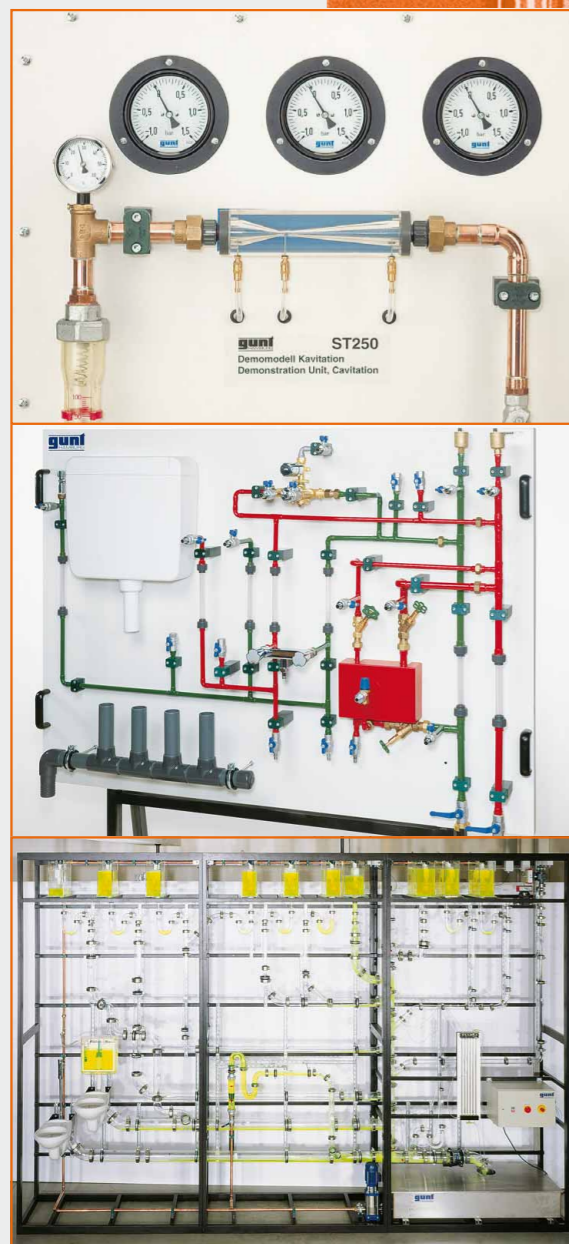


# SANITARY SYSTEMS

CODE	PRODUCT	PAGE
ST 210	Sanitation Fittings Training Panel	328
ST 250	Cavitation Demonstrator	330
ST 310	Drinking Water Installation Demonstrator	332

CODE	PRODUCT	PAGE
ST 320	Pipe Cleaning Training Panel	334
ST 330	Protection of Drinking Water Training Panel	336
ST 510	Full-Scale Sewerage System	338

CODE	PRODUCT	PAGE
HL 900	Base Unit for Sanitary Modules	340



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**ST 210 SANITATION FITTINGS TRAINING PANEL**



**Technical description**

Common sanitation fittings, which are not included, can be connected and investigated in respect of their function and operation on this training panel. The panel provides several methods of connection so products from different manufacturers can be used. Some connectors are flexible and will adapt to different sized fittings.

Supplies of hot and cold water are required for operation.

The training panel can be fitted to the HL 100 Universal Stand.

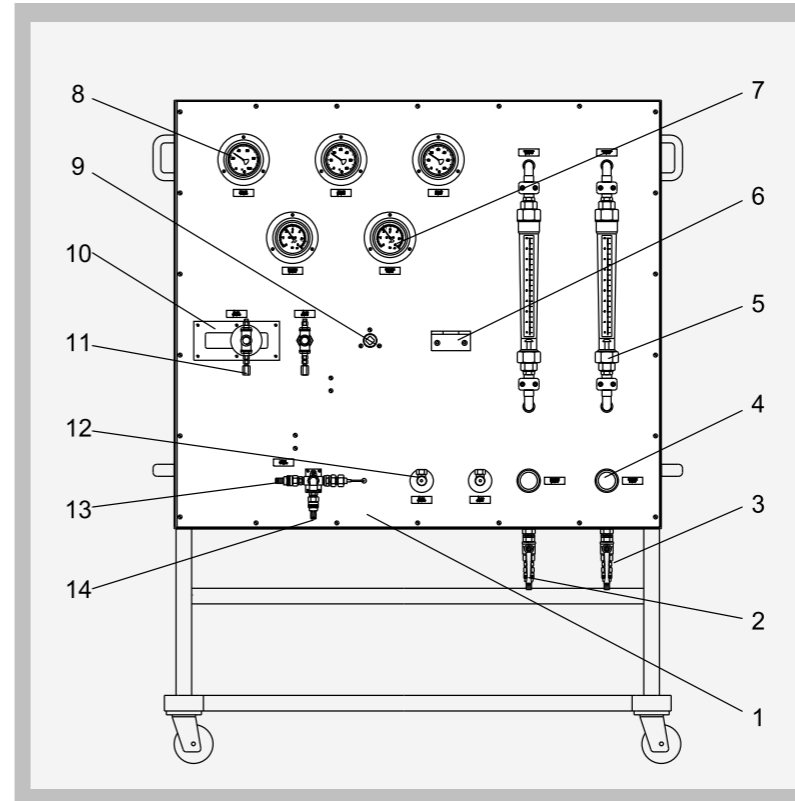
**Experiments**

- Familiarisation of common sanitation fittings:
  - Single handle mixers
  - Two handle mixers
  - Flushing valves
  - Pillar mixers
- Investigation of function and operating behaviour
- Comparison of products from different manufacturers

- Hands-on experience with different fittings
- Training panel with facilities for connecting the most common forms of sanitary fittings

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**ST 210 SANITATION FITTINGS TRAINING PANEL**



1 training panel, 2 hot water feed, 3 cold water feed, 4 pressure reducer, 5 variable-area flow meter, 6 bracket for standard fitting, 7 Bourdon gauge, 8 dial thermometer, 9 flushing valve connection, 10 adjustable centre distance, 11 wall fitting connection, 12 standard fitting connection, 13 mixed water connection, 14 mixed water drain

**Specification**

- [1] Training panel for investigating the most common sanitation fittings
- [2] Training panel on laboratory trolley
- [3] Facilities for hot and cold water supply using quick action hose couplings
- [4] Possibility to simultaneously test different fittings (fittings are not supplied)
- [5] 3 dial thermometers
- [6] 2 spring tube manometers
- [7] 2 variable-area flow meters
- [8] 2 adjustable pressure reducers
- [9] Required pressure reduction on water supply 1.5bar

**Technical data**

Pressure reducer: max. initial pressure: 25bar, outlet pressure: 1.5...6bar, up to 70°C  
 Measuring ranges:  
 - temperature: 0...100°C  
 - pressure: 0...6bar  
 - flow rate: 0...1600ltr/h

**Dimensions and weight**

l x w x h : 1250 x 300 x 1100 mm  
 Weight : approx. 55 kg

**Connections**

Cold water connection 1.5bar  
 Hot water connection 1.5bar

**Scope of delivery**

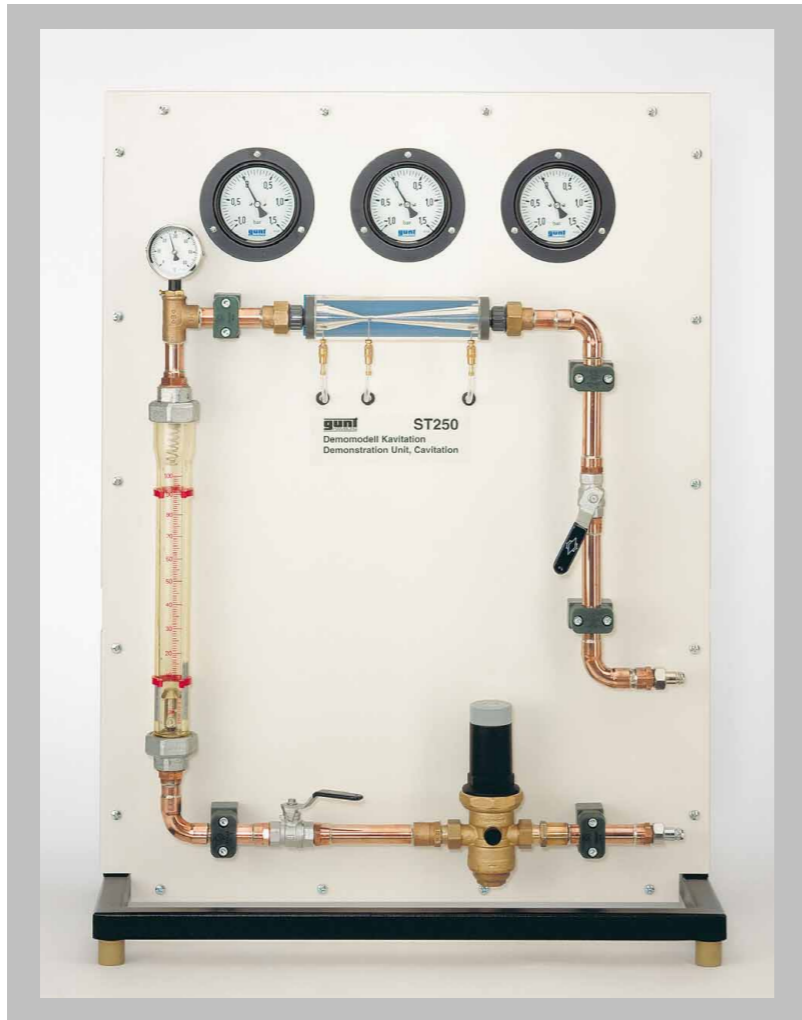
1 training panel, 1 instruction manual

**Order details**

066.21000 ST 210 Sanitation Fittings Training Panel

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**ST 250 CAVITATION DEMONSTRATOR**



**Technical description**

The term cavitation is used for the formation of vapour bubbles in flowing liquids as a result of a large partial vacuum. The benchtop unit contains a venturi tube made of transparent plastic. Cavitation is induced when the pressure at the smallest cross-section drops below the vapour pressure of the water. The pressures at the inlet, at the smallest point and at the outlet of the venturi tube are displayed using the dial manometers. The flow rate can be read on a rotameter. The inlet pressure can be preset using a pressure reducer. A supply of water is required.

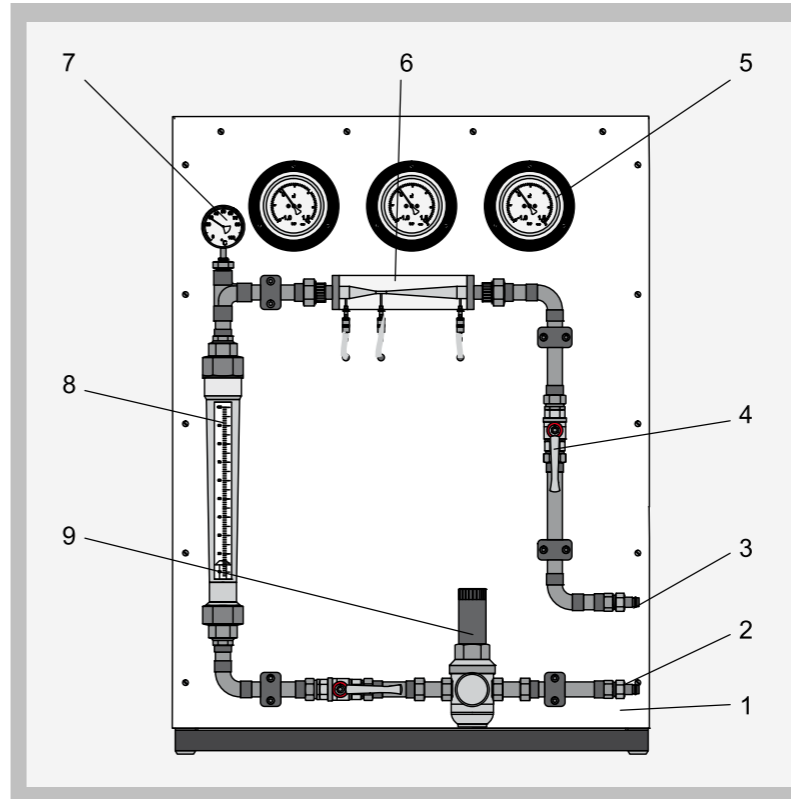
**Experiments**

- Layout and function of a Venturi tube
- Theory of cavitation
- Cavitation processes for varying flow rates

- Table unit for investigating cavitation processes
- Instruction manual with detailed description of the theoretical background

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**ST 250 CAVITATION DEMONSTRATOR**



1 back panel, 2 water connection, 3 water drain, 4 manual valve, 5 manometer, 6 venturi tube, 7 thermometer, 8 variable-area flow meter, 9 pressure reducer with manometer

**Specification**

- [1] Benchtop unit for investigating cavitation in a venturi tube
- [2] Venturi tube with 3 pressure measuring connections
- [3] Adjustment of flow rate on manual valves
- [4] Copper piping
- [5] Pressure reducer, adjustable
- [6] 3 manometers
- [7] Bimetallic dial thermometer
- [8] Variable-area flow meter
- [9] Cold water connection required, 2bar
- [10] l x w x h: 700x400x930mm, 30kg

**Technical data**

Pressure reducer: setting range: 0.5..2bar, up to 70°C  
 Transparent Venturi tube:  
 - Inlet flow cross-section: id=18mm, taper 10.5°  
 - Smallest flow cross-section: id=3.5mm  
 - Outlet flow cross-section: id=18mm, taper 4°  
 Measuring ranges:  
 - pressure: -1...1.5bar  
 - temperature: 0...60°C  
 - flow rate: 1000ltr/h

**Dimensions and weight**

l x w x h : 700 x 400 x 930 mm  
 Weight : approx. 30 kg

**Connections**

Cold water connection 2bar

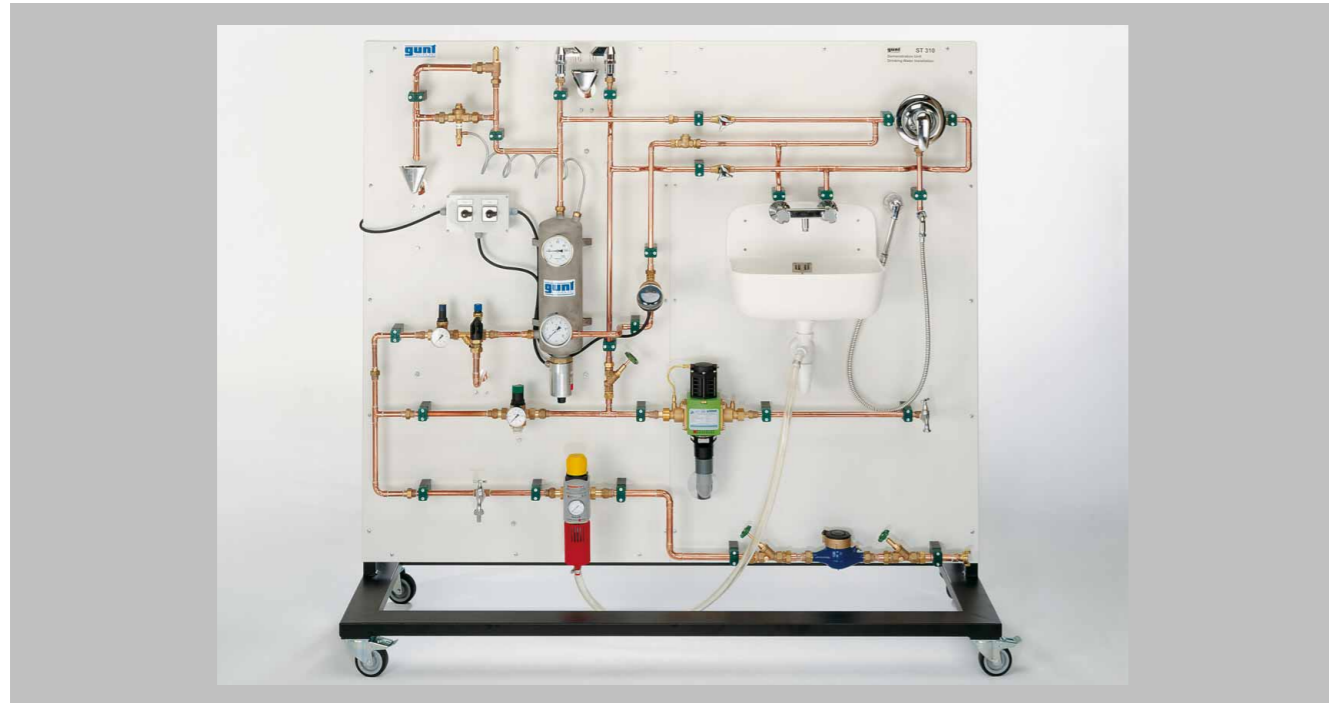
**Scope of delivery**

1 benchtop unit, 1 instruction manual

**Order details**

066.25000 ST 250 Cavitation Demonstrator

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**ST 310 DRINKING WATER INSTALLATION DEMONSTRATOR**


- Demonstration panel with all components common in a drinking water installation
- Designed for training in the plumbing sector
- Comprehensive instruction manual
- Range of experiments can be expanded

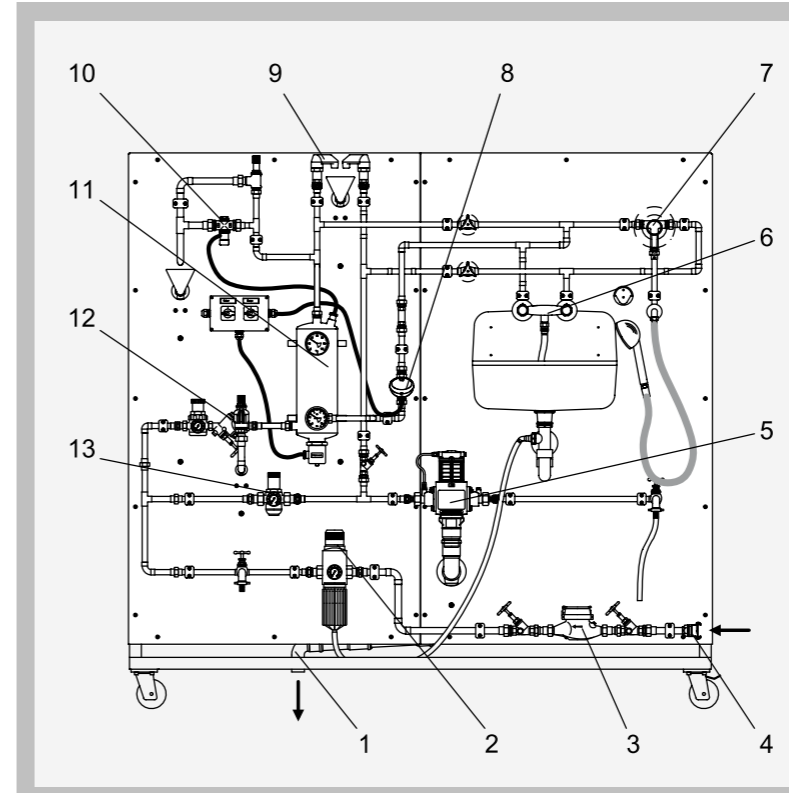
**Technical description**

A typical household drinking water installation is fitted to the panel. A small electrical boiler for hot water and a circulation pipe with the related components demonstrate the heating of domestic hot water from the cold water supplied. Safety devices show how the drinking water pipework is protected against the backflow of waste water. A pipe system for draining the waste water is mounted on the back of the panel. A supply of water is required for operation.

**Experiments**

- Function and operation of components:
  - Water meter
  - Pressure reducer with and without reversible flow filter
  - Backflow preventer / system separator
  - System of safety devices
  - Pressure vessel with heater
  - Circulating pump
  - Thermal discharge safety device

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**ST 310 DRINKING WATER INSTALLATION DEMONSTRATOR**


1 drain, 2 reversible flow filter with pressure reducer, 3 water meter, 4 water connection, 5 system separator, 6 outlet two handle mixer, 7 outlet point single handle mixer, 8 circulating pump, 9 pipe bleed and vent with funnel as protection, 10 thermal discharge safety device, 11 pressure vessel with heater, 12 system of safety devices hot water heating feed, 13 pressure reducer

**Specification**

- [1] Mobile unit to familiarize with the most important components in a drinking water installation
- [2] System divided into cold water side, hot water side, drain system
- [3] Cold water circuit with water meter, pressure reducer, y-type globe valve, system separator, outlets
- [4] Hot water circuit with system of safety devices, pressure vessel with heater, pressure reducer, non-return valve, circulating pump with timer, outlets
- [5] Drain system on rear of panel, HT drain pipe DN 40
- [6] Single handle mixer, two handle mixer, shower sprinkler, pipe vents
- [7] 230V, 50Hz, 1 phase; water connection

**Technical data**

Vane impeller water meter DN20: 2.5m<sup>3</sup>/h  
Euro system separator BA, hazard class 4  
System of safety devices: backflow preventer, pressure reducer, shut-off valve: 6bar  
Thermal discharge safety device: 95°C  
Threaded heater element 3000W (in pressure vessel)  
Circulating pump, 20W: max. Flow rate: 640ltr/h, max. head: 0.14bar, max. operating temperature: 110°C  
Pressure measuring range: 3x 0...10bar

**Dimensions and weight**

l x w x h : 1995 x 700 x 1915 mm  
Weight : approx. 130 kg

**Connections**

230V, 50Hz, 1 phase  
Cold water connection 1.5bar

**Scope of delivery**

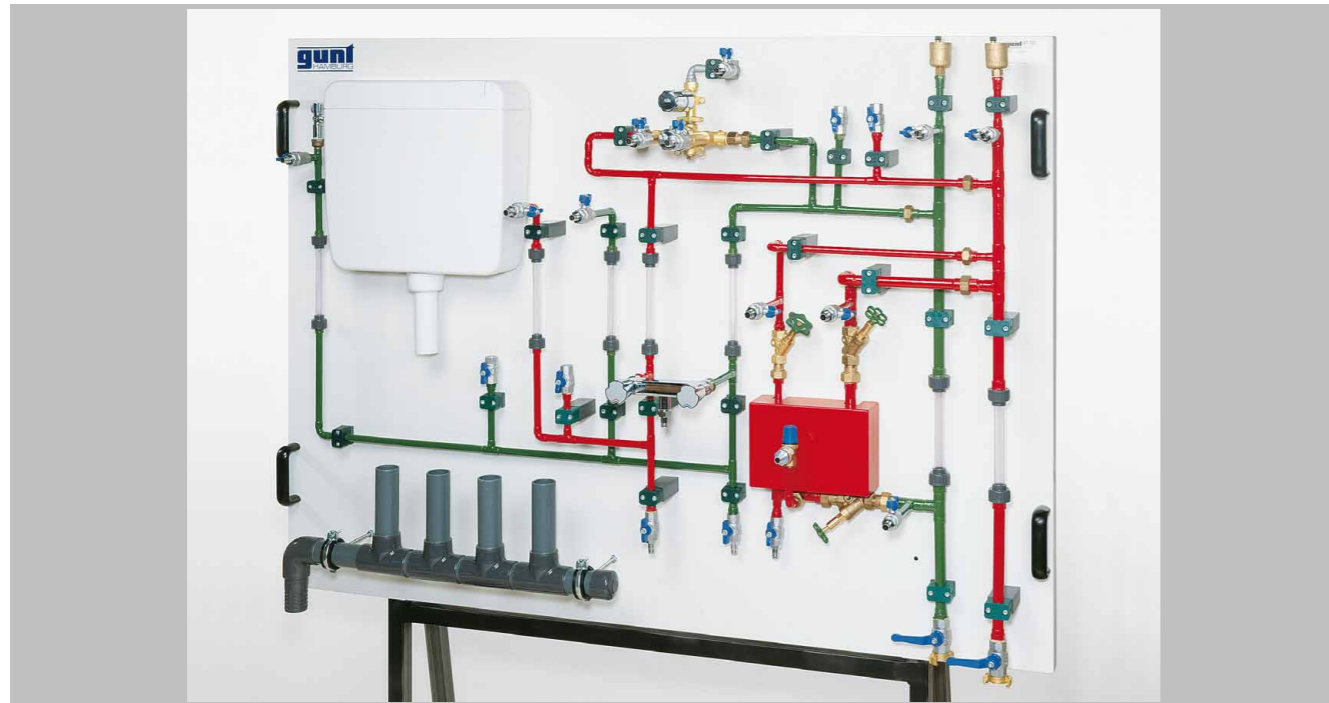
1 demonstration unit, 1 instruction manual

**Order details**

066.31000 ST 310 Drinking Water  
Installation Demonstrator

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**ST 320 PIPE CLEANING TRAINING PANEL**



- Pipe flushing according to DIN 1988 standards
- Usage of original plumbing components
- Clearly laid out training panel
- Dirt can be introduced

**Technical description**

The flushing process is intended to remove contaminants, for example the remnants of solder or sealant from the drinking water pipes. The individual pipe circuits must be flushed from bottom to top. It is possible to observe the flushing action by means of transparent pipe sections. Flushing is performed via two lines that are connected to a cold water supply. Contaminants are introduced into the pipe system through openings with shut-off valves. Original plumbing components are used in the unit.

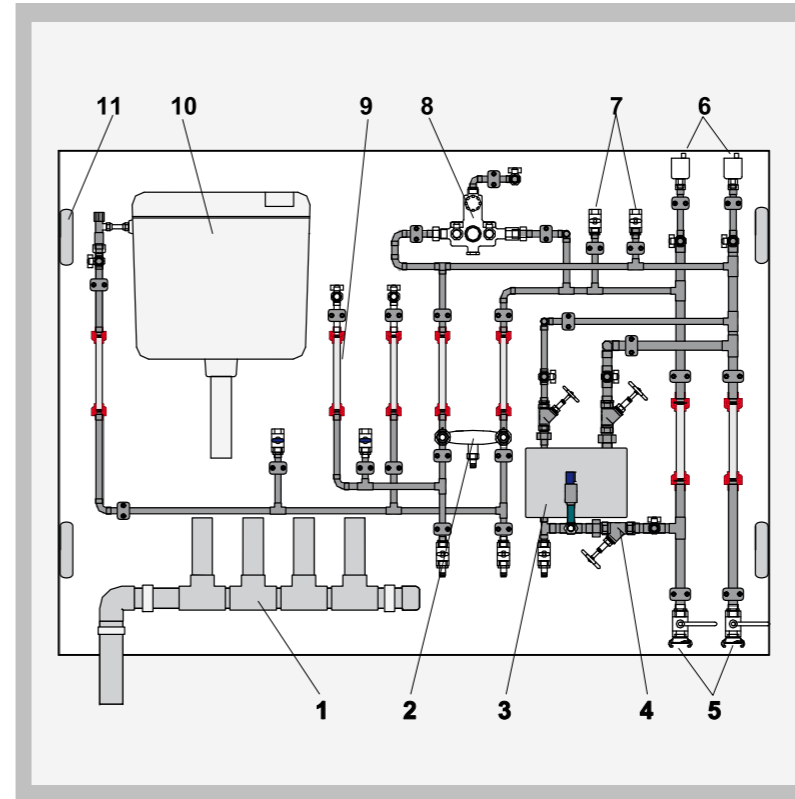
A supply of water is required for operation.  
The training panel can be fitted to the HL 100 Universal Stand for Training Panels.

**Experiments**

- Introducing contaminants into the system
- Limitations of flushing according to technical regulations

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**ST 320 PIPE CLEANING TRAINING PANEL**



1 drain collector pipe, 2 water mixer, 3 hot water preparation simulation, 4 shut-off valve, 5 water connection, 6 quick action bleed valve, 7 filling opening that can be shut off, 8 automatic mixer, 9 transparent pipe section, 10 toilet tank, 11 handle

**Specification**

- [1] Pipe flushing in accordance with DIN 1988
- [2] l x w x h: 1900x300x1300mm, approx. 100kg
- [3] Cold water connection using hose
- [4] Usage of original plumbing components
- [5] Contaminants can be introduced into the pipe system via filling openings that can be shut off
- [6] Transparent pipe fittings enable optimal observation of the flushing process
- [7] Alternative accessories: flushing compressor (not included)
- [8] Cold water supply min. 3bar

**Technical data**

Automatic mixer: thermostatic battery: recommended flow pressure: 1...5bar, min. flow rate: 5ltr/min, max. water temperature: 80°C, with temperature safety stop  
Water mixer  
Simulated hot water preparation  
Safety fittings: quick-action bleed valve, safety valve on the hot water preparation unit  
Pipes: Cu / transparent plastic  
2x cold water connection Geka coupling 1"  
10x hose connection with quick-action couplings

**Dimensions and weight**

l x w x h : 1900 x 300 x 1300 mm  
Weight : approx. 100 kg

**Connections**

Cold water supply min. 3bar

**Scope of delivery**

1 training panel, completely assembled, 1 set of connecting hoses, 1 instructions manual

**Order details**

066.32000 ST 320 Pipe Cleaning Training Panel

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**ST 330 PROTECTION OF DRINKING WATER TRAINING PANEL**



- **Experimental set-up on the safety and hygiene of drinking water pipes**
- **Drinking water installation for a three-floor house with cellar**
- **Investigations on the return of contaminated water back into the drinking water pipe**

**Technical description**

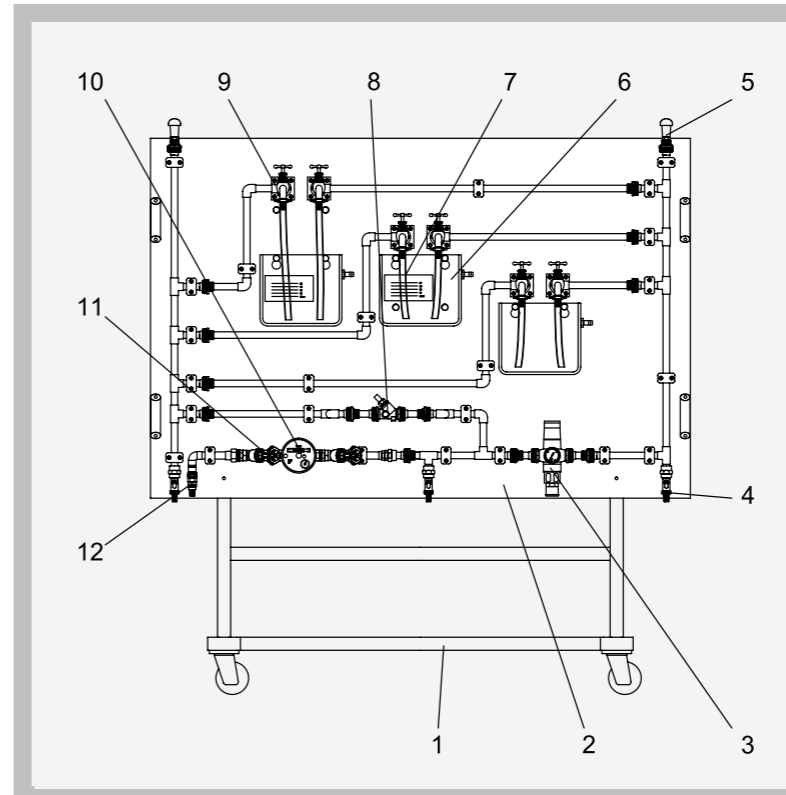
An open pipe system that simulates a domestic installation for drinking water with four different levels is mounted on the training panel. The levels represent the cellar (drinking water connection level) and three floors. It is possible to simulate a pipe fracture or a pressure drop. During this process the return of contaminated water into the drinking water pipe can be observed.

A water supply is necessary for operation. The training panel can be fitted to the HL 100 Universal Stand.

**Experiments**

- Function of various safety devices:
  - Pipe separator
  - Backflow preventer
  - Pipe vents
- Prevention of the return of contaminated water back into the drinking water pipe

**ST 330 PROTECTION OF DRINKING WATER TRAINING PANEL**



1 universal frame HL 100 (not included), 2 training panel, 3 pipe separator, 4 drain tap, 5 riser vent, 6 water tank, 7 hose, 8 backflow preventer, 9 outlet valve, 10 water meter, 11 y-type globe valve, 12 water feed

**Specification**

- [1] Training panel with simulation of 3 floors and a cellar of a house
- [2] Devices to prevent the return of contaminated water into the drinking water pipe
- [3] Possible simulations: pipe fracture, pressure drop
- [4] Pipe system made of transparent material
- [5] 2 risers with vent
- [6] 6 outlet valves with hose connections
- [7] 3 transparent water containers
- [8] Pipe separator, backflow preventer and riser vent as safety devices
- [9] Water meter in feed pipe
- [10] Cold water connection 1.5bar

**Technical data**

- 2 backflow preventers DN 20
- 1 pipe separator DN 20
- 2 riser vents DN 20
- 1 flow rate pipe vent with backflow preventer DN 20
- 1 flow rate pipe vent without backflow preventer DN 20
- 2 sealing plugs DN 20
- 2 pipe sections DN 20
- 3 Plexiglass tanks 6.5ltr

**Dimensions and weight**

l x w x h : 1650 x 200 x 1100 mm  
Weight : approx. 45 kg

**Connections**

Cold water connection 1.5bar

**Scope of delivery**

1 training panel, 1 instruction manual

**Order details**

066.33000 ST 330 Protection of Drinking Water Training Panel

**ST 510 FULL-SCALE SEWERAGE SYSTEM**



- Easy observation through glass pipes and Plexiglass tank
- Usage of common plumbing components
- Large number of possible experiments

**Technical description**

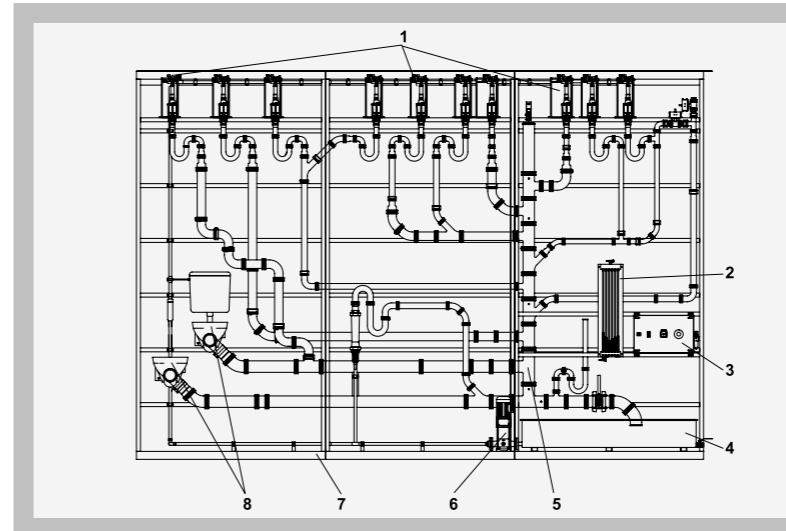
This full-scale unit contains a comprehensive sewerage pipe system with many branches fabricated using high quality glass laboratory pipes. Using this unit the flow and pressure can be investigated at various junctions, pipe offsets, changes in cross-section and at siphons under varying ventilation situations. Elevated tanks can be emptied using a remote control so that a realistic flow of waste water can be produced. The unit has a closed water circuit with pump and tank. A supply of three-phase mains electricity and compressed air is required for operation.

**Experiments**

- Pressure distribution in the waste water downcomer
- Bypass pipe
- Flow in case of pipe offset
- Suction effect at junctions
- Operation of sanitation fittings

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**ST 510 FULL-SCALE SEWERAGE SYSTEM**



1 cistern, 2 downcomer, 3 6-tube manometer, 4 switch box, 5 collecting tank, 6 centrifugal pump, 7 three-part frame, 8 toilet

**Specification**

- [1] Demonstration unit on waste water engineering
- [2] l x w x h: 5700 x 800 x 3900mm, approx. 3t
- [3] Numerous experiments possible
- [4] Usage of common plumbing components
- [5] Transparent pipes made of glass
- [6] 10 cisterns, with valves that can be operated by remote control
- [7] 2 toilets, 1x with toilet tank, 1x with pressure flushing
- [8] Includes downcomer, collecting pipe, ventilation pipe and bypass pipes
- [9] 6-tube manometer to determine pressure distribution along a pipe
- [10] 400V, 50Hz, 3 phases

**Technical data**

Pump, 4 stages: power consumption: 550W, max. flow rate: 70ltr/min, max. head: 4.2bar  
Pressure reducer (pneumatic) 0-10bar, setting pressure: 5bar  
Radio remote control, battery-operated  
Feed tank: approx. 300ltr  
Cisterns: 2x20ltr and 8x10ltr

**Dimensions and weight**

l x w x h : 5700 x 800 x 3900 mm  
Weight : approx. 3000 kg

**Connections**

400V, 50Hz, 3 phases  
Compressed air: 6...10bar

**Scope of delivery**

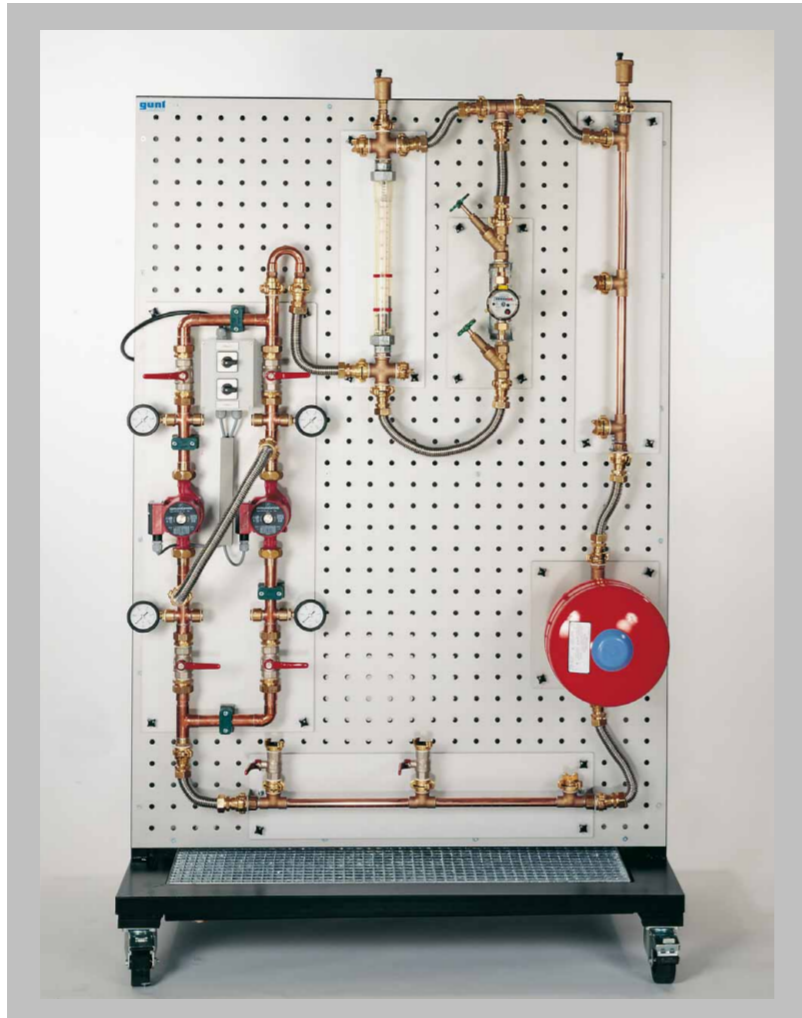
1 demonstration unit, 1 set of measuring hoses, 1 radio remote control, 1 instruction manual

**Order details**

066.51000 ST 510 Full-Scale Sewerage System

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**HL 900** **BASE UNIT FOR SANITARY MODULES**



**Technical description**

The trolley-mounted base unit forms the core for a variety of installation exercises aimed squarely at heating and plumbing trainees. The unit has a perforated backboard on which module panels with a wide range of sanitary elements can be rapidly and easily fitted. Using metal hoses with quick-release couplings, the individual modules can be combined into functional systems. Several base units can be used together if required for large and complex set-ups. Any water that leaks out when modifications are made is collected in a tray at the base of the trolley.

**Experiments**

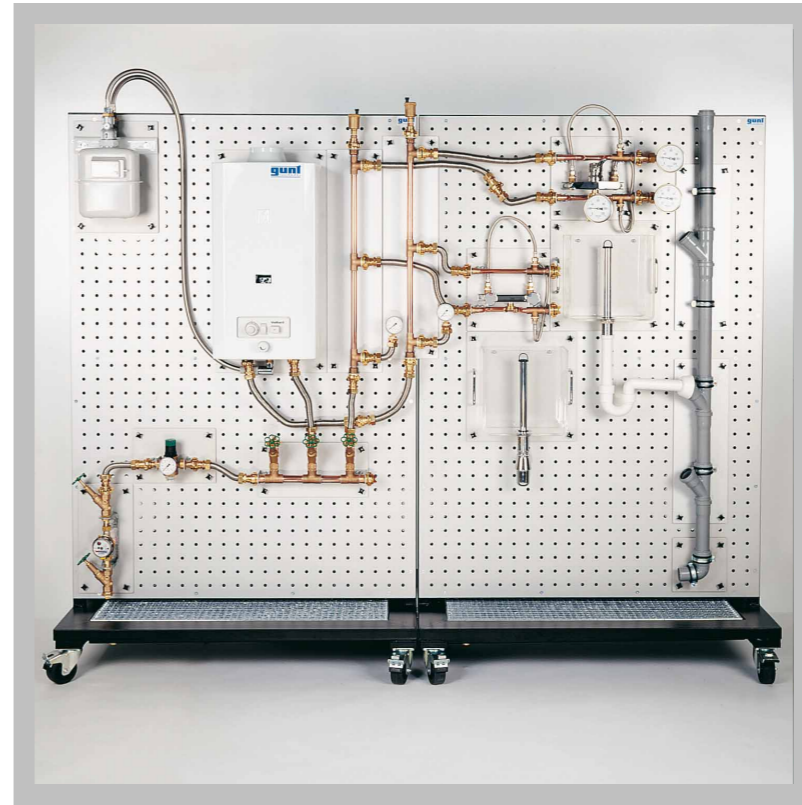
- Layout of functional sanitary installations from simple to complex
- Laboratory exercises directly relevant in practice

The illustration shows HL 900 together with additional modules.

- **Basic module of a modular sanitary technology series**
- **Multi-use individual modules permit the layout of practice-oriented sanitary installations**
- **For becoming familiar with every all important components of sanitary technology, as well as their function and operation**

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**HL 900** **BASE UNIT FOR SANITARY MODULES**



The illustration shows an example of a sanitary installation using HL 900.01, HL 900.02, HL 900.03, HL 900.04, HL 900.06, HL 900.07, 2x HL 900.08, HL 900.10, HL 900.11, 2x HL 900.12, HL 900.15, HL 900.16, HL 900.20, HL 900.30

**Specification**

- [1] Basic module for the HL 900 series, experiment trolley to attach module panels
- [2] Experiment trolley equipped on both sides with perforated plates
- [3] Perforated plates made of anodized aluminium, l x w x h 1741x1241x3mm
- [4] Leak water drip tray with discharge and grid
- [5] Sturdy frame of steel profile, welded and powder-coated
- [6] 4 castors, 2 of them are blockable
- [7] l x w x h 1250x800x1975mm, 60kg
- [8] Water supply and water drain, gas connection and exhaust, 230V, 50Hz, 1 phase

**Technical data**

Perforated plates  
Material: anodized aluminum plate  
Perforated grid 50mm

**Dimensions and weight**

l x w x h : 1250 x 800 x 1975 mm  
Weight : approx. 60 kg

**Connections**

Cold water connection, drain, power supply 230V, 50Hz, 1 phase, gas connection + exhaust

**Scope of delivery**

1 experimental trolley, 1 instruction manual with didactic companion material

**Order details**

065.90000 HL 900 Base Unit for Sanitary Modules

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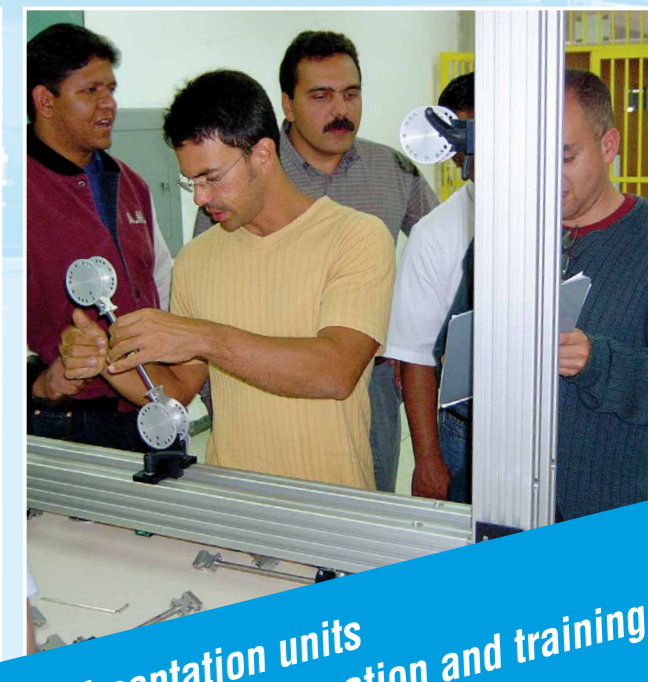
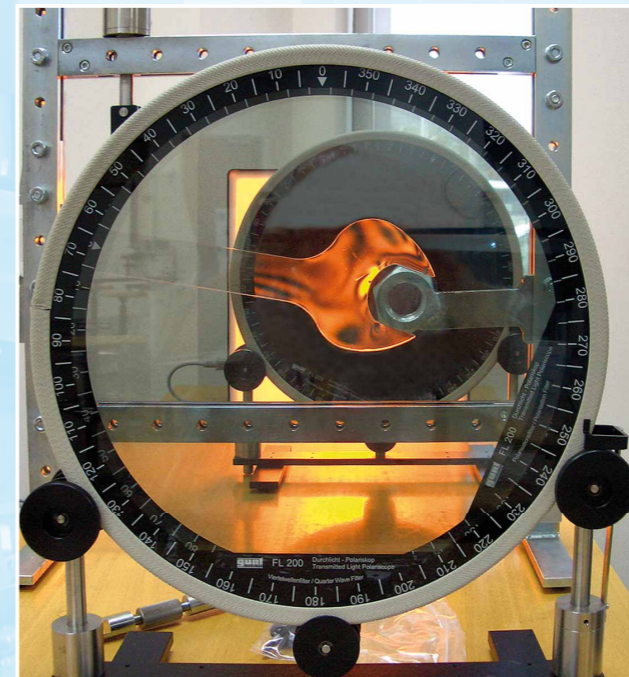
**HL 900 BASE UNIT FOR SANITARY MODULES**

**Available Accessories**

Product no.	Ordertext
065.90001	HL 900.01 Gas Meter Module
065.90002	HL 900.02 Gas Instantaneous Water Heater Module
065.90003	HL 900.03 Water Meter Module
065.90004	HL 900.04 Pressure Reducer Module
065.90005	HL 900.05 Circulating Pump Module
065.90006	HL 900.06 Cold Water Distributor Module
065.90007	HL 900.07 Electrical Water Heater Module
065.90008	HL 900.08 Riser Module
065.90009	HL 900.09 Cold Water Drain Module
065.90010	HL 900.10 Two Handle Mixer Module
065.90011	HL 900.11 Single Handle Mixer Module
065.90012	HL 900.12 Collecting Tank Module
065.90013	HL 900.13 Rotameter Module 1000 ltr/h
065.90014	HL 900.14 Rotameter Module 1600 ltr/h
065.90015	HL 900.15 Downcomer with Branch Module
065.90016	HL 900.16 Downcomer with Two Branches Module
065.90017	HL 900.17 Waste Water Bend Module
065.90018	HL 900.18 Digital Differential Pressure Gauge Module
065.90019	HL 900.19 Digital Thermometer Module
065.90020	HL 900.20 Accessory Set of Connecting Elements
065.90030	HL 900.30 Accessory Set of Gauges and Fittings
065.90031	HL 900.31 Expansion Compensation Module
065.90032	HL 900.32 Three-Way Mixing Valve Module
065.90033	HL 900.33 Four-Way Mixing Valve Module
065.90034	HL 900.34 Plate Heat Exchanger Module
065.90035	HL 900.35 Pressure Flushing Valve GK1 Module
065.90036	HL 900.36 Pressure Flushing Valve GK2 Module
065.90037	HL 900.37 Y-Type Globe Valve Module
065.90038	HL 900.38 Globe Valve Module
065.90039	HL 900.39 Gate Valve Module
065.90040	HL 900.40 Bend Module
065.90041	HL 900.41 Elbow Module
065.90050	HL 900.50 Accessory Set Pressure Loss in Pipes
065.90051	HL 900.51 Accessory Set Pumps
065.90052	HL 900.52 Accessory Set Safety Devices
065.90053	HL 900.53 Accessory Set Thermal Expansion
065.90060	HL 900.60 Planning Software

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**A LOOK INSIDE OUR CUSTOMERS' LABORATORIES**



**GUNT demonstration and experimentation units have been in use for many years at hundreds of technical education and training centres, and have always proved highly satisfactory to our customers.**

**The very finest design and detailing: Working with GUNT demonstration and experimentation units teaches students in an engaging, illustrative manner.**