

Model : PPGC-720

Edition : January 2006

Programmable Plant Growth Chamber



Before operating this unit,
please read and understand
this manual completely
and keep it for future
reference.

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1.2. Getting Started

Thank you very much for purchasing OYO GC Series Programmable Growth Chamber.

Your Growth Chamber has been designed with function, reliability, and safety in mind. It is your responsibility to install it in conformance with local electrical codes. For safe operation, please pay attention to the alert symbols through the manual.

This manual contains important operating and safety information. You must carefully read and understand the contents of this manual prior to the use of this equipment.



Warning

Warning alert you to a possibility of personal injury



Caution

Caution alert you to a possibility of damage to the equipment.



Note

Notes alert you to pertinent facts and conditions.



Hot Surface

Hot surface alert you possibility of burning injury by hot instrument surface



Explosive

Explosive alerts you to possibility of explosion by high pressure.

1.3. Product Overview

GC-Series Plant Growth Chamber

- ◆ Microprocessor PID Controller
- ◆ 10 Step Programmable Control
- ◆ Self Diagnostic Function
- ◆ Light Bank System
- ◆ Temperature Range from 0 °C to 50 °C
- ◆ Reliable and Accurate Temperature Control
- ◆ Tempered Pair Glass Viewing Window
- ◆ Optional RS-485 Communication Interface †
- ◆ Optional Mobile Alert Control System ††

Programmable Microprocessor PID Control

provides precise temperature control from 0°C to 50°C, relative humidity from 50 to 90%, and illumination from 0 to 25,000 Lux.

10 Step Programmable Controller

provides automatic operation of variable temperature and humidity and illumination up to 999 cycles

Light Bank System

With 6 step programmable control from 0 to 25,000 Lux

Back Light LCD

displays current value and set value simultaneously

1.4. Product Specifications

Model		PGC-432	PGC-864	PGC-1344
Capacity		432 liter	864 liter	1344 liter
Chamber (WxDxH)mm		600x600x1200	900x800x1200	1400x800x1200
Temp.	Range	-10 to 60 °C (0% illumination) / 14 to 60 °C (100% illumination)		
	Accuracy	±0.1 °C / uniformity : ±0.5°C at 20°C		
Humidity	Range	30 to 98% RH		
	Accuracy	±1.0% / uniformity : ±2% at 60% RH		
Illumination	Range	0 - 15,000 Lux / 8 steps		
	Lamp	FL 40W x 12 ea	FL 40W x 16 ea	FL 40W x 20 ea
Heater		2 x 650W	2 x 800W	2 x 1500W
Refrigerator		1/2HP	3/4HP	1HP
Timer		24 hours and 7 days		
Control & Display		Microprocessor PID controller / Digital LCD backlight pannel		
Safety device		Over temp. protector, Safety cut-off valve, Over current breaker		
Material	Interior	Stainless steel plate		
	Exterior	Powder coated steel plate		
	Door	1 x tempered glass and silicon packing		2 x tempered glass
Electric Power		220VAC, 50/60Hz, single phase		
Overall (WxDxH)mm		820 x930 x2000	1020x1130x2000	1620x1130x2000

1.5. Parts and Functions

1.5.1. Main Parts

1) Water Inlet

Supply water to the humidity steam chamber

Connect tap water or any water supply through connector

2) Door Handle

Handle to open light bank

3) Light Bank

Equipped with Fluorescent and Metal Halide Lamp Systems for illumination

4) Door Latch

Pull the handle to open front door.

Push door to close door

Equipped with key lock and key

5) Viewing Window

Small door for viewing chamber not opening front door

6) Main Control

Main controller and on/off switch

Refer Main Controller section for more detail

7) Stop Bolt

Screw clockwise to fix your Growth Chamber on the right place

8) Drain

Drain water from humidity steam chamber

Drain water from humidity steam chamber when not in use to keep the steam chamber dry.

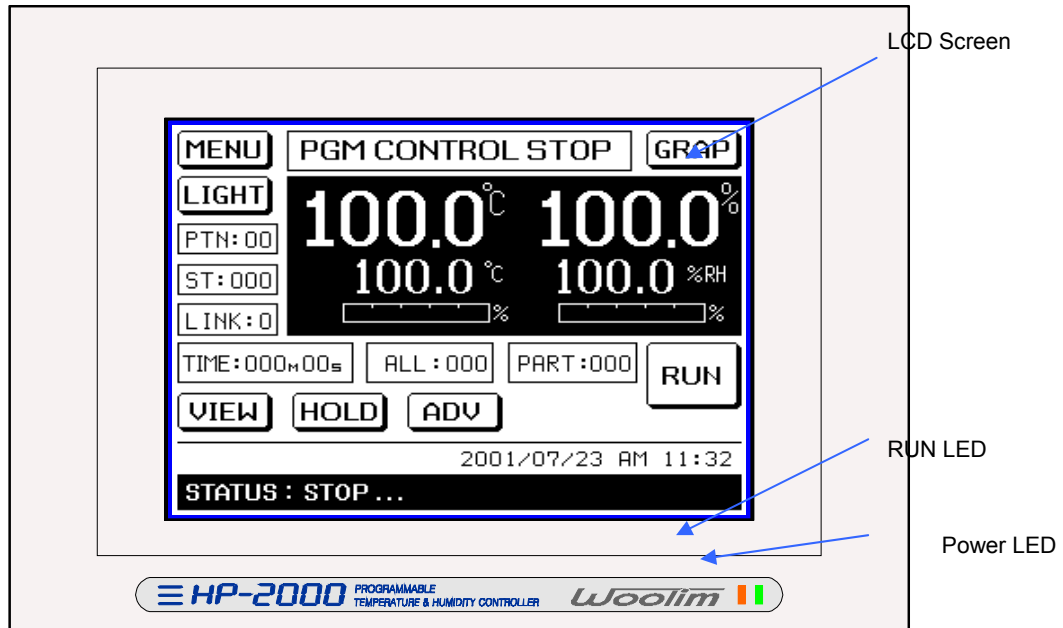
Connect Drain fitting to sink-hole with provided silicone tubing

9) Overflow

Water from the humidity chamber overflows through overflow fitting.

Connect overflow to sink-hole with provided silicone tubing

1.5.2. Main Controller



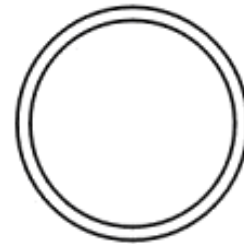
Circuit Breaker



Circuit Breaker



Main Power S/W



Over Temp.

(Circuit Breaker)

Main Electric Leakage Circuit Breaker

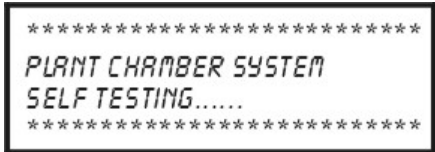
(Main Power Switch)

(Over Temp.)

Over temperature protection

Set 10 to 20% higher than the maximum operating temperature.





☐ **Back-Light LCD Display**

Display operating information of the Growth Chamber



☐ **START/STOP BUTTON**

Press to start and stop operation



☐ **PROGM/MNUL BUTTON**

Press to shift Program Operating Mode to Manual Operating Mode.

Vise versa

Press and hold 5 seconds to change mode



⓪ **MODE BUTTON**

Press to set various operating parameters



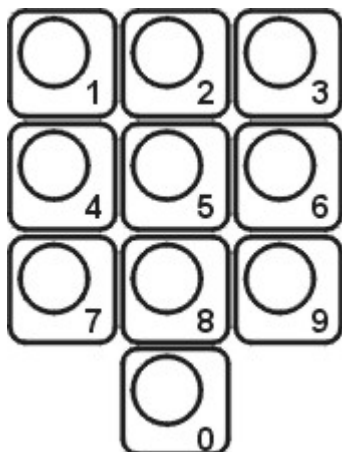
☒ **ENTER (AT) BUTTON**

Press to confirm changes

Press to go next parameter during parameter setting mode

Press and hold 5 seconds to start auto-tuning

See Auto-Tuning section for more information



☒ **NUM BUTTONS**

Numeric input buttons. (0 to 9)



☒ **SHIFT BUTTON**

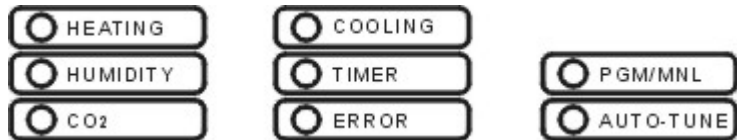
Press to shift to adjacent digit during parameter setting mode



☒ **MINUS BUTTON**

Press to input – (minus) sign

Indication Lamps



HEATING LAMP

Heater on Indicator

Lamp on and off during controller give output signal to heater to heating up the chamber

COOLING

Cooler on indicator

Lamp on and off during controller give output signal to compressor to cool down the chamber

HUMIDITY

Humidity heater on indicator

Lamp on and off during controller give output signal to heater for humidity heater to keep operating humidity in the chamber

TIMER

Timer on indicator

Lamp on and off during counting down timer

PGM/MNL MODE INDICATOR

Program Mode or Manual Operating Mode Indicator

CO₂ INDICATOR

CO₂ control indicator

Lamp on and off during controller give output signal to controlling CO₂ level in the chamber

ERROR INDICATOR

Low water level indicator

Indicator on if the water level of the humidity steam chamber is low

AUTO-TUNE INDICATOR

Blinks during auto-tuning

Indication Lamps



LAMP 1 INDICATOR

Lamp On when F parameter is 10000000

LAMP 2 INDICATOR

Lamp On when F parameter is 01000000

LAMP 3 INDICATOR

Lamp On when F parameter is 00100000

LAMP 4 INDICATOR

Lamp On when F parameter is 00010000

LAMP 5 INDICATOR

Lamp On when F parameter is 00001000

LAMP 6 INDICATOR

Lamp On when F parameter is 000000100

LAMP 7 INDICATOR

Lamp On when F parameter is 00000010

LAMP 8 INDICATOR

Lamp On when F parameter is 00000001

1.6. Operating

* Before Operation

- 1) The main voltage must correspond to the voltage given on the name-plate.

Place growth chamber on the flat and level surface

Put growth chamber for one to two hours before running to stabilize compressor.

* Getting Started

- 1) Open the front door and remove packing materials

- 2) Install shelves in the chamber

- 3) Connect water supply to the connector on the back panel

Be sure to there is any water leakage through tubing lines

- 4) Connect tubing to the drain and over flow valve

Put the other end of the tubing to sink-hole which is lower than the valve

- 5) Turn the circuit breaker on.

- 6) Turn the Main Power Switch on.

- 7) Turn the Cooler Switch on.

* Start Operation <Manual Mode>

You can operate your growth chamber at fixed temperature, humidity and illumination.

```
*****
PLANT CHAMBER SYSTEM
SELF TESTING.....
*****
```

1) LCD turn on after main power switch on

Main controller perform self-testing for 5 seconds to start up

```
*****
<MNL READY>
T : 35.0C      CO2 : 0000P
H : 40.0%     LUX : 2000
TM : 00.00    SVT : 60.0C
*****
```

2) If your growth chamber turned off after manual operating cycle, the

controller waiting for a manual operating mode

<MNL READY> : Manual operating mode ready

T : 35.0C : Current temperature (PV) of the chamber

H : 40.0% : Current humidity (PV) of the chamber

CO2 : 0000P : Current CO2 concentration (PV) of the chamber

LUX : 2000 : Current LUX (PV) of the chamber

Tm : 00.00 : Timer

SvT : 60.0C : Operating Temperature (SV)

SvH : 70.0% : Operating Humidity (SV)

SvC : 0000P : Operating CO2 Concentration

```
*****
<MNL READY>
T : 35.0C      CO2 : 0000P
H : 40.0%     LUX : 2000
TM : 00.00    SVH : 70.0%
*****
```

```
*****
<MNL READY>
T : 35.0C      CO2 : 0000P
H : 40.0%     LUX : 2000
TM : 00.00    SVC : 0000P
*****
```

SvT, SvH and SvC alternatively displays on the LCD display

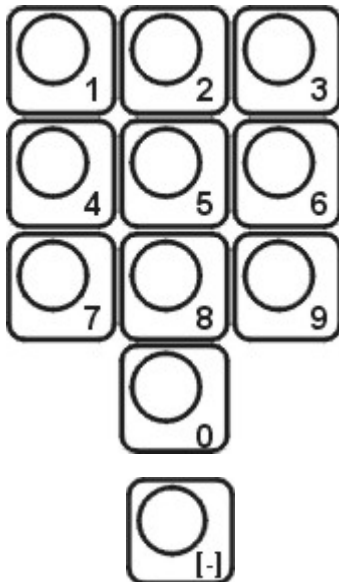
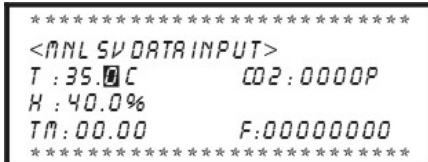
*** If the LCD displays <Pgm Ready> Step 1, press 'PROGM/MNUL' button to shift to Manual Mode**

```
*****
<MNL RUN...>
T : 35.0C      CO2 : 0000P
H : 40.0%     LUX : 2000
TM : 00.00    SVT : 60.0C
*****
```

3) Press START/STOP button to start operation

<MNL READY> sign change into <MNL RUN...> and start controlling temperature, humidity and CO₂ level in the chamber

*** Setting Operating Parameters <Manual Mode>
Temperature, Humidity, Illumination and Timer**



- 1) Press STOP button to stop operation before changing operating parameters.
- 2) Press MODE button to get into Setting Mode
- 3) LCD displays SV parameters user input
- 4) Press SHIFT button to move next adjacent digit.
- 5) Press minus button to put minus sign
- 6) Press Numeric buttons to change or put SV values
- 7) Press ENTER button to go next parameter

Parameter	Descriptions
T: 35.0 C	Operating Temperature (SV)
CO2 : 0000P	Operating CO ₂ Concentration (SV) – optional
H : 40.0%	Operating Humidity (SV)
Tm: 00.00	Timer (preset scale = HH:MM)
F : 00000000	Lamp 1 : Lamp On 0 : Lamp Off ex) F : 111111000 F:11010000

Your growth chamber can control up to 6 (SIX) different cases and its combination

- F : 10000000 [One FL Lamp on]
- F : 01000000 [Three FL Lamps on]
- F : 00100000 [Four FL Lamps on]
- F : 00010000 [One Metal Lamp on]
- F : 00001000 [One Metal Lamp on]
- F : 00000100 [One Metal Lamp on]
- F : 000000xx [xx – reserved]

- Ex) F : 11000000 [Four FL Lamps on]
- F : 11100000 [Eight FL Lamps on]
- F : 10100000 [Five FL Lamps on]
- F : 10010000 [One FL Lamps and One Metal Lamp on]

You can check the LUX shown on the control panel and make different combinations to set at operating illumination.

* Start Operation <Program Mode>

You can operate your growth chamber up to 10 step, 999 cycle with variable temperature, humidity, illumination and time

```
*****
PLANT CHAMBER SYSTEM
SELF TESTING.....
*****
```

1) LCD turn on after main power switch on

Main controller perform self-testing for 5 seconds to start up

```
*****
<PGMREADY> STEP1...
T : 35.0C      CO2: 0000P
H : 40.0%     LUX: 2000
TM: 00.00     SVT: 60.0C
*****
```

2) If your growth chamber turned off after program operating cycle, the controller waiting for a program operating mode

<PGM READY> STEP 1... : Program operating mode ready

T : 35.0C : Current temperature (PV) of the chamber

H : 40.0% : Current humidity (PV) of the chamber

CO2 : 0000P : Current CO2 concentration (PV) of the chamber

LUX : 2000 : Current LUX (PV) of the chamber

Tm : 00.00 : Timer

SvT : 60.0C : Operating Temperature (SV)

SvH : 70.0% : Operating Humidity (SV)

SvC : 0000P : Operating CO2 Concentration

```
*****
<PGMREADY> STEP1...
T : 35.0C      CO2: 0000P
H : 40.0%     LUX: 2000
TM: 00.00     SVH: 70.0%
*****
```

```
*****
<PGMREADY> STEP1...
T : 35.0C      CO2: 0000P
H : 40.0%     LUX: 2000
TM: 00.00     SVC: 0000P
*****
```

SvT, SvH and SvC alternatively displays on the LCD display

*** If the LCD displays <MNL Ready> , press 'PROGM/MNUL' button to shift to Program Mode**

```
*****
<PGMRUN> STEP1...
T : 35.0C      CO2: 0000P
H : 40.0%     LUX: 2000
TM: 00.00     SVT: 60.0C
*****
```

Press START/STOP button to start operation

```
*****
<PGMRUN> CYCLE1...
T : 35.0C      CO2: 0000P
H : 40.0%     LUX: 2000
TM: 00.00     SVT: 60.0C
*****
```

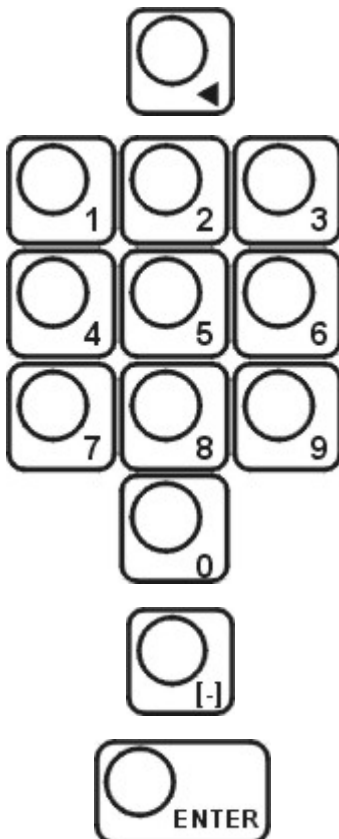
<PGM READY> sign change into <PRM RUN...> and start controlling temperature, humidity and CO₂ level according to the program.

LCD displays STEP number and cycle number alternatively.

*** Setting Operating Parameters of Program
Temperature, Humidity, Illumination, Timer, Step and
Cycle**



```
*****
PGM STEP <01> INPUT
T : 35.0 C      CO2 : 0000P
H : 40.0%
TM : 00.00     F : 00000000
*****
```



- 1) Press STOP button to stop operation before changing operating parameters.
- 2) Press PROGM/MNUL button to shift to program mode
- 3) Press MODE button to get into Setting Mode
- 4) LCD displays STEP Number and SV parameters user input
- 5) Press SHIFT button to move next adjacent digit.
- 6) Press minus button to put minus sign
- 7) Press Numeric buttons to change or put SV values
- 8) Press **ENTER** button to go next parameter
- 9) If you set all parameters, press **MODE** button to go next STEP
- 10) If you want make program have only three steps, input time 00.00 in PGM STEP <03>.

Parameter	Descriptions
PGM STEP <01>	Program Step <01> ~ <10> Steps
T: 35.0 C	Operating Temperature (SV)
CO2 : 0000P	Operating CO ₂ Concentration (SV) – optional
H : 40.0%	Operating Humidity (SV)
Tm: 00.00	Time of the Step (preset scale = HH:MM)
F : 00000000	<p>Lamp</p> <p>1 : Lamp On 0 : Lamp Off</p> <p>ex) F : 111111000 F:11010000</p> <p>Your growth chamber can control up to 6 (SIX) different cases and its combination</p> <p>F : 10000000 [One FL Lamp on]</p> <p>F : 01000000 [Three FL Lamps on]</p> <p>F : 00100000 [Four FL Lamps on]</p> <p>F : 00010000 [One Metal Lamp on]</p> <p>F : 00001000 [One Metal Lamp on]</p> <p>F : 00000100 [One Metal Lamp on]</p> <p>F : 000000xx [xx – reserved]</p> <p>Ex) F : 11000000 [Four FL Lamps on]</p>

	<p>F : 11100000 [Eight FL Lamps on] F : 10100000 [Five FL Lamps on] F : 10010000 [One FL Lamps and One Metal Lamp on]</p> <p>You can check the LUX shown on the control panel and make different combinations to set at operating illumination.</p>
--	---

11) Press MODE button to finish parameter setting for each STEPS.

12) The controller prompt user to input cycles to run and lamp on delay time

```

*****
PARAMETER INPUT
RUN CYCLE NO.: 005
LAMP ON DELAY: 00605
*****

```

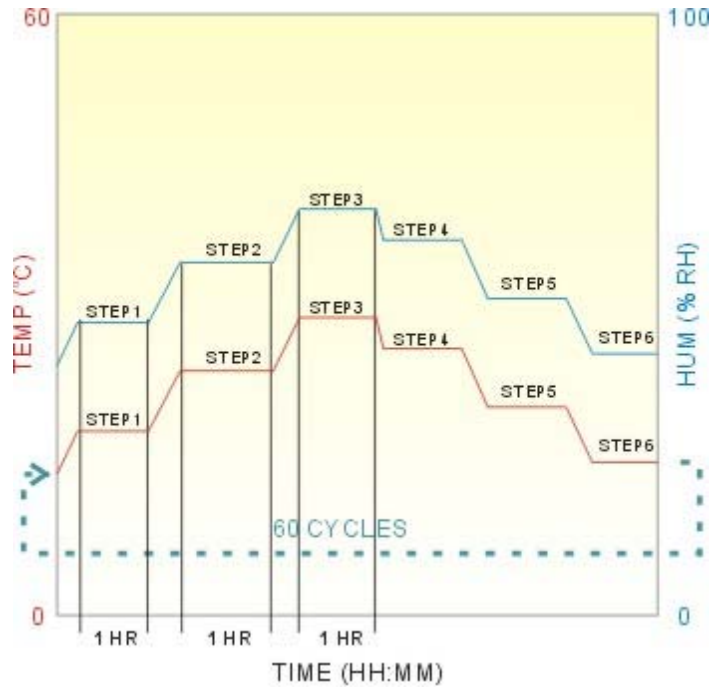
RUN CYCLE NO. : The total number of repeated cycle of the program
Maximum : 999 cycles
Infinite Cycle : 000

LMP ON DELAY : Lamp on delay time (sec.)

To reduce the stress of the plant in the growth chamber against light, the lamp on time is delays during the time.

< EXAMPLE >

A program having
STEP <01> to STEP <06>
60 Cycles



- 1) Set parameters of STEP1
(Temp. Hum. Conc. & Time 1 hr)
- 2) Set parameters of STEP2
(Temp. Hum. Conc. & Time 1 hr)
- 3) Set parameters of STEP3
(Temp. Hum. Conc. & Time 1 hr)
- 4) Set parameters of STEP4
(Temp. Hum. Conc. & Time 1 hr)
- 5) Set parameters of STEP5
(Temp. Hum. Conc. & Time 1 hr)
- 6) Set parameters of STEP6
(Temp. Hum. Conc.)
Set Time (Tm) 00:00
- 7) Press MODE Button
- 8) Input Cycle number 60
- 9) Press MODE button
- 10) Press START/STOP

* The program timer starts count down after the PV temperature reaches and stabilized at SV temperature at the STEP.

* Setting Control Parameters

Your growth chamber has many control parameters.

To set factory parameter, press and hold MODE button for 5 seconds.

```

*****
* PARAMETER INPUT
PASSWORD : 0000
*****
    
```

Press MODE button again to get into control parameter setting mode. (factory default password is 0000)

Press SHIFT and NUM button to move and change parameters

Press MODE to go next parameter

Parameter Symbol	Name of Parameter	Setting Range and Descriptions	Factory Dafault	User Set Value
DISPLAY		<pre> ***** * PARAMETER INPUT PASSWORD : 0000 ***** </pre>		
PASSWORD	Password	Password to set factory parameters	000000	
DISPLAY		<pre> ***** * PARAMETER INPUT TEMP PERIOD : 55 P:0035 I:0400 D:0100 ***** </pre>		
PERIOD	PERIOD	Output Period of Temperature (seconds) Controller output signal to the heater by designated time interval	5 sec.	DO NOT CHANGE
P	PROPORTION	Proportion of Temperature	Auto-Tuned Value	DO NOT CHANGE
I	INTEGRAL	Integral of Temperature	Auto-Tuned Value	DO NOT CHANGE
D	DIFFERENTIAL	Differential of Temperature	Auto-Tuned Value	DO NOT CHANGE

DISPLAY	<pre> ***** * PARAMETER INPUT HUMI PERIOD : 55 P:0035 I:0400 D:0100 ***** </pre>			
PERIOD	PERIOD	Output Period of Humidity (seconds) Controller output signal to the heater for humidity control by designated time interval	5 sec.	DO NOT CHANGE
P	PROPORTION	Proportion of Humidity	Auto-Tuned Value	DO NOT CHANGE
I	INTEGRAL	Integral of Humidity	Auto-Tuned Value	DO NOT CHANGE
D	DIFFERENTIAL	Differential of Humidity	Auto-Tuned Value	DO NOT CHANGE
DISPLAY	<pre> ***** * PARAMETER INPUT CO₂ PERIOD : 55 P:0035 I:0400 D:0100 ***** </pre>			
PERIOD	PERIOD	Output Period of CO ₂ Conc. (seconds) Controller output signal to the Solenoid valve for CO ₂ concentration control by designated time interval	5 sec.	DO NOT CHANGE
P	PROPORTION	Proportion of CO ₂	Auto-Tuned Value	DO NOT CHANGE
I	INTEGRAL	Integral of CO ₂	Auto-Tuned Value	DO NOT CHANGE
D	DIFFERENTIAL	Differential of CO ₂	Auto-Tuned Value	DO NOT CHANGE

DISPLAY	<pre> ***** * PARAMETER INPUT COOLER START: 030.0C BEEP-TIME : 0030S LOCK MODE : 0000 ***** </pre>			
COOLER START	COOLER STARTING TEMPERATURE	<p>Temperature where the relay turn on and off cooler</p> <p>Cooler Start Temp. > SV = Cooler ON</p> <p>Cooler Start Temp. < SV = Cooler OFF</p> <p><i>This function protects cooler from over load at high operating temperature</i></p>	35.0 C	DO NOT CHANGE
BEEP-TIME	BEEP ON TIME	<p>Time duration of beep sound after timer finish</p> <p><i>Set at 0 for continuous beep</i></p> <p><i>Press any key to stop beep</i></p>	30 sec.	
LOCK MODE	PARAMETER LOCK MODE	<p>0001 : Protect parameter of Manual Operating Mode</p> <p>0010 : Protect parameter of Program Operating Mode</p> <p>0100 : Protect factory parameter</p> <p>1000 : All key (button) lock</p> <p>Just viewing SV available.</p>		

* Setting Factory Parameters

Your growth chamber has many factory parameters.

To set factory parameter, press and hold MODE button for 30 seconds.

Press SHIFT and NUM button to move and change parameters

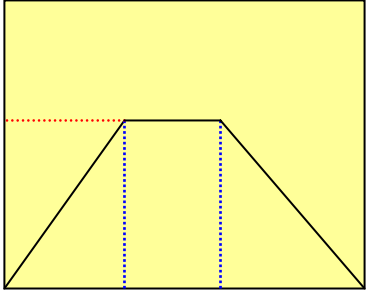
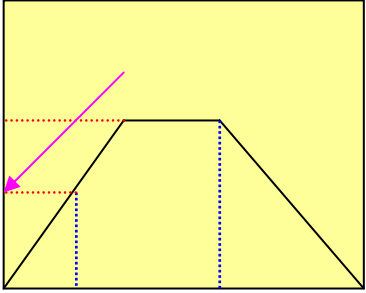
Press MODE to go next parameter

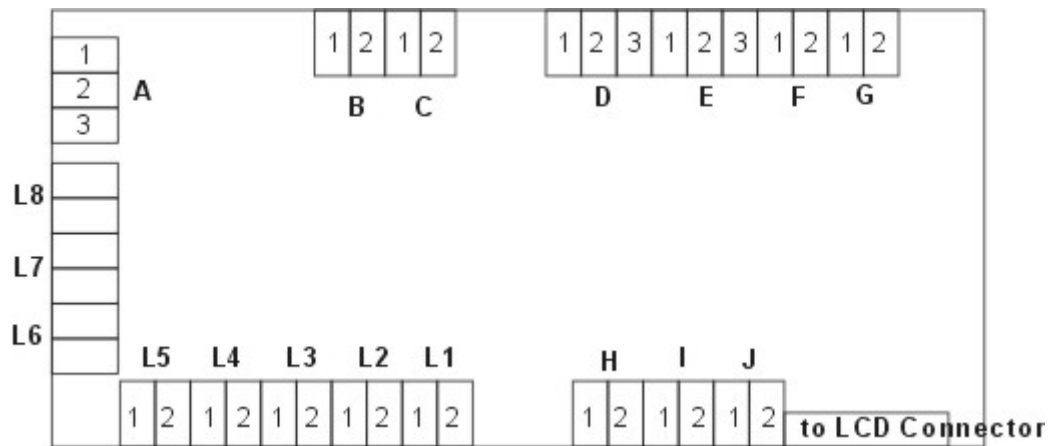
Parameter Symbol	Name of Parameter	Setting Range and Descriptions	Factory Dafault	User Set Value
DISPLAY		<pre> ***** * PARAMETER INPUT TEMP MAX-IN : 070.0C ZERO ADJUST : 000.0C DATA MODE : 0000 ***** </pre>		
TEMP MAX-IN	MAXIMUM TEMPERATURE LIMIT	<p>000.0 ~ 099.9</p> <p>Maximum temperature limit of user input TEMP MAX-IN protect your growth chamber from temperature setting higher than maximum available operating temperature</p>	070.0	DO NOT CHANGE
ZERO ADJUST	ZERO ADJUST	<p>000.0 ~ 099.9</p> <p>ZERO ADJUST compensate temperature difference between controller, PT sensor reading and calibrated standard thermometer</p>	000.0	
DATA MODE	DATA MODE	<p>0000 ~ 1111</p> <p>0000 : Displays fixed number of temperature EX) 35 °C</p> <p>0001 : Displays one digit below decimal point EX) 35.5 °C</p>		

DISPLAY	<pre> ***** * PARAMETER INPUT HUMIMAX-IN : 099.9 % ZERO ADJUST : 000.0 % DATA MODE : 0000 ***** </pre>		
HUMI MAX-IN	MAXIMUM HUMIDITY LIMIT	000.0 ~ 099.9 Maximum humidity reading where the output signal from the sensor is 1V	DO NOT CHANGE
ZERO ADJUST	ZERO ADJUST	000.0 ~ 099.9 ZERO ADJUST compensate humidity difference between controller, humidity sensor reading and calibrated standard humidity sensor	000.0
DATA MODE	DATA MODE	0000 ~ 1111 <u>0000</u> : Displays fixed number of humidity EX) 80% <u>0001</u> : Displays one digit below decimal point EX) 80.5 % <u>0000</u> : reserved <u>0010</u> : reserved <u>0000</u> : reserved <u>0100</u> : reserved <u>0000</u> : Use humidity control <u>1000</u> : Do not use humidity control (Humidity value is not displaying on the LCD display)	

DISPLAY		<pre> ***** * PARAMETER INPUT CO₂ MAX-IN : 5000P ZERO ADJUST : 0000P DATA MODE : 0000 ***** </pre>		
CO2 MAX-IN	MAXIMUM CO2 LIMIT	000.0 ~ 9999 Maximum CO2 reading where the output signal from the sensor is 1V		DO NOT CHANGE
ZERO ADJUST	ZERO ADJUST	000.0 ~ 9999 ZERO ADJUST compensate CO2 level difference between controller, CO2 sensor reading and calibrated standard CO2 sensor	0000	
DATA MODE	DATA MODE	0000 ~ 1111 00 <u>0</u> : Displays fixed number of CO2 Conc. EX) 5 % 00 <u>1</u> : Displays one digit below decimal point EX) 5.1 % 00 <u>0</u> : Displays CO2 level in % 00 <u>1</u> : Displays CO2 level in ppm 0 <u>0</u> 0 : reserved 0 <u>1</u> 0 : reserved <u>0</u> 00 : reserved <u>1</u> 00 : reserved		

DISPLAY		<pre> ***** * PARAMETER INPUT LUX MAX-IN : 50000 ZERO ADJUST : 00000 DATA MODE : 0000 ***** </pre>		
LUX MAX-IN	MAXIMUM LUX LIMIT	000.0 ~ 9999 Maximum Illumination reading where the output signal from the sensor is 1V		DO NOT CHANGE
ZERO ADJUST	ZERO ADJUST	000.0 ~ 9999 ZERO ADJUST compensate illumination intensity difference between controller, sensor reading and calibrated standard sensor	0000	
DATA MODE	DATA MODE	0000 ~ 1118 000 <u>0</u> : Number of lamps (do not use illumination) 000 <u>6</u> : Number of lamps (sex lamps installed) 000 <u>8</u> : Number of lamps (eight lamps installed) 00 <u>0</u> 0 : reserved 00 <u>1</u> 0 : reserved 0 <u>0</u> 00 : reserved 0 <u>1</u> 00 : reserved <u>0</u> 000 : Use illumination function <u>1</u> 000 : Do not use illumination function (LUX value is not displaying on LCD display)	0008	DO NOT CHANGE

DISPLAY	<pre> ***** * PARAMETER INPUT TIMER START :00.00 DATA MODE :0000 PASSWORD :0000 ***** </pre>		
TIMER START	TIMER START	000.0 ~ 99.9 Temperature where timer start count down	
	<p>Absolute value (Current Temp. - Set Temp) > ACTP then timer starts</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="323 629 826 1010">  <p style="text-align: center;">Where ACTP = 0</p> </div> <div data-bbox="855 629 1358 1010">  <p style="text-align: center;">Where ACTP > 0</p> </div> </div>		
DATA MODE	DATA MODE	0000 ~ 1111 000 <u>0</u> : Program Memory Off 000 <u>1</u> : Program Memory On Program and operating condition recovery after power fail and restore 00 <u>0</u> 0 : Time Scale in Minutes:Seconds (MM:SS) 00 <u>1</u> 0 : Time Scale in Hour:Minutes (HH:MM) 0 <u>0</u> 00 : reserved 0 <u>1</u> 00 : reserved <u>0</u> 000 : reserved <u>1</u> 000 : reserved	0011
PASSWORD	PASSWORD	Password to protect unauthorized lock control parameter change	0000



"A" : AC INLET

1 - 0 Volt 2 - 110 Volt 3 - 220 Volt

"B" : COOL RELAY (COOL ON – ON/STOP COOL OFF – OFF WHEN TIME END.)

1- NO RELAY 2- COMMON RELAY 3- NC RELAY

"C" : Water Supply Error Input (REPLAY ON: ERROR, RELAY OFF: NORMAL)

"D" : Pt100 ohm Thermocouple Input

1: - (minus) 2: + (plus) 3: - (minus)

"E" : 0-1V Humidity Sensor Input

1: + (plus) 2: - (minus) 3: reserved

"F" : 0-1V CO2 Sensor Input

1: + (plus) 2: - (minus)

"G" : 0-1V Lux Sensor Input

1: + (plus) 2: - (minus)

"H" : Triac Temperature Control Output

1- Triac gate

2- Triac MT2

"I" : Triac Humidity Control Output

1- Triac gate

2- Triac MT2

"J" : Triac CO2 Control Output

1- Triac gate

2- Triac MT2

"L8"- "L1" : 8 each of LAMP Triac ON/OFF Output Control

1- Triac gate

2- Triac MT2

(Remarks: On the LCD display,

where F:11111111 is

F : L8 L7 L6 L5 L4 L3 L2 L1

1.8. Warning



1. The main voltage must correspond to the voltage given on the name-plate
2. **Some parts of the growth chamber is extremely hot. Do not touch any part of the growth chamber without personal safety device during operation.**
3. Place your growth chamber on the flat and level surface
4. Do not put volatile, flammable and explosive material in the growth chamber.

1.9. Service Part List

Cabinet & Hardware Components

Part#	Part	Material/Model	Q'ty
GC-H007-1	Ceiling Glass	Pair Glass 455x1355x5t	2 EA
GC-H007-2	Door Glass	Glass 667x1502x5t	1 EA
GC-H008	Door Packing	Silicone Foam Packing Bumjin Type Packing	2 EA
GC-H010	Caster	Poot master / 80 Kg	4 EA
GC-H011	Stop Bolt	27 x 100 mm	EA
GC-H012	Door Handle	D-9 Normal Handle	2 EA
GC-H013	Shelve	Coated Shelve	5 EA
GC-H014	Shelve Support	SUS	20 EA
GC-H015	Membrane Key Pad	PVC	1 EA
GC-H016	Shock Absorber		EA

Electric Components

Part#	Part	Model	Specifications	Q'ty
GC -E001	PID Controller	BK4-PL	Calibration Cert#:N/A	1 EA
GC -E003	PT-100 Sensor for PID Controller	PT-100Ω	Calibration Cert# : N/A	1 EA
GC-E004	Humidity Sensor	tdk(R/T)	40~95RH, 4~20mA(1~5v) 250 ohm	1 EA
GC-E005	OPT Sensor (Hi-Temp.)	Rainbow	TS-120S AC250V 18A	1 EA
GC-E005-1	OPT Sensor (Low Temp.)	PCC	TS -20~40 10A	1 EA
GC -E006	Power S/W	Series 82.X.X.8	16A 250 VAC	1 EA
GC-E007	Cool S/W	Series 82.X.X.8	16A 250 VAC	1 EA
GC -E008	Circuit Breaker	GRH-32	220/110V	1 EA
GC -E009	Heater for Heating		1.6KW	1 EA
GC-E009-1	Heater for Humidity		1.5KW	EA
GC -E010	TRIAC	TG25C60	100Ω 35A	8 EA
GC -E011	Fuse Holder	HY-F15-1P	AC 250V, 15A	EA
GC -E012	Fuse		15A, 30mm	2 EA
GC -E013	Noise Filter	WYF-S06A2	250 VAC, 6A 50/60Hz	1 EA
LGC-E014	Timer	EH715	110/220V	EA
GC -E015	Relay	SLY-2S	250V 10A	2 EA
GC -E016	Relay Socket	LR-LY2	250V 10A	2 EA
GC -E017	Power Relay	DPR-302S	220V 7A	2 EA
GC -E018	Power Relay Socket	DR-06	250V 10A	EA
GC -E019	Packing Heater	Silicon Heater	30W	1 SET
GC -E020	Heat Sink	N027	70X80, 100X105	8 EA
GC -E021	Power Cord		250V 30A	1 EA
GC-E022	Terminal Strip	SH-15A	25P25A, 4P30A,	3 EA

GC-E023	Solenoid Valve	DS10 200A	200V 50/60Hz	1 EA
GC-E024	Fluorescent Lamp		40 Watt	22 EA
GC-E025	Metal Lamp	MH250		EA
GC-E027	Fluorescent Lamp Ballast	KSC810Z	230V60Hz 0.34A 42W	8 EA
GC-E028	Power Supply	VSF15-24	50/60Hz 0.4A 264V	EA
GC-E029	Fan	NMB STC	120X120 X40 220V 50/60Hz	4 EA EA

Refrigeration Components

Part#	Part	Model	Specifications	Q'ty
GAB-R001	Compressor	SC12G	1/3HP 220~240V 50/60Hz Danfuss	2 EA
GAB-R002	Air Cooled Condenser	CCI-04	0.4 Kw Surface Area : 2.9 m2 Capacity : 525 kCal/hr Fitting : INPUT 3/8" OUTPUT 3/8"	2 EA
GAB-R003	Evaporator		580x110x160 mm	2 EA
GAB-R004	Condenser Fan	FS-20	225φ	2 EA
GAB-R005	Condenser Motor	IS-4415YSA	AC220V 50/60Hz 9W 4P	2 EA
GAB-R006	Condenser	YP04P 1072	40 uF -0/20% (65C) 330V 50/60Hz	2 EA
GAB-R007	Compressor Relay	MSRL	59D98 M107	2 EA
GAB-R008	Compressor OPT	T150	T0517/55	
GAB-R009	Dryer Filter	ADK-032		2 EA
GAB-R010	Anti Vibration Rubber Support		φ30 x 22x 4 ea	2 SET
GAB-R011	Capillary	Copper Wire	Dia. 2.2φ x 1500mm	1 SET
GAB-R012	Refrigerant	R-134A		
GAB-R013	Solenoid Valve	Y-267	220V	1 EA

1.9. Trouble Shooting

Trouble	Check First	Trouble Shooting
Power Failure	Check Electric Supply	Plug firmly into the electric supply
Temperature Control Failure	Check set values	Change set values
Error Indication	Check water supply	

Contact sales representative or customer service department

HumanLab Instrument Co. (www.humanlab.co.kr)

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Limited Warranty

Descriptions	Plant Growth Chamber
Model	PPGC-720
Serial No.	
Warranty Period	12 Months after purchase
Date of Purchase	May 2006.
Purchase From	

WARRANTY COVERAGE

HumanLab's warranty obligations for the products are limited to the terms set forth below:

HumanLab Instrument Co. ("HumanLab") warrants the product against defects in materials and workmanship for a period of one (1) year from the date of original purchase ("Warranty Period").

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