Sputtering Equipment FHR.Line.1100.V

In-Line Sputtering Equipment vertical, 7° inclined to the front side for the deposition of metal layers

General Description

Sputtering machine for the deposition of metals, alloys or compound layers, preferably on planar substrates on carriers able to run in DC

carrier transport is vertical, 7° inclinded to the front side

The system is built of rectangular recipients (modules). The modules in the lock section are separated from each other by rectangular valves designed for a very low particle emission. Further process units with additional deposition sources can be created optional at a later time by adding additional modules.

The system is also equipped with two cross transportation modules used for loading and unloading of the substrates and a carrier return system.

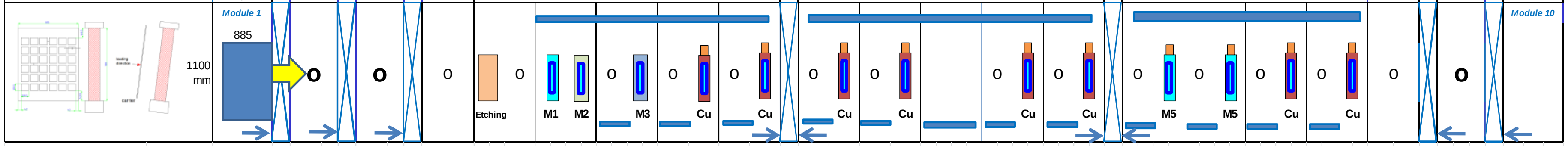
The Equipment consists of the following modules:

- Module 1: loading station
- Module 2: input load lock
- Module 3: buffer chamber 1
- Module 4: transfer chamber
- Module 5: process chamber 1: etching,sputtering
- Module 6: process chamber 2: sputtering
- Module 7: process chamber 3: sputtering
- Module 8: transfer chamber
- Module 9: output load lock
- Module 10: unloading station
- Module for substrate load/unload of carriers using 2 midsized Kuka robots

Vacuum

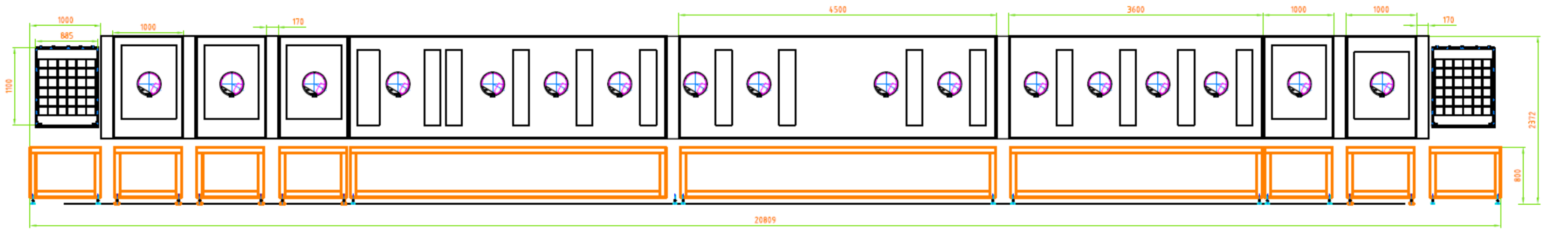
end pressure	$\leq 2 \times 10^{-6}$ mbar after 8 hours (Equipment was already pumped before and vented with CDA, opening time <30 min)
end pressure	$\leq 1{,}5 \times 10^{-6}$ mbar after 12 hours (Equipment was already pumped before and vented with CDA, opening time <30min)

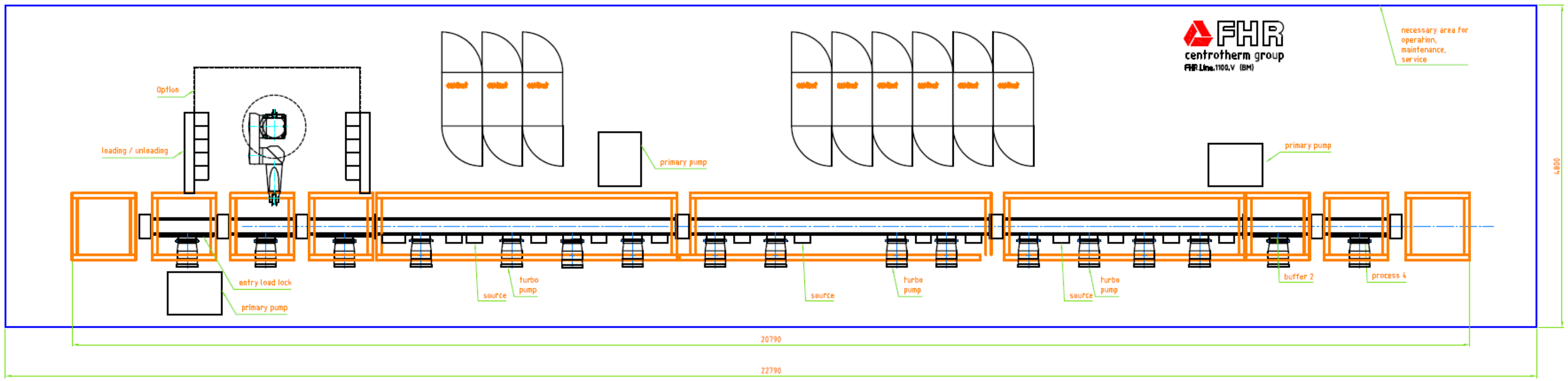
Basic equipment configuration



		Transfer table (under athmosphere) *Module 1*		Entry lock *Module 2*		Buffer 1 *Module 3*		Transfer *Module 4*	Process chamber 1 *Module 5*		Process chamber 2 *Module 6*		Process chamber 3 *Module 7*	Transfer *Module 8*		Exit lock *Module 9*		Transfer table (under athmosphere) *Module 10*
Coater length	**20790**	1000	170	1000	170	1000	170	1000	4500	170	4500	170	3600	1000	170	1000	170	1000
Magnetrons single	**13**								1 1 1 1 1		1 1 1 1		1 1 1 1					
DC power supply	**13**								1 1 1 1 1		1 1 1 1		1 1 1 1					
Turbo pump 1900 l/s	**3**			1		1										1		
Turbo pump 1500 l/s	**14**							1	1 1 1 1		1 1 1 1		1 1 1 1	1				
Meissner trap with cryo generator	**1**					1												
VAT DN 250	**2**			1												1		
MFC	**16**					1			1 1 1 1 1 1		1 1 1 1		1 1 1 1			1		
Flap valve	**7**		1		1		1			1		1			1		1	
Rotary vane pump 250 m³/h	**2**			1												1		
Screw pump 300 m³/h	**1**				1											1		
Roots pump 1000 m³/h	**3**			1	1											1		
Carrier	**22**			1		1			14					1		1		4

Rough layout plan





Technical data

- length approx. 18,500 mm (overall length)
- width approx. 4,800 mm (including maintenance area)
- height approx. 2,350 mm

Substrate loading/unloading

loading station before load lock chamber for sequential manual loading/moving of carriers

unloading station after exit lock for sequential manual unloading of carriers

DN 250 ISO-K for turbo molecular pump
DN 63 ISO-K fore vacuum pump
view port DN 100
service flange in the front
additional flanges for heaters, vacuum gauges, rotary feedthroughs, reserve flanges
DN 16/25/40, etc.

Chambers

vacuum chamber made of stainless steel.

chamber frame made of powder coated mild steel

pneumatic gate valves

Modules include:

DN 250 ISO-K for turbo molecular pump
view port DN 100
service flange in the front
additional flanges for heaters, vacuum gauges, rotary feedthroughs, reserve flanges
DN 16/25/40, etc.
Flap valves VAT

rotary dry pumps	300 m³/h and 250 m³/h
roots pumps	1,000 m³/h
turbomolecular pumps approx..	1,900 l s^{-1} for N_2 and ca. 1,400 l/s for N_2

gate valves DN 250

Meissner trap with cryo generator

6 x Pirani gauges fore vacuum sensors 1000mbar – 10^{-3} mbar

8 x Penning high vacuum sensors 10^{-3} mbar – 10^{-8} mbar, to measure the end pressure

13 x Baratrons MKS Typ 627 10^{-1} mbar – 10^{-4} mbar, for measurering the process pressure

pressure regulation “upstream” - changing of the gas flow with constant pumping

atmospheric preasure sensors

Technology

Inverted magnetron plasma source

- number of sources 1
- target length approx. 1,100 mm

Planar sputtering cathodes

- number of cathodes 1 slim, 2 std
- target length 1,100 mm
- target-substrate-distance 100 mm

Rotatable sputtering cathodes

- number of cathodes 10
- brand SCI
- type MC-End block
- target length 1,100 mm
- backing tube diameter 133 mm
- target-substrate-distance 100 mm

Gas admission system

MFCs for Ar for each sputtering source

all gas lines specified for 5N purity

Power supplies

- 1 x high voltage power supply for inverted magnetron plasma source
- 1 x DC AE power supply >=1 kW
- 1 x DC AE power supply 2 x 6 kW
- 1 x DC AE power supply 30 kW
- 5 x DC AE power supply 2 x 10 kW

Control and visualization

- PC surface
- software based on Windows 7 Professional
- industrial PLC for general control (SIEMENS S7)
- software: visualisation of the whole equipment function
- parallel processing

Electrical power

- aggregate connection 3/N/PE AC 380V/50Hz
- control voltage 24 V

Cooling water

Power supplies (PSU), cathodes and cathode surrounds are cooled by water loops.

The following materials are used in the cooling circuits: stainless steel, copper, brass, plastics, nickel

Guidelines

Guideline for machines 2006/42/EG

Low voltage guideline 2006/42/EG

Guideline for electromagnetic compatibility 2006/95/EG

The Equipment CE-mark

The main electrical cabinet will be compliant with UL electrical standards. Subsequent electrical cabinets will be in compliance with CE standards

Automatization

The automatization consists of carrier return system with station for carriers to load/unload the carrier into the sputtering Equipment with **2 midsized Kuka robots**