



# Model 2400 D

## Pneumatic Indicating Relay



### FEATURES

- PINPOINTS TROUBLE
- FIELD PROVEN
- WIDE OPERATING PRESSURE RANGE
- SIMPLE MAINTENANCE
- ONE MOVING PART
- CORROSION RESISTANT GULFPROOFED FINISH

### APPLICATIONS

- PNEUMATIC CONTROL PANELS
- FIRST-OUT INDICATION
- SAFETY SEQUENCING SYSTEMS
- FAIL SAFE SYSTEMS

**PINPOINTS TROUBLE** and instantly provides easily visible trip indication. The first-out indication is held indefinitely. This simplifies trouble shooting to save time and reduce maintenance costs.

**FIELD PROVEN DURABILITY** that has made this indicating relay the industry standard pneumatic panel relay for over thirty years. Originally developed to withstand the rigorous conditions experienced in diesel and gas engine operating environments, the 2400D has proven highly reliable in turbine pump and demanding process applications.

**WIDE OPERATING PRESSURE RANGE** allows the 2400D to be used in pneumatic systems having circuit pressure of up to 125 psi.

**SIMPLE MAINTENANCE** has been a key factor in the acceptance of the 2400D. The 2400D has only one moving part and all seals and o-rings on this sliding piston are easily accessible.

**GULFPROOFED** (corrosion resistant) finish is standard for increased resistance to seacoast or other corrosive atmospheres.

## OPERATION

Usually one 2400 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, pressures, 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 2400 Relay panel at any time and tell immediately what caused the trouble.

When a 2400 Relay systems is reset, most relays will momentarily move the "Trip" position, then back to the "Green" 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 within a 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".

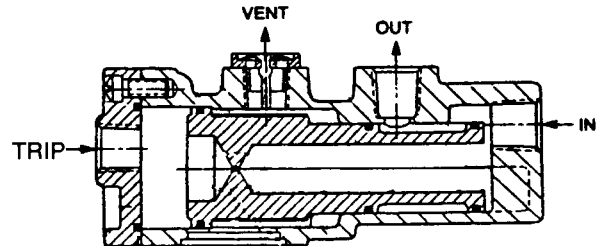
Type 2400D with spring return is suggested when a Relay and Pressure indicator is required, having an automatic return to "Red" on loss of pressure. It has a return spring and no orifice, thus the TRIP Port is isolated from the other ports. Then an indicator for pressure only is desired, AMOT Model 4101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

## APPLICATION

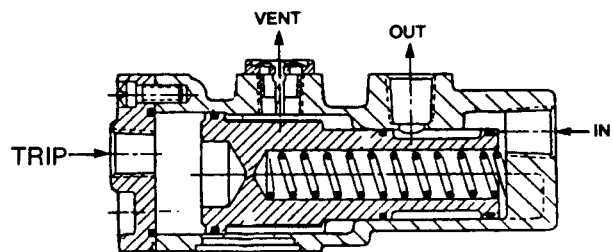
Model 2400D Relays can be used in many different ways in control and warning systems but their most common application is for tripping a safety systems and indicating the cause. The control system is powered by clean dry air or gas at moderate pressure, making an ideal arrangement for hazardous duty locations. Utiliz-

ing 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.

### 2400D (Standard)



### 2400D with Spring Return



## SPECIFICATIONS

Housing and Piston Material .....	Aluminum
Standard Seals .....	Viton
Window .....	Acrylic
Bezel .....	Nylon
Operating Pressure .....	20 to 125 psi (140-860 kPa)
Suggested Operating Pressure .....	60 psi (413 kPa)
Flow Coefficient - relay valve .....	Cv = 0.67
- internal orifice .....	Cv = 0.017
Net Weight .....	3/4 lb. (.34 kg)
Shipping Weight .....	1 lb. (.45 kg)

## HOW TO ORDER

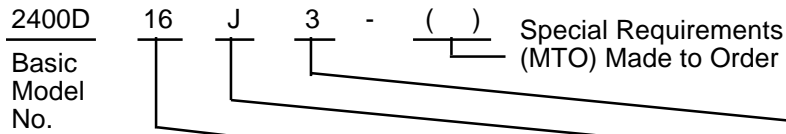
When ordering, please specify the following:

1. AMOT Model 2400D
2. Any of the following special features required:
  - a. Relay without orifice (was type DH)
  - b. Spring return relay without orifice (was type DB)
  - c. Reverse indication tape, Part No. 5808, to be installed by customer
  - d. BSP Parallel Port Threads (instead of NPT) available from U.K. factory only

This unit may be ordered using the full description as shown or by constructing a Model No. using the Model Code System. The complete Model No. for a standard unit with orifice, no spring return, NPT threads and Viton seals is 2400D16J3.

# MODEL CODE SYSTEM

NOTE: Letters and numbers in the MTO space, other than nothing, A1 or AA, indicate the unit is built to special requirements and some of the code numbers may not be valid. Check with the factory with full specifications of such models.

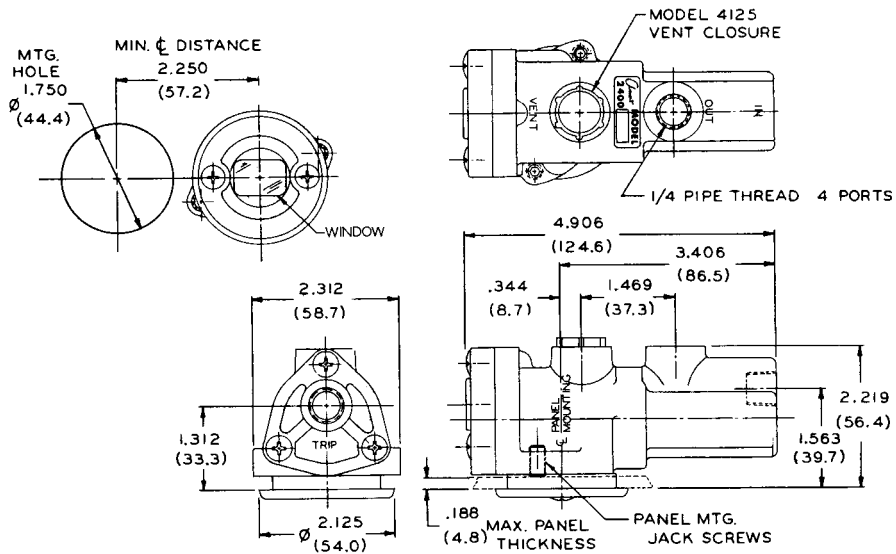


Description of Indicating Relay	TABLE A Port Thread, Conduit Thread		TABLE B Piston		TABLE C Seal Material
	Gulproofed Finish NPT	BSP (PL)*	With Orifice	Without Orifice	Viton
Standard (was Type D & DE)	16	32	J	E	3
with Spring Return (was Type DB)	15	31		E	3

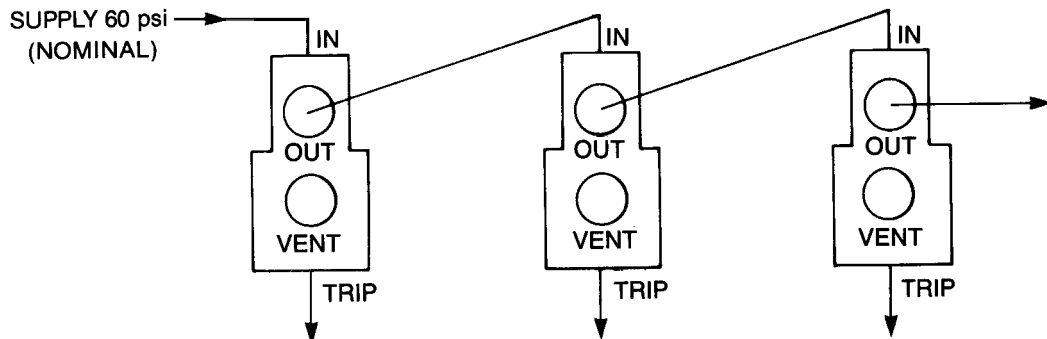
• Available from U.K. factory only.

= Non-Standard

## TYPICAL DIMENSIONS



## TYPICAL PIPING OF AMOT 2400D INDICATING RELAYS



## INSTALLATION

AMOT 2400D's are suitable for horizontal or vertical mounting in panels 3/16" (4.75 mm) thick. To install, remove the two phillips head machine Screws (5) and the Bezel (4). The Window (2) and the O-ring (3) should remain in the body. Place the relay against the back of the panel, put the Bezel (4) in the panel hole and replace the machine screws. Tighten the panel Jack Screws (12) 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 1/4" O.D. Supply pressure tubing should be 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 to 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.

## SERVICE PARTS

Ref. No.	Part No.	Qty.	Description
2	5702L001	1	Window
3	711	1	O-ring, Viton
4	7083L003	1	Bezel, Black
6	6087X004	1	Piston Assy, with Orifice
6	6087X003	1	Piston Assy, with out Orifice
-	5808	1	Red/Green Piston Tape
7	712	2	O-ring, Viton
8	713	1	O-ring, Viton
9	810L028	1	Seal
	911L001	A/R	Lubricant

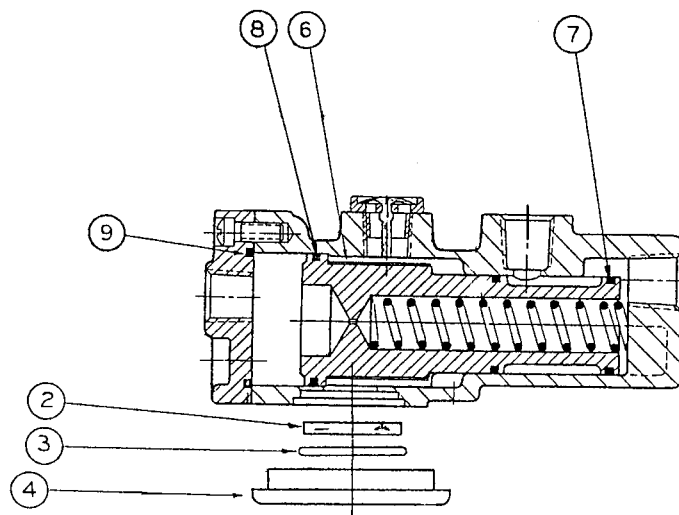
This parts list effective with valve serial No. D651 and will also fit older Type DF Indicating Relays. For service parts on TRIP Port Relay, see Parts List Form 598.

AMOT designs and tests all of its products to ensure that high quality standards are maintained. For proper operating and maximum product life, carefully follow AMOT's installation and maintenance instructions. Failure to do so could result in damage to the equipment being protected or controlled.

## MAINTENANCE

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.

Periodic inspection, cleaning, O-ring replacement and lubrication are all the maintenance that these units should require. The Bezel (4) and Window (2) may be easily removed for cleaning with the relay left in place and held by connecting tubing. Piston (6) containing all of the moving seals may be removed by disconnecting the TRIP Port connection, removing the Screws (11) holding the Cover (10) and pulling out the piston. O-rings (7 & 8) should be cleaned or replaced then relubricated with AMOT 911L001 grease (DOW Corning #33 Pneumatic Lubricant). Reassemble in reverse order. When reassembling, check condition of Seal (9) and replace as necessary.



When communicating with AMOT regarding operation of a control, always give the complete model and serial number. If ordering service parts, give the part number, description and quantity desired. If ordering parts by reference number, please give the form number, revision number and date of the brochure.

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