

S9201A1028 Integrated Furnace Control

Application

The S9201A1028 Integrated Furnace Control is used in high efficiency gas fired warm air furnaces with an induced draft blower and a combination hot surface igniter/flame sensor. The S9201 provides:

- sequencing of ignition and burner operation,
- up to five trials for ignition before lockout, if initial lightoff is unsuccessful,
- ignition return if established flame fails during the run cycle.
- control of indoor blower motor operation, including heating and cooling speeds,
- control of the induced draft blower motor,
- control of the humidifier, and
- control of the electronic air cleaner.

The S9201 cannot be used with a vent damper.

The S9201 Integrated Furnace Control is intended for residential furnaces only. Other applications require Honeywell Residential Design Engineering review and written approval. Contact your Honeywell Sales Representative for assistance.

VOLTAGE: 24 Vac.

CURRENT DRAW: Inrush—0.32A plus gas control current; running—0.10A plus gas control current.

POWER CONSUMPTION: Inrush—7.7 VA plus gas control VA; running—2.4 VA plus gas control VA.

THERMOSTAT ANTICIPATOR SETTING: 0.10A plus gas control load. For VR8204 and VR8205, set anticipator to 0.6A.

PREPURGE TIMING: 30 sec., nominal.

WARM UP TIMING: 36 sec.

TRIAL FOR IGNITION: 9 sec., nominal. Igniter is off 1 sec. before end of ignition trial.

FLAME FAILURE RESPONSE TIME: 2.3 sec. max. with 5 μ A flame signal.

FLAME CURRENT: 0.8 μ A dc, min.

IGNITION TRIALS: Five, with 30 sec. purge between trials.

INDOOR FAN ON DELAY: 12 sec., fixed.

INDOOR FAN OFF DELAY: 120 sec., factory set; selectable to 90, 160 or 180 sec.

GAS CONTROL: Any 24 Vac redundant gas control rated at 1A or less. Honeywell VR8204 or VR8205 recommended.

COOLING CONTACTOR: Any 24 Vac contactor rated at 1A or less.

HOT SURFACE IGNITER: Norton Model 201 or equivalent.

NOTE: Igniter must meet the following minimum lifetime specifications:

- Igniter must reach 1000° C [1832° F] within 36 seconds with 102 Vac applied.

- Igniter must maintain at least 500M ohms insulation resistance between the igniter leadwires and the igniter mounting bracket.
- Igniter must not develop an insulating layer on its surface (over time) that would prevent flame sensing.
- Igniter surface area immersed in flame must not exceed one-fourth of the grounded area immersed in flame. This would prevent flame sensing.
- Igniter current draw at 132 Vac must not exceed 5A.

Installation

WHEN INSTALLING THIS PRODUCT...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in these instructions to make sure the integrated furnace control is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out operation as provided in these instructions.



WARNING

**FIRE OR EXPLOSION HAZARD.
MAY CAUSE PROPERTY DAMAGE, SEVERE INJURY OR DEATH.**

1. The integrated furnace control can malfunction if it gets wet, leading to accumulation of explosive gas.
 - Never install where water can flood, drip or condense on control.
 - Never try to use an integrated furnace control that has been wet—replace it.
2. Liquefied petroleum (LP) gas is heavier than air and will not vent upward naturally.
 - Do not operate electric switches, lights, or appliances until you are sure the appliance area is free of gas.



CAUTION

1. Disconnect power supply before beginning wiring to prevent electrical shock or equipment damage.
2. If furnace control must be mounted near moisture or water, provide suitable waterproof enclosure.

LOCATION

The integrated furnace control is mounted inside the furnace wiring compartment. The location must provide:

- Access to the field wiring terminals.
- Operating ambient temperature between minus 40° F and plus 150° F [minus 40° C and plus 66° C], except temperatures to 170° F [77° C] are acceptable for occasional brief periods.
- Relative humidity below 95% non-condensing.
- Protection from water, steam or corrosive chemicals that might be used to clean the appliance.
- Protection from dripping water, such as from an overfilled humidifier or from condensation.
- Protection from dust or grease accumulation.
- A barrier between line and low voltage field wiring terminals.

MOUNTING

Select a location close enough to the burner to allow a short, direct cable route to the igniter. The integrated furnace control can be mounted in any position. Line voltage wiring terminals must be in an enclosure separate from low voltage field wiring terminals. The unit is designed to snap into predrilled holes in the mounting surface.

WIRING



CAUTION

1. Check the wiring diagram furnished by the appliance manufacturer, if available, for circuits differing from the general hookup shown. Carefully follow any special instructions affecting the general procedures outlined below.
2. Disconnect the power supply before making wiring connections to prevent electrical shock or equipment damage.

IMPORTANT:

1. *The common ground required for the S9201 and the main burner must be supplied through the plug connected to the P1 receptacle on the board.*
2. *Make sure the transformer has adequate VA. To determine the total VA requirement, add the maximum current draws of all devices in the control circuit, including the furnace control and the gas control, and multiply by 24. The result is the minimum transformer VA rating. Use a Class II transformer if replacement is required.*

All wiring must comply with local codes and ordinances. See Table 1 and Fig. 1 for typical connections, but refer to furnace manufacturer's instructions if available. See Fig. 2 for an internal schematic.

TABLE 1—WIRING CONNECTIONS.

Installation	Voltage	Terminal Type	Connects S9201 To:
Factory	120 Vac	6-socket AMP Mate-N-Loc receptacle	Igniter and induced draft blower motor.
		1/4 in. male quick-connects	Indoor blower motor, system transformer and 120 Vac power supply.
	24 Vac	9-socket AMP Mate-N-Loc receptacle	Pressure switch, gas control and limits. Also supplies common ground between burner and S9201.
		1/4 in. male quick-connects	Transformer secondary.
Field	120 Vac	Screw terminals	Humidifier and electronic air cleaner.
	24 Vac	Screw terminals	Thermostat.

Fig. 1—Typical wiring connections to S9201A Integrated Furnace Control.

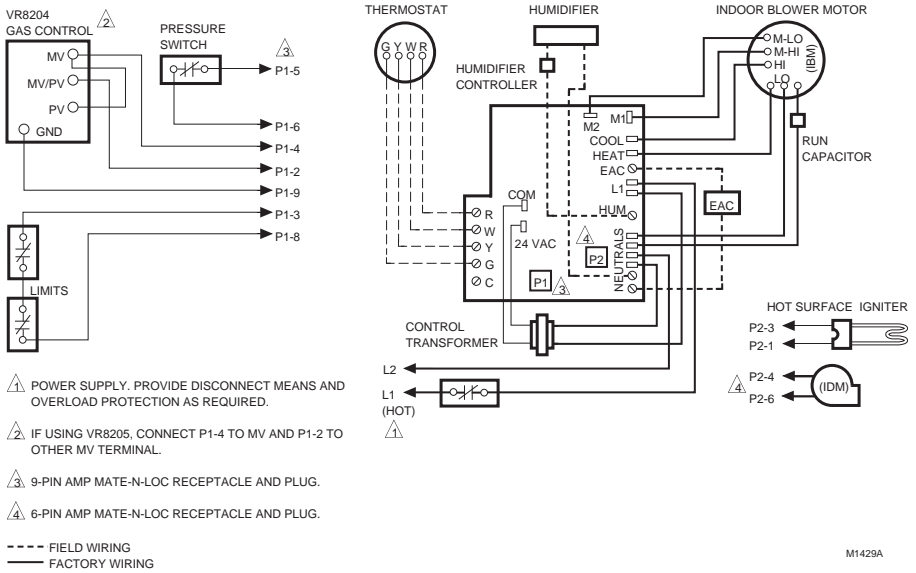
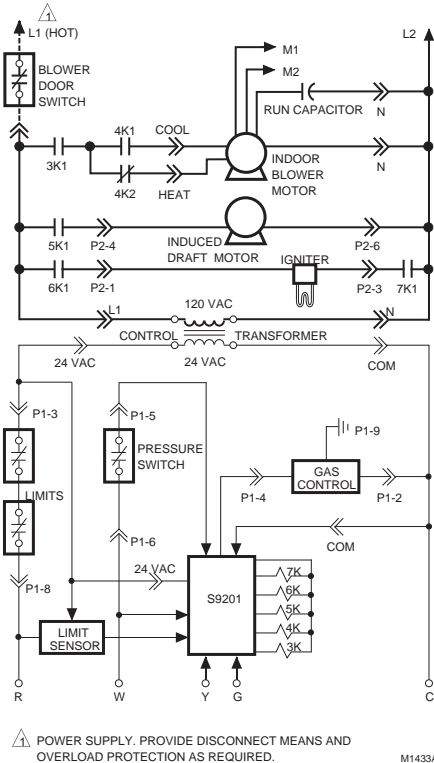


Fig. 2—Ladder diagram of S9201 Integrated Furnace Control.



Settings and Adjustments

THERMOSTAT ANTICIPATOR

Set the heat anticipator in the thermostat to 0.1 plus the current draw of the gas control.

FAN OFF TIMING

The fan off delay time is factory set at 120 seconds. To change it, first disconnect power, then turn the switch screws in or out according to Table 2. In means to turn down until snug; Out means to turn up one to one and one-half full turns.

TABLE 2—INDOOR FAN-OFF DELAY TIME SETTINGS.

Fan Off Delay Time	SW 1	SW 2
120 sec. (factory setting)	In	In
160 sec.	In	Out
90 sec.	Out	In
180 sec.	Out	Out

Checkout

Check out the control system:

- At initial installation of the appliance.
- As part of regular maintenance procedures.
- As the first step in troubleshooting.
- Any time work is done on the system.

The following procedures cover the integrated furnace control only; see individual component instructions for additional checkout procedures.

Check Normal Operation

1. Turn on power to the appliance, and reset the furnace control by turning the thermostat to its lowest setting and waiting at least 45 seconds.

Troubleshooting



WARNING

FIRE, EXPLOSION OR SHOCK HAZARD. MAY CAUSE PROPERTY DAMAGE, SEVERE INJURY OR DEATH.

Do not attempt to modify the physical or electrical characteristics of this device in any way. Replace it if troubleshooting indicates a malfunction.

IMPORTANT:

1. The service procedure outlined in Fig. 3 is a general guide. Follow appliance manufacturer's service instructions when available.
2. All meter readings must be taken within the trial for ignition period. After the ignition period ends, the system must be reset by setting the thermostat down for at least 45 sec. before continuing.
3. If any component does not function properly, make sure it is correctly installed and wired before replacing it.
4. Static discharge can damage the integrated furnace control. Touch metal surface to discharge static electricity before touching furnace control.
5. The integrated furnace control cannot be repaired. If it malfunctions, it must be replaced.
6. Only trained, experienced service technicians should service integrated furnace control systems. Perform the checkout steps on page 3 before beginning the troubleshooting procedure in Fig. 3. Following troubleshooting, check out the system again to be sure it is operating normally.

The integrated furnace control has two status lights:

- PWR—is on whenever the control has 24 Vac input power from the system transformer.
- OK—comes on if control's internal checks are OK. Light pulses at approximately six second intervals as long as control's continuous self-check indicates normal operation. If the light goes out during operation, control must be replaced.

2. Set thermostat to call for heat. Make sure integrated furnace control sequences the system as indicated in Table 3.

3. Set thermostat below room temperature to end call for heat. Burner should go out; induced draft fan should stop; and, after delay time, indoor fan should stop.

TABLE 3—S9201A1028 SEQUENCE ON NORMAL HEATING CYCLE.

	PREPURGE (30 SECONDS)	IGNITER WARM UP (36 SECONDS)	TRIAL FOR IGNITION (9 SECONDS)	FAN ON DELAY (12 SECONDS)	NORMAL RUN PERIOD	FAN OFF DELAY (180/90/120/160 SEC.)
THERMOSTAT CALL FOR HEAT	[Timeline bar]					
PREPURGE	[Timeline bar]					
INDUCED DRAFT BLOWER ON	[Timeline bar]					
IGNITER ON	[Timeline bar]					
GAS CONTROL OPEN	[Timeline bar]					
PROOF OF FLAME	[Timeline bar]					
INDOOR BLOWER MOTOR, EAC ON	[Timeline bar]					
HUMIDIFIER* ON	[Timeline bar]					

* IF HUMIDIFIER CONTROLLER IS CALLING FOR HUMIDIFICATION. M2600

Check Safety Shutoff Operation

1. Shut off gas supply at manual gas valve ahead of appliance.

2. Set thermostat to call for heat. System should operate as indicated in Table 4.

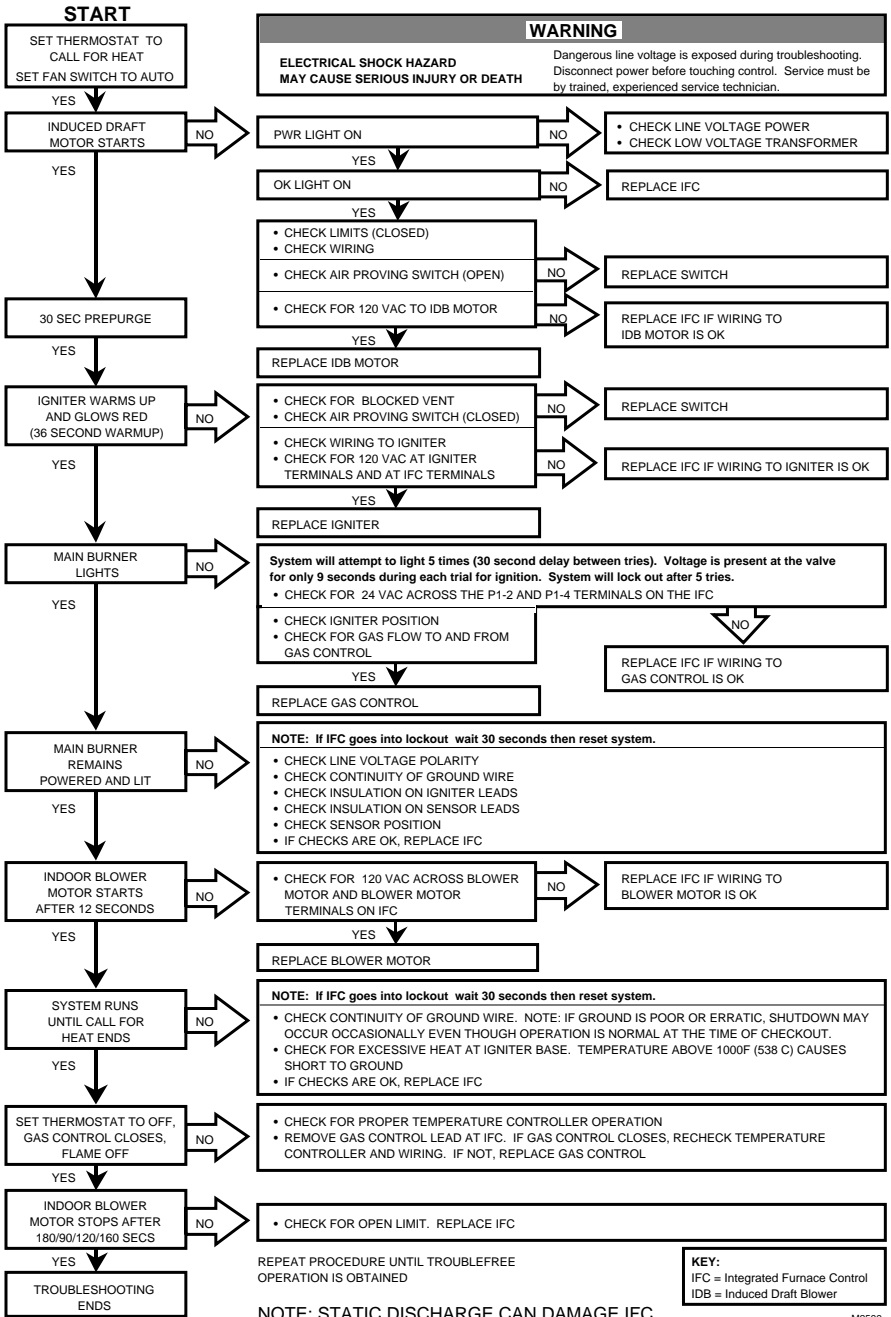
3. Following lockout, open manual gas valve and make sure no gas is flowing to burner.

TABLE 4—S9201A1028 SEQUENCE ON FAILURE TO LIGHT.

	PREPURGE (30 SECONDS)	IGNITER WARM UP (36 SECONDS)	TRIAL FOR IGNITION (9 SECONDS)	BETWEEN TRIAL PURGE (30 SECONDS)	IGNITER WARM UP (36 SECONDS)	TRIAL FOR IGNITION (9 SECONDS)	PURGE, IGNITER WARM UP, IGNITION SEQUENCE REPEATS 3 MORE TIMES	LOCKOUT (IMMEDIATE)
THERMOSTAT CALL FOR HEAT	[Timeline bar]							
PREPURGE	[Timeline bar]							
INDUCED DRAFT BLOWER ON	[Timeline bar]							
IGNITER ON	[Timeline bar]							
GAS CONTROL OPEN	[Timeline bar]							
PROOF OF FLAME	[Timeline bar]							
INDOOR BLOWER MOTOR, EAC ON	[Timeline bar]							
HUMIDIFIER ON	[Timeline bar]							

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Fig. 3—S9201A1028 troubleshooting guide.



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