

## **SALES BULLETIN**

## **HEIDENHAIN CORPORATION**

333 East State Parkway  
Schaumburg, IL 60173-5337  
Telephone: (847) 490-1191  
Fax: (847) 490-3931  
E-mail: info@heidenhain.com

**FROM:** Nathan Mathiot

**SUBJECT:** Introduction of the RCN 2000, RCN 5000, and RCN 8000 Series  
With EnDat 2.2 Interface (EnDat22) and Functional Safety

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### **1. Introduction**

The RCN 2000, RCN 5000, and RCN 8000 series with EnDat 2.2 interface (ordering designation EnDat22) will be available soon in the “Functional Safety version”. With these series, HEIDENHAIN now also offers solutions for position measurement on rotational axes in safety-related applications with high accuracy requirements. The encoders can be operated as single-encoder systems in conjunction with a safe control in applications with control category SIL-2 (according to EN 61 508) or performance level “d” (of EN ISO 13 849).

Reliable transmission of the position is based on two independently generated absolute position values and on error bits. These are then provided to the safe control. The safety-relevant information is saved as so-called additional information of the EnDat protocol. In addition to the data interface, the mechanical connection of the encoders is also relevant to safety. Since it cannot be guaranteed that the control will detect such errors, these devices feature fault exclusion for the loosening of the mechanical connection.

The connection to the subsequent electronics is made with the same standard adapter cables that are also used for the RCN 2000, RCN 5000, and RCN 8000 standard series with purely serial EnDat interface.

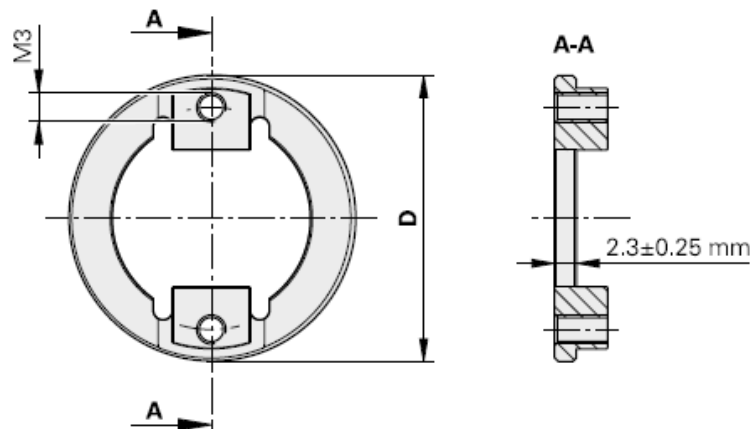


## 2. Mounting

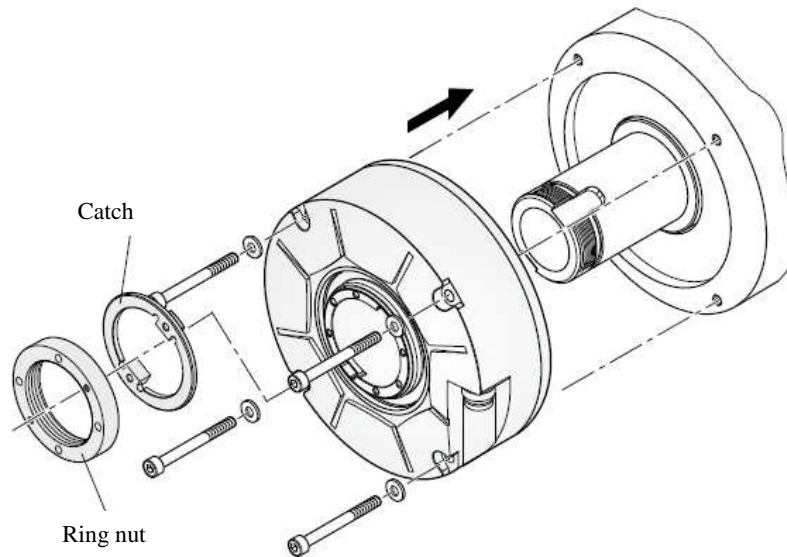
To ensure fault exclusion for the loosening of the mechanical connection, some peculiarities must be considered for the shaft connection of the RCN with functional safety. There are two mounting options. The housing in turn is mounted as usual via the integral mounting flange and the centering collar.

### Mounting option I: Shaft connection with ring nut and catch

The shaft connection of the RCN with functional safety can be made by means of a ring nut. In this case, a catch must be used in addition to the ring nut. The catch, as well as the ring nut, can be ordered as accessories from HEIDENHAIN.



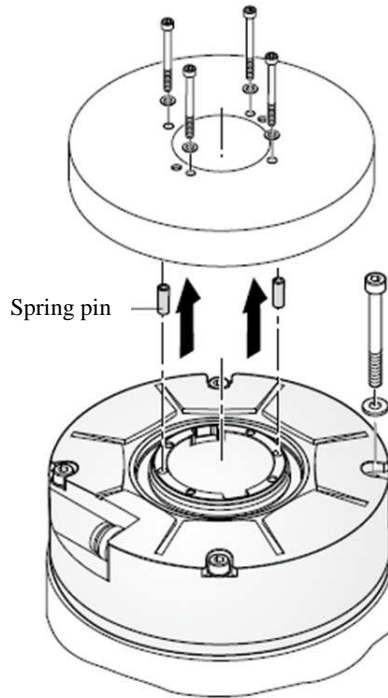
	Hollow shaft of the RCN	ID
Catch for RCN 2x10	Ø 20 mm	817921-01
Catch for RCN 5x10	Ø 35 mm	817921-02
Catch for RCN 8x10	Ø 60 mm	817921-03
	Ø 100 mm	817921-04



There are two shackles on the inside diameter of the catch (three shackles on the RCN 8000). These lock into the slots of the mating measured shaft, which must be provided additionally for the safe connection, and thus permit a positive-locking connection with the measured shaft. Another positive-locking connection is made with the hollow shaft of the angle encoder. For this purpose, the catch has another two shackles on the front (three shackles on the RCN 8000), which lock into the slots of the encoder's hollow shaft. This finally ensures a safe mechanical connection between the hollow shaft of the encoder and the mating measured shaft.

### **Mounting option II: Front-end shaft coupling with mounting screws and spring pins**

The hollow shaft is attached with the threaded holes on the face and by means of special mounting elements fitted to the individual design (not included in delivery). The safe mechanical shaft connection is then made with additional spring pins. These are pushed into the mating mounting element until the spring pins protrude by about 4 mm. When the mounting element and the angle encoder are pushed together in axial direction, the protruding part of the spring pins locks into the holes of the hollow shaft and thus ensures the safe mechanical connection between the hollow shaft of the encoder and the mating mounting element.



### 3. Schedule

The RCN 2000, RCN 5000, and RCN 8000 series in the “Functional Safety version” will be available in series as of December 2013.

The “Functional Safety versions” of the angle encoders have the following ID numbers:

	Hollow shaft	System accuracy	ID
RCN 2310	20 mm	± 5°	667789-01
RCN 2510		± 2.5°	667790-01
RCN 5310	35 mm	± 5°	667835-01
RCN 5510		± 2.5°	667836-01
RCN 8310	60 mm	± 2°	667600-01
	100 mm	± 2°	667594-01
RCN 8510	60 mm	± 1°	667601-01
	100 mm	± 1°	667595-01

#### Attachment

- Price sheets for RCN 2000, RCN 5000, RCN 8000,

**RCN 2310, RCN 2380, RCN 2390F, RCN 2390M**

	<b>RCN 2310</b>	<b>RCN 2380</b>	<b>RCN 2390F</b>	<b>RCN 2390M</b>
	Integral bearing, integral stator coupling			
<b>Mating Ø flange</b>	85 mm			
<b>System accuracy</b>	± 5"			
<b>Shaft</b>	Hollow shaft Ø 20 mm			
<b>Position values/rev</b>	2 <sup>26</sup> = 67 108 864			
<b>Power supply</b>	3.6 to 14 V			
<b>Absolute position values</b>	EnDat 2.2 without incremental signals	EnDat 2.2 with incremental signals	Fanuc serial interface ai	Mitsubishi high speed interface
<b>Ordering designation</b>	EnDat22	EnDat02	Fanuc05	Mit03-4
<b>Incremental signals</b>	–	≈ 1 Vpp 16384 signal periods/rev	□	
<b>Max. operating temp.</b>	60 °C			
<b>Protection</b>	IP 64			
<b>Electrical connection</b>	Quick disconnect (separate adapter cable connectable to encoder)			
<b>Overall dimensions</b>				
<b>ID</b>	667787-xx	667785-xx	751363-xx	751365-xx

	QUANTITIES				
	50	20	10	5	1
<b>RCN 2310</b> (without adapter cable)	2936.80	3120.35	3303.90	3487.45	3671.00
<b>RCN 2380</b> (without adapter cable)	3271.20	3475.65	3680.10	3884.55	4089.00
<b>RCN 2390F</b> (without adapter cable)	3271.20	3475.65	3680.10	3884.55	4089.00
<b>RCN 2390M</b> (without adapter cable)	3271.20	3475.65	3680.10	3884.55	4089.00

**RCN 2510, RCN 2580, RCN 2590F, RCN 2590M**

	RCN 2510	RCN 2580	RCN 2590F	RCN 2590M
	Integral bearing, integral stator coupling			
<b>Mating Ø flange</b>	85 mm			
<b>System accuracy</b>	± 2.5"			
<b>Shaft</b>	Hollow shaft Ø 20 mm			
<b>Position values/rev</b>	2 <sup>28</sup> = 268 435 456			
<b>Power supply</b>	3.6 to 14 V			
<b>Absolute position values</b>	EnDat 2.2 without incremental signals	EnDat 2.2 with incremental signals	Fanuc serial interface ai	Mitsubishi high speed interface
<b>Ordering designation</b>	EnDat22	EnDat02	Fanuc05	Mit03-4
<b>Incremental signals</b>	–	≈ 1 Vpp 16384 signal periods/rev	–	–
<b>Max. operating temp.</b>	50 °C			
<b>Protection</b>	IP 64			
<b>Electrical connection</b>	Quick disconnect (separate adapter cable connectable to encoder)			
<b>Overall dimensions</b>				
<b>ID</b>	667788-xx	667786-xx	751364-xx	751367-xx

	QUANTITIES				
	50	20	10	5	1
<b>RCN 2510</b> (without adapter cable)	4672.00	4964.00	5256.00	5548.00	5840.00
<b>RCN 2580</b> (without adapter cable)	5006.40	5319.30	5632.20	5945.10	6258.00
<b>RCN 2590F</b> (without adapter cable)	5006.40	5319.30	5632.20	5945.10	6258.00
<b>RCN 2590M</b> (without adapter cable)	5006.40	5319.30	5632.20	5945.10	6258.00

**RCN 5310, RCN 5380, RCN 5390F, RCN 5390M**

	<b>RCN 5310</b>	<b>RCN 5380</b>	<b>RCN 5390F</b>	<b>RCN 5390M</b>
	Integral bearing, integral stator coupling			
<b>Mating Ø flange</b>	85 mm			
<b>System accuracy</b>	± 5"			
<b>Shaft</b>	Hollow shaft, Ø 35 mm			
<b>Position values/rev</b>	2 <sup>26</sup> = 67 108 864			
<b>Power supply</b>	3.6 to 14 V			
<b>Absolute position values</b>	EnDat 2.2 without incremental signals	EnDat 2.2 with incremental signals	Fanuc serial interface ci	Mitsubishi high speed interface
<b>Ordering designation</b>	EnDat22	EnDat02	Fanuc05	Mit03-4
<b>Incremental signals</b>	–	≈ 1 Vpp 16384 signal periods/rev	□	
<b>Max. operating temp.</b>	60 °C			
<b>Protection</b>	IP 64			
<b>Electrical connection</b>	Quick disconnect (separate adapter cable connectable to encoder)			
<b>Overall dimensions</b>				
<b>ID</b>	667833-xx	667831-xx	751368-xx	751370-xx

	QUANTITIES				
	50	20	10	5	1
<b>RCN 5310</b> (without adapter cable)	3271.20	3475.65	3680.10	3884.55	4089.00
<b>RCN 5380</b> (without adapter cable)	3604.00	3829.25	4054.50	4279.75	4505.00
<b>RCN 5390F</b> (without adapter cable)	3604.00	3829.25	4054.50	4279.75	4505.00
<b>RCN 5390M</b> (without adapter cable)	3604.00	3829.25	4054.50	4279.75	4505.00

**RCN 5510, RCN 5580, RCN 5590F, RCN 5590M**

	RCN 5510	RCN 5580	RCN 5590F	RCN 5590M
	Integral bearing, integral stator coupling			
<b>Mating Ø flange</b>	85 mm			
<b>System accuracy</b>	± 2.5"			
<b>Shaft</b>	Hollow shaft, Ø 35 mm			
<b>Position values/rev</b>	2 <sup>28</sup> = 268 435 456			
<b>Power supply</b>	3.6 to 14 V			
<b>Absolute position values</b>	EnDat 2.2 without incremental signals	EnDat 2.2 with incremental signals	Fanuc serial interface ai	Mitsubishi high speed interface
<b>Ordering designation</b>	EnDat22	EnDat02	Fanuc05	Mit03-4
<b>Incremental signals</b>	–	≈ 1 Vpp 16384 signal periods/rev	□	
<b>Max. operating temp.</b>	50 °C			
<b>Protection</b>	IP 64			
<b>Electrical connection</b>	Quick disconnect (separate adapter cable connectable to encoder)			
<b>Overall dimensions</b>				
<b>ID</b>	667834-xx	667832-xx	751369-xx	751371-xx

	QUANTITES				
	50	20	10	5	1
<b>RCN 5510</b> (without adapter cable)	5006.40	5319.30	5632.20	5945.10	6258.00
<b>RCN 5580</b> (without adapter cable)	5339.20	5672.90	6006.60	6340.30	6674.00
<b>RCN 5590F</b> (without adapter cable)	5339.20	5672.90	6006.60	6340.30	6674.00
<b>RCN 5590M</b> (without adapter cable)	5339.20	5672.90	6006.60	6340.30	6674.00

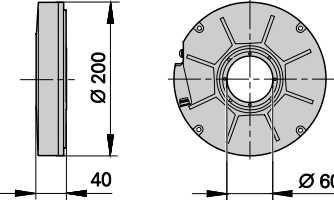
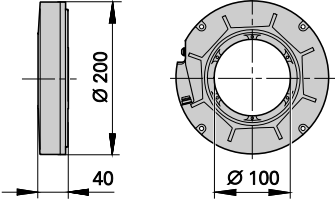


**RCN 8310, RCN 8380, RCN 8390F, RCN 8390M**

	<b>RCN 8310</b>	<b>RCN 8380</b>	<b>RCN 8390F</b>	<b>RCN 8390M</b>
	Integral bearing, integral stator coupling			
<b>Mating Ø flange</b>	180 mm			
<b>System accuracy</b>	± 2"			
<b>Shaft</b>	Hollow shaft Ø 60 mm/100 mm			
<b>Position values/rev</b>	2 <sup>29</sup> = 536 870 912			
<b>Power supply</b>	3.6 V to 14 V			
<b>Absolute position values</b>	EnDat 2.2 without incremental signals	EnDat 2.2 with incremental signals	Fanuc serial interface ai	Mitsubishi high speed interface
<b>Ordering designation</b>	EnDat22	EnDat02	Fanuc05	Mit03-4
<b>Incremental signals</b>	–	≈ 1 Vpp 32768 signal periods/rev	□	
<b>Max. operating temp.</b>	50 °C			
<b>Protection</b>	IP 64			
<b>Electrical connection</b>	Quick disconnect (separate adapter cable connectable to encoder)			
<b>Overall dimensions</b>	Hollow shaft Ø 60 mm		Hollow shaft Ø 100 mm	
<b>ID</b>	Ø 60 mm: 667598-xx  Ø 100 mm: 667592-xx	Ø 60 mm: 667596-xx  Ø 100 mm: 667590-xx	Ø 60 mm: 671081-xx  Ø 100 mm: 671068-xx	Ø 60 mm: 671085-xx  Ø 100 mm: 671070-xx

	QUANTITIES				
	50	20	10	5	1
<b>RCN 8310</b> (without adapter cable)					
Hollow shaft Ø 60 mm	5740.00	6098.75	6457.50	6816.25	7175.00
Hollow shaft Ø 100 mm	6475.20	6879.90	7284.60	7689.30	8094.00
<b>RCN 8380</b> (without adapter cable)					
Hollow shaft Ø 60 mm	6074.40	6454.05	6833.70	7213.35	7593.00
Hollow shaft Ø 100 mm	6808.00	7233.50	7659.00	8084.50	8510.00
<b>RCN 8390F</b> (without adapter cable)					
Hollow shaft Ø 60 mm	6074.40	6454.05	6833.70	7213.35	7593.00
Hollow shaft Ø 100 mm	6808.00	7233.50	7659.00	8084.50	8510.00
<b>RCN 8390M</b> (without adapter cable)					
Hollow shaft Ø 60 mm	6074.40	6454.05	6833.70	7213.35	7593.00
Hollow shaft Ø 100 mm	6808.00	7233.50	7659.00	8084.50	8510.00

**RCN 8510, RCN 8580, RCN 8590F, RCN 8590M**

	RCN 8510	RCN 8580	RCN 8590F	RCN 8590M
	Integral bearing, integral stator coupling			
<b>Mating Ø flange</b>	180 mm			
<b>System accuracy</b>	± 1"			
<b>Shaft</b>	Hollow shaft Ø 60 mm/100 mm			
<b>Position values/rev</b>	2 <sup>29</sup> = 536 870 912			
<b>Power supply</b>	3.6 V to 14 V			
<b>Absolute position values</b>	EnDat 2.2 without incremental signals	EnDat 2.2 with incremental signals	Fanuc serial interface ai	Mitsubishi high speed interface
<b>Ordering designation</b>	EnDat22	EnDat02	Fanuc05	Mit03-4
<b>Incremental signals</b>	–	≈ 1 Vpp 32768 signal periods/rev	□	
<b>Max. operating temp.</b>	50 °C			
<b>Protection</b>	IP 64			
<b>Electrical connection</b>	Quick disconnect (separate adapter cable connectable to encoder)			
<b>Overall dimensions</b>	Hollow shaft Ø 60 mm		Hollow shaft Ø 100 mm	
				
<b>ID</b>	Ø 60 mm: 667599-xx  Ø 100 mm: 667593-xx	Ø 60 mm: 667597-xx  Ø 100 mm: 667591-xx	Ø 60 mm: 671083-xx  Ø 100 mm: 671069-xx	Ø 60 mm: 671086-xx  Ø 100 mm: 671071-xx

	QUANTITIES				
	50	20	10	5	1
<b>RCN 8510</b> (without adapter cable)					
Hollow shaft Ø 60 mm	6741.60	7162.95	7584.30	8005.65	8427.00
Hollow shaft Ø 100 mm	7475.20	7942.40	8409.60	8876.80	9344.00
<b>RCN 8580</b> (without adapter cable)					
Hollow shaft Ø 60 mm	7075.20	7517.40	7959.60	8401.80	8844.00
Hollow shaft Ø 100 mm	7809.60	8297.70	8785.80	9273.90	9762.00
<b>RCN 8590F</b> (without adapter cable)					
Hollow shaft Ø 60 mm	7075.20	7517.40	7959.60	8401.80	8844.00
Hollow shaft Ø 100 mm	7809.60	8297.70	8785.80	9273.90	9762.00
<b>RCN 8590M</b> (without adapter cable)					
Hollow shaft Ø 60 mm	7075.20	7517.40	7959.60	8401.80	8844.00
Hollow shaft Ø 100 mm	7809.60	8297.70	8785.80	9273.90	9762.00