

5004-890 FLAME SAFEGUARD CONTROLLER

Product Overview

The **Quanta-Flame 5004-890** is a state-of-the-art flame safeguard controller series designed for on-off single burner process heat applications. The controller sequences the burner through Ignition, Pilot Trial for Ignition, and Main Flame Trial for Ignition. The primary difference between these controllers and the 5004-795 series controllers is the 890 series controllers lack blower motor terminals. The 5004-890 series controllers monitor the burner flame and running interlocks to safely shut down the burner in the event of an unsafe operating condition.

The 5004-890 controllers are direct replacements for most Honeywell RA890 controls. They operate with the existing Q270 wiring bases, C7027A UV scanners or flame rods.

- No re-wiring required when replacing an RA890 controller.
- Operates with existing UV sensors and flame rods.
- 5004-890A model resets automatically when power is restored to the controller after an interruption.
- 5004-890S model supports a standing pilot. (Pilot remains on continuously.)

The 5004-890 replaces the following models of Honeywell controls:

- RA890F-1288
- RA890G-1260
- RA890F-1031
- RA890G-1047
- RA890F-1056
- RA890G-1062
- RA890F-1072
- RA890G-1112
- RA890G-1120
- RA890G-1179
- RA890G-1187
- RA890F-1262
- RA890F-1437
- RA890F-1510

Controller Functions

The controller sequences the burner through Purge, Ignition, Pilot, and Main Flame. It monitors the burner flame and running interlocks to safely shut down the burner in the event of an unsafe operating condition.

Features include:

- Optional plug in diagnostic display
- Microcomputer burner control
- Standard relay alarm contact
- Pilot Test Mode
- Selectable Trial for Ignition times (3, 5, 10, or 15)
- Selectable Interrupted or Intermittent Pilot
- Selectable Recycle or Non-Recycle modes
- Every unit interfaces to ultraviolet or flame rod sensors



Quanta-Flame 5004-890 Flame Safeguard Controller

Functional Summary

Recycle Mode

When selected, the control will recycle the burner through Purge and startup when the main burner has shutdown with a Flame Failure alarm. The recycling of the burner will only occur after the main burner has been in operation. There is no recycle on Pilot Flame Failure.

Pilot Turndown Test Mode

Permits the pilot to ignite and remain burning regardless if Interrupted or Intermittent Pilot has been selected. The main burner will not be ignited as long as the control is in this mode. This permits the service technician to adjust and inspect the pilot flame.

Interrupted Pilot

The pilot will ignite and be turned off 10 seconds after the main burner valve is opened.

Intermittent (non-interrupted) Pilot

The pilot will ignite and remain lit for the entire duration of the main burner run cycle.

Pilot Verification Feature

The ignitor will be de-energized 5 seconds before the main valve is energized to ensure the pilot flame is stable before lighting the main burner.

False Flame Indication

If the control senses a flame out of the proper sequence, the sequence will stop and wait for 30 seconds for the False Flame signal to disappear. During this time, the Flame Fail light and the Alarm light will blink on and off. If the signal disappears, the lights will cease blinking, and the sequence will continue. If the false flame signal is present for more than 30 seconds, the lights will stay on and stop blinking, and the control will go into lockout.

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System Overview

Flame Signal Analog Meter Jacks

Two test probe inputs are located on the front of the control. By inserting the meter probes from a high impedance (100k ohm/volt) DC volt meter the control will indicate the relative flame signal level in the range of 0 to 5 VDC.

Control Reset

When the control enters a Lockout condition the red Alarm light will light and begin blinking. To reset the control, press the Reset button on the front of the control. The control will not reset on power interruption. Lockout conditions for the control are:

- Flame failure
- False flame present for more than 30 seconds
- Relay failure and internal fault
-

Product Certifications:

UL Recognized: File No. E233069
CSA Certified: Number 204571-1435343

Controller Specifications:

Mechanical

Enclosure: 5" H by 5" W by 1 3/4" D
Shipping Weight: 2 lbs. for all models
Area Classification: NEMA 1
Temperature Range: 0° F to +140° F
(-40° C to +60° C)

Electrical

Voltage: 120 VAC 50/60Hz
Power Consumption: 2 VA
Load Ratings (pilot & main): 10 A (1/4 HP inductive)
Total Connected Load: 15 A (1800 VA)
Alarm Contact: 230 VAC, 2 A maximum

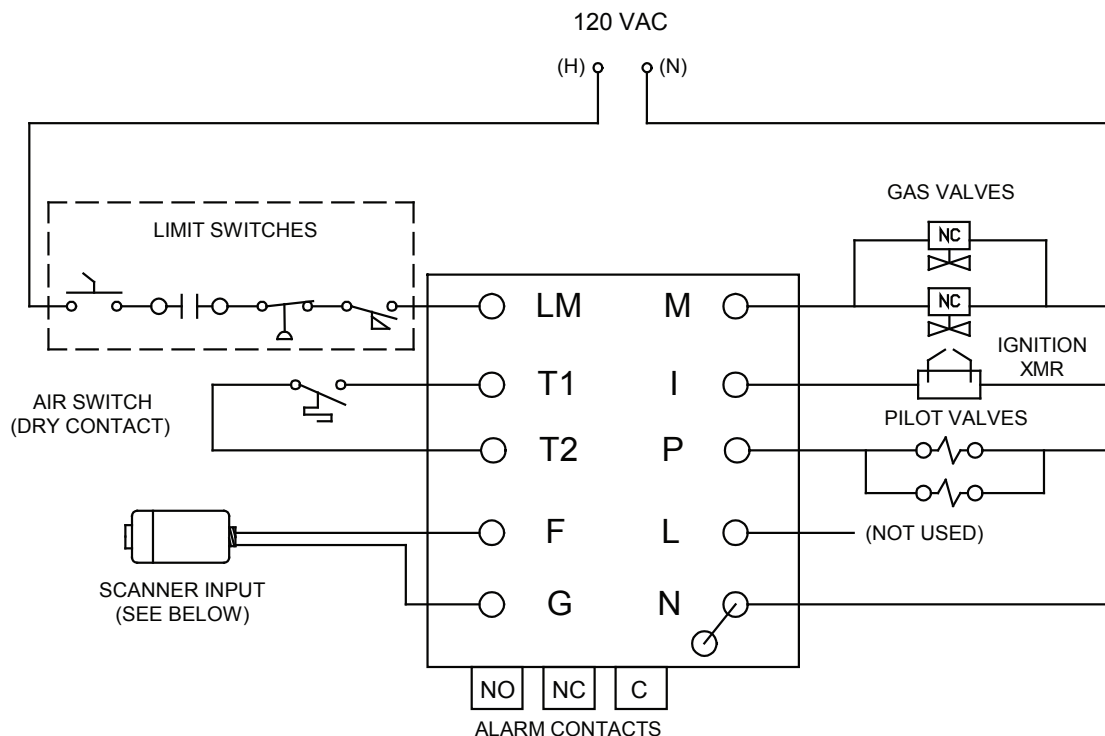
Optional Panel-Mounted Display

The optional 5004-216RN display is a panel-mounted display for the 5004 Series Quanta-Flame Controls. It mounts in a control panel through a 1/8 DIN mounting hole and is secured with the included mounting clips.

During operation the display will indicate each step in the control sequence. When the main burner is in the run mode the flame signal level will be indicated in a range of 0 to 5 VDC.

The display constantly refreshes itself with new information from the control. This refreshing is indicated by the slight periodic blink of the messages.

During the Trial for Ignition period the display may show a blank line across the top row. This indicates the presence of an electrical noise field generated by the ignition circuit. This in no way affects the display or the control. The display will revert to the proper message when the electrical noise ends.



Typical 5004-890 Wiring Schematic.

5004-890 FLAME SAFEGUARD CONTROLLER

System Overview



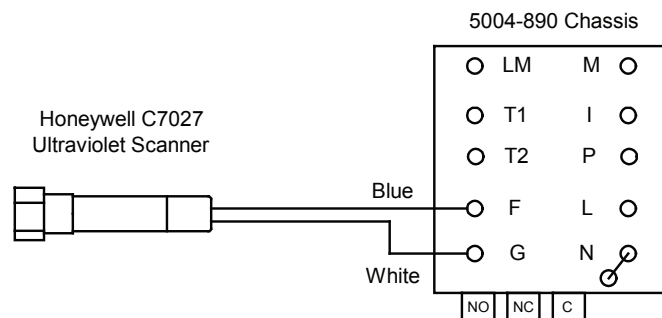
Optional 5004-216RN Flush-Mount Remote Display



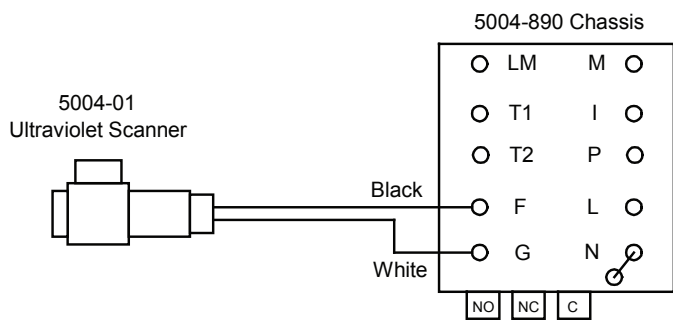
Rear View of 5004-216RN shows remote reset terminal block, 12-pin connection display cable connect, and power input terminal block



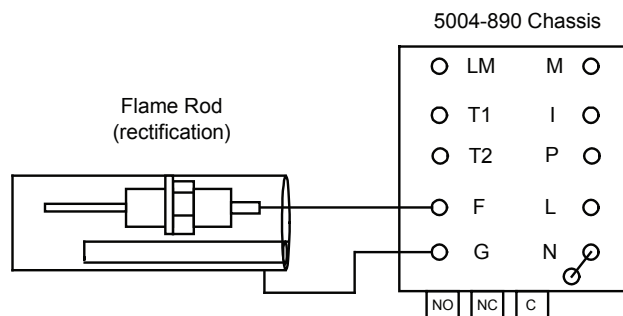
Optional Control Connector and Display Cable Attached to 5004-890 chassis



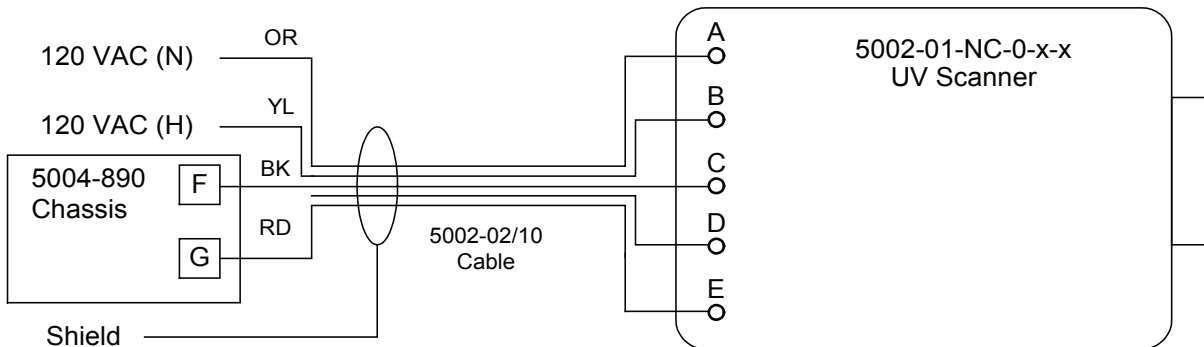
Scanner Wiring for Honeywell Flame Scanners



Scanner Wiring for 5004-01 Flame Scanners



Flame Rod Wiring for 5004-890 Flame Safeguard Controller



Scanner Wiring for 5002-01-NC UV scanner to 5004-890 Flame Safeguard Controller

5004-890 FLAME SAFEGUARD CONTROLLER

Ordering Information

Controller Inputs:

Power (Terminal L)

Input that receives all the permissives and the burner start signal switch or contact

Neutral (Terminal N)

Grounded neutral connection to control.

Air Switch (Terminals T1 & T2)

Input is connected to the combustion airflow switch. This must be a dry contact. No voltage can be applied to these terminals. Voltage applied to these terminals will damage control and void the warranty

Flame Sensor (Terminals F & G)

Sensor inputs:

Flame rod connects to Terminal F

UV sensor connects to F & G. (see wiring schematics)

Controller Outputs:

Pilot (Terminal P)

Output to energize the burner pilot valve.

Ignition (Terminal I)

Output to energize the ignition transformer.

Main (Terminal M)

Output to energize the burner main valve.

Alarm (NO, NC, C)

This is a dry contact output, which closes when an alarm condition occurs. (rated up to 230 VAC, 2 A max)

Display Specifications (Model 5004-216RN):

Mechanical

Enclosure:

1¾" H by 3½" L by 3" D (1/8th DIN)

Area Classification:

NEMA Type 4 Membrane Front

Electrical Supply:

120 VAC 50/60 Hz

Power consumption:

2 VA

Output:

Relay reset contact (15 A), communication cable to 5004 control

Environmental:

Temperature: 0° F to 140° F (-20° C to +60° C).

Ordering Information

| Description | Catalog Number |
|--|-----------------|
| 5004-890 "No-Purge" Controller (Replaces HW RA-890F & G Controllers) | |
| UV scanner or flame rod input. Purge and TFI time selectable | 5004-890-0-0-00 |
| UV scanner or flame rod input. Purge and TFI time selectable; Automatic Reset (w/new controller only) | 5004-890-0-A-00 |
| UV scanner or flame rod input. Purge and TFI time selectable; Standing Pilot (Only available with a flame rod sensor. Not available with UV detection. Not field selectable) | 5004-890-S-0-00 |
| UV scanner or flame rod input. Purge and TFI time selectable; Automatic Reset (w/new controller only); Standing Pilot (Only available with a flame rod sensor. Not available with UV detection. Not field selectable) | 5004-890-S-A-00 |
| UV scanner or flame rod input. Purge and TFI time selectable; Historical Alarm Log (last 16 alarm events) Requires 5004-216 display | 5004-890-0-0-LG |
| UV scanner or flame rod input. Purge and TFI time selectable; Automatic Reset (w/new controller only); Historical Alarm Log (last 16 alarm events) Requires optional 5004-216 display | 5004-890-0-A-LG |
| UV scanner or flame rod input. Purge and TFI time selectable; Standing Pilot (Only available with a flame rod sensor. Not available with UV detection. Not field selectable); Historical Alarm Log (last 16 alarm events) Requires 5004-216 display | 5004-890-S-0-LG |
| UV scanner or flame rod input. Purge and TFI time selectable; Automatic Reset (w/new controller only); Standing Pilot (Only available with a flame rod sensor. Not available with UV detection. Not field selectable); Historical Alarm Log (last 16 alarm events) Requires 5004-216 display | 5004-890-S-A-LG |

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Suggested Specification

Ordering Information (Flame Safeguard Controller Accessories)

| Description | Catalog Number |
|---|-----------------|
| Wiring base for model 5004-890, 5004-795 | 5004-270 |
| Plug in display for the 5004 series controls | 5004-216 |
| Remote Display package - Remote Display, Interface & 6 foot Cable | 5004-216-R |
| Remote Display package - Remote Display with NEMA 4 front membrane, Interface, & 6 foot Cable | 5004-216-RN |
| Tester & Demonstrator for 5004-890 & 5004-795 | 5004-890-Tester |
| Remote Display for Data Acquisition Module | QD485 |

Suggested Specification:

1. Microprocessor Flame Safeguard Controller

Controller shall be U.L. recognized and CSA certified for single burner boiler applications. The controller shall be a plug-in replacement for Honeywell RA890F and RA890G controllers. The controller shall be capable of accepting inputs from ultraviolet, self-checking ultraviolet, and flame rod detectors without changing controller hardware. Pilot Trial for Ignition (PTFI) timing, and other control functions shall be DIP switch selectable.

2. Flame Safeguard Controller Hardware

Controller and included flame amplifier circuitry shall be microprocessor-based and include the following as a minimum:

- Removable LCD display for status information and troubleshooting information.
- Optional remote display
- Sequence status LEDs on the controller faceplate including: Limits Made (green), Pilot (yellow), Main (yellow), Flame Fail (red), Alarm (red) Power (red), Flame (red),
- Test jacks for direct flame intensity measurement (0-5 VDC)

3. Flame Safeguard Functions

The controller shall cycle the burner from Standby, supervised Pilot Trial for Ignition, Main Flame Trial for Ignition and Main flame. De-energization of pre-ignition interlocks, running interlocks, or loss of flame signal shall result in the safe shutdown of the burner.

4. Manufacturer

The flame safeguard controller shall be model 5004-890 manufactured by Preferred Utilities Mfg. of Danbury, CT.