



MPD
Stainless steel

Overview

The Metal Particle Detector switch from AMOT can detect and alert equipment operations of the presence of metal particles in non-conductive fluid lubrication systems (lube oil, transmission fluid etc).

Typical applications

Developed for use in manual and automatic control systems:

- Reciprocating equipment
 - gas engines
 - diesel engines
 - compressors
- Rotating equipment
 - gas turbines
 - steam turbines
 - transmissions and gear boxes
 - pumps
 - compressors

Key features and benefits

- Unique grid sensing technology
 - detects metal particles and metal chips
 - detects all conductive metal particles (including non magnetic metal particles)
- Provides early warning of impending failure
 - reduced operating costs
 - corrective maintenance can be scheduled to minimize costly downtime
 - prevents unnecessary repairs and replacement of expensive parts
- Dual seal with weep hole construction
 - meets API 614
 - meets National Electric Code

Approvals

UL Class 1 Division 1, Groups A, B, C & D

Metal Particle Detector - MPD

Installation

For in depth installation instructions, refer to AMOT Form No. 1248 and Drawing No. 10956. Installation of the MPD is accomplished in four (4) steps:

1. Locating where the MPD will be mounted.

The MPD must be located in a side stream of the lube oil / fluid system, after the pump but before the filter. (Refer to Figure 1).

2. Mounting the MPD.

Mount the MPD with the grid in a horizontal position. **It does not matter which process port is the IN port so long as the flow through the MPD is from top to bottom and the grid is on a horizontal plane.** Two 5/16-18 UNC mounting holes are cast into the MPD body. Isolation valves should be used as in Figure 1 to facilitate inspection and service of the MPD switch.

3. Piping the process fluid to the MPD.

When connecting the piping, never use excessive force to stop thread leakage. Apply a quality thread sealant such as Loctite™ Pipe Sealant to the MPD's pipe threads. Do not permit debris to enter the MPD while piping (this will set off the MPD).

CAUTION:

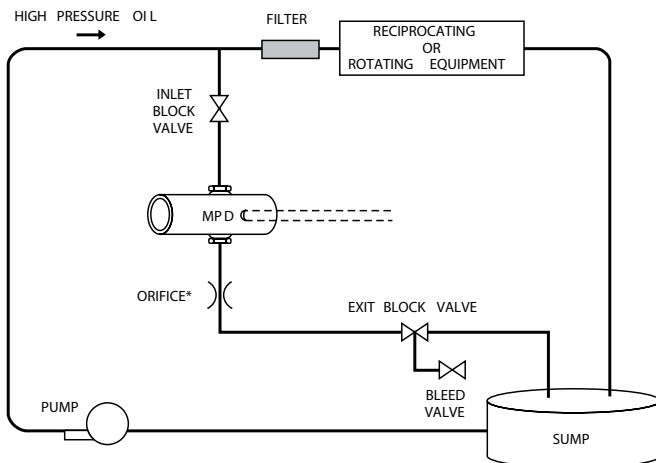
Flow to the MPD should be limited to prevent starving the equipment of oil (use an orifice, needle valve, etc.).

4. Making MPD electrical connections.

All wiring to and from the MPD should be done in accordance with the applicable electrical code. End Cap (22) should be removed (with a 1/2" S.A.E. drive ratchet) to access the MPD's terminal block, flying leads or plug connector (depending on the MPD connection option ordered).

Operation

Figure 1 - MPD Installation diagram

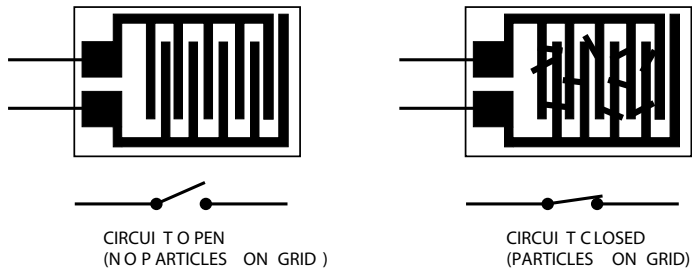


Operation is simple and straight forward. Process fluid, such as lube oil or transmission fluid, enters at the top of the MPD's body. Fluid then travels through a perforated board containing a plated electrical grid on the board's top and bottom sides. Fluid exits through the bottom of the MPD body (refer to Figure 1).

Metal Particle Detector - MPD



Figure 2 - MPD Switch diagram



Metal particles gather on the MPD's grid to complete an electrical circuit. Refer to right diagram.

Activation of the MPD switch occurs when metal particles bridge the gaps on its electrical grid and complete a normally open (N.O.) electrical circuit to drive an alarm or shutdown relay (refer to Figure 2).

For installation refer to work instructions log 56.

Design considerations

The following considerations should be noted when installing the metal particle detector:

- **Locating where the MPD will be mounted**
The MPD must be located in a side stream of the lube oil/fluid system, after the pump but before the filter.
- **Mounting the MPD**
Mount the MPD with the grid in horizontal position.

- **Piping the process fluid to the MPD**
Do not permit debris to enter the MPD while piping (this may close the MPD grid circuit).
- **Making MPD electrical connections**
All wiring to and from the MPD should be done in accordance with the applicable electrical code.

Metal Particle Detector - MPD

Service & Maintenance

Refer to Figure 3, cross sectional.

**Prior to servicing or maintaining the MPD:
Make sure all electricity is disconnected
from the MPD.**

**Ensure all process pressure is relieved
from the grid compartment before
removing the MPD's end cap (block valve
closed, bleed valve open).**

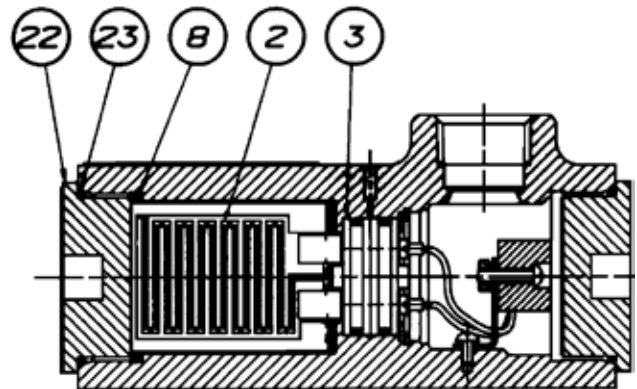
AMOT MPD requires minimal maintenance. Recommended maintenance would include removal and replacement of the MPD's End Cap O-Rings (23), Grid O-Ring Seal (8), and Grid Board (2). Inspection of the aforementioned components should take place during the equipment's scheduled maintenance.

Multi Meter Grid Conductivity Test

Grid (2) should be inspected for signs of lacquering or residue build up which will interfere with the grid's ability to detect metal particles and complete the electrical circuit. AMOT recommends using a multi meter to test the grid's ability to complete an electrical circuit.

Remove End Cap (22) with a 1/2" S.A.E. drive ratchet. Pull the Grid (2) free of the MPD body (26) by hand. Use the multi meter to determine the grid's conductivity. Touch one multi meter probe to each of the MPD's grid pads. Short the grid out by placing a small metal object (such as a penny or screw) across the grid. If the grid will not short out, it must be replaced.

FIGURE 3: CROSS SECTIONAL



Recommended Spares / Service Parts

Kit 10829X001

| Ref. No. | Qty. | Part No. | Description |
|----------|------|-----------|-------------------------|
| 2 | 1 | 10831 | Grid |
| 23 | 2 | 11462L001 | End Cap O-Ring, Viton |
| 8 | 1 | 1919L001 | Grid O-Ring Seal, Viton |



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Metal Particle Detector - MPD

Specification

| | | |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------|
| Body & end caps: | 316 stainless steel | |
| Seals: | Viton (Buna N optional) | |
| Electrical connections: | Plated tin | |
| Oil port connections: | 1/2" Threaded connection | |
| Electrical connection: | 3/4" NPT | |
| Grid electrical ratings: | 3.5 va. 24 volts (AC or DC) Maximum recommended for operator safety. Intrinsically safe power supplies may also be used. | |
| Temperature rating (Viton): | -23 to 177°C (Viton) | (-10 to 350°F) (Viton) |
| | -48 to 121°C (Buna) | (-54 to 250°F) (Buna N) |
| Max. working pressure: | 13.8 bar | (200 psi) |
| Recommended wire gauge: | 1.5mm ² | (16 gauge) |
| Lead wire gauge: | 1.5mm ² | (16 gauge) |
| Flow coefficient: | Kv = 3.78 | (Cv = 4.39) |
| Grid specification: | Hole size (std.) | 0.8mm (1/32") |
| | Grid space distance (std.) | 1.6mm (1/16") |
| Approvals: | UL Class, Division 1, Groups A, B, C & D | |

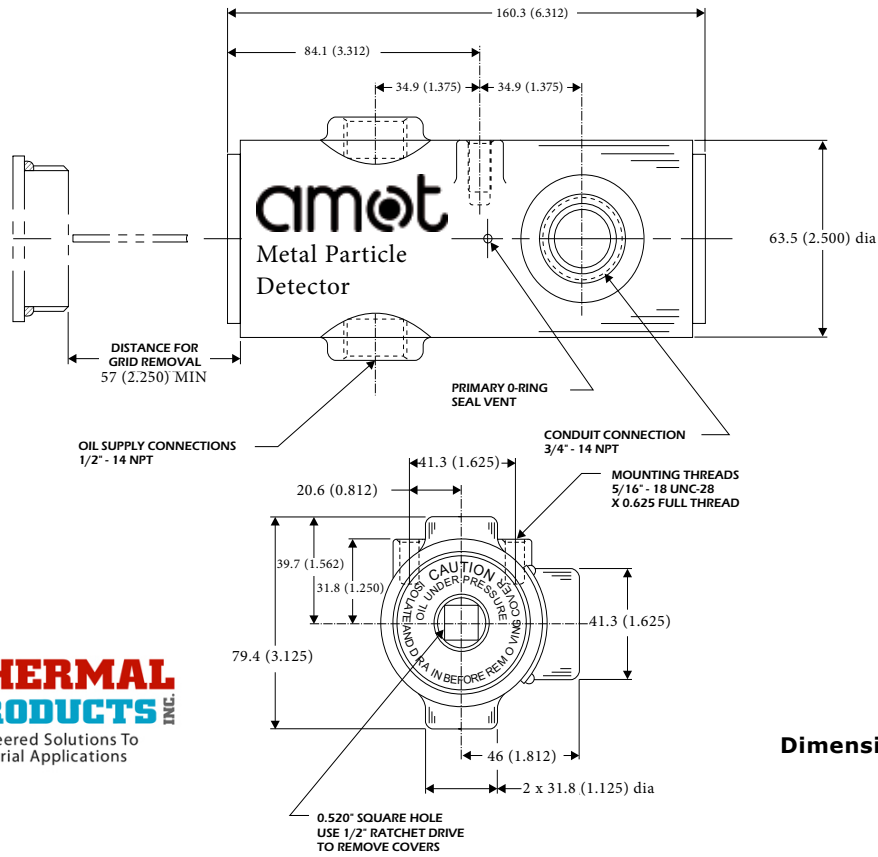
How to order

Use the tables below to select the unique specification of your MPD Metal Particle Detector or specify the following information:

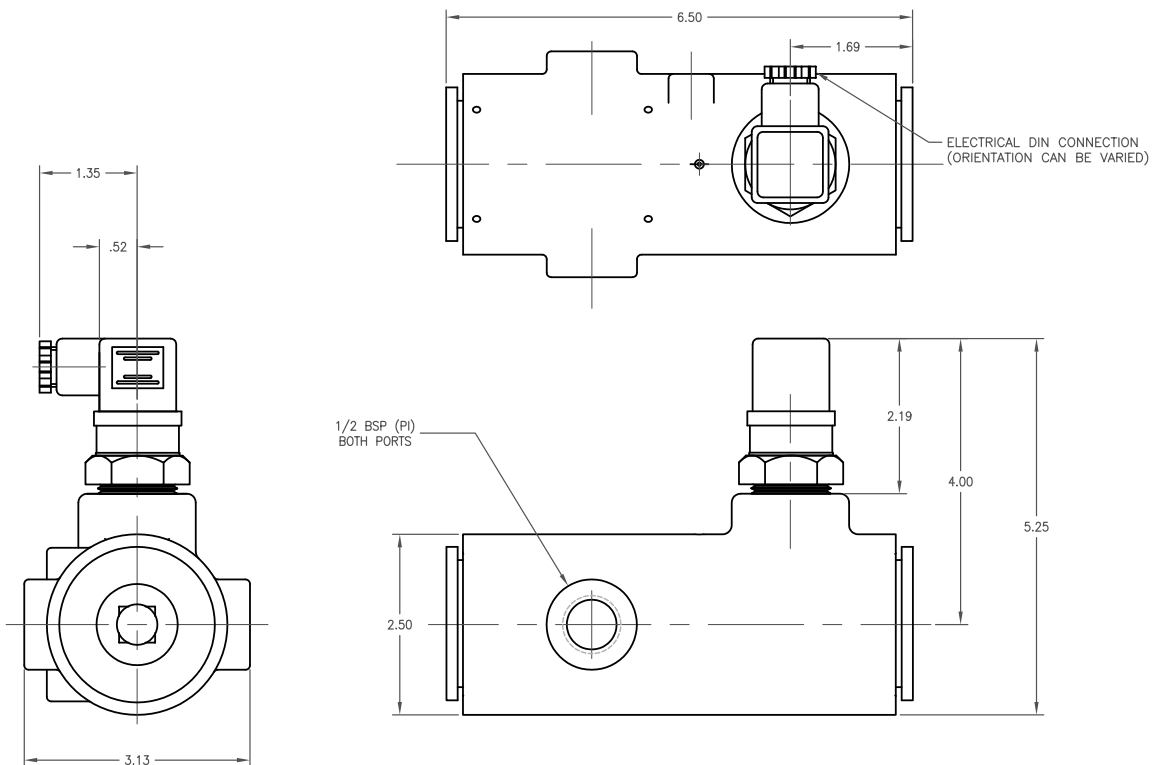
| Example | MPD2R | T | 5 | P | 2 | -AA | Code Description |
|-----------------------------------|-------|---|---|---|---|-----|-----------------------------------|
| Model and design level | MPD2R | | | | | | Basic Stainless Steel Model |
| | | | | | | | Port Connection |
| Oil Port Connection | | T | | | | | 1/2" NPT |
| | | W | | | | | 1/2" SAE |
| | | U | | | | | 1/2" BSP (PL) |
| | | | | | | | Connection Tube |
| Electrical Conduit Port | | | 5 | | | | 3/4 NPT |
| Electrical connection tube | | | | D | | | DIN connector C/W earth with wire |
| | | | | P | | | Terminal plug |
| | | | | T | | | Terminal block |
| | | | | W | | | Wire leads 18" |
| | | | | | | | Material |
| Seal material | | | | | | 1 | Buna N/Nitrile |
| | | | | | | 2 | Viton |
| | | | | | | | Special requirements |
| Special requiriements | | | | | | -AA | Standard |
| | | | | | | -** | Special requirements |

Metal Particle Detector - MPD

Dimensions



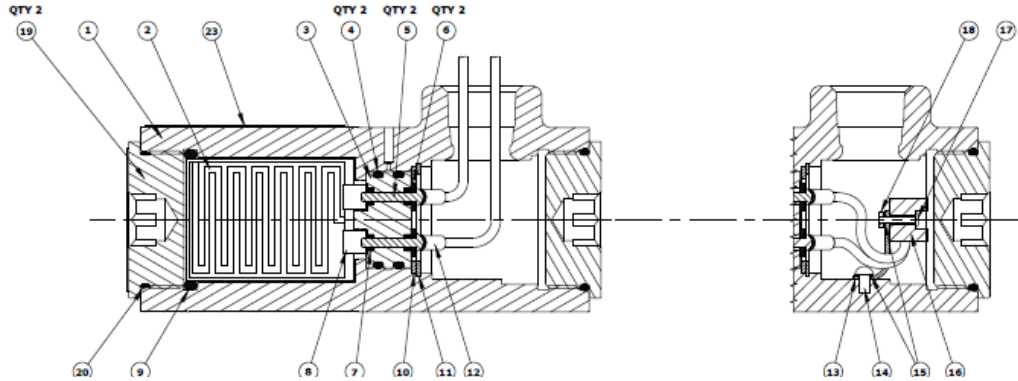
Dimensions in mm (inches)



Metal Particle Detector - MPD

Service kits

Recommended spares/service parts



Stainless steel version - Kit 10829X001

| Ref. No. | Qty. | Description |
|-------------|------|------------------|
| 2 | 1 | Grid |
| Viton 20 | 2 | End Cap O-Ring |
| 9 | 1 | Grid O-Ring Seal |



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