

## **Process Protection**

### **MFA 4P Motion Failure Alarm**

#### **Part 1. General**

##### **1.1 Scope**

- A.** This section describes the requirements for a motion alarming system.
- B.** Under this item, the contractor shall furnish and install the motion alarming system as indicated on the plans and as herein specified.

##### **1.2 Submittals**

- A.** The following information shall be included in the submittal for this section:
  - 1. Data sheets and catalog literature for the alarming electronics and sensing probe.
  - 2. Interconnection and dimensional drawings.

#### **Part 2. Motion Alarming System**

- A.** Electronics
  - 1. Operation:
    - a. The electronics shall provide overspeed, underspeed or slowspeed alarming for all types of conveyors and rotary equipment.
  - 2. Construction:
    - a. Standard enclosure shall be a polycarbonate Nema 4 enclosure.
    - b. Power supply shall be 115VAC +/- 10% @ 60 Hz or optional 230VAC +/- 10% @60Hz.
    - c. Operating temperature shall be -40° to 140° F

d. Output shall be two (2) Form C, 10 Amp @ 115/230 VAC, DPDT, non-inductive alarm relays.

e. Adjustments:

- Speed setpoint shall be adjustable from 2 to 3000 pulses per minute.

- Startup time alarming delay shall be adjustable from 0 to 60 seconds.

**B. Motion Sensing Probe**

1. Operating principle:

The probe shall generate a magnetic field sufficient to sense ferrous objects passing through the field. Power for the motion sensing probe is supplied by the system electronics.

2. Primary Sensor:

The available sensing probe models shall be constructed to meet either Nema 4 or Class I, Div. I, Group A, B, C, and D, Class II, Div. I, Group E, F and G, Class III hazardous locations when mounted and wired according to manufacturers recommendations.

3. Construction:

a. The standard low temperature sensing probe shall have a phenolic body complete with cast zinc cap, mounting flange, locknut and neoprene gasket.

b. The standard high temperature sensing probe shall have a cast aluminum body complete with cast zinc cap, mounting flange, locknut and teflon gasket.

c. The explosion proof sensing probe shall have a phenolic body complete with cast zinc mounting flange and locknut.

- d. The stainless steel high temperature probe shall have a 316 SS body, mounting flange and cap.
  - e. The miniature probe shall have a CPVC body and locking nut.
4. Range:
- a. All sensing probes, except the miniature probe, shall have a maximum detection range of four (4) inches with a minimum of 1" X 1" X 2" ferrous metal target. The miniature probe's detection range shall be two (2) inches with the same size target as stated above.
5. Separation:
- a. Maximum separation between the motion failure alarming electronics and the sensing probe pre-amplifier (see section C) shall be 25,000' with 12 gauge wire.
6. Available motion sensing probes:
- a. MSP-12 standard low temperature with internally mounted pre-amplifier. Temperature range -40° to 140° F.
  - b. MSP-3 aluminum high temperature with remote mounted pre-amplifier in a cast aluminum Nema 4 enclosure. Temperature range -40° to 500° F.
  - c. MSP-9 stainless steel (316) high temperature with remote mounted pre-amplifier in painted steel or stainless steel Nema 4 enclosure. Temperature range -40° to 500° F.
  - d. MSP-1 miniature probe with remote mounted pre-amplifier in a cast aluminum Nema 4 enclosure. Temperature range -40° to 180° F.
  - e. XPP-4 explosion proof probe with internally mounted pre-amplifier. Temperature range -40° to 140° F.

## C. Pre-amplifier

### 1. Operation

- a. The pre-amplifiers, either internal or external, shall amplify the signal coming from the motion sensing probes to the electronics by converting the voltage inputs from the probes and converting it into milliamp outputs to the electronics.

## Part 3. Operator Functions

### 3.1 Calibration

- A. Calibration of the Motion Failure Alarm shall be accomplished by setting the minimum or maximum pulse rate. A stab selector tab must be chosen to get pulses within the correct decimal range (i.e. 10s, 100s, or 1000s). A potentiometer shall be provided for fine adjustment to the desired number of pulses. In addition, a startup time delay can be chosen to prevent alarms prior to monitored equipment reaching normal operating speed. A timer potentiometer allows selection of 0 to 60 seconds delay prior to alarming.

## Part 4. Execution

### 4.1 Installation

- A. Follow the manufacturers recommendations regarding minimum target size and sensing probe to target separation.
- B. Mount the probe per manufacturers recommendations and typical applications in the operations and maintenance manual.
- C. Select interconnection cable size per the table in the operations and maintenance manual.
- D. Mount electronics in a Nema 4 environment.

**Part 5. Warranty**

**5.1 Terms**

- A.** The manufacturer of the above specified equipment shall guarantee for twenty four (24) months from equipment startup or thirty (30) months from date of shipment, whichever occurs first, that the equipment shall be free from defects in design, workmanship or materials.
- B.** In the event a component fails to perform as specified or is proven defective in service during the warranty period, the manufacturer shall promptly repair or replace the defective part at no cost to the owner.

**Part 6. Options**

**6.1 Related Equipment**

- A.** Open style electronics
- B.** Overspeed alarm
- C.** Extreme slow speed alarm
- D.** 230 VAC +/- 10% 50/60 hZ @ 5 vA