

# INSTRUCTION MANUAL

## VIBRATION TRANSMITTER XT-101

## Model XT-101 – Two-Wire Vibration Transmitter

### Description and Features:

1. **General** – The XT-101 Transmitter converts the vibration signal as sensed by a proximity probe to a DC voltage which proportionally controls a 4-20 mA current loop for a specified vibration range such as 0-5 mils peak-to-peak, 0-125 microns peak-to-peak, etc. Note that the loop current solely powers the transmitter.
2. **Sensor** - The proximity probe operates in combination with an internal oscillator/demodulator and is connected via a coaxial cable with SMA connectors. Vibration is measured relative to the probe mounting. Note: Indikon also manufactures a very accurate seismic displacement sensor – Model A3J – for absolute vibration sensing of a mechanical casing. It utilizes an internal inductance element, which provides an exact measure of displacement on a specific plane. The seismic pickup is, therefore, entirely interchangeable with the Indikon proximity probe.
3. **SIG Output** – The output of the internal oscillator/demodulator is accessible by way of the SIG coaxial connector and/or Auxiliary Output screw terminals. Its output calibration is generally 200mV/mil and is used to for vibration diagnostics as well as for setting the probe gap, which is represented by the DC component of the signal voltage.
4. **Current Loop Output** – The dynamic portion of the SIG output goes to a detector which converts the peak-to-peak gap variation, i.e.- vibration signal, to a DC voltage. This voltage is what controls the 4-20 mA two-wire current loop in proportion to the vibration level. A user accessible adjustment allows the output to be zeroed, if necessary.
5. **Fault Detection** – The DC portion of the SIG Output (gap voltage) is continuously sensed by a dual limit comparator. When the gap voltage is outside its given limits (refer to specifications), which would provide less accurate vibration measurements, the comparator causes the loop current either to go downscale (<3 mA) or upscale (>21 mA), whichever is specified. This allows a connecting system to detect one or more of the following fault conditions:
  - a. Out-of-range probe gap.
  - b. A defective probe, probe cable, or connection.
  - c. Probe cable shield or connector bodies touching local ground.
  - d. Malfunction internal to the transmitter.
6. **Inherent Protection** – A current limiting circuit protects against excessive loop current when vibration far exceeds the specified vibration range. An internal diode across the current terminals protects against accidental polarity reversals of up to 180mA.

## MODEL XT-101 TRANSMITTERS

<u>Function</u>	<u>Specifications</u>
VIBRATION RANGE	0-5 mils peak-to- peak
CONTROLLED LOOP CURRENT	4-20 mA DC High Limit: 25 +/- 4 mA Maximum Reverse Current: 180mA
FREQUENCY RESPONSE	420 – 270,000 CPM (+/- 5%) 180 – 300,000 CPM (< 3 dB)
SIGNAL OUPUT (SIG connector and Auxiliary Output)	200 mV / mil Source Resistance: 1,820 ohms Maximum load: 0.5 mA
LOOP POWER SUPPLY	17.0 to 36.0 VDC (=V sup) 36.0 VDC is the absolute maximum
OVERALL LOOP RESISTANCE	50 ohms maximum (V sup –16)
NOT OK LOOP CURRENT	3.0 +/- .2 mA when gap voltage is outside of the 4.0-18.0 Vdc limits (OK range) due to incorrect probe gap or a malfunctioning probe circuit, including connector body or cable shield touching local ground
PROXIMITY PROBE (Eddy-Current)	Type LG; diameter .25" – Gap range 15-95 mils Gap setting: 0.050" +/- .005" for SIG voltage of 10.0 +/- 0.5 Vdc
CALIBRATION	Sensitivity: 200 mV/mil for a probe gap range of 0.015" to 0.095" Target Material: SS A276 TYPE 410
TEMPERATURE RANGE	-34°C to +66°C
ISOLATION	Case isolated from connectors and terminals to a maximum of 350 Vrms or 500 Vdc.

## TRANSMITTER INSTALLATION

The outline and mounting dimensions of the transmitter are shown in drawing A-32966 for models XT101, XT-101X, and XT101Y. Model XT101 is most commonly used. Model XT101X and XT101Y are only used in applications where two probes are mounted in close proximity of each other. The XT101X and the XT101Y versions have different excitation frequencies to prevent interference. These Y units will have a "Y" identifier on the label for easy identification.

Since the probe cable length influences the calibration of the unit, it is important that the proper length be used, printed on its label. The allowable deviation of the total length, including extensions, is  $\pm 2$  feet, which will amount to an equivalent deviation from calibrated output sensitivity of about  $\pm 3\%$ .

Mounting - The unit should be mounted in a protective housing, which may be a water-tight, oil-tight or explosion proof housing, whatever is applicable. More than one unit may share a single housing to simplify an installation. Always locate transmitters in a place where easy access can be obtained.

Environment - Ambient temperatures should not exceed  $66^{\circ}\text{C}$  ( $150^{\circ}\text{F}$ ). The housing cover should always be closed whenever one is not working on the unit(s), for protection of wiring and terminals.

Probe Cable Connections - The probe cable furnished with the system, connects the probe to the transmitter via SMA coaxial connectors. A substitute cable from sources other than Indikon should not be used, as it may not be compatible and may seriously affect system accuracy.

NOTE: Guard against oil and dirt from getting into the connectors. When turning a connector's screw collar onto the mating device, make sure not to turn the connector's body also. This could otherwise result in twisting the cable shield, rupturing its bond to the body of the connector.

Excess length of probe cable can be coiled up inside the housing to accommodate placement of the housing. Connections must be tight; snug the connector's screw collar with a **small** 5/16" (8 mm) open-end wrench applying a torque of about 5 inch-lbs (0.6 N-m). Do not exceed 8 inch-lbs (0.9 N-m), it may otherwise rupture the connector's insulator and epoxy seal.

Probe connectors when mated, must not touch any machine metal parts to avoid faulty grounding, as the system should be grounded at the central system only. Where extension cables and/or probe cable armor are used, connector bodies may come in close proximity to machine ground. The mated connectors must therefore be insulated by means of Teflon tape or other reliable covering. Pipe-fitter's Teflon thread sealant without adhesive coating would be a good choice.

Terminal connections - Strain relief for the cable connections should be provided by means of compression glands or conduit fittings. For shielded cables, it is imperative that the shield be connected at the system only and not at the transmitter. At the transmitter end, cut off the shield at the cable outer jacket. If it has an aluminum/polyester shield, cut off the drain wire also and insulate the jacket termination with suitable electrical tape.

## PROXIMITY PROBE INSTALLATION

Environment - The probe tip temperature should not exceed +149°C (300°F).

Mounting - Refer to probe drawing AP-1491 for dimensions and mounting details and to applicable machine parts and installation drawings. Vibration monitoring probes are to be mounted radially to the shaft at a gap of 0.050"  $\pm$ 0.005" (1.27mm  $\pm$ 0.13 mm). The observed shaft surface must have a roughness not to exceed 50 microinches (1.3 microns) and should be concentric. If this surface is rough, has discontinuities or excessive mechanical run-out, false vibration readings may become apparent.

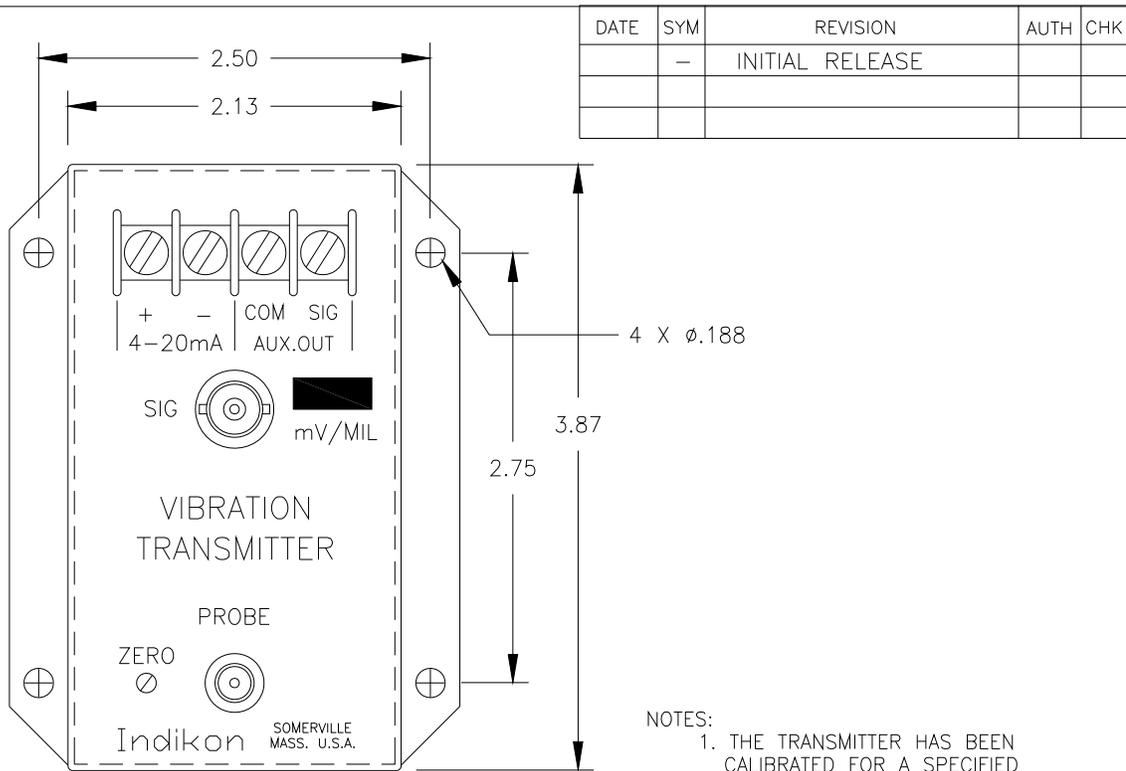
To insure accuracy of measurement, the target area at the circumference of the shaft and concentric to the probe tip must have a diameter of at least 0.75" (19 mm). Keyways, oil slingers, increases and decreases in shaft diameter should not enter into this target area. Furthermore, proper clearance around the probe tip must be provided. There should be no metal other than the target within a radius of 0.45" (11.4 mm) from the probe tip centerline over a distance of 0.75" (19 mm) from target towards the probe body. A metallic surface in a plane "X" inches away from the probe tip's centerline has much less effect than placing the probe tip in a hole whose radius is "X" inches.

If the shaft diameter is relatively small, the probe may have to be positioned closer to the shaft. For example, when the shaft diameter is 1.25" the probe gap needs to be about 0.005" less than specified to obtain the same gap voltage as for a flat target.

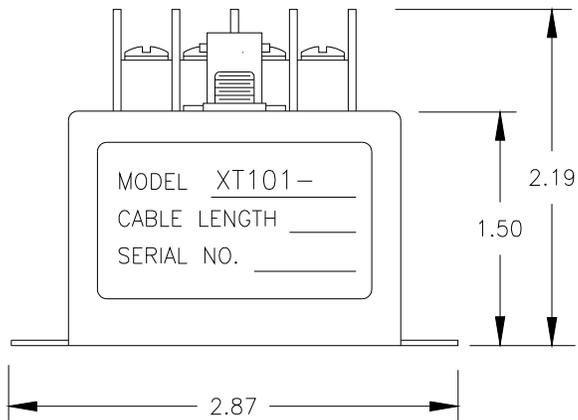
When all connections to the transmitter have been made and the probe is locked in place at a torque in the range of 20-25 foot-lbs (recommended for 3/8-24 UNF thread), apply loop power. The voltage at the BNC connector (SIG) or AUX.OUT terminals (SIG and COM) should be 10.0  $\pm$ 0.5Vdc for a 0.050" gap. For other gaps, this voltage changes at a rate of 200 mv/mil.

## APPLICABLE DRAWINGS

Vibration Transmitter - Installation & Outline      A-32966



DATE	SYM	REVISION	AUTH	CHK
	-	INITIAL RELEASE		



- NOTES:
1. THE TRANSMITTER HAS BEEN CALIBRATED FOR A SPECIFIED PROBE CABLE LENGTH. THE ALLOWABLE DEVIATION FROM THIS LENGTH IS  $\pm 2$  FEET.
  2. FOR APPLICATIONS WHERE THE PROBES OF TWO TRANSMITTERS ARE IN CLOSE PROXIMITY TO EACH OTHER, ONE HAS A SUFFIX Y ADDED TO ITS MODEL NUMBER AND SHOWS A LARGE Y ON TOP FOR EASY IDENTIFICATION.
  3. ALL DIMENSIONS ARE FOR REFERENCE ONLY.

INDIKON COMPANY, INC. SOMERVILLE, MA, 02144, U.S.A.			
TITLE VIBRATION TRANSMITTER INSTALLATION & OUTLINE XT101			
DRAWN KM DEAN	DATE 18AUG98	DRAWING NUMBER A- 32966	
CHECKED	ISSUED	SHEET 1 OF 1	
APPROVED	SCALE 1/1		REV -

## LIMITED ONE YEAR WARRANTY

**Limited Warranty:** All proximity probe products and accessories are warranted by the Seller for one year to be free from defects in both materials and workmanship under normal use and service. This warranty is in lieu of and excludes any other warranty, express or implied, including, but not limited to, any implied warranty derived from quote or fitness of purpose. *(Manufacturer's liability and Buyer's limited remedies under Manufacturer's warranty shall be limited solely to repair, replacement, credit or refund, at the Manufacturer's option, with respect to products supported by a Return Material Authorization number obtained from the Manufacturer and returned to the Manufacturer. The Manufacturer shall not be liable, under any circumstances, for consequential or incidental damages, including, but not limited to, labor costs or loss of profits arising in connection with the use of or inability to use products purchased from the Seller)*

**Product Application:** The Buyer is solely responsible in determining the suitability of the Manufacturer's products in its application regardless of circumstances.

Manufacturer reserves the right to make future design changes to any of its products without thereby incurring any obligations to make changes to or replacements of this product.

Manufacturer neither makes nor authorizes any person to make on its behalf any other guarantee or warranty concerning its products.

To obtain service under this Limited Warranty call Riverhawk Customer Service Department (315-624-7171) to obtain an RMA (Return Material Authorization) number. If you cannot deliver the product in person:

- Pack it in its original shipping container (or equivalent)
- Put the RMA number on the address label
- Put the RMA number on the shipping carton
- Insure it (or assume the risk of loss / damage during shipment)
- Deliver the product freight pre-paid

Manufacturer is not responsible for damage to inbound product.

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