



*Hamo 210 / 210 P (Pharma Grade)*

*Hamo 420*

*Industrial, Medical and cGMP-conform Cleaning Equipment*

## Unique solutions for your critical Cleaning Process

Hamo Cleaning equipment for medical, industrial and life sciences fields are special cleaning equipment designed to process critical components such as, fermentation containers, big bottles, glassware, components of filling and packing-machines, mixers, cones, palettes, boxes, tableting-tools, medical Implants, medical devices and other parts from the pharmaceutical, diagnostic and cosmetic industries.

Executed as «HAMO 210 P» (Pharma Grade), the machines Hamo 210P follow the latest requirements of cGMP.

## Cleaning Equipment with maximum Flexibility

Hamo Cleaning equipment are available in various sizes, to accommodate many different sizes of cleaning goods:

### Hamo 210

Chamber usable dimensions W x D x H, mm (inches):  
640 x 640 x 640/1000 mm (25,2x25,2x25,2/39,4)

### Hamo 210 P

Chamber usable dimensions W x D x H, mm (inches):  
640 x 640 x 640 mm (25,2x25,2x25,2)

### Hamo 420

Chamber usable dimensions W x D x H, mm (inches):  
1290 x 800 x 700/1000 (50,8 x 31,5 x 27,6/39,4)  
or twice: 640 x 800 x 700/1000 (25,4 x 31,5 x 27,6/39,4)

### Chamber

The chamber and tubing are designed to fully drain. The chamber ceiling and the chamber are designed with slopes to achieve a quick and full emptying. On request the chamber is equipped with internal lighting, to monitor the process during cleaning.

### Glass-Doors

The units are executed in a single door-version, or as double-door if wash load shall be introduced through the machine into an higher classified room. The doors are made out of double-walled hardened glass, with surrounding EPDM-seals.

### Load- and Unloading

By means of an external transport trolley the machines are loaded and unloaded. Automated systems with feed- in and feed-out roller conveyors are also available.





## Dosing Pumps

Up to four detergents or additives are dosed (monitored by a flow-meter) into the machine; the dosing volume set values are part of the wash-cycle setting; the pumps are integrated in the machine.

## Drying

The dryer of the standard machine sucks the air through a H13 filter and blows the air then with a side-channel-blower, electrically heated into the chamber and the wash-system.

## Utilities

All media-supplies (except drain) are from above:

- The electrical and pneumatic supply
- Up to three separate water supplies
- Up to 4 additives/detergents
- Optional clean-air supply (eg for blow-out or blow-off of wash-loads)

## Service Friendliness

The machine concept allow easy access through doors to the control cabinet, to the dosing systems, the sensors, and the water-sample-probes.



## Energy Efficiency

Hamo machines are built according the latest technologies to reduce the loss of energy and the use of resources. The double walled chamber are asbestos and chlorine free insulated, which reduces the heat loss to a minimum. The innovative pump and spray system reduces the use of water to an absolute minimum.

## Safety

The machines are built to the latest safety guidelines: Main switch and safety circuits, pressure monitoring of the pneumatic supply, door-opening only if chamber temperature is below safety level, dripping pan with alarm, etc.

## Machine Documentation

The machine is shipped with a detailed machine documentation according CE, containing eg: Manual, spare part list, lay-out, P&ID-plans, data-sheets, CE-conformity declaration, electrical-diagram, pneumatic diagram etc.

Additional documentation and/or certificates (for application in medical or pharmaceutical areas) are optional available.

## Tank Independent Direct Rinse System (IDRS)

A final rinse system in sanitary execution, using directly supplied water for rinsing without contacting the tank or the pump; it can also be used to blow off with clean air.



## Process-Safety / Reproducibility

### Control

The machine is controlled via a modern Control-system ( Windows/Siemens) which stands for reliability and flexibility. The visualization (HMI) runs on a touch screen .

The cleaning cycles are individually configured to be adapted to the soiling and the specific requirements of the wash-load.

The integrated user management on the software allows easy configuration of the access-levels of each user-group. Specific user-group have different access-rights; therefore configuration or changes on cleaning-processes can only be made by authorized personal.

### Job-Report / Load-Documentation

cGMP and state of the art quality methods request the documentation of the cleaning processes and their critical parameter.

The job-report and /or the load-documentation can therefore be printed by a local printer.

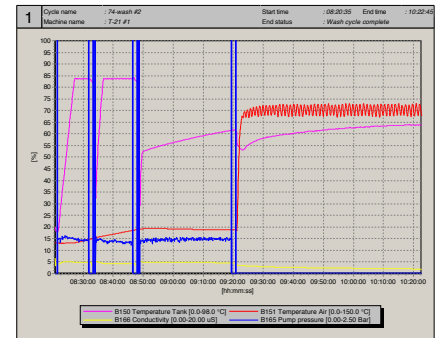
Machine	T-21	User		View	1:7:5		
Program	HAMO SERVER Ver 2.0.2.0	Name		Date	09. December 2011		
Title	P.D.V.S.	PC	EQUP-9800970	Printed	10:22:46		
Machine name	T-21	Job N°	: B15				
Machine Cycle IPS N°	: 74	Wash date	: 09. December 2011				
Machine cycle name	: Wash #2	Charge	:				
Operator	:	Product	:				
Machine Cycle N° Name	: 74 Wash #2	Revision N°	: Rev. 2				
Machine name	: T-21	Start time	: 08:20:35	End time	: 10:22:46		
		End status	: Wash cycle complete				
IP	Phase	Pressure	Temperature	Water	Soap	Temp	Alarm
1	FA_01	08:20:35	-	ON	-	-	-
2	RWRC_01	08:21:24	80 °C	-	-	-	-
3	DRIN_01	08:31:55	-	-	-	-	-
4	FA_02	08:32:22	-	ON	-	-	-
5	RWRC_02	08:34:08	80 °C	-	-	-	-
6	DRIN_02	08:44:23	-	-	-	-	-
7	FA_03	08:48:02	-	ON	-	-	-
8	RWRC_03	08:48:48	50 °C	-	-	-	-
9	DRIN_03_ effluent	09:19:31	-	-	-	-	-
10	DR_01_ Real air	09:21:00	100 °C	-	-	-	-

### PDVS and Process-Monitoring-Options

The PDVS (Process Data Validation System) for Water-Temperature and the drying temperature are installed default on the standard machine.

Process-independent and redundant measuring probes monitor the critical parameters with alarm.

Optionally the PDVS can be extended to more parameters, such as eg conductivity in tank, PH-measurement; pump-pressure monitoring is also available.



### Calibration

Machines working in a qualified environment have to be maintained and calibrated on a regular base. The components in Hamo machines allow easy maintenance and quick calibration in accordance with the latest regulations.

### Regulation / Quality Assurance

Design and manufacturing are by a quality system ISO 9001/ISO 13485 and a team with high quality experience. The manufacturing process is guided by reviews and milestones which guarantee the requirements of FDA and cGMP.

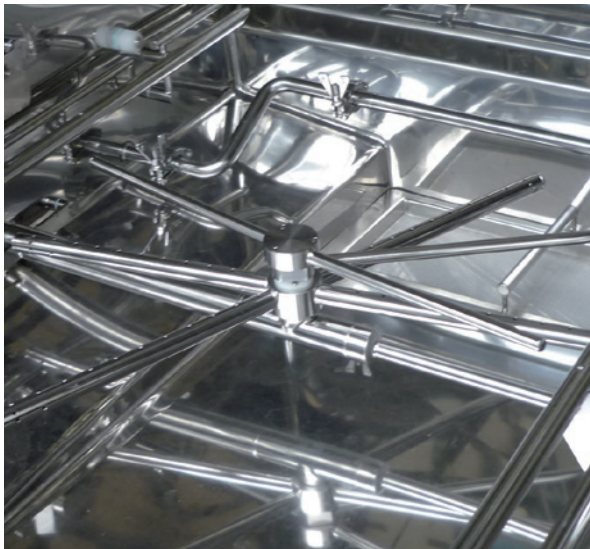


## Execution 210 P (210 Pharma Grade)

### Technical Execution / Tubing / Components

Pharma-grade execution ( 210 P ) the machine is executed according the requirements of the pharmaceutical industry. Eg.

- The chamber 316L (14404), with radius > 3mm, surface RA  $\leq 0,8 \mu\text{m}$
- Circulation System, rotating arms round in sanitary execution TRI-Clamps; surface RA  $\leq 0,8 \mu\text{m}$
- Water inlets in sanitary execution (Membrane valves); surface RA  $\leq 0,8 \mu\text{m}$
- Circulating pump in sanitary execution, surface RA  $\leq 0,8 \mu\text{m}$
- Door seal in silicone
- Electrical tank-heater mounted with TRI-clamp.
- Dryer electrically heated, air-suction from above (filter F8); filter H13 Filter H13 after ventilator and after electric heater, just before entry into chamber.



### Qualification Support Package (QSD)

Hamo can offer the customer a full qualification support package in the form of extensive professional support-documentation as well as with qualification-services. This service results in a massive reduction of time and cost for IQ, OQ and PQ as well as for calibration and maintenance.

### FAT/SAT and IQ/OQ

During factory acceptance test, based on the standard FAT protocols the machines are checked on conformity according the URS/FS. Trained Hamo personal set up, install, start-up, calibrate the equipment; also they can execute installation qualification IQ and Operational qualification OQ as well they can support any performance qualification PQ.

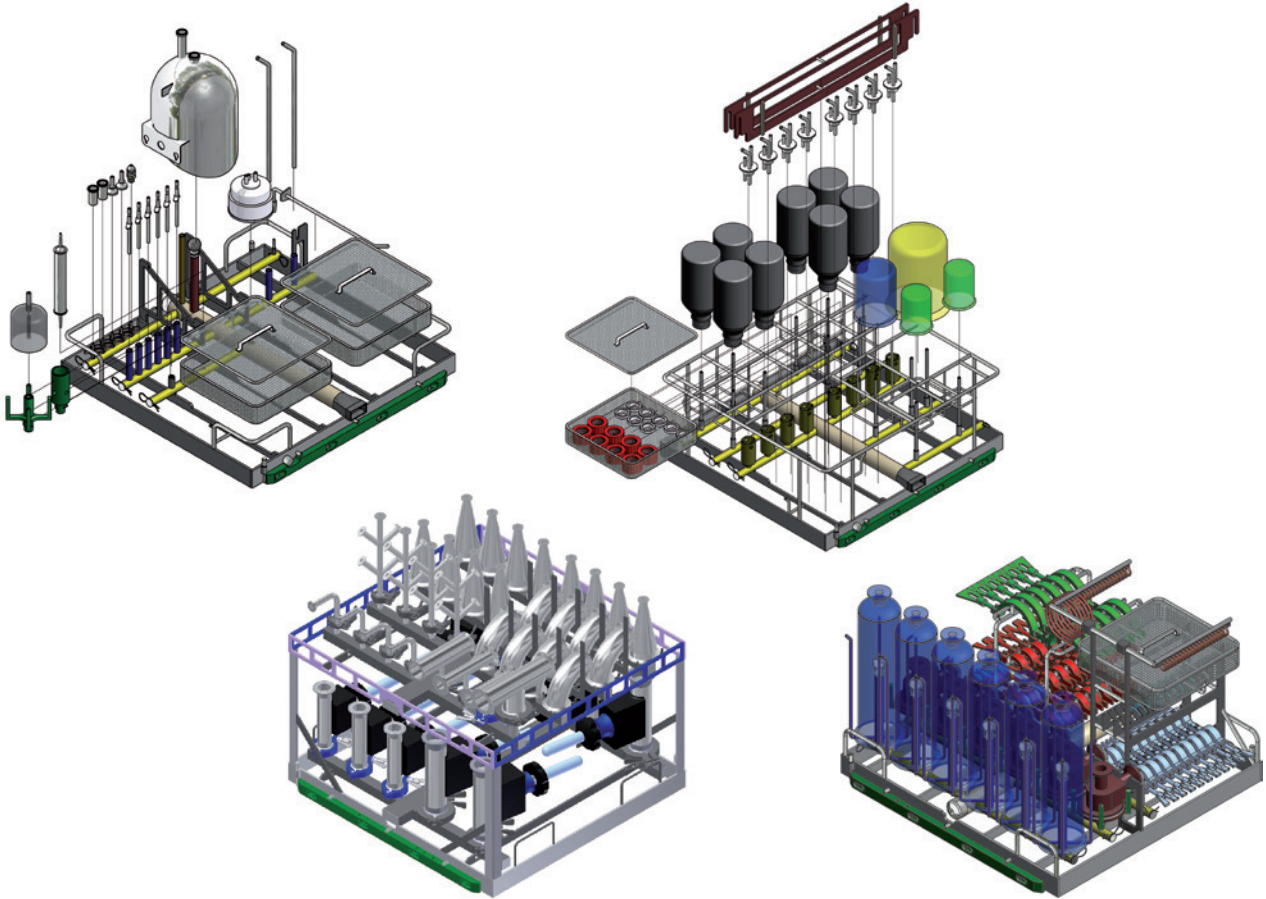


## Customized Racks

Hamo have specialized personnel with long experience in medical, industrial and pharmaceutical cleaning capable of developing customized racks.

This experience paired with intense cooperation with our customers, allow innovative and creative solutions.

In Pharma execution all racks are completely in stainless steel 316L, electro polished and are delivered with the requested documentation and the necessary certificates.



## Application Laboratory



New cleaning cycles are developed and validated in the application laboratory.

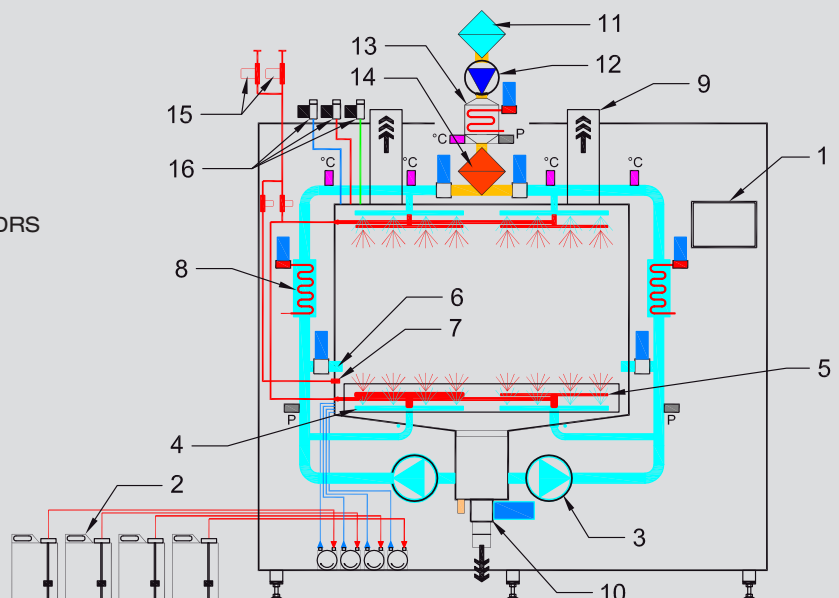
Customized cleaning processes will be (on request together with the customer) tested and documented.

## Technical Data

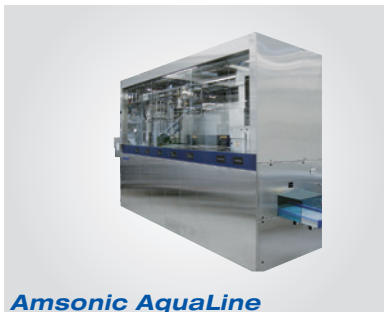
HAMO	210	420	210 P
External Dimensions (mm)			
Width	1200	2200	1200
Height	1800 (*2200)	1800 (*2200)	2500
Height with door open	2650 (*3350)	2650 (*3350)	2650
Depth	900 (*1100)	1100	900
Usable Dim. WxDxH (mm)	640x640x640	1290x800x700	640x640x640
or twice WxDxH (mm)		640x800x700	N/A
*Special Height (mm)	1000*	1000*	N/A
Standards	CE / FDA / 21 CFR part 11: Electronic records		
Documentation/Certificates	QSD / Qualification-Documents and certificates (GMP/FDA) on request		
Materials	Stainless steel in contact with media AISI 316L; other AISI 304		
Electricity	3x 400V, 50 Hz and special executions		
Water	Three different Water (eg Tap-water, demineralized- and WFI)		
Pneumatic	(Optional)		2-6 bar, dry oil-free
Drain	50 l/min (gravity)		

## P&ID Scematic (Example Hamo 420)

- 1 Control(HMI)
- 2 Containers (4) for detergent and additives
- 3 Circulating pumps (2)
- 4 Sprayarms (4)“
- 5 Option: Sprayarms IDRS (4)
- 6 Contact couplers (2) for internal washing/rinsing
- 7 Option: Contact couplers (2) for IDRS
- 8 Water heater
- 9 Air extraction (2)
- 10 Drain valve
- 11 Air suction filter dryer
- 12 Ventilator dryer
- 13 Air heater dryer
- 14 Air-Filter H13
- 15 Valves for tank independent rinsing and blow out
- 16 Water supplies (3)



## Your centre of competence for precision cleaning



**Amsonic AquaLine**

Hamo/Amsonic offers a wide range of water-based and closed circuit A3 solvent based cleaning units that provide thorough cleaning processes for various industrial sectors:

### **Water-Based Precision Cleaning Equipment (Ultrasonic)**

#### **Amsonic AquaLine / ModuLine**

High performance-Ultrasonic-Precision-Cleaning equipment



**Hamo 210**

### **Water-Based Spray Cleaning systems**

#### **Hamo 210 / 420 / 840**

Spray-cleaning and drying equipment for life sciences- and medical-devices applications



**Hamo PG 800**

### **Pharma-Conform Spray Cleaning systems (cGMP)**

#### **Hamo PG 800 / 1300**

Pharma-Conform (cGMP) Cleaning equipment in single or double door execution (Bio Seal)

#### **Amsonic Hamo HPM**

High pressure cleaning systems (>80 bar) for pharmaceutical application



**Amsonic 400 R**

### **Solvent-Based Precision Cleaning Equipment**

#### **Amsonic 400 R Serie**

Solvent-based Ultrasonic equipment (Class A3) Cleaning under vacuum, above or below flash point

### **Detergents / Additives**

#### **Amsonic PreciClean / Hamo liquid**

Water based detergents



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