

Case Study | VLT® AutomationDrive FC 302

## Maersk Supply Service – shore power supply with a payback period of less than 5 months

Due to the low oil price and challenges in the oil and gas industry, Maersk Supply Service has since 2016 had some of its anchor handling vessels and platform supply vessels in layup waiting for the next job. Up to 10 vessels have been parked between jobs in the Port of Fredericia, Denmark, where the location and facilities are well-suited for longer-term storage.



**Total**

stop to local  
pollution from diesel  
exhaust





***“The shore power system is a very cost-effective solution for supplying our vessels with clean power – and the cooperation with Danfoss is excellent.”***  
**Karl Jeppesen,**  
**Electrical Superintendent at**  
**Maersk Supply Service**

### **Warm storage costs**

To avoid any damage to vital systems due to the effects of a long-term standstill period, the ships are stored “warm” – which means that the diesel engines are preheated and the electrical control systems and ventilation systems are kept running.

Initially, the ships were powered by onboard harbor generators. This was not a satisfactory solution though, due to diesel exhaust pollution and constant noise nuisance. In addition, the high costs of quality marine diesel and genset maintenance were considerable: Genset maintenance alone incurs the costs of oil and filter replacement every 1,000 hrs and a stipulated major overhaul every 20,000 hrs. It also takes a 6 to 8 people crew to keep the ships running according to legal requirements.

### **The shore power alternative**

Early in 2017, Karl Jeppesen, the Electrical Superintendent for Maersk Supply Service, presented a business case for the management of Maersk Supply Service, where ships were converted to shore power with an attractive payback time of less than 6 months. He soon received a green light to proceed with the shore power supply project and by October 2017 the system was fully operational.

### **Tried and trusted**

Maersk Supply Service already use a large number of Danfoss drives on their vessels and over the years Karl Jeppesen has retrofitted many Danfoss VLT® drives for deck machinery, thrusters, cooling water pumps and engine room ventilation systems on Maersk Supply Service’s fleet. These drives have proven themselves to be reliable in heavy duty and rough environments around the globe, so approaching Danfoss Drives for a proposal for a shore power system was the preferred solution.







*The VLT® drives are cooled with the back channel cooling system which draws cooling air in and out directly via the vents in the container wall.*

### **A flexible partner**

The topology was designed by Danfoss Drives in Denmark and the container, switchboards and system integration were manufactured and installed by Caverion according to Karl Jeppesen's specifications. The project also involved close cooperation with the electricity company, Trefor, who

installed a 10 kV to 450 V (max. 1800 A) transformer at the quay. This involved some costly civil engineering to install several hundred meters of 10 kV underground cable to the transformer. The electricity is purchased directly from TreFor according to an agreement between Maersk Supply Service and TreFor.







The sea water cooling pumps and engine room ventilation systems onboard the vessel are powered by Danfoss drives.

### Greater efficiency all round

The new shore power solution has considerably reduced workload and maintenance and the crew now consists of just two engineers/electricians and one galley assistant. The noise impact in the port environment has now become negligible and there is a total stop to local pollution from diesel exhaust. On a larger scale, there's good news too: the electricity that runs the system comes from Denmark's national grid where more than 40% is generated from renewable resources.

### Payback time

During the winter period, power consumption to the ships is twice as high as the consumption during the summer season, as it is important to avoid frozen water pipes and equipment damage due to freezing temperatures. After having the system in operation through all four seasons, the

business case has proven to be even better than projected with a payback of less than 5 months.

### Further ship potential

A container for the 50 to 60 Hz converter was placed on the deck of one of the ships and 440V, 60Hz cables were connected from the output of the container to the shore power entry point on each of the other ships.

Inside the container there are 2 x 450 kW, VLT® AutomationDrive FC 302 units, each with a sinewave filter and a transformer for galvanic isolation. There are 12 x 250 A output circuit breakers which allow up to 12 ships to be supplied from the system. The output to each ship is monitored and if the power consumption to one of the ships appears abnormal it is quickly investigated and corrected.



Maersk Supply Service provides reliable, safe and efficient marine services and integrated solutions to the offshore energy sector worldwide. For years, Maersk Supply Service has been a leader in driving technical development within

the offshore marine supply industry, and they have a successful history of developing specialist hardware for offshore support operations.