DIRECT HOT SURFACE IGNITION

INTRODUCTION

Hot surface ignition (HSI) systems are being used on their heating appliances by a growing number of manufacturers. And to safely and effectively service these appliances, technicians need to understand how HSI systems operate and what to consider when servicing them.

HSI IGNITION SEQUENCE

The igniter on an HSI system is a silicon-carbon element. When energized through the controller, electrical resistance causes the element to glow red-hot. And because HSI igniters are resistance elements, they require a warmup period before they are hot enough to ignite the burner gas.

HSI controllers have a timed trial for ignition period. And on HSI systems, the trial for ignition period timing begins when the gas control is opened. But during the warmup period, no gas flows to the burner. However, gas flows for the entire trial for ignition period, but power to the igniter may be shut off before the end of the trial for ignition period to allow the rectification sensor to sense the presence of flame.

SERVICE CONSIDERATIONS FOR HSI SYSTEMS

HSI systems are controlled by either a component module, like the Honeywell S89/S890 Hot Surface Ignition Module, or an integrated controller, like the Honeywell S9201 Integrated Furnace Control or Honeywell S9301 Integrated Boiler Control. How HSI systems are serviced depends a great deal on which type of controller is being used.

INTEGRATED CONTROLLERS AND CONTROL MODULES

Control modules like the S89 and S890 control the gas valve, igniter circuit, and vent damper (optionally). Integrated controllers like the S9201 and S9301 supervise more than that; they also provide control of other system components such as induced draft blowers, circulating fans (on furnaces) or circulator pumps (on boilers). Some also control electronic air cleaners or central humidifiers on warm air systems.

Because integrated controllers are designed with specific features and control schemes, they should always be replaced with controls from the same manufacturer, unless the appliance OEM recommends an alternative control.

When servicing HSI systems that use control modules, there is more commonality of central design, and thus more opportunity for servicing when using more universal replacement controls.

THE SOURCE

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Obtaining, stocking, and carrying like-for-like replacements in the service vehicle can be difficult. But carrying and using modules like the S89 and S890 make sense if you are sure that the specifications of the replacement module match those of the module being replaced.

When replacing control modules, check to be sure the replacement module matches the original module in the following areas:

- *Number of trials for ignition.* A module with three trials for ignition can be replaced with one that has a single trial for ignition, but never replace a single trial for ignition module with one that has three trials for ignition.
- *Type of igniter/sensor.* If there is a separate igniter and sensor, use a module that accommodates a separate igniter and sensor. If there is a combination igniter/sensor, use a module that accommodates a combination igniter/sensor.
- *Prepurge or no prepurge cycle.* The prepurge cycle of the replacement module can be longer than the original module, but it should never be shorter.
- *Lockout timing.* Lockout timing of the replacement module should be the *same or shorter* than the original. It should never be longer than the original control module.
- *Induced draft blower control used or not.* Generally speaking, if the module directly controls the combustion air blower, replace it like-for-like with the same control module.

IGNITERS AND SENSORS

When servicing igniters and sensors of an HSI system, always replace them with the same type. Use an igniter that matches the physical and electrical characteristics of the original igniter and also matches the requirements of the control module. Note that it is acceptable to use a longer warmup time module with a shorter warmup igniter, but the opposite should not be attempted. Sensor specifications also must match those of the original and the replacement module. *Never* relocate the igniter or move the sensor; both *must* remain in the same location defined by the appliance manufacturer.

COMPLETE CHECKOUT

As for any system you service, completely check the operation of the appliance to assure proper lightoff.

SUMMARY

Hot spark ignition is being used by an increasing number of appliance manufacturers. Understanding how HSI works and the points to consider when servicing HSI systems will give you the knowledge you need to service this type of ignition system confidently and successfully.

Honeywell

Home and Building Control
Honeywell Inc.
1985 Douglas Drive North
Golden Valley, MN 55422

Home and Building Control
Honeywell Limited—Honeywell Limitée
740 Ellesmere Road
Scarborough, Ontario
M1P 2V9

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