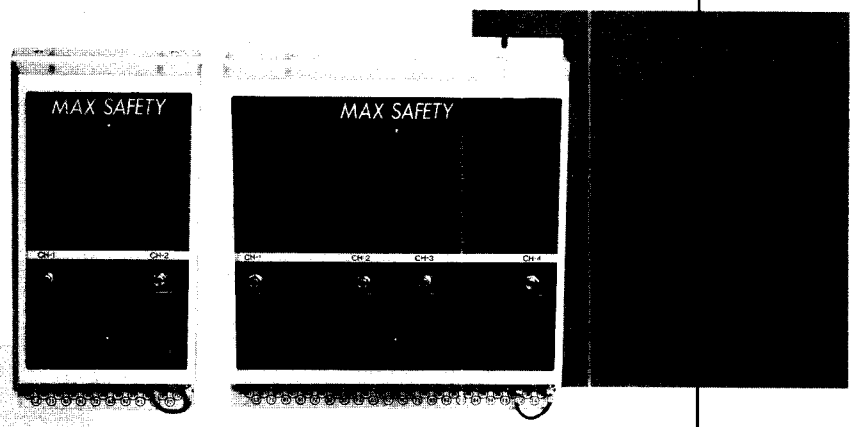
YAMATAKE

No. CP-UM-1212E

Max Safety Flame Safeguard Multiburner Modules R4332A, R4334A

User's Manual



R4332A R4334A

Yamatake Corporation

Caution:

These flame safeguard multiburner modules are crucial to the safe operation of combustion devices. Consult this manual before attempting to operate the equipment.
Do not attempt to perform installation, connections, maintenance, checks, adjustments or any other work on this equipment without the help of engineers who are familiar with combustion and combustion safety device technology.

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1. GENERAL

The R4332A/R4334A flame safeguard multiburner modules are combustion safety equipment used to monitor multiburners and to control continuous operation combustion devices.

The R4332A/R4334A are used with the C7012E/F or C7076A/D Ultravision devices with a sensitivity adjustment function or a flame rod. These provide continuous dynamic self-diagnostics. The amplifier differs according to the type of flame detector.

By combining the flame detector with a fuel or pilot valve, an ignition transformer and other components, combustion safety can be ensured in a variety of industrial furnance, boiler, etc., installations.

If the flame goes out or becomes abnormal during combustion, the combustion valve is automatically shut and the combustion lamp goes out to signal that there is trouble. As a further safety enhancement, all circuits of the R4332A/R4334A, amplifier, the C7012E/F and the C7076A/D Ultravision are continuously self-checked. If trouble occurs, the equipment automatically stops.

Features

- ☐ The R4332A can monitor two burners. The R4334A can monitor four burners.
- ☐ Plug-in type amplifiers can be used to detect various kinds of flames.
- ☐ The flame signal can be measured easily on a microammeter using a measuring jack and the voltage can be monitored at a measuring terminal.
- ☐ The amplifier and flame detector perform continuous self-check operations and are protected against all erroneous signals. If an electronic circuit has become defective before start up, the main fuel valve does not open, even if start up operation is performed. The main fuel valve is shut off, even if trouble occurs in a circuit during combustion.

2. EXTERNAL DIMENSIONS AND MOUNTING DIMENSIONS

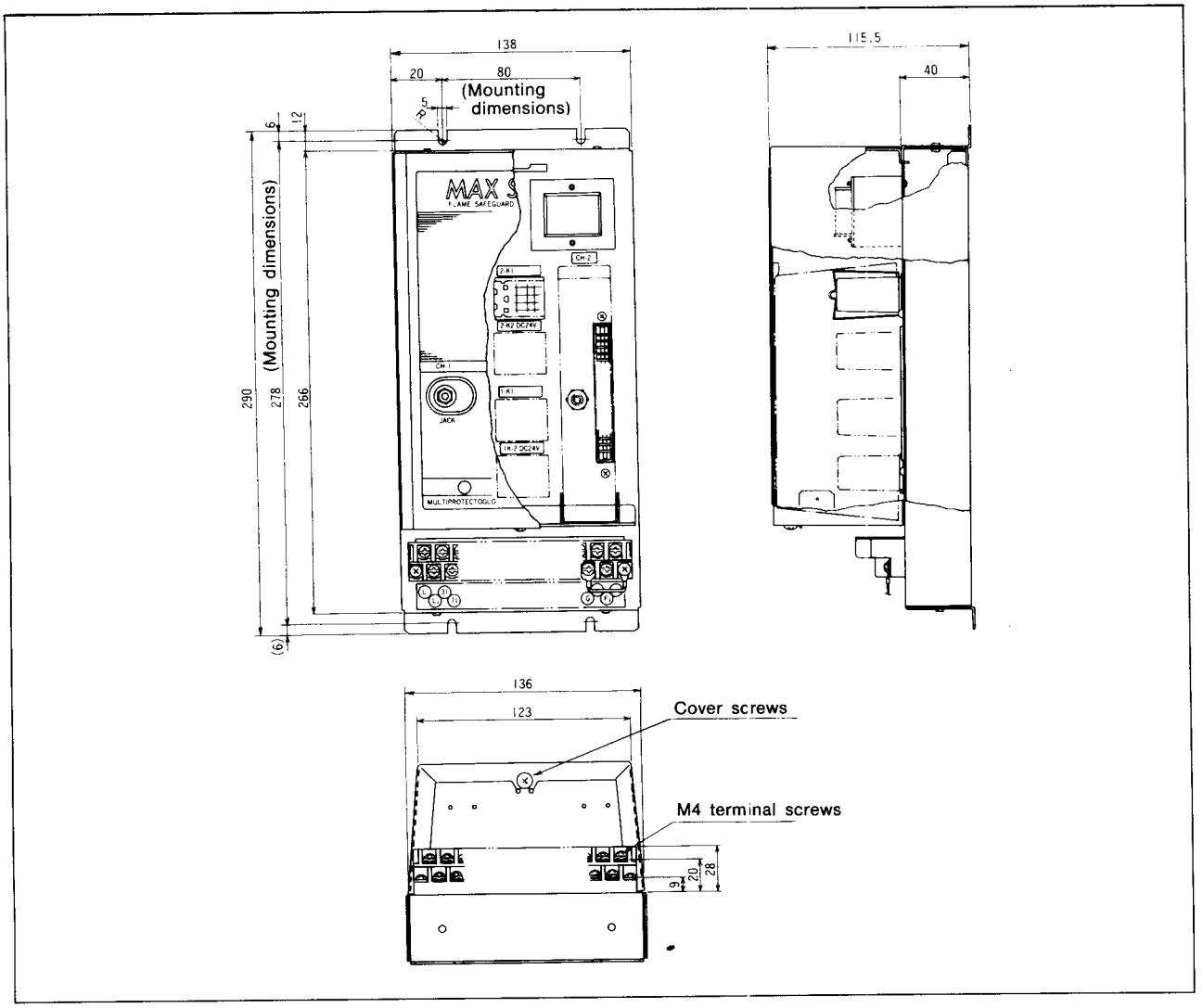


Fig. 1 R4332A (2cH)

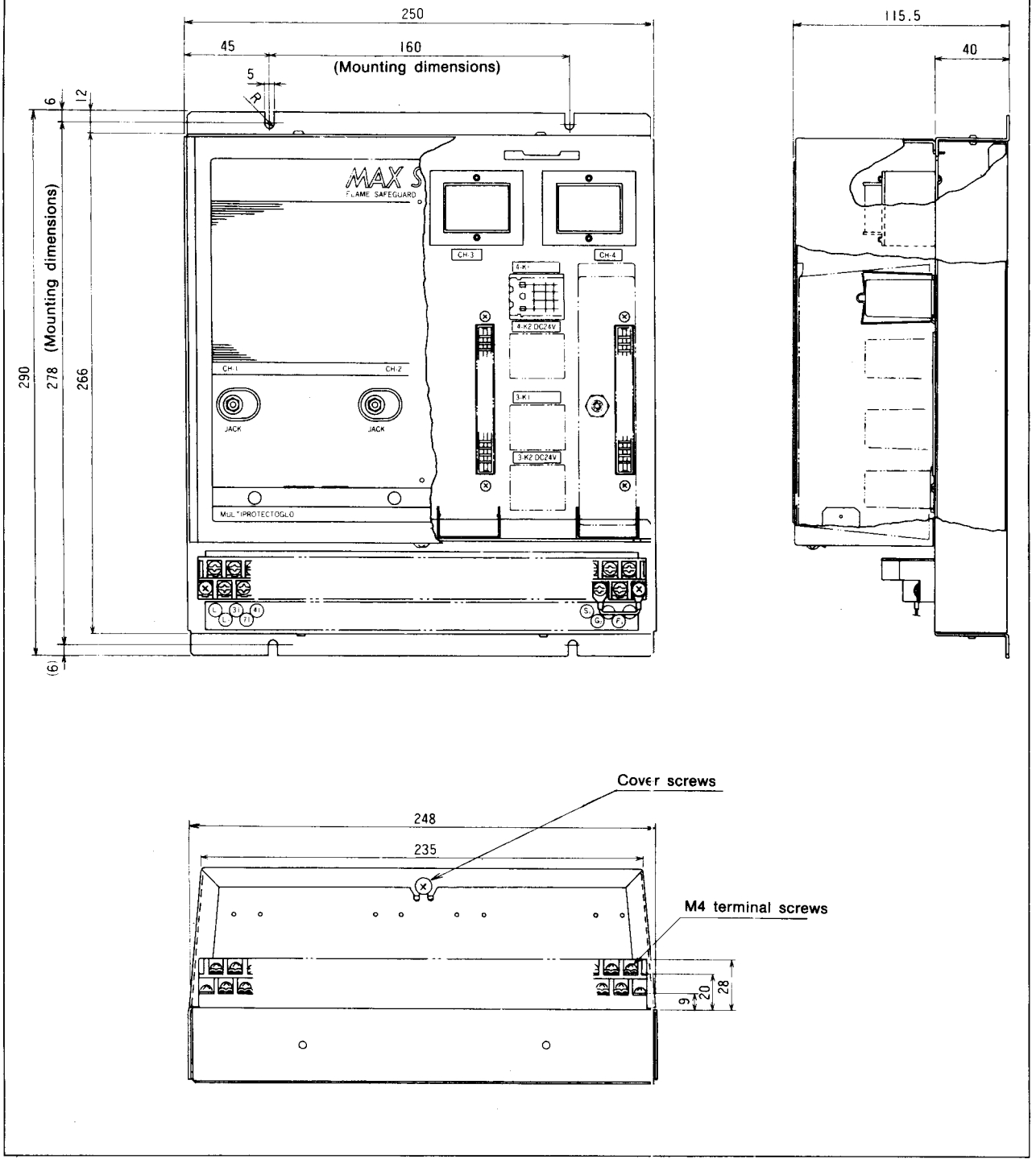


Fig. 2 R4334A (4cH)

3. INSTALLATION AND WIRING

Caution:

(1) Never mount the equipment where it might be exposed to the following:
- Chemicals or corrosive gases (ammonia, sulfur, chlorine, ethylene compounds, acids)
- High humidity or condensation
- High temperature
- Continuous vibrations

(2) Never attempt to perform installation and wiring without refering to this instruction manual or an authorized substitute supplied by the manufacturer.
(3) Perform all wiring according to specified standards.
(4) In order to prevent shocks or other accidents, connect the power supply last.
(5) Suppress the terminal loads below the rated values.
(6) Make sure the power and voltage match those specified on the equipment.
(7) Select reliable timers, auxiliary relays and other parts if optional equipment is necessary.
(8) Perform category 3 grounding work according to existing standards. Be sure to ground the burner cabinet.
(9) Don't run the power, high voltage (HV), and flame detector lines together or through the same conduit. Connect and leave at least 10cm between the HV line and the R4332A/R4334A.
(10) Make sure the HV line has been securely connected. If not, high-frequency electric waves may lead to erroneous operations. Mount the ignition transformer directly onto the burner unit or a part grounded to it.
(11) Check that all wiring has been connected correctly. If not, operational failures may occur.

1. Mounting Position

Mount the instrument so that the terminal board faces downward as shown in Fig. 1.

2. Installation

(1) Mount the instrument by tightening the four mounting screws as shown in Fig. 1 and 2.
(2) After loosening the cover screws, detach the cover and mount the amplifier as shown in Fig. 3.
(3) Insert the PC board into the connector securely with the amplifier nameplate facing outward as shown in Fig. 1 and 2.
(4) Remount the instrument cover.

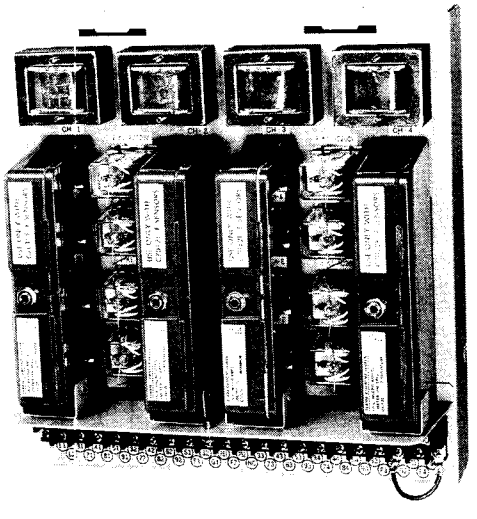
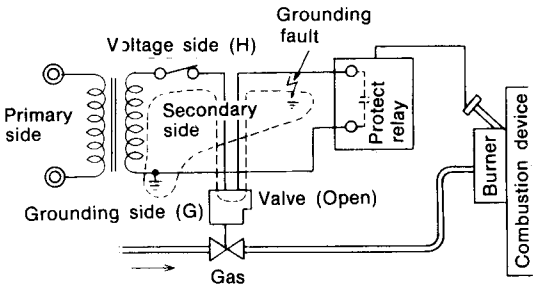


Fig. 3 Installation of Amplifier

3. Wiring Method

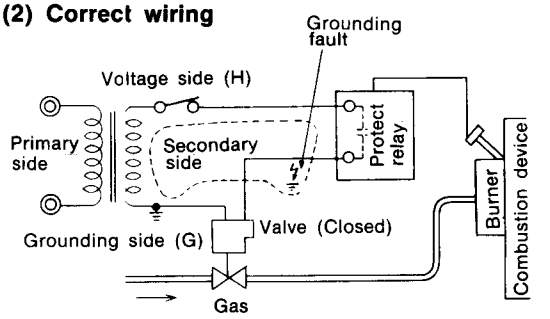
- Perform wiring for the 2-burner R4332A according to Fig. 5, and the 4-burner R4334A according to Fig. 6.
- If the voltage (H) and grounding lines (G) are separately identified, connect (H) to terminal L_1, and (G) to terminal L_2, and connect the valve and load to (G) as illustrated in Fig. 4, 5, and 6.
- To wire various flame detectors, use terminals F and G for the C7012E, F, and flame rod, and terminal F and FS for the C7076A, D. See Fig. 7.
- For continuous flame current measurement, connect a voltmeter or a recorder with an input impedance of higher than 100kΩ in the following manner:
  Connect the C7012E, F and flame rod to terminals G and FS (⊕ to G and ⊖ to FS).
  Connect the C7076A, D to terminals G and FS (⊕ to G and ⊖ to FS).
  Connect terminal F and G via a resistor.
  See Fig. 7.
- Use an overload preventer as required.
- Don't disconnect the jumper wire from terminal G_1 or G_2, except when conducting the dielectric strength test.
- Terminal NC at the center of the board should not be used.
- Wiring diagram (Fig. 5 and 6) shows an individual manual ignition system. The stop switch is used to stop all channels.
- It is recommended that JAN standard RF coaxial cables RG-11/U or equivalent be used as flame detection signal cables between the C7012E, F flame detector and the R4332A/R4334A.

(1) Incorrect wiring



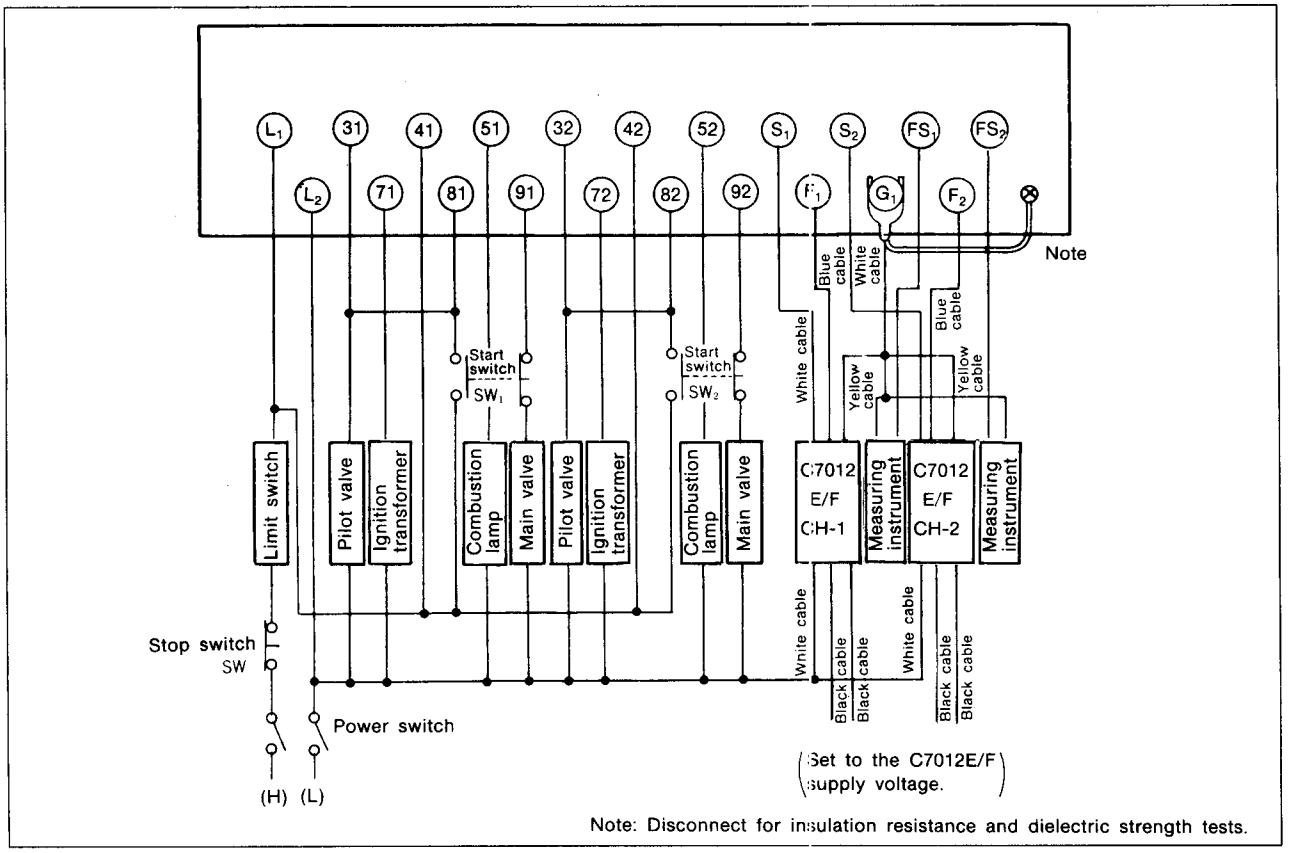
If wiring s done between the protect relay and the valve as illustrated above, a current will flow to the valve and open it. As a result, the gas will cause an explosion.

(2) Correct wiring



When wiring is done correctly as shown in the above figure, a grounding fault current cannot flow to the valve even if it has been caused by an insulation failure on the voltage side (H). As a result, the valve does not open and no gas escapes.

Fig. 4 Wiring of Power Supply and Valve



Note: Disconnect for insulation resistance and dielectric strength tests.

Fig. 5 R4332A (2cH) External Wiring (Example of individual manual ignition system)

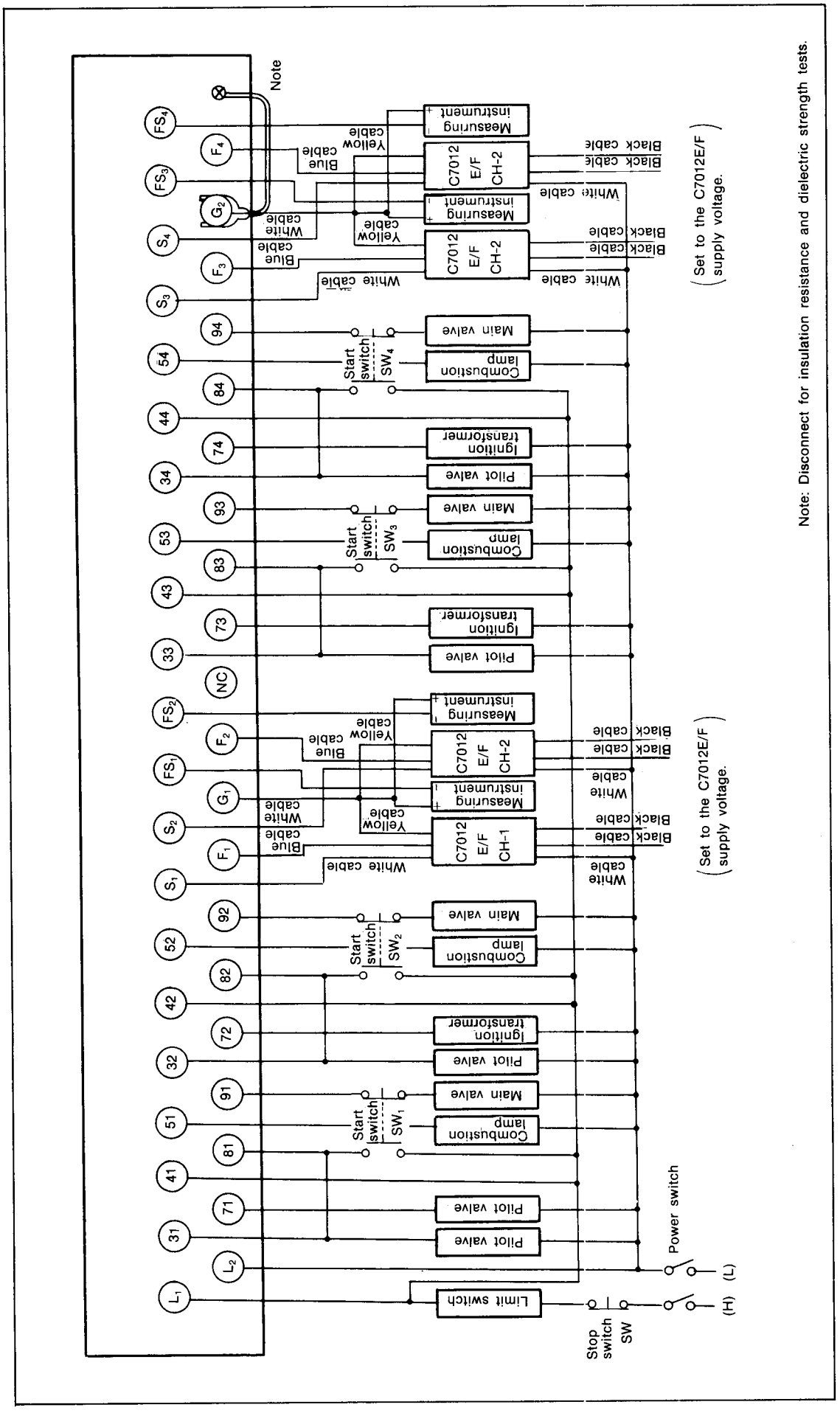


Fig. 6 R4334A (4cH) External Wiring (Example of individual manual ignition system)

The signal cable from the flame detector to the R4332A/R4334A should be as short as possible so that the flame current is not reduced due to line capacitance.

Table 1 shows the allowable length.

(10) A vinyl wire (IV or CVV) with a diameter of 1.25mm² can be connected as a signal cable between the C7076A, D detector and the F4332A/R4334A units.

Table 1

Type of signal cable	Allowable length		
	C7012E/F	Flame rod	C7076A/D
JAN RG-11/U 5C2V, 7C2V	About 50m	About 30m	—
IV Cable (2mm²) 600V ac vinyl insulation wire	–	–	About 300m

Caution:

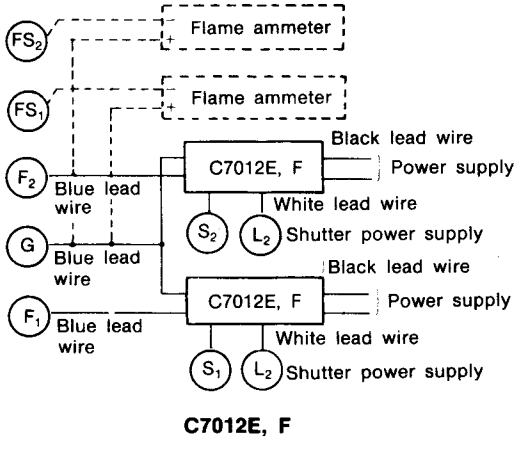
(1) Read the C7012E, F and the C7076A, D instructions carefully when connecting equipment to the flame detector.

(2) Use a flame ammeter with an input impedance higher than 100kΩ and connect it with a separate relay terminal.

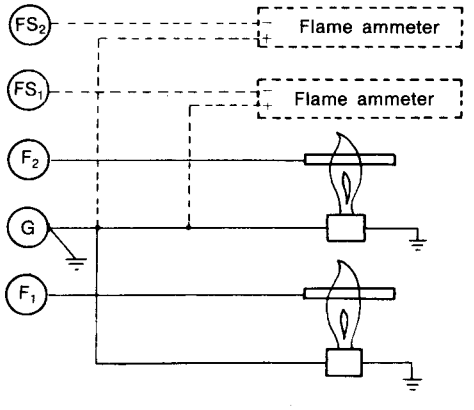
(3) Never connect the flame ammeter to terminals F_1, F_2, F_3, or F_4, or erroneous operations will result.

(4) Make sure the shutter voltages (100V or 120V) are equal when the R4332A and R4334A are used with an Ultravision (7012E/F, C7076A/D) flame detector.
Be careful when selecting the Ultravision supply voltage since 100V and 208V models are available.

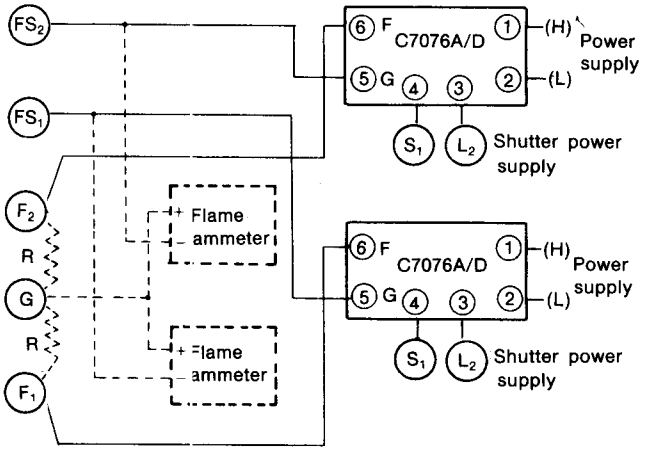
Model	Working voltage	Shutter voltage	Model	Working voltage	Shutter voltage
C7012E1245	AC120V	AC120V	C7012E1211	AC100V	AC100V
C7012E1146	AC208V	AC120V	C7012A1015	AC100V	AC100V
C7012F1060	AC120V	AC120V	C7076D1001-1	AC100V	AC100V



C7012E, F



Flame rod



C7076A, D

Note: 1. Connect terminal (5) G of the C7076A, D to terminal (FS) of the R4332A/R4334A.

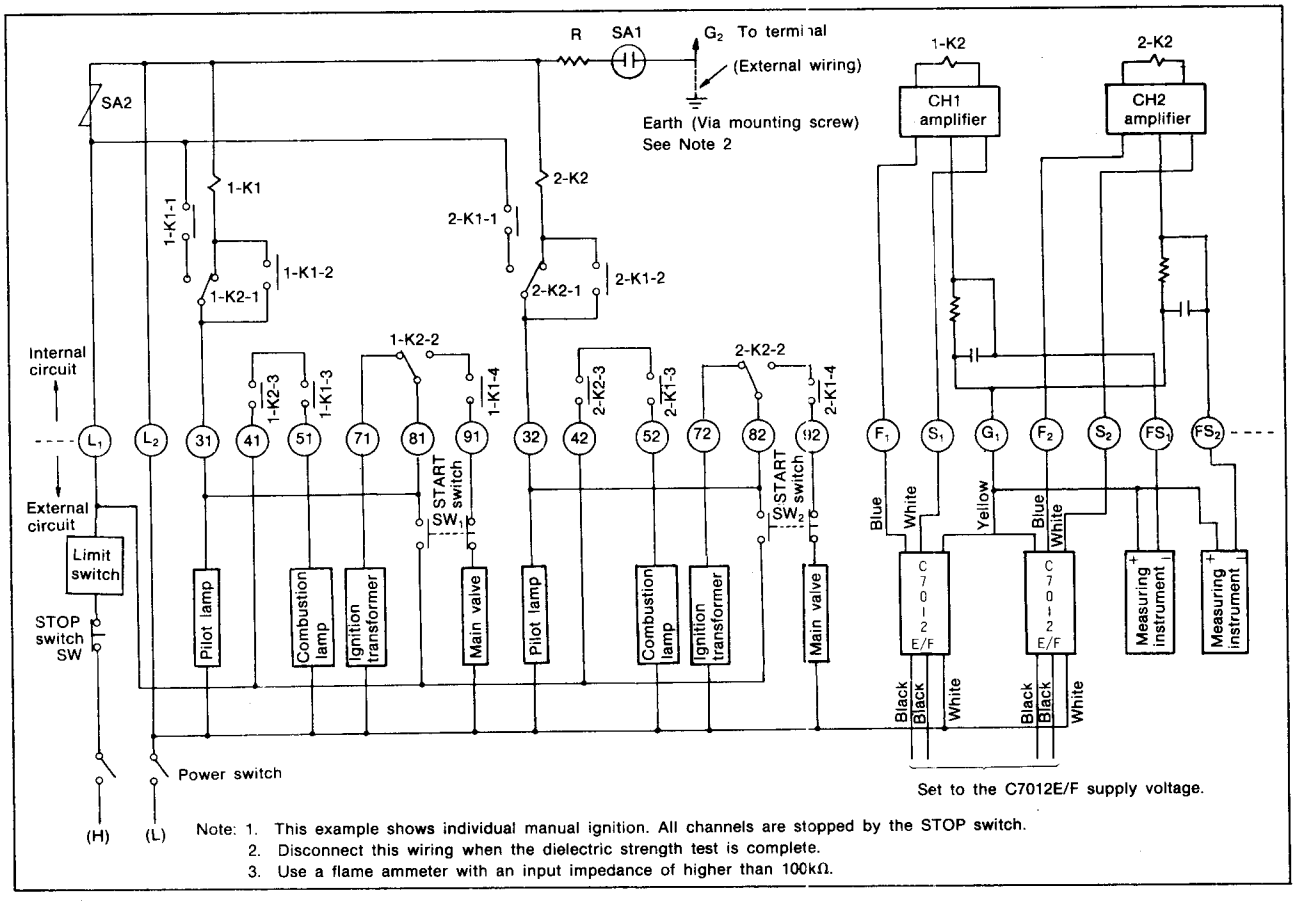
2. For continuous measurement of the flame current, mount a resistor R (3MΩ1/2W) between terminals F -- G , and connect the equipment as indicated by the dotted line.

Fig. 7 Wiring Diagrams of Various Flame Detectors

4. OPERATION

Caution:

If the POWER or STOP switch is turned on and off intermittently, erroneous operations may occur. Maintain an interval of about 10 seconds between on and off actions.

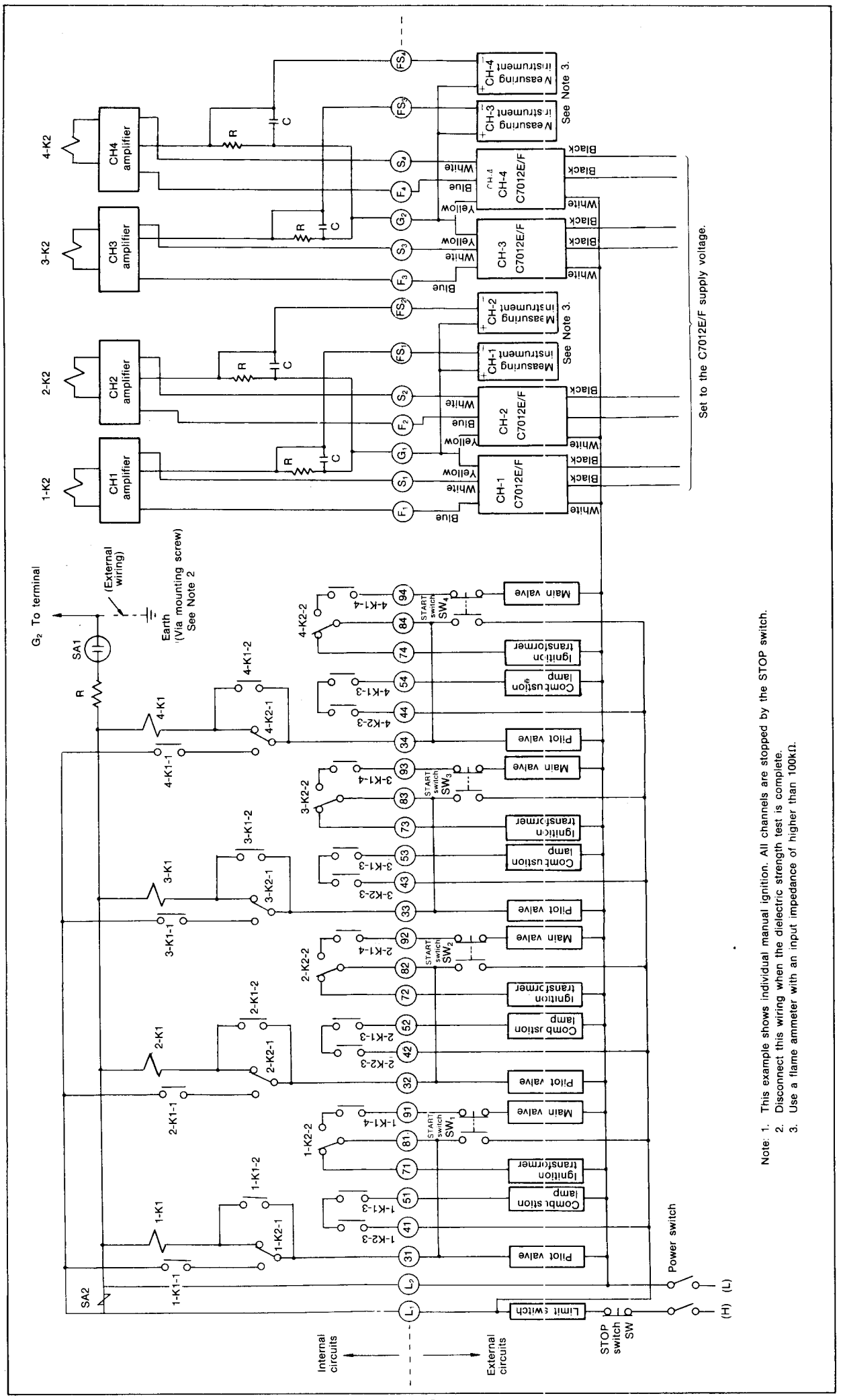


Note: 1. This example shows individual manual ignition. All channels are stopped by the STOP switch.
2. Disconnect this wiring when the dielectric strength test is complete.
3. Use a flame ammeter with an input impedance of higher than 100kΩ.

Fig. 8 Wiring the R4332A to External Devices (Individual manual ignition)

1. Normal functions (See Fig. 8 and 9.)

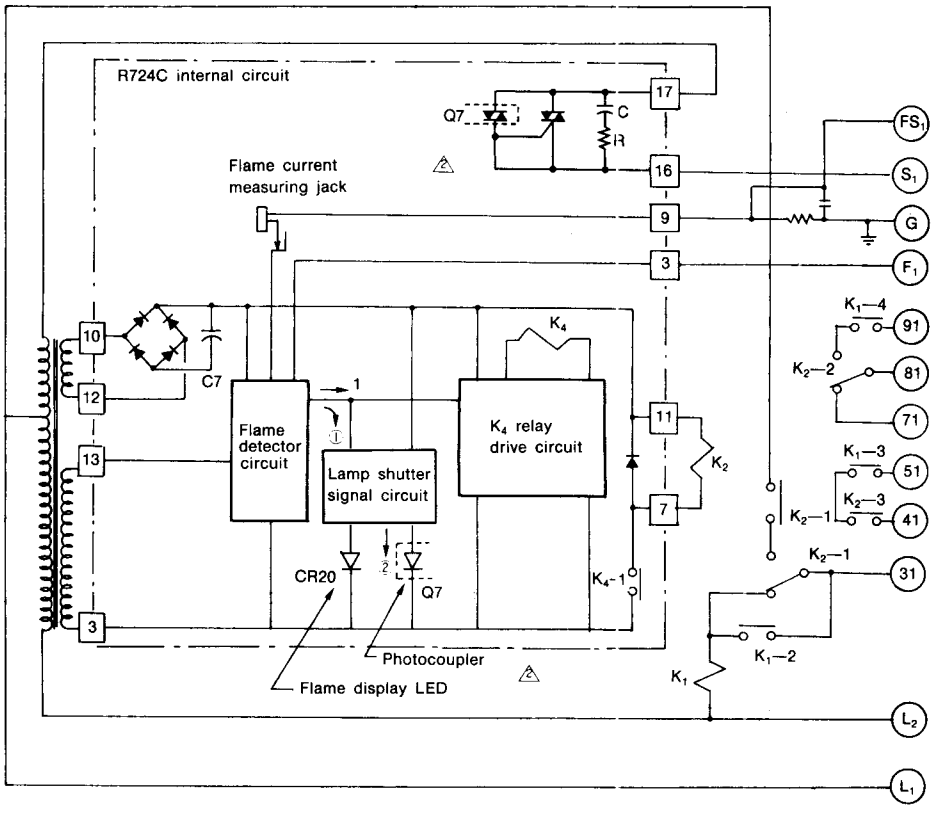
Operation	R4332A functions	Unit conditions
Turn on POWER switch. Turn on limit switch.	A voltage is applied to (L1) and (L2). (A voltage is applied to the amplifier.)	
Continue pushing the START switch SW1 until the combustion lamp is confirmed. (Terminals (41), (51).)	o When power is applied to terminal (31), flame relay contact 1K2-1 is closed (false fire check), and load relay 1K1 is excited through the flame relay contact. o When the pilot flame is detected, flame relay IK2 is excited. Contacts 1-K1-1 and 1-K1-2 are turned on to hold the 1-K1 relay. o 1-K2-2 and 1-K1-4 turn on. o 1-K2-3 and 1-K1-3 turn on.	Ignition transformer starts operating. Pilot valve opens. Combustion lamp flickers.
Release START switch SW1.		Ignition transformer stops. Main valve opens to ignite main burner. Normal operation is started.
Push STOP switch. (Stop operation)	o All relays are de-energized.	Pilot valve and main valve are closed.
Flame extinguished during operation (Trouble occurred in amplifier fire sensor.)	o All relays are de-energized in the channel where the flame was extinguished.	Pilot valve and main valve are closed.



Note: 1. This example shows individual manual ignition. All channels are stopped by the STOP switch.
2. Disconnect this wiring when the dielectric strength test is complete.
3. Use a flame ammeter with an input impedance of higher than 100kΩ.

Fig. 9 Wiring between the R4334A and External Devices (Individual manual ignition)

2. Dynamic self-check operation



- All relays are set to the condition before start.
- ⚠2 shows the internal circuit of the R7247C. For the flame rod R7247B, this photocoupler serves as a photo FET, and its contact is connected in series to terminal (F). Terminal (S1) is not used.

Fig. 10 Internal Circuit Diagram of the R4332A + R7247C

Normal functions

(1) A voltage is applied to terminal (L1) and (L2) (This voltage is applied from the transformer to the amplifier.)
(2) The lamp shutter signal circuit is operated by a no flame signal (1) on the flame detection circuit, and photocoupler Q7 is turned on by signal (2).
(3) When photocoupler Q7 turns on, a voltage is generated at terminals (S1) and (L2), causing the flame detector shutter to be open.
(4) When a voltage is applied to terminal (31), load relay K_1 is energized through flame relay contact K_2-1 (closed: false flame check).
(5) When the flame detector detects a flame, the flame display LED flickers due to the on-off operation of the lamp shutter signal circuit. Photocoupler Q7 turns on and off to start opening and closing the shutter at the same time.
(6) The K_4 drive circuit functions to energize K_4, causing K_4-1 to turn on to energize K_2. Load relay K_1 is held by flame relay contact K_2-1.
(7) When the flame goes out, photocoupler Q7 turns on, the shutter remains open, the K_4 drive circuit does not function, and the relay is de-energized. The flame display LED goes out.

Abnormal functions

(1) Flame detection sensor trouble
- If an existing flame is not detected, the K_4 relay is de-energized, and the flame display LED does not light.
- If a flame is detected even when one does not exist, the flame signal does not turn on and off but remains on, because the flame signal is turned on after closing the shutter. Accordingly, the K_4 drive circuit does not function, and the K_4 relay is de-energized. The flame display LED remains lit.

(2) Lamp shutter signal circuit trouble
Photocoupler Q7 remains on or off, and the shutter remains on or off.
As a result, the K_4 relay is de-energized.

Shutter opens	A flame exists. ---	Flame display LED lights.
	No flame exists. ---	Flame display LED does not light.
Shutter is closed	A flame exists. ---	Flame display LED lights.
	No flame exists. ---	Flame display LED does not light.

(3) K_4 relay drive circuit trouble
When the drive circuit in this circuit turns on and off, the K_4 relay is energized. If this drive circuit does not function, the K_4 relay is de-energized.
A flame exists. --- Flame display LED flickers.
No flame exists. --- Flame display LED does not light.

5. CHECKOUT AND ADJUSTMENT

Caution
Pay careful attention when performing these tests, since voltage is applied to most of the terminals.

Preliminary check
(1) Check all connection points.
(2) Make sure that the equipment is mounted in a place where the ambient temperature is within the allowable range.
(3) Make sure the flame detector is mounted correctly. (Refer to the corresponding instruction manual.
(4) Make sure the burner has been adjusted correctly.
(5) Check the exhaust mechanism of the stack.
(6) Make sure the flame amplifier and flame detector are correctly combined with each other.

Checkout procedure
Perform the following checks completely to guarantee safe operations.
(1) Flame current check
(2) Ignition spark response test
(3) Pilot turn-down test
(4) Safety break check
(5) Operation check indicator lamp (red)

(1)* Flame current check
Checking the flame current is the best method of judging the mounting position of the flame detector. Check the flame current at installation and each time maintenance work is done. Check it at least once every month to prevent problems caused by shortage of the flame detection signal.

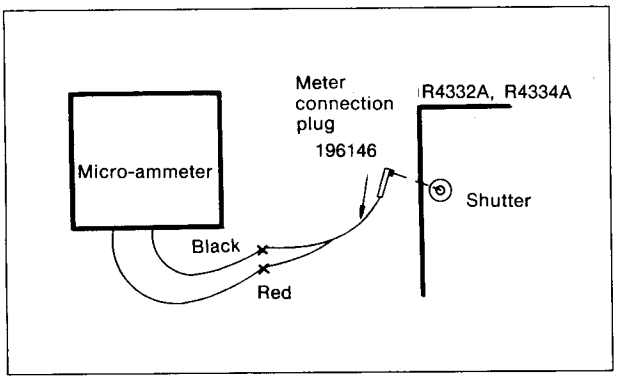


Fig. 10 Flame Current Measurement Method

For measurement of the flame current, connect the micro-ammeter lead (red or black) to the same color lead wire on the meter connection plug (196146), and insert the plug into the R4332A/R4334A test jack.
Then operate the burner and read the flame current. (See Fig. 10)
Check for the following when measuring the flame current:
① The flame current value must be stable within the range specified in Table 1.
② The meter deflection should not be higher than necessary.
If a stable flame current cannot be obtained it may be due to one of the following:
- Unsuitable supply voltage
- Disconnection of the flame detector
  — Open condition
  — Shorted condition
  — High resistance short circuit of lead wires due to moisture or contamination
  — Insulation deteriotation at Ⓕ, Ⓕ$ and Ⓖ terminals
- Unsuitable monitoring position and window
- Contamination of the Ultravision's light receiving face
- Ultravision trouble

(2)* Ignition spark response test
Flame relay (K_2) should not be excited by the spark generated during operation of the ignition transformer.
Check the response of the flame detector to an ignition spark by the following procedure, (also check the mounting position):
(1) Shut off the fuel by closing the manual fuel valves for the pilot and main burners.
(2) Turn on the power and start the equipment by increasing the set point of the controller or by turning on the start/stop switch.
(3) The ignition transformer generates a spark between the ignition electrode and the flame ground.
(4) Make sure that the flame relay is not energized.
(5) If the flame relay is energized, relocate the flame detector or ignition electrode.

Table 1 Flame Current Value (recommendation)

Flame detector	Amplifier	Minimum current value	Maximum current value	The flame current value is unstable or weak.
Flame rod	R7247B	1.5μA	2.5μA	Make sure grounding area is large enough. Make sure grounding connection is securely done.
C7012E/F	R7247C	2μA	5μA	Make sure the flame is adjusted normally. Check the lens and monitoring window for contamination. Make sure the detector voltage and monitoring positions are normal.
C7076A/D	R7476A	2.5μA	5.5μA	Make sure the flame is adjusted normally. Check the lens and monitoring window for contamination. Make sure the monitoring position and detector voltage are normal. Make sure the detector sensitivity control is preset normally.

* When the flame detector is mounted in the correct position, a strong, minimum signal is easily obtained. Be sure to secure the values specified above after the trial run.

(3)* Pilot turn-down test

Caution:
The pilot turn-down test should be conducted by an experienced professional only.

This test is made to confirm that the flame is transferred to the main burner when the pilot flame has been detected, even if the gas and air pressure have altered unfavorably.

The test must be performed as follows.

① Shut off the gas by closing the manual valves in the pilot and main passages.
② Connect a manometer to the downstream of the pilot solenoid valve.
③ Open the manual valve of the pilot passage.
④ Start operating the equipment by increasing the controller setting. Relay K_1 is energized to open the pilot valve, and the ignition action is started.
⑤ Close the manual valve of the pilot passage slowly. The pilot flame will gradually diminish. Reduce it gradually until it is no longer detectable by the flame detector. Flame relays K_2 and K_1 turn off, the pilot solenoid valve closes, and the manometer pressure abruptly drops. Record the pressure just before the pilot solenoid valve is closed.
⑥ Restart the equipment.
⑦ Gradually open the manual valve of the pilot passage again, and set it to the pressure just before the shut off measured in step 5.
⑧ Make sure that the main burner is ignited smoothly and instantly when opening the manual valve of the main passage.
⑨ Change the gas pressure to the minimum and maximum, and repeat the ignition to the main burner 5 to 6 times. Make sure that ignition is smooth and instantaneous each time.
⑩ If the main burner does not ignite, the pilot flame is too small. In such a case, perform the following adjustment after increasing the pilot flame.
   1. Separate the monitoring line of the flame detector slightly from the pilot flame axis, or insert a restrictor for correction.
   2. Pull out the flame rod slightly from the center of the pilot flame.
⑪ After adjustment, repeat steps 5 to 9, and make sure that the main burner is ignited.
⑫ After the test is complete, reset the manual valve in the main passage to the fully open position. Make sure that the flame current is okay.
⑬ Disconnect the manometer.

Caution:
It this test must be repeated several times, completely stop the equipment once and fully exhaust unburned gas and oil from the combustion chamber and stack before resuming testing.

Caution:
Make sure that the Ultravision does not detect an ignition spark yet.
If it does, relocate the Ultravision or the ignition electrode.

(4)* Complete shutoff check

① Limit operation check
Normal shutoff operation can be done during simulated operation of the burner by lowering the high-limit level of the boiler or furnance. Reset the high-limit setting afterward and the burner will be started again.

② Flame failure check
Extinguish the burner flame by closing the manual fuel valve during burner operation. Make sure that the main and pilot valves are closed after the flame response time.

Caution:
Stop the burner artificially, and make absolutely sure that the protect relay functions normally.

(5)* Operating conditions of indicator lamp (red)

① When no flame exists:
The lamp shines faintly.
② When a flame exists:
The lamp flickers at a rate of 2½ to 4 times/second when the R7247B and flame rod are used.
The lamp flickers 1 to 2 times/minute when the R7247C and the C7012E/F are used.
The lamp flickers about 75 times/minute when the R7476A and the C7076 are used.
(These all indicate a proper flame current.)

(6)* Measurement of insulation at Ⓕ, Ⓕⓢ and Ⓖ terminals

① Disconnect all amplifiers from the main unit.
② Disconnect the flame detector cable on the detector side.
③ Measure the insulation of the following terminals by using a 500V DC megger:
Between F_1 and F_2, F_3, F_4, FS_1, FS_2, FS_3, FS_4, G (etc.) terminals
Between F_2 and F_3, F_4, FS_1, FS_2, FS_3, FS_4, G terminals
Between F_3 and F_4, FS_1, FS_2, FS_3, FS_4, G terminals
Between F_4 and FS_2, FS_3, FS_4, G terminals
Between FS_1 and FS_2, FS_3, FS_4, G terminals
Between FS_2 and FS_3, FS_4, G terminals
Between FS_3 and FS_4, G terminals
Between FS_4 and G terminals
④ The insulation resistance should be higher than 100MΩ.

6. MAINITENANCE AND CHECKOUT

1. General Maintenance and Checks

Caution:
- **Maintenance must be performed by an experienced professional.**
- **Perform all checks in accordance with the items in section 5 after any necessary equipment has been replaced and fully shut off.**
- **Make sure each controller is operated normally during on-site maintenance and service.**
- **Don't lubricate any part of the flame safeguard multiburner module.**
- **Clean the flame detector when cleaning the burner.**

2. Maintenance frequency

Determine the maintenance and check cycles according to the equipment, ambient conditions at the mounting site (presence of dust, ambient temperature, etc.) and the extent of shutoff damage caused by trouble during operation.

(1) Be certain to perform the pilot turn-down test when burner maintenance and checks have been completed. Perform this test at least once a year.
(2) Check the burner shutoff once a month.
(3) Check the flame detector for contamination of the monitoring window and for ambient temperature. Clean the window if necessary.
(4) Measure the flame current at least once a month.
When operations are damaged due to a shutoff, check the equipment frequently, and measure the insulation of the F , FS and G terminals.

3. Trouble shooting

Observe the following procedure if trouble with the equipment occurs.
(1) Set the equipment so that the limit switch is on.
(2) Turn the power switch on.
(3) Make sure voltage is applied between terminals (L1) and (L2) . The voltage should be within ±15% of the rated voltage.

Caution:
The specified voltage is simultaneously applied to almost all of the terminals when the power is turned on. Be careful when trouble shooting.

4. Check the flame.
(1) If the flame current is lower than the value specified in Table 1, check the insulation resistance of the (F), (FS) and (G) terminals.
(2) Proceed to item 5, if the K_2 relay is not energized.
(3) Check the false flame phenomenon when the K_2 relay is energized.
① Replace the amplifier if the K_2 relay is still energized after disconnecting the cable from the flame detector.
② If the K_2 relay is not energized even after disconnecting the cable, the flame detector or external circuit is faulty. Check them.

5. Check to see if the 1K relay is energized.
(1) If it is energized, and the pilot ignites when pushing the START button, proceed to item 8.
(2) If K_1 relay is not energized, proceed to item 6.
(3) If ignition action is not started, proceed to item 7.

6. If the K_1 relay is not energized, turn on the limit switch and check the voltage between terminals (L2) and (31) again. Replace the K_1 relay, if the rated voltage appears.

7. Check the voltage between terminals (L2) — (71) if ignition is not the cause for the burner starting failure even when the K_1 relay is energized.
(1) Replace the K_2 relay, because voltage is not flowing between terminals (L2) and (71) .
(2) Check the burner, the ignition transformer and the fuel valve external connection circuit if the rated voltage is detected between terminals (L2) and (71) .
Check the following conditions which may cause ignition delay: connections, burner adjustment, ignition function (including the electrode interval and mounting position), oil quality and spray, fuel pressure, flame profile, flame quality, main burner pilot mounting position, flame detector, and others.

Flame detection function

8. Observe the flame relay (K_2 relay) function when the burner has ignited.
(1) If the flame relay is energized, proceed to item 10.
(2) If the flame relay is not energized, proceed to item 9.

9. Check the flame relay action according to the following procedure.
(1) Check the flame current. (See Section 5.)
(2) Replace the amplifier if the flame current is sufficient.
(3) Check the items described in Section 5 if the flame current is insufficient.

Sequence action observation

10. Check the main fuel valve action when the flame relay has been energized.
Check the voltage between terminals (L2) and (91) if the main fuel valve is not open.
(1) Check the main fuel valve and its connection if the voltage is normal.
(2) Replace the K_2 relay if no voltage appears.

11. Make sure that a spark by the ignition transformer connected to terminal (71) stops when the flame relay has been energized. If the spark does not stop, make sure the correction is normal. If not, replace the K_2 relay.

Other phenomena

12. Chattering of relays

Chattering of the K_1 relay may be caused by an abnormal drop in the power supply (check the voltage) or a loose terminal connection (tighten it).

Chattering of the K_2 relay may be caused by abnormal combustion (adjust the burner) or contamination of the monitoring section of the flame detector (clean it).

13. Repeated lockout or faulty control fuctions

A repeated fault or lockout due to the controller or flame detector is likely caused by the following:

① High ambient temperatures (For the allowable range, refer to the specifications.)
② The power supply fluctuation is wider than the range of ±15% of the rated value.
③ Contacts are overloaded.
④ Critical flame current value
⑤ Frequent start/stop at high ambient temperatures.

7. SPECIFICATIONS

Product Specification Information

Model Number:

Model Number		No. of Burners	Power Supply Voltage (50/60Hz)	Shutter Voltage
Standard Type	Sealed Type			
R4332A1024	R4332A100	2	100VAC	100VAC
R4332A1008	R4332A104	2	100VAC	120VAC
R4332A1016	R4332A200	2	200VAC	120VAC
R4334A1022	R4334A100	4	100VAC	100VAC
R4334A1006	R4334A104	4	100VAC	120VAC
R4334A1014	R4334A200	4	200VAC	120VAC

Power Consumption: Per channel, 19W max., 30VA max. (including amplifier, flame detector)

Allowable Voltage: 85 to 110% of rated voltage

Contact Ratings: 3A 200V (cos ø = 1) for standard type (400VA inductive load)
1A 200V (cos ø = 1) for sealed type (100VA inductive load)

Applicable Amplifiers:

Amplifier	Flame Response	Flame Current	Flame Detector	Qty for	
				R4332A	R4334A
R7247C1001	2-4 s	2-5 μA	C7012E or F	2	4
R7247C1019	2 s max.	2-5 μA	C7012E or F	2	4
R7476A1007	2-4 s	2.5-5.5 μA	C7076A or D	2	4
R7247B1003	2-4 s	1.25-2.5 μA	Flame rod	2	4

Relay (K_1K_2)

Type	Specifications	Parts No.	Contact ratings
Standard type relay	K_1 relay—100VAC	81403124/100	200V 3A (Resistive load) 400VA (Leading load)
	K_1 relay—200VAC	81403124/200	
	K_2 relay—24VDC	81403124/024	
* Sealed type relay	K_1 relay—100VAC	81403125/100	200V 1A (Resistive load) 100VA (Leading load)
	K_1 relay—200VAC	81403125/200	
	K_2 relay—24VDC	81403125/024	

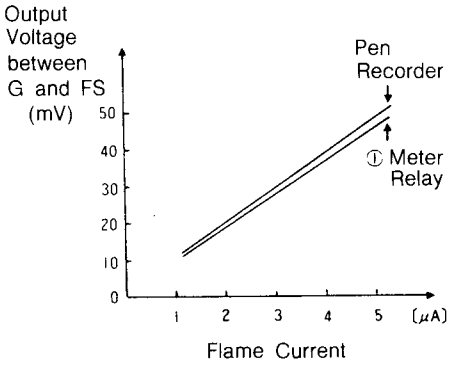
Insulation Resistance:
More than 100 MΩ between each terminal and ground with a DC500V megger (except F1 F2 FS1 FS2 G F3 F4 FS3 FS4 G1 G2 terminals).

Dielectric Strength:
No damage when 1500VAC 50/60Hz is applied for 1 min or 1800VAC is applied for 1s between each terminal and ground (except F1, F2, FS1, FS2, G, F3, F4, FS3, FS4, G1, G2 terminals).
Before testing, the wiring of terminals G, G1, G2 must be removed.

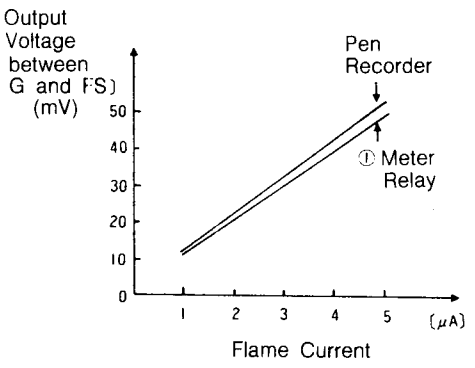
Weight: About 4.0 kg (including two amplifiers)
About 6.5 kg (including four amplifiers)
Allowable Vibration: 4.9m/s² 3600 rpm max.
Ambient Temperature: -20 to +60°C
Ambient Humidity: 90%RH max. at 40°C
Life: 100,000 cycles (at room temperature, room humidity, rated voltage, and rated load)
Thunder Lightning Surge: 10kV, 1.2/50μs (JEC-212, Surge impedance 75 Ω min.)

Output Voltage of Test Terminal:
Output voltage between G and FS is basically proportional to the flame current, but varies with exterminal wiring length, input impedance of measuring equipment, and grounding condition. Use afterdue testing.

Application Example 1
Flame Current
Measurement ... W136A (or equivalent)
Output Voltage
Measurement ...① Meter Relay (Input impedance 100 kΩ)
...② Pen Recorder (Input impedance 1 MΩ)
Cable ... 5C2V (5m)
Flame Detector ... C7012E



Application Example 2
Flame Current
Measurement ... W136A (or equivalent)
Output Voltage
Measurement ...① Meter Relay (Input impedance 100 kΩ)
② Pen Recorder (Input impedance 1 MΩ)
Cable ... 5C2V (5m)
Flame Detector ... C7076A



Note: Use shielded wire (equivalent to 5C2V) shorter than 5m for wiring from flame signal measuring terminal. When extending the wire longer than 5m, transmit signal through signal amplifier or converter. Use measuring equipment or recorder of which input impedance is 100 kΩ min.

Specifications are subject to change without notice.

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