

# Absolute encoders - SSI

## Blind or through hollow shaft $\varnothing 12$ mm

### Optical singleturn encoders 12 bit

#### BFF, BFG SSI



BFF SSI with blind hollow shaft

#### Features

- Encoder singleturn / SSI
- Optical sensing
- Resolution: 12 bit
- Small profile depth
- Counting direction input
- Blind or through hollow shaft  $\varnothing 12$  mm

#### Technical data - electrical ratings

Voltage supply	10...30 VDC
Consumption typ.	70 mA (24 VDC, w/o load)
Initializing time typ.	170 ms after power on
Interface	SSI
Function	Singleturn
Steps per turn	4096 / 12 bit
Absolute accuracy	$\pm 0.025^\circ$
Sensing method	Optical
Code	Gray
Code sequence	CW/CCW coded by connection
Inputs	UP/DOWN SSI clock
Output stages	SSI data: linedriver RS485
Interference immunity	DIN EN 61000-6-2
Emitted interference	DIN EN 61000-6-3
Diagnostic functions	Self-diagnosis Code continuity check
Approval	UL approval / E217823

#### Technical data - mechanical design

Size (flange)	$\varnothing 58$ mm
Protection DIN EN 60529	IP 42, IP 65
Operating speed	$\leq 12000$ rpm (mechanical) $\leq 6000$ rpm (electric)
Operating temperature	0...+65 °C
Relative humidity	95 % non-condensing
Resistance	DIN EN 60068-2-6 Vibration 10 g, 10-200 Hz DIN EN 60068-2-27 Shock 50 g, 11 ms
Weight approx.	300 g
Connection	Connector M23, 12-pin Cable 2 m

#### BFF

Shaft type	$\varnothing 12$ mm (blind hollow shaft)
Operating torque typ.	0.009 Nm (IP 42) 0.037 Nm (IP 65)
Materials	Housing: aluminium Housing: steel (connection -5) Flange: aluminium

#### BFG

Shaft type	$\varnothing 12$ mm (through hollow shaft)
Operating torque typ.	0.0175 Nm (IP 42) 0.047 Nm (IP 65)
Materials	Housing: aluminium Flange: aluminium

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#### Part number

##### Blind hollow shaft

BFF 0G. 24C 4096 - -

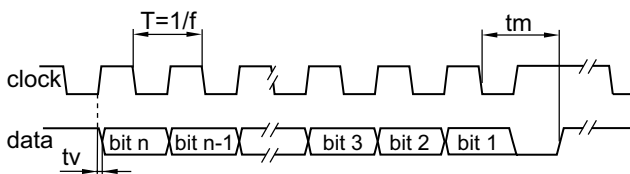
Connection  
 5 Cable 2 m, radial  
 A Connector radial 12-pin  
  
 Blind hollow shaft  
 12  $\varnothing 12$  mm, IP 42  
 B2  $\varnothing 12$  mm, IP 42, with clamping ring  
 E2  $\varnothing 12$  mm, IP 65, with clamping ring  
 L2  $\varnothing 12$  mm, IP 65  
  
 Resolution  
 4096 12 bit singleturn  
  
 Voltage supply / signals  
 24C 10...30 VDC / SSI

##### Through hollow shaft

BFG 0G. 24C 4096 - -

Connection  
 5 Cable 2 m, radial  
 A Connector radial 12-pin  
  
 Through hollow shaft  
 B2  $\varnothing 12$  mm, IP 42, with clamping ring  
 E2  $\varnothing 12$  mm, IP 65, with clamping ring  
  
 Resolution  
 4096 12 bit singleturn  
  
 Voltage supply / signals  
 24C 10...30 VDC / SSI

#### Data transfer



Clock frequency f	100...1000 kHz
Duty cycle of T	40...60 %
Delay time tv	200 ns
Monoflop time tm	20 $\mu$ s + T/2

#### Trigger level

Control inputs	Input circuit
Input level Low	<0,4 V (>2 ms)
Input level High	+Vs or open

#### Accessories

##### Connectors and cables

10116717	Female connector M23, 12-pin, straight, without cable
10130372	Female connector M23, 12-pin, straight, 2 m cable BFF/BFG
10130373	Female connector M23, 12-pin, straight, 5 m cable BFF/BFG

##### Mounting accessories

10110616	Clamp set $\varnothing 15$ mm
10107540	Torque pin
10109520	Torque spring
10136635	Set of spring washers for encoders $\varnothing 58$ mm
10142556	Clamping ring set for 12 mm hollow shaft

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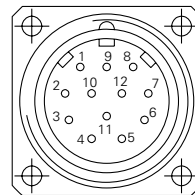
##### Terminal significance

+Vs	Encoder supply voltage.
0 V	Encoder ground connection relating to +Vs.
Data+	Positive, serial data output of differential linedriver.
Data-	Negative, serial data output of differential linedriver.
Clock+	Positive SSI clock input. Clock+ together with Clock- forms a current loop. A current of approx. 7 mA towards Clock+ input means logic 1 in positive logic.
Clock-	Negative SSI clock input. Clock- together with Clock+ forms a current loop. A current of approx. 7 mA towards Clock- input means logic 0 in positive logic.
UP/DOWN	UP/DOWN counting direction input. This input is standard on High. UP/DOWN means ascending output data with clockwise shaft rotation when looking at flange. UP/DOWN-Low means ascending values with counterclockwise shaft rotation when looking at flange.
DATAVALID	Diagnostic output. An error warning is given at level High. Important: Interferences must be drained by the downstream electronics.
Rot. direction	Ascending position values when looking at the flange and rotating the shaft clockwise.

##### Terminal assignment

##### Cable / Connector M23 male for connection references -A and -5

Connector	Core colour	Signals	Description
Pin 1	yellow	Clock-	Clock signal
Pin 2	green	Clock+	Clock signal
Pin 3	grey	Data+	Data signal
Pin 4	pink	Data-	Data signal
Pin 5	–	n.c.	–
Pin 6	–	n.c.	–
Pin 7	–	n.c.	–
Pin 8	blue	UP/DOWN	Counting dir.
Pin 9	red	DATAVALID	Diagnostic outp.
Pin 10	–	n.c.	–
Pin 11	brown	+Vs	Supply voltage
Pin 12	white	0 V	Supply voltage
Screen	connected to housing		
Cable data	8 x 0,14 mm <sup>2</sup>		



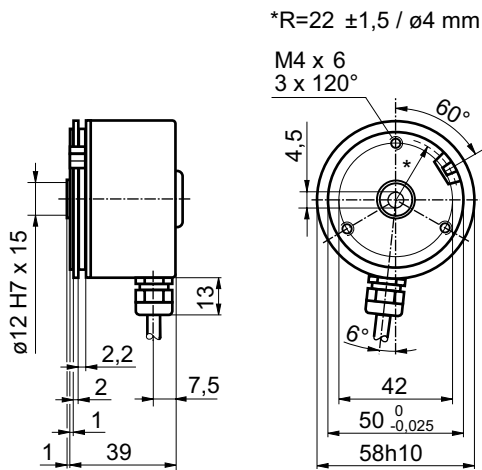
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## Dimensions

BFF SSI



BFG SSI

