

**Precise basis weight CD profiling
with best profile stability**
OnQuality.Actuators



Best profile quality with high control dynamics

Voith has developed its OnQuality.Actuators to control the dilution water valves or slice lip geometry on headboxes. These products regulate the basis weight and guarantee the best CD profiles

By the time raw materials, water and chemicals come together, Voith automation products have long since been doing their precision work to prepare for this step. As part of this process, measuring and control systems ensure exact process variables. Careful upkeep and maintenance of the modern automation environment is absolutely essential to ensure a faultless production workflow. Experienced service personnel from Voith support papermakers through regular maintenance and initiate the necessary measures in the event of problems. This is ideally complemented by a broad range of training for the mill's workforce.

OnQuality.Actuators

In paper manufacturing, the quality of the paper produced is highly dependent on the CD basis weight profile of the product. As in many other producing industries, the more uniform the product the better. To obtain uniform CD profiling of basis weight, and thus achieve good profile stability, Voith developed the actuators of the OnQuality product range. They are impressively accurate, even under the most challenging conditions, and also feature highly precise positioning.

If existing CD profiling equipment to deviations and thus to quality and losses of profit, upgrading or retrofitting with Voith products can provide a solution. This highlights yet another advantage of the OnQuality product range: whether they are installed as part of new systems or upgrades, actuators like OnQ ModuleStep, OnQ ModuleTap and OnQ ModuleJet represent a valuable improvement to any machine.

Basis weight actuators

OnQ ModuleJet and OnQ ModuleTap were developed specifically for dilution headboxes. The basis weight controller controls the dilution water in each control zone and thus evens out the profile. OnQ ModuleStep, which was designed for conventional slice lip controls, can be retrofitted easily to almost all headboxes and includes actuators for lip adjustment and the control unit.

Moisture profile and coating weight actuators

As well as basis weight actuators, Voith also offers a range of actuators for CD profiling for moisture and coating weight to meet additional quality requirements.



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1 HW20

2 SCM 79/S attached gearbox

3 LCA 600-10

Fields of application

	HW20	LVM6	SCM79/S	LCA600
<p>Dilution Control OnQ ModuleJet, OnQ ModuleTap</p>	●	●	●	●
<p>Slice lip Control OnQ Module Step</p>	●	●	●	●
<p>Actuator Control Units Standard: ACB-7</p>	●	●	●	●
<p>Optional: VAM</p>	○	○	○	○



Outstanding results in CD profile control

To achieve automation processes that are seamlessly coordinated with one another and optimum results, Voith actuators are connected to the proven system platform Voith ComCore. As a result, the system is perfectly tailored to the machine.

Voith ComCore provides comprehensive overview

To obtain optimum results in CD profiling, a diverse range of constellations and complex interactions have to be taken into consideration. Over time, the demands imposed on applications have grown steadily. Conventional systems often consist of several platforms, resulting in different user interfaces, longer startup times and also increased maintenance and servicing needs.

Voith ComCore allows you to focus on what matters. Because just one click gives the platform access to all key information from your quality control system. An intuitive user interface and low maintenance requirement help to get the job done as easily and quickly as possible. The flexible, readily scalable system architecture can be extended at any time. Because it uses Microsoft Internet Explorer, standard PCs can also be used as operating stations, avoiding expensive software licenses and costs for special hardware. Likewise, the web browser also allows access from the company's intranet and via commercially available tablet computers. Via a tablet, the service technician has an overview of the entire process. This considerably simplifies the servicing job and ensures complete

reliability. Thanks to the integrated information system, Voith ComCore not only offers traditional QCS functions but also operating trends, reporting and extended analysis functions.

Profilmatic for optimum CD profile control

As a key component of Voith ComCore, Profilmatic includes numerous progressive control strategies with fast response times that deliver reliable, flat cross profiles. Because several process models and grade-specific target profiles are used, every paper grade gets the appropriate control setting. In the process, a dynamic algorithm ensures the correlation of the actuators to the profiles determined by the scanner at all times. Deviations due to paper shrinkage and wandering of the paper web are automatically compensated. The capabilities of Profilmatic are particularly demonstrated following web breaks and during grade changes: supported by statistical process control (SPC) algorithms and adaptive control parameters, the customary high-quality profiles are quickly restored. To save raw materials and energy, various modes of operation are available to optimize the economic efficiency of the production process.



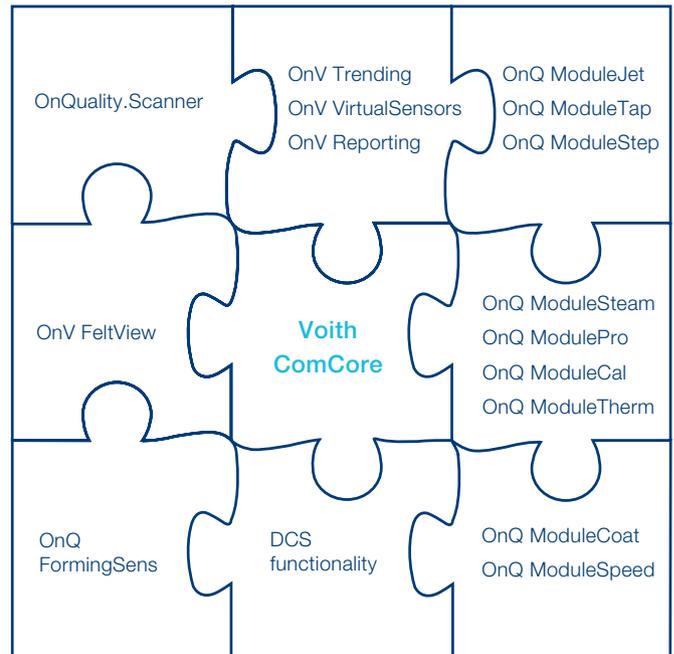
4 OnQ ModuleJet actuators with control unit

5 The clearly laid-out design of the user interface means it is easy to navigate and use.

Benefits

- + Web-based operation
- + Easy to use, just like browsing the web
- + No complex client installation necessary
- + Mobile clients for maintenance activities in the field
- + Integrated alarm function and data history
- + Analysis functions (FFT, correlation etc.)
- + Fast and easy remote service and maintenance options
- + Scalable and flexible architecture for stand-alone products through to complete QCS
- + Reliable, easy to maintain and operate due to the use of industry standards
- + Time-saving and well organized thanks to platform solutions
- + Minimal servicing and tuning requirement
- + Fast and accurate CD profile control
- + No disruptive bump tests during operation
- + Two measured criterias in one actuator system
- + Networked control structures ensure optimum control behavior and decouple technologically linked control loops (feed forward control)

Know-how from a single source





Optimum Long-term CD Profile Control OnQ ModuleJet

OnQ OnQ ModuleJet is the preferred option for dilution water CD profile control at head-boxes, because the interplay of state-of-the-art actuator technology, multi-variable control software and special valves guarantees consistently high profile quality.

Best actuators

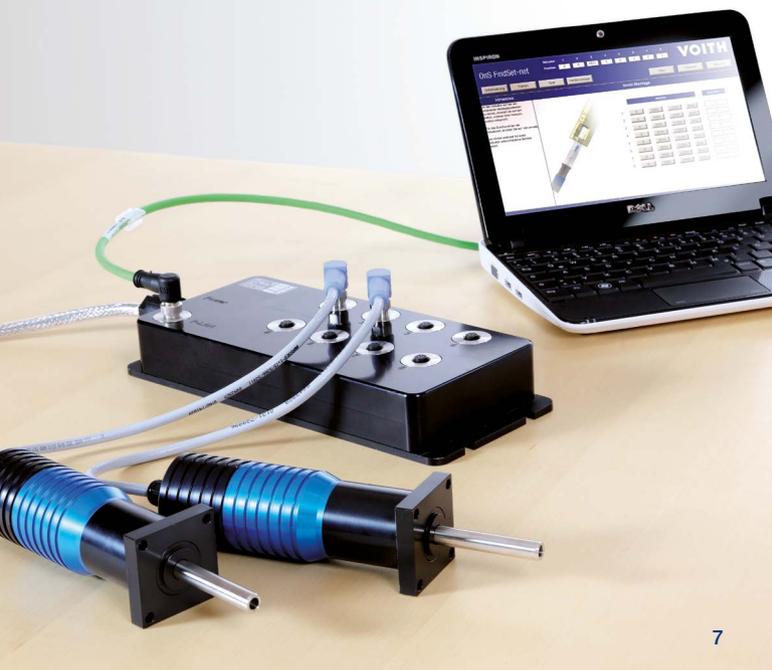
The OnQ ModuleJet actuator has already been installed 35 000 times for CD profiling in headboxes using dilution water technology and has impressed customers worldwide with its reliability. The inflow of dilution water is precisely metered using highly accurate linear motion and a specially developed valve. This proven system has now been improved yet again. OnQ ModuleJet is an automated control system that ensures consistent quality of the CD basis weight profile.

Consistently high quality

The combination of Profilmatic control software and OnQ ModuleJet actuator system guarantees good, uniform basis weight cross profiles and also ensures short settling times after malfunctions, resulting in a reduction of broke. In addition, it offers the papermaker a range of diagnostic options like trend display, trend correlation and calculation of shrinkage curves. Moreover, the customer can request support from automation specialists at any time via a remote-access server.

High availability guaranteed

The powerful electronics are separated from the motor unit with spindle drive and can therefore be readily installed so they are protected from white water, which substantially extends service life. A single electronics unit can control up to eight actuators. It also communicates directly with the Profilmatic control system. A great advantage of this system is that the actuators can be replaced by local personnel in a maximum of ten minutes during operation and without the need for parameter setting. A fast, secure Ethernet-based 100 Mbit/s fieldbus allows comprehensive and fast diagnosis up to and including the motor unit. Due to the star topology of the bus system, up to 2 048 drives can be connected per network segment. In addition, a software function ensures that positioning of the actuators is absolutely accurate. OnQ ModuleJet complies with protection class IP67 and can even be used at ambient temperatures of up to 70°C. The actuator system is completely submersible for short periods and is therefore well protected from water spray during normal operation.



- 6 Uniform basis weight cross profiles thanks to OnQ ModuleJet
- 7 OnQ ModuleJet actuators with Actuator Control Box (ACB-7) and diagnostic software.

Benefits OnQ ModuleJet

- + Uniform cross-profiling for high quality
- + Fast, inexpensive connection when retrofitting new valve-actuator unit
- + Extended service life due to separation of control electronics and motor
- + Rugged, durable construction
- + Failure detection with actuator identification
- + Diagnosis time for key components 2 ms
- + Proven Ethernet technology in widespread international use, no special knowledge or devices necessary
- + High transfer security thanks to Ethernet protocol
- + Unlimited number of actuators (2 048 per IP segment), readily extendable
- + Complete remote diagnosis via SNMP
- + Automatic assignment of IP address to actuator
- + Fast support by Voith experts possible via remote service
- + Simultaneous travel of all actuators prevents process noise

Stepper motor LVM6

Nominal linear force	nom. 300 N @ v = 200 Hz
Travel	30 mm
Resolution	2.5 µm/step
Steps	200 per revolution
Power supply	24 V, 1 A _{DC}
Protection class	IP67 at max. 70°C ambient temperature
Operating voltage	22 – 23 V, 0,6 A

Actuator Control Box ACB-7

Number of axes	8
Operating mode	Full step
Data interface	Ethernet TCP/IP
Type of protection	IP67 bei max. 70°C ambient temperature
Surface protection	Aluminum housing (AlMgSi1), black anodized
Rating	For stepped motors with 10 – 60 Ω
Step resolution	Full step, configured for micro-stepping
Operating voltage	19,2 V _{DC} – 30 V _{DC}
Current consumption	max. 5 A
Option: Actuator Control Unit VAM	



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CD profile control at the headbox

OnQ ModuleTap

With OnQ ModuleTap Voith is extending its actuator range especially for dilution water headboxes from other vendors to provide the benefits of an end-to-end quality control system.

Large global application area

OnQ ModuleTap is an actuator for use in dilution headboxes with ball valves. In total there are over 35 000 Voith headbox actuators already in use worldwide.

Thanks to an integrated gear unit, OnQ ModuleTap can execute a rotary motion of 0 – 90°, as a result of which the valve can be opened or closed automatically and very precisely.

Uniform CD basis weight profiles

On many headboxes, the CD basis weight profiles are still controlled manually by the operating personnel. This often leads to especially undesirable fluctuations of the CD basis weight profile which is reflected in correspondingly poor quality and unnecessary and avoidable production costs. With OnQ ModuleTap, the papermaker gets an automatic control system that ensures the consistently high quality of the CD basis weight profile.

Also excellently suitable for rebuilds

The OnQ ModuleTap actuator system from Voith is equally suitable for rebuilds of existing headboxes and can also be used in headboxes from other manufacturers. This results in measurable benefits, especially when replacing existing actuator systems.

Existing dilution water systems with manual control can also be equipped with an automatic CD profile controller. A large number of integrated interfaces also allows the capture of quality measuring data from the systems of other vendors. In most cases, the existing interface can simply be re-used when replacing the system.

The software for OnQ ModuleTap is part of Profilmatic and is fully integrated into the Voith ComCore platform.

Vorteile OnQ ModuleTap

- + Simultaneous adjustment of all actuators ensures fast response and improved quality
- + Suitable for installation on almost all dilution water headboxes with ball valves
- + Resolution of more than 7 500 steps ensures good control quality
- + Model-based control strategies ensure optimum profiles and fast grade changes
- + High torque for reliable valve adjustment
- + Re-use of existing valves possible

Modellvarianten OnQ ModuleTap

OnQ ModuleTap HW20

Specification HW20

Max. torque	20 Nm
Angle of rotation	90° (clockwise or anti-clockwise, continuous)
Resolution	0.012°
Speed	6°/sec.
Pulse generator	3 750 steps/90°

Actuator Control Box ACB-7

Number of axes	8
Operating mode	Full step
Data interface	Ethernet TCP/IP
Type of protection	IP67 at max. 70°C ambient temperature
Surface protection	Aluminum housing (AlMgSi1), black anodized
Rating	For stepped motors with 10 – 60 Ω
Step resolution	Full step, configured for micro-stepping
Operating voltage	19.2 V _{DC} – 30 V _{DC}
Current consumption	max. 5 A

Option: Actuator Control Unit VAM



Accurate control of basis weight

OnQ ModuleStep

It has been standard practice for many years to control the CD basis weight profile by adjusting the aperture of the headbox. The OnQ ModuleStep actuator family offers individually adjusted actuators for existing and new installations.

Comprehensive actuator systems

OnQ ModuleStep controls the actuators for the aperture adjustment on headboxes to optimize the CD basis weight profile. The complete profiling system consists of the OnQ ModuleStep actuators with position measurement and Profilmatic control unit. The Profilmatic CD profile control for the basis weight can be a component of the Voith quality control system or can also be combined with an existing measuring system. The design and the required force decide which actuator is used.

Flexible and robust

OnQ ModuleStep actuators are suitable for installation on all headbox models. Their housings are water-tight and work reliably even under extreme environmental conditions.

Excellent control quality

In all Voith actuator models, gear units that have been tried and tested in practice ensure precise adjustments. Thanks to the synchronous control of all actuators, excellent control dynamics are also achieved and paper quality improved. The precise position measurement function integrated into the system ensures extensive protection of the headbox aperture and therefore reduces the maintenance requirement.

Comprehensive overview

The Profilmatic software provides continuous information about all key parameters. Its innovative control strategies include both auto-mapping and an optimization of the deflection curve. Algorithms help to protect the headbox aperture against any overstress.



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10 OnQ ModuleStep at the machine

11 OnQ ModuleStep SCM79-S

12 OnQ ModuleStep LCA600-10 with ACB-7

Detailed description

The extremely rugged design of the OnQ ModuleStep actuators ensures high reliability under extreme conditions. The actuator includes a high-resolution stepped motor, a gear unit, a position measuring device and a manual adjusting button.

Also ideal for rebuilds

The OnQ ModuleStep actuator system is ideal for retrofitting basis weight CD controls to headboxes that previously could only be adjusted manually or in cases where the actuators of other vendors are no longer available. This means that a significant improvement in paper quality can be achieved at a reasonable investment cost.

Vorteile OnQ ModuleStep

- + Simultaneous adjustment of all actuators
- + Installation on all types of headbox
- + Step size of 0.25 µm ensures good control quality
- + Position measurement monitors actuator adjustment and thus protects the aperture
- + Rugged and durable gears
- + Progressive control strategies
- + Water-tight actuator housing
- + Actuator Control Box ACB-7

Option: Actuator Control Unit VAM

Model variants OnQ ModuleStep

OnQ ModuleStep SCM79/S
 OnQ ModuleStep LCA600-10
 OnQ ModuleStep HW20

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