

MT 220

Assembly station gas booster in hydrogen technology



Learning objectives/experiments

Learning in an industrial-like environment for training in the field of hydrogen technology

- design and function of a single-stage gas booster
- professional preparation and execution of pipe assembly
 - ▶ cutting, deburring and bending pipes
 - ▶ installation of cutting ring and clamping ring fittings
 - ▶ installing seals
- familiarisation with the special features of hydrogen applications
- use components of hydrogen technology: valves, fittings, seals, safety devices
- commissioning and leak testing
- maintenance work on the gas booster
- familiarisation with pneumatic piston actuator in gas boosters
- read and understand engineering drawings and technical documentation

GUNT Media Center, develop digital skills

- retrieve information from digital networks
- use digital learning media, e.g. Web Based Training (WBT)

Description

- practical installation of pipes and valves and fittings in hydrogen technology
- single-stage gas booster with pneumatic drive
- real leak test and maintenance work
- Industrial Application Project of the TVET programme

Green hydrogen is seen as a key technology for a sustainable future economy. Compression is crucial for space-saving storage and higher transport capacities. The experimental plant has been specially developed for training and practical work.

The MT 220 assembly station contains an industrial gas booster from the field of hydrogen technology, which is installed in a pipe section with various valves and fittings. Students install the pipework themselves according to the

specifications. The manual work includes cutting, bending and connecting the pipes. Compressed air is used as the drive and operating fluid for the experiments. The special characteristics for hydrogen applications are explained.

The basic setup consists of a gas booster, connections for the compressed air supply from the laboratory and a pressure vessel pre-assembled on a mobile base frame. The students install the connection lines for the gas booster and the subsequent pipe section with various valves and fittings. Some components can be reused multiple times and allow for frequent assembly and disassembly. The fully assembled structure can be studied using a real leak test with leak detection spray or a leak detector.

The use of hydrogen requires special safety measures. The single-stage gas booster is pneumatically driven accordingly. When the final pressure is reached on the high-pressure side, the gas booster automatically stops operating. The final pressure is determined by the set drive pressure, which is limited by a safety valve.

Typical maintenance tasks can be carried out on the gas booster. For example, the inlet and outlet valves can be removed and spare parts can be replaced. The scope of delivery includes pipes for three assemblies, the necessary tools and spare parts.

The GUNT Media Center provides free digital multimedia teaching materials.

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1 manometer, 2 pressure controller, 3 pressure vessel, 4 safety valve, 5 maintenance and pressure control unit for compressed air, 6 filter, 7 gas booster, 8 shut-off valve, 9 rupture disc, 10 compressed air outlet pipe section



1 basic setup with pre-assembled gas booster, pressure vessel and compressed air connections on the laboratory side, 2 storage system with components, tools, spare parts



Manual work in preparation for pipe assembly

Specification

- [1] industrial gas booster from hydrogen technology with pneumatic drive for education and practice (TVET)
- [2] cutting, deburring, bending and connecting pipes with fittings
- [3] pipe section with components for hydrogen applications: measuring, control, shut-off and safety valves, pressure vessel
- [4] safety devices: safety valve, rupture disk, automatic stop of the gas booster operation when reaching the defined final pressure, emergency stop switch
- [5] compressed air instead of H₂ as a safe drive and operating fluid
- [6] real leak test with leak detection spray and leak detector
- [7] typical maintenance tasks: e.g. cleaning or installing spare parts
- [8] tools and spare parts required included in the scope of delivery, contents sufficient for three assemblies
- [9] clear storage system
- [10] accessory set MT 220.01 for three pipe assemblies available as an option
- [11] digital multimedia teaching materials: manuals, drawings, technical documentation
- [12] online access to the GUNT Media Center

Technical data

Gas booster, single-stage, single-acting

- transmission ratio: 1:5
- compression ratio: 1:15
- pressure of drive fluid inlet: 1...10bar
- pressure of operating fluid inlet: 2...50bar
- displacement: 373cm³

Pipes, length 1m each

- drive fluid: 4x pipes Ø 12x1 mm, copper
- operating fluid: 8x main pipes, Ø 12x1 mm, 4x secondary pipes Ø 6x1 mm, stainless steel

Fittings: cutting ring fittings, clamping ring fittings

Valves: 1x pressure controller, adjustable 0,5...15bar, 4x shut-off valves, 1x ball valve, 1x safety valve, max. 5bar, 1x rupture disc, max. 60bar

Manometers: 1x 0...10bar, 2x 0...25bar

Pressure vessel: 1000mL

LxWxH: 1110x750x1590mm; Weight: approx. 200kg

Required for operation

compressed air connection: min. 4bar, forming gas for leak detection; PC or online access recommended

Scope of delivery

basic setup with gas booster, accessories for 3 assemblies, 1 set of pipes, 1 set of fittings, 1 set of valves, 1 set of tools, 1 set of spare parts, 1 leak test kit, 6x storage system with foam inlay, 1 online access to the GUNT Media Center

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Optional accessories

MT 220.01 Accessory set for MT 220