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Product Information

ECN 413

ECN 425

ERN 421

ERN 487

Rotary Encoders
for Drive Control
in Elevators

April 2006

ECN/EQN/ERN 400 Series

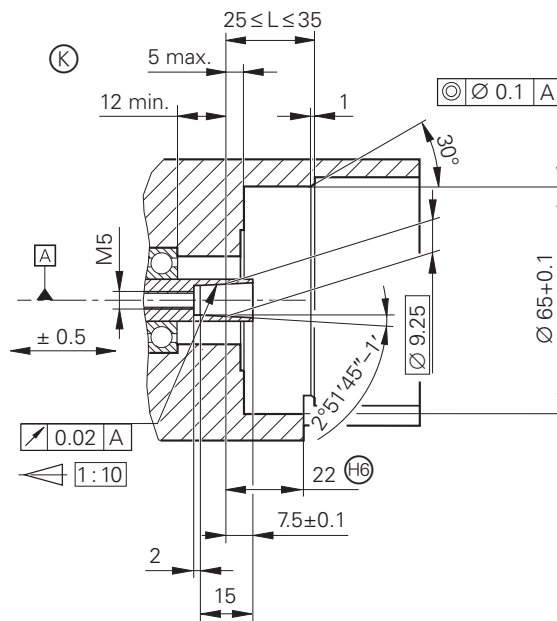
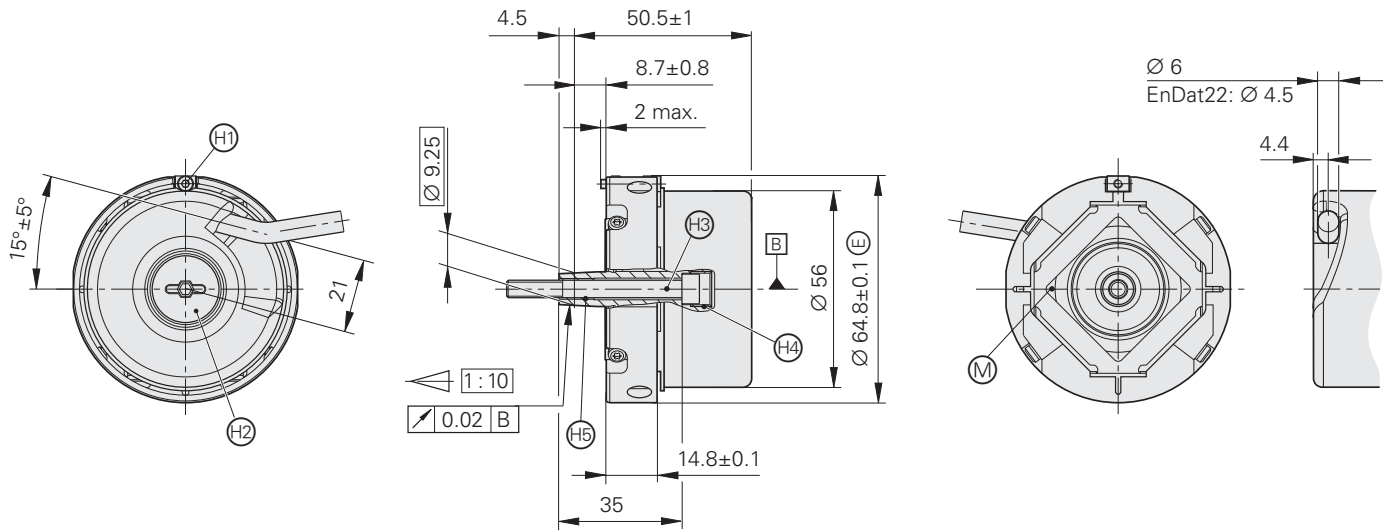
Rotary Encoders with Integral Bearings for Elevator Technology

- Easy mounting
- Rigid coupling
- Direct cable connection
- Uniform dimensions for various interfaces

Dimensions in mm



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



- Ⓐ = Bearing of mating shaft
- Ⓑ = Bearing of encoder
- Ⓚ = Required mating dimensions
- Ⓜ = Measuring point for operating temperature
- Ⓜ = Clamping screw for coupling ring – size 2
Tightening torque 1.25 Nm
- Ⓜ = Screw plug sizes 3 and 4
Tightening torque 5 +0.5 Nm
- Ⓜ = Self-tightening screw (with Tuflok coating)
M5 x 50 DIN 6912 size 4
Tightening torque 5+0.5 Nm
- Ⓜ = Back-off thread M10
- Ⓜ = Back-off thread M6
- Ⓜ = Encoder version with flange socket

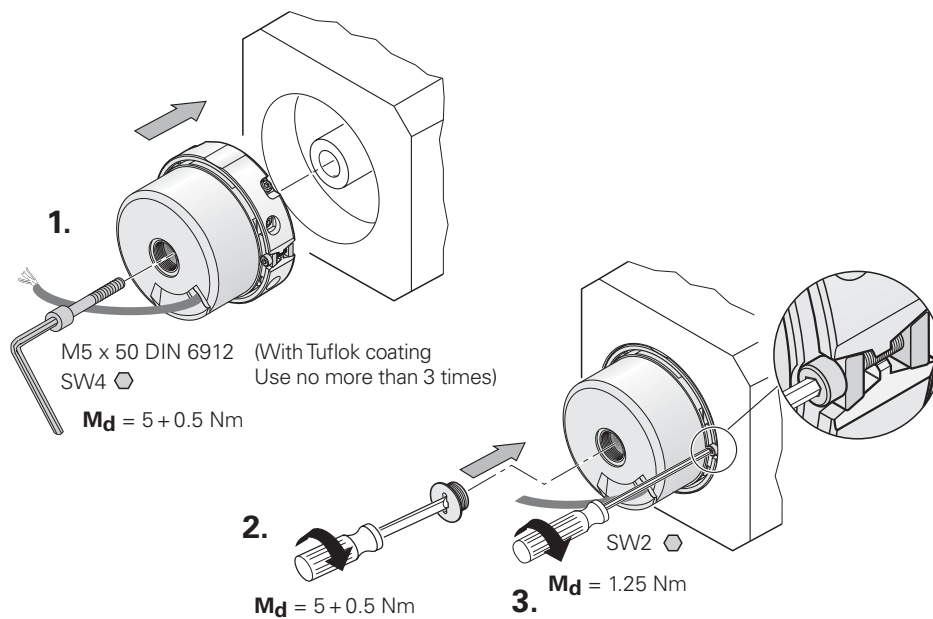
	Absolute		Incremental	
	ECN 425	ECN 413	ERN 487	ERN 421
Incremental signals	–	$\sim 1 V_{PP}$	$\sim 1 V_{PP}$	\square TTL
Line count*/ System accuracy	2048/± 20"	512/± 60" 2048/± 20"	2048/± 20"	1024/± 64" 2048/± 32" 4096/± 16"
Reference mark	–		One	
Cutoff frequency –3 dB	–	2048 lines: ≥ 200 kHz 512 lines: ≥ 100 kHz	≥ 210 kHz	–
Scanning frequency Edge separation	– –	–	–	≥ 300 kHz ≥ 0.35 μs
Absolute position values	EnDat 2.2		1 V _{PP}	–
Ordering designation	EnDat 22	EnDat 01	–	
Position values/rev	33554432 (25 bits)	8192 (13 bits)	Z1 track ¹⁾	–
Elec. permissible speed/ System accuracy	≤ 12000 rpm (for continuous position value)	512 lines: 5000 rpm/± 1 LSB 12000 rpm/± 100 LSB 2048 lines: 1500 rpm/± 1 LSB 12000 rpm/± 50 LSB	–	
Calculation time t _{cal}	≤ 5 μs	≤ 0.25 μs	–	
Power supply	3.6 to 5.25 V	5 V ± 5%	5 V ± 5%	5 V ± 10%
Current consumption without load	≤ 150 mA	≤ 160 mA	≤ 130 mA	≤ 120 mA
Electrical connection ²⁾	Cable 1 m/5 m with M12 coupling	Cable 1 m/5 m without coupling	Cable 1 m/5 m without coupling	
Shaft	Taper shaft Ø 9.25 mm; taper 1:10		Taper shaft Ø 9.25 mm; taper 1:10	
Mech. permissible speed n	≤ 12000 rpm		≤ 12000 rpm	
Starting torque at 20 °C	≤ 0.01 Nm		≤ 0.01 Nm	
Moment of inertia of rotor	2.6 · 10 ⁻⁶ kgm ²		2.6 · 10 ⁻⁶ kgm ²	
Permissible axis motion of measured shaft	± 0.5 mm		± 0.5 mm	
Max. operating temp.	100 °C		100 °C	
Min. operating temp.	–10 °C		–10 °C	
Protection IEC 60529	IP 64 when mounted		IP 64 when mounted	
Weight (approx.)	0.25 kg		0.25 kg	

* Please indicate when ordering

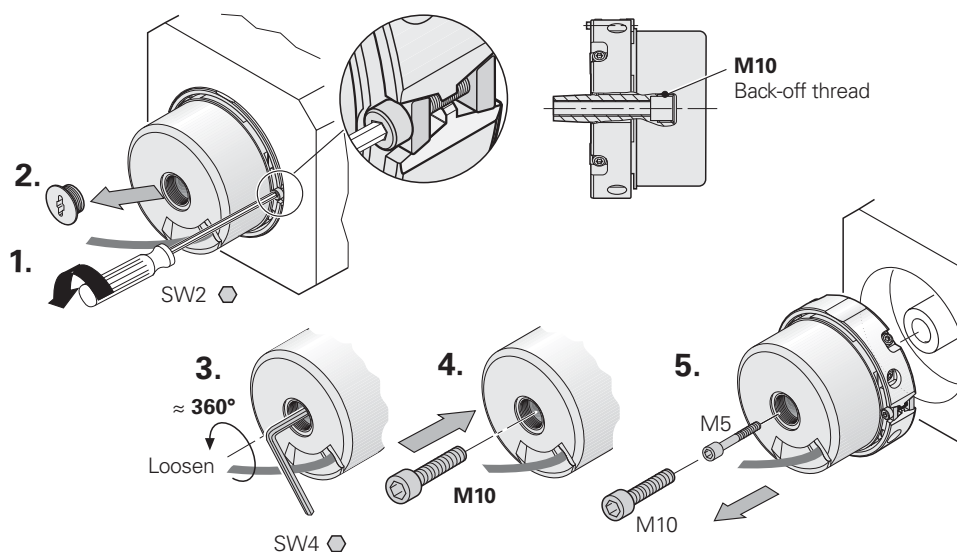
¹⁾ One sine and one cosine signal per revolution

²⁾ Other versions available on request

Mounting



Removal






M10 Tighten the screw only until the taper disconnects.

Electrical Connection

Pin Layouts

Pin layout for ECN 425


8-pin coupling M12								
	Power supply				Absolute position values			
	2	8	1	5	3	4	7	6
	U_P ¹⁾	U_P	$0V$ ¹⁾	$0V$	DATA	$\overline{\text{DATA}}$	CLOCK	$\overline{\text{CLOCK}}$
	Blue	Brown/Green	White	White/Green	Gray	Pink	Violet	Yellow

Shield on housing; U_P = power supply voltage

¹⁾ For power lines configured in parallel

Vacant pins or wires must not be used!

Pin layout for ECN 413


Power supply						Incremental signals				Absolute position values			
	U_P	Sensor U_P	$0V$	Sensor $0V$	Inside shield	A+	A-	B+	B-	DATA	$\overline{\text{DATA}}$	CLOCK	$\overline{\text{CLOCK}}$
	Brown/ Green	Blue	White/ Green	White	/	Green/ Black	Yellow/ Black	Blue/ Black	Red/ Black	Gray	Pink	Violet	Yellow


Shield on housing; U_P = power supply voltage

Sensor: The sensor line is connected internally with the corresponding power line.

Vacant pins or wires must not be used!


Pin layout for ERN 487

	Power supply					Incremental signals					
	U_P	Sensor U _P	0V	Sensor 0V	Inside shield	A+	A-	B+	B-	R+	R-
	Brown/ Green	Blue	White/ Green	White	/	Green/ Black	Yellow/ Black	Blue/ Black	Red/ Black	Red	Black

	Other signals			
	C+	C-	D+	D-
	Gray	Pink	Yellow	Violet

Shield on housing; **U_P** = power supply voltage
C, D = commutation signals for sinusoidal commutation
Sensor: The sensor line is connected internally with the corresponding power line.
 Vacant pins or wires must not be used!

Pin layout for ERN 421

	Power supply				Incremental signals						Other signals	
	U_P	Sensor U _P	0V	Sensor 0V	U_{a1}	\overline{U}_{a1}	U_{a2}	\overline{U}_{a2}	U_{a0}	\overline{U}_{a0}	\overline{U}_{aS}	Vacant
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Violet	Yellow

Shield on housing; **U_P** = power supply voltage
Sensor: The sensor line is connected internally with the corresponding power line.
 Vacant pins or wires must not be used!

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For more information

- Brochure: *Position Encoders for Servo Drives*
- *Rotary Encoders* catalog

