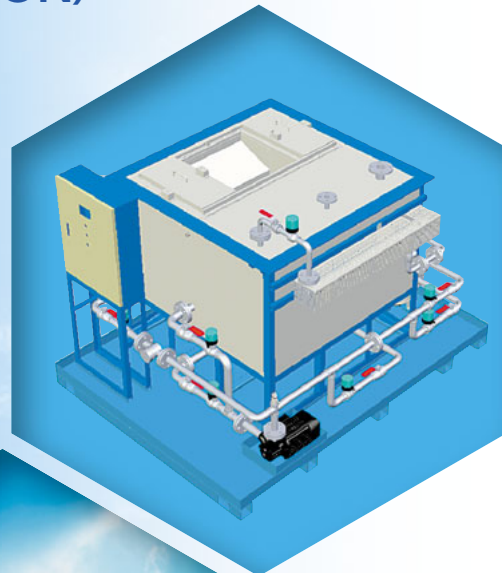


DAIHATSU

DAIHATSU DIESEL

AUS (AQUEOUS UREA SOLUTION) **GENERATOR**

for the SCR NO_x reduction system



DAIHATSU DIESEL MFG.CO.,LTD.

With DAIHATSU'S AQUEOUS UREA SOLUTION GENERATOR, high grade aqueous urea solution indispensable for NOx reduction can be produced on-board easily from urea powder

The IMO NOx Tier-III standards, applied to diesel engines installed on ships built in January 2016 or later, require a significant reduction in NOx emissions in NOx Emission Control Areas (NOx-ECA) compared to NOx Tier-I. One of the principle means of complying with these stringent standards is the Selective Catalytic Reduction (SCR) system, which requires an Aqueous Urea Solution (AUS) NOx reducing agent of a consistent high quality. Currently, ships are equipped with large on-board storage tanks containing enough AUS for the entire navigation of NOx-ECA. Instead, DAIHATSU DIESEL offers the AQUEOUS UREA SOLUTION GENERATOR, allowing you to produce AUS on-board as needed, when and where you need it, and as always with DAIHATSU's thorough after-sales service included.

■ Advantages of the AUS Generator

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.

2 Save money on your AUS

- In general, AUS produced from urea powder is cheaper than buying AUS already in its liquid form.

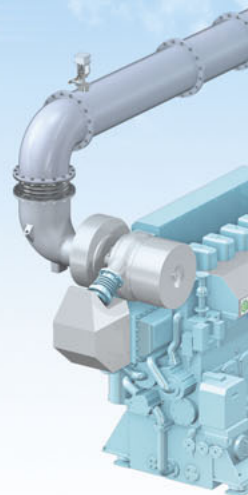
3 Loading urea powder is easier than loading AUS

- 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.

4 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.

AUS GENERATOR



DAIHATSU
SCR SYSTEM

ERATOR, s an SCR's NOx reducing agent, er and distillate water.

AUS GENERATOR for the SCR NOx reduction system

require an 80%

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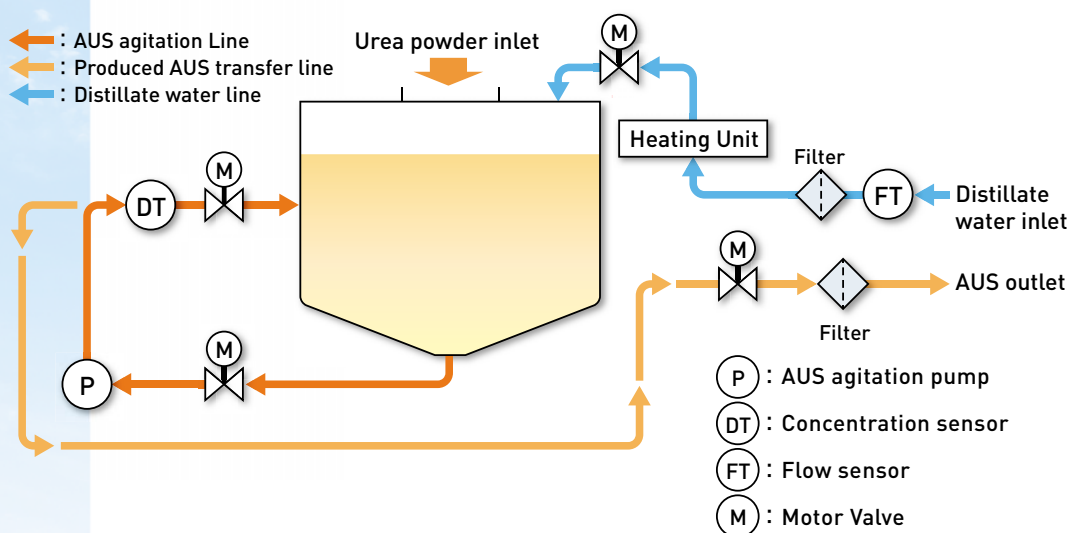
only the AUS you
as standard.

■ Structure and Function

The AQUEOUS UREA SOLUTION GENERATOR consists of a tank, pump, heating unit and filters arranged on a common base plate to form a unit. Through the process outlined below the valves, pump and heating unit are operated automatically to reach a fixed AUS concentration. The process is designed to take 3 - 3.5 hours.

The process time varies depending on the selected model and the supplied distillate water temperature.

- Add the prescribed mass of urea powder into generator.
- Close the lid and start the generator. The addition of distillate water and agitation automatically begins.
- A sensor monitors the consistency, continuing the process until the prescribed AUS concentration has been reached.
- After notifying the completion of the agitation procedure, the generator stops.
- Once the available volume of the buffer tank and transfer lines has been confirmed, manual transfer of the AUS can begin.
- The production cycle ends when all of the AUS has been transferred.



The material of pipe, valve, and fittings shall be made of stainless steel from urea solution outlet to shipyard storage tank.

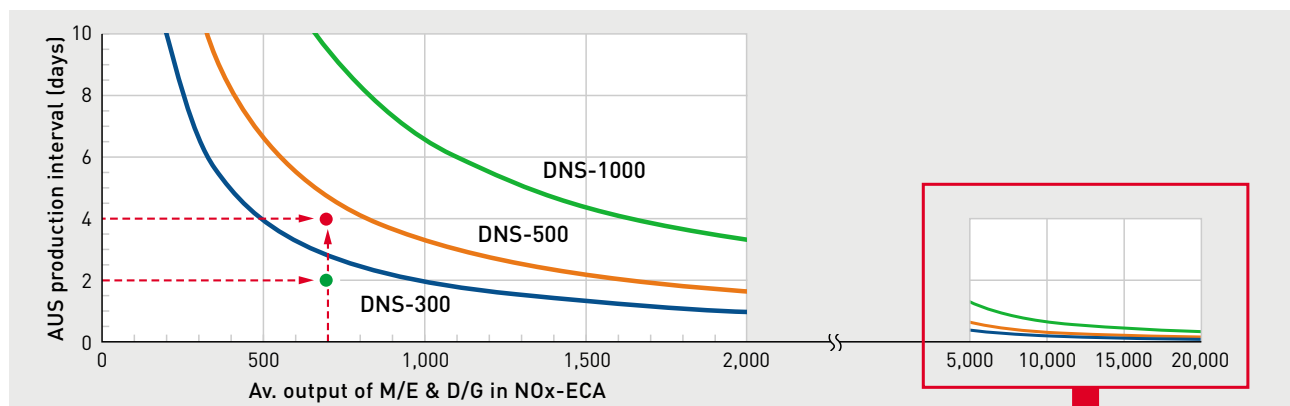
■ Specifications

Model			DNS-300	DNS-500	DNS-1000
Mass of urea powder	kg		300	500	1,000
AUS concentration	% wt		40	40	40
Required distillate water	Lit		450	750	1,500
Amount of AUS produced	Lit		675	1,120	2,250
Pump motor for agitation	—		2.0kW	2.0kW	5.5kW
Heating Unit	—		Electric		
Pump/heating unit power supply	—		AC440V 60Hz 3 phase		
External measurements	length	mm	2,000	2,400	2,800
	width	mm	1,700	2,000	2,550
	height	mm	1,400 *1	1,400 *1	1,600 *1
Mass	dry mass	kg	780	1,060	2,070
	op. mass	kg	1,530	2,310	4,570

*1: Height to top of tank

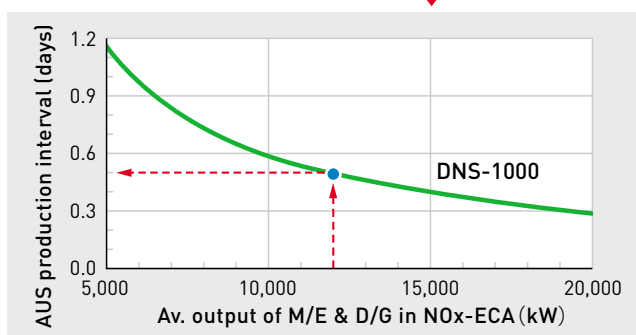
Specifications in this catalog are subject to change without notice.

AUS Generator Model Selection



From the above graph we can determine the most suitable AUS generator model. The red plot above signifies a diesel generator (D/G) averaging an output of 700kW in a NOx-ECA with, for example, a 4-day AUS production interval planned. From this plot we would select the DNS-500 generator as the most appropriate model. If, for the same output, a 2-day AUS production interval were preferred the resulting plot would be the one in green and the DNS-300 generator would be selected.

Produced AUS may also be used for the main propulsion engine's SCR system. The blue plot on the graph to the right indicates the combined average output of 12,000 kW from a diesel generator and a main propulsion engine (M/E). The graph shows that operating the DNS-1000 twice a day would be enough to provide the necessary amount of AUS.



Case Study: Car Carrier's AUS storage tank (for reference)

(Main engine rated output: 14,000kW ; Time in NOx-ECA: 7 days)

AUS Generator	Without DNS	With DNS
Storage Tank Capacity	17.0m ³	5.0m ³
AUS Generator Model	—	DNS-1000
AUS Production interval	—	At sailing: twice a day At port: once every 4 days

Stainless steel independent tank

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