

Niigata Marine

Selection Guide

IHI Power Systems Co., Ltd.



Marine Products



**More than century of experience
leads to innovative power**

NIIGATA is the core brand of IHI Power Systems Co., Ltd., the only manufacturer in the world with both engines and azimuth Z-Pellers that is of our own, original design without integrating or merging with other brands.

With more than 100 years' history, NIIGATA is proud of its reliability and reputation among harbour and terminal tug and OSV operators across the world. The Japan-headquartered company manufactures engines producing a total of around 1m horsepower a year and nearly 5,000 units of Z-Pellers have been delivered around the world. As an all-round power system provider, it is also involved in diesel engines, gas engines, and gas turbines co-generation activity.



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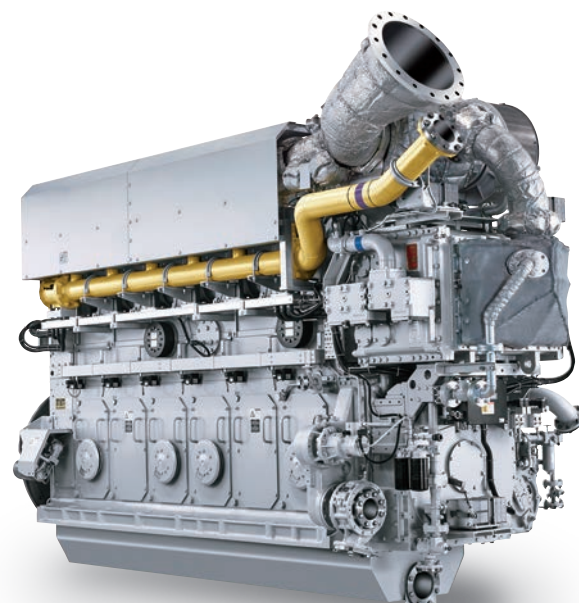
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28AHX-DF

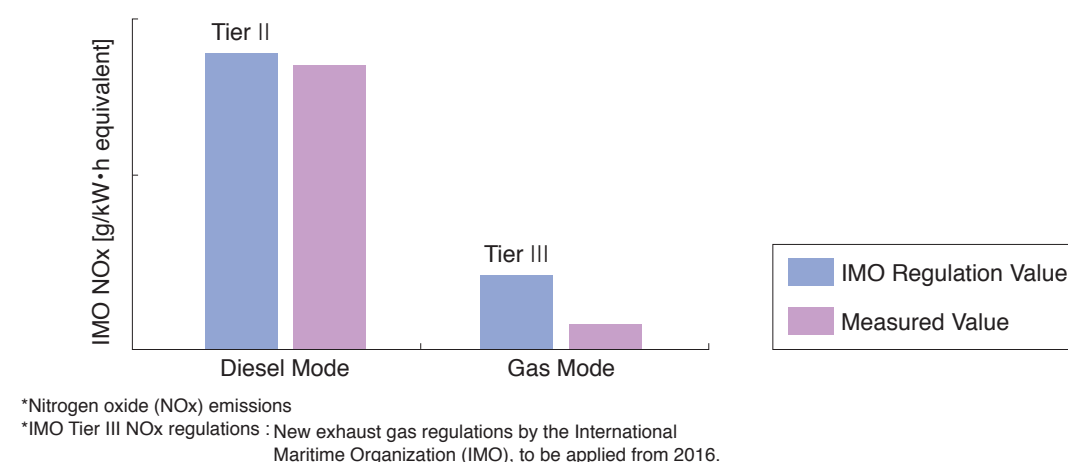
Ship Propulsion Dual Fuel Engine

Natural gas burns far cleaner than petroleum fuel, to there is growing interest in the ship field. We successfully delivered the world's first 4 stroke Dual Fuel engine for Fixed Pitch Propeller directly couple driven LNG fueled harbor tug boat. It offers high dynamic performance of load following capacity in gas mode, equivalent in diesel mode for tug operation, and safe redundancy as instantly switch between gas & diesel mode.



Environmental Performance Meets IMO Tier III NOx Regulations

The 28AHX-DF is an environmentally friendly engine, satisfying IMO Tier III NOx regulations. It uses clean gas combustion, making it possible to meet the new regulations without the need for an exhaust gas processing reactor.



Model	Max.Continuous Rating		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS				t
6L28AHX-DF	1920	2610	800	280	390	22
8L28AHX-DF	2560	3480	800	280	390	28
9L28AHX-DF	2880	3915	800	280	390	31

Model	Dimension (mm)							
	L ₁	L ₂	W ₁	W ₂	H ₁	H ₂	H ₃	H ₄
6L28AHX-DF	5049	5099	1955	1200	2240	445	3315	2040
8L28AHX-DF	5920	5970	1956	1200	2370	445	3445	2040
9L28AHX-DF	6370	6420	2051	1200	2370	445	3445	2040

| Note | * See dimensional drawing in P.11.

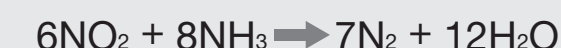
SCR(Selective Catalytic Reduction System)

Principle of the SCR system (Reduction reaction by Urea)

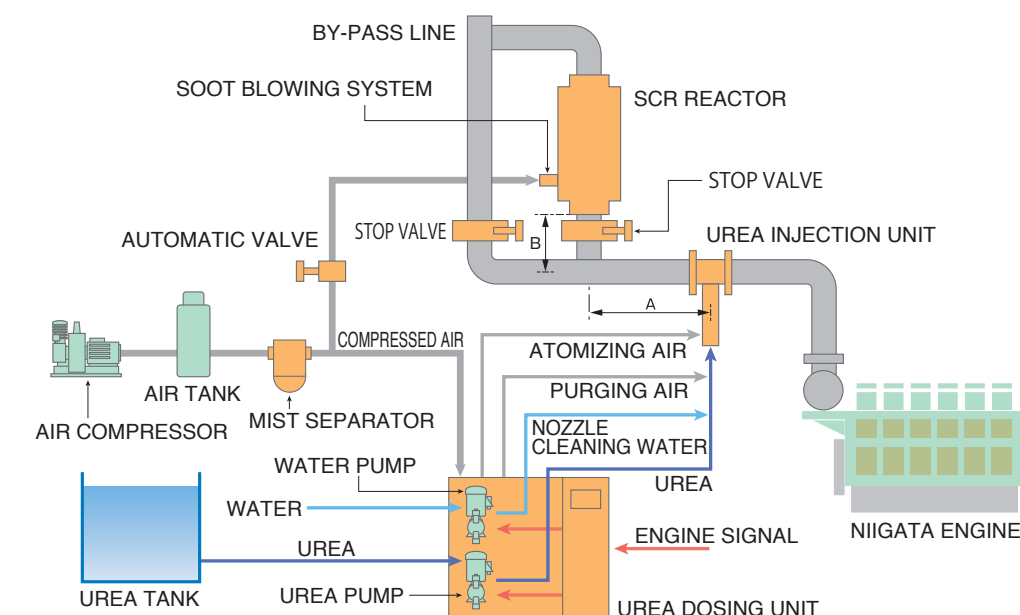
- 1 Urea is injected by the Urea injection device. The Urea is decomposed into ammonia and carbon dioxide by the heat from exhaust gas.



- 2 Generated ammonia, nitrogen oxides and oxygen are decomposed into nitrogen and water by the catalyst in the reactor.



Composition of the SCR system



COMPONENTS OF SCR SYSTEM

| Note 1 | Please plan for the straight length of the exhaust pipe from Urea injection unit (A) to be 2000mm or more and total length from Urea injection unit to reactor inlet (A+B) to be 3000mm or more.

| Note 2 | Please contact NIIGATA if the above exhaust pipe length requirements cannot be met.

Dimension table of Examples of standard SCR reactors

Engine Model	Engine Output	Dimensions of Reactor (mm)			Mass of Reactor
		L	W	H	
6MG25HX	1323	967	967	3500	1.8
6MG28HX	1838	1909	967	3550	2.6
6MG28AHX	2220	1438	967	3800	2.5
8MG28AHX	2960	1438	1438	3900	3.2
9MG28AHX	3330	1438	1438	3900	3.2

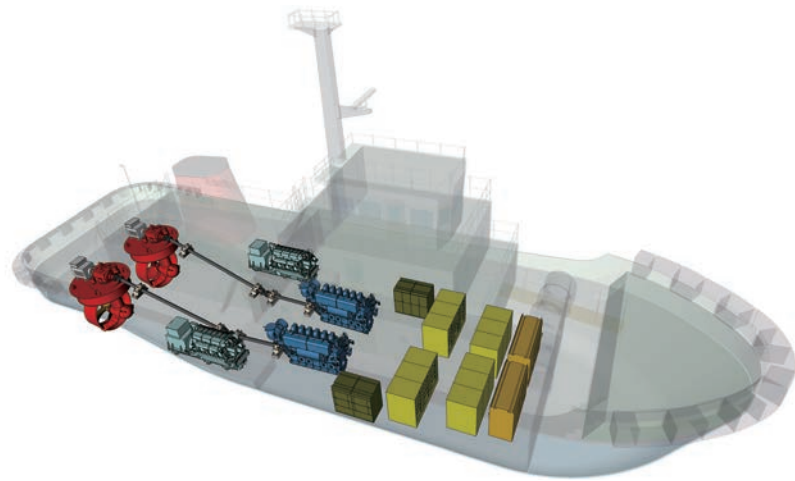
| Note | * This system can reduce NOx emissions by 80%.
* This table is for MDO use. Please contact NIIGATA if using HFO.

Hybrid Tug System

Tugboats are small work boats that assist in bringing large ships to shore, mostly in harbors, and they are deployed in large numbers at ports throughout the world.

These ports, where large numbers of these ships are gathered, are located near areas of human activity, and so many concerns over reducing their environmental impact have emerged.

For many years, NIIGATA has been providing marine engines, Z-Pellers and control systems as tugboat propulsion systems. We're now pushing ahead with the development of the "NIIGATA Hybrid System", as a new type of system that is friendly to the environment.



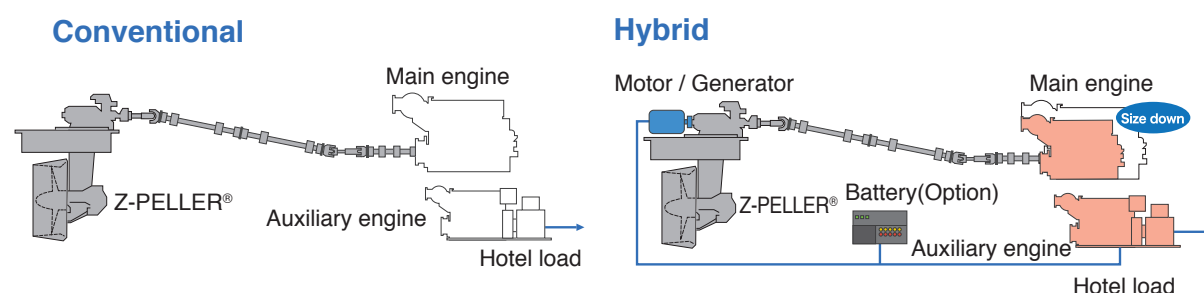
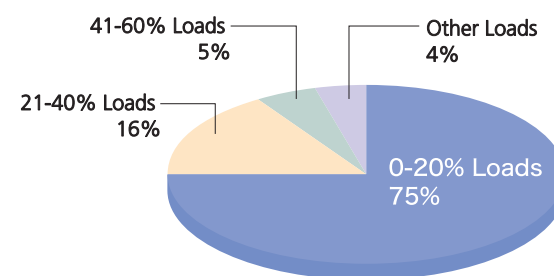
Advantages of the Hybrid System

Tugboats, which are designed to produce maximum output during operation, experience fluctuations in their engine-load factor while being piloted.

The reason is that they are run at low output while traveling from one place to another or while returning to port.

On the other hand, the efficiency of diesel engines drops when load is low, and thus fuel consumption tends to worsen.

Hybrid tugboats use a propulsion system that combines conventional shaft drives with the driving force of the electric motor, so that optimal performance in various types of operations is achieved. Through this arrangement, fuel consumption is drastically reduced.

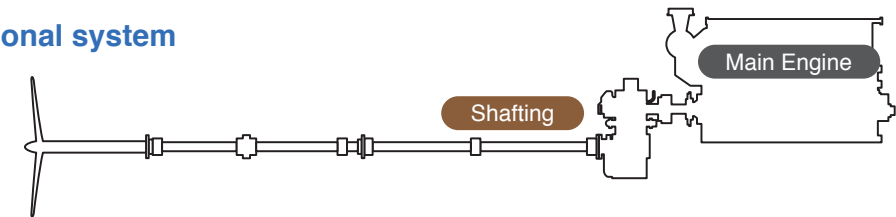


Diesel Driven System

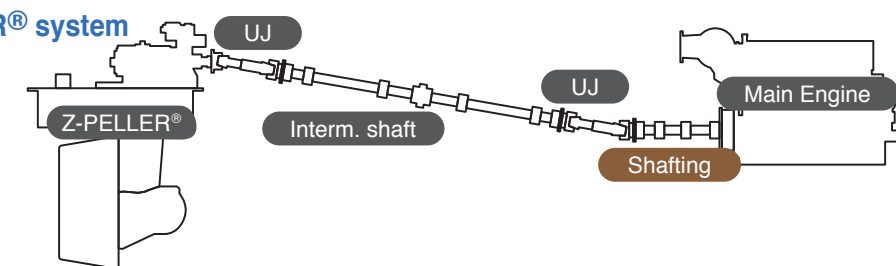
All engines meet NOx emission limit specified by IMO Tier II.

These systems are applied for any kind of vessel's requirements by customers, especially Tug boats and Offshore support vessels.

Conventional system



Z-PELLER® system



Diesel Electric System

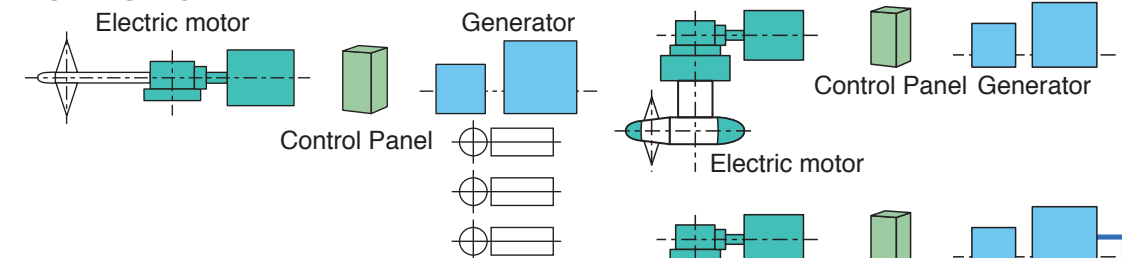
Modern power package integrated propulsion system shall take account of efficiency at saving energy which equal meaning for environmental control eventually.

Diesel Electric driven system is really one of solution as the symbol for future aspects of modernized power package. Motor driven application is available to be given satisfaction at any operator.

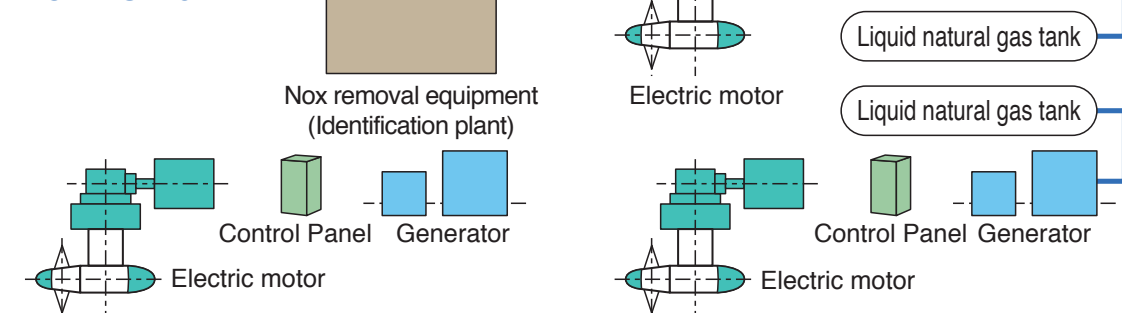
Electric Propulsion System

The electric propulsion system is a technology that improves energy efficiency throughout the high value Multi Purpose OSV.

For IMO Tier II



For IMO Tier III



| Note | * Conventional arrangement applies the same system.

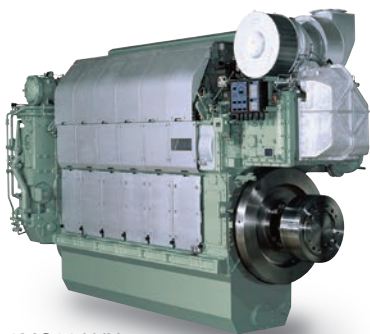
Product Lineup

Medium Speed Diesel Engine

► P10



6MG26HLX



6MG28AHX



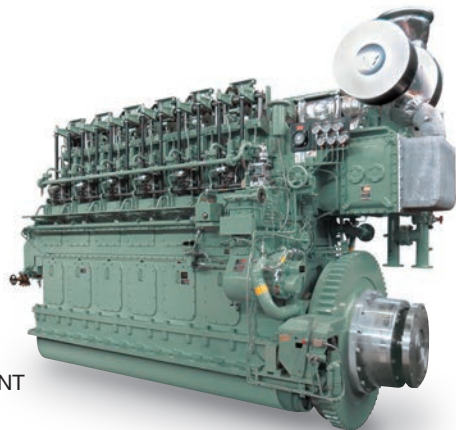
8MG28HX



12MG28AHX

Low Speed Diesel Engine

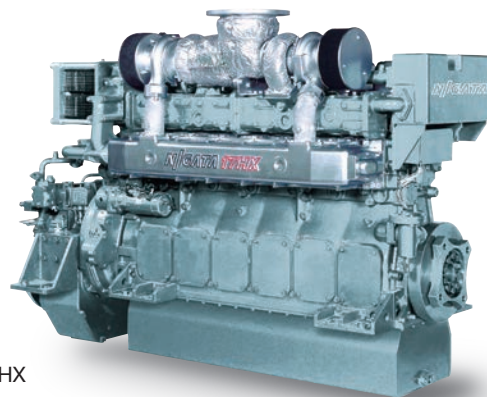
► P16



6M31NT

High Speed Diesel Engine

► P18



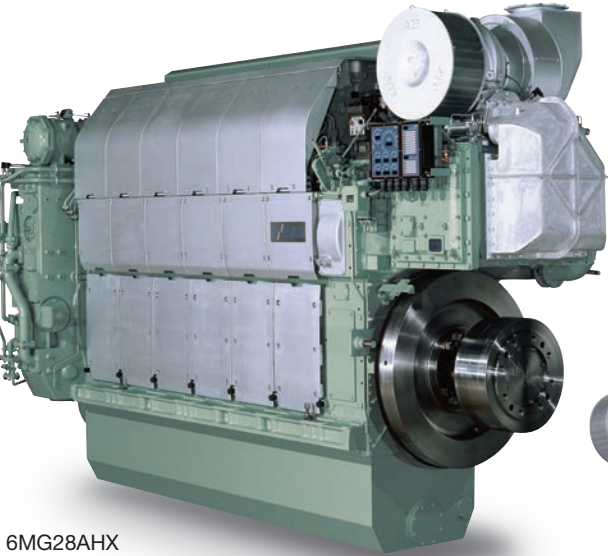
6MG17HX

Medium Speed Diesel Engine Power Range

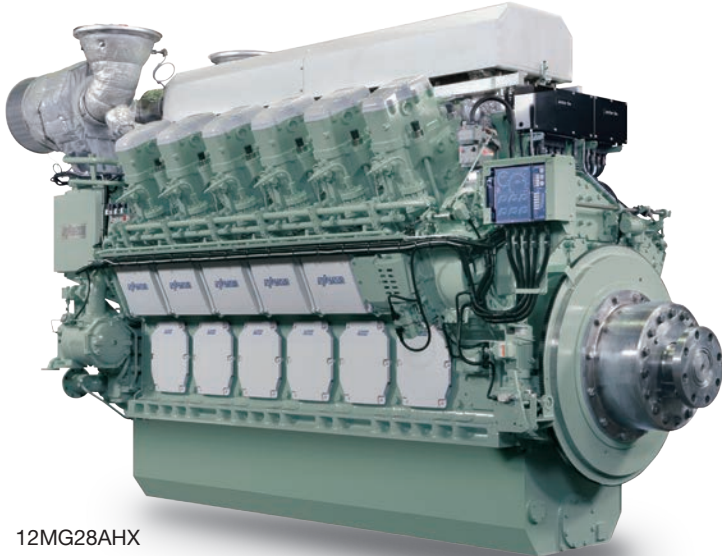
Model	kWm		1000		2000		3000		4000		5000		6000		7000	
	PS	1000	2000	3000	4000	5000	6000	7000	8000	9000						
5~9MG17AHX																
6MG19HX																
6MG22HX																
6MG25HX																
6MG26HLX																
6MG28HX																
6MG28AHX																
8MG28HX																
6MG34HX																
8MG28AHX																
9MG28AHX																
8MG34HX																
6MG41HX																
12MG28AHX																
16MG28AHX																
18MG28AHX																

AHX Series

Medium Speed Diesel Engine



6MG28AHX

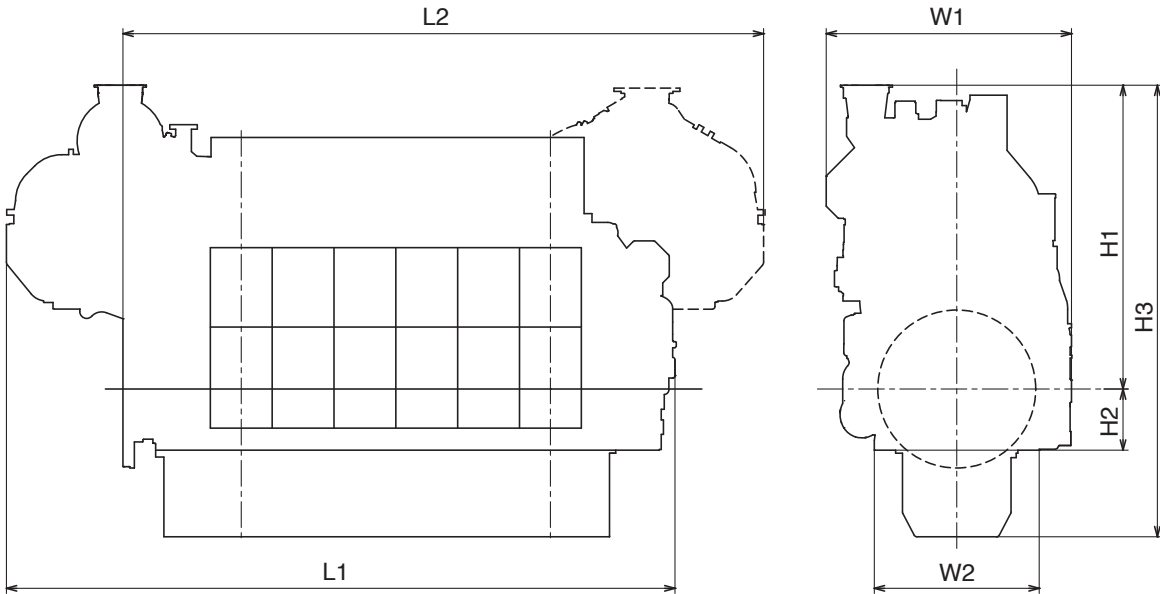


12MG28AHX

28AHX Specifications

Model	Max.Continuous Rating		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS				
6MG28AHX	2220	3018	800	280	390	20
8MG28AHX	2960	4024	800	280	390	26
9MG28AHX	3330	4527	800	280	390	28
12MG28AHX	4440	6036	800	280	390	36
16MG28AHX	5920	8048	800	280	390	45
18MG28AHX	6660	9055	800	280	390	50

Model	Dimension (mm)							
	L ₁	L ₂	W ₁	W ₂	H ₁	H ₂	H ₃	H ₄
6MG28AHX	4870	4650	1750	1200	2200	445	3275	2040
8MG28AHX	5770	5550	1850	1200	2330	445	3405	2040
9MG28AHX	6220	6000	1850	1200	2330	445	3405	2040
12MG28AHX	—	5260	2200	1450	2425	445	3370	1910
16MG28AHX	—	6450	2300	1450	2580	445	3525	1910
18MG28AHX	—	7100	2350	1450	2780	445	3725	1910

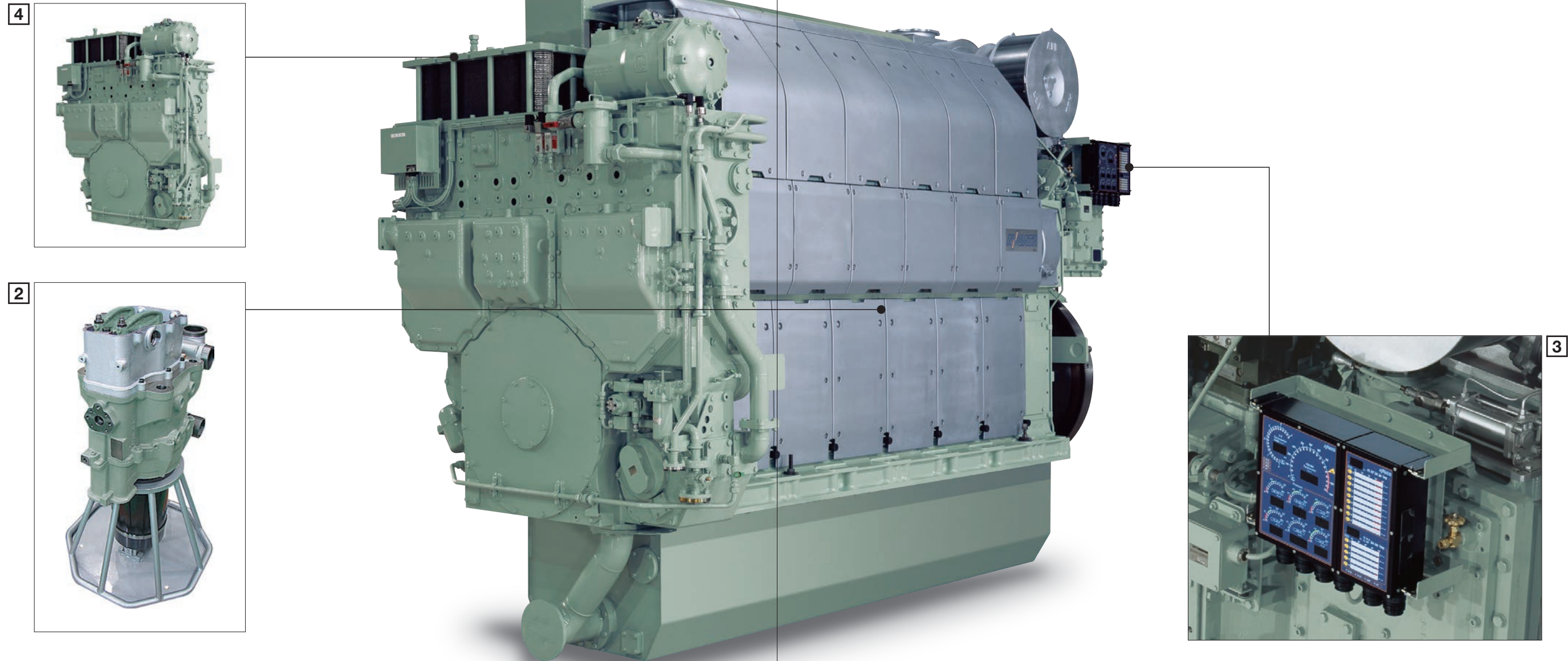


17AHX Specifications

Model	Propulsion						Approx. Dry Mass
	900min ⁻¹		1000min ⁻¹		1200min ⁻¹		
	kWm	PS	kWm	PS	kWm	PS	t
5MG17AHX	500	680	525	714	625	850	6.8
6MG17AHX	600	816	630	857	750	1020	8.1
7MG17AHX	700	952	735	1000	875	1190	9.4
8MG17AHX	800	1088	840	1142	1000	1360	10.7
9MG17AHX	900	1224	945	1285	1125	1530	11.9

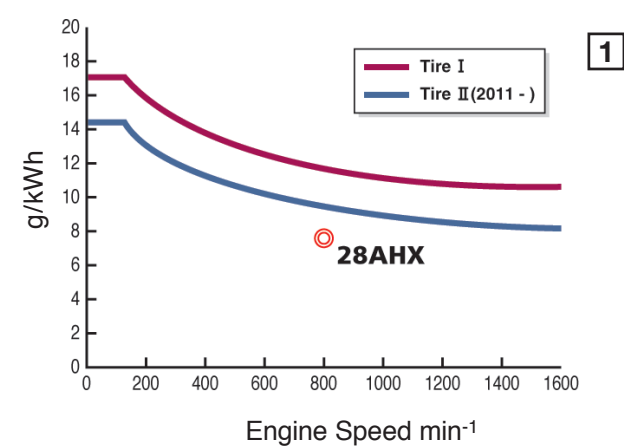
Model	Dimension (mm)							
	L ₁	L ₂	W ₁	W ₂	H ₁	H ₂	H ₃	H ₄
5MG17AHX	2950	3570	1510	780	1575	310	2305	1435
6MG17AHX	3235	3855	1510	780	1670	310	2400	1435
7MG17AHX	3520	4140	1510	780	1670	310	2400	1435
8MG17AHX	3805	4425	1510	780	1670	310	2400	1435
9MG17AHX	4090	4710	1510	780	1755	310	2485	1435

Note * Maximum Continuous Rating shows the figure at crankshaft end and as per one engine power.
* Maximum Continuous Rating is applied for Marine Diesel Oil (A oil, ISO8217) or Gas Oil.
* Due to continuous development, some data may change.



1 High efficiency and low emissions

By employing the Miller cycle system and VIVT (Variable Intake Valve Timing) technology, 28AHX series has realized the best performance and low fuel consumption. 28AHX engine complies fully with IMO NOx regulation Tier II.



2 Easy maintenance and Low operating cost

The Cylinder unit design that integrates the piston, cylinder liner and cylinder head helps reduce the amount of maintenance work and cost, makes it easier to remove these parts from the crankcase.

3 Gauge board "Grafico"

The latest electrical type gauge board "Grafico" is installed on 28AHX engine. Displays engine status, engine speed, pressure and temperature, digitally and as bar graphs using LEDs, for excellent visibility and rapid assessment to safe engine operations. Interface includes industry-standard signaling system to ensure compatibility with external systems.

4 Front-end unit (Optional)

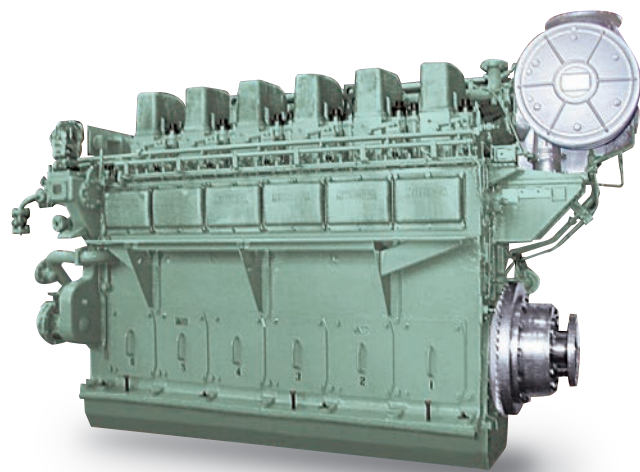
Auxiliary equipment, including the lubricating oil system, fuel system, and cooling water system, are integrated into a single unit located at the front end of the engine.

HX Series

Medium Speed Diesel Engine

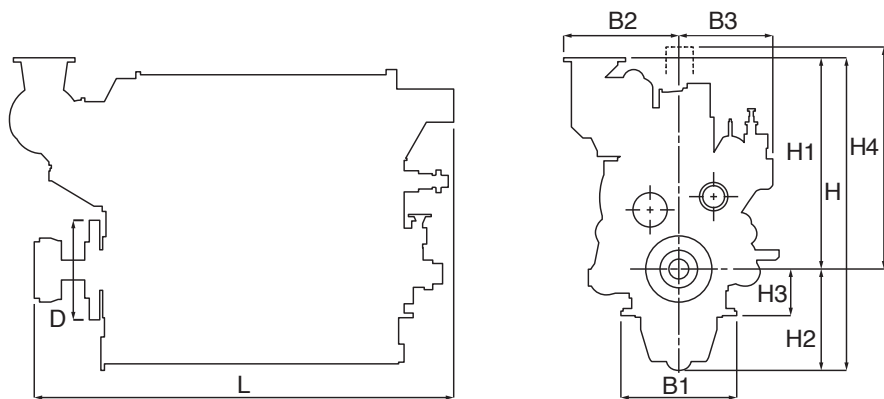
Best seller of NIIGATA engines

Completed series “HX engines” design with modernized concept, 4 cycle, 4 stroke, hanger type, medium speed engines.



6MG28HX

Specifications



Model	Max.Continuous Rating		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS				
6MG19HX	761	1035	1000	190	260	7.0
6MG22HX	1062	1445	1000	220	280	9.1
6MG25HX	1368	1860	750	250	350	13.0
6MG26HLX	1518	2065	750	260	350	13.5
6MG28HX	1897	2580	750	280	370	16.0
8MG28HX	2427	3300	750	280	370	21.5
6MG34HX	3033	4125	620	340	450	33.6
8MG34HX	3640	4950	600	340	450	43.5
6MG41HX	4552	6190	520	410	560	64.0

Model	Dimension (mm)								
	L	H	H ₁	H ₂	H ₃	H ₄	B ₁	B ₂	B ₃
6MG19HX	2912	2122	1472	650	320	1550	800	809	666
6MG22HX	3027	2389	1729	660	330	1690	890	865	688
6MG25HX	3408	2886	2166	720	380	2080	1040	992	758
6MG26HLX	3463	2921	2201	720	380	2080	1040	1030	765
6MG28HX	3704	3142	2260	882	400	2210	1130	1001	823
8MG28HX	4638	3319	2485	834	400	2210	1130	1001	823
6MG34HX	4530	3573	2580	993	515	2760	1390	916	1028
8MG34HX	5590	3573	2580	993	515	2760	1390	916	1178
6MG41HX	6890	3875	2875	1000	650	3030	1796	1225	1848

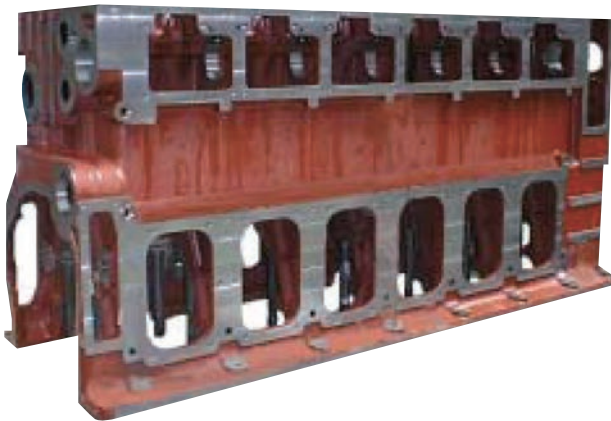
Note

- * Maximum Continuous Rating shows the figure at crankshaft end and as per one engine power.
- * Maximum Continuous Rating is applied for Marine Diesel Oil (A oil, ISO8217) or Gas Oil.
- * Due to continuous development, some data may change.

Feature of HX Series

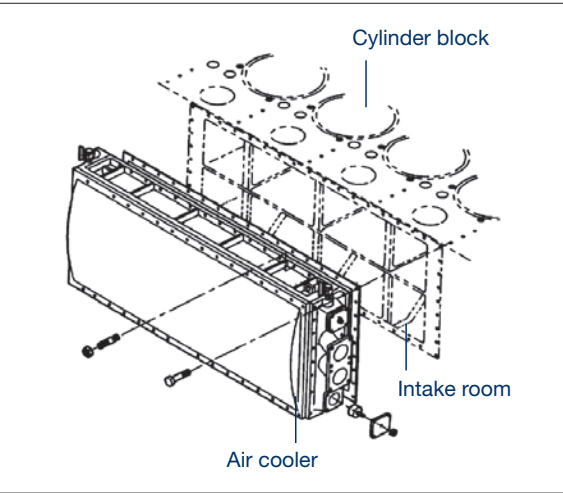
Cylinder Block

Highly rigid monoblock double walled hanger type cylinder block. Simple and compact design of cylinder block is realized as lubrication pipe and cooling water pipe being molded into cylinder block and the air cooler is directly fitted on the cylinder block so that outside piping and duct are minimized.



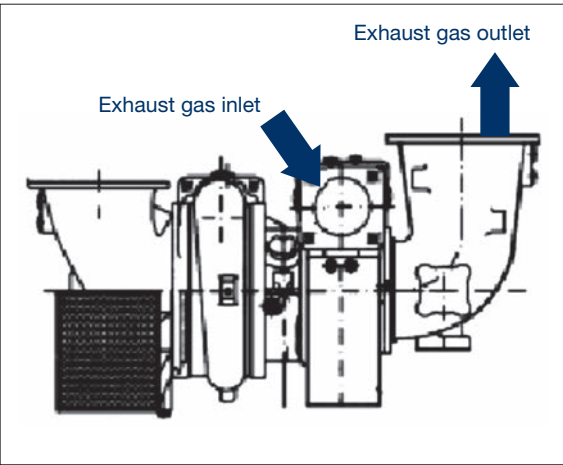
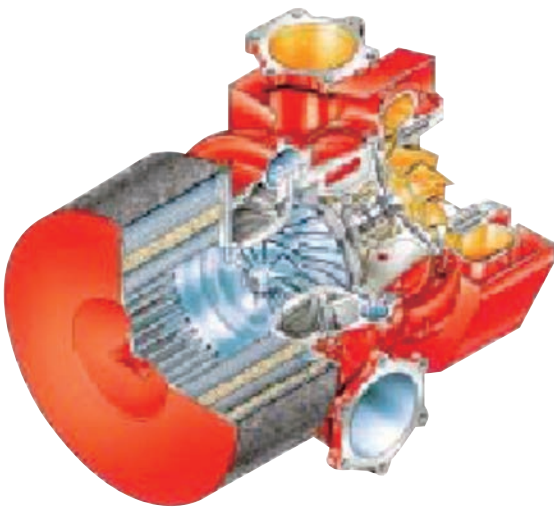
Air Cooler

Air cooler is installed directly to the intake room on the side of the cylinder block. As a result, connecting duct, bracket and fittings are eliminated and the structure is simplified.



Exhaust Turbocharger

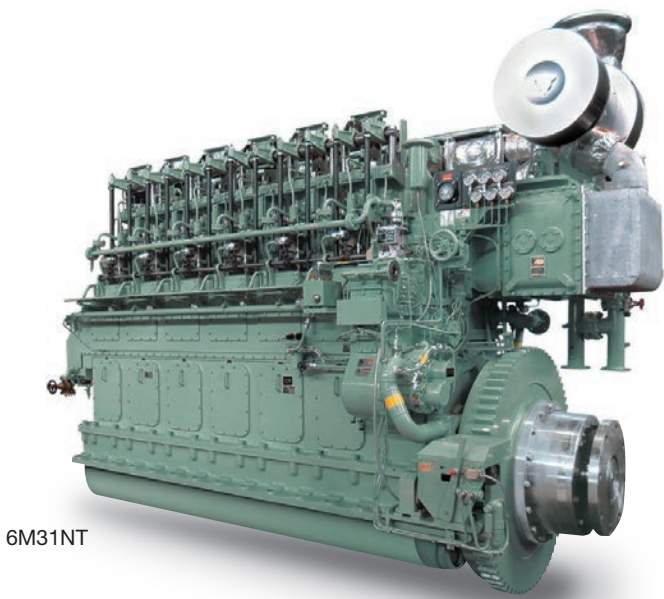
High performance non cooling type turbocharger made by ABB company TPS is adopted. The performance improvement is aimed at the same time as increasing corrosion resistance.



Low Speed Diesel Engine

Durability with Japanese 4 stroke Low Speed Engine

To meet the long time customer's expectations, NIIGATA has continually developed and manufactured the 4 stroke low speed diesel engines and the total propulsion systems for in-land general cargo and ocean fishery vessel.

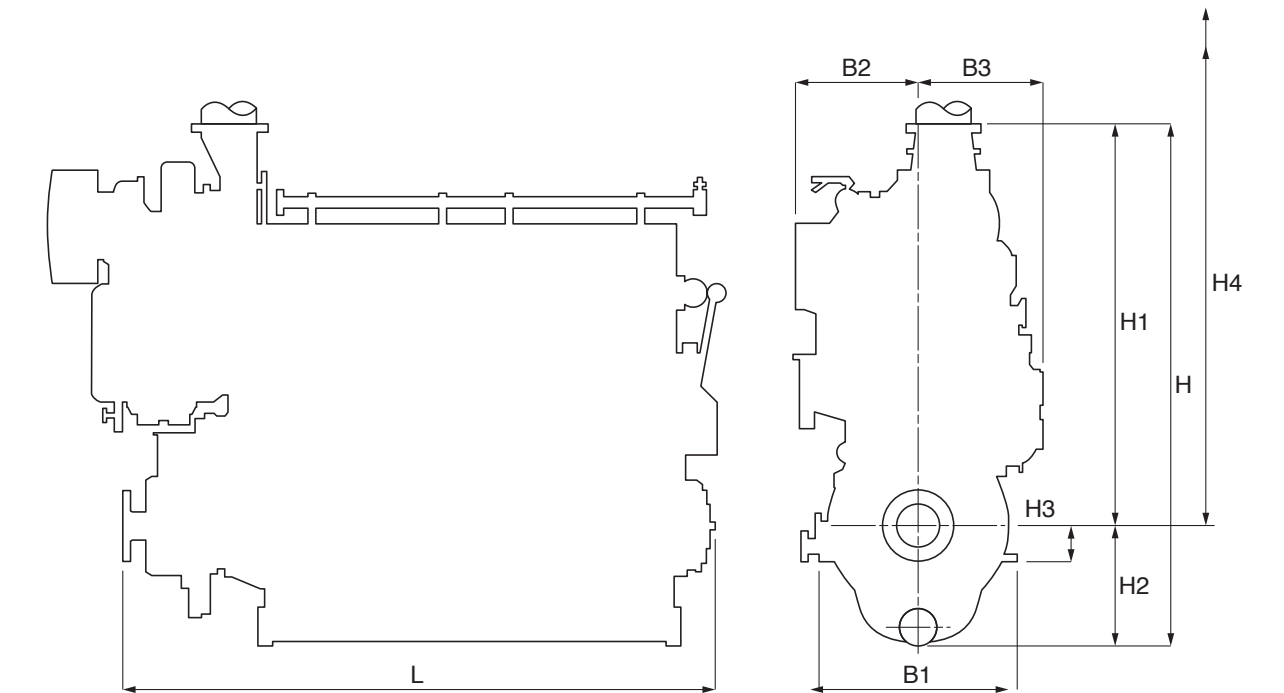


6M31NT

Low Speed Diesel Engine Power Range

Model	kWm	1000		2000		3000	
	PS	1000	2000	3000	4000		
6M26ATE							
6M28BT							
6M28NT							
6M31BT							
6M31NT							
6M34RT							
6M34BT							
6M34NT							

Specifications



Model	Max.Continuous Rating		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS	min ⁻¹	mm	mm	t
6M26ATE	912	1240	400	260	460	13.7
6M28BT	1062	1445	390	280	480	16.2
6M28NT	1214	1650	390	280	480	16.2
6M31BT	1368	1860	360	310	530	21.3
6M31NT	1353	1840	290	310	600	25.2
6M34RT	1471	2000	280	340	630	31.0
6M34BT	1669	2270	310	340	620	28.5
6M34NT	1897	2580	310	340	620	28.7

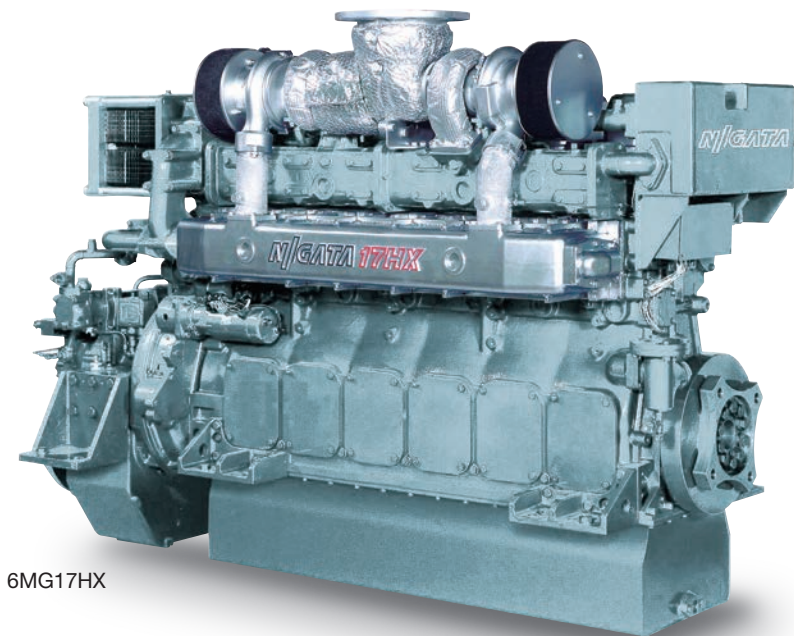
Model	Dimension (mm)								
	L	H	H ₁	H ₂	H ₃	H ₄	B ₁	B ₂	B ₃
6M26ATE	3204	2945	2240	705	210	2317	1220	904	888
6M28BT	3760	3075	2330	745	230	2512	1270	910	859
6M28NT	3760	3075	2330	745	230	2512	1270	910	859
6M31BT	4139	3550	2715	835	250	2773	1300	1061	1039
6M31NT	4491	3714	2984	730	250	3220	1450	1194	1130
6M34RT	4684	3646	2835	811	315	3360	1420	1112	1000
6M34BT	4701	3520	2745	775	315	3100	1440	1141	920
6M34NT	4731	3625	2850	775	315	3100	1440	1031	920

Note * Maximum Continuous Rating shows the figure at crankshaft end and as per one engine power.
* Maximum Continuous Rating is applied for Marine Diesel Oil (A oil, ISO8217) or Gas Oil.
* Due to continuous development, some data may change.

High Speed Diesel Engine

Compact and Reliability

Brand new design concept with the latest mechanically controlled technology for emission guard, 4 cycle, 4 stroke, hanger type, reliable high speed diesel engines.



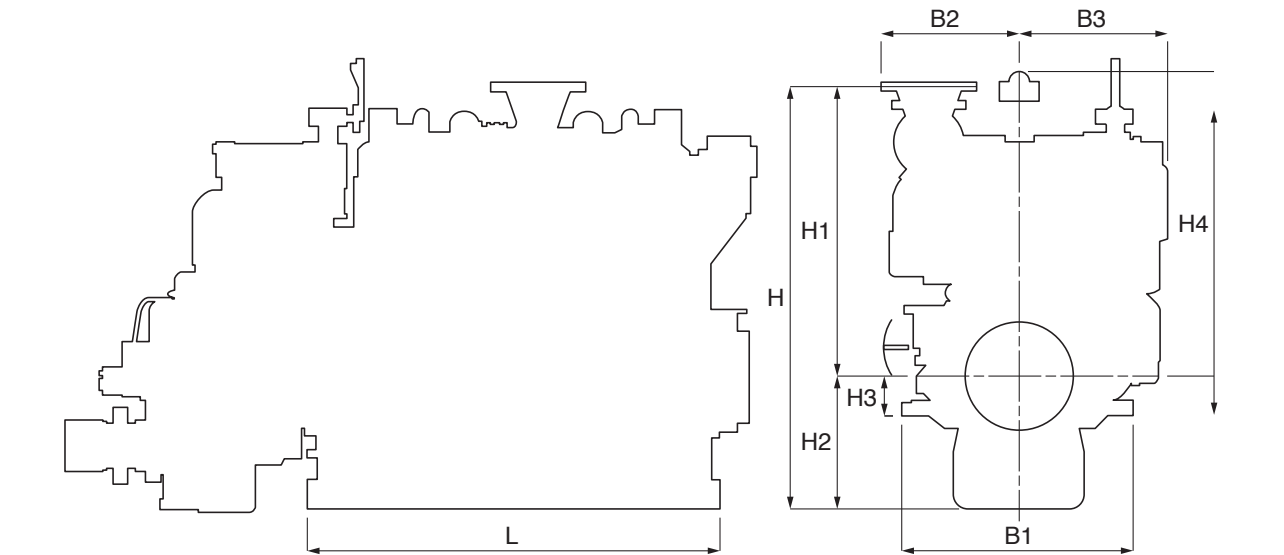
6MG17HX

High Speed Diesel Engine Power Range

Model	kWm	1000		2000		3000		4000	
	PS	1000	2000	3000	4000	5000	6000		
6NSD-M									
6NSDL-M									
6MG17HX									
16V20FX									

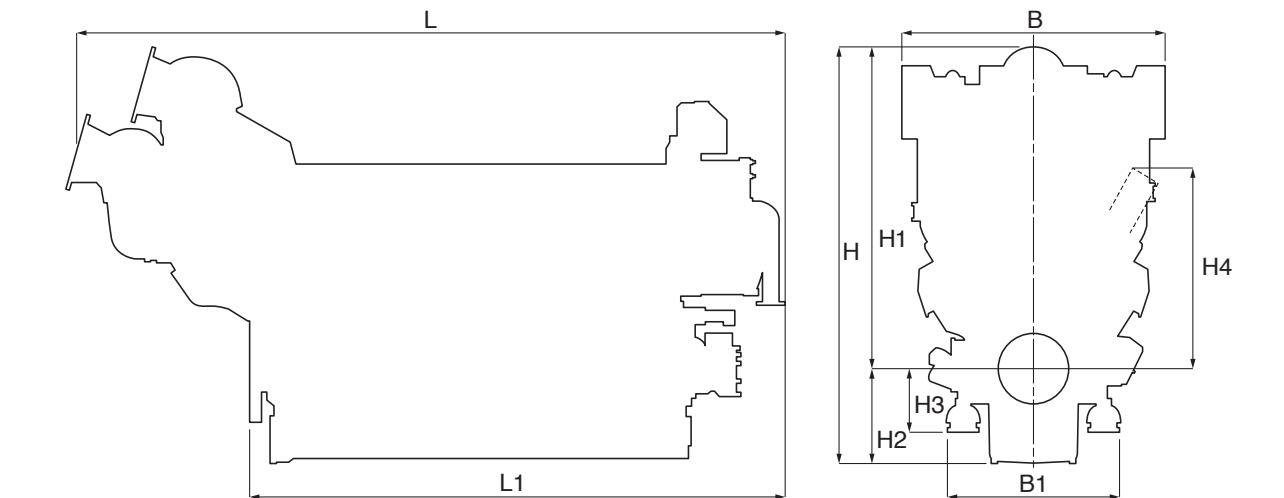
Note * Maximum Continuous Rating shows the figure at crankshaft end and as per one engine power.
* Maximum Continuous Rating is applied for Marine Diesel Oil (A oil, ISO8217) or Gas Oil.
* Due to continuous development, some data may change.

Specifications



Model	Max.Continuous Rating		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS	min ⁻¹	mm	mm	t
6NSD-M	496	675	1450	160	210	2.9
6NSDL-M	570	775	1400	160	235	3.4
6MG17HX	761	1035	1650	165	215	3.2

Model	Dimension (mm)								
	L	H	H ₁	H ₂	H ₃	H ₄	B ₁	B ₂	B ₃
6NSD-M	1929	1592.5	1088	504.5	200	1210	798	537	551
6NSDL-M	1872	1682.5	1153	529.5	225	1330	828	537	561
6MG17HX	1975	1722	1178	544	160	1240	930	562	600



Model	Max.Continuous Rating		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS	min ⁻¹	mm	mm	t
16V20FX	4000	5440	1650	205	220	13.8

Model	Dimension (mm)								
	L	L ₁	H	H ₁	H ₂	H ₃	H ₄	B	B ₁
16V20FX	4861	3663	2826	2176	650	435	1170	1782	1150

Z-PELLER® Propulsion System

Z-PELLER® embodies the essence of NIIGATA technology and experience

Total solution is secured under complete NIIGATA's technology for providing Single Responsibility on the propulsion package. NIIGATA has its own positive design logic for producing prime movers as the best match with Z-PELLER® propulsion unit for achieving high level performance. It is most effective advantage which NIIGATA is in a position to provide solo NIIGATA's brand integrated propulsion package.



Application of Z-PELLER®

Multi application along with high class efficient propeller

Z-PELLER® assures high grade performance and supports the operation of various kinds of vessels, for which sailing, handling, steering with excellent maneuverability to be realized.

Tug boats



Offshore vessels



Passenger vessels



Special vessels



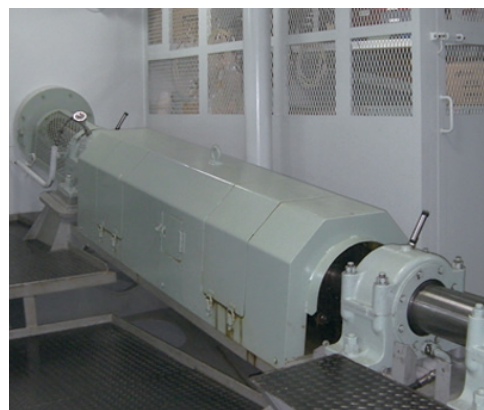
Single Responsibility

Technology configurative one brand propulsion package

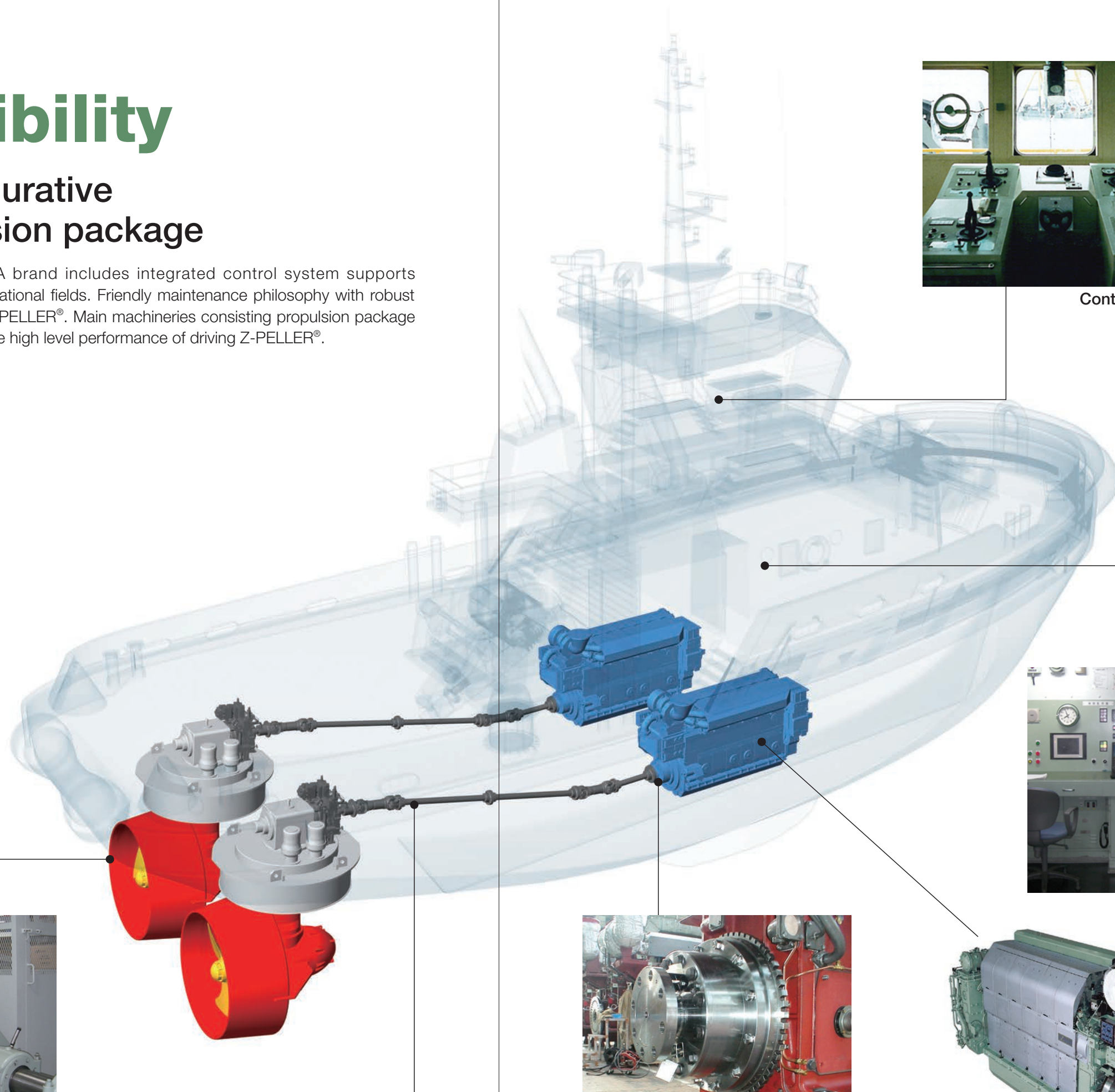
Single propulsion package of NIIGATA brand includes integrated control system supports unconditional security at variety ship operational fields. Friendly maintenance philosophy with robust structure is considered at the design of Z-PELLER®. Main machineries consisting propulsion package are developed principally how to make sure high level performance of driving Z-PELLER®.



Z-PELLER®



Shafting



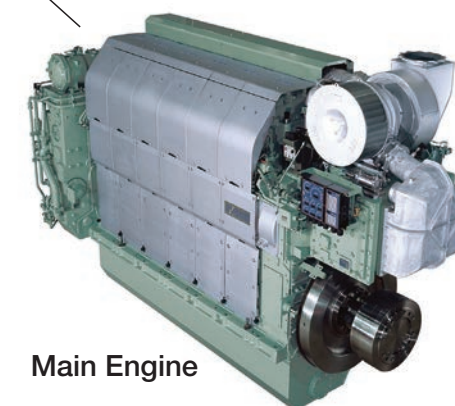
Control Device



Monitor Device



Flexible Coupling



Main Engine

Specifications of Z-PELLER® Propulsion Packages

Z-PELLER® FPP Series

Model	Max. Cont. Input		Input Speed	Prop. Dia.	Bollard Pull		Mass
	kWm	PS			100%	110%	
ZP-09	735	1000	1000-1650	1600	26	28	9.5
ZP-10	956	1300	1000	1750	32	34	12.5
ZP-11A	1176	1600	750-1800	1900	40	43	15
ZP-21	1323	1800	750-1800	2000	45	48	15.5
ZP-31	1654	2250	750-1800	2300	56	60	20
ZP-31B	1654	2250	750	2300	60	64	21.1
ZP-41A	1838	2500	750	2600	65	69	25
ZP-41	2427	3300	750-1800	2700	85	90	31
ZP-41B	2574	3500	750	2800	90	95	36.5
ZP-41B	2942	4000	800	3100	100	105	43

Z-PELLER® CPP Series

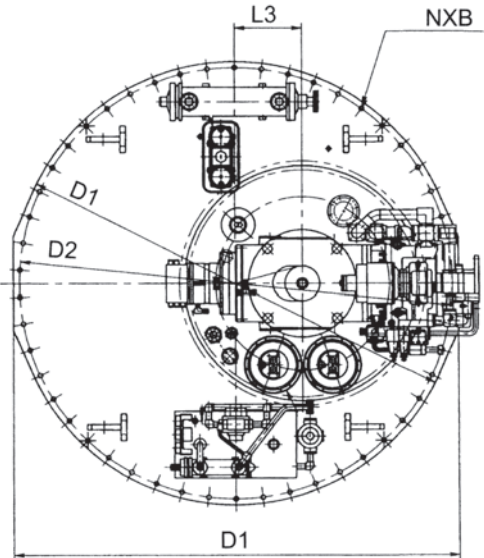
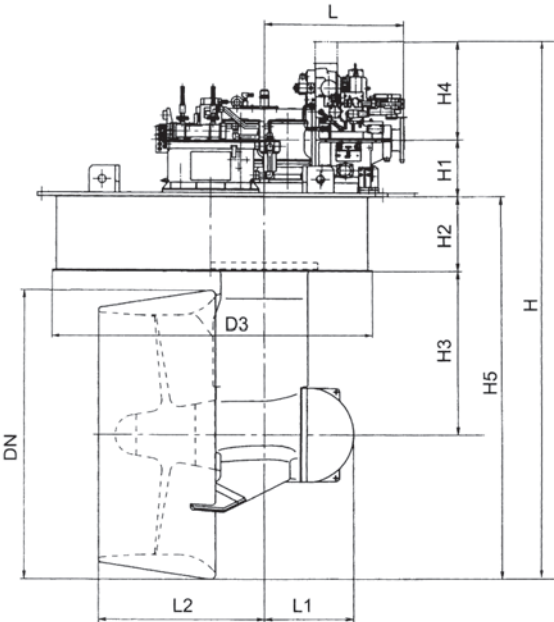
Model	Max. Cont. Input		Input Speed	Prop. Dia.	Bollard Pull		Mass
	kWm	PS			100%	110%	
ZP-31CP	1618	2200	750	2300	53	56	25
ZP-41CP	2206	3000	750-800	2700	75	80	36.5
ZP-52CP	3310	4500	800	3200	110	115	54

Z-PELLER® FPP Series

Model	Dimension (mm)														
	L	L ₁	L ₂	L ₃	H	H ₁	H ₂	H ₃	H ₄	H ₅	D ₁	D ₂	D ₃	DN	N x B
ZP-09	835	700	1110	325	3805	500	560	1130	636	2669	2500	2420	2220	1957	36x35
ZP-10	1170	690	1215	275	4370	569	610	1212	910	2891	2700	2610	2380	2138	36x35
ZP-11A	1170	720	1385	450	4496	569	645	1400	725	3202	3000	2910	2680	2314	36x35
ZP-21	1170	720	1410	450	4560	569	645	1400	925	3266	3000	2910	2680	2442	36x35
ZP-31	1300	830	1580	500	5057	530	690	1520	915	3612	3400	3310	3080	2804	50x35
ZP-31B	1300	830	1580	500	5109	530	690	1700	750	3830	2800	2710	2480	2879	60x35
ZP-41A	1350	1022	1775	0	5563	754	645	1730	853	3957	3000	-	2524	3163	welded construction
ZP-41	1450	1357	1860	0	6101	790	740	1880	1047	4265	3300	3210	2980	3289	60x35
ZP-41B	1550	1300	1955	0	6151	790	740	2030	886	4475	3300	3210	2980	3289	60x35
ZP-41B	1550	1300	2105	0	6509	790	740	2211	886	5627	3300	3210	2980	3772	60x35

Z-PELLER® CPP Series

Model	Dimension (mm)														
	L	L ₁	L ₂	L ₃	H	H ₁	H ₂	H ₃	H ₄	H ₅	D ₁	D ₂	D ₃	DN	N x B
ZP-31CP	1300	858	1580	500	4857	530	690	1520	915	3612	3400	3310	3080	2804	50x35
ZP-41CP	1450	1270	1905	0	6117	790	740	1880	1063	4265	3300	3210	2980	3289	60x35
ZP-52CP	1700	1881	2350	0	7231.7	900	820	2360	1110	5132.5	3300	3210	2980	3905	60x35



Selection Chart for Z-PELLER® Propulsion Package

Bollard Pull	Main Engine			Z-PELLER®	
	Model	Engine Speed (min ⁻¹)	Max. Cont. Rating (kWm/PS)	Model	Propeller Dia. (mm)

FPP Packages (2units / 1ship)

25	6L19HX	1000	735/1000	ZP-09	1600
33	6L22HX	1000	956/1300	ZP-10	1750
40	6L25HX	750	1176/1600	ZP-11A	1900
45	6L25HX	750	1323/1800	ZP-21	2000
52	6L26HLX	750	1471/2000	ZP-31	2200
55	6L28HX	750	1618/2200	ZP-31	2200
60	6L28HX	750	1654/2250	ZP-31B	2300
65	6L28HX	750	1838/2500	ZP-41A	2600
70	6L28HX	750	1838/2500	ZP-41	2700
80	6L28AHX	800	2206/3000	ZP-41	2700
85	8L28HX	750	2427/3300	ZP-41	2700
85	8L28AHX	750	2574/3500	ZP-41B	2700
90	8L28AHX	750	2574/3500	ZP-41B	2800
100	8L28AHX	800	2942/4000	ZP-41B	3100

FPP Packages (3units / 1ship for Rotortug)

60	6L25HX	750	1323/1800	ZP-21	2000
80	6L28HX	750	1654/2250	ZP-31	2300
112	6L28AHX	800	2206/3000	ZP-41	2700
120	8L28HX	750	2427/3300	ZP-41	2700
125	8L28AHX	750	2574/3500	ZP-41B	2800

FPP Packages (2units / 1ship)

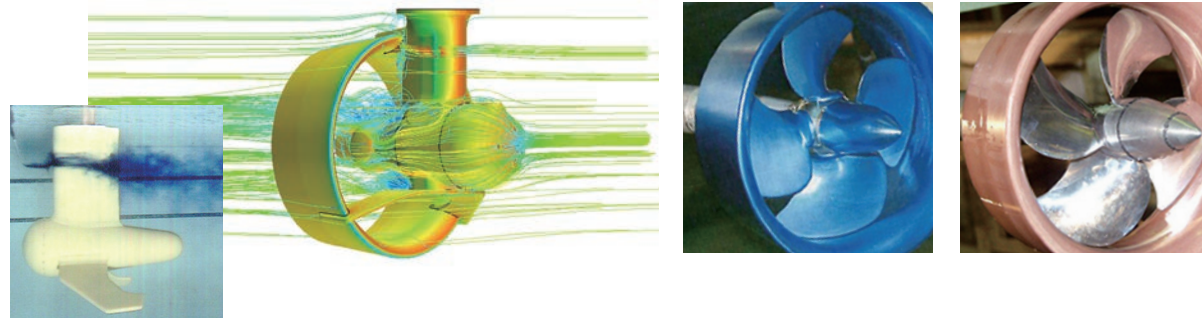
45	6L25HX	750	1323/1800	ZP-31CP	2200
50	6L26HLX	750	1471/2000	ZP-31CP	2300
60	6L28HX	750	1838/2500	ZP-41CP	2700
75	6L28AHX	800	2206/3000	ZP-41CP	2700
110	9L28AHX	800	3310/4500	ZP-52CP	3200

| Note | Z-PELLER® FPP Series & Z-PELLER® CPP Series
* Type of propeller : 4 bladed Fixed/Controllable pitch skewed kaplan type with kort nozzle.
* Steering system : Main engine driven P.T.O. driven and/or Electric motor driven.
* Maximum continuous input is shown as per one unit base.
* Bollard pull is shown as per two units tf base, with bollard pitch, ahead pull at MCR engine speed.

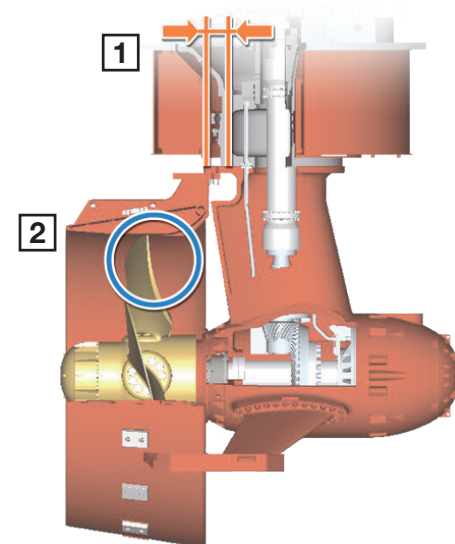
| Note | Main Engines
* Maximum continuous rating shows the matching with each Z-PELLER® Max. continuous input power.
* Maximum continuous rating is applied for Marine diesel oil (A oil, ISO8217) or gas oil.

Research and Development

Ongoing Research and Development for Z-PELLER® will be given continuously in order to improve its performance. The results of various tests and analyses generate the best solution at the design for propulsion and maneuvering system.



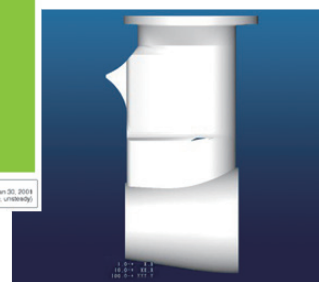
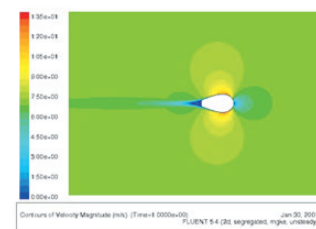
Excellent high performance (Bollard Pull)



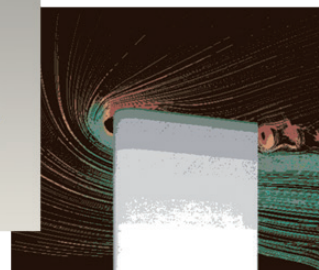
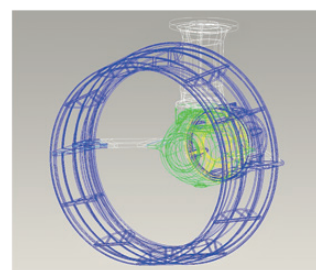
1 Gear case position is considered and set Kort Nozzle having effective distance.

2 Suitable propeller position.

Z-PELLER® generates powerful thrust and excellent efficiency by best strut shape and also suitable distance between strut and nozzle.

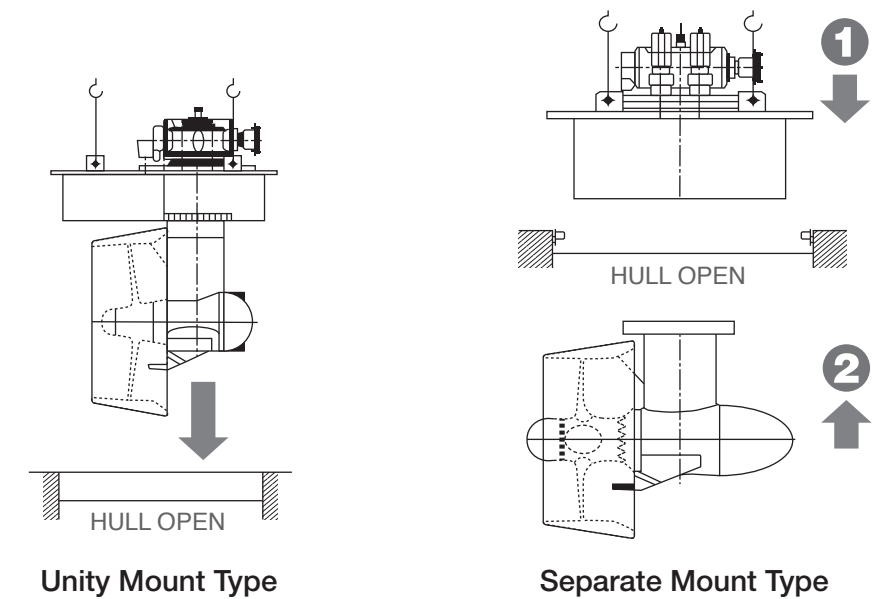


Option is available at large capacity Z-PELLER® for performing much greater thrust power applying specially designed kort nozzle.



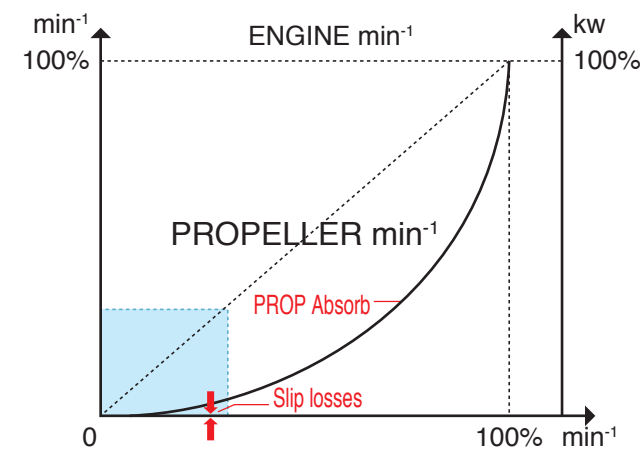
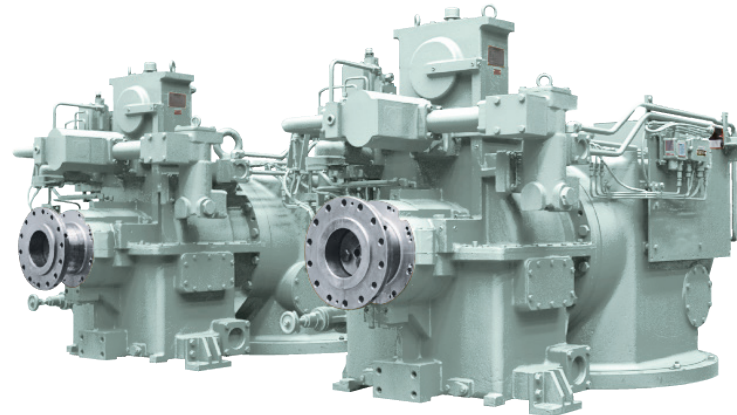
Easy Installation

- Z-PELLER® is suitable for any mounting.
- Auxiliaries ready for mounting on the thruster.
- Simple and effective lube oil system.
- Compact closed loop hydraulic steering system.



Idle Slipping Clutch

- Idle slipping device is include in as standard application.
- Shaft brake assists automatically at slow speed operation.
- Simple structure.
- All pumps are driven by power take off system of main engine.

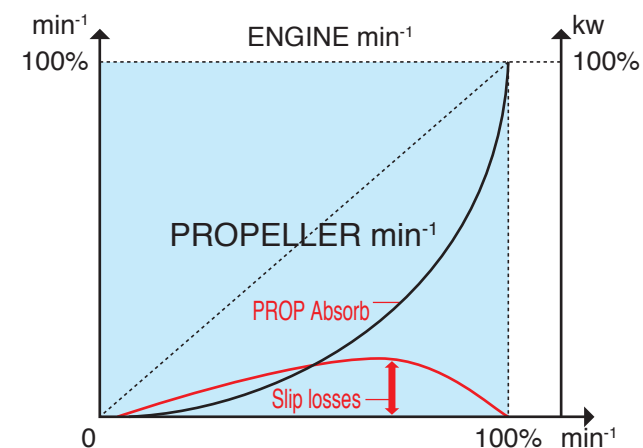


IDLE SLIPPING CLUTCH

Slipping control can be done only when main engine is at idling.

Dual Modulation Clutch

Dual modulation clutch can accept fully to apply for fire fighting pump and shaft generator with fixed pitch propeller type NIIGATA Z-PELLER® instead of controllable pitch propeller.



DUAL MODULATION CLUTCH

Slipping control can be done when main engine is at rated speed constant.



Remote Control System

Integrated complete NIIGATA control system is ensuring fine handling for ship. Handle type GSO lever, UNI lever, and S-Con lever consolidated into the control system make sure the best matching with all rounding requirement of steering vessels.

Interface with Auto Pilot system, Dynamic Positioning System, Fi-Fi mode etc.



PTO (Power Take Off) Fire fighting system & Shaft generating system

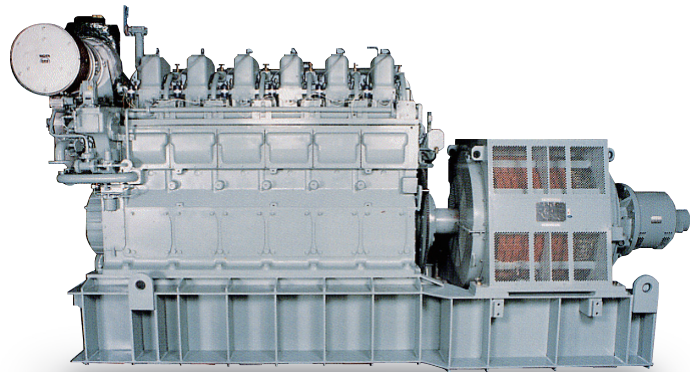
Fire fighting system and Shaft generating system are available through power take-off at Main Engine front end as providing the best solution at variety of ship applications. NIIGATA brand Dual Modulation Clutch is ensuring reliable operation under power package of PTO at Main Engine front end and driving Z-PELLER® via Main Engine output.



Niigata Diesel Generator Set

NIIGATA diesel generator sets, comprising generator and diesel engines mounted on a common base frame, are available for power generations and diesel-electric propulsion system.

All generator sets listed in this section are based on NIIGATA standard that means Low voltage only,. Large diesel generator sets are delivered for separate mounting of diesel engine and generator.



Specifications of Generator

50Hz

Model	Engine Capacity		Gene. Capacity		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS	kWe	kVA	min ⁻¹	mm	mm	t
6NSD-G	485	660	446	550	1500	160	210	2.9
6L19HX	661	900	615	750	1000	190	260	7
6L22HX	1029	1400	962	1200	1000	220	280	9.1
6L25HX	1323	1800	1250	1550	750	250	350	13
6L26HLX	1471	2000	1390	1700	750	260	350	13.5
6L28HX	1838	2500	1746	2150	750	280	370	16
6L28AHX	2190	2978	2089	2600	750	280	390	20
8L28AHX	2920	3970	2789	3450	750	280	390	26
9L28AHX	3285	4466	3137	3900	750	280	390	28
12V28AHX	4380	5955	4183	5200	750	280	390	36
16V28AHX	5840	7940	5577	6950	750	280	390	45
18V28AHX	6570	8933	6274	7800	750	280	390	50

60Hz

Model	Engine Capacity		Gene. Capacity		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS	kWe	kVA	min ⁻¹	mm	mm	t
6NSD-G	441	600	406	500	1200	160	210	2.9
6L19HX	661	900	615	750	900	190	260	7
6L22HX	956	1300	894	1100	900	220	280	9.1
6L25HX	1250	1700	1181	1450	720	250	350	13
6L26HLX	1397	1900	1320	1650	720	260	350	13.5
6L28HX	1765	2400	1677	2050	720	280	370	16
6L28AHX	2100	2855	2003	2500	720	280	390	20
8L28AHX	2800	3807	2674	3300	720	280	390	26
9L28AHX	3150	4283	3008	3750	720	280	390	28
12V28AHX	4200	5710	4011	5000	720	280	390	36
16V28AHX	5600	7614	5348	6650	720	280	390	45
18V28AHX	6300	8566	6017	7500	720	280	390	50

Model	Dimension (mm)							
	A	A ₁	H	H ₁	H ₂	H ₃	B	B ₁
6NSD-G	1896	3122	1592.5	1088	200	1210	1088	798
6L19HX	2524	4756	2272	1472	320	1550	1475	800
6L22HX	2700	4925	2579	1729	330	1690	1553	890
6L25HX	3200	5545	2836	2066	380	2130	1754	1040
6L26HLX	3864	6664	2921	2201	380	2080	1795	1040
6L28HX	3953	7081	3142	2260	400	2210	1824	1130
6L28AHX	4710	7760	3485	2410	445	2100	1750	1200
8L28AHX	5610	8660	3625	2550	445	2100	2067	1200
9L28AHX	6060	9110	3625	2550	445	2100	2067	1200
12V28AHX	5260	8651	3370	2425	445	1910	2200	1450
16V28AHX	6450	9839	3525	2580	445	1910	2300	1450
18V28AHX	7100	10375	3725	2780	445	1910	2350	1450

Specification of Dual Fuel Generator

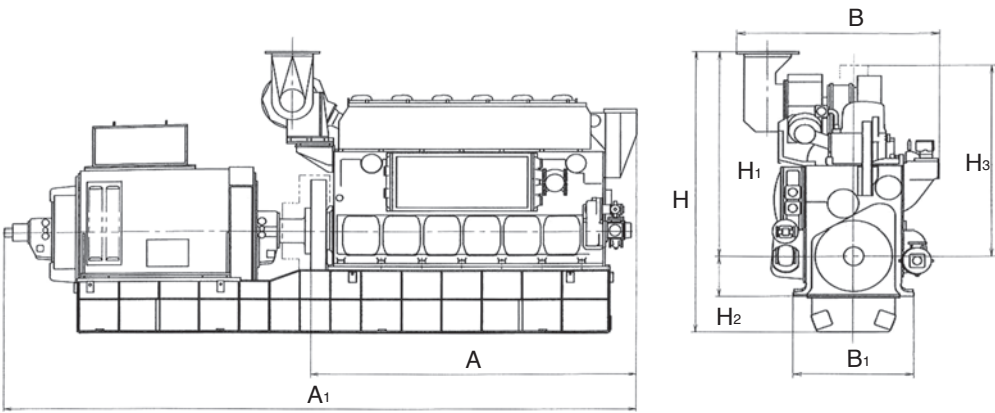
50Hz

Model	Engine Capacity		Gene. Capacity		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS	kWe	kVA	min ⁻¹	mm	mm	t
6L28AHX-DF	1801	2449	1711	750	750	280	390	22
8L28AHX-DF	2401	3264	2291	750	750	280	390	28
9L28AHX-DF	2701	3672	2579	750	750	280	390	31

60Hz

Model	Engine Capacity		Gene. Capacity		Engine Speed	Cyl. Bore	Piston Stroke	Approx. Dry Mass
	kWm	PS	kWe	kVA	min ⁻¹	mm	mm	t
6L28AHX-DF	1729	2351	1643	2050	720	280	390	22
8L28AHX-DF	2305	3134	2199	2700	720	280	390	28
9L28AHX-DF	2593	3525	2476	3050	720	280	390	31

Model	Dimension (mm)							
	L ₁	L ₂	W ₁	W ₂	H ₁	H ₂	H ₃	H ₄
6L28AHX-DF	5049	5099	1955	1200	2240	445	3315	2040
8L28AHX-DF	5920	5970	1956	1200	2370	445	3445	2040
9L28AHX-DF	6370	6420	2051	1200	2370	445	3445	2040



NICO Precision Co.,Inc.

As a part of IHI Power Systems Co., Ltd.,embracing a solid commitment to uncompromisingly stringent quality control, NICO Precision manufactures products of superior quality and performance ensuring all users full peace of mind. We also provide services that all customers can truly appreciate.



Fuel Injection System

Fuel Injection Pumps

Fuel injection pumps compress fuel oil and supply the oil, under high pressure, to the fuel injection nozzle. NICO Precision's fuel injection pumps boast outstanding quality and durability to withstand pressures up to 160MPa. They are used worldwide in engines of all kinds.



Fuel Injection Nozzles

Fuel Injection Nozzles atomize high-pressure oil and inject it into the engine's cylinders. NICO Precision's nozzles offer optimal performance that brings out excellent performance in the engine.



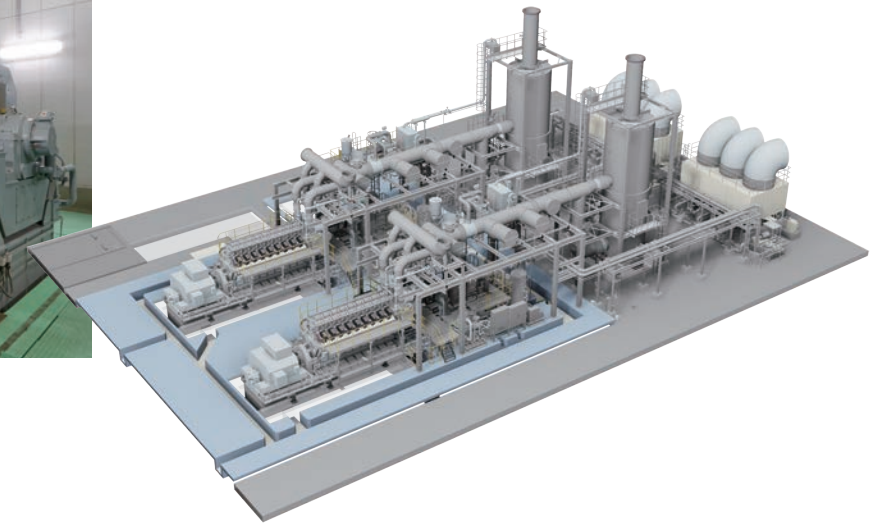
Fuel Injection Valves

Fuel Injection Valves supply high-pressure oil from the fuel injection pump to the fuel injection nozzle in order to control injection starts. NICO Precision's fuel injection valves provide superlative reliability to prevent fuel leakage and robust durability to withstand high pressure levels.



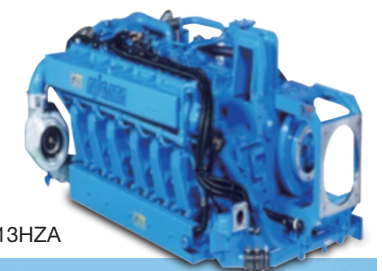
Land Use

NIIGATA Stationary Diesel & Gas engines and Gas Turbine engines as prime movers of generating sets have been delivered to the world-wide owners as applications for building, factory, power plant under the design for proven reliability, low emissions, low operating cost to meet owner's requirements.



Rail Traction

NIIGATA has been producing the railway vehicle engines for more 80 years and offer the high reliability and prominent power through our tradition, experience, and the-state-of-the-art.



DMF13HZA





Service Network

IHI Power Systems Co., Ltd.

14-5, Sotokanda 2-Chome, Chiyoda-ku, Tokyo 101-0021, Japan
TEL : +81-3-4366-1226/1227 FAX : +81-3-4366-1310

Asia

CHINA

Niigata Power Systems (Shanghai) Co., Ltd.

RM902, Orient International Plaza Part(C), No.85 Loushanguan Road, Shanghai China 200336
TEL:+86-21-6278-7681 FAX:+86-21-6278-7682

Hoi Tung Marine Machinery Suppliers Limited

27/F., China Merchants Tower, Shun Tak Centre, 168-200 Connaught Road Central, Hong Kong
TEL:+852-2853-8648 FAX:+852-2851-9007

CHI Corporation

No.5B, Jinming Bldg 8 Zunyi Rd. (South) Shanghai. 200336, China
TEL:+86-21-6219-3232 FAX:+86-21-6219-2965

GFI Co., Ltd.

502A, Harbour Crystal Centre, 100 Granville Road, TST East, Kowloon, Hong Kong
TEL:+852-2721-5320 FAX:+852-2369-7503

Niteto Co., Ltd.

26/F., Unit H, Yiu Sing Mansion, 14 Taikoo Shing Road, Hong Kong
TEL:+852-2521-1505 FAX:+852-2521-1805

KOREA

IHI Power Systems Co., Ltd. Seoul Office

RM902, (Yeoksam-Dong, Seolleung Tower), Seolleung-Ro 89-Gil 9, Gangnam-Gu, Seoul, 06212, Korea
TEL:+82-2-556-8522 FAX:+82-2-556-8523

K.N.S

1333Ho, 202Dong, Songdo-dong, Yeonsu-gu, Incheon, Korea
TEL:+82-32-887-2666 FAX:+82-32-889-2666

SEBO Co., Ltd.

Room No.1902, 48, Centum jungang-ro, Haeundae-gu, Busan, 48059, Korea
TEL:+82-51-462-6888 FAX:+82-51-462-6889

TAIWAN

Yi Chan Enterprise Co.

Fl. 6 No. 154, Chung Cheng 3rd Road, Shin Hsin Dist., Kaohsiung, Taiwan R. O. C
TEL:+886-7-235-0226 FAX:+886-7-236-0817

SINGAPORE

Niigata Power Systems (Singapore) Pte. Ltd.

31 Bukit Batok Crescent, #01-33 The Splendor, Singapore 658070
TEL:+65-6899-1500 FAX:+65-6899-1600

Z - Power Automation Pte. Ltd.

No.55 Tuas Crescent, #02-01 Singapore 638743
TEL:+65-6697-0300 FAX:+65-6465-1926

Fumar Marine Services Pte. Ltd.

14 Kian Teck Drive, Singapore 628831
TEL:+65-6261-2088 FAX:+65-6261-3088

INDONESIA

PT. SURYA INDAH PUTRAPERKASA

JL. NIAS, NO.66, Surabaya, 60281, Indonesia
TEL:+62-31-503-7166 FAX:+62-31-503-1327

PT Ramoco Dinamika

Jl. Batu Tulis Raya No.3, Jakarta 10120, Indonesia
TEL:+62-21-380-1590 FAX:+62-21-384-9353

PT. NGT Trading & Engineering Indonesia

Jl. Cilosari No.4, Jakarta 10330, Indonesia
TEL:+62-21-390-4924 FAX:+61-21-314-5249

PT. TRIJAYA SEJAHTERA ABADI

Karawaci Office Park Blok A15-16 (Ruko Pinangsia) Lippo Karawaci, Tangerang, Banten 15139, Indonesia
TEL:+62-21-5576-5224 FAX:+62-21-5576-5226

THAILAND

LINKTHAIBZ Co., Ltd.

Athenee Tower 23rd Floor, 63 Wireless Road, Lumpini, Pathumwan, Bangkok, Thailand 10330
TEL:+66-2126-8049 FAX:+66-2181-4179

PHILIPPINES

Niigata Power Systems Philippines, Inc.

2nd Floor, BJ Marthel Building, No.5 Ascie Avानue, Km.16 West Service Road, Parañaque City, Philippines
TEL:+63-2-822-3678 FAX:+63-2-822-6380

BJ Marthel International, Inc.

#5 Acsie Avenue, Severina Industrial Estate, Km.16 South Superhighway, Paranaque, Metro Manila, Philippines
TEL:+63-2-823-2002 FAX:+63-2-823-2407

INDIA

Neptunus Power Plant Services Pvt. Ltd.

A-554, TTC Industrial Area, MIDC Mahape, Navi Mumbai 400b701, India
TEL:+91-22-4141-0777 FAX:+91-22-4141-0700

U.A.E

NICO International U.A.E.

P.O.Box 12068, Dubai, U.A.E
TEL:+971-4-338-2135 FAX:+971-4-338-1832

AUSTRALIA

J-MAC. Ltd.

8 Erskine Road, Taren Point NSW, Sydney NSW 2229, Australia
TEL:+61-2-9524-3255 FAX:+61-2-9524-3167

Europe

NETHERLANDS

Niigata Power Systems (Europe) B.V.

RM312. Beursplein 37, 3011 AA Rotterdam, The Netherlands
TEL:+31-10-405-3085 FAX:+31-10-405-5067

UNITED KINGDOM

Royston Marine Ltd.

Unit 3 Walker Riverside Wincombee Road, Newcastle upon Tyne NE6 3PF, UK
TEL:+44-191-295-8000 FAX:+44-191-295-8001

TURKEY

OZSAY DENIZ ELEKTRONIGI A.S.

Guzelyali Mh., Ankara Asfalti E-5 Uzeri No:18 Pendik 34903 Istanbul / Turkey
TEL:+90-216-4933610 FAX:+90-216-4930306

ITALY

DEUTZ Italy Srl

Via Giovanni Rasori 13, 20145, Milano, Italy
TEL:+39-039-5914329 FAX:+39-039-5914226

Americas

CANADA/UNITED STATES OF AMERICA

Industrial/Marine Power Engineering Group (IMPEG) Division of mechtronics technology Inc.

2110-1851 Savage Road, Richmond, B.C. V6V 1R1, Canada
TEL:+1-604-276-8188 FAX:+1-604-276-2790

UNITED STATES OF AMERICA

UNITED WORLD ENTERPRISE HOUSTON OFFICE

6310 WINFREE, HOUSTON, TX 77087
TEL:+1-713-641-1915 FAX:+1-713-641-2717

Simplex Americas LLC (USA&MEXICO)

20 Bartles Corner Road Flemington, NJ 08822-5717
TEL:+1-908-237-9099 FAX:+1-908-237-9503

PANAMA

DES Marine and Industrial Engines S.A.

Arturo Del Valle Street, Building#0-02 La Loceria Panama, Republic of Panama
TEL:+507-236-4500

BRAZIL

DLC DIESEL LINE CAMBUI LTDA

Rod. Amaral Peixoto, Km160-Cond. Com. Mar do Norte Rio das Ostras –RJ-BRAZIL
TEL:+55-22-3321-8000

ARGENTINA

Igarreta

Av. Amancio Alcorta 2200, C 1283 AAV, Buenos Aires, Argentina
TEL:+54-11-4303-0291 FAX:+54-11-4303-0305

PROIOS S.A.

Ministro Brin 774 Buenos Aires (C1158AAH) Argentina
TEL:+54-11-4307-8799 FAX:+54-11-4300-5142

Africa

MAURITIUS

Desgn 2 Ltd.

6, Sir William Newton St, P.O.Box 1011, Port Louis, Mauritius
TEL:+230-208-8413 FAX:+230-208-8414

EGYPT

EI-Ramly Import and Export and General Agents

97 Corniche el-Nil, Cairo, 11231 Egypt
TEL:+20-2-7547182 FAX:+20-2-7546998

NAMIBIA

Diesel Power Services Namibia (PTY/LTD)

Corner of Allan Dean Martin Str & Hanna Mupetami Street, P.O. Box 4710, Walvis Bay, Namibia
TEL:+264-81-2759932 or 1400402 FAX:+264-64-205004

Questionnaire

1. Date
2. Ref. No.
3. Company Name / Type of business / Address
4. End User Name / Type of business / Address
5. Shipyard Name / Address
6. New built or re-powering
7. Type of vessel
8. Operation Country /Service Area /Flag
9. No. of Vessel
10. Delivery Time
11. Delivery CIF Port
12. Classification / Class Notation detail
13. Engine

Required Output (kW)

Units per vessel

Front End PTO

☐ Port or Stbd

☐ Both

Cooling system

☐ FW/SW

☐ Central cooling

LO sump system

☐ Wet sump

☐ Dry sump

Type of Fuel

☐ MDO

☐ HFO

☐ LNG

Drive

☐ Direct

☐ Diesel Electric

14. Z-PELLER®

Input Power (kW)

Input Speed (min-1)

Units per vessel

Location of R/C

Required Bollard Pull (Ahead/Astern)

Required Hull Speed with condition

15. Other Propulsion System

16. Electric Power (V, Hz)

17. Site Condition at ECR

Ambient Air Temp.

Sea water Temp.

LTFW inlet Temp.

18. General & Machinery section of hull spec. (reference)

19. General Arrangement of vessel (reference)

20. Option

Engine Resilient Mounting

SCR for Tier III

Required Additional Spare Parts

Conversion Table

Force	1 tf	=	9.807 kN
	1 N	=	0.102 kgf
Pwer	1 kW	=	1.360 PS
	1 kW	=	1.341 bhp
	1 HP	=	1.014 PS
Heating Value	1 kWh	=	860 kcal
	1 cal	=	4.187 J
	1 BTU	=	1.055 kJ
Length	1 inch	=	2.540 cm
	1 foot	=	0.305 m
	1 yard	=	3 feet
	1 mile	=	1.609 km
	1 naut.mile	=	1.853 km
Fluid Volume	1 UK Gallon	=	4.546 l
	1 US Gallon	=	3.785 l
	1 US Barrel	=	0.159 m³
		=	42 US Gallons
Pressure	1 MPa	=	10.197 kgf/cm²
	1 mm Hg	=	1.333mbar (133.3Pa)