PRODUCT INFORMATION

DRY RUNNING PISTON COMPRESSOR AG series
MODULAR ENERGY SYSTEM

CLEAN - SAFE - RELIABLE

DRY RUNNING PISTON COMPRESSOR (AG series)

sera piston compressors from the AG series were specially developed for operation with hydrogen in order to store it at up to 300 bar in the long term and convert it back into energy depending on requirements and application. The piston compressor plays an important role in a wide range of applications for autonomous energy systems in residential areas, neighbourhoods and industrial energy solutions. This dry-running, two-stage piston compressor is air-cooled, extremely energy-efficient, very quiet, oil-free and has been specially developed for its intended use. The simple installation and user-friendly design make the piston compressor the ideal choice for energy systems and for use in the modular **sera** compressor station MES.

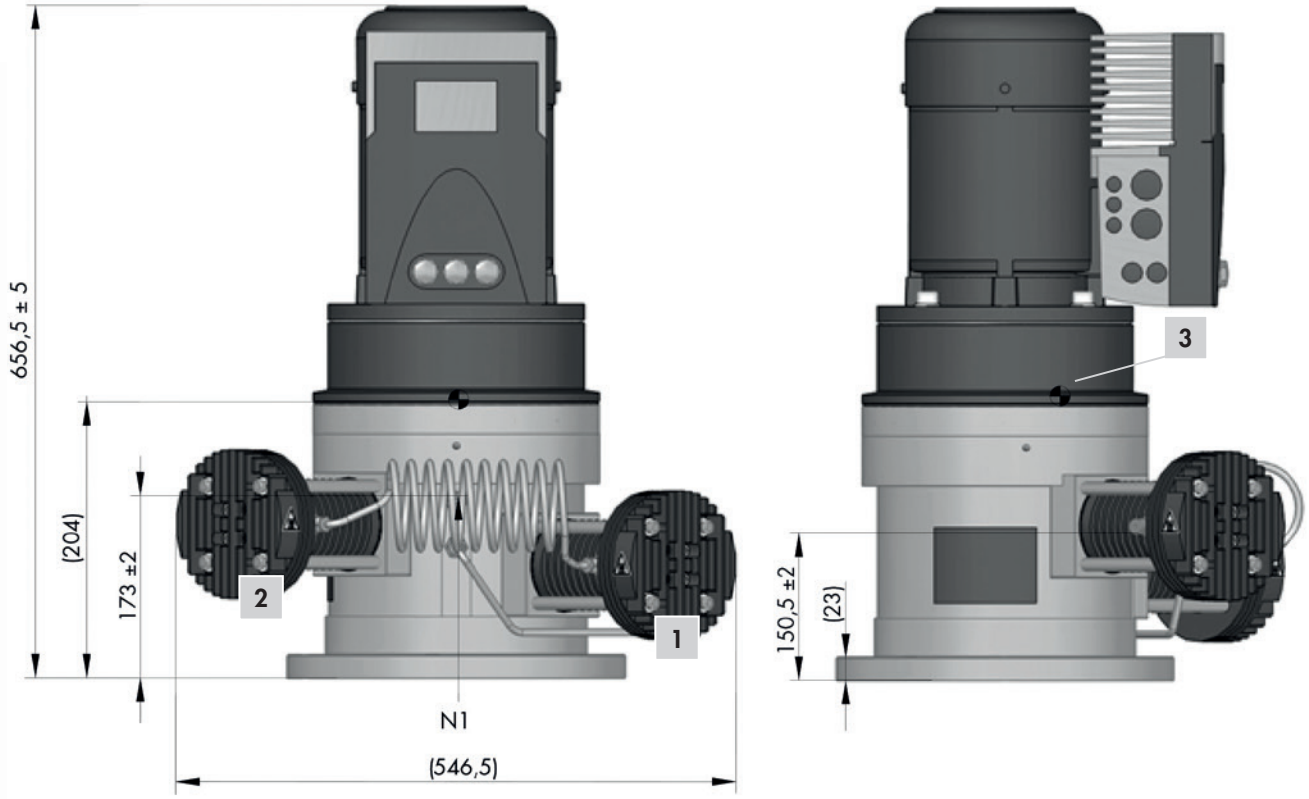
APPLICATIONS

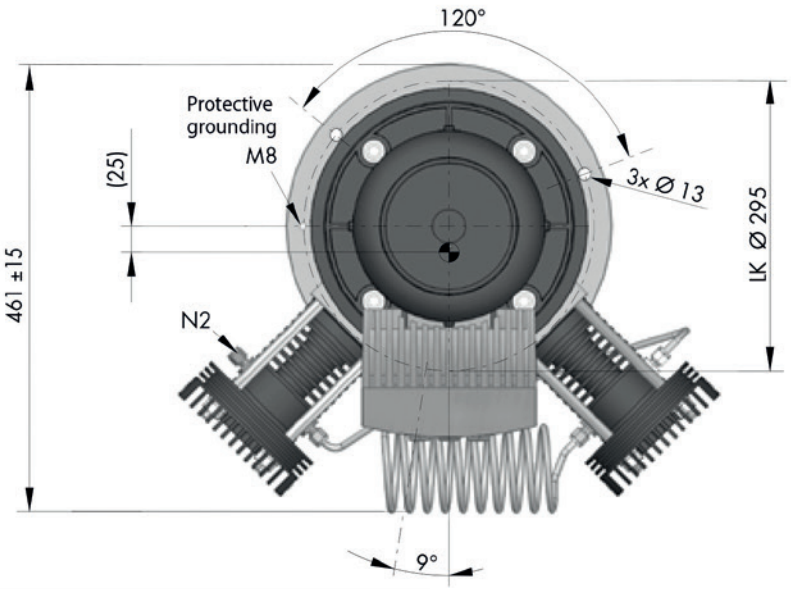
- Heat and Power Applications
- District and neighbourhood supply
- Industrial supply
- Heat and power applications
- Emergency power supply
- Laboratory and research
- Solutions for self-sufficient energy supply

TECHNICAL DATA

- Gas: H2, dry,free of solids
- Inlet pressure: 25-35 bar(g)
- Outlet pressure: max. 300 bar(g)
- Ambient temperature: -15 °C to +40 °C
- Flow rate: ≥ 3.0 Nm^3/h at 150 bar(g) final pressure and ≥ 2.0 Nm^3/h at 300 bar(g) final pressure
- Air-cooled and oil-free
- Noise emission less than 52 dB(A)
- High energy efficiency

DIMENSIONS (AG Series)





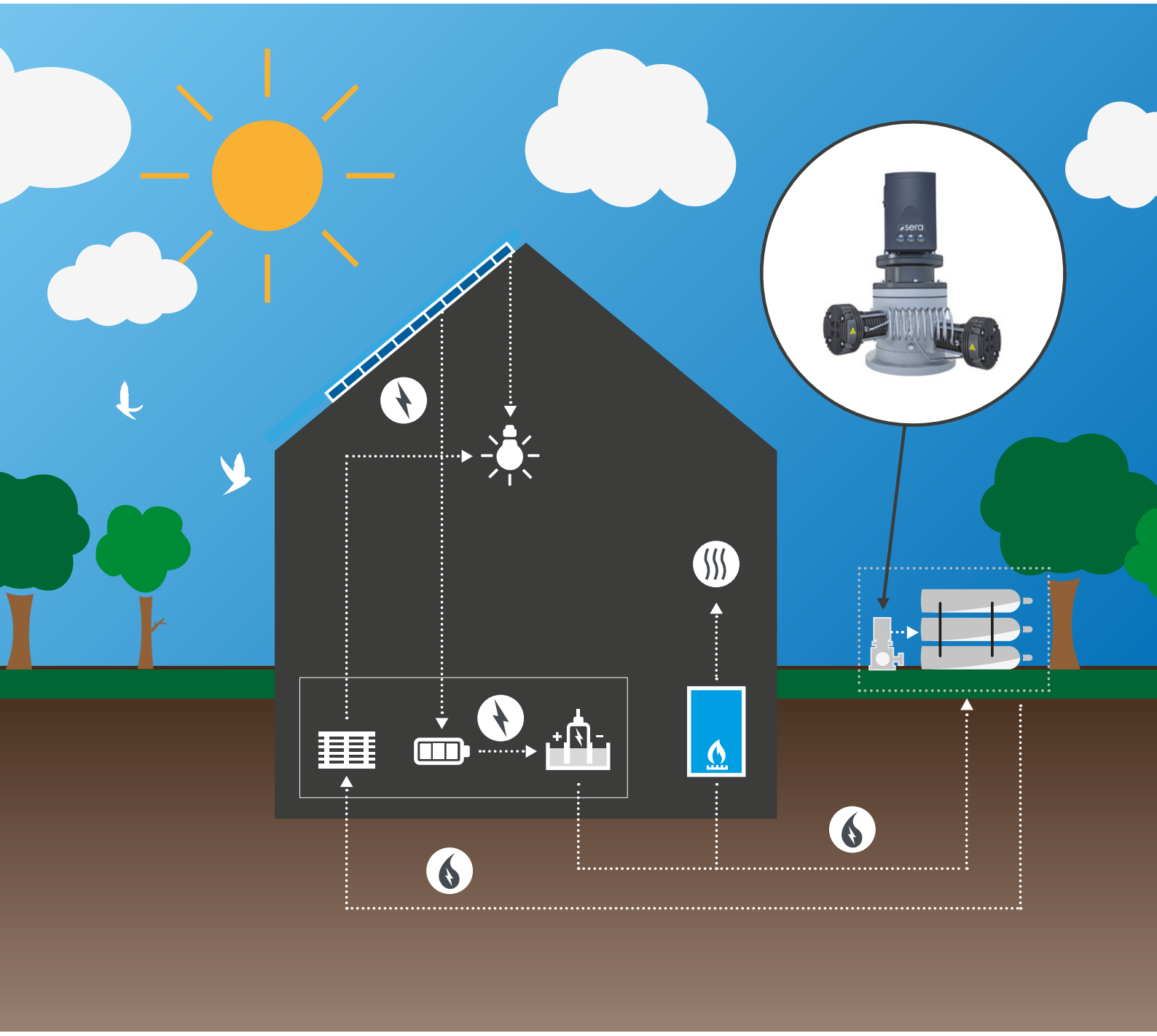
Connections		
N1	**Gas inlet** Pipe fitting	d=6 mm
N2	**Gas outlet** Pipe fitting	d=6 mm

1	Stage 1
2	Stage 2
3	Centre of mass

DRY RUNNING PISTON COMPRESSOR (AG series)

HOME POWER APPLICATION

Renewable energy can be converted into hydrogen by electrolysis when surplus energy is available. After generation, the hydrogen is compressed with the **sera** piston compressor for long-term storage. If there is an energy demand that cannot be covered by the photovoltaic system or the battery storage system, for example, the previously generated, compressed and stored hydrogen is converted back into electricity or used to generate heat. Based on this concept, energy supply and heat supply can be realised autonomously.

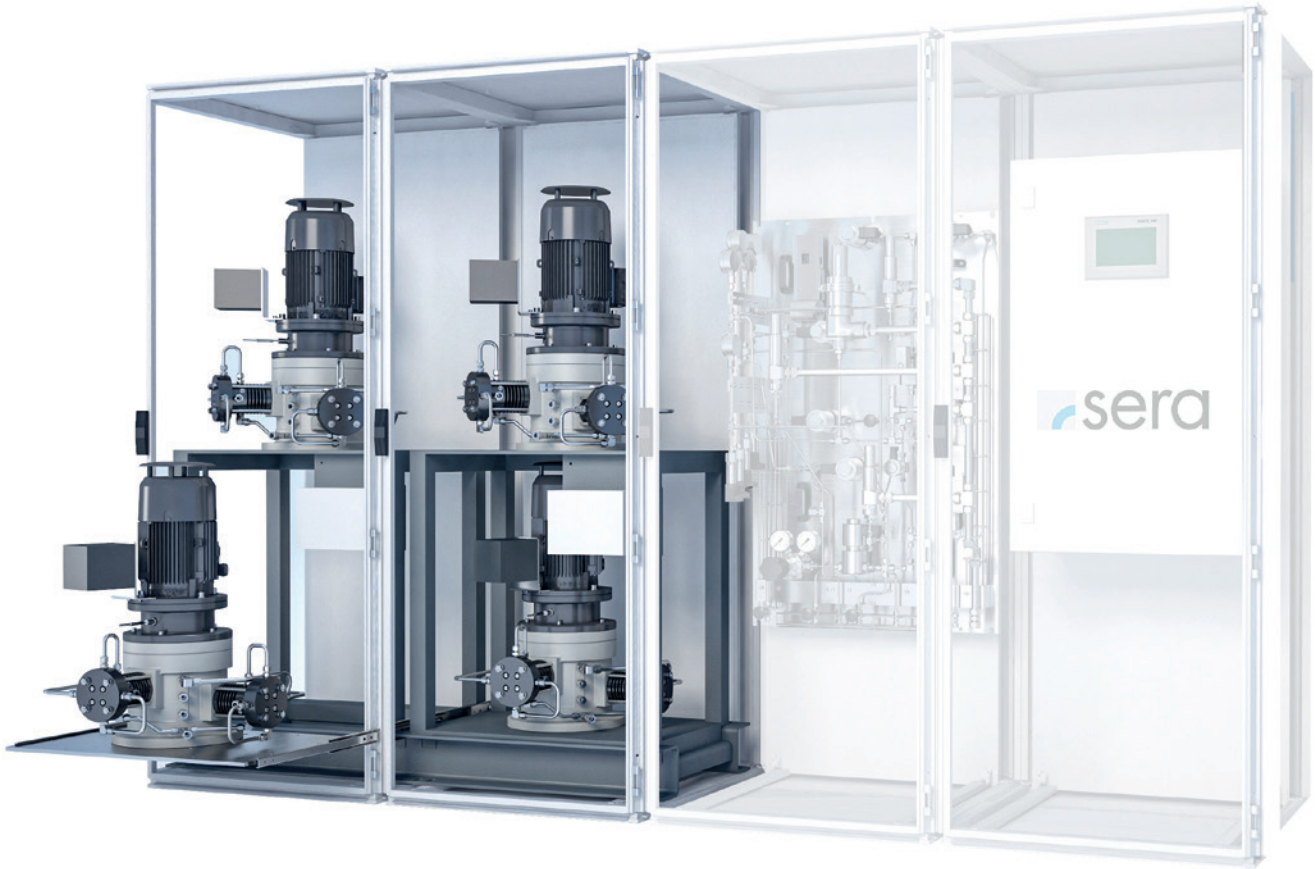


MODULAR ENERGY SYSTEM (MES)

Compressor stations in the MES series are designed for storing hydrogen at pressures of up to 300 bar. The system can be supplied completely pre-configured and is therefore quickly ready for use. Wherever higher annual energy quantities are required for the independent and emission-free supply of neighbourhood and industrial solutions, the system can be used optimally with delivery rates of up to 12 Nm^3/h at 150 bar or 9 Nm^3/h at 300 bar. Thanks to its modular design, it can be easily adapted to new requirements at a later date. The **sera** Modular Energy System makes an important contribution to achieving the energy transition.

APPLICATION

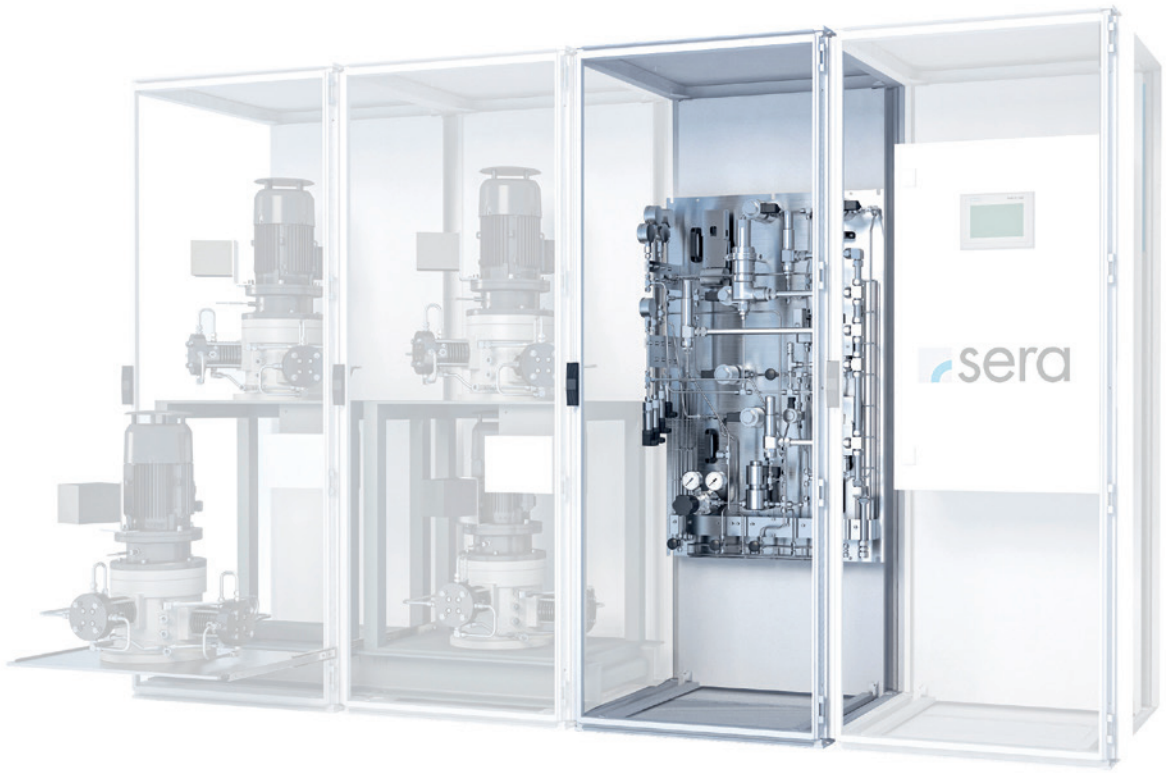
The **sera** Modular Energy System is the link between the electrolyser and the fuel cell. Depending on requirements, it compresses hydrogen to up to 300 bar, which increases the energy density of the medium and requires less storage space while maintaining the same amount of energy.



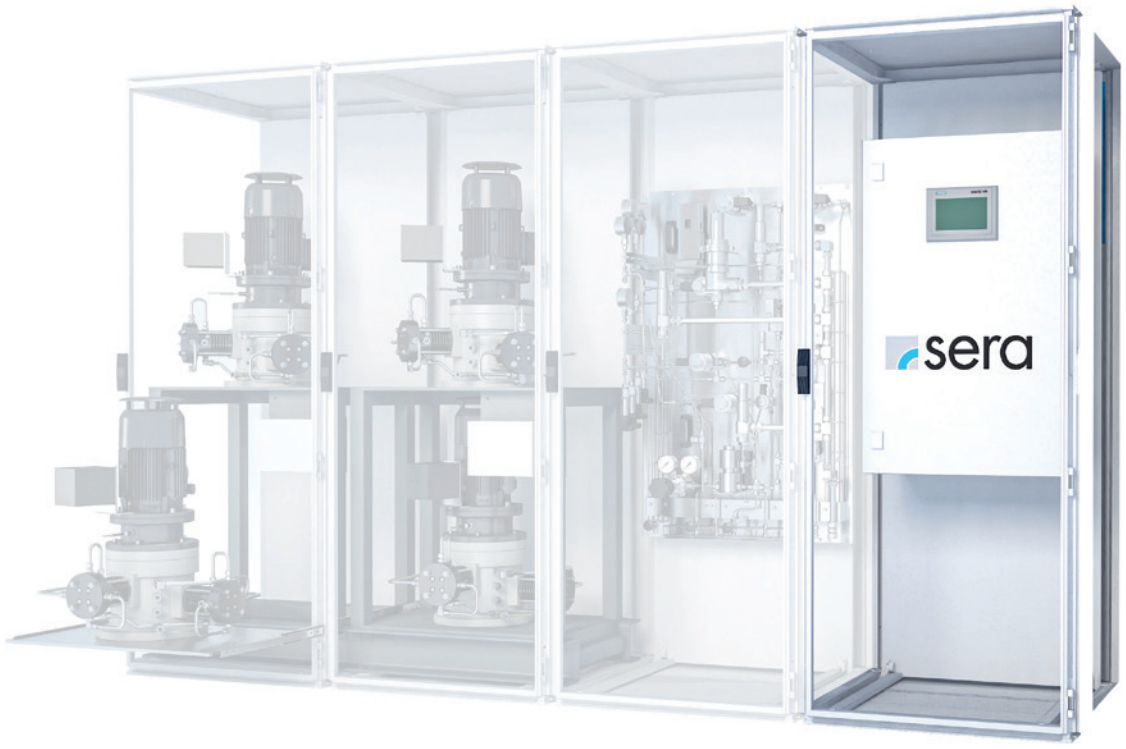
The core of the Modular Energy System consists of up to four piston compressors connected in parallel. Instrumentation and a corresponding controller are optional.
Note: a controller is essential if the instrumentation option is selected!

MODULAR ENERGY SYSTEM

The modular design of the Modular Energy System makes the compressor system flexibly expandable. With control and instrumentation, it is a fully integrated solution, ready for integration.



Instrumentation (option)



Control unit (option)

MODULAR ENERGY SYSTEM MES 1.1

The MES 1.1 compressor station includes an AG series compressor with frequency converter, instrument panel and control cabinet with Profinet, integrated into a Rittal cabinet equipped with ventilation and SIL sensors.

The instrumentation includes flushing connections, overpressure protection and sensors for operating the compressor. The control system communicates with higher-level systems either via Profibus or Modbus. The gas connections are located on on the left-hand side.

The MES 1.1 compressor station is the entry-level solution for compressing and storing hydrogen.
It is the most compact in this series and, with one piston compressor, is capable of compressing up to 2.5 Nm^3/h of hydrogen at up to 300 bar.

It is characterised by its small footprint and modular design. This means that it can be optimally adapted to the respective upstream and downstream customer systems, which was a key basis for its development.
In addition, it can be individually selected whether it is used as a complete unit or as a built-in element in the customer system.

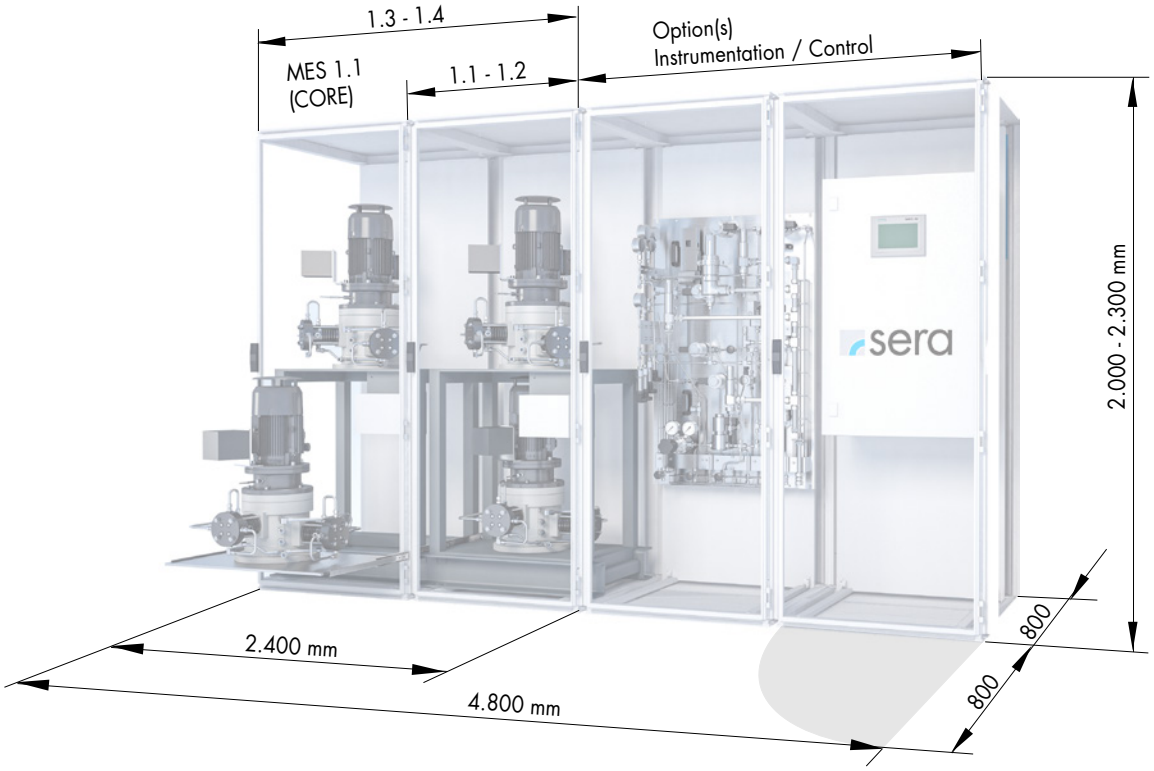
Where large quantities of hydrogen are to be stored in a short time Modular Energy Systems 1.2 to 1.4 can be used, each with two to four piston compressors in a structurally similar and fully modular design.

MES 1.1

1. Cabinet with ventilation and SIL sensors
2. Base frame for assembly on site
3. Piston compressor with mounted frequency inverter
4. Instrumentation for piston compressor
5. Control system for piston compressor with fail-safe PLC

DIMENSIONS
MES 1.1

DIMENSIONS
MES 1.2 TO 1.4



MODULAR ENERGY SYSTEM (MES)
SYSTEM AND COMPRESSOR DATA

SYSTEM DETAILS (The operating mode must be agreed with sera depending on the application)	
Inlet pressure	25-35 bar(g)
Outlet pressur	300 bar(g)

Conveying capacity with test gas helium at 30 bar(g) inlet pressure	
MES 1.1	≥ 2,0 Nm3/h at 300 bar(g) final pressure ≥ 3,0 Nm3/h at 150 bar(g) final pressure
MES 1.2	≥ 4,0 Nm3/h at 300 bar(g) final pressure ≥ 6,0 Nm3/h at 150 bar(g) final pressure
MES 1.3	≥ 6,0 Nm3/h at 300 bar(g) final pressure ≥ 9,0 Nm3/h at 150 bar(g) final pressure
MES 1.4	≥ 8,0 Nm3/h at 300 bar(g) final pressure ≥ 12,0 Nm3/h at 150 bar(g) final pressure

COMPRESSOR DATA PISTON COMPRESSOR	
Inlet pressure (PS)	Short-term min. 10 bar(g) operation 25 - 35 bar(g) housing pressure max. 40 bar(g)
Outlet pressur	max. 300 bar(g)
Delivery rate per piston compressor with test gas helium at 30 bar(g) inlet pressure	≥ 2,0 Nm^3/h at 300 bar(g) final pressure ≥ 3,0 Nm^3/h at 150 bar(g) final pressure
Protection class	IP 55
Noise emission	< 52 dB(A)
Corrosion protection	Coating C2 in accordance with DIN EN ISO 12944-2

ENVIRONMENTAL CONDITIONS	
Max. Installation height	1,000 m above sea level, Higher installation with de-rating
Ambient temperature	-15 °C - +40 °C

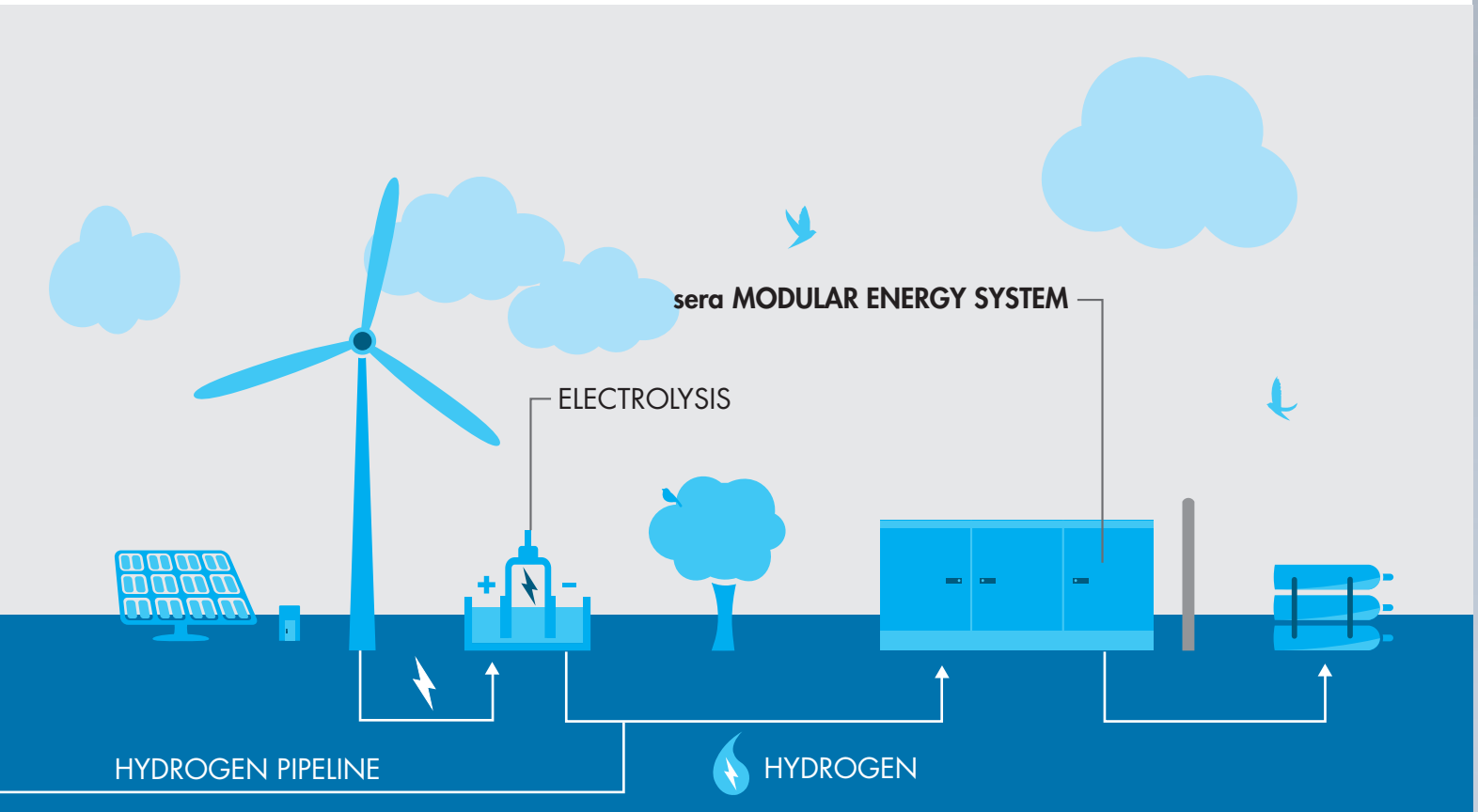
CONVEYING MEDIUM	
Gas type	Hydrogen 5.0, dry, free ofsolids (other qualities or gases on request)
Input temperature	max. 30°C
Dew point hydrogen	-50°C at 1 bar
Contamination from compressor	abrasion due to seals, initial lubricant

MODULAR ENERGY SYSTEM (MES)
SYSTEM AND COMPRESSOR DATA

DRIVE/MOTOR	
Motor type of the individual compressors	Asynchronous motor, 4-pole
Speed	Ca. 540 rpm (18Hz) and 750 rpm (25Hz)
Electrical voltage	220 VAC (Y)
Drive power per compressor	2.200 W; 750 W (at 16Hz)
Continuous power consumption per compressor	Ca. 650 W

INTERFACES	
Electrical (with control unit option)	Potential-free contacts
Communication (with control unit option)	PROFINET
Gas inlet	½"
Gas outlet	½"
Purge connection	½"
Blow-off line	½"

The control and operating mode of the overall system or the Modular Energy System and/or the piston compressor must be agreed with **sera** in advance depending on the use and application.



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