



5477B TWO-WIRE SOLID STATE VIBRATION SWITCH

Installation Manual



OVERVIEW

The Model 5477B features two-wire hook-up and solid state reliability, which make it an ideal replacement for mechanical vibration switches when increased accuracy and repeatability are required. Powered by an AC or DC control circuit, the unit closes or interrupts the circuit when the base vibration level exceeds the field adjustable setpoint. Separate start-up and monitor delays prevent nuisance trips. A flashing red LED indicates the tripped condition, and an optional LCD indicator provides a convenient local display of vibration level.

The electronics module plugs into the weather tight, explosion-proof aluminum housing. The wire entry is sealed against moisture. The NPT stud provides a rigid, single hole mount to machinery.

SPECIFICATIONS

Frequency Range	3 Hz to 500 Hz
Setpoint	Externally adjustable with tamperproof graduated dial.
Startup Trip Delay	30 seconds (standard) from application of power
Monitor Trip Delay	3 seconds (standard), integrating type
Trip Logic	<ul style="list-style-type: none"> • AC Supply: N.C. triac is standard. N.O. field selectable. Non-latching, automatic reset • DC Supply: N.O. latching. Interrupt supply to reset
Triac Output	5A inductive. Surge current: 60A for one cycle. Normally open triac leakage: 10mA
Trip Indicator	Flashing red LED
Digital Indicator	2 1/2 digit LCD displays vibration level in engineering units
Temperature Range	See Table 1
Housing Rating	Housing CSA certified Class I (C & D), Class II (E, F, & G), Div. 1
Electrical Connection	3 wires, AWG #18, 1m (40 in.) long.
Supply Voltage	See Table 1
Weight	1.4 kg (3.0 lbs.)
Vibration Range	See Table 1

AUXILIARY RELAYS

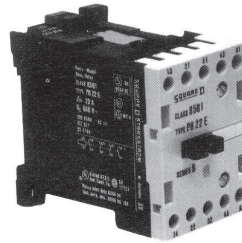
For use when isolated, dry contacts are required. DPDT contacts rated 120/240 VAC, 10A; 24VDC, 3A; 110 VDC, 0.8A. Surface or DIN rail mount. UL listed, CSA certified and built per IEC 337-1.

94500-065 Relay: 120 VAC coil

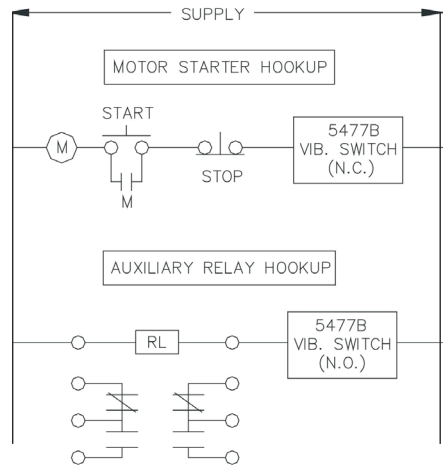
94500-066 Relay: 240 VAC coil

94500-067 Relay: 24 VDC coil

94500-068 Relay: 110 VDC coil

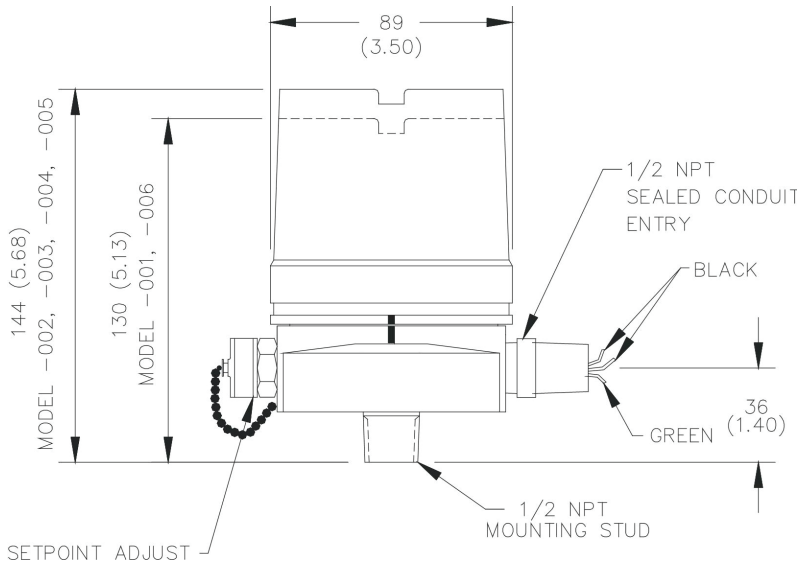


WIRING DIAGRAM



OUTLINE & DIMENSIONS

Dimensions are in mm (inches)



MODEL	INCLUDED	VIBRATION RANGE	TEMP. RANGE	OPERATION
5477-001	Blank cover	0 to 1.0 ips/25 mm/s, pk	-40°C to 100°C	AC, NO/NC
5477-002	Window cover, Digital indicator and Trip led	0 to 1.0 ips/25 mm/s, pk	-20°C to 75°C	AC, NO/NC
5477-003		0 to 19.9 mm/s, 0.8 ips, pk	-20°C to 75°C	AC, NO/NC
5477-004		0 to 1.0 ips/25 mm/s, pk	-20°C to 75°C	DC, NO
5477-005		0 to 19.9 mm/s, 0.8 ips, pk	-20°C to 75°C	DC, NO
5477-006	Blank cover	0 to 1.0 ips/25 mm/s, pk	-40°C to 100°C	DC, NO

Table 1

INSTALLATION

The vibration switch must be solidly mounted to the machine surface. The recommended methods include:

1. Drill and tap a 1/2" NPT hole in the machine case to accept the 1/2" NPT mounting stud, **or**
2. Weld to the machine case a 1/2" NPT pipe coupling, **or**
3. Install a 7084 Flange Adapter, which attaches with three screws.

The sensitive axis is in line with the mounting stud, and the axis may be oriented in any direction. In models having a digital indicator the socket for the plug-in electronics module can be rotated in 90° steps to obtain the optimum viewing position. The screws securing the socket should not be fully tightened, to allow the module to center itself when the cover is tightened.



CAUTION: As the case cover secures the electronics module, it must be fully tightened to avoid erroneous response. Should unit be opened, use dow corning #33 molycote as o-ring lubricant for reassembly.

SELECTING NORMALLY OPEN OR NORMALLY CLOSED SWITCHING

Units for use in DC control circuits are available only normally open (N.O.), i.e., the switch is open when the vibration level is below the setpoint.

Unless otherwise specified, an AC vibration switch is factory set for normally closed (N.C.) operation. If normally open (N.O.) operation is desired, proceed as follows:

1. Remove the case cover and unplug the electronics module.
2. Remove the module socket from the housing and cut the jumper between terminals (6) and (7). Reassemble.

WIRING

The polarity of the two switch wires is arbitrary. The switch may be employed in control circuits powered by the following supply voltages:

- AC Vibration Switches: 95 to 250 VAC, 50/60 Hz
- DC Vibration Switches: 22 to 250 VDC

Some typical control circuits are shown in the accompanying wiring diagrams. As the vibra-



CAUTION: As with any switching device, the 5477B vibration switch must be connected in series with a load and not directly across the supply voltage, which action will severely damage the unit. Do not connect two or more 5477B units in series or in parallel with each other.

tion switch is a two wire device, it must “steal” a small amount of power from the control circuit in order to operate. Even when the switch is open, the unit conducts about 10 mA of current. Therefore, the load device (contactor coil or relay) must be of such rating that it will not change state with this small leakage current. The 5477B requires a minimum of 60mA load current to switch properly. The maximum coil resistance can be determined as follows:

$$\frac{\text{SUPPLY VOLTAGE}}{60\text{mA}} = \text{COIL RESISTANCE}$$

For 110V supply voltage the maximum coil resistance is:

$$\frac{110\text{V}}{60\text{mA}} = 1.83 \text{ K } \Omega$$

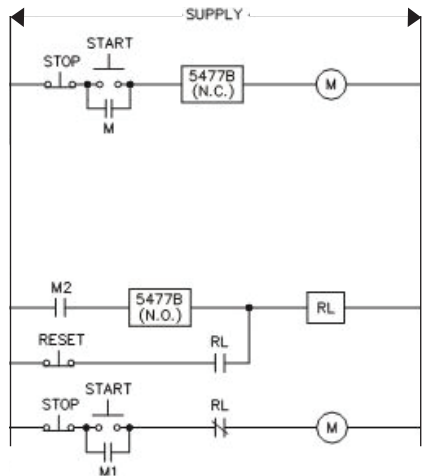
Most contacts and/or relay coils rated at 6 watts or more will not energize or hold in with this small leakage current. If an auxiliary relay is required, specify a 94500-054 (120 VAC coil) or 94500-055 (230 VAC coil), or equivalent.

• **5477B Wired to Interrupt Motor Starter (Non-latching)**

- Set 5477B for N.C. operation.
- Starting the motor applies power to 5477B, initiating the 30 second trip delay. Subsequently, if the vibration exceeds the setpoint for more than 3 seconds, the 5477B opens and drops out holding contact (M), stopping the motor. The motor can be re-started with the START PB.

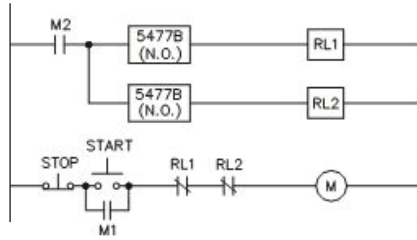
• **5477B Wired to Interrupt Motor Starter (Latching)**

- Set 5477B for N.O. operation.
- Starting the motor closes (M) contacts, applies power to 5477B and initiates 30 second trip delay. Subsequently, if the vibration level exceeds setpoint for more than 3 seconds, the vibration switch trips and energizes auxiliary relay (RL), which latches and prevents a restart without first actuating the momentary RESET PB. M2 contact can be deleted if startup delay is not required.



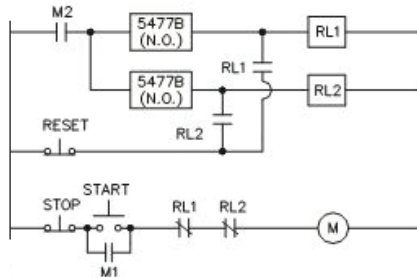
- **Two 5477B's Wired to interrupt a Single Motor Starter (Non-latching)**

- Set 5477B's for N.O. operation.
- Starting the motor closes the (M) contacts and applies power to MZ vibration switches, initiating 30 second trip delay. Subsequently, if either vibration switch trips, the corresponding auxiliary relay is energized, which interrupts the motor starter. The motor can be re-started with the START PB. The M2 contact can be deleted if startup trip delay is not required.



- **Two 5477B's Wired to interrupt a Single Motor Starter (Latching)**

- Set 5477B's for N.O. operation.
- Starting the motor closes the (M) contacts and applies power to vibration switches, initiating the 30 second start-up trip delay. Subsequently, if either vibration switch trips, the corresponding auxiliary relay is energized and latched, which interrupts the motor starter and prevents a restart without first actuating the momentary RESET PB. The M2 contact can be deleted if startup trip delay is not required.



SETPOINT ADJUSTMENT

Remove the setpoint dust cap located on the opposite side from the conduit entry. Adjust the pointer on the setpoint control shaft for the desired setpoint value.

Vibration switches that are not equipped with a digital indicator are supplied with a separate setpoint range label calibrated in the equivalent metric units. To install the metric label, turn the setpoint control fully counter-clockwise, remove backing from label and install it with zero lining up with the pointer on the setpoint control.

TRIP INDICATOR

Vibration switches with window covers are provided with an LED TRIP indicator, which illuminates at the instant the vibration level exceeds the setpoint. The TRIP indicator is useful in checking the operation of the trip circuit.



NOTE: As the AC versions of the vibration switch are non-latching, the TRIP indicator will remain ON only so long as the vibration exceeds the setpoint.

CALIBRATION

The unit has been factory calibrated for the full scale vibration level marked on the setpoint label. If the calibration is in doubt, the unit can be calibrated as follows:

1. Measure the vibration velocity at the base of the vibration switch with an independent vibration meter. Take into account that the frequency response of the vibration switch is 5 Hz to 500 Hz.
2. Slowly reduce the setpoint adjustment until the vibration switch trips. The setpoint adjustment must be done slowly to account for the 3-second monitor trip delay. Note any error between the setpoint and the actual vibration level. If an excessive error exists, proceed as follows:
 1. Disconnect power. Do not attempt to adjust the calibration control while the circuit is alive.
 2. Remove the housing cover, exposing the electronics module and the calibration adjustment access hole. Use a small screwdriver to adjust the calibration control.
 3. If the trip setpoint is lower than the actual vibration level, turn the calibration control clockwise, or vice versa. The sensitivity of the calibration adjustment is about 6% of full scale per turn.
 4. Replace the housing cover and re-power the vibration switch.

ENVIRONMENTAL INFORMATION



This electronic equipment was manufactured according to high quality standards to ensure safe and reliable operation when used as intended. Due to its nature, this equipment may contain small quantities of substances known to be hazardous to the environment or to human health if released into the environment. For this reason, Waste Electrical and Electronic Equipment (commonly known as WEEE) should never be disposed of in the public waste stream. The “Crossed-Out Waste Bin” label affixed to this product is a reminder to dispose of this product in accordance with local WEEE regulations. If you have questions about the disposal process, please contact Metrix Customer Service.

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