DET TRONICS

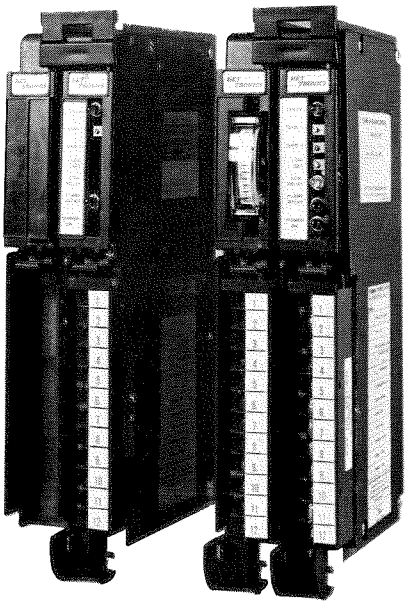
SPECIFICATION DATA
Flame Control Modules
R9102 and R9103 Series

DESCRIPTION

The R9102 and R9103 Flame Control Module Series are specifically designed for use in the Allen Bradley 1771 Input/Output (I/O) Rack. Used as part of an Allen Bradley Programmable Controller System with one or more Det-Tronics ultraviolet, infrared or fiber optic flame scanners, the Flame Control Modules provide recognition and continuous monitoring of fossil fuel flames in utility boilers, industrial boilers, furnaces, ovens and kilns.

Any of six modules may be selected, which will provide the most needed features for any application. The R9102 series provides a safe-start check feature within the flame control module circuitry. The safe-start check is provided by an AC Interlock relay that prevents system startup if correct operating conditions have not been satisfied. In order to accommodate control systems that provide the safe-start check function, the R9103 series does not incorporate the AC Interlock relay.

The features listed in Table 1 are available through each of the six Flame Control Modules.



SPECIFICATIONS

OUTPUTS—

Relay contact ratings: 5 amperes resistive at 28 vdc, 3 amperes resistive at 240 vac.

OPERATING VOLTAGE—

102 to 135 vac, 45 to 65 Hz.

POWER CONSUMPTION—

12 va maximum at 120 vac.

OPERATING TEMPERATURE RANGE—

−40°F to +167°F (−40°C to +75°C).

SHIPPING WEIGHT (Approximate)—

2 pounds (0.9 kilogram).

FLAME FAILURE RESPONSE TIME—

2.75 seconds miminum, 3.25 seconds maximum.

LIGHT CHOPPER SELF-CHECK PERIOD—

10 seconds (8.8 seconds viewing, 1.2 seconds blocked).

Table 1—R9102 and R9103 Features

Feature	R9102M	R9102N	R9102P	R9103M	R9103N	R9103P
Mounting in A-B rack using two slots	X	X	X	X	X	X
Safe start check (AC Interlock relay)	X	X	X	----	----	----
CHECK LED (Self check)	X	X	X	X	X	X
LOW RELAY LED	----	----	X	----	----	X
Low setpoint adjustment	----	----	X	----	----	X
FLAME RELAY LED	X	X	X	X	X	X
BURNER ON LED	----	X	X	----	----	----
Sensitivity adjustment	1	2	2	1	2	2
Number of scanners	1	2	2	1	2	2
Flame signal meter	----	X	X	----	X	X
Flame signal output available on field wiring arm	X	X	X	X	X	X
POWER ON LED	----	----	----	X	X	X

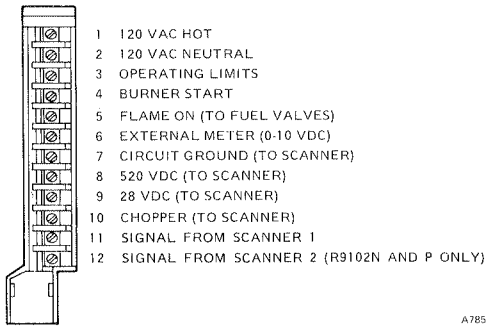


Figure 1—R9102 Field Wiring Arm P1

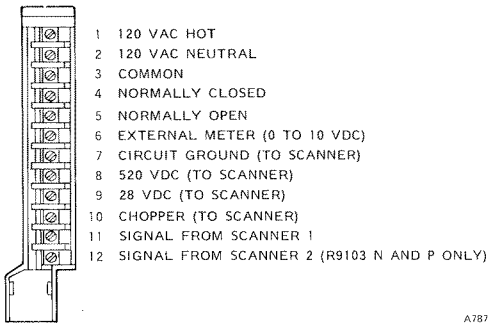


Figure 2—R9103 Field Wiring Arm P1

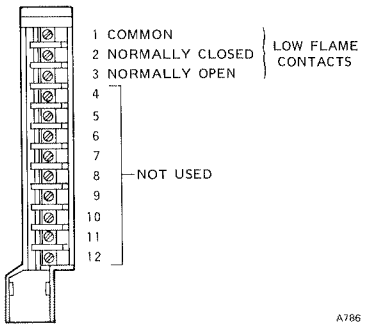


Figure 3—R9102P and R9103P Field Wiring Arm P2 (Optional)

FACTORY-SET FLAME-ON THRESHOLD—
2 volts (relative reading) will energize the Flame relay.

ADJUSTABLE LOW RELAY THRESHOLD—
LOW SET potentiometer adjusts voltage from 3.3 to 6.6 vdc, and the Low relay will energize at the customer preselected threshold voltage.

THEORY OF OPERATION

The function of a flame safeguard system is the verification of burner flame. The Flame Control Module monitors signals from one or two ultraviolet, infrared or fiber optic flame scanners individually or in combination and actuates relay output switching in response to changes in flame status. Together with the Allen-Bradley Programmable Controller, external sensing devices, and load relays, the flame safeguard system controls safe startup and initiates burner shutdown in response to a loss of flame.

In the Flame Control Module, the flame response circuitry monitors the signals from the flame scanners and energizes the Flame On relay when the integrated and combined scanner signals exceed the preset flame-on threshold. If the scanner signals fall below the flame-on threshold for 3.25 seconds, the Flame On relay is de-energized and the FLAME ON LED turns off.

At regular intervals the Flame Control Module actuates a mechanical light chopper in the scanner, which interrupts the flame signal pulses by blocking the scanner's view of the flame. The interruption serves as a scanner self-check that is indicated by the faceplate CHECK LED.

Normal system operation occurs in the following manner:

- The terminals allow monitoring of flame intensity over a range of 0 to 10.0 volts. A built-in blanking feature prevents the meter from reacting to the chopper test, yielding a nearly steady display.
- The green BURNER ON LED is illuminated when the AC Interlock relay is energized (R9102 series only).
- The red POWER ON LED is illuminated in response to 110 vac being applied (R9103 series only).
- The green CHECK LED is illuminated by the self-check (chopper) circuitry. The cycle time is 8.8 seconds off, 1.2 seconds on (shorter than the 3.25 seconds required for reaction to flame failure).
- The red FLAME ON LED is illuminated whenever the Flame relay is energized.
- The yellow LOW RELAY LED (R9102P and R9103P only) is illuminated and its corresponding relay is energized if the burner flame signal is above the user-preset threshold. This threshold is selected on the low setpoint potentiometer located on the faceplate of the module.

ORDERING INFORMATION

For assistance in ordering a system to fit your application please contact:

Detector Electronics Corporation
Burner Management Systems Group
6901 West 110th Street
Minneapolis, Minnesota 55438 USA

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Printed in U.S.A.