

Vibraswitch Malfunction Detector Model 365

General Description

The Model 365 **VIBRASWITCH** provides maximum protection for large motors, pumps, compressors, and other rotating equipment by responding to mechanical malfunctions the instant they occur. Failing bearings, bent shafts, broken blades, overspeeding and similar malfunctions cause increased imbalance or high frequency vibration detectable with the model 365 **VIBRASWITCH**. The instrument may be wired to actuate an alarm or cause a shutdown before costly damage occurs. It is designed for maintenance-free service in permanent installations.

The **VIBRASWITCH** is an acceleration sensitive instrument that measures the total acceleratory shock present on the machine. Acceleration is a vibration characteristic of prime importance in cases of mechanical failure on reciprocating or rotating machinery. Newton's second law of motion states that the force exerted on a body is equal to its' **mass** multiplied by its **acceleration: $F = MA$** . Thus the destructive forces acting on a bearing are directly dependent on the acceleration of the masses involved at the shaft which is supported by the bearings.

Acceleratory measurements made by the **VIBRASWITCH** are the summation of all the individual accelerations giving a total destructive force acting on the machine - the result is positive protection.

With the growing use of computers, an increasing number of applications are coming into existence where the Vibraswitch will be connected to a computer or PLC. In these applications the voltage and/or current may be too low for standard contacts. For these applications the model 365 may be supplied with an optional sealed switch with gold contacts.

Invensys®



Features & Benefits

- **Explosion Proof-**
CSA Certified and FM approved.
(Most models.)
- **Self Powered-**
Does not require external power to operate
(Except remote reset.)
- **Optional Gold Contact-**
For Low Voltage/Current Applications
- **Acceleration Sensitive-**
Measures destructive forces.
- **Minimum Maintenance-**
No moving parts except at trip level.
- **Continuous Protection-**
No attention required after installation.
- **Ease of Installation-**
Requires no special training.
- **Long Life-**
Instrument is rugged and durable-no wear.
- **Ease of Adjustment-**
Set it and forget it-one adjustment.
- **Reset-**
Remote electrical or manual at unit.
- **AC or DC-**
Reset coil options.
- **O-Ring Shaft Seals Standard**

Principle of Operation

The Model 365 **VIBRASWITCH** employs a magnetic circuit opposed by inertial and adjustable spring forces in the actuating mechanism. Operation of the **VIBRASWITCH** may be understood by reference to Figure 1. The armature is constrained so as to respond to only one direction of movement by a frictionless flexure pivot composed of two overlapping blocks and a leaf spring loaded in one direction to hold the blocks together. The armature rotates on the pivot being forced in one direction by the adjusting spring force and the other direction by the magnetic force.

When the entire assembly is subjected to vibration perpendicular to the base, the peak acceleration times the effective mass of the armature produces an inertial force, aided by the adjustable spring tending to pull the armature away from the stop pin and the restraining force of the magnet. When the peak acceleration exceeds the set point level the armature leaves the stop pin, increasing the gap and decreasing the force with the armature continuing to move up until it reaches the latch magnet, actuating the switch during its upward travel.

The **VIBRASWITCH** may be reset by depressing the reset button or by applying power to the electrical reset coil. The effect of temperature in the mechanism is negligible as the elastic modulus of the adjusting spring and the magnetic flux through the air gap both decrease slightly with increasing temperature thereby compensating each other.

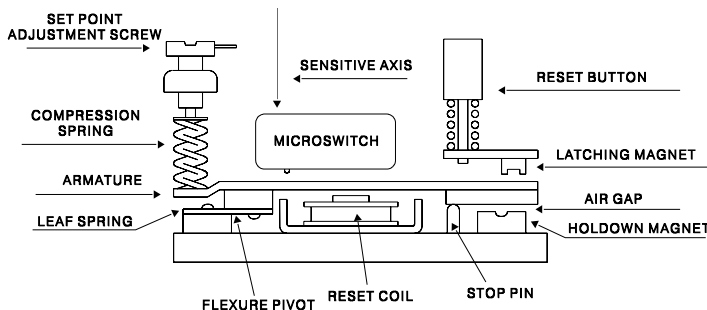


FIGURE 1

SPECIFICATIONS

Housing: Cast aluminum - Meets Class I, Div. 1, Groups C & D, and Class II, Div. 1, Groups E, F, & G, hazardous classification - CSA Certified and FM approved.

Set Point Ranges:

Mounted Horizontal 0 to 4.5 G (peak)
 Mounted Vertical..... 0 to 3.5 G (peak)

Accuracy: ... $\pm 5\%$ of full range at frequencies up to 300 Hz.

Contact Ratings:

Designation "A":

SPDT

7 A max. at 460 VAC max. noninductive;

0.5 A max. at 120 VDC;

1 A max. at 48VDC;

2 A max. at 24 VDC;

5 A max. at 12 VDC.

Designation "D":

DPDT

5 A max. at 240 VAC max.;

5 A max. at 30 VDC.

Designation "G":

DPDT - Sealed switch with gold contacts

0.1 A max. at 125, 250 VAC res.;

0.1 A max. at 30 VDC res.;

5.0 mA min. at 6 VDC res.;

2.0 mA min. at 12 VDC res.;

1.0 mA min. at 24 VDC res.

Contact Arrangements: SPDT or DPDT

Temperature Limits: Maximum +140°F Minimum -40°F

Manual Reset: All models supplied with manual reset

Reset Coil: Available in 24 VDC, 48 VDC, 120 VDC, 120 VAC @ 50/60 Hz, and 240 VAC @ 50/60 Hz.

Reset Coil Power: 24 VDC, 0.5 amp

48 VDC, 0.2 amp

120 VDC, 0.14 amp

120 VAC, 0.3 amp

240 VAC, 0.3 amp

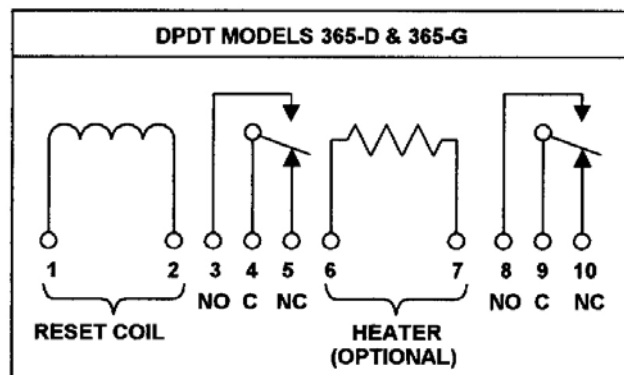
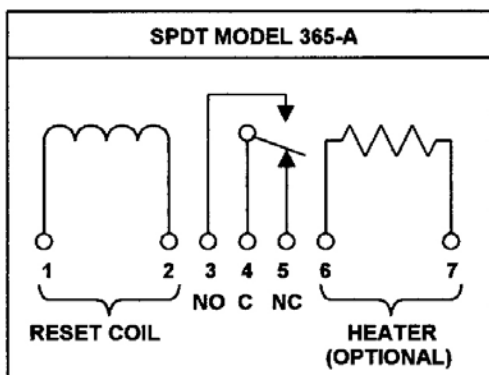
Space Heater: 2 watt, same voltage as reset coil

Weight: Net 6.5 lbs.

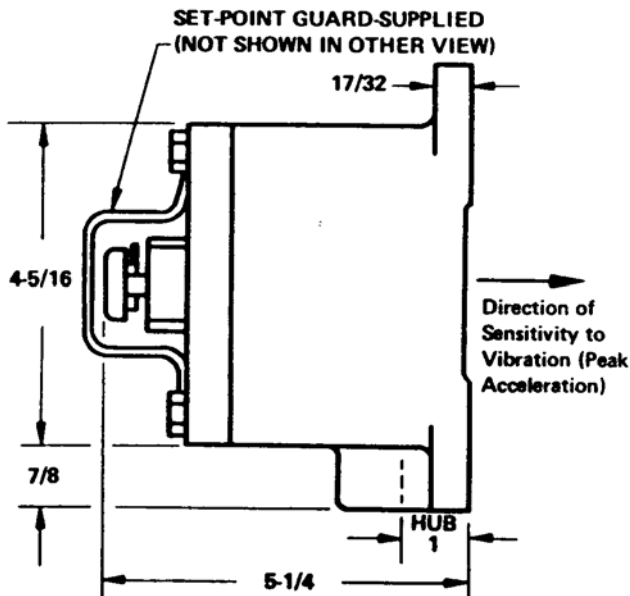
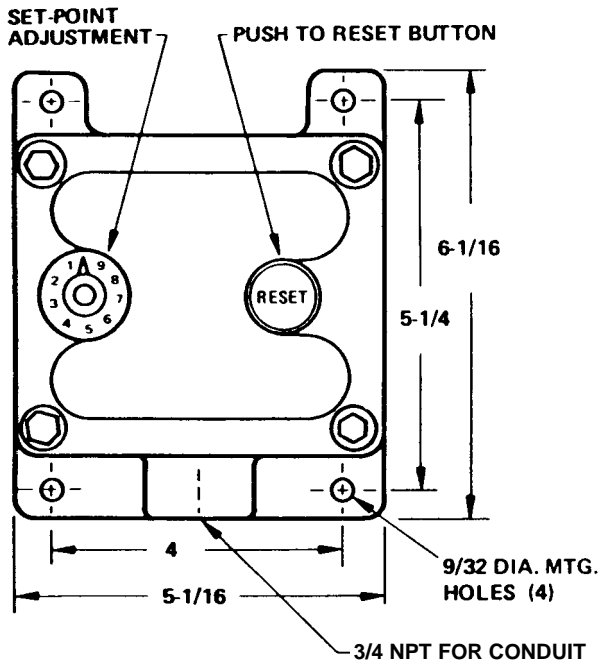
Shipping 7 lbs.

Shock: 40 g @ 11 ms maximum

SWITCH CONFIGURATIONS



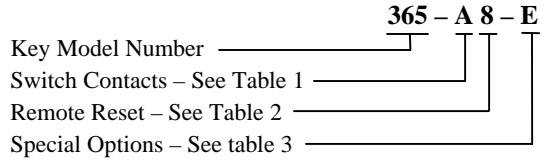
DIMENSION DATA



Note: Vibraswitch is shown mounted vertical.

ORDERING INFORMATION

- Standard Model 365 - A8
Optional Models - select from tables below.



Key Model Number

Designation	Description
*365	Vibraswitch®, Explosion Proof Range: 0 - 4.5G

Table 1 - Switch Contacts

Designation	Description
*A	SPDT - Single pole, double throw load contacts
D	DPDT - 2 gang mounted SPDT load switches.
***G	DPDT - 2 gang mounted SPDT sealed switches with gold contacts for low voltage/current applications

*** Not CSA Certified or FM Approved

Table 2 - Remote Reset

Designation	Description
**0	No reset coil
2	24 volt DC reset coil voltage
***3	240 volt AC reset coil voltage
4	48 volt DC reset coil voltage
**7	120 volt DC reset coil voltage
*8	120 volt AC reset coil voltage

** Not FM Approved

*** Not CSA Certified or FM Approved

Table 3 - Special Options

Designation	Description
omit	No special options
E	Enclosure painted with gray epoxy paint
H	Space heater installed for maintaining internal area of unit moisture free. Space heater voltage same as reset coil voltage.
EH	Enclosure painted with gray epoxy paint and space heater installed. Space heater voltage same as reset coil voltage.

Accessory Items
(Must be ordered separately)

Part No.	Description
904GB016	Rainshield for unprotected outdoor installations.
904GB016-03	Rainshield for unprotected outdoor installations. Painted with gray epoxy paint.

ALSO AVAILABLE FROM ROBERTSHAW

Model 365A and E365A Vibraswitches

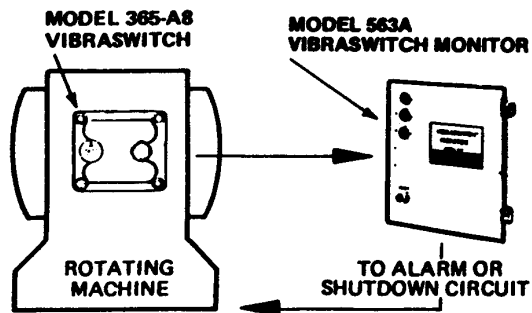
These Vibraswitches are weather proof (NEMA 4 & IP66) versions of the model 365 and the hazardous area ratings also include Group B. The E365A is also CE (ATEX) Certified for use in Europe.
See Product Specification 365A/E365A for details.

Model 375A Vibraswitch

This Vibraswitch can be supplied with “Starting Time Delay” and/or “Monitoring Time Delay” for transient shock elimination to prevent false shut downs or alarm conditions.
See Product Specification 375A/376A for details.

Model 563A Vibraswitch Electronic Monitor

This monitor provides “Starting Time Delay” and “Monitoring Time Delay” for from one to eight Vibraswitches on a single machine. These delays are for transient shock elimination to prevent false shut downs or alarm conditions.
See Product Specification 563A for details.



U.S.A. and CANADA

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