VIBRATION AND TEMPERATURE SENSOR (FY01) – USER GUIDE

(For FCC/IC Certification)

Version: 0.7

TABLE OF CONTENTS

1. OVERVIEW 4

1.1 Features 4

1.2 Applications 4

2. GETTING STARTED 4

3. VIBRATION AND TEMPERATURE SENSOR USE CASE 4

4. SPECIFICATIONS AND CONFIGURATIONS 5

4.1 Specifications 5

4.2 Accelerometer Sampling 6

4.3 Configurations and Accessories 6

4.4 Antenna Types 6

5. INSTALLATION 7

5.1 Installation of ThermoCap 7

5.2 Installation of Thermocouple 7

5.3 Installation of Battery 8

5.4 Unit Installation 8

6. REGULATORY INFORMATION AND CERTIFICATIONS 9

6.1 FCC Certifications and Regulatory Information (USA Only) 9

6.2 Innovation, Science and Economic Development Canada Information (CANADA) 9

LIST OF FIGURES

Figure 1: FY01 Vibration and Temperature Sensor Use Case 4

Figure 2: FY01 Vibration and Temperature Sensor Dimensions 5

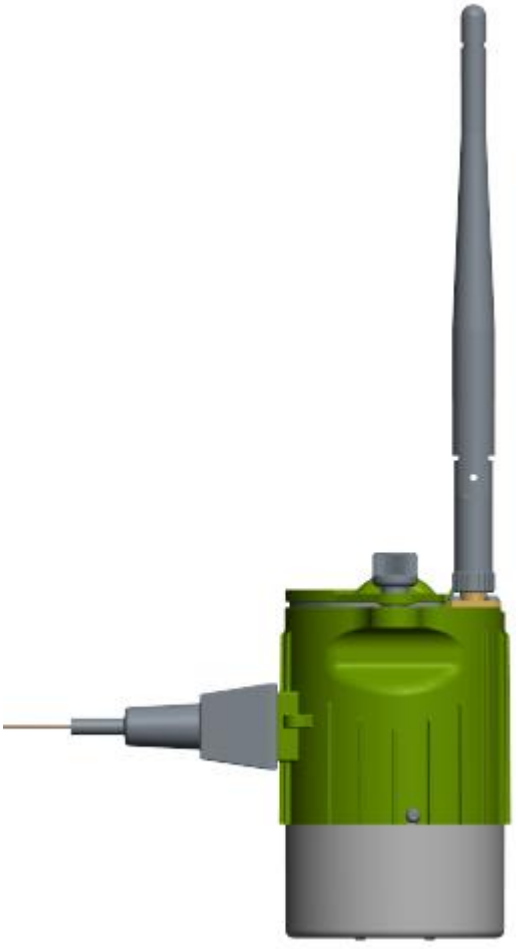
Figure 3: Installation of ThermoCap 7

Figure 4: Installation of Thermocouple 7

Figure 5: Installation of Battery 8

1. OVERVIEW

The FY01 model VIBRATION AND TEMPERATURE SENSOR is a Sensor with IEEE 802.15.4 compliant 2.4 GHz Wireless Connectivity, used for monitoring motors and other equipment.



1.1 FEATURES

- ✓ Accurately monitors vibration and temperature in a wide variety of applications.
- ✓ Provides continuous wireless communication of monitored data and alerts for quick analysis and efficient equipment maintenance.
- ✓ Robust industrial-grade design allows vibration and temperature sensor to be reliably used in harsh industrial environments.
- ✓ Very easy installation – locate, place and use
- ✓ Long Battery life

1.2 APPLICATIONS

- ✓ Food & Beverage Production Facilities
- ✓ Paper & Metal Manufacturing
- ✓ Cooling Towers
- ✓ Pumping Stations
- ✓ HVAC System Equipment
- ✓ Power Plants

2. GETTING STARTED

The FY01 VIBRATION AND TEMPERATURE SENSOR consists of precision electronics enclosed in an enclosure made up of bottom Aluminium part and top made up of Styrene-Acrylonitrile. The unit is powered by a 3V Lithium Battery CR123A. The battery can be accessed by unscrewing the captive screw on the top cover. The procedure for accessing the battery is explained in the section 5.3. The unit comes with optional accessories as listed in the section 4.2. The Sensor unit has an opening for connecting an Optional Thermocouple to measure the external temperature (of any part of the equipment or fluids used). Whenever thermocouple is not required, the opening should be closed using a thermocap, the installation procedure for thermocouple and thermocap are explained in the sections 5.1 and 5.2. The top cover has an RP-SMA Connector to connect the antenna for wireless connectivity. The lists of Antennas supported by the unit are listed in the section 4.3.

3. VIBRATION AND TEMPERATURE SENSOR USE CASE

The FY01 VIBRATION AND TEMPERATURE SENSOR is installed on motors and other equipment to sense the Vibration and Temperature the unit and send the data to a nearby paired gateway over IEEE 802.15.4 compliant 2.4 GHz Wireless Connectivity. From gateway the data are sent to cloud over WiFi or Cellular network. In the cloud, the data are analysed and stored for future reference. If there are any abnormalities, the cloud sends the alerts to the user over E-Mail and SMS. The analysed data can be viewed in the Forecyte Portal through a PC. Apart from viewing the data, we can also update the firmware and configure the settings of the unit and gateway over the air using the Forecyte portal.

Figure 1: FY01 Vibration and Temperature Sensor Use Case

4. SPECIFICATIONS AND CONFIGURATIONS

4.1 SPECIFICATIONS

ELECTRICAL	
POWER	3.0V Internal Lithium Battery (CR123A)
BATTERY LIFE	2 years, when the unit is Transmitting 1 axis vibration data for every 15 minutes. **Note:** Battery Life is somewhat reduced at extremely cold temperatures (<-20 °C) and extremely hot temperatures (>+60 °C)
WIRELESS RADIO	
RADIO	IEEE 802.15.4 compliant 2.4 GHz SNAP Protocol
ANTENNA	Omni directional Antenna providing 360° Coverage Screw Mount Dipole Antenna with 3.2dBi gain (Model : W1027)
ACCELEROMETER	
RANGE	± 15g over a frequency range of 20Hz to 4000 Hz
SAMPLES PER ACQUISITION	1650
INTERNAL TEMPERATURE SENSOR	
RANGE	-25 °C to +70 °C
EXTERNAL TEMPERATURE SENSOR	
TYPE	T Type Thermocouple
RANGE	-200 °C to +400 °C
MECHANICAL	
ENCLOSURE MATERIAL	Al 6061 & Styrene-Acrylonitrile (SAN) Resins
WEIGHT	267 grams, with Thermocouple
	250 grams, without Thermocouple
ENVIRONMENTAL	
OPERATING TEMPERATURE	-25 °C to +70 °C
IP RATING	IP55, Protection against harmful deposits of dust and impervious to water jets
MOUNTING	
1. The Unit can be mounted on a shaft with threading ¼-28	
2. The Unit can be assembled on any magnetic surface as the unit is assembled with a magnet of 15 lbs pull force	
3. The Unit can be assembled on any surface with the help of an adhesive	

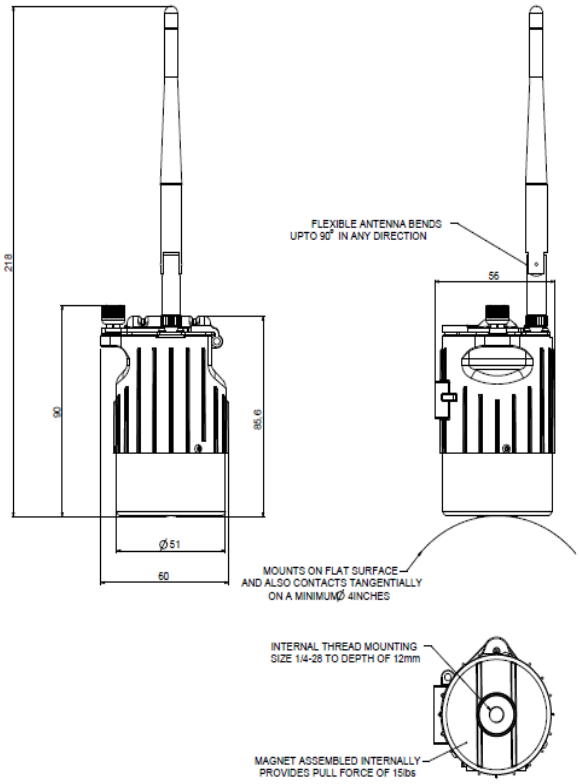


Figure 2: FY01 Vibration and Temperature Sensor Dimensions

4.2 Accelerometer Sampling

Sampling Frequency (Hz)	Sample Duration* (S)	Spectral Resolution (Hz)
10240	0.161	5
5120	0.322	2.5
2560	0.644	1.25
1280	1.289	0.625
640	2.578	0.3125
320	5.156	0.15625

'*' Rounded off to 3 decimal points

4.3 Configurations and Accessories

Model Number	Description
FY01	Wireless Vibration Sensor with Antenna
Optional Accessories	Thermocouple along with Cover Thermocap

4.4 Antenna Types

Part Number	Description
W1027	2.4 GHz Omni directional 3.2dBi Screw Mount Dipole Antenna, RP-SMA, in-door use
W1030	2.4 GHz Omni directional 2.0dBi Screw Mount Dipole Antenna, RP-SMA, in-door use
GW.11.A153	2.4 GHz Omni directional 2.3dBi Screw Mount Dipole IP65 Antenna, RP-SMA, out-door use

Note: Along with the sensor unit, any one of the Antennas will be supplied as per order

5. INSTALLATION

5.1 INSTALLATION OF THERMOCAP

Thermocouple cap is assembled when Thermocouple is not intended with the vibration sensor. Position the Thermocouple cap as in the first image and push tight in to the window opening to fit. Thermocouple cap can be pulled out holding the cap tight and pulling away from sensor.

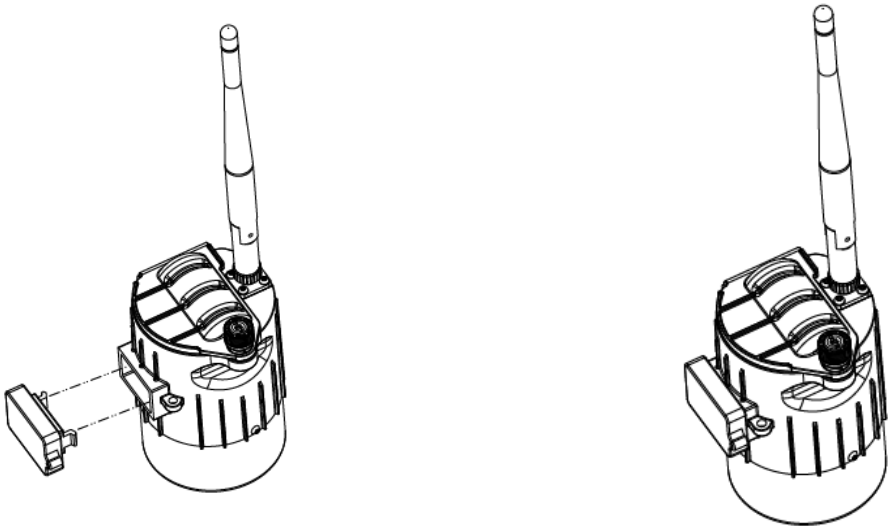


Figure 3: Installation of ThermoCap

5.2 INSTALLATION OF THERMOCOUPLE

The Thermocouple connector assembly should be pushed tight into the window opening of the sensor to assemble. Thermocouple cover along with plug can be pulled out holding the Thermocouple tight and pulling away from sensor.

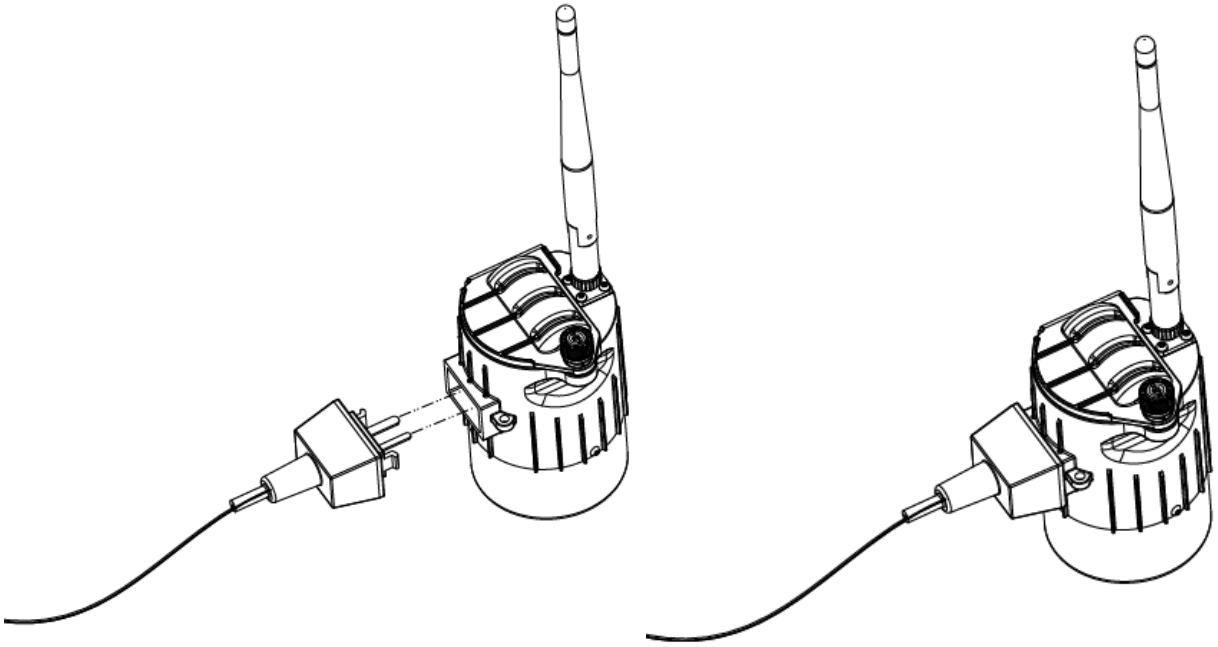


Figure 4: Installation of Thermocouple

5.3 INSTALLATION OF BATTERY

Unscrew the Captive screw, flip open the battery cover, place Battery in the battery compartment in the direction indicated and push in to snap, close the battery cover and tighten the Captive screw. Battery can be disassembled by positioning fingers around the battery and pulling the Battery out.

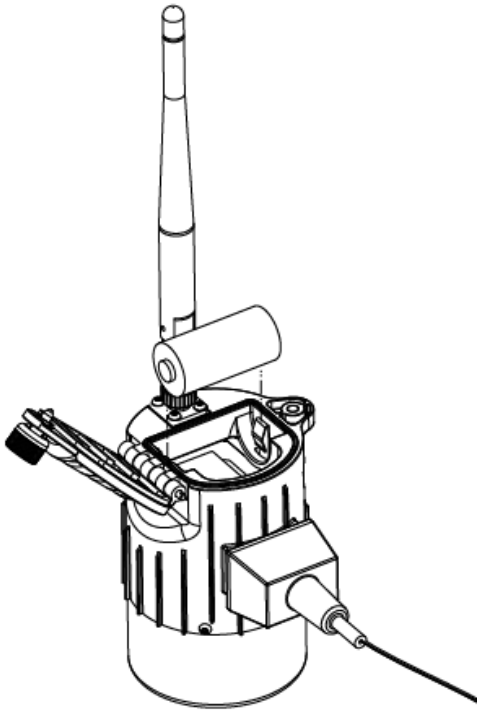


Figure 5: Installation of Battery

5.4 UNIT INSTALLATION

The Unit can be installed on

Type of Surface:

- Flat surface
- Curved surface with a diameter of 4 inches or more

Orientation:

- Horizontal
- Vertical

Mounting Options:

- On a threaded shaft which meets the threaded dimensions ¼-28
- Directly on a Magnetic Surface
- Directly on any non-magnetic surface using an adhesive

The Unit needs to be installed only in Horizontal or Vertical Orientation by a Trained and qualified person only.

6. REGULATORY INFORMATION AND CERTIFICATIONS

6.1 FCC CERTIFICATIONS AND REGULATORY INFORMATION (USA ONLY)

This devices comply with part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) This devices may not cause harmful interference, and
(2) This devices must accept any interference received, including interference that may cause harmful operation.

RF Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radio Frequency Interference (RFI)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules.

Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Nidec Motor Corporation (NMC) may void the user's authority to operate this equipment.

6.2 INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA INFORMATION (CANADA)

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This device complies with Industry Canada license-exempt RSS Standard(s). Operation is subject to the following two conditions:
(1) This devices may not cause harmful interference, and
(2) This devices must accept any interference received, including interference that may cause undesired operation of the device.

Déclaration d'exposition RF

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Interférence radiofréquence (RFI)

Cet équipement a été testé et s'est avéré conforme aux limites d'un appareil numérique de classe B, conformément à la partie ICES-003 règles de la ISED.

This equipment has been tested and found to comply with the limits for a Class B digital device, in accordance with ICES-003 Rules of the ISED.

Modifications

Les modifications ou modifications apportées à cet équipement qui ne sont pas expressément approuvées par Nidec Motor Corporation (NMC) peuvent annuler l'autorisation de l'utilisateur d'utiliser cet équipement.

Changes or modifications to this equipment not expressly approved by Nidec Motor Corporation (NMC) may void the user's authority to operate this equipment.