

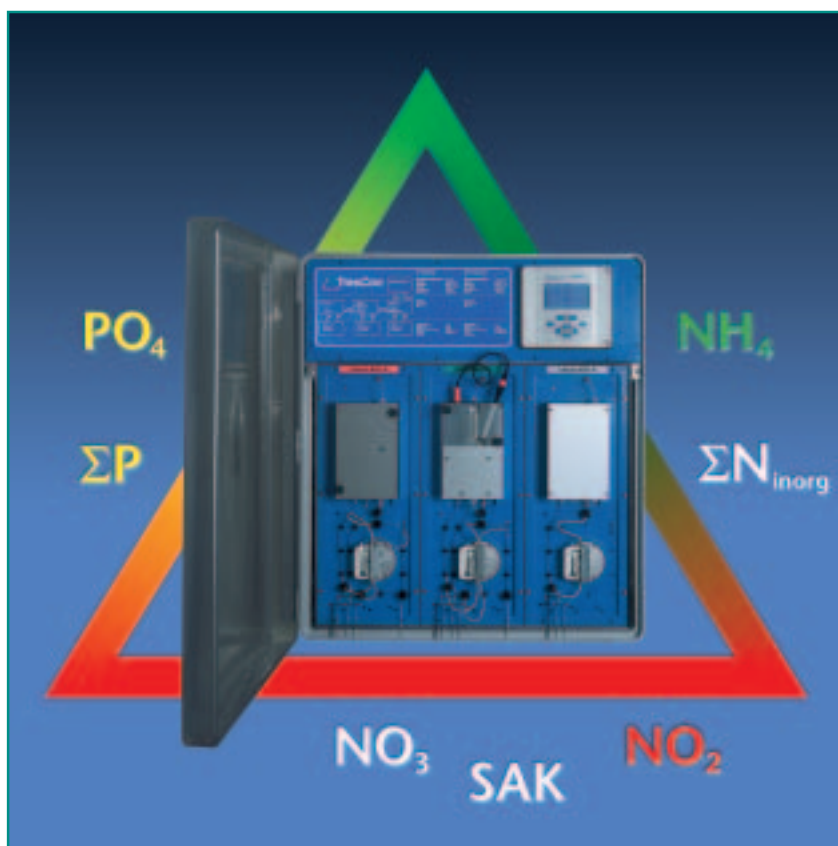


TresCon[®]

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.



TresCon[®] OP 510

Total phosphorus analyzer module

- On-line analysis of total phosphorus for wastewater treatment plant effluent
- Rapid analysis at 10 min intervals
- 2-point calibration – high degree of accuracy
- Automatic Cleaning
- Automatic Monitoring
- Blue method



On-line P_{Total} measurement

- Monitoring the effluent from wastewater treatment plant for P_{Total}
- Monitoring phosphorus pollution in natural waters

	Measuring Range*	
	mg/l	µmol/l
P _{Total}	0.01 ... 3.00/ 6.00*	0.3 ... 100/ 200*

* by continuous sample dilution in a 1:1 ratio



TresCon® OP 510

Parameter section

Dissolved Oxygen

pH/ORP

Conductivity

Turbidity/
Suspended Solids

Nitrogen

Phosphate

Carbon:
COD/TOC/DOC/
BOD/SAC

Measuring Principle

The P_{Total} module consists of two units: in the first unit (digestion unit) the sample undergoes a chemical-thermal digestion; in the second unit the total phosphorus content is determined.

During the **digestion** all the phosphorus compounds contained in the sample are converted to orthophosphate; this can be determined photometrically. The phosphorus compounds are oxidized by peroxodisulfate under acidic conditions. This process is accelerated by overpressure and an increased temperature so that very short digestion times are achieved.

The subsequent **analysis** is by the molybdenum blue method. The sample is mixed with a molybdate reagent which reacts with phosphate via an intermediate chemical step to form a blue coloration. The intensity of this coloration is a measure of the original concentration of the phosphate ions. It is measured photometrically and evaluated.

Technical Data

Resolution (Display)	Range: 0.01 ... 3.00 mg/l : 0.001 mg/l 0.30 ... 100 µmol/l : 0.1 µmol/l
Measuring principle	Photometric reference beam method after digestion
Measuring method	Molybdenum blue method
Coefficient of variation for method	1.5%
Measuring interval	10, 15, 20, 25, 30 or 60 min can be set (DIN EN measurement with 30 min digestion at approx. 248 °F/120 °C)
Calibration	Fully automatic 2-point calibration
Consumption	Reagents A, B, C, D: 10/15/20/30/60 days with 10/15/20/30/60 min measuring interval Standard, 1.5 l: 70 days with 24 h calibration interval Cleaning solution, 1.5 l: 60 days with 24 h cleaning interval
Maintenance interval	Every 6 months

Ordering Information Total Phosphorus OP 510

		Order No.
OP 510	Separate TresCon® analyzer module for total phosphorus for extension of an existing TresCon® system (requires 2 TresCon® measuring places)	820 011
TresCon® P 511	TresCon®-basic instrument with analysis module OP 510 for total phosphorus (wall mounting, space for 1 further module) Accessories and Consumables see brochure "Product Details"	8A-8X030

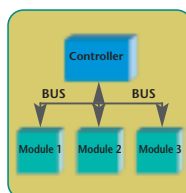
Homogenizer available on demand (see brochure "Product Details")



A Progressive Design Modular System

The TresCon®'s individual system components, the central control unit and the self-contained analyzer modules, have their 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 independent 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.

- NH₄-Module (Ammonium-Nitrogen)
- NO₃-Module (Nitrate-Nitrogen)
- NO₃/SAC-Module (Nitrate-Nitrogen and SAC)
- NO₂-Module (Nitrite-Nitrogen)
- PO₄-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



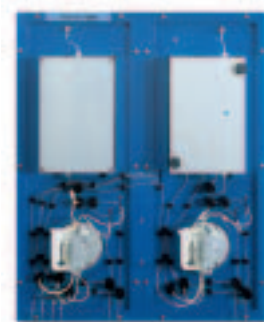
Nitrate-Nitrogen/SAC



Nitrite-Nitrogen



Orthophosphate

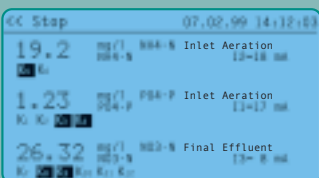


Total Phosphorus





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.



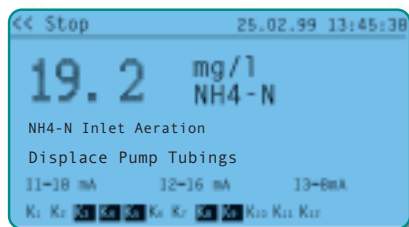
TC/PU 1 Two-Channel Permeate Switcher

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 oper-

ator 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) <i>The technical data of the analyzer modules can be found on pages 36 to 53.</i>

Ordering Information

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)

		1st module	2nd module	3rd module
TresCon ® Ammonium, A111	Basic instrument with OA 110 module for Ammonium-Nitrogen	8A-1	<input type="checkbox"/>	<input type="checkbox"/>
TresCon ® Nitrate, N211	Basic instrument with ON 210 module for Nitrate-Nitrogen	8A-2	<input type="checkbox"/>	<input type="checkbox"/>
TresCon ® Nitrite, N511	Basic instrument with ON 510 module for Nitrite-Nitrogen	8A-3	<input type="checkbox"/>	<input type="checkbox"/>
TresCon ® Orthophosphate, P211/MB 1	Basic instrument with OP 210/MB1 module for Orthophosphate (measuring range 1)	8A-4	<input type="checkbox"/>	<input type="checkbox"/>
TresCon ® Orthophosphate, P211/MB 2	Basic instrument with OP 210/MB2 module for Orthophosphate (measuring range 2)	8A-5	<input type="checkbox"/>	<input type="checkbox"/>
TresCon ® Orthophosphate, P211/MB 3	Basic instrument with OP 210/MB3 module for Orthophosphate (measuring range 3)	8A-6	<input type="checkbox"/>	<input type="checkbox"/>
TresCon ® Nitrate/SAC, S211	Basic instrument with OS 210 module for Nitrate-Nitrogen and SAC	8A-7	<input type="checkbox"/>	<input type="checkbox"/>
TresCon ® Total Phosphorus, P511	Basic instrument with OP 510 module for Total Phosphorus (requires two module places)	8A-8	<input checked="" type="checkbox"/>	<input type="checkbox"/>