



HEIDENHAIN



Product Information

ECN 413

ECN 425

ERN 421

ERN 487

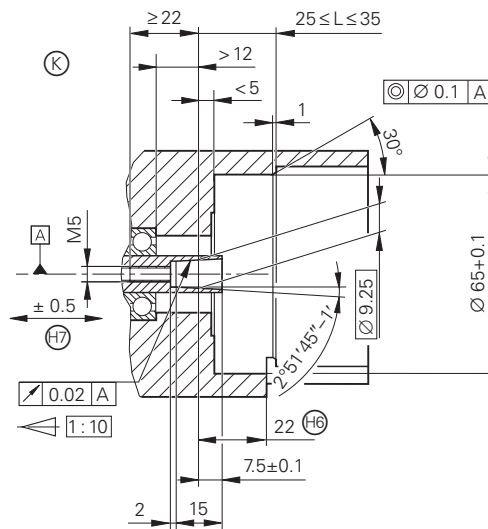
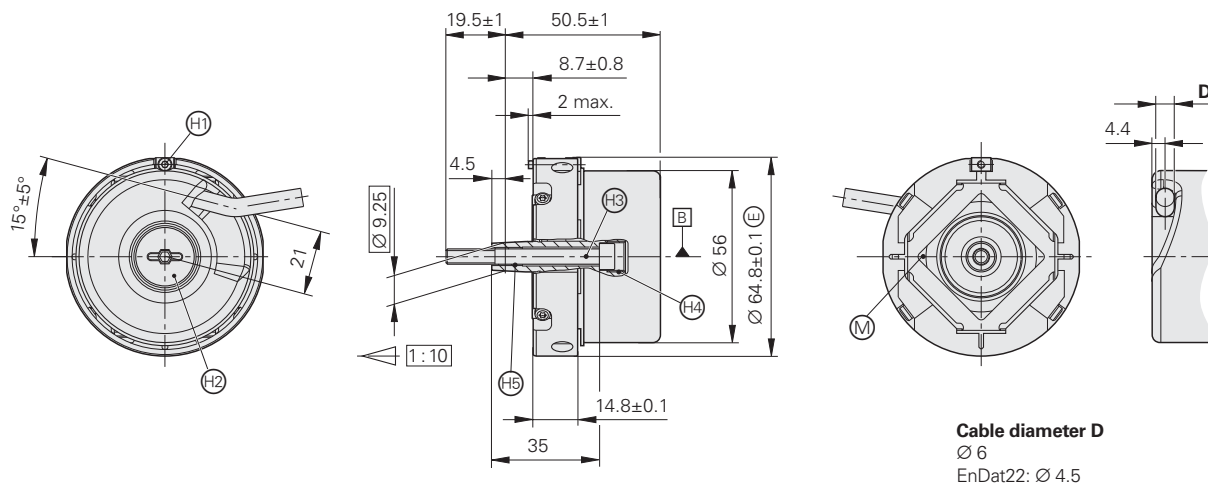
Rotary Encoders for
Drive Control in Elevators

October 2007

ECN/ERN 400 Series

Rotary Encoders with Integral Bearings for Elevator Technology

- Simple installation
- Rigid shaft 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 – width A/F 2, tightening torque 1.25 Nm–0.2 Nm
- Ⓕ = Screw plug width A/F 3 and 4, tightening torque 5 +0.5 Nm
- Ⓖ = Self-tightening screw (with Tuflok coating) M5 x 50 DIN 6912 width A/F 4, tightening torque 5+0.5 Nm
- Ⓖ = Back-off thread M10
- Ⓖ = Back-off thread M6
- Ⓖ = Encoder version with flange socket
- Ⓖ = Compensation of mounting tolerances and thermal expansion, not dynamic motion

	Absolute		Incremental	
	ECN 425	ECN 413	ERN 487	ERN 421
Incremental signals¹⁾	–	 1 V _{PP}	 1 V _{PP}	 TTL (max. 10000 signal periods)
Line count*/ System accuracy	2048/± 20"	512/± 60" 2048/± 20"	2048/± 20"	1024/± 64" 2048/± 32" 4096/± 16" 5000/± 13"
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 values¹⁾	EnDat 2.2		1 V _{PP}	–
Order designation	EnDat22	EnDat01	–	
Position values per rev	33554432 (25 bits)	8192 (13 bits)	Z1 track ³⁾	–
Elec. permissible speed/ deviation ²⁾	≤ 12000 min ^{–1} (for continuous position value)	512 lines: ≤ 5000 min ^{–1} /± 1 LSB ≤ 12000 min ^{–1} /± 100 LSB 2048 lines: ≤ 1500 min ^{–1} /± 1 LSB ≤ 12000 min ^{–1} /± 50 LSB	–	
Calculation time t _{cal}	≤ 5 µs		–	
Power supply	3.6 to 14 V		5 V ± 5%	5 V ± 10%
Current consumption without load	≤ 150 mA	≤ 160 mA	≤ 130 mA	≤ 120 mA
Electrical connection²⁾	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 min ^{–1}		≤ 12000 min ^{–1}	
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 axial motion of measured shaft⁴⁾	± 0.5 mm		± 0.5 mm	
Max. operating temperature	100 °C		100 °C	
Min. operating temperature	–10 °C		–10 °C	
Protection IEC 60529	IP 64 when mounted		IP 64 when mounted	
Weight	Approx. 0.25 kg		Approx. 0.25 kg	

* Please indicate when ordering

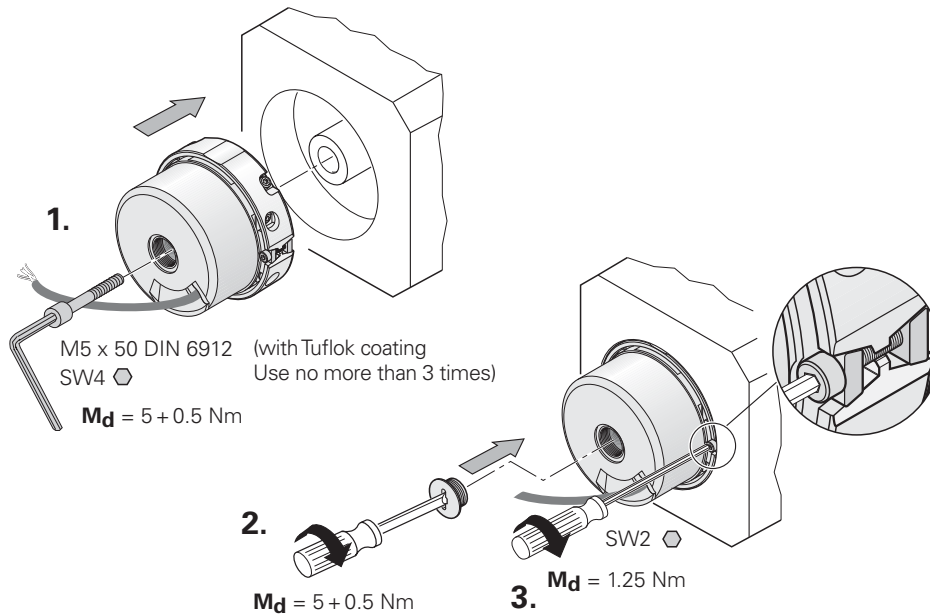
¹⁾ For signal description, see *Position Encoders for Servo Drives* catalog

²⁾ Velocity-dependent difference between the absolute and incremental signals

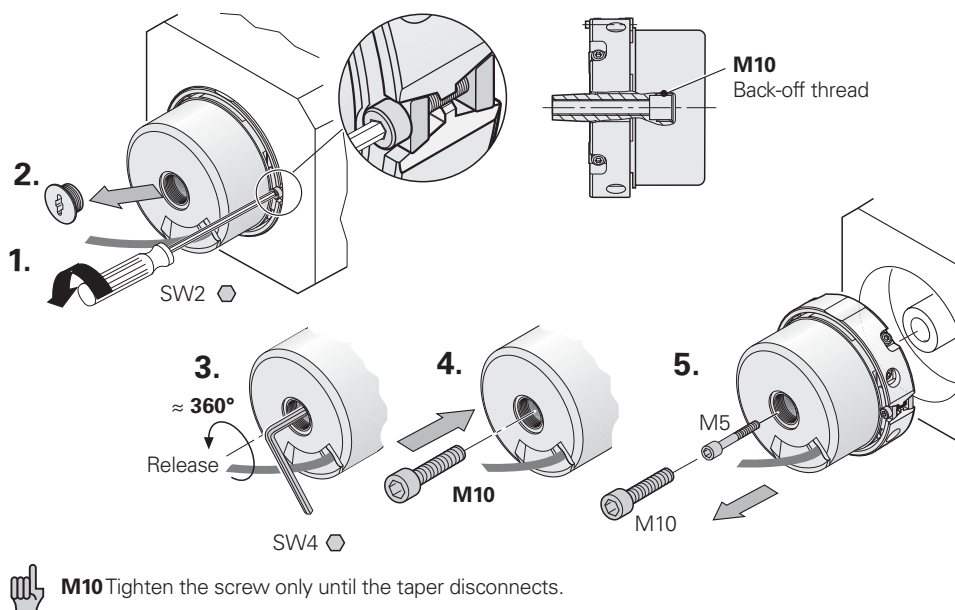
³⁾ One sine and one cosine signal per revolution

⁴⁾ Compensation of mounting tolerances and thermal expansion, not dynamic motion

Mounting



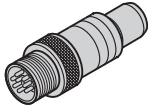
Dismounting



Electrical Connection

Pin Layouts

Pin layout for ECN 425

8-pin M12 coupling								
  			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 parallel supply lines

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					
	Up	Sensor Up	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; **Up** = 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	
	Up	Sensor Up	0V	Sensor 0V	Ua1	Ua1	Ua2	Ua2	Ua0	Ua0	UaS	Vacant
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Violet	Yellow

Shield on housing; **Up** = 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

