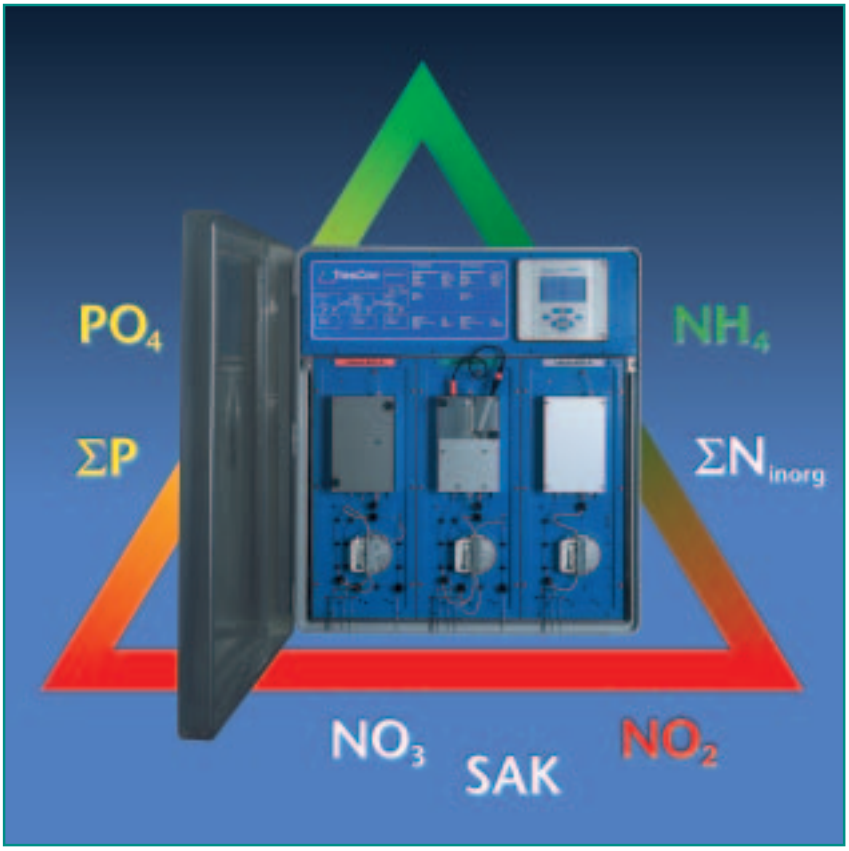
TresCon® – Systematic On-line Analysis

For Continuous Monitoring and Process Control

- Simultaneous analysis of up to three parameters
- Mix or Match analysis parameters
- Easily upgradeable
- Ideal for monitoring
- Reliable & Accurate
- Consistent operation of all modules



As the need for higher quality measurements in water and wastewater plants increases so does the complexity and degree of automation. Practical and maintenance-free instruments to continuously monitor these processes requires that those instruments be also rugged and efficient. The **TresCon®** Multi-parameter System exceeds all requirements for accurate and precise continuous measurements.

OP 210

Phosphate Analyzer Module

On-line orthophosphate measurement

- Control or feedback control of chemical phosphate precipitation, e.g. precipitating agent addition with simultaneous precipitation
- Monitoring biological phosphate elimination
- Measuring the phosphate pollution in natural waters
- Monitoring the phosphate concentration in the drinking water

Yellow method

Continuous background compensation

Continuous/Discontinuous operation selectable

Can be used in weakly polluted water without sample preparation

Measuring Principle

The PO_4 module uses the vanadate/molybdate method (yellow method) for determining the orthophosphate content. A reagent reacts with phosphate in the sample to color the sample solution yellow. The intensity of this color is recorded photometrically and evaluated as a measure of the phosphate content.

Technical Data OP 210

Resolution (Display)	Measuring range 1: 0.01 mg/l or µmol/l Measuring range 2: 0.1 mg/l or µmol/l Measuring range 3: 0.1 mg/l or µmol/l
Coefficient of variation for method	2% (for all measuring ranges)
Response time	< 3 min to measured value (after alteration in concentration at module input)
Measuring interval	Quasi-continuous measurement; 5, 10, 15, 20, 25 or 30 min settings
Calibration	Automatic 2-point calibration (time and interval selectable)
Background correction	Continuous background compensation based on new WTW algorithm
Sample input	Approx. 0.06 l/h, solid content <50 mg/l (e.g. sewage treatment plant effluent)
Consumption	Reagent, 10 l: 60/155/310/465 days with cont. /10/20/30 min measuring intervals Standard B 1.5 l: 90 days with 24 h calibration interval Cleaning solution, 1.5 l: 45 days with 24 h cleaning interval
Maintenance interval	Every 6 months

Measuring Range 1		
	mg/l	**µmol/l**
PO_4-P	0.05 - 3.00	1.5 - 100
PO_4	0.15 - 9.00	1.5 - 100

Measuring Range 2		
	mg/l	**µmol/l**
PO_4-P	0.1 - 10.0	3 - 320
PO_4	0.3 - 30.0	3 - 320

Measuring Range 3		
	mg/l	**µmol/l**
PO_4-P	0.1 - 25.0	3 - 800
PO_4	0.3 - 80.0	3 - 800

Ordering Information OP 210

Separate TresCon® analyzer module for Orthophosphate for extension of an existing TresCon® system (requires 1 measuring place)		**Order No.**
OP 210/ MB 1	Module for Orthophosphate: Measuring range 1	820 004
OP 210/ MB 2	Module for Orthophosphate: Measuring range 2	820 005
OP 210/ MB 3	Module for Orthophosphate: Measuring range 3	820 006
TresCon®-basic instrument with analysis module OP 210 for ortho-phosphate (wall mounting, space for 2 further modules)		**Order No.**
TresCon® P 211/MB1	Orthophosphate, Measuring range 1	8A-40030
TresCon® P 211/MB2	Orthophosphate, Measuring range 2	8A-50030
TresCon® P 211/MB3	Orthophosphate, Measuring range 3	8A-60030
TresCon® Uno single parameter system ortho-phosphate with analysis module OP 210		**Order No.**
TCU/P211-MB1	TresCon® Uno for Orthophosphate: Measuring range 1	820 104
TCU/P211-MB2	TresCon® Uno for Orthophosphate: Measuring range 2	820 105
TCU/P211-MB3	TresCon® Uno for Orthophosphate: Measuring range 3	820 106
	Accessories and Consumables see brochure "Product Details"	

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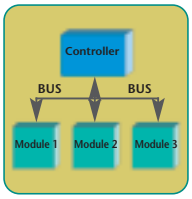
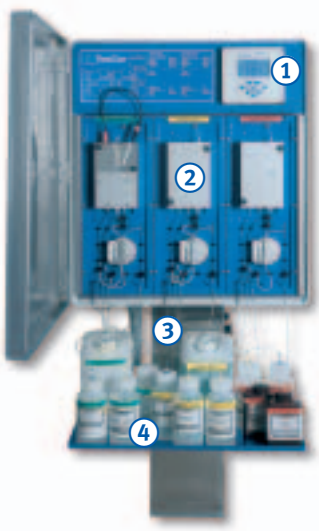
A Progressive Design
Modular System

The **TresCon®'s** individual system components, the central control unit and the self-contained analyzer modules, have heir own microprocessors which can perform specific tests independently.

The controller and the module communicate via high speed internal connections. Real-time control of the most difficult tests are easily accomplished with the **TresCon®'s** superior design. System can be custom designed to meet the operator's needs.





① System Controller Module

Equipped with a fast microprocessor, the controller includes a graphic display unit, a control panel and all the input/output interfaces. The controller inputs all application functions, calibration protocols, processing and storage of data and the display of measured results.)

If modules are added or exchanged TresCon will automatically recognize the new parameter and automatically updates the system. No operator servicing is required.

③ System Mounting

The stainless steel mounting column is an integral part of the TresCon® system. It is used for simple wall mounting and also contains the wide-range power supply for TresCon®.

② Analysis Modules

The analyzer modules are microprocessor-based, self-contained system components which will operate completely independant of each other. Up to three modules, in any combination of parameters, can be integrated into a single TresCon® system. The modules can be for the same parameter from different sample sites, or for any combination of the available parameters.

- NH_4-Module (Ammonium-Nitrogen)
- NO_3-Module (Nitrate-Nitrogen)
- NO_3/SAC-Module (Nitrate-Nitrogen and SAC)
- NO_2-Module (Nitrite-Nitrogen)
- PO_4-Module (Orthophosphate)
- ΣP-Module (Total Phosphorus)

Retrofitting or exchanging a module can be carried out in a few minutes. The new module is automatically recognized by the TresCon® controller and is immediately ready to use

④ Supplies Tray

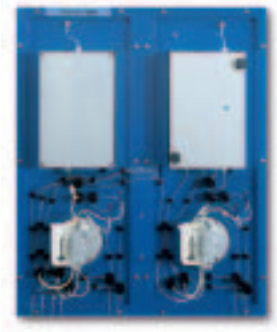
A tray holds all bottles and containers for reagent, standard and cleaning solutions. The containers are color-coded so that parameters and connections can be easily connected.

Ammonium-Nitrogen

Nitrate-Nitrogen/SAC

Nitrite-Nitrogen

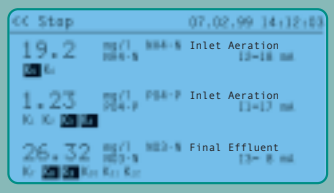
Orthophosphate



Total Phosphorus

IP 54 CE 1 Year Warranty

User Interface



Simple Operation

- Uniform user interface for the complete system
- Uniform operation of all analysis parameters
- Clear and logically structured system program
- Rapid and safe input by 8 function and control keys
- Quick Start Guide/Instruction Manual

Easy-to-read information and graphical presentation

- High-resolution backlit graphics display
- Up to 3 measuring parameters at a glance
- Clear presentation of measurement, units, individual text and assigned relays and current interfaces
- Daily or weekly trend curves for individual or several parameters in a single graph
- Status line for auxiliary information

Auto Functions of All Modules

AutoClean®	An innovative method for automatic self-cleaning whose high efficiency allows measurements in slightly polluted wastewater, e.g. in sewage treatment plant effluent, without sample preparation.
AutoCal	Automatic calibration and plausibility check at predefined time intervals – resulting in a higher degree of accuracy.
AutoKorr	A correction algorithm developed by WTW for compensating background color in the sample in photometric measuring methods.
AutoFlow	Function for continuously monitoring the container filling levels and the sample/reagent flow in the module and for producing useful maintenance messages.
AutoTherm	Automatic temperature control means that ambient temperature influences on the analytical results can be disregarded.
Interval	Software function for regular measurements at selectable intervals.
Interval-Program	Measuring program – for a period of one week the measuring intervals within two-hour sections can be defined. This allows extremely reagent-saving operation in periods where experience has shown that only slight variations in the measurements are to be expected.
AutoAdapt	Measuring routine for automatically adapting the measuring intervals to the rate at which the measurements alter in order to minimize operating costs.

System Inputs & Outputs

TresCon® standard features include a number of analog and digital outputs, which provide enhanced data management and control capabilities of the system. All inputs and outputs can be assigned at will to the installed analyzer modules and freely configured.

Serial Interfaces

Two serial input/output interfaces which can be operated independently are standard equipment in the analyzer. While the RS 232, for example, is linked to a local device for data recording – such as a printer –, the RS 485 interface allows for remote control of the unit.

If a telephone connection is available then TresCon® can be accessed and controlled by a remote computer via the RS 232 interface and a modem. The RS 485 interface also allows TresCon® to be coupled to PROFIBUS-DP by using a gateway.

PID Control

As an alternative to outputting the measured values, the analog outputs of TresCon® can also be used as PID controllers for control and feedback control purposes.

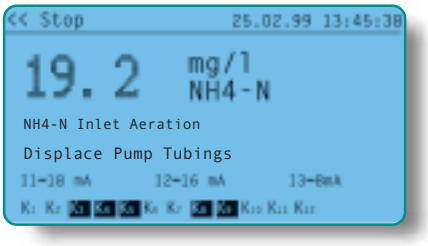
Proportional Control (PW/PF)

As well as being used for report or limit contacts, each relay can also be programmed as an impulse or frequency controller. Depending on the control function, in I/F control either the impulse length (I-control) or the impulse frequency (F-control) of the output signal is varied.

TC/PU 1 Two-Channel Permeate Switcher

By means of the TC/PU 1 Two-Channel Permeate Switcher **TresCon®** can analyze samples from two different sampling locations in sequence. As the two analyzer samples, e.g. the permeate flows from two **PurCon®** systems, are directly in contact with the switching valve, any alteration in concentration of either of the permeate flows can be registered within minutes. Up to three **TresCon®** modules can be connected to the TC/PU 1 Two-Channel Permeate Switcher. It is available as an accessory and can be mounted on the side of the **TresCon®** stand in a space-saving manner. Control is via the **TresCon®** terminal. The mA outputs and relays can be parametrized accordingly so that no additional external reporting units are necessary.

Maintenance and Service



TresCon® systems are service-friendly requiring little or no maintenance. The numerous useful system functions are easily accessed and changed. The operator is also prompted as to service intervals automatically. It has also been designed for easy access and maintenance.

Technical Data

Sample preparation	TresCon® analyzer modules require continuous sample input with a low solids content; typical sample preparation with PurCon® (see Sample Preparation Section).
Sample delivery	Sample presented for analysis in overflow vessels supplied; up to three analyzer modules can be connected to one overflow vessel. Operation with up to three overflow vessels is also possible (parallel analysis of different samples).
Interfaces	3 freely configurable galvanically separated 0/4-20 mA outputs, 12 potential-free relays, freely configurable, RS 232, RS 485.
Electrical connections	230 VAC ± 10%, 50 Hz / 115 VAC ± 10%, 50 – 60 Hz
Ambient conditions	Storage temperature – 77 … 140 °F (25 … 60 °C), operating temperature 32 … 104 °F (0 … 40 °C), climate class 4, VDI/VDE 3540 Bl. 2
Test marks	CE, DIN-GOST
Instrument protection	Safety class I according to IEC 1010-1/EN 61010-1
Weight	Empty housing: 59.5 lb (27 kg); each module: 22 lb (10 kg); mounting column: 55 lb (25 kg)
	The technical data of the analyzer modules can be found on pages 36 to 53.

Ordering Information

			1st module	2nd module	3rd module		
One TresCon® basic instrument (without module) consisting of:	TresCon® terminal, mounting column, reagent tray, overflow vessels for max. three modules, terminal operating instructions (German)						
	If operating instructions in English are required these must be ordered separately.						
TresCon® basic instrument (with first analyzer module)							
TresCon® Ammonium, A111	Basic instrument with OA 110 module for Ammonium-Nitrogen	**8A-1**				3	
TresCon® Nitrate, N211	Basic instrument with ON 210 module for Nitrate-Nitrogen	**8A-2**				3	
TresCon® Nitrite, N511	Basic instrument with ON 510 module for Nitrite-Nitrogen	**8A-3**				3	
TresCon® Orthophosphate, P211/MB 1	Basic instrument with OP 210/MB1 module for Orthophosphate (measuring range 1)	**8A-4**				3	
TresCon® Orthophosphate, P211/MB 2	Basic instrument with OP 210/MB2 module for Orthophosphate (measuring range 2)	**8A-5**				3	
TresCon® Orthophosphate, P211/MB 3	Basic instrument with OP 210/MB3 module for Orthophosphate (measuring range 3)	**8A-6**				3	
TresCon® Nitrate/SAC, S211	Basic instrument with OS 210 module for Nitrate-Nitrogen and SAC	**8A-7**				3	
TresCon® Total Phosphorus, P511	Basic instrument with OP 510 module for Total Phosphorus (requires two module places)	**8A-8**		X		3	

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