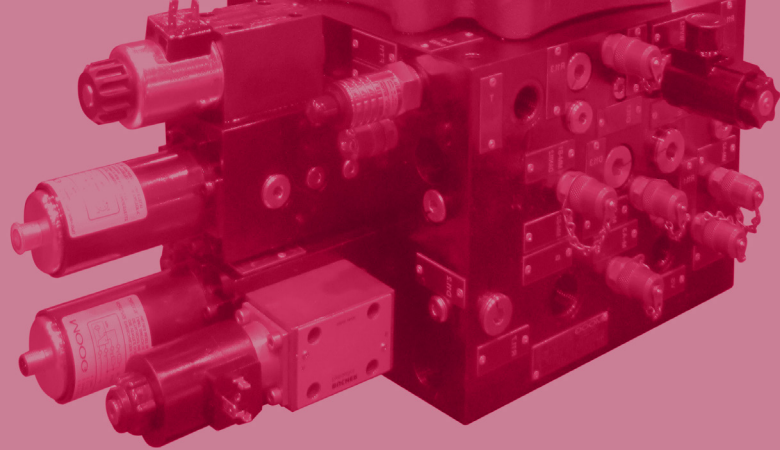


# THE MOOG EAS SYSTEM INCREASES ACCURACY, EFFICIENCY, AND PRODUCTIVITY FOR FREY AND CO.



## Summary

Frey and Co. was looking for modern, more efficient technology to replace the previous hydraulic system solution used in their EasyISO 2000 - 4000 KN ceramic isostatic presses. In cooperation with Frey, Moog developed a new, modern EAS (electrohydrostatic actuation system) consisting of a function block with an integrated EPU (electrohydrostatic pump unit). The EPU is conceived of as an energy saving solution that can be designed very flexibly according to the chosen infrastructure.

## Frey and Co. Background

Frey and Co. was founded in 1989 by Dieter Frey, and the company's facilities are located in Lenggries Fleck, Southern Bavaria, Germany. As a leading manufacturer of adaptor tools, press machines and automation systems for the powder metallurgy sector, the company provides innovative applications for the medical, electronics, automotive and ceramics industries. Frey have many years' experience in tool and adaptor construction and the development of specialized machines. Principally, the company's employees deal with the design, manufacturing and assembly processes, and the company have a worldwide sales network in South Korea, China, South America, the Czech Republic, Russia and several other countries.

Frey's EasyISO ceramic isostatic presses are used in the production of ceramic parts with an even density distribution and long lengths. Cold isostatic pressing (CIP) is a materials processing technology whereby high pressure is applied to ceramic powder in a sealed elastomer container, shaped specifically for the application. During the manufacturing process, the powder is converted from loose aggregate into a partly dense compact with enough strength to permit handling, before it is transferred to the next stage of the process.

The EasyISO Series is equipped with a pressure vessel, a pressure intensifier and a locking cylinder built into the press frame. The machines have a modular structure for press forces ranging from 2,000 to 10,000 KN and can be tailored to specific customer requirements. In short, each press can be defined between different press pressures as well as component sizes within a specific framework.



Frey and Co. facilities, Lenggries Fleck, Southern Bavaria, Germany (photo courtesy of Frey and Co.)

The company's presses perform production functions that range from manual removal and filling to fully automated manufacturing lines. Depending on the type of aggregate powder used, presses are fitted with dies that are replaced after each cycle. Frey's EasyISO presses are very cost effective and are required to produce long ceramic parts with an even density distribution.

## The Challenge

The collaboration between Frey and Moog began in 2010 with the development of a new hydraulic powder press. In 2018 the partnership continued to develop further, this time with the aim of jointly developing an improved, future-oriented drive system for the EasyISO press machine series.

The original design of the EasyISO 2,000 and 4,000 KN presses included a traditional hydraulic system solution for five individual machine axes that Frey had used for many years, and which was supplied by a leading Moog competitor. This complex motion control solution was not ideal as required considerable maintenance and had high energy consumption, which increased operating costs to challenge overall company productivity. Aiming to introduce new, smarter and less complex motion control technology to their press machinery, Frey approached Moog with the goal of introducing more up to date, efficient drive technology for their isostatic press series.



Frey EasyISO Ceramic Press Machine with the Moog EAS  
(photo courtesy of Frey and Co.)

## The Moog Solution

The Moog team provided the necessary expertise for the project and delivered a new system design. As Moog already had a close working relationship with Frey's engineering department, a good understanding of the system's special requirements developed quickly. The suggested solution was to use Moog's EAS (electrohydrostatic actuation system) with a central EPU (electrohydrostatic pump unit) to control all five press axes. This solution would not only lower the overall footprint requirement, but also significantly reduce the size of the HPU (hydraulic power unit).

After carefully reviewing Frey's press application requirements, the Moog team developed a new concept proposal whereby the Moog EAS would control the main axes of the EasyISO presses, and all additional tool axes. Moog's modular and easy to use solution comprises of an EPU, a manifold assembly, an accumulator and small auxiliary power unit. The entire system is straightforward to use and could be assembled and commissioned quickly on-site.

At the beginning of 2019 the Moog EAS was assembled at the Frey manufacturing facility in Lenggries and put into operation with Moog's support. The entire assembly and commissioning process was carried out with minimal downtime. The compact design of the EPU drive unit and the Moog team's ability to assess Frey's specific requirements quickly contributed not only to the speed of delivery, but also to the overall success of the project.

## The Outcome

The Moog EAS improved the repeatability and accuracy of the EasyISO press series, and it also proved easy to use. Overall, the system reduced noise levels on the basis that the EPU delivers power only when it is needed, which also greatly improved energy efficiency by more than 40 % and also helped reduce operational costs. In terms of the requirements of the isostatic press market, by replacing the hydraulic system on Frey's press series with the Moog EAS resulted in increased productivity, higher quality ceramic parts as well as a more stable production process. The EPU's limited oil requirement led to an improved CO<sub>2</sub> balance in the overall footprint of the Frey presses, making the project a considerable all around success.

## Project Summary

Frey was enthusiastic about the performance of the Moog system on its EasyISO presses.

The cooperation between the two engineering teams proved to be very successful, and it was again very effective teamwork between the two organizations that brought excellent results for everyone involved.

Not only was Frey able to operate all five press axes with one EPU, but the entire EAS significantly improved the energy efficiency and quality of the finished ceramic parts while reducing the total cost of ownership. The Moog team developed, constructed and commissioned the EAS very quickly. As a result of the EPU's compactness and small number of components, maintenance work proved easy and quick.

## Custom Applications

The Moog EPU Series is available from size 19 cm<sup>3</sup> to 250 cm<sup>3</sup> which can serve as a complete electrohydrostatic system with flow rates from 50 l/min up to 450 l/min.

As a complete system, the Moog EAS is a highly flexible and compact solution to control linear motion. The configuration can be easily adapted to most types of industrial manufacturing machinery. The Moog global engineering team can help select and integrate the correct components based on specific customer requirements.

### For further information visit [moog.com/industrial](https://moog.com/industrial)

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Moog's Solution Increases Accuracy, Efficiency, and Productivity for Frey and Co.

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