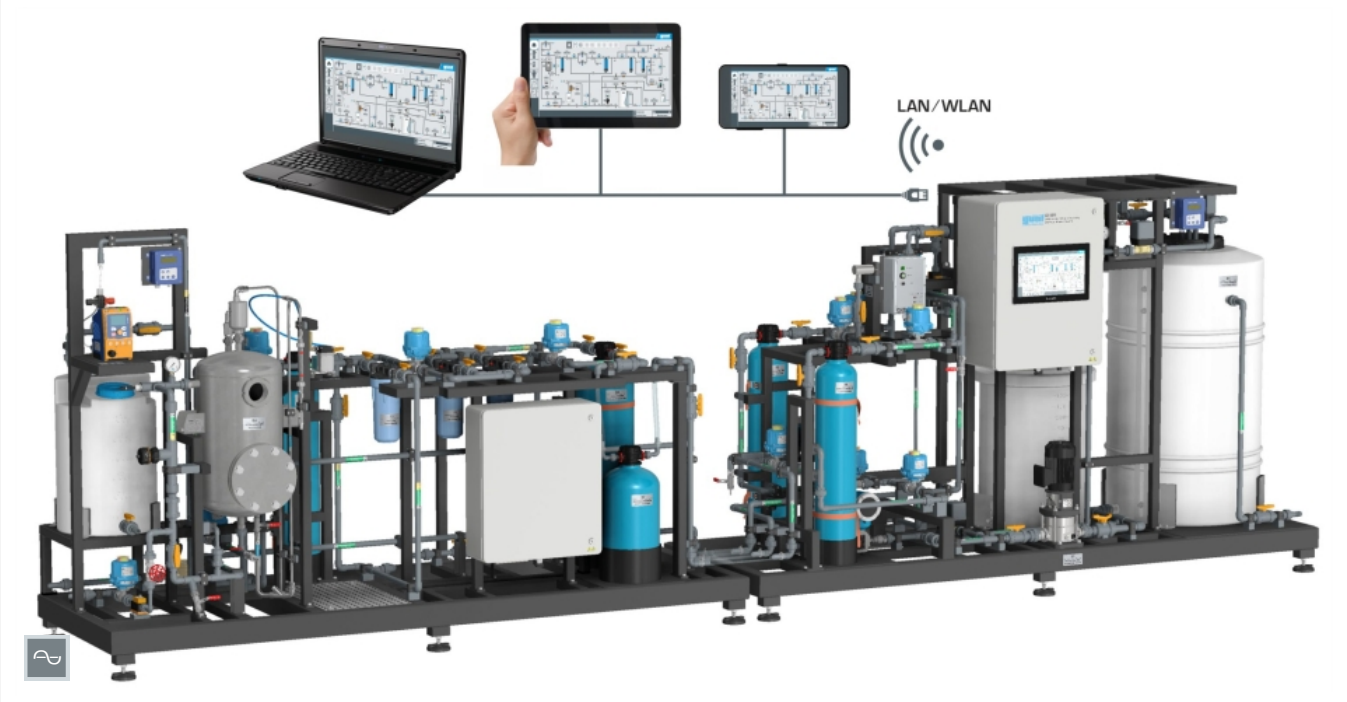
CE 585
Water purification process



screen mirroring is possible on up to 10 end devices

Description

- **Industrial Application Project of the TVET programme**
- **multi-stage water purification plant on an industrial scale**
- **extensive operating functions and maintenance work**
- **controlled via integrated PLC with touch screen**

The CE 585 multi-stage water purification plant has been specially developed for educational purposes, for example for environmental engineers and for practical work. In addition to operating and monitoring the plant, various maintenance tasks can be carried out, such as calibration, replacement and cleaning of plant components. The plant consists of the following process stages: aeration (oxidation), filtration (mechanical filter with BIRM®, candle filter, activated carbon filter), softening (ion exchange), disinfection using UV light.

The aim of the process is to remove certain substances from the raw water, such as dissolved iron. Aeration and oxidation convert the iron in the raw water into an undissolved state. The iron particles are separated in a mechanical filter. Two candle filters connected in parallel remove the remaining iron particles. Other substances dissolved in the water are removed by an activated carbon filter. Two ion exchangers connected in parallel then soften the water in alternating operation. This enables the ion exchangers to be regenerated during operation. The final stage of the process is disinfection with UV light.

The plant can be operated with its own raw water via an external feed or in a closed circuit. In circuit operation, concentrated raw water is added to the feed of the first process stage (aeration). This operating mode reduces water consumption even during longer operating times.

All main components comply with industrial standards and allow maintenance tasks to be carried out and documented in a practical manner. This includes backwashing filters, regenerating ion exchangers, and cleaning, installing and removing plant components.

The plant is controlled via an integrated PLC with touch screen. The experimental plant can alternatively be operated and controlled via a terminal device by means of an integrated router. The user interface can also be displayed on other terminals (screen mirroring). The measured values can be stored internally via the PLC. Students learn how to operate the PLC, including setting and monitoring process variables.

The GUNT Media Center provides free digital multimedia teaching materials.

Learning objectives/experiments

Learning in an industrial-like environment for training in water supply technology

- operation of an industrial water purification plant
- adjust and monitor important process variables
- detection of operational faults
- carry out and document maintenance work
  - backwashing a filter
  - regenerating ion exchangers
  - replacing filter cartridges and filter materials
  - cleaning plant components
  - calibrating measuring instruments
- installing and removing plant components
- monitoring, determination and documentation of water analysis parameters
- assign symbols in the process schematic to the plant components
- operate a PLC

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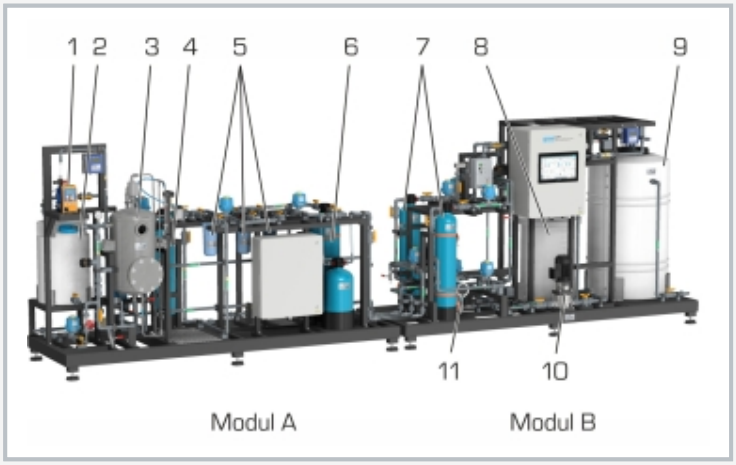
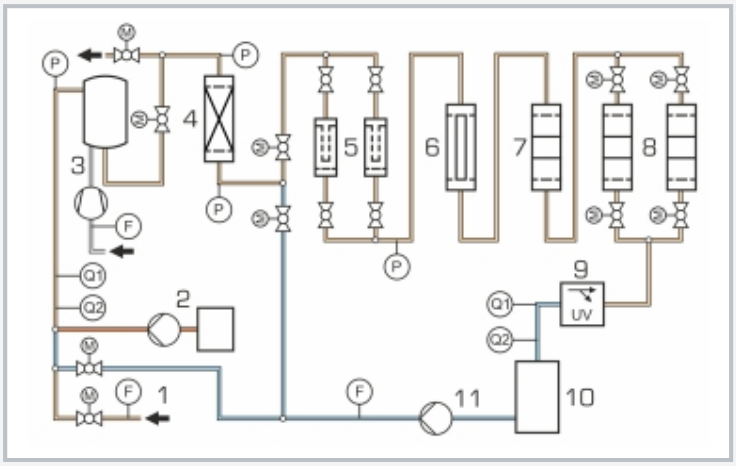
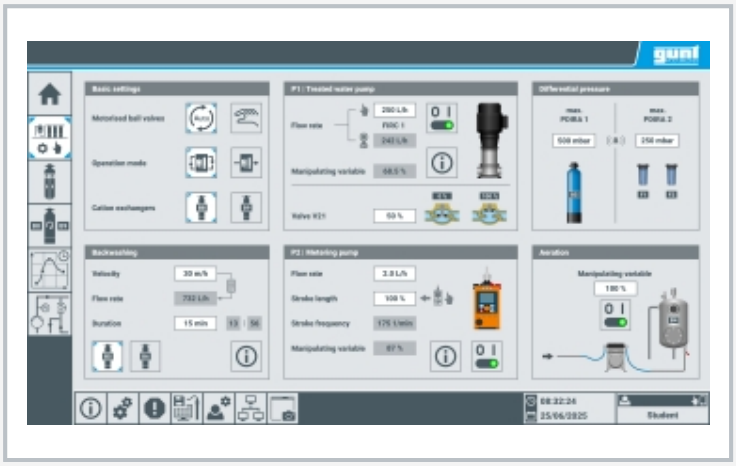


Module A, aeration and filtration: 1 metering pump, 2 raw water concentrate, 3 aeration tank, 4 mechanical filter with BIRM®, 5 candle filter, 6 activated carbon filter, Module B, softening and disinfection: 7 ion exchanger, 8 desalination tank, 9 storage tank, 10 circulation pump, 11 flow meter



1 external feed for own raw water, 2 raw water concentrate, 3 aeration with aeration tank and compressor, 4 mechanical filter with BIRM®, 5 candle filter, 6 activated carbon filter, 7 anion exchanger, 8 cation exchanger, 9 reactor for disinfection with UV light, 10 storage tank, 11 circulation pump; P pressure, F flow rate, Q1 pH value, Q2 conductivity; orange (concentrated) raw water, light blue purified water*



control of the experimental plant using a PLC, operated by touch screen

Specification

[1] operation and maintenance of an industrial-scale water purification plant for training and practice (TVET)
[2] two separate modules for variable installation
[3] removal of iron particles by aeration and subsequent filtration with BIRM® and candle filters
[4] removal of dissolved substances by activated carbon filters
[5] softening with two ion exchangers in altern. operation
[6] disinfection with UV light in the reactor
[7] samples can be taken at all relevant points
[8] circuit operation or operation with own raw water
[9] adjustable operating states
[10] control of the experimental plant using a PLC, operated by touch screen
[11] screen mirroring is possible on up to 10 end devices
[12] data acquisition via PLC on internal USB memory, access to stored measured values via WLAN/LAN with integrated router/LAN connection to customer's own network or direct LAN connection without customer network
[13] multimedia instructional materials online in GUNT Media Center

Technical data

Tanks
- storage tank: 500L
- tank for raw water concentrate: 60L
- aeration tank: approx. 62L, ØxH: 350x700mm
- desalination tank: 120L

1 mechanical filter, 2 cation exchangers
- ØxH: 7"x35" each (184x900mm), volume: approx. 20L each

1 activated carbon filter
- ØxH: 10"x35" (257x900mm), volume: approx. 40L

1 anion exchanger
- ØxH: 10"x19" (257x500mm), volume: approx. 19L

Circulation pump
- max. flow rate: 2,4m³/h, max. head: 11,5m

Metering pump for raw water concentrate
- max. flow rate: 2,3L/h, max. head: 160m

Aeration compressor: max. flow rate: 840L/h

Measuring ranges
- flow rate: 1x 0...1300L/h, 2x 0...600L/h
- pressure: 3x 0...600mbar
- conductivity: 0...1000µS/cm
- pH value: 1...14

230V, 50Hz, 1 phase; 230V, 60Hz, 1 phase
120V, 60Hz, 1 phase; UL/CSA optional
LxWxH: 2905x950x1800mm (per module)
Weight: approx. 800kg

Required for operation

water connection, drain, analysis technology

Scope of delivery

Water purification plant consisting of 2 modules, 1 set of accessories, online access to the GUNT Media Center, set of instructional material