

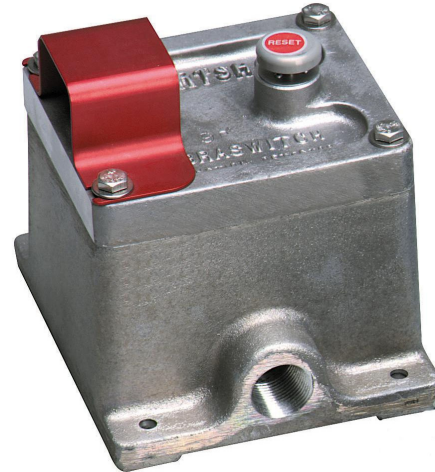
## Vibraswitch Malfunction Detector Model 365

### 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.



### Features & Benefits

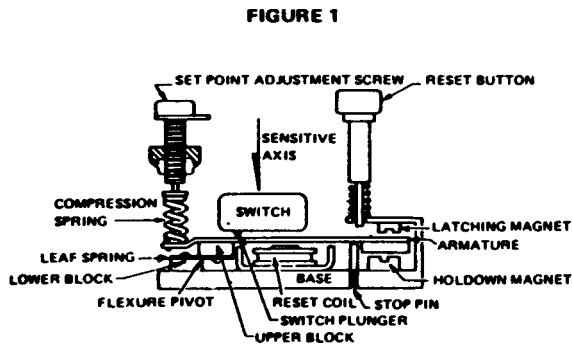
- **Explosion Proof-**  
CSA Certified and FM approved.  
(Most models.)
- **Self Powered-**  
Does not require external power to operate  
(Except remote reset.)
- **Acceleration Sensitive-**  
Measures destructive forces.
- **Minimum Maintenance-**  
No moving parts except at trip level.
- **Continuous 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

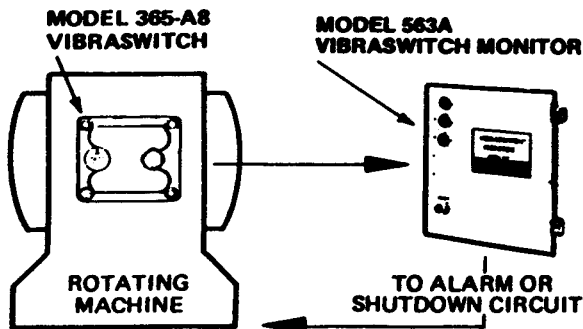
The Model 365 VIBRASWITCH employs a magnetic circuit opposed by inertial and adjustable spring forces in the actuating mechanism. Operation of the VIBRASWITCH may be understood by reference to Figure 1. The armature is constrained so as to respond to only one direction of movement by a frictionless flexure 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.



**ALSO AVAILABLE**  
**VIBRASWITCH MONITORS** - To eliminate false shutdowns due to transient shocks or vibrations. (See PS-563A).



## SPECIFICATIONS

**Housing:** ..... 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:** ..... to 4.5G

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

**Contact Ratings:**

Designation "A": 7a max. 460 VAC max. noninductive; 0.5a max. at 120 VDC; 1 a max. at 48 VDC; 2a max. at 24 VDC.

Designation "D": 5 amps max. 240 VAC max.; 5 amps max. at 30 VDC.

**Contact Arrangements:** ..... SPDT or DPDT

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

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

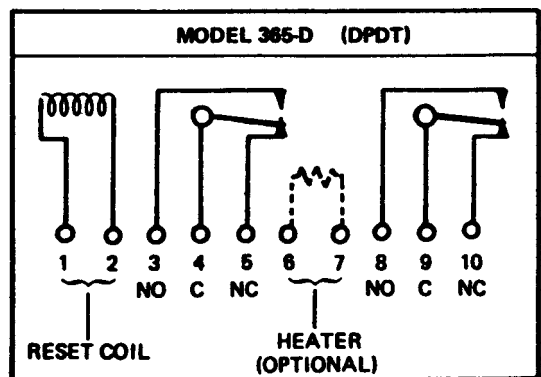
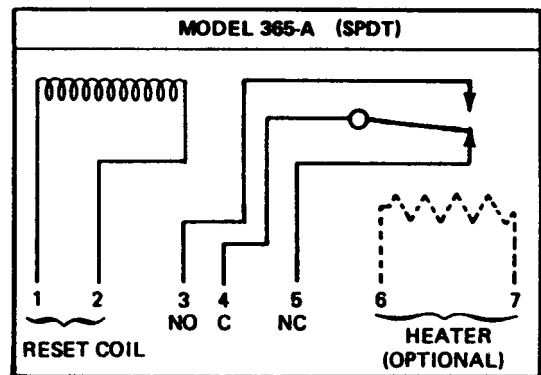
**Reset Coil Power:** .....  
 24 VDC, 0.5 amp  
 48 VDC, 0.2 amp  
 120 VDC, 0.14 amp  
 120 VAC, 0.3 amp  
 240 VAC, 0.3 amp

**Weight:** Net ..... 6 lbs.  
 Shipping ..... 6.5 lbs.

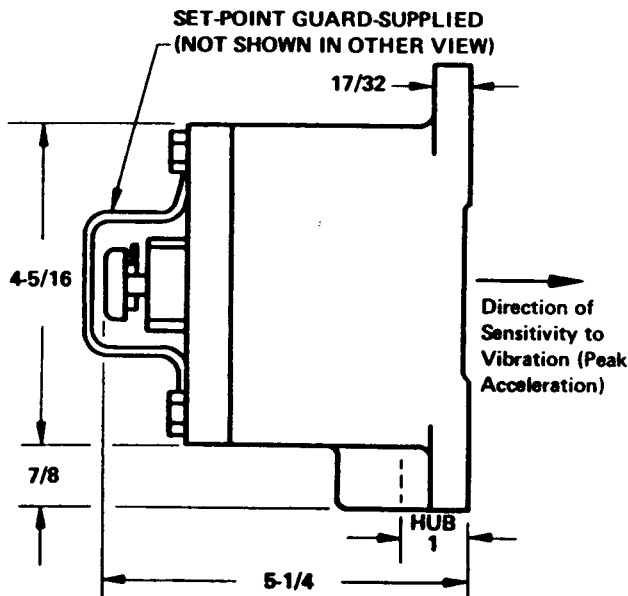
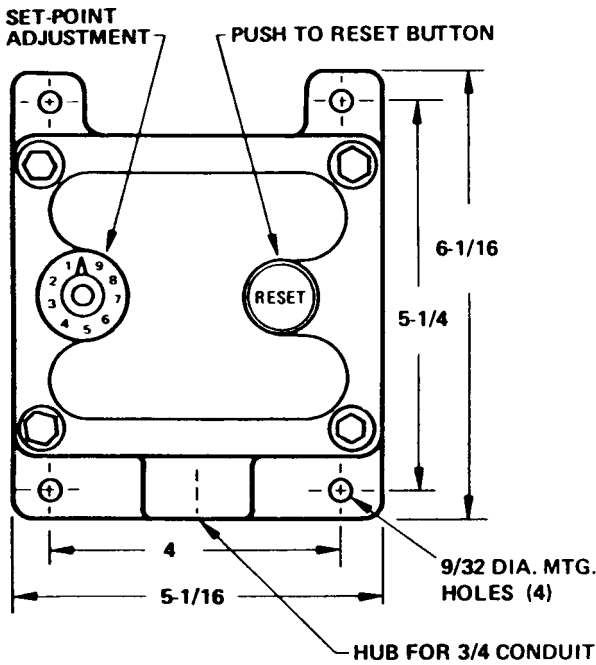
**Accessory Equipment (Optional):** Control Units are available which offer "Starting Time Delays" and "Monitoring Time Delays" to prevent false shutdown or alarm conditions.

Related product Vibraswitches with built-in start and monitoring delays are available. (See PS-375A/376A).

### SWITCH CONFIGURATIONS



**DIMENSION DATA**



**ALSO AVAILABLE**

Model 375A Vibraswitch incorporating transient shock elimination to prevent false shut downs. See PS-375A/375A.

**ORDERING INFORMATION AND MODEL NUMBERS**

\* Standard Model 365 - A8

**Key Model Number**

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

**Table 1 - Switch Contacts**

Desig.	Description
*A	SPDT Single pole, double throw load contacts
D	DPDT (2 gang mounted SPDT load switches).

**Table 2 - Remote Reset**

Desig.	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**

Desig.	Description
E	Enclosure painted with gray epoxy paint
H	Space heater installed for maintaining internal area of unit moisture free
EH	Enclosure painted with gray epoxy paint and space heater installed

**Accessory Items**

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

## VIBRASWITCH® MALFUNCTION DETECTOR Model 366

### GENERAL DESCRIPTION

The Model 366 **VIBRASWITCH** is a vibration sensitive device that protects rotating and reciprocating machinery from extensive damage resulting from mechanical malfunction. When the vibration level of a **VIBRASWITCH** protected machine exceeds normal by a preselected amount, an internal switch closes, actuating either an audible warning system or a shutdown circuit before costly damage occurs. Failing bearings, broken blades and similar malfunctions cause increased imbalance or high frequency vibration detectable with the **VIBRASWITCH**. It is designed for maintenance-free service in permanent installations where general purpose weather-resistant enclosures are required.

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. Acceleration is directly related to the shock forces (impact) acting on a machine - thus the **VIBRASWITCH** offers a valid measurement of the destructive forces acting on the machine.

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

### PRINCIPLE OF OPERATION

The Model 366 **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, 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.

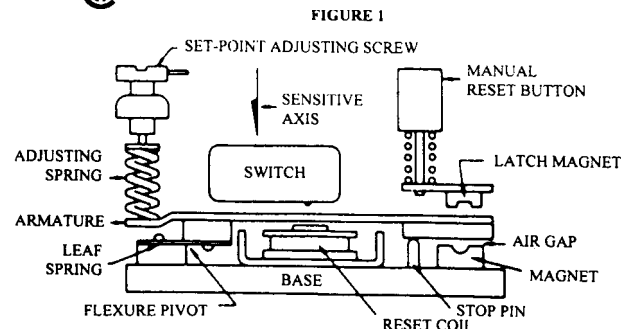


VIBRASWITCH MODEL 366



### FEATURES AND BENEFITS

- **Acceleration sensitive-**  
Measures total destructive shock, not displacement.
- **No maintenance-**  
No moving parts except when set-point is exceeded.
- **Continuous protection-**  
No attention required after installation.
- **Long life-**  
Instrument is rugged and durable - no wearing parts.
- **Reset-**  
Choice of remote electrical or manual at unit.
- **Self powered-**  
Does not require any form of external power to operate.
- **SF Certified**



## SPECIFICATIONS

**Enclosure** ..... General purpose, meets weather resistant NEMA 4 specifications

### Enclosure Materials

**Cover** ..... High impact ABS thermoplastic

**Base** ..... Type 360 (Cu Free) Aluminum

**Setpoint Range** ..... 0-4.5g, adjustable 1 g per turn

**Accuracy** ..... ± 5% of full range at frequencies up to 300 Hz.

### Contact Ratings:

**Designation "A"** ..... 7a max. 460 VAC max. non-inductive; 0.5a max. at 120 VDC; 1a max. at 48 VDC; 2a max. at 24 VDC.

**Designation "D"** ..... 5 amps max. 240 VAC max.; 5 amps max. at 30 VDC.

**Contact Arrangements** ..... SPDT or DPDT

**Temperature Limits** ..... Maximum + 200°F.  
Minimum -40°F.

**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

### Weight:

**Net** ..... 2 lbs.

**Shipping** ..... 2.5 lbs.

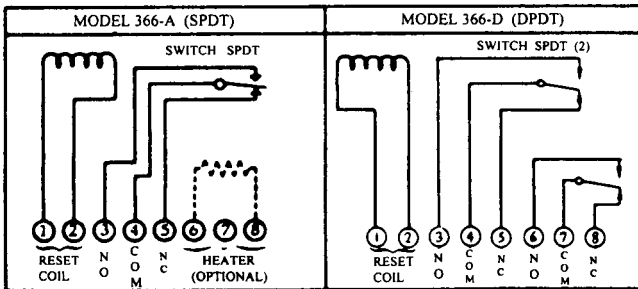
### Accessory Equipment (optional)

Model 563A Vibration Monitor is available with "starting time delays" and "monitoring time delays" to prevent false shutdown or alarm conditions.

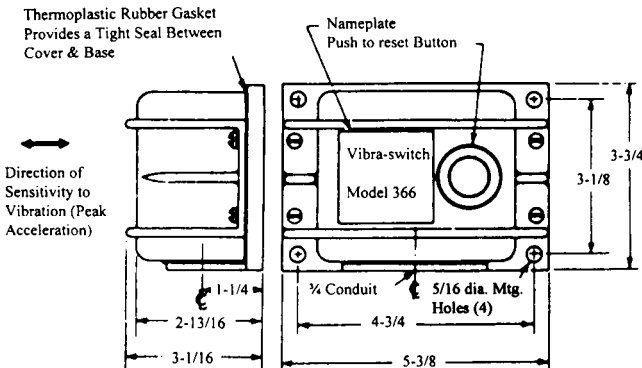
### Related Product

Vibraswitches with built-in start and monitoring delays are available. See PS 375A/376A.

## CUSTOMER CONNECTIONS



## DIMENSION DATA



## ORDERING INFORMATION AND MODEL NUMBERS

\* Standard Model 366 - A8

### Key Model Number

Desig.	Description
* 366	Vibraswitch® CSA Certified Enclosure 4 and 5 Equivalent: NEMA-4 & NEMA-12 Range: 0 - 4.5G

Table 1 - Switch Contacts

Desig.	Description
*A	SPDT Single pole, double throw load contacts.
D	DPDT (2 gang mounted SPDT load switches). See note below.

Table 2 - Remote Reset

Desig.	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 CSA Certified.

Table 3 - Special Options

Desig.	Description
E	Base painted with gray epoxy paint
***H	Space heater installed for maintaining internal area of unit moisture free
***EH	Base painted with gray epoxy paint and space heater installed

\*\*\* Not available with 366-D3.

Not CSA Certified when used with 366-D.

# Robertshaw

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