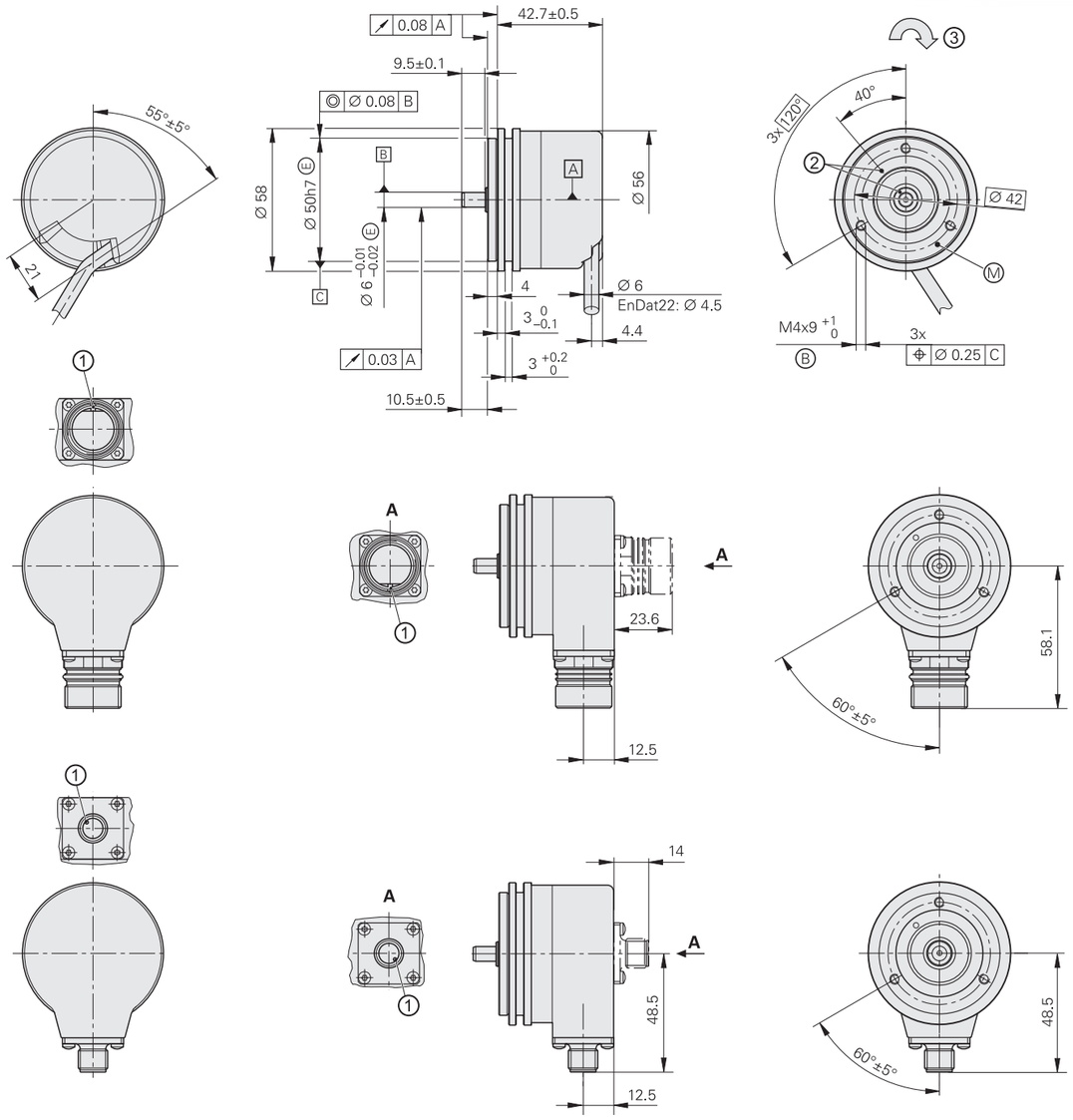
ROC/ROQ/ROD 400 series

Absolute and incremental rotary encoders
- **Synchro flange**
- **Solid shaft for separate shaft coupling**



mm
Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

Radial cable (can also be used axially)
A = Bearing
B = Fastening thread
M = Measuring point for operating temperature
1 = Connector coding
2 = ROD reference mark position on shaft and flange ±30°
3 = Direction of shaft rotation for output signals as per the interface description

	Incremental			
	ROD 426	**ROD 466**	**ROD 436**	**ROD 486**
Interface	TTL		HTL	1 V_{PP} [1]
Line counts*	50 100 150 200 250 360 **500** 512 720			–
	1000 1024 1250 1500 1800 **2000 2048 2500 3600 4096 5000**			
	6000 [2] 8192 [2] 9000 [2] 10000 [2]		–	
Reference mark	One			
Cutoff frequency –3 dB Scanning frequency Edge separation *a*	– ≤ 300 kHz/≤ 150 kHz [2] ≥ 0.39 µs/≥ 0.25 µs [2]			≥ 180 kHz – –
System accuracy	1/20 of grating period			
Electrical connection*	• **M23 flange socket**, radial and axial • **Cable (1 m/**5 m) with or **without M23 coupling**			
Supply voltage	DC 5 V ±0.5 V	DC 10 V to 30 V	DC 10 V to 30 V	DC 5 V ±0.5 V
Current consumption without load	≤ 120 mA	≤ 100 mA	≤ 150 mA	≤ 120 mA
Shaft	Solid shaft Ø 6 mm			
Mech. permiss. shaft speed *n*	≤ 16000 rpm			
Starting torque (typical)	0.01 Nm (at 20 °C)			
Moment of inertia of rotor	≤ 2.7 · 10^{-6} kgm^2			
Shaft load [3]	*Axial:* ≤ 40 N; *radial:* ≤ 60 N at shaft end			
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 300 m/s^2 (EN 60068-2-6) ≤ 2000 m/s^2 (EN 60068-2-27)			
Max. operating temp. [4]	100 °C	70 °C	100 °C [5]	
Min. operating temp.	*Flange socket or fixed cable:* –40 °C; *moving cable:* –10 °C			
Protection EN 60529	IP67 at housing; IP64 at shaft inlet (IP66 upon request)			
Mass	≈ 0.3 kg			
Valid for ID	376846-xx	376866-xx	376836-xx	376886-xx [6]

Bold: This preferred version is available on short notice.
* Please select when ordering
1) Limited tolerances: signal amplitude: 0.8 V_{PP} to 1.2 V_{PP}
2) Signal periods; they are generated via 2-fold interpolation (TTL x 2)
3) See also *Mechanical design types and mounting*
4) For the relationship of operating temperature to shaft speed and supply voltage, see *General mechanical information*
5) 80 °C for ROD 486 with 4096 or 5000 lines
6) Available with mechanical fault exclusion; for deviating specifications and special mounting information, see the *Fault Exclusion* Customer Information document

	Absolute					
	Singleturn			**Multiturn**		
	ROC 425 Functional Safety	**ROC 413**		**ROQ 437** Functional Safety	**ROQ 425**	
Interface*	EnDat 2.2	EnDat 2.2	SSI	EnDat 2.2	EnDat 2.2	SSI
Ordering designation	EnDat22	EnDat01	SSI39r1	EnDat22	EnDat01	SSI41r1
Positions per revolution	33554432 (25 bits)	8192 (13 bits)		33554432 (25 bits)	8192 (13 bits)	8192 (13 bits)
Revolutions	–			4096		
Code	Pure binary		Gray	Pure binary		Gray
Elec. permiss. shaft speed Deviations[1]	≤ 15000 rpm for continuous position value	*512 lines:* ≤ 5000/12000 rpm ±1 LSB/±100 LSB *2048 lines:* ≤ 1500/12000 rpm ±1 LSB/±50 LSB	12000 rpm ±12 LSB	≤ 15000 rpm for continuous position value	*512 lines:* ≤ 5000/10000 rpm ±1 LSB/±100 LSB *2048 lines:* ≤ 1500/10000 rpm ±1 LSB/±50 LSB	12000 rpm ±12 LSB
Calculation time t_{cal} Clock frequency	≤ 7 µs ≤ 8 MHz	≤ 9 µs ≤ 2 MHz	≤ 5 µs –	≤ 7 µs ≤ 8 MHz	≤ 9 µs ≤ 2 MHz	≤ 5 µs –
Incremental signals	Without	~ 1 V_{PP}[2]		Without	~ 1 V_{PP}[2]	
Line counts*	–	**512** 2048	512	–	**512** 2048	512
Cutoff frequency –3 dB	–	*512 lines:* ≥ 130 kHz; *2048 Str.:* ≥ 400 kHz		–	*512 lines:* ≥ 130 kHz; *2048 lines:* ≥ 400 kHz	
System accuracy	±20“	*512 lines:* ±60“; *2048 lines:* ±20“		±20“	*512 lines:* ±60“; *2048 lines:* ±20“	
Electrical connection*	• **M12 flange socket**, radial • Cable (1 m) with M12 coupling	• **M23 flange socket**, axial or radial • Cable (1 m/5 m) with or without M23 coupling		• **M12 flange socket**, radial • Cable (1 m) with M12 coupling	• **M23 flange socket**, axial or radial • Cable (1 m/5 m) with or without M23 coupling	
Supply voltage	DC 3.6 V to 14 V	DC 3.6 V to 14 V	DC 4.75 V to 30 V	DC 3.6 V to 14 V	DC 3.6 V to 14 V	DC 4.75 V to 30 V
Power consumption (max.)	*3.6 V:* ≤ 0.6 W *14 V:* ≤ 0.7 W		*5 V:* ≤ 0.8 W *10 V:* ≤ 0.65 W *30 V:* ≤ 1 W	*3.6 V:* ≤ 0.7 W *14 V:* ≤ 0.8 W		*5 V:* ≤ 0.95 W *10 V:* ≤ 0.75 W *30 V:* ≤ 1.1 W
Current consumption (typical, without load)	*5 V:* 85 mA		*5 V:* 90 mA *24 V:* 24 mA	*5 V:* 105 mA		*5 V:* 120 mA *24 V:* 28 mA
Shaft	Solid shaft ∅ 6 mm					
Mech. permiss. shaft speed *n*	≤ 15000 rpm			≤ 12000 rpm		
Starting torque (typical)	0.01 Nm (at 20 °C)					
Moment of inertia of rotor	≤ 2.7 · 10^{-6} kgm^2					
Shaft load	*Axial:* ≤ 40 N; *radial:* ≤ 60 N at shaft end (see also *Mechanical design types and mounting)*					
Vibration 55 Hz to 2000 Hz **Shock** 6 ms	≤ 300 m/s^2 (EN 60068-2-6) *ROC/ROQ:* ≤ 2000 m/s^2; *RIC/RIQ:* ≤ 1000 m/s^2 (EN 60068-2-27)					
Max. operating temp.[3]	100 °C					
Min. operating temp.	*Flange socket or fixed cable:* –40 °C; *moving cable:* –10 °C					
Protection EN 60529	IP67 at housing; IP64 at shaft inlet (IP66 upon request)					
Mass	≈ 0.35 kg					
Valid for ID	683639-xx[4] / 1322268-xx[4] [5]	1109254-xx	1131750-xx / 1353113-xx[5]	683641-xx[4] / 1322273-xx[4][5]	1109256-xx	1131752-xx / 1353117-xx[5]

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***** Please select when ordering
1) Speed-dependent deviations between absolute value and incremental signal
2) Limited tolerances: signal amplitude: 0.8 V_{PP} to 1.2 V_{PP}
3) For the relationship of operating temperature to shaft speed and supply voltage, see *General mechanical information*
4) Also available with functional safety; for dimensions and specifications, see Product Information document
5) Successor variants