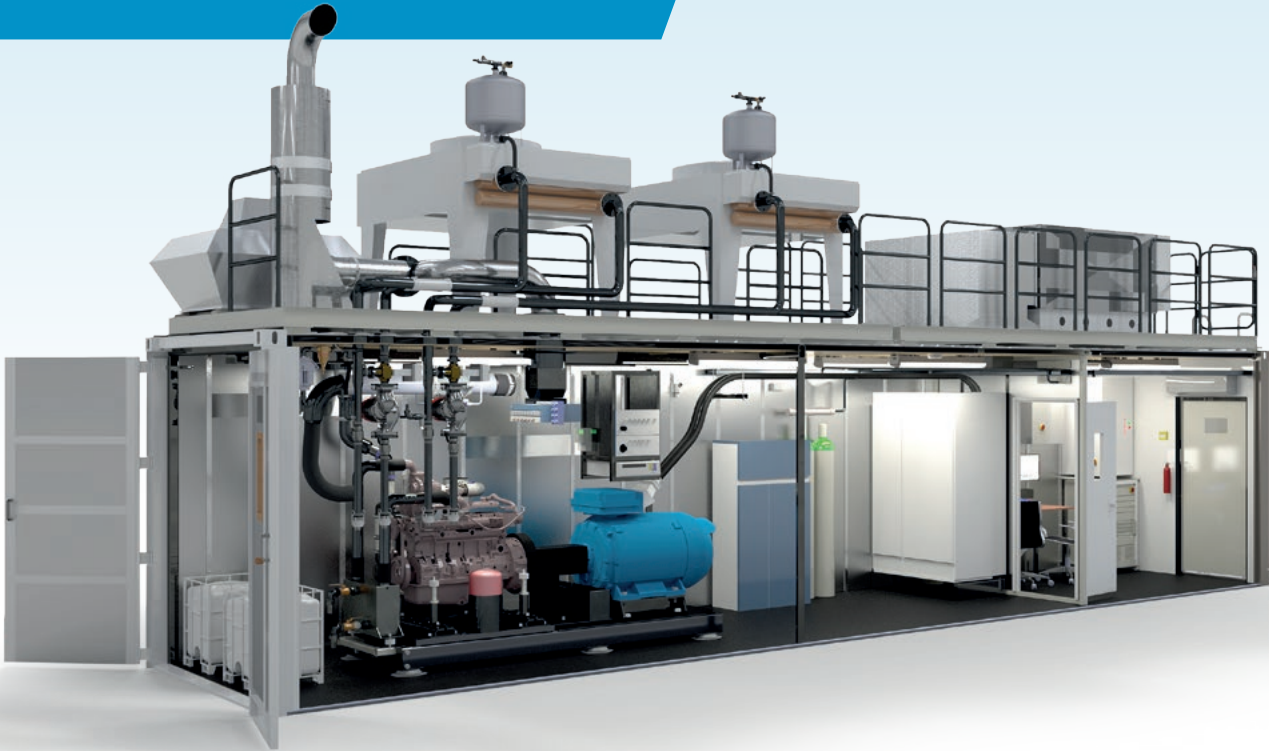


Proventia Test Unit

Modular Engine Test Laboratory



M Measuring and testing are a must in the engine and machine industries. With proper, reliable testing, many technical problems and warranty costs can be easily avoided. Proventia's solution for diverse engine testing needs is the Proventia Test Unit. Modularity of the Proventia Test Unit makes it fully scalable for a variety of testing requirements and the size of investment in question.

Saving space, time and money

When the technical solution matches the use, costs are lower and the investment is in balance with the test objectives. Proventia Test Units are always optimised to customer's testing requirements e.g. ageing, and then modified or upgraded to another objective, e.g. performance and emission testing. Compared to the costs and time involved in building an in-house testing facility, the Proventia Test Unit is a truly cost-effective, adaptive testing laboratory with a long life cycle expectancy. It saves space, time and money in both short- and in long-term testing arrangements.



Fast & flexible delivery and commissioning

Proventia Test Units are manufactured and tested in Finland; ready-designed platforms combined with optimised component selection guarantee a short delivery time to the site. After the pre-commissioning, the test unit modules are separated from each other for transport. At the final destination, the modules are simply assembled back in place, connected to the existing facility infrastructure and tested one more time before the customer can start operating the new engine test laboratory. Compared to conventional alternatives, the building a Proventia Test Unit does not disturb the customer's daily operations or cause operational downtime in their engine test laboratory.

Active Engine Test Dynamometer

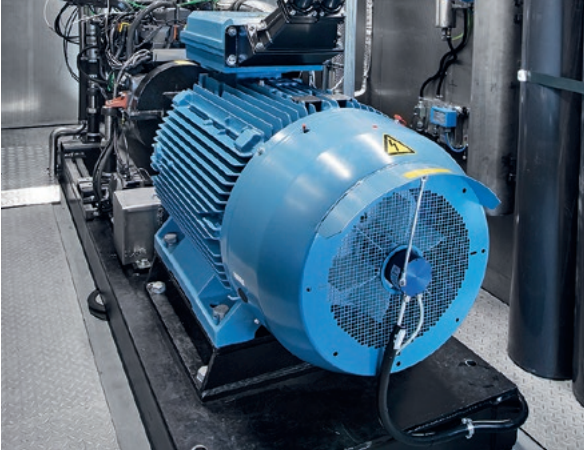
Today, active engine test dynamometers, AC dynos, are replacing traditional eddy current dynamometers in test laboratories, because they allow not only the braking of engines, but also driving, which means that with an AC dyno it is possible to simulate real life torque conditions on the road. Proventia Test Units are equipped with AC dynos allowing a wider operational power range and more detailed engine performance analysis. AC dynos with modern automation systems allow a large selection of both steady state and dynamic test cycles, e.g. WHSC, WHTC, NRSC, NRTC and ISO 8178.

Automation systems

The main automation system controls all operations, but concentrates on engine and dynamometer control. The main system uses Proventia Programmable Logic Control (PLC) to operate all the infrastructural components, such as main power, water pumps, cooling fans, and three-way valves controlling temperature and air flow. Main test automation also uses Proventia PLC to handle all safety systems, such as doors, emergency switches, fire extinguishers, as well as HC, CO and fluid sensors. Task partitioning between the main automation system and Proventia PLC simplifies the process

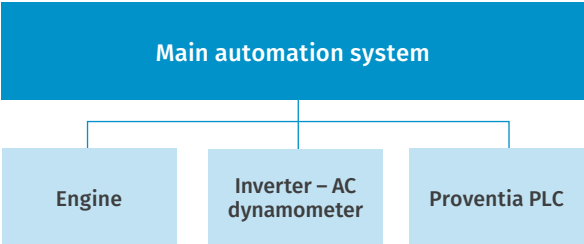
Proventia Test Unit can be re-located over and over again wherever testing is needed. The Proventia Test Unit is ideal for ageing and durability testing for engines, components, exhaust aftertreatment systems, fuels and lubricants. It is capable of 24/7 testing, manned or unmanned, with the possibility for remote monitoring from a PC, tablet or smartphone. In addition, when testing needs change, the unit can be modified for other testing requirements.

The modular concept makes it a straightforward solution that can be quickly and flexibly deployed maximising its investment value.

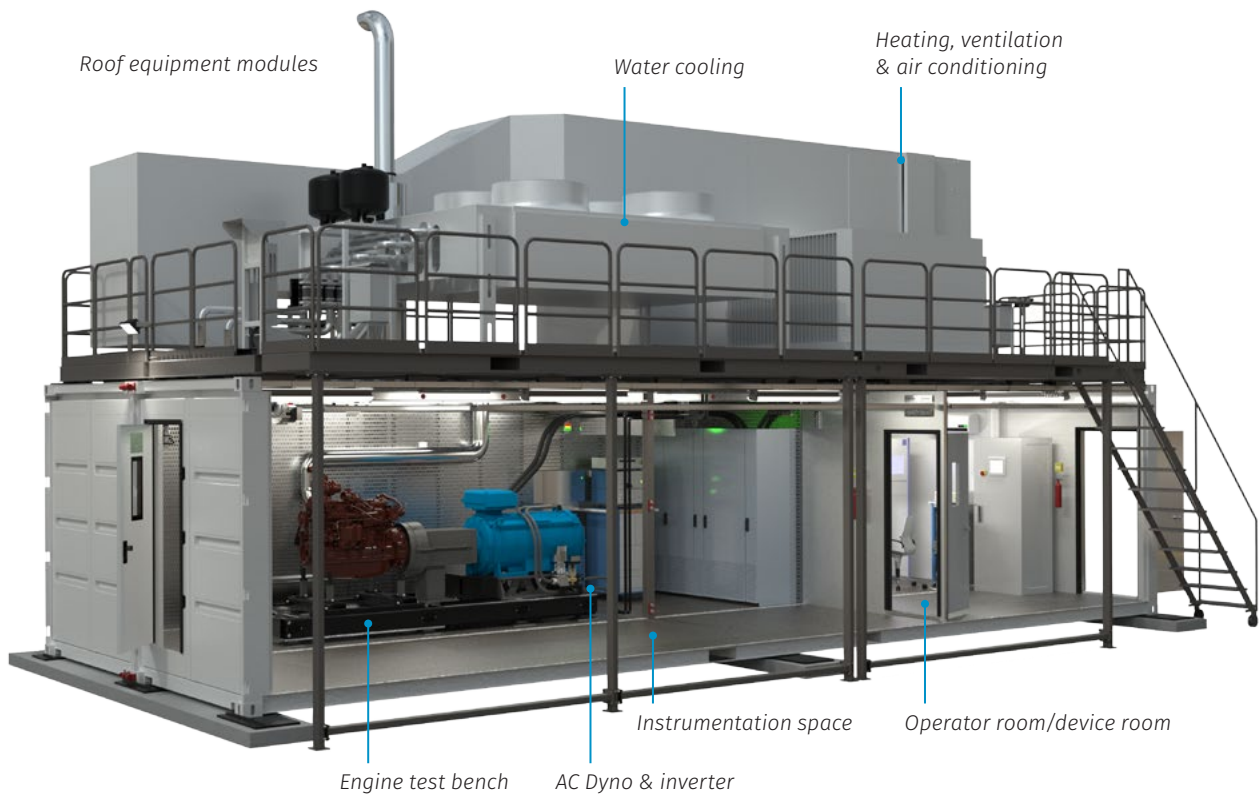


One of the advantages of an AC dyno with an inverter is that the energy produced can be fed to the power grid at 90% efficiency. This means that the Proventia Test Unit produces electricity for you, which you can use or even sell onwards to the local electricity company.

of integrating Proventia Test Unit with various automation systems, meaning that, for the main, any system defined by the customer can be used for automation.



Scalability through modular concept



Proventia Test Units are available in two basic module, single and double, sizes depending on general space requirements and the size of the dyno & inverter package in question. All size classes and measurements can be modified to meet specific customer needs offering

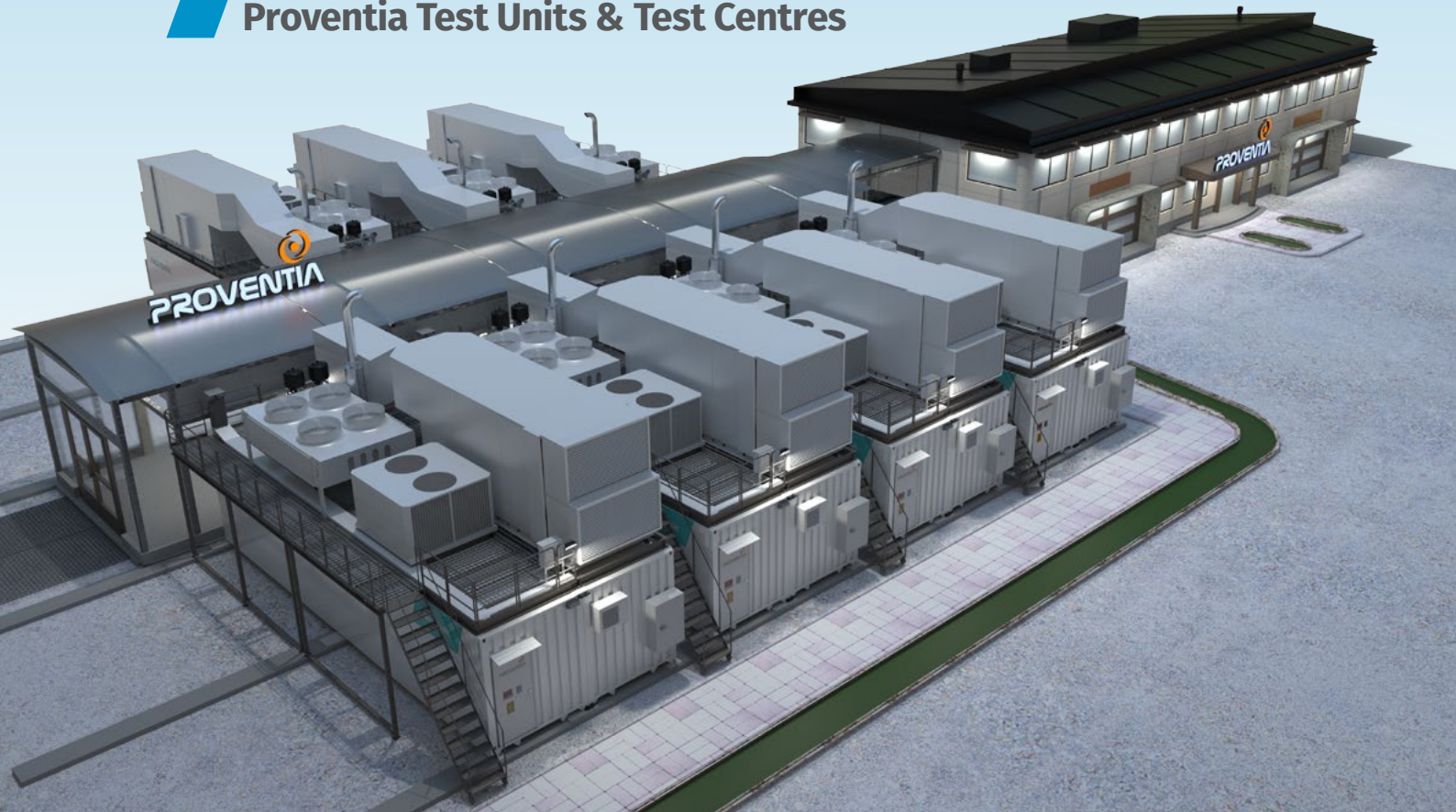
a practical amount of space for the equipment and operator activities. Double unit structure brings more space for bigger engine classes or more space for test equipment or control and monitoring systems.

Key features

- AC dynamometer system capable of variable RPM and torque conditions
- Independent, high-quality test automation system with variable governor possibilities
- Ready for running 24/7 unmanned automated cycles
- Possibility for remote monitoring
- Fully CAN-capable
- Easily transportable shape and size with standard corner locking features
- Fire- and soundproof <80 dB, can be used in residential areas
- Exhaust fume extraction system
- Integrated closed circle cooling system
- Refrigerated unit for cold start as optional extra



Proventia Test Units & Test Centres



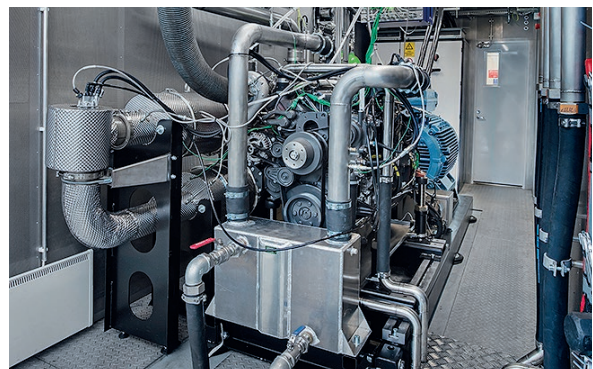
From Test Units to Test Centres

Several test units can be connected through service corridors and buildings into larger test centres. This new kind expandable test centre concept offers cost-efficiency and optimisation to various testing needs in the future as it allows the test centre to grow through phases over several years adapting to changing requirements. Building a Test Centre by

using Proventia Test Units does not require heavy investments in facilities. The costs of various test units can be spread over several years as the test centre grows as needed. The Proventia Test Centre can also be deployed quickly, as the single units are always manufactured elsewhere and transported assembly-ready to the site; each unit can also be easily replaced.

To whom

Modular Proventia Test Units and Test Centres provide maximum diversity for alternating testing requirements, serving the needs of engine, machine, vehicle and component manufacturers, emission technology developers, and research and test service providers. It is also ideal for educational purposes in automotive universities and polytechnics training new engineers for the industry.



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