

# TERMS USED IN HONEYWELL PRODUCT HANDBOOKS



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## GLOSSARY

### Air flow (proving) switch (APS)

A control used to prove proper air movement through a combustion chamber by measuring windbox or breeching pressure or by measuring air velocity (sail switch).

### Alarm

An audible device or visible signal indicating a malfunction or off-normal condition.

### Ambient temperature

The temperature of the air surrounding the equipment.

### Automatic ignition

A system in which a burner is ignited directly, without manual intervention, by an automatically supervised ignition spark or pilot.

### Burner

A device which introduces gas and air into a furnace at the desired velocities, turbulence and concentration to establish and maintain proper ignition and combustion of the gas.

### Call for heat

When the controlled temperature drops below the operating set point, the burner controller contacts make to initiate burner operation.

### Combustion

The act or process of burning; the rapid oxidation of gas accompanied by the production of heat or heat and light. Complete combustion requires an adequate supply of oxygen.

### Combustion air

The air required for complete and satisfactory combustion of the gas; does not include the air used for atomization. Also called main air. The actual amount of air supplied is usually expressed as a percentage of the theoretical amount required for complete combustion.

### Control

A device which directly operates a system to regulate the gas, air, water or electrical supply to the controlled equipment. It may be automatic, semiautomatic or manual.

### Extended spark time ( $T_{ext}$ )

The time interval between flame detection and de-energizing of the igniter.

### Fan

Any device or machine used to set up an air flow.

### Flame

The visible or other physical evidence of the chemical process of rapidly converting gas and air into products of combustion.

### Flame current

The current measured at the meter jack of a flame signal amplifier in a flame safeguard control. The current is produced by the flame detector when it senses a flame.

### Flame detector

The components of a flame detection system which detect the presence or absence of a flame.

### Flame failure response time (TFR)

The time interval between the loss of flame and the dropping out of the flame relay in a flame safeguard control, which then de-energizes the automatic gas valve(s).

### Flame rectification

The phenomenon which causes a flame to conduct more current in one direction than in the other. It is due to the ionization of air in and around the flame and to the difference in area of the electrodes in the flame envelope. (The ground area is at least 4 times the area of the flame rod.)

### Flame relay

The relay in a flame safeguard control which pulls in when a flame or a condition simulating a flame, is detected. It drops out on loss of flame signal, causing the flame safeguard control to shut down the burner.

### Flame signal

A signal given by the flame detector device in case of sensed flame.

### Flame simulation

A condition which occurs when the flame signal indicates the presence of a flame when in reality no flame is present.

### Flame rod

A metal rod projected into the flame envelope to function as an electrode in a flame detection circuit.

### Frequency

The number of recurrences of a periodic phenomenon in a unit of time, usually expressed in Hertz (Hz).

### Ground

A metallic connection with the earth to establish ground potential.

### Heat demand

When the controlled temperature drops below the operating set point, the burner controller contacts make to initiate burner operation.

### Heat exchanger

Any device for transferring heat from one medium to another.

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## Igniter

Any electrical or mechanical device and related equipment used to ignite a gas-air mixture.

## Ignition

The act of starting combustion.

## Ignition electrode

A metal conductor used to generate a spark across a narrow gap to ground or another ignition electrode in order to ignite a gas-air mixture.

## Ignition transformer

A device which provides a high-voltage spark which will cause ignition.

## Intermittent pilot

A pilot automatically ignited each time there is a call for heat and maintained during the entire run period. It is shut off with the main burner at the end of heat demand.

## Ionization

A process by which electrons are detached from or attached to atoms or molecules, thus originating ions and freeing or absorbing electrons. This is achieved by collisions or by high-energy radiation.

## Limit

A control which continuously monitors a condition (such as temperature, pressure or liquid level) in a controlled medium and responds immediately to shut down the system if a dangerous, predetermined condition occurs. It is normally set beyond the operating range of the controlled equipment.

## Lock-out (non volatile)

The safety shut down condition of the system, such that a restart can only be accomplished by a manual reset of the system and by no other means.

## Lock-out (volatile)

The safety shut down condition of the system, such that a restart can only be accomplished by either the manual reset of the system or an interruption of the main power.

## Main burner

The burner (as distinguished from the pilot burner) which delivers gas to the combustion chamber (and mixes it with air) where it is burned to provide heat to the desired space.

## Manual reset

The manual operation required after safety shut-down before the system can be restarted.

## NTC sensor

A temperature sensing device incorporating a resistor with a negative temperature coefficient; the resistance becomes lower when the temperature rises.

## Pilot

A small burner (or a flame, smaller than the main burner flame) which is used to light off the main burner or burners.

## Pilot valve

An automatic safety shut off valve which controls the gas input to the pilot.

## Post-purge time

A period of time after the run period during which the burner motor (blower or fan) continues to run, driving all the products of combustion and any unburned gas from the combustion chamber and supplying air to burn gas being purged from the gas line downstream from the safety shut-off valve.

## Premix burner

A gas burner in which the gas and air are mixed before they are introduced into the combustion chamber. Usually, the gas and air are both fed into a fan or blower and the mixture is then blown into the combustion chamber. A premix burner burns with a short, hot flame with high heat release.

## Pre-purge time ( $T_p$ )

A period of time after burner startup (call for heat) during which the burner motor (blower or fan) turns to change the air of the combustion chamber and breeching prior to ignition trials. This removes any unburned gas so only the incoming gas will be present for ignition.

## Pressure switch

A switch that monitors the pressure of steam, air, gases or liquids and breaks a circuit when the pressure either rises or falls to a preset value. It is used as a limit or interlock with a flame safeguard control to shut down the burner if the pressure exceeds (High Pressure Switch) or falls below (Low Pressure Switch) a preset value. It may reset automatically when the pressure returns to normal or it may require manual resetting.

## Pulse Width Modulation (PWM)

Varying a physical quantity (e.g. modulator valve voltage) as a function of some control input by means of varying the pulse width of a square wave signal.

## Purge

The forced introduction of air through the combustion chamber and flue passages in order to displace any remaining gas/air mixture and/or products of combustion.

## Recycling

The process by which, after a safety shut down a full start-up sequence is automatically repeated

## Relay

An electromechanical device with contacts that open and/or close when its coil is energized or de-energized in response to a change in the conditions of the electrical circuit. The operation of the contacts affect the operation of other other devices in the same circuit or in other circuits.

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## Running interlock

An interlock which proves a condition is proper for burner operation to continue through pre-purge, ignition trials and the run period. It is used with a primary or programming control which will shut down the burner if an improper condition occurs. The interlock may be a combustion air controller (air flow switch), a damper position indicator (low or high fire proving switch) or a gas pressure switch. It can be a recycling type or it may require manual reset. Also see LOCK-OUT.

## Safety start check

A feature of flame safeguard controls to prevent a burner start if a flame is detected or if a condition simulating a flame exists in the flame detection circuit. (See self check time)

## Safety shutdown (lock-out)

The process which is effected immediately following the response of a protection device or the detection of a fault in the automatic burner control system and which prevents the burner from going into operation or puts the burner out of operation. The resulting state of the system is defined by deactivated terminals for the gas shut-off valves and the ignition.

## Safety time ( $T_s$ )

The time interval between the pilot gas valve, the start gas valve or main gas valve, as applicable, being energized and the pilot gas valve, the start gas valve or main gas valve, as applicable, being de-energized if the flame detector signals the absence of a flame.

## Self check time ( $T_c$ )

The time interval immediately after a call for heat during

which the flame detector device and other electronics are checked.

## Stabilisation time ( $T_{stab}$ )

The time interval between detection of a flame of a pilot and enabling the ON signal for main gas or flame relay.

## Systems for permanent operation

Systems that are designed to remain in the running position for longer than 24 hour without interruption.

## Systems for non permanent operation (intermittent)

Systems that are designed to remain in the running position for less than 24 hour without interruption.

## Thermostat

An automatic control that responds to temperature changes to maintain the temperature within predetermined limits.

## Timer

A timing device used in a flame safeguard programming control to sequence the operation of a burner system. It consists of an ac synchronous motor driving a series of cams which open or close several sets of switch contacts at predetermined times.

## Waiting time ( $T_w$ )

For burners without fans, this is the interval between the call for heat and the energization of the ignition device. During this time natural ventilation of the combustion chamber and the flue passages may take place.

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## ABBREVIATIONS

### APS

Air flow Proving Switch

### CH

Central Heating

### Combi board

Ignition control and logic control combined on one PCB.

### CVI-m

Combined Valve and Ignition with modulation

### DBI

Direct Burner Ignition

### DHW

Domestic Hot Water

### EC

European Community

### EMC

Electro Magnetic Compatibility

### HSI

Hot Surface Igniter

### HT

High Tension, output of spark transformer

### HTG

High Tension Ground, reference output of spark transformer

### IP

Intermittent Pilot burner Ignition

### L

Mains life

### LED

Ligh Emitting Diode

### LPG

Liquid Propane Gas

### N

Mains neutral

### NTC

Negative Temperature Coefficient

### PCB

Printed Circuit Board

### PWM

Pulse Width Modulation

### RFI

Radio Frequency Interference

### S/L

Swiched Life, control thermostat input

### SPDT

Single Pole Dual Throw of a relay

### SPST

Single Pole Single Throw of a relay

### T<sub>C</sub>

Self check period of ignition control

### T<sub>ext</sub>

Extended spark time

### T<sub>FR</sub>

Flame Response time of ignition control

### T<sub>NF</sub>

No Flame indicator period

### T<sub>p</sub>

Prepurge time of ignition control

### T<sub>s</sub>

Safety time of ignition control


























### T<sub>stab</sub>

Stabilisation time of ignition control

### T<sub>w</sub>

Waiting period of ignition control

# SYMBOLS

	Control thermostat		Air flow (proving) switch
	Fan		limit thermostat
	Spark ignition		Reset switch
	HS ignition		High-low switch
	Gas Valve		Main burner interrupt
	Pilot Valve		Flame relay contact
	Main Valve		External igniter
	LPG Valve		Hour counter
	Flame rod		NTC sensor
	Alarm, high power		Clock
	Alarm, low power		Pump
	Fan		Gas valve
	Modulating gas valve		

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