

LENNOX GSR 21Q

MODEL NUMBER:	Downflow/Horizontal - "PULSE"
BTU SIZES:	50,000 to 100,000 Btu's

ACCESSIBILITY CLEARANCE

See rating plate.

CLEARANCE FROM COMBUSTIBLE MATERIAL

CLEARANCE TO COMBUSTIBLES

DOWNFLOW		HORIZONTAL	
Sides	1"	Ends	3"
Rear	1"	Rear	3"
Top	1"	Top	3"
Front	6"	Front	6"
Flue Pipe	0"	Flue Pipe	0"
Floor	*combustible	Floor	* combustible

* When unit is installed on a combustible floor, an additive base (ordered separately) must be installed between furnace and floor. Do not install on carpeting, tile, or other combustible material other than wood flooring.

COLD AIR RETURN AIR DUCTS

Sealed to the furnace casing and terminating outside the space containing the furnace.

MOBILE HOME APPLICATION: The furnace and its return air system must be designed and installed so that negative pressure created by the air-circulating fan cannot affect another appliances combustion air supply or act to mix products of combustion air with circulating air. When installed in an enclosure communicating with another fuel-burning appliance not of the direct vent type. The furnace air-circulating fan must operate only when all doors or panels in the furnace fan compartment or in a return air plenum or duct are in the closed position.

GARAGE

Approved. Must meet requirements in the UMC and the Good Practice Book.

GENERAL

Furnace must be electrically grounded.

There must be no contact between furnace and gas piping. The unit must be installed level.

Insulate supply air plenum and duct work at least through first elbow.

When installed horizontally and when viewing from the front. The blower compartment must be located to the right. Drip pan must also be installed under furnace when installed horizontally.

When installed where freezing temperature are possible, the condensate line must be protected against freezing using a self regulating heat cable - do not use copper tubing. If blockage of the condensate line occurs, the furnace will go into lockout.

The GC-3 and GC-1 with WG1 watchdog ignition controls have a watchguard feature that will break and remake the thermostat when furnace is in lockout and thermostat has had a continuous demand for heat that has lasted at least an hour.

The 2 amp fuse must be an AGC fast blow type

HIGH ALTITUDE INSTALLATIONS

Deration	No deration of this unit is required because of the self-compensating gas valve unless installed at elevation above 6,000 ft., then deration is 4% for each 1,000 ft. above sea level.
Orifice	Specifically designed for each unit, standard atmospheric orifices or orifice blanks cannot be used.
Regulator Pressure	See rating plate.
Pressure Switch	Barbed fitting on exhaust piping must point toward pressure switch. Differential pressure switch - normally closed - opens on blockage of intake or exhaust venting.

MOBILE HOME

50,000 BTU and 80,000 BTU models are approved for mobile home installation.

See cold air return ducts.

VENTING MATERIAL AND REQUIREMENTS

Vent Pipe	Schedule 40 PVC (Type 1120 and 1220) plastic pipe
Vent Fittings	PVC -1 PVC - 12

Horizontal application - exhaust connection must be below intake connection to ensure proper coil drainage.

Mufflers are required on 100,000 BTU models.

VENT CLEARANCE FROM COMBUSTIBLE MATERIAL

PVC - 0"

VENTING PROCEDURE

Venting must be sized per Table 6.

MINIMUM DIAMETER FOR GSR21 VENTING					
Pipe Length (Max. Feet)	Number of 90° Elbows				
	0	2	4	6	8
5	2	2	2	2	2
10	2	2	2	2	2
20	2	2	2	2	2-1/2
30	2	2	2	2-1/2	2-1/2
40	2	2	2-1/2	2-1/2	2-1/2
50	2	2-1/2	2-1/2	2-1/2	2-1/2
60	2-1/2	2-1/2	2-1/2	2-1/2	3
70	2-1/2	2-1/2	2-1/2	3	3
80	2-1/2	2-1/2	3	3	3
90	2-1/2	3	3	3	3

Horizontal runs of exhaust piping must not sag or have low spots and must be supported every 5 feet using isolation hangers. Maximum length is 35 feet with 5 elbows.

Cannot be common vented.

Exhaust piping must be insulated with 1/2" Armaflex when going through unconditioned space.

Combustion air intake should not be within 6 feet of a dryer vent, condensing unit, or combustion air inlet or outlet of another appliance. Venting should not exit less than 3 feet from opening into another building. Maximum separation of intake and exhaust pipes at point of termination is 3" on roof terminations and 6" on side walls.

Vertical venting is preferred. Exhaust and intake exists must be in the same pressure zone. Do not exit one vertical and one horizontal. Both must terminate on the same side of the building.

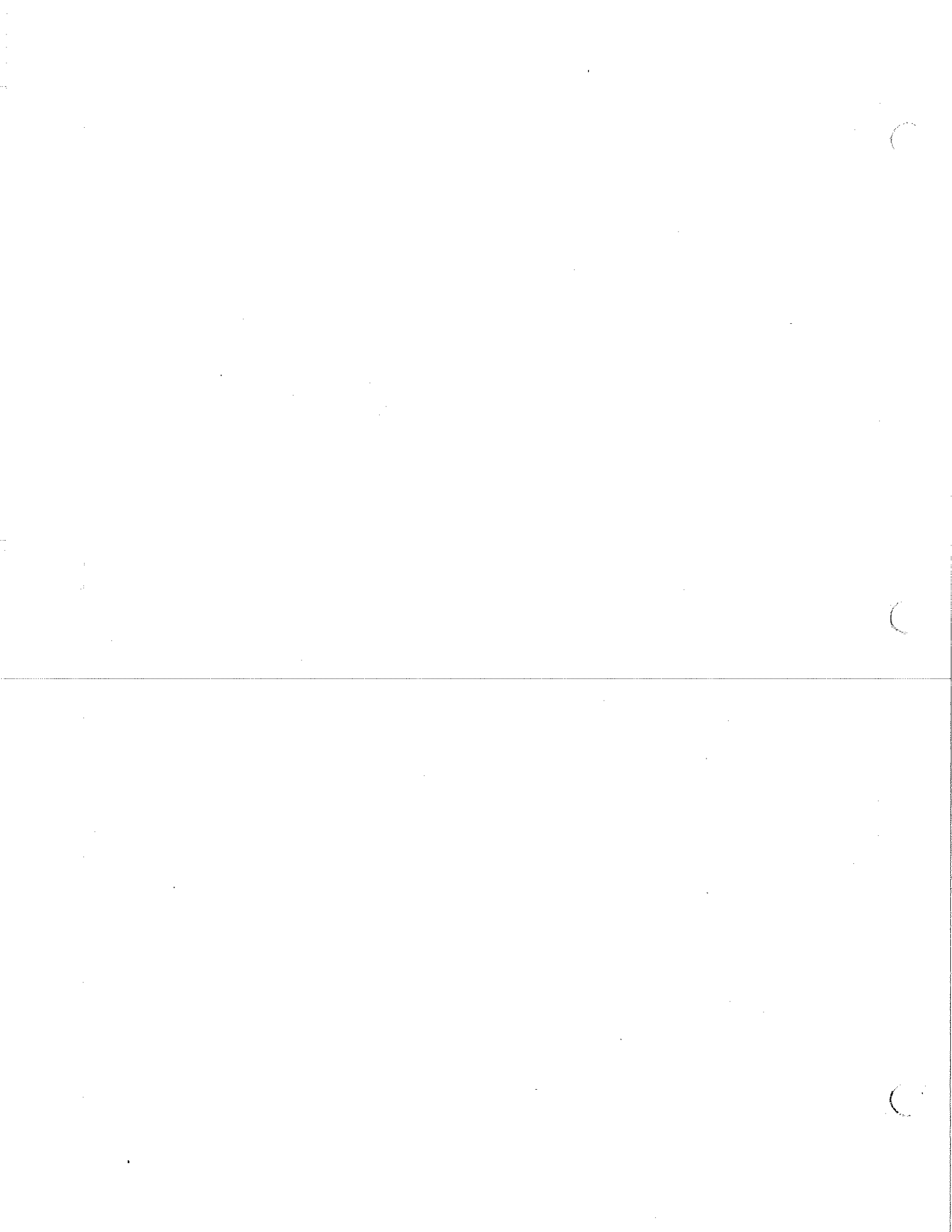
Exhaust piping mufflers must also be protected from freezing when installed in the horizontal position using a self regulating heat cable.

MISCELLANEOUS INFORMATION/NOTES

When used as a unit heater, it must be installed horizontally. May be used in aircraft hangers and repair garages.

Flexible gas connector cannot penetrate the furnace cabinet and must be installed in a "U" shaped fashion.

Blower will begin to blow after 45 seconds. Shut down is adjustable from 120 to 240 seconds.



LENNOX GSR-21Q WITH THE GC3 CONTROL Schematic Explanation

Line voltage power enters at "L1" passing through the fan door interlock switch (fan door must be in place). From the fan door power goes two ways. One to the open set of contacts at terminal "6" on the indoor blower relay, also to the open set of contacts of the speed switch. Power also goes to terminal "1" also on the indoor blower relay through the normally closed set of contacts to terminal "2" of the indoor blower relay and on to terminal "C" of the blower deck connector and on to the open set of contacts of the fan control. Line voltage power also goes to provide 110 volts to the line voltage side of the transformer which then completes back to "N".

Low voltage power leaves the secondary side of the transformer and goes through the 2.0 amp fuse to the "R" terminal of the low voltage terminal strip and up to the "R" terminal of the thermostat, completion for the low voltage system is at terminal "C". Low voltage power also goes through terminal 4 of the primary control connector to the module which provides power for the operation of the purge blower during the post purge cycle. Low voltage power also branches off to the "A28" relay energizing a coil which completes from "C" back to the transformer, this coil is to hold open the contacts of that same relay (loss of 24 volt power will result in the closing of those contacts energizing the blower motor).

As the thermostat closes power goes from "R" to "W", and leaves the thermostat and goes back to the "W1" terminal on the low voltage terminal strip. It leaves the "W1" terminal and goes through terminal "8" of the blower deck connector through the normally closed contacts of the primary limit switch through the normally closed contacts of the pressure switch through connection 1 of the primary control connector energizing the primary control timer, completion is through terminal "2" of the primary control connector back to the transformer.

With the thermostat closed and the power at the primary control timer the open set of line voltage contacts close sending power from the primary control through terminal "5" of the primary control connector energizing the purge blower which completes back to "N". After a 30 second prepurge the open set of low voltage contacts close sending 24 volts through terminal "3" of the primary control to energize the gas valve and the fan control heater both of which complete to "C" and back to the transformer. At this same time the spark plug is also energized and we should have ignition and the pulse combustion should begin. Ignition must be sensed within 7 seconds by the flame sensor which shuts off the spark and the purge blower, the pulse combustion process continues. If ignition cannot be verified the gas valve will be de-energized.

After approximately 45 seconds the fan control heater of the "A28" relay will close the normally open contacts of that same relay causing power to be sent through terminal "5" of the blower deck connector to the blower motor and capacitor which completes through connection "6" of the blower deck connector back to "N".

After the thermostat is satisfied and opens removing power from terminal "1" of the primary control connector, the low voltage power at terminal "4" of the primary control connector activates the purge blower for the post purge cycle. The indoor blower will continue to run until the air temperature lowers to 90 degrees.

TYPICAL GSR21Q WIRING DIAGRAM WITH GC3 ELECTRONIC IGNITION CONTROL

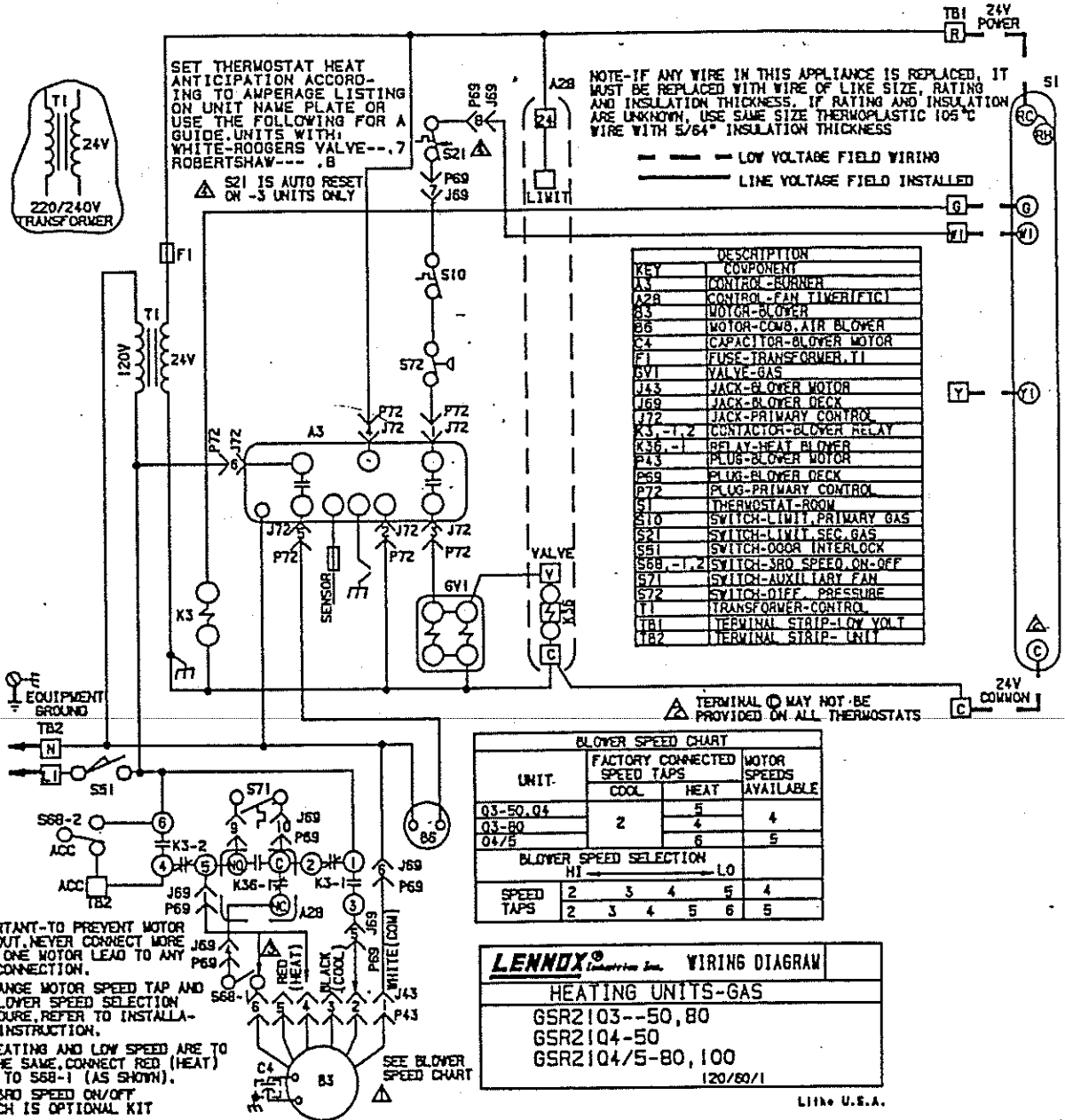


FIGURE 31

LENNOX GSR-21Q WITH THE GC1 AND WG1 (WATCHDOG) CONTROL
Schematic Explanation

Line voltage power enters at "L1" passing through the fan door interlock switch (fan door must be in place). From the fan door interlock switch power goes two ways. One to the open set of contacts at terminal "6" on the indoor blower relay, also to the open set of contacts of the speed switch. Power also goes to terminal "1" also on the indoor blower relay through the normally closed set of contacts to terminal "2" of the indoor blower relay and on to terminal "C" of the blower deck connector and on to the open set of contacts of the fan control. Line voltage power also goes through terminal "6" of the primary control connector to provide 110 volts to the open set of contacts of the module. It also continues over to provide 110 volts to the line voltage side of the transformer which then completes back to "N".

Low voltage power leaves the secondary side of the transformer and goes through the 2.0 amp fuse to the "R" terminal of the low voltage terminal strip and up to the "R" terminal of the thermostat, completion for the low voltage system is at terminal "C". Low voltage power also goes through terminal 4 of the primary control connector to the module which provides power for the operation of the purge blower during the post purge cycle. Low voltage power also branches off to the "A28" relay energizing a coil which completes from "C" back to the transformer, this coil is to hold open the contacts of that same relay (loss of 24 volt power will result in the closing of those contacts energizing the blower motor).

As the thermostat closes power goes from "R" to "W", and leaves the thermostat and goes back to the "W1" terminal on the low voltage terminal strip. It leaves the "W1" terminal and goes to the watchguard circuit (A18) terminal "I" through the normally closed contacts to terminal "O" and onto terminal "8" of the blower deck connector through the normally closed contacts of the secondary limit, then through connection "7" of the blower deck connector through the normally closed contacts of the primary limit switch through the normally closed of the pressure switch through connection 1 of the primary control connector energizing the primary control timer, completion is through terminal "2" of the primary control connector back to the transformer.

With the thermostat closed and the power at the primary control timer the open set of line voltage contacts close sending power from the primary control through terminal "5" of the primary control connector energizing the purge blower which completes back to "N". After a 30 second prepurge the open set of low voltage contacts close sending 24 volts through terminal "3" of the primary control to energize the gas valve and the fan control heater both of which complete to "C" and back to the transformer. At this same time the spark plug is also energized and we should have ignition and the pulse combustion should begin. Ignition must be sensed within 7 seconds by the flame sensor which shuts off the spark and the purge blower, the pulse combustion process continues. If ignition cannot be verified the gas valve will be de-energized.

After approximately 45 seconds the fan control heater of the "A28" relay will close the normally open contacts of that same relay causing power to be sent through terminal "5" of the blower deck connector to the blower motor and capacitor which completes through connection "6" of the blower deck connector back to "N".

After the thermostat is satisfied and opens removing power from terminal "1" of the primary control connector, the low voltage power at terminal "4" of the primary control connector activates the purge blower for the post purge cycle. The indoor blower will continue to run until the air temperature lowers to 90 degrees.

TYPICAL GSR21Q WIRING DIAGRAM WITH GC1 ELECTRONIC IGNITION CONTROL AND WG1 WATCHGUARD CONTROL

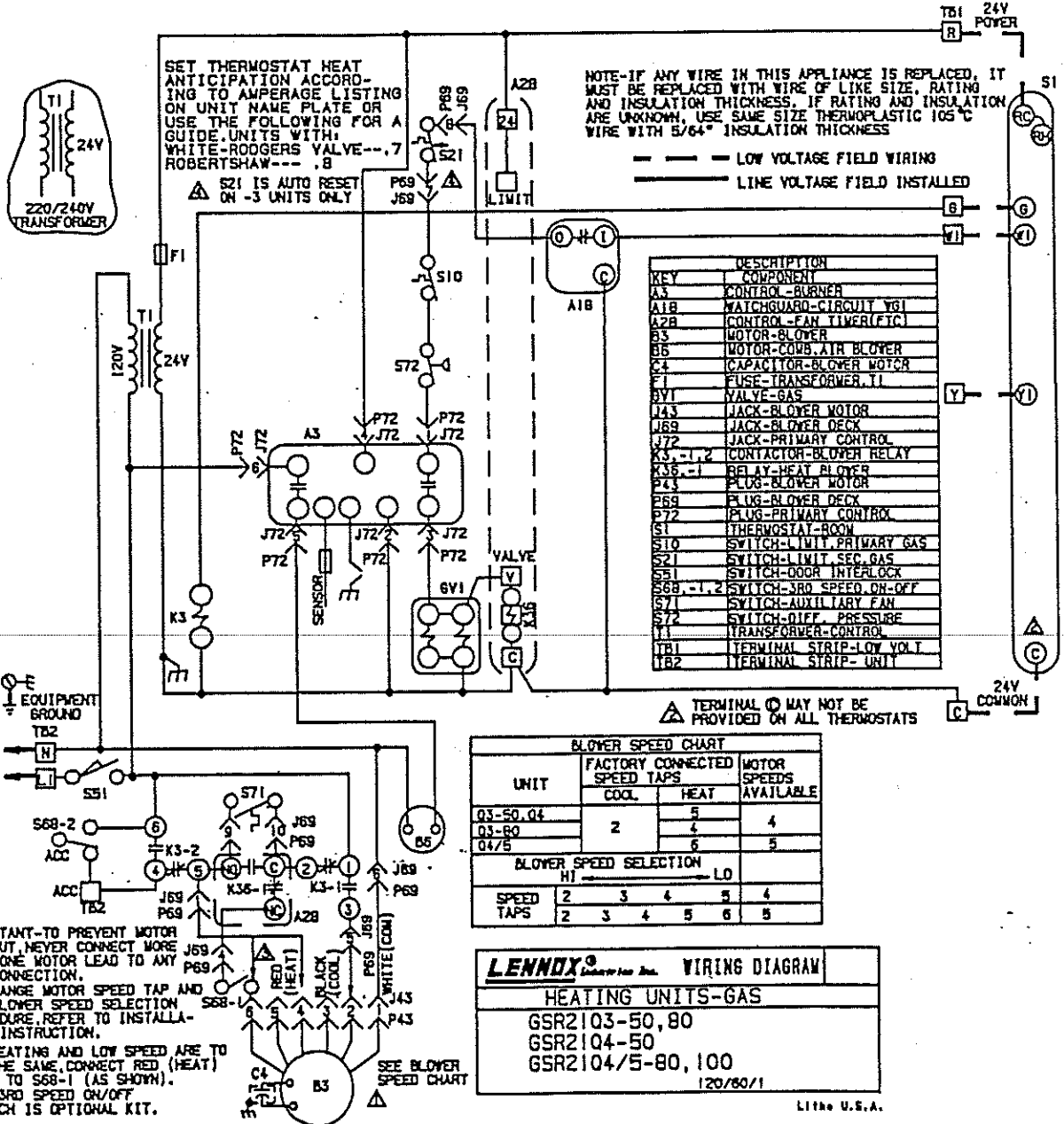


FIGURE 32

Intake and Exhaust Piping Terminations

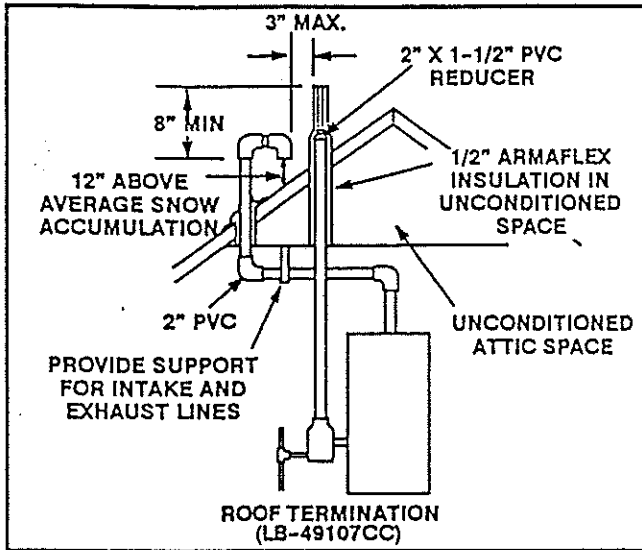


FIGURE 20

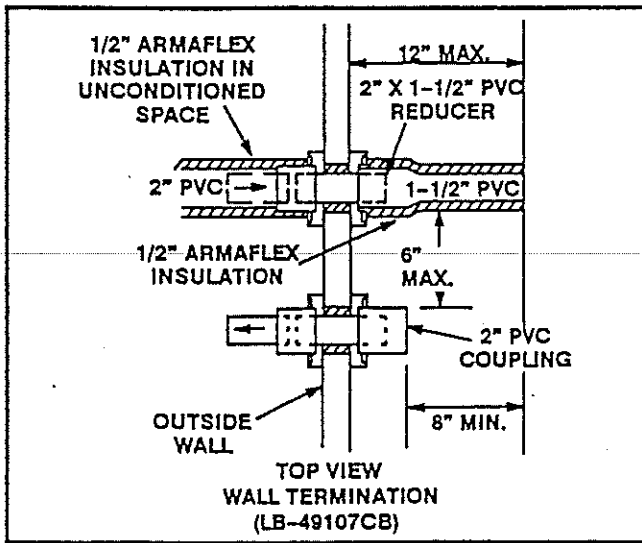


FIGURE 21

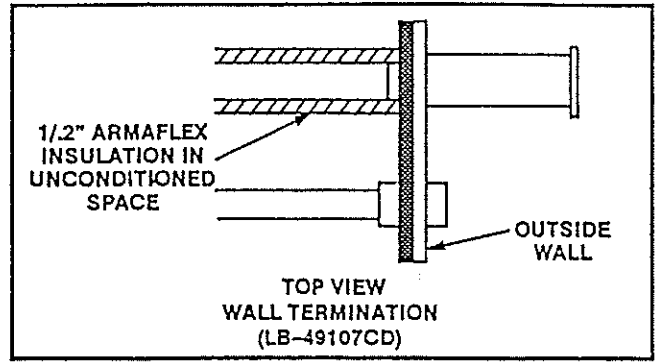
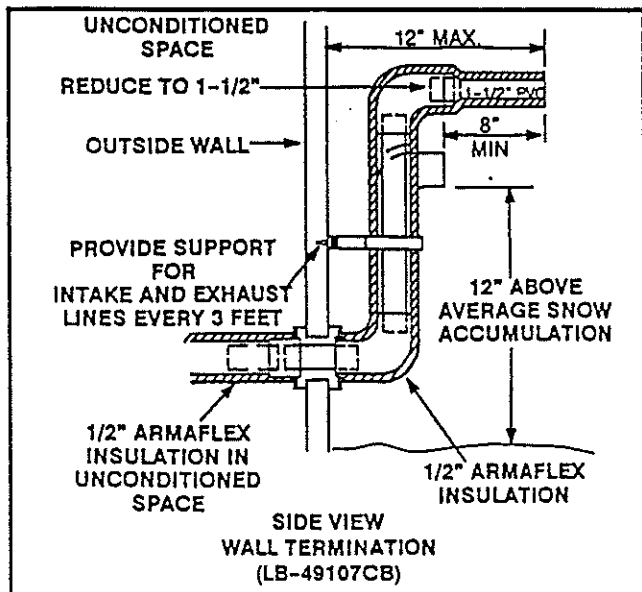


FIGURE 22

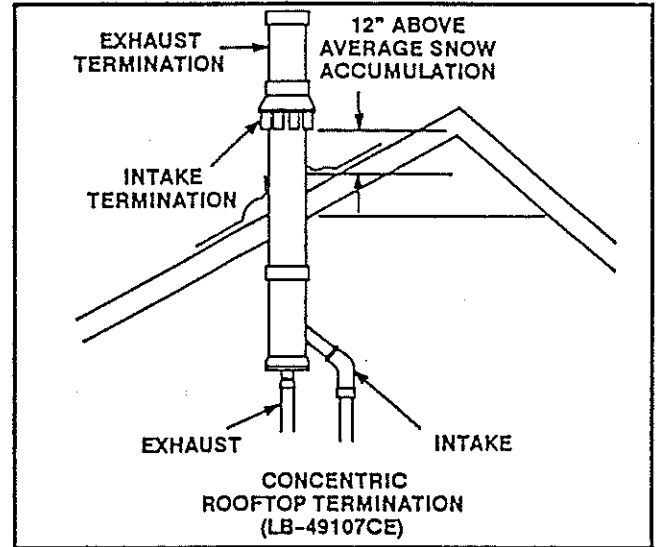


FIGURE 23

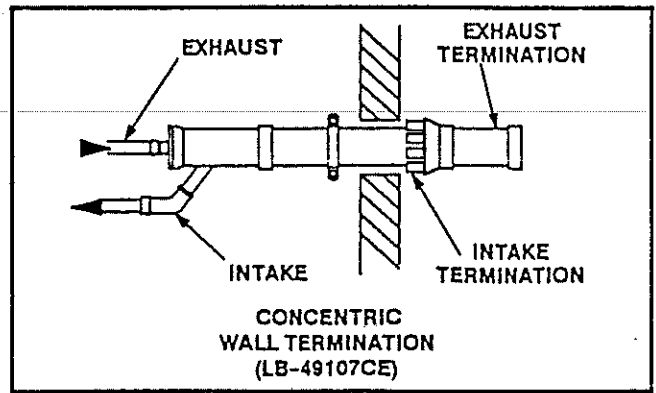


FIGURE 24

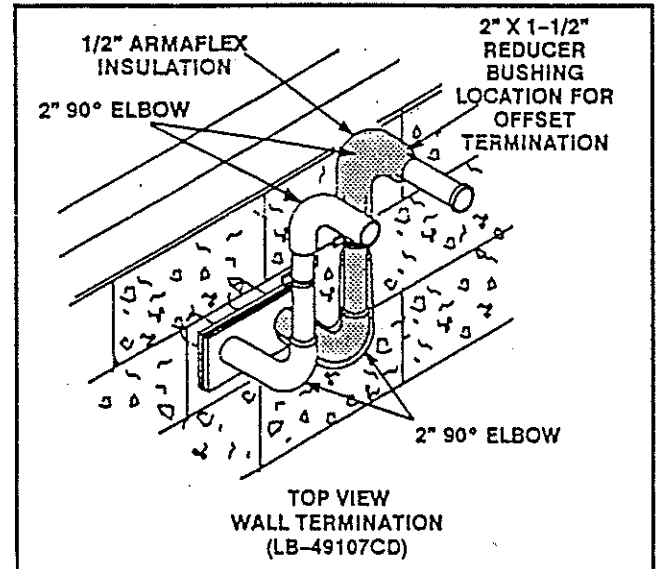


FIGURE 25

X-REPAIR PARTS LIST

The following repair parts are available through independent Lennox dealers. When ordering parts, include the complete furnace model number listed on the unit rating plate. Example: GSR21Q3-50-1.

CABINET PARTS

- Blower access panel
- Control access panel
- Upper vestibule panel
- Lower vestibule panel
- Control box cover

CONTROL PANEL PARTS

- Transformer
- Indoor blower relay
- Low voltage terminal strip with fuse
- High voltage terminal strip
- Fan timer control

HEATING PARTS

- Heat exchanger assembly
- Gas orifice
- Gas valve
- Gas decoupler
- Gas flapper valve
- Purge blower
- Air intake flapper valve
- Primary control board
- Ignition lead
- Spark plug ignitor
- Flame sensor lead
- Flame sensor
- Primary limit control
- Secondary limit control
- Auxiliary fan control
- Differential pressure switch
- Door interlock switch
- Air filter

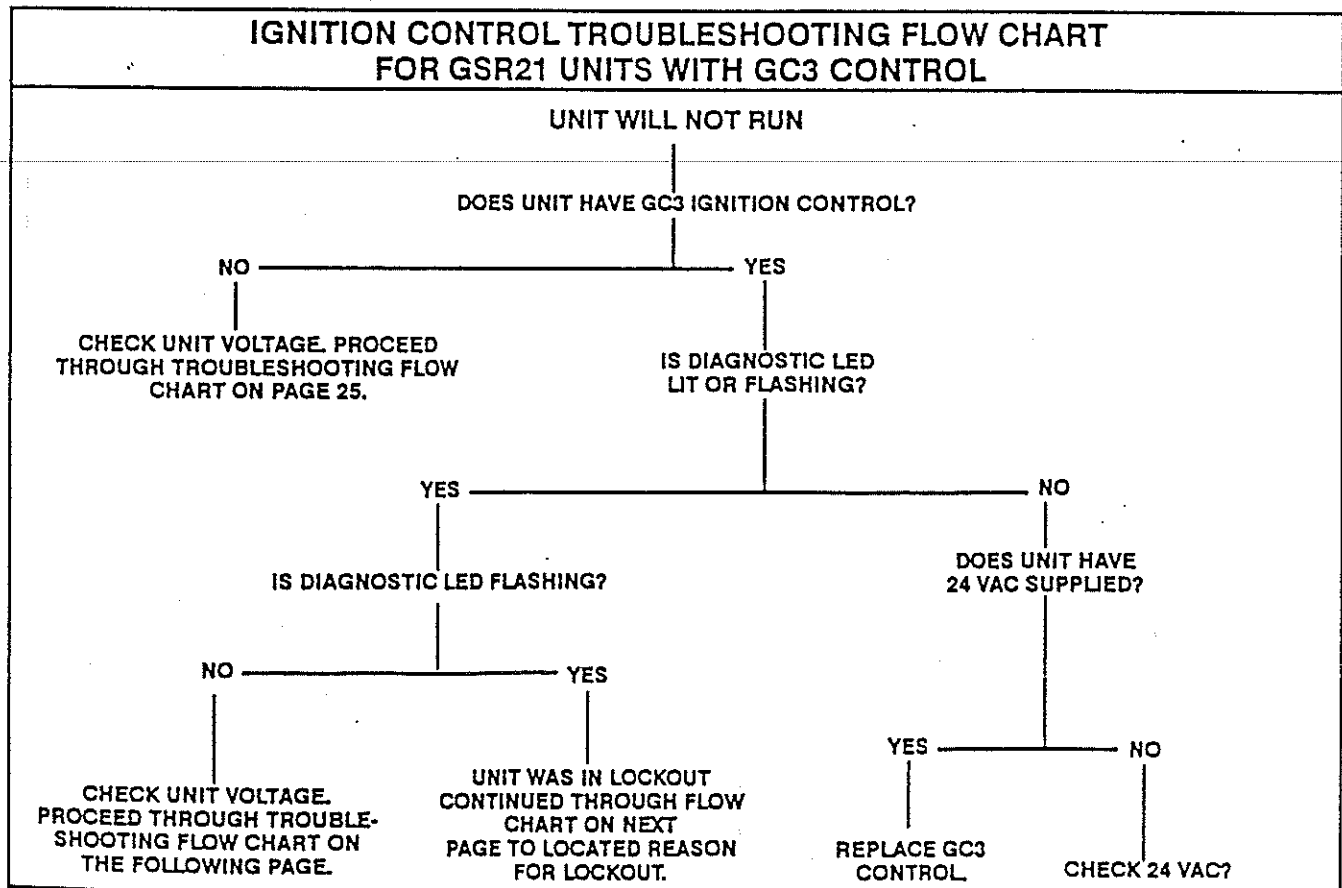
BLOWER PARTS

- Blower wheel
- Motor
- Motor mounting frame
- Motor capacitor
- Blower housing cut-off plate
- Blower housing

CONDENSATE TRAP PARTS

- Float
- Seat
- O-ring
- Clamps and screws
- Housing
- Trap assembly
- Dam

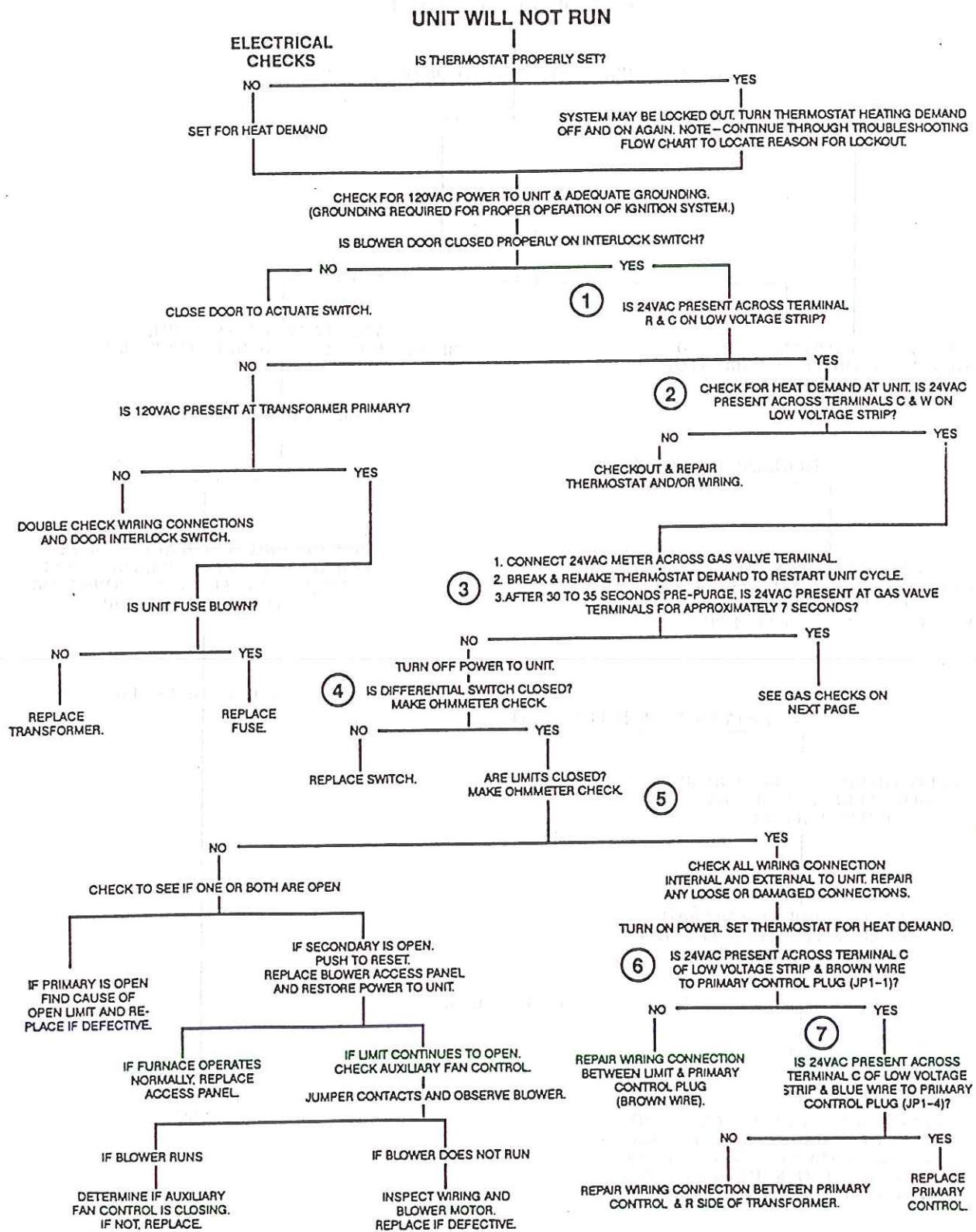
XI-TROUBLESHOOTING



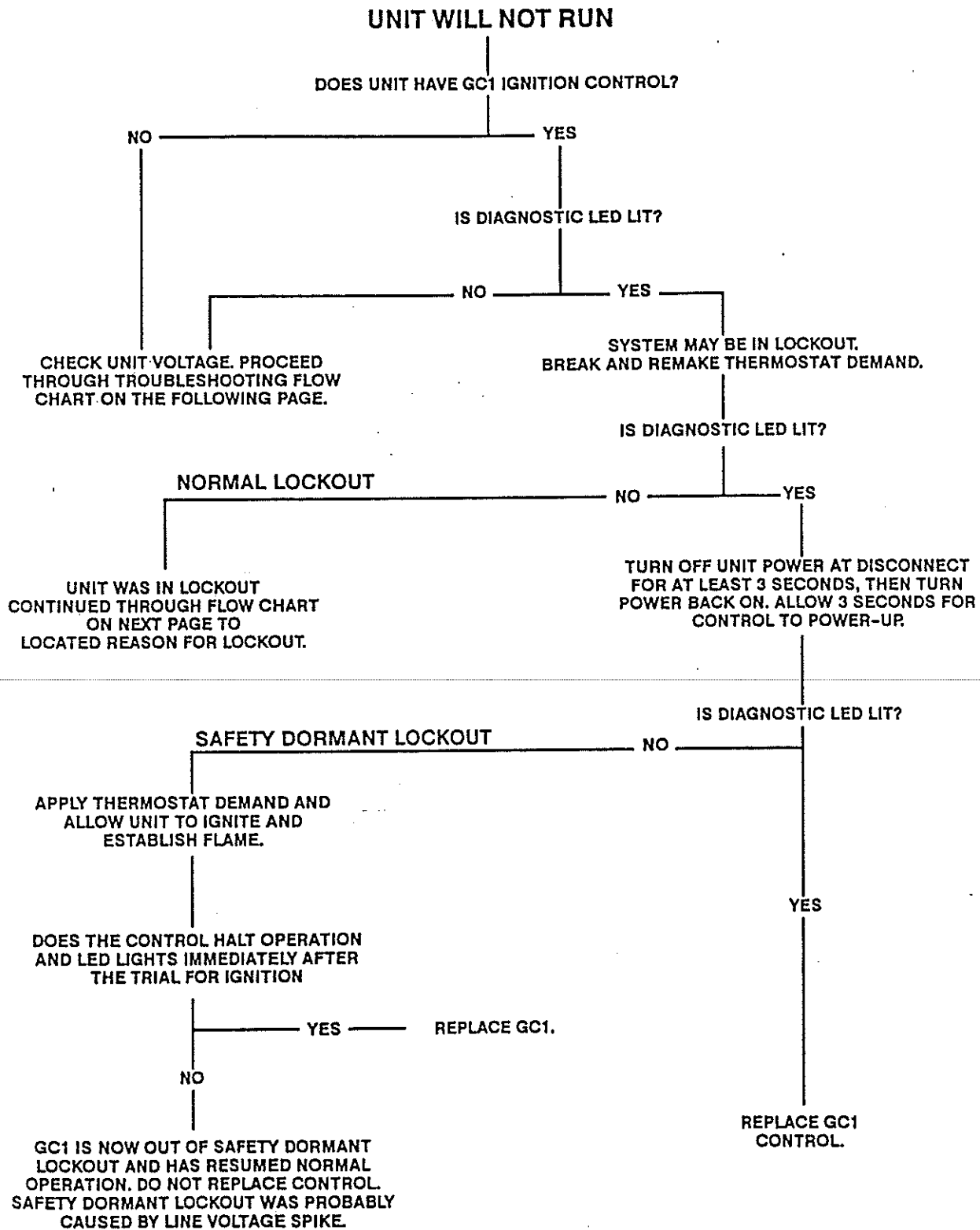
GSR21 TROUBLESHOOTING FLOW CHART

(continued from flow chart on previous pages)

NOTE—Numbered steps refer to illustrations on last page.



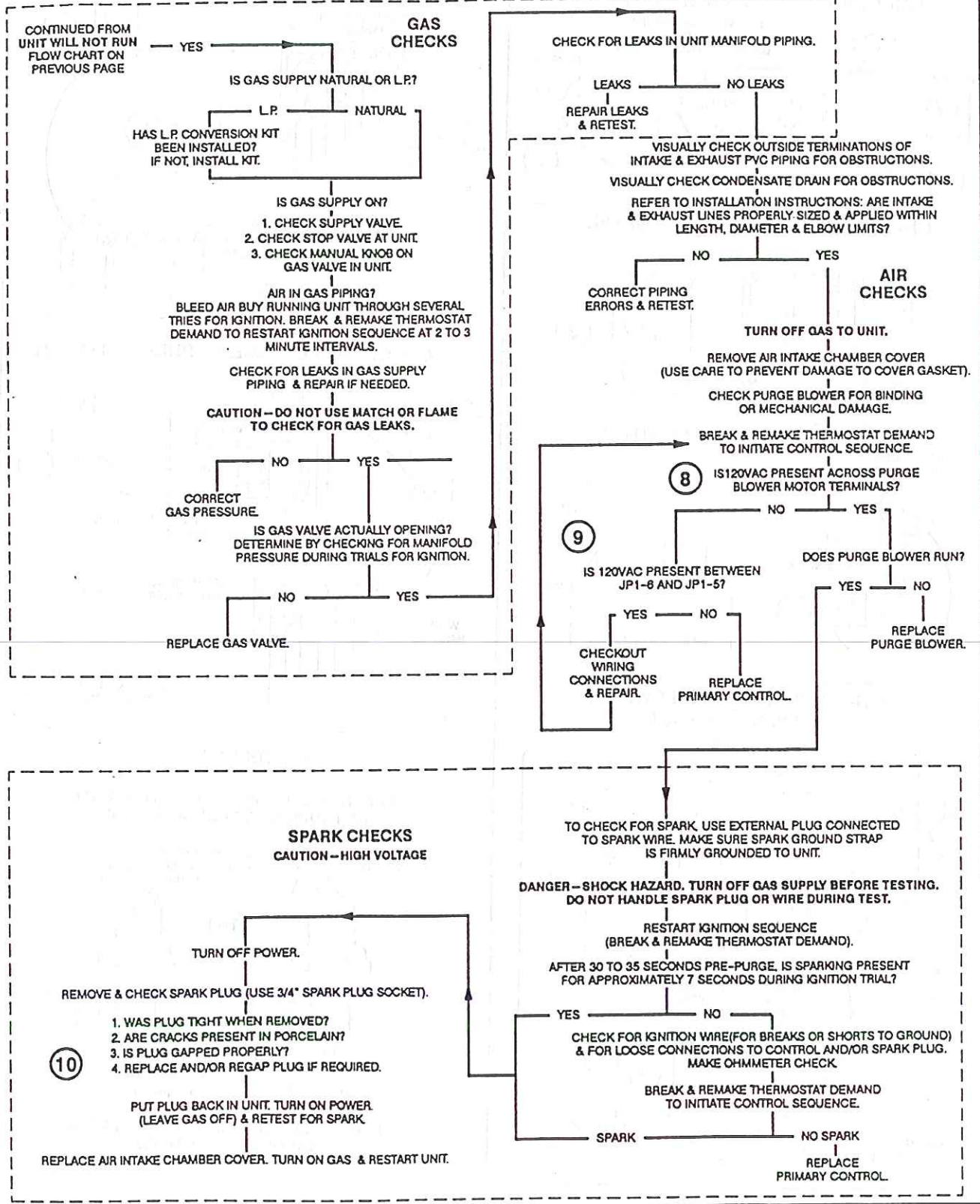
IGNITION CONTROL TROUBLESHOOTING FLOW CHART FOR GSR21 UNITS WITH GC1 CONTROL AND WG1 WATCHGUARD



GSR21 TROUBLESHOOTING FLOW CHART

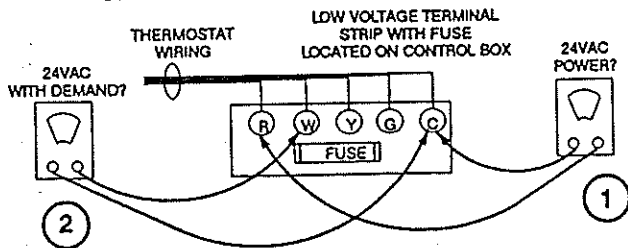
(continued from flow chart on previous pages)

NOTE—Numbered steps refer to illustrations on last page.

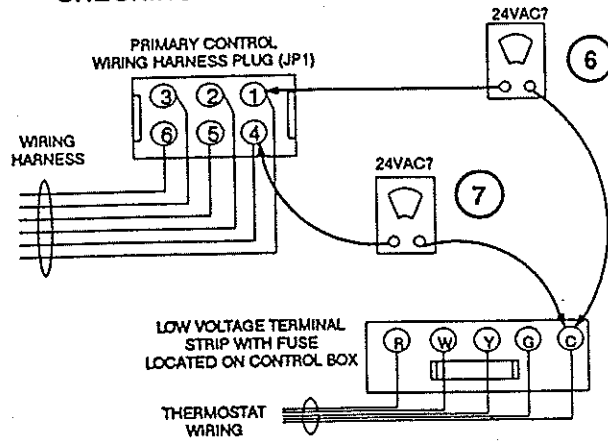


GSR21 TROUBLESHOOTING FLOW CHART – UNIT WILL NOT RUN

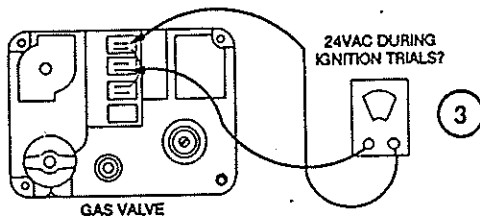
CHECK VOLTAGE AT TERMINAL AND CHECKING THERMOSTAT DEMAND



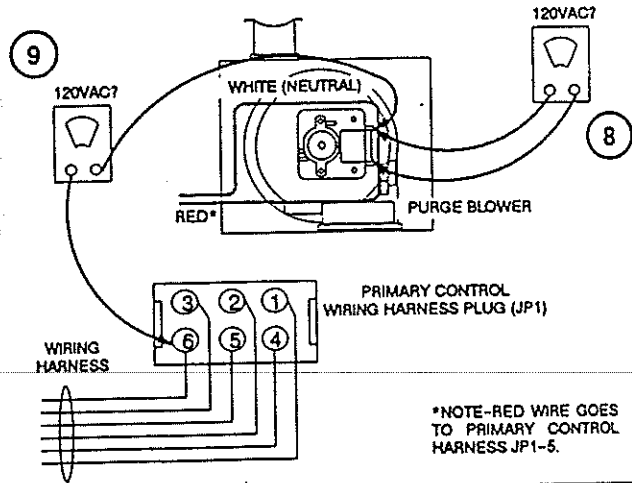
CHECKING VOLTAGE AT PRIMARY CONTROL



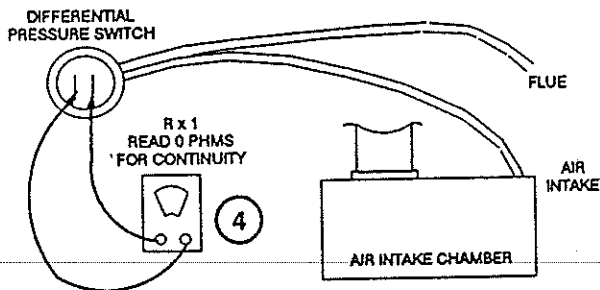
CHECKING VOLTAGE AT GAS VALVE



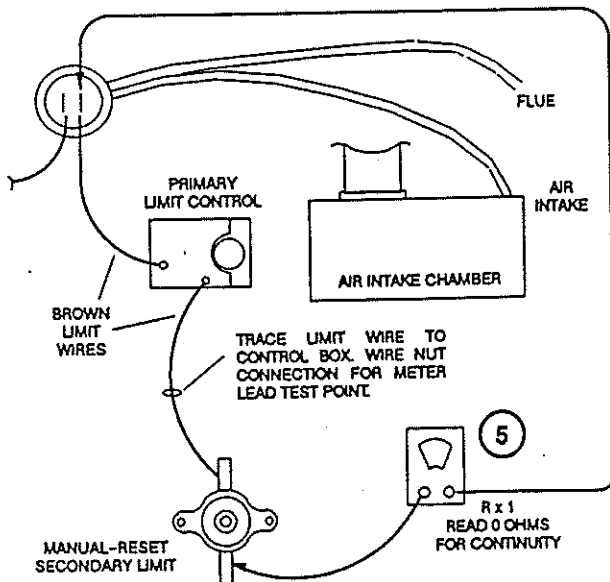
CHECKING VOLTAGE AT PURGE BLOWER



CHECKING FOR OPEN SWITCH



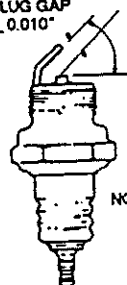
CHECKING FOR OPEN SWITCH IN LIMIT CONTROL



SPARK PLUG

IT IS NORMAL FOR THE ELECTRODE TO PROTRUDE AT AN UNUSUAL ANGLE

SPARK PLUG GAP
 $0.115' \pm 0.010'$



10

NON-RESISTOR TYPE

CHAMPION CJ8 (NOT FOR QC1)

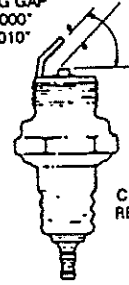
NOTE- CARBON RESISTOR TYPE PLUGS SHOULD NOT BE USED.

CHAMPION CH-21500

CERAMIC RESISTOR TYPE

SPARK PLUG GAP
 $0.115' + 0.000' - 0.010'$

SPARK PLUG GAP
 $0.115' + 0.000' - 0.010'$



CHAMPION CH-21500

NOTE- CARBON RESISTOR TYPE PLUGS SHOULD NOT BE USED.

CHAMPION CJ8 (NOT FOR QC1)