R O T A S Y N

RO

S O L I D   R O T O R   R E S O L V E R

Solid rotor, variable reluctance, frameless, brushless resolvers for severe applications.

Admotec RO Series Rotasyn variable reluctance frameless resolvers provide high performance in measurement and feedback applications where traditional resolvers fail. Perfect for aerospace, down-hole, nuclear, and other severe applications, these solid-rotor resolvers offer original equipment manufacturers reliable solutions at any quantity—from prototype units all the way up to high-volume production.

The Rotasyn has fewer parts and a solid rotor without windings, making it much simpler than traditional brushless resolvers. Since the solid rotor has no coils and the stator has only half the number of windings of a traditional brushless resolver, reliability is significantly increased. And the solid rotor allows operation with the rotor immersed in hydraulic oil or other liquids.

The Rotasyn resolver is mechanically and electrically compatible with traditional brushless resolvers and can replace them as original equipment or in existing applications. And if our standard products don't meet your needs, custom versions can be quickly designed for your application.

Admotec—motion and position sensing for original equipment manufacturers.

TYPICAL APPLICATIONS

- Industrial tachometer
- Motor feedback
- Angle measurement
- Aerospace
- Downhole (oilwell)
- High-speed spindles
- AC and DC servo motors
- Flight control systems
- Hydraulic pumps
- Nuclear environments

FEATURES & BENEFITS

Non-contact design	No wear or aging
Rugged construction	Tolerates vibration and shock
Solid rotor	Higher speed, lower inertia
Lower impedance	Better noise immunity
Fewer coils	Higher reliability
Functionally equivalent to traditional brushless resolvers	Higher performance replacement for obsolete or unavailable devices
Absolute over 360°	No homing at power up

GENERAL SPECIFICATIONS

Operating Temperature		
ROxxxx-M	−40 to +175	°C
ROxxxx-K	−196 to +220	°C
Shock	20	G
Vibration	10	G (10–500 Hz, 0.5 Hr)
Radial Air Gap	0.3	mm nominal
Excitation Frequency	5 to 50	kHz typical
	10	kHz recommended
Excitation Amplitude	2 to 12	Vrms typical
Transformation Ratio	0.50	V/V ±10%
Angular Error*	±30	arc-minutes typical
	±60	arc-minutes maximum
Insulation Resistance	100	MΩ minimum
Dielectric Strength (Hipot)		
Winding to Winding	300	Vac (50Hz for 1 minute)
Winding to Housing	500	Vac (50Hz for 1 minute)
Lead Wire Size	26	AWG
Lead Length	300	mm

* Every Rotasyn shipped with an individual accuracy report.
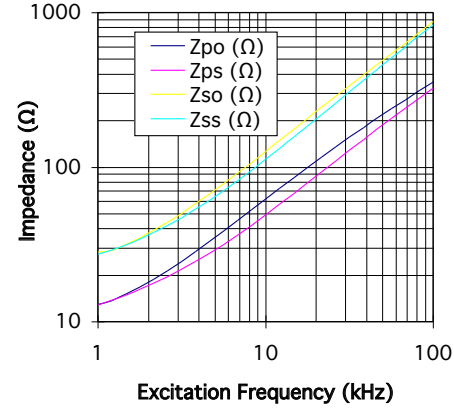
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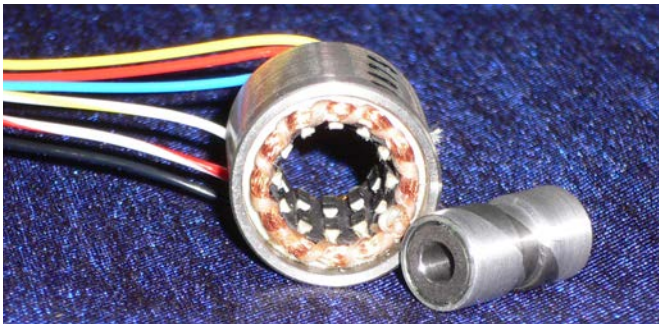
Series RO2010 is a frameless size 8 solid-rotor resolver with a 20mm stator OD and a 10mm airgap diameter. It fits shafts up to 4mm in diameter.
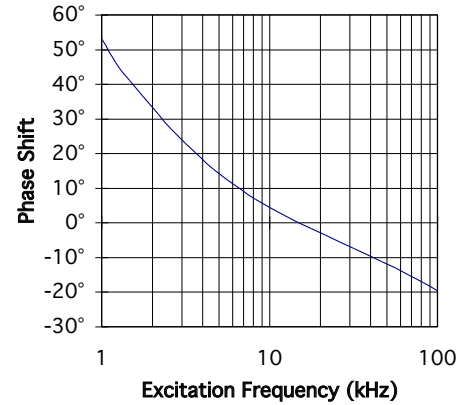
RO2010 SPECIFICATIONS

Mass (Weight)	30	grams
Maximum Speed		
RO2010-x-R Models	150	kRPM
RO2010-x-V Models	160	kRPM
Rotor Moment of Inertia		
RO2010-x-R Models	1	gram•cm^2
RO2010-x-V Models	2	gram•cm^2
Primary DC Resistance		
RO2010-M Models	11	Ω ±10%
RO2010-K Models	14	Ω ±10%
Secondary DC Resistance		
RO2010-M Models	20	Ω ±10%
RO2010-K Models	24	Ω ±10%

RO2010 OUTLINE & MOUNTING DIMENSIONS*

Section A-A

Lead outlet

Ø10   Ø20± 0.05   Ø9.4± 0.02   Ø 4 H7

18± 0.05

* All dimensions in mm.

RO2010 PRIMARY CURRENT AND POWER

4Vrms Excitation

— Current (mA)
— Power (mW)

Excitation Frequency (kHz)

RO2010 IMPEDANCES

— Zpo (Ω)
— Zps (Ω)
— Zso (Ω)
— Zss (Ω)

Impedance (Ω)

Excitation Frequency (kHz)

RO2010 PHASE SHIFT

Phase Shift

Excitation Frequency (kHz)
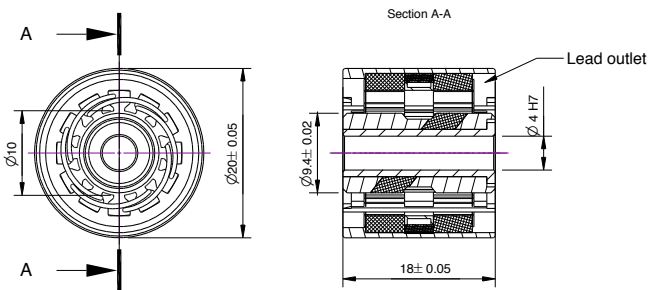
RO2010 TRANSFORMATION RATIO

Transformation Ratio

Excitation Frequency (kHz)
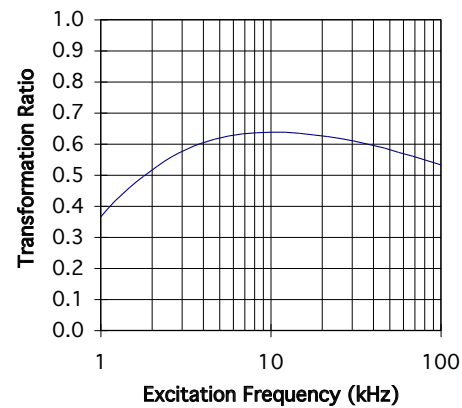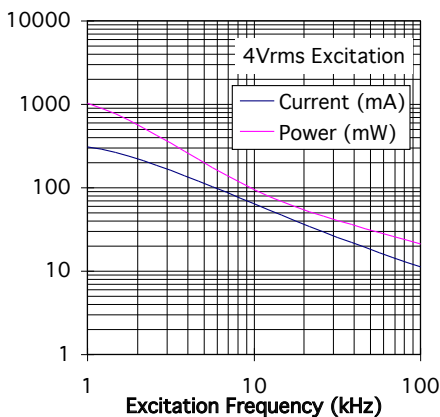
RO2010 ORDERING INFORMATION
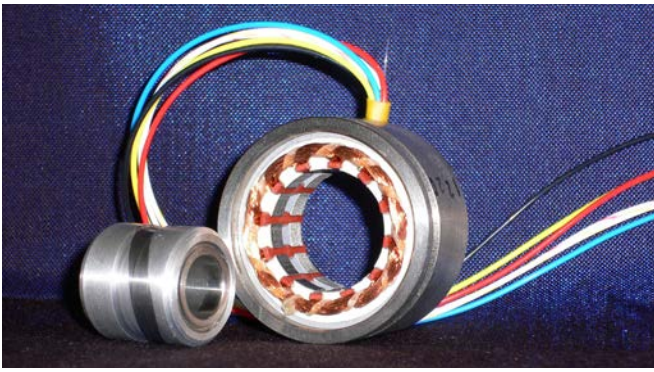
RO2010 - ☐ - ☐ ☐ ☐ ☐

Stator Construction
M = Standard
K = Hi Temp/Hi Rad
(Kapton insulation)

Custom constructions available

Rotor Bore (mm)
004 = 4mm (Standard)

Smaller bores available.

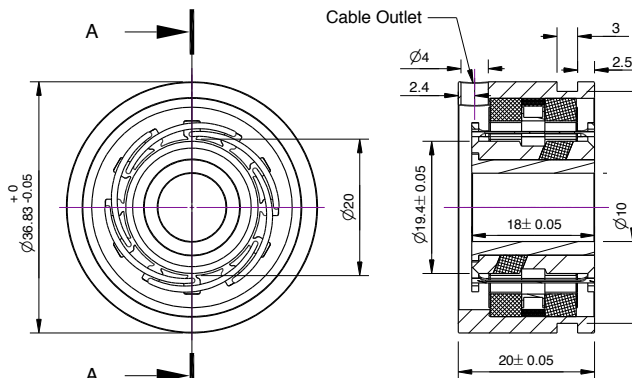**Rotor Construction**
R = Standard
V = Hi Speed

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Series RO3620 is a frameless size 15 solid-rotor resolver with a 36mm stator OD and a 20mm airgap diameter. It fits shafts up to 12mm in diameter.

RO3620 SPECIFICATIONS

Mass (Weight)	85	grams
Maximum Speed		
RO3620-x-R Models	100	kRPM
RO3620-x-V Models	110	kRPM
Rotor Moment of Inertia		
RO3620-x-R Models	20	gram•cm^2
RO3620-x-V Models	40	gram•cm^2
Primary DC Resistance	13	Ω ±10%
Secondary DC Resistance	20	Ω ±10%

RO3620 OUTLINE & MOUNTING DIMENSIONS*

* All dimensions in mm.

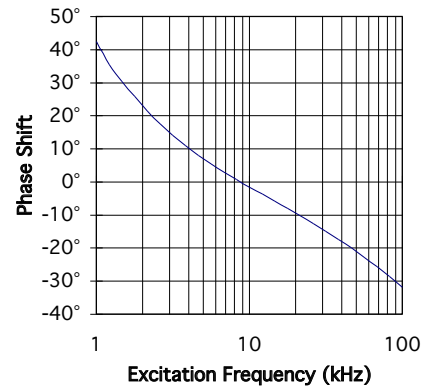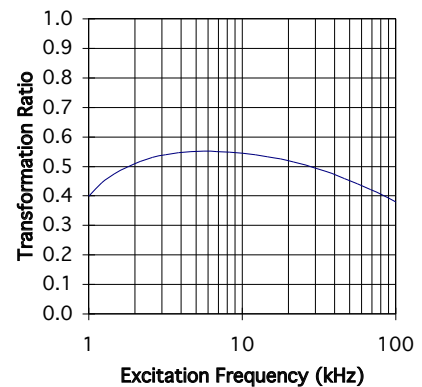## RO3620 PRIMARY CURRENT AND POWER

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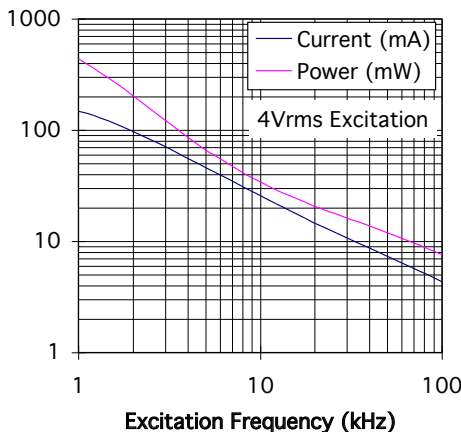
RO3620 IMPEDANCES
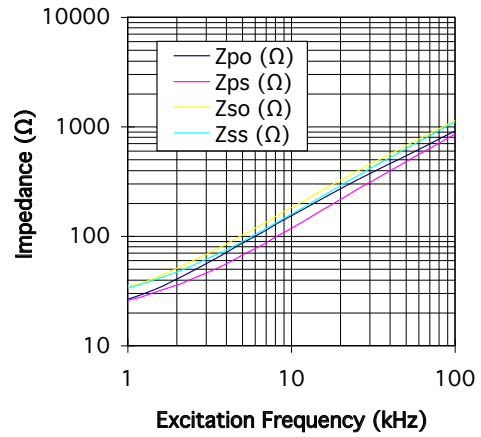
RO3620 PHASE SHIFT

RO3620 TRANSFORMATION RATIO

RO3620 ORDERING INFORMATION

RO3620 - ☐ - ☐☐☐☐

Stator Construction
M = Standard
K = Hi Temp/Hi Rad
(Kapton insulation)

Custom constructions available

Rotor Bore (mm)
010 = 10mm (Standard)
952 = ⅜" (Standard)
Other bores available (12mm max)
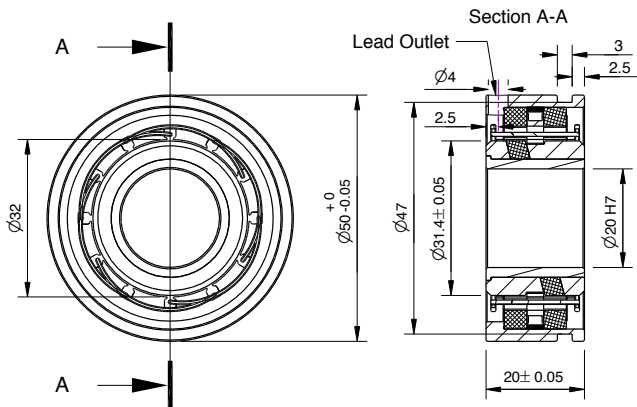
Rotor Construction
R = Standard
V = Hi Speed

Series RO5032 is a frameless size 21 solid-rotor resolver with a 50mm stator OD and a 32mm airgap diameter. It fits shafts up to 20mm diameter.
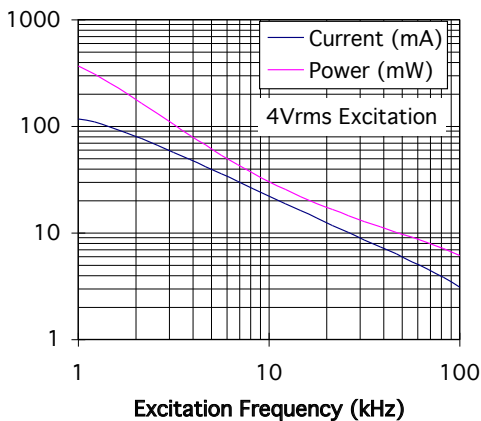
RO5032 SPECIFICATIONS

Mass (Weight)	190	grams
Maximum Speed		
RO5032-x-R Models	60	kRPM
RO5032-x-V Models	65	kRPM
Rotor Moment of Inertia		
RO5032-x-R Models	140	gram•cm^2
RO5032-x-V Models	200	gram•cm^2
Primary DC Resistance	20	Ω ±10%
Secondary DC Resistance	27	Ω ±10%

RO5032 OUTLINE & MOUNTING DIMENSIONS*
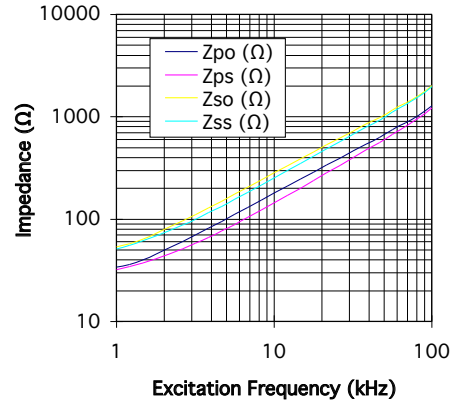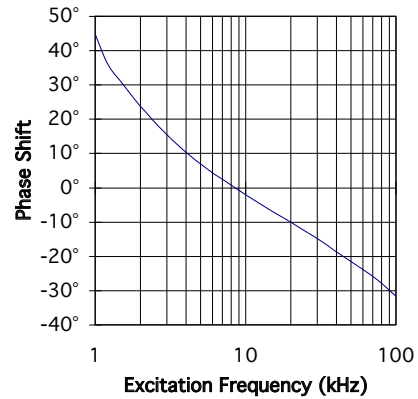

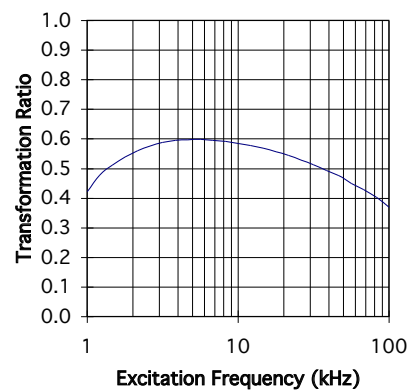* All dimensions in mm.

RO5032 PRIMARY CURRENT AND POWER

RO5032 IMPEDANCES

RO5032 PHASE SHIFT

RO5032 TRANSFORMATION RATIO

RO5032 ORDERING INFORMATION

RO5032 - ☐ - ☐☐☐☐

Stator Construction
M = Standard
K = Hi Temp/Hi Rad
(Kapton insulation)
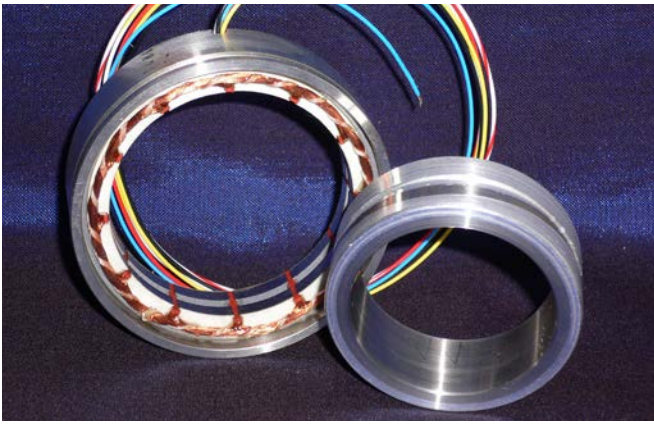
Custom constructions
available

Rotor Construction
R = Standard
V = Hi Speed

Rotor Bore (mm)
020 = 20mm (Standard)

Smaller bores available.

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Series RO7557 is a frameless size 30 solid-rotor resolver with a 75mm stator OD and a 57mm airgap diameter. It fits shafts up to 47mm in diameter.
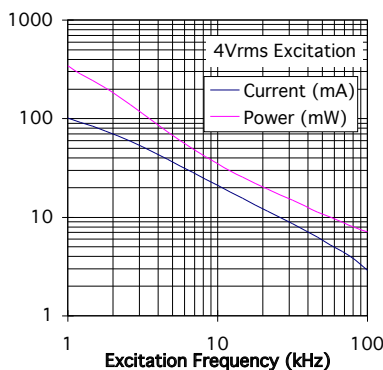
RO7557 SPECIFICATIONS

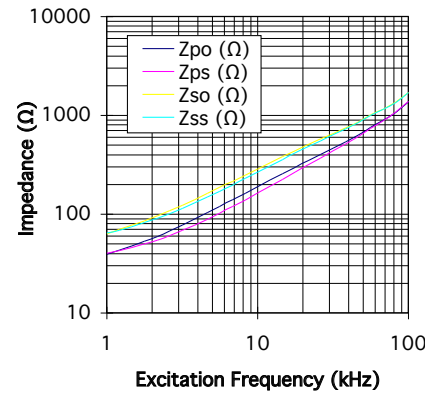|		
Mass (Weight)	300	grams
Maximum Speed		
RO7557-x-R Models	25	kRPM
RO7557-x-V Models	28	kRPM
Rotor Moment of Inertia		
RO7557-x-R Models	1.1	kg•cm^2
RO7557-x-V Models	1.8	kg•cm^2
Primary DC Resistance	20	Ω ±10%
Secondary DC Resistance	50	Ω ±10%

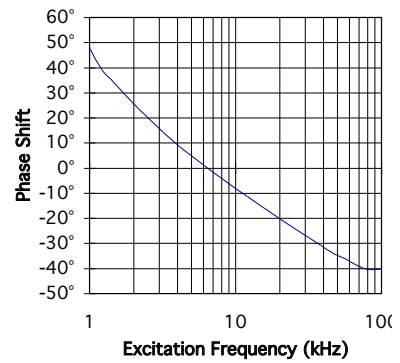## RO7557 OUTLINE & MOUNTING DIMENSIONS*
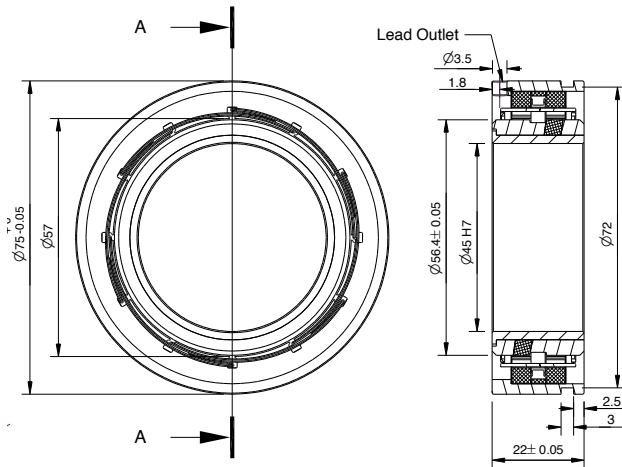
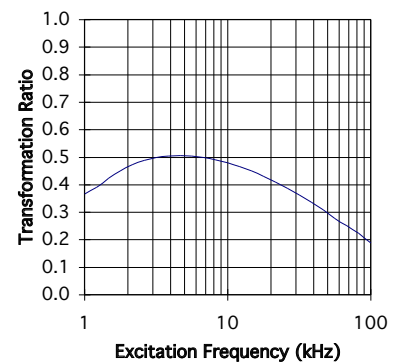* All dimensions in mm.

RO7557 PRIMARY CURRENT AND POWER

RO7557 IMPEDANCES

RO7557 PHASE SHIFT

RO7557 TRANSFORMATION RATIO

RO7557 ORDERING INFORMATION

RO7557 - ☐ - ☐ ☐ ☐ ☐

Stator Construction
M = Standard
K = Hi Temp/Hi Rad
(Kapton insulation)

Custom constructions available

Rotor Bore (mm)
045 = 45mm (Standard)
Other bores available
(47mm max)

Rotor Construction
R = Standard
V = Hi Speed

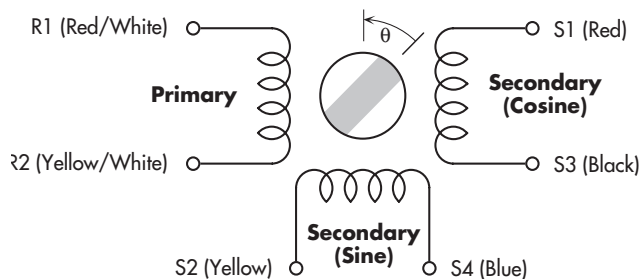## admotec
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PRINCIPLE OF OPERATION

Unlike traditional brushless resolvers, the Rotasyn has both primary and secondary windings in the stator and thus no transformer is required—the Rotasyn is intrinsically brushless. The transferred energy remains magnetic from the primary coil through the airgap to the sinusoidally shaped poles of the solid rotor.

Primary   Secondaries   Solid Rotor
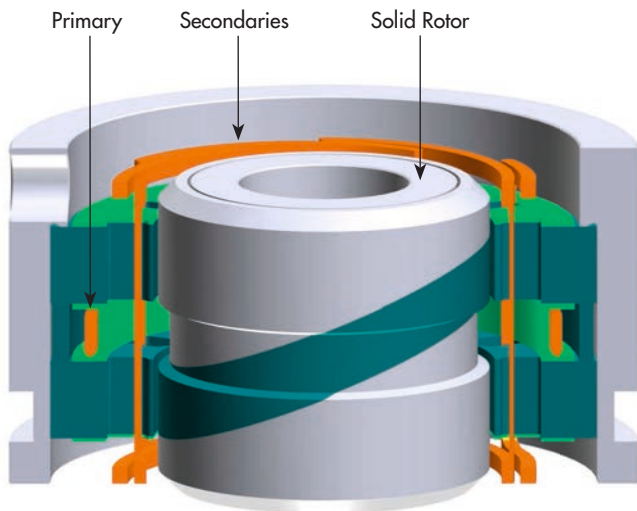
The Rotasyn is similar to a rotary variable differential rotary transformer (RVDT) in which the rotor acts as a magnetic valve completing the flux path. The total flux through the gap is constant—the rotor determines the angular position within the stator bore where the coupling occurs, and thus the relative amplitudes of the output signals.

ELECTRICAL SCHEMATIC

R1 (Red/White)
Primary
R2 (Yellow/White)
θ
S1 (Red)
Secondary (Cosine)
S3 (Black)
S2 (Yellow)
Secondary (Sine)
S4 (Blue)

$$V_{(S1-S3)} = V_{(R1-R2)} \times TR \times \cos(\theta)$$

$$V_{(S2-S4)} = V_{(R1-R2)} \times TR \times \sin(\theta)$$

θ increases for CCW rotation when viewed from lead exit end

TYPICAL APPLICATION

Rotasyns can be used directly with all commercially available Resolver-to-Digital (R/D) converters to provide digital angle and speed information.

Digital Position Data
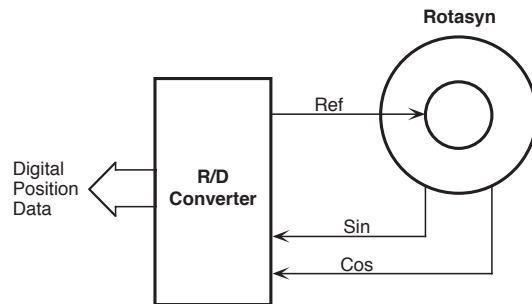
CUSTOM ROTASYNS

In addition to the standard versions, Series RO Rotasyn resolvers may be fully customized to your needs. Available customization options include (but are not limited to) those shown below. Contact us with your requirements for customized versions.

- Size 35, 40, 50, and 60 and larger models

- Customized housings for different stator mounting

- Larger airgap (up to 1mm)

- Flooded rotor to eliminate rotating seal

- Different windings for modified electrical characteristics

- Operating temperature down to 4 Kelvin

- Custom lead length and wire specification

- Bifilar winding for electrical redundancy

- Duplex units for complete redundancy

- Aerospace qualification testing

- Multispeed (multipole) design

- Enclosed units with bearings and shaft (Series DG)