Blackbird OECD (12CH, CNO) Measuring device

Product Description

The Blackbird OECD is a fiber optical measurement device for measuring the wavelength of fiber Bragg grating sensors (for example temperature, strain or acceleration).

The advantages of fiber optical measurement technology include a high durability of the sensors without EMC, ESD or insulation problems.

The Blackbird OECD prevents aliasing effects and enables control applications and vibration measurements according to DIN 45662.

Highlights

- 12 channels for Fiber Bragg grating sensors.
- True anti-aliasing
- Synchronous sampling
- Ethernet Interface
- CAN Interface

Mechanical Data

Property	Value	Unit
Length	186	mm
Height	141	mm
Width	148	mm
Total weight*	1.6	kg

* Blackbird OECD without packaging

Property	Value	Unit
Mounting	4x M6	-

Electrical Data

Property	Value	Unit
Power supply	10 ... 28	V DC
Power consumption	15	W
Electrical connector	MC 1,5/ 2-GF-3,81	

Optical Data

Property	Value	Unit
Connector type	E-2000/APC	-
Fiber type	SMF 28 compatible	-
Output power per channel (max.)	< 10	mW
Output power per channel (typical)	0.5 ... 1	mW
Laser Class (DIN EN 60825-1)	1	-

Measurement and Sensors

Measuring Properties

Property	Value	Unit
Channels	12	-
Measuring range	1545.5 1561.0	nm
Absolute precision (Measuring range 1546.0 1558.0 nm)	50	pm
Absolute precision (Measuring range 1545.5 1561.0 nm)	150	pm
Wavelength stability over the temperature range	20	pm
Noise[1]	< 1	pm
Resolution[2]	< 0.01	pm
Warm-up time[3]	20	min
3 dB cut-off frequency	500	Hz
Internal sample synchrony	< 300	µs
External sample synchrony (ETH) (Precision Time Protocol)	< 300	µs
External sample synchrony (CAN)[4]	< 1	ms

1 Standard deviation at a sampling frequency of 5 Hz.

2 At wavelength 1552 nm and signal level 60 %.

3 Time between power-up and operation within specification

4 Triggered by CANopen SYNC messages.

Requirements for sensors

Property	Value	Unit
Sensor type	Fiber Bragg grating	-
Reflectivity	70 ± 20	%
Full width half maximum (FWHM)	400 ... 600	pm
Side lobe suppression	> 12	dB

Compatible sensors from fos4X

Measurand	Sensor
Strain	fos4Strain fos4Strain expert
Vibration	fos4Acc 1D fos4Acc 2D fos4Acc 3D
Temperature	fos4Temp

Interfaces

Ethernet

Property	Value	Unit
Connector	RJ45	-
Transfer rate	10/100	Mbps
Max. Output rate	1000	Hz
Protocol	IPv6	-
PTP protocol	IEEE 1588 PTPv2	-

CAN

Property	Value	Unit
Connector	MC 1,5/ 3-GF-3,81	-
Max. CAN data rate	1	Mbps
Output rate	100	Hz
Protocol	CANopen	-

Environmental Conditions

Property	Value	Unit
IP Protection	IP20	-
Maximum operating altitude	3000	m
Permitted temperature (Transport and storage)	-40 ... +85	°C
Permitted relative humidity (Transport and storage)	5 ... 95	%
Permitted temperature (Operation)	-20 ... +65	°C
Permitted relative humidity (Operation)	5 ... 95	%
Cooling	Passive	-

Tested Standards and MTBF

Tested Standards

Test	Standard
Shock	IEC 60068-2-27, 10 g in all directions
Vibration	IEC 60068-2-6, 2 g
Temperature	IEC 60068-2-1 Class 3M6 IEC 60068-2-2 Class 3M6
Electromagnetic Compatibility	IEC 61326-1, EN 55032

MTBF

Property	Value	Unit
MTBF	> 100000	h

Dimensions

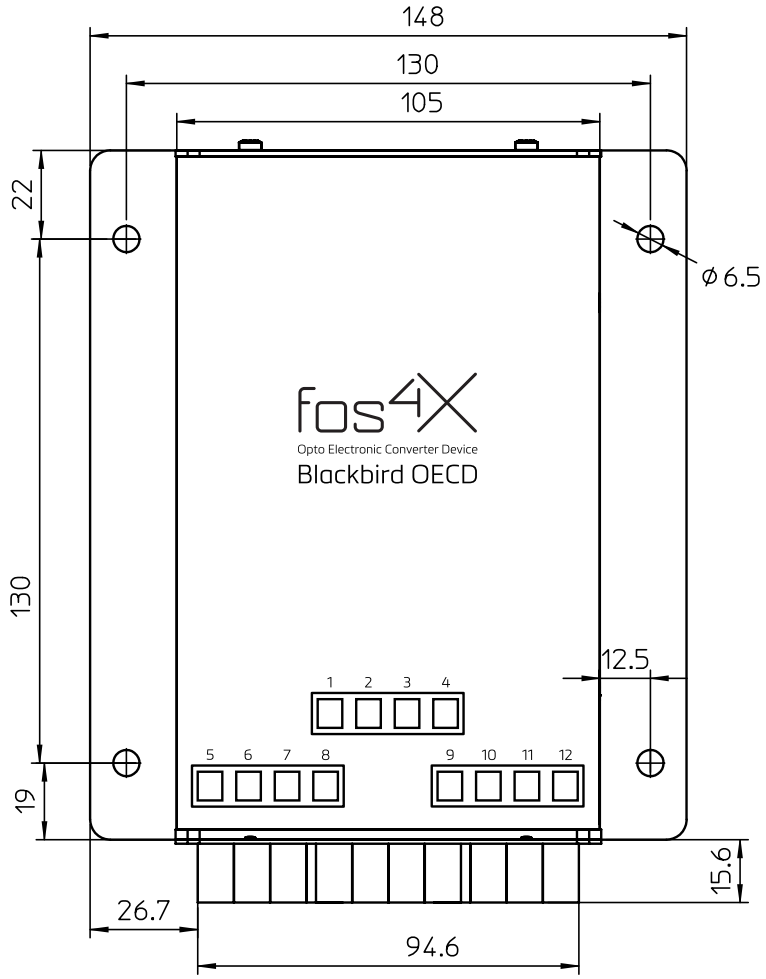

Figure 1: Dimensions (top view)

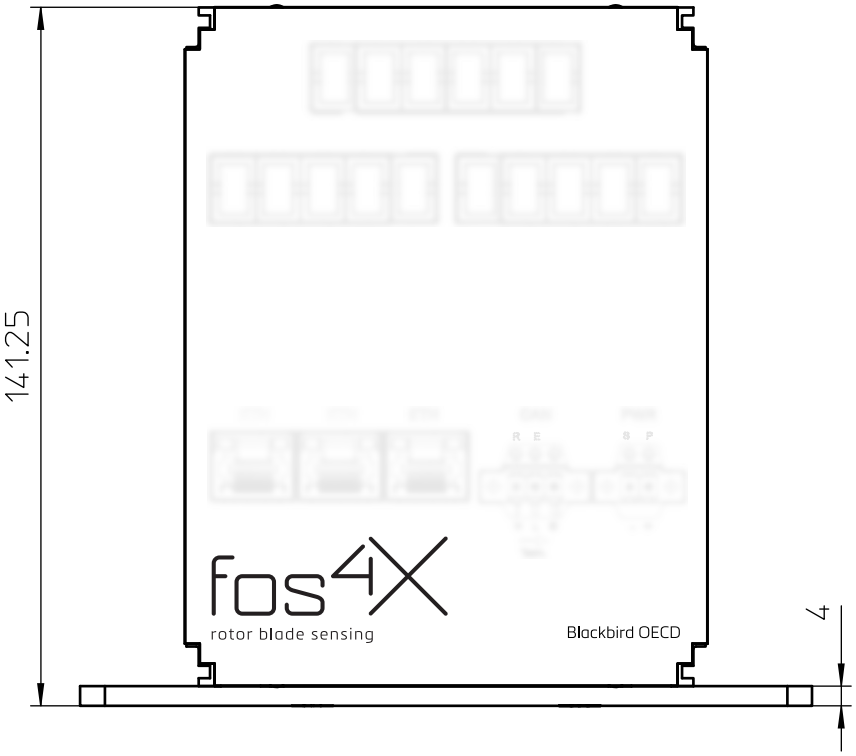

Figure 2: Dimensions (front view)