



Johnson Gas Carbon Dioxide Generator



**IMPROVE PLANT QUALITY
INCREASE PRODUCTION**



Manufacturing begins with body construction from the highest quality steel.

Economical to operate

Typically, organic spice growers in the central portion of North America who install a bank of Johnson CO₂ Generators add an entire crop to their winter growing cycle.



Then the bodies are carefully painted to prevent rust and ensure years of performance.



Controls are assembled.



Controls are subjected to rigorous testing to ensure safety and proper operation.



Johnson Gas Appliance employees with decades of experience assemble the generators.

Easy to Install

You can install the Johnson Gas CO₂ Generator easily in any greenhouse. In fact, most growers do it themselves. No expensive duct work necessary. The CO₂ is diffused evenly throughout the greenhouse without supplemental fans.



Finally, the units are prepared for shipment

Safe and Rugged

In case of flame failure, gas supply shuts off automatically and the Johnson Gas unit saves you valuable floor space. It hangs from the rafters... completely out of the way. It's only 18" in diameter and 20" high, it weighs 21 lbs. and is easy to move.

The Johnson Gas generator is constructed of special heavy gauge aluminized steel for maximum corrosion resist and long life.

CO₂ ENRICHMENT –THE PLANT NUTRIENT FOR THE 22nd CENTURY.

Carbon dioxide is one of the essential ingredients in green plant growth, and is a primary environmental factor in greenhouses.

CO₂ enrichment at 2, 3 or 4 times natural concentration will cause plants to grow faster and improve plant quality.

Modern growers are becoming increasingly aware of the value of CO₂. Particularly now that most greenhouses are purposely shutting out CO₂ to conserve energy.

The Johnson Gas CO₂ Generator automatically provides the carbon dioxide to meet maximum growing potentials, and operates for only pennies a day

The Johnson Gas Generator can easily be installed in any greenhouse. No expensive ductwork is necessary and CO₂ is diffused evenly without supplemental fans

Join with modern growers every where - use Johnson Gas CO₂ Generators- the low cost way to produce CO₂ the nutrient of the 90's.

Johnson CO₂ Generator fertilizes greenhouse air and is easy and inexpensive to install

Why you get more rapid and efficient growth and better plant quality with the Johnson Gas CO₂.

Plants must absorb carbon dioxide (CO₂) in combination with water, soil nutrients and sunlight to produce the sugars vital for growth. A shortage of any of these requirements will retard the growing process. Normally, there are approximately 300 parts per million (PPM) of CO₂ in the atmosphere; when this level is increased to over 1,000 ppm, results are higher production and better plant quality. the AEON International Corporation vides up to 1,500 ppm per unit in an average 24' x 200 greenhouse or an equivalent 50,000 cu. ft. volume based on one air change per hour.

Nighttime levels in a greenhouse range from 400 to 500 ppm due to plant respiration. Shortly after sunrise this level will drop to normal atmosphere (300 ppm) due to the plant using the early light to start photosynthesis. After 3 to 4 hours of early morning sunlight the CO₂ level can drop to around 100 to 150 ppm, then growth is practically stopped. Supplemental CO₂ added during this period can substantially increase your plant and flower production. By adding CO₂, during winter months when greenhouse ventilators are closed and when low CO₂ concentration becomes a limiting factor in

growth, users are obtaining yield and bloom quality, which is normally associated with spring and summer.

CO₂ More Important Than Ever

The Johnson Gas CO₂ Generator is more important than ever because greenhouse growers, trying to conserve energy, are shutting Out CO₂. Rising fuel costs have forced many growers to use doubled-layered glass, etc., to conserve energy - as a result much less CO₂ is entering the greenhouse.

How to use the Johnson CO₂Generator

When there is sunlight and the vents are closed, CO₂ should be added continuously to your greenhouse. If the vents are opened because of heat buildup the generator should continue to operate for about 2 hours and then be shut off. Approximately 1 lb. Of CO₂ per hour per 1,000 sq. ft. yields 1,000 ppm's of CO₂. A 4,000 sq. ft. house requires at least 4 lbs. Of CO₂ per hour. If CO₂ level drops off from 1,000 ppm's to 500 ppm's on a clear sunny day, you can easily adjust to a higher burning rate to make up for the more rapid absorption Of CO₂ by plants. Most growers use their AEON International Corporation Generator daily in winter from approximately 7:30 a.m. to 4:30 p.m.

Easy and inexpensive to install

You can install the Johnson Gas CO₂ Generator easily in any greenhouse. In fact, most growers do it themselves. No expensive duct work necessary. The CO₂ is diffused evenly throughout the greenhouse without supplemental fans.

Automatic... fully adjustable

Completely automatic, the Johnson Gas unit comes complete with a gas pressure gauge. Simply set the gauge to the pressure desired for your greenhouse area and the Johnson Gas Generator will automatically provide the correct amount of CO₂. Just as you adjust the amount of water and fertilizer to meet the changing needs of your plants, you also set the AEON International Corporation Generator to produce the desired amount Of CO₂ for your greenhouse. The Johnson Gas unit includes a 24V. gas valve. A timer or a combination timer thermostat, which automatically turns the units on in the morning and off in the evening as desired, can activate this valve.

Safe.... requires no floor space....rugged construction

In case of flame failure, gas supply shuts off automatically and the Johnson Gas unit saves you valuable floor space. It hangs from the rafters... completely out of the way. It's only 18" in diameter and 20" high, it weighs 21 lbs. and is easy to move.

The Johnson Gas generator is constructed of special heavy gauge aluminized steel for maximum corrosion resist and long life.

Specifications

Maximum area fertilized per unit*	4,800 Sq. Ft.
Cubic feet/hr. CO ₂ @ 60° temperature*	72
Pounds CO ₂ /hr.*	8.25
Burner Range Btu/hr.*	20,000-60,000
Diameter: 18"; Height: 20" Shipping	Weight: 25 lbs.

*Based on adding 1,500 PPM CO₂ to a greenhouse with one air change per hour CO₂ production slightly less when burning natural gas.

Equipment

No. 1332 Johnson Gas CO₂ Generator with safety valve & gas pressure gauge.

Transformer (1 15V/24V; 50VA).

(Required for operation of one unit. Same transformer can be used to operate two additional units.)

Control Package (optional)

(Automatically turns unit(s) on before sunrise - off after sunset. Package controls up to 3 units. includes thermostat and 24 hr. timer)

SPECIFICATIONS

JOHNSON GAS NO. 1332 CO₂ GENERATOR

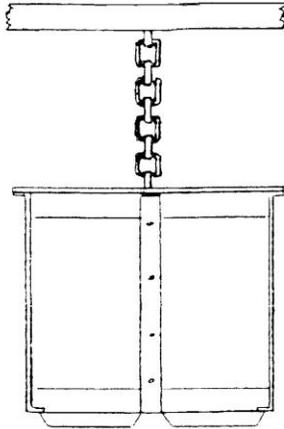
Greenhouse Area (sq. ft. per unit)*	4,800
Capacity Btuh/hr	60,000
Cubic feet/hr CO ₂ (600) (LP Gas)	72
Pounds of CO ₂ /hr (LP Gas)	8.25
Gas Control Valve	24v- 60cy
Gas Pressure Required - LP gas (inches w.c.)	11"
Gas Pressure Required - Natural Gas (inches w.c.)	5"
Gas Connection Size	3/8" pipe
Thermostat	Optional
Timer	Optional
Transformer	Optional

*Based on 1 air change per hour to furnish 1500 ppm CO₂.

Units furnished for either LP or natural gas. CO₂ production will be slightly less than tabulated values when burning natural gas. Flame safety control furnished as standard equipment provides 100% shut-off in case of pilot failure. Appliance gas pressure regulators are available. (Not furnished as standard equipment).

1332 CO₂ GENERATOR INSTALLATION INSTRUCTIONS

NOTE: Proper ventilation must be supplied when using this heater. Approximately one (1) air change per hour.



Hang unit from ceiling to the desired height by using chain. (Not supplied with unit.)

Run gas line to the inlet of the unitrol valve. Gas pressure at the inlet should be 5" to 7" water column (3 ounces) on natural gas and 11" water column (6 ounces) on LP gas while the burner is in operation.

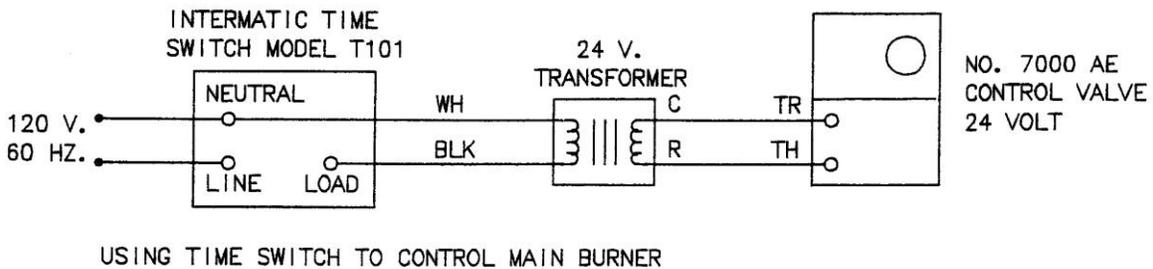
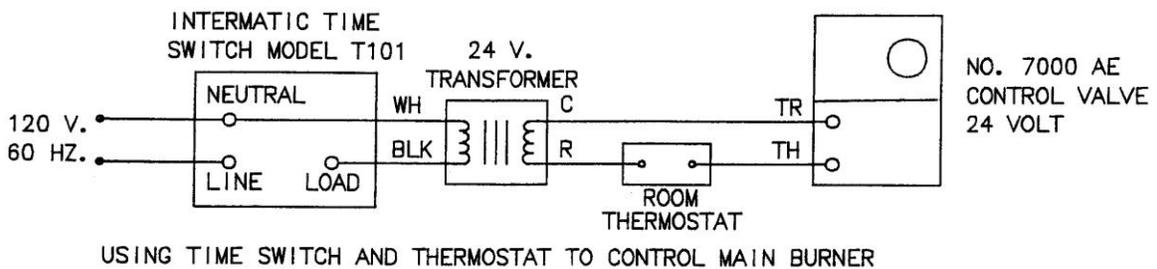
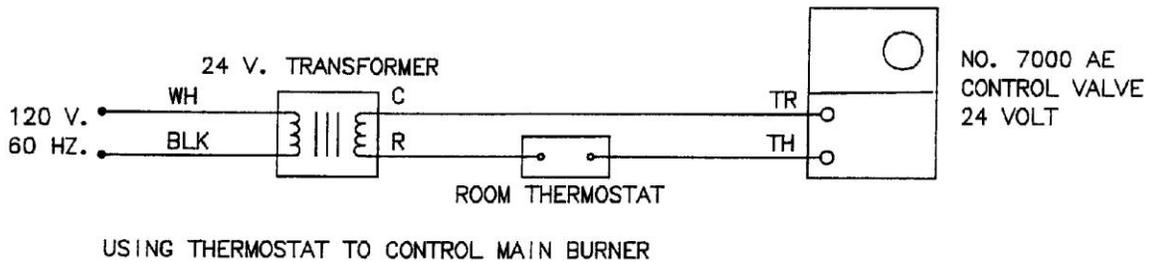
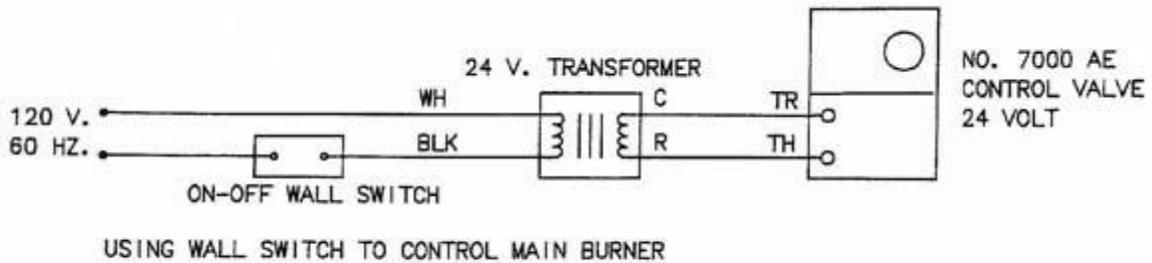
Supply a 24 volt electrical source to the unitrol valve. See form 292 for typical wiring diagrams. The 24 volt transformer, room thermostat and time switch can be purchased as optional equipment from the Johnson Gas Appliance Company. As many as three generators can be operated from one of these control set ups.

See form 294 for lighting instructions. See charts below for proper burner settings.

Check size of hot house area, adjust manual gas valve to obtain proper pressure gauge reading.

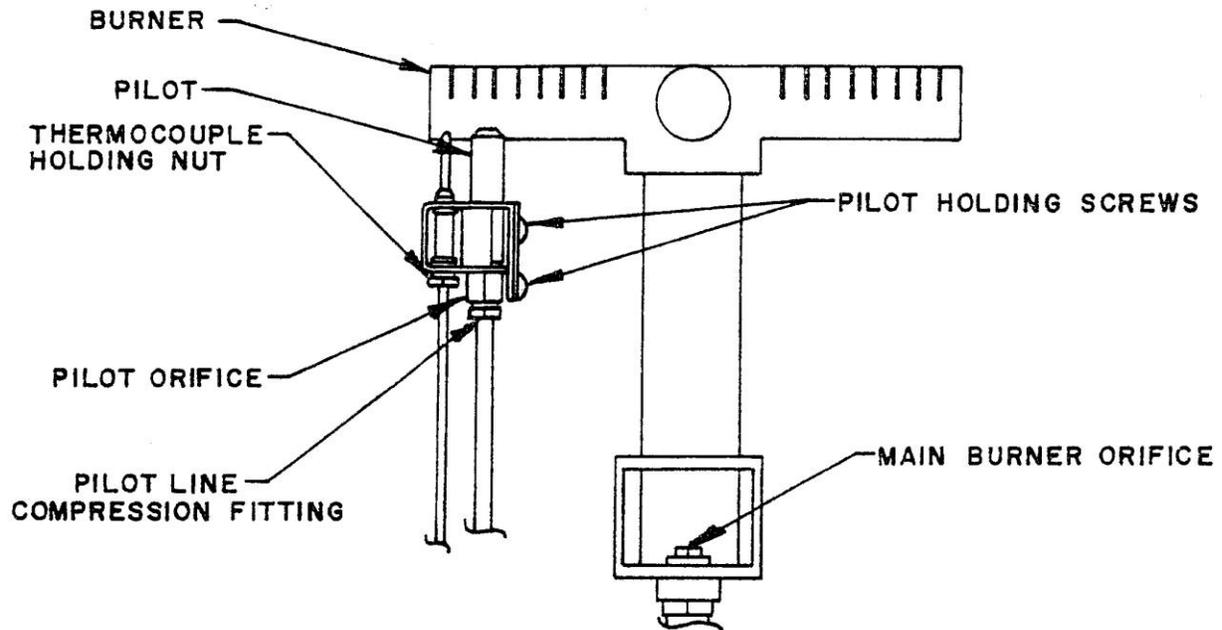
LP Gas (Use H.D. 5 Propane)			Natural Gas		
Pressure Gauge Reading Inches W.C.	Gas Input BTUH/hr.	Hot House Area in Square ft.	Pressure Gauge Reading Inches W.C.	Gas Input BTUH/hr.	Hot House Area in Square Ft.
11	60,000	4,800	5	63,800	4,250
9	54,500	4,320	4	57,500	3,850
7	47,800	3,820	3	50,200	3,350
5	40,400	3,220	2	40,400	2,700
3	31,300	2,500	1	28,475	1,900

TYPICAL WIRING DIAGRAMS FOR NO. 1332 CO₂ GENERATOR



NOTE: 3 NOS. 7000 AE VALVES CAN BE RUN FROM ONE CONTROL SYSTEM, USING TIME SWITCH, THERMOSTAT, AND TRANSFORMER.

NO. 1332 CO₂ GENERATOR ORIFICE REPLACEMENT INSTRUCTIONS



TO REPLACE PILOT ORIFICE IN #1332 CO₂ GENERATOR

1. Remove thermocouple by loosening thermocouple holding nut to give ready access to pilot line.
2. Loosen pilot line compression fitting.
3. Remove screws holding pilot and remove pilot from unit.
4. Remove pilot orifice and replace with proper orifice.
5. Replace pilot, pilot line, and thermocouple.
Be sure to snug up all connections to prevent possibility of gas leaks.

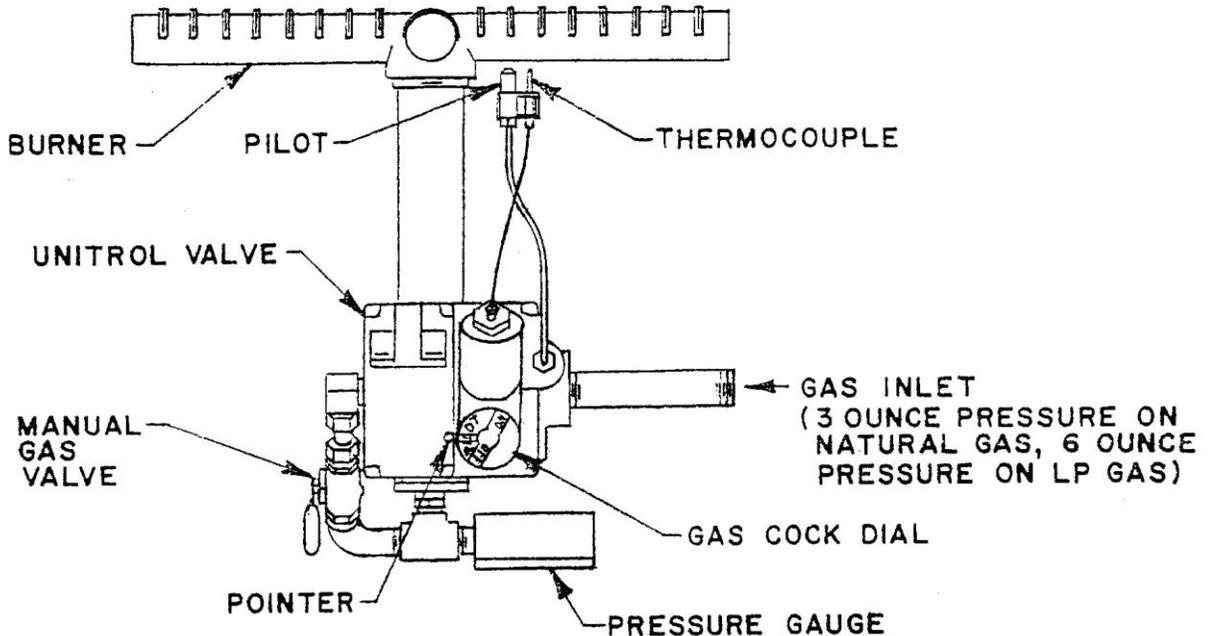
TO REPLACE MAIN BURNER ORIFICE

1. Remove present main burner orifice as shown above.
2. Screw in proper orifice.

ORIFICE SIZES

	<u>LP GAS</u>	<u>NATURAL GAS</u>
Main Burner	#45 Drill	#27 Drill
Pilot	.013	.023

LIGHTING INSTRUCTIONS FOR #1332 CO₂ GENERATOR



AFTER ALL WIRING AND PIPING HAVE BEEN COMPLETED

1. Make sure manual gas valve is in the "off" position. Turn the "gas cock dial" so that the "pilot" position lines up with the "pointer". Depress the "red button" down and ignite the pilot burner. Keep the button depressed until the pilot has burned for (40) seconds. Release button and pilot should remain burning. If not, repeat step no. 1.
2. Turn the gas cock dial counter-clockwise to the "on" position.
3. Supply 24 volt electrical power to the Unitrol valve.
4. Consult the chart on Form 295 for proper pressure gauge setting. Turn on the manual gas valve until you obtain your desired reading on the pressure gauge.
5. To shut off the main burner and pilot, turn gas cock dial to the "off" position.