

## 1 or 2 Channel Vibration Transmitter – model eMT800

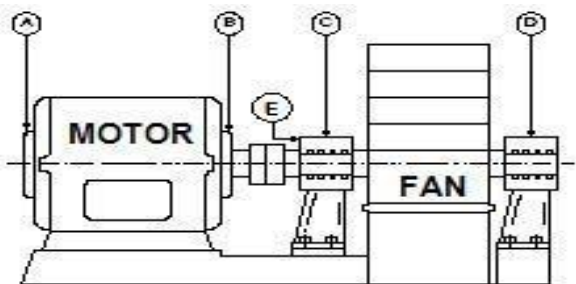
Fully Programmable(Microprocessor based)

The eMT800 Vibration Transmitter (1 or 2 Channel) is microprocessor based fully programmable device, designed to meet industrial environment and is very reliable and accurate employing the latest technology. All the units undergo stringent tests to assure quality performance.

Large Fans and Blowers (ID, FD, SA, PA etc.) are used in process plants for moving air or gases; they are essential for cooling, heating or transporting product. They usually are centrifugal or axial driven and commonly develop erosion and/or corrosion and/or deposition on the blades. This results in a progressive increase in vibrations. And build-up of dirt or cake on a fan's impellor is quite normal. However, not always are these faults progressive and predictive but, should a dirt piece become detached then suddenly the rotor becomes out of balance, and if ignored, consequential damage to the drive motor's bearings and coupling will result. This can be extremely destructive and threaten personnel and plant safety. The loss of a single line Fan or Blower can shut down the process causing significant production and financial losses.



The re-transmission analogue signal can be trended in DCS/PLC to monitor defect progression and plan maintenance considering production schedule and fix the problem before catastrophic failure. RS485 Modbus RTU or GSM or RS232 connectivity is also available as an option.



### SITE CHALLENGES:

Due to its operational application, analysing and designing an Machine Monitoring System has considered the following:

- Unbalance
- Misalignment
- Bad bearings
- Mechanical looseness
- Aerodynamic forces

### RECOMMENDED MEASUREMENT POSITIONS:

Locating the vibration sensors as indicated in the schematic will be most sensitive and effective in detecting the above faults listed. The sensor orientations are summarised as follows:

- HORIZONTAL on two motor bearings (A & B) and two fan bearings (C&D). B&C ideally recommended
- VERTICAL on motor & fan drive end bearings (B&C).
- AXIAL on motor & fan drive end bearings (B&C). B or C is recommended

**MACHINE FAULTS COMMON TO FANS AND BOWERS.**

| SN | TYPE OF FAULT  | AMPLITUDE                                       | FREQUENCY  | PHASE   | REMARKS   |
|----|--|---|--|---|---|
| 1  | <b>Unbalance</b>   | Proportional to unbalance in radial direction   | 1 x RPM  | Single steady reference mark                                    | Most common cause of vibration. Correct by balancing each rotating parts before assembly then after assembly.   |
| 2  | <b>Misalignment</b> of couplings, bearings or bent shaft | Axial vibration 50% of more of the radial level | 1 x RPM common but often x 2 or 3 RPM                | Single double or triple reference mark                          | Best identified by dominant axial vibration. Confirm with phase measurement or dial gauges. If sleeve bearing with no coupling misalignment balance the rotor |
| 3  | <b>Antifriction Bearings</b>                             | Use Bearing Defect Energy, Demodulation         | High frequency 35K to 55K CPM not related to RPM.    | Erratic   | Sensor proximity to a defective bearing is a clear indicator. External signals like steam leaks and cavitation can give false readings                        |
| 4  | <b>Mechanical Looseness</b>                              | Often highest in vertical direction             | 2 x RPM  | 1 or 2 reference marks depending on frequency. Usually unsteady | Usually accompanied by unbalance and/or misalignment  |
| 5  | <b>Aerodynamic Forces</b>                                | Axial readings may be higher than normal        | 1 x RPM or number of blades on fan or impellor x RPM | Steady if one blade damaged - like unbalance                    | Likely to occur where blade is bent or out of track. Use noise analysis for high frequencies.   |

**eMT800 Series Vibration Transmitter Specification:**

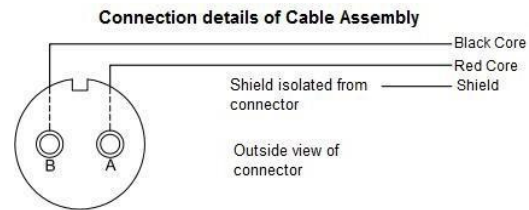
|                                      |  |
|--------------------------------------|--|
| <b>No. of Channels:</b>              | 1 to 2   |
| <b>Signal Input:</b>                 | Piezo Accelerometer 2 Wire CC, Piezo Velocity 2 Wire CC or Loop Powered Sensor   |
| <b>Sensor Power:</b>                 | +24 V DC @ 4 mA Constant Current or +24 V DC   |
| <b>Frequency Response:</b>           | Loop Power 5 Hz – 10KHz +/-3 dB for acceleration`<br>5 Hz – 2.5KHz +/-3 dB for velocity.<br>5 Hz – 600 Hz +/-3 dB for Displacement   |
| <b>Display:</b>                      | 7 Segment 4 Digit 12.5mmH Bright LED Display per channel   |
| <b>Measurement:</b>                  | Acceleration 0-19.99 g (Pk or RMS) or Velocity 0-199.9 mm/s (Pk or RMS) or Displacement 0-1999 microns (Pk-Pk).<br>Alarm & Trip levels are independently programmable over full scale range Relay contacts 1 C/O, 5 A @ 230 V AC resistive |
| <b>Alarm &amp; Trip:</b>             | Isolated 4-20 mA DC with max load of 600 Ohms  |
| <b>Output:</b>                       | per channel RS485 Modbus RTU, Wireless or GSM connectivity – Optional  |
| <b>Accuracy:</b>                     | +/-1% @ full scale   |
| <b>Enclosure:</b>                    | ABS.plastic moulded OR IP65 OR Flame   |
| <b>Mounting:</b>                     | Proof Panel mounted or Field Mounted   |
| <b>Power Supply:</b>                 | 110V / 230V selectable or 90 to 260 VAC-DC & 24Vdc(optional)   |
| <b>Environmental &amp; Physical:</b> |  |
| <b>Operating temp:</b>               | 0 oC to 60 oC ambient  |
| <b>Storage temp:</b>                 | -18 oC to 85 oC ambient  |
| <b>Humidity:</b>                     | <95% non-condensing  |
| <b>Dimensions:</b>                   | 96(W) x 96(H) x 110(D) mm for ABS Plastic moulded enclosure For IP65 & Flame Proof enclosure, custom made as required.   |

## Sensor Cable Assembly High Temperature – series eM1001-XX



| Item Description   | Part Number |
|--|-------------|
| Cable, Teflon 2 core (high Temperature up to 220°C), shielded, XX m length, with stainless steel flexible conduit. Mil 2 Pin connector (for 2 wire AC sensor) and pin type lugs at free end. | eM1001-XX   |

The eM1001 series is a rugged, high temp Teflon cable assembly with flexible Stainless Steel Conduit for mechanical protection for Online Vibration Monitoring System Installations. The cable shield is isolated from the Mil 2-Pin Connector, for ensuring grounding at one point only, in an Online System installation. The red core is connected to pin A and black core is connected to pin B, as shown. Standard lengths of 5, 10, 15, 20 and 25m could be selected and ordered. For other lengths, please contact us.



### Cable Specifications

|  |                            |
|--|----------------------------|
| <b>Cable type</b>                      | Teflon (FEP), extruded     |
| <b>Size</b>                            | 0.5 Sq. mm                 |
| <b>No of cores</b>                     | 2 (twisted pair)           |
| <b>Core</b>                            | Tinned copper              |
| <b>No of strands in each core</b>      | 7                          |
| <b>Dia of each strand</b>              | 0.32mm                     |
| <b>Core dia</b>                        | 0.97mm                     |
| <b>Core Cross Section</b>              | 0.563 Sq.mm                |
| <b>Voltage grade</b>                   | 600V                       |
| <b>Resistance (ohm/KM at 20°C)</b>     | 33.0                       |
| <b>Elongation (min)</b>                | 33.0 mm                    |
| <b>Insulation</b>                      | 0.5mm                      |
| <b>Nominal dia of insulated Core</b>   | 1.47mm                     |
| <b>Insulation type</b>                 | Teflon (FEP)               |
| <b>Temperature rating (insulation)</b> | 220°C                      |
| <b>Shielding</b>                       | Aluminium mylar tape       |
| <b>Overall shielding</b>               | Tinned copper braided wire |

### Stainless Steel Double Interlock Flexible Conduit

|                                       |                        |
|---------------------------------------|------------------------|
| <b>Material of Construction (MOC)</b> | SS J4 (SS304 Optional) |
| <b>Inside dia</b>                     | 6mm                    |
| <b>Outside dia</b>                    | 8mm                    |
| <b>Temperature Limit (Max)</b>        | 400°C                  |