



Polyma

Mobile hybrid power
generation



Generating electricity where it is needed

The hybrid power unit for flexible energy supply

Based in Kassel, Germany, Polyma Energiesysteme specialise in developing and manufacturing customised power generators. The customised power units are used in many different areas – from vital emergency response measures and stationary solutions in industrial environments to mobile power supplies at festivals or on film sets. To fulfil the requirements for maximum flexibility and ease of use, Polyma relies upon close, trusting cooperation with ifm, a leading supplier of automation technology. An innovative combination forms the core of Polyma's hybrid power units: a conventional motor-generator unit and a powerful battery.

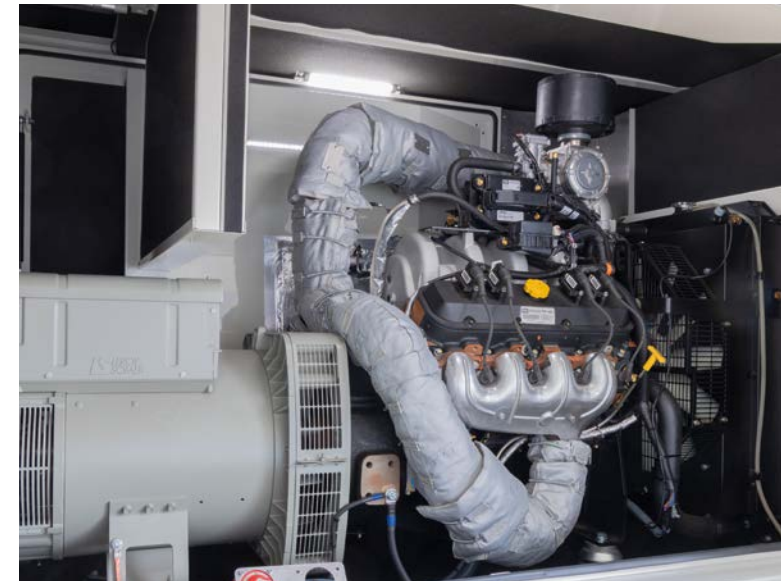
Mobile power generation for festivals or film sets, for example.

Daniel Andler, Development Engineer at Polyma, explains how they work together: *"This combination makes our devices extremely flexible and perfectly adapted to today's energy supply requirements. The motor can be operated with either diesel, gas or LPG, making it highly adaptable to different operating conditions. A powerful generator converts the mechanical energy into electricity, which can be temporarily stored in a modern lithium iron phosphate battery if required. This battery technology not only offers high energy density, but also excellent service life and safety."*

Advanced battery management

At Polyma, battery management is mastered through the use of advanced control systems. *"The integration of lithium iron phosphate batteries is more complex than that of conventional lead batteries; it requires a sophisticated management system for monitoring and control,"* explains Andler.

This is where ifm's expertise comes into play. A programmable logic controller (PLC) is responsible for the intelligent operational management of the entire system and ensures seamless coordination of the various components.



The motor-generator unit for mobile power generation.



The CR710S central mobile control unit has both a "normal" and a second independently operating safety PLC.



The control centre and the various power connections are located at the rear of the vehicle.

” *The combination of a conventional motor-generator unit and a powerful battery makes our devices extremely flexible and perfectly adapted to today’s energy supply requirements.*

Powerful PLC

The robust, mobile ifm CR710S controller comprises two independently operating PLCs, one of which is a TÜV-certified safety controller. The powerful triple-core controller, combined with a large working memory, enables complex control functions. If required, the application software can be split so that the safe program part can be executed without interference from the general program execution. The various inputs and outputs can be configured as digital, frequency or analogue inputs with diagnostic function or as inputs for resistance measurement. Analogue inputs enable both current and voltage measurement. The outputs can be configured as digital or PWM outputs with diagnostic capabilities.

All inputs and outputs can also be configured as safe channels, so that safety-related sensors and actuators can be connected directly and their data processed in the application software. The device is also equipped with two Ethernet ports and four CAN interfaces. The CAN interfaces support all important bus protocols (CANopen, CANopen Safety and J1939) as well as

transparent, preprocessed data exchange. The control functions are easily integrated into the application program thanks to CODESYS programming.

The open programming interface enabled Polyma to implement its own software solutions, which are designed for maximum user-friendliness and efficiency.

Robust and reliable for mobile applications

The robustness and reliability of the technology are vital for mobile applications. Polyma prioritises ensuring that the housings and technology of the units function reliably even under harsh conditions.

“The devices must be resistant to vibration and shaking, as they are often used on the move,” stresses Daniel Andler.

This is precisely what the mobile ifm controllers are designed for. The units are equipped with ifm sensors for comprehensive condition monitoring, including, for example, a capacitive sensor for leakage detection. This sensor is located in the collecting tray under the unit. If a line is defective and fluid leaks out,



The central ifm CR1204 touch display is used to visualise all operating parameters and to set a wide range of functions.

it collects in the tray and is detected by the sensor. This then sends an alarm signal to the controller. This prevents fluids from leaking unnoticed into the environment.

Powerful visualisation and operation

The customised automation solution that Polyma has developed in collaboration with ifm gives the company and its customers maximum flexibility.

Thanks to the advanced battery technology, the motor can be switched off at low load, which enables considerable fuel savings while increasing the service life of the motor. The user always has full control of the system via the freely programmable CR1204 touch display. They can check the current status, apply settings and switch functions on and off.

The display has been developed for use in cabins and outside vehicles. A high protection rating of IP65/IP67 means it is optimally protected against moisture. It is resistant to strong impacts, permanent vibration and extreme ambient temper-

atures. The high-resolution RGB LED panel offers optimum readability even in a bright environment. The display has freely programmable buttons and a capacitive touchscreen for operation tasks.

The integrated powerful 64-bit PLC can perform visualisation and operation tasks and is freely programmable via CODESYS. Numerous interfaces at the back of the device, e.g. CAN, analogue video, USB 2.0 and Ethernet offer maximum connectivity.

Whether on a construction site, on a film set or in the event of a disaster, Polyma's hybrid power units, equipped with automation technology from ifm, guarantee an easy-to-operate, reliable and efficient power supply on site.

Close cooperation with ifm

From the initial contact with ifm, Polyma felt it was in good hands and a long-term partnership was formed.

"The expertise of ifm's telephone hotline cannot be taken for granted these days," praises Daniel Andler. He particularly appreciates the fact that ifm took the time to closely support the medium-sized company. "ifm really is 'close to you' – or, in this case, close to Polyma. I was very well looked after from the outset. The ifm employees took the time to solve any problems competently, which impressed me."

Conclusion

This innovative solution is a prime example of how customised technology and close cooperation between companies can result in outstanding products that not only meet today's requirements, but also contribute to environment protection by optimising energy consumption and reducing emissions. Polyma and ifm are thereby setting new standards in the industry and demonstrating that technological progress and sustainability can go hand in hand.