

# GROWTH CHAMBERS



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Accredited Laboratory

**JSR**

[주] 제이에스리서치  
JS Research Inc.

# Growth CHAMBER

## CLIMATIC CONTROL Phytotron

### Control Performance

- ▶ High precision Digital PID Microprocessor controller and cooling system controls temperature from +0°C to 60 °C
- ▶ Humidifier controls humidity from 30% to 85% RH with excellent temperature control
- ▶ Built-in light sensor in chamber measure and display light intensity in LUX  
Combination of maximum 8 level light control can create sixteen light intensity gradation.
- ▶ Optional CO<sub>2</sub> control with precise NDIR-Diffusion Sensor controls CO<sub>2</sub> concentration from ambient approx. 700 ppm to 5000 ppm  
Concentration can be expressed in % as well
- ▶ Program mode capable to create various climatic conditions of temperature, humidity, lighting and CO<sub>2</sub> conc. with time duration up to 11 Segments 999 cycles or unlimited repeating operation with easy-to-use 3-line back light LCD display and alpha numeric key pad

	Temp. +0 °C ~ 60 °C
	Humidity 30 ~ 98% RH
	Lighting 0 - 50,000 Lux
	CO <sub>2</sub> Conc. amb. - 5000 ppm (%)
	Program Controller
	Photoperiodic Control 



## 3-D Illumination Plant Growth Chamber

### JSPG-Series

JSPG-1500C 3-Side Illumination Plant Growth Chamber provides reliable controlled climatic condition of temperature, humidity, lighting and CO<sub>2</sub> concentration.

Ideal to growing plant, plant tissue culture or any other laboratory experiments needs controller climatic simulation.

1512 L large capacity and tall height of the chamber suitable to growing larger plants up to 1.2 m.

Combination of top and two side light bank with HQI and fluorescent lamps provide light intensity up to 50,000 LUX.



## Top Illumination

### JSGC-Series

JSGC-Series Top Illumination Plant Growth Chamber provides reliable controlled climatic condition of temperature, humidity, lighting and CO<sub>2</sub> concentration

Ideal to growing plant, plant tissue culture or any other laboratory experiments needs controller climatic simulation.

Various choice of capacity from 432L ~ 1512 L suitable to growing larger plants up to 1.2 m.

Light bank on the top with HQI and fluorescent lamps provide light intensity up to 40,000 LUX.



## 3-Side Illumination

### JSPC-Series

JSPC-Series 3-Side Illumination Plant Growth Chamber provides reliable controlled climatic condition of temperature, humidity, lighting and CO<sub>2</sub> concentration

Ideal to growing plant, plant tissue culture or any other laboratory experiments needs controlled climatic simulation.

Various choice of capacity from 200L ~ 964 L for tissue culture and plants growing.

Light bank on the 3-side with fluorescent lamps provide light intensity up to 30,000 LUX.



### Controller

#### ▶ JSC-4CP Programmable Controller



- ▶ High precision Digital PID Microprocessor controls temperature, humidity, lighting and CO<sub>2</sub> concentration in one integrated unit with easy to use 3-line back-light LCD display interface
- ▶ Constant temperature, humidity, lighting and CO<sub>2</sub> conc. operation with automatic OFF timer
- ▶ Programmable operation capability of various climatic conditions of temperature, humidity, lighting and CO<sub>2</sub> conc. with time duration up to 11 Segments 999 cycles or unlimited repeating operation
- ▶ Calibration and auto-tuning function
- ▶ Class A Pt-100 Ω temperature sensor
- ▶ Precision electronic humidity sensor
- ▶ Built-in LUX Meter in chamber to measure light intensity
- ▶ The most accurate NDIR-Diffusion (Infra Red) CO<sub>2</sub> Sensor
- ▶ Automatic defrost cycle

- ▶ 정밀한 PID 컨트롤러는 온도, 습도, 조도 및 CO<sub>2</sub> 농도를 통합적으로 제어하고 back-light LCD 창을 통해 손쉽게 조작할 수 있음
- ▶ 정치 제어 기능은 고정된 온도, 습도, 조도 및 CO<sub>2</sub> 농도에서 연속 작동 하거나 타이머 설정
- ▶ 프로그램 제어 기능은 온도, 습도, 조도 및 CO<sub>2</sub> 농도 등 다양한 환경 조건을 시간에 따라 11 segment 999회 또는 무한 반복 작동
- ▶ 온도, 습도, 조도, CO<sub>2</sub> 농도 보정, 오토튜닝 기능
- ▶ Class A Pt-100Ω 온도센서
- ▶ 전자식 습도센서
- ▶ 챔버 내부 조도 센서
- ▶ 정밀한 적외선 방식 (NDIR-Diffusion) CO<sub>2</sub> 농도 센서
- ▶ 자동 제상 시스템

### Performance & Convenience

#### ▶ Light Bank System

- ▶ Light Bank System with HQI and Fluorescent lamps
- ▶ Combination of 8-Level Lamp Control creates over 16 light intensity gradation
- ▶ Lamp-on-Delay System turn on lamp one by one which provides gradual increase of light intensity



#### ▶ Chamber

- ▶ Stainless Steel 304 chamber
- ▶ Removable and height adjustable shelf
- ▶ Internal LUX meter sensor
- ▶ Built-in humidifier and automatic water supply
- ▶ Low water level sensor and alarm



#### ▶ Maintenance

- ▶ Easy to access Light Bank System for convenient maintenance
- ▶ Easy to maintain refrigeration system



#### ▶ Infra-Red CO<sub>2</sub> Sensor

- ▶ High precision Dual wavelength NDIR Diffusion sensor to measure and control CO<sub>2</sub> concentration
- ▶ 적외선 방식 CO<sub>2</sub> 센서로 챔버 내부의 이산화탄소 농도를 정밀하게 제어



## Performance

- ▶ Forced air circulation of controlled temperature and humidity to achieve excellent thermal uniformity
- ▶ Durable Stainless Steel 304 Sheath Heater and copper-aluminum finned evaporator
- ▶ Temperature control within  $\pm 0.1^{\circ}\text{C}$  resolution
- ▶ Humidity control within  $\pm 1.0\%$  RH resolution
- ▶ Lighting control from 0 ~ 50,000 Lux by 8-Step light intensity for photoperiodic Day-Night simulation
- ▶ Lamp-on-Delay System by turn on lamp one by one which provides gradual increase of light to eliminate sudden light intensity change
- ▶ CO<sub>2</sub> concentration control within  $\pm 1$  ppm (1%) resolution
  
- ▶ 내구성과 내부식성이 뛰어난 Stainless Steel 304 재질의 히터와 냉각 효율이 뛰어난 냉각시스템
- ▶ 부드러운 공기 순환식 설계로 균일한 온도 분포
- ▶  $\pm 0.1^{\circ}\text{C}$  해상도의 온도제어능력
- ▶  $\pm 1.0\%$  RH 해상도의 상대습도 제어능력
- ▶ 0 ~ 40,000 Lux 의 조도를 8 단계로 제어하는 일광조절기능
- ▶ 각 단계별로 램프가 한 개씩 순차적으로 점등 되어 급격한 조도의 변화에 의한 식물체의 스트레스를 방지
- ▶  $\pm 1$  ppm (1%) 해상도의 CO<sub>2</sub> 농도 제어능력

## Convenience

- ▶ Outer door with self adhesive magnetic packing
- ▶ Inner glass door with high density silicone packing and air-tight door lock (depends model)
- ▶ Removable and height adjustable shelf by 25mm spacing
- ▶ Easy to access Light Bank System for convenient maintenance
- ▶ Corrosion resistant Stainless Steel 304 (ASTM 304) chamber
- ▶ Auto-defrost system, user settable interval and time
- ▶ Built-in casters for easy transport
  
- ▶ 자석 접착방식의 외부 도어 패킹
- ▶ 내부 유리 도어와 고밀도 실리콘 패킹, 밀착식 도어락은 기밀성이 뛰어남 [일부모델]
- ▶ 내부식성이 강한 Stainless Steel (SUS304) 챔버
- ▶ 25mm 간격으로 높이 조절 가능한 선반
- ▶ 라이트뱅크 시스템은 손쉽게 조명기구를 교체할 수있음
- ▶ 바퀴와 수평조절좌를 장착하여 설치, 이동, 평형유지 기능

## Safety

- ▶ **OVER TEMP. CUT-OFF**  
Analog system cut-off heater 10% above set temp.
- ▶ **MAX TEMP CUT-OFF** heater and **AUDIO VISUAL ALARM** when if  $+1^{\circ}\text{C}$  above maximum limit
- ▶ **SENSOR DISCONNECTION ALARM**
- ▶ **LOW WATER LEVEL ALARM**
- ▶ **DRY BURN PROTECTION OF HUMIDIFIER**
- ▶ **OVER CURRENT CUT-OFF** : Electrical Leakage Breaker
  
- ▶ **과열방지장치**  
컨트롤러 오류로 설정온도 초과 시 히터차단
- ▶ **최고온도알람기능** : 한계온도 $+1^{\circ}\text{C}$  초과시 히터 차단
- ▶ **센서단락알람**
- ▶ **저수위 알람**
- ▶ **누전차단기** : 전기 누설 시 주전원 차단



# Growth CHAMBER

## JSGC-Series TOP ILLUMINATION Wide Range



### Specifications

<b>Heating</b>	Forced Air Convection
<b>Cooling</b>	CFC Free Air Cooled Compressor
<b>Humidifier</b>	Water Boiling Humidifier
<b>Temp. Range</b>	+0 °C ~ 60 °C (Light Off JSGC-960C) +10 °C ~ 60 °C (Light On JSGC-960C)
<b>Accuracy</b>	± 0.3 °C at 20.0°C 60% RH
<b>Uniformity</b>	± 1.0 °C at 20.0°C 60% RH
<b>Temp. Sensor</b>	Class A Pt-100 Ω Sensor
<b>Humidity Range</b>	30 - 98% RH (Sensor Range) 30 - 85% RH (Control Range)
<b>Accuracy</b>	± 3.0 % RH at 20.0°C 60% RH
<b>Humidity Sensor</b>	Electronic Sensor
<b>Illumination</b>	0 ~ 40,000 Lux by 8-Step Combination
<b>Light Sensor</b>	Lux Meter 1 Lux resolution
<b>CO<sub>2</sub> Range</b>	ambient to 5,000 ppm ( ~ 20 %)
<b>CO<sub>2</sub> Sensor</b>	Dual Wavelength NDIR Diffusion
<b>Controller</b>	Programmable PID Control 11 Segment 999 Cycle Repeat
<b>Safety</b>	Over-Temperature Cut-Off Over Current Cut-Off Low Water Level Cut-Off
<b>Material</b>	Body : Epoxy Powder Coated Steel Chamber : Stainless Steel 304 Double Layer Vacuum Glass Ceiling on Light Bank Including PVC Coated Wire Shelf
<b>Electric Plug config.</b>	220 ± 10% VAC 50/60Hz 1-Phase Direct connect to 60 Amp ELB Mains

	Temp. +0 °C ~ 60 °C
	Humidity 30 ~ 85% RH
	Lighting 0 ~ 40,000 Lux
	CO <sub>2</sub> Conc. amb. ~5000 ppm (%)
	Program Controller
	Timer On / Off 
	Photoperiodic Control 

## Performance

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- 부드러운 공기 순환식 설계로 균일한 온도 분포
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각 단계별 램프는 한 개씩 순차적으로 점등되어 급격한 조도의 변화에 의한 식물체의 스트레스를 방지
- $\pm 1$  ppm (1%) 해상도의 CO<sub>2</sub> 농도 제어능력

## Options

Art No.	Descriptions
OHC-100	CO <sub>2</sub> Control - 5,000 ppm with NDIR CO <sub>2</sub> Sensor supplied without CO <sub>2</sub> gas cylinder
OHC-101	2 Stage CO <sub>2</sub> Gas Regulator
OHC-102	Flow Meter
OHC-103	Metering Valve

## Accessories

Art No.	Descriptions
<b>PVC Coated Wire Shelf</b>	
PHS-C10	for JSGC-420C W570 x D580 mm
PHS-C12	for JSGC-960C W870 x D880 mm
PHS-C11	for JSGC-1500C W685 x D830 mm

## Ordering Information

	JSGC-420C	JSGC-960C	JSGC-1500C
Chamber Volume (Capacity)	432L	972L	1512L
Dimensions Inner	600 x 600 x 1200	900 x 900 x 1200	1400 x 900 x 1200
W x D x H mm Outer	1180 x 850 x 2080	1480 x 1150 x 2080	1980 x 1150 x 2080
Temperature Range	Light Off : +0°C ~ 60°C Light On : +10°C ~ 60°C w/o Humidity Control		
Accuracy	$\pm 0.3^\circ\text{C}$ at 20.0°C 60% RH (Light Off)		
Uniformity	$\pm 1.0^\circ\text{C}$ at 20.0°C 60% RH (Light Off)		
Humidity Range	30 ~ 98% RH (Sensor Range) 30 ~ 85% RH (Control Range)		
Accuracy	$\pm 3.0\%$ RH at 20.0°C 60% RH		
Uniformity	$\pm 6.0\%$ RH at 20.0°C 60% RH		
Illumination Range / Steps	6 Step	7 Step	8 Step
Lamp Configuration	2 x 150W HQI 4 x 55W FPL	3 x 150W HQI 4 x 55W FPL	4 x 150W HQI 8 x 36W FPL
CO <sub>2</sub> Conc. Range	ambient ~ 5,000 ppm (ambient ~ 20%)		
Accuracy	$\pm 50$ ppm		
Controller	Programmable PID Control 11 Segment 999 Cycle Repeat		
Sensors	Class A Pt-100 $\Omega$ Sensor / Electronic Humidity Sensor / Lux Meter / NDIR Diffusion CO <sub>2</sub> Sensor		
No. of Shelves / Maximum No.	3 / 37	4 / 37	8 / 43
Heater Rating	4.0 kW	6.0 kW	8.0 kW
Refrigeration System	CFC Free Air Cooled Compressor		
Electric Requirement	220 VAC 50/60Hz 1P		
Power Rating	25 Amp	36 Amp	53 Amp
Plug Configuration	30 AMP	50 AMP	60 AMP ELB Mains