LTN Servotechnik GmbH

PRODUCT BROCHURE - RESOLVERS
QUALITY COMBINED WITH HIGH VERTICAL INTEGRATION

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ABOUT US

LTN Servotechnik GmbH is a manufacturer of customized transmission and feedback systems located in the south of Munich. For over 40 years we have continuously specialised in the development, design and series manufacture of components for apparatus, machinery and plant engineering customers worldwide.

Our product range includes slip rings for power, signal and data, resolvers for open & closed-loop control tasks and rotary joints for fibre-optic information systems. Our product portfolio are characterised by extraordinary diversity.

SLIP RINGS

Slip rings are electromechanical components which allow electrical power, signal and data transmission between stationary and rotating systems. The spectrum ranges from just a few mV or mA to many hundreds A and few thousand V. Our slip ring systems withstand harsh environmental influences such as corrosive, salty air or severe vibration. LTN slip ring systems are found in many electrical machines and ensure the reliable functionality of entire machine systems.

LTN slip rings meet all the requirements for error-free transmission of real time fieldbus systems. Of course, all our Fast, Gigabit and 10 Gigabit Ethernet slip rings are certified according to TIA-568 and EN 50173.

Our components conform to the highest standards of durability, sensitivity and reaction time and are therefore an important part of automation, robotics and all other highly dynamic applications.

In addition, we offer fibre-optic rotary joints for contactless transmission of high data rates.

RESOLVERS

Resolvers convert the angular position of a rotor to two voltages. The absolute position can be represented clearly in this way. Modern resolvers are usually brushless and the information is transmitted through induction. Resolvers provide an absolute signal within a single revolution and therefore do not have to be calibrated after switching on.

Resolvers are used for open and closed-loop control tasks such as electric servo drives, positioning drives and machines with interdependent motors. The robustness and availability of the systems are of central importance. Our brushless resolvers operate without wear and are fail-safe – even in the harshest environmental conditions (e.g. extreme temperatures).

In addition, we offer electrical circuits for evaluating the resolver's analogue output signals. Rotary encoder output signals can be emulated, for example. Using our downstream electronics, the analogue signal can also be digitized.

RESOLVERS

Transmission ratio: 0.3 / 0.5 / 1
Operating temperature: -55 °C ... +155 °C
Connection: Leads, cables, clamp terminals and length on request

Stated values are standard. Other configurations, customized versions and resolver combinations are available on request. Combinations consisting of slip rings and resolvers on request.

Type		Min. outer diameter	Max. hollow shaft diameter
Housed	R36	36 mm	12 mm
	R58	58 mm	17 mm
	R71	71 mm	20 mm
Frameless	RE15	36 mm	12 mm
	RE21	52 mm	17 mm
	RE27	72 mm	30 mm
	RE35	90 mm	40 mm
	RE43	110 mm	65 mm

Stated values are standard. Other configurations are available on request.

Max. shaft diameter	Pole pairs	Acurracy	Input current (can vary by types)	Page
16 mm	1 ... 5	± 6′ / ± 10′	58 mA at 7 V & 5 kHz	8
12 mm	1 ... 5	± 6′	58 mA at 7 V & 5 kHz	10
12 mm	1 ... 5	± 6′	47 mA at 7 V & 5 kHz	12
16 mm	1 ..5	± 5′ / ± 6′ / ± 7′ / ± 10′	58 mA at 7 V & 5 kHz	14
26 mm	1 ... 5	± 4′ / ± 6′ / ± 10′	47 mA at 7 V & 5 kHz	16
30 mm	1	± 10′	30 mA at 7 V & 10 kHz	18
40 mm	1 ... 4	± 10′	48 mA at 7 V & 5 kHz	20
30 mm	1 ... 3	± 20′	55 mA at 7 V & 5 kHz	22

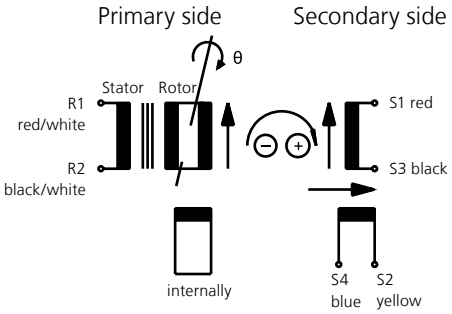
HOUSED RESOLVER

R36

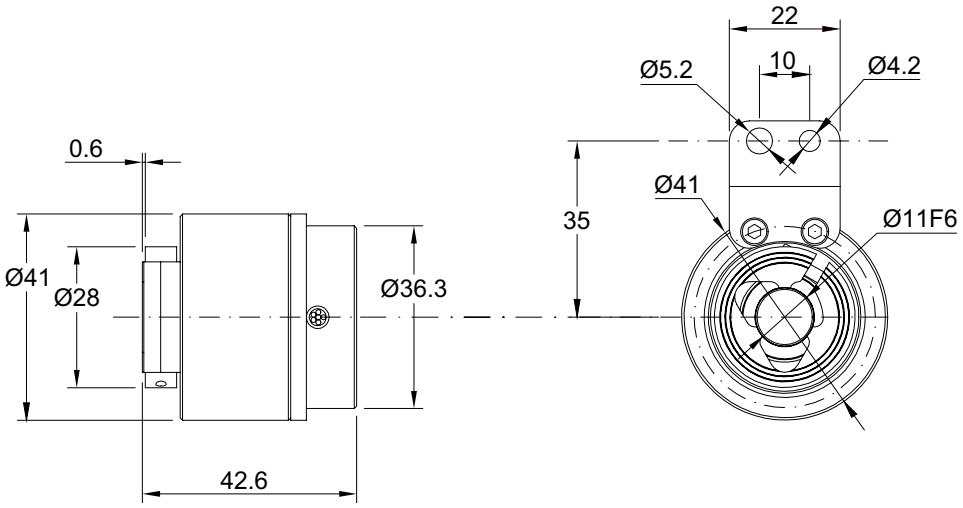
FACTS

- Outer Ø: 36 mm
- Hollow shaft Ø: max. 12 mm
- Length: 16 mm

OPERATING PRINCIPLE



Input: E(R1-R2) = E · sin(ω·t)
Output: E(S1-S3) = TR · E(R1-R2) · cos θ
E(S2-S4) = TR · E(R1-R2) · sin θ
TR = Transformation ratio



Positive counting direction:
Rotor cw as viewed (X→)

Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

Primary side	R1 - R2
Pole Pairs	1
Transformation ratio	0.5 ± 0.05
Input voltage	7 V / 7 V
Input current (typ.)	58 mA / 36 mA
Input frequency	5 kHz / 10 kHz
Phase shift (± 3°)	8° / -6°
Null voltage	max. 30 mV
Accuracy	± 10', ± 6' on request
Accuracy ripple	max. 1'
Operating temperature	-55 °C ... +155 °C (-67 °F ... +311 °F)
Max. permissible speed	20.000 min^{-1}
Hi-pot housing/winding	min. 500 V_{AC}
Hi-pot winding/winding	min. 250 V_{AC}
Rotor / Stator	Completely impregnated

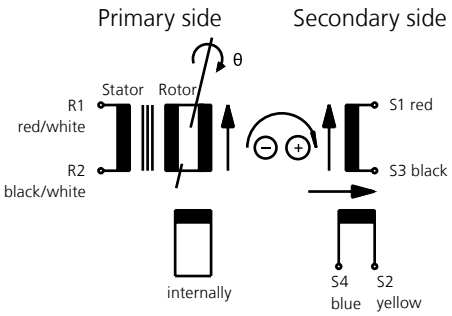
HOUSED RESOLVER

R58

FACTS

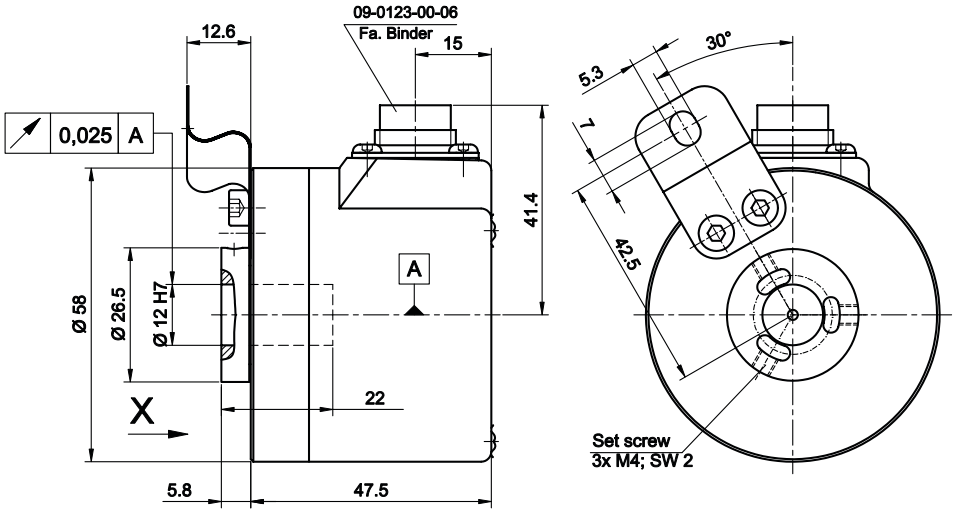
- Shaft Ø: max. 12 mm
- Hollow shaft Ø: max. 17 mm
- Outer Ø: 58 mm

OPERATING PRINCIPLE



Input: E(R1-R2) = E · sin(ω·t)
Output: E(S1-S3) = TR · E(R1-R2) · cos θ
E(S2-S4) = TR · E(R1-R2) · sin θ
TR = Transformation ratio

Positive counting direction:
Rotor cw as viewed (X→)



Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

Primary side	R1 - R2	R1 - R2
Pole Pairs	1	1
Transformation ratio	0.5 ± 10%	0.5 ± 10%
Input voltage	7 V	7 V
Input current (typ.)	58 mA	36 mA
Input frequency	5 kHz	10 kHz
Phase shift	8° ± 3°	-6° ± 3°
Null voltage	max. 30 mV	max. 30 mV
Impedance		
Zro	75 Ω + j · 98 Ω	110 Ω + j · 159 Ω
Zrs	70 Ω + j · 85 Ω	96 Ω + j · 150 Ω
Zso	180 Ω + j · 230 Ω	245 Ω + j · 400 Ω
Zss	170 Ω + j · 200 Ω	216 Ω + j · 370 Ω
D.C. resistance		
Rotor	40 Ω ± 10% at 20 °C	40 Ω ± 10% at 20 °C
Stator	102 Ω ± 10% at 20 °C	102 Ω ± 10% at 20 °C
Accuracy	± 6′	± 10′
Accuracy ripple	max. 1′	max. 1′
Operating temperature	-55 °C ... +155 °C (-67 °F ... +311 °F)	-55 °C ... -155 °C (-67 °F ... +311 °F)
Max. permissible speed	5.000 min^{-1}	5.000 min^{-1}
Weight rotor/stator	350 g	350 g
Hi-pot housing/winding	min. 500 V_{AC}	min. 500 V_{AC}
Hi-pot winding/winding	min. 250 V_{AC}	min. 250 V_{AC}
Rotor / Stator	Completely impregnated	Completely impregnated

Stated values are standard. Other configurations are available on request.

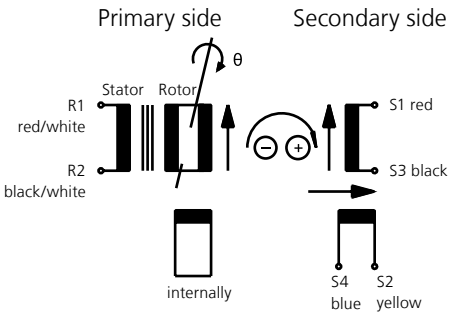
HOUSED RESOLVER

R71

FACTS

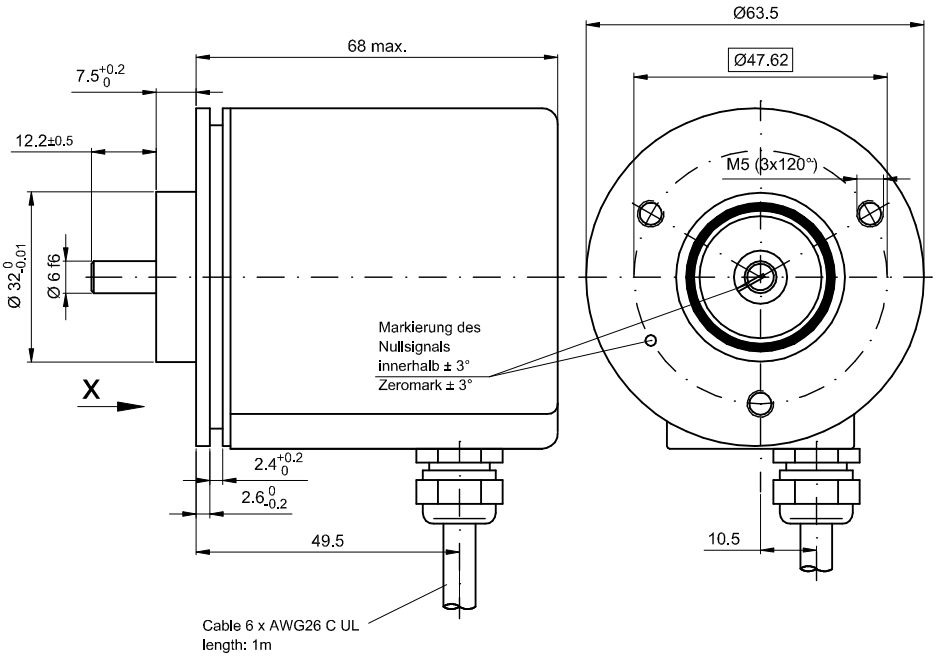
- Shaft Ø: max. 12 mm
- Hollow shaft Ø: max. 20 mm
- Outer Ø: 71 mm

OPERATING PRINCIPLE



Input: E(R1-R2) = E · sin(ω·t)
Output: E(S1-S3) = TR · E(R1-R2) · cos θ
E(S2-S4) = TR · E(R1-R2) · sin θ
TR = Transformation ratio

Positive counting direction:
Rotor cw as viewed (X→)



Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

Primary side	R1 - R2	R1 - R2
Pole Pairs	1	1
Transformation ratio	0.5 ± 10%	0.5 ± 10%
Input voltage	7 V	7 V
Input current (typ.)	47 mA	35 mA
Input frequency	5 kHz	8 kHz
Phase shift	8° ± 3°	-3° ± 3°
Null voltage	30 mV max.	30 mV max.
Impedance		
Zro	92 Ω + j · 120 Ω	110 Ω + j · 170 Ω
Zrs	82 Ω + j · 100 Ω	95 Ω + j · 153 Ω
Zso	154 Ω + j · 275 Ω	210 Ω + j · 387 Ω
Zss	140 Ω + j · 240 Ω	178 Ω + j · 347 Ω
D.C. resistance		
Rotor	56 Ω ± 10% at 20 °C	56 Ω ± 10% at 20 °C
Stator	53 Ω ± 10% at 20 °C	53 Ω ± 10% at 20 °C
Accuracy	± 6′	± 6′
Accuracy ripple	10′	10′
Operating temperature	-55 °C ... +155 °C	-55 °C ... +155 °C
	(-67 °F ... +311 °F)	(-67 °F ... +311 °F)
Max. permissible speed	5.000 min^{-1}	5.000 min^{-1}
Weight rotor/stator	350 g	350 g
Hi-pot housing/winding	500 V_{AC}	500 V_{AC}
Hi-pot winding/winding	250 V_{AC}	250 V_{AC}
Rotor / Stator	Completely impregnated	Completely impregnated

CABLE LAYOUT

RESOLVER	LEADS
R1	brown
R2	orange
S1	red
S3	black
S2	yellow
S4	green

Stated values are standard. Other configurations are available on request.

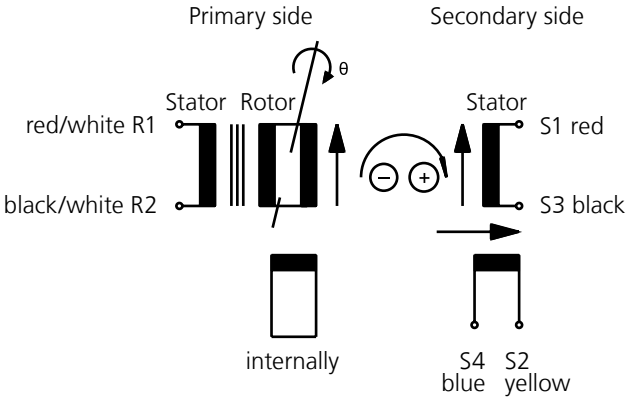
FRAMELESS RESOLVER

RE15

FACTS

- Hollow shaft Ø: max. 12 mm
- Outer Ø: 36 mm
- Length: 16 mm

OPERATING PRINCIPLE



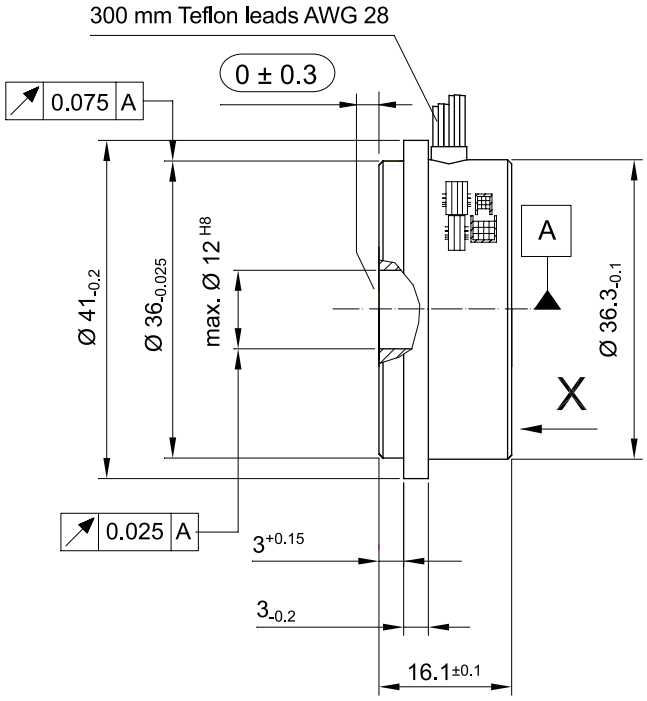
Input: $E(R1\text{-}R2) = E \cdot \sin(\omega \cdot t)$

Output: $E(S1\text{-}S3) = TR \cdot E(R1\text{-}R2) \cdot \cos\theta$

$E(S2\text{-}S4) = TR \cdot E(R1\text{-}R2) \cdot \sin\theta$

TR = Transformation ratio

Positive counting direction: Rotor cw as viewed (X→)



Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

Basic Model	**RE 15-1-A15**		**RE 15-1-K01**		**RE 15-1-V07**		**RE 15-3-D04**		**RE 15-4-D04**	
Primary Side	R1 - R2									
Pole Pairs	1						3		4	
Transformation ratio	0.5 ± 0.05									
Input voltage	7 V_{rms}	7 V_{rms}	5 V_{rms}	5 V_{rms}	7 V_{rms}	7 V_{rms}	7 V_{rms}	7 V_{rms}	7 V_{rms}	7 V_{rms}
Input current (typ.)	58 mA	36 mA	48 mA	17 mA	58 mA	36 mA	50 mA	24 mA	20 mA	10 mA
Input frequency	5 kHz	10 kHz	1 kHz	4.5 kHz	5 kHz	10 kHz	4 kHz	10 kHz	5 kHz	10 kHz
Phase shift (± 3°)	13°	-2°	26°	0°	8°	-6°	15°	0°	8°	3°
Null voltage	max. 30 mV									
Accuracy	± 10', ± 6' on request				± 4'		± 5'		± 7'	
Accuracy ripple	max. 1'						max. 3'			
Operating temperature	- 55 °C ... + 155 °C (-67 °F ... +311 °F)									
Max. permissible speed	20.000 min^{-1}									
Hi-pot housing/winding	min. 500 V_{AC}									
Hi-pot winding/winding	min. 250 V_{AC}									
Rotor/Stator	Completely impregnated									

Stated values are standard. Other configurations are available on request.

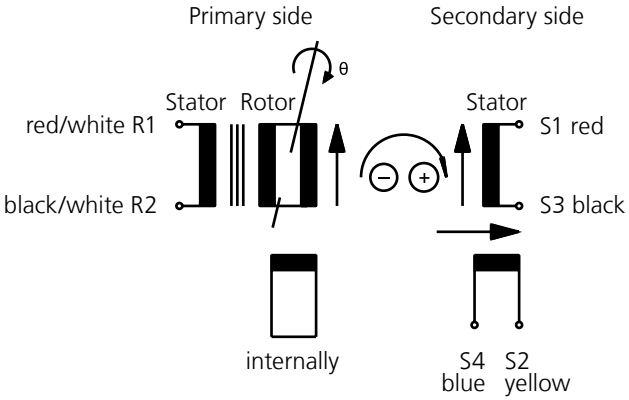
FRAMELESS RESOLVER

RE21

FACTS

- Hollow shaft Ø: max. 17 mm
- Outer Ø: 52 mm
- Length: 26 mm

OPERATING PRINCIPLE



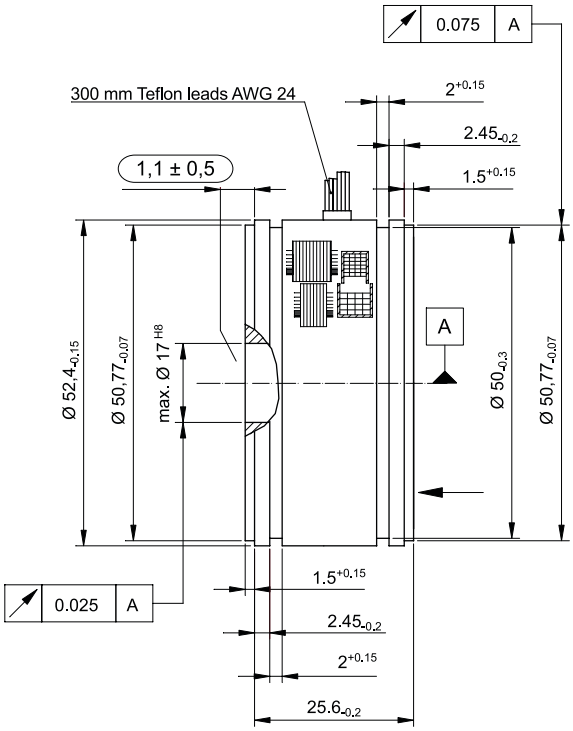
Input: $E(R1\text{-}R2) = E \cdot \sin(\omega \cdot t)$

Output: $E(S1\text{-}S3) = TR \cdot E(R1\text{-}R2) \cdot \cos\theta$

$E(S2\text{-}S4) = TR \cdot E(R1\text{-}R2) \cdot \sin\theta$

TR = Transformation ratio

Positive counting direction: Rotor cw as viewed (X→)



Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

Basic Model	RE 21-1-A01		RE 21-1-A05		RE 21-1-K05		RE 21-3-A03	
Primary Side	R1 - R2							
Pole Pairs	1						3	
Transformation ratio	1.0 ± 0.1		0.5					
Input voltage	7 V_{rms}	7 V_{rms}	7 V_{rms}	7 V_{rms}	5 V_{rms}	5 V_{rms}	7 V_{rms}	7 V_{rms}
Input current (typ.)	40 mA	30 mA	70 mA	56 mA	32 mA	17 mA	70 mA	40 mA
Input frequency	5 kHz	10 kHz	5 kHz	7 kHz	1 kHz	4.5 kHz	5 kHz	10 kHz
Phase shift (± 3°)	11°	-7.5°	8°	0°	26°	-6°	12°	1°
Null voltage	max. 30 mV							
Accuracy	± 10', ± 4' on request							
Accuracy ripple	max. 1'							
Operating temperature	- 55°C ... + 155°C (-67 °F ... +311 °F)							
Max. permissible speed	20.000 min^{-1}							
Hi-pot housing/winding	min. 500 V_{AC}							
Hi-pot winding/winding	min. 250 V_{AC}							
Rotor/Stator	Completely impregnated							

Stated values are standard. Other configurations are available on request.

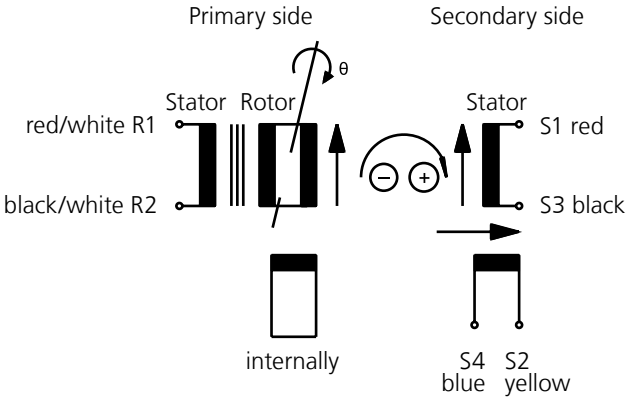
FRAMELESS RESOLVER

RE27

FACTS

- Hollow shaft Ø: max. 30 mm
- Outer Ø: 72 mm
- Length: 30 mm

OPERATING PRINCIPLE



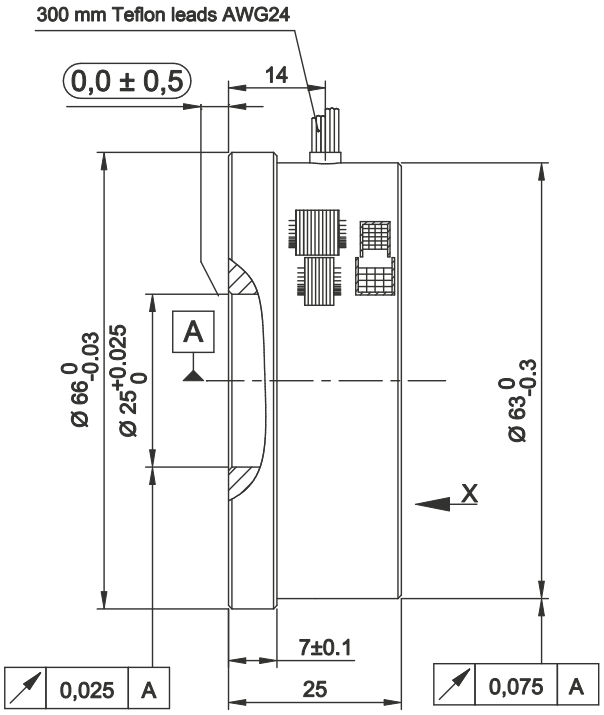
Input: $E(R1\text{-}R2) = E \cdot \sin(\omega \cdot t)$

Output: $E(S1\text{-}S3) = TR \cdot E(R1\text{-}R2) \cdot \cos\theta$

$E(S2\text{-}S4) = TR \cdot E(R1\text{-}R2) \cdot \sin\theta$

TR = Transformation ratio

Positive counting direction: Rotor cw as viewed (X→)



Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

Primary side	R1 - R2
Pole Pairs	1
Transformation ratio	0.5 ± 10%
Input voltage	7 V
Input current (typ.)	30 mA
Input frequency	10 kHz
Phase shift	-8° ± 3°
Null voltage	max. 30 mV
Impedance	
Zro	138 Ω + j · 210 Ω
Zrs	116 Ω + j · 191 Ω
Zso	271 Ω + j · 462 Ω
Zss	223 Ω + j · 420 Ω
D.C. resistance	
Rotor	62 Ω ± 10% at 20 °C
Stator	53 Ω ± 10% at 20 °C
Accuracy	± 10'
Accuracy ripple	max. 1'
Operating temperature	-55 °C ... +155 °C (-67 °F ... +311 °F)
Max. permissible speed	16.000 min^{-1}
Shock (11ms)	< = 1.000 m/s^2
Vibration (10 to 500 Hz)	< = 500 m/s^2
Weight rotor/stator	142 g / 188 g
Hi-pot housing/winding	min. 500 V_{AC}
Hi-pot winding/winding	min. 250 V_{AC}
Rotor/Stator	Completely impregnated

Stated values are standard. Other configurations are available on request.

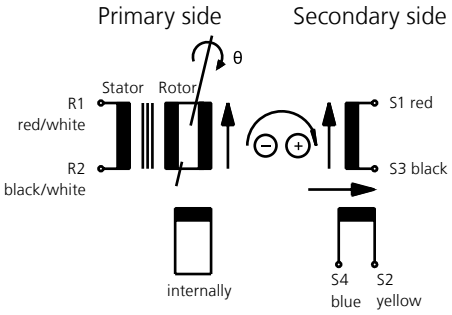
FRAMELESS RESOLVER

RE35

FACTS

- Hollow shaft Ø: max. 40 mm
- Outer Ø: 90 mm
- Length: 40 mm

OPERATING PRINCIPLE



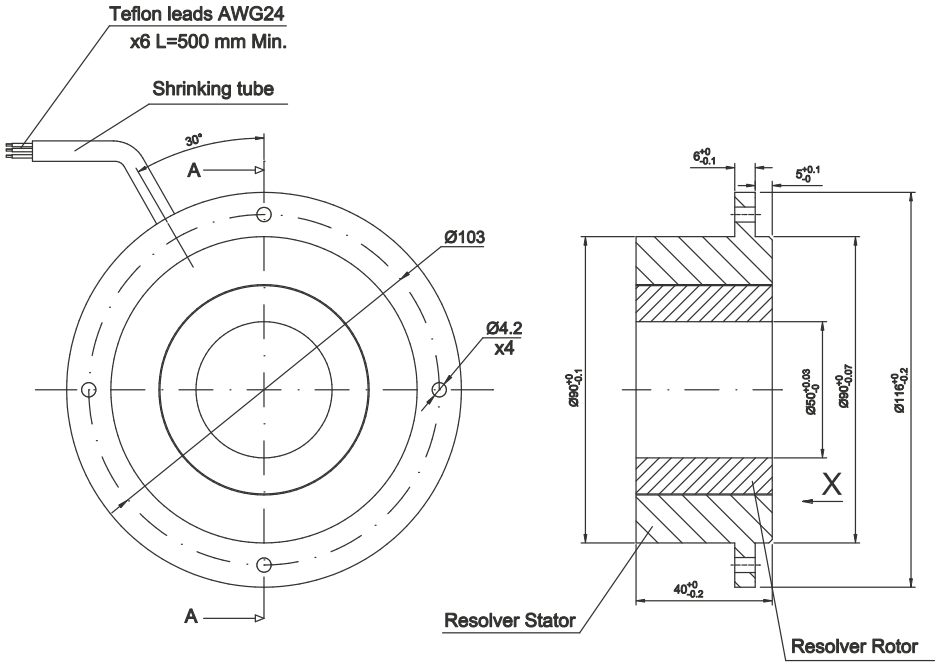
Input: $E(R1\text{-}R2) = E \cdot \sin(\omega \cdot t)$

Output: $E(S1\text{-}S3) = TR \cdot E(R1\text{-}R2) \cdot \cos \theta$

$E(S2\text{-}S4) = TR \cdot E(R1\text{-}R2) \cdot \sin \theta$

TR = Transformation ratio

Positive counting direction:
Rotor cw as viewed (X→)



Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

	RE-35-1-V05	RE35-3-V01
Primary side	R1 - R2	R1 - R2
Pole Pairs	1	3
Transformation ratio	0.5 ± 10%	0.5 ± 10%
Input voltage	7 V	7 V
Input frequency	5 kHz	5 kHz
Phase shift	+4° ± 3°	+5° ± 3°
Input current (typ.)	48 mA	30 mA
Null voltage	max. 30 mV	max. 30 mV
Accuracy spread	20'	6'
Operating temperature	-55 °C ... +155 °C (-67 °F ... +311 °F)	-55 °C ... +155 °C (-67 °F ... +311 °F)
Hi-pot housing/winding	min. 500 V_{AC}	min. 500 V_{AC}
Hi-pot winding/winding	min. 250 V_{AC}	min. 250 V_{AC}
Rotor/Stator	Completely impregnated	Completely impregnated

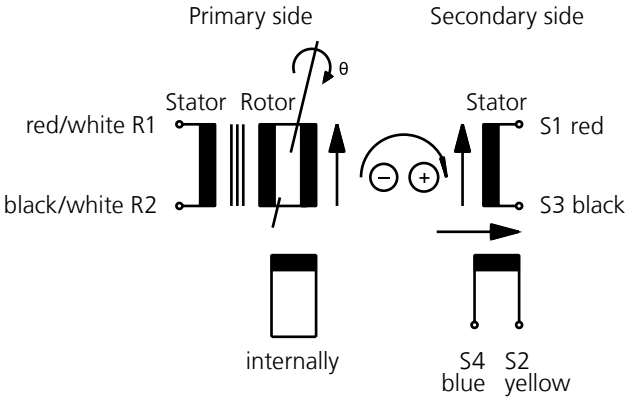
FRAMELESS RESOLVER

RE43

FACTS

- Hollow shaft Ø: max. 65 mm
- Outer Ø: 110 mm
- Length: 30 mm

OPERATING PRINCIPLE



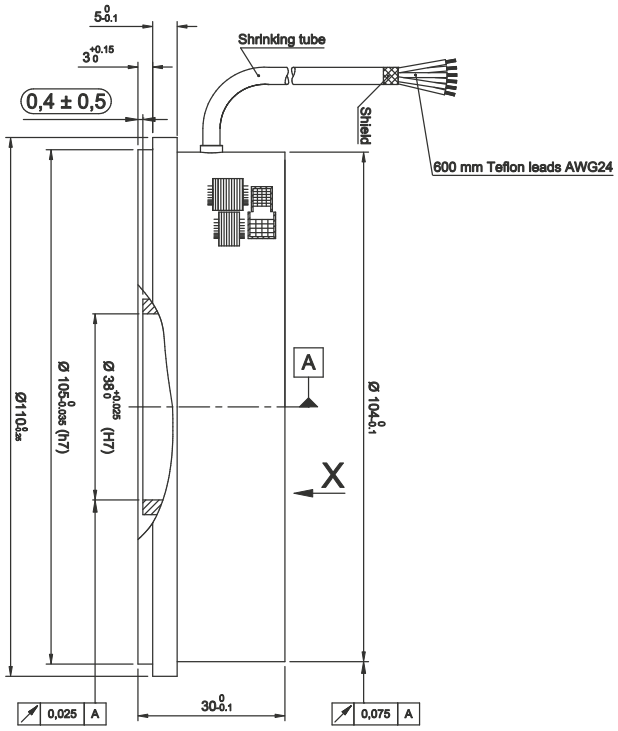
Input: $E(R1\text{-}R2) = E \cdot \sin(\omega \cdot t)$

Output: $E(S1\text{-}S3) = TR \cdot E(R1\text{-}R2) \cdot \cos\theta$

$E(S2\text{-}S4) = TR \cdot E(R1\text{-}R2) \cdot \sin\theta$

TR = Transformation ratio

Positive counting direction: Rotor cw as viewed (X→)



Stated values are standard. Other configurations are available on request.

ELECTRICAL DATA

Primary side	R1 - R2	R1 - R2
Pole Pairs	1	1
Transformation ratio	0,5 ± 10%	0,5 ± 10%
Input voltage	7 V	7 V
Input current (typ.)	55 mA	39 mA
Input frequency	5 kHz	10 kHz
Phase shift	10° ± 3°	-7° ± 3°
Null voltage	max. 30 mV	max. 30 mV
Impedance		
Zro	109 Ω + j · 72 Ω	129 Ω + j · 120 Ω
Zrs	96 Ω + j · 64 Ω	114 Ω + j · 115 Ω
Zso	204 Ω + j · 238 Ω	279 Ω + j · 380 Ω
Zss	185 Ω + j · 211 Ω	240 Ω + j · 355 Ω
D.C. resistance		
Rotor	76 Ω ± 10% at 20 °C	76 Ω ± 10% at 20 °C
Stator	74 Ω ± 10% at 20 °C	74 Ω ± 10% at 20 °C
Accuracy	± 20'	± 20'
Accuracy ripple	max. 1'	max. 1'
Operating temperature	-55 °C ... +155 °C (-67 °F ... +311 °F)	-55 °C ... -155 °C (-67 °F ... +311 °F)
Max. permissible speed	5.000 min^{-1}	5.000 min^{-1}
Shock (11ms)	< = 1.000 m/s^2	< = 1.000 m/s^2
Vibration (10 to 500 Hz)	< = 500 m/s^2	< = 500 m/s^2
Weight rotor/stator	400 g / 500 g	400 g / 550 g
Hi-pot housing/winding	min. 500 V_{AC}	min. 500 V_{AC}
Hi-pot winding/winding	min. 250 V_{AC}	min. 250 V_{AC}
Rotor/Stator	Completely impregnated	Completely impregnated

Stated values are standard. Other configurations are available on request.

RESOLVER CONVERTER

G-REC

RESOLVER TO ENCODER CONVERTER

The LTN-REC is a position data converter.
The LTN-REC drives autonomous a resolver sensor and converts its output signals to encoder incremental (square wave) output signals (emulates encoder signals).

SPECIFICATIONS - ENCODER OUTPUT

Output Signals:	incremental A+, A-, B+, B-, Z+, Z-
Resolution:	12 bit / 1024 incremental steps per revolution
Output Voltage Level:	5 V (TTL), 14-36 V (HTL) limited by the supply voltage
Output Current:	100 mA limited, short circuit proof
Dynamic Peak Current:	1500 mA max.
Accuracy:	+/- 0.184° (+/- 11 arcmin)
Repeatability:	+/- 1/4 of incremental step
Rotational speed:	up to 1000 s^{-1}

RESOLVER OUTPUT / INPUT

Output Ref. Signal:	2.8 V_{rms}
	100 mA max.
	10 kHz
Input SIN / COS:	1.4 V_{rms} (diff.)
Transformation Ratio:	K = 0.5 +/- 10%

POWER SUPPLY

Supply Voltage (+V_S):	+8 to +15 V_{DC} or +14 to +36 V_{DC}
Power Consumption:	~1 W (e.g. 40 mA at 24V)
Operating Temperature:	0 to +85 °C

The supply voltage can be supplied via the power connector or optionally via the encoder connector (from the encoder decoding unit).
The G-REC is protected against the wrong polarity and transient overvoltage of power supply and short circuit proof on output terminals.

Housing:	Phoenix Contact „ME 22,5“ for top hat rail mounting
Dimensions:	l=114.5 mm; h = 99 mm, w = 22.5 mm

Stated values are standard. Other configurations are available on request.

CONNECTOR TERMINALS

Encoder Out: Sub-D, 9-pole male -> mating connector: female	
Pin 1	GND
Pin 2	Z-
Pin 3	Z+
Pin 4	A
Pin 5	A+
Pin 6	-
Pin 7	$+V_S$ (Opt.)
Pin 8	B-
Pin 9	B+
Screen	PE

Resolver IN: Sub-D, 9-pole female -> mating connector: male	
Pin 1	Ref-
Pin 2	-
Pin 3	-
Pin 4	-
Pin 5	SIN+
Pin 6	SIN
Pin 7	Ref+
Pin 8	COS+
Pin 9	COS
Screen	PE

Power connector: 4-pole plug, screw wire connection, included	
Pin 1 (left)	$+V_S$
Pin 2	$+V_S$
Pin 3	GND
Pin 4	GND
Max. loopthroughed current:	
$+V_S$:	Pin 1 - Pin 2: 3A
GND:	Pin 3 - Pin 4: 3A

The PE connection (protective earth) is implemented over the mounting clamp to the top hat rail.

ORDERING INFORMATION

Type	Supply Voltage ($+V_S$)	Output Voltage Level	Part Number
G-RECLDBI-1024-5X1-15	+8 to +15 V_{DC}	5V	3933542
G-RECLDBI-1024-5X1-24	+14 to +36 V_{DC}	5V	3931647
G-RECKIBI-1024-5X1-24	+14 to +36 V_{DC}	Vs	3932553
G-RECKIBI-1024-5X1-24CX	+14 to +36 V_{DC}	Vs	3932553-01
	Adjusted for long cable lengths. Optimised for 130 m cable.		

RESOLVER CONVERTER

G-RDC

RESOLVER TO DIGITAL CONVERTER

The LTN G-RDC is a position data converter.
The LTN G-RDC drives autonomous a resolver sensor and converts its output signals to digital position data.

SPECIFICATIONS - CONVERTER OUTPUT / CONTROL

Output Signals:	10 bit: binary position data, parallel, H-active 16 bit: binary position data, parallel, H-active 1 bit: /BIT (Error), L-active
Input Signals:	1 bit: /Inhibit, L-edge-active 1 bit: /Enable, L-edge-active (Both Inputs can be put together)
Resolution:	10-bit / 1024 steps per revolution 16-bit / 65536 steps per revolution
Output Voltage Level:	TTL (5 V)
Output Current:	30 mA
Input Voltage Level:	TTL (5 V)
Accuracy:	0.072° (4 arcmin +1LSB max.)
Repeatability:	+/- 1 LSB
Rotational speed:	10 bit: up to 1152 s^{-1} 16 bit: up to 18 s^{-1} (to be specified on order)

RESOLVER OUTPUT / INPUT

Output Ref. Signal:	4 V_{rms} 100 mA max. 5 kHz
Input SIN / COS:	2 V_{rms}
Transformation Ratio:	K = 0.5 +/- 10%

POWER SUPPLY

Supply Voltage (+Vs):	+10 to +36 V_{DC}
Power Consumption:	~1,5 W (e.g. 60 mA at 24 V)
Operating Temperature:	0 to +85°C

The supply voltage can be supplied via the power connector or optionally via the encoder connector (from the encoder decoding unit).
The G-RDC is protected against the wrong polarity and transient overvoltage of power supply and short circuit proof on output terminals.

Housing:	Phoenix Contact „ME 22,5“ for top hat rail mounting
Dimensions:	l = 114,5 mm; h = 99 mm, w = 22,5 mm

Stated values are standard. Other configurations are available on request.

CONNECTOR TERMINALS

10 bit

Data Out /Controll I/O: Sub-D, 25-pole female -> mating connector: male	
Pin 1	Out DB1 (MSB)
Pin 2	Out DB2
Pin 3	Out DB3
Pin 4	Out DB4
...	...
...	...
Pin 10	Out DB10 (LSB)
Pin 11	NC
...	...
Pin 16	NC
Pin 17	Out /BIT (Error)
Pin 18	IN /Inhibit
Pin 19	IN /Enable
Pin 20	NC
Pin 21	NC
Pin 22	NC
Pin 23	V_S (Opt.)
Pin 24	GND
Pin 25	GND
Screen	PE

16 bit

Data Out /Controll I/O: Sub-D, 25-pole female -> mating connector: male	
Pin 1	Out DB1 (MSB)
Pin 2	Out DB2
Pin 3	Out DB3
Pin 4	Out DB4
...	...
...	...
Pin 13	Out DB13
Pin 14	Out DB14
Pin 15	Out DB15
Pin 16	Out DB16 (LSB)
Pin 17	Out /BIT (Error)
Pin 18	IN /Inhibit
Pin 19	IN /Enable
Pin 20	NC
Pin 21	NC
Pin 22	NC
Pin 23	V_S (Opt.)
Pin 24	GND
Pin 25	GND
Screen	PE

Resolver IN: Sub-D, 9-pole female -> mating connector: male	
Pin 1	Ref-
Pin 2	-
Pin 3	-
Pin 4	-
Pin 5	SIN+
Pin 6	SIN-
Pin 7	Ref+
Pin 8	COS+
Pin 9	COS-
Screen	PE

Power connector: 4-pole plug, screw wire connection, included	
Pin 1 (left)	$+V_S$
Pin 2	$+V_S$
Pin 3	GND
Pin 4	GND
Max. loopthroughed current:	
$+V_S$:	Pin 1 - Pin 2: 3A
GND:	Pin 3 - Pin 4: 3A

The PE connection (protective earth) is implemented over the mounting clamp to the top hat rail.

ORDERING INFORMATION

Type	Supply Voltage ($+V_S$)	Output Voltage Level	Part Number
10 bit: G-RDCTLSC01024-0XX-24	+10 to +36 V_{DC}	TTL (5V)	3938524
12 bit: G-RDCTLSC04096-0XX-24	+10 to +36 V_{DC}	TTL (5V)	1185043-01
16 bit: G-RDCTLSC65536-0XX-24	+10 to +36 V_{DC}	TTL (5V)	3933425

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