

Resolvers

MICRONOR resolver technology opens fully new applications for rotary sensors. This unique technology is available in standard executions allowing cost effective solutions for small volume applications for new application. Customised design is indicated for large volume applications or for special shape design. The purpose of the leaflet is to give an idea of available resolvers in many different executions.



- **Solid rotor with low inertia**
- **Constant air gap** 1)
- **Insensitive to magnetic stray fields**
- **MTBF doubled** 2)
- **High rotational speed** 3)
- **Flooded rotor applications** 4)
- **Nuclear requirement** 5)
- **Wide-temperature range** 6)

- 1) Less sensitive to excentricity
- 2) Compared to a classical brushless resolver the MICRONOR Resolver has only the half number of windings
- 3) >100'000 rpm for size 15
- 4) With cup around the rotor
- 5) Radiation Dose > 10⁹ Rad
- 6) Temperature range from -60° to 250°C are possible

Technical Data

Electrical Data			RE2010	RE3620	RE5032	RE7557	RE8565	RE125100
Frequency		[kHz]			10 kHz and Winding E001			
Primary impedance	Z _{so}	[Ω]	94	115	130	160	180	115
Secondary impedance	Z _{ps}	[Ω]	51	190	260	290	300	500
Transformation ratio	+/- 5%	[mm]	0.5	0.5	0.5	0.5	0.5	0.4
Mechanical data			Size 08	Size 15	Size 21	Size 30	Size 35	Size 50
Stator OD		[mm]	20	36.83	50	75	85	125
Max Rotor ID		[mm]	4	12	20	42	53	85
Weight		[g]	35	95	200	450	580	830
Rotor length		[mm]	18	18	20	22	22	24
Rotor OD		[mm]	10	20	32	57	65	100
Rotor inertia		[gcm ²]	1	20	140	1286	1721	9010

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General Data		
Power Supply	[VAC]	2 to 12 VAC
Frequency	[kHz]	6-12
Shock	[G]	5
Vibrations(10-500Hz) for 0.5h	[G]	10

	[kHz]	Influence of Frequency			
		6	8	10	12
Primary Impedance	[%]	90	95	100	200
Secondary impedance	[%]	90	95	100	180
Phase Shift	[°]	+3°	0°	-3°	-15°

		Influence of number of poles				
		1	2	3	4	6
Speed		1	2	3	4	6
Nb. of pole pairs		1	2	4	6	6
Accuracy (mechanical)	[Arcmin]	60	30	15	10	8

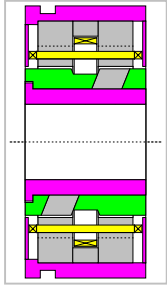
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Electrical Schematic

Principle of MICRONOR Resolver



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

The MICRONOR Resolver 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.

Equations and Definitions

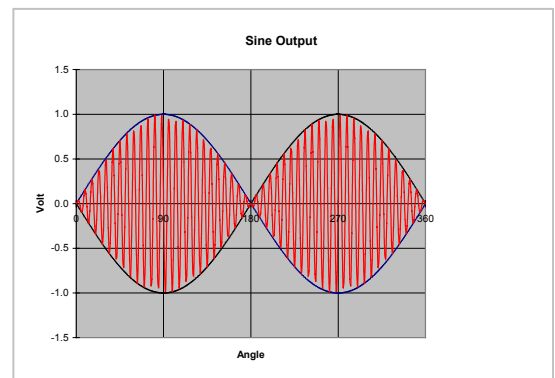
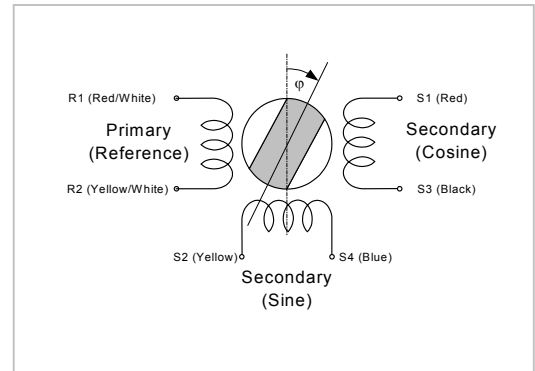
Positive sense of rotation is clockwise when the resolver is viewed from the mounting side.

$$U_{2c} = U_1 \cdot i \cdot \sin(\omega_e t) \cdot \cos\phi$$

$$U_{2s} = U_1 \cdot i \cdot \sin(\omega_e t) \cdot \sin\phi$$

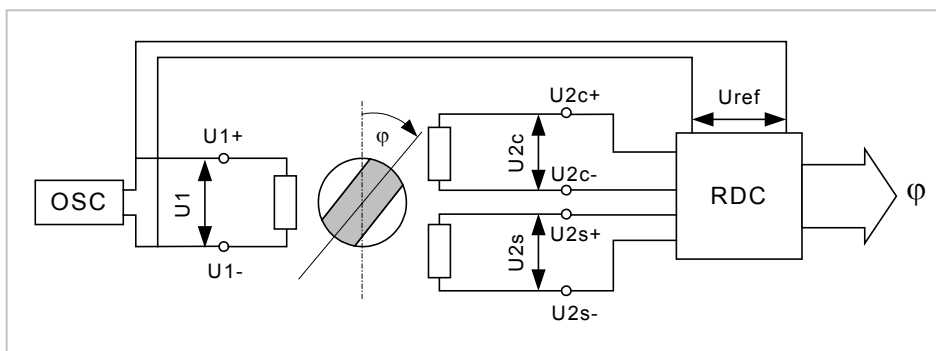
Where:

ϕ	Rotor Angle
ω_e	Excitation Frequency
U_1	Supply Voltage
i	Transformation Ratio
U_{2c}	Cosine Output
U_{2s}	Sine Output



Application

The schematic drawing represents an example of a circuit allowing to use the Resolver to get a digital signal of the angle of the rotor. The Oscillator (OSC) and the Resolver to Digital Converters (RDC) are available as commercial chips.



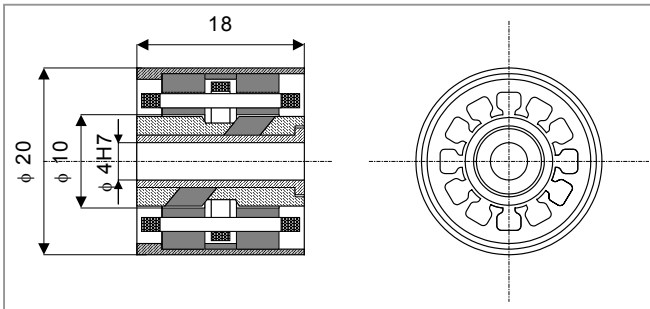
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Outline and Mounting

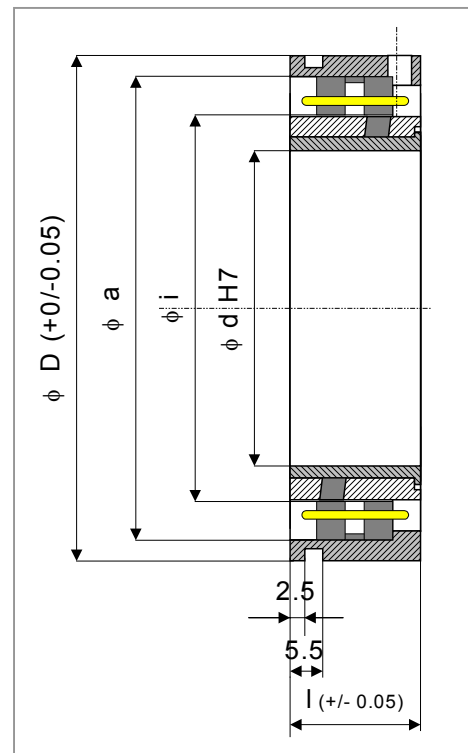
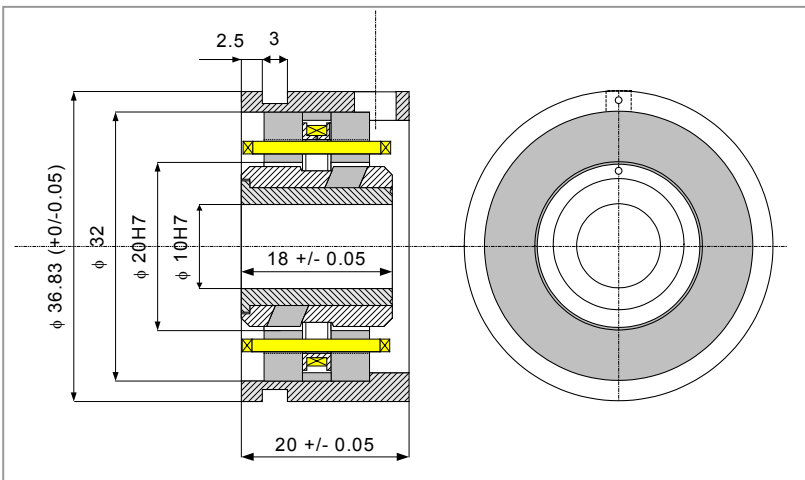
Size 08



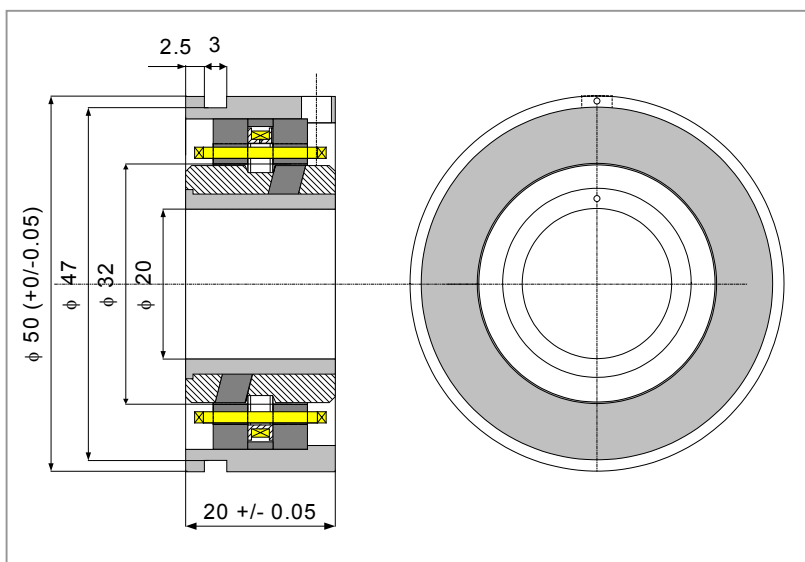
Sizes 30 / 35 / 40 / 50

		Dimensions in mm			
Lamination Size		Size 30	Size 35	Size 40	Size 50
Stator OD	D	75	85	100	125
Lamination OD	a	70	78	92	114
Lamination ID	i	57	65	80	100
Rotor ID	d	45	53	65	85
Length	l	22	22	24	24

Size 15



Size 21



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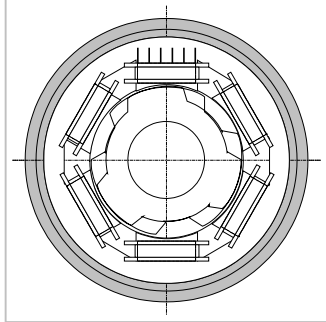
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Selection and Ordering Data

Special Executions

Multipole: When higher accuracy is needed and where reduced absolute angle can be accepted. For motor commutation applications for example.



Hi-Rad: Use of special isolation materials for applications in radioactive areas within nuclear plants.

Hi-Temp: Use of special isolation materials resisting to higher temperatures

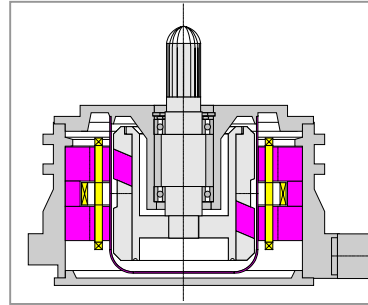
Hi-speed: Statically and dynamically balanced rotor to insure a vibration free rotation.



Airgap: Standard air gap is 0.3 mm. For special applications it can be increased to max. 1mm. Doing this will

reduce the transformation ratio from 0.5 to 0.30

Flooded Rotor: For hydraulic or chemical applications where the liquid is either chemically aggressive or electrically conducting. No rotating seal necessary



Aerospace: Execution with ATP (Acceptance Test Procedures) and Certificates as required for aerospace applications. Special

housing made of titanium to reduce weight

Automotive: For crankshaft feedback, hybrid and electrical motors and servo assisted steering the MICRONOR resolver offers a price competitive solution.

Ordering Data

- Frameless or With Bearing
- Stator OD (mm), Rotor ID (mm)
- Speed (number of pole pairs)
- Mechanical Design (Standard, Custom, Aerospace, High speed, High Radiation)
- Airgap

Standard execution:	
Frameless	
Airgap	0.3 mm
Temperatures	-60° to 155°C
Leads outlets	Radial
Transformation	0.5

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