HEIDENHAIN

Product Information

ECN 200 Series

Absolute Angle Encoders

March 2006

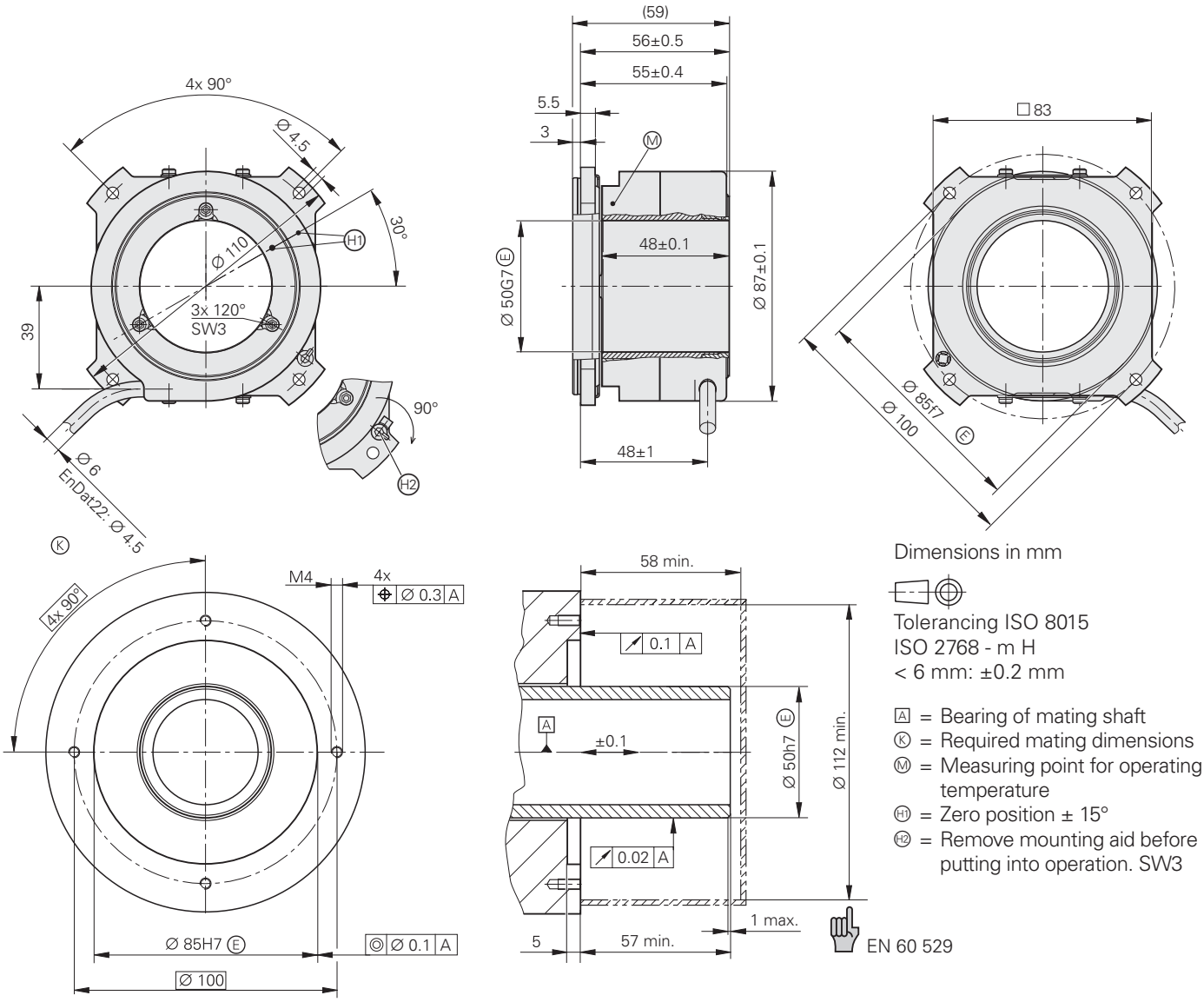
ECN 200 Series

- **Absolute angle encoder with mounted stator coupling**
- **Hollow through shaft with Ø 20 mm and Ø 50 mm**

	ECN 225		**ECN 223 F**	**ECN 223 M**
Absolute position values	EnDat 2.2	EnDat 2.2	Fanuc 02 serial interface	Mitsubishi High-Speed Serial Interface
Ordering designation	EnDat 22	EnDat 02	Fanuc 02	Mit 02-4
Positions per rev	33 554 432 (25 bits)		8 388 608 (23 bits)	
Elec. permissible speed	3000 rpm			
Clock frequency	≤ 8 MHz	≤ 2 MHz	–	
Calculation time t_{cal}	5 µs		–	
Incremental signals	–	~ 1 V_{PP}	–	
Line count	–	2048	–	
Cutoff frequency –3 dB	–	≥ 200 kHz	–	
Recommd. measuring step	0.000 01° (approx. 0.04“)		0.000 04° (approx. 0.15“)	
System accuracy	± 10“			
Power supply	3.6 V to 5.25 V max. 200 mA (without load)			
Electrical connection*	Cable 1 m, with coupling M12	Cable 1 m with coupling M23 or Binder connector, 14-pin	Cable 1 m, with M23 coupling	
Cable length with HEIDENHAIN cable	≤ 150 m		≤ 30 m	
Shaft*	Hollow through shaft D = 20 mm, 50 mm			
Mech. permissible speed	≤ 3000 rpm			
Starting torque at 20 °C	*D = 20 mm:* ≤ 0.1 Nm *D = 50 mm:* ≤ 0.15 Nm			
Moment of inertia of rotor	*D = 20 mm:* 138 · 10^{-6} kgm^2 *D = 50 mm:* 215 · 10^{-6} kgm^2			
Natural frequency	≥ 1000 Hz			
Permissible axial motion of measured shaft	± 0.1 mm			
Vibration 55 to 2000 Hz **Shock** 6 ms	≤ 100 m/s^2 (IEC 60 068-2-6) ≤ 1000 m/s^2 (IEC 60 068-2-27)			
Max. operating temp.	70 °C			
Min. operating temp.	*Moving cable:* –10 °C *Rigid configuration:* –20 °C			
Protection IEC 60 529	IP 64			
Weight	*D = 20 mm:* 0.8 kg *D = 50 mm:* 0.7 kg			

***** Please select when ordering

Hollow Shaft D = 50 mm



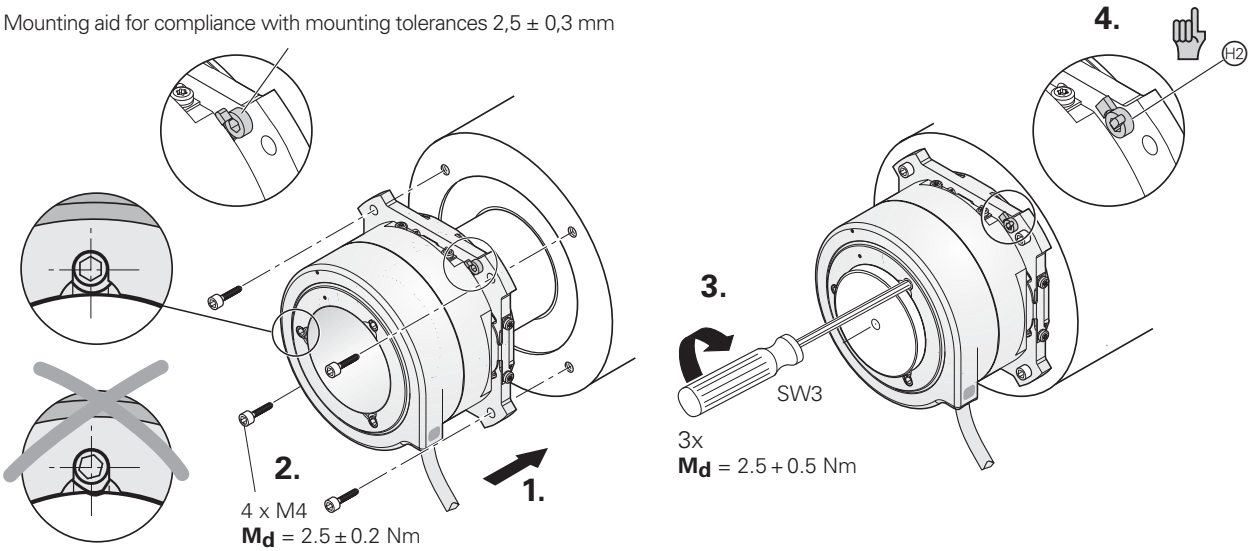
Dimensions in mm

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

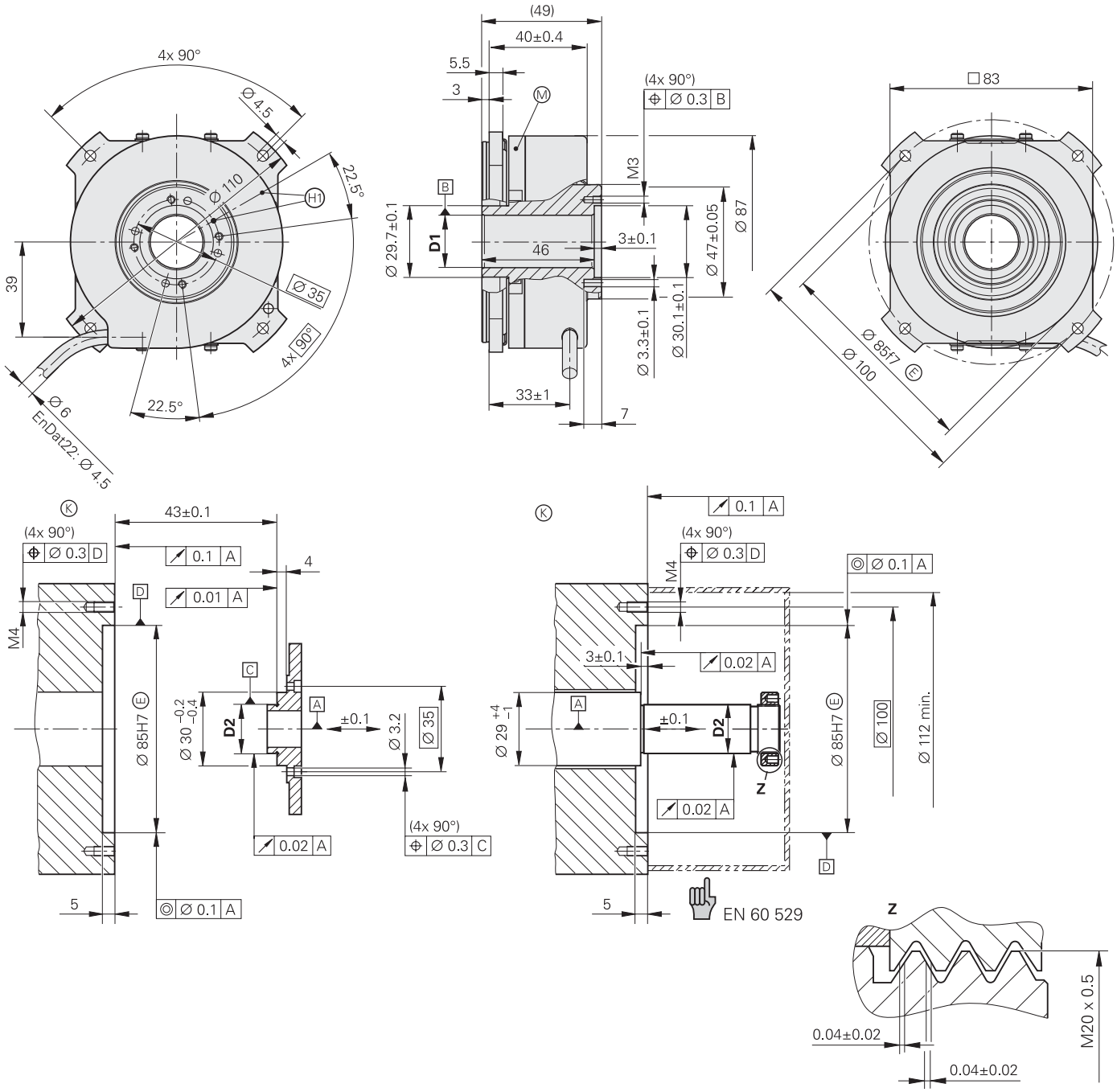
Ⓐ = Bearing of mating shaft
Ⓚ = Required mating dimensions
Ⓜ = Measuring point for operating temperature
Ⓗ1 = Zero position ± 15°
Ⓗ2 = Remove mounting aid before putting into operation. SW3

Mounting

Mounting aid for compliance with mounting tolerances 2,5 ± 0,3 mm



Hollow Shaft D = 20 mm



Dimensions in mm

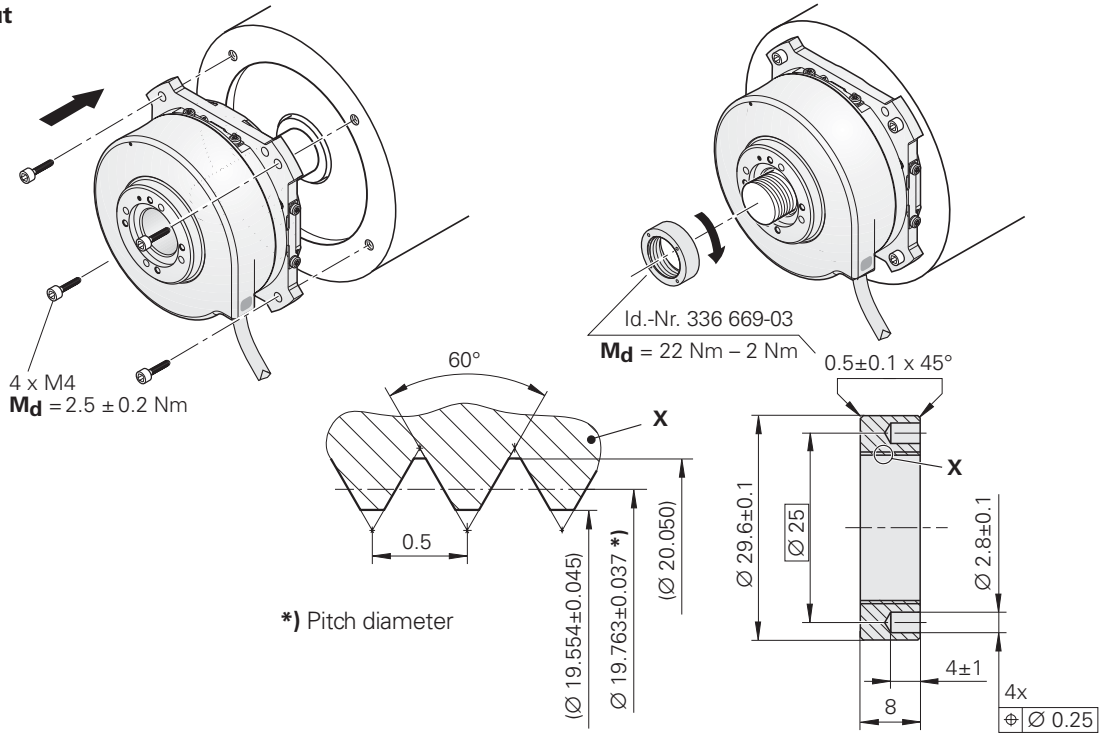
Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm

D1	D2
Ø 20H7 E	Ø 20g7 E
Ø 22H7 E	Ø 22g7 E

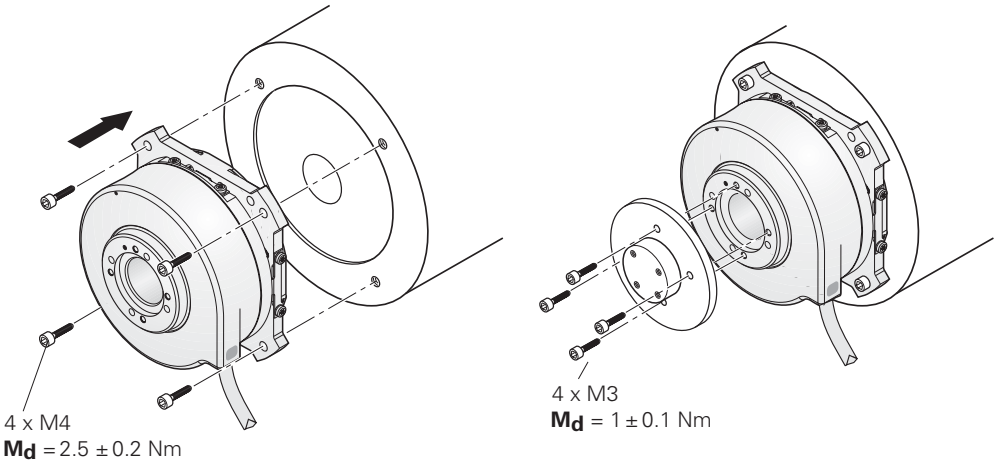
A = Bearing of mating shaft
B = Bearing of encoder
K = Required mating dimensions
M = Measuring point for operating temperature
H1 = Zero position ± 15°

Mounting

Shaft coupling with ring nut

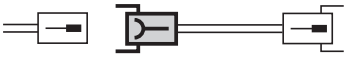
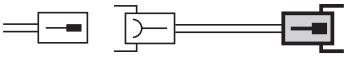
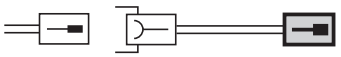
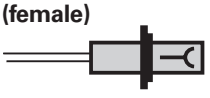
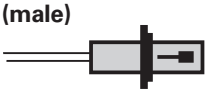
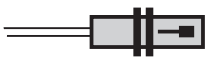


Front end shaft coupling



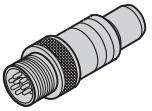
Electrical Connection
ECN 225

			EnDat 22	EnDat 02	
			8-pin M12	**17-pin M23**	**14-pin Binder**
PUR connecting cable	**Ø 6 mm** **Ø 8 mm** **Ø 6 mm**	**8-pin:** [(4 x 0.14 mm²) + (4 x 0.34 mm²)] **17-pin:** [(4 x 0.14 mm²) + 4(2 x 0.14 mm²) + (4 x 0.5 mm²)] **14-pin:** [3(4 x 0.32 mm²) + (4 x 0.32 mm²)]			
Complete with connector (female) and coupling (male)			368330-xx	323897-xx	348824-xx
Complete with connector (female) and D-sub connector (female) for IK 220			530627-xx	332115-xx	–
Complete with connector (female) and D-sub connector (male) for IK 115/IK 215			524599-xx	324544-xx	–
With one connector (female)			559346-xx	309778-xx	–
Cable only, Ø 8 mm			–	266306-xx	–

Mating element on connecting cable for connecting element on encoder	**Connector (female)** for cable Ø 8 mm		–	291697-26	292275-08
Connector on cable for connection to subsequent electronics	**Connector (male)** for cable Ø 8 mm Ø 6 mm		–	291697-27	–
Coupling on connecting cable	**Coupling (male)** for cable Ø 4.5 mm Ø 6 mm Ø 8 mm		–	291698-25 291698-26 291698-27	–
Flange socket for mounting on the subsequent electronics	**Coupling (female)**		–	315892-10	–
Mounted couplings	**With flange (female)** Ø 6 mm Ø 8 mm		–	291698-35	–
	With flange (male) Ø 6 mm Ø 8 mm		–	291698-41 291698-29	–
	With central fastening (male) Ø 6 mm		–	291698-37	–

ECN 225 – EnDat 22

8-pin
coupling M12

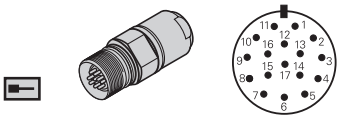


M12

	Power supply				Absolute position values			
M12	**2**	**8**	**1**	**5**	**3**	**4**	**7**	**6**
	U_P[1]	**U_P**	**0 V**[1]	**0 V**	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**
	Blue	Brown/Green	White	White/Green	Gray	Pink	Violet	Yellow

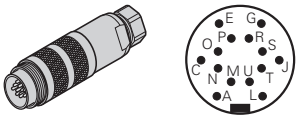
ECN 225 – EnDat 02

17-pin
coupling M23



14-pin
Binder coupling

B



	Power supply				Incremental signals				Absolute position values			
	7	**1**	**10**	**4**	**15**	**16**	**12**	**13**	**14**	**17**	**8**	**9**
B	**O**	**C**	**S**	**N**	**U**	**L**	**T**	**J**	**P**	**E**	**G**	**R**
	U_P	**Sensor U_P**	**0 V**	**Sensor 0 V**	**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

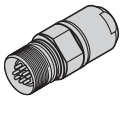
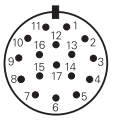
Shield is on housing; **U_P** = power supply
Sensor: The sensor line is connected internally to the respective power supply.
Vacant pins or wires must not be used!
[1] For parallel supply lines

ECN 223 F, ECN 223 M

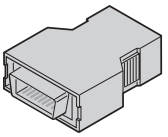
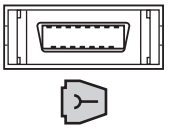
PUR connecting cable Ø 8 mm	**For M23 connecting element, 17 pin** [(4 x 0.14 mm²) + 4(2 x 0.14 mm²) + (4 x 0.5 mm²)]	**ECN 223 F**	**ECN 223 M**
Complete with connector (female) and coupling (male)		349314-xx	349314-xx
With one connector (female)		309778-xx	309778-xx
Complete with M23 connector (female) 17-pin and Fanuc connector [(2 x 2 x 0.14 mm²) + (4 x 1 mm²)]		534855-xx	–
Complete with M23 connector (female) 17-pin and Mitsubishi connector [(2 x 2 x 0.14 mm²) + (4 x 0.5 mm²)]		–	*10-pin:* 573661-xx *20-pin:* 367958-xx

ECN 223 F

17-pin coupling M23

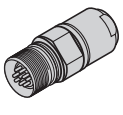
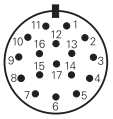
20-pin Fanuc connector Only on connecting cable

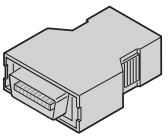
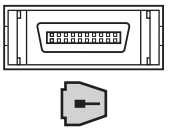
	Power supply				Absolute position values			
	7	**1**	**10**	**4**	**14**	**17**	**8**	**9**
	9	**18/20**	**12**	**14/16**	**1**	**2**	**5**	**6**
	U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**Serial Data**	**$\overline{\text{Serial Data}}$**	**Request**	**$\overline{\text{Request}}$**
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow

ECN 223 M

17-pin coupling M23

10 or 20-pin Mitsubishi connector Only on connecting cable

		Power supply				Absolute position values			
		7	**1**	**10**	**4**	**14**	**17**	**8**	**9**
	10-pin	**1**	**–**	**2**	**–**	**7**	**8**	**3**	**4**
	20-pin	**20**	**19**	**1**	**11**	**6**	**16**	**7**	**17**
		U_P	**Sensor** U_P	**0 V**	**Sensor** 0 V	**Serial Data**	**$\overline{\text{Serial Data}}$**	**Request Frame**	**$\overline{\text{Request}}$ $\overline{\text{Frame}}$**
		Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow

Shield on housing; **U_P** = power supply voltage
Vacant pins or wires must not be used.

Sensor: The sensor line is connected internally with the corresponding power line.

For more information
Brochure: *Angle Encoders*

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