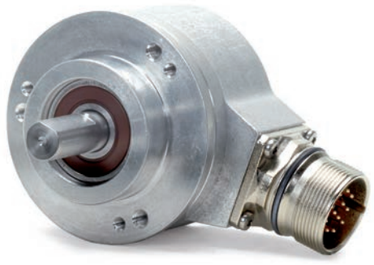
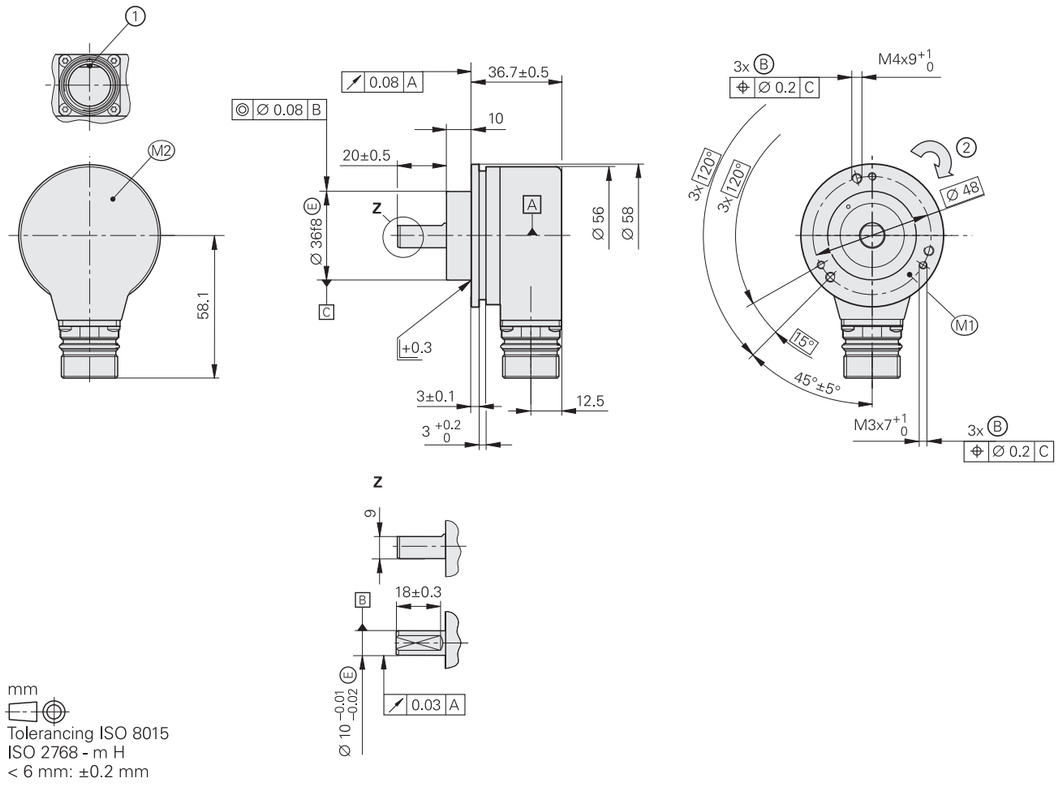
	Absolute					
	Singleturn			**Multiturn**		
	ROC 425 Functional Safety	**ROC 413**		**ROQ 437** Functional Safety	**ROQ 425**	
Interface*	EnDat 2.2	EnDat 2.2	SSI	EnDat 2.2	EnDat 2.2	SSI
Ordering designation	EnDat22	EnDat01	SSI39r1	EnDat22	EnDat01	SSI41r1
Positions per revolution	33554432 (25 bits)	8192 (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]

Bold: This preferred version is available on short notice.
***** 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

ROQ 425

Rotary encoder for absolute position values with solid shaft for separate shaft coupling
- **EnDat interface**
- **Additional incremental signals with TTL or HTL levels**





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

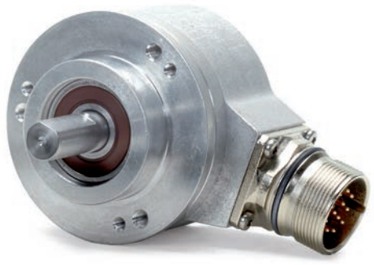
Ⓐ = Bearing
Ⓑ = Fastening thread
M1 = Measuring point for operating temperature
M2 = Measuring point for vibration, see also D 774714
1 = Connector coding
2 = Direction of shaft rotation for output signals as per the interface description

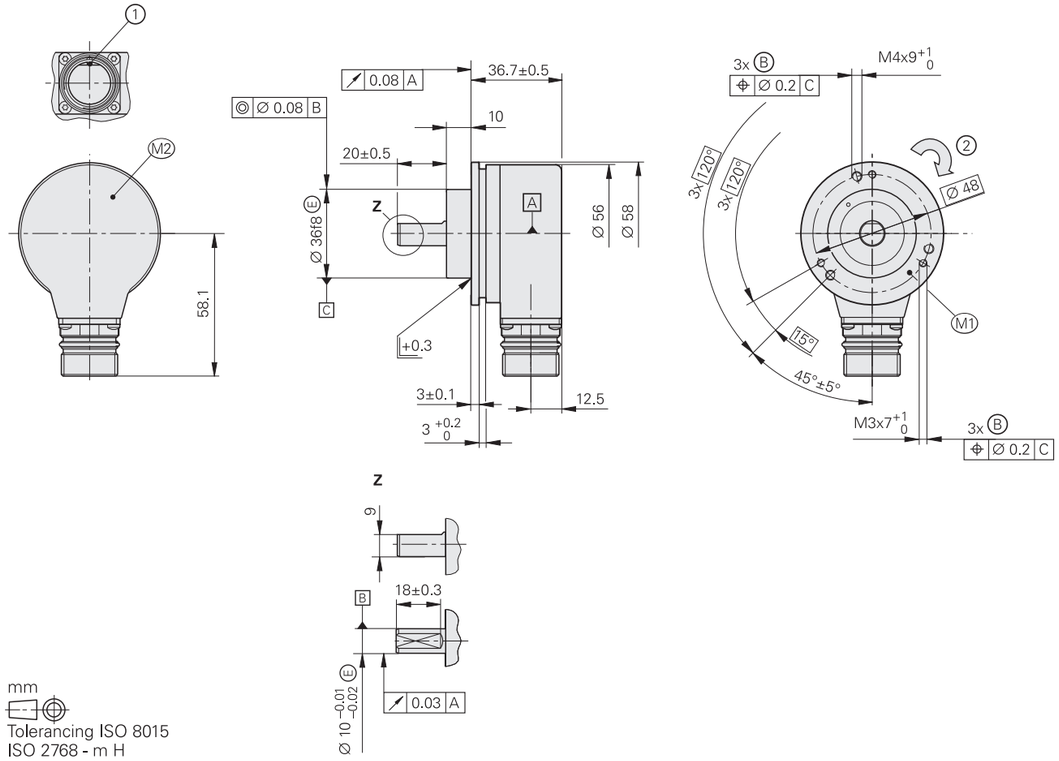
	Absolute **Multiturn** **ROQ 425**					
Interface	EnDat 2.2					
Ordering designation*	EnDatH			EnDatT		
Positions per revolution	8192 (13 bits)					
Revolutions	4096 (12 bits)					
Code	Pure binary					
Calculation time t_{cal} Clock frequency	≤ 9 µs ≤ 2 MHz					
Incremental signals	HTL			TTL		
Signal periods *	512	1024	2048	512	2048	4096
Edge separation *a*	≥ 2.4 µs	≥ 0.8 µs	≥ 0.6 µs	≥ 2.4 µs	≥ 0.6 µs	≥ 0.2 µs
Output frequency	≤ 52 kHz	≤ 103 kHz	≤ 205 kHz	≤ 52 kHz	≤ 205 kHz	≤ 410 kHz
System accuracy[1]	±60″	±60″	±20″	±60″	±20″	±20″
Electrical connection	17-pin M23 radial flange socket (male)					
Cable length[2]	≤ 100 m (with HEIDENHAIN cable)					
Supply voltage	DC 10 V to 30 V			DC 4.75 V to 30 V		
Power consumption (max.)[3]	See *Power consumption* diagram			*At 4.75 V:* ≤ 900 mW *At 30 V:* ≤ 1100 mW		
Current consumption (typical, without load)	*At 10 V:* ≤ 56 mA *At 24 V:* ≤ 34 mA			*At 5 V:* ≤ 100 mA *At 24 V:* ≤ 25 mA		
Shaft	Solid shaft Ø 10 mm with flat					
Mech. permiss. shaft speed *n*[4]	≤ 12 000 rpm					
Starting torque (typical)	0.025 Nm (at 20 °C)					
Moment of inertia of rotor	$2.7 \cdot 10^{-6}$ kgm^2					
Shaft load	*Axial:* ≤ 40 Nm *Radial:* ≤ 60 Nm at shaft end (see also *Mechanical design types and mounting*)					
Vibration 10 Hz to 2000 Hz[5] **Shock** 6 ms	≤ 150 m/s^2 (EN 60068-2-6) ≤ 1000 m/s^2 (EN 60068-2-27)					
Max. operating temp.[4]	100 °C					
Min. operating temp.	–40 °C					
Protection EN 60529	*Housing:* IP67 *Shaft exit:* IP66					
Mass	≈ 0.30 kg					
Valid for ID	1042530-xx			1042529-xx		

* Please select when ordering
1) For absolute position value; accuracy of the incremental signal upon request
2) For HTL signals, the maximum cable length depends on the output frequency (see the *Cable length for HTL* diagrams)
3) See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure
4) For the relationship of operating temperature to shaft speed and supply voltage, see *General mechanical information*
5) 10 Hz to 55 Hz constant over 4.9 mm peak to peak

ROQ 425

Rotary encoder for absolute position values with solid shaft for separate shaft coupling
- **SSI interface**
- **Additional incremental signals with TTL or HTL levels**





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

Ⓐ = Bearing
Ⓑ = Fastening thread
M1 = Measuring point for operating temperature
M2 = Measuring point for vibration, see also D 774714
1 = Connector coding
2 = Direction of shaft rotation for output signals as per the interface description

	Absolute **Multiturn** **ROQ 425**					
Interface	SSI					
Ordering designation*	SSI41H			SSI41T		
Positions per revolution	8192 (13 bits)					
Revolutions	4096 (12 bits)					
Code	Pure binary					
Calculation time t_{cal} Clock frequency	≤ 9 µs ≤ 2 MHz					
Incremental signals	HTL[6]			TTL		
Signal periods *	512	1024	2048	512	2048	4096
Edge separation *a*	≥ 2.4 µs	≥ 0.8 µs	≥ 0.6 µs	≥ 2.4 µs	≥ 0.6 µs	≥ 0.2 µs
Output frequency	≤ 52 kHz	≤ 103 kHz	≤ 205 kHz	≤ 52 kHz	≤ 205 kHz	≤ 410 kHz
System accuracy[1]	±60″	±60″	±20″	±60″	±20″	±20″
Electrical connection	12-pin M23 radial flange socket (male)			17-pin M23 radial flange socket (male)		
Cable length[2]	≤ 100 m (with HEIDENHAIN cable)					
Supply voltage	DC 10 V to 30 V			DC 4.75 V to 30 V		
Power consumption (max.)[3]	See *Power consumption* diagram			*At 4.75 V:* ≤ 900 mW *At 30 V:* ≤ 1100 mW		
Current consumption (typical, without load)	*At 10 V:* ≤ 56 mA *At 24 V:* ≤ 34 mA			*At 5 V:* ≤ 100 mA *At 24 V:* ≤ 25 mA		
Shaft	Solid shaft Ø 10 mm with flat					
Mech. permiss. shaft speed *n*[4]	≤ 12 000 rpm					
Starting torque (typical)	0.025 Nm (at 20 °C)					
Moment of inertia of rotor	$2.7 \cdot 10^{-6}$ kgm^2					
Shaft load	*Axial:* ≤ 40 Nm *Radial:* ≤ 60 Nm at shaft end (see also *Mechanical design types and mounting*)					
Vibration 10 Hz to 2000 Hz[5] **Shock** 6 ms	≤ 150 m/s^2 (EN 60068-2-6) ≤ 1000 m/s^2 (EN 60068-2-27)					
Max. operating temp.[4]	100 °C					
Min. operating temp.	–40 °C					
Protection EN 60529	*Housing:* IP67 *Shaft exit:* IP66					
Mass	≈ 0.30 kg					
Valid for ID	1065028-xx			1042524-xx		

* Please select when ordering
1) For absolute position value; accuracy of the incremental signal upon request
2) For HTL signals, the maximum cable length depends on the output frequency (see the *Cable length for HTL* diagrams)
3) See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure
4) For the relationship of operating temperature to shaft speed and supply voltage, see *General mechanical information*
5) 10 Hz to 55 Hz constant over 4.9 mm peak to peak
6) HTLs upon request