This document illustrates the main steps involved in the installation of VibroSystM equipment.

Keep in mind that only a general overview is presented, as this document is intended for planning purposes only. Concerns about safety issues or specific installation considerations are not included.

For safe operation and to ensure that your system functions at its optimum capability, the installation and adjustment process should be handled only by VibroSystM trained service specialists.

SBV-202 Measuring Chains with LIN-302V Signal Conditioner

Stator Bar Vibration Measuring Chains - Installation

(P/N: 9462-25I8A-301)

This manual divides into the following sections:

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1. OVERVIEW OF THE SBV-202 WITH LIN-302V MEASURING CHAINS

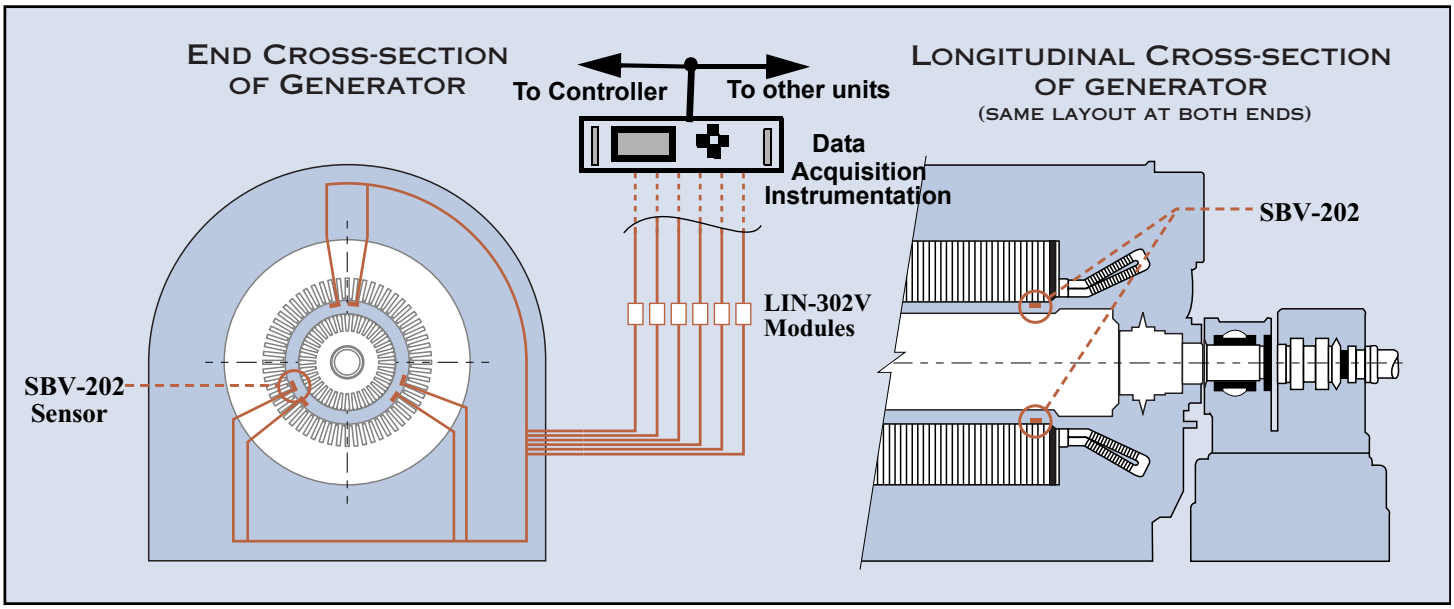
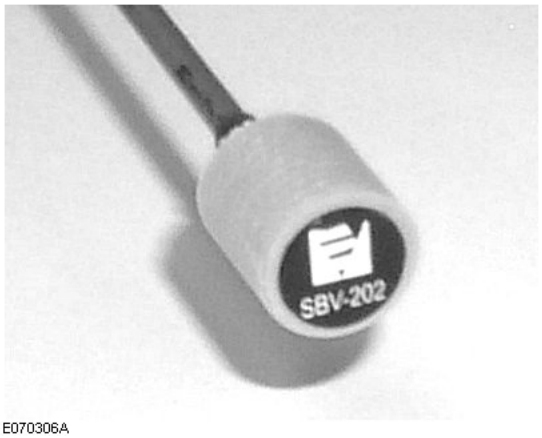


Figure 1 : Typical SBV-202 Sensor with LIN-302V Signal Conditioner Measuring Chains

2. INSTALLATION OF THE SBV-202 VIBRATION SENSOR

2.1 Preliminary considerations



- SBV-202 capacitive sensors are mounted into wedges to measure stator bar vibration. Sensors are screwed and glued into 1/2-20 threaded holes which must be machined into the wedges.
- The sensors are usually installed on the high voltage bars of each phase circuit.
- The cable attached to the sensor (integral cable) must remain tight against the wall of the stator. The length of the integral cable is 6 m (19.7 ft.). A first shield-to-ground wire lead at 80cm (31.5 in) from the sensor head must be connected to the stator. The cable is terminated with an SMA connector and a second shield-to-ground wire lead which must be connected to the signal conditioner.
- Note: the shield-to-ground wires are not terminated; a lug must be crimped at the end of each wire during the calibration process.
- Installation can take place in one of two possible situations: either the rotor is in place, or it has been removed.

Rotor is in place and can be rotated:

In this case, we suggest moving the rotor in such a position that the space between two poles provides access to the selected stator slot. If possible, remove one pole for an easier access to the stator.

Rotor has been removed:

The work is done more easily when the entire stator wall is accessible. Still, be careful and take all security measures.

IMPORTANT WARNINGS!

- **Surface of the stator bar must be conductive or semi-conductive**
- **Handle the sensor with great care.**
- **Do not apply paint or silicone on the sensor sensing surface**
- **Never exert traction on the cable or connector.**
- **Integral cables must be installed on the STATOR CORE to avoid disrupting the equipotential.**
- **Integral cables are calibrated and must never be cut or altered.**
- **Never install the cables on high voltage components. Never install two integral cables close or in parallel to one another. Keep the cables apart by at least one meter.**
- **Do not cut the grounding wires attached to the SBV-202 integral cable. Once the integral cable has been routed, a lug must be placed at the end of both grounding wires, and these two lugs must be connected to the ground.**

2.2 Additional considerations relative to installation

- The SBV-202 measuring chain is designed and calibrated to operate strictly according to the expressed specifications, and the cable must not be cut or altered.
- Possible locations for sensors are restricted by the 6m (19.7 ft.) length of the sensor integral cable.
- To prevent wear caused by vibration, use cable clamps, glue and epoxy to secure cables.

Prior to installation, make sure the integral cable and connector can be freely routed along the whole course of the cable run without restriction that may cause damage.

2.2.1 Supplies needed

E290806F

- clean dry cloth
- a sensor installation kit including:
  - silicone (3145RTV, or equivalent)
  - glue (Loctite 330) and its activator (Loctite 7387), or equivalent
- 24” length of protective tubing
- cable clamps

2.2.2 Tools needed

SBV-202 Adjustment Tool

E250509A

- assorted drill bits and taps
- cutters or saw for protective tubing
- fish-tape
- SBV-202 adjustment tool

2.3 Wedge Preparation

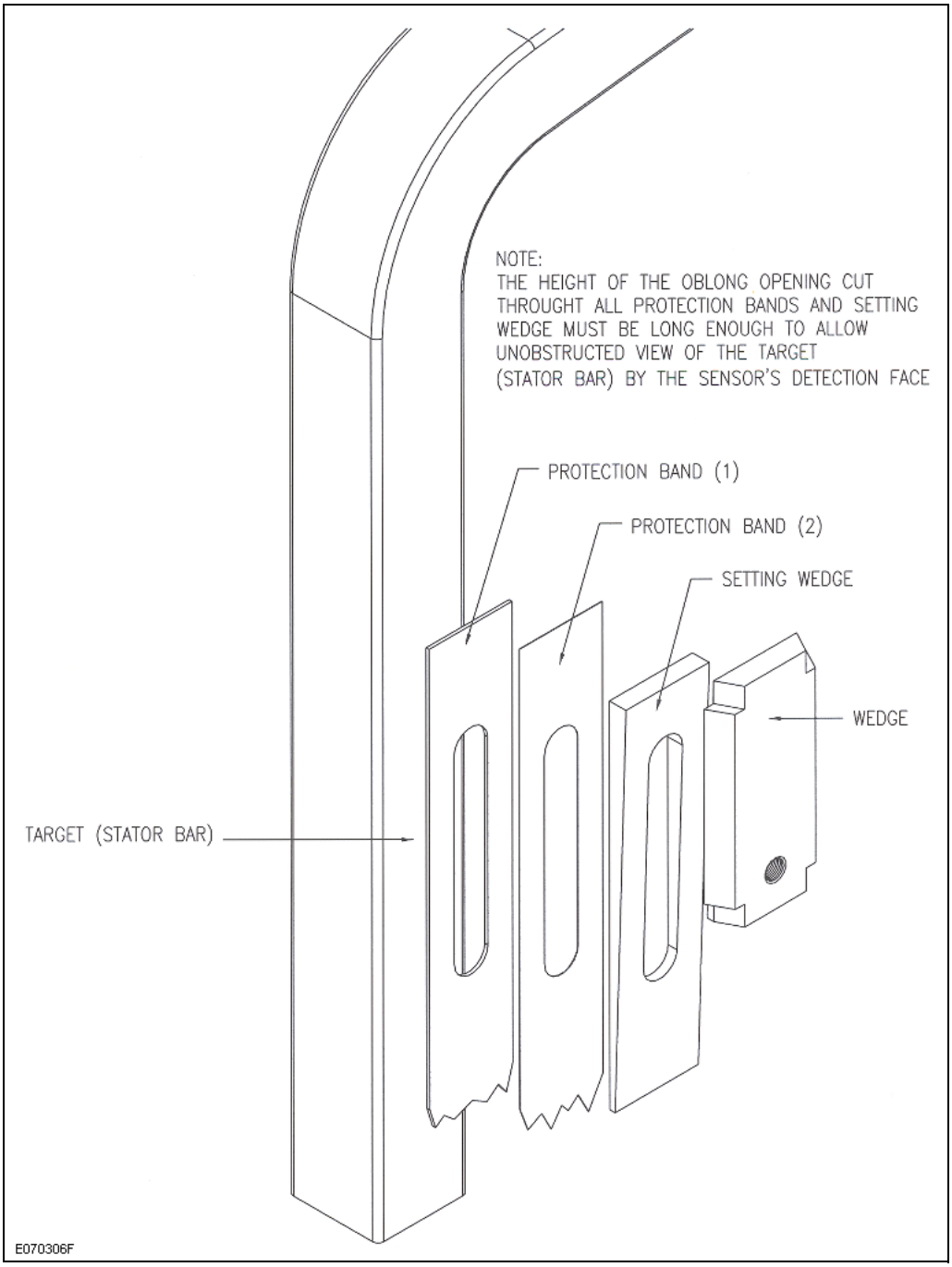


Figure 2 : Machined wedge and bands

1. After choosing the location where the sensor will be installed, remove the wedge, setting wedge, ripple spring and protections bands.

2. Machine a 1/2-20 filleted hole into the wedge and an oblong opening into all layers of setting wedge, ripple spring and protection bands.

   The height of the oblong opening cut through must be long enough to allow unobstructed view to the target (stator bar) by the sensor detection face.

3. Before putting the wedge and other components into the slot, verify the quality of the machined 1/20-20 thread for the SBV-202 sensor. It must be clean and deep enough to be able to easily screw the sensor into the hole.

4. Reassemble all components into the slot.

2.4 SBV-202 Sensor Installation

As the full measuring range is 0.3 to 2.3 mm, the SBV-202 sensor must be installed with a 1.3 mm gap between the face of the sensor and the target (stator bar).

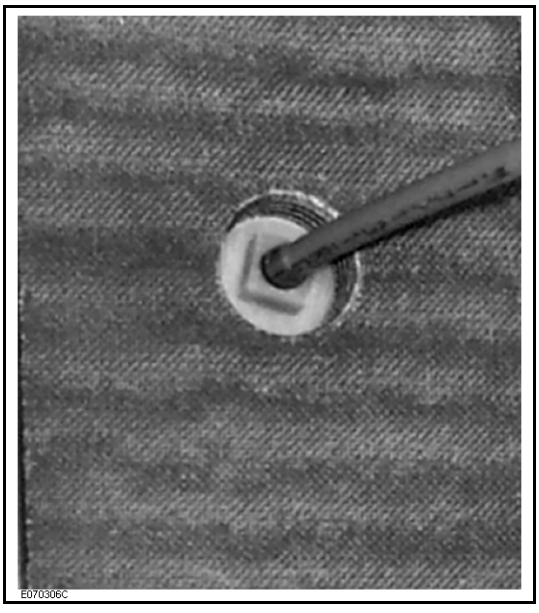
To adjust the sensor position, the complete measuring chain must be installed and powered. The adjustment tool is then used to precisely set the position of the SBV-202 sensor until a reading corresponding to mid-range (i.e. 12 mA +/- 2 mA) is obtained.

WARNING!

The entire measuring chain, including the two grounding wires on the sensor integral cable, must be correctly installed and connected before proceeding with the adjustment.

Failure to connect the grounding wires will result in incorrect readings and can compromise the operation of the measuring chain.

The SBV-202 sensor may be set in place permanently with epoxy only after the whole measuring chain has been secured and a mid-range reading of 12 mA +/- 2 mA has been confirmed.



1. The first step of the installation consists in placing the SBV-202 sensor into the wedge at approximately the correct distance.

   With a thread of 20 per inch, each turn of the sensor corresponds to approximately 1.25 mm. Screw the sensor into the wedge until it touches the stator bar, and then back out by one turn.

   During this operation, the integral cable must be handled with caution to avoid damage.

WARNING!

Avoid twisting or placing any other mechanical stress on the cable.

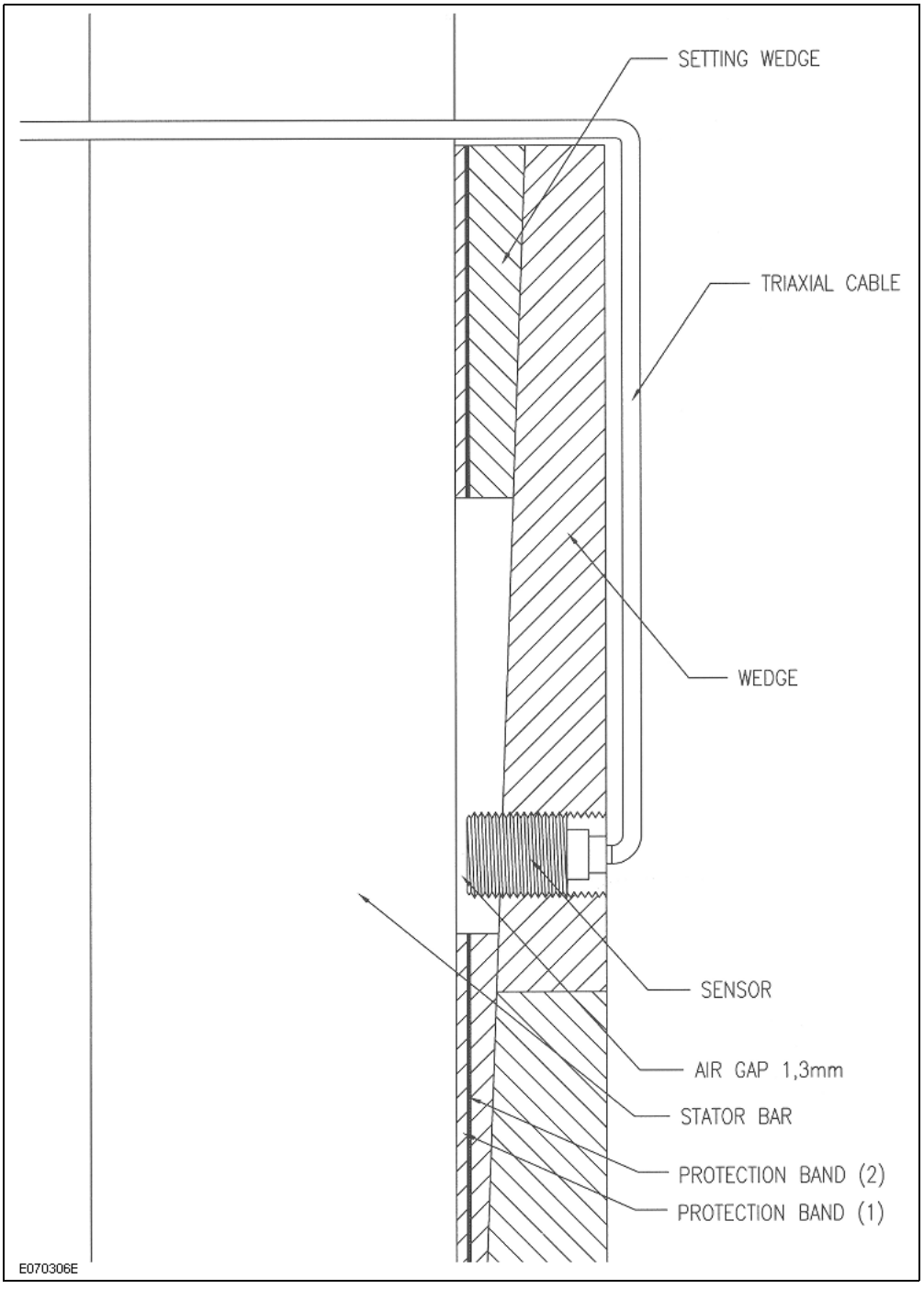
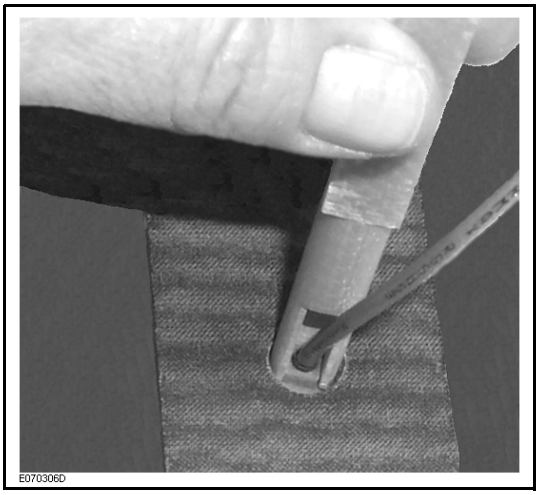


Figure 3 : Lateral cut-up view of SBV-202 sensor installed into a wedge



2. Complete the measuring chain (refer to *Section 2.5 - Cable Installation* and *Section 4 - LIN-302V Modules Installation*), apply power, and verify the output signal.

   Use the SBV-202 adjustment tool to adjust the sensor until the reading reaches mid-range.

   The output current between Signal Output (I_{OUT}) and Common (GND) terminals must measure 12 mA +/- 2mA.

3. Once the sensor has been correctly adjusted, proceed to a complete verification of the measuring chain installation and measuring integrity as follows:
   a) The sensor is correctly set in the wedge
   b) The two shield-to-ground wires from the integral cable are set to ground potential (first wire to stator, second to the LIN-302V signal conditioner)
   c) The integral cable SMA connector is tightly secured to the LIN-302V conditioner
   d) The M12 extension cable for power input and signal output is tightly secured to the LIN-302V conditioner
   e) The LIN-302V conditioner must be turned on for a warm-up period of at least 15 minutes prior to the first reading
   f) The output current between Signal Output (I_{OUT}) and Common (GND) terminals must be 12 mA +/- 2mA

4. Once the measuring chain has been adjusted and validated, proceed to the permanent installation as follows:
   a) Apply silicone into the threaded hole to prevent sensor movemen
   b) Using quick set Loctite, tack the integral cable against the stator core as it runs out of the air gap up to the top of the stator core
   c) Apply a bead of silicone on both sides of the cable to protect it against debris and wear caused by vibrations
   d) Apply silicone on the loops formed by the cable. Use enough to cover the loops, and prevent damage from air turbulences and small particles circulating at great velocity into the air gap
   e) Apply enough silicone at each end of the protection tubing to form a plug
   f) Apply silicone at all locations where the cable comes in contact with a surface that may wear
   g) Protect the cable from the protection tubing to the cabinet housing the conditioner by placing it into a conduit
   h) Make sure the shield-to-ground wire on the sensor side of the cable is correctly fastened to the stator. The grounding lug at the end of the wire must be fixed to the stator as to ensure an optimal electrical connection and mechanical solidity.

2.5 Cable Installation

IMPORTANT WARNING!

Integral cable must be installed on the stator core to avoid disrupting the equipotential.

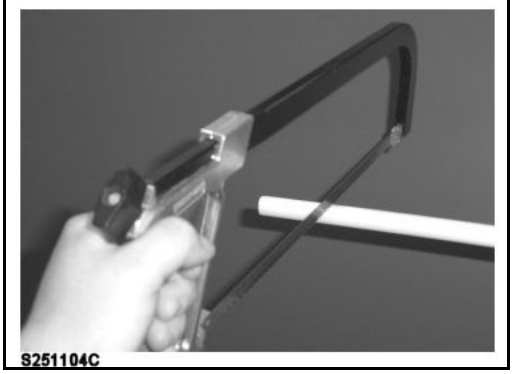
2.5.1 Supplies needed

- watertight connector
- 90° 3/8 elbow
- 3/4” to 3/4” coupling, 3/4” to 1/2” reducer
- protective tubing
- heat-shrinkable tubing
- grounding lugs and screws
- cable clamps
- rigid or flexible conduits (not shown)

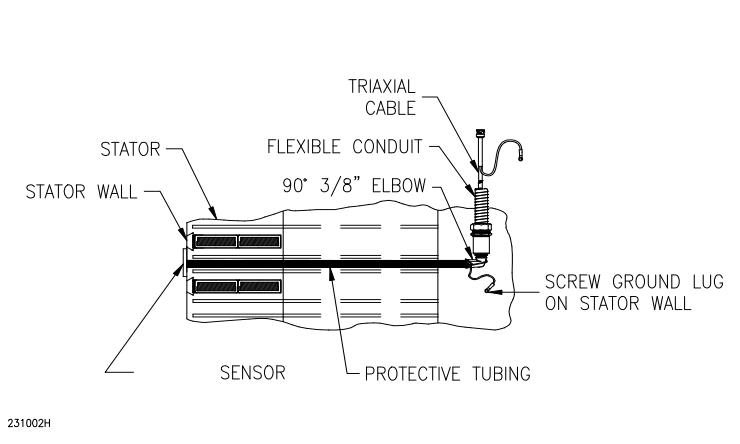
2.5.2 Tools needed

- assorted drill bits and taps
- heat gun
- cutters or saw for protective tubing
- fish-tape

- **To avoid damage to the connector, protect it before pulling the cable into the conduit.**
- **There is a grounding cable on both ends of the cable. Make sure both are perfectly installed**.
- **Never install the cables on high voltage components.**



1. Cut a section of protective tubing to the needed length. Make sure the tubing does not stick out into the air gap. This tubing can be heated and lightly bent to adapt to the stator contour.
2. Gently pull the cable inside the tubing, just enough to straighten the cable and eliminate slack. Be careful not to add any stiffness to the cable. Once the cable has been straightened inside the tubing, the shield-to-ground cable should hang out of the tube. Drill and tap a hole into the stator casing within reach of the ground lug. Attach the ground lug with the screw.



3. Determine the run of the protective conduit, from the LIN protection box to the location of the elbow. Always keep in mind that the maximum length of the integral cable is 6 m.
4. Unroll the flexible conduit following the planned course of the cable. Cut the conduit to desired length.
5. With a fish-tape, carefully pull the cable into the conduit.

Figure 4 : Protective tubing and elbow assembly

2.5.3 Permanent fastening of the cables

The integral cable cannot be cut. Any surplus length of cable must be stored inside the protection box.

Vibrations can cause mechanical damage by abrasion. To ensure lasting operation of the system, make sure all cables are firmly held in place over their entire run with adhesive and/or cable clamps.

A Clamp kit has been added to complete the installation kit of the measuring chains. The clamps will be used to secure the protective tubing and the coupling firmly against the installation surface to make sure they remain flat and immobile.

The Clamp kit is comprised of:

- Clamps for 1” conduits
- Clamps for 3/8’“conduits
- Flat washers ¼ “
- Spring lockwashers ¼ “
- Hexagon cap screws ¼ - 20 x 5/8 ”

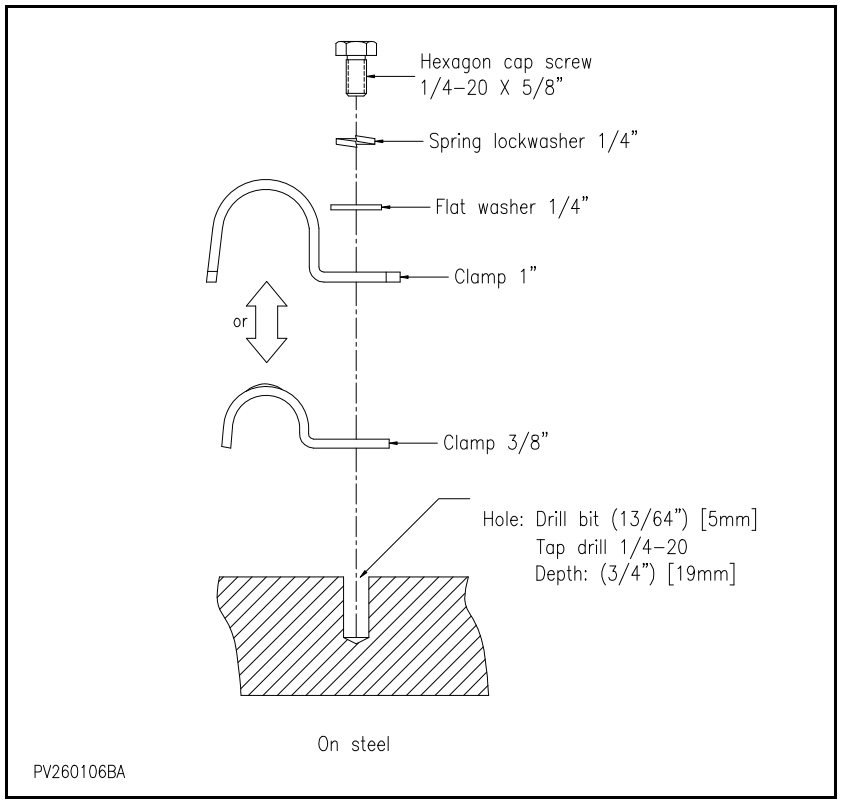


Figure 5 : Clamp installation

1. Drill holes as shown in *Figure 5 : Clamp installation*.
2. Secure the protective tubing and its coupling (refer to *Figure 4 : Protective tubing and elbow assembly*).

3. INSTALLATION OF THE LIN-300 PROTECTION BOXES

LIN-300 modules may be protected by an ABS enclosure (single module) or a larger steel enclosure with a mounting plate for two modules and, if desired, a rail-mounted power supply and terminal blocks. The following details the installation procedure for both types of protection boxes.

3.1 Installation of the 10X6X3 ABS Protection Box

3.1.1 Preliminary considerations

The ABS protection box is a plastic enclosure which can house a single LIN-300 Series conditioner. Outer dimensions are 254 x 152 x 76 mm (10 x 6 x 3 in.).

Figure 1: Front view of the ABS protection box

All connected cables must be protected by flexible protective conduits and attached with liquidtight connectors. Prepare the openings on the protection box and set the liquidtight connectors in place before fastening the protection box.

To determine the best location for the protection box, survey all potential locations with respect to the following limitations:

- the optimal location at which the protection box can be installed depends on the length of the triaxial cables used;
- all cables should be placed inside 19mm (3/4") flexible protective conduits or equivalent when possible;
- sufficient space must be allowed around the protection box for the installation of the protective conduits.

Figure 2 : Inside view of the ABS protection box

When routing cables into the protection box for connection to the conditioner, the excess length of cable can be coiled as shown inside the protection box.

Note: Be carefull when handling the cable. Do not kink the cable and avoid forming sharp bends.

3.1.2 Installation of the Protection Box

Figure 3 : Protection Box -Installation kit

3.1.3 Supplies needed

- (2) 3/4” flexible conduit liquid tight connectors
- (4) bolts 1/4-20 x 5/8”
- (4) concrete anchors
- (4) bolts M6 - 1.00 x 16 mm
- (4) spring lockwashers 1/4”
- (4) flat washers 1/4”
- (4) brackets
- (4) spring lockwashers 10-32
- (4) flat washers 10-32
- (4) screws 10-32 x 1/2”

3.1.4 Tools needed

- Drill bits 5mm (13/64’’) and 8mm (5/16’’)
- Tap drill 1/4’’-20
- Hammer drill
- Drill
- Concrete drill bit 8mm (5/16’’)
- Anchor setting punch
- Ratchet set
- 3/4’’ conduit hole saw or knockout punch set for 3/4’’ liquidtight fittings

The installation of the LIN-300 ABS protection box involves two main steps:

1. Preparing the holes for the connectors;
2. Fastening the protection box.

3.1.5 Preparing the holes for the liquidtight connectors

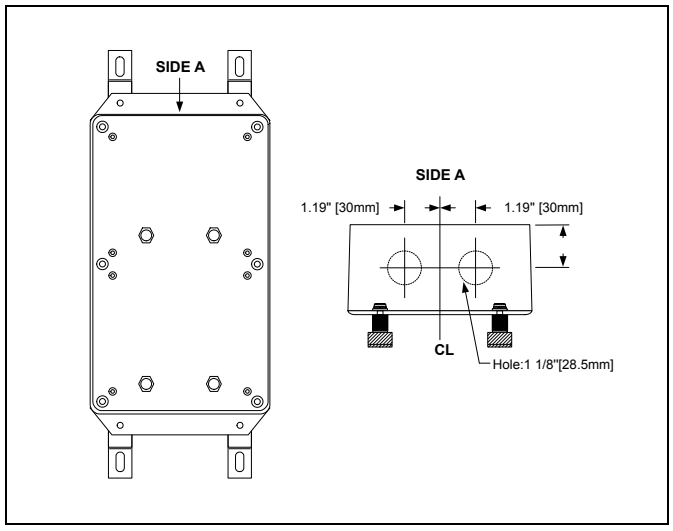


Figure 4 : Suggested location for liquidtight connector holes

1. To prevent damage, remove the LIN conditioner before drilling the protection box. Do not misplace the anti-vibration rubber mounts added to the mounting brackets.

   Before deciding on the location for the holes, make sure that the liquidtight connectors will not be too close to the LIN conditioner once it is reinstalled, and that the cables will not be kinked.

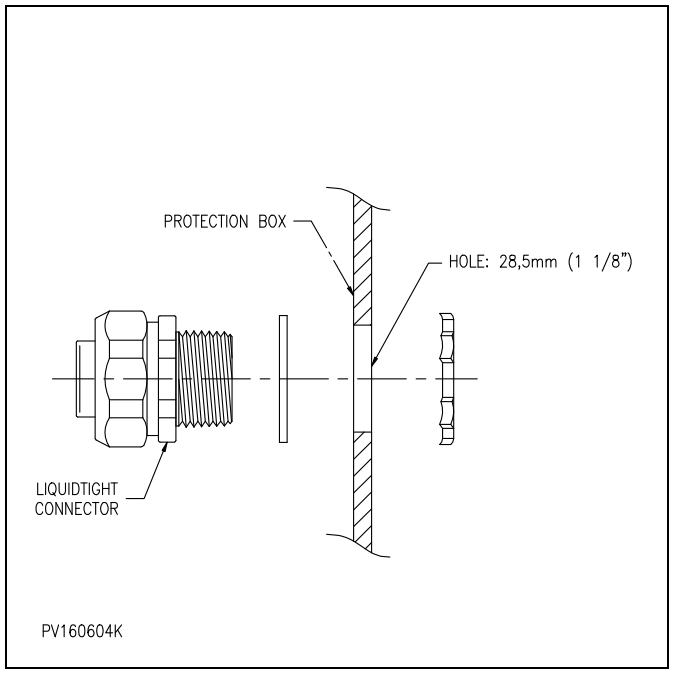


Figure 5 : Mounting the liquidtight connectors on ABS protection box

2. Drill holes and install the the liquidtight connectors. Refer to *Figure 5 : "Mounting the liquidtight connectors on ABS protection box"*.

3.1.6 Fastening the protection box

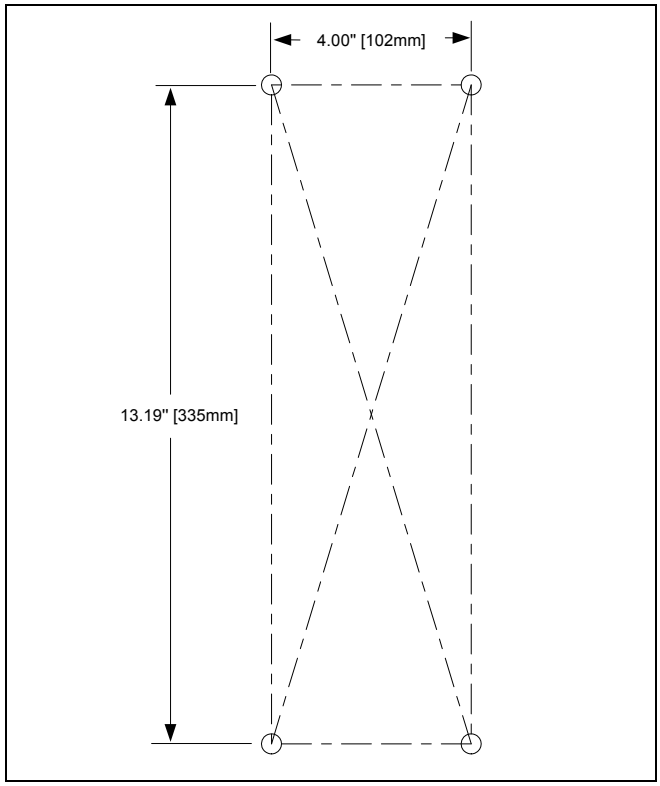


Figure 6 : Mounting holes location

Choose the location for the protection box.

The protection box can be mounted on a concrete wall or, whenever possible, directly onto the structure of the stator or machine casing.

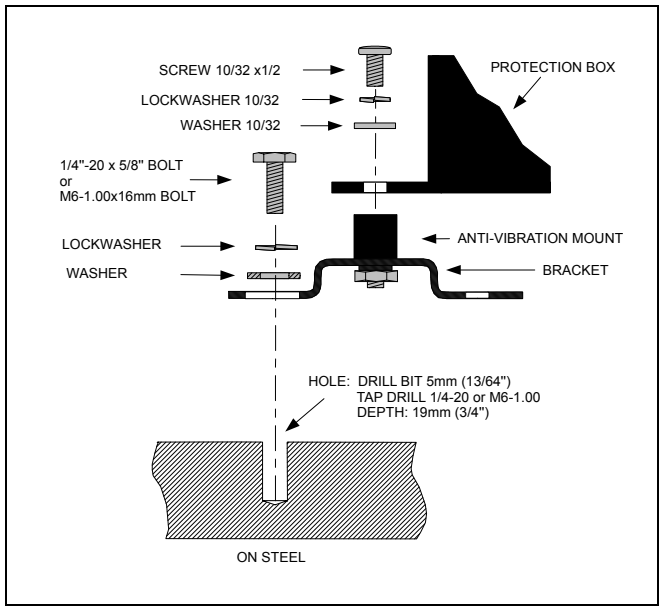


Figure 7 : Fastening the ABS protection box on steel

Mounting a protection box on the stator or machine casing:

1. Drill (refer to *Figure 6 : "Mounting holes location"*) and thread into the structure (refer to *Figure 7 : "Fastening the ABS protection box on steel"*).
2. Fasten the protection box as shown.

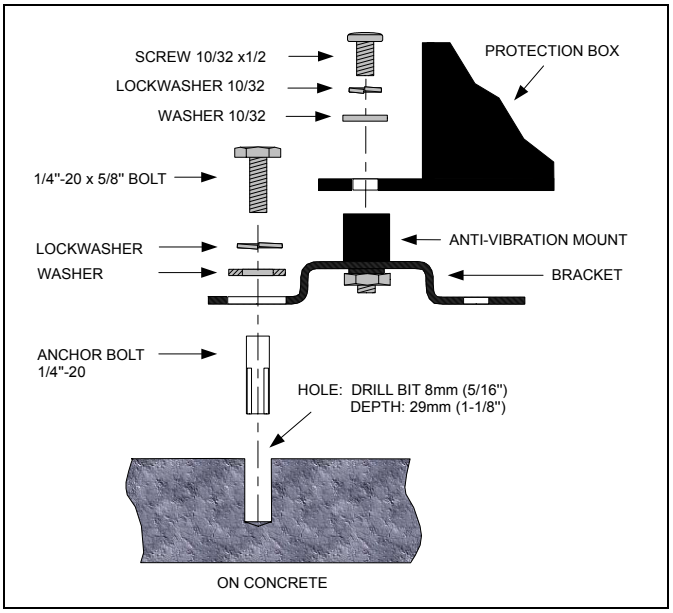


Figure 8 : Fastening the ABS protection box on concrete

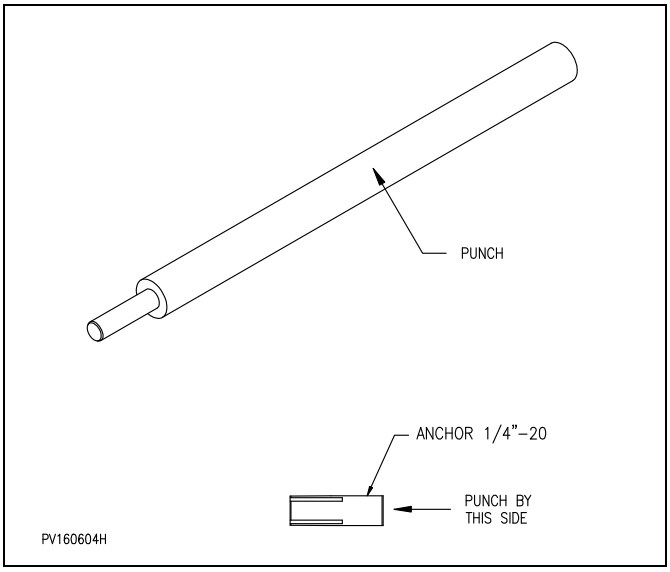


Figure 9 : Anchor setting punch for concrete anchors

Mounting a protection box on concrete:

1. Drill into the concrete wall (refer to *Figure 6 : "Mounting holes location"*) and drive the anchor bolts with the special punch (*Figure 9 : "Anchor setting punch for concrete anchors"*).
2. Fasten the ABS protection box as shown (refer to *Figure 8 : "Fastening the ABS protection box on concrete"*).

3.2 Installation of the 14 x 12 x 8 Metal Protection Box

3.2.1 Preliminary considerations

The standard protection box is a watertight, dust-tight and corrosion-resistant metal enclosure that protects the electronic components of the acquisition units. Outer dimensions are 356 x 305 x 203mm (14 x 12 x 8 in.).

Figure 10 : Front view of the 14x12x8 protection box

- To prevent damage to the electronic components, always remove the mounting panel before working on a protection box.

Note: Except for the ground wire, all connected cables must be protected by flexible protective conduits and attached with liquidtight connectors. Prepare the openings on the protection box and set the liquidtight connectors in place before fastening the protection box.

Figure 11 : Suitable location for a protection box

To determine the best location for the protection box, survey all potential locations with respect to the following limitations:

- The protection box must be installed within the appropriate distance according to the specifications of the components mounted inside;
- All cables should be placed inside 19mm (3/4”) flexible protective conduits or equivalent when possible;
- Sufficient space must be allowed around the protection box for the installation of the protective conduits;
- Sufficient clearance is necessary to open the door for easy access of components.

3.2.2 Installation of the Protection Box

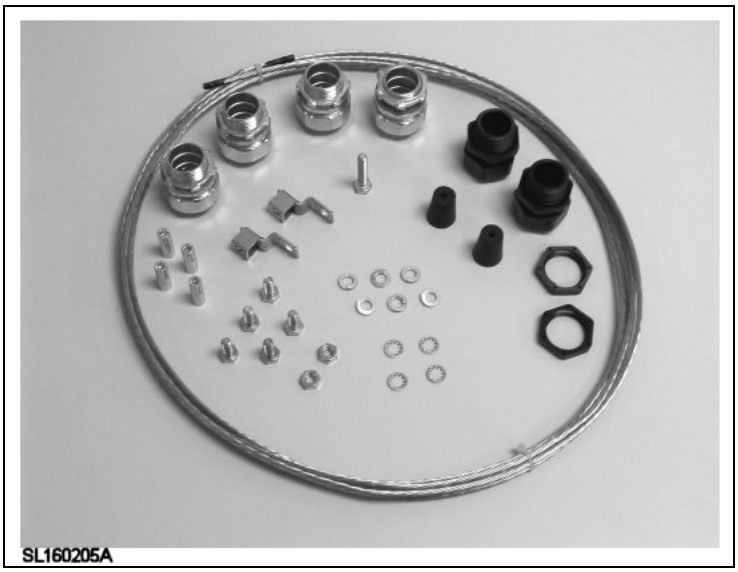


Figure 12 : Protection Box -Installation kit

3.2.3 Supplies needed

- (4) 3/4” flexible conduit liquid tight connectors
- (2) hex machine screw nuts 1/4-20
- (6) spring lockwashers 1/4”
- (4) tooth lockwashers 1/4”
- (5) bolts 1/4-20 x 5/8”
- (1) bolt 1/4-20 x 1-1/4”
- (4) concrete anchors
- (2) copper lugs
- (1) ground copper wire (5m)
- (2) liquidtight strain relief connector
- (2) nylon locknuts 3/4’’
- (2) rubber adapters for liquidtight strain relief connectors

3.2.4 Tools needed

- Drill bits 5mm (13/64’’) and 8mm (5/16’’)
- Tap drill 1/4’’-20
- Hammer drill
- Drill
- Concrete drill bit 8mm (5/16’’)
- Punch
- Ratchet set
- 3/4’’ conduit hole saw or knockout punch set for 3/4’’ liquidtight fittings

The installation of the LIN-300 metal protection box involves three main steps:

1. Preparing the holes for the connectors and grounding assembly;
2. Fastening the protection box;
3. Grounding the protection box.

3.2.5 Preparing the holes for the liquidtight connectors and grounding assembly

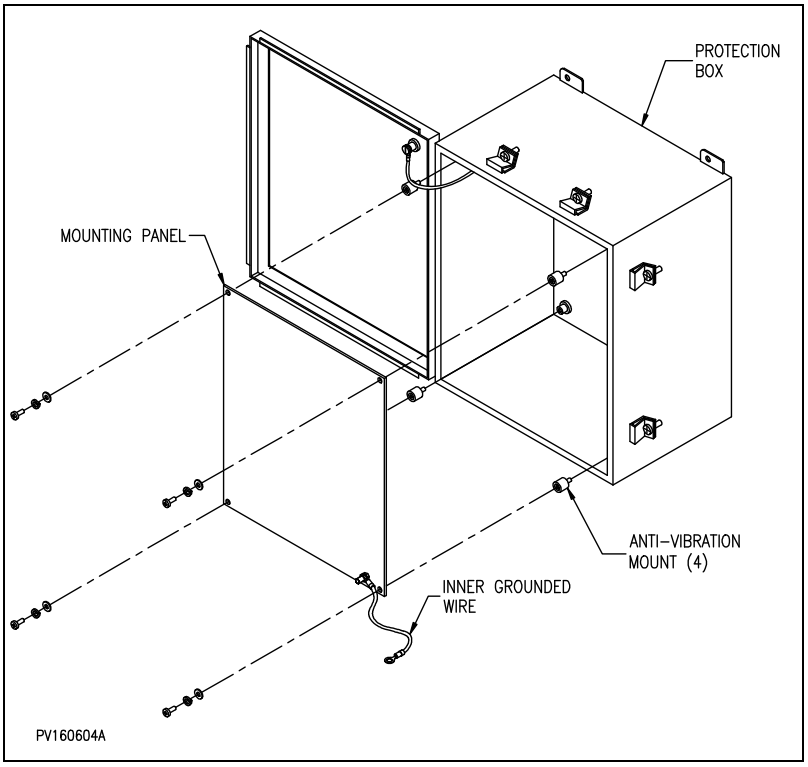


Figure 13 : Removing the mounting panel and anti-vibration mounts

1. As a precaution before drilling the protection box, remove the mounting panel to prevent metal particles infiltration. Do not misplace the anti-vibration rubber mounts added to the mounting panel assembly.

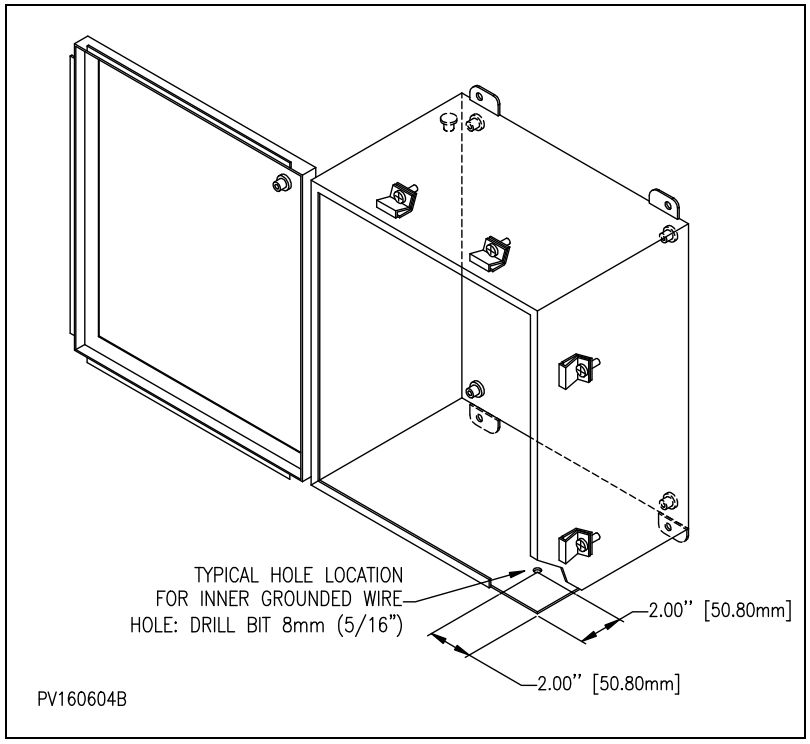


Figure 14 : Typical location for inner grounding wire

2. Drill a grounding hole inside the protection box according to *Figure 14 : "Typical location for inner grounding wire"*.

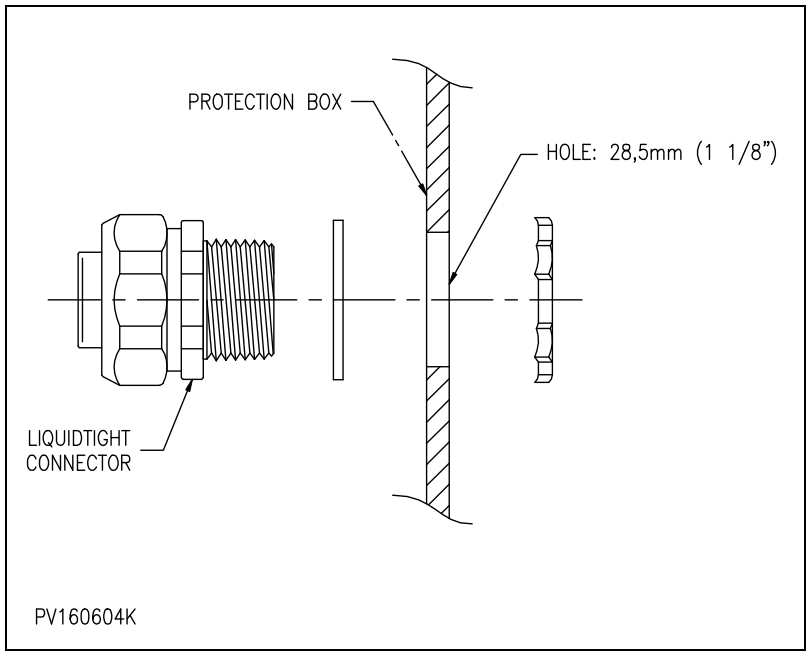


Figure 15 : Mounting the liquidtight connectors

To determine the location for the holes, keep in mind the components on the mounting panel. Make sure the components will not get in the way of the connectors once the mounting panel is reinserted.

3. After visualizing the routing of all cables, drill holes for the liquidtight connectors. Refer to *Figure 15 : "Mounting the liquidtight connectors"*.
4. Install the connectors.

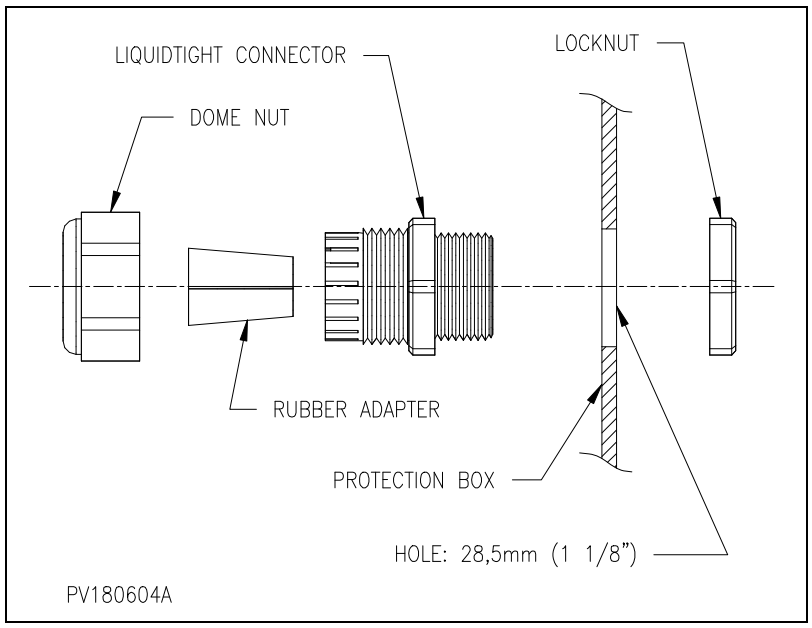


Figure 16 : Mounting the liquidtight strain relief connectors

When using conduit other than the 19mm (3/4'') conduit, use the appropriate liquidtight strain relief connectors according to the size of the cable.

5. Drill holes for the appropriate liquidtight strain relief connectors. Refer to *Figure 16 : "Mounting the liquidtight strain relief connectors"*.
6. Install the connectors.
7. Reinsert the mounting panel.

3.2.6 Fastening the protection box

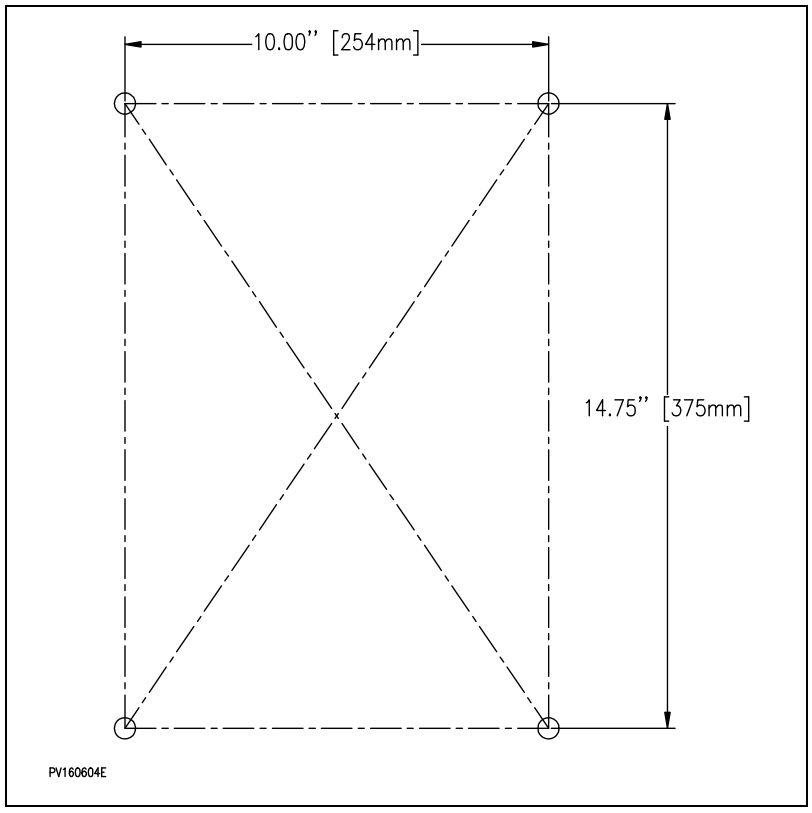


Figure 17 : Mounting holes location

Choose the location for installing the protection box.

The protection box can be mounted on a concrete wall or, whenever possible, directly onto the structure of the stator or machine casing.

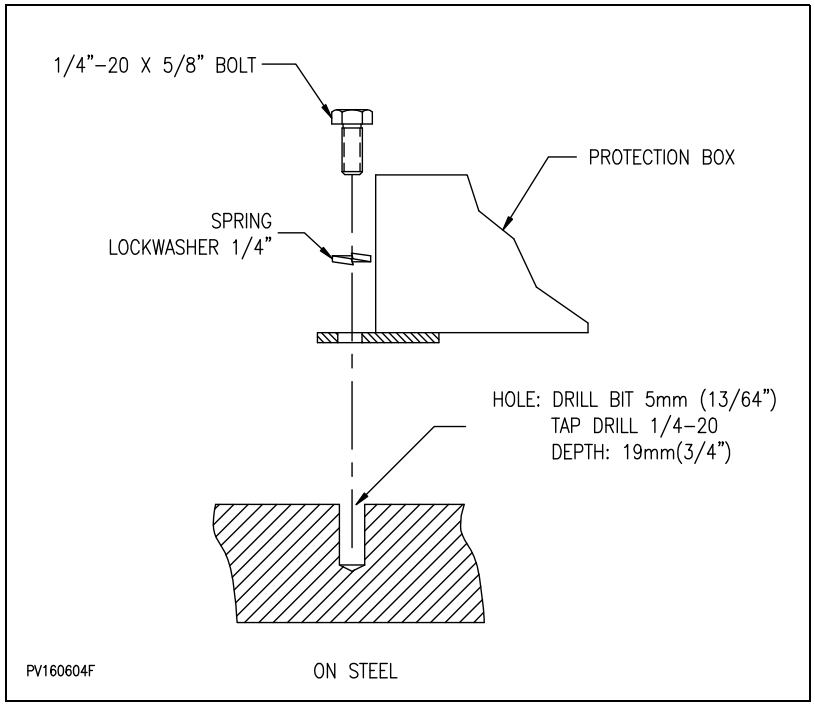


Figure 18 : Fastening the protection box on steel

Mounting a protection box on the stator or machine casing:

1. Drill (refer to *Figure 17 : "Mounting holes location"*) and thread into the structure (refer to *Figure 18 : "Fastening the protection box on steel"*).
2. Fasten the protection box as shown.

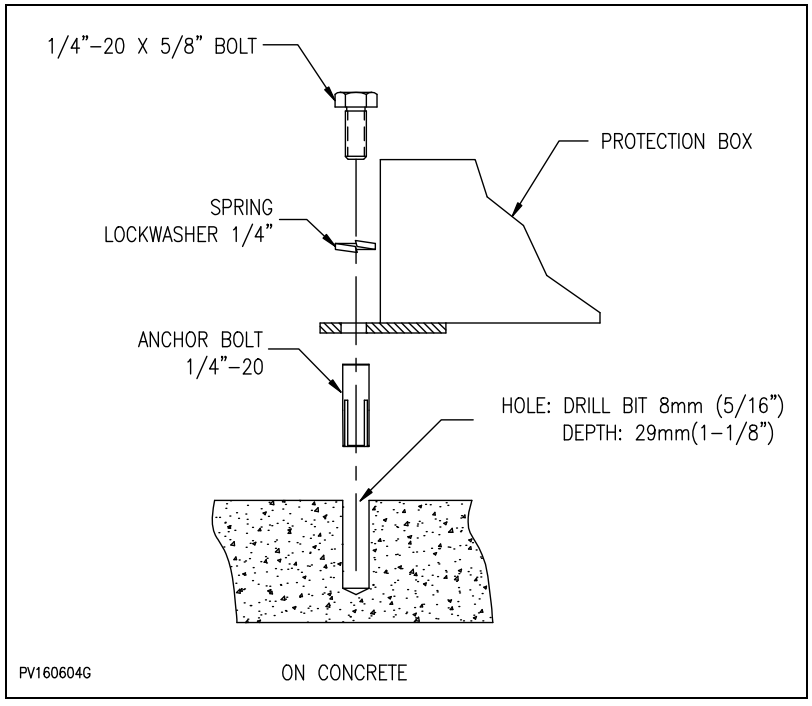


Figure 19 : Fastening the protection box on concrete

Mounting a protection box on concrete:

1. Drill into the concrete wall (refer to *Figure 17 : "Mounting holes location"*) and set the anchor bolts with the special punch (refer to *Figure 20 : "Punch for concrete anchors"*).
2. Fasten the metal protection box as shown (refer to *Figure 19 : "Fastening the protection box on concrete"*).

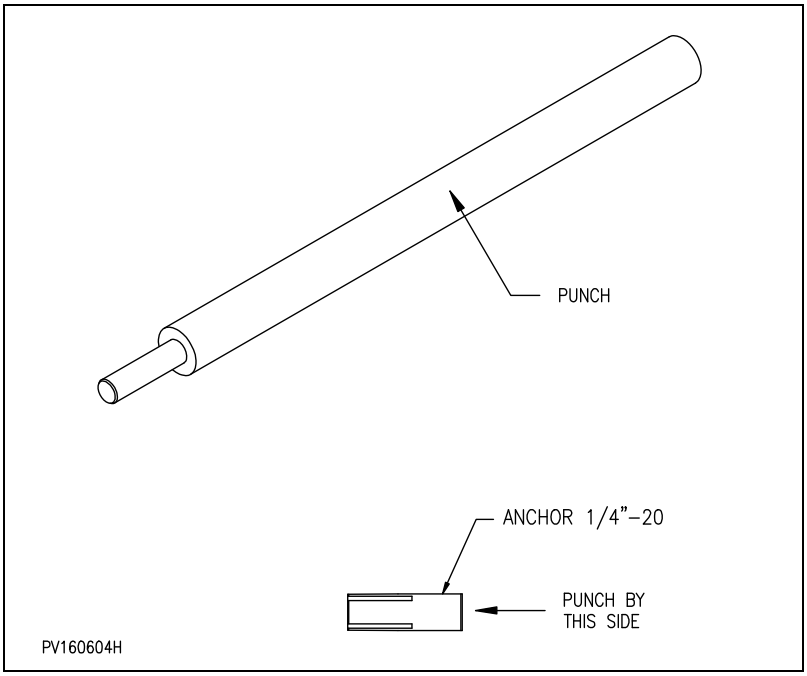


Figure 20 : Punch for concrete anchors

3.2.7 Grounding the protection box

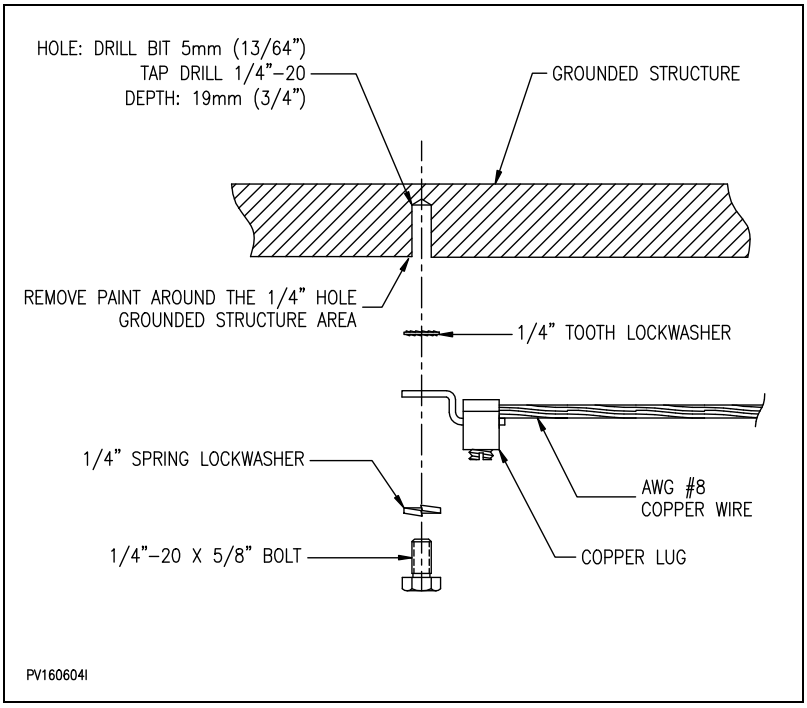


Figure 21 : Fastening the ground wire to grounded structure

Grounding is essential for protection against hazardous voltage as well as for system operation integrity. For best grounding, provide the shortest path possible between the protection box and the grounded structure.

1. Drill and tap a hole in a grounded structure. Make it as close as possible to the 6mm (1/4'') hole in the bottom of the protection box.
2. Fasten the AWG #8 copper wire to the structure according to *Figure 21 : "Fastening the ground wire to grounded structure"*.

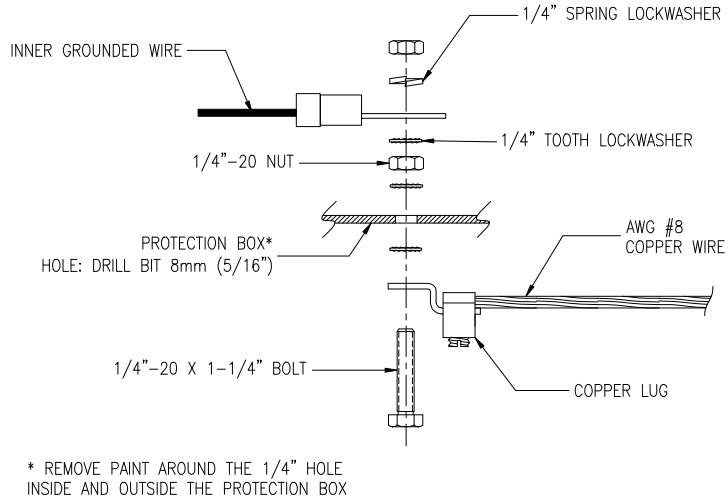


Figure 22 : Fastening the grounding wires to the protection box

3. Cut the copper wire and fasten it to the outside of the protection box as shown in *Figure 22 : "Fastening the grounding wires to the protection box"*.

4. INSTALLATION OF LIN-302V SIGNAL CONDITIONER FOR SBV-202 SENSOR

4.1 Preliminary considerations

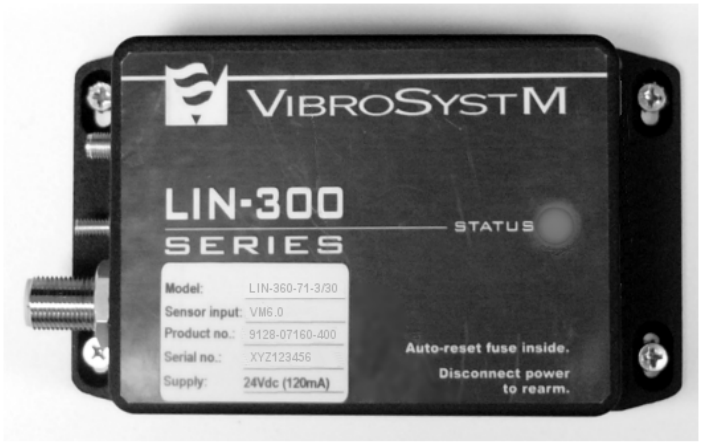


Figure 23 : LIN-300 Series module

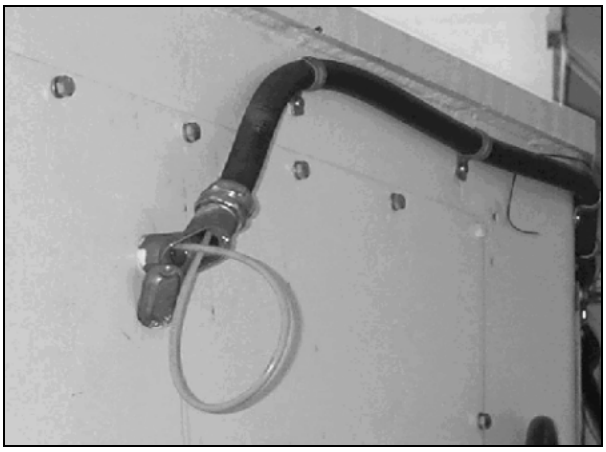
- LIN-302V modules are signal conditioning units designed to process the raw output signal received from SBV-202 Stator Bar Vibration sensors.
- Input power and output signal are both carried through an extension cable with an M12 connector.
- The module delivers a 4 to 20 mA linearized raw vibration output signal which can be used by AGMS and ZOOM systems, a PCU-100 Programmable Monitor, or third-party instrumentation.

- **The LIN-302V processes a signal from the SBV-202 sensor on a range of 0.3 mm to 2.3 mm**
- **The installation of the LIN protection box, power and signal output cables and triaxial cables from the sensors should be completed before proceeding to the connection of the LIN-300 modules.**

Figure 24 : Pair of LIN-300 Series modules inside a protection box

- To avoid crosstalk, special care must be taken while routing the cables. Two cables should never be inserted in the same conduit. LIN-300 modules can be installed in pairs on a mounting plate enclosed in a wall-mounted protection box, but one LIN-300 module per enclosure is preferable. Call VibroSystM if further information is needed.
- +24 VDC power input is required. LIN-300 conditioners can receive power from the XPSP Series External Power Supply through the M12 extension cable. A miniature rail-mount power supply can also be installed in the protection box.
- The length of the standard M12 extension cable is 30m (100 ft.). This cable is rated for a maximum operation temperature of 80° C (176° F). Since this cable is not calibrated, it can be cut. The cable should be protected by flexible or rigid conduit.

4.2 Installation of the protective conduit for M12 extension cable



1. Determine the run of the protective conduit, from the protection box to the location of the instrumentation cabinet. Unroll the flexible conduit following the planned course of the cable. Cut the conduit to desired length. Cable clamps must be used to secure protective conduits.

   The maximum length of the cable from LIN-300 signal conditioner to instrument is 300m (330 ft.).

   With a fish-tape, carefully pull the cable into the conduit. Notice the direction of the cable: the connector must be placed on the LIN-300 signal conditioner side.

   Any surplus length of cable may be cut or pulled back and stored inside the protection box or cabinet.

4.3 Installation the M12 extension cable (Power Input and Signal Output)

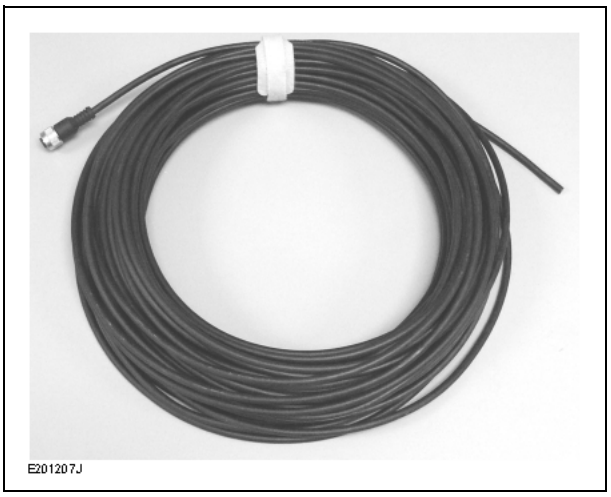


Figure 25 : Preassembled M12 extension cable

4.3.1 Supplies needed

- M12 extension cable (standard M12 or field-assembled)
- rigid or flexible conduits (not shown)
- cable clamps (not shown)

4.3.2 Tools needed

- assorted drill bits and taps
- cutters or saw for protective tubing
- fish-tape
- wire-stripper
- wrench

4.3.3 Preparation of a field-assembled extension cable using Belden cable and M12 connector

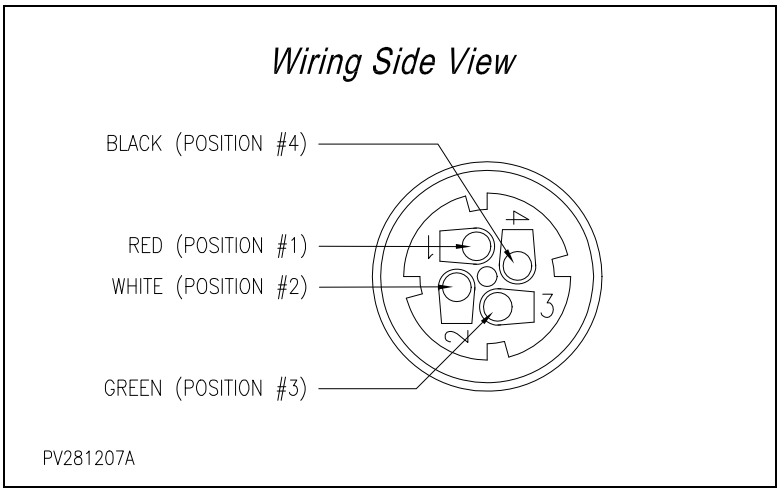


Figure 26 : M12 Female Connector for field assembled extension cable - wiring assignment

The pin-out of the M12 connector is shown in *Figure 26 : "M12 Female Connector for field assembled extension cable - wiring assignment"* and *Table 1: "Extension cable pin-out"*.

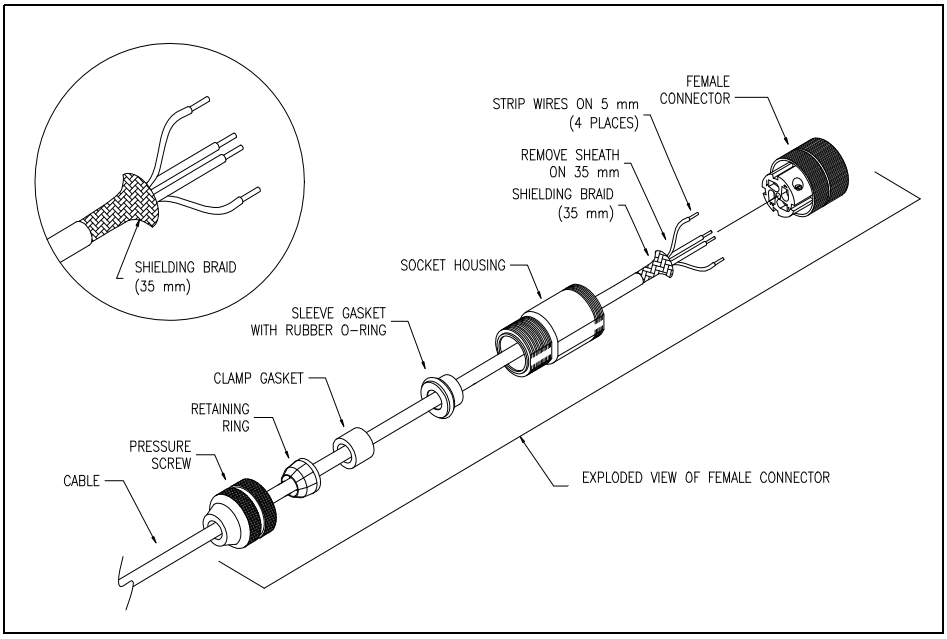


Figure 27 : Connector assembly

1. Slip the various parts on the cable: pressure screw, retaining ring, clamp gasket, sleeve gasket with its rubber o-ring, and socket housing.
2. Strip 35 mm off the external sheathing of the cable.
3. Push shielding braid back.
4. Remove foil and nylon thread (under the shielding braid).
5. Strip 5 mm off the insulation of the wires. Install the wires to the female connector the pin-out table, push together and fasten all housing components.

Table 1: Extension cable pin-out

Pin #	Standard 30 m (100 ft.) pre-assembled M12 cable	#9940 Belden* cable for field assembly	Designation
1	Brown	Red	Power supply +24 VDC
2	White	White	Signal Output (I_{OUT})
3	Blue	Green	Common (GND)
4	Black	Black	-

Note*: the #9940 Belden cable may be replaced with any cable with similar characteristics.

4.4 Cable connections to the LIN-302V module

To prevent damage to the LIN module and avoid risk of injuries: If the connection has already been completed at the other end of the power and output cable, make sure the power is turned off at the source before proceeding.

WARNING !

The ground lug must never come in contact with the SMA connector.

4.4.1 Connection of the SBV-202 integral cable

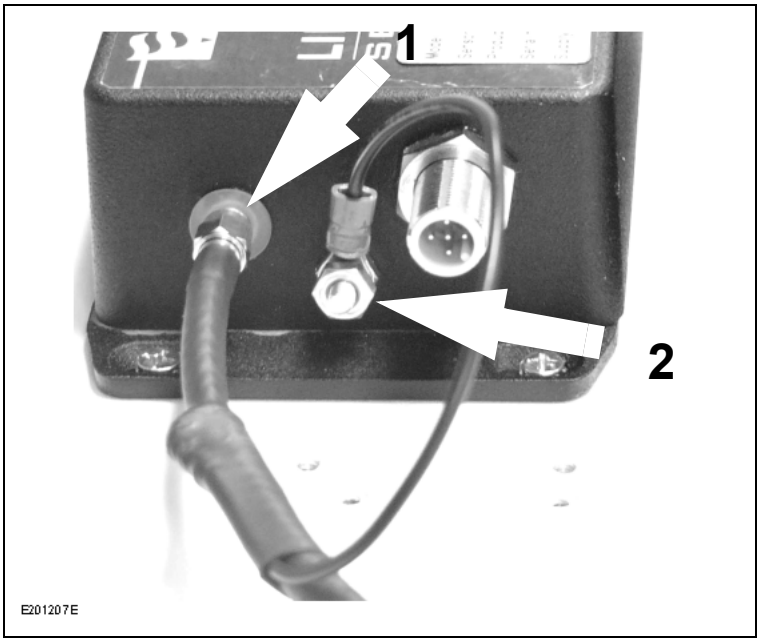


Figure 28 : SBV-202 integral cable connected to a LIN-302V Series module

1. Connect the integral cable from the SBV-202 sensor to the SMA socket. Thighten firmly with a flat wrench.

2. Insert the tooth lock washer, the round grounding lug, the spring lock washer and the nut onto the grounding bolt. Tighten the nut firmly to ensure a good grounding connection.

4.4.2 Connection of the M12 extension cable (Power Input and Signal Output)

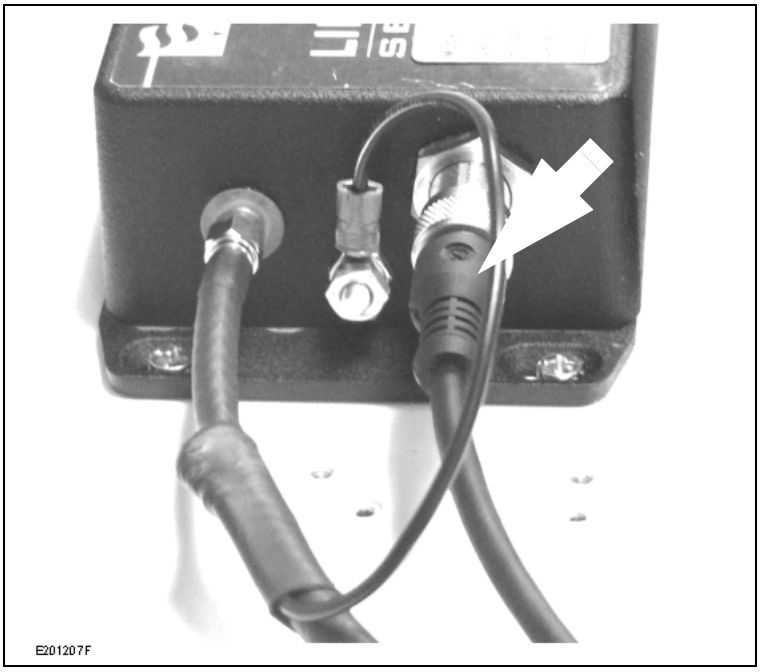


Figure 29 : Power and Signal output cable (right) connected to a LIN-300 Series module

1. Insert the M12 connector and engage by turning clockwise. All connections must be firmly tightened.

4.5 Verification

The linear measuring range for the SBV-202 measuring chains is:

- with LIN-302V-6I-0.3/2.3 linearization module:0.3 to 2.3 mm (*7.6 to 58.4 mils*)

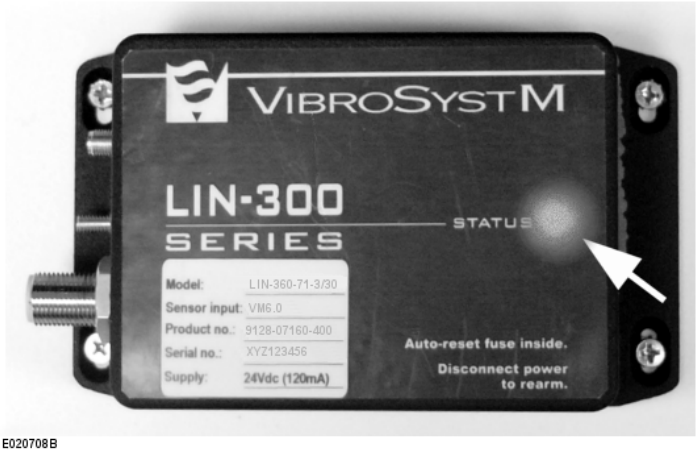
Output Signal Values

The output provides linear current throughout the measuring range. The distance value expressed in mm or in mil is obtained by applying the following transfer formula:

LIN-302V-6I-0.3/2.3:

- $D_{mm} = (I_{out}(mA) - 1.60) / 8$ over 4-20 mA output
- $D_{mil} = (I_{out}(mA) - 1.60) / 0.315$ over 4-20 mA output

4.6 LED functionality



A colored LED provides a visual clue to the status of the LIN-300 Series signal conditioner.

- A green pulse (one brief flash per second) indicates normal operation (Status OK).
- The LED turns red and repeats a sequence of pulses to indicate an error condition:

  Error condition # 1 : the LED turns on for one second, followed by one brief flash, to indicate that the sensor is either not connected or the distance to the target is beyond the maximal detection range

  Error condition # 2 : the LED turns on for one second, followed by two brief flashes, to indicate that the distance to the target is below the minimal detection range.

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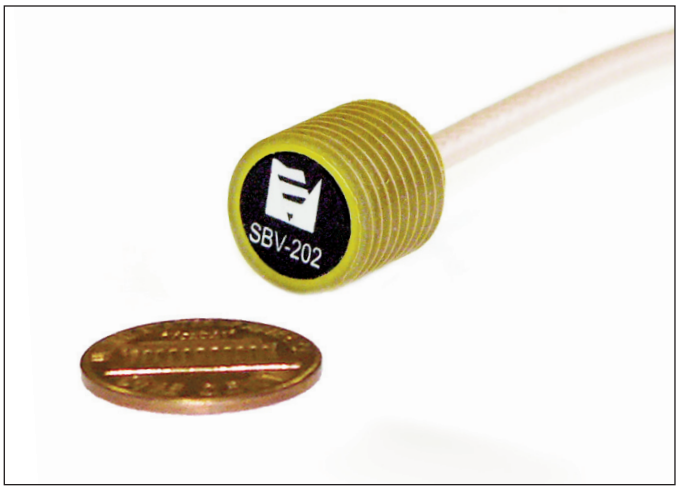


[1]SBV™-202

STATOR BAR VIBRATION CAPACITIVE SENSOR

DESCRIPTION

The SBV™-202 Capacitive Sensor is designed for non-contact in-slot measurements of stator winding vibration (i.e. bar relative to core). The sensor is screwed into a tapped hole in the wedge. It has an integrated triaxial cable which is connected to the linearization module (LIN™-300 series). This linearization module provides a 4 to 20 mA analog raw output of bar displacement/vibration. The SBV™-202 measuring range, accuracy, and reliability is unaffected by dirt, strong magnetic fields, high shock vibration, and EMI-RFI.

For wedges with ripple springs, both ripple spring and in-slot bar tightness can easily be evaluated by measuring the position and the displacement from the face of the SBV™-202 probe.

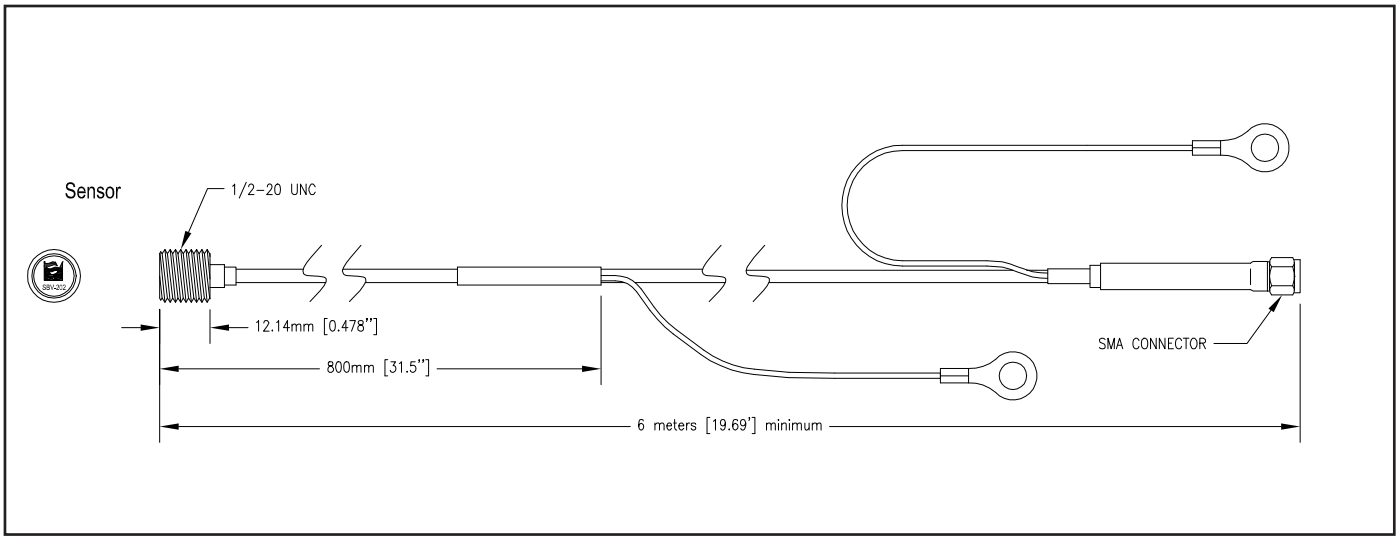
APPLICATIONS

- On-line in-slot measurements of stator bar vibration in:
  - hydrogenerators
  - turbogenerators
  - synchronous condensers
  - large motors

FEATURES

- Range: 2.0 mm (0.3 to 2.3 mm)
- Sensor head is non-metallic and safe for machine operations
- Highly immune to deposits of carbon dust and dirt, and strong magnetic fields
- Non-contact measurements

DIMENSIONS



SBV™-202
General Specifications

Operation

• Measuring Range	2.0 mm (0.3 to 2.3 mm)
• Power Source	455 kHz
• Interchangeability	±150µm
• Linearity	≤5%

Environmental

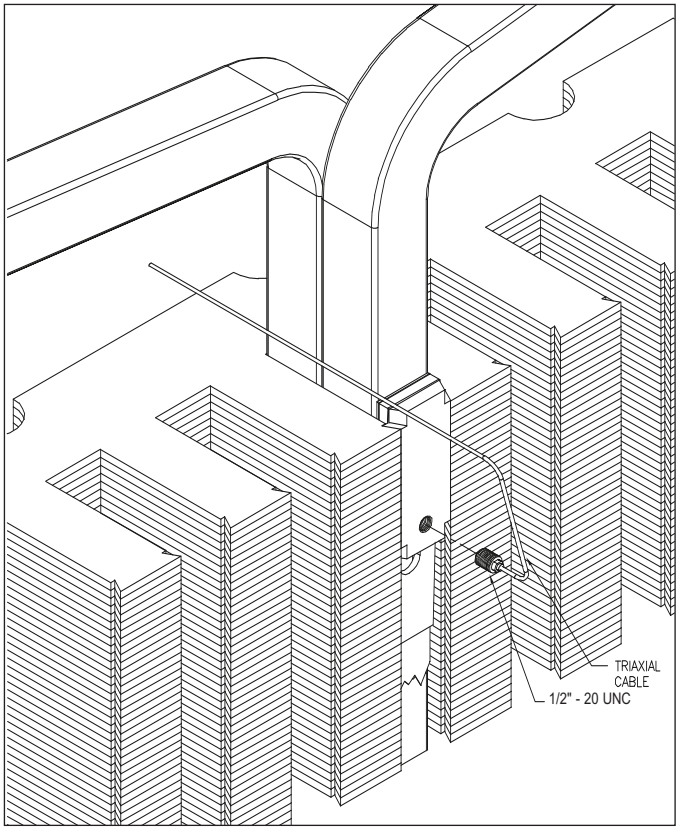
• Temperature Range	0°C to 125°C *(32°F to 260°F)*
• Magnetic Field	Up to 1.5 tesla [50 Hz or 60 Hz]
• Dust Contamination	No effect

Connection

• Integral Cable Type	Teflon triaxial
- Connector	Male SMA with ground lug
- Length	6.0 m *(19.7 ft)*

Dimensions

• Length	12.14 mm	*(0.48 in.)*
• Diameter	12.70 mm	*(0.50 in.)*
• Threads	1/2-20 UNC	



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