# VIBRATION ANALYSIS HARDWARE

DSB1000 Series Modular Switch Box
4-8 Channel
Product Manual

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# INTRODUCTION

CTC modular switch box solutions allow for the monitoring of remotely mounted vibration sensors, which would otherwise be restricted to human access due to safety considerations.

**DSB1000 Series Modular Switch Box Overview**: 4, 6, and 8 position switched output for dual output vibration and temperature sensors or biaxial accelerometers, for a total of 8, 12, or 16 channels of measurement data respective to the model purchased. Fiberglass enclosure.

CTC modular switch box solutions allow for the monitoring of remotely mounted vibration sensors, which would otherwise be restricted to human access due to safety considerations.

The DSB1000 fiberglass modular switch box is used to convert the three-conductor wiring of up to 8 remotely installed dual output sensors to two switched BNC connectors and one switched three-pin MIL spec connector for portable data collection. BNC labeled "A" and the three-pin MIL provide output for vibration and the BNC labeled "B" provides output for temperature or vibration channel 2 measurements. Input wiring from each sensor is connected via quick-connect or screw terminal blocks. Each terminal block includes input for signal, temperature, negative and shield. The shield drain wire is earth-grounded via a ground stud that is mounted to the side of the fiberglass enclosure.

Additional switch box modules can be installed or removed after initial manufacturing and onsite installation, using the quick-release DIN rail clip If continuous output is desired, select the DSB1001 Series. On all continuous output modules,  a quick disconnect Tplug is available to easily connect and disconnect the input wiring.

Rated for NEMA 4X (IP66), the DSB1000/DSB1001 can withstand harsh environments including temperatures ranging from -58° to 180°F (-50° to 82°C). The box is also resistant to hose directed fluid and corrosion. A snap latch is installed on the door allowing the box to be sealed from the elements when not in use.
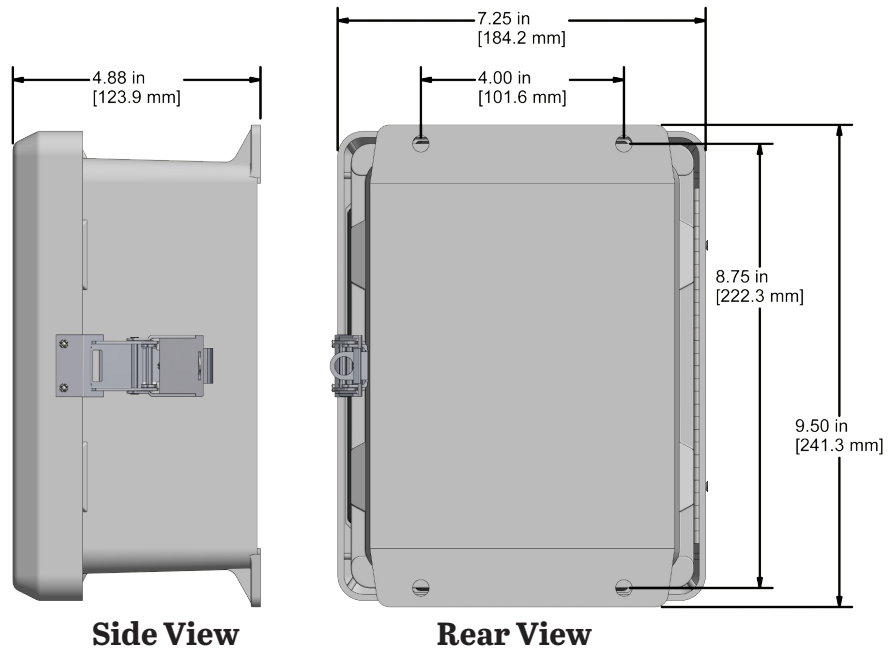
# PRODUCT DIMENSIONS



7.25 in
[184.2 mm]

4.88 in
[123.9 mm]

4.00 in
[101.6 mm]

8.75 in
[222.3 mm]

9.50 in
[241.3 mm]

**Side View**          **Rear View**

*Figure 1. Dimensions*



Three-pin MIL
Output Connector

BNC Output
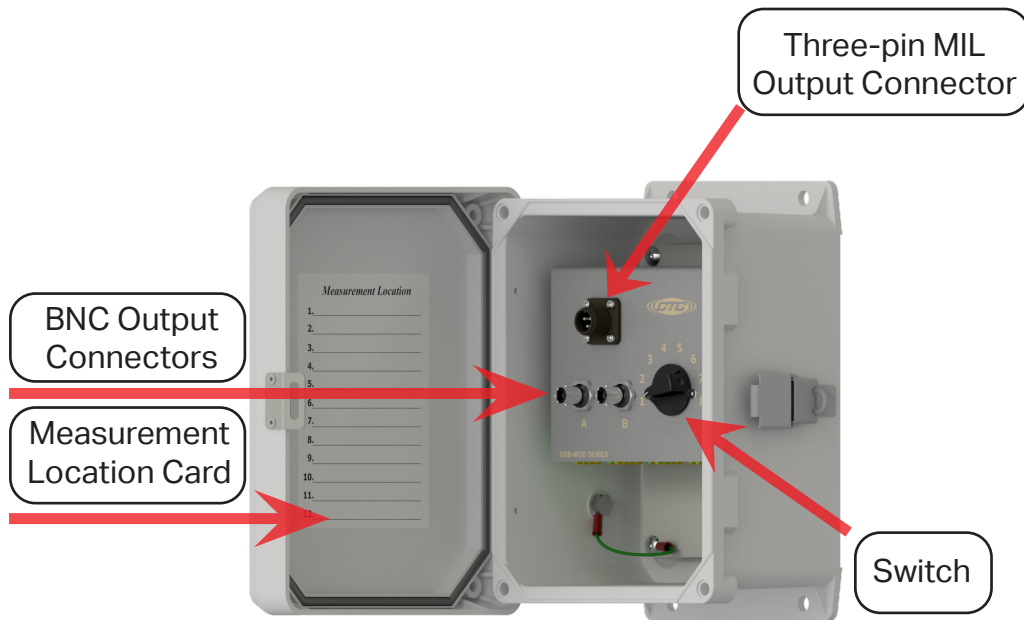Connectors

Measurement
Location Card

Switch

*Figure 2. Diagram*

# Mounting Instructions

**Note:** if you have purchased a modular switch box without cable entries provided, you should add your own entry prior to mounting the modular switch box. CTC does not recommend putting holes in the top of the enclosure due to access and moisture concerns.
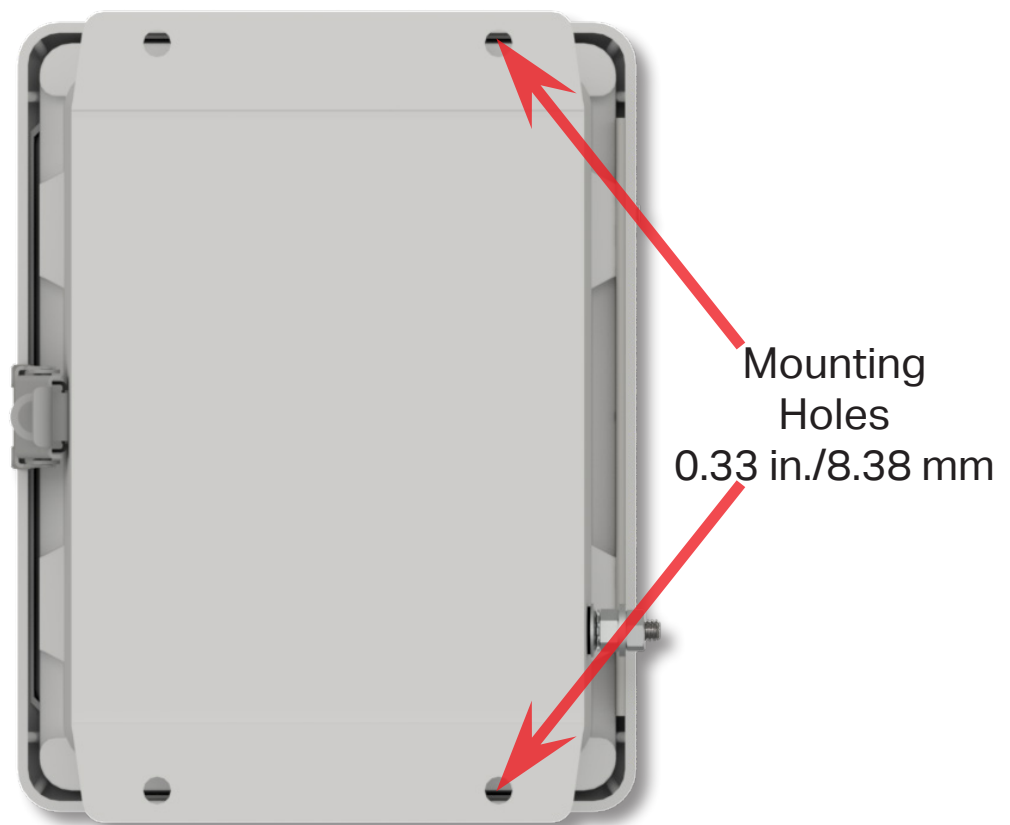
Mounting
Holes
0.33 in./8.38 mm

*Figure 3. Modular Switch Box Rear View*

# Conduit Entry

If you are running conduit to your enclosure, ensure the conduit cable entry enters from the bottom of the enclosure when mounted.

**Note:** To ensure moisture will not flow into the enclosure, a hole should be drilled at the lowest point in the conduit to provide drainage for any moisture.
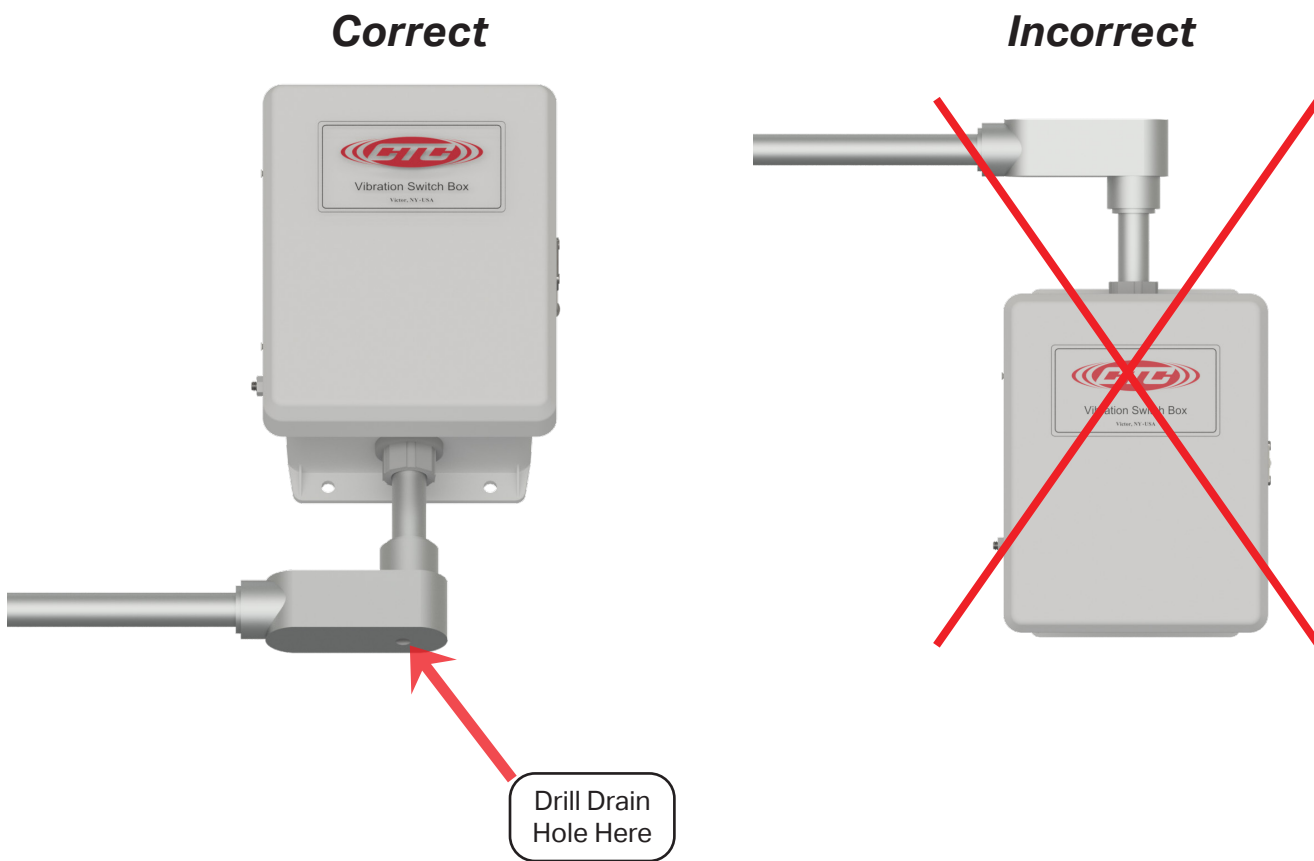


*Figure 4. Conduit Entry for Modular Switch Box*

# Grounding

Ensure the shield ground wire on the DSB1000 Series modular switch box is grounded to earth ground.

*A. Mounting to Earth Ground*

When mounting DSB1000 Series modular switch boxes to earth ground (such as an I-Beam), mount the shield ground wire using a mounting bolt through one of the mounting brackets on the enclosure.



***Figure 5. Proper Shield Grounding Technique***

*B. Mounting to non-grounded structure*

When mounting the modular switch box to a non-grounded structure, ensure the shield ground wire or customer supplied ground wire is tied to a source of earth ground.



***Figure 6. Ground Wire Placement***

# Sensor Installation

**Installation of sensors/signal input cable**

1.  Feed blunt end through the cable entry at the bottom of the enclosure.
    **Note:** it is recommended that cables are marked on both ends.

For cord grip cable entry, take off the cord grip cover with bushing and run cable into enclosure, hand tighten cord grip cover to base to prevent damage of cord grip.

**Figure 7. Front View**



**Figure 8. Bottom View**

1. Strip outer jacket of cable back 1¼ in. - 1½ in. and remove all of the shielding.
2. Strip red and black insulation back ¼ in.
3. Remove each terminal plug from respective channel.



(-) Common
Shield / Drain wire
(+)
(+)

**Figure 9. Stripped Wire**

4. Locate the appropriate plug (identified by channel number), remove it, and install the wires using a small flathead screwdriver. Depress selected position button to open terminal for respective wire. Push plug back into location. Refer to the table on page 11 for the correct orientation, based on application.
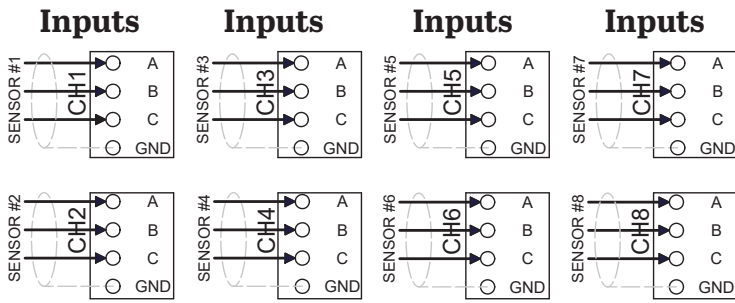
See input wiring chart on the next page for the specific type of sensor you are utilizing.

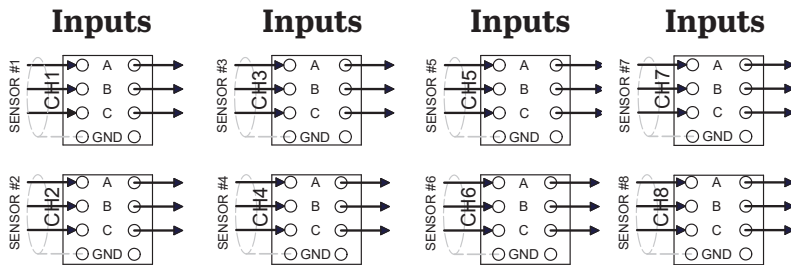*Figure 10. Connecting Cables to Modular Switch Box (DSB1000)*



*Figure 11. Connecting Cables to Modular Switch Box (DSB1001)*

5.  Insert plug into the appropriate PC board connector and double check to ensure that the cable is going to the correct channel.

6.  Mark the Measurement Location Card located on the inside front cover with a description of each measurement location.

| DUAL OUTPUT - VIBRATION & TEMPERATURE | | |
|---|---|---|
| SOCKET A | RED WIRE | VIBRATION (+) |
| SOCKET B | BLACK WIRE | COMMON |
| SOCKET C | WHITE WIRE | TEMPERATURE (+) |
| SOCKET GND | SHIELD DRAIN | SHIELD |

| BIAXIAL VIBRATION - AXIS X & Z | | |
|---|---|---|
| SOCKET A | GREEN WIRE | AXIS X (+) |
| SOCKET B | BLACK WIRE | COMMON |
| SOCKET C | WHITE WIRE | AXIS Z (+) |
| SOCKET GND | SHIELD DRAIN | SHIELD |

Note: CTC recommends using 4 conductor cables such as CB105, CB117, CB119, CB192, CB218, CB618, CB818, or CB819 for biaxial applications. If using a 3 conductor cable such as CB112, CB191, CB212, CB512, CB612, or CB812 substitue the red wire for green.

| TWO SINGLE AXIS VIBRATION ACCELEROMETERS | | |
|---|---|---|
| SOCKET A | RED WIRE | SENSOR 1 (+) |
| SOCKET B | BLACK WIRE | COMMON |
| SOCKET C | RED WIRE | SENSOR 2 (+) |
| SOCKET GND | SHIELD DRAIN | SHIELD |

| LP400 SERIES DYNAMIC & 4-20 mA VIBRATION | | |
|---|---|---|
| SOCKET A | WHITE WIRE | VIBRATION (+) |
| SOCKET B | BLACK WIRE | COMMON |
| SOCKET C | RED WIRE | 4-20 mA (+) |
| SOCKET GND | SHIELD DRAIN | SHIELD |

*Table 1. Wiring Instructions for Various Applications*

# Post Installation Testing

The TM1018 Accelerometer Verification Meter can be used to verify cable conductivity, sensor location and proper wiring connections. The Verification Meter will indicate if the sensor, cable and/or junction box is in working condition. It will also confirm bias voltage of the accelerometer, which will inform you of the operation of the internal accelerometer amplifier.
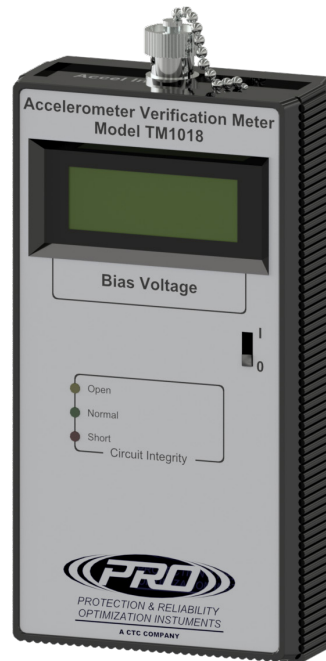


*Figure 12. TM1018 Accelerometer Verification Meter*

**Testing Method:**

1. Utilizing two personnel, Person A will be located at the modular switch box, while Person B will be located at the measurement location.
2. Once positioned, Person A will connect the TM1018 to the data collector output to the modular switch box and turn the Channel Selector to the channel that corresponds to the referenced measurement. Person A should observe a "NORMAL" LED reading.
3. Person B disconnects the cable from the accelerometer, and the TM1018 should respond with an "OPEN" LED. Reconnect the cable to the accelerometer, and the TM1018 should respond with a "NORMAL" LED.
4. Repeat for each measurement location to verify that accelerometer location is properly identified at the modular switch box.

The following LED Readout indicates the circuit integrity:

1.  Green LED: Normal. Indicates proper connection and an output bias will be given, indicating the health of the sensor (4 – 16 V indicates a healthy accelerometer).
2.  Yellow LED: Open Circuit. Indicates one of the following:
    a.  Cable connector is not connected to accelerometer.
    b.  Cable is open circuit (broken or not connected @ one end).
    c.  Accelerometer is not functioning correctly
3.  Red LED: Short Circuit. Indicates one of the following:
    a.  Water or contamination in the connector.
    b.  Reverse Wiring ((+) and (-) leads are reversed).
    c.  Wires in modular switch box or cable connector (+) & (-) are touching.

# WARRANTY & REFUND

**Warranty**

All CTC products are backed by our unconditional lifetime warranty. If any CTC product should ever fail, we will repair or replace it at no charge.

**Refund**

All stock products qualify for a full refund if returned in new condition within 90 days of shipment. Build to order products qualify for a 50% refund if returned in new condition within 90 days of shipment. Custom products are quoted and built specifically to the requirements of the customer, which may include completely custom product designs or private labeled versions of standard products for OEM customers. Custom products ordered are non-cancellable, non-returnable and non-refundable.