

# AQUBE® XH9

## CLEANING TECHNOLOGY

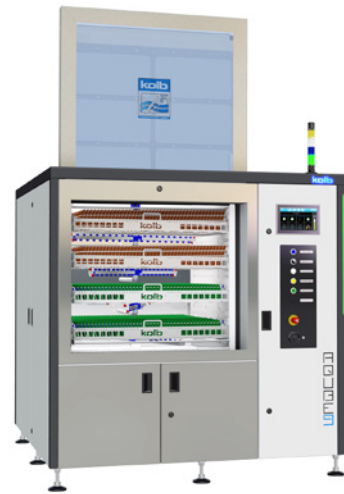
Made in Germany

Fully automatic high end 3-tank, 3-circuit PowerSpray® XXL ultra-fine cleaning system for cleaning of assembled PCBs

Cleans PCBs, hybrids and misprints from flux residues, resin, copper, oxide and soldering support substances

Capacity: up to 830 equals 19 m<sup>2</sup> (204.5 ft<sup>2</sup>) eurocards in up to four variable drawer baskets

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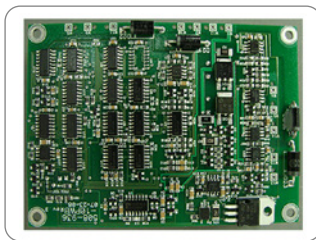


### Certifications:

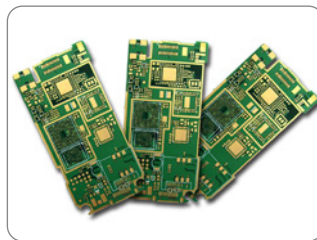
This system in its basic version was certified for its energy and water saving processing, for easy operability and for the standard integration of comprehensive safety features.

- \* Three tank system with three separate circuits
- \* Smart Factory ready: DNAces, remote control, traceability (PLC data scanning and memorizing)
- \* Fully automatic 4step (optional up to 5step) process: cleaning, (MediumWipe®), rinsing (tap water), DI-water rinsing, VMH®-TurboDigital hot air evaporative drying
- \* 6.5 seconds relative cycle time for the cleaning, rinsing and drying of one eurocard
- \* Horizontal PTFE mounted rotor system with up to six asynchronous spray rotors for thorough wetting (no blind spots)
- \* Heater cleaning tank A, automatic water change for the rinsing circuit, DI water system, DI-bypass processing, water measuring unit (ion contamination measurement), ion exchanger and fine filter systems as standard
- \* Processes and service intervals PLC controlled. Event issuing and software control via touch screen
- \* EDGELESS Design and VARAccess® service access: maximum capacity, easy maintenance on a very small footprint
- \* Suitable for high temperature cleaning and rinsing up to 80 °C (176 °F)

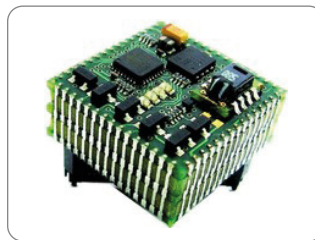
### Key applications



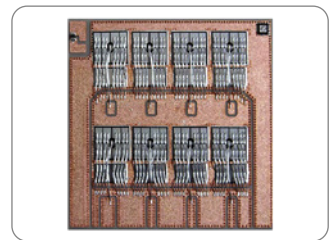
Assembled PCBs



Hybrids (HDIs)



Hybrids (SiPs)



DCBs

The new kolb AQUBE® series offer next-generation cleaning systems - even more efficient, even more compact, easy to handle and maintain, pre-equipped for extended water management and cyber-physically ready for the smart factory.

AQUBE® XH9 is a completely German engineered and manufactured fully automatic XXL high volume PCB ultra-fine cleaning system with by far the largest process chamber in a PCB cleaning batch system worldwide and thus with higher capacity per time than even any common inline system: 860 / 19m<sup>2</sup> (204.5 ft<sup>2</sup>) eurocards in one cleaning cycle, corresponding to a relative cleaning time of 6.5 seconds per card. With up to 80° (176 °F) cleaning and 120° (248 °F) drying temperature also ideally suited for parts cleaning of medical equipment and use in the production of medical electronics.

The three-tank, three-circuit configuration ensures very short cycle times, low running costs and makes this system the perfect economic choice for the precision mass cleaning of assembled PCBs.

**The cleaning system can be operated with all common electronics cleaning supplies (detergents / chemistry, etc.) which are approved by the manufacturer.**

Performance description of a fully equipped system. All rights for changes reserved that lead to technical improvement.

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### Application overview

 Most suitable	 Optional suitable	 Optional suitable	 Optional suitable	 Not suitable
PCBAs, Hybrids Power electronics Misprints (mounted)	Stencils Screens Misprints (bare boards)	Solder frames Solder carriers Solder masks	ESD Boxes Containers Magazines	Condensation traps Filters Steel sheets

Optional suitable applications can also be optimally realized with the appropriate options.

**Cleaning** (key process 1): From the cleaning tank A (TA) the cleaner liquid is sucked by a magnetically coupled pump unit and routed with a controllable volume flow through a separate circuit into the PTFE mounted ASYNCHRO® stainless steel spray rotors with patented PUSHFORCE® nozzles. Their geometry ensures a comprehensive and thorough cleaning, even in inaccessible and critical areas. After the washing procedure, the valve switchover of the process chamber undocks the cleaning circuit until the next process run.

**MediumWipe®** (optional intermediate process): The remaining cleaner is blown off from the clean products and blown out of the cleaner circuit and recirculated into the cleaning tank before the valve switchover closes.

**Rinsing with tap water** (key process 2): From the first rinsing tank B (TB), the water is pumped through the separate second circuit into the spray rotors. Tap water has (compared to DI / DM water) the advantage of lower surface tension and thus flushes also critical points as low standoffs more efficient.

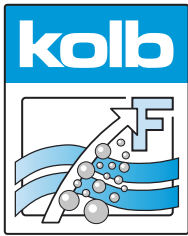
**MediumWipe®** (optional intermediate process): The remaining water is blown off from the products and blown out of the cleaner circuit and recirculated into the rinsing tank (TB).

**Clear rinsing with DI / DM water** (key process 3): The DI / DM water is produced in an integrated MB-cartridge from tap water and kept in the second rinsing tank C (TC). Through the third cycle it flushes conducting ions of the preliminary processes. This process is repeated automatically until the remaining amount of ions falls below the programmed value.

**MediumWipe®** (optional intermediate process): Blowing off and recirculating the remaining DI / DM water into the rinsing tank (TC).

**Drying** (key process 4): The clean products are dried with the patented VMH® (Venturi Mixed Hot air) technology. A high volume flow of normal circulating air is blown into a venturi nozzle. The resulting differential pressure there (passively) sucks on a small amount of very high temperature air. The resulting air mixture provides for uniformly high drying temperature - adjustable between 45 and 120 °C (113 and 248 °F) - all over the process chamber. Further advantages are robustness and low cost of ownership. Energy is only needed for a fan and the heating of a very small amount of air; the rest is executed by pressure differences and air duct geometry.

**Maintenance:** The system has a VARAccess® maintenance access system with recessed, variable doors and removable panels. In the maintenance area among others are the pump-out set, the re-dosage unit with space for a 25 liter detergent container and an optional re-dosing unit for a 5 l additive container as well as the MB cartridge for DI / DM water processing. Tank levels as well as pressure values and maintenance cycles are monitored by the PLC and displayed on the touch screen.



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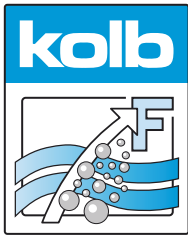
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### Main standard features

- PowerSpray® technology bundle: magnetically coupled XXL-Power (tank A) and X-Power (tank B, tank C) pump units, lower VA drawer basket, twofold ASYNCHRO® volume-spray rotorsystem with low maintenance PTFE mounted stainless steel rotors and PUSHFORCE® special nozzles, "Option100" software program (100 freely selectable process programs)
- PolyPower® pump-nozzle configuration with power pump unit
- EATON Programmable Logic Controller (PLC) with module extension for special programming and technology extensions
- Smart Factory ready: DNAccess® (standard) for remote control (see options) and traceability with retractable touch monitor and integrated industrial PC (see options)
- High resolution 10" (1,024 x 600 px) display with capacitive multi-touch and intuitive process view
- Fourfold alternating LED status light bar integrated in the system frame
- Function package PCBA Cleaning (incl. option automatic water change for rinsing circuit / tank C with lifting unit, option heater cleaning tank (TA), function package DI water system (incl. DI / DM water measuring unit (residual ion contamination measurement), DI-bypass processing, ion exchanger cartridge, cartridge deaerator)
- Full flow coarse filter (process chamber)
- Function package Fine Filter System Tank A (incl. XXL-Power pump unit for the cleaning circuit and fine filter system for the cleaning tank A (TA))
- Function package Fine Filter System Tank B (incl. X-Power pump unit for the rinsing circuit and fine filter system for the rinsing tank B (TB))
- Function package AOSelection® - for separate discharge of rinsing water rinsing water that must be disposed (incl. automatic wastewater changer for rinsing tank B (TB), 1000 liter IBC empty container, overflow protection for empty container).
- ClosedLoop reprocessing of cleaning and rinsing fluids
- Automatic re-dosage unit for 25 l detergent container
- VMH® TurboDigital hot air evaporative drying (control range approx. 45 - 120 °C / 113 - 248 °F)
- ESD grounding point for the operating personnel
- Ø 160 mm 2Step chamber extraction with extraction control
- Safety features: safety interlock on the process chamber door, overflow alarm for all tank sections, overheating protection for all heating and drying elements, end switches for all motor-driven valves and drives, personnel protection insulation
- VARlccess® service access with right and left-hinged side doors as well as unhinging possibility for side doors, front panel, and rear supply rail
- EDGELESS housing design. Doors, cover panels and hinges without edges, depot for traceability scanner and monitor in the right side panel
- Process sections made of electrolysis resistant elements



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### Main options

- Function package high-temperature application (incl. process chamber thermal insulation, VapourStop, temperature stabilization and Ø 250mm 3Step XL chamber extraction with extraction control and tube fan to reduce cooling time)
- Function package WPCL IU Wastewater Recycling Unit (incl. WPCL IU-T3 SYMBIO® module, option automatic re-dosing unit for 5 l additive canister, 3 ion exchanger cartridges, 3 cartridge deaerators, overflow protection for external IBC container)
- Function package WPSD IU Wastewater Treatment Unit (incl. WPSD IU5/7 SYMBIO® module, pH-lowering unit with pH measuring probe, pH re-dosing, control valves, two heavy metal adsorber cartridges, two cartridge deaerators)
- Function package Online Cleaner Regulation (incl. brix monitor for refraction measurement, automatic re-dosing of the cleaner, flow meter, dosing ball valve)
- Function package Traceability "Basic" (incl. SPC data scanner, data backup in CSV file, backup via SD card (via slot in the PLC))
- Function package Traceability "Comfort" (incl. PLC data scanner and retractable touch monitor and industrial PC with Intel processor)
- Function package QuickChange (incl. SlideIn quick-loading feeder unit, upper wash basket with PTFE-mounted ASYNCHRO® TopDown stainless steel double rotors with PUSHFORCE® special nozzles and SpeedLoad cart to accommodate of two feeder units)
- Automatic re-dosage unit for 5 l additive container
- Decalcification unit for reducing the lime content in the rinsing water (tap water) circuit / rinsing tank B (TB)
- Air filter unit for filtering the drying air according to filter class F7
- MediumWipe® unit for further optimization of detergent and rinsing fluid use
- Permanent automatic rotor run control
- QuickConnect rotor quick-clamping system for fast insertion or removal of the rotors
- Remote control (browser-based control / monitoring via mobile device or PC)
- RMA Remote Maintenance Assistance (factory controlled maintenance support)
- Paint of choice (frame rack, coverings and hood)
- XL-Power pump units for the rinsing circuits / rinsing tanks B and C (TB, TC)

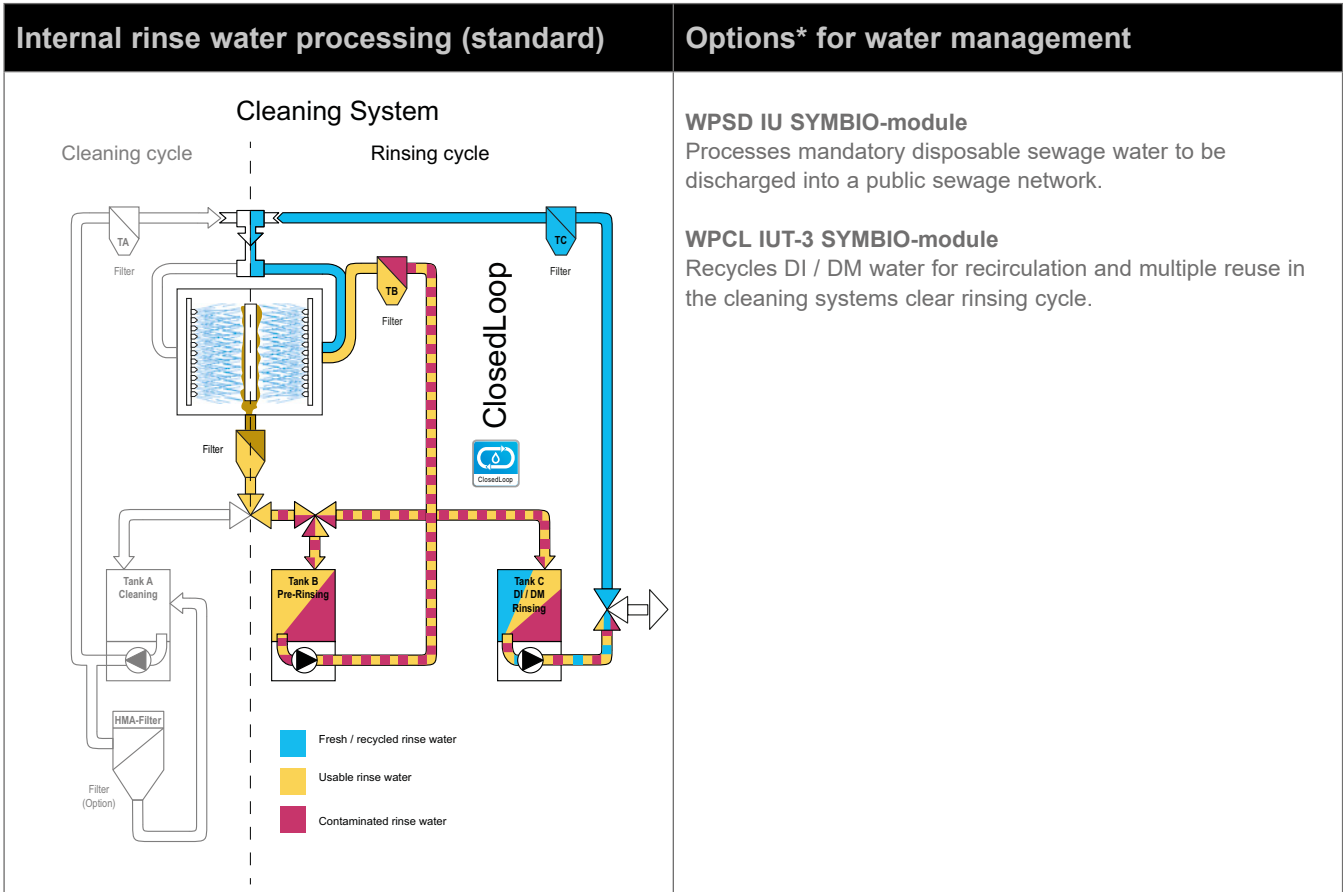


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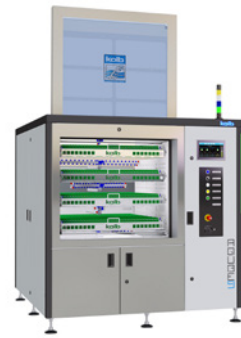
\* Operating companies of industrial cleaning systems are responsible for proper disposal of wastewater / rinse water and (wasted) cleaning detergent. Further information on wastewater management at [www.kolb-ct.com/systems/water-management/](http://www.kolb-ct.com/systems/water-management/), consulting requests to [info@kolb-ct.com](mailto:info@kolb-ct.com)



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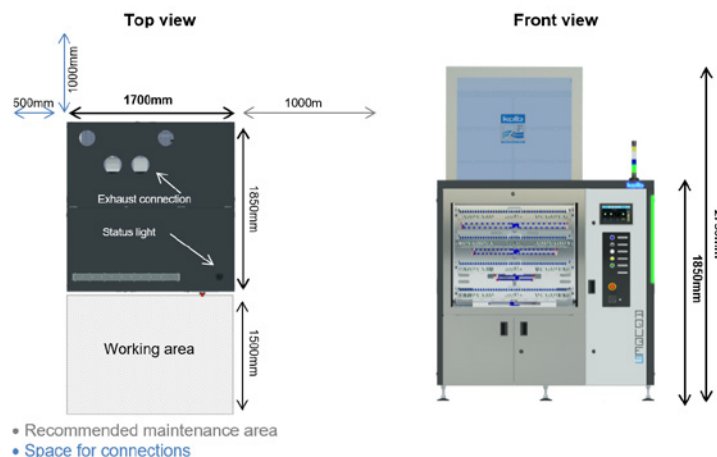
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## Technical data

Technology base	<b>kolb PowerSpray®</b>
Capacity	830 (19 m <sup>2</sup> / (204.5 ft <sup>2</sup> ) eurocards
Process chamber dimensions	W 970 • D 955 • H 900 mm (W 38.18" • D 37.59" • H 35.43")
Usable space lower basket only	W 880 • D 890 • H 760 mm (W 34.65" • D 35.04" • H 29.92")
Usable space utilizing four baskets	W 880 • D 890 • H 150 mm (W 34.65" • D 35.04" • H 5.9") four times
Volume tank A (cleaning), tank C (DI-rinsing)	125 l each
Volume tank B (rinsing)	100 l
Power supply	400 V AC, 32 A, CEE-plug / 3 Ph / 50 or 60 Hz
Power consumption	18 kW
Control system	PLC (EATON)
Temperature load	up to 80 °C (176 °F)
Control range drying	approx. 45 - 120 °C (113 - 248 °F)
Filter system	up to four stages - 1. Full flow coarse filter < 2mm (0.08"), 2. Sediment filter inside the tank, 3. 20" fine filter (1 - 100 µm - process dependent), 4. HMA filter
Supply connection 1 (tap water)	> 18 °C, 1" hose with 30µm water filter (on-site inlet water quality, pressure 3 - 4 bar, < 250 - 350 µS conductivity (< 10° dH) or descaling unit option. Do not use a softening / soft water system in the inlet)
Supply connection 2 (DI / DM water)	> 18 °C, 1" hose with 30µm water filter (DI-net provided by customer or bridging to tap water)
Supply connection 3 (compressed air)	6 - 8 bar (87 - 116 psi) - 100 l / min for options HT-version or MediumWipe®, connection for 8 mm (0.31") compressed air hose
Rinse water drain connection	(with integrated pump out system ) connection for 1" hose
Exhaust connection	Ø 160 mm (6.3"), exhaust capacity > 1,100 m <sup>3</sup> / h (38,847 ft <sup>3</sup> / h)
Operating condition room temperature	20 - 35 °C (68 - 95 °F)
Operating noise / Footprint / Empty weight	63 dB (A) / 1,700 x 1,850 mm (66.9" x 72.8") / 920 kg (2,028 lbs)

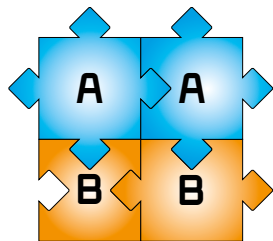
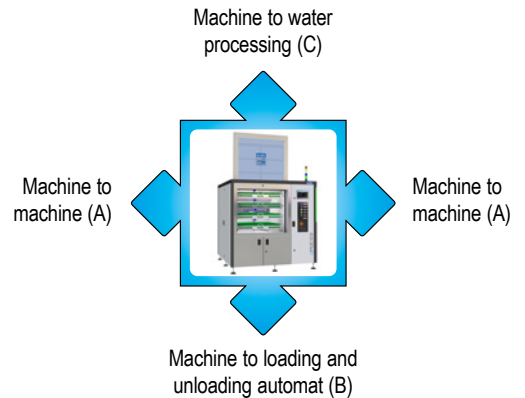




## kolb CleaninGrid® Technology

AQUBE® XH9 systems are suitable for use in a kolb CleaninGrid® plant. The kolb CleaninGrid® technology is an intelligent combination and integration of cleaning, loading, water treatment and control systems to large-scale facilities for the efficient mass cleaning of assemblies, tools and machine parts. The CleaninGrid® technology is completely flexible, constructively easy to execute and based on three connection availabilities:

- Machine (A) to machine (A)
- Machine to loading / unloading automat (B)
- Machine to water processing system (C)

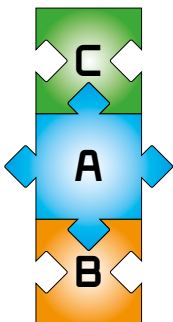


Example configuration:  
Two AQUBE® XH9 systems,  
two loading and unloading  
units.  
Capacity:  
Appr. 8300 eurocards  
(per 8 hour shift)  
Appr. 25.000 eurocards  
(per 24 hour operation)



### Large installations and comprehensive washing plants

From just connecting two systems together to fulfill moderately growing volume requirements to building a complete washing center for quantities of multi-thousands of boards per day und evaporator water processing, the mutable kolb CleaninGrid® technology leaves all options.



Example configuration:  
AQUBE® XH9 system with  
loading and unloading unit and  
kolb vacuumdistiller for 100%  
recycling of rinse water.  
Capacity:  
830 eurocards per cycle (appr.  
6,5 sec. per board)



### The main advantages of the kolb CleaninGrid® technology:

- \* Much higher throughput than any conventional inline installation (a single AQUBE® XH9 batch system already exceeds the capacity of one average inline system).
- \* Shorter cycle times per board than any PCB cleaning system on the market.
- \* Extremely lower power consumption compared to any system or installation on the market with a comparable capacity.
- \* Significantly lower operating costs compared to any conventional inline system with a comparable capacity.
- \* The complete installation out of one hand.