

Угловые энкодеры RON 785, 786, 886, RPN 886

Технические характеристики

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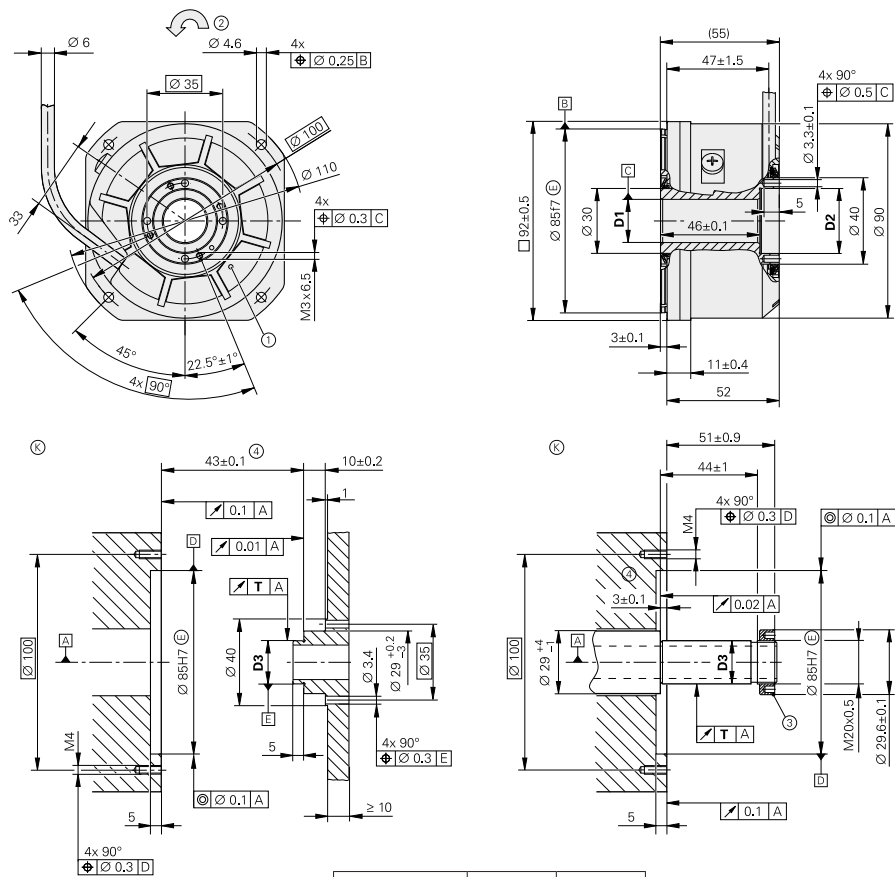
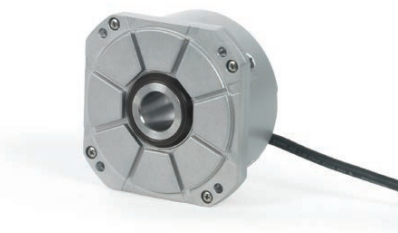
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RON 200 series

- Integrated stator coupling
- Hollow through shaft (Ø 20 mm)
- System accuracy: ±2.5" and ±5"



System accuracy	±2.5"	±5"
D1	Ø 20H6	Ø 20H7
D2	Ø 30H6	Ø 30H7
D3	Ø 20g6	Ø 20g7
T	0.01	0.02

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

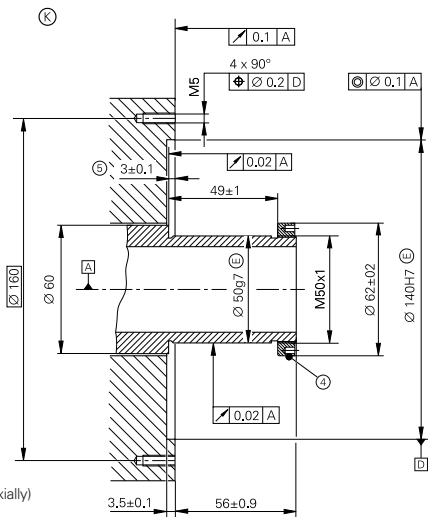
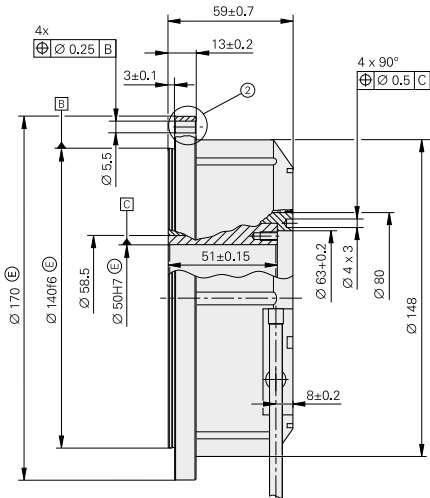
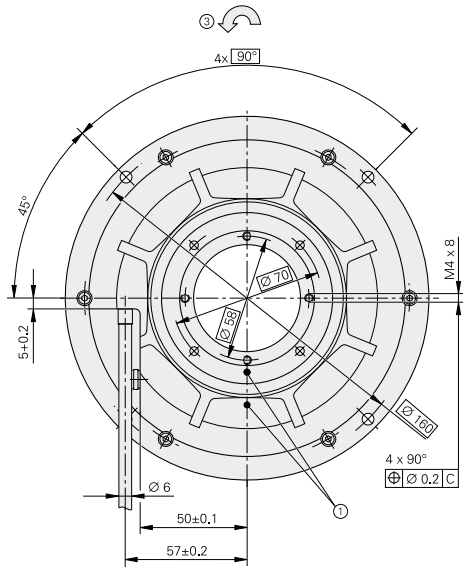
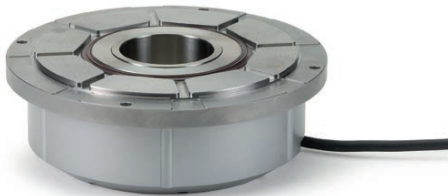
Radial cable (can also be used axially)
⊠ = Bearing of mating shaft
⊙ = Required mating dimensions
1 = Position of the reference mark signal ±5°
2 = Direction of shaft rotation for ascending position values
3 = Accessory: ring nut (ID 336669-03)
4 = Stated tolerance contains mounting tolerances and thermal expansion;
no dynamic movement permitted

	Incremental RON 275	RON 275	RON 285	RON 287
Measuring standard	DIADUR circular scale with incremental track			
Line count	18000			
System accuracy	±5"			±2.5"
Position error per signal period	≤ ±0.7"			
Interface	□ TTL		~ 1 V _{pp}	
Integrated interpolation* Output signals per rev.	5-fold 90000	10-fold 180000	–	
Reference mark*	One		RON 2xx: One RON 2xx C: Distance-coded	
Cutoff frequency –3 dB	–	–	≥ 180 kHz	
Output frequency	≤ 250 kHz	≤ 1 MHz	–	
Edge separation <i>a</i>	≥ 0.96 μs	≥ 0.22 μs	–	
Elec. permissible speed	≤ 166 rpm	≤ 333 rpm	–	
Electrical connection *	Cable (1 m), with or without 12-pin M23 coupling (male)			
Cable length ¹⁾	≤ 50 m		≤ 150 m	
Supply voltage	DC 5 V ±0.5 V/≤ 150 mA (without load)			
Shaft	Hollow through shaft D = 20 mm			
Mech. permissible speed	≤ 3000 rpm			
Starting torque	≤ 0.08 Nm at 20 °C			
Moment of inertia of rotor	73.0 · 10 ^{–6} kgm ²			
Permissible axial motion of measured shaft	±0.1 mm			
Natural frequency	≥ 1200 Hz			
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 100 m/s ² (EN 60068-2-6) ≤ 200 m/s ² (EN 60068-2-27)			
Operating temperature	Frequent flexing: –10 °C to 70 °C Stationary cable: –20 °C to 70 °C			0 °C to 50 °C
Protection EN 60529	IP64			
Mass	≈ 0.8 kg			

* Please select when ordering
1) With HEIDENHAIN cable
2) Range includes mounting tolerances and thermal expansion; no dynamic movement permitted

RON 785

- Integrated stator coupling
- Hollow through shaft (Ø 50 mm)
- System accuracy: ±2"



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

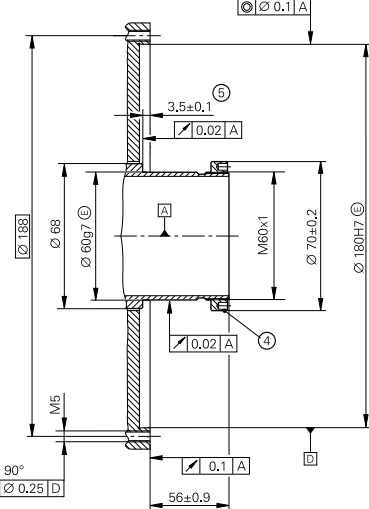
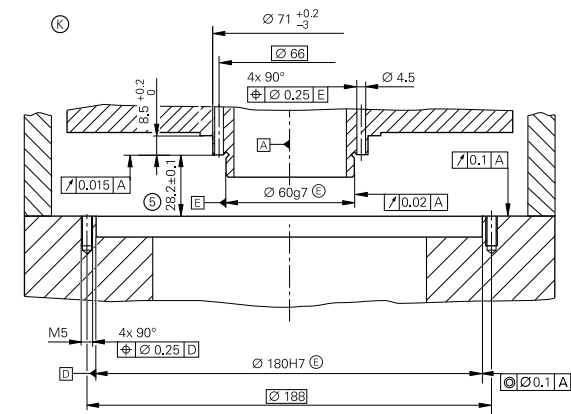
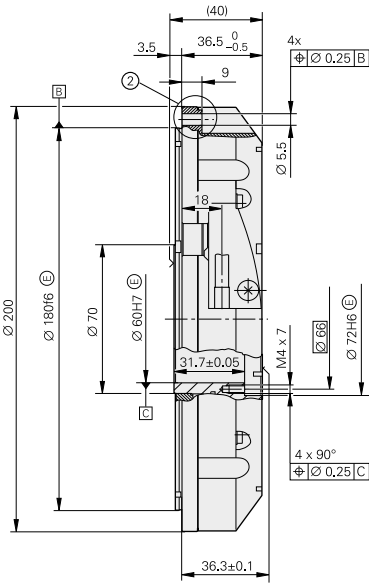
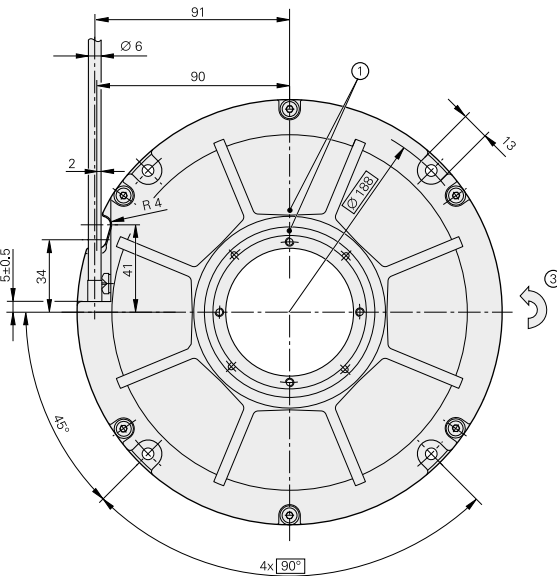
Radial cable (can also be used axially)
□ = Bearing of mating shaft
⊕ = Required mating dimensions
1 = Position of the reference mark signal ±5°
2 = Shown rotated by 45°
3 = Direction of shaft rotation for ascending position values
4 = Accessory: ring nut (ID 336669-15)
5 = Specified tolerance includes mounting tolerances and thermal expansion; no dynamic motion permitted

	Incremental RON 785
Measuring standard	DIADUR circular scale with incremental track
Line count	18000
System accuracy	±2"
Position error per signal period	≤ ±0.7"
Interface	~ 1 V _{pp}
Reference mark*	RON 785: One RON 785 C: Distance-coded
Cutoff frequency -3 dB	≥ 180 kHz
Electrical connection*	Cable (1 m), with or without 12-pin M23 coupling (male)
Cable length ¹⁾	≤ 150 m
Supply voltage	DC 5 V ±0.5 V/≤ 150 mA (without load)
Shaft	Hollow through shaft D = 50 mm
Mech. permissible speed	≤ 1000 rpm
Starting torque	≤ 0.5 Nm at 20 °C
Moment of inertia of rotor	1.05 · 10 ⁻³ kgm ²
Permissible axial motion of measured shaft	±0.1 mm
Natural frequency	≥ 1000 Hz
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 100 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	≈ 2.5 kg

* Please select when ordering
1) With HEIDENHAIN cable
2) Range includes mounting tolerances and thermal expansion; no dynamic movement permitted

RON 786/RON 886/RPN 886

- Integrated stator coupling
- Hollow through shaft (Ø 60 mm)
- System accuracy: ±1" or ±2"



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

Radial cable (can also be used axially)
□ = Bearing of mating shaft
⊙ = Required mating dimensions
1 = Position of the reference mark signal ±5°
2 = Shown rotated by 45°
3 = Direction of shaft rotation for ascending position values
4 = Accessory: ring nut ID 336669-15
5 = Stated tolerance includes mounting tolerances and thermal expansion; no dynamic movement permitted

	Incremental RON 786	RON 886	RPN 886
Measuring standard	DIADUR circular scale with incremental track		
Line count*	18000 36000	36000	90000 (≥ 180 000 signal periods)
System accuracy	±2"	±1"	
Position error per signal period	18000 lines: ≤ ±0.7" 36000 lines: ≤ ±0.35"	≤ ±0.35"	≤ ±0.1"
Interface	~ 1 V _{PP}		
Reference mark*	RON x86: One RON x86C: Distance-coded		One
Cutoff frequency	-3 dB -6 dB	≥ 180 kHz	≥ 800 kHz ≥ 1300 kHz
Electrical connection*	Cable (1 m), with or without 12-pin M23 coupling (male)		
Cable length ¹⁾	≤ 150 m		
Supply voltage	DC 5 V ±0.5 V/≤ 150 mA (without load)		DC 5 V ±0.5 V/≤ 250 mA (without load)
Shaft	Hollow through shaft D = 60 mm		
Mech. permissible speed	≤ 1000 rpm		
Starting torque	≤ 0.5 Nm at 20 °C		
Moment of inertia of rotor	1.20 · 10 ⁻³ kgm ²		
Permissible axial motion of measured shaft	≤ ±0.1 mm		
Natural frequency	≥ 1000 Hz		≥ 500 Hz
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 100 m/s ² (EN 60068-2-6) ≤ 200 m/s ² (EN 60068-2-27)		≤ 50 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	≈ 2.5 kg		

* Please select when ordering
1) With HEIDENHAIN cable
2) Range includes mounting tolerances and thermal expansion; no dynamic movement permitted

Mechanical design types and mounting

RON, RPN

The **RON** and **RPN** angle encoders have an integral bearing, a hollow shaft and a stator-side coupling. The measured shaft is directly connected to the shaft of the angle encoder.

Setup
The circular scale is rigidly affixed to the hollow shaft. The scanning unit rides on the shaft on ball bearings and is connected to the housing with a coupling on the stator side. The stator coupling and the sealing design compensate for axial and radial mounting error to a high degree without restricting accuracy or functionality. This thereby simplifies mounting. During angular acceleration of the shaft, the stator coupling must absorb only the torque resulting from friction within the bearing. Angle encoders with stator coupling therefore provide excellent dynamic performance.

Mounting
The housing of the RON and RPN is firmly connected to the mounting surface of the machine part by means of a mounting flange and a centering collar.

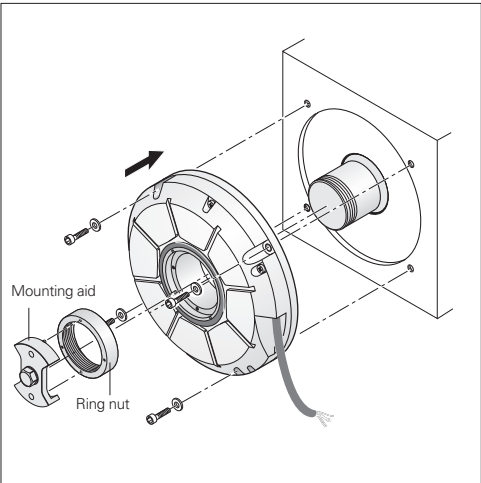
• **RON and RPN shaft coupling**

Shaft coupling with ring nut

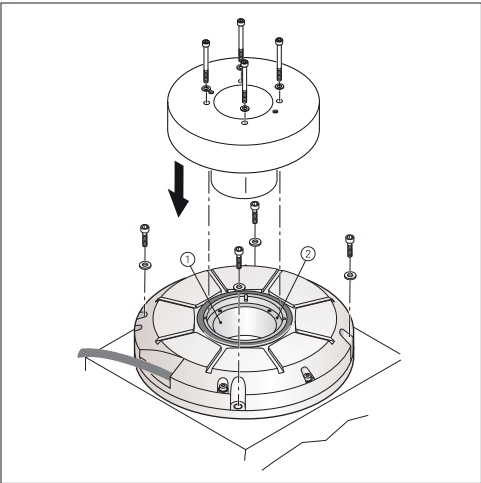
The shaft is designed as a hollow through shaft. For installation, the hollow through shaft of the angle encoder is seated onto the machine shaft and fastened from the encoder's front face with a ring nut. The ring nut can be easily tightened with the mounting aid.

Front-face shaft coupling

Especially for rotary tables, it is often helpful to integrate the angle encoder into the table such that the encoder is accessible when the rotor is lifted. The hollow shaft is connected through the front-face threaded holes by means of special mounting elements made for the given design (not included in delivery). In order to meet the radial and axial runout requirements, the interior hole ① and the shoulder surface ② must be used as the mounting surfaces for the front-face shaft coupling.



Mounting an angle encoder with a ring nut



Example of connecting an encoder to the shaft face

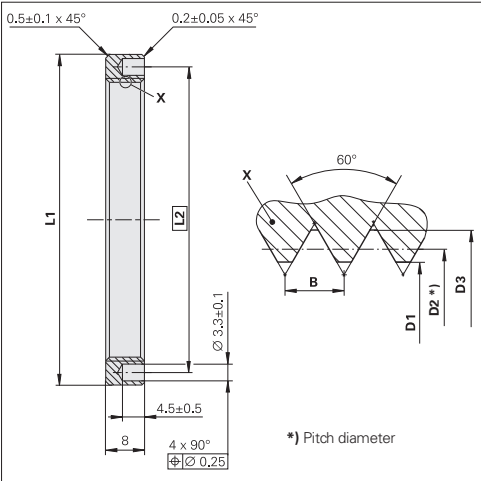
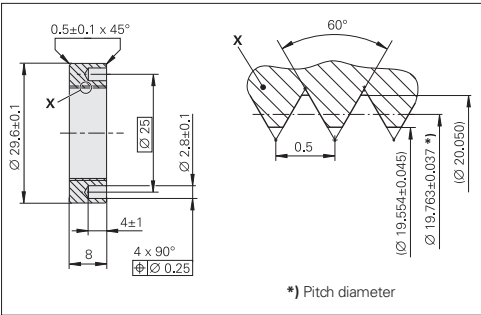
Ring nuts for the RON and RPN
HEIDENHAIN offers special ring nuts for RON and RPN angle encoders. Choose the tolerance of the shaft thread such that the ring nut can be tightened easily, with a small amount of axial play. This guarantees that the load is evenly distributed on the shaft connection and prevents undesirable forces on the encoder's hollow shaft.



Ring nut for
Hollow shaft Ø 20 mm: ID 336669-03
Hollow shaft Ø 50 mm: ID 336669-15
Hollow shaft Ø 60 mm: ID 336669-11

Ring nut for	L1	L2	D1	D2	D3	B
Hollow shaft Ø 50	Ø 62±0.2	Ø 55	(Ø 49.052 ±0.075)	Ø 49.469 ±0.059	(Ø 50.06)	1
Hollow shaft Ø 60	Ø 70±0.2	Ø 65	(Ø 59.052 ±0.075)	Ø 59.469 ±0.059	(Ø 60.06)	1

Ring nut for hollow shaft Ø 20 mm



PWV inspection tool for RON/RPN angle encoders
The PWV makes it fast and easy to inspect the most significant mating dimensions. Its built-in measuring equipment measures position and radial runout, for example. It is best suited for the shaft coupling with a ring nut.

PWV for
Hollow shaft Ø 20 mm: ID 516211-01
Hollow shaft Ø 50 mm: ID 516211-02
Hollow shaft Ø 60 mm: ID 516211-03

Mounting tool for HEIDENHAIN ring nuts
The mounting aid is used to tighten the ring nut. Its pins lock into the holes in the ring nut. A torque wrench provides the necessary tightening torque.

Mounting aid for ring nuts with
Hollow shaft Ø 20 mm: ID 530334-03
Hollow shaft Ø 50 mm: ID 530334-15
Hollow shaft Ø 60 mm: ID 530334-11

Materials required for mounting the RON and RPN
The machine shaft and the fastening components must be made of steel. The material must exhibit a thermal coefficient of expansion $\alpha_{\text{therm}} = 10 \cdot 10^{-6} \text{ K}^{-1}$ to $\alpha_{\text{therm}} = 16 \cdot 10^{-6} \text{ K}^{-1}$. Additionally, the material must meet the following specifications:
• For hollow-shaft connection
 $R_m \geq 650 \text{ N/mm}^2$
 $R_{p0.2} \geq 370 \text{ N/mm}^2$
• For housing connection
 $R_{p0.2} \geq 370 \text{ N/mm}^2$

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