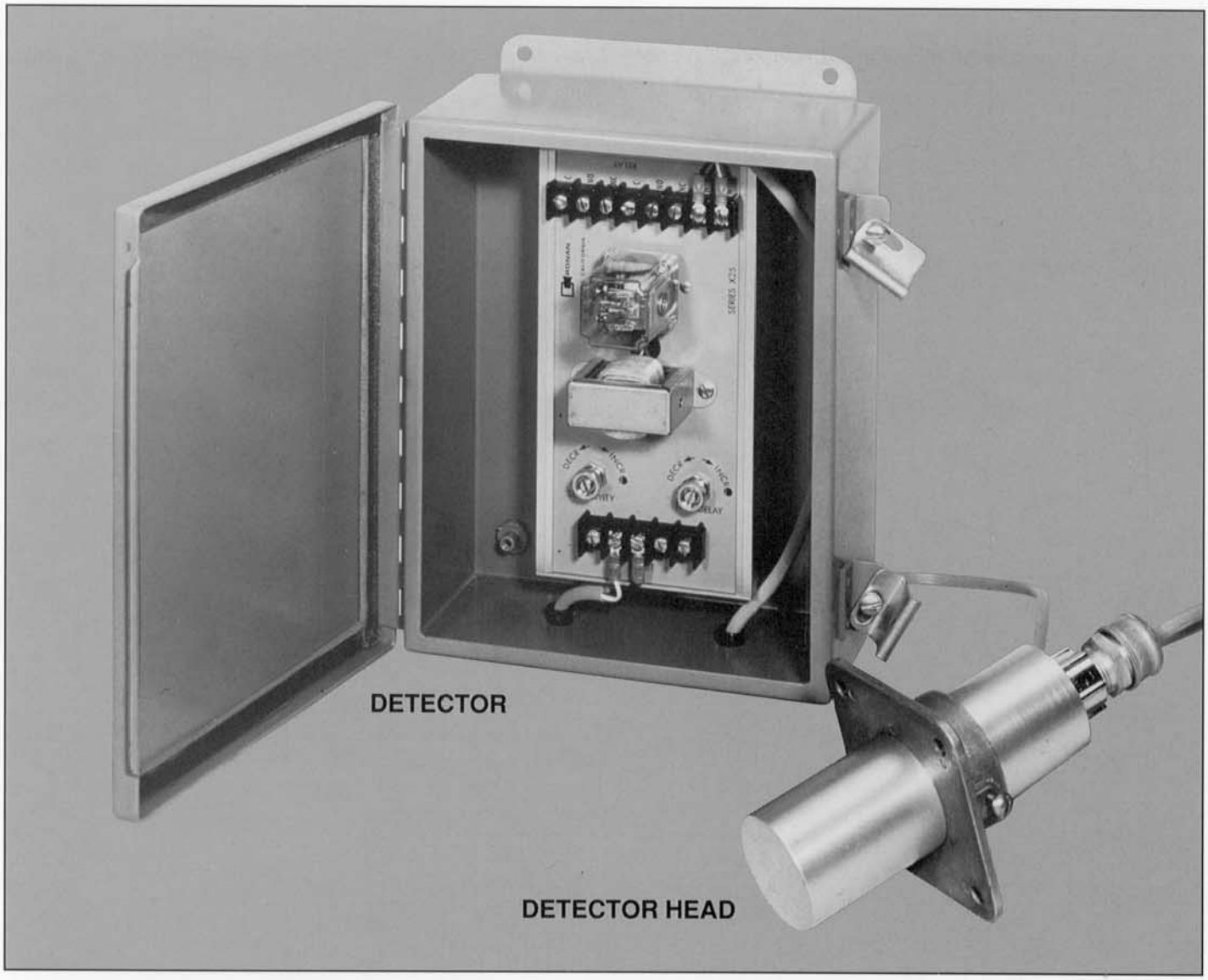
SERIES X25
MOTION DETECTOR APPLICATION, OPERATING AND TECHNICAL DATA



RONAN

SPEED AND SENSITIVITY CHARTS

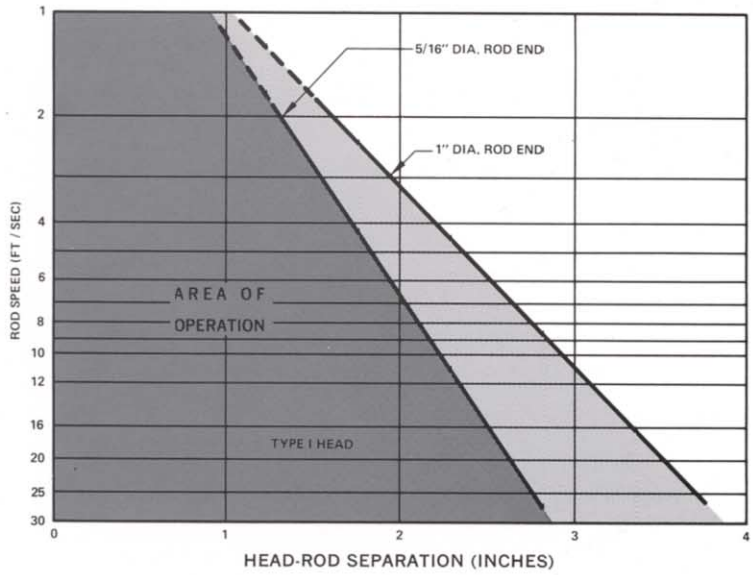


CHART I
SENSITIVITY CHART TYPE 1 HEAD

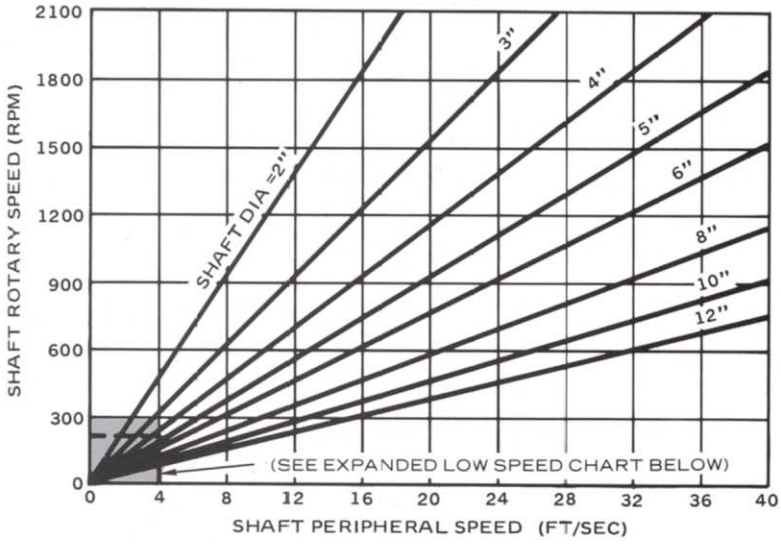


CHART II
SHAFT SPEED RELATIONSHIP (CONVERSION: ROTARY SPEED TO CIRCUMFERENTIAL SPEED)

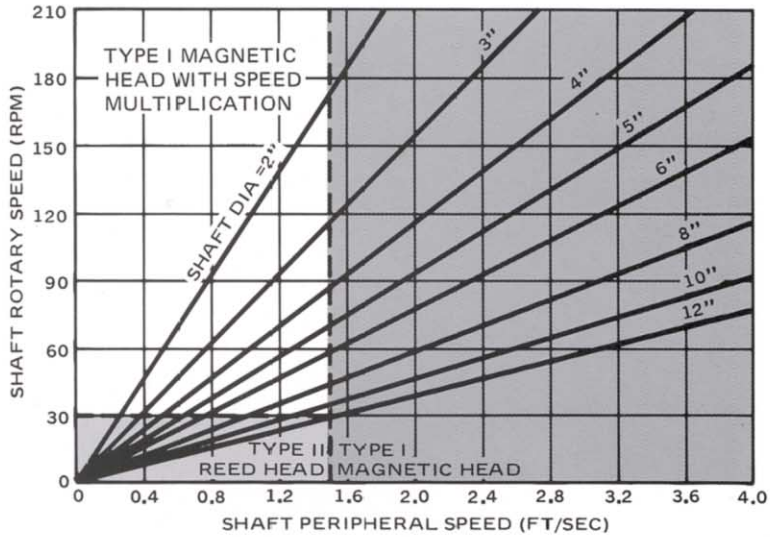


CHART III
LOW SPEED CHART

APPLICATION AND ENGINEERING NOTES

The Ronan X25 Motion Detector is designed for application in typically encountered industrial environments and, as such, is an inherently long-lived, and rugged device. As with all instruments, however, attention given certain details at the time of installation will result in the most satisfactory operation and performance. The following points deserve consideration when planning an X25 installation:

1. SIGNAL CABLES — Wiring between the X25 amplifier and the X25 head should be restricted to a twisted, shielded pair of 100 feet or less, with the wires avoiding power cables and/or high-intensity magnetic fields. These wires carry a typical signal of 40-50 millivolts which requires that induced transients be kept well below this figure. Wire size #22 or heavier is satisfactory.

2. MAGNETIC HEAD MOUNTING — Proper attention to the mounting of the Type I Head spells the difference between a successful and a marginal installation. There are really only a few major details to be considered:

- **A.** **Mount the head** so as to pick up the most rapidly moving element available. Signal to noise ratio will increase proportionally to your success here.
- **B.** **Vibration** between the mounted head and the monitored element should be minimal or non-existent. Rather obviously, the head responds to the relative motion of the monitored element, and any displacement due to vibration will qualify as motion.
- **C.** **Vibration** between the mounted head and a nearby (3-4 inches) ferrous mass will also be treated as motion and must be avoided.
- **D.** **Magnetic Fields** existing around motor casings, transformers, or solenoids must not impinge on the Type I Head. The resultant induced EMF in the head will be treated as detected motion by the Amplifier.
- **E.** **Ferrous Masses** too near the head may distort the magnetic field produced by the head such as to either increase or decrease its sensitivity (depending on placement). After having insured against (3) above, try to avoid nearby ferrous objects by at least 4-5 inches in the area between the head's nose and the monitored element.

3. AMPLIFIER MOUNTING — The X25 amplifier may be mounted in any position. NEMA 1 or NEMA 12 enclosed units are available.

4. AMPLIFIER ADJUSTMENTS — Two locking potentiometer adjustments control the amplifier's sensitivity and time constant (delay).

- **A.** **Sensitivity** — This control adjusts the amplifier's gain and thereby the magnitude of the signal to which it will respond. The optimum sensitivity setting is about midway between the point where the relay does not pull in and the point where it will not drop out. In cases where the latter condition does not occur, one third of the way between the first point and maximum sensitivity is a compromise giving good margin.
- **B.** **Time Delay** — This adjustment spans the range .25 seconds to approximately 10 seconds. It's function is to maintain the relay in the closed condition between successive input signals; if the delay is set at 4 seconds, for example, the relay will drop out 4 seconds after receipt of the **last** input signal or will drop out whenever the lapsed time between input signals exceeds 4 seconds. For most applications, the delay should be set to span several input periods.

5. OUTPUT CONTACTS — The X25's output relay contacts are rated at 10 amps, 120 volts AC, non-inductive. Standard derating for DC voltage and inductive loads apply; contact life may be extended by the use of normal suppression techniques where inductive loads are encountered.

HEAD SENSITIVITY VS SPEED RELATIONSHIPS

The magnitude of the signal generated by the magnetic head is a function of the velocity of the monitored object as well as the object's size, shape and its distance from the lead. The velocity/head spacing relationship is depicted in speed Chart I from which it can be seen that a linear velocity of 1.5 feet per second or more is adequate for head separation distances of ½ inch or more. The "rod end" called out on the chart is mounted radially to the shaft as would be a setscrew, holding a brass or aluminum collar to the shaft.

Speed of the monitored object is actually peripheral speed and may be found by referring to speed Charts II or III or by calculating:

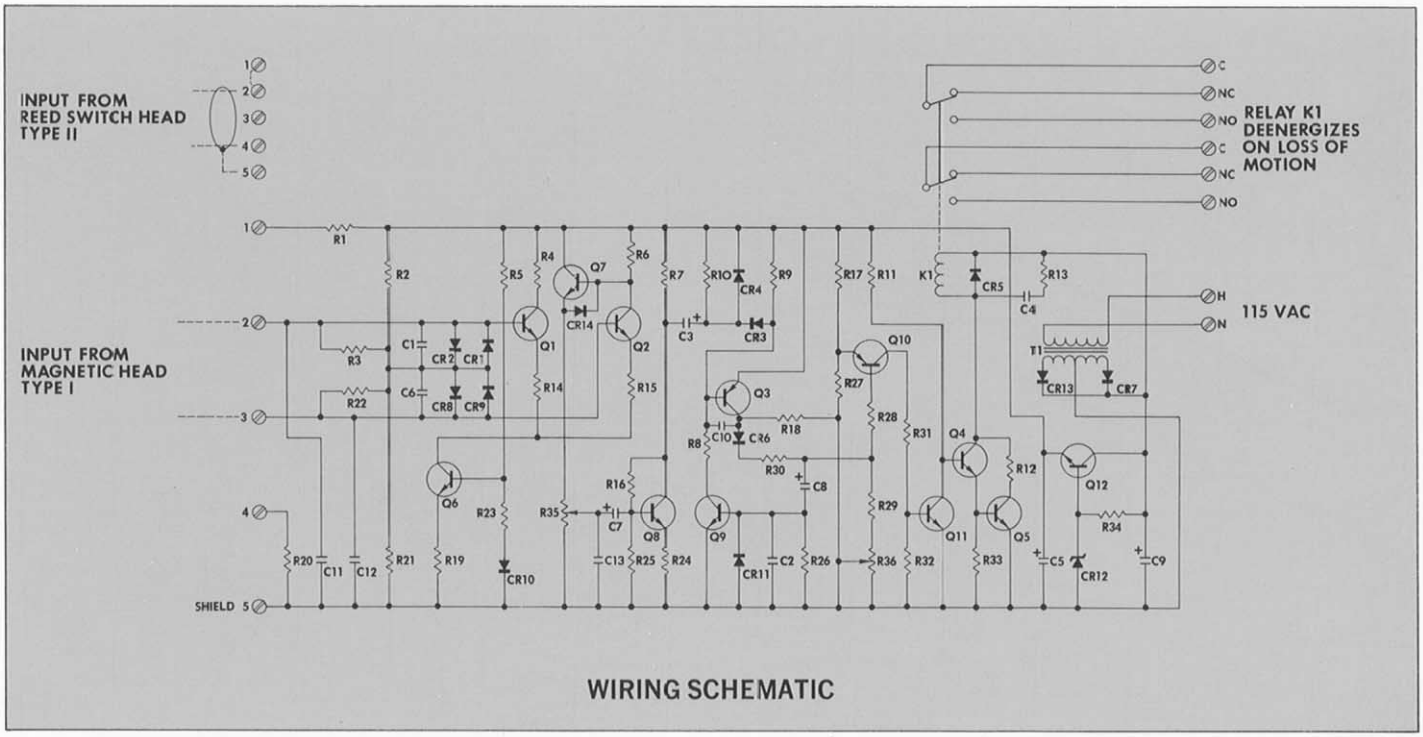
$$S = \frac{\text{RPM} \times \text{DIA (inches)} \times 3.14}{60 \times 12} \text{ feet per second}$$

For example: A 2 inch shaft rotating 1750 RPM has

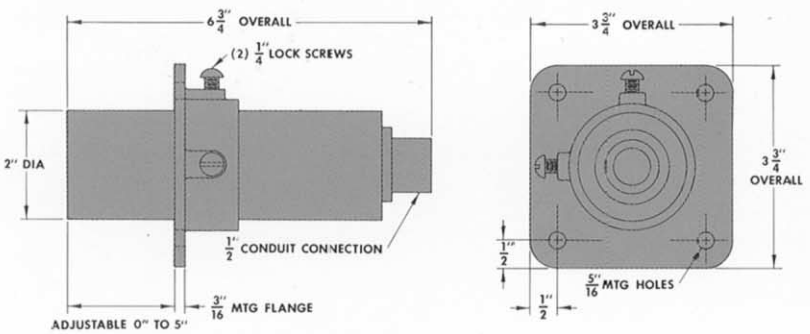
$$\frac{1750 \times 2 \times 3.14}{720} = 15.26 \text{ feet/sec peripheral speed.}$$

Should this calculation or the charts show a speed below 1.5 feet/second, one of two solutions may apply. Referring to Chart III, the area to the left of the 1.5 ft./sec. line recommends speed multiplication above 30 RPM and the Type II Head below. Speed multiplication is achieved chiefly by gearing, belting, or the use of lever arms to amplify the basic speed. **Very** slowly moving devices may require the use of multiple magnets and the Type II reed head. Accompanying drawings suggest several solutions to head-mounting problems typically encountered.

SCHEMATIC AND DIMENSIONAL INFORMATION

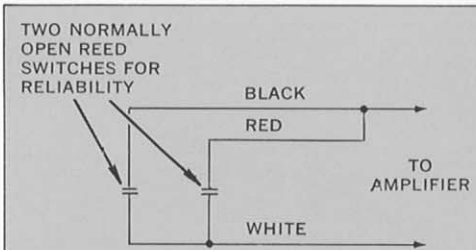


WIRING SCHEMATIC

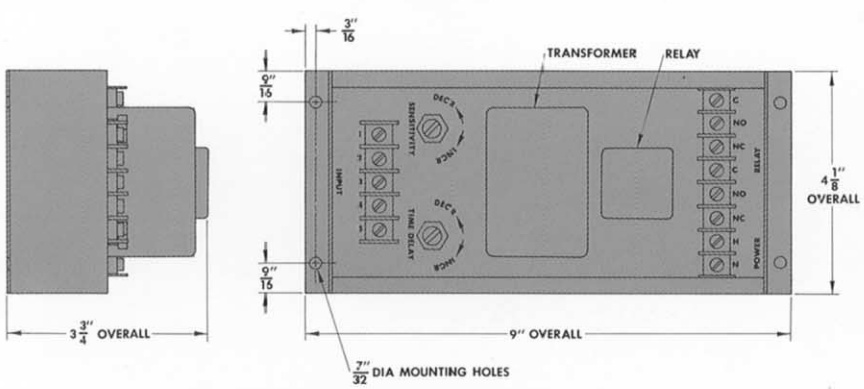


SERIES X25 DETECTOR HEAD

Model X25-1003 TYPE I (Magnetic)
Model X25-1003 TYPE II (Reed)

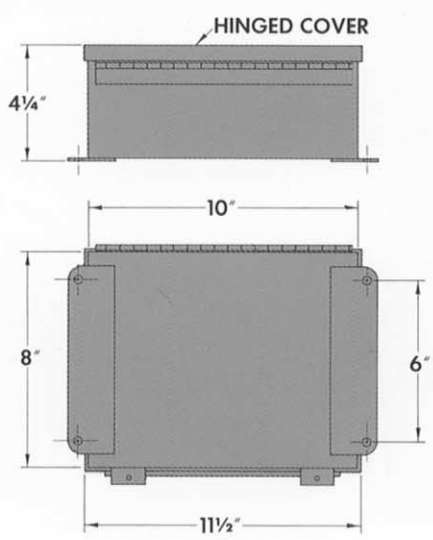


TYPE II REED HEAD WIRING SCHEMATIC



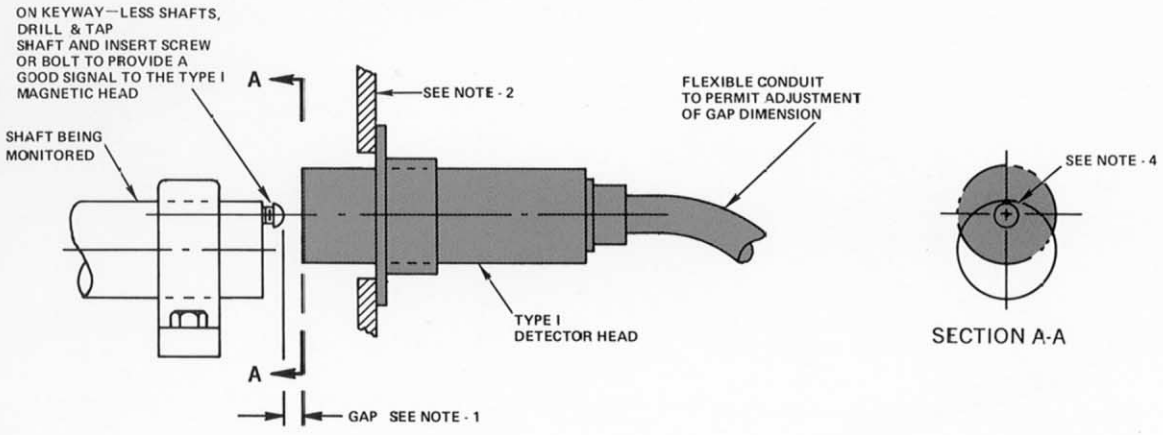
SERIES X25 MOTION DETECTOR

AMPLIFIER — Model X25-1002

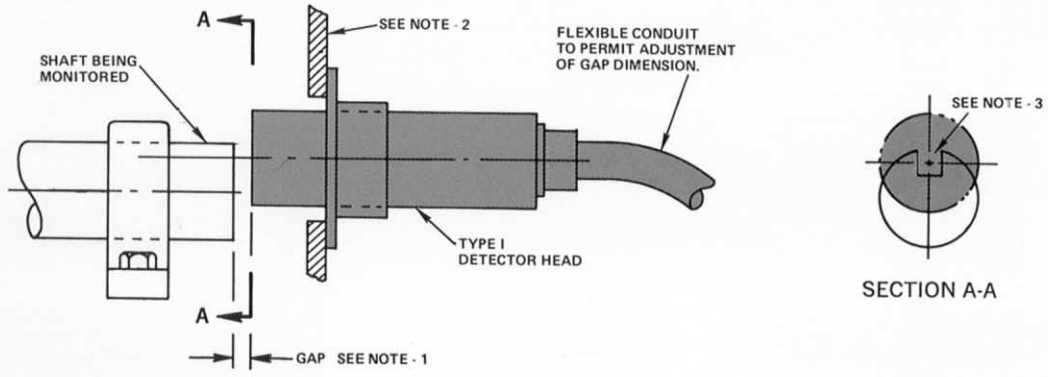


NEMA 12 ENCLOSURE DETAILS

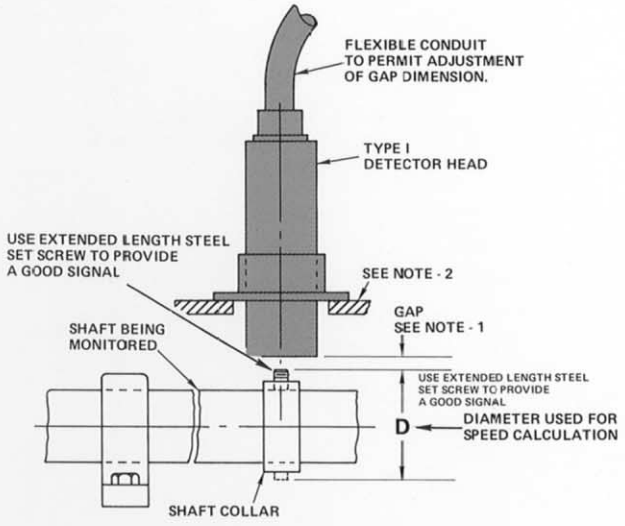
TYPICAL APPLICATIONS



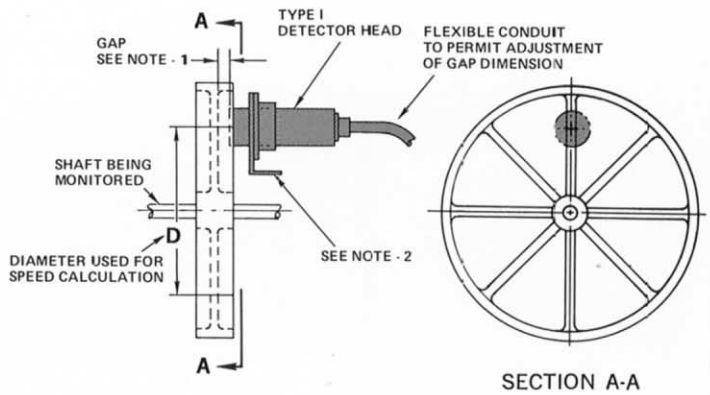
SHAFTS LESS KEYWAY



SHAFTS WITH KEYWAY

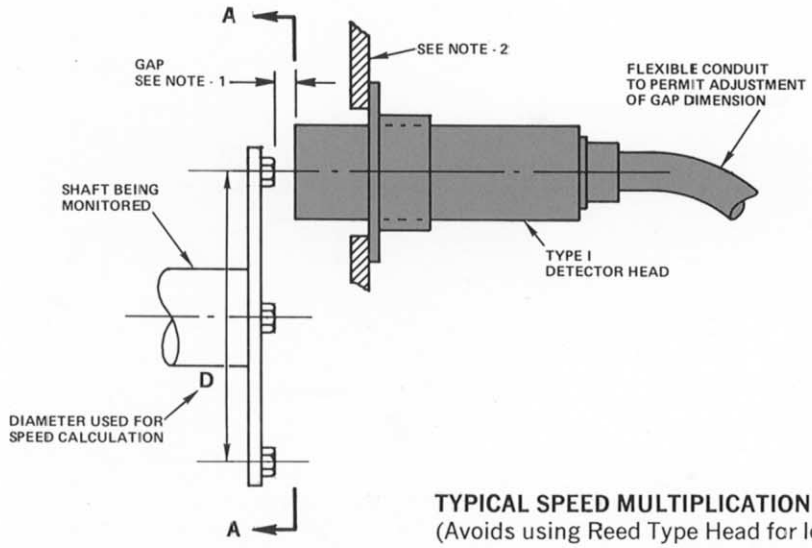


SHAFT COLLARS ON SMOOTH SHAFT

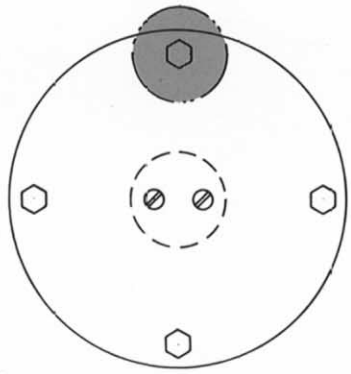


SPOKE TYPE WHEELS

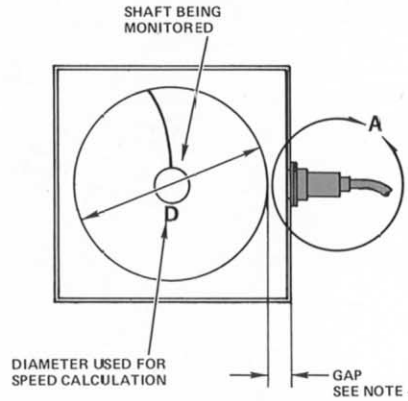
TYPICAL APPLICATIONS (continued)



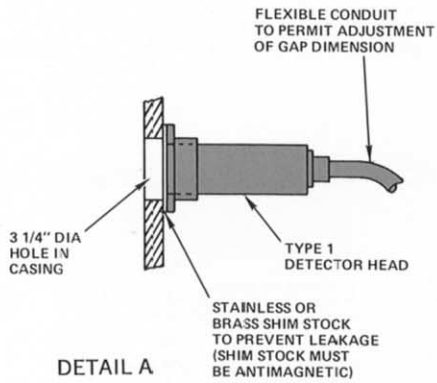
TYPICAL SPEED MULTIPLICATION ADAPTOR
(Avoids using Reed Type Head for lower speeds)



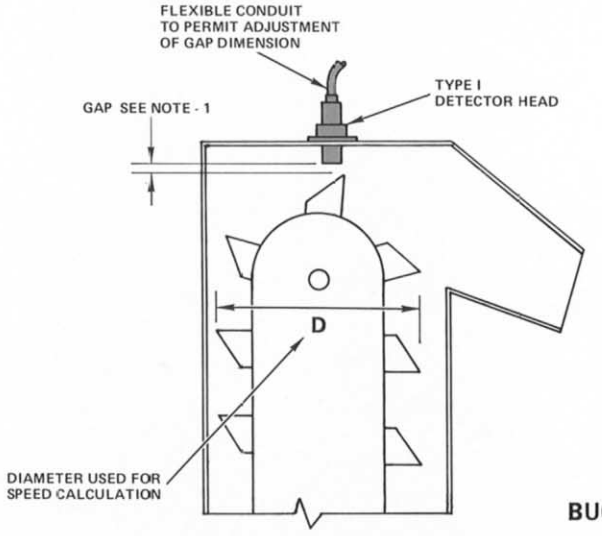
SECTION A-A



SCREW CONVEYOR

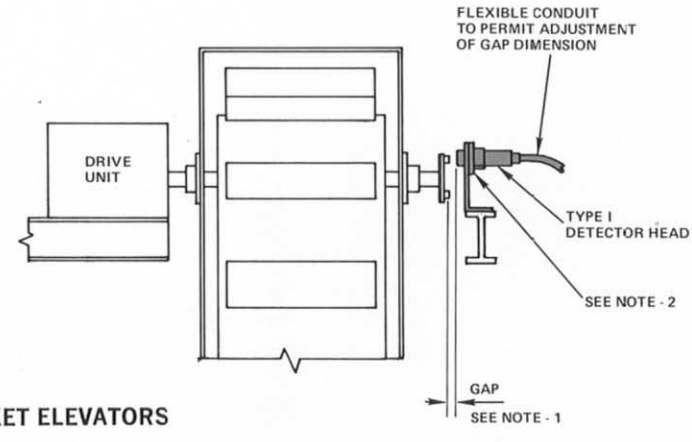


DETAIL A



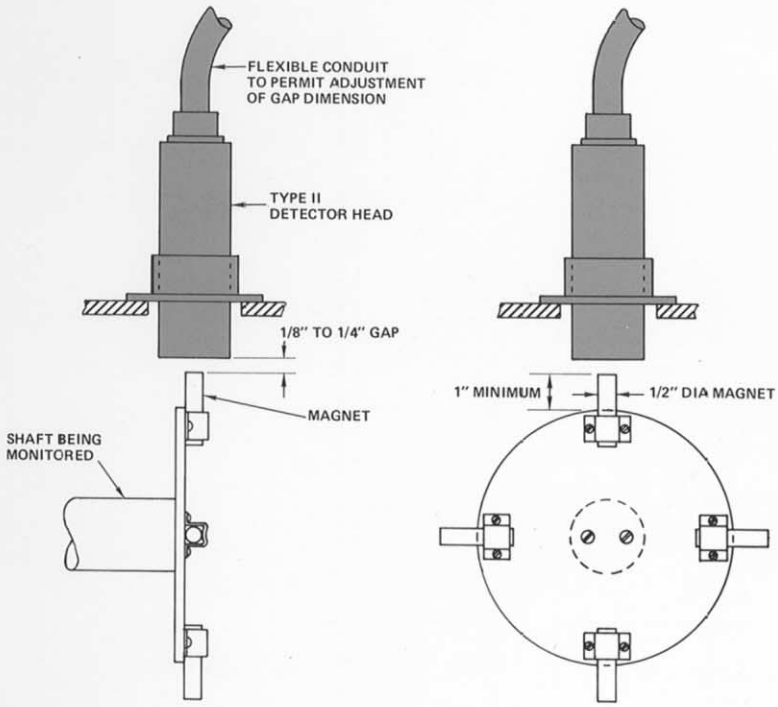
RECOMMENDED TYPE INSTALLATION
ELIMINATES PROBLEM OF BELT SLIPPAGE

BUCKET ELEVATORS



ALTERNATE TYPE INSTALLATION

TYPICAL APPLICATIONS (continued)



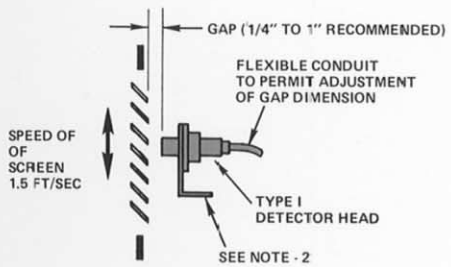
NOTES:

Time interval between two adjacent magnets passing the TYPE II Head should be less than ½ the time delay setting of the unit.

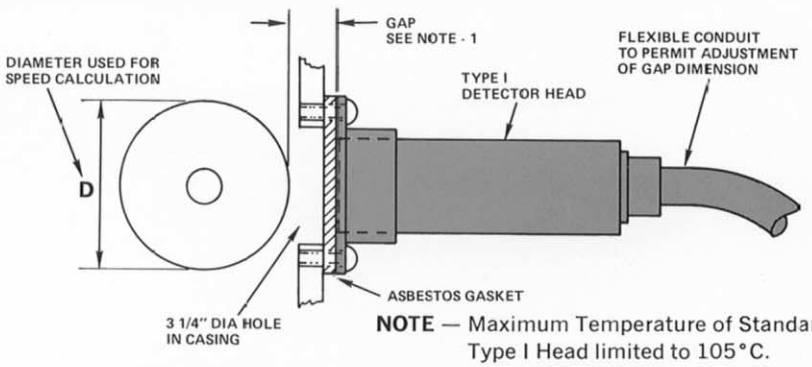
$$\text{Time interval between magnets (in seconds)} = \frac{60}{\text{RPM} \times N}$$

where N = Number of Magnets

SLOWER SPEED APPLICATION USING TYPE II (REED) HEAD WITH INPUT MAGNETS



VIBRATING SCREENS



HIGH TEMPERATURE APPLICATION

NOTE — Maximum Temperature of Standard Type I Head limited to 105°C. Consult Factory for higher temperatures.

NOTES:

1 First select the gap dimension to provide mechanical clearance taking into consideration any anticipated end play of the shaft. For maximum output signal in the Type I Detector Head a gap dimension of ⅛" to ¼" is normal. Higher speed shafts permit wider gap spacing.

2 When selecting or detailing the bracket to mount the Type I Detector Head care must be taken to provide a bracket attached to a support that has essentially zero or minimum vibration. Note any vibration of the Type I Head will be considered as motion by the amplifier.

3 Position head such that its axis is in line with the keyway for maximum signal.

4 Position head such that its axis is in line with the screw head for maximum signal.

OTHER PRODUCTS BY RONAN

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ELECTRONIC TRIP MODULES
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EXPLOSION PROOF ALARMS
CONTACT MONITORS

WARRANTY

Ronan warrants equipment of its own manufacture to be free from defects in material and workmanship, under normal conditions of use and service, and will replace any component found to be defective, on its return, transportation charges prepaid, within one year of its original purchase. This warranty carries no liability, either expressed or implied, beyond our obligations to replace the unit which carries the warranty. Note: Specifications and designs subject to change without notice.

RONAN

RONAN ENGINEERING COMPANY
P.O. Box 1275
21200 Oxnard Street
Woodland Hills
California 91367 U.S.A.
(818) 883-5211
FAX (818) 992-6435

RONAN ENGINEERING LIMITED U.K
1 Tilley Road
Crowther District 3
Washington, Tyne and Wear
United Kingdom, NE38-OEA
(091) 416-1689 • Telex 537-746
FAX (091) 416-5856

RONAN ENGINEERING LIMITED
32 Bermondsey Road
Toronto, Ontario
Canada M4B1Z5
(416) 752-0310 • Telex 63662
FAX (416) 752-8072
54-200 & X54-202/591

RONAN ENGINEERING (AUST.) PTY. LTD.
Unit 10, 8 Leighton Place
Hornsby, N.S.W. 2077
Australia
(02) 477-7344 • Telex 73467
FAX (02) 477-6151

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