

The detecting mechanism consist of an armature suspended on a flexure pivot which is restrained from motion by a permanent magnet (the holddown magnet). In the "armed" condition, the armature is held against the stop pin by the holddown magnet. The stop pin maintains a precise air gap between the armature and the holddown magnet. On the opposite end of the armature, the compression spring provides an adjustable force to oppose the force of the holddown magnet. Whenever the peak vibration inertial force (mass X acceleration) plus the adjustable compression spring force exceeds the force of the holding magnet, the armature is released and is pulled into the latching magnet ("tripped" position). Simultaneously, it activates the snap-action switch. This detecting mechanism has a uniform response from 0 to 300 Hz over a range of 0 to 4.5 g's.

The mechanism may be reset to the "armed" position manually (locally) or electrically (remotely). Manually, depress the reset button to move the armature away from the latching magnet ("tripped" position) until it is held against the stop pin ("armed" position). Electrically, the reset coil may be activated to pull the armature into the "armed" position against the stop pin.

A reset and holding coil is provided, in the DC/AC voltage as specified, so that accidental shutdowns on starts can be prevented. External time-delay relay circuits are required to maintain voltage at the holding coil during the startup period and then release this voltage when operation is normal. At full voltage, the reset coil should not be energized for more than four minutes to prevent overheating. Then, the reset coil must be de-energized for a period of 10 minutes before re-energizing. For longer hold-in requirements the reset coil should be energized at full voltage and then held-in at one-half the rated voltage.

The Vibraswitch, Model 366, may be used in conjunction with the Vibraswitch Monitor. The Monitor is a solid-state electronic system designed to "sort-out" false signals received by the Vibraswitch so that Alarm and/or Shutdown of the operating machine will not result from false, transient disturbances. Examples of transient disturbances are the closing of pipeline check valves on pumping applications, the start-up of additional pumps on a line, and the initial start-up of various operating machines. These disturbances may cause the Vibraswitch to "trip-out" if the vibratory shock level is in excess of its setpoint.

The purpose of the Vibraswitch Monitor is to "supervise" and "sort-out" the transient disturbances so that the Alarm or Shutdown is not falsely imposed on the machine being monitored; but any continuous vibration level which exceeds the Setpoint of the Vibraswitch will cause Alarm and/or Shutdown.

## 4.2 ADJUSTMENT OF OPERATING SETPOINT

The operating setpoint for the Vibraswitch varies with the type of machine and its location (measurement point) on the machine. The setpoint adjustments suggested in this instruction manual are for machines which are functioning in a "good" or "normal" condition. This method follows the concept of vibration tolerance for the machine and in this case is dependent upon an individual who is experienced in the operation of the machine to define the vibration as "normal", "fair", "slightly rough", etc. These various degrees of machine to define the vibration are, therefore, based on the individual's physical perception between normal and abnormal roughness while the machine is operating.

It is agreed that this method can lead to differences in the classification of degree of vibration between individual observers. It is Robertshaw's contention, and experience bears out this conclusion, that if the machine is operating satisfactorily as previously defined and the acceleration as measured by the Vibraswitch is within certain limits, the settings as outlined in the instructions will offer protection to the machine and prevent catastrophic failure.

For example, assume that a relatively new machine which, in the experience of the operator, is operating as "smooth" or "good" regarding vibration and the Vibraswitch measures this acceleration level to be 0.25 g above its static condition (zero). Experiences suggests that a reasonable level for alarm conditions would be a minimum of twice this value or 0.5 g. It must be acknowledged that such a definition of upper vibration limits (alarm condition) on the machine may no have adequately defined the upper tolerance limit of the machine before major repairs or excessive machine damage occurs. It does, however, define a limit which, in our experience, has proven to be safe. As the user becomes more adept in using the Vibraswitch as a monitoring device, his experience may dictate a higher setpoint more in Keeping with the experience he has gained on the particular machine.

The Model 366 Vibraswitch is adjusted by a simple, three step procedure. In making these measurements the cover must be removed to gain access to the Setpoint adjusting screw. (Ref. Figure 4-2).

### A) Zero Vibration Level Measurement

With the equipment on which the Vibraswitch is mounted not operating, back off the Setpoint adjusting screw counterclockwise (CCW) two turns and press the reset button. Then turn the Setpoint adjusting screw slowly clockwise until actuation occurs (the armature assembly is against the latch magnet, Figure 4.1). This is the zero vibration point, or actuating point, with the machine not operating. A mark should be made with a lead pencil or other convenient means to permanently record this "zero vibration point". Subsequent measurements are made relative to this point.