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# Special demagnetizing tunnel for Pioneering Spirit



12-metre tubes that need to be welded together to 24 metres and form a pipeline in the sea through which - in this case - gas flows is quite a job, but is daily business for Pioneering Spirit. The largest construction vessel in the world is owned by Swiss-Dutch offshore contractor Allseas and is located off the coast of Rotterdam, at the Maasvlakte. Her job is to install and remove rotary offshore platforms and lay the largest and heaviest undersea pipelines on the seabed. The colossus is 477 metres long, 124 metres wide and can handle 48000 tonnes. It picks up a drilling rig in just 10 seconds. Incredible but true.

**Problem: residual magnetism obstructs pipeline welding**

whether the improvement could be implemented in the process. They took a gaussmeter and a number of demagnetizing systems with them, including a demagnetizing tunnel and a mobile demagnetizing unit.

### **Special custom-made demagnetization tunnel**

After a day of testing, the [demagnetization tunnel](#) proved to give the desired result. But in the offshore industry, corrosion resistance is always a challenge, so we were asked if it was possible to make a special, extra robust tunnel with a housing made of plastic. Preferably a precise fit, leaving as little air gap as possible between pipe and tunnel. We succeeded. For mounting to the ship, a frame made of non-magnetic stainless steel sits on the tunnel. Based on the result from the first field test, our FEM Engineers calculated the correct sizing of design parameters. Based on this, mechanical engineers then took care of mechanical elaboration of the demagnetization tunnel. This resulted in the most optimal design for Pioneering Spirit's application.

### **Special control box and on-site commissioning prove successful**

The standard control system was also modified upon request. The Pioneering Spirit team wanted a start/stop sensor, which makes the through tube turn on and off the tunnel. The tubes are made of a thick steel alloy that can hold more magnetism. If there is more magnetic field, you also need more current to extract the magnetism. Demagnetization is possible by creating a decreasing alternating magnetic field in the work piece. This is achieved with an alternating continuous signal and passage of the product through the tunnel. The lower the frequency, the deeper the signal penetrates the metal. But low frequency also requires low pipeline throughput through the tunnel. The limitation of our system is the frequency and for the client it is the speed of the pipe to be installed.

During commissioning of this customer-specific demagnetization system, we searched for the optimum between throughput, frequency, current and pure signal shape. By targeted testing in a number of iterations, we achieved the best result and were able to optimally tune the controller to the client's product on site.

### **A suitable solution for every process**

The tubes are delivered on a kind of powered roller conveyor system and with the help of this system it is possible to demagnetise with a continuous signal while the tube moves through the tunnel. Depending on the application, there are 3 possibilities for demagnetisation. With a decreasing signal, with a continuous signal or with a constant signal. The less the tunnel is on, the less it gets hot or consumes energy. In half an hour, two tubes are demagnetised and then welded

# DE-MAG 500

## LOW-COST MAGNETIZING AND DEMAGNETIZING DEVICE

### Efficient and powerful, thanks to the capacitor discharge process

The **DE-MAG 500** magnetizing and demagnetizing device is a newly developed low-cost device based on the capacitor discharge process. It is therefore very well suited for magnetizing magnets and sensor systems made of ferrite or AlNiCo alloy. It can also be used to demagnetize solid or hardened steel parts.

For magnetization and demagnetization, a coil is connected to the device that matches the geometry of the components to be magnetized or demagnetized.

The magnetization of ferrite or AlNiCo magnet systems is performed with a single high current pulse. The current strength can be up to a maximum of 15,000 A. This current is passed through the magnetizing coil and enables cycle times of 3 to 5 seconds in flow production.

During demagnetization, individual decaying alternating field pulses are emitted to the connected coil via a special high-current thyristor circuit. The low frequency is adjustable in the range from 5 Hz to 50 Hz. Magnetic field strengths of up to 5,000 A / cm are achieved. This guarantees an optimal demagnetization of the component, with less than 5 A / cm remanence, even with large component geometry, since the depth of penetration of the demagnetization is very large.

The device has a built-in graphic PLC control that communicates with an automatic process automation in production via its interfaces.



## PULSE MAGNETIZING YOKE

The **yoke magnetization process** is the most established process for magnetizing permanent magnets and permanent magnetic systems. It is particularly suitable for magnetizing 2-pole ferrite or AlNiCo magnet systems.

Due to the high functional reliability when used in flow production, and due to the very favorable price-performance ratio, the yoke magnetization process is still used especially in automatic manufacturing technology.

Our magnetizing yokes are made from a special electrical sheet to ensure a loss-free pulse curve.

As an option we deliver for all magnetizing yokes:

- Any desired connection voltage
- Suitable pole inserts for magnets and magnet systems, on request with fluxmetric measuring coils for measuring the magnetic flux
- Current monitoring to control the magnetization field strength
- Suitable manual workstations with automatic feeding of the systems to be magnetized into the magnetizing yoke

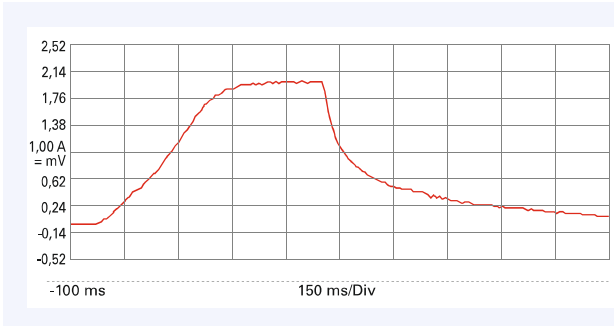
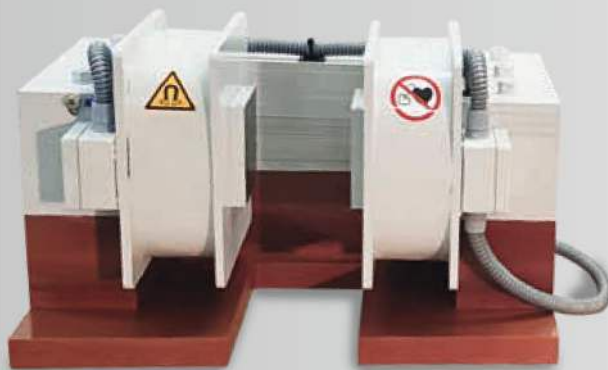


Diagram: pulse curve



Magnetizing Yoke EM-5/J



Pulse Generator IG-10