



HEIDENHAIN



Product Information


ECN 200 Series

Absolute Angle Encoders

October 2009

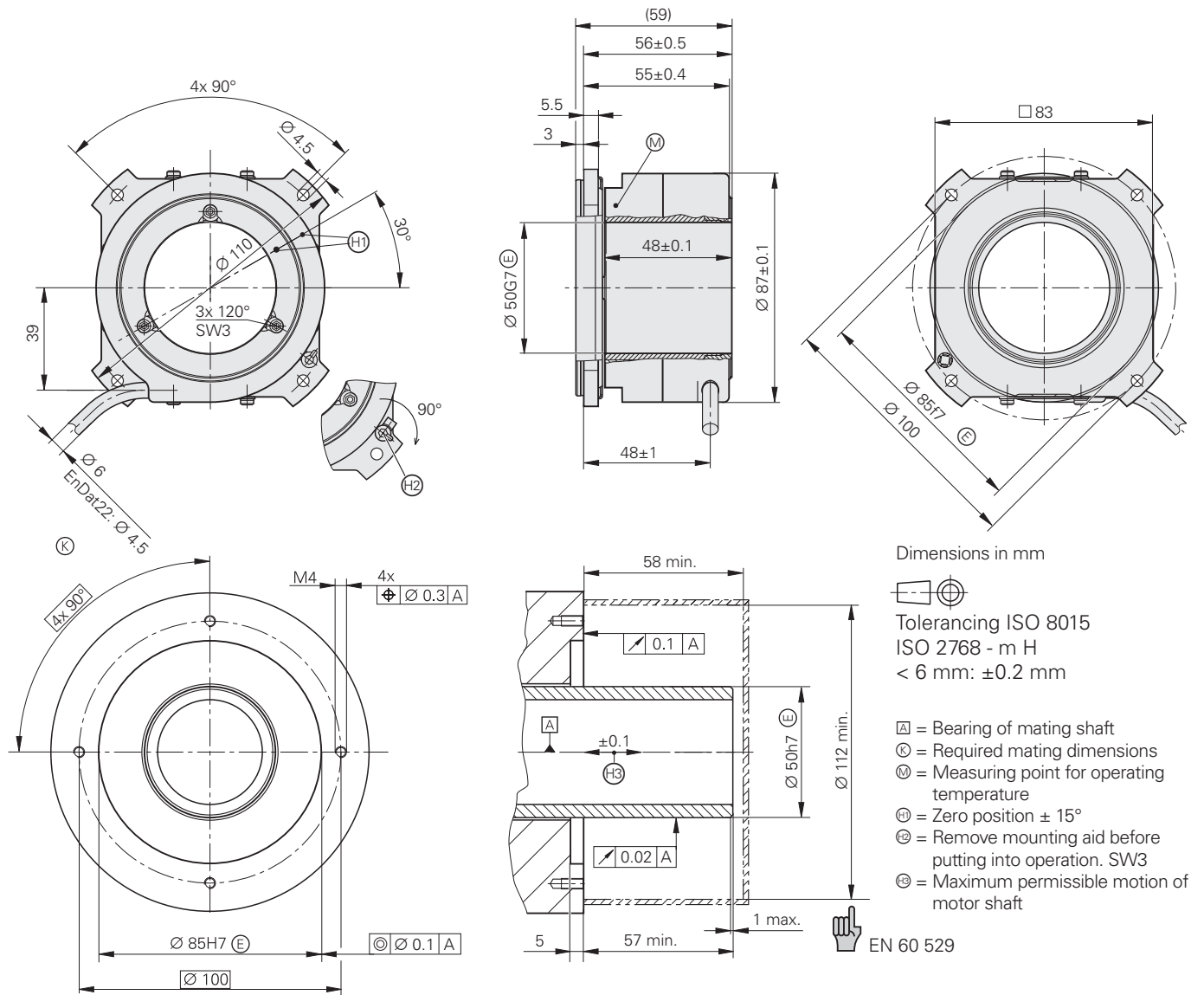
ECN 200 Series

- Absolute angle encoder with mounted stator coupling
- Hollow through shaft with $\varnothing 20$ mm and $\varnothing 50$ mm

	ECN 225		ECN 223F	ECN 223M
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	With 02-4
Positions per revolution	33554432 (25 bits)		8388608 (23 bits)	
Elec. permissible speed	3000 min ⁻¹			
Clock frequency	≤ 8 MHz	≤ 2 MHz	–	
Calculation time t_{cal}	5 μ s		–	
Incremental signals	–	 1 V _{pp}	–	
Line count	–	2048	–	
Cutoff frequency –3 dB	–	≥ 200 kHz	–	
Recommended measuring step	0.00001° (approx. 0.04")		0.00004° (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 M12 coupling	Cable 1 m, with M23 coupling	Cable 1 m, with M12 or M23 coupling	
Cable length with HEIDENHAIN cable	≤ 150 m		≤ 30 m	
Shaft*	Hollow through shaft D = 20 mm, 50 mm			
Mech. permissible speed	≤ 3000 min ⁻¹			
Starting torque at 20 °C	<i>D = 20 mm:</i> ≤ 0.1 Nm <i>D = 50 mm:</i> ≤ 0.15 Nm			
Moment of inertia of rotor	<i>D = 20 mm:</i> 138 · 10 ⁻⁶ kgm ² <i>D = 50 mm:</i> 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 (EN 60068-2-6) ≤ 1000 m/s ² (EN 60068-2-27)			
Max. operating temp.	70 °C			
Min. operating temp.	<i>Moving cable:</i> –10 °C <i>For fixed cable:</i> –20 °C			
Protection EN 60529	IP 64			
Weight	<i>D = 20 mm:</i> 0.8 kg <i>D = 50 mm:</i> 0.7 kg			

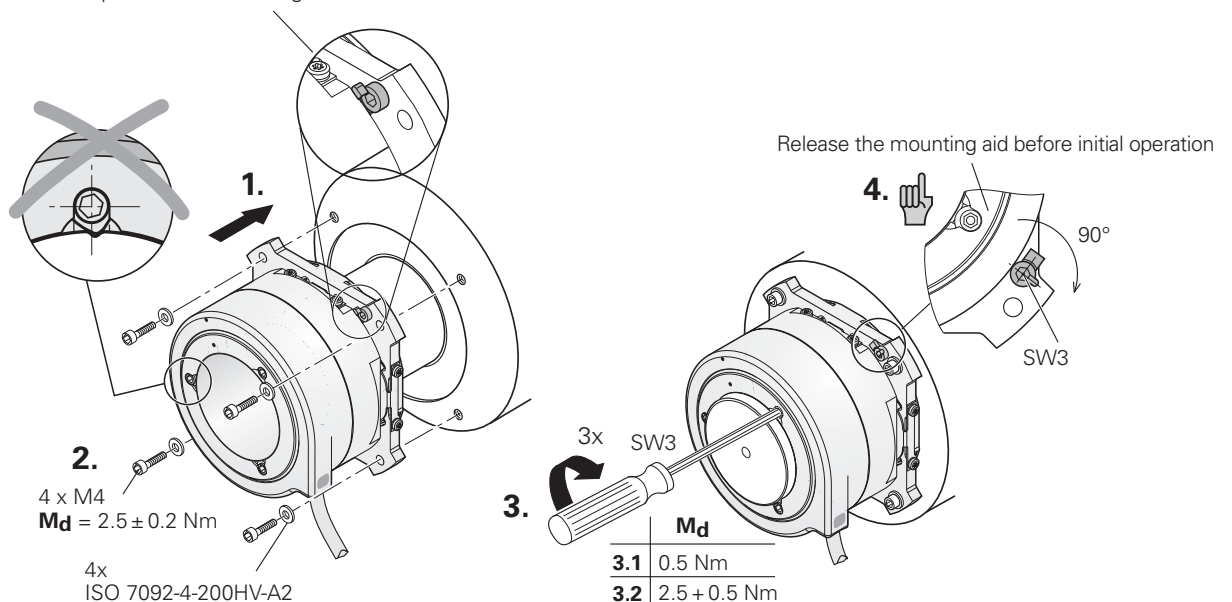
* Please select when ordering

Hollow Shaft D = 50 mm

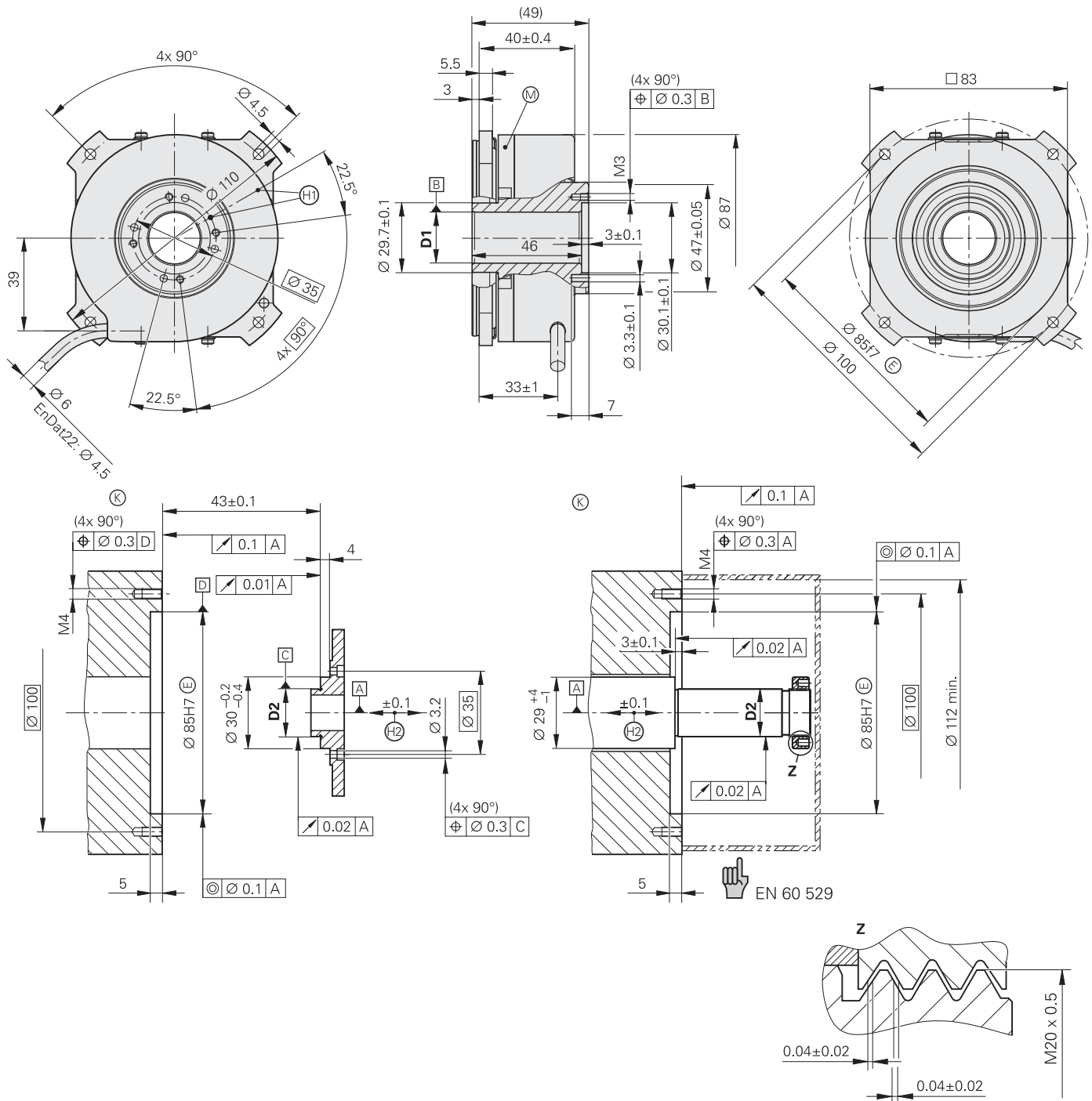


Mounting

Mounting aid ensures compliance with mounting dimension 2.5 ± 0.3 mm



Hollow Shaft D = 20 mm



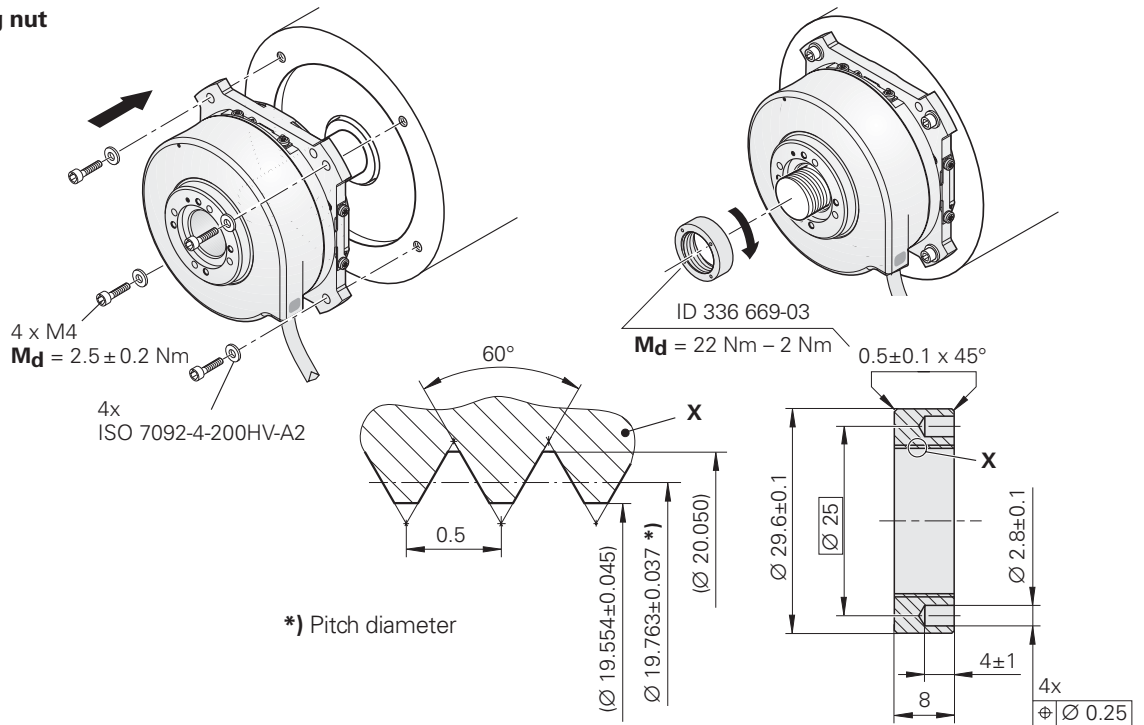
Dimensions in mm



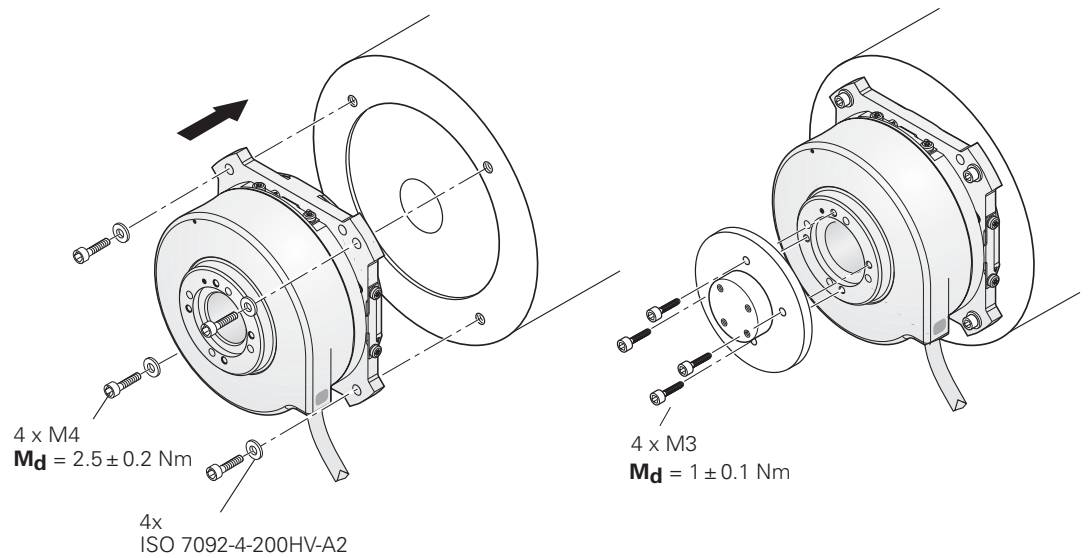
Tolerancing ISO 8015
 ISO 2768 - m H
 < 6 mm: ±0.2 mm

Mounting

Shaft coupling with ring nut



Front end shaft coupling









Electrical Connection

Connecting Cable





EnDat 22

EnDat 02

ECN 225

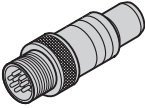




		8-pin M12	17-pin M23
PUR connecting cable	Ø 6 mm Ø 8 mm Ø 6 mm	8-pin: [(4 x 0.14 mm ²) + (4 x 0.34 mm ²)] 17-pin: [(4 x 0.14 mm ²) + 4(2 x 0.14 mm ²) + (4 x 0.5 mm ²)] 14-pin: [3(4 x 0.32 mm ²) + (4 x 0.32 mm ²)]	
Complete with connector (female) and coupling (male)		368330-xx	323897-xx
Complete with connector (female) and D-sub connector (female) for IK 220		533627-xx	332115-xx
Complete with connector (female) and D-sub connector (male) for IK 215		524599-xx	324544-xx
With one connector (female)		634265-xx	309778-xx
With one right-angle connector (female)		606317-xx	-
Cable only , Ø 8 mm		-	266306-xx

ECN 223 F, ECN 223 M


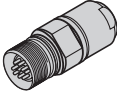
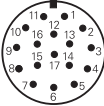


		ECN 223 F		ECN 223 M	
		M12	M23	M12	M23
Connecting cable					
For M12 connecting element Ø 6 mm	8-pin: [(4 x 0.14 mm ²) + (4 x 0.34 mm ²)]				
For M23 connecting element Ø 8 mm	17-pin: [(4 x 0.14 mm ²) + 4(2 x 0.14 mm ²) + (4 x 0.5 mm ²)]				
Complete with connector (female) and coupling (male)		368330-xx	349314-xx	368330-xx	349314-xx
With one connector (female)		634265-xx	309778-xx	634265-xx	309778-xx
Complete with connector (female), 17-pin, and Fanuc connector [(2 x 2 x 0.14 mm ²) + (4 x 1 mm ²)]		-	534855-xx	-	-
Complete with connector (female), 17-pin, and Mitsubishi connector [(2 x 2 x 0.14 mm ²) + (4 x 0.5 mm ²)]		-	-	-	10-pin: 573661-xx 20-pin: 367958-xx

Pin Layout

ECN 225 – EnDat 22

8-pin coupling M12   								
	Power supply				Absolute position values			
 M12	2	8	1	5	3	4	7	6
	U_P¹⁾	U_P	0V¹⁾	0V	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   												
	Power supply				Incremental signals				Absolute position values			
	7	1	10	4	15	16	12	13	14	17	8	9
	U_P	Sensor U_P	0V	Sensor 0V	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 on housing; **U_P** = Power supply voltage

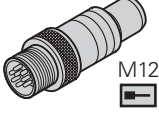


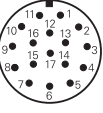
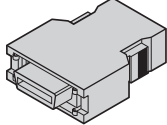
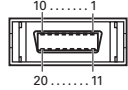




Sensor: The sensor line is connected internally with the corresponding power line

Vacant pins or wires must not be used.

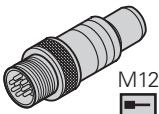

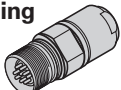
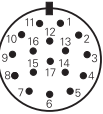
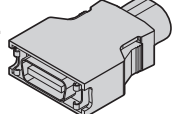
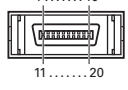




¹⁾ For parallel supply lines

Pin Layout

ECN 223 F

8-pin coupling M12		17-pin coupling M23				20-pin Fanuc connector			
								Only on connecting cable	
	Power supply				Absolute position values				
	M12	2	8	1	5	3	4	7	6
	M23	7	1	10	4	14	17	8	9
		9	18/20	12	14/16	1	2	5	6
	U_P	Sensor U_P	0V	Sensor 0V	Serial Data	Serial Data	Request	Request	
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow	

ECN 223 M

8-pin coupling M12		17-pin coupling M23				10 or 20-pin Mitsubishi connector			
								Only on connecting cable	
	Power supply				Absolute position values				
	M12	2	8	1	5	3	4	7	6
	M23	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	0V	Sensor 0V	Serial Data	Serial Data	Request	Request	
	Brown/Green	Blue	White/Green	White	Gray	Pink	Violet	Yellow	

Shield on housing; U_P = Power supply voltage

Sensor: The sensor line is connected in the encoder with the corresponding power line

Vacant pins or wires must not be used.

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For more information

Brochure: *Angle Encoders*