




Automation

Unattended manufacturing & digital monitoring



Automation

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Manufacturers who desire cost-effective processes in the future will have no other choice but to automate. This trend will continue to rise, especially in the case of smaller production runs. Machines and equipment must be flexible, and ideally they should automate themselves, as well as autonomously test the quality that they produce. The machine operator only wants to be informed as soon as the process is outside of the defined limits.

Our solutions make all of this possible – culminating in automated change-over of entire clamping devices. Not to mention our clamping devices with integrated electronics. The comprehensive monitoring capabilities of IQ clamping devices eliminate the need for measuring machines. And if you need complete automation concepts for turning, milling, grinding or assembly, we can deliver these as well.

You buy the machine, we do the rest.

AUTOMATION

IQ clamping devices with integrated measurement intelligence

IQ chucks & IQ mandrels

with integrated intelligent measuring technology



IQ clamping device with integrated smart measuring functions

Chucks and mandrels with IQ take over the monitoring of production and facilitate work steps. They enable quality control with 100 % good parts, and automated processes detect errors early on so you can take countermeasures.

Integrated sensors enable numerous different measuring and monitoring functions. The measured data is relayed via contactless transmission of data and energy directly to the machine controller where it is analyzed. The controller executes a setpoint comparison. If there are deviations, a message is output or a correction is initiated.

Long-term control is possible with the data obtained through »condition monitoring«. Thus traceability as stipulated in DIN EN 1550 is ensured.

Key advantages

- Clamping and measurement of the workpiece Ø in one step
- Measurement of temperature and RPM of the clamping device
- Automated detection of the workpiece end-stop
- Continuous clamping force monitoring directly on the workpiece

Your benefits









- Reduce measurement procedures
- Prevent scrap
- Increase machine availability and process capability
- Ensure as-needed and status-oriented maintenance intervals
- Monitoring of defined clamping forces
- Document the measurement results



Measuring station

IQ clamping devices with integrated measurement intelligence

IQ clamping devices at a glance

	TOPlus IQ chuck		SPANNTOP IQ chuck		MAXXOS IQ mandrel	MANDO IQ mandrel	
							
Variant	Pull-back	Deadlength	Pull-back	Deadlength	T211 pull-back	T211 pull-back	T212 pull-back
Variant	SE [hexagonal] 		RD [round] 		SE [hexagonal] 	RD [round] 	
Sizes	52, 65, 100		32, 42, 52, 65, 80, 100, 125, 160		A, B, C, D, E, F	0, 1, 2, 3, 4, 5, 6, 7	XXS, XS, S, 0, 1, 2, 3, 4, 5, 6, 7
Clamping range of all sizes [mm]	3 – 100		3 – 160		18 – 100	20 – 200	8 – 190
Actuation	Pull	Push	Pull	Push	Pull	Pull	
Clamping elements	Standard clamping head SE		Standard clamping head RD		Standard segmented clamping bushing SE	Standard segmented clamping bushing RD	
Adaptations	Can be used, however without IQ function				No adaptations available		
Applications	Lathe, vertical lathe, milling machine, machining center, grinding machine, measuring machine, assembly workstation						
Use	Clamping of raw material, clamping of finished material, measuring, final inspection						
Measurement parameters							
Workpiece Ø	✓	✓	✓	✓	✓		✓
Temperature	✓	✓	✓	✓	✓		✓
RPM	✓	✓	✓	✓	✓		✓
Workpiece contact	✓		✓		✓		✓
Workpiece clamping force	✓	✓					

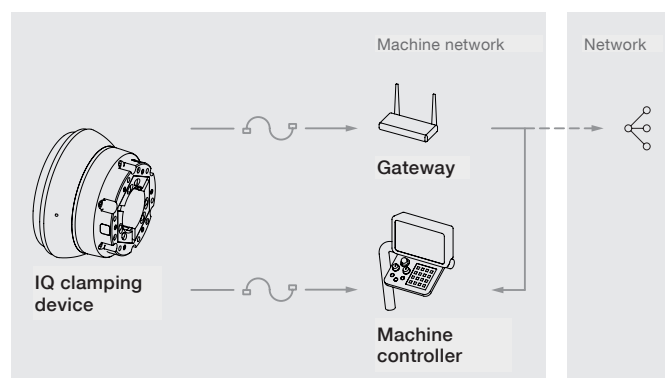
HAINBUCH scope of delivery

- IQ clamping device
- Modulator for the communication between clamping device and machine [machine controller]
- Register description for parameterization of the industrial fieldbus system

Integration tasks of the machine builder

- Adapt software for control of the machine cycle
- Provide the input and output required on the machine side
- Visualize the measured values and interaction buttons on the user interface

Transmission of data and energy



Touchless transmission of data and energy between the rotating clamping device and the stator fixed on the headstock.

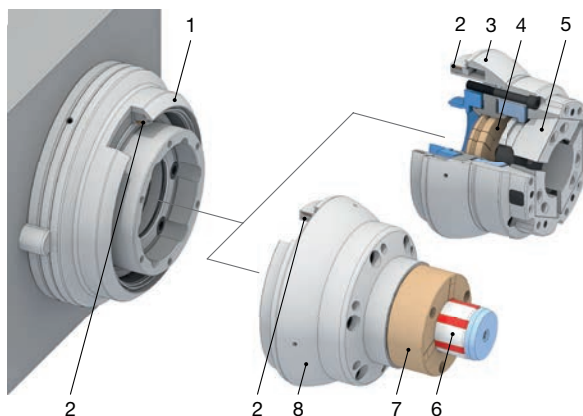
The data can be transmitted with a fieldbus system [e.g. PROFINET] directly to the machine controller or to a gateway.

IQ clamping devices with integrated measurement intelligence

IQ clamping devices in detail

Designation

- 1 Stator on the fixed headstock
- 2 Touchless, inductive transmission of data and energy
- 3 TOPlus IQ chuck
- 4 Workpiece end-stop TOPlus IQ chuck with 3-point part support contact for air-sensing control
- 5 Standard clamping head
- 6 Standard segmented clamping bushing
- 7 Workpiece end-stop MANDO IQ mandrel with 3-point part support contact for air-sensing control
- 8 MANDO IQ mandrel



Measuring and monitoring possibilities



Workpiece diameter

- Clamping and measuring in one step – without additional measuring machine [»inline measuring«]
- Accuracy: in $\varnothing \pm 0.01 \text{ mm}$

Application example: Detects whether the correct diameter was produced in the upstream machining.



Workpiece contact

- Detects the workpiece contact through sensors in the basic body and through the 3-point part support contact on the workpiece end-stop
- Minimum thickness of foreign objects: $\geq 0.03 \text{ mm}$

Application example: Detects chips on the workpiece end-stop without complex air sensing control with rotary unit and piping.



Temperature

- Measuring of the temperature of the clamping device
- Accuracy: $\pm 1 \text{ }^{\circ}\text{C}$

Application example: Detects a gradual temperature change, triggered by the machining process, which can be taken into account for measuring procedures.



Workpiece clamping force

- Continuous clamping force monitoring directly on the workpiece
- Deviation from a calibrated clamping force value is determined [not an absolute measurement]

Application example: Detects whether clamping force that is suitable for the workpiece has been set on the hydraulic unit/clamping cylinder – this is the prerequisite for automated manufacturing of different workpieces.

In addition, analysis of the clamping force measurement data enables reliable-process manufacturing and is an important component of maintenance as-needed.



RPM

- Measuring the RPMs of the clamping device
- Accuracy: $\pm 1 \%$

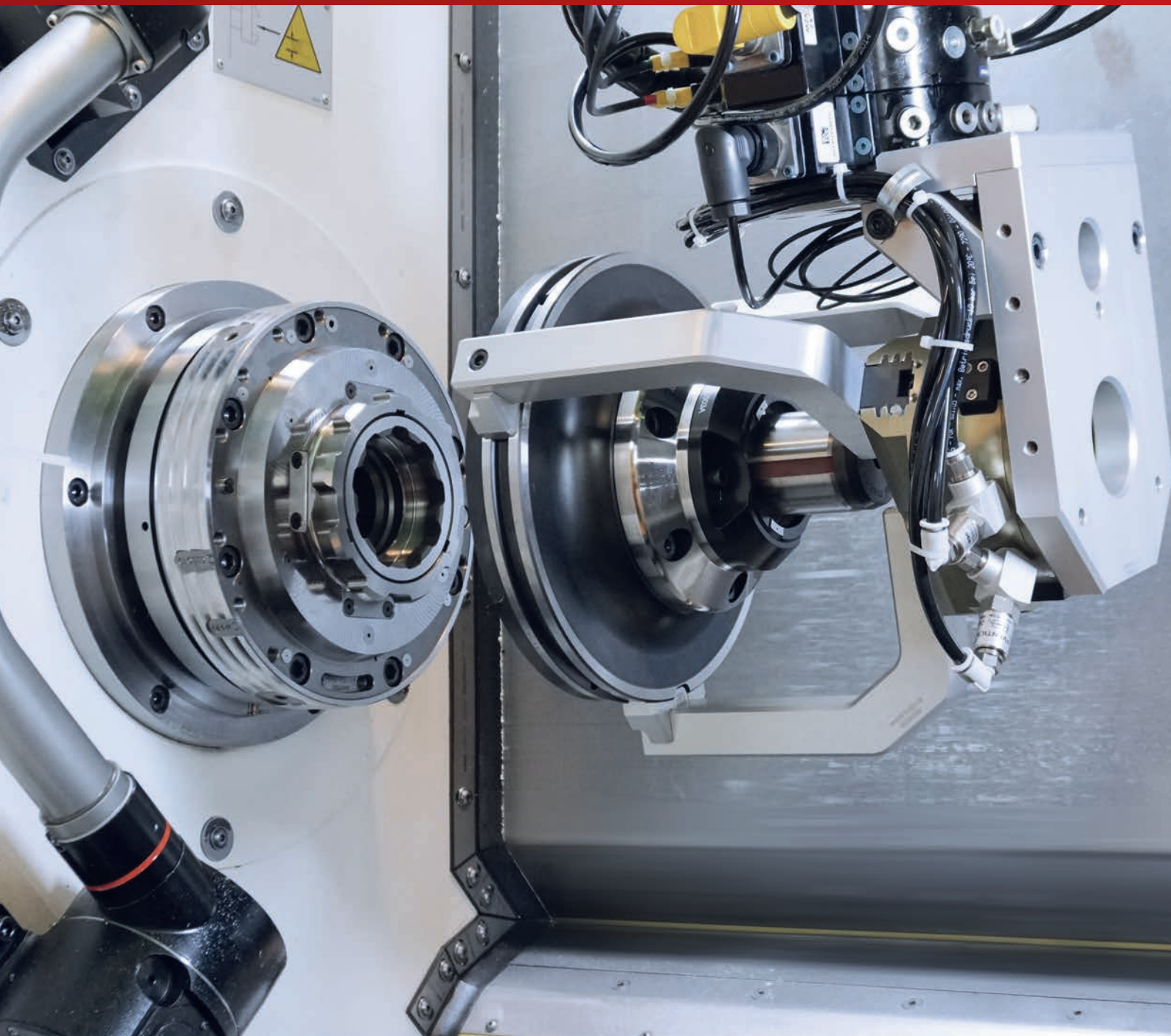
Application example: Ideal for »condition monitoring« for preparation of RPM-based analysis diagrams, detecting inertia losses.

AUTOMATION

AC [automated change] Line

AC [automated change] line

for automated set-up of workholding technology



Smart automated processes are everywhere, whether in everyday life or in production facilities. The increasing individualization of products, culminating in efficient one-off production, necessitates rethinking in manufacturing planning. Machines and systems have to be flexible and they must be designed for automated set-up. That is where our automation solutions come into play. They increase the machine runtime and allow automated set-up, to reduce your costs.

Our TOPlus AC and SPANNTOP AC chucks allow automatic change-over of clamping heads and workpiece end-stops. This enables unattended set-up and manufacturing of workpieces with different clamping diameters, profiles and lengths.

If you wish to change entire clamping devices, however, you can use our CENTREX duo AC and centroteX AC interfaces. We can custom tailor them to your individual requirements.

Key advantages

- Automated changing of clamping heads with or without a workpiece end-stop
- Automated changing of mandrels and chucks
- Reliable processes, successfully used by numerous customers
- Flexible and efficient, even in one-off production

Your benefits

- Improved quality and assurance of consistent results
- Increased productivity, as unattended manufacturing is possible



centroteX AC in action

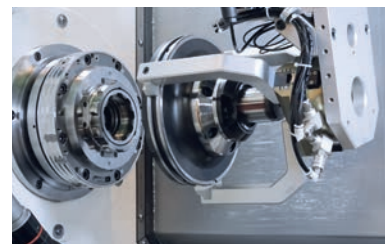


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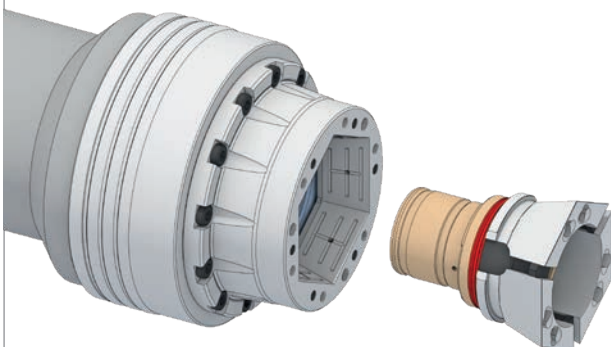
Combined clamping head and workpiece end-stop change-over

with TOPlus AC or SPANNTOP AC

- Power-operated chuck with integrated interface for changing clamping head and workpiece end-stop together
- For machines with a horizontal or vertical rotating spindle
- Also for stationary use [machining center, measuring machine, ...]

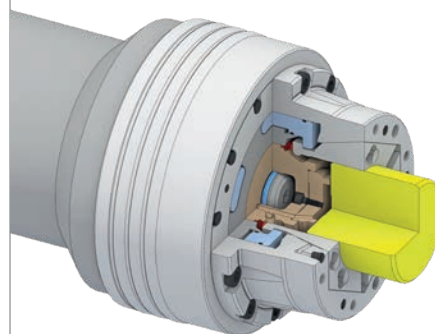
Technical requirements

- Power-operated clamping device under tension and pressure
- Clamping cylinder with through-bore for passage of at least two media required [cooling lubricant, air sensing]
- Due to media supply, no capacity for the workpiece is possible
- Programmable clamping pressure [e.g. proportional valve] recommended



Result

- Automated set-up of different clamping diameters and clamping lengths in one set-up process
- Set-up of the clamping head with the workpiece end-stop eliminates one set-up process
- Same run-out and production accuracy as TOPlus and SPANNTOP chucks



SAVINGS

- Higher machine utilization, since unattended shifts can be implemented with high process reliability
- No personnel required for set-up



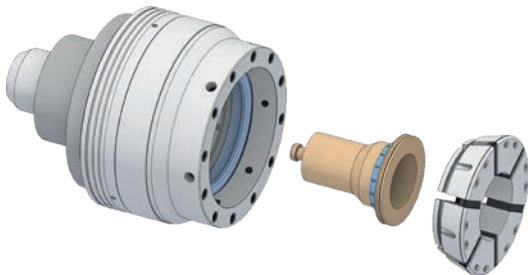
Separate clamping head and workpiece end-stop change-over

with TOPlus AC or SPANNTOP AC

- Power-operated chuck with integrated interface for changing clamping head and workpiece end-stop separately
- For machines with a horizontal or vertical rotating spindle
- Also for stationary use [machining center, measuring machine, ...]

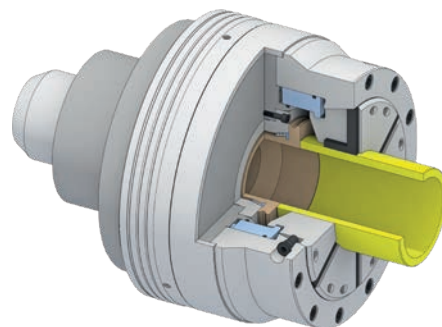
Technical requirements

- Power-operated clamping device under tension and pressure
- Double-piston clamping cylinder with double media passage [cooling lubricant, air sensing] for actuation of the base end-stop and the clamping head is required
- Clamping diameter must be larger than the end-stop diameter or the end-stop plane must be behind the clamping head
- Programmable clamping pressure [e.g. proportional valve] recommended



Result

- Automated set-up of different clamping diameters and clamping lengths in two separate set-up processes
- Workpiece families with different clamping diameters often need no changing of end-stop, which greatly reduces stocking of changing parts
- Same run-out and production accuracy as TOPlus and SPANNTOP chucks



SAVINGS

- Higher machine utilization, since unattended shifts can be implemented with high process reliability
- No personnel required for set-up
- Smaller robots are possible due to the lower load

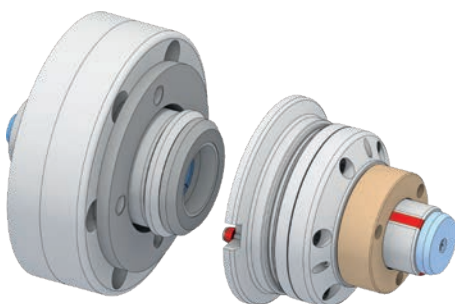


Mandrel change-over [MAXXOS und MANDO] with CENTREX duo AC

- CENTREX duo AC interface for automated changing of pre-setup MAXXOS and MANDO mandrels
- For machines with a horizontal or vertical rotating spindle
- Also for stationary use [machining center, measuring machine, ...]

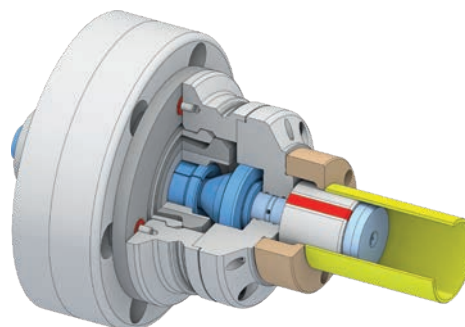
Technical requirements

- Power-operated clamping device under tension
- Double-piston clamping cylinder, with position measuring system for passage of two media [2 x air sensing] for mounting of the mandrel on the spindle is required
- Programmable clamping pressure [e.g. proportional valve] required



Result

- Automated changing of pre-setup mandrels
- Segmented clamping bushing and end-stop are pre-setup separately outside of the machine
- Different mandrel sizes can be used, therefore ideal for small and large workpieces
- Same run-out and manufacturing accuracy as the mandrels used, plus change-over accuracy of the CENTREX duo AC interface [≤ 0.003 mm]



SAVINGS

- Higher machine utilization, since unattended shifts can be implemented with high process reliability
- Personnel required only for external preliminary set-up, allowing simultaneous operation of multiple machines



Clamping device change-over with centroteX AC

- centroteX AC interface for automated changing of pre-setup chucks and mandrels
- For machines with a horizontal or vertical rotating spindle
- Clamping device mounting via bayonet mechanism using mechanical actuator [e.g. screwdriver or wrench]

Technical requirements

- Power-operated clamping device under tension and pressure
- Maximum clamping device outer diameter 224 mm [TOPlus and SPANNTOP up to max. size 65]
- Clamping cylinder with through-bore, with position measuring system for passage of four media [cooling lubricant, 2 x air sensing, 1 x air purge] is required
- Programmable clamping pressure [e.g. proportional valve] required



Result

- Automated changing of complete, different clamping devices, therefore ideal for different workpieces
- Changing parts can be pre-setup on the machine or separately outside of the machine
- Same run-out and manufacturing accuracy as the clamping devices used, plus change-over accuracy of the centroteX AC interface [≤ 0.003 mm]



SAVINGS

- Custom one-off manufacturing of different workpieces with minimal set-up expenditure is possible, with no manual intervention
- Higher machine utilization, since unattended shifts can be implemented with high process reliability
- Personnel required only for external preliminary set-up, allowing simultaneous operation of multiple machines

Vischer & Bolli Automation

You buy the machine, we do the rest.



Vischer & Bolli Automation [VBA], one of our subsidiaries since October 2020, specializes in the automation of complete manufacturing cells – with more than 20 years of experience.

VBA develops overall automation concepts for milling, turning, grinding and assembly, providing support from the very beginning. You get everything from a single source – from the clamping device, robot cell, mounting fixture and grippers to the storage solution, sensors and software.

In other words: You buy the machine, VBA does the rest.

VBA attaches great importance to smooth processes, maximum functionality and productivity at a fair price. An extensive partner and service network allows them to offer everything from a single source in order to optimally fulfill customer requirements. No matter how complex and technically challenging the task may seem – VBA is certain to have a solution at the ready. Extremely important: Sustainable implementation of projects for both the customer and the environment.

VBA also shows you how you can integrate additional automated processes such as measuring, cleaning and deburring.

Capabilities

- Unattended 24/7 or > 48 hour manufacturing
- Handling weights from 10 grams to 3 tons
- Automated changing of fixtures, workpieces and tools even in one-off production
- Connection to any machine tool, as well as integration of peripheral equipment, such as lift systems, measuring machines, deburring stations, labeling systems, cleaning equipment, etc.
- Master computer software available in all development stages, as well as connection to an ERP system

Your benefits

- Cost-effective solutions thanks to a modular concept
- Improved product quality as a result of consistent and repeatable processes
- Full utilization of your machines
- Reduction of your labor costs
- Potential cost reductions of € 200,000 per year or more

Contact

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