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 fiber-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.

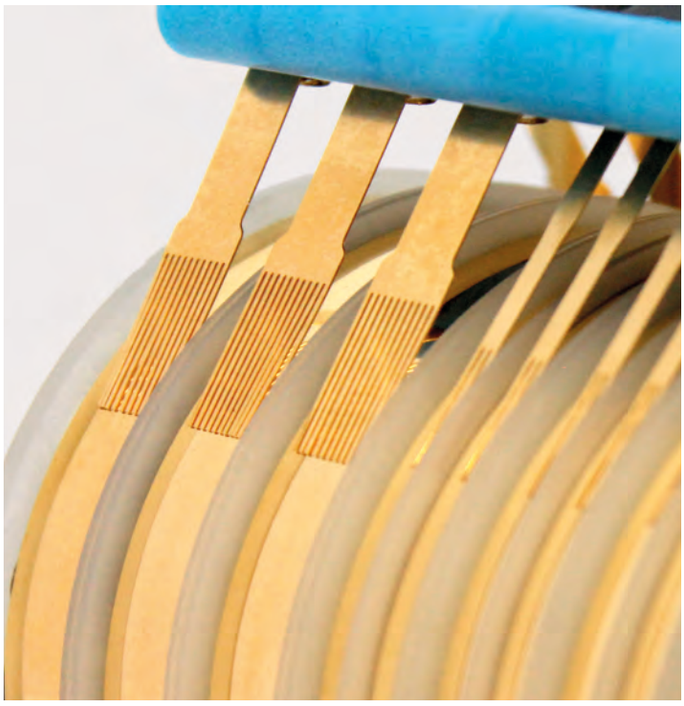
In addition, we offer fiber-optic rotary joints for contactless transmission of high data rates.

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
Frameless	RE15	36 mm	12 mm
	RE21	52 mm	20 mm
Housed	R36	36 mm	11 mm
	R58	58 mm	17 mm
	R71	71 mm	20 mm

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

Max. shaft diameter	Pole pairs	Acurracy	Input current (can vary by types)	Page
on request	1 / 3 / 4	± 4′ / ± 6′ / ± 10′	58 mA at 7 V & 5 kHz	8
on request	1 / 3 / 5	± 4′ / ± 6′ / ± 10′	47 mA at 7 V & 5 kHz	10
on request	1 / 3 / 4	± 4′ / ± 6′ / ± 10′	65 mA at 7 V & 5 kHz	12
12 mm	1 / 3 / 4	± 6′ / ± 10′	58 mA at 7 V & 5 kHz	14
12 mm	1 / 3 / 5	± 6′ / ± 10′	47 mA at 7 V & 5 kHz	16

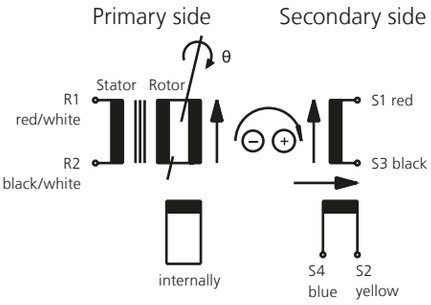
FRAMELESS RESOLVER

RE15

FACTS

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

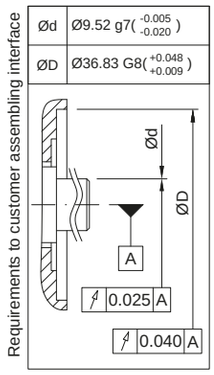
OPERATING PRINCIPLE

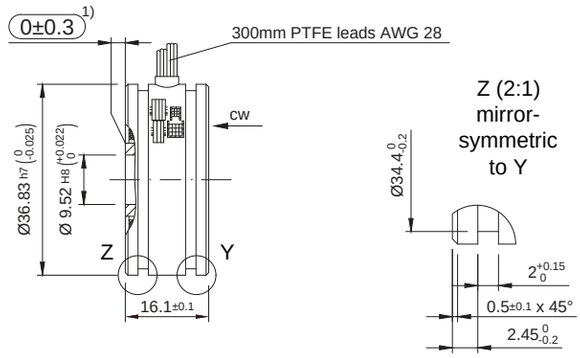


Inner diam. stator = 22.820 min.
Outer diam. rotor = 22.350 max.

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

1) axial offset
operational tolerance



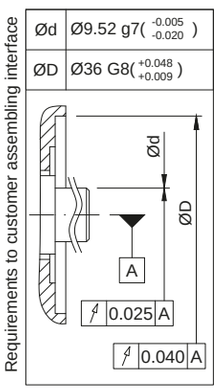


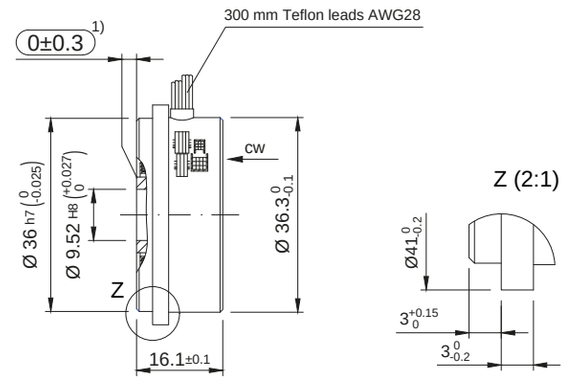
Input: E(R1-R2) = E · sin(ω·t)
Output: E(S1-S3) = TR · E(R1-R2) · cos θ
E(S2-S4) = TR · E(R1-R2) · sin θ
TR = Transformation ratio

Inner diam. stator = 22.820 min.
Outer diam. rotor = 22.350 max.

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

1) axial offset
operational tolerance





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

ELECTRICAL DATA

Type	RE-15-1-XXX	RE-15-3-XXX	RE-15-4-XXX
Pole Pairs	1	3	4
Transformation Ratio	0,5 ±10%	0,5 ±10%	0,5 ±10%
Input Voltage	7 V	7 V	7 V
Input Current	65 mA 7 V & 5 kHz	50 mA 7 V & 4 kHz ± 10%	53 mA 7 V & 5 kHz
Phase Shift	13° ±3° 7 V & 5 kHz	15° ±3° 7 V & 4 kHz	18° ±3° 7 V & 5 kHz
Acuracy	± 10′/20' spread ± 4/6' on request	± 5′/9' spread	± 6′/12' spread
Null Voltage	≤ 30 mV	≤ 30 mV	≤ 30 mV
Operating Temperature	-55 °C ... +155 °C	-55 °C ... +155 °C	-55 °C ... +155 °C
R1-R2 DC Resistance at room temperature	37 Ohm ± 10%	34 Ohm ± 10%	25 Ohm ± 10%
S1-S3/S2-S4 DC Resistance at room temperature	102 Ohm ± 10%	380 Ohm ± 10%	231 Ohm ± 10%
Max. Permissible Speed	≤ 20.000 rpm	≤ 20.000 rpm	≤ 20.000 rpm
Shock	≤ 1.000 m/s2 (11 ms)	≤ 1.000 m/s2 (11 ms)	≤ 1.000 m/s2 (11 ms)
Vibration	≤ 500 m/s2 10...500 Hz	≤ 500 m/s2 10...500 Hz	≤ 500 m/s2 10...500 Hz
High Pot Test Voltage Housing/Winding	≤ 500 VAc 50 Hz & 3 s	≤ 500 VAc 50 Hz & 3 s	≤ 500 VAc 50 Hz & 3 s
High Pot Test Voltage Winding/Winding	≤ 250 VAC 50 Hz & 3 s	≤ 250 VAC 50 Hz & 3 s	≤ 250 VAC 50 Hz & 3 s
Rotor / Stator	completely impregnated	completely impregnated	completely impregnated
Lead Length	AWG 28 min. 300 mm	AWG 28 min. 300 mm	AWG 28 min. 300 mm

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

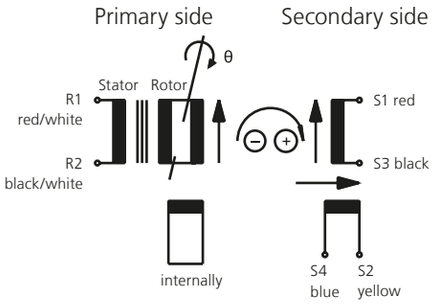
FRAMELESS RESOLVER

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

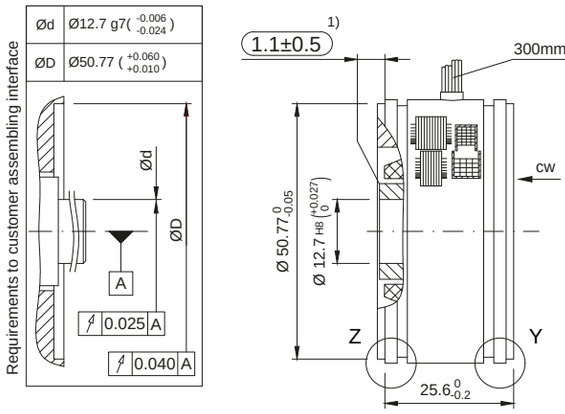
$E(S2\text{-}S4) = TR \cdot E(R1\text{-}R2) \cdot \sin\theta$

TR = Transformation ratio

Inner diam. stator = 33.500 min.
Outer diam. rotor = 32.725 max.

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

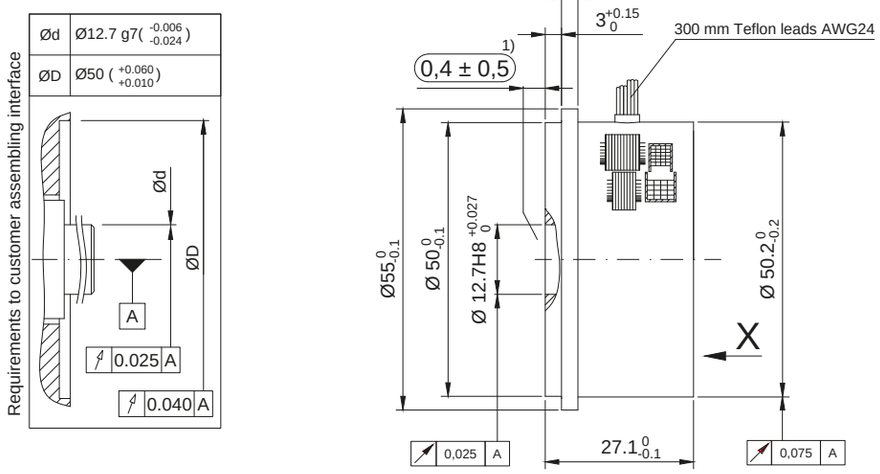
1) axial offset
operational tolerance



Inner diam. stator = 33.500 min.
Outer diam. rotor = 32.725 max.

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

1) axial offset
operational tolerance



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

ELECTRICAL DATA

Type	RE-21-1-A04	RE-21-1-A05	RE-21-1-A06
Pole Pairs	1	1	1
Transformation Ratio	0,5 ±10%	0,5 ±10%	0,5 ±10%
Input Voltage	7 V	7 V	7 V
Input Current	40 mA 7 V & 5 kHz	70 mA 7 V & 4 kHz ± 10%	45 mA 7 V & 4 kHz ± 10%
Phase Shift	10° ±3° 7 V & 5 kHz	8° ±3° 7 V & 4 kHz	8° ±3° 7 V & 4 kHz
Acuracy	± 6'/10' spread	± 5'/9' spread	± 6'/12'' spread
Null Voltage	≤ 30 mV	≤ 30 mV	≤ 30 mV
Operating Temperature	-55 °C ... +155 °C	-55 °C ... +155 °C	-55 °C ... +155 °C
R1-R2 DC Resistance at room temperature	90 Ohm ± 10%	48 Ohm ± 10%	61 Ohm ± 10%
S1-S3/S2-S4 DC Resistance at room temperature	72 Ohm ± 10%	31 Ohm ± 10%	53 Ohm ± 10%
Max. Permissible Speed	≤ 20.000 rpm	≤ 20.000 rpm	≤ 20.000 rpm
Shock	≤ 1.000 m/s2 (11 ms)	≤ 1.000 m/s2 (11 ms)	≤ 1.000 m/s2 (11 ms)
Vibration	≤ 500 m/s2 10...500 Hz	≤ 500 m/s2 10...500 Hz	≤ 500 m/s2 10...500 Hz
High Pot Test Voltage Housing/Winding	≤ 500 VAc 50 Hz & 3 s	≤ 500 VAc 50 Hz & 3 s	≤ 500 VAc 50 Hz & 3 s
High Pot Test Voltage Winding/Winding	≤ 250 VAC 50 Hz & 3 s	≤ 250 VAC 50 Hz & 3 s	≤ 250 VAC 50 Hz & 3 s
Rotor / Stator	completely impregnated	completely impregnated	completely impregnated
Lead Length	AWG 24 min. 300 mm	AWG 24 min. 300 mm	AWG 24 min. 300 mm

Type	RE-21-1-A07	RE-21-3-XXX	RE-21-5-XXX
Pole Pairs	1	3	5
Transformation Ratio	1 ±10%	0,5 ±10%	0,5 ±10%
Input Voltage	7 V	7 V	7 V
Input Current	40 mA 7 V & 4 kHz ± 10%	40 mA 7 V & 4 kHz ± 10%	34 mA 7 V & 5 kHz
Phase Shift	14° ±3° 7 V & 4 kHz	14° ±3° 7 V & 4 kHz	16° ±3° 7 V & 5 kHz
Acuracy	± 6'/12'' spread	± 6'/10' spread	± 5'/7' spread
Null Voltage	≤ 30 mV	≤ 30 mV	≤ 30 mV
Operating Temperature	-55 °C ... +155 °C	-55 °C ... +155 °C	-55 °C ... +155 °C
R1-R2 DC Resistance at room temperature	90 Ohm ± 10%	90 Ohm ± 10%	49 Ohm ± 10%
S1-S3/S2-S4 DC Resistance at room temperature	260 Ohm ± 10%	72 Ohm ± 10%	820 Ohm ± 10%
Max. Permissible Speed	≤ 20.000 rpm	≤ 20.000 rpm	≤ 20.000 rpm
Shock	≤ 1.000 m/s2 (11 ms)	≤ 1.000 m/s2 (11 ms)	≤ 1.000 m/s2 (11 ms)
Vibration	≤ 500 m/s2 10...500 Hz	≤ 500 m/s2 10...500 Hz	≤ 500 m/s2 10...500 Hz
High Pot Test Voltage Housing/Winding	≤ 500 VAc 50 Hz & 3 s	≤ 500 VAc 50 Hz & 3 s	≤ 500 VAc 50 Hz & 3 s
High Pot Test Voltage Winding/Winding	≤ 250 VAC 50 Hz & 3 s	≤ 250 VAC 50 Hz & 3 s	≤ 250 VAC 50 Hz & 3 s
Rotor / Stator	completely impregnated	completely impregnated	completely impregnated
Lead Length	AWG 24 min. 300 mm	AWG 24 min. 300 mm	AWG 24 min. 300 mm

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

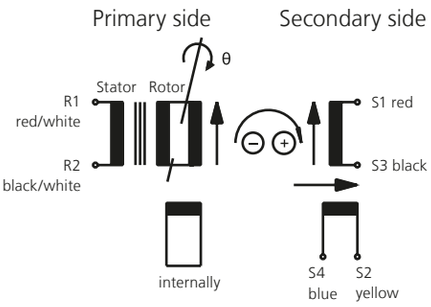
HOUSED RESOLVER

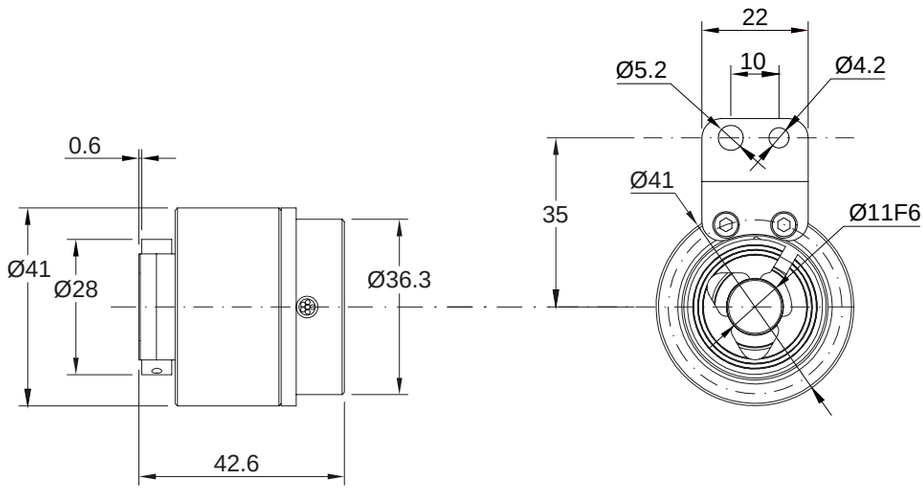
R36

FACTS

- Outer Ø: 36 mm
- Hollow Shaft Ø: max. 11 mm
- Shaft: on request
- Length: 42,6 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

Type	R36
Pole Pairs	1
Transformation Ratio	0,5 ±10%
Input Voltage	7 V
Input Current	65 mA 7 V & 5 kHz
Phase Shift	13° ±3° 7 V & 5 kHz
Acuracy	± 10’/20' spread ± 4/6' on request
Null Voltage	≤ 30 mV
Operating Temperature	-40 °C ... +100 °C
R1-R2 DC Resistance at room temperature	37 Ohm ± 10%
S1-S3/S2-S4 DC Resistance at room temperature	102 Ohm ± 10%
Max. Permissible Speed	≤ 5.000 rpm
Shock	≤ 1.000 m/s2 (11 ms)
Vibration	≤ 500 m/s2 10...500 Hz
High Pot Test Voltage Housing/Winding	≤ 500 VAc 50 Hz & 3 s
High Pot Test Voltage Winding/Winding	≤ 250 VAC 50 Hz & 3 s
Rotor / Stator	completely impregnated
Lead Length	AWG 28 min. 300 mm

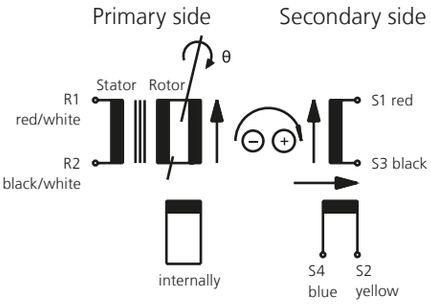
HOUSED RESOLVER

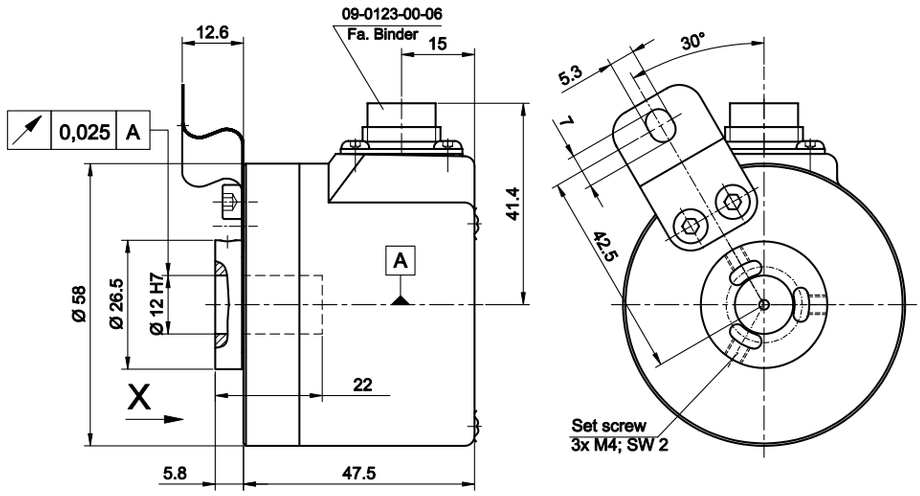
R58

FACTS

- Shaft Ø: max. 12 mm
- Hollow Shaft Ø: max. 17 mm
- Outer Ø: 58 mm
- Customized Connector | Cable possible

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

Type	R58
Pole Pairs	1
Transformation Ratio	0,5 ±10%
Input Voltage	7 V
Input Current	65 mA 7 V & 5 kHz
Phase Shift	13° ±3° 7 V & 5 kHz
Acuracy	± 10’/20' spread ± 4/6' on request
Null Voltage	≤ 30 mV
Operating Temperature	-40 °C ... +100 °C
R1-R2 DC Resistance at room temperature	37 Ohm ± 10%
S1-S3/S2-S4 DC Resistance at room temperature	102 Ohm ± 10%
Max. Permissible Speed	≤ 5.000 rpm
Shock	≤ 1.000 m/s2 (11 ms)
Vibration	≤ 500 m/s2 10...500 Hz
High Pot Test Voltage Housing/Winding	≤ 500 VAc 50 Hz & 3 s
High Pot Test Voltage Winding/Winding	≤ 250 VAC 50 Hz & 3 s
Rotor / Stator	completely impregnated
Lead Length	AWG 28 min. 300 mm

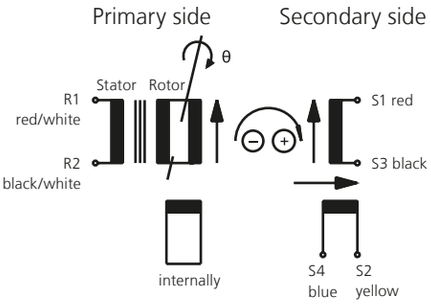
HOUSED RESOLVER

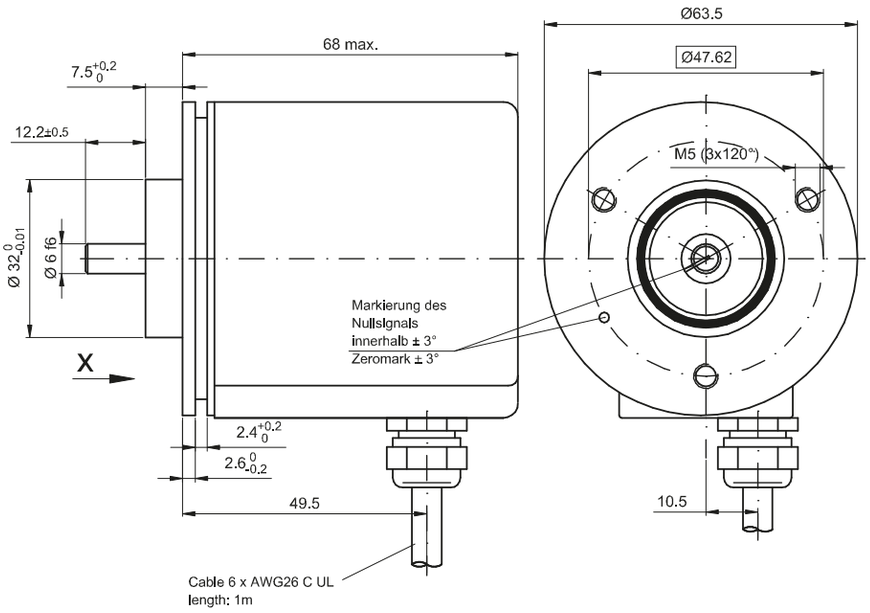
R71

FACTS

- Shaft Ø: max. 12 mm
- Hollow shaft Ø: max. 20 mm
- Outer Ø: 71 mm
- Customized Connector | Cable possible

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

Type	R71-XXX-A05	R71-XXX-A06
Pole Pairs	1	1
Transformation Ratio	0,5 ±10%	0,5 ±10%
Input Voltage	7 V	7 V
Input Current	70 mA 7 V & 4 kHz ± 10%	45 mA 7 V & 4 kHz ± 10%
Phase Shift	8° ±3° 7 V & 4 kHz	8° ±3° 7 V & 4 kHz
Acuracy	± 5'/9' spread	± 6'/12'' spread
Null Voltage	≤ 30 mV	≤ 30 mV
Operating Temperature	-40 °C ... +100 °C	-40 °C ... +100 °C
R1-R2 DC Resistance at room temperature	48 Ohm ± 10%	61 Ohm ± 10%
S1-S3/S2-S4 DC Resistance at room temperature	31 Ohm ± 10%	53 Ohm ± 10%
Max. Permissible Speed	≤ 5.000 rpm	≤ 5.000 rpm
Shock	≤ 1.000 m/s2 (11 ms)	≤ 1.000 m/s2 (11 ms)
Vibration	≤ 500 m/s2 10...500 Hz	≤ 500 m/s2 10...500 Hz
High Pot Test Voltage Housing/Winding	≤ 500 VAc 50 Hz & 3 s	≤ 500 VAc 50 Hz & 3 s
High Pot Test Voltage Winding/Winding	≤ 250 VAC 50 Hz & 3 s	≤ 250 VAC 50 Hz & 3 s
Rotor / Stator	completely impregnated	completely impregnated
Lead Length	AWG 24 min. 300 mm	AWG 24 min. 300 mm

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

RESOLVER PRODUCT GROUP

G-REC

RESOLVER TO ENCODER CONVERTER

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

G-REC (DESIGN EXAMPLE)

SPECIFICATIONS - ENCODER OUTPUT

Output Signals:	incremental A+, A-, B+, B-, Z+, Z-
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.
Resolution:	12 bit / 1024 incremental steps per revolution (other resolutions on request)
Accuracy:	+/- 0.184° (+/- 11 arcmin)
Repeatability:	+/- 1/4 of incremental step
Rotational speed:	up to 1000 s^{-1} (depending on version)

RESOLVER OUTPUT / INPUT

Output Ref. Signal:	2.8 V_{rms}
	100 mA max.
	10 kHz, 5 kHz
	(depending on version)
Input SIN / COS:	1.4 V_{rms} (diff.)
Resolver 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 data connector (from the control 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

Encoder Out (Default): 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	NC
Pin 7	+Vs (Opt.)
Pin 8	B-
Pin 9	B+
Screen	PE

Encoder Out (DX): Sub-D, 25-pole female > mating connector: male

Pin 1	NC
...	NC
Pin 16	NC
Pin 17	A-
Pin 18	B-
Pin 19	Z-
Pin 20	A+
Pin 21	B+
Pin 22	Z+
Pin 23	+Vs (Opt.)
Pin 24	GND
Pin 25	GND
Screen	PE

Resolver IN: Sub-D, 9-pole female -> mating connector: male

Pin 1	Ref-	(R2)
Pin 2	NC	
Pin 3	NC	
Pin 4	NC	
Pin 5	SIN+	(S2)
Pin 6	SIN-	(S4)
Pin 7	Ref+	(R1)
Pin 8	COS+	(S1)
Pin 9	COS-	(S3)
Screen	PE	

Power connector: 4-pole plug, screw wire connection, included

Pin 1 (left)	+Vs
Pin 2	+Vs
Pin 3	GND
Pin 4	GND

Max. loopthroughed current:

+Vs	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

Part No.	Type	Supply Voltage ($+V_S$)	Output Voltage Level	Rotational Speed	Reference Frequency
3933542	G-RECLDBI1024-5X1-15	+8 to +15 V_{DC}	5V	up to 1000 s^{-1}	10kHz
3931647	G-RECLDBI1024-5X1-24	+14 to +36 V_{DC}	5V	up to 1000 s^{-1}	10kHz
3932553	G-RECKIBI1024-5X1-24	+14 to +36 V_{DC}	Vs	up to 1000 s^{-1}	10kHz
3932553-01	G-RECKIBI1024-5X1-24CX	+14 to +36 V_{DC}	Vs	up to 1000 s^{-1}	10kHz
		Adjusted for long cable lengths. Optimised for 130 m cable.			
1340804-01	G-RECKIBI1024-5X1-24DX	+14 to +36 V_{DC}	Vs	up to 500 s^{-1}	5kHz
		Adjusted for long cable length, tested up to 260 m			

RESOLVER PRODUCT GROUP

G-RDC

RESOLVER TO DIGITAL CONVERTER

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

SPECIFICATIONS - CONVERTER OUTPUT / CONTROL

Output Data:	10 bit, 12 bit, 16 bit: binary position data, parallel, H-edge-active 1 bit: /BIT (Error), L-edge-active
Input Signals:	1 bit: /Inhibit, L-edge-active 1 bit: /Enable, L-edge-active (Both inputs can be put together)
Output Voltage Level:	TTL (5 V)
Output Current:	30 mA
Input Voltage Level:	TTL (5 V)
Resolution:	10-bit / 1024 steps per revolution 12-bit / 4096 steps per revolution 16-bit / 65536 steps per revolution
Accuracy:	0.072° (4 arcmin +1LSB max.)
Repeatability:	+/- 1 LSB
Rotational Speed:	10 bit: up to 1152 s^{-1} 12 bit: up to 520 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}
Resolver 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 data connector (from the control 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

Data Out /Controll I/O: Sub-D, 25-pole female -> mating connector: male

	10 bit	12 bit	16 bit
Pin 1	Out DB1 (MSB)	Out DB1 (MSB)	Out DB1 (MSB)
Pin 2	Out DB2	Out DB2	Out DB2
Pin 3	Out DB3	Out DB3	Out DB3
Pin 4	Out DB4	Out DB4	Out DB4
...	...	...	...
Pin 10	Out DB10 (LSB)	Out DB10	Out DB10
Pin 11	NC	Out DB11	Out DB11
Pin 12	NC	Out DB12 (LSB)	Out DB12
Pin 13	NC	NC	Out DB13
Pin 14	NC	NC	Out DB14
Pin 15	NC	NC	Out DB15
Pin 16	NC	NC	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-	(R2)
Pin 2	NC	
Pin 3	NC	
Pin 4	NC	
Pin 5	SIN+	(S2)
Pin 6	SIN-	(S4)
Pin 7	Ref+	(R1)
Pin 8	COS+	(S1)
Pin 9	COS-	(S3)
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

ORDERING INFORMATION

Part No.	Type	Supply Voltage ($+V_S$)	Output Voltage Level
3938524	10 bit: G-RDCTLSC01024-0XX-24	+10 to +36 V_{DC}	TTL (5V)
1185043-01	12 bit: G-RDCTLSC04096-0XX-24	+10 to +36 V_{DC}	TTL (5V)
3933425	16 bit: G-RDCTLSC65536-0XX-24	+10 to +36 V_{DC}	TTL (5V)

RESOLVER PRODUCT GROUP

G-RCC

RESOLVER TO CANOPEN CONVERTER / RESOLVER AS ENCODER IN CANOPEN-PROFILE

The LTN G-RCC is a resolver to CANopen converter to enable the integration of a resolver into a CANopen network as single CANopen node. The G-RCC drives the resolver autonomously and delivers position and speed values as encoder in CANopen-profile. The LTN G-RCC uses a monolithic RDC-IC for resolver to digital conversion and a separate microcontroller for all other functions (control, communication, scaling, computation, etc.).

CAN-REFERENCES

1) Robert Bosch GmbH, CAN Specification 2.0A, 1991 | 2) CiA DS 201...207 ver. 1.1, CAN Application Layer for Ind. Appl. | 3) CiA DS 301 ver. 4.02, CAL-based Communication Profile, Feb. 2002 | 4) CiA DS 303 ver. 1.3, Add. Spec., Part: Indicator Spec., Aug. 2006 | 5) CiA DS 305 ver. 2.0, Layer Setting Service (LSS) | 6) CiA DS 306 ver. 1.3, EDS Spec. for CANopen, Jan. 2005 | 7) CiA DS 406 ver. 3.1, Device Profile for Encoders, Dec. 2001

SPECIFICATIONS - CONVERTER OUTPUT

Protocol:	CANopen Protocol
Output Data:	position value (in incremental steps), current speed value (in incremental steps per second)
Resolution:	can be free software-scaled between 2 and 65536 incremental steps per revolution by CANopen protocol, preset-function (software-zero) and change of the direction of rotation (CW - CCW) are also supported
Accuracy:	+/- 0.10° (+/- 6 arcmin) +/- 0.05° (+/- 3 arcmin) on request
Repeatability:	+/- 1 LSB (incremental step) of the set resolution, e.g. at 16 bits / 65536 incr: +/- 0.33 arcmin. for single speed resolver
Rotational Speed:	Up to 0.5 s^{-1} (mech.) for single speed and 0.166 s^{-1} (mech.) for triple speed resolver
Baudrate Settings:	0, 20, 50, 125, 250, 500, 800 or 1000 kB/s
Node ID Settings:	0 to 127 (dec), internal bus terminating resistor (120 Ohm / 1W) can be switched by a switch placed on the front panel. Baudrate and node-ID can be set by hardware (coding microswitches) or by LSS.

SPECIFICATIONS - RESOLVER INPUT / OUTPUT

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

POWER SUPPLY

Supply Voltage (+V_S):	+10 ... +36 V_{DC}
Power Consumption:	~2 W (e.g. 70 mA at 24 V)
Operating Temperature:	0 ... +85°C

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

The LTN-RCC is protected against the wrong polarity of power supply and transient overvoltage on all terminals.

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

CONNECTOR TERMINALS

Power:	Sub-D, 9-pin male connector in the front panel / TBUS in the back (top hat rail) / screw terminal connector
CANopen:	Sub-D, 9-pin male connector in the front panel / TBUS in the back (top hat rail)
Resolver:	Sub-D, 9-pin female connector in the front panel

Power and CAN signals are passed (loopthroughed) from one terminal / connector to the other one.

CONNECTOR TERMINALS

Signals	CAN (front panel) Sub-D, 9 pin male	TBUS connector top hat rail	Screw terminal
CAN Gnd	3, 6	1 (TOP)	3, 4 (RIGHT)
CAN V_S	9	2	1, 2 (LEFT)
CAN Lo	2	3	
CAN Hi	7	4	
CAN Shield/PE	5, screen	5 (BOTTOM)	
NC	1, 4, 8		

Sub-D connector bolt thread: 4-40#

Signals	Resolver (front panel) Sub-D, 9 pin female
Ref+ (R1)	7
Ref- (R2)	1
Sin+ (S2)	5
Sin- (S4)	6
Cos+ (S1)	8
Cos- (S3)	9
NC	2, 3, 4
Shield/PE	screen

Recommended additional components for using the TBUS system / Phoenix Contact part numbers:

Part No.	Type	Description	Requirement
2713722	ME 22.5 TBUS 1.5/5-ST-3.81 KMGY	TBUS plug component for top hat rail	necessary
1719697	MC 1.5/5-ST-3.81 GY7035AU	axial plug, connector mating male side of TBUS	optional
1719707	IMC 1.5/5-ST-3.81 GY7035AU	axial plug, connector mating female side of TBUS	optional
1719684	MCVR 1.5/5-ST-3.81 GY7035AU	vertical plug, connector mating male side of TBUS	optional
2713780	E/ME TBUS NS35 GY	end clamp, stable contruction for bus connector	optional
2706302	ME B-KA KMGY	terminal cover for male side of TBUS	optional
2706700	ME B-SA/NS35 KMGY	terminal cover for female side of TBUS	optional

ORDERING INFORMATION

Part No.	Type
3938776	G-RCCLDSC65536-0XX-24

Distributors for Australia & New Zealand

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