TECHNICAL DATA

XM-121A ABSOLUTE SHAFT MODULE

FOR APPLICATIONS REQUIRING SHAFT ABSOLUTE MEASUREMENT

The award winning, Allen-Bradley XM® series is the worlds most comprehensive, family of distributed machine condition monitoring and protection devices.

With the XM® series discrete or networked monitoring solutions can be quickly and cost effectively deployed for steam, gas and hydro turbines, motors, compressors, pumps, fans, blowers, and most other rotating machinery.

The Absolute Shaft Module is an XM-121 Low Frequency Dynamic Module with alternative XM-121A firmware loaded. The XM-121A firmware is included on the distribution CD with every standard XM-121.

Shaft Absolute is the measure of the shafts motion relative to free space - its *absolute* motion. In the XM-121A the measurement is made by summing the signals of both an eddy current probe, measuring the motion of the shaft relative to the case, and a seismic or velocity sensor measuring the absolute motion of the case.

In application the Absolute Shaft Module is almost exclusively deployed on large steam turbines for either of two reasons:

- On turbines where the shaft to case weight ratio is high.
- On turbines where shaft riders are being, or were originally, replaced with Shaft Absolute measurement systems.

Because the XM-121A uses the XM-121 Low Frequency Dynamic hardware module, many of the specifications of that module are common to the XM-121A, particularly with respect to communications, tachometer inputs, outputs, approvals and its physical and environmental specifications. Refer to the **XM-120 & 121 Dynamic Module** data sheet for details regarding these and other characteristics of the module.

SPECIFICATIONS

Inputs

Channel 1

- Eddy Current Transducer
- Supported Probes
  - Allen-Bradley 2100 series 5mm probes
  - Allen-Bradley 2100 series 8mm probes
  - Bently Nevada 3300 XL series probes
- Transducer Power: -24VDC
- Sensitivity: User configurable
- Impedance: >100 kΩ
- Frequency Range: 0 -12,800 Hz

Channel 2

- Case Mounted Sensor
- Supported Probes
  - 9000A General Purpose Accelerometer
  - 9100VO Velocity Output Accelerometer
  - 9100CSA General Purpose Accelerometer
  - 9100T High Temperature Accelerometer, 150C
- Transducer Power: Constant current (4.5mA ±20%)
- Sensitivity: User configurable
- Impedance: >100 kΩ
- Frequency Range: 0 -12,800 Hz

Measured Parameters

Overall Shaft Relative, Case Absolute*, Shaft Absolute

- Accuracy
  - – Amplitude (min): ±1% full scale
- Resolution
  - – A/D Conversion: 24 bits
  - – Dynamic Range: <80dBfs (0.01% fs), -90dBfs (typical)
- Filtering
  - – Selectable HPF: 0.8, 2, 4, 23.8 Hz
  - – Roll Off: -89dB / decade
  - – Adjustable LPF: 600 - 4000 Hz
  - – Roll Off: -40dB / decade

1x Magnitude & Phase Shaft Relative, Case Absolute*, Shaft Absolute

- Accuracy
  - – Amplitude (min): ±1% full scale
  - – Phase (max): 3 deg >10 Hz
- Resolution
  - – A/D Conversion: 24 bits
  - – Dynamic Range: <80dBfs (0.01% fs), -90dBfs (typical)
- Filtering
  - – Selectable HPF: 0.8, 2, 4, 23.8 Hz
  - – Roll Off: -89dB / decade
  - – Tracking Filter:
    - 4-1000 Hz / 240-60,000 cpm
    - Selectable as:
      - o Constant Bandwidth (0.5-15 Hz)
      - o Constant Q (1-200) Roll Off: -89dB / octave

** Case Absolute units selectable as velocity or displacement.*

Gap / Bias Shaft Relative, Case Absolute

- Resolution: 14 bits
- Filtering Configurable LPF

Speed RPM: Refer to XM-120/121 Technical Data Sheet for details

Complex Data

Time Waveform

- Block Size: 256, 512, 1024, 2048
- Period: 0.02 – 80 seconds
- FMAX: 65.536 – 32,768 Hz

Alarms

Number: 9 alarm and danger pairs:

- Shaft Absolute Overall
- Shaft Absolute 1x Magnitude
- Shaft Relative Overall
- Casing Absolute Overall
- Shaft Relative 1x Magnitude
- Casing Absolute 1x Magnitude
- Probe Gap
- Accelerometer Bias
- Speed

Hysteresis: User defined

Startup inhibit/Set point multiplication:

- Period: 0 to 1092 minutes in 0.1 min increments
- Inhibit/multiplication function: Multiply by N (0-10, 0=Disarm)

Speed Inhibit: A speed range may be specified for each alarm. When applied, if the speed is outside of the defined range, the alarm is disabled.

HOW TO ORDER

The XM-121A Absolute Shaft Module can be ordered by contacting your local authorized Allen-Bradley distributor or Rockwell Automation sales office.

Catalog Number	Description
1440-VLF02-01RA	XM-121 Low Frequency Dynamic Module*
1440-TB-A	Terminal Base A for XM-12x
1440-SCDB9FXM2	XM Serial Communications Cable

* **The XM-121A firmware is included on the CD distributed with every XM-121 Low Frequency Dynamic Measurement Module. Users need only order a standard XM-121 and load the provided XM-121A firmware during configuration.**

www.rockwellautomation.com

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