

# PROCESS OPTIMISATION THROUGH REAL TIME CONTROL (RTC)



## Wastewater treatment. In Control.

Hach®'s RTC solutions consist of standardised feed-forward- and/or feed-back control modules, which are specifically designed for the requirements of biological sewage treatment to optimise various sub-processes of wastewater treatment. This ensures that your plant always meets the required effluent consent while minimising operating costs. The RTC modules are available in different variants to meet different system types. If several processes are to be automated, the RTC modules can also be easily combined. Our specialists are available to assist you with the analysis of your waste water treatment and sludge treatment processes and to advise you on the selection of suitable RTC modules.

### A standardised system

The modular RTC modules can be quickly integrated into an existing automation structure without much effort. Standardisation of the control algorithms eliminates the need to create specifications, implementing the algorithms in the PLC, and often cost-intensive testing of the software on-site. After the installation, Hach supports you with the parameterisation of your system so that the transition to the real-time-controlled cleaning of the sewage is seamless and safe.

### Safe compliance with limits

The combination of process measurement technology and RTC modules is suited to react immediately to load peaks in the inlet to the sewage treatment plant in order to guarantee a consistent effluent quality. This ensures that legal requirements are met at all times.

### Reduction of operating costs

Since 2012 more than 1,500 standardised control modules have been successfully installed on more than 800 sewage treatment plants with a load of just a few 1,000 PE up to 3.5 million PE. In addition to the increase in operational safety, savings of between 10 and 30% have been achieved for energy, precipitants or polymers, depending on the initial situation.

### When we say service, we mean service!

A complete Service package includes local field service experts to provide routine maintenance visits and warranty repair, plus a team of remote technical experts with the ability to monitor your system to ensure optimum performance. It's like having a Hach Technician right there with you at the facility.

## Integration

The standardised control modules are available for the processes listed in the table below. They are used as individual modules, but can also be combined on a single hardware if several processes are to be optimized on a plant. All input signals and control variables can be exchanged digitally via a fieldbus or via TCP / IP with PLC or the control system. Alternatively, however, analog integration is also possible.

The software modules are installed on an industrial PC (IPC). The control modules are operated either on-site via a touch panel IPC or via a remote access.

### Overview Available Modules

Model	Application	Input Parameter	Output	Benefit
<b>RTC-P</b>	Chemical phosphate removal	$PO_4\text{-P}$ , $Q_{In}$	$Q_{Precipitation}$	Maintain compliance based on stable $PO_4\text{-P}$ discharge values, reduced precipitant consumption and less precipitation sludge, improved acid capacity
<b>RTC-N/DN</b>	Denitrification, intermittent	$NH_4\text{-N}$ , $NO_3\text{-N}$ , $Q_{In}$	Nitrification/ denitrification signal	Maintain compliance based on stable $NH_4\text{-N}$ and $N_{tot}$ discharge values, reduced energy consumption for aeration
<b>RTC-OXD</b>	Denitrification, simultaneous	$NO_3\text{-N}$ , $NH_4\text{-N}$ , $Q_{In}$	Aeration volume and intensity	
<b>RTC-N</b>	Nitrification (upstream denitrification)	$NH_4\text{-N}_{In}$ , $NH_4\text{-N}_{Out}$ , TSS, Temp., $Q_{In}$	$O_2$ setpoint (profile)	
<b>RTC-SZ</b>	Control of facultative aerated zones	$NH_4\text{-N}_{In}$ , $NH_4\text{-N}_{Out}$ , TSS, Temp., $Q_{In}$ <i>As additional option for RTC-N and RTC-N/DN</i>	Activation/deactivation	
<b>RTC-DN</b>	Denitrification (recirculation / ext. C)	$NO_3\text{-N}$ , $Q_{In}$ <i>Only in combination with RTC-N</i>	$Q_{Reci}$ , $Q_{external\ C}$	Maintain compliance based on stable $NH_4\text{-N}$ and $N_{tot}$ discharge values, minimised external C dosage
<b>RTC-DO</b>	Aeration process	$O_2$ <i>As additional option for RTC-N and RTC-N/DN</i>	Blower frequency, valve opening	Reduced energy consumption for aeration
<b>RTC-SRT</b>	Sludge age	$TSS_{AT}$ , $TSS_{RLS}$ , $O_2$ , Temp. <i>Only in combination with RTC-N or RTC-N/DN</i>	$Q_{waste\ activated\ sludge}$	Maintain compliance based on stable $NH_4\text{-N}$ discharge values, reduced energy consumption for aeration
<b>RTC-ST</b>	Sludge thickening	$TSS_{In}$ , $TSS_{Out}$ , $TSS_{Filt}$ , $Q_{In}$	$Q_{Polymer}$ , $Q_{feed}$	Reduced polymer consumption, improved gas production during sludge digestion
<b>RTC-SD</b>	Sludge dewatering	$TSS_{In}$ , $TSS_{Cent}$ , $Q_{In}$	$Q_{Polymer}$ , $Q_{feed}$	Reduced polymer consumption, increased solids concentration in the dewatered sludge
<b>RTC-DOS</b>	Nutrient dosing	$TOC_{In}$ , $NH_4\text{-N}$ , $PO_4\text{-P}$ , $NO_3\text{-N}$	$Q_{N\text{-component}}$ , $Q_{P\text{-component}}$	Reduced nutrient dosing