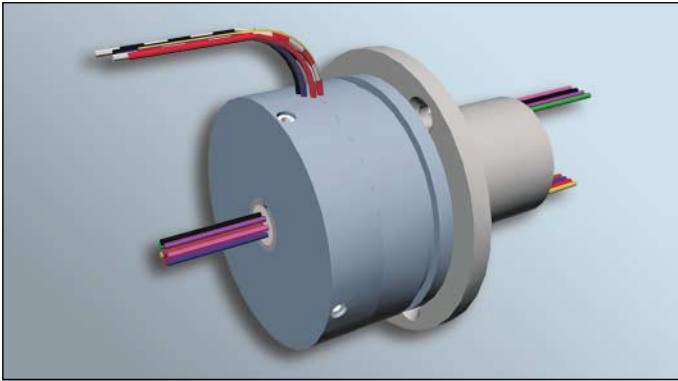
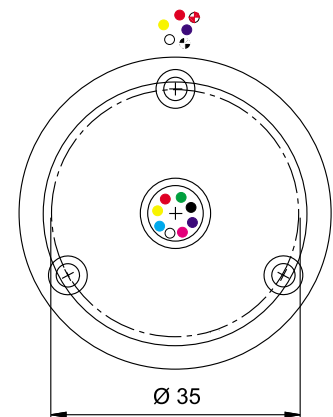
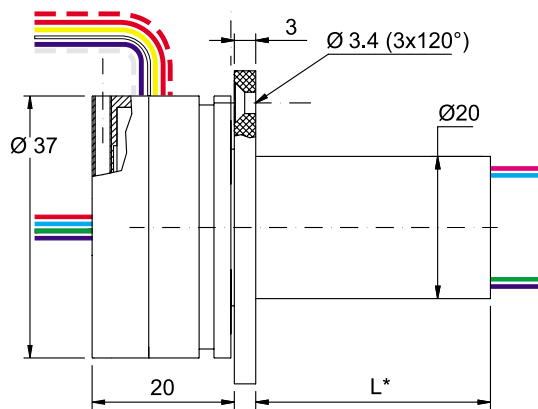
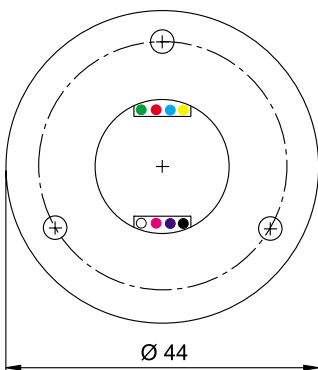


Slip Ring Capsule SC 020-R



- Slip ring SC020 + Resolver RE-15-1-B24
- 6, 12, 18 or 24 rings for max. 2 A each
- 2 rings combined for 4 A; 3 rings for 6 A
- Outer diameter 20 mm
- 240 V DC / 240 V AC max.

L* = 15 mm at 6 rings
 L* = 24 mm at 12 rings
 L* = 33 mm at 18 rings
 L* = 42 mm at 24 rings



Electrical Data

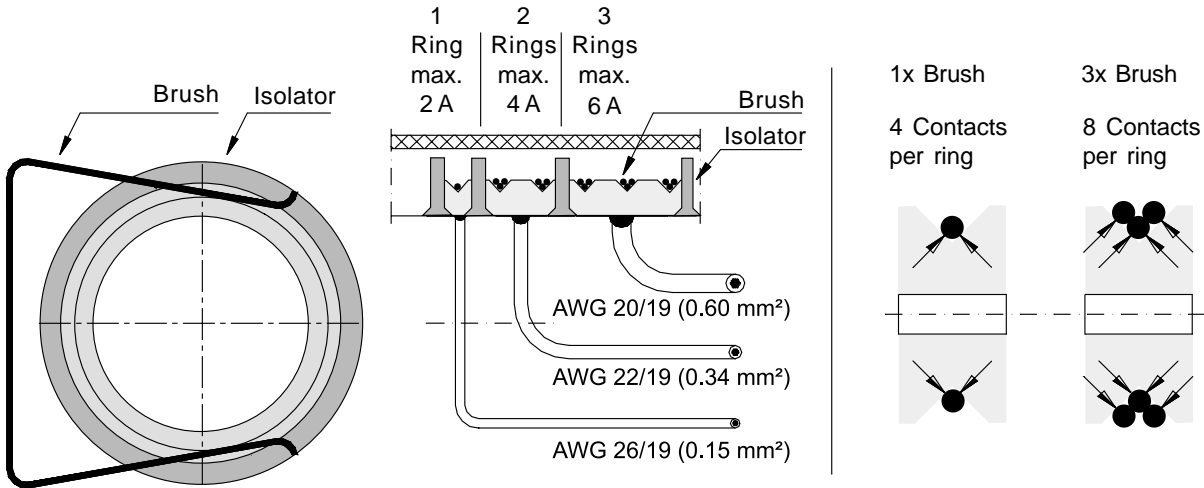
Number of rings: 6, 12, 18 or 24
 Current: 2 A max. per single ring; 4 A with 2 combined rings; 6 A with 3 rings
 Voltage: 240 V DC / 240 V AC max.
 High pot: 500 V AC
 Insulation resistance: 1000 MOhm at 500 V DC
 Noise: 60 MOhm at 5 rpm, 6 V DC and 50 mA
 Contacts / Leads: Gold-gold / silver plated copper with teflon insulation

Mechanical Data

Speed: 250 rpm max.
 Protection class: IP 40
 Temperature: -20 °C ... +80 °C (-5 °F ... +175 °F)
 Rotor connection: 300 leads; AWG 26/19 (0,15 mm²)
 Stator connection: 300 / 500 / 1000 mm leads; AWG 26/19 (0,15 mm²); others on request
 Bearings: Miniature ball bearings of steel
 Housing: with flange of POM; others on request
 Weight: 200 g max.

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Operating Principle: Slip Ring



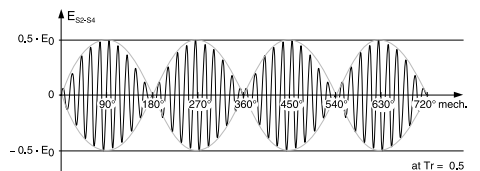
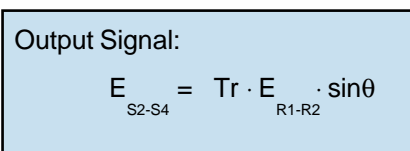
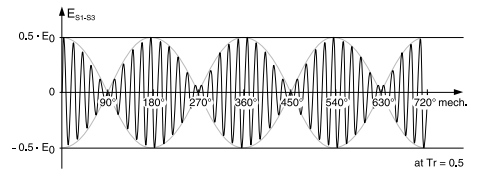
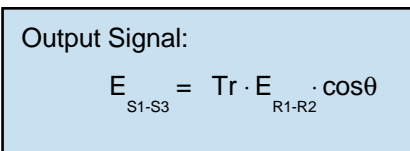
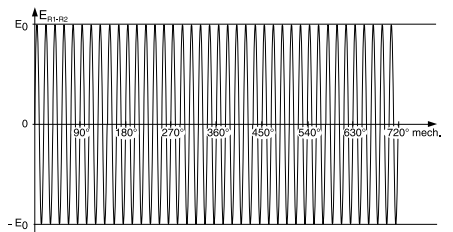
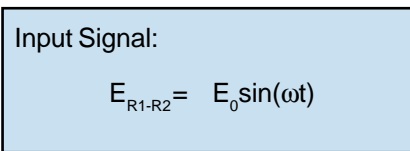
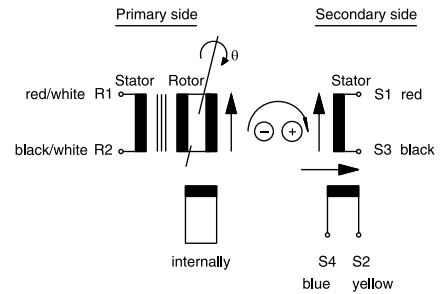
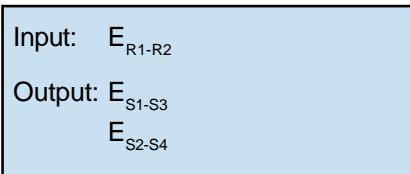
Operating Principle Resolver

A resolver is a **contact less** rotary transformer that provides information on the rotor position angle θ .

The stator bobbin winding is energized with an AC voltage E_{R1-R2} . This AC voltage is transferred to the rotor winding with transformation ratio Tr . The AC voltage then

induces the voltages E_{S1-S3} and E_{S2-S4} into the two output windings of the stator.

The magnitude of the output voltages vary with the sine and the cosine of the rotor position angle θ , because the two secondary windings are shifted by 90° .



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Accuracy Resolver

The accuracy ϵ is defined as the difference between the electrical angle θ_{el} , indicated by the output voltages of the secondary windings, and the mechanical angle or rotor position angle θ_{mech} .

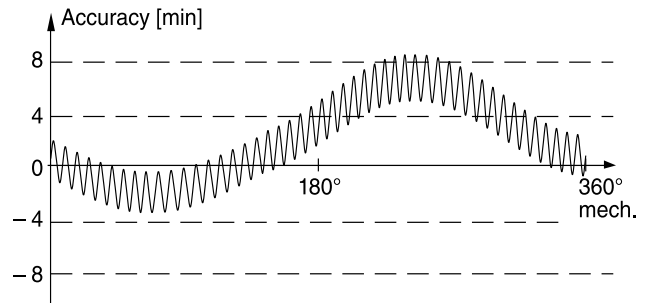
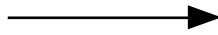
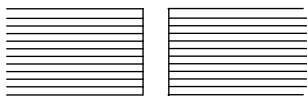
$$\text{accuracy } (\epsilon) = \text{electrical angle } (\theta_{el}) - \text{mechanical angle } (\theta_{mech})$$

For each LTN resolver the accuracy is indicated in the data sheet by the terms 'accuracy absolute', 'accuracy spread' and 'accuracy ripple'.

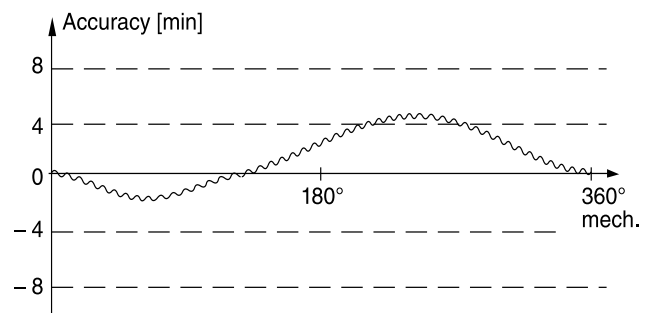
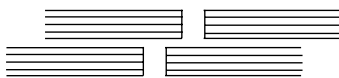
The 'accuracy absolute' or the 'accuracy spread' is caused by the internal error of the resolver and the mounting error resulting in 1st and 2nd order harmonics of the sinusoidal signal.

The 'accuracy ripple' has decisive influence on the speed stability of a drive. This ripple is caused by 3rd and higher order harmonics. LTN resolvers have an accuracy ripple of less than 1' which is achieved by a patented procedure of stepping two lamination assemblies in the rotor.

Straight lamination assembly:



Stepped lamination assembly:
(LTN patent)



Electrical Data Resolver RE-15-1-B24

Primary Side	R1 – R2	
Transformation Ratio ($\pm 10\%$)	0.5	
Input Voltage	7 V _{rms}	7 V _{rms}
Input Current	58 mA	36 mA
Input Frequency	5 kHz	10 kHz
Phase Shift ($\pm 3^\circ$)	8°	-6°
Null Voltage	30 mV max.	
Impedance		
Z_{ro}	75 j 98 Ω	110 j 159 Ω
Z_{rs}	70 j 85 Ω	96 j 150 Ω
Z_{so}	180 j 230 Ω	245 j 400 Ω
Z_{ss}	170 j 200 Ω	216 j 370 Ω
D.C. Resistance ($\pm 10^\circ$)		
Rotor	40 Ω	17.5 Ω
Stator	102 Ω	200 Ω

Accuracy	$\pm 10'$
Accuracy Ripple	1' max.
Operating Temperature	-55°C ... +155°C
Max. Permissible Speed	20,000 rpm
Shock (11 ms)	$\leq 10,000 \text{ m/s}^2$
Vibration (10 to 500 Hz)	$\leq 500 \text{ m/s}^2$
Hi-pot Housing/Winding	500 V min.
Hi-pot Winding/Winding	250 V min.
Rotor	Completely impregnated
Stator	Completely impregnated

Primary Side	R1 – R2	
Pole Pairs	1	
Transformation Ratio ($\pm 10\%$)	0.5	
Input Voltage	7 V _{rms}	7 V _{rms}
Input Current	58 mA	36 mA
Input Frequency	5 kHz	10 kHz
Phase Shift ($\pm 3^\circ$)	8°	-6°
Null Voltage	30 mV max.	
Impedance		
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Stator	102 Ω	200 Ω

Accuracy Ripple	1' max.
Operating Temperature	-55°C ... +155°C
Max. Permissible Speed	20,000 rpm
Shock (11 ms)	$\leq 10,000 \text{ m/s}^2$
Vibration (10 to 500 Hz)	$\leq 500 \text{ m/s}^2$
Rotor Moment of Inertia	$0.02 \times 10^{-4} \text{ kgm}^2$
Hi-pot Housing/Winding	500 V min.
Hi-pot Winding/Winding	250 V min.
Rotor	Completely impregnated
Stator	Completely impregnated

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Order Information

Type of slip ring:		<table border="1"><tr><td>S</td><td>C</td><td>0</td><td>2</td><td>0</td></tr></table>	S	C	0	2	0				
S	C	0	2	0							
No. of rings with:	max. 2 A max. 4 A max. 6 A	<table border="1"><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>							Standard: 6 / 12 / 18 / 24		
Length of leads in mm:	Rotor Stator	<table border="1"><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>									Standard: 300 mm Standard: 300 mm
Resolver RE-15-1-B24		<table border="1"><tr><td>R</td><td>0</td><td>1</td></tr></table>	R	0	1	Stator of resolver rotating with rotor of slip ring					
R	0	1									

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