# U7698E Flame Detector

Customer Product Manual
Part 334614E

Issued 3/02

**Nordson.**

# C E

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# Table of Contents

# U7698E Flame Detector

## Safety

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

### Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

### Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

### Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

All phases of equipment installation must comply with all federal, state, and local codes.

## Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.

- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.

- Keep clear of moving equipment. Before adjusting or servicing any moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.

- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.

- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.

- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

## Fire Safety

To avoid a fire or explosion, follow these instructions.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.

- Provide adequate ventilation to prevent dangerous concentrations of volatile materials or vapors. Refer to local codes or your material MSDS for guidance.

- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.

- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.

- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.

- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

## *Grounding*

⚠️ **WARNING:** Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program. If you receive even a slight electrical shock or notice static sparking or arcing, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

All work conducted inside the spray booth or within 1 m (3 ft) of booth openings is considered within a Class 2, Division 1 or 2 Hazardous location and must comply with NFPA 33, NFPA 70 (NEC articles 500, 502, and 516), and NFPA 77, latest conditions.

- All electrically conductive objects in the spray areas shall be electrically connected to ground with a resistance of not more than 1 megohm as measured with an instrument that applies at least 500 volts to the circuit being evaluated.

- Equipment to be grounded includes, but is not limited to, the floor of the spray area, operator platforms, hoppers, photoeye supports, and blow-off nozzles. Personnel working in the spray area must be grounded.

- There is a possible ignition potential from the charged human body. Personnel standing on a painted surface, such as an operator platform, or wearing non-conductive shoes, are not grounded. Personnel must wear shoes with conductive soles or use a ground strap to maintain a connection to ground when working with or around electrostatic equipment.

- Operators must maintain skin-to-handle contact between their hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If gloves must be worn, cut away the palm or fingers, wear electrically conductive gloves, or wear a grounding strap connected to the gun handle or other true earth ground.

- Shut off electrostatic power supplies and ground gun electrodes before making adjustments or cleaning powder spray guns.

- Connect all disconnected equipment, ground cables, and wires after servicing equipment.

## *Action in the Event of a Malfunction*

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures.

- Identify the reason for the malfunction and correct it before restarting the equipment.

## *Disposal*

Dispose of equipment and materials used in operation and servicing according to local codes.

# Description

The model U7698E flame detector installs in a coating system booth and interfaces with the booth and application equipment controls. The flame detector shuts down the booth, application equipment, and conveyor when it detects a fire in the booth.

See Figure 1.

The flame detector consists of an indicator panel (1) and one or two detector heads (2). Each detector head has an air shield that keeps the lens clean.
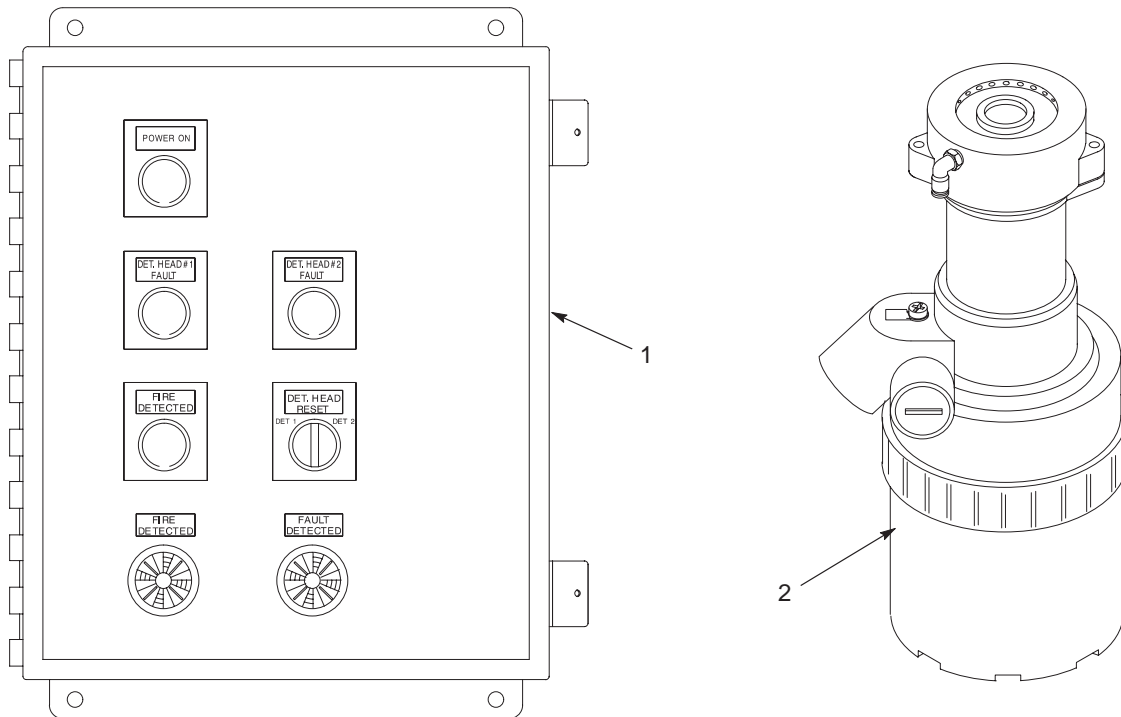


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Figure 1     U7698E Indicator Panel and Flame Detector Head

1. Indicator panel                    2. Detector head

## *Indicators, Alarms, Interlocks, and Controls*

The indicator panel houses the flame detector indicators, alarms, interlocks, and controls.

### Indicators
- POWER ON (green)
- DET. HEAD #1 FAULT (amber)
- DET. HEAD #2 FAULT (amber)
- FIRE DETECTED (red)

### Alarm Buzzers
- FAULT DETECTED (continuous tone)
- FIRE DETECTED (fast intermittent tone)

### Interlocks

The indicator panel houses three interlock relays:

- booth
- conveyor
- customer use

If a fire is detected in the booth, the booth and conveyor interlocks shut down the booth, application equipment, and conveyor. The customer-use interlock relay can be wired to activate an alarm or other external device.

Refer to *Installation* for instructions on wiring these interlocks, and *Specifications* for the relay contact conditions during fault, major fault, and fire alarms.

### Reset Switch

The DET. HEAD RESET switch is a three-position momentary selector switch. Use the switch to reset the detector heads after correcting a fault. Move the switch to the left to reset detector head 1. Move the switch to the right to reset detector head 2.

## *Detector Heads*

See Figure 2.

A detector head consists of an air shield (1), sensor module (2), electronics module (3), housing (4), and connector board (not shown) mounted in the housing.
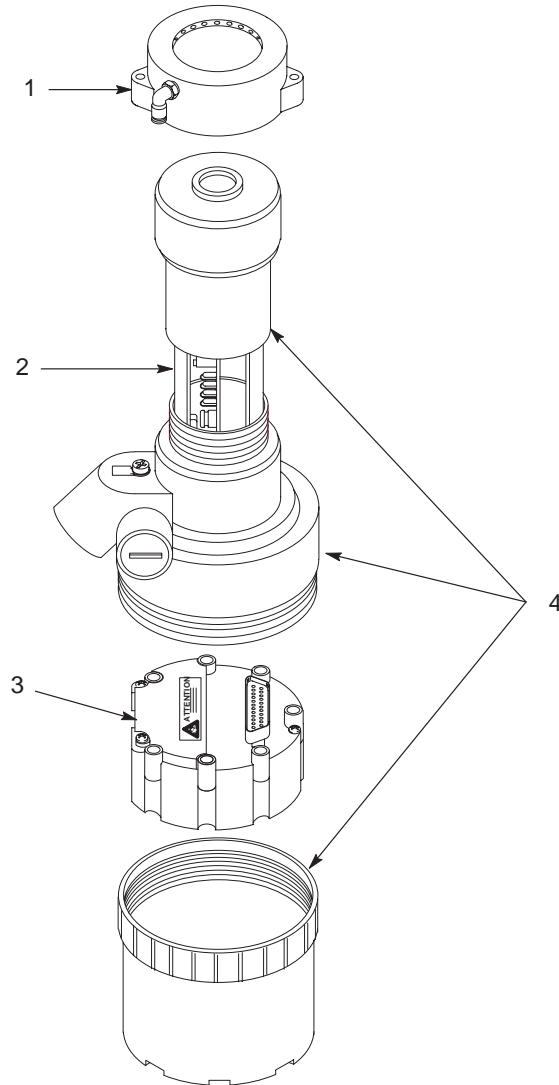


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Figure 2    Detector Head Components

1. Air shield
2. Sensor module
3. Electronics module
4. Housing

A DIN connector mounted on the electronics module plugs into the connector board in the housing.

The detector heads scan the IR spectrum.  They use intelligent, real-time signal processing to tell the difference between a real fire and false-alarm radiant energy sources.

Each detector head continuously monitors itself via a through-the-lens test. Two clear (white) LEDs on the top of the sensor module light to run the test. If the test fails, the detector head goes into fault mode and the amber fault indicator on the panel lights.

Each detector head also has two red power LED indicators, visible through the lens.  The detector head lens is continuously cleaned by low-pressure air flowing from the air shield.

# *Theory of Operation*

Power is supplied to the indicator panel from the booth electrical panel.  The indicator panel supplies 24 Vdc power to the detector heads.

## Flame Detection

If a flame is detected inside the booth, interlock relays in the indicator panel open and shut down the booth exhaust fan, application equipment, and conveyor.  The red FIRE DETECTED indicator lights and the FIRE DETECTED alarm sounds.

## Faults

The DET. HEAD FAULT indicators and and the FAULT DETECTED alarm alert operators to problems with the detector heads.  There are two fault modes:

**Fault:**  A fault occurs when one detector head loses power, fails a through-the-lens test, or has a sensor or electronics module malfunction. The fault indicator for that detector head lights and the fault alarm sounds. No interlocked equipment is shut down if two detector heads are installed and only one has a fault.  If only one detector head is installed, then any fault is a major fault.

**Major Fault:**  A major fault occurs when both detector heads lose power, fail a through-the-lens test, or have a sensor or electronics module malfunction.  Both fault indicators light and the fault alarm sounds.  If only one detector head is installed, then any fault is a major fault.  A major fault shuts down the booth and application equipment.  The conveyor will continue to run.  The conveyor shuts down only if a flame is detected.
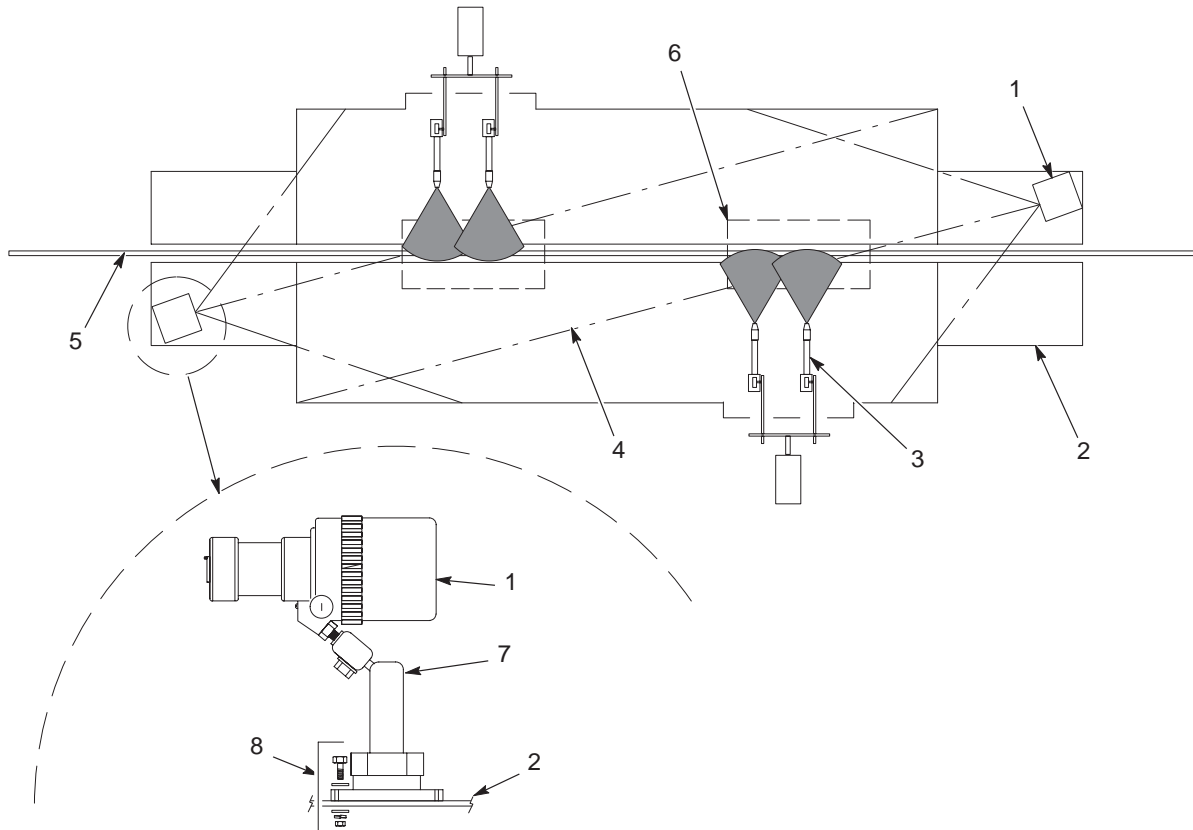
# Installation

⚠ **WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

## *Mounting*

See Figure 3.

1.  Measure and mark the locations in the booth entrance and exit vestibules (2) for the detector heads (1).

2.  Mount the detector heads to the spray booth entrance and exit vestibule walls or floors, using the mounting brackets (7) and screws, flat washers, lock washers, and nuts (8).

3.  Align the detector head centerlines (4) so they have an unobstructed view of the spray guns (3), conveyor (5), hangers, and workpieces (6). Each detector head has an 80-degree, cone-shaped field of view.

4.  Mount the indicator panel close to or on the booth electrical panel or on an operator platform using the mounting holes on the panel flanges.

Figure 3    Detector Head Installation

1. Detector heads
2. Booth vestibules
3. Spray guns
4. Centerlines
5. Conveyor
6. Hangers and workpieces
7. Mounting bracket
8. Screws, flat washers, lock washers, and nuts

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## *Pneumatic Connections*

See Figure 4.

Install a 0.7-bar (10-psi) fixed-pressure regulator for each detector head.

1. Install the regulator(s) (4) on the booth as close as practical to the detector head (2).

2. Install 6-mm air tubing (5) between the regulator input port(s) and the system air supply.

3. Install 6-mm air tubing (3) between the regulator output port(s) and the air shield input port(s).
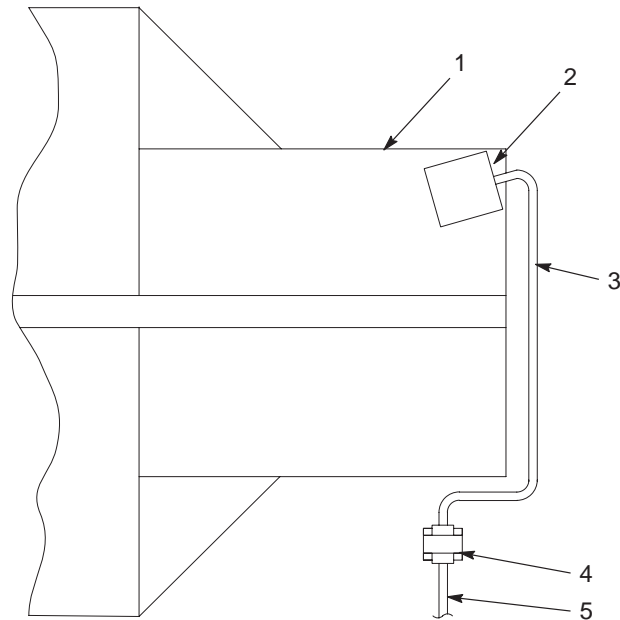
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Figure 4    Detector Head Pneumatic Connections

1. Vestibule
2. Detector head
3. 6-mm air tubing to air shield
4. Regulator
5. 6-mm air tubing to system air supply

## *Electrical Connections*

⚠ **WARNING:**  All electrical connections must be made according to local or national electrical codes.  Use properly sized wire and approved conduit and fittings.  Failure to observe this warning could result in property damage or personal injury.
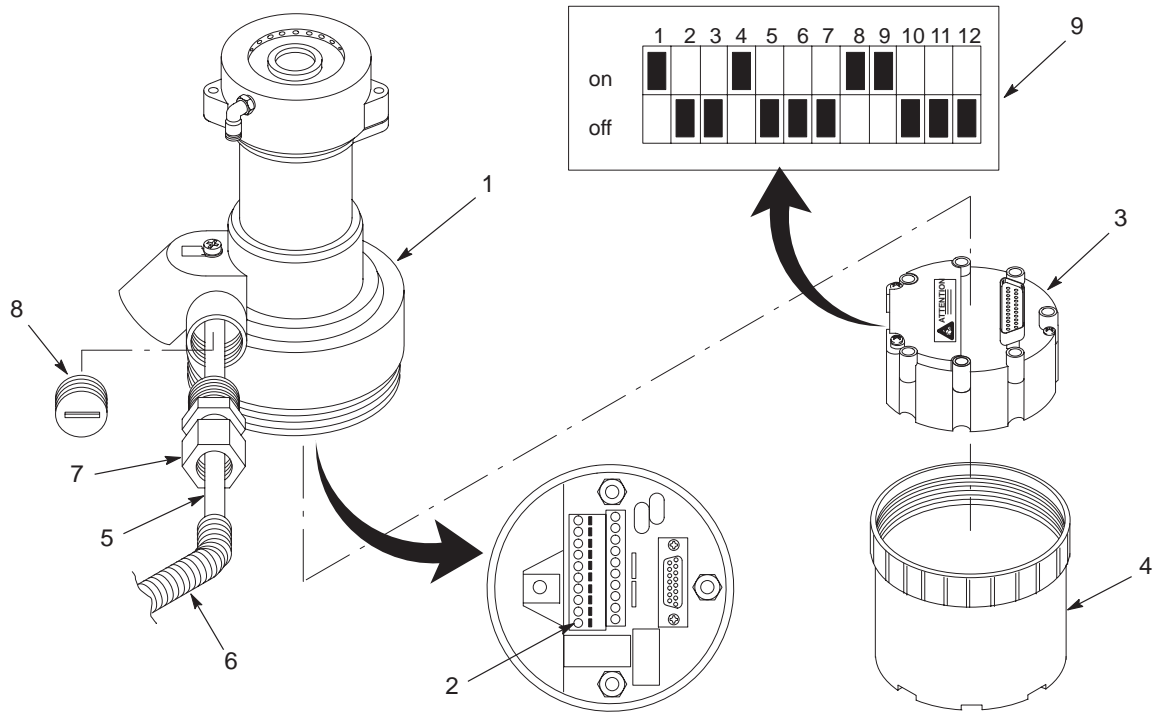
### Detector Heads

Connect the detector heads to the indicator panel with 7-wire shielded cable, flexible or rigid conduit, and liquid-tight conduit fittings.

See Figure 5.

1.  Unscrew the upper housing (1) from the lower housing (4).

2.  Loosen the mounting screws and unplug the electronics module (3) from the connector board in the upper housing.

3.  Remove one of the plugs (8) from the upper housing, and install a $3/_4$-in. NPT liquid-tight conduit fitting (7) in the open port.

4.  Connect conduit (6) to the fitting.  Route the cable (5) through the conduit and fitting and into the upper housing.

5.  Connect the cable wires to the terminal block (2) and the detector head ground.  See Figure 6 for connections.

6.  See Figure 5.  Set the configuration switches (9).

7.  Plug the electronics module back into the connector board.  Tighten the electronics board mounting screws.

8.  Screw the upper housing on the lower housing.

9.  Install a liquid-tight conduit fitting into a knockout in the bottom of the indicator panel and secure the conduit to the fitting.

10. Connect the cable wires to the indicator panel terminal block as shown in Figure 6.

## Detector Heads *(contd)*



Figure 5     Detector Head Electrical Connection

1. Upper housing
2. Terminal  block
3. Electronics module

4. Lower housing
5. Cable
6. Conduit

7. Conduit fitting ($^3/_4$-in. NPT)
8. Plug
9. Configuration switches

### Interlocks

**NOTE:**  All interlock relays are rated for 120–240 Vac, 10A.

Connect interlock wiring as shown in Figure 6.

1. Wire the booth interlock terminals so that the booth and application equipment will be shut down when the fire interlock relay opens.

2. Wire the conveyor interlock to the normally open or normally closed relay contacts.

3. If desired, wire a customer-supplied device such as a remote alarm to the customer-use terminals.  Use either the normally open or the normally closed contacts.

**NOTE:**   Refer to *Interlock Relay Contact Conditions* for contact operating states

## Power Supply

See Figure 6.

Supply 120–240 Vac, 1phase, 50/60 Hz, 2A electrical service to the indicator panel from the booth electrical panel, using 3-wire cable, flexible or rigid conduit, and liquid-tight conduit fittings. Connections must be made so that power is supplied to the indicator panel as long as the booth electrical power is turned on.
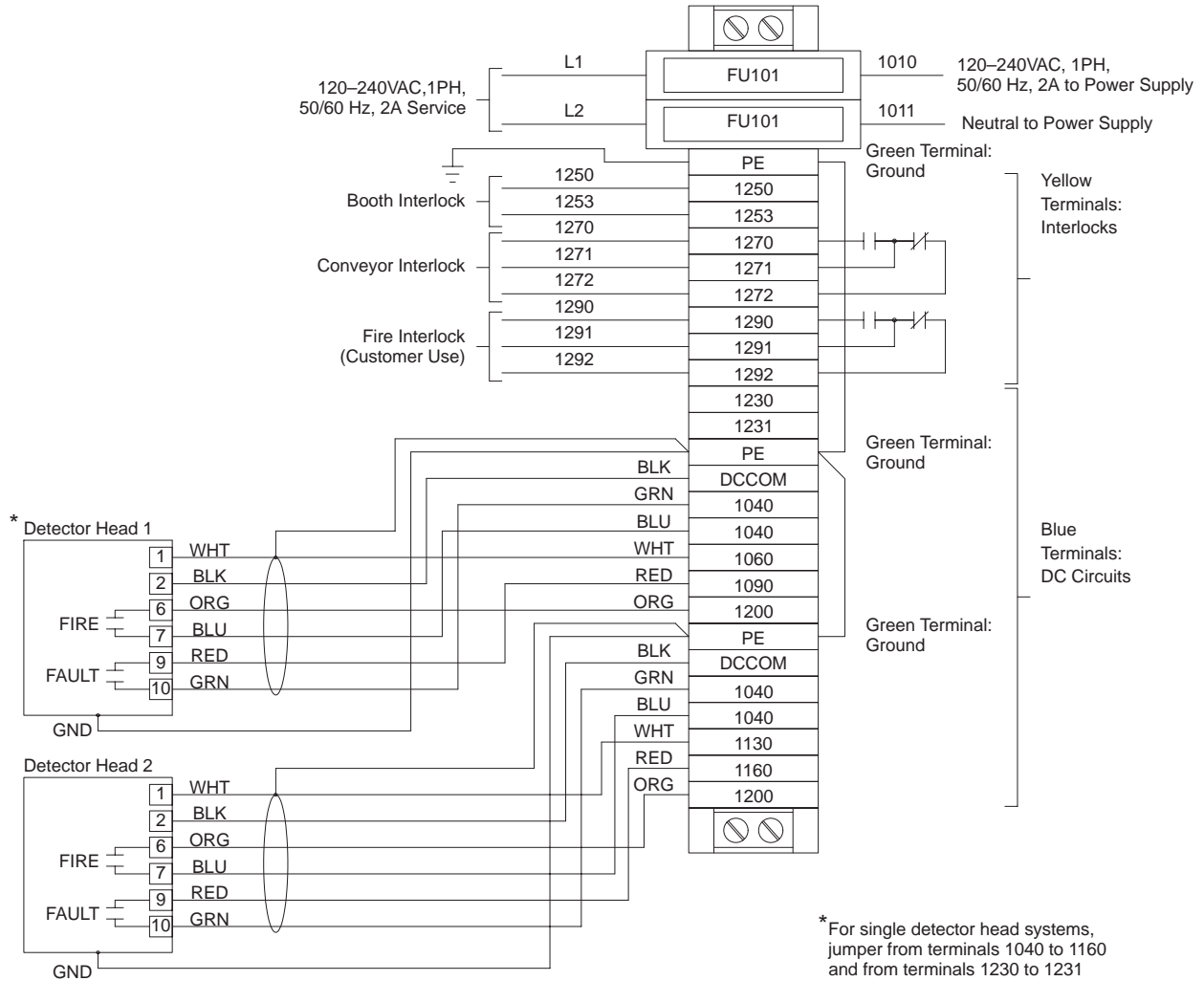


Figure 6    Installation Wiring Diagram

# Operation

> ⚠ **WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

## *Startup*

Turn on power to the powder coating system.

- The green POWER ON indicator on the indicator panel will light.
- The FAULT indicators will light then shut off if there are no faults.
- The red FIRE DETECTED indicator will stay off.

## *Normal Mode*

In normal operating mode, the

- green POWER ON indicator is on.
- amber FAULT and red FIRE DETECTED indicators are off.
- red LEDs on the detector heads blink once every 5 seconds.
- interlocked equipment can be started.

## *Fault Mode*

In fault mode,

- the amber DET. HEAD FAULT indicator corresponding to the faulted detector head lights.
- the FAULT DETECTED alarm turns on (continuous tone).
- all interlocked equipment continues to run.

> ⚠ **WARNING:** Immediately correct any condition that causes a fault or major fault. Do not operate the coating system with the flame detector shut down or bypassed, or with a malfunctioning flame detector component.

The system indicates a fault if a

- detector head loses power,
- through-the-lens test fails, or
- sensor or electronics module malfunctions.

**NOTE:** If only one detector head is installed, any fault is treated as a major fault. The booth interlock opens, shutting down the booth and application equipment.

When the fault is corrected, the fault indicator turns off and normal mode resumes.

## Major Fault Mode

The system goes into major fault mode when faults are detected in both detector heads, preventing the detection of a fire.

⚠ **WARNING:** Immediately correct any condition that causes a fault or major fault. Do not operate the coating system with the flame detector shut down or bypassed, or with a malfunctioning flame detector component.

In major fault mode,

- both amber DET. HEAD FAULT indicators light.
- the FAULT DETECTED alarm turns on (continuous tone).
- the booth fire interlock opens, shutting down the booth and application equipment.
- the conveyor continues to run.

**NOTE:** If only one detector head is installed, any fault is treated as a major fault.

When the fault is corrected, the fault indicator(s) and alarm turn off and Normal mode resumes.

## Fire Mode

When a fire is detected,

- the red FIRE DETECTED indicator turns on.
- the FIRE DETECTED alarm turns on (fast intermittent tone).
- booth and conveyor interlock relays open. The booth, application equipment, and conveyor will shut down.
- fire interlock contact (customer use) changes state. Customer use equipment is either activated or deactivated, depending on use.

## Reset

To reset a detector head after a fault has been corrected, move the DET. HEAD RESET switch toward the appropriate detector head fault indicator, then release it.

## Through-the-Lens Test

The detector heads automatically perform periodic through-the-lens tests to check their operation. If a test fails, the detector head goes into fault mode. Refer to *Troubleshooting* for diagnostic and correction procedures.

## *Optional Test Lamp*

An optional test lamp can be used to test the ability of the flame detector to detect and warn of a fire in the spray booth.  The test lamp produces light with the same frequencies as the light produced by a fire.  The test lamp must be placed very close to the detector and waved back and forth slightly to initiate a response.  Refer to *Parts* for the part number.

# Maintenance

⚠ **WARNING:**  Allow only qualified personnel to perform the following tasks.  Follow the safety instructions in this document and all other related documentation.

⚠ **WARNING:**  Keep the detector head lenses clean.  Dirty lenses can prevent the detector heads from detecting a fire in the booth.   Failure to observe this warning could result in property damage or personal injury.

**NOTE:**  Keeping the lenses clean will prevent nuisance fault alarms or shutdowns.  A dirty lens can cause a through-the-lens test to fail, triggering a fault.  If only one detector head is installed, a fault will shut down the coating system during production.

## *Daily*

Check the detector head lenses daily.  If they are dirty, clean them with an approved low-pressure air gun or an oil- and silicone-free cloth.  If necessary, dampen the cloth with ethyl alcohol.  Do not use a silicone-based product such as commercial window cleaner to clean the detector head lenses.

**NOTE:**  If the detector head lenses are covered with powder overspray, check the air supply to the air shields.  Air should be supplied at 0.7 bar (10 psi).  Make sure the air shield orifices are not clogged.

## *Periodic*

Periodically, check all electrical connections.  Tighten any loose terminals.  Replace any wiring that has worn or damaged insulation.  Make sure conduit fittings are tight.

# Troubleshooting

⚠️ **WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

⚠️ **WARNING:** Hazardous voltages are present inside the indicator panel when booth power is on. Do not touch exposed terminals or wiring when checking voltages. Use insulated tools. Failure to observe could result in severe shock and personal injury.

## *Troubleshooting Chart*

Use the following chart to isolate and correct problems with the flame detector.

| Problem | Possible Cause | Corrective Action |
|---|---|---|
| **1. Detector fault** | Through-the-lens test failed | Make sure the detector lens is clean. If powder is accumulating on the lenses, check the air supply to the air shields. Reset the detector head if the fault continues. |
| | Detector head lost power, or sensor or electronics module malfunctioned | Check the red detector head LEDs. When operating normally, the LEDs should blink every 5 seconds. |
| | | If the LEDs are not blinking, check the wiring between the indicator panel and the detector. There should be 24 Vdc between pins 1 and 2 at the detector. |
| | | • If 24 Vdc is present, make sure the electronics module is securely connected to the connector board and that the connector board harness is connected to the sensor module. If all connections are secure, replace the electronics module. |
| | | • If 24 Vdc is not present, make sure green POWER ON indicator on the indicator panel is on. If the indicator panel has power, repair or replace the wiring between controller and detector. |
| **2. No power (green POWER ON indicator on indicator panel is off)** | Blown fuse in indicator panel | Check the fuses on the terminal block. Replace if necessary with 2A fuses. |
| | Faulty wiring to booth electrical panel | See Figure 6. Check for the correct voltage at the L1 and L2 terminals on the indicator panel terminal block. If the correct voltage is present, refer to next Possible Cause. If the correct voltage is not present, repair or replace the supply wiring. |
| | Indicator panel dc power supply failed | Check for 24 Vdc at terminals 1040 and DCCOM on the indicator panel terminal block. If 24 Vdc is not present, replace the power supply. |

## *Electrical Schematic*

See Figure 7.
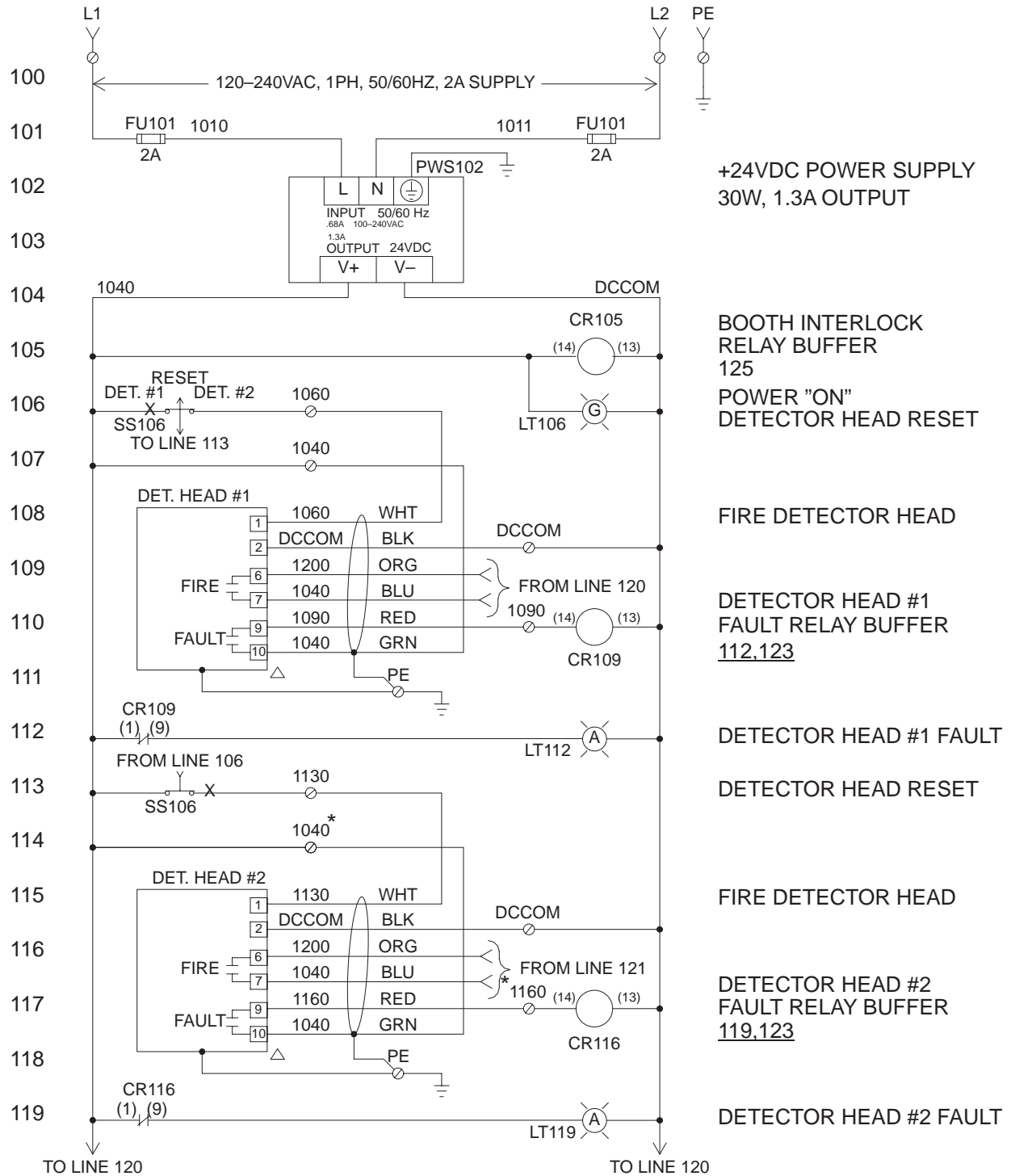


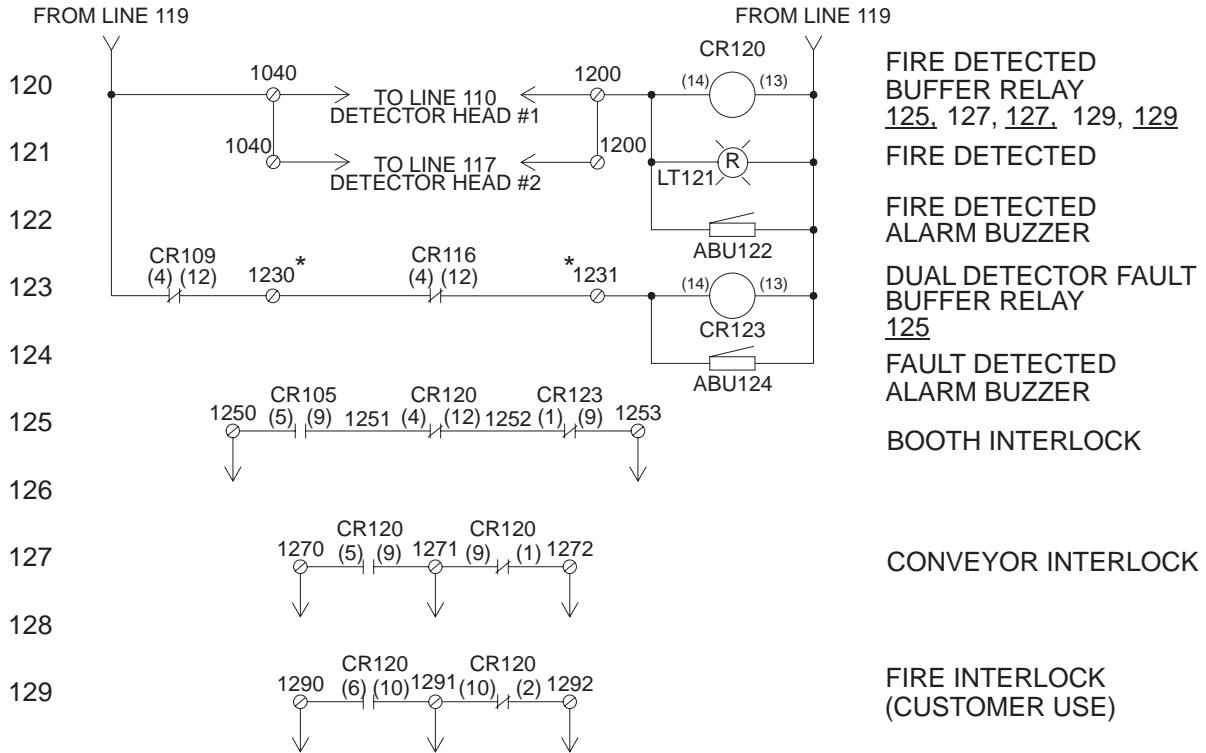Figure 7    Indicator Panel Electrical Schematic (1 of 2)

## *Electrical Schematic* *(contd)*





\* FOR SINGLE DETECTOR HEAD SYSTEMS,
   JUMPER FROM TERMINALS 1040 TO 1160 AND
   FROM TERMINALS 1230 TO 1231

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Figure 7    Indicator Panel Electrical Schematic (2 of 2)

# Repair

⚠ **WARNING:** Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

⚠ **WARNING:** Disconnect and lock out electrical power before servicing.

## *Sensor and Electronics Module Replacement*

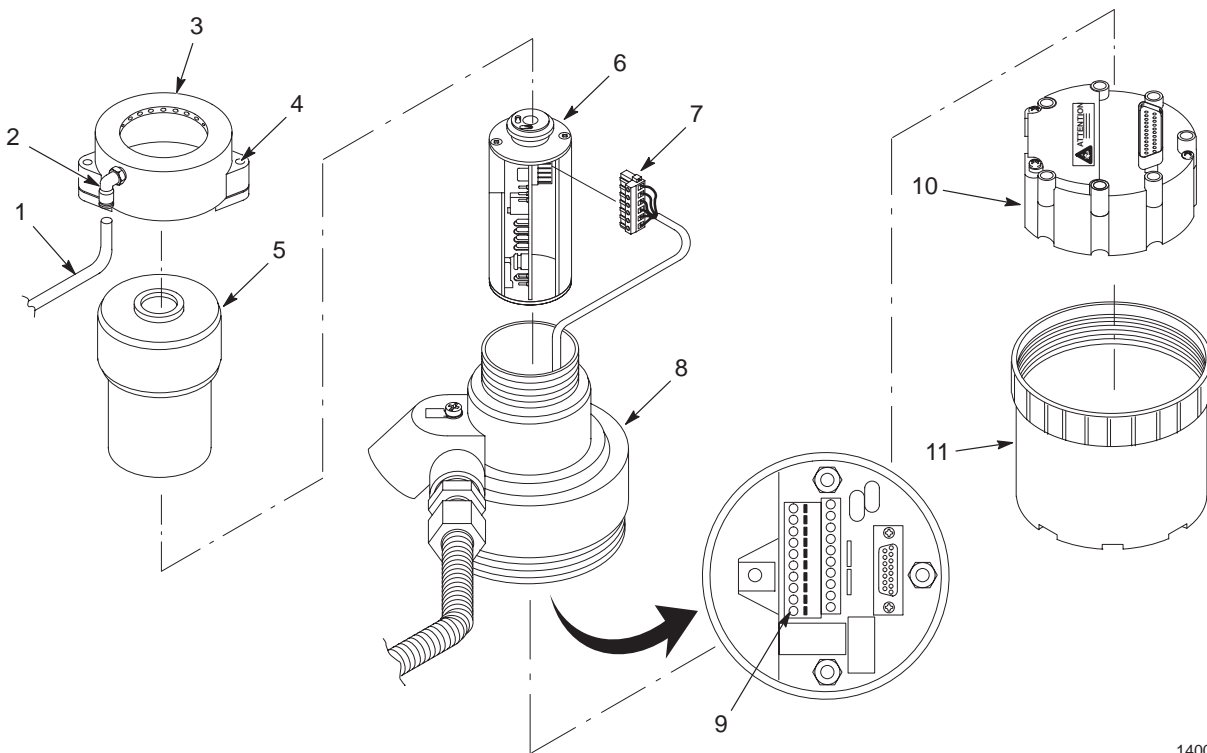### Removing the Old Sensor and Electronics Modules

See Figure 8.

1. Turn off power to the detector heads by turning off power to the system.

2. Disconnect the air tubing (1) from the air fitting (2).

3. If desired, loosen the socket-head screws (4) and remove the air shield (3) from the sensor housing (5).

4. Unscrew the sensor housing from the upper housing (8).

5. Disconnect the harness connector (7) from the sensor module (6), and remove the sensor module from the upper housing.

6. Unscrew the lower housing (12) from the upper housing.

7. Loosen the mounting screws and unplug the electronics module (11) from the connector board (not shown) in the upper housing.

## Installing the New Sensor and Electronics Modules

1. Set the configuration switches. See Figure 5 for settings.

2. See Figure 8. Plug the electronics module (10) DIN connector into the socket on the connector board in the upper housing (8). Secure in place by tightening the mounting screws.

**NOTE:** Apply molybdenum disulfide grease to the lower housing and sensor housing threads to prevent galling or binding.

3. Screw the lower housing (11) into the upper housing.

4. Connect the harness connector (7) to the sensor module (6) and place the sensor into the upper housing, making sure it is aligned properly.

5. Install the sensor housing (5) over the sensor. Screw the sensor housing onto the upper housing.

6. If removed, install the air shield (3) onto the sensor housing. Tighten the socket-head screws (4) to secure it to the sensor housing.

7. Connect the air tubing (1) to the air fitting (2).



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Figure 8     Sensor and Electronics Module Replacement

| | | |
|---|---|---|
| 1. Air tubing | 5. Sensor housing | 9. Terminal block |
| 2. Air fitting | 6. Sensor module | 10. Electronics module |
| 3. Air shield | 7. Harness connector | 11. Lower housing |
| 4. Socket-head screws | 8. Upper housing | |

# Parts

To order parts, call the Nordson Customer Service Center or your local Nordson representative.  Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

## *Using the Illustrated Parts List*

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list.  The code NS (not shown) indicates that a listed part is not illustrated.  A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number.  A series of dashes in this column (- - - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate.  Indentions show the relationships between assemblies, subassemblies, and parts.

| Item | Part | Description | Quantity | Note |
|:---:|:---:|:---|:---:|:---:|
| — | 0000000 | Assembly | 1 | |
| 1 | 000000 | • Subassembly | 2 | A |
| 2 | 000000 | • • Part | 1 | |

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly.  The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list.  Notes contain important information about usage and ordering.  Special attention should be given to notes.

## *Detector Head*

See Figure 9.

| Item | Part | Description | Quantity | Note |
|------|------|-------------|----------|------|
| 1 | 341561 | Shield, air, U7698E | 1 | |
| 2 | 341560 | Bracket, mounting, U7698E | 1 | |
| 3 | 341559 | Detector, flame, U7698E | 1 | |
| 4 | 341565 | • Module, IR, spare, U7698E | 1 | |
| 5 | 341562 | • Module, electronic, U7698E | 1 | |
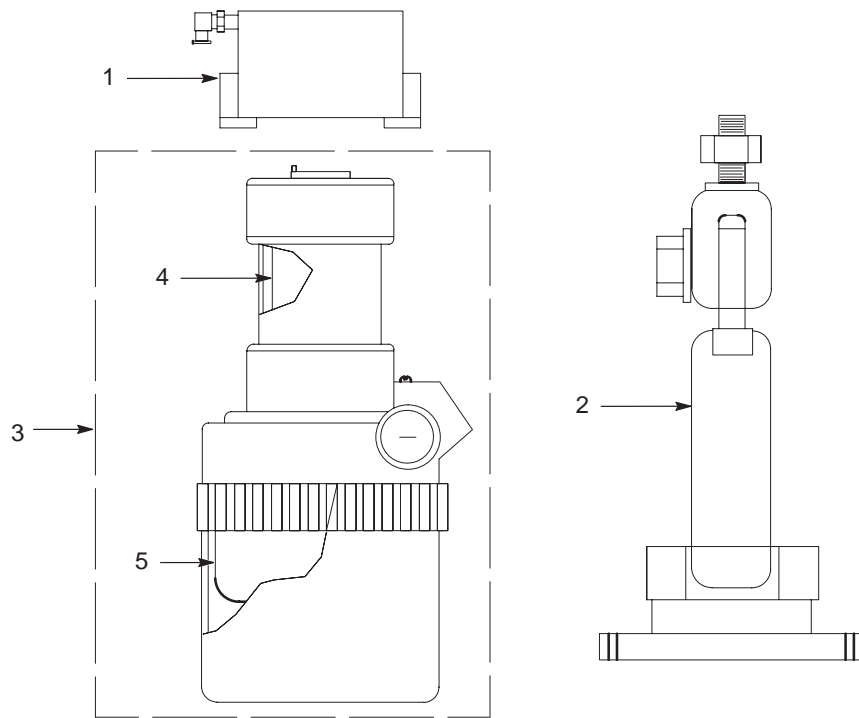
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Figure 9     Detector Head Parts

## *Indicator Panel*

See Figure 10.

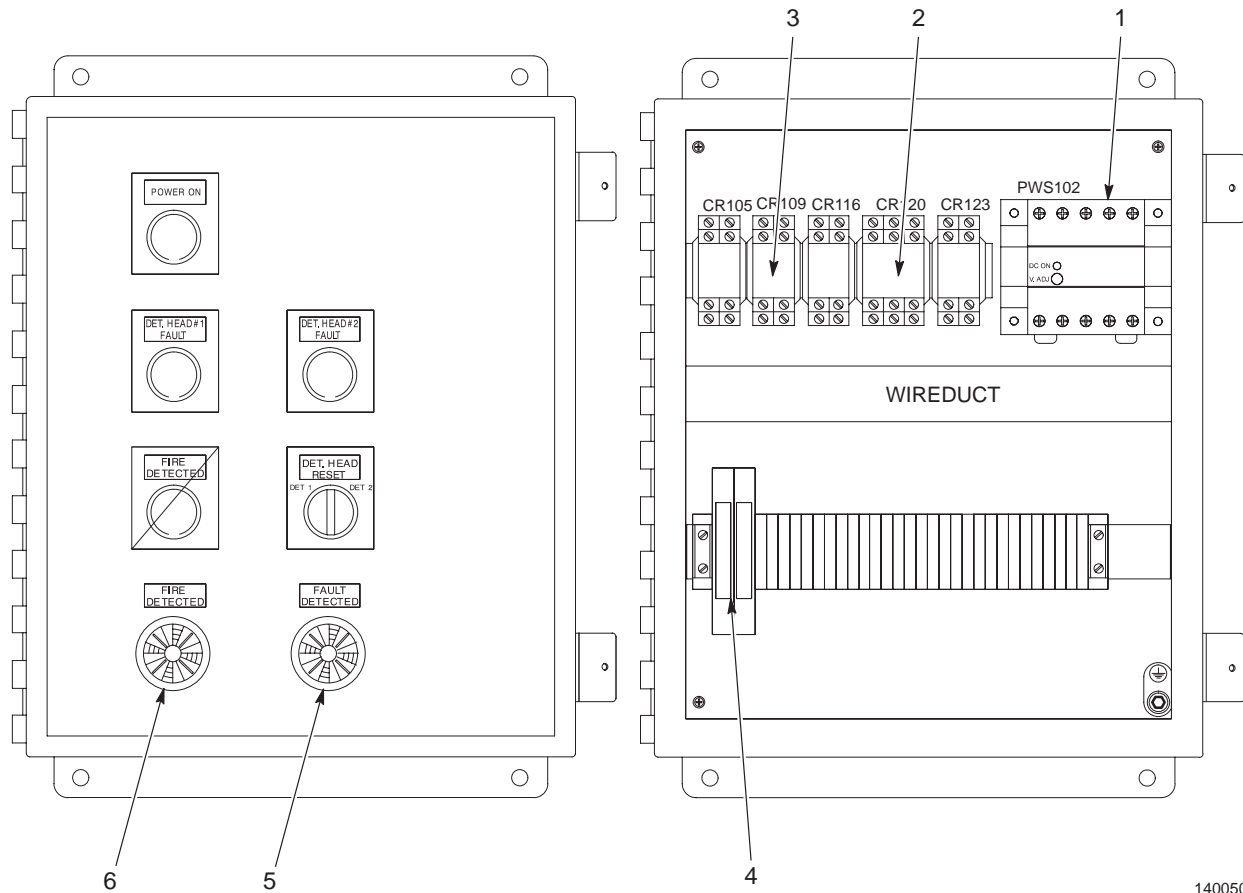| Item | Part | Description | Quantity | Note |
|:---:|:---:|:---|:---:|:---:|
| — | 307445 | Panel, indicator | 1 | |
| 1 | 341361 | • Power supply, 24 V | 1 | |
| 2 | 332222 | • Relay, control, 3-pole | 1 | |
| 3 | 332223 | • Relay, control, 2-pole | 4 | |
| 4 | 939267 | • Fuse, fast-acting, 250 V, 2 A, 0.25 x 1.25 in. | 2 | |
| 5 | 332227 | • Alarm, piezo, fault, continuous | 1 | |
| 6 | 332226 | • Alarm, piezo, fire, intermittent | 1 | |



Figure 10    Indicator Panel Parts

# Options

Options must be ordered separately.

## *Test Lamp*

See Figure 11.

| Part | Description | Note |
|---|---|---|
| 341566 | Lamp, test, U7698E | |
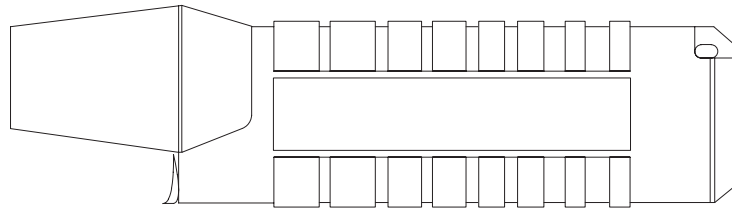


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Figure 11    Test Lamp

## *Air Supply Parts*

Use these parts to supply air to the air shields.

| Part | Description | Note |
|---|---|---|
| 249467 | Regulator, fixed, 10 psi | |
| 900730 | Tubing, 0.25 x 0.040 in., polyurethane, blue | |
| 900742 | Tubing, 6-mm OD, polyurethane, blue | |

# Specifications

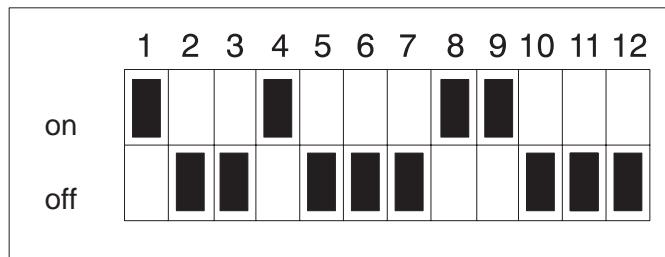This section includes specifications for the Nordson U7698E flame detector.

## *Detector Head Terminal Block Connections*

Table 1  Detector Head Terminal Block Connections

| Pin | Function |
|-----|----------|
| 1 | +24 Vdc |
| 2 | dc Common |
| 6 | Fire Relay (N.O.) |
| 7 | Fire Relay (Com) |
| 9 | Fault Relay (N.O.) |
| 10 | Fault Relay (Com) |

## *Configuration Switch Settings*

See Figure 12.



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Figure 12    Configuration Switch Settings

## *Interlock Relay Contact Conditions*

Table 2  Interlock Relay Contact Conditions

| Interlock | Terminal | Condition | | | | |
|---|---|---|---|---|---|---|
| | | **No Power** | **Normal Operation** | **Fault** | **Major Fault** | **Fire Alarm** |
| Booth | 1250–1253 | ○ | ● | ● | ○ | ○ |
| Conveyor | 1272–1271 | ● | ● | ● | ● | ○ |
| | 1271–1270 | ○ | ○ | ○ | ○ | ● |
| Customer Use | 1292–1291 | ● | ● | ● | ● | ○ |
| | 1291–1290 | ○ | ○ | ○ | ○ | ● |
| ● = Closed contact | | | | | | |
| ○ = Open contact | | | | | | |
| **NOTE:** All relays are rated at 120–240 Vac, 10A. | | | | | | |

## *Weight and Dimensions*

**Indicator Panel**

Height:             304.8 mm (12 in.)

Width:             254 mm (10 in.)

Depth:             127 mm (5 in.)

**Detector Head (Including Air Shield)**

Height:             229 mm (9 in.)

Diameter:          114 mm (4.5 in.)

## *Electrical Power*

**Indicator Panel**

Input voltage:      100–240 Vac, 1 A, 1 phase 50/60 Hz

**Detector Heads**

Input voltage:       24 Vdc