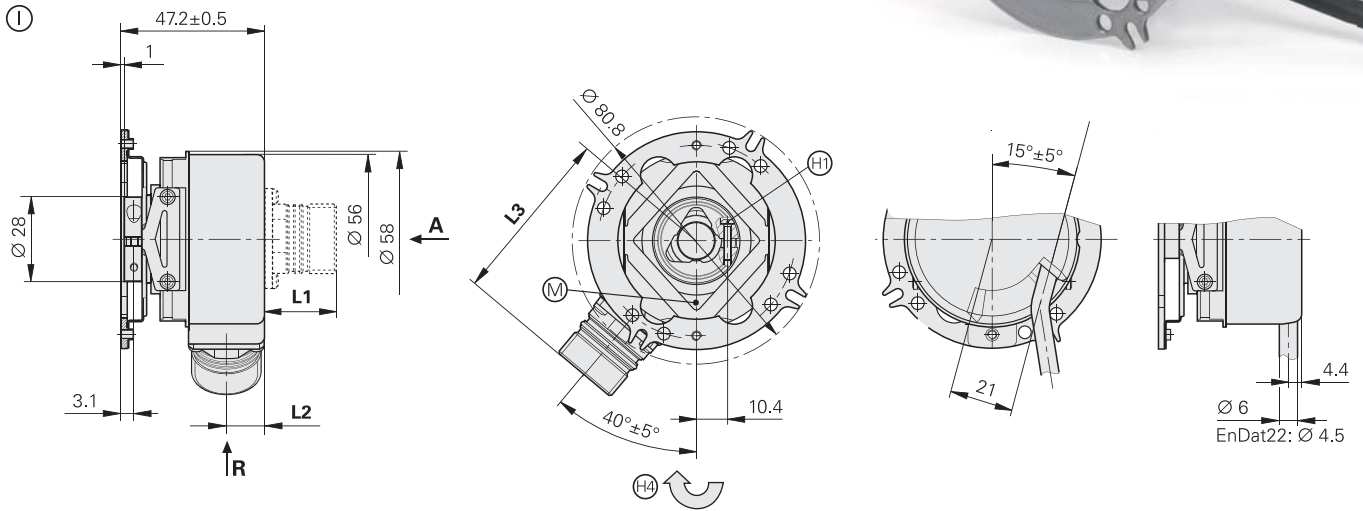


ECN/EQN/ERN 400 Series

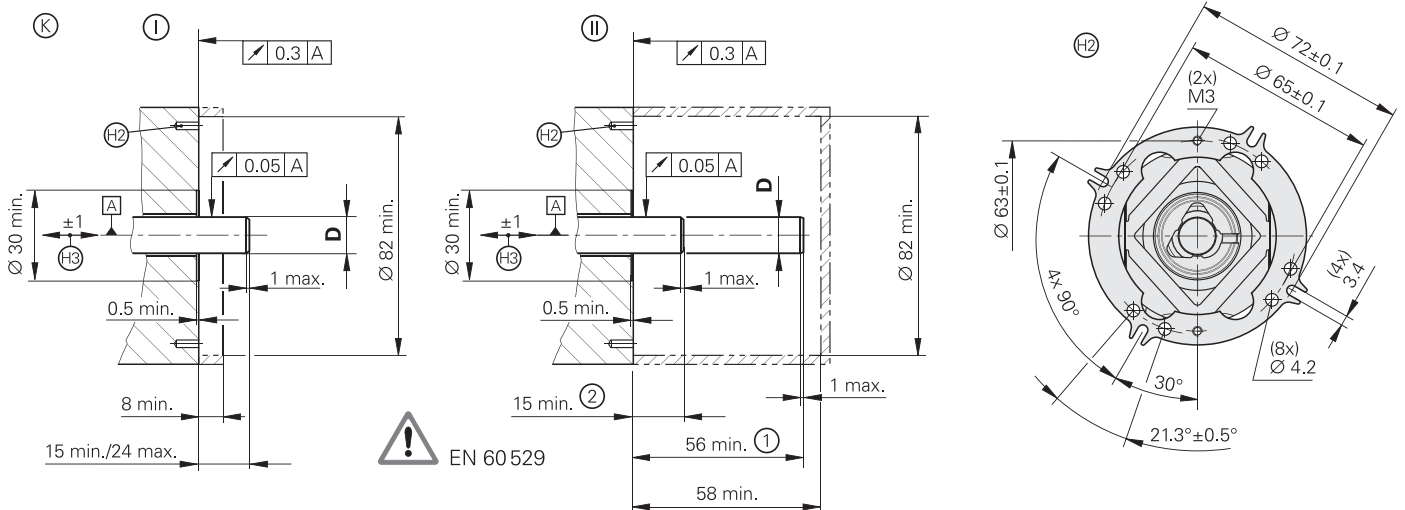
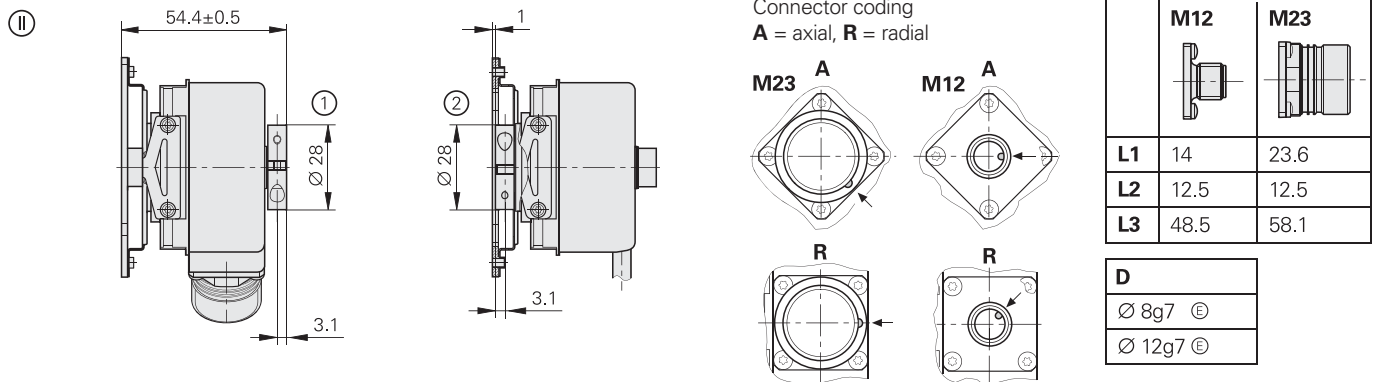
- Rotary encoders with mounted universal stator coupling
- Blind hollow shaft or hollow through shaft



Blind hollow shaft



Hollow through shaft



mm

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

- Cable radial, also usable axially
- $\text{\textcircled{A}}$ = Bearing of mating shaft
- $\text{\textcircled{C}}$ = Required mating dimensions
- $\text{\textcircled{M}}$ = Measuring point for operating temperature
- $\text{\textcircled{H}}$ = Clamping screw with X8 hexalobular socket
- $\text{\textcircled{H}}$ = Hole circle for fastening, see coupling
- $\text{\textcircled{E}}$ = Compensation of mounting tolerances and thermal expansion, no dynamic motion permitted
- $\text{\textcircled{H}}$ = Direction of shaft rotation for output signals as per the interface description
- $\text{\textcircled{I}}$ = Clamping ring on housing side (condition upon delivery)
- $\text{\textcircled{II}}$ = Clamping ring on coupling side (optionally mountable)

	Incremental			
	ERN 420	ERN 460	ERN 430	ERN 480
Incremental signals	□□ TTL		□□ HTL	~ 1 V _{PP} ¹⁾
Line counts*	250 500			–
	1000 1024 1250 2000 2048 2500 3600 4096 5000			
Reference mark	One			
Cutoff frequency –3 dB	–			≥ 180 kHz
Scanning frequency	≤ 300 kHz			–
Edge separation a	≥ 0.39 μs			–
System accuracy	1/20 of grating period			
Power supply	5 V DC ± 10 %	10 to 30 V DC	10 to 30 V DC	5 V DC ± 10 %
Current consumption without load	120 mA	100 mA	150 mA	120 mA
Electrical connection*	<ul style="list-style-type: none"> • Flange socket M23, radial and axial (with blind hollow shaft) • Cable 1 m, without connecting element 			
Shaft*	Blind hollow shaft or hollow through shaft; D = 8 mm or D = 12 mm			
Mech. perm. speed n²⁾	≤ 6000 min ⁻¹ /≤ 12000 min ⁻¹ ³⁾			
Starting torque	At 20 °C	Blind hollow shaft: ≤ 0.01 Nm Hollow through shaft: ≤ 0.025 Nm		
	Below –20 °C	≤ 1 Nm		
Moment of inertia of rotor	≤ 4.3 · 10 ⁻⁶ kgm ²			
Permissible axial motion of measured shaft	± 1 mm			
Vibration 55 Hz to 2000 Hz	≤ 300 m/s ² ; flange socket version: 150 m/s ² (EN 60068-2-6)			
Shock 6 ms/2 ms	≤ 1000 m/s ² /≤ 2000 m/s ² (EN 60068-2-27)			
Max. operating temp.²⁾	100 °C	70 °C	100 °C ⁴⁾	
Min. operating temp.	Flange socket or fixed cable: –40 °C Moving cable: –10 °C			
Protection EN 60529	At housing: IP 67 (IP 66 for hollow through shaft) At shaft inlet: IP 64 (IP 66 upon request)			
Weight	Approx. 0.3 kg			

Bold: These preferred versions are available on short notice

* Please select when ordering

¹⁾ Restricted tolerances: Signal amplitude 0.8 to 1.2 V_{PP}

²⁾ For the correlation between the operating temperature and the shaft speed or supply voltage, see *General Mechanical Information*

³⁾ With two shaft clamps (only for hollow through shaft)

⁴⁾ 80° for ERN 480 with 4096 or 5000 lines



Absolute			
Singleturn			
	ECN 425	ECN 413	ECN 413
Absolute position values*	EnDat 2.2	EnDat 2.2	SSI
Ordering designation	EnDat 22	EnDat 01	SSI 39r1
Positions per revolution	33554432 (25 bits)	8192 (13 bits)	
Revolutions	–		
Code	Pure binary		Gray
Elec. permissible speed Deviations ¹⁾	≤ 12000 min ⁻¹ for continuous position value	<i>512 lines:</i> ≤ 5000/12000 min ⁻¹ ± 1 LSB/± 100 LSB <i>2048 lines:</i> ≤ 1500/12000 min ⁻¹ ± 1 LSB/± 50 LSB	≤ 12000 min ⁻¹ ± 12 LSB
Calculation time t _{cal}	≤ 7 μs	≤ 9 μs	≤ 5 μs
Incremental signals	Without	~ 1 V _{PP} ²⁾	
Line counts*	–	512 2048	512
Cutoff frequency –3 dB	–	<i>512 lines:</i> ≥ 130 kHz; <i>2048 lines:</i> ≥ 400 kHz	
Scanning frequency	–	–	
Edge separation a	–	–	
System accuracy	± 20"	<i>512 lines:</i> ± 60"; <i>2048 lines:</i> ± 20"	
Power supply*	3.6 to 14 V DC	3.6 to 14 V DC	5 V DC ± 5 % or 10 to 30 V DC
Power consumption (maximum)	<i>3.6 V:</i> ≤ 600 mW <i>14 V:</i> ≤ 700 mW	<i>5 V:</i> ≤ 800 mW <i>10 V:</i> ≤ 650 mW <i>30 V:</i> ≤ 1000 mW	
Current consumption (typical; without load)	<i>5 V:</i> 85 mA	<i>5 V:</i> 90 mA <i>24 V:</i> 24 mA	
Electrical connection*	<ul style="list-style-type: none"> • Flange socket M12, radial • Cable 1 m, with M12 coupling 	<ul style="list-style-type: none"> • Flange socket M23, radial • Cable 1 m, with M23 coupling or without connecting element 	
Shaft*	Blind hollow shaft or hollow through shaft; D = 8 mm or D = 12 mm		
Mech. perm. speed n³⁾	≤ 6000 min ⁻¹ /≤ 12000 min ⁻¹ ⁴⁾		
Starting torque	At 20 °C Below –20 °C	<i>Blind hollow shaft:</i> ≤ 0.01 Nm <i>Hollow through shaft:</i> ≤ 0.025 Nm ≤ 1 Nm	
Moment of inertia of rotor	≤ 4.3 · 10 ⁻⁶ kgm ²		
Permissible axial motion of measured shaft	± 1 mm		
Vibration 55 Hz to 2000 Hz Shock 6 ms/2 ms	≤ 300 m/s ² ; <i>flange socket version:</i> 150 m/s ² (EN 60068-2-6) ≤ 1000 m/s ² /≤ 2000 m/s ² (EN 60068-2-27)		
Max. operating temp. ³⁾	100 °C		
Min. operating temp.	<i>Flange socket or fixed cable:</i> –40 °C <i>Moving cable:</i> –10 °C		
Protection EN 60529	IP 67 at housing, IP 64 at shaft end (IP 66 available on request)		
Weight	Approx. 0.3 kg		

Bold: These preferred versions are available on short notice

* Please select when ordering

¹⁾ Velocity-dependent deviations between the absolute value and incremental signal

Multitum		
EQN 437	EQN 425	EQN 425
EnDat 2.2	EnDat 2.2	SSI
EnDat 22	EnDat 01	SSI 41r1
33 554 432 (25 bits)	8 192 (13 bits)	
4 096		
Pure binary		Gray
$\leq 12\,000 \text{ min}^{-1}$ for continuous position value	<i>512 lines:</i> $\leq 5\,000/10\,000 \text{ min}^{-1}$ $\pm 1 \text{ LSB}/\pm 100 \text{ LSB}$ <i>2048 lines:</i> $\leq 1\,500/10\,000 \text{ min}^{-1}$ $\pm 1 \text{ LSB}/\pm 50 \text{ LSB}$	$\leq 12\,000 \text{ min}^{-1}$ $\pm 12 \text{ LSB}$
$\leq 7 \mu\text{s}$	$\leq 9 \mu\text{s}$	$\leq 5 \mu\text{s}$
Without	$\sim 1 V_{PP}^{2)}$	
–	512 2048	512
–	<i>512 lines:</i> $\geq 130 \text{ kHz}$; <i>2048 lines:</i> $\geq 400 \text{ kHz}$	
–	–	
–	–	
$\pm 20''$	<i>512 lines:</i> $\pm 60''$; <i>2048 lines:</i> $\pm 20''$	
3.6 to 14 V DC	3.6 to 14 V DC	5 V DC $\pm 5\%$ or 10 to 30 V DC
<i>3.6 V:</i> $\leq 700 \text{ mW}$ <i>14 V:</i> $\leq 800 \text{ mW}$		<i>5 V:</i> $\leq 950 \text{ mW}$ <i>10 V:</i> $\leq 750 \text{ mW}$ <i>30 V:</i> $\leq 1\,100 \text{ mW}$
5 V: 105 mA		5 V: 120 mA 24 V: 28 mA
<ul style="list-style-type: none"> • Flange socket M12, radial • Cable 1 m, with M12 coupling 	<ul style="list-style-type: none"> • Flange socket M23, radial • Cable 1 m, with M23 coupling or without connecting element 	

2) Restricted tolerances: Signal amplitude 0.8 to 1.2 V_{PP}

3) For the correlation between the operating temperature and the shaft speed or power supply, see *General Mechanical Information*

4) With 2 shaft clamps (only for hollow through shaft)

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