



HEIDENHAIN



Product Information

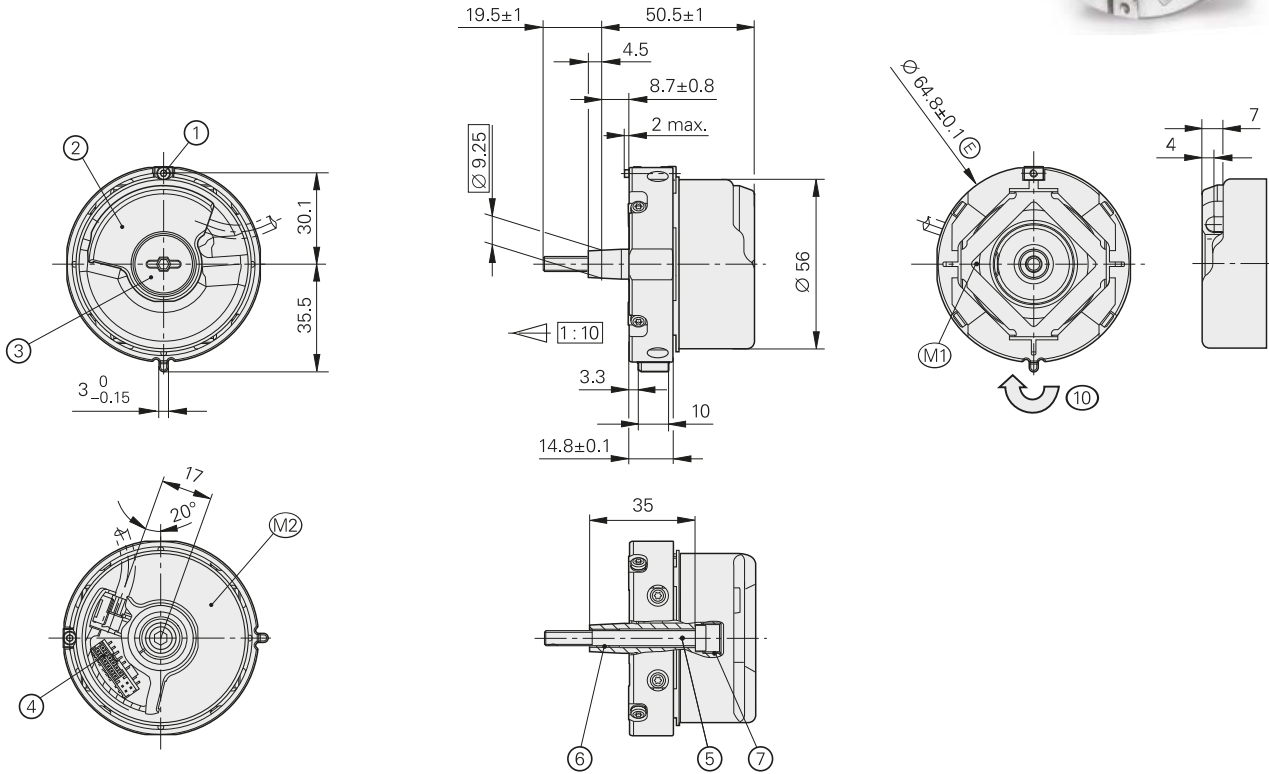
EQN 1337 F

Absolute Rotary Encoder
with Tapered Shaft for
Fanuc Controls with
 α i Interface

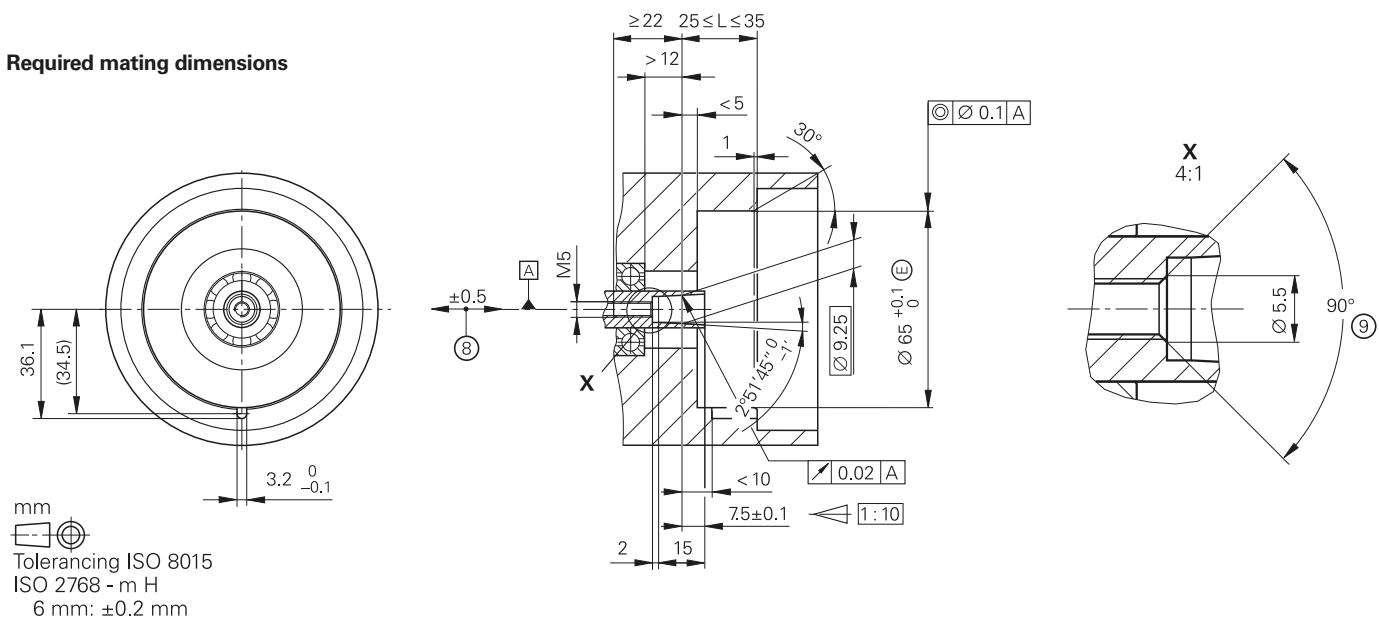
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Rotary encoders for absolute position values

- Installation diameter 65 mm
- Expanding ring coupling, 07B
- Taper shaft, 65B



Required mating dimensions



mm

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

- ▣ = Bearing of mating shaft
- Ⓜ1 = Measuring point for operating temperature
- Ⓜ2 = Measuring point for vibration, see D 741714
- ① = Clamping screw for coupling ring, width A/F 2, tightening torque 1.25 Nm – 0.2 Nm
- ② = Die-cast cover
- ③ = Screw plug width A/F 3 and 4, tightening torque 5 Nm + 0.5 Nm
- ④ = Pin header, 16-pin
- ⑤ = Self-locking screw as per DIN 6912 – M5x50 SW4, tightening torque 5 Nm + 0.5 Nm
- ⑥ = Back-off thread, M6
- ⑦ = Back-off thread, M10
- ⑧ = Compensation of mounting tolerances and thermal expansion, no dynamic motion permitted
- ⑨ = Chamfer at start of thread is obligatory for materially bonding anti-rotation lock
- ⑩ = Direction of rotation for ascending position values

Specifications	EQN 1337 F – Multiturn
These data apply for	ID 1087512-04
Interface	Fanuc serial α i interface
Ordering designation	Fanuc06
Position values/revolution	33554 432 (25 bits)
Revolutions	4096 (12 bits)
Calculation time t_{cal}	$\leq 5 \mu s$
System accuracy	$\pm 20''$
Electrical connection	PCB connector 16-pin with connection for temperature sensor ¹⁾
Cable length	≤ 30 m
Voltage supply	DC 3.6 V to 14 V
Power consumption ²⁾ (maximum)	At 3.6 V: ≤ 750 mW At 14 V: ≤ 850 mW
Current consumption (typical)	At 5 V: 100 mA (without load)
Shaft	Tapered shaft $\varnothing 9.25$ mm; taper 1:10 (65B)
Speed	≤ 12000 rpm
Starting torque at 20 °C	≤ 0.01 Nm
Moment of inertia of rotor	2.6×10^{-6} kgm ²
Angular acceleration of rotor	$\leq 1 \times 10^5$ rad/s ²
Natural frequency of the stator coupling (typical)	1800 Hz
Axial motion of measured shaft	$\leq \pm 0.5$ mm
Vibration 55 Hz to 2000 Hz Shock 6 ms	≤ 300 m/s ² (EN 60068-2-6); 10 Hz to 55 Hz, constant over 4.9 mm peak to peak ≤ 2000 m/s ² (EN 60068-2-27)
Operating temperature	-30 °C to +100 °C
Relative humidity	≤ 93 % (+40 °C/21 d as per EN 60068-2-78); without condensation
Protection EN 60 529	IP40 (see <i>Insulation</i> under <i>General mechanical information</i> in the brochure <i>Encoders for Servo Drives</i> ; contamination from the ingress of liquid must be prevented)
Mass	≈ 0.25 kg

¹⁾ See *Temperature measurement in motors* in the brochure *Encoders for Servo Drives*

²⁾ See *General electrical information* in the *Interfaces of HEIDENHAIN Encoders* brochure

Integrated temperature evaluation

Information for the connection of an external temperature sensor

- The external temperature sensor must comply with the following prerequisites as per EN 61800-5-1:
 - Voltage class A
 - Contamination level 2
 - Overvoltage category 3
- Only connect passive temperature sensors
- The connections for the temperature sensor are galvanically connected with the encoder electronics.
- Depending on the application, the temperature sensor assembly (sensor + cable assembly) is to be mounted with double or reinforced insulation from the environment.
- Accuracy of temperature measurement depends on the temperature range.
- Comply with tolerance of the temperature sensor
- The transmitted temperature value is not a safe value in the sense of functional safety
- The motor manufacturer is responsible for the quality and accuracy of the temperature sensor, as well as for ensuring that electrical safety is maintained
- Use a crimp connector with a suitable temperature range (e.g. up to +150 °C ID 1148157-01)

The accuracy of temperature measurement depends on the sensor used and the temperature range.

	KTY84-130
–31 °C to +80 °C	±6 K
+80.1 °C to +160 °C	±2 K
+160.1 °C to +200 °C	±6 K
+200.1 °C to +223 °C	±12 K

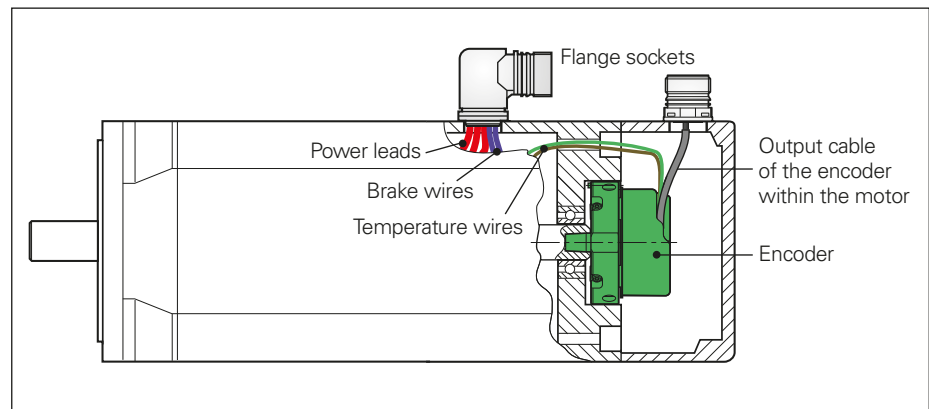
Connectable temperature sensors

The temperature evaluation within the rotary encoder is designed for a KTY 84-130 PTC thermistor.

The table shows the relationship between the output value and the resistance of the temperature sensor.

For the KTY 84-130, the temperature value equals the output value. The value unit is 1 kelvin.

Temperature output value In °C	Resistance (typical) In Ω	
	Binary	
	00000000	>1980
223	11111111	1980
222	11111110	1969
...
130	10100010	1177
...
100	10000100	988
...
25	00111001	610
...
0	00100000	508
–1	00011111	503
...
–30	00000010	395
–31	00000001	392
	00000000	<392





Cable configuration of the temperature wires in the motor

Specifications of the evaluation	
Resolution	1 K
Power supply of sensor	3.3 V over dropping resistor $R_V = 2 \text{ k}\Omega$
Measuring current typically	1.2 mA at 595 Ω 1.0 mA at 990 Ω
Total delay of temperature evaluation ¹⁾	160 ms max.
Cable length ²⁾ with wire cross section of 0.16 mm ² with TPE or 0.25 mm ² with cross-linked polyolefin	≤ 1 m



¹⁾ Filter time constants and conversion time are included. The time constant/response delay of the temperature sensor and the time lag for reading out data through the device interface are not included here.

²⁾ Limit of cable length due to interference. The measuring error due to the line resistance is negligible.

Electrical connection


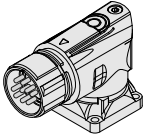
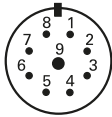

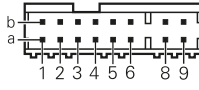



Cable inside the motor housing with wires for temperature sensor		
Cable design	$A_P = 2 \times 0.06 \text{ mm}^2$ $\varnothing 3.7 \text{ mm EPG (with shield crimping } \varnothing 6..1 \text{ mm)} 1 \times (4 \times 0.06 \text{ mm}^2) + 4 \times 0.06 \text{ mm}^2$ and TPE wires $2 \times 0.16 \text{ mm}^2$ for temperature sensor	
Complete PCB connector, 16-pin/SpeedTEC M23 right-angle flange socket (male) 9-pin		1120948-01
With one connector PCB connector, 16-pin/Cable cut off		1108076-01

A_P = Cross section of power supply lines

PUR connecting cables		
Cable design	$A_P 2 \times 0.16 \text{ mm}^2$ $\varnothing 6 \text{ mm}, 2 \times (2 \times 0.09 \text{ mm}^2) + 2 \times (2 \times 0.16 \text{ mm}^2)$	
Complete M23 connector, female, 9-pin/ M12 coupling, male, 8-pin		1136863-xx
Complete M23 connector, female, 9-pin/ D-sub connector 2-row with locking screws, male, 15-pin		1173166-xx

A_P = Cross section of power supply lines

Pin layout

Angle flange socket, SpeedTEC M23, 9-polig					PCB connector, 16-pin					
										
	Voltage supply				Serial data transfer				Other signals ¹⁾	
	3	7	4	8	5	6	1	2	/	/
	1b	6a	4b	3a	6b	1a	2b	5a	8a	8b
	Brown/ Green	Blue	White/ Green	White	Gray	Pink	Violet	Yellow	Brown	Green
	U_P	Sensor U _P	0V	Sensor 0V	DATA	DATA	Request	Request	T⁺²⁾	T⁻²⁾

Cable shield connected to housing

U_P = Voltage supply; **T** = Temperature

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

Vacant pins or wires must not be used.

¹⁾ Only for adapter cables within the motor

²⁾ Connections for external temperature sensor; evaluation optimized for KTY 84-130 (see *Temperature measurement in motors* in the brochure *Encoders for Servo Drives*)


SpeedTEC is a registered trademark of TE Connectivity Industrial GmbH.


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This Product Information supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Information document edition valid when the order is made.



For more information:

Comply with the requirements described in the following documents to ensure the correct operation of the encoder:

- Brochure: *Encoders for Servo Drives* 208922-xx
- Brochure *Interfaces of HEIDENHAIN Encoders* 1078628-xx
- Mounting Instructions: *EQN 1337 F* 1125136-xx

For brochures and product information documents, visit **www.heidenhain.de**.