G21 and GSR21 units are condensing air heaters utilizing the pulse combustion process. Initially, combustion takes place in an enclosed chamber. Then, as combustion products pass through the heat exchanger system into a coil, the latent heat of combustion is extracted and water is condensed from the exhaust gas.

The unit uses a safety shut-off gas valve. The units are manufactured for natural gas application. Liquid Petroleum (Propane) kits are available for field change-over.

An electronic direct spark ignition control initiates combustion. The ignition control serves four functions: pre-purge, ignition, flame sensing and post-purge. It also resets in the event of nuisance lockout. The control also verifies loss of combustion during a cycle, closing the gas valve. A differential pressure switch shuts down the unit immediately if there are obstructions in the exhaust outlet or air intake.

A purge fan clears the combustion chamber before and after each heating cycle to ensure proper air mixture for start-up.

All units feature direct drive multi-speed multi-tap fan motors.

All specifications in this manual are subject to change.

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**PULSE COMBUSTION PROCESS**

1 - Gas and air enter and mix in combustion chamber.
2 - To start the cycle a spark is used to ignite the gas and air mixture (this is one “pulse”).
3 - Positive pressure from combustion closes flapper valves and forces exhaust gases down the tailpipe.
4 - Exhaust gases leaving chamber create a negative pressure. This opens the flapper valve drawing in gas and air.
5 - At the same instant, part of the pulse is reflected back from the tailpipe causing the new gas and air mixture to ignite. No spark is needed. (this is another “pulse”).
6 - Steps 4 and 5 repeat 60 to 70 times per second forming consecutive “pulses” of 0.26kJ to 0.52kJ (1/4 to 1/2 Btu/h) each.
7 - Latent heat is removed from combustion products and condensate (water) is formed in the condensate coil.
TYPICAL G21 INSTALLATION*

INTAKE PIPE (2" PVC)

MUFFLER**

SUPPLY AIR PLENUM
1.5 TO 3 LB. DENSITY, MATTE FACE,
1 INCH THICK INSULATION
INSULATED PAST 1ST ELBOW

FLEXIBLE CONNECTOR
IN DUCT OR PLENUM (SUPPLY AIR)

SUPPLY AIR

RETURN AIR

FLEXIBLE CONNECTOR
IN PLENUM
OR DUCT (SUPPLY AIR)

EXHAUST PIPE
(2" PVC)

MUFFLER**

CONTROL ACCESS PANEL

FAN COMPARTMENT ACCESS PANEL

ISOISATION PADS (ISO MODE) (4)

FLEXIBLE CONNECTOR
IN PLENUM OR DUCT
(RETURN AIR)

RETURN AIR PLENUM
1.5 TO 3 LB. DENSITY, MATTE FACE,
1 INCH THICK INSULATION
INSULATED PAST 1ST ELBOW

DRIP LEG

ELECTRICAL CONDUIT:
IF CLAMPED TO UNIT
IT MUST BE ISOLATED
FROM DUCTWORK AND
JOISTS

MANUAL MAIN SHUT OFF VALVE

GAS CON NECTOR

*INSTALLATION PROCEDURES OUTLINED IN THIS MANUAL ARE PRESENTED AS RECOMMENDATION ONLY AND DO NOT
SUPERSEDE OR REPLACE LOCAL CODE. IF LOCAL CODES DO NOT EXIST, THE PROCEDURES OUTLINED IN THIS MANUAL
ARE RECOMMENDED ONLY AND DO NOT CONSTITUTE CODE.

**ALL G21/GSR21 UNITS REQUIRE THE USE OF MUFFLERS.