

Incremental Rotary Encoder G36

Shaft: Type S / L



- Housing diameter: 36,5 mm
- Shaft: Ø 4 ... 6,35 mm
- Hollow shaft: Ø 4 ... 8 mm
- Line counts: 36 ... 4.096
- Output signals: RS422, TTL, OC, KS, KI, 1Vpp, 11µApp
- Cable output: axial or radial

Hollow shaft: Type W



Mechanical Data

G36	Shaft Type S	Shaft Type L	Hollow shaft Type W
	Ø Shaft / Hollow shaft	6 mm	6,35 mm
Weight	ca. 85 g	ca. 85 g	ca. 85 g
Accuracy (up to line count 2500)	$< \pm \frac{360^\circ}{\text{Line counts} \times 20}$	$< \pm \frac{360^\circ}{\text{Line counts} \times 20}$	$< \pm \frac{360^\circ}{\text{Line counts} \times 20}$
Mech. permissible speed	max. 12.000 min ⁻¹	max. 12.000 min ⁻¹	max. 12.000 min ⁻¹
Starting torque (25 °C)	< 0,001 Nm	< 0,001 Nm	< 0,001 Nm
Shaft load at 12.000 min ⁻¹	5 N axial; 10 N radial	5 N axial; 10 N radial	---
Rotor inertia	0,15 x 10 ⁻⁶ kgm ²	0,15 x 10 ⁻⁶ kgm ²	0,20 x 10 ⁻⁶ kgm ²
Vibration	100 m/s ² ; higher upon request	100 m/s ² ; higher upon request	100 m/s ² ; higher upon request
Shock	300 m/s ² ; higher upon request	300 m/s ² ; higher upon request	300 m/s ² ; higher upon request
Operating temperature	-25°C ... +85°C; -25°C ... +70°C for QI	-25°C ... +85°C; -25°C ... +70°C for QI	-25°C ... +85°C; -25°C ... +70°C for QI
Protection class	IP 64	IP 64	IP 64

Line counts

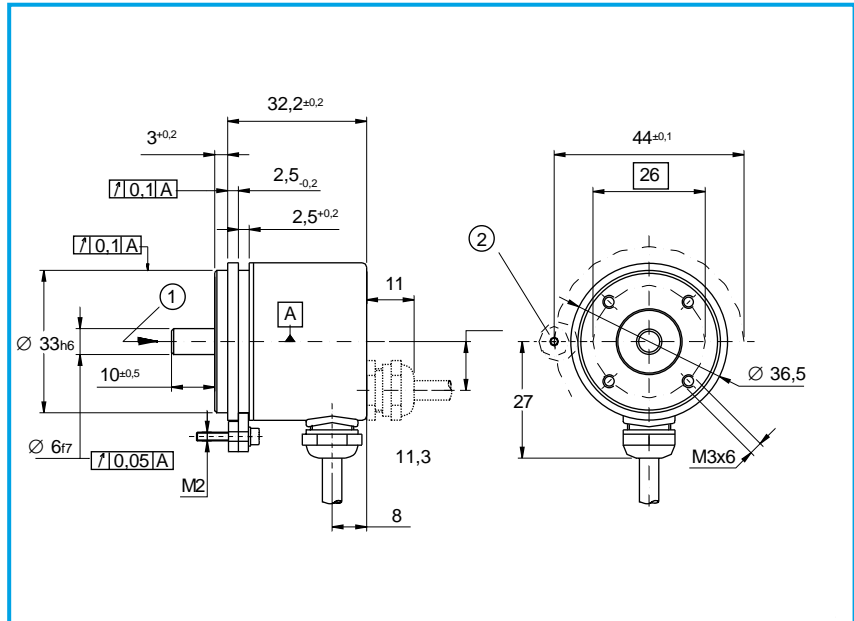
36	100	200	250	360	400	500	1000	1024
1250	1440	1500	2000	2048	2500	3600	4096	others upon request

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Dimensions (mm)

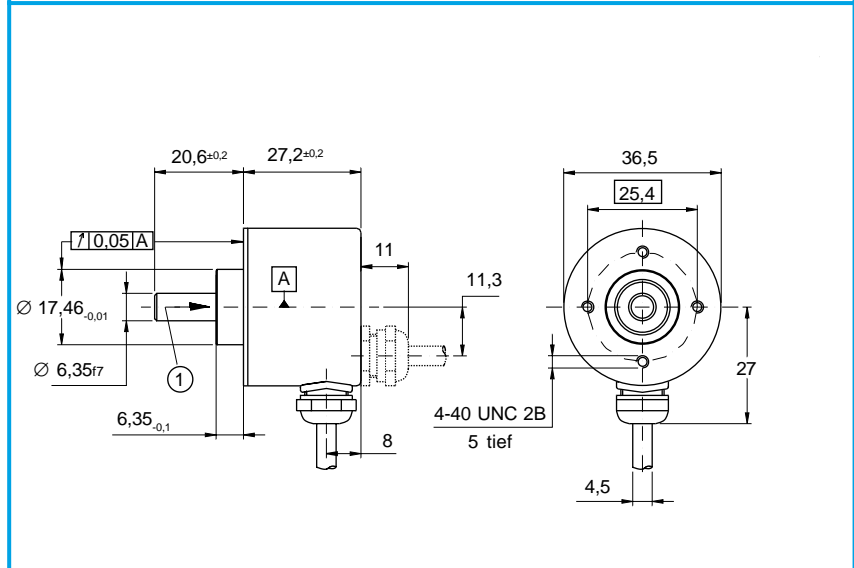
G 36 S

- optional: sealed bearing
- cable output: radial or axial
- cable with PG or connector
- optional: square flange receptacle
- ② optional: servo clamps



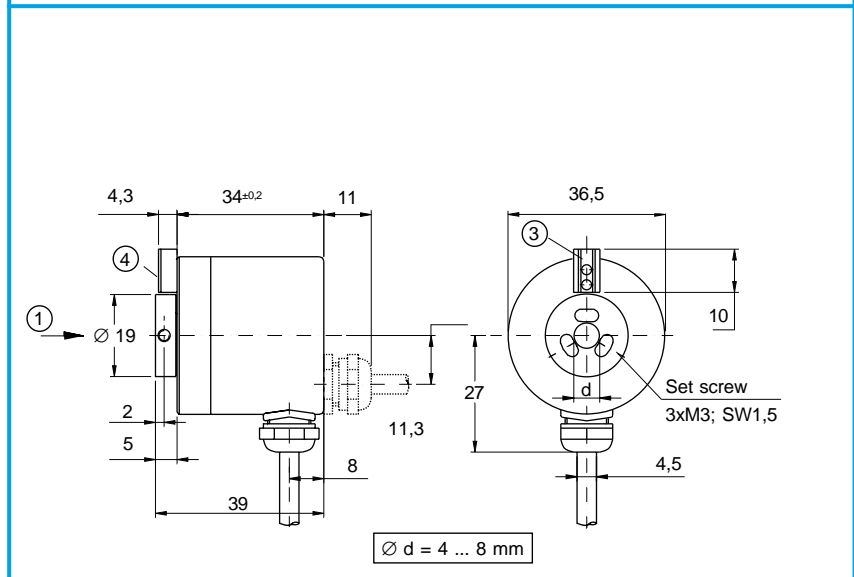
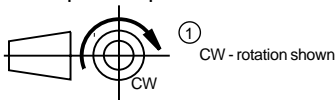
G 36 L

- optional: sealed bearing
- cable output: radial or axial
- cable with PG or connector
- optional: square flange receptacle



G 36 W

- hollow shaft type (blind hole)
- optional: hollow through shaft for QI
- cable output: radial or axial
- cable with PG or connector
- axial backlash (shaft): max. ± 0,5 mm
- ③ coupling pin 3m6 x 10 included
- ④ other torque coupling designs: upon request



Electrical Data

G36	Type S	Type L	Type W
Supply voltage	5 V: LD, SI 5 V o. 8 ... 30 V: IX, TL, OC, QI 8 ... 15 V: KI 8 ... 30 V: KS	5 V: LD, SI 5 V o. 8 ... 30 V: IX, TL, OC, QI 8 ... 15 V: KI 8 ... 30 V: KS	5 V: LD, SI 5 V o. 8 ... 30 V: IX, TL, OC, QI 8 ... 15 V: KI 8 ... 30 V: KS
Current requirement (without load)	max. 100 mA: LD, IX, KS, KI, TL, OC, QI, SI	max. 100 mA: LD, IX, KS, KI, TL, OC, QI, SI	max. 100 mA: LD, IX, KS, KI, TL, OC, QI, SI
Output load	± 20 mA (RS422): LD, IX 40 mA: OC 50 mA: KS, KI 40 mA (3,3 kOhm): TL 8 mA (120 Ohm): SI 11µAss (1 kOhm): QI	± 20 mA (RS422): LD, IX 40 mA: OC 50 mA: KS, KI 40 mA (3,3 kOhm): TL 8 mA (120 Ohm): SI 11µAss (1 kOhm): QI	± 20 mA (RS422): LD, IX 40 mA: OC 50 mA: KS, KI 40 mA (3,3 kOhm): TL 8 mA (120 Ohm): SI 11µAss (1 kOhm): QI
Output frequency	0 ... 100 kHz: TL, OC 0 ... 160 kHz (-3dB): QI, SI 0 ... 300 kHz: LD, KS, KI 0 ... 400 kHz: IX	0 ... 100 kHz: TL, OC 0 ... 160 kHz (-3dB): QI, SI 0 ... 300 kHz: LD, KS, KI 0 ... 400 kHz: IX	0 ... 100 kHz: TL, OC 0 ... 160 kHz (-3dB): QI, SI 0 ... 300 kHz: LD, KS, KI 0 ... 400 kHz: IX
Cable length	max. 5 m: QI max. 30 m: TL, OC max. 50 m: KS, KI max. 100 m: LD, IX max. 150 m: SI	max. 5 m: QI max. 30 m: TL, OC max. 50 m: KS, KI max. 100 m: LD, IX max. 150 m: SI	max. 5 m: QI max. 30 m: TL, OC max. 50 m: KS, KI max. 100 m: LD, IX max. 150 m: SI
Interpolation	5-fold: IE; 10-fold: IM 25-fold: IO; 50-fold: IP	5-fold: IE; 10-fold: IM 25-fold: IO; 50-fold: IP	5-fold: IE; 10-fold: IM 25-fold: IO; 50-fold: IP
Zero index	5 = Z „high“ if A + B „high“ others upon request	5 = Z „high“ if A + B „high“ others upon request	5 = Z „high“ if A + B „high“ others upon request

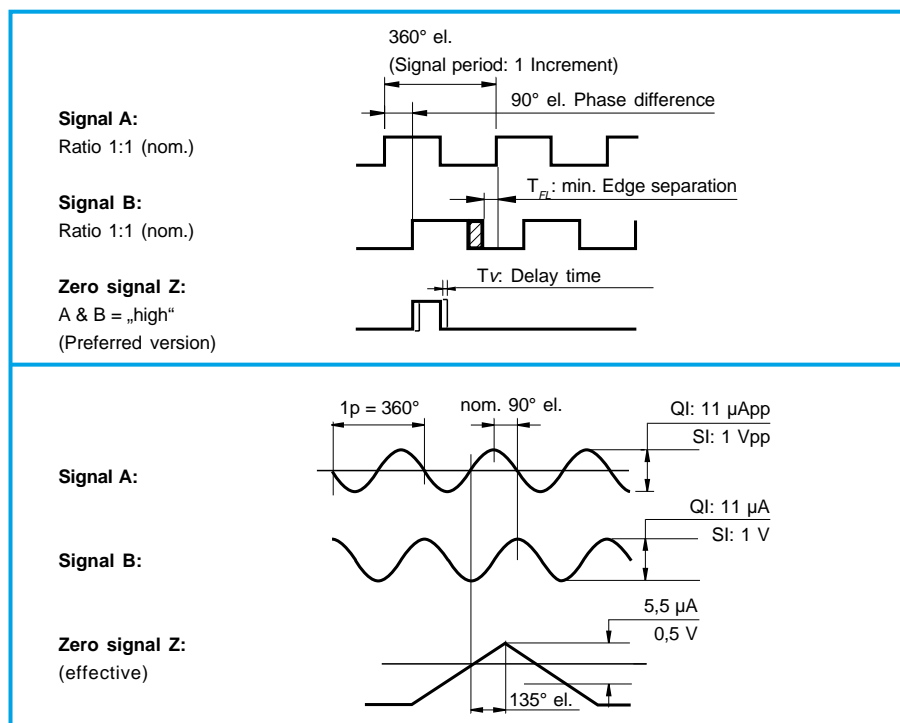
Output Signals

Version:

- LD = Line driver RS422
- IX = LD with interpolation
- PP = Push pull with short-circuit protection
- TL = TTL compatible
- OC = Open collector

Version:

- QI = 11 µApp at 1 kOhm load
- SI = 1 Vpp at 120 Ohm load

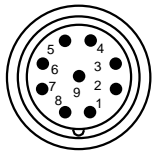


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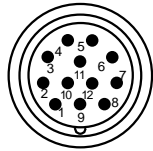
Connector-Terminal and Cable Designation

G 36	Output circuit			
	OC / TL / KS		LD / IX / KI	
Function / Signal	12-pin	cable Pur 10 x 0,14	12-pin	cable Pur 10 x 0,14
Signal A	5	brown	5	brown
Signal \bar{A}	-	-	6	green
Signal B	8	grey	8	grey
Signal \bar{B}	-	-	1	pink
Signal Z	3	red	3	red
Signal \bar{Z}	-	-	4	black
V _{CC}	12	blue	12	blue
V _{CC Sense}	2	violet	2	violet
0 Volts	10	white	10	white
0 Volts _{Sense}	11	yellow	11	yellow
Shield	9	white-blue	9	white-blue

G 36	Output circuit			
	QI		SI	
Function / Signal	9-pin	cable Pur 10 x 0,14	9-pin	cable Pur 10 x 0,14
Signal A +	1	green	5	brown
Signal A -	2	yellow	6	green
Signal B +	5	blue	8	grey
Signal B -	6	red	1	pink
Signal Z +	7	grey	3	red
Signal Z -	8	pink	4	black
V _{CC}	3	brown	12	blue
V _{CC Sense}	-	-	2	violet
0 Volts	4	white	10	white
0 Volts _{Sense}	-	-	11	yellow
Shield	9	white-blue	9	Case
External shield	-	Case		



Pin plug 9-pin:
Metal: RC-09P1N1280EF
Plastic: RC-09P2N12K0EF



Pin plug 12-pin:
Metal: RC-12P2N1280EF
Plastic: RC-12P1N12K0EF

Socket coupling for pin plug:
Metall: RC-09S2N1290EF
Kunststoff: RC-09S2N12M0EF

Socket coupling for pin plug:
Metall: RC-12S1N1290EF
Kunststoff: RC-12S1N12M0EF

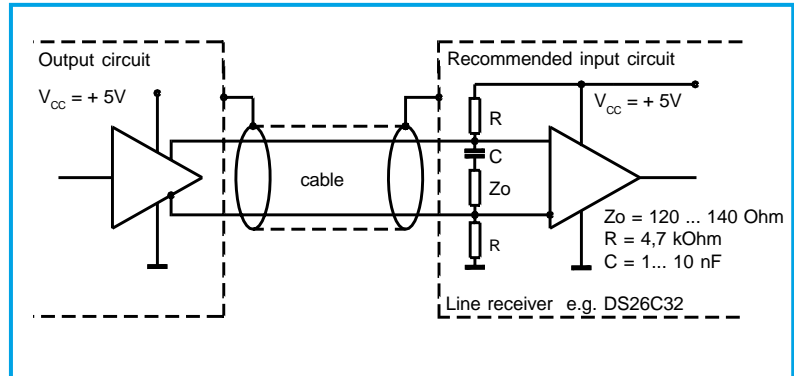
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Recommended input circuitry of subsequent electronics LD and IX: Line driver RS 422 A

Operating voltage: $5\text{ V} \pm 5\%$
 Current requirement: max. 100 mA (without load)
 Output signals: A, \bar{A} , B, \bar{B} , Z, \bar{Z}
 Max. output frequency: 300 kHz for LD
 400 kHz for IX

Min. edge separation: $TFL \geq 0,25\ \mu\text{s}$ (400 kHz)
 Level (RS422): $VH \geq 2,5\text{ V}$ ($IH = -20\text{ mA}$)
 $VL \leq 0,5\text{ V}$ ($IL = 20\text{ mA}$)

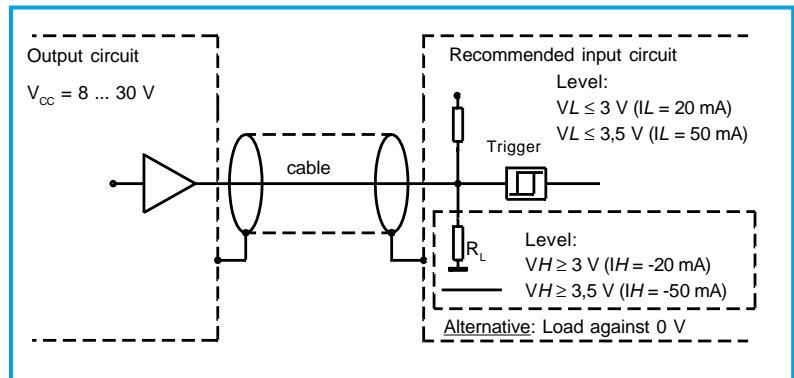
Max. current load cap.: $I_{max} = \pm 20\text{ mA}$ per output
 Delay time: $TV \leq 50\text{ ns}$
 Switching times: rise / fall times: $\leq 100\text{ ns}$
 Cable length: max. 100 m
 Operating temperature: $-25\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}$



KS: Push pull output with short-circuit protection

Operating voltage: 8 ... 30 V
 Current requirement: max. 100 mA (without load)
 Output signals: A, B, Z
 max. output frequency: 300 kHz

Min. edge separation: $TFL \geq 0,9\ \mu\text{s}$ (400 kHz)
 Max. current load cap.: $I_{max} = 50\text{ mA}$ per output
 Delay time: $TV \leq 400\text{ ns}$
 Switching times: rise / fall times: $\leq 350\text{ ns}$
 (1 m cable and $I_{out} = 50\text{ mA}$)
 Cable length: max. 50 m
 Operating temperature: $-25\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}$

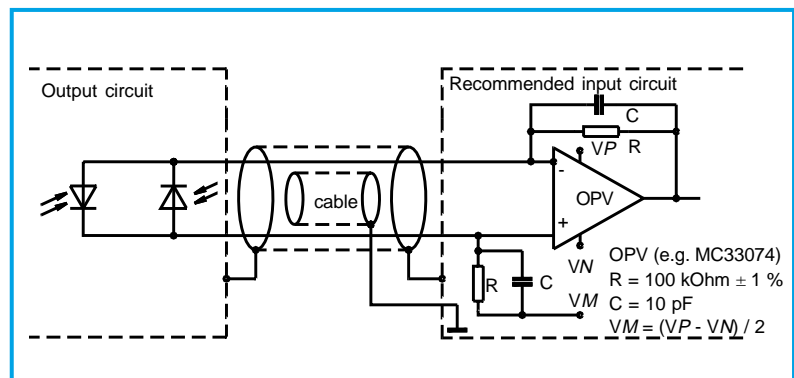


QI: Current interface 11 μApp

Operating voltage: $5\text{ V} \pm 5\%$ or 8 ... 30 V
 Current requirement: max. 100 mA
 Output signals: A+, A-, B+, B-, Z+, Z-
 Limit frequency (-3dB): max. 160 kHz

Signal level at a load of 1 kOhm: track signals:
 A, B $\geq 11\ \mu\text{App}$ (7 ... 16 μApp)
 index signal (effective signal):
 Z $\geq 5,5\ \mu\text{A}$ (2 ... 8,5 μA)

Cable length: max. 5 m
 Operating temperature: $-25\text{ }^\circ\text{C} \dots +70\text{ }^\circ\text{C}$

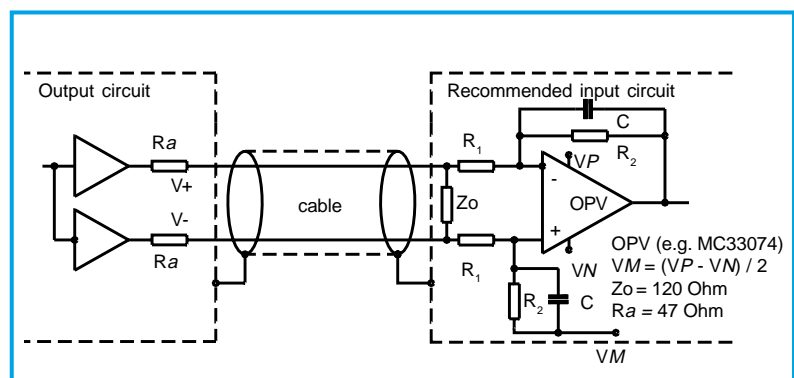


SI: Voltage interface 1 Vpp

Operating voltage: $5\text{ V} \pm 5\%$
 Current requirement: max. 100 mA
 Output signals: A+, A-, B+, B-, Z+, Z-
 Limit frequency (-3dB): max. 160 kHz

Signal level at a load of $Z_o = 120\ \text{Ohm}$: track signals:
 A, B $\sim 1\text{ Vpp}$ (0,8 ... 1,2 Vpp)
 index signal (effective signal):
 Z $\sim 0,5\text{ V}$ (0,2 ... 0,85 V)

Cable length: max. 150 m
 Operating temperature: $-25\text{ }^\circ\text{C} \dots +85\text{ }^\circ\text{C}$



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Ordering Information	G	36	X	X	XX XX	XXXX	-	X X X	-	XX
	G	36	3	4	5.1 5.2	6	-	7 8 9	-	10
G	Incremental Rotary Encoder									
36	Model series									
3	Mechanical specification S = Type S shaft and servo flange L = Type L shaft and clamping flange W = Type W hollow shaft (blind hole)									
4	Shaft or hollow shaft configuration R = 4 mm W = 5 mm for G36W S = 6 mm Standard for G36S and G36W N = 6,35 mm Standard for G36L T = 8 mm for G36W others upon request									
5.1	Output circuit LD = Line driver; RS422 IX = LD with Interpolation KS = Push pull with short-circuit protection TL = TTL-compatible OC = Open collector QI = Current interface 11 µApp at 1 kOhm load SI = Voltage interface 1 Vpp at 120 Ohm load									
5.2	Output channels BI = channel A and B IN = channel B only others upon request									
6	Line counts 36 100 200 250 360 400 500 1000 1024 1250 1440 1500 2000 2048 2500 3600 4096 others upon request									
7	Zero index Z 5 = Z „high“ if A + B „high“ others upon request									
8	Flange Type S: 2 = servo 5 = servo + sealed bearing Type L and Type W: 3 = round 5 = round + sealed bearing									
9	Connector or cable output 2 = cable axial (with PG) 3 = cable radial (with PG) 4 = cable radial with connector 5 = cable axial with connector others upon request									
10	Supply voltage 05 = 5 Volts 24 = 8 ... 30 Volts									

LTN Servotechnik GmbH
 Georg-Hardt-Straße 4
 D-83624 Otterfing
 Germany
 Tel: +49 - 08024 - 60 80 - 0
 Fax: +49 - 08024 - 60 80 - 100
 E-Mail: LTN@LTN.de
 Internet: www.LTN.de