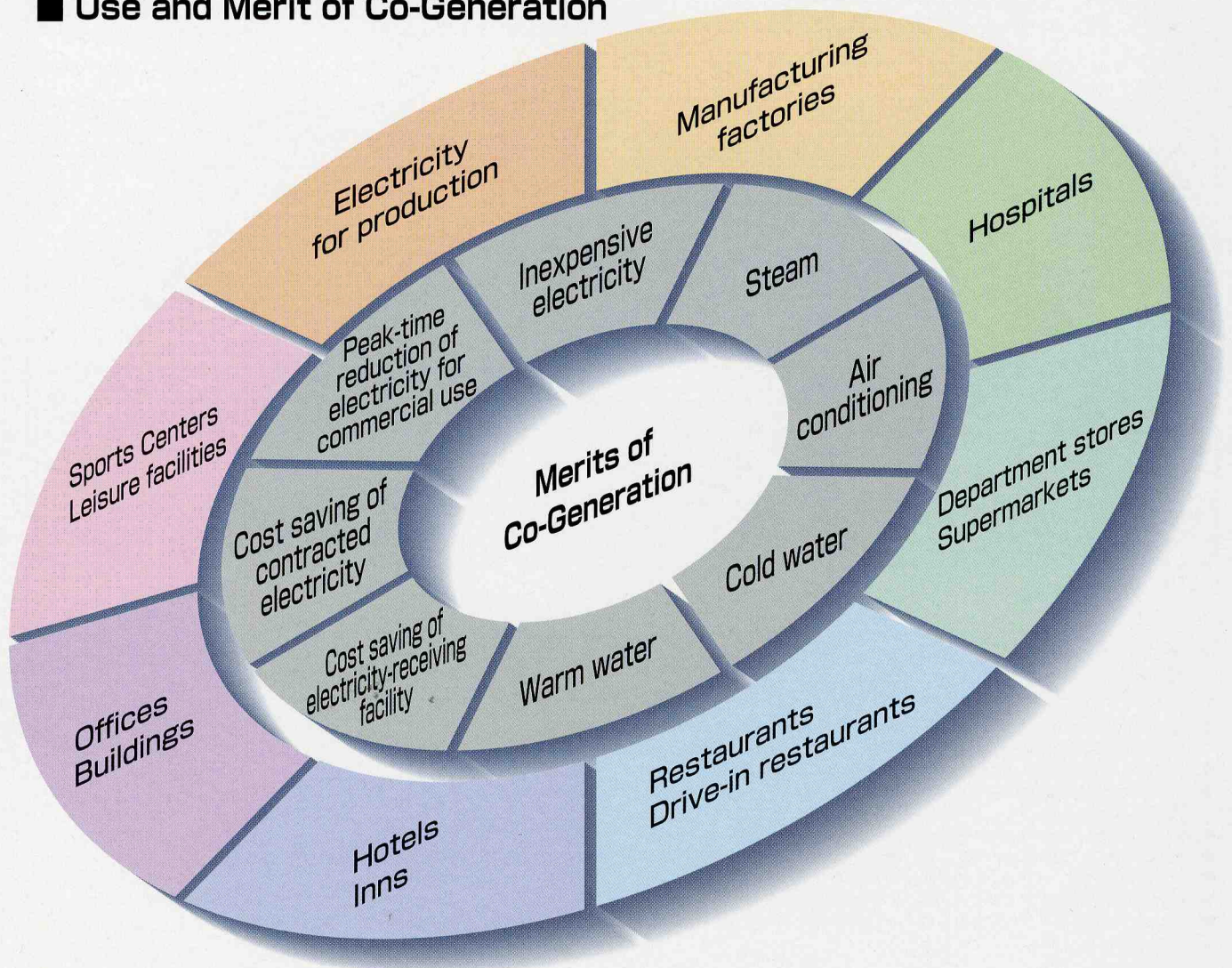
in various fields.

Important features of the Daihatsu Co-Generation System

- Each of the prime mover employed (diesel engine or gas engine) advances the concept of environmental protection.
- Each of the engine has been designed with utmost priority on thermal efficiency, and less fuel consumption.
- Long-term achievements in the field of general-purpose of marine application engines (durability and reliability)



■ Use and Merit of Co-Generation



Specifications for The Daihatsu Co-Generation System

DK series

Specifications of diesel engines

Generating capacity		Diesel engine			Exhaust gas		Steam & Warm water system		Steam system	Warm water system	Utility (consumption)			
kWe / kVA	Hz	Model No.	Output kWm / PS	Rotational speed min ⁻¹	Temp. °C	Flow rate Nm ³ /h	Steam kg/h	Warm water MJ/h	Steam kg/h	Warm water MJ/h	Fuel oil L/h	Cooling water m ³ /h	Lube oil L/h	Auxil. power kWe
360 / 450	50 / 60	5DK-20 / 3DK-20	388 / 528	1,000 / 900	350	2,429	178	282	190	824	● Fuel consumption rate shall separately be specified in accordance with the engine specifications.	0.6	0.5	6.9
450 / 563	50 / 60	5DK-20	485 / 660	750 / 720	355	3,245	246	373	262	1,118		1.1	0.6	8.7
550 / 688	50 / 60	5DK-20	586 / 797	1,000 / 900	355	3,919	297	450	317	1,351		1.1	0.7	8.7
600 / 750	50 / 60	6DK-20	647 / 880	750 / 720	330	4,377	278	464	297	1,326		1.1	1.0	10.7
750 / 938	50 / 60	6DK-20	798 / 1,085	1,000 / 900	330	5,398	343	576	366	1,638		1.1	1.2	10.7
800 / 1,000	50 / 60	8DK-20	863 / 1,173	750 / 720	355	5,857	444	663	474	2,008		1.4	1.3	10.7
1,000 / 1,250	50 / 60	8DK-20	1,062 / 1,443	1,000 / 900	355	7,205	547	815	583	2,470		1.4	1.6	10.7
1,250 / 1,563	50 / 60	6DK-26	1,327 / 1,804	750 / 720	330	9,196	585	506	624	2,317		1.5	2.0	12.2
1,500 / 1,875	50 / 60	6DK-28	1,587 / 2,158	750 / 720	350	10,791	792	717	845	3,124		2.1	2.4	15.7
1,800 / 2,250	50 / 60	6DK-32	1,905 / 2,590	750 / 720	330	11,936	759	975	810	3,325		2.4	2.9	12.7
2,000 / 2,500	50 / 60	8DK-28	2,094 / 2,847	750 / 720	350	13,798	1,013	952	1,080	4,031		2.7	3.2	22.2
2,400 / 3,000	50 / 60	8DK-32	2,513 / 3,417	750 / 720	340	15,386	1,054	1,287	1,124	4,518		3.0	3.8	22.2
2,750 / 3,438	50 / 60	6DK-36	2,874 / 3,907	600 / 600	350	17,698	1,299	1,105	1,385	5,054		3.3	4.3	62.6
3,670 / 4,588	50 / 60	8DK-36	3,835 / 5,214	600 / 600	350	23,619	1,734	1,475	1,849	6,745		4.4	5.8	70.6
4,000 / 5,000	50 / 60	16DK-28	4,167 / 5,665	750 / 720	350	28,892	2,121	1,894	2,262	8,341		3.6	6.3	67.3
5,500 / 6,875	50 / 60	12DK-36	5,705 / 7,757	600 / 600	350	35,140	2,580	2,742	2,751	10,583		4.5	8.6	92.9

- Engine output is based on an engine chamber temperature of 5~40°C, an altitude of less 300m, humidity of 85%, and cooling water temperature of 32°C.
- NOx content in the exhaust gas is less than 950ppm (13%O₂).
- The maximum temperature of the exhaust gas for heat recovery is 200°C for steam and 180°C for warm water.
- Steam volume for saturation is at 0.78MPa (8 kgf/cm²G).
- Supplied water temperature for heat recovery is 20°C. However, it is 60°C at the boiler inlet.
- Jacket water temperature at the engine outlet is 80°C.
- As for the specifications of the radiator, please consult us.
- The contents of this catalogue and the specifications may be revised without prior notice.

Specifications for The Daihatsu Co-Generation System

GS series

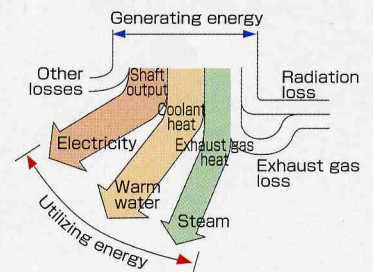
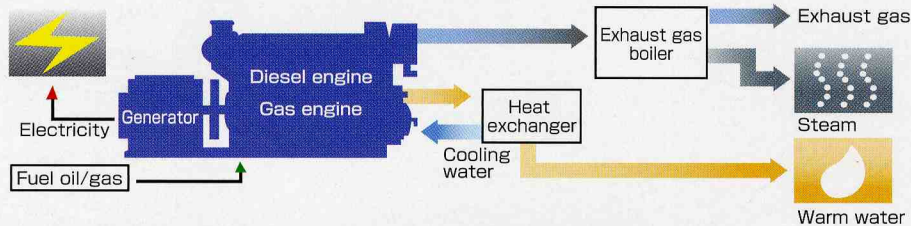
Specifications of gas engines

Generating capacity		Gas engine			Exhaust gas		Steam & Warm water system		Steam system	Warm water system	Utility (consumption)			
kWe / kVA	Hz	Model No.	Output kWm / PS	Rotational speed min ⁻¹	Temp. °C	Flow rate Nm ³ /h	Steam kg/h	Warm water MJ/h	Steam kg/h	Warm water MJ/h	Fuel gas Nm ³ /h	Cooling water m ³ /h	Lube oil L/h	Auxil. power kWe
400 / 500	50	6GS-22	431	1,000	580	1,361	273	1,426	291	2,255	● Fuel consumption rate shall separately be specified in accordance with the engine specifications.	1.2	0.39	18
	60		587	900										
800 / 1,000	50	6GSV-22	851	1,000	550	2,697	499	3,276	532	4,805				
	60		1,157	900										
1,000 / 1,250	50	8GSV-22	1,062	1,000	540	3,426	616	4,325	656	6,219	3.0	0.96	23	
	60		1,443	900										

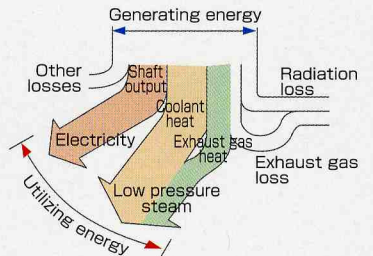
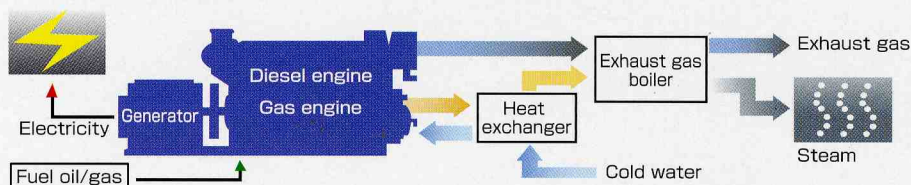
- Engine output is based on engine chamber temperature of 5~40°C, an altitude of less 300m, humidity of 85% and cooling water temperature of 32°C.
- Fuel oil gas pressure is 0.098 - 0.147MPa (1.0 - 1.5 kgf/cm²G).
- The maximum temperature of the exhaust gas for heat recovery is 200°C for steam and 150°C for warm water.
- Steam volume for saturation is at 0.78MPa (8 kgf/cm²G).
- Supplied water temperature for heat recovery is 20°C. However, it is 60°C at the boiler inlet.
- Jacket water temperature at the engine outlet is 90°C.
- As for the specifications of the radiator, please consult us.
- Since the outputs and other items may be changed depending on the conditions, please consult us when the details are examined.

Examples of Co-Generation System

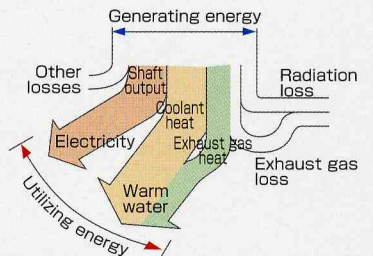
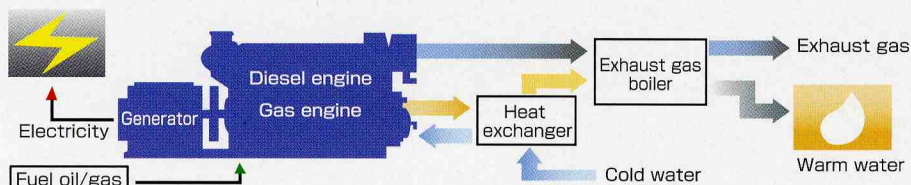
Electricity generation, Steam, and Warm water



Electricity generation and Steam

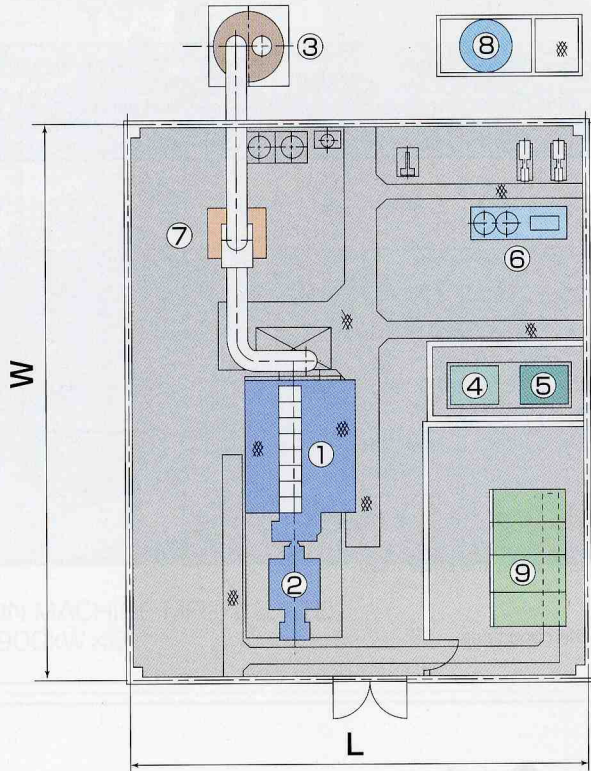


Electricity generation and Warm water



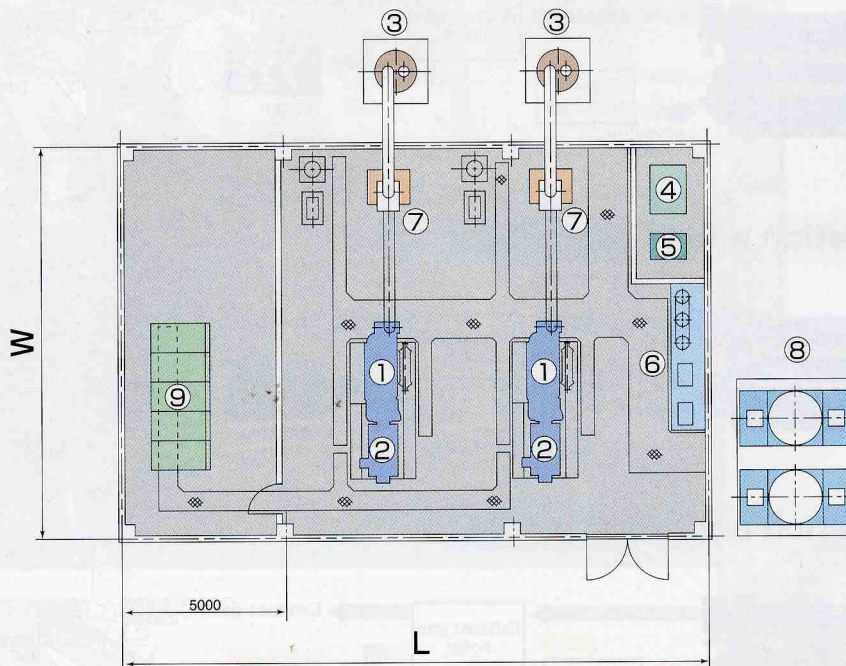
Equipment Layout for The Daihatsu Co-Generation System (Examples)

Example in case of 1 engine



No.	Item	Q'ty
1	Engine	1
2	Generator	1
3	Exhaust silencer	1
4	Fuel oil dispenser	1
5	Lube oil dispenser	1
6	Starting air device	1
7	Exhaust gas boiler	1
8	Cooling tower	1
9	Control Panel	1 set

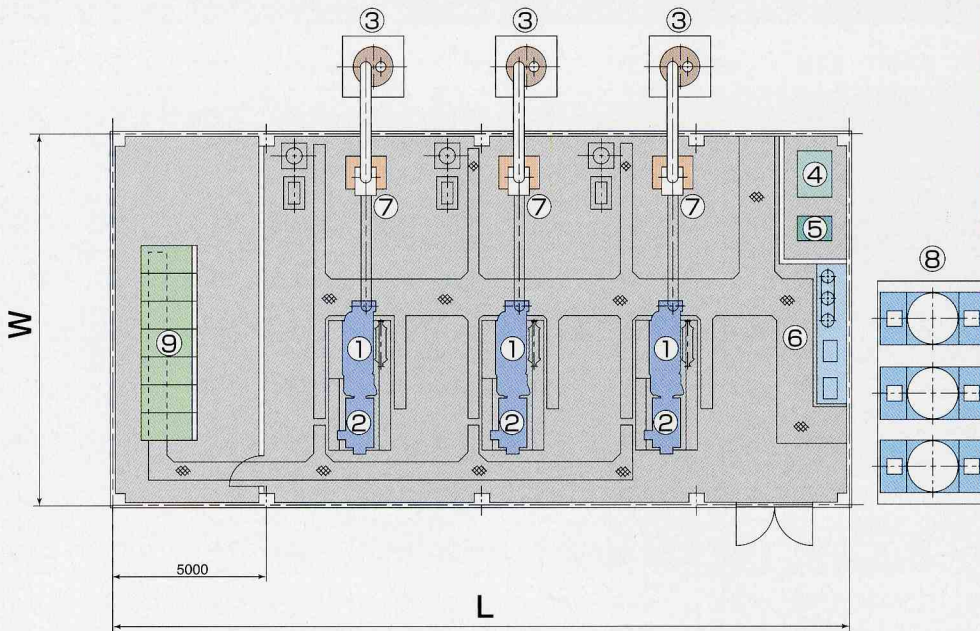
Example in case of 2 engines



No.	Item	Q'ty
1	Engine	2
2	Generator	2
3	Exhaust silencer	2
4	Fuel oil dispenser	1
5	Lube oil dispenser	1
6	Starting air device	1 set
7	Exhaust gas boiler	2
8	Cooling tower	2
9	Control Panel	1 set

Equipment Layout for The Daihatsu Co-Generation System (Examples)

Example in case of 3 engines



No.	Item	Q'ty
1	Engine	3
2	Generator	3
3	Exhaust silencer	3
4	Fuel oil dispenser	1
5	Lube oil dispenser	1
6	Starting air device	1 set
7	Exhaust gas boiler	3
8	Cooling tower	3
9	Control Panel	1 set

Size of the generator room (for reference)

Diesel engine

Generating capacity (kWe)	Model No.	(m)		
		1 Engine (W×L×H)	2 Engines (W×L×H)	3 Engines (W×L×H)
360	3DK-20	11 × 12 × 6.5	11 × 19.5 × 6.5	11 × 25 × 6.5
550	5DK-20	12 × 12 × 6.5	12 × 19.5 × 6.5	12 × 25 × 6.5
750	6DK-20	14 × 12 × 6.5	14 × 19.5 × 6.5	14 × 25 × 6.5
1000	8DK-20	15 × 14 × 7	15 × 19.5 × 7	15 × 25 × 7
1250	6DK-26	16 × 14 × 7	16 × 19.5 × 7	16 × 25 × 7
1500	6DK-28	16 × 14 × 7	16 × 19.5 × 7	16 × 25 × 7
1800	6DK-32	16 × 14 × 8	16 × 20 × 8	16 × 26 × 8
2000	8DK-28	17 × 14 × 7	17 × 19.5 × 7	17 × 25 × 7
2400	8DK-32	17 × 14 × 8	17 × 20 × 8	17 × 26 × 8
2750	6DK-36	19 × 15 × 12	19 × 21 × 12	19 × 27 × 12
3670	8DK-36	20 × 15 × 12	20 × 21 × 12	20 × 27 × 12
4000	16DK-28	20 × 15 × 10	20 × 21 × 10	20 × 27 × 10
5500	12DK-36	20 × 16 × 12	20 × 22.5 × 12	20 × 29 × 12

Gas engine

400	6GS-22	15 × 13 × 6.5	15 × 17 × 6.5	15 × 21 × 6.5
800	6GSV-22	15 × 14 × 6.5	15 × 18 × 6.5	15 × 22 × 6.5
1000	8GSV-22	16 × 15 × 6.5	16 × 19 × 6.5	16 × 23 × 6.5

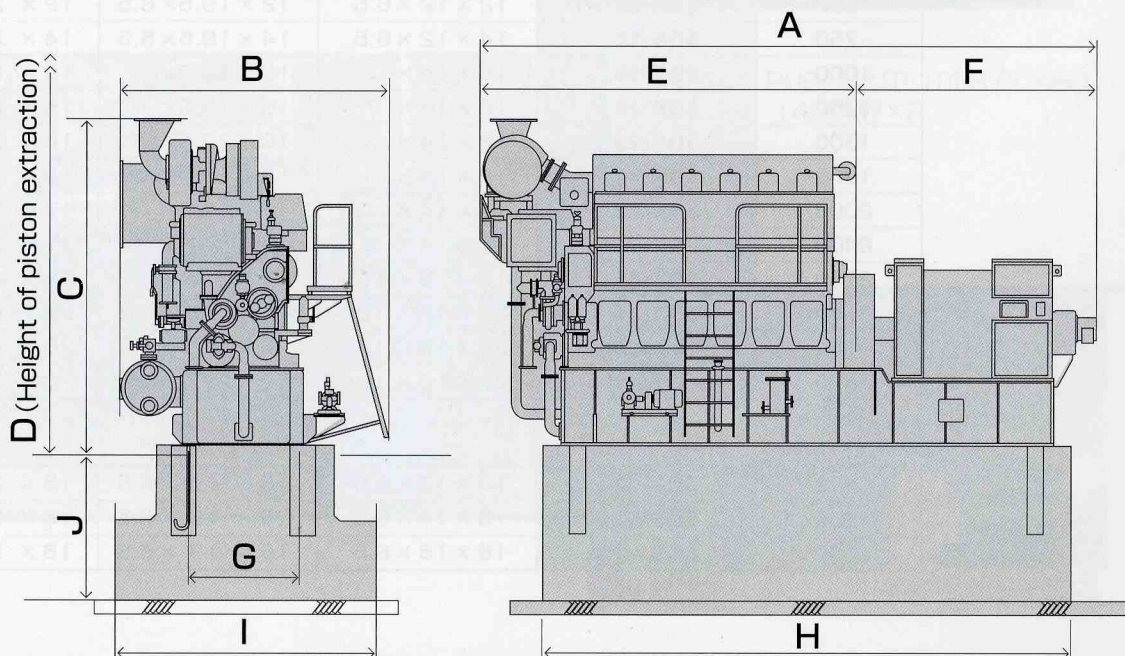
Dimensions and Weight of Generators and Engines for The Daihatsu Co-Generating System

(mm)

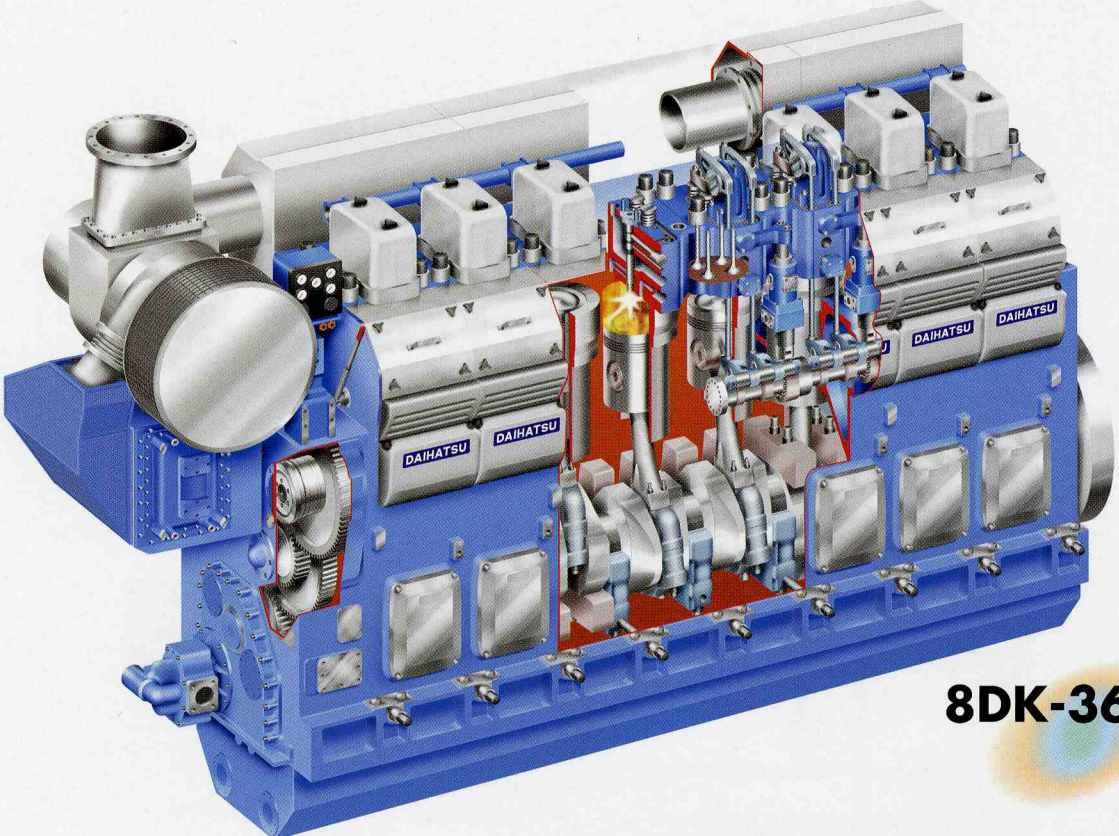
Model No.	A	B	C	D	E	F	G	H	I	J	Weight of generating plant (kg)			
											Engine	Generator	Baseplate & Accessories	Total
Diesel engine														
3DK-20	3,921	1,867	2,741	2,980	2,231	1,690	1,150	4,000	3,000	1,600	5,400	2,450	2,200	10,050
5DK-20	4,846	1,856	2,770	3,500	2,996	1,850	1,150	4,600	3,000	1,800	7,000	2,800	2,600	12,400
6DK-20	5,500	2,250	3,000	3,500	3,300	2,200	1,200	5,000	3,000	1,800	8,650	3,600	2,750	15,000
8DK-20	6,700	2,250	3,000	3,500	4,170	2,530	1,200	5,800	3,000	1,800	10,600	4,500	4,000	19,100
6DK-26	7,210	2,900	3,406	3,865	4,175	3,035	1,130	6,000	3,500	2,400	16,000	8,700	5,500	30,200
6DK-28	7,100	3,500	3,600	4,300	3,950	3,150	1,700	6,500	4,000	2,400	18,000	9,100	6,000	33,100
6DK-32	8,100	4,700	4,000	5,050	4,670	3,430	2,050	7,000	4,000	2,400	24,000	10,700	8,000	42,700
8DK-28	8,200	3,500	3,900	4,300	5,000	3,200	1,700	7,000	4,000	2,400	23,000	10,150	7,850	41,000
8DK-32	9,200	4,700	4,000	5,050	5,850	3,350	2,050	8,000	4,000	2,400	31,000	12,000	9,500	52,500
6DK-36	9,748	5,000	5,000	5,363	5,598	4,150	1,940	8,500	4,500	2,800	44,000	17,000	10,000	71,000
8DK-36	11,028	5,000	5,000	5,363	6,728	4,300	1,940	9,800	4,500	2,800	55,000	21,000	13,300	89,300
16DK-28	10,820	4,500	4,268	4,000	7,097	3,720	1,440	9,900	5,000	2,900	49,000	16,000	15,000	80,000
12DK-36	12,020	5,000	4,995	4,910	7,765	4,255	1,940	10,400	6,000	3,000	80,000	26,080	*16,150	122,230
Gas engine														
6GS-22	4,800	2,050	2,690	3,000	2,800	2,000	1,550	4,100	2,000	(1,000)	8,600	3,500	3,000	15,100
6GSV-22	5,800	3,100	3,050	3,760	3,770	2,030	1,800	5,600	2,300	(1,100)	14,500	4,500	5,000	24,000
8GSV-22	7,600	3,100	3,400	3,760	5,120	2,480	1,800	6,000	2,300	(1,100)	19,200	5,000	5,800	30,000

The number in parentheses indicates vibration-insulated mounting.

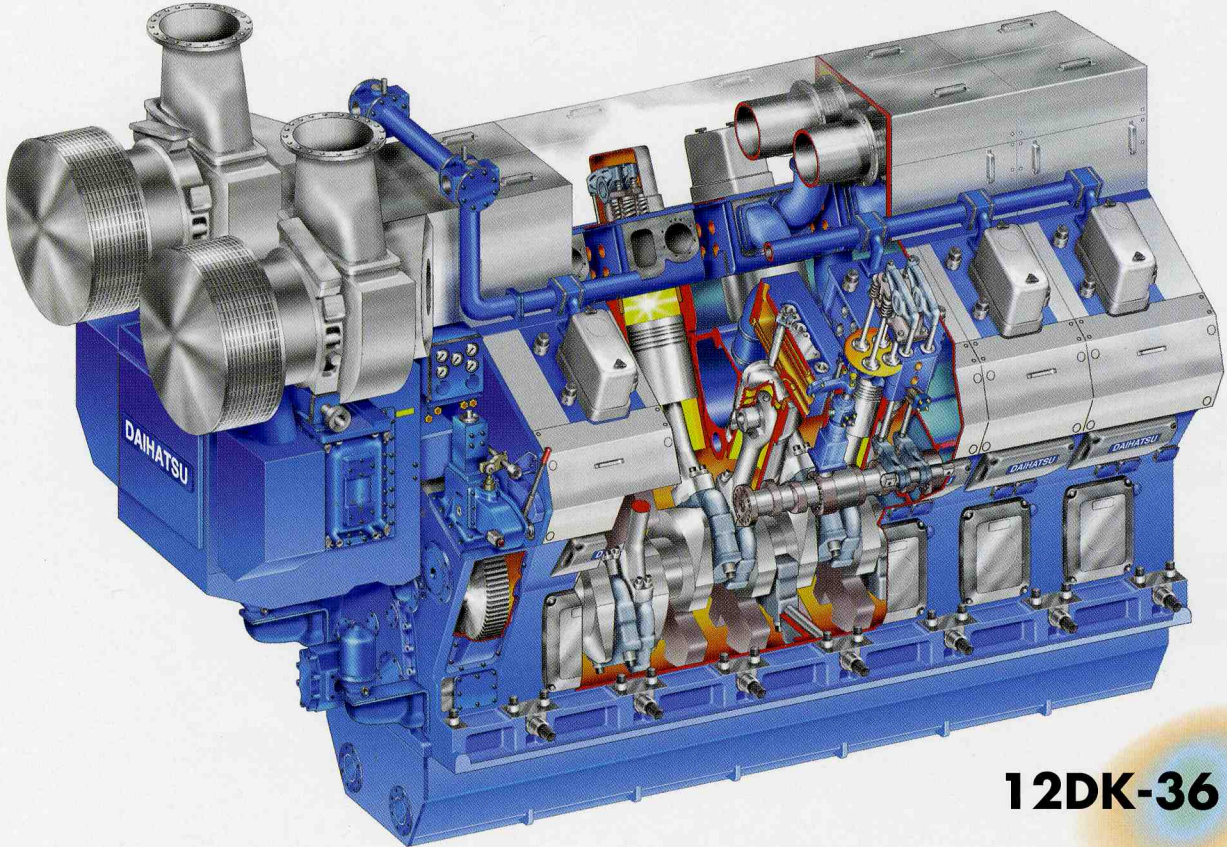
* Engine base plate only.



Three-Dimension Sectional Drawing of Engines for The Daihatsu CO-Generation System

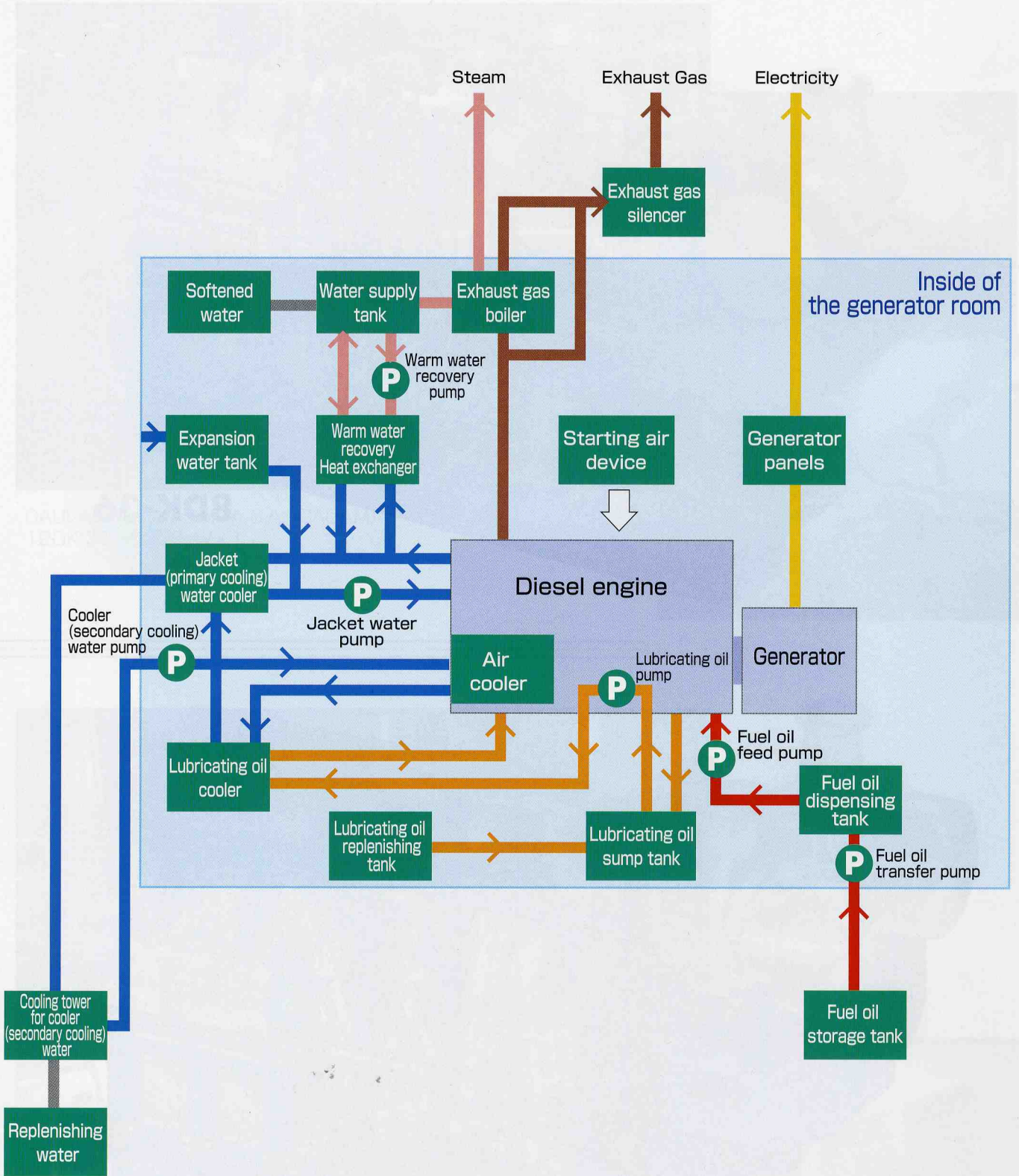


8DK-36

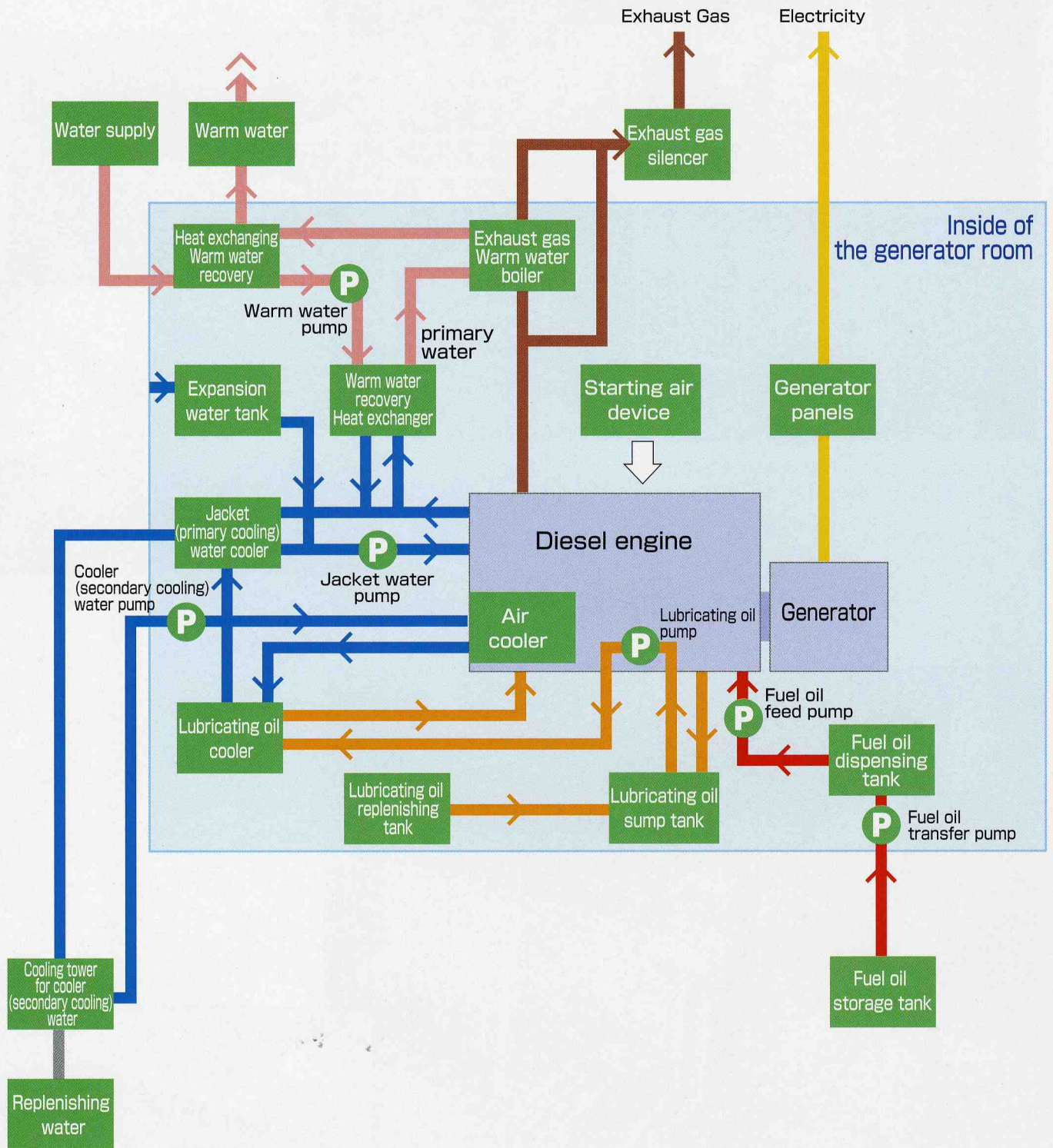


12DK-36

Flow Chart of Piping for The Daihatsu Co-Generation System Example of Steam Recovery

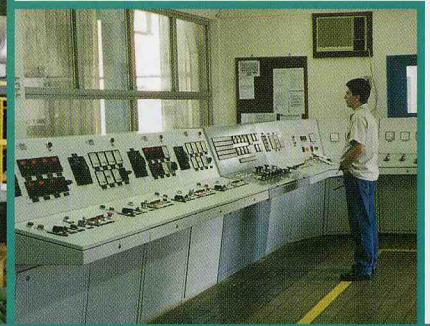


Flow Chart of Piping for The Daihatsu Co-Generation System Example of Warm Water Recovery

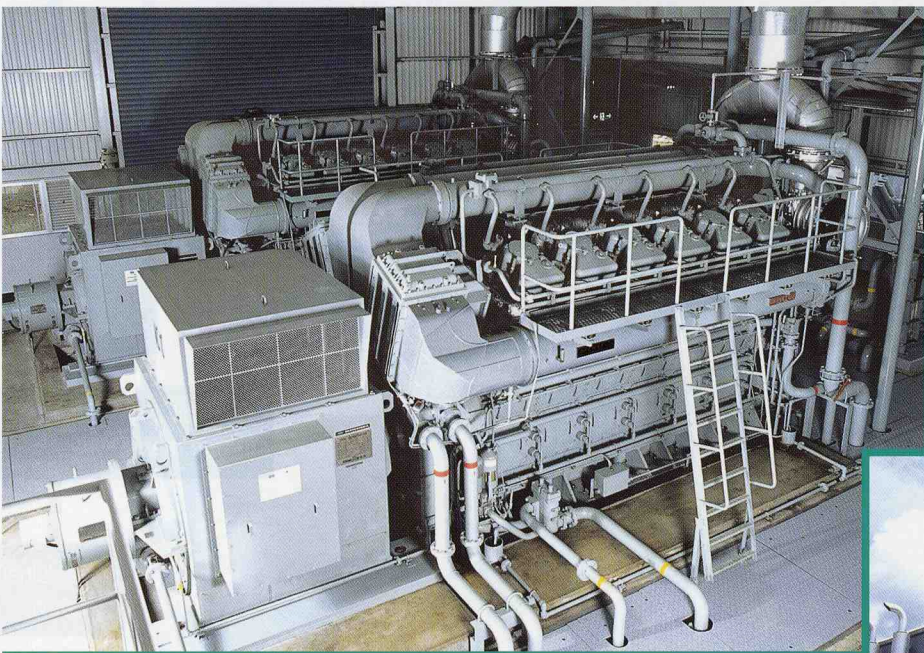


Sales Achievements

The Daihatsu Co-Generation System has been exhibiting its performance

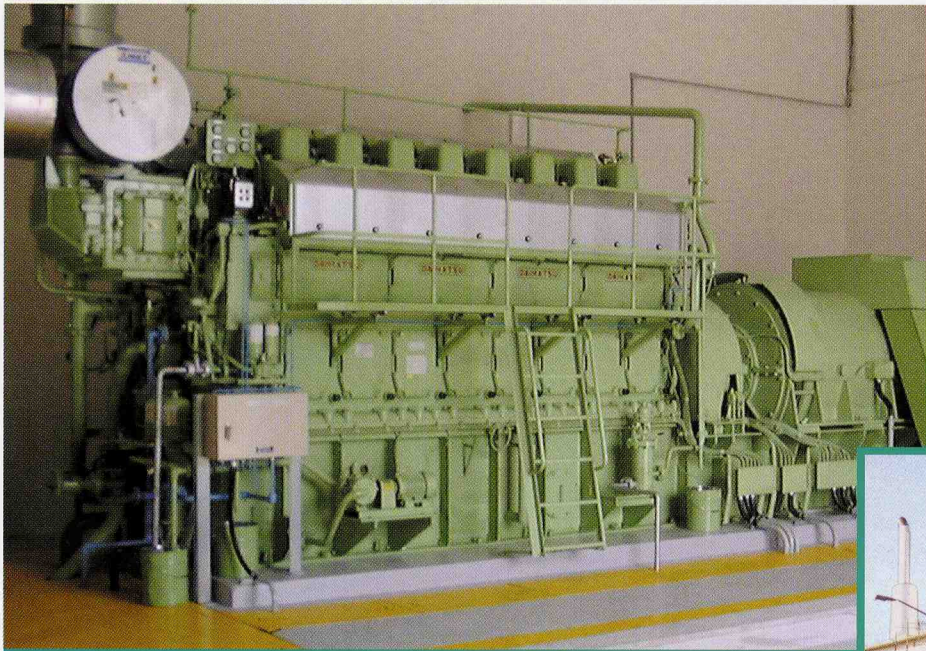


CAULIM DA AMAZONIA S.A. (CADAM)
12DK-36 5300kW×1

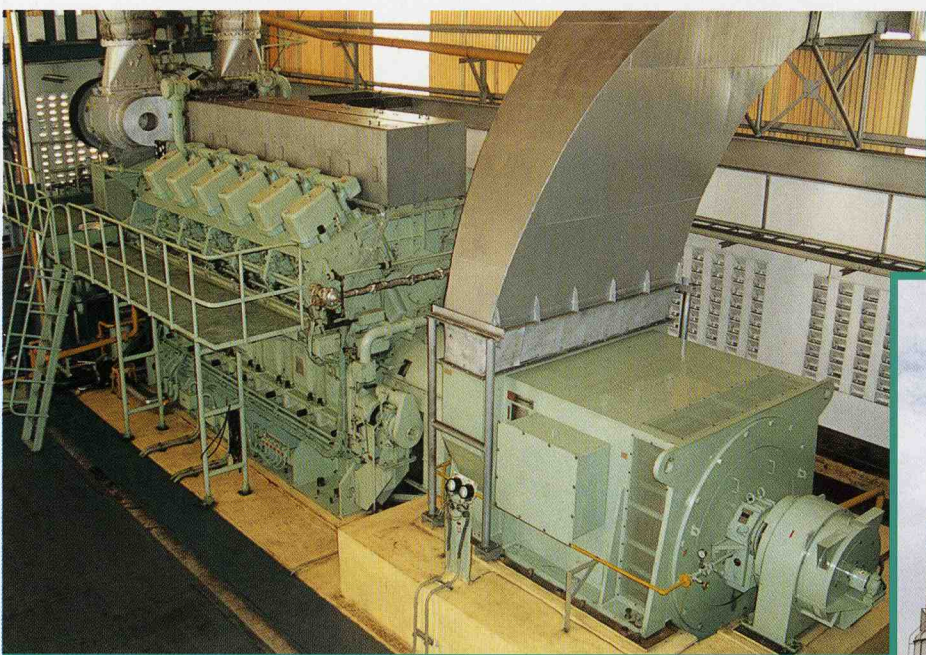


POHNPEI UTILITIES CORPORATION
12DS-32 2500kW×4

in various ways such as the stable supply of electrical power, pursuit of efficiency, and energy saving.



MOTO HONDA DA AMAZONIA LTDA.
8DK-28 2100kW×1

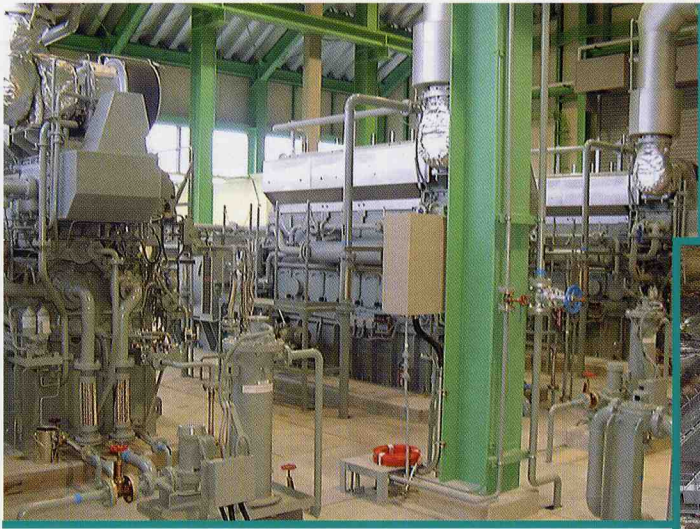


CONTAINER CORPORATION OF PHILIPPINES
12DK-36 5300kW×1



Sales Achievements

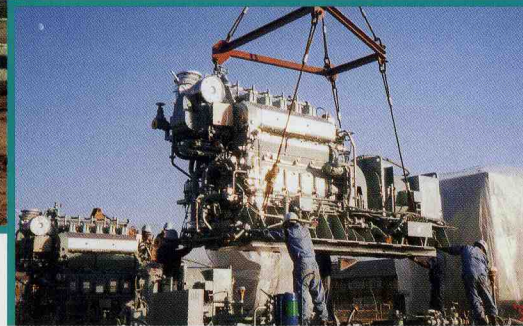
The Daihatsu Co-Generation System has been exhibiting its performance



SHIKOTAN ISLAND
8DK-20 800kW×3



ETOROFU ISLAND
5DK-20 500kW×2



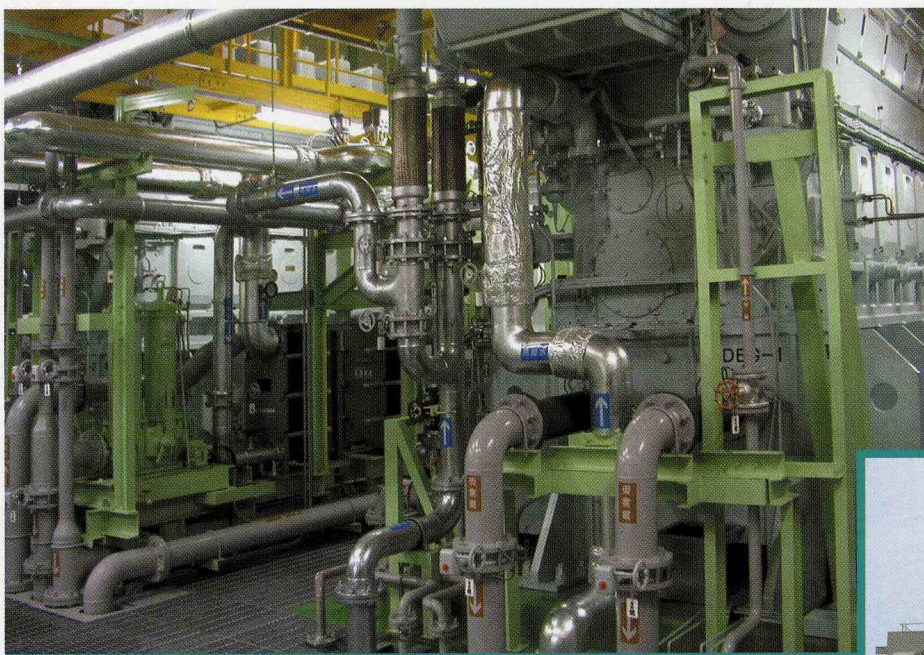
KIRIBATI PUBLIC UTILITIES BOARD
6DK-28 1400kW×2



in various ways such as the stable supply of electrical power, pursuit of efficiency, and energy saving.



SARAWAK ELECTRICITY SUPPLY CORPORATION
12DK-32B 3500kW×1

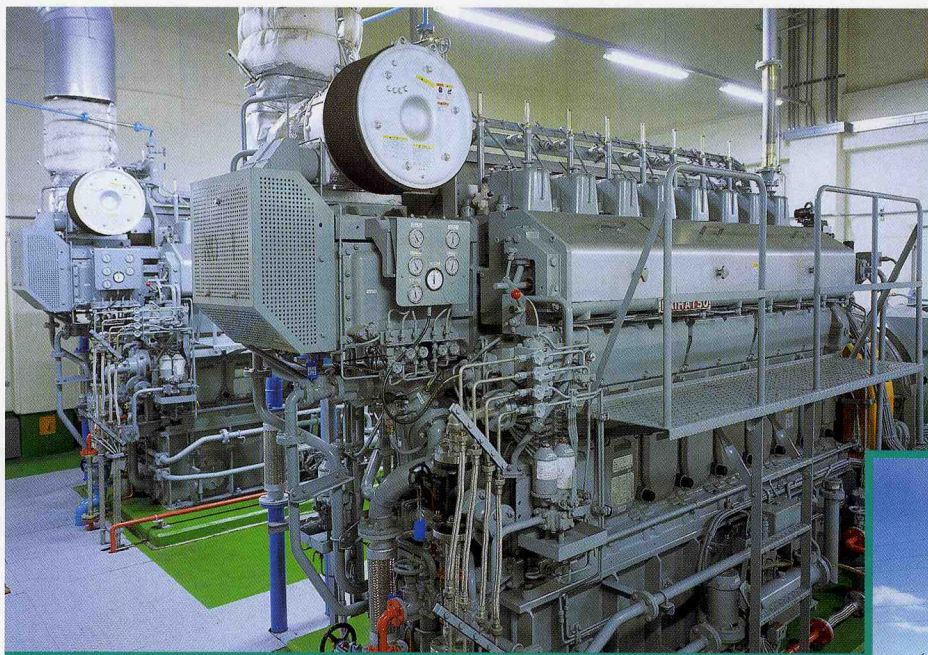


MITSUBISHI PHARMA CORP.
6DK-36 2750kW×2

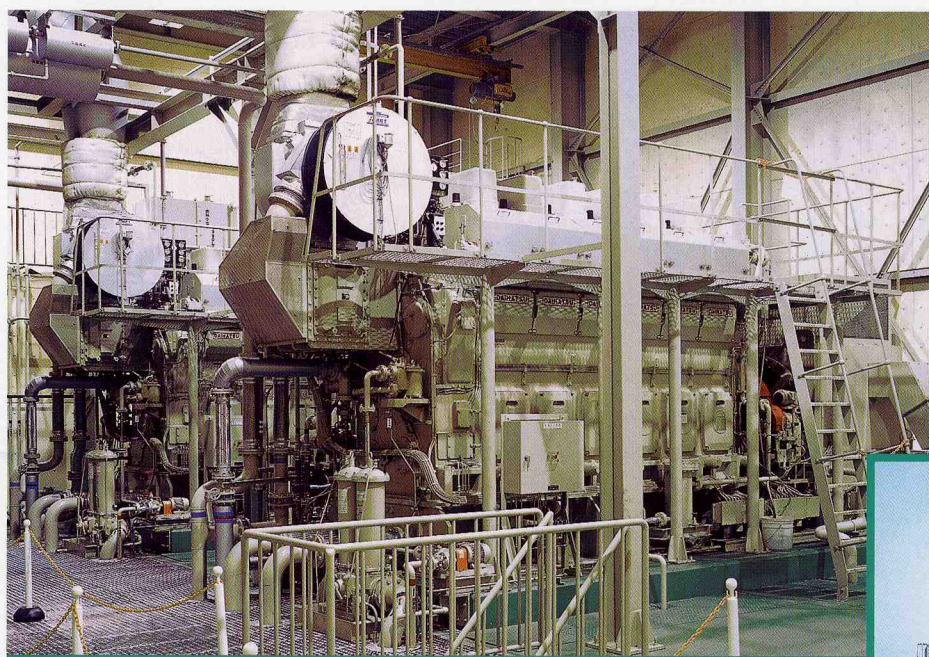


Sales Achievements

The Daihatsu Co-Generation System has been exhibiting its performance



SHIN NIHON MACHINE MFG. CO.,LTD.
8DK-20 900kW×2



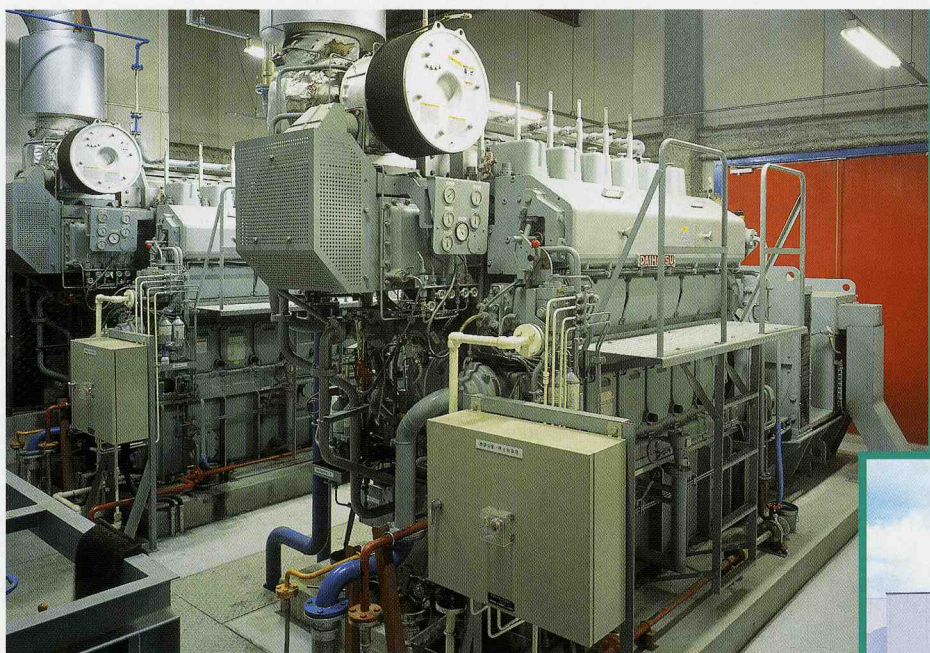
ASAHI TECHNOGLASS CORP.
6DK-36 2750kW×2



in various ways such as the stable supply of electrical power, pursuit of efficiency, and energy saving.



NGK SPARK PLUG CO.,LTD.
6DK-28 1500kW×2



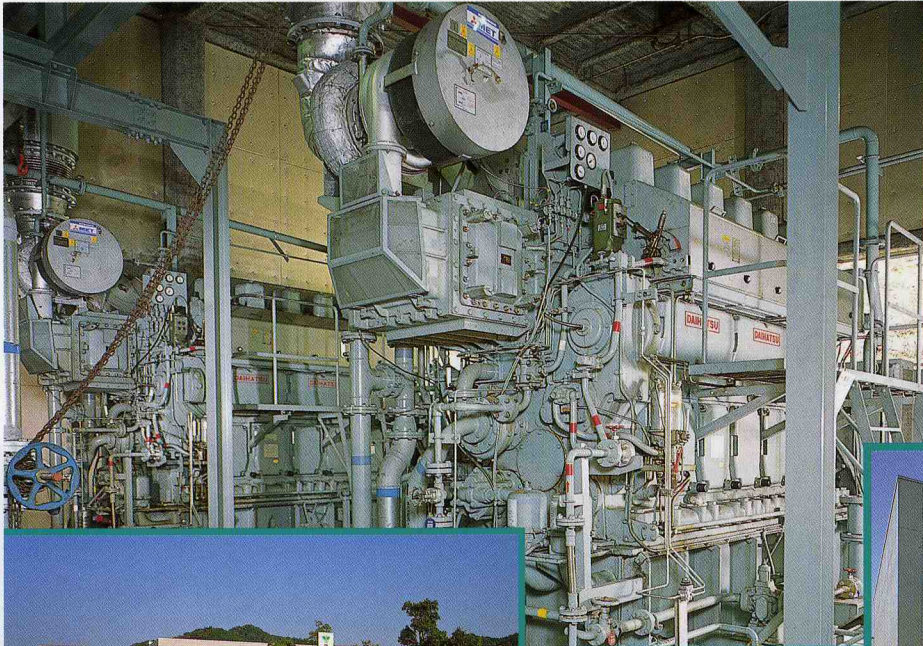
SHOWA MANUFACTURING CO.,LTD.
6DK-20 750kW×2



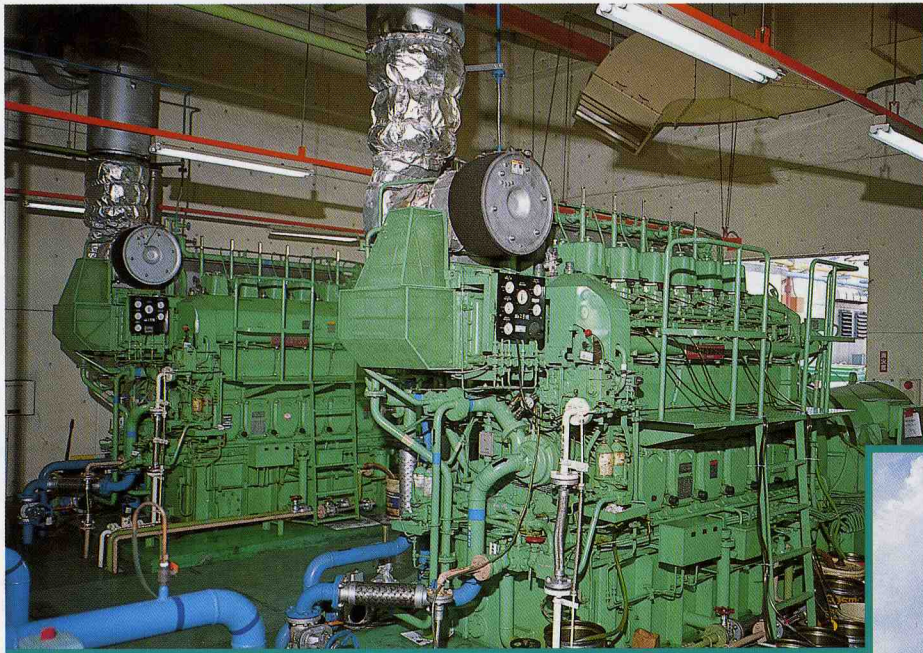
Sales Achievements

The Daihatsu Co-Generation System has been exhibiting its performance

DK series



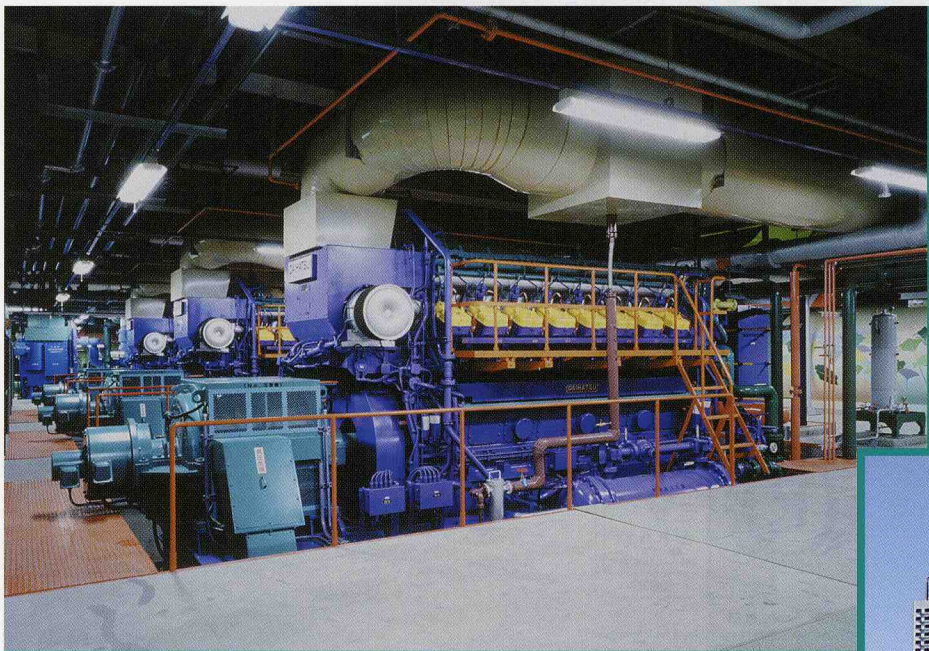
FUTABA INDUSTRIES SATTA PLANT
6DK-28 1500kW×2



NISHIKAWA RUBBER MIHARA PLANT
6DK-20 700kW×2



in various ways such as the stable supply of electrical power, pursuit of efficiency, and energy saving.



SHIN-UMEDA CITY
8GSV-22 1000kW×3



MITSUBISHI PLASTICS INC.
6DK-36 2750kW×2



THE DAIHATSU CO-GENERATION SYSTEM

Daihatsu Diesel's engines, gas engines, reduction gears, gas turbines and other products are manufactured under excellent quality assurance systems which conform to ISO 9001

The industry-leading quality assurance systems of Daihatsu Diesel's Headquarters and Moriyama Works, covering every aspect of design, development, manufacture and off-site maintenance — the first manufacturer in this field in Japan to be accredited for this aspect — are certified as satisfying the requirements of ISO 9001. As a result all engines, gas turbines and marine-use equipment of Daihatsu Diesel are manufactured under quality assurance systems that also meet the requirements of EN ISO 9001, JIS Z9901 and BSEN ISO 9001. The compliance audit was performed by Lloyd's Register Quality Assurance, Ltd.



ISO 9001 Accredited
Quality Assurance System Standards of the International
Organization for Standardization
Conforming Sites : Head Office-Moriyama Factory

DAIHATSU

DAIHATSU DIESEL MFG.CO.,LTD.©

<http://www.dhtd.co.jp>

Head Office

1-30, Oyodo Naka1-chome, Kita-ku, Osaka, 531-0076 Japan
TEL:81-6-6454-2393 FAX:81-6-6454-2686

Moriyama Factory

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

Tokyo Office

2-10, 2-chome, Nihonbashi-Honcho, Chuo-ku, Tokyo, 103-0023 Japan
TEL:81-3-3279-0827 FAX:81-3-3245-0395

Taiwan Office

No.14 Tai-Tang RD. Lin-Hai Industrial Zone, Kaohsiung, 812 Taiwan
(c/o Marine Technical Industries Co., Ltd.) TEL:886-7-803-1082 FAX:886-7-801-9179

Daihatsu Diesel (Europe) Ltd.

7th Floor, Peninsular House,36 Monument Street,London EC3R 8LJ, U.K.
TEL:44-20-7626-4600 FAX:44-20-7626-6020

Daihatsu Diesel (AMERICA), Inc.

180 Adams Avenue,Hauppauge,NY 11788,U.S.A.
TEL:1-631-434-8787/8/9 FAX:1-631-434-8759

Daihatsu Diesel (ASIA PACIFIC) Pte.Ltd.

128 Pioneer Road Singapore 639586
TEL:65-6270-7235 FAX:65-6270-6236

Daihatsu Diesel (SHANGHAI) Co.,Ltd.

Huamin Enterprize PLAZA 9A, Yananxilu 726, Changnin-Area, Shanghai, China
TEL:86-21-6225-7876/7 FAX:86-21-6225-9299

Daihatsu Diesel Parts Service Co.,Ltd.

12-34, Tanaka-cho, Ibaraki, Osaka, 567-0025 Japan
TEL:81-72-621-3482 FAX:81-72-621-3484

- Please refer to the separate brochure for "DAIHATSU AFTER-SERVICE NETWORK".
- All information contained in this Pamphlet is corrected at the time of printing, but will be subject to change without notice.

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