Rotary Variable Differential Transformer (RVDT)

TYPICAL APPLICATIONS

- Flight control actuation / navigation
- Fuel control / valves
- Cockpit controls
- Nose wheel steering systems
- Missile fin actuation

FEATURES

- Brushless, non-contacting technology
- Repeatable position sensing with infinite resolution
- Housed and frameless versions available
- Single cycle (+/- 80 deg.) or dual cycle (+/- 40 deg.)
- Standard size 8 (housed version) with servo clamp interface available
- Multiple channel (tandem) versions available
- Geared configurations available

BENEFITS

- Long life
- High reliability
- High accuracy
- Repeatable performance
- Robust, compact construction
- Custom electrical and mechanical designs available – contact factory with requirements

Note: If your application requires gearing or other complex mechanical configurations, please provide us with your requirements.

A Rotary Variable Differential Transformer (RVDT) is an electromechanical transducer that provides a variable alternating current (AC) output voltage that is linearly proportional to the angular displacement of its input shaft. When energized with a fixed AC source, the output signal is linear within a specified range over the angular displacement.

RVDT's utilize brushless, non-contacting technology to ensure long-life and reliable, repeatable position sensing with infinite resolution. Such reliable and repeatable performance assures accurate position sensing under the most extreme operating conditions.

Moog offers seven frequency optimized RVDT's in a basic size 8 configured housing. Each is designed to operate at a specific frequency. Frequency optimization provides the benefit of an increased operating range of angular displacement with a reduction in sensor size and weight.

Please contact our application engineers for more information and to discuss your specific needs.

Rotary Variable Differential Transformer

Basic RVDT construction and operation is provided by rotating an iron-core bearing supported within a housed stator assembly. The housing is passivated stainless steel. The stator consists of a primary excitation coil and a pair of secondary output coils.

A fixed alternating current excitation is applied to the primary stator coil that is electromagnetically coupled to the secondary coils. This coupling is proportional to the angle of the input shaft. The output pair is structured so that one coil is in-phase with the excitation coil, and the second is 180 degrees out-of-phase with the excitation coil.

When the rotor is in a position that directs the available flux equally in both the in-phase and out-of-phase coils, the output voltages cancel and result in a zero value signal. This is referred to as the electrical zero position or E.Z. When the rotor shaft is displaced from E.Z., the resulting output signals have a magnitude and phase relationship proportional to the direction of rotation.

Because RVDT's perform essentially like a transformer, excitation voltages changes will cause directly proportional changes to the output (transformation ratio). However, the voltage out to excitation voltage ratio will remain constant. Since most RVDT signal conditioning systems measure signal as a function of the transformation ratio (TR), excitation voltage drift beyond 7.5% typically has no effect on sensor accuracy and strict voltage regulation is not typically necessary. Excitation frequency should be controlled within +/- 1% to maintain accuracy.

Please contact our application engineers for more information and to discuss your specific needs.

Common RVDT Terms

- **Scale Factor** (Sensitivity) – Slope of a best fit straight line drawn through the output data. RVDTs are ratiometric devices with the sensitivity commonly expressed in volts out per degree.
- **Accuracy** – Maximum allowed deviation from the nominal output. Specified as +/- degrees.
- **Crosstalk** – Applicable when using multiple channel units. Voltage produced in the secondary of one channel by the primary excitation of another channel.
- **Temperature Coefficient** (Temperature Variation) – % change in device sensitivity over a temperature range. Expressed as % / degrees C.
- **Single Cycle** – Linear (operating) region through +/- 80 degrees.
- **Dual Cycle** – Linear (operating) region through +/- 40 degrees.

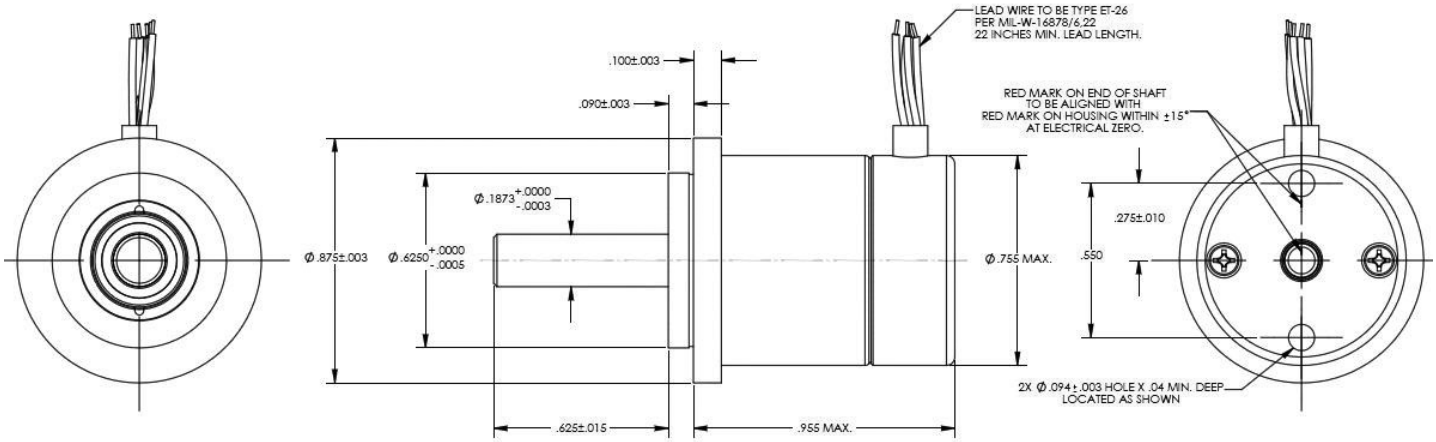
Specifications

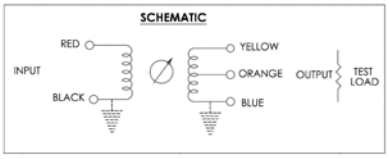
Model No.	AS-827-001	AS-827-002	AS-827-003	AS-827-004	AS-887-001	RV-08-B-05C	PRV-15-A-15A
Input							
Voltage (VRMS)*	8.0	8.0	8.0	8.0	7.0	5.7	3.5
Frequency (Hz)	1870	1870	1870	1870	3000	3500	2879
Impedance	65 + j475	65 + j475	65 + j475	65 + j475	217 + j448	84 + j99	TBD
Output							
Scale Factor (V / Deg.)	0.061	0.068	0.068	0.061	0.052	0.019	0.015
Angular Displacement (+/- Deg)	40	40	40	42	30	80	37
Accuracy (+/- Deg.)	0.2	0.3	0.3	0.4, 0.6	0.25	0.50**	0.2
Phase Angle (+/- Deg.)	5	5	5	7	7	5	7.5
Impedance	78 + j88	78 + j88	78 + j88	78 + j88	114 + j103	88 + j361	50 ohms
Test Load	7000 pF	7000 pF	7000 pF	7000 pF	40 Kohms	50 Kohms	N/A
Variation with Temp. (Deg. C Max.)	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Crosstalk (%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Weight (oz)	2.0	2.0	2.0	2.0	2.0	2.0	1.0

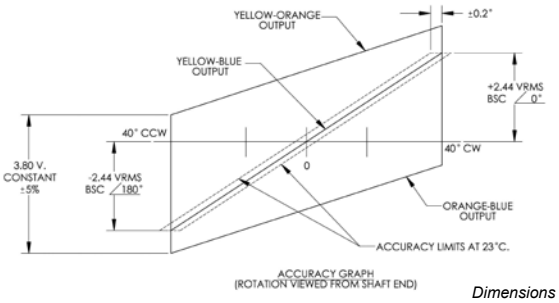
***Voltage and frequencies shown are typical. RVDTs can operate at other voltages and frequencies. Our design engineers are happy to design an RVDT to meet your voltage and frequency requirements.**
****Accuracy varies with excursion angle.**

Typical Outline Drawings

AS-827-001-003

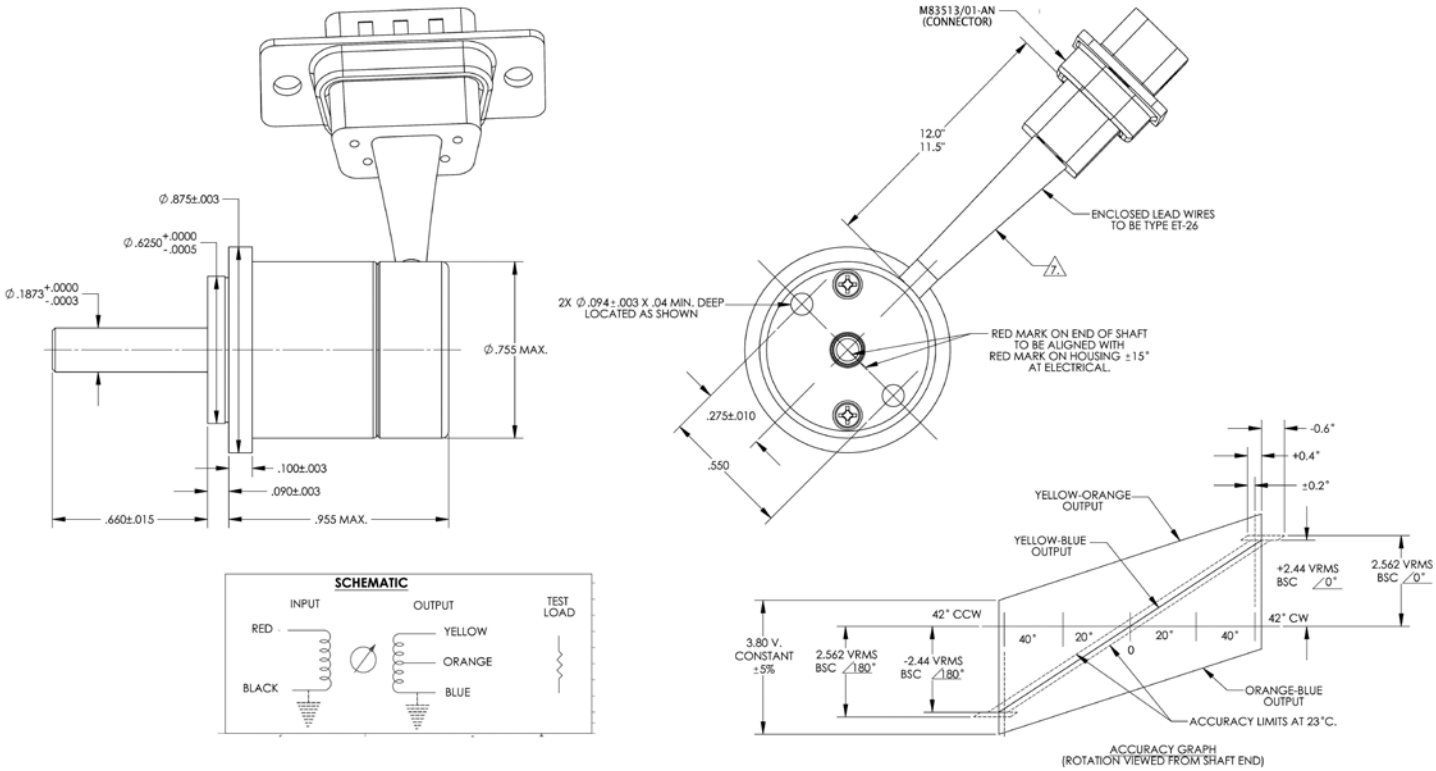






Dimensions are in inches

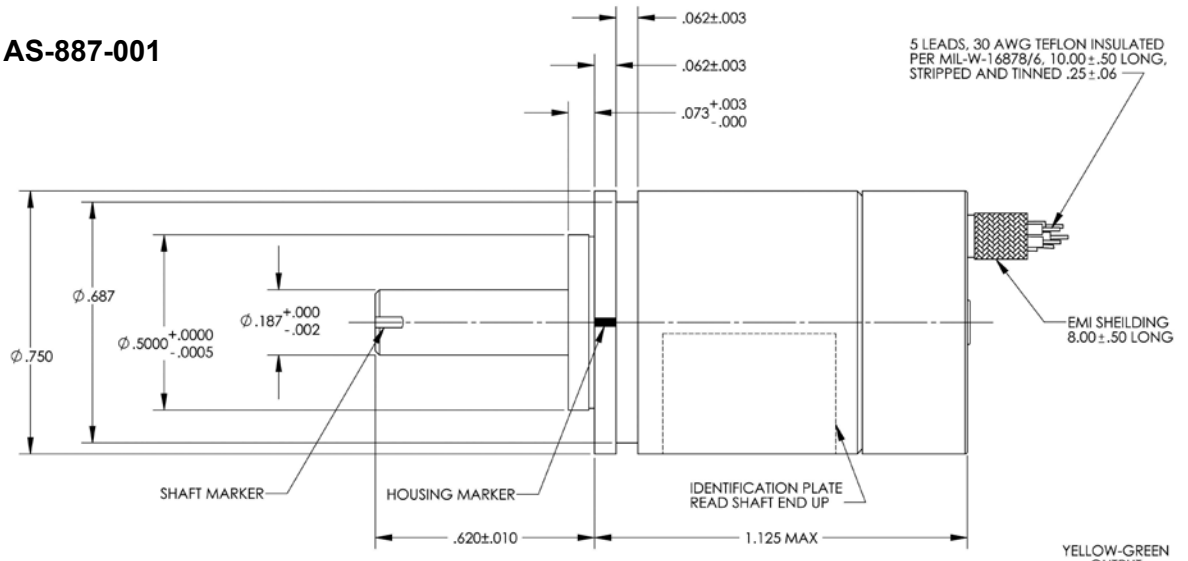
AS-827-004

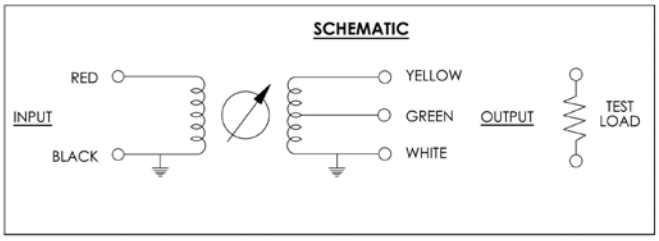


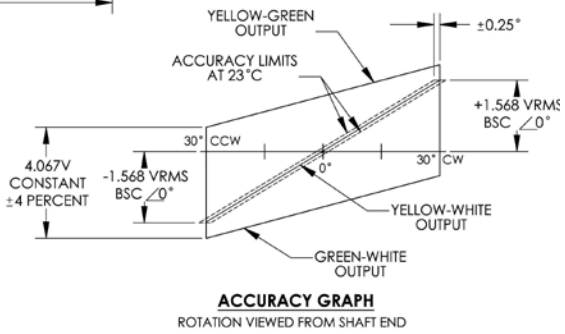
Dimensions are in inches

Typical Outline Drawings

AS-887-001





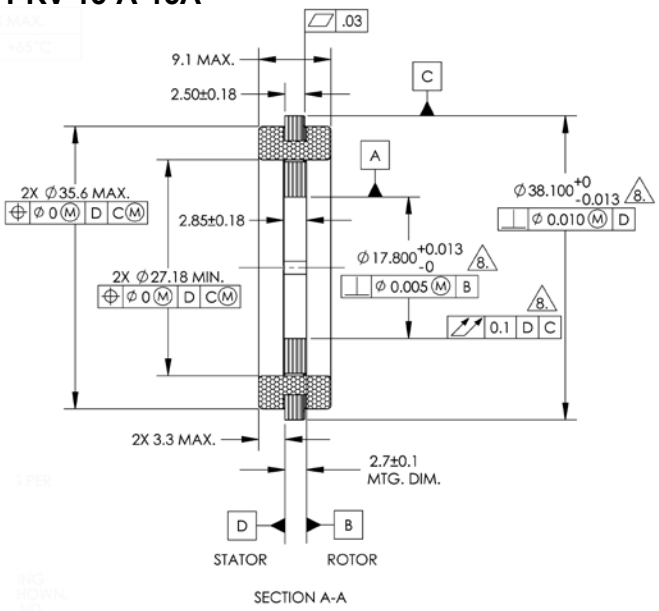


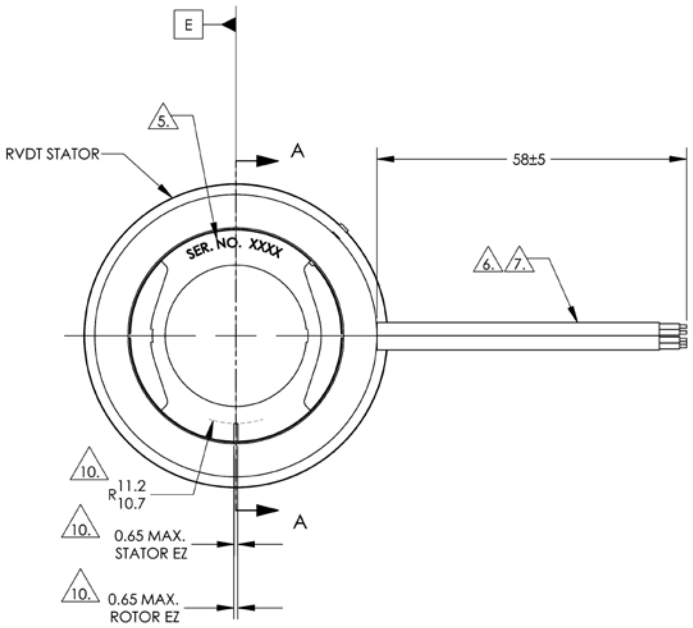
Note: Configured for traditional servo clamp mounting

Dimensions are in inches

Typical Outline Drawings

PRV-15-A-15A





Note: With respect to the U.S. export regulations, this product is controlled by the U.S. Commerce Department or the U.S. State Department. Contact Moog Components Group for additional detail on the export controls that are applicable.

Dimensions are in millimeters