

# Pneumatic Indicating Relay

## Model 2400D

### Typical applications

- Pneumatic control panels
- First-out indication
- Safety sequencing systems
- Fail safe systems

### Key features and benefits

- Pinpoints trouble
- Field proven
- Wide operating pressure range
- Simple maintenance
- One moving part
- Corrosion resistant gulfproofed finish



**Model 2400D**

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# Pneumatic Indicating Relay - Model 2400D

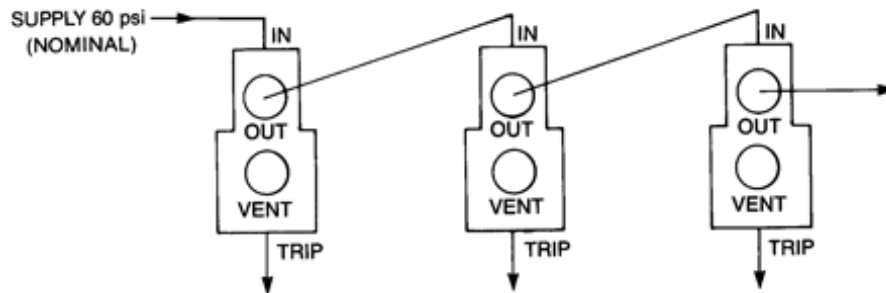
## Overview

The AMOT Model 2400D Pneumatic Indicating Relay pinpoints trouble and instantly provides easily visible trip indication. The first-out indication is held indefinitely which saves time and reduces maintenance cost. Field proven durability has made this indication relay the industry standard pneumatic panel relay for over thirty years.

Developed to withstand the rigorous conditions experienced in diesel and gas engine operation environments, the 2400D has proven highly reliable in turbine pump and demanding process applications. Gulfproofed (corrosion resistant) finish is standard for increased resistance to seacoast or other corrosive environments.

## Operation

**Figure 1 - typical piping of AMOT 2400D indicating relays**



Usually one 2400D relay is connected to each condition sensing device as shown in figure 1. The sensing devices are normally closed 2- or 3-Way valves which detect undesirable temperatures, vibration, liquid levels, etc. Sensing valves are connected to the TRIP Port in each relay, and pressure is introduced at the IN Port. If the particular parameter is in a "Run" or satisfied condition, and the sensing valve is closed, pressure will feed through the internal orifice to the large end of the piston and force it into the "Green" or safe position. Pressure is also directed through to the OUT Port which is normally piped to the IN Port of the next relay.

When a fault condition arises, the valve sensing that condition opens, causing a loss of pressure at the large end of the piston and allowing pressure on the small end to move the piston to the "Red" or tripped position. The OUT Port connects with the VENT Port through specially formed vent grooves and all pressure down stream is released to the VENT Port as the IN Port is closed off from the OUT Port. This loss of pressure can be used to close fuel valves, actuate audible alarm devices or operate remote signal devices or switches. Any indications existing at the moment will be held indefinitely. The unique Red and White "Trip" tape, selected by optical specialists, can be clearly seen at a distance even in poor light or by those with impaired color vision. An operator can check the 2400D relay panel at any time and tell immediately what caused the trouble.

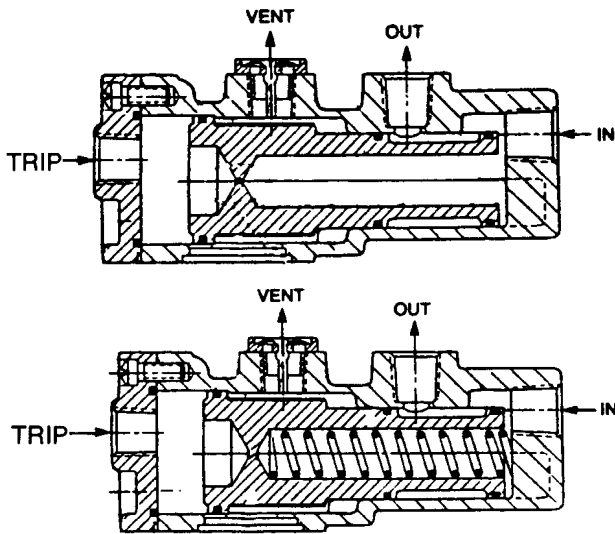
When a 2400D Relay systems is reset, most relays will momentarily move to the tripped (Red) position, and then back to the safe (Green) position as the lines to the sensing valves are pressurized. Only when sensor lines are very short will this not occur. This action will be quite pronounced in some systems and is an indication that the Relay is performing properly. If all sensing valves are healthy or satisfied on start-up, all relays will be "Green". Should a condition not be satisfied, its relay will stay "Red". Most systems have certain functions that are unsatisfied on start-up. These functions are locked out by pneumatic time delays or other means to allow the rest of the system to function normally.

In most cases, only one Relay will show "Red" on a shutdown in a properly designed system. However, if two or more malfunctions should occur with in split second of each other, both Relays may go "Red". A correct system will be designed so that an intentional or normal shutdown will leave the Relays all "Green".

Type 2400D with spring return is suggested when a relay and pressure indicator is required, having an automatic return to "Red" on loss of pressure. It has a return spring and no orifice, thus the TRIP Port is isolated from the other ports. When an indicator for pressure only is desired, AMOT Model 4101 should be ideal as it matches the panel-front appearance of the 2400D's.

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## Application



Model 2400D relays can be used in many different ways in control and warning systems but their most common application is for tripping a safety system and indicating the cause. The control system is powered by clean dry air or gas at moderate pressure, making an ideal arrangement for hazardous duty locations. Utilizing pneumatically operated mechanical components not only eliminates most of the undesirable features of electric systems, but also makes possible truly Fail-Safe applications. With 2400D's, a safety system can warn of impending trouble, or shut down an operation and still show the cause of trouble even if control pressure has been lost or cut off. With a pneumatic system, maintenance and trouble shooting may be performed by less specialized personnel.

## Installation *(refer to diagram on page 6)*

- The Model 2400D is suitable for horizontal or vertical mounting in panels 4.75 mm ( $\frac{3}{16}$ " ) thick.
- To install, remove the two phillips head machine screws ⑤ and the bezel ④. The window ② and the window seal ③ should remain in the body.
- Place the relay against the back of the panel, put the bezel in the panel hole and replace the machine screws.
- Tighten the panel jack screws until the relay is held firmly in the panel.
- A high quality polyethylene tubing is recommended for use wherever possible for system connection, and must not be less than  $\frac{1}{4}$ " O.D. Supply pressure tubing should be  $\frac{3}{8}$ " minimum.
- Apply a quality thread sealant such as Loctite™ Pipe Sealant or Teflon thread tape to the threaded connections. Make sure that excess tape, sealant, dirt or tubing chips do not enter the relay.
- The Model 4125 vent closure that is shipped installed in the vent port may be removed if the vents are to be piped to a common vent header.
- Relay systems should always be designed so that a loss of pressure will initiate a shutdown. This assures that any cut or loose tubing or connections will not be overlooked and negate the safety system. Also, some provision must be designed into the system to verify the functioning of devices that are locked out on start up and do not have an automatic reset.

## How to Order

Use the table below to select the unique specification of your 2400D Pneumatic Indicating Relay.

| Example                                  | 2400D | 16 | J | 3 | -AA  | Code description                         | Comments                             |
|--|-------|----|---|---|------|--|--------------------------------------|
|  |       |    |   |   |      | <b>Basic model (A)</b>                   |                                      |
| <b>Basic model (A)</b>                   | 2400D |    |   |   |      |  |                                      |
|  |       |    |   |   |      | <b>Port and conduit thread (B)</b>       |                                      |
| <b>Port and conduit thread (B)</b>       | 15    |    |   |   |      | Spring return NPT                        | Gulfproofed finish                   |
|  | 16    |    |   |   |      | Standard NPT                             |                                      |
|  |       |    |   |   |      | <b>Piston (C)</b>                        |                                      |
| <b>Piston (C)</b>                        |       |    | J |   |      | With orifice                             | For port and conduit thread (B) = 16 |
|  |       |    | E |   |      | Without orifice                          |                                      |
|  |       |    |   |   |      | <b>Seal material (D)</b>                 |                                      |
| <b>Seal material (D)</b>                 |       |    |   | 3 |      | Viton                                    |                                      |
|  |       |    |   |   |      | <b>Customer special requirements (E)</b> |                                      |
| <b>Customer special requirements (E)</b> |       |    |   |   | -AA  | Standard                                 | May be omitted                       |
|  |       |    |   |   | -*** | Made-to-order                            |                                      |

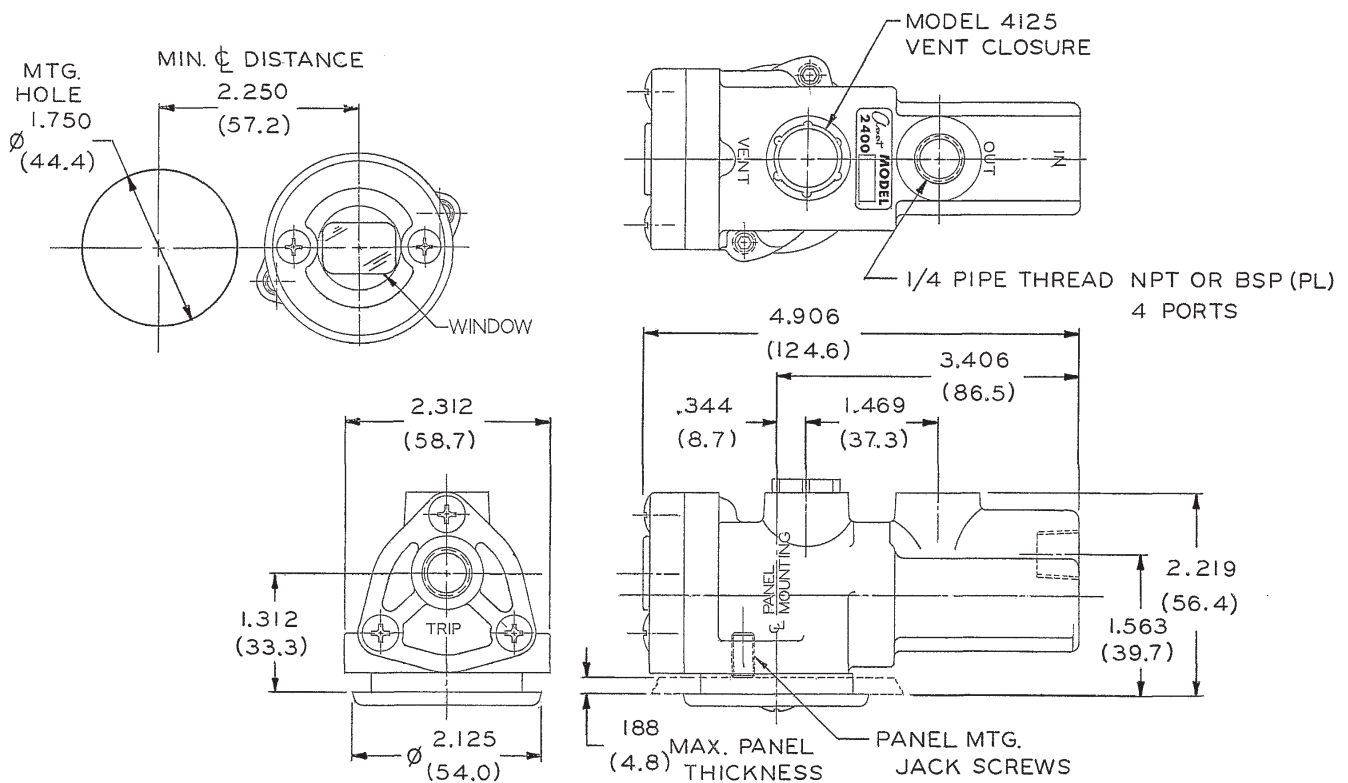
# Pneumatic Indicating Relay - Model 2400D

## Specification

|                                     |                  | Metric units  | English units |
|-------------------------------------|------------------|---------------|---------------|
| <b>Body and piston material</b>     | Aluminum         |               |               |
| <b>Standard seals</b>               | Viton            |               |               |
| <b>Window material</b>              | Acrylic          |               |               |
| <b>Bezel material</b>               | Nylon            |               |               |
| <b>Operating pressure</b>           |                  | 1.4 - 8.6 bar | 20 - 125 psi  |
| <b>Suggested operating pressure</b> |                  | 4.1 bar       | 60 psi        |
| <b>Flow coefficient</b>             | Relay valve      | Kv = 0.58     | Cv = 0.67     |
|                                     | Internal orifice | Kv = 0.015    | Cv = 0.017    |
| <b>Net weight</b>                   |                  | 0.34 kg       | 0.75 lb       |
| <b>Shipping weight</b>              |                  | 0.45 kg       | 1 lb          |

## Dimensions

Dimensions - inches (mm)



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## Maintenance and Service Parts

Over time, exposure to foreign chemicals, particulate matter and prolonged operation at extreme conditions may reduce the effectiveness of the indicating relay. At such time, AMOT Pneumatic Indicating Relays can be restored to original performance by installing an AMOT pneumatic indicating relay service kit. Service kits include all new seals and seal components required for normal maintenance.

***Periodic inspection, cleaning, o-ring replacement and lubrication is the only maintenance that these units should require.***

### How to order service kits

Service kits are available with seals required to service the valve.

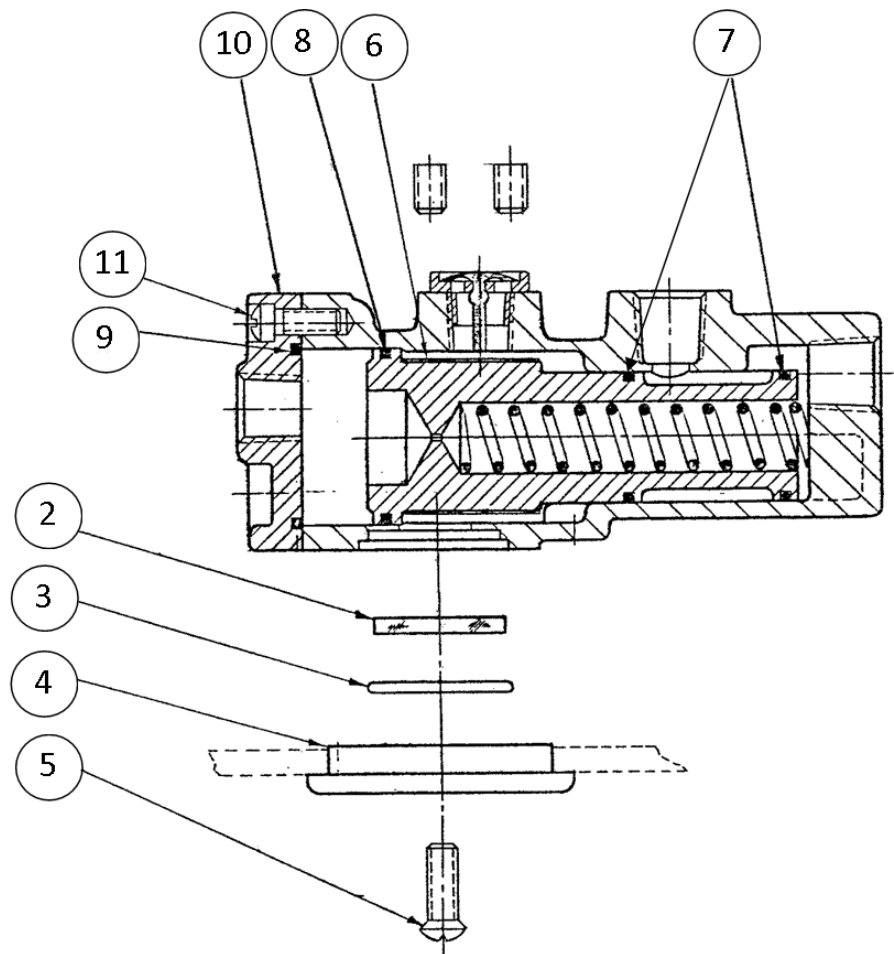
### Service parts

| Service kit parts |      |                   |
|-------------------|------|-------------------|
| Ref no.           | Qty. | Description       |
| 3                 | 1    | Window seal       |
| 7                 | 2    | Lower piston seal |
| 8                 | 1    | Upper piston seal |
| 9                 | 1    | Cover seal        |

2400D Relays have a snap-action initiated by loss of pressure on the TRIP Port end of the piston. If the unit is sluggish or fails to respond, check for foreign material, piston deformation, lack of o-ring lubrication, lack of sufficient air pressure etc. Also check the sensing device to assure proper operation.

AMOT designs and tests all its products to ensure that high quality standards are met. For good product life, carefully follow the installation and maintenance instructions; failure to do so could result in damage to the equipment being protected or controlled.

All 2400D Pneumatic Indicating Relays have the same service kit **9108X**.



# Pneumatic Indicating Relay - Model 2400D

## Contact

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#### **WARNING**

This product can expose you to chemicals including Lead, which is known to the state of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).