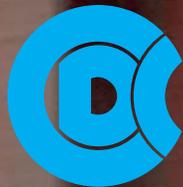
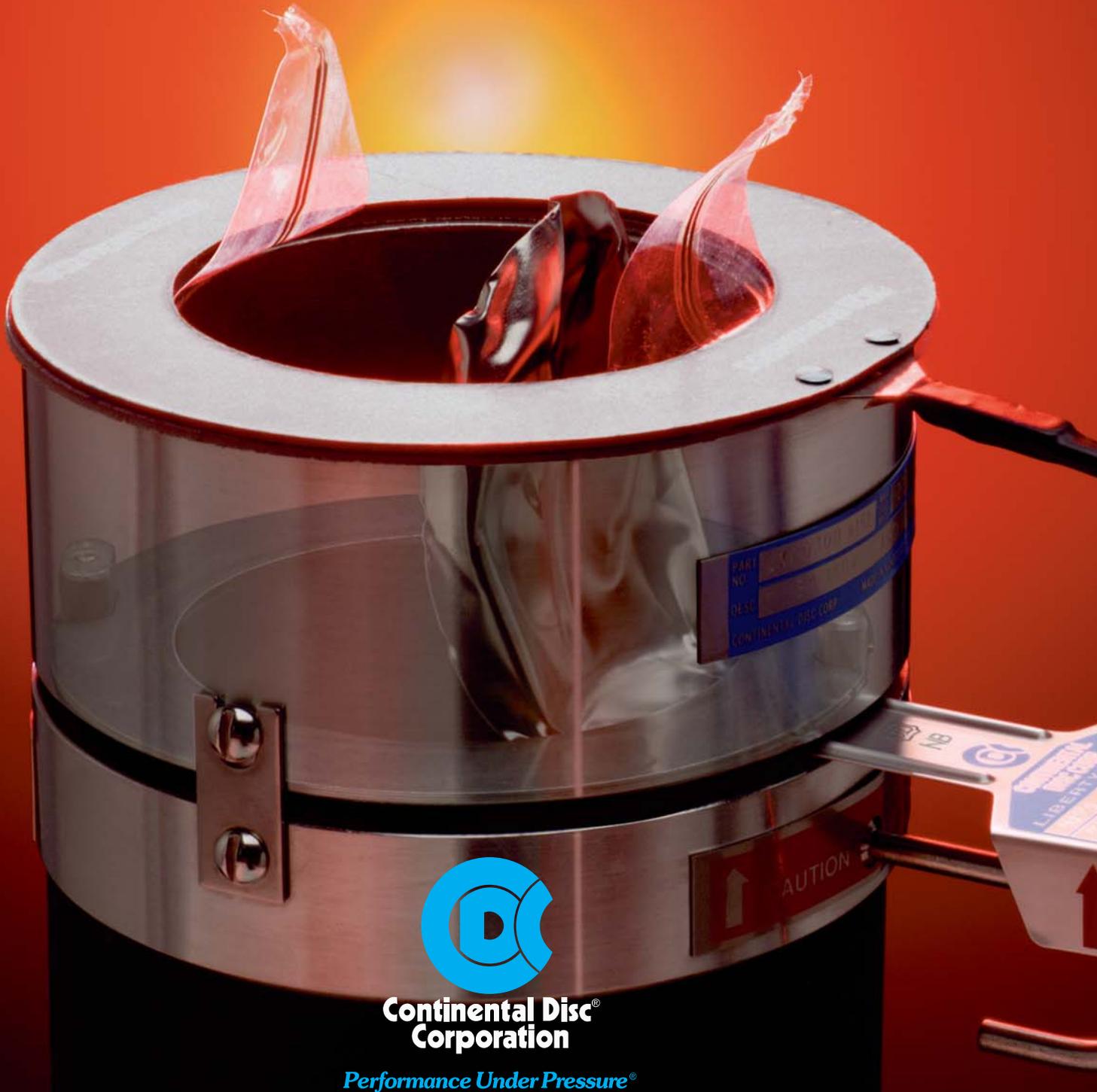


# Rupture Discs with B.D.I.® Alarm System

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**Continental Disc®  
Corporation**

*Performance Under Pressure®*

## Continental Rupture Discs with the B.D.I.® Alarm System

The Continental B.D.I. (Burst Disc Indicator) Alarm System is designed specifically for use with Continental Rupture Discs. It signals the operator of a system when a rupture disc has burst to relieve an overpressure condition.

The heart of the system is the B.D.I. Alarm Strip. Upon disc rupture, the Burst Disc Indicator Alarm Strip is severed, disrupting the flow of electric current through the strip. An attached alarm monitor can then transmit a warning and/or activate appropriate equipment.

The B.D.I. Alarm System should be specified:

- When warning of pressure relief is essential for plant safety
- When immediate notice is needed of relief of an overpressure or vacuum condition to indicate process malfunction
- When indication is vital that a rupture disc has burst and toxic substances are venting
- When emergency equipment must be triggered immediately upon disc rupture to alter or stop a process
- When loss or contamination of product will occur if a rupture disc is not replaced immediately
- When monitoring of rupture discs is important in hard-to-reach locations

## Proven Design

The Burst Disc Indicator Alarm Strip is designed to break when its corresponding rupture disc bursts. Continental's design has been proven through years of testing, both in the field and in our ASME accepted flow testing laboratory. This testing has proved the reliability of the Alarm Strip when used with Continental Rupture Discs. The B.D.I. Alarm Strip does not affect the life or performance of the rupture disc.

The Continental B.D.I. Alarm Strip is carefully designed and manufactured with the following features in mind:

- Resistant to chemicals and weather
- Usable over a wide range of temperatures
- Easily replaceable upon disc rupture
- Compatible with standard design Continental Rupture Discs

## ATEX Directive Compliant

The B.D.I. Alarm Strip and the MTB-700 Alarm Monitor have been certified for use in "potentially explosive atmospheres" according to the requirements of the European Union, ATEX Directive 94/9/EC. ATEX type approval and quality assurance notification certificates are available on our website at [www.contdisc.com](http://www.contdisc.com).

## Typical Applications

Rupture disc applications which can incorporate the B.D.I. Alarm System are unlimited. They occur in all major industries—anywhere quick notice of an overpressure or vacuum condition and release is required.

### Relief Valves

Isolating relief valves with a rupture disc protects internal valve parts from corrosive media. The B.D.I. Alarm System signals when a disc rupture relieves an overpressure condition, enabling the operator to correct the process and restore protection to the relief valve.

Installing a rupture disc with a B.D.I. Alarm Strip on the outlet side of a relief valve notifies the operator when a valve has relieved. This is an especially important application when handling toxic or corrosive substances.

### Processing Vessels

Rupture discs with the B.D.I. Alarm System are used on processing tanks and vessels requiring protection from overpressure or vacuum conditions. The system warns when a disc ruptures.

### Chemical Reactors

When processing temperatures and pressures are critical, the B.D.I. Alarm System gives immediate warning when service is interrupted due to relief of an overpressure condition.

### Tank Transports

The B.D.I. Alarm System signals immediately when a rupture disc has burst, thereby releasing product to the atmosphere.

### Pipeline Pumping Stations

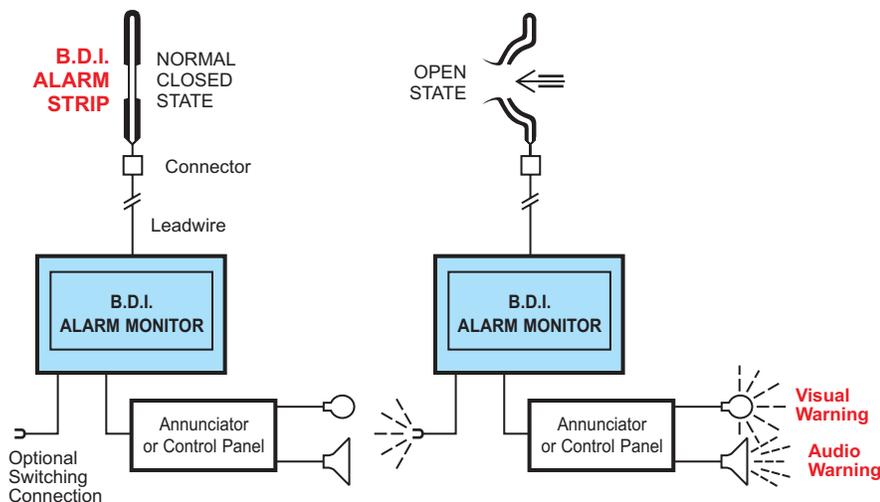
Rupture discs relieve pressure buildup in pumping stations caused by blocked pipelines. The system signals as relief occurs and can trigger shutdown of pumping systems.

### Fermentation Vessels

Products requiring gaseous blankets to prevent spoilage or product contamination must be protected from the atmosphere. Immediate warning of disc rupture permits quick corrective action, reducing loss of product and expensive gases.

## B.D.I. ALARM SYSTEM

• OPERATING SCHEMATIC •



## Storage/Silo Tanks

Storage tanks which damage easily from overpressure or vacuum conditions are protected with the CAL-VAC® Rupture Disc or POS-A-SET® Rupture Disc. Often these discs are located in hard-to-reach areas. The B.D.I. Alarm System warns immediately when the rupture disc bursts.

## Distillation Equipment

Distilled products must be free from contamination. Operator warning is vital when a product batch is contaminated from the intake of an outside atmosphere during vacuum relief. The B.D.I. Alarm System provides the needed warning.

## The Heart of the System: The B.D.I. Alarm Strip

The Burst Disc Indicator Alarm Strip is designed to break when its corresponding rupture disc bursts. This creates an open circuit which is detected by the B.D.I. Alarm Monitor, or other suitable monitoring device.

## Design Specifications

- Maximum current: 50 milliamps
- Maximum voltage: 24 VDC RMS
- Operating temperature range:  
-40°F to +400°F (-40°C to +204°C)

## Components

The B.D.I. Alarm Strip is composed of **copper conductors** adhered to a thin strip of **Kapton®\*\* film**. Tantalum conductors are available for some applications. The tail of the strip, extending from the rupture disc seating area to the B.D.I. Connector, is protected with polyolefin **heat shrink tubing**. A strain brace is attached to most designs to prevent undue stress to the B.D.I. Alarm Strip and premature alert.

Each B.D.I. Alarm Strip is carefully adhered to a **Teflon®\*\* membrane** to insure proper breakage upon disc rupture. Care is also taken to position the alarm strip where it will be gripped properly by the rupture disc flanges without crushing the conductors. This design prevents the B.D.I. system from signaling prematurely upon installation.

The B.D.I. Alarm Strip is manufactured as either an **Integral Fit** or a **Universal** design, dependent upon the rupture disc product it is to mate with. Refer to photo on page 4-5 for examples. It is compatible with assemblies designed to install between flange bolting classes including ANSI, DIN, JIS, BSI and sanitary clamping designs. Custom designs are also available. Contact the factory for details.

Linking the B.D.I. Alarm Strip to the monitoring system is the **B.D.I. Connector**. A two-pin bullet terminal with O-rings protects the terminals at the connecting point against moisture. It is abrasion resistant, flexible, and highly weather-resistant, even in sub-zero climates.

The **Interconnecting Leadwire** between the B.D.I. Connector and a monitor or junction box is unfinished on one end to permit connection dictated by local electrical codes. It is available in standard lengths from 6 ft. to 500 ft. (1.8m to 152m).



To protect the tail of the B.D.I. Alarm Strip, each comes with a **Leadwire Strain Relief Device**. This device prevents undue stress on the alarm strip by securing the B.D.I. Interconnecting Leadwire in place.



Sanitary Design Holder



Insert Design Assembly

## Option

When there is a distance of 15 feet or more between the B.D.I. Alarm Strip and the monitoring device, a **junction box** is recommended. This box protects the alarm strip from the weight of the long cable and from environmental elements.

Shielded cable (such as blue Beldon #8412 cable) should be used for cable runs between a junction box and the B.D.I. Alarm Monitor, to prevent triggering of a false alarm. If the cable is run through conduit, a less expensive cable (such as Beldon #8441 instrumentation cable) can be used.

\* Burst Disc Indicator (B.D.I.) Alarm System incorporates U.S. patent no. Re.34,308 and 4,408,194; Australia patent no. 539415; Canada patent no. 1199990; Germany patent no. 3174227.0; Belgium, France and United Kingdom patent no. EP 0 033 867; Japan patent no. 2032464.

\*\* Kapton and Teflon are registered trademarks of E.I. du Pont de Nemours and Company used under license.

**Continental Products  
Supplied with Integral Fit  
B.D.I. Alarm Strip**

For the Integral Fit design, the copper strip is adhered to a Teflon membrane which has been formed to the same configuration as the mating rupture disc. Then, the B.D.I. Membrane is permanently affixed to the rupture disc, usually on the downstream side. A strain brace is attached to the disc or the 3-D flow direction tag to avoid damage to the strip extension.

**GRAFSERT Rupture Disc**

The GRAFSERT® Rupture Disc is for applications requiring resistance to most commercial chemicals.

The B.D.I. Alarm Strip is permanently mounted between the outlet side of the rupture disc and the non-asbestos gasket.

**CAL-VAC / POS-A-SET Rupture Discs**

CAL-VAC® Rupture Discs provide ultra-low vacuum relief in addition to positive pressure relief. Vacuum relief begins as low as 1" water column.

POS-A-SET® Rupture Discs provide ultra-low positive pressure relief in addition to vacuum relief. Positive pressure relief begins as low as 1" water column.

On both the CAL-VAC and the POS-A-SET, the B.D.I. Alarm Strip is mounted directly to the Teflon seal. Upon disc rupture, in either direction, the alarm strip activates a signal to the monitoring device.

**SANITRX Rupture Disc**

SANITRX® Rupture Discs are ideal for applications requiring reliable overpressure protection for sanitary systems, equipment and vessels. This disc is

designed for operation up to 90% of the disc's rated burst pressure.

The B.D.I. Alarm Strip is mounted directly between the disc and the arcuate, passing out of the sanitary clamping device through the bolt opening.

**ENVIRO-SEAL Rupture Disc**

The ENVIRO-SEAL is for systems requiring economical protection for low pressure atmospheric storage vessels, downstream isolation of safety relief valves and protection of equipment from corrosive environments. It is designed for operations at up to 50% of rated burst pressure.

The B.D.I. Alarm Strip is mounted directly to the outlet side of the rupture disc.

**Vent Panels**

Vent Panels are designed to minimize structural or mechanical damage that may be caused by expanding gases resulting from the deflagration of dust, gases, or mists in equipment, rooms, buildings or other enclosures.

The B.D.I. Alarm Strip is mounted directly to the outlet side of the vent panel.

**Continental Products  
Supplied with Universal  
B.D.I. Alarm Strip**

The Universal B.D.I. Alarm Strip incorporates a copper strip adhered to a full Teflon membrane and mounted between non-asbestos gaskets. The Universal design alarm strip is positioned on the downstream side of the holder outlet when installed in service.

**MICRO X Rupture Disc**

The MICRO X® Rupture Disc is a cross-scored tension type disc for systems with normal operating pressures up to 80-85% of the burst pressure rating of the rupture disc.

The Universal B.D.I. Alarm Strip is mounted to the outlet side of the holder outlet.

**ULTRX®, MINTRX®, STAR X®, & LOTRX®  
Rupture Discs**

This unique family of semicircular scored reverse-acting rupture discs are for liquid or gas systems with operating pressures to 90% of the rupture disc stamped rating and are superior for cyclic operating conditions.

The Universal B.D.I. Alarm Strip is mounted to the outlet side of the holder outlet. Contact the factory for available configurations with the LOTRX Rupture Disc.

**RCS Rupture Disc**

The RCS™ Rupture Disc is a cross-scored reverse-acting design disc for gas service and 90% operating-to-burst ratio.

The Universal B.D.I. Alarm Strip is mounted to the outlet side of the holder outlet.

**KBA Rupture Disc**

The KBA is for systems requiring exceptional burst accuracy and operating pressures to 90% of the burst pressure rating on the rupture disc.

The Universal B.D.I. Alarm Strip is mounted to the outlet side of the holder outlet.

**ZAP Rupture Disc**

The ZAP® Rupture Disc is for systems where conditions of pressure, pulsations and cycles exist. It withstands operating pressures up to 90% of the rupture disc burst rating and backpressure to 110% of the disc rating.

The Universal B.D.I. Alarm Strip is mounted to the outlet side of the holder outlet.

**Continental Products  
Supplied with Either  
Integral Fit or Universal  
B.D.I. Alarm Strip**

**Standard Rupture Disc**

The Standard Rupture Disc is for systems with normal operating pressures up to 70% of the burst pressure rating of the rupture disc.

The Integral Fit B.D.I. Alarm Strip is available for sizes 1-1/2" to 12" (40mm to 300mm). All others use the Universal B.D.I. Alarm Strip.

**Composite Rupture Disc**

The Composite Rupture Disc is for systems with operating pressures up to 80% of the burst pressure rating of the rupture disc. It is especially suitable for systems requiring low pressure relief.

An Integral Fit B.D.I. Strip is available for sizes 1-1/2" to 12" (40mm to 300mm). All other size Composite rupture discs use a Universal B.D.I. Alarm Strip.

B.D.I. Alarm Strips can, in general, be applied in any of the following holder classes:	
150/300# ANSI	.....1" - 24"
MSS SP-44 150#	.....28" - 36"
DIN 10/16	.....25mm - 900mm
JIS 10/16	.....25mm - 200mm



## Burst Disc Indicator Alarm Monitors

The B.D.I. Alarm System uses a normally closed electrical circuit. A continuous signal flows between the B.D.I. Alarm Strip and the Alarm Monitor under normal conditions. Once the rupture disc bursts, the Alarm Strip breaks, opening the electrical circuit.

Each Continental B.D.I. Monitor contains replaceable modules with individual channel relays. Each channel relay connects to one Alarm Strip. As the rupture disc and B.D.I. strip break, a specific relay is actuated, sending a signal to the control panel.

Control panels, annunciators, light panels or other signalling devices can be used to warn of a ruptured disc. The Alarm System is versatile to adapt to a variety of warning devices. Individual relay circuitry allows the user to monitor several B.D.I. alarm strips at once. Pumps, valves, and other systems may also be activated to respond to an overpressure or vacuum situation by the break of a specific alarm strip.

### Definitions

As used in the SB-100, BB-100A, BB400A and MTB-700 Alarm Monitor descriptions:

\*INTRINSICALLY SAFE is defined as:

*“Apparatus, including wiring, in which any spark or thermal effect produced either normally or in specified fault conditions ... is incapable under test conditions of causing ignition of a specified mixture of flammable or combustible material in air.”*

\*\*FAIL SAFE, as generally accepted by industry and the military: *“If any one component in the sensing section should fail, the alarm must either continue to work properly or activate the alarm.”*

### Specifications

Continental's B.D.I. Alarm Monitors are offered in five standard, “off the shelf” models (pictured on page 7, items 1, 2, 3, 4, and 6). Customized alarm monitors, built to specification, are also available (pictured page 7, item 5). Features common to standard models SB-100, BB-100A, BB-400A and LCB-400 are:

- Terminals for 115/230 VAC @ 50 to 60 Hz or 12 VDC  $\pm$  1 volt power input
- Each relay has independent common terminals
- Output relay contacts (one per channel) rated as follows:
  - 2 AMPS @ 120 V Resistive
  - 1 AMP @120 V Inductive
  - 2 AMPS @ 24 V Inductive
- Monitor box is intended for indoor use to provide a degree of protection against dust and dripping liquids
- Operating temperature range: -40°F to 104°F (-40°C to +40°C)

①

## Model SB-100 Alarm Monitor

Designed for wall mounting, the SB-100 has a front-mounted annunciator panel, incorporating audio and visual alarms. The unit features modular construction with all sensing and alarm relays in one easily replaceable module.

Specifications:

- Monitors two discs separately and continuously
- Intrinsically safe\* signal output to B.D.I. Strip: 6 VDC @ 0.1 MA max
- Latching mode only. Once the alarm is triggered, it must be reset manually
- Fail-safe\*\* circuitry design for alarm sensing and activation circuitry
- Contains easily replaceable incandescent alarm indicator lamps
- Contains alarm buzzer, alarm master test switch, alarm master reset-acknowledge switch

*Replacement module for the SB-100 Monitor: specify AF-100*

②

## Model BB-100A Alarm Monitor

The BB-100A Monitor is a wall mount design and provides information to the operator's control panel. The unit features modular construction with all sensing and alarm relays in one easily replaceable module.

Specifications:

- Monitors two discs separately and continuously
- Intrinsically safe\* signal output to B.D.I. Alarm Strip: 6 VDC @ 0.1 MA max
- Each channel can be set for latching or non-latching circuitry, where alarm reset is handled manually or automatically
- Fail-safe\*\* circuitry design for alarm sensing and activation circuitry
- Intrinsically Safe\*

*Replacement module for the BB-100A Monitor: specify NAF-100*



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## Model BB-400A Alarm Monitor

The BB-400A Monitor is a larger version of the BB-100A. It uses the same replaceable sensing and alarm relays module, but it can accommodate four modules for a total of eight different rupture discs, monitored individually and continuously.

Specifications:

- Identical to Model BB-100A
- Intrinsically Safe\*

*Replacement module for the BB-400A Monitor: specify NAF-100*

④

## Model LCB-400 Alarm Monitor

The LCB-400 is designed for use where an intrinsically safe\* sensor signal is not required. The unit is a wall mount design and provides information to the operator's control panel. It features modular construction with eight easily replaceable modules.

Specifications:

- Monitors eight discs separately and continuously
- Highly regulated low current signal output to disc: 12 VDC @ 0.5 MA max

*Replacement module for the LCB-400 Monitor: specify LCAF-100*

⑤

## Custom Built Monitor

Custom designed alarm monitors are available for specific applications, such as the two-channel unit pictured. Contact the factory for details.

⑥

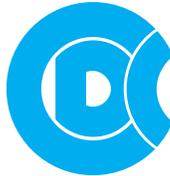
## MTB-700 Alarm Monitor

The MTB-700 Monitor incorporates Intrinsically Safe Galvanically Isolated Barriers, approved for use in many countries worldwide. Upon disc rupture, these barriers activate signals and/or output relays to warn operators and actuate pumps, valves, or other equipment connected to the system.

The unit is modular in construction, and can be purchased with a single MTL two-channel barrier, or it can be upgraded to four channels. Each channel features one DPDT relay for auxiliary contacts, capable of operating a 1/8 HP motor at 120/240VAC for a maximum carrying current of 7 AMPS. When purchased with an annunciator panel, the monitor provides both visual and auditory warning capabilities. The monitor may also be tested and reset from a remote location, i.e. control room, laboratory, etc.

Specifications:

- 100% galvanically isolated barriers
- 2 channels, expandable to 4
- Supply voltage: 24 VDC, 120/240 VAC
- With or without annunciator panel
- Maximum intrinsically safe output level: 7 VDC @ 22 MA
- Latching mode on all channels
- Intrinsically safe barrier approvals:
  - USA (Factory Mutual): Class I, II & III: Division I, Groups A-G
  - UK (BASEEFA): [EEx ia] IIc
  - Australia (SA): [EEx ia] IIc
  - Denmark (DEMKO): [EEx ia] IIc
  - Finland (SETI): [EEx ia] IIc
  - Canada (CSA): Class I, II & III: Division I, Groups A-G
  - Japan (RIIS): 3aG6
- Operating temperature range: -20°C (-4°F) to 45°C (113°F)
- Enclosure Nema ratings 4, 4X, 12 and 13



**Continental Disc®  
Corporation**

*Performance Under Pressure®*

A Siegel-Robert Company



Certified Quality System  
First Certified In 1992



ASME Code Symbol Stamp  
Available When Specified



China Manufacture License  
Available When Specified



ATEX Directive for  
MTB-700 Alarm Monitors  
Available When Specified

Continental Disc Corporation has representatives located throughout the world.  
Contact the C.D.C. office nearest you for the authorized representative in your area.

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