

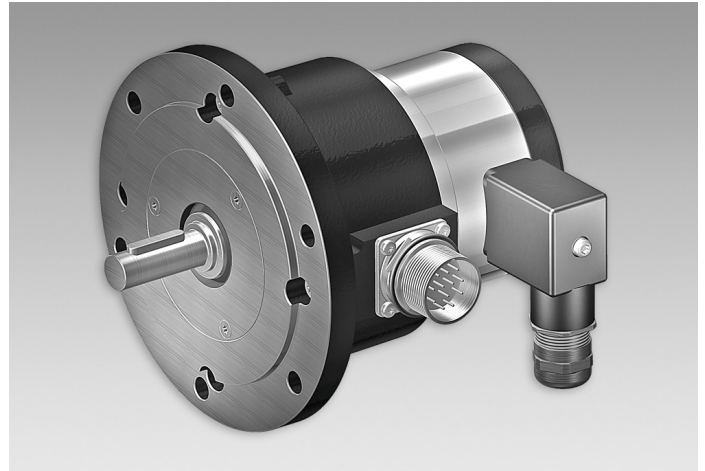
FOG 9 + GT 7

Encoder and tachogenerator in combination

Solid shaft with EURO flange B10 / 100...5000 pulses per revolution

Overview

- Compact, robust die-cast housing
- Flange connector with metal mating connector
- EURO flange B10 / solid shaft $\varnothing 11$ mm
- Temperature compensation of tacho voltage as standard
- Open circuit voltage 10...60 mV per rpm



Technical data

Technical data - electrical ratings (encoder)

Voltage supply	9...30 VDC; 5 VDC ± 5 %
Consumption w/o load	≤ 100 mA
Pulses per revolution	100 ... 5000
Phase shift	$90^\circ \pm 20^\circ$
Duty cycle	40...60 %
Reference signal	Zero pulse, width 90°
Output frequency	≤ 120 kHz ≤ 300 kHz (on request)
Output signals	K1, K2, K0 + inverted Error output (option EMS)
Output stages	HTL TTL/RS422

Technical data - electrical ratings (tachogenerator)

Reversal tolerance	≤ 0.1 %
Linearity tolerance	≤ 0.15 %
Temperature coefficient	± 0.05 %/K (open-circuit)
Isolation class	B
Calibration tolerance	± 5 %
Climatic test	Humid heat, constant (IEC 60068-2-3, Ca)
Performance	GT 7.08: 0.3 W (speed ≥ 5000 rpm) GT 7.16: 0.6 W (speed ≥ 5000 rpm)
Armature-circuit time-constant	< 4 μ s
Open-circuit voltage	10...60 mV per rpm

Technical data - mechanical design

Size (flange)	$\varnothing 115$ mm
Shaft type	$\varnothing 11$ mm solid shaft
Admitted shaft load	≤ 200 N axial ≤ 300 N radial
Flange	EURO flange B10
Protection EN 60529	IP 55
Operating speed	≤ 10000 rpm
Operating torque typ.	6 Ncm
Rotor moment of inertia	160 gcm ²
Material	Housing: aluminium die-cast Shaft: stainless steel
Operating temperature	-30...+100 °C -25...+100 °C (> 3072 pulses)
Resistance	IEC 60068-2-6 Vibration 10 g, 10-2000 Hz IEC 60068-2-27 Shock 100 g, 6 ms
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions C4 according to ISO 12944-2
Connection	Flange connector M23, 12-pin Screw terminal connector Connecting cable (option)
Weight approx.	1.3 kg (GT 7.08) 1.6 kg (GT 7.16)
Interference immunity	EN 61000-6-2
Emitted interference	EN 61000-6-3
Approval	CE

Optional

- Connecting cable
- Function control with EMS (Enhanced Monitoring System)

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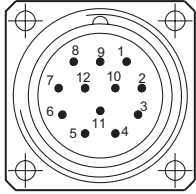
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Terminal assignment

View A (see dimension)

Assignment flange connector encoder

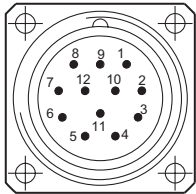


Flange connector M23,
male, 12-pin,
clockwise (CW)

Pin	Assignment
1	$\overline{K2}$
2	dnu
3	K0
4	$\overline{K0}$
5	K1
6	$\overline{K1}$
7	dnu
8	K2
9	dnu
10	0V ($\perp$)
11	dnu
12	+UB

Option EMS: View A (see dimension)

Assignment flange connector encoder



Flange connector M23,
male, 12-pin,
clockwise (CW)

Pin	Assignment
1	$\overline{K2}$
2	dnu
3	K0
4	$\overline{K0}$
5	K1
6	$\overline{K1}$
7	$\overline{Err}$
8	K2
9	0V ($\perp$) @ $\overline{Err}$
10	0V ($\perp$)
11	dnu
12	+UB

Terminal assignment

Assignment connecting cable

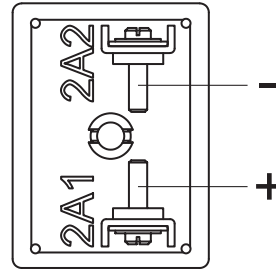
Encoder with connection cable, no EMS output is possible.

Wire colour	Assignment
Red	+UB
Blue	0V ($\perp$)
White	K1
Brown	$\overline{K1}$
Green	K2
Yellow	$\overline{K2}$
Grey	K0
Pink	$\overline{K0}$

View B (see dimension)

Connecting terminal

Polarity for positive rotating direction



Terminal significance

Encoder incremental

+UB	Voltage supply
0V ($\perp$)	Ground
K1	Output signal channel 1
$\overline{K1}$	Output signal channel 1 inverted
K2	Output signal channel 2 (offset by 90° to channel 1)
$\overline{K2}$	Output signal channel 2 inverted
K0	Zero pulse (reference signal)
$\overline{K0}$	Zero pulse inverted
$\overline{Err}$	Error output (option EMS)
dnu	Do not use

FOG 9 + GT 7

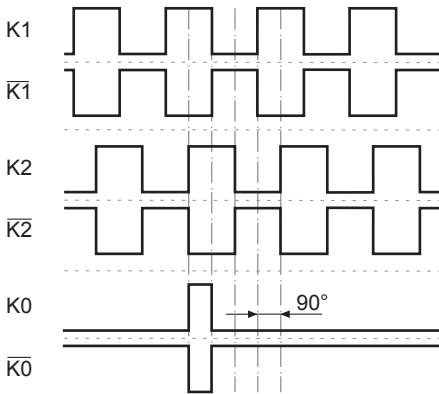
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Output signals

HTL/TTL

At positive rotating direction (see dimension)



Option EMS: Status LED / error output

Flash light red*	Error of signal sequence, zero pulse or pulses (Error output = HIGH-LOW alternation)
Red	Overload output transistors (Error output = LOW)
Flash light green	Device o.k., rotating (Error output = HIGH)
Green	Device o.k., stopped (Error output = HIGH)
No light	No voltage supply connection or wrong connection (Error output = LOW)

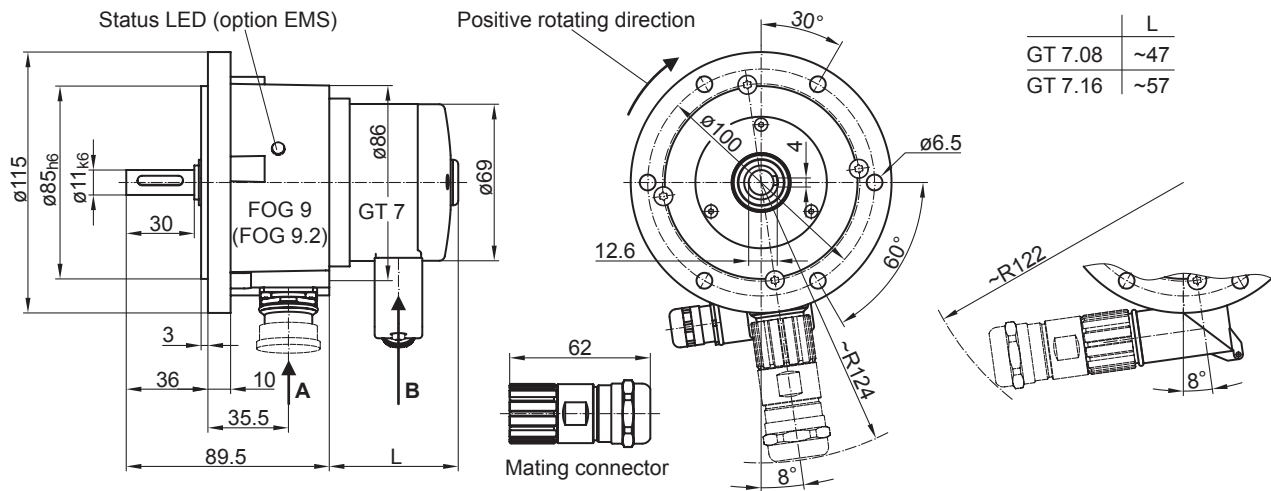
* Only at rotating device

FOG 9 + GT 7

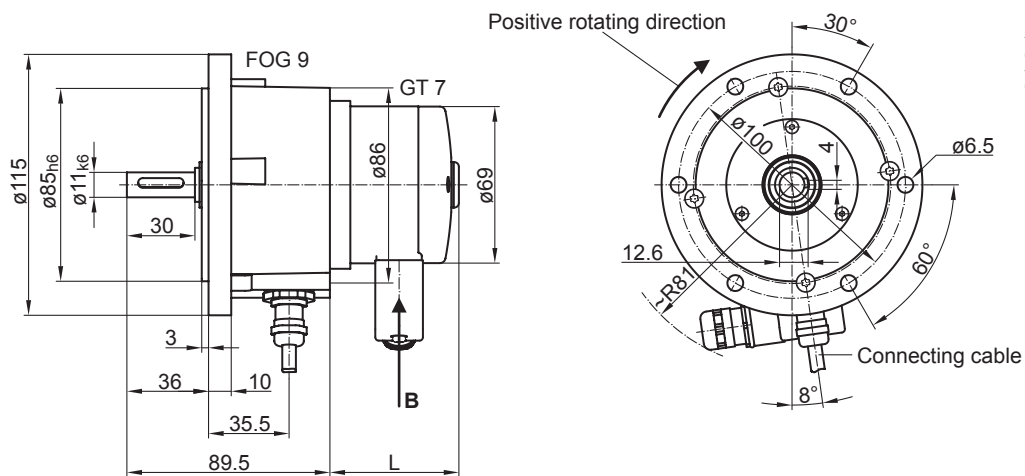
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Dimensions



FOG 9 with flange connector



FOG 9 with connecting cable

FOG 9 + GT 7

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Solid shaft with EURO flange B10 / 100...5000 pulses per revolution

Ordering reference

	FOG9	##	DN	####	###	+GT7	#####
Product							
Incremental encoder + tachogenerator	FOG9						
EMS - Enhanced Monitoring System							
Without EMS							
With EMS		.2					
Output signals							
K1, K2, K0			DN				
Pulse number⁽¹⁾							
100				100			
120				120			
128				128			
180				180			
192				192			
200				200			
250				250			
256				256			
300				300			
360				360			
400				400			
500				500			
512				512			
600				600			
720				720			
900				900			
1000				1000			
1024				1024			
1200				1200			
1250				1250			
2048				2048			
2500				2500			
3072				3072			
4096				4096			
5000				5000			
Voltage supply / output stage							
9...30 VDC / output stage HTL with inverted signals					I		
5 VDC / output stage TTL with inverted signals					TTL		
9...30 VDC / output stage TTL with inverted signals					R		
Version tachogenerator							
Tachogenerator GT 7						+GT7	
Open-circuit voltage							
10 mV per rpm							.08L/410
20 mV per rpm							.08L/420
30 mV per rpm							.08L/430
40 mV per rpm							.16L/440
60 mV per rpm							.16L/460

(1) Other pulse numbers on request.

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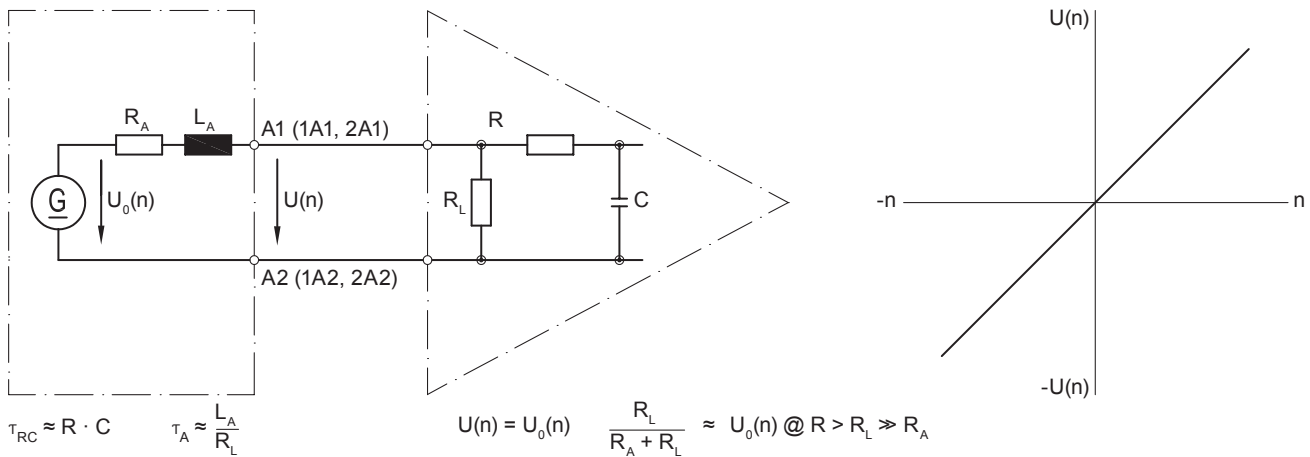
Data according to type

Type	Off-load voltage U_0 [mV/rpm]	Minimum load required depending on speed range [rpm]			Maximum operating speed n_{max} [rpm]	Armature resistance R_A (20°C) [Ω]	Armature inductance L_A [mH]
		0-3000 R_L [kΩ]	0-6000 R_L [kΩ]	0- n_{max} R_L [kΩ]			
GT7.08L/410	10	≥5	≥12	≥27	9000	60	20
GT7.08L/420	20	≥20	≥48	≥108	9000	230	80
GT7.08L/430	30	≥45	≥108	≥243	9000	550	180
GT7.16L/440	40	≥40	≥96	≥216	9000	410	160
GT7.16L/460	60	≥90	≥215	≥223	6100	760	360

Superimposed ripple (for $\tau_{RC} = 0.3$ ms): ≤0.6% (peak-peak) ≤0.25% (rms)

Equivalent circuit diagram

Tachogenerator



Polarity for positive rotating direction (see dimension) / A1 (1A1, 2A1): + (VDE) / A2 (1A2, 2A2): - (VDE)

Accessories

Mounting accessories

Spring disk coupling K 35 (shaft ø6...12 mm)

Spring disk coupling K 50 (shaft ø11...16 mm)

Spring disk coupling K 60 (shaft ø11...22 mm)