

Угловые энкодеры ROC 2000, 7000

Технические характеристики

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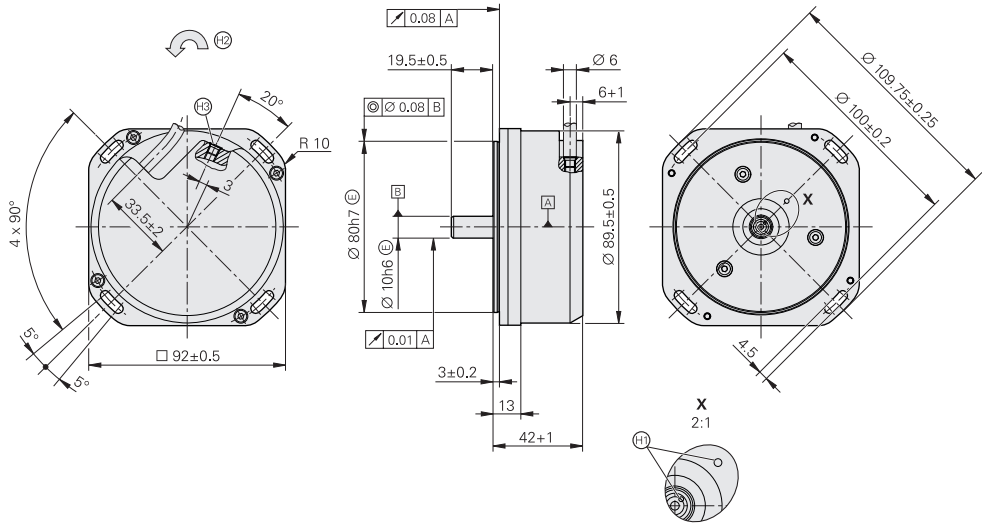
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ROC 2000 series

- For a separate shaft coupling
- System accuracy: ±5"



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

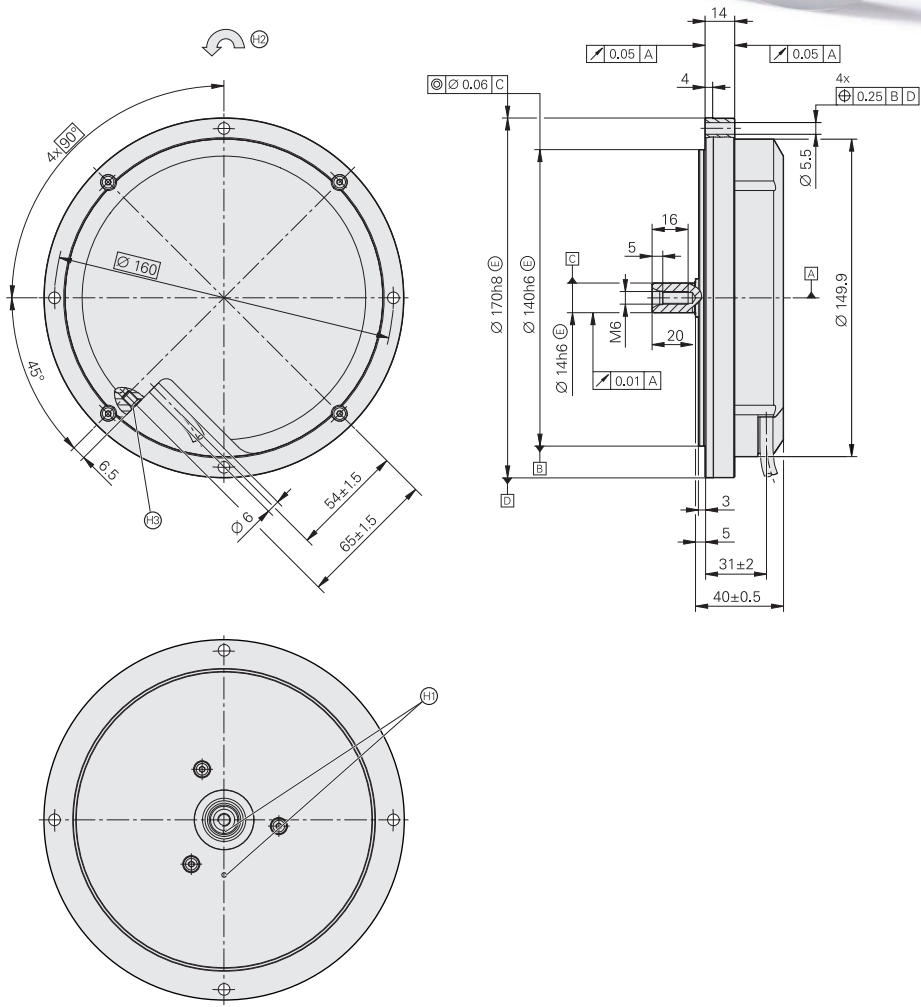
▣ = Bearing
⊙ = Position of the reference mark signal ±5°
⊙ = Direction of shaft rotation for output signals in accordance with the interface description
⊙ = M5 compressed-air inlet

	Absolute ROC 2310		ROC 2380	ROC 2390F	ROC 2390M
Measuring standard	DIADUR circular scale with absolute track and incremental track (16 384 lines)				
System accuracy	±5"				
Position error per signal period	±0.4"				
Interface	EnDat 2.2			Fanuc serial interface αi interface	Mitsubishi high speed interface
Ordering designation	EnDat22	EnDat02	Fanuc05	Mit03-4	
Position values per rev.	67 108864 (26 bits); <i>Fanuc α interface</i> : 8388608 (23 bits)				
Electrically permissible speed	≤ 3000 rpm for continuous position values	≤ 1500 rpm for continuous position values	≤ 3000 rpm for continuous position values		
Clock frequency Calculation time t _{cal}	≤ 16 MHz ≤ 5 μs	≤ 2 MHz ≤ 5 μs	–		
Incremental signals Cutoff frequency –3 dB	–	~ 1 V _{pp} ≥ 400 kHz	–		
Electrical connection	Cable (1 m) with M12 coupling (male) <i>With EnDat02</i> : cable (1 m) with 17-pin M23 coupling (male)				
Cable length ¹⁾	≤ 150 m			≤ 50 m	≤ 30 m
Supply voltage	DC 3.6 V to 14 V				
Power consumption ²⁾ (max.)	3.6 V: ≤ 1.1 W; 14 V: ≤ 1.3 W				
Current consumption (typical)	5 V: 140 mA (without load)				
Shaft	Solid shaft D = 10 mm				
Mech. permissible speed	≤ 3000 rpm				
Starting torque	≤ 0.02 Nm at 20 °C				
Moment of inertia of rotor	50.0 · 10 ^{–6} kgm ²				
Permissible shaft load	<i>Axial</i> : 30 N <i>Radial</i> : 30 N at shaft end				
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 200 m/s ² (EN 60068-2-6) ≤ 200 m/s ² (EN 60068-2-27)				
Operating temperature	<i>Moving cable</i> : –10 °C to 60 °C <i>Fixed cable</i> : –20 °C to 60 °C				
Protection EN 60529	IP64				
Mass	≈ 1.0 kg				

* Please select when ordering
1) With HEIDENHAIN cable; ≤ 8 MHz
2) See General electrical information in the Interfaces of HEIDENHAIN Encoders brochure

ROC 7000

- For a separate shaft coupling
- System accuracy ±2"



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

⊠ = Bearing
⊙ = Position of the reference mark signal ±5°
⊙ = Direction of shaft rotation for output signals in accordance with the interface description
⊙ = M5 compressed-air inlet

	Absolute ROC 7310	ROC 7380	ROC 7390F	ROC 7390M
Measuring standard	DIADUR circular scale with absolute track and incremental track (16 384 lines)			
System accuracy	±2"			
Position error per signal period	±0.4"			
Interface	EnDat 2.2		Fanuc serial interface αi interface	Mitsubishi high speed interface
Ordering designation	EnDat22	EnDat02	Fanuc05	Mit03-4
Position values per rev.	268435456 (28 bits); <i>Fanuc α interface</i> : 134217728 (27 bits)			
Electrically permissible speed	≤ 3000 rpm for continuous position values	≤ 1500 rpm for continuous position values	≤ 3000 rpm for continuous position values	
Clock frequency Calculation time t _{cal}	≤ 16 MHz ≤ 5 μs	≤ 2 MHz ≤ 5 μs	–	
Incremental signals Cutoff frequency –3 dB	–	 1 V _{pp} ≥ 400 kHz	–	
Electrical connection	Cable (1 m) with M12 coupling (male) <i>With EnDat02</i> : cable (1 m) with 17-pin M23 coupling (male)			
Cable length ¹⁾	≤ 150 m		≤ 50 m	≤ 30 m
Supply voltage	DC 3.6 V to 14 V			
Power consumption ²⁾ (max.)	3.6 V: ≤ 1.1 W; 14 V: ≤ 1.3 W			
Current consumption (typical)	5 V: 140 mA (without load)			
Shaft	Solid shaft D = 14 mm			
Mech. permissible speed	≤ 3000 rpm			
Starting torque	≤ 0.025 Nm at 20 °C			
Moment of inertia of rotor	65.0 · 10 ^{–6} kgm ²			
Permissible shaft load	<i>Axial</i> : 30 N <i>Radial</i> : 30 N at shaft end			
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 200 m/s ² (EN 60068-2-6) ≤ 200 m/s ² (EN 60068-2-27)			
Operating temperature	0 °C to 50 °C			
Protection EN 60529	IP64			
Mass	≈ 1.6 kg			

* Please select when ordering
1) With HEIDENHAIN cable; ≤ 8 MHz
2) See General electrical information in the Interfaces of HEIDENHAIN Encoders brochure

Shaft coupling

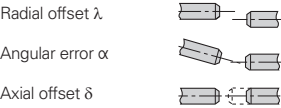
Angle encoders of the **ROC** product family require a separate coupling for connection to the drive shaft. The shaft coupling compensates for axial movement and misalignment between the shafts, thereby preventing an excessive load on the bearing of the angle encoder. For realizing high accuracies, it is necessary that the shaft of the angle encoder is optimally aligned with the shaft of the machine. The HEIDENHAIN product portfolio includes diaphragm couplings and flat couplings designed for connecting the shaft of the ROC angle encoder to the drive shaft.

Mounting

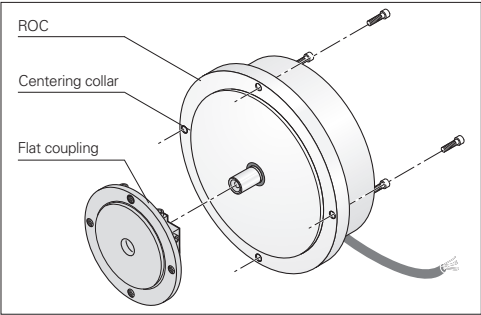
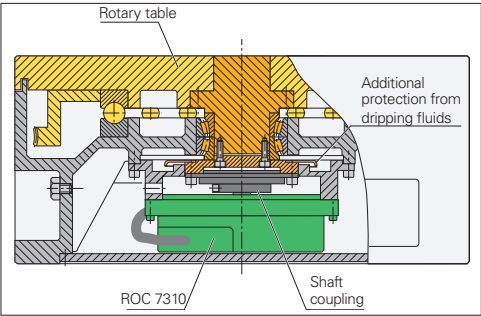
ROC angle encoders have an integral mounting flange with a centering collar. The encoder shaft is connected to the machine shaft by means of a diaphragm coupling or flat coupling.

Shaft couplings

The shaft coupling compensates for axial movement and misalignment between the encoder shaft and the drive shaft, thereby preventing excessive encoder bearing loads.

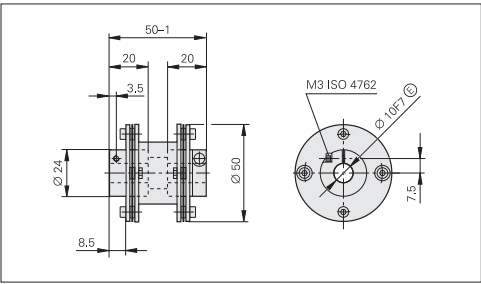


Mounting example
ROC 7310

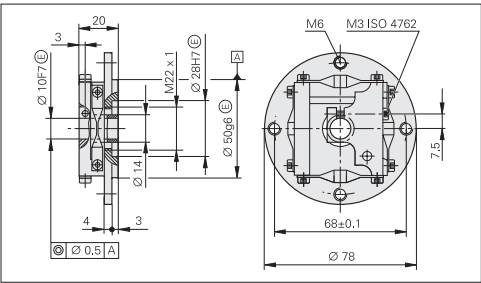


Shaft coupling	ROC 2000 series		ROC 7000 series		
	K 03 Diaphragm coupling	K 18 Flat coupling	K 01 Diaphragm coupling	K 15 Flat coupling	K 16 Flat coupling
Hub bore	10 mm		14 mm		
Kinematic transfer error	±2" At $\lambda \leq 0.1$ mm and $\alpha \leq 0.09^\circ$		±1"	±0.5" At $\lambda \leq 0.05$ mm and $\alpha \leq 0.03^\circ$	
Torsional rigidity	1500 Nm/rad	1200 Nm/rad	4000 Nm/rad	6000 Nm/rad	4000 Nm/rad
Permissible torque	0.2 Nm	0.5 Nm			
Perm. radial offset λ	≤ 0.3 mm				
Perm. angular error α	≤ 0.5°			≤ 0.2°	≤ 0.5°
Perm. axial offset δ	≤ 0.2 mm			≤ 0.1 mm	≤ 1 mm
Moment of inertia (approx.)	20 · 10 ⁻⁶ kgm ²	75 · 10 ⁻⁶ kgm ²	200 · 10 ⁻⁶ kgm ²		400 · 10 ⁻⁶ kgm ²
Permissible shaft speed	10 000 rpm	1000 rpm	3000 rpm	1000 rpm	
Tightening torque of clamping screws (approx.)	1.2 Nm		2.5 Nm	1.2 Nm	
Mass	100 g	117 g	180 g	250 g	410 g

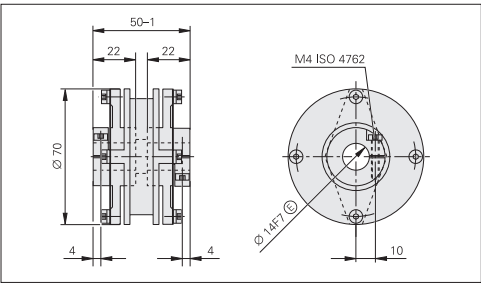
K 03 diaphragm coupling
ID 200313-04



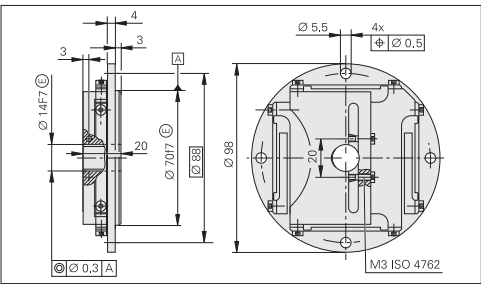
K 18 flat coupling
ID 202227-01



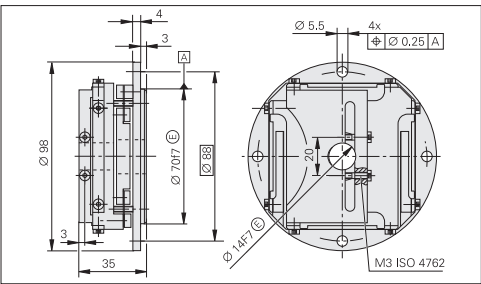
K 01 diaphragm coupling
ID 200301-02



K 15 flat coupling
ID 255797-01



K 16 flat coupling
ID 258878-01



mm
Tolerancing ISO 8015
ISO 2768:1989-mH
≤ 6 mm: ±0.2 mm

Electrical connection

EnDat pin layout without incremental signals

8-pin M12 coupling								
			Power supply				Serial data transmission	
	8	2	5	1	3	4	7	6
	U _P	Sensor U _P	0 V	Sensor 0 V	DATA	DATA	CLOCK	CLOCK
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow

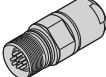
Cable shield connected to housing; **U_P** = Power supply voltage
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!

Fanuc pin layout

8-pin M12 coupling									
			Power supply				Serial data transmission		
	8	2	5	1	–	3	4	7	6
	U _P	Sensor U _P	0 V	Sensor 0 V	Shield	Serial DATA	Serial DATA	Request	Request
	Brown/Green	Blue	White/Green	White	–	Gray	Pink	Violet	Yellow

Cable shield connected to housing; **U_P** = Power supply voltage
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!

EnDat pin layout with incremental signals

17-pin M23 coupling													
			Power supply			Incremental signals ¹⁾				Serial data transfer			
	7	1	10	4	11	15	16	12	13	14	17	8	9
	U _P	Sensor U _P	0 V	Sensor 0 V	Internal shield	A+	A–	B+	B–	DATA	DATA	CLOCK	CLOCK
	Brown/Green	Blue	White/Green	White	/	Green/Black	Yellow/Black	Blue/Black	Red/Black	Gray	Pink	Violet	Yellow

Cable shield connected to housing; **U_P** = Power supply voltage
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!

¹⁾ Only with ordering designations EnDat01 and EnDat02

Mitsubishi pin layout

8-pin M12 coupling								
			Power supply				Serial data transmission	
	8	2	5	1	3	4	7	6
	U _P	Sensor U _P	0 V	Sensor 0 V	Serial DATA	Serial DATA	Request Frame	Request Frame
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow

Cable shield connected to housing; **U_P** = Power supply voltage
Sensor: The sense line is connected in the encoder with the corresponding power line.
Vacant pins or wires must not be used!

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