

2 Semiconductor Manufacturing Process CHEMICAL CIRCULATOR

Direct circulation type chemical isothermal device indispensable for wet process by contamination free in-line type cooling/heating unit

Chemical Circulator performs precision temperature control of chemicals used for RCA cleaning and wet etching. This is widely employed as an element indispensable for the wet process of semiconductor manufacturing. This Chemical Circulator is newly introduced to meet the needs for an increase in cleanness along with recent diversification of chemicals and higher megabits.

(Note) For use with high-temperature chemicals, the CS-Heater is recommended.

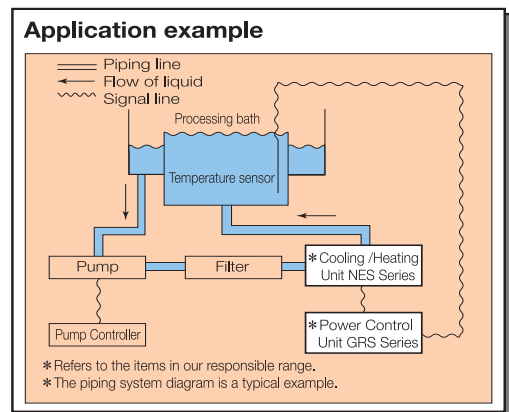
Features

1. The wet material for heat transfer in contact with the liquid in the cooling/heating unit is made from high-purity glassy carbon and is free from contamination with dissolved metallic ions. No surface protection film is necessary. Performance deterioration due to peeling of the film is therefore eliminated.
2. The seal is constructed to prevent direct contact of the rubber O ring with the liquid. Accordingly, it is not necessary to select the seal material as using each of the acid or alkaline chemicals.
3. Thermoelectric heating/cooling is appropriate for temperature control to around room temperature with high accuracy.
4. This equipment conforms with the International Protection (IP) code 31.
5. A leak sensor for chemical liquid and overheat/overcool temperature sensors, each for chemical liquid and cooling water, give safety for operation.

(Note) This heater cannot be used for chemicals containing ozone.

Applications

1. Chemicals temperature control for the wet process of semiconductor manufacturing
 - RCA cleaning liquid
 - Etching liquid
 - Development liquid of the lithography process
2. Chemicals temperature control in other fields
 - Plating liquid, various surface treatment liquids



Specifications

Model	Cooling/heating unit		NES-333-7	NES-363-7	NES-3123-7
	Power control unit		GRS-63	GRS-66	GRS-612
Method		Water-cooled thermoelectric cooling/heating. Direct circulation system with the processing bath through in-line piping.			
Performance	Temperature setting range	15 to 50°C for typical chemicals used in application 1 (Varies with the kind of chemicals, total heat capacity of the circulation system, and heat balance)			
	Temperature control accuracy	± 0.1°C (Varies with the conditions)			
	Cooling capacity*1	Approx.230W	Approx.450W	Approx.810W	
	Heating capacity*1	Approx.580W	Approx.1160W	Approx.1980W	
Configuration	Temperature control method	Digital PID control with auto tuning function			
	Temperature sensor	Platinum resistor(Pt 100Ω)built-in			
	Temperature setting method	Setting by UP/DOWN key			
	Temperature indicator	Four-digit digital display in 0.1°C increments			
	Wetted Material in circulation	Fluorocarbon polymer. Vitrified carbon (Amorphous carbon)on the heat transfer wetted surface.			
	Circulation system pressure loss(at 20l/min.)	0.01MPa(0.1kgf/cm ²) or less	0.01MPa(0.1kgf/cm ²) or less	0.02MPa(0.2kgf/cm ²) or less	
Others	Safety functions		A total of 9 Self-diagnostic functions detects, error indication and alarm output		
	Other functions		External communication function(RS-232C),remote ON/OFF functions, cascade control possible by adding an external sensor (PV2).		
Others	Overall dimensions(mm)*2	Cooling/heating unit	W136 × D300 × H226 Approx.10.5kg	W156 × D300 × H226 Approx.12.5kg	W280 × D300 × H226 Approx.20.5kg
	Weight	Power control unit	W150 × D400 × H180 Approx.9kg	W185 × D420 × H265 Approx.13kg	W220 × D430 × H250 Approx.20kg
	Power requirement(50/60Hz)	200 to 240VAC/8A		200 to 240VAC/8.5A	

*1: Conditions: At the set, ambient and heat dissipating water temperatures of 25°C, and circulation flow rate of 15l/min.
Generated heat load due to pump circulation not included.

*2: Not including the dimensions of any projections.