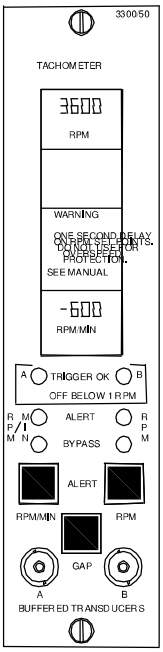
3300/50 Tachometer

Bently Nevada™ Asset Condition Monitoring



Description

The 3300/50 Tachometer continuously measures shaft rotative speed, rotative acceleration, or provides an output for zero speed indication. The tachometer provides a proportional voltage or current output on the rear terminal strip and supplies Alert status via relay contacts for use with an external annunciator panel.

Although a single channel monitor, the 3300/50 Tachometer accepts inputs from two transducers. Voting logic between the two transducers is internal to the monitor, minimizing false indications in the event of a single transducer failure.

⚠ Warning

Bently Nevada 3300/50 Tachometers are not designed for use independently as, or as a component of, a speed control or overspeed protection system. Bently Nevada 3300/50 Tachometers do not provide protective redundancy and the response speed needed for reliable operation as a speed control or overspeed protection system. Where provided, the analog proportional output is suitable for data logging or chart recording purposes only. Also, where provided, speed alert setpoints are suitable for annunciation purposes only.

Failure to take the above warnings into account constitutes a misuse of the product and may result in property damage and/or bodily injury. When applications require machine overspeed protection, use Bently Nevada's 3300/53 or 3500/53 Electronic Overspeed Detection Monitors instead.

Specifications

Inputs

Transducers:

Bently Nevada 3300, 7200, or 3000 series proximity probes; Magnetic pickups.

Note: Magnetic pickups are not recommended for zero speed monitoring.

Signal:

Accepts two transducer signals. The monitor can operate with any combination of the above inputs.

Input Impedance:

10 k Ω.

Power Consumption:

Nominal consumption is 2.5 watts.

Signal Conditioning

Monitor Range:

Shaft rotative speed (rpm) monitor operates from 1 to 99,999 rpm. Rotor acceleration/deceleration (rpm/min) monitor operates from -9,999 to 9,999 rpm/min. Zero Speed operates below 100 rpm.

Accuracy:

Within ±1 rpm for speed display and within 20 rpm/min for rotor acceleration display.

Specified at ambient temperature of +25°C (+77°F).

Transducer Conditioning

Auto Threshold:

Use for any input above 10 Hz

(600 rpm for 1 event/revolution) to 10 KHz.

Duty Cycle:

1% minimum

Manual Threshold:

User-selectable from 0 to -18 Vdc.

Hysteresis:

User-selectable from 0.2 to 2.0 Volts.

Events per Revolution Option:

User-selectable from 1 to 255 for numerator and 1 to 255 for denominator. Num/Den ≥ 0.1.

Outputs

Recorder:

User-programmable for +4 to +20 mA, 0 to -10 Vdc, or +1 to +5 Vdc. Voltage or current outputs are proportional to selected monitor full-scale. Individual recorder outputs are proportional to shaft rotative speed (rpm), and rotor acceleration (rpm/min).

Recorder accuracy (in addition to signal conditioning accuracy):

All specified at +25°C (+77°F).

+4 to +20 mA: ±1.8% of signal, ±0.09 mA offset.

+1 to +5 Vdc: ±2.2% of signal, ±10 mV offset.

0 to -10 Vdc: ±2.1% of signal, ±15 mV offset.

Output Impedance (voltage outputs):

100 Ω. Minimum load resistance is 10 k Ω

Voltage Compliance (current outputs):

0 to +12 Vdc range across load. Load resistance is 0 to 600 Ω when using +4 to +20 mA option.

Buffered Transducer Outputs:

One coaxial connector per transducer on the front panel. Both are short-circuit protected.

Output Impedance:

100 Ω.

Transducer Supply Voltage:

User-programmable in Power Supply for -24 Vdc or -18 Vdc. Current limited on individual monitor circuit board.

Alarms

Alarm Setpoints:

All Alarm setpoints are digitally adjustable. They are adjusted using tamper proof switches on the monitor circuit board and up/down switches on the System Monitor front panel. Both rpm and delta rpm/min alarms are user-selectable from 0 to 100% of full-scale display. Zero Speed Alert can be selected (and changed) at any speed below 100 rpm. Alarm setpoints are stored in nonvolatile memory.

Alarms and OK Relay Drives:

Two Alarm relay drive signals and one OK relay drive signal.

Monitor Alarm Functions:

Both Alarm signals are independently field adjustable and selectable for overspeed or underspeed annunciation, and are user- programmable for latching or nonlatching operation.

Alarm Time Delays:

Tachometer or Rotor Acceleration Tachometer: one second or three valid input triggers, whichever is greatest. Zero Speed (<100rpm): three valid input triggers. One minute maximum is required to declare an Alarm when three input triggers are not detected (machine rotor at zero rpm). One valid pulse after power up is required to enable alarm detection.

Relay Modules

Location:

One relay module can be installed behind each monitor. At least one alarm relay module must be ordered with each 3300 System.

Display

LCD Indicators:

The front panel LCD can display both rpm and Rotor Acceleration in two separate five digit numbers. Digits also indicate probe gap voltage. The Zero Speed display section indicates whether that function is enabled.

RPM and RPM/MIN Character Size:

84 mm x 38 mm

(0.33 in x 0.15 in).

RPM Range:

1 to 99,999 rpm.

Resolution:

±1 rpm.

Accuracy:

±1 rpm.

RPM/MIN Range:

-9,999 to 9,999 rpm/min.

Resolution:

±1 rpm/min.

LED Indicators

OK:

One constant ON green OK LED for transducer A and one constant ON green OK LED for transducer B indicate OK operational condition of monitor. Constant OFF indicates the operational speed is below 1 rpm or above 99,999 rpm. When in NOT OK condition or the monitor is by-passed, the red bypass LED will be ON. OK LED flashing at 5 Hz indic-ates error code(s) stored in memory.

Alert:

Two red LEDs per channel indicate alert status. Flashing Alert LED indicates First Out, independent for Alert 1 and Alert 2

Note: The Tachometer only drives the Rack First Out Alert Bus.

Bypass:

One red LED indicates status of Alert 2 Bypass and Rack / Monitor Bypass functions.

Environmental Limits

Operating Temperature:

0°C to +65°C (+32°F to +150°F).

Storage Temperature:

-40°C to +85°C (-40°F to +185°F).

Relative Humidity:

To 95%, noncondensing.

CE Mark Directives

EMC Directive

Certificate of Conformity: 158710

Low Voltage Directive

Certificate of Conformity: 135300

Hazardous Area Approvals

CSA/NRTL/C

Class I, Div 2

Groups A, B, C, D

T4 @ Ta = +65 °C

Certification Number

150368 – 1002151 (LR 26744)

ATEX

II 3 G

EEx nC[L] IIC

T4 @ Ta = -20°C to +60°C

When installed per document number 132577-01.

Certification Number

BN26744C-55A

Physical

Space Requirements:

One rack position (any position except 1 and 2, which are reserved for the Power Supply and System Monitor, respectively).

Weight:

1 kg (2.2 lbs.).

Ordering Information

For spares, order the complete catalog number as described below. This includes a front panel assembly, monitor PWAs with sheet metal, and appropriate relay module. This unit is optioned, tested and ready to install in your system. Spare relay modules can be ordered separately.

Tachometer

3300/50-AXX-BXX-CXX-DXX

A: Tachometer Type Option

- **0 1** Dual Setpoint Tachometer
- **0 2** Zero Speed Tachometer
- **0 3** Rotor Acceleration Tachometer

B: Alert Relay Option

- **0 0** No Relays
- **0 1** Epoxy-sealed
- **0 2** Hermetically-sealed
- **0 4** Spare Monitor-No SIM/SIRM

Notes:

At least one relay module must be ordered with each 3300 System. If one common relay module per system has been ordered, all monitors of this type must be jumper programmed at the factory to activate a relay bus by ordering a Special Configuration Kit (SCK). Contact your nearest Bently Nevada office for information.

Agency approval places limitations on the relay module. Refer to the Relay Module data sheet for information.

C: Agency Approval Option

- **0 0** Not Required
- **0 1** CSA/NRTL/C
- **0 2** ATEX self certification

Note: ATEX approval requires the monitor rack be installed in a weatherproof housing.

D: Safety Barrier Option

- **0 0** None
- **0 1** External
- **0 2** Internal

Spare Relay Module Assemblies
(Order the option in parenthesis for ATEX approved spares)

DUAL SETPOINT

84689-01(02)

No Relays

84140-01(02)

Dual Epoxy Relays

84146-01(02)

Dual Hermetic Relays

88843-07(17)

No Relays, Internal Barriers

88843-04(14)

Dual Epoxy Relays, Internal Barriers

88843-01(11)

Dual Hermetic Relays, Int Barriers

ZERO SPEED

84690-01(02)

No Relays

84141-01(02)

Dual Epoxy Relays

84147-01(02)

Dual Hermetic Relays

88843-08(18)

No Relays, Internal Barriers

88843-05(15)

Dual Epoxy Relays, Internal Barriers

88843-02(12)

Dual Hermetic Relays, Int Barriers

ROTOR ACCEL

84691-01(02)

No Relays

84142-01(02)

Dual Epoxy Relays

84148-01(02)

Dual Hermetic Relays

88843-09(19)

No Relays, Internal Barriers

88843-06(16)

Dual Epoxy Relays, Internal Barriers

88843-03(13)

Dual Hermetic Relays, Int Barriers

Note: External Safety Barriers must be ordered separately.

Field-programmable Options

These options are field-programmable via plug-in jumpers. **Bold text** indicates options as shipped from the factory.

Transducer A Input Option

External Proximitor® (3300, 7200, or 3000)

System Keyphasor® Transducer 1

External Magnetic pickup

Transducer B Input Option

External Proximitor (3300, 7200, or 3000)

System Keyphasor Transducer 2

External Magnetic pickup

Notes:

Contact your nearest Bently Nevada Sales Professional if 3000 series transducers are to be used in a monitoring rack which also uses 3300 and/or 7200 series transducers.

Do Not Use Magnetic Pickups for Zero Speed applications.

RPM Full-scale Range Option

100 rpm

200 rpm

500 rpm

1,000 rpm

2,000 rpm

5,000 rpm

10,000 rpm

20,000 rpm

50,000 rpm

100,000 rpm

(display maximum = 99,999 rpm)

RPM/MIN Full-scale Range Option

-100 to 100 rpm/min

-200 to 200 rpm/min

-500 to 500 rpm/min

-1000 to 1,000 rpm/min

-9,999 to 9,999 rpm/min

(display maximum = ±9,999 rpm/min)

Recorder Output Option

+4 to + 20 mA

+1 to + 5 Vdc

0 to -10 Vdc

Recorder Clamping Mode (+4 to +20 mA Option only)

NOT OK = +4 mA

NOT OK = +2 mA

Note: Clamping occurs for monitor Not OK condition only.

Events-per-revolution Option

Numerator: 1 to 255

Shipped as = 1

Denominator: 1 to 255

Shipped as = 1

Note: Transducers A and B must observe the same number of events per revolution.

RPM Alert 1 or RPM Alert Mode Option

Overspeed

Underspeed

RPM Alert 1 or RPM Alert Reset Option

Latching

Nonlatching

RPM Alert 2, Zero Speed Alert, or RPM/MIN Alert Mode Option

Overspeed

Underspeed

Note: Zero Speed is always underspeed and RPM/MIN is always overspeed (Increasing rate of change).

RPM Alert 2, Zero Speed Alert, or RPM/MIN Alert Reset Option

Latching

Nonlatching

Zero Speed Alert Hysteresis

0 rpm

1 rpm

5 rpm

10 rpm

Threshold Option

Manual

Auto

Note: Tachometer Option 02 (Zero Speed Tachometer) is shipped as Manual.

Hysteresis Option

0.2 volts

0.5 volts

1.0 volts

2.0 volts

Alert 1 Relay Bypass

Disabled

Enabled

Alert 2 Relay Bypass

Disabled

Enabled

First Out Option

Enabled

Disabled

Note: The 3300/50 Tachometer drives the Rack Alert First Out Bus only. It never drives the First Out Danger Bus.

Accessories

89634-01

-24V to -18V Proximitor Power Converter

128112

Galvanic Isolator Kit

02245002

External Barrier

02200214

Surge Protector

Field wiring diagrams

3300/50 Tachometer

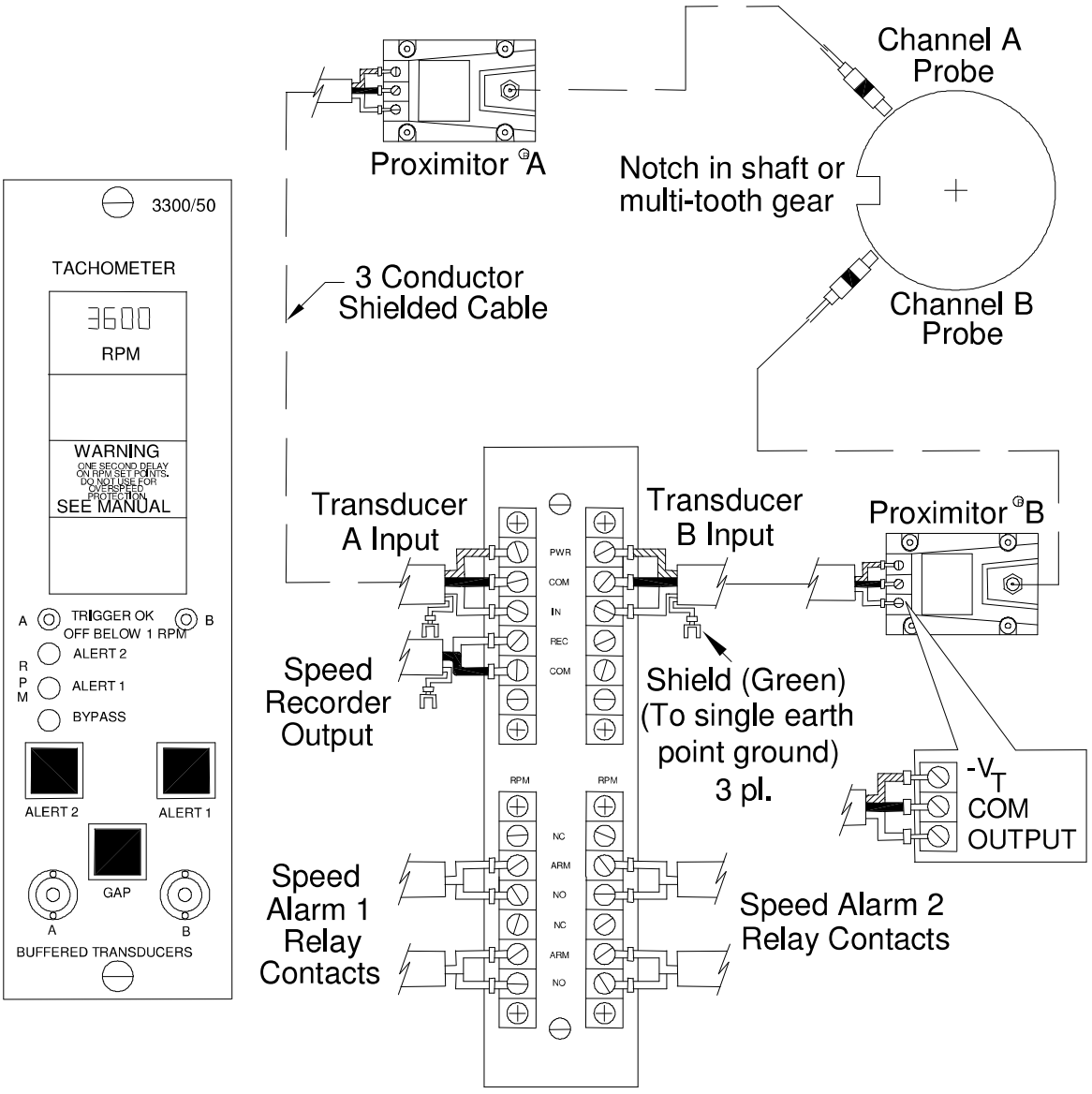


Figure 1: Field wiring diagram for 3300/50 Dual Setpoint Tachometer

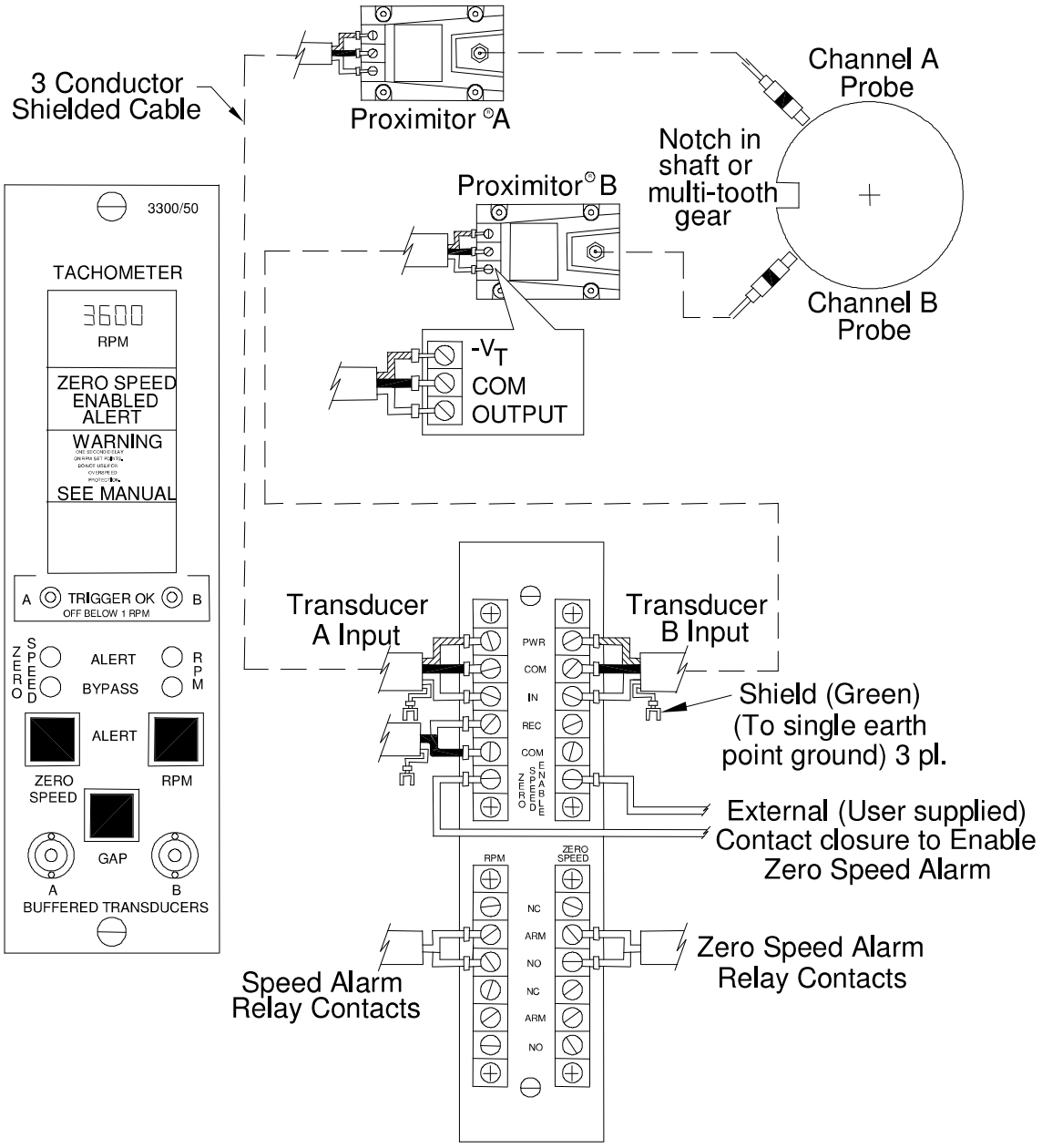


Figure 2: Field wiring diagram for the 3300/50 Zero Speed Tachometer

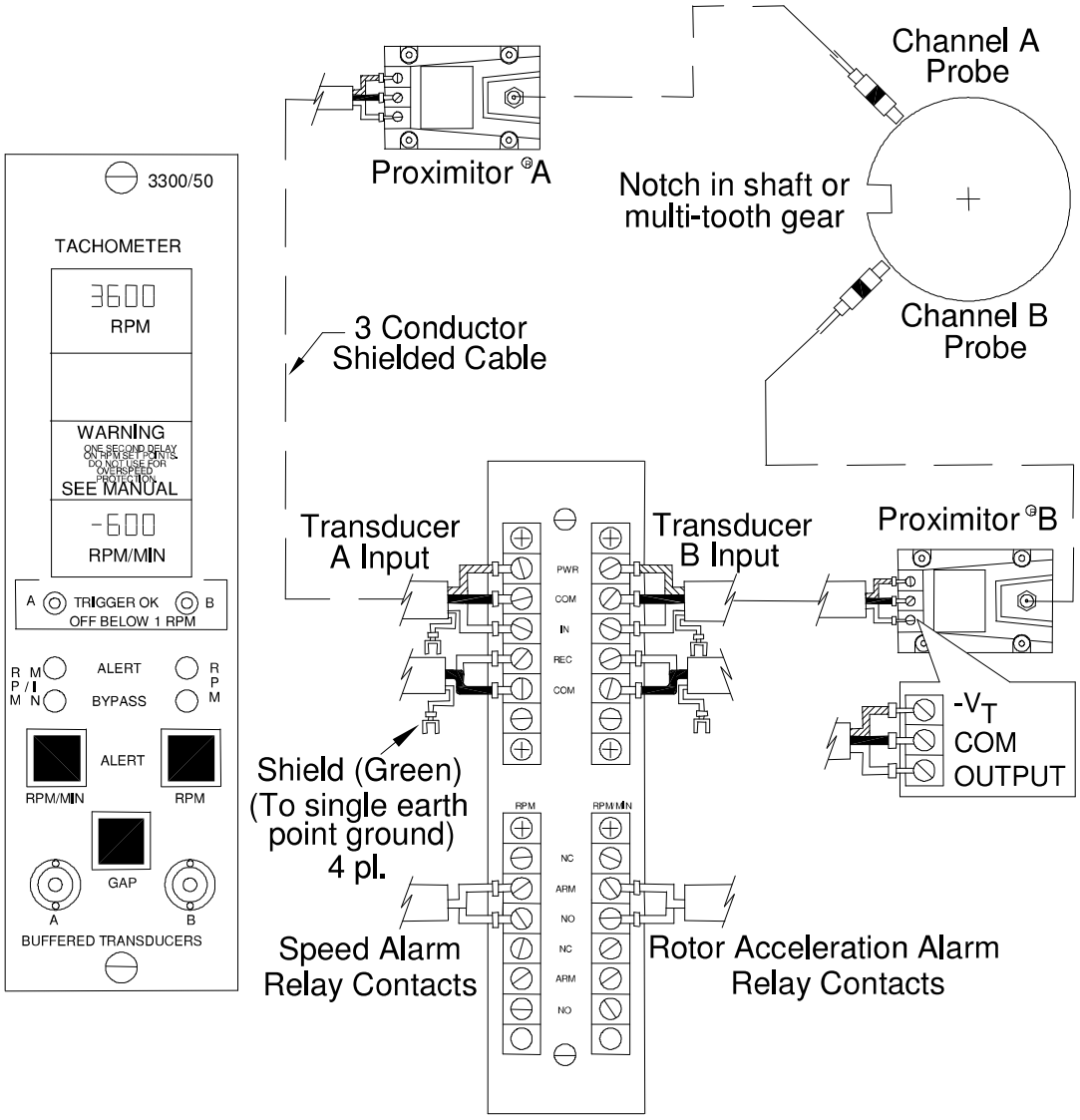


Figure 3: Field wiring diagram for the 3300/50 Rotor Acceleration Tachometer

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