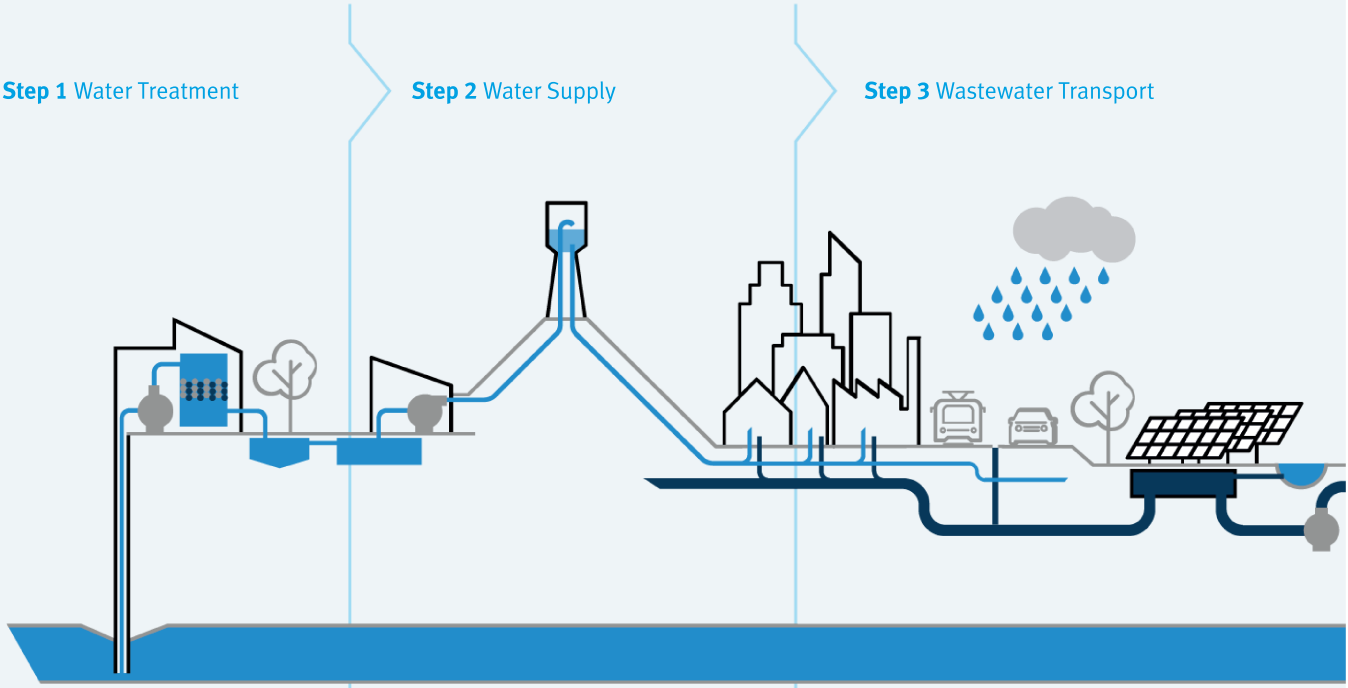
EDS Water Management

Discovering the Water Circuit

→ Video

Treatment Processes

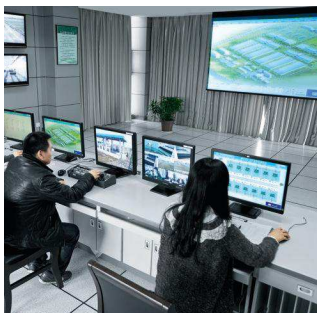




Clean Water for Everyone with Modern Technology
Complex systems require responsible operation, as the applications have far-reaching effects on humans, the plant and the environment.

The EDS Water Management stations prepare users optimally for these varied tasks and systems with state-of-the-art technology.

Teaching the Water Circuit in a Small Space
Experience the complexity of corporate working processes from administration, technology and science with mobile and compact tabletop stations.



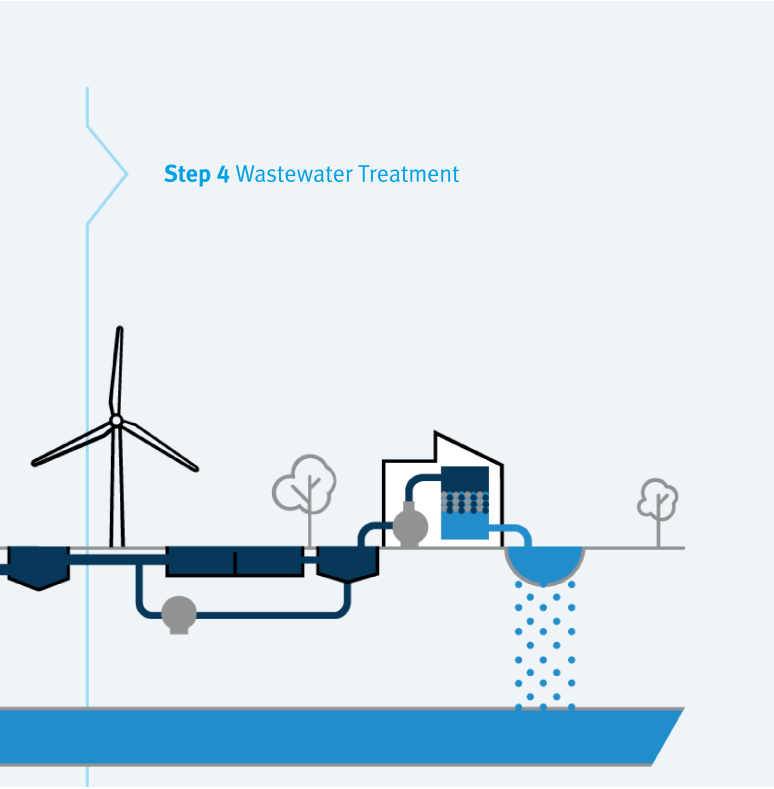
Experience Process Control Engineering
One click in the control room needs to be thought through, as a switching signal changes the system functions invisibly to the operator. The effects often appear hours later. In the worst case, they can result in water pollution or wasted energy and resources.

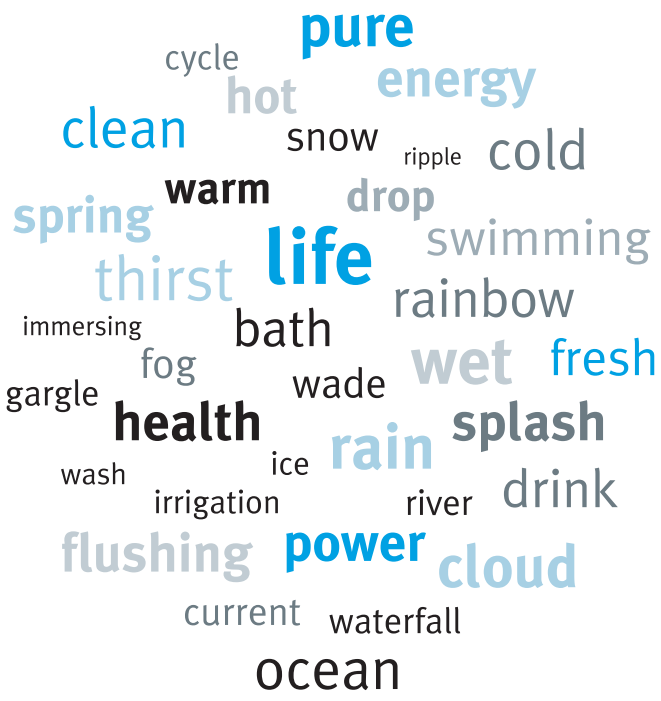
The EDS Water Management allows you to experience the effects directly and rapidly.



Setup Times and Operating Costs – Less is More
Add water, start PCs and software – and you're ready to start water circuit training.

Plastic granules are used as the soiled load and can be air-dried and re-used after utilization – reducing the operating costs of the training system to water and electricity.







Basic Water Circuit System
With the four main stations of the basic system, you are ideally equipped to get to know the world of process command, measurement and control technology.

If you operate the stations individually, up to three learners can work on the following learning areas:
– Plant engineering, process and laboratory technology
– Electrical engineering
– Automation/process control engineering and administration



Control Test in the Laboratory
Laboratory control tests are required to verify the in-line measurement technology of process engineering systems.

The EDS Water Management is the ideal addition for combining your new knowledge directly with your laboratory, applying scientific skills.

General Training Content
– Controlling, regulating and monitoring physical variables such as levels, flows and pressure
– Technical/physical functions of sensors and actuators as well as wiring, adjustment and parameterization
– Analyzing controlled systems, parameterizing and optimizing regulators
– System operation, maintenance, troubleshooting and repair
– Plant engineering
– Optimization and energy monitoring
– Electronic data processing
– Reading and interpreting process flowcharts, electrical and pneumatic circuit diagrams

Hardware, Software, Courseware
For ideal training – the workbooks with theory sections and exercise scenarios are perfectly customized for the stations. There are digital training programs on many topics for presentation or self-learning phases. A wide range of training courses is available for training staff.

The EDS Water Management offers the required planning documents, e.g. electric and pneumatic circuit diagrams, process flowcharts, data sheets and operating instructions. All documents comply with European standards.

The EDS Water Management equipment is used in WorldSkills competitions for Skill 55 Water Technology.

worldskills

DWA Mitglied

Member of German Water Partnership

Water Purification Station



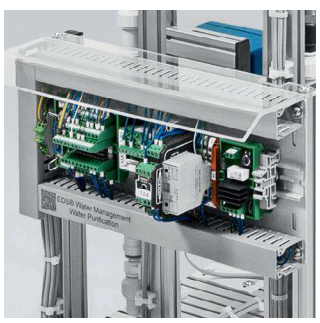
Function
The water purification station represents a basic logic function of water treatment in the form of a water storage system with an overflow rim. A groundwater tank with a submersible pump is required for operation.

Focal points include:
– Setting flow rate values for volume control
– Level measurement via analog pressure measurement
– Level sensing via capacitive proximity sensors

The training documents reveal how a flocculation reaction is implemented by adding a flocculant, and how sedimentation can occur in spite of the flow.

Drinking Water and Chlorine
Chlorine is used worldwide to preserve drinking water. Overmetering not only increases the plant operator's costs unnecessarily, it also pollutes the environment and endangers the consumers. The additional chlorine measurement package with manual metering technology is a 1:1 training scenario for online chlorine measurement. This allows you to learn how to operate a chlorine metering system, and react to malfunctions and optimize the system.







worldskills

Official Competition Equipment for Skill #55 Water Technology

 For tailored advice and product selection/configuration assistance, please contact a sales representative.

Water Purification Station	**8024504**

The station is fully assembled, wired and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

3 l tank, including an overflow rim, capacitive proximity sensor, float switch, impeller flow sensor, pressure sensor, 2/2-way solenoid valve, non-return valve, electric connection board, aluminum profile plate.

For single operation, a water supply tank/ground water is required.

Required accessories, also order:

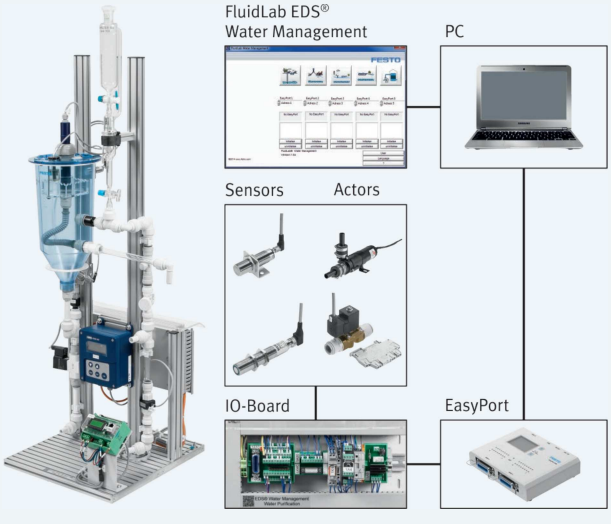
1x Water supply tank/ground water	8024503
1x Tabletop power supply unit ➔ page 64	

Recommended accessories ➔ page 64

1x Additional chlorine measurement package	8025419
1x DC wattmeter	8216170
1x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Water supply technology training set	8038315

Recommended software:

FluidLab-PA Closed-Loop ➔ page 171



General Training Content

See the workbook “Water Purification” ➔ page 156

Learning Content for Project Work

– Function of an overflow rim
– Analog level measurement via a pressure sensor
– Capacitive proximity sensor for level querying
– Basic processes of precipitation, flocculation and sedimentation

Training Content with Water Supply Tank

– Activation of a pump for flow control
– Regulation variants with capacitive sensors for level control

Training Content with Additional Chlorine Measurement Package

– Measuring chlorine content
– Effects of excessive or insufficient chlorine metering

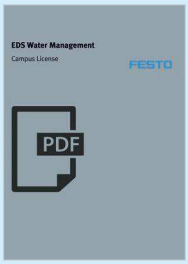
Technical Data

– Water (10 – 15 l)
– Power supply: 24 V DC
– 3 digital inputs
– 3 digital outputs
– 4 analog inputs
– 1 analog output
– Dimensions (H x W x D): 1100 x 355 x 400 mm

Recommended Learning Material

Workbooks

➔ page 156



Campus license:

en/de	8208239

Note: The campus license includes both the student and instructor versions of all PDF workbooks related to EDS Water Management: “Water Purification”, “Water Supply”, “Wastewater Transport”, Wastewater Treatment”, “Sand Filtration”, “Membrane Filtration”, “Monitoring, Controlling, and Optimizing Operations”, and “Energy Optimization in Water and Wastewater Treatment Plants”.

Courses on Festo LX

➔ Water Purification



➔ Introduction to Water Cycle and Water Management
➔ Water Supply
➔ Wastewater Transport
➔ Wastewater Treatment
➔ Sand filtration for Water Purification
➔ Membrane Filter Process in Water Management
➔ Mechanical Pre-Treatment for Wastewater
➔ Adsorption in Water Management

Water Supply Station









Function
The water supply station deals with water storage and distribution via an elevated container, e.g. a water tower. The elevated container is filled via a pump, which can be operated in open- or closed-loop control mode. Water is withdrawn via valves. The process command software configures its switching characteristics. Depending on the withdrawal characteristics, feedback to the pump controller and shock loads for wastewater transport can result.

Balancing the water quantity provided with the water quantity delivered is another focus. In many water supply systems, leakages are a significant waste, and elimination by trained personnel is highly important.

Training by simulating a leakage using a valve, and subsequent location of the leakage are useful exercises.

 For tailored advice and product selection/configuration assistance, please contact a sales representative.

Water Supply Station	**8024505**

The station is fully assembled, wired and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

3 l tank, capacitive proximity sensor, float switch, impeller flow sensor, ultrasound sensor, centrifugal pump, 2/2-way solenoid valve, 2-way ball valve with pneumatic semi-rotary drive, electric connection board, aluminum profile plate.

Note

For single operation, a water supply tank/ground water (order no. 8024503) is required.

Required accessories, also order:

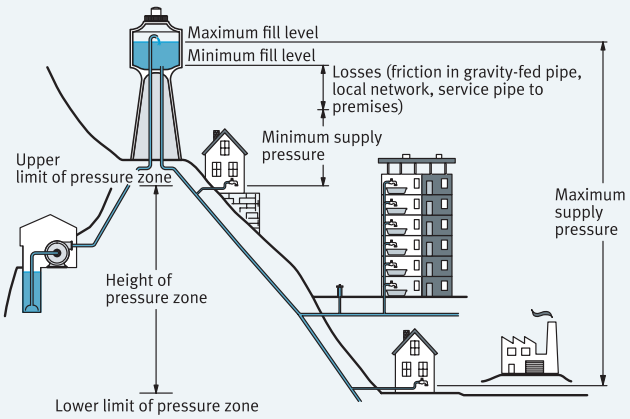
1x Tabletop power supply unit → page 64	
1x Compressor → page 67	
1x Compressor accessories	102725

Recommended accessories → page 64

1x Water supply tank/ground water	8024503
1x DC wattmeter	8216170
1x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Water supply technology training set	8038315

Recommended software:

FluidLab-PA Process → page 170
FluidLab-PA Closed-Loop → page 171



General Training Content

See the workbook “Water Supply” → page 156

Learning Content for Project Work

– Setting the pump to open- and closed-loop control mode and determining the effect on the delivery rate
– Determining the interaction between pressure and flow rate in a piping system
– Controlling the water supply via various valve types and showing the effects of shock loads
– Finding water losses in distribution networks and showing problems in leakage detection
– Measuring/controlling levels with ultrasound sensors
– Understanding and applying the function of pneumatically driven valves and fittings

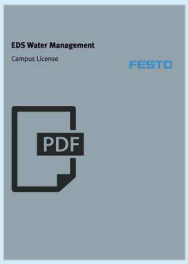
Technical Data

– Operating pressure: 4 – 6 bar (50 l/min)
– Water (10 – 15 l)
– Power supply: 24 V DC
– 5 digital inputs
– 7 digital outputs
– 4 analog inputs
– 1 analog output
– Dimensions (H x W x D): 1200 x 355 x 400 mm

Recommended Learning Material

Workbooks

→ page 156



Campus license:

en/de	8208239

Note: The campus license includes both the student and instructor versions of all PDF workbooks related to EDS Water Management: “Water Purification”, “Water Supply”, “Wastewater Transport”, Wastewater Treatment”, “Sand Filtration”, “Membrane Filtration”, “Monitoring, Controlling, and Optimizing Operations”, and “Energy Optimization in Water and Wastewater Treatment Plants”.

Courses on Festo LX

→ Water Supply



→ Introduction to Water Cycle and Water Management
→ Water Purification
→ Wastewater Transport
→ Wastewater Treatment
→ Sand filtration for Water Purification
→ Membrane Filter Process in Water Management
→ Mechanical Pre-Treatment for Wastewater
→ Adsorption in Water Management

Wastewater Transport Station









Function
The wastewater transport station teaches control technology for wastewater disposal and the associated processes. It comprises four sub-areas:
– Feeding device for supplying a soiled load
– Sewage pipe section with branch
– Tank with overflow rim as a rain retention and sedimentation basin
– Tank as a primary settlement tank for the biological stage and the option of starting sludge removal via a pneumatically automated fitting.

Plastic granules are used as the soiled load and can be air-dried and re-used after utilization. Flooding due to rainfall or problems transporting solids can be simulated realistically.

The fluids are supplied to the primary settlement tank via a pump. A flow meter records the flow rate, which is configured via a motor control system of the pump or a proportional media valve.

The media valve functions based on the principle of a pneumatically activated constriction-hose valve. The throttle opening can be configured via air pressure with a proportional pressure regulator valve. That allows the effects on energy efficiency and the flow control quality to be shown clearly.

Wastewater Transport Station	**8024506**

The station is fully assembled, wired and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

3 l tank, including overflow rim, 1 l tank, gravity duct, capacitive proximity sensor, float switch, magnetic-inductive flow sensor, ultrasound sensor, centrifugal pump, proportional media valve, proportional pressure regulator valve, pneumatic slide, metering screw for metering solids, electric connection board, aluminum profile plate.

Note

For single operation, a water supply tank/ground water (order no. 8024503) is required.

Required accessories, also order:

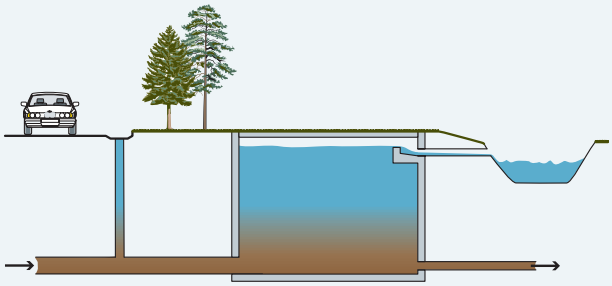
1x Tabletop power supply unit → page 64	
1x Compressor → page 67	
1x Compressor accessories	102725

Recommended accessories → page 64

1x Water supply tank/ground water	8024503
1x Sedimentation granules	8037688
1x DC wattmeter	8216170
1x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Sewage technology training set	8174093

Recommended software:

FluidLab-PA Closed-Loop → page 171



General Training Content

See the workbook “Wastewater Transport” → page 156

Learning Content for Project Work

– Transporting solid matter in a sewer system using different flow velocities
– Effects of exceeding the hydraulic capacity
– Naming the basic mechanisms that make flushing necessary
– Functions of a rain overflow basin
– Basic functions of sedimentation in a flow basin
– Level measurement with an “ultrasound sensor
– Functions of pneumatically driven valves and fittings

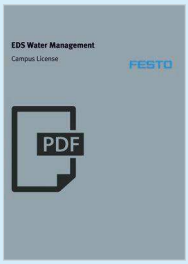
Technical Data

– Operating pressure: 4 – 6 bar (50 l/min)
– Water (10 – 15 l)
– Power supply: 24 V DC
– 5 digital inputs
– 5 digital outputs
– 4 analog inputs
– 2 analog outputs
– Dimensions (H x W x D): 1200 x 1200 x 400 mm

Recommended Learning Material

Workbooks

→ page 156



Campus license:

en/de	8208239

Note: The campus license includes both the student and instructor versions of all PDF workbooks related to EDS Water Management: “Water Purification”, “Water Supply”, “Wastewater Transport”, Wastewater Treatment”, “Sand Filtration”, “Membrane Filtration”, “Monitoring, Controlling, and Optimizing Operations”, and “Energy Optimization in Water and Wastewater Treatment Plants”.

Courses on Festo LX

→ Wastewater Transport



→ Introduction to Water Cycle and Water Management
→ Water Supply
→ Water Purification
→ Wastewater Transport
→ Sand filtration for Water Purification
→ Membrane Filter Process in Water Management
→ Mechanical Pre-Treatment for Wastewater
→ Adsorption in Water Management

Wastewater Treatment Station









Function
The wastewater treatment station maps the physical functions of wastewater treatment after the sludge treatment and contains an aeration tank and a secondary settlement tank. Plastic granules are used as the soiled load and can be air-dried and re-used after utilization. The sludge return has a flow measurement system with an adjustable pump for setting and monitoring the sludge return ratio.

The oxygen feeding on the station functions using an electrically adjustable compressed air diaphragm pump. Combined with the available oxygen sensor, there is also an option of extending the oxygen feeding system to a control circuit.

Economical Oxygen Regulation
Adding oxygen to water is not only relevant in the wastewater sector, but also in fish breeding or bioreactors.

In order to guarantee energy-optimized oxygen feeding, in-line oxygen measurement is required and must be combined with the oxygen feeding actuator in a control circuit. That avoids unnecessary energy use and possible biochemical malfunction.

The EDS Water Management forms a neutral learning environment on the subject of oxygen feeding regulation. Periodic addition of sodium sulphite (Na_2SO_3) to the upstream supply water causes a continuous oxygen consumption, thus simulating the oxygen demand of bacteria eating up organic substances in a real biological treatment of wastewater.

Handling with real wastewater is too complex and therefore not planned.

 For tailored advice and product selection/configuration assistance, please contact a sales representative.

Wastewater Treatment Station	**8024507**

The station is fully assembled, wired and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

3 l tank, including an overflow rim, 10 l tank, ventilation system, capacitive proximity sensor, float switch, magnetic-inductive flow sensor, centrifugal pump, 2/2-way solenoid valve, electric connection board, aluminum profile plate.

Note

For single operation, a water supply tank/ground water (order no. 8024503) is required.

Required accessories, also order:

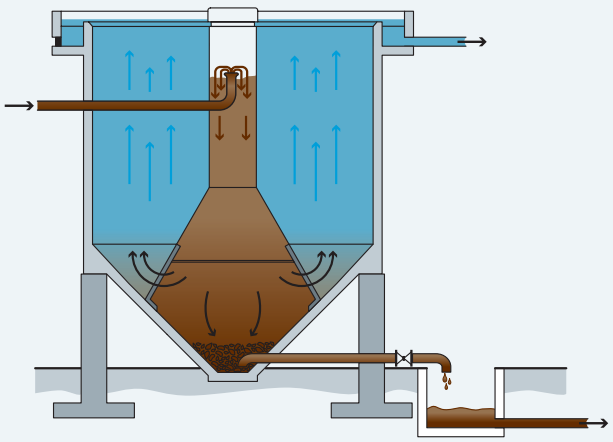
1x Tabletop power supply unit → page 64	

Recommended accessories → page 64

1x Additional oxygen measurement package	8025418
1x Water supply tank/ground water	8024503
1x Sedimentation granules	8037688
1x DC wattmeter	8216170
1x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Sewage technology training set	8174093

Recommended software:

FluidLab-PA Closed-Loop → page 171	



General Training Content

See the workbook “Wastewater Treatment” → page 156

Learning Content for Project Work

– Behavior of flakes at different flow velocities and different solid loads
– Hydraulic overloading of a wastewater treatment plant and the consequences
– Basic function of aerobic water treatment
– Function of sludge return
– Analog level measurement via a pressure sensor

Training Content with Additional Oxygen Measurement Package

– Measuring the quantity of dissolved oxygen
– Showing the advantages of continuous measurement/ control of the oxygen content

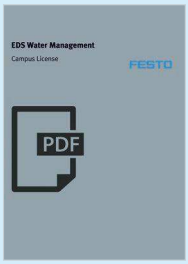
Technical Data

– Water (10 – 15 l)
– Power supply: 24 V DC
– 5 digital inputs
– 5 digital outputs
– 4 analog inputs
– 2 analog outputs
– Dimensions (H x W x D): 900 x 710 x 400 mm

Recommended Learning Material

Workbooks

→ page 156



Campus license:

en/de	8208239

Note: The campus license includes both the student and instructor versions of all PDF workbooks related to EDS Water Management: “Water Purification”, “Water Supply”, “Wastewater Transport”, Wastewater Treatment”, “Sand Filtration”, “Membrane Filtration”, “Monitoring, Controlling, and Optimizing Operations”, and “Energy Optimization in Water and Wastewater Treatment Plants”.

Courses on Festo LX

→ Wastewater Treatment



→ Introduction to Water Cycle and Water Management
→ Water Supply
→ Water Purification
→ Wastewater Transport
→ Sand filtration for Water Purification
→ Membrane Filter Process in Water Management
→ Mechanical Pre-Treatment for Wastewater
→ Adsorption in Water Management

Sand Filtration Station









Function
This sand filtration station focuses on the filtration processes for separating solids frequently used in drinking and sewage technology. As in nature, the sand layers are used to retain the undissolved and suspended pollutants via deep-bed filtration as it trickles through. The pollutants are trapped in the sand layer and are deposited as filter cake. With time, the permeability decreases, the water level above the sand layer rises and is recorded via sensing. The sensor signal shuts off the inlet and starts the backwash process.

Parametrization of the filtration process is configured on the PC via the enclosed software, such as the change of the backwash time or the pressure adjustment of the purge air to break up the filter cake.

The structure of the different filter layers with quartz sand and quartz gravel in different grain sizes and corresponding monitoring of the cleaning performance through the transparent filter housing is a special aspect.

Sand Filtration Station	**8024508**

The station is fully assembled, wired and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

3 l tank, including overflow rim, capacitive proximity sensor, float switch, magnetic-inductive flow sensor, centrifugal pump, 4.75 l sand filter unit, proportional media valve, proportional pressure regulator valve, pneumatic valve terminal with 5/2-way solenoid valves, non-return valve, pressure sensor, electric connection board, aluminum profile plate, 1x quartz sand and quartz gravel.

Required accessories, also order:

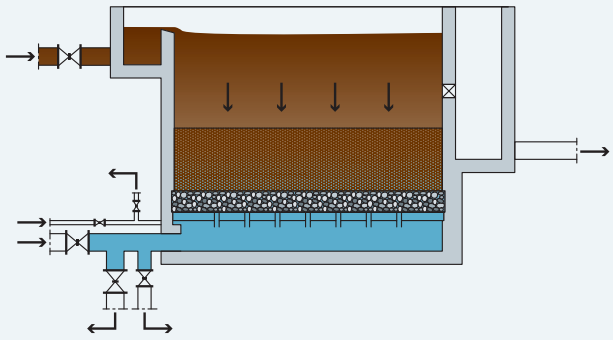
1x Tabletop power supply unit → page 64	
1x Compressor → page 67	
1x Compressor accessories	102725

Recommended accessories → page 64

1x DC wattmeter	8216170
1x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Quartz and quartz gravel	8039989
1x Sewage technology training set	8174093
1x Water supply technology training set	8038315

Recommended software:

FluidLab-PA Process → page 170
FluidLab-PA Closed-Loop → page 171



General Training Content

See the workbook “Sand Filtration”
→ page 157

Learning Content for Project Work

– Separation of pollutants via a quartz sand and quartz gravel layer
– Deep-bed filtration and structure of a filter cake
– Measurement of pressure loss via the sand filter
– Automated filter process and sand filter backwashing
– Parameterizing the process steps
– Functions of pneumatically driven valves and fittings
– Creating a Micheau diagram

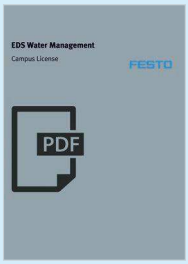
Technical Data

– Operating pressure: 4 – 6 bar (50 l/min)
– Water (10 – 15 l)
– Power supply: 24 V DC
– 6 digital inputs
– 8 digital outputs
– 4 analog inputs
– Dimensions (H x W x D): 1350 x 355 x 400 mm

Recommended Learning Material

Workbooks

→ page 156



Campus license:

en/de	8208239

Note: The campus license includes both the student and instructor versions of all PDF workbooks related to EDS Water Management: “Water Purification”, “Water Supply”, “Wastewater Transport”, Wastewater Treatment”, “Sand Filtration”, “Membrane Filtration”, “Monitoring, Controlling, and Optimizing Operations”, and “Energy Optimization in Water and Wastewater Treatment Plants”.

Courses on Festo LX

→ Sand filtration for Water Purification



→ Introduction to Water Cycle and Water Management
→ Water Supply
→ Water Purification
→ Wastewater Transport
→ Wastewater Treatment
→ Membrane Filter Process in Water Management
→ Mechanical Pre-Treatment for Wastewater
→ Adsorption in Water Management

Membrane Filtration Station









Function
Membrane filtration is highly topical in modern water treatment. Depending on the pore size, the principle is used in water treatment.

Drinking water and wastewater treatment in the form of microfiltration and ultrafiltration is another area of application. The objective of both methods is retaining pathogenic germs, for example. The differences between the cross-flow and dead-end filtration operating modes are covered.

The membrane filtration station maps both processes. In cross-flow operation, the trans-membrane pressure is set for optimal filter performance. The inflows to and outflows from membrane filters can be measured and thus the performance of the membrane can be determined.

The backwash process takes place automatically if the filter performance is insufficient. Backwashing uses system filtrate created previously. The pressure resistance test checks the functionality of the membrane.

Other typical applications include:
– Reverse osmosis for seawater desalination
– Process water treatment in the pharmaceutical industry
– Steam generation in power stations

Membrane Filtration Station	**8024509**

The station is fully assembled, wired and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

3 l tank, including overflow rim, 3/2-way ball valve, membrane filter unit, capacitive proximity sensor, float switch, magnetic-inductive flow sensor, pneumatic valve terminal with 3/2-way solenoid valves, 5/2-way solenoid valve, membrane pump, proportional media valve, proportional pressure regulator valve, pressure sensor, electric connection board, aluminum profile plate.

Note

For single operation, a water supply tank/ground water (order no. 8024503) is required.

Required accessories, also order:

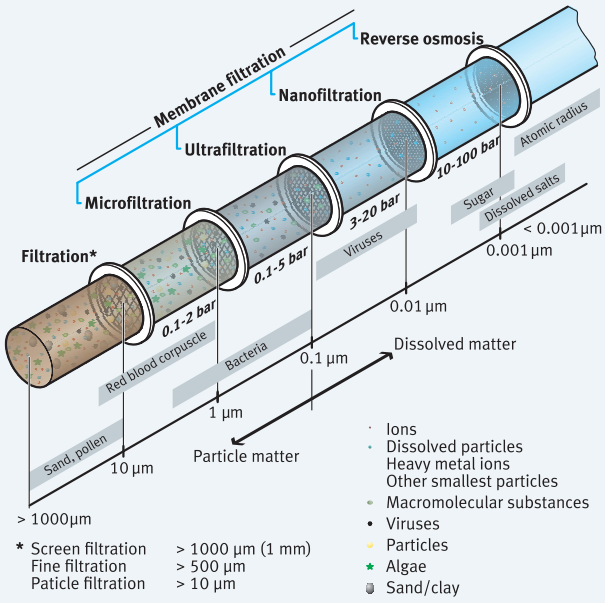
1x Tabletop power supply unit → page 64	
1x Compressor → page 67	
1x Compressor accessories	102725

Recommended accessories → page 64

1x Water supply tank/ground water	8024503
1x DC wattmeter	8216170
1x Membrane filter unit	8024510
1x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Sewage technology training set	8174093
1x Water supply technology training set	8038315

Recommended software:

FluidLab-PA Process → page 170
FluidLab-PA Closed-Loop → page 171



General Training Content

See the workbook “Membrane Filtration” → page 157

Learning Content for Project Work

– Membrane filtration operating modes like filtration and backwashing
– Presentation of the theoretical basic principles of various membrane filtration (micro-, ultra-, nanofiltration and reverse osmosis)
– Process engineering differences between the cross-flow and dead-end filtration
– Automated integrity test for quality testing the membrane via pneumatic actuation and monitoring
– Effect of the transmembrane pressure on the filter performance
– Functions of pneumatically driven valves and fittings

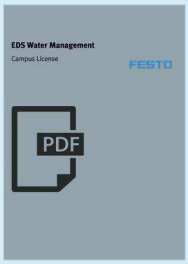
Technical Data

– Operating pressure: 4 – 6 bar (50 l/min)
– Water (10 – 15 l)
– Power supply: 24 V DC
– 8 digital inputs
– 8 digital outputs
– 4 analog inputs
– 2 analog outputs
– Dimensions (H x W x D): 1250 x 710 x 400 mm

Recommended Learning Material

Workbooks

→ page 156



Campus license:

en/de	8208239

Note: The campus license includes both the student and instructor versions of all PDF workbooks related to EDS Water Management: “Water Purification”, “Water Supply”, “Wastewater Transport”, Wastewater Treatment”, “Sand Filtration”, “Membrane Filtration”, “Monitoring, Controlling, and Optimizing Operations”, and “Energy Optimization in Water and Wastewater Treatment Plants”.

Courses on Festo LX

→ Membrane Filter Process in Water Management



→ Introduction to Water Cycle and Water Management
→ Water Supply
→ Water Purification
→ Wastewater Transport
→ Wastewater Treatment
→ Sand filtration for Water Purification
→ Mechanical Pre-Treatment for Wastewater
→ Adsorption in Water Management

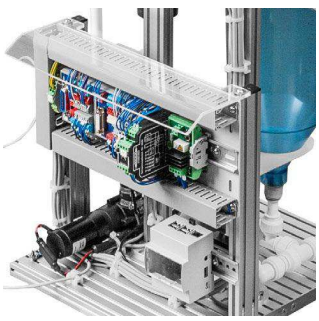
Adsorption Station

New









Function
Adsorption processes are extensively employed, particularly in industrial wastewater treatment for various sectors such as food, textile, pharmaceutical, and petroleum refineries. Activated carbon is also employed in municipal wastewater treatment plants as a fourth purification stage to remove trace substances like drug residues and microplastics, thereby enhancing water pollution control.

At the adsorption station, clear tap water is dyed and introduced into the wastewater tank for illustrative purposes. A second tank receives the purified water. For operational convenience, the colored water can be continuously pumped through the activated carbon filter within the circuit of the first tank, under observation, until the desired level of decolorization is achieved. Subsequently, a solenoid valve can be activated to redirect the flow of water to the clear water tank.

For automated operation, the piping system is equipped with a flow meter, a pressure sensor, and a smart arti:sens photometer. Signal processing of the photometer is employed to control the solenoid valve automatically.

The station comprises two filter modules and additional piping materials, allowing flexibility for various operational modes. It can function either with the filter modules in series, which increases the filtration capacity but necessitates plant shutdown for filter replacement, or in parallel, where one of the two filters can be removed during operation, for instance, to replace the activated carbon. The remaining filter can continue to operate at a reduced flow rate.

Adsorption Station	**8133701**

The station is fully assembled, wired, and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

3 l tank, ultrasound sensor, capacitive proximity sensor, float switch, magnetic-inductive flow sensor, centrifugal pump, 2/2-way solenoid valve, filter unit, inline photometer Arti:sens, analysis unit for the photometer, electric connection board, aluminum profile plate.

Required accessories, also order:

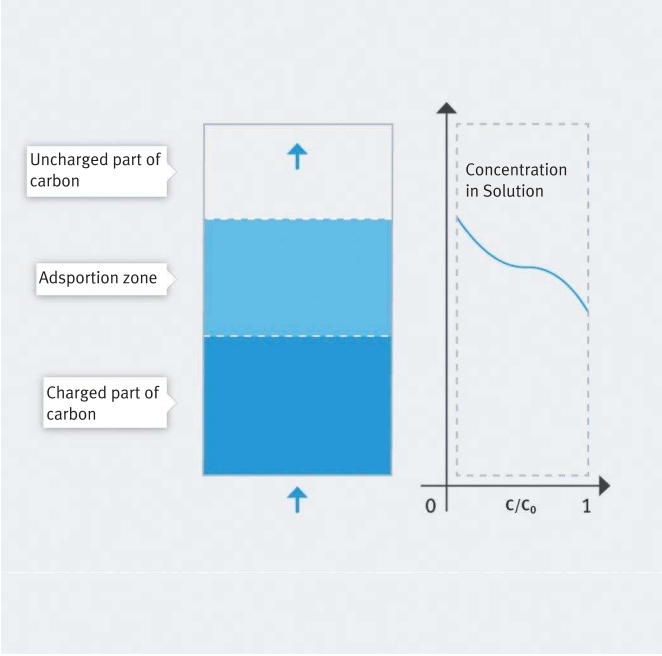
1x Tabletop power supply unit → page 64	

Recommended accessories → page 64

1x Water supply tank/ground water	8024503
1x DC wattmeter	8216170
1x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Sewage technology training set	8174093
1x Water supply technology training set	8038315

Recommended software:

FluidLab-PA Closed-Loop → page 171	



Learning Objectives

– In-depth understanding of the adsorption process.
– Learn the fundamentals of closed-loop control in the station adsorption.
– Read and design technical drawings for a adsorption engineering system.
– Learn the various methods used for control loop tuning in a adsorption.
– Operate, identify, and analyze different control systems for flow, pressure, and a adsorption process.

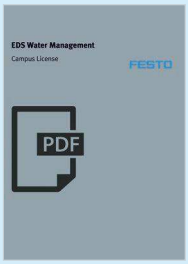
Technical Data

– Water (10 – 15 l)
– Power supply: 24 V DC
– 4 digital inputs
– 6 digital outputs
– 3 analog inputs
– 1 analog output
– Dimensions (W x H x D): 355 x 1200 x 400 mm

Recommended Learning Material

Workbooks

→ page 156



Campus license:

en/de	8208239

Note: The campus license includes both the student and instructor versions of all PDF workbooks related to EDS Water Management: “Water Purification”, “Water Supply”, “Wastewater Transport”, Wastewater Treatment”, “Sand Filtration”, “Membrane Filtration”, “Monitoring, Controlling, and Optimizing Operations”, and “Energy Optimization in Water and Wastewater Treatment Plants”.

Courses on Festo LX

→ Adsorption in Water Management



→ Introduction to Water Cycle and Water Management
→ Water Supply
→ Water Purification
→ Wastewater Transport
→ Wastewater Treatment
→ Sand filtration for Water Purification
→ Membrane Filter Process in Water Management
→ Mechanical Pre-Treatment for Wastewater

Mechanical Pre-Treatment Station

New



Function
Mechanical cleaning, also known as screening systems raking, serves as the initial cleaning stage to remove coarse materials, such as wood, hygiene articles, and more, from the inlet. Its purpose is to protect downstream machinery from clogging and damage.

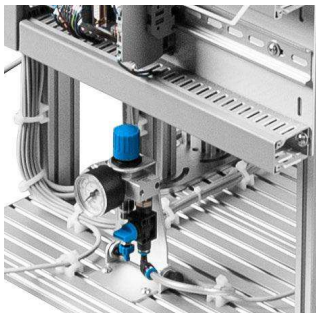
Various applications include:
– Wastewater pre-cleaning in the inlet structures of sewage treatment plants.
– Water extraction from flowing water sources.
– Placement in front of water turbines at weirs.

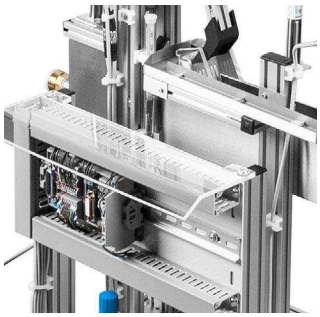
In all three cases, the goal is to maintain a steady water flow while collecting coarse materials for further use. Ultrasonic sensors are employed for level measurement both upstream and downstream of the rake to enable remote plant status monitoring and automatic scraper activation.

As a demonstration, plastic balls are introduced into the water flow to simulate contaminants. The scraper captures solid materials at the rake, and the electro-pneumatically driven scraper conveys them either to a collection tank or a water return trough. If the water return trough is utilized, the balls remain in the system as contaminants, enabling continuous operation without manual intervention.

This station can be seamlessly integrated into the EDS Water Management System. An overflow connection is included to demonstrate potential flooding scenarios. The channels are constructed from sturdy stainless steel sheets.







Mechanical Pre-Treatment Station	**8133700**

The station is fully assembled, wired, and tested.

Including control system with FluidLab Water Management, EasyPort, connecting cables, accessory set and “Getting Started” technical documentation.

Main components

Drain channel, screen, ultrasonic sensor, pneumatic cylinder, pneumatic solenoid valve, electric connection board, aluminum profile plate, LED lamp, water supply tank/ground water.

Required accessories, also order:

1x Tabletop power supply unit → page 64	
1x Compressor → page 67	
1x Compressor accessories	102725

Recommended accessories → page 64

1x DC wattmeter	8216170
1x Trolley with plate	8039990
1x Tool set	538767
1x Pipe and tubing cutter	7658
1x Sewage technology training set	8174093
1x Water supply technology training set	8038315
1x Wastewater transport station	8024506

Recommended software:

FluidLab-PA Closed-Loop → page 171



Learning Objectives

– Gain a deep understanding of the water pre-treatment process
– Read and design technical drawings for water pre-treatment engineering
– Know the functions of pneumatically cylinder
– Parameter the process steps

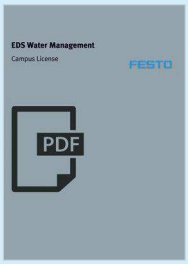
Technical Data

– Operation pressure: 4 – 6 bar (50l/min)
– Water (10 – 15 l)
– Power supply: 24 V DC
– 6 digital inputs
– 5 digital outputs
– 2 analog inputs
– Dimensions (W x H x D): 580 x 900 x 400 mm

Recommended Learning Material

Workbooks

→ page 156



Campus license:

en/de	8208239

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Courses on Festo LX

→ Mechanical Pre-Treatment for Wastewater



→ Introduction to Water Cycle and Water Management
→ Water Supply
→ Water Purification
→ Wastewater Transport
→ Wastewater Treatment
→ Sand filtration for Water Purification
→ Adsorption in Water Management
→ Membrane Filter Process in Water Management

Basic Water Circuit System

Fully Equipped – Four Stations Become One



Shown with optional equipment

Function
Efficiency and economy are not only in demand in the water sector – Save time and money with the basic system. The basic water circuit system, comprising all necessary water supply and disposal stations which also function independently of one another.

Use in a Control Room
The learners initially control the individual stations in manual over-ride using a simulation box.

The included EasyPort devices are then used to control and observe the stations via the control software.

One PC, to which all four EasyPort devices are connected, controls the complete system.

For Perfect Classes
The workbooks with theory sections and exercise scenarios are perfectly customized for the stations and guarantee ideal class preparation.

The learning system components map real processes, making the exercises interesting and informative.

General Training Content
- Controlling, regulating and monitoring physical variables such as levels, flows and pressure
- Technical/physical functions of sensors and actuators as well as wiring, adjustment and parameterization
- Analyzing controlled systems, parameterizing and optimizing regulators
- System operation, maintenance, troubleshooting and repair
- Plant engineering
- Optimization and energy monitoring
- Electronic data processing

Basic Water Circuit System	**8024501**

The basic system stations are fully assembled, wired and tested. For single operation, a water supply tank/ground water (order no. 8024503) is required.

The water circuit basic system contains:
1x Water treatment station
1x Water supply station
1x Wastewater transport station
1x Wastewater treatment station
1x Water supply tank/ground water including cables
1x Additional chlorine measurement package
1x Additional oxygen measurement package
1x Digital/analog simulation box, including cables
4x EasyPort including cables
4x DC wattmeter
4x FluidLab Water Management

Necessary accessories, also order:

4x Tabletop power supply unit→ page 64	
1x Compressor → page 67	
1x Compressor accessories	102725

Recommended accessories → page 64

3x Water supply tank/ground water	8024503
5x Trolley with plate	8039990
1x Tool set	539767
1x Pipe and tubing cutter	7658
1x Water supply technology training set	8038315
1x Sewage technology training set	8174093
Commissioning service	On request

Recommended software:

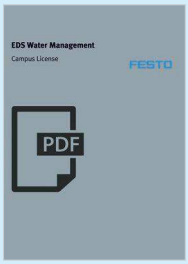
FluidLab-PA Process → page 170
FluidLab-PA Closed-Loop → page 171

Learning Content for Project Work
All training content of the individual stations apply. It is supplemented with the following training content:
– Showing dependences in a water circuit
– Increasing the degree of complexity by networking systems
– Identifying interactions of hydraulic flow and delivery rate beyond the limits of the station
– Getting to know the importance of different pressure zones in a water supply network

Technical Data
– Operating pressure: 4 – 6 bar (50 l/min)
– Water (30 – 40 l)
– Power supply: 24 V DC
– Dimensions (H x W x D): 1150 x 2760 x 400 mm

Recommended Learning Material

Workbooks
→ page 156



Campus license:

en/de	8208239

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Courses on Festo LX
→ Introduction to Water Cycle and Water Management



→ Water Purification
→ Water Supply
→ Wastewater Transport
→ Wastewater Treatment
→ Sand filtration for Water Purification
→ Membrane Filter Process in Water Management
→ Mechanical Pre-Treatment for Wastewater
→ Adsorption in Water Management

EDS Water Management
Accessories



Tabletop Power Supply Unit
– Input voltage:
85 – 265 V AC (47 – 63 Hz)
– Output voltage:
24 V DC, short-circuit-proof
– Output current: max. 4.5 A
– Dimensions: 75 x 155 x 235 mm

Without power cable
Order no. **8049633**

With IEC power cable, 1.3 m
Connector as per CEE 7/VII for DE, FR, NO, SE, FI, PT, ES, AT, NL, BE, GR, TR, IT, DK, IR, ID
Order no. **162417**
Connector as per NEMA 5-15 for US, CA, Central America, BR, CO, EC, KR, TW, TH, PH, JP
Order no. **162418**
Connector as per BS 1363 for GB, IE, MY, SG, UA, HK, AE
Order no. **162419**
Connector as per AS 3112 for AU, NZ, CN, AR
Order no. **162380**
Connector as per SEV 1011 for CH
Order no. **162381**
Connector as per SANS 164-1 for ZA, IN, PT, SG, HK, (GB), (AE)
Order no. **162382**



Water Supply Tank/Ground Water
Main components
– Systainer with T-LOC system, 30 l
– Adapter for piping connectors
– Submersible pump
– Pre-filter
– Float switch
– Water sieve
– Mobile roller system
Order no. **8024503**



Trolley with Plate
Stable sheet steel construction with table plate. Dimensions (W x H x D including rollers to bottom edge of profile plate): 700 x 770 x 700 mm
Order no. **8039990**



Additional Oxygen Measurement Package
Optional extension for the waste-water treatment station. Measuring cell for dissolved oxygen with integrated optoelectronics. Measuring principle: Oxygen-dependent luminescence.
Order no. **8025418**

For tailored advice and product selection/configuration assistance, please contact a sales representative.



Sewage Technology Training Set
How does a wastewater treatment plant work? Explains and demonstrates sewage technology with didactically designed magnet cards, etc.
– Plastic case
– 60 DIN A7 magnet cards
– 44 learning cards in a set (playing card-size)
– 130 questions on a USB stick for instructors

Order no. **8174093**



Water Supply Technology Training Set
Water, waste, energy: Showing connections on whiteboards or flipcharts with didactically designed magnet cards. All important stations/structures in the water and energy circuit are shown as color pictograms.
– Plastic case
– 62 DIN A7 magnet cards

Order no. **8038315**



Sedimentation Granules
For demonstrating the sedimentation process:
– Plastic granules, red
– Volume content 0.5 l (corresponds to approx. 340 g)
– Packaged in a PVC wide-neck container

Order no. **8037688**



Quartz and Quartz Gravel
Used in treating drinking and wastewater as a natural filter material. The filter medium is delivered in various grain sizes to optimize sand filtration.

Order no. **8039989**

EDS Water Management
Accessories



Additional Chlorine Measurement Package
Optional extension for the water treatment station: Measurement of free chlorine. This package is equipped with a dropping funnel, a membrane-covered, amperometric measuring cell and an indicator that can be parametrized. The measuring cell functions within an operating range of 4 to 9 pH.

Order no. **8025419**



Membrane Filter Unit
Interchangeable filter unit with a pore size of 0.02 µm. Including connections to the pipe system and blanking plug.

Order no. **8024510**



DC Wattmeter
The DC wattmeter is a smart meter for training facilities with a 24 V DC power supply and up to 120 W power consumption. All measured values can be read out via data transmission with the integrated Ethernet port. Power consumption is read out as an analog signal within a range of either 0 to 10 V DC. Product picture for illustrative purposes only; actual product may vary.

Order no. **8216170**



Tool Set
The tool set contains basic tools for practical work on mechatronic systems such as MPS stations and modules.

Order no. **539767**



Pipe and Tubing Cutter
For pneumatic tubing made of plastic and Perbunan with and without textile insert up to 20 mm outside diameter. Right-angled, burr-free cut due to positive support of the tubing in the cutter. It also has an integrated retaining clip to prevent unintentional opening. Delivery includes two replacement blades.

Order no.	**7658**



Compressor
Oil-lubricated, very quiet (45 dB (A)) compressor. This makes it ideal for use in classrooms. With pressure reducer and water separator.
– Pressure: 800 kPa (8 bar) P_{max}
– Suction capacity: 50 l/min
– Tank volume: 24 l
– Compressed air outlet: ¼“ or KD4
– Noise level: 45 dB (A)/1 m
– Duty cycle: max. 50%
– Pressure regulator with gauge

230 V	**91030**
100 V – 120 V	**565440**