Industriestrasse 7 ▪ 65366 Geisenheim ▪ Germany
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Technical Data Sheet
OPUS B4 ECO Basic Touch



12.05.2022
Errors and technical changes excepted

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1 Notes and Warnings

Attention!

This description is not a substitution for the concerned product's documentation. Please do read the documentation including the manuals carefully before dealing with this product. If the safety instructions in the documentation are not followed dangerous situation can occur that can result in damages, injuries and/or death by high voltage or wrong handling. In case you do not have the correct documentation, you can order it by contacting **opus-support@topcon.com.** Only properly trained personnel with the correct qualification is allowed to handle the device.

Attention!

Do not open the housing to avoid danger to high voltage. Before touching the electric assemblies make sure that the electricity is switched off completely. If the front pane is broken the device needs to be taken out of service due to risk of injury. If perceivable damages on the device exist that can compromise the functionality, it must be taken out of service due to the danger of malfunctions. These particularly include damages to t he LCD display, damages to the keyboard, damages that compromise the protection level and damages to the encoder knobs.

Please note:

All content is subject to change without notice. Errors and omissions excepted.

Mounting and Handling

- Do not use the cable as a handle to carry the device.
- Mounting in clean working environment only.
- Do not mount the device under the use of violence because it can cause damage.
- The device must be mounted by trained personnel only into especially designed and tested system.
- The device may not be opened or disassembled.
- The device is to be cleaned with a moist fuzz free cotton cloth. If necessary, a mild cleaning agent may be used. Do nit use acid or abrasive cleaning agents.
- The device is to be stored in a cool and dry environment and to be protected against sunshine.
- If the environmental temperature is beneath 10°C the reaction time of the display increases.

2 General Information

Order numbers

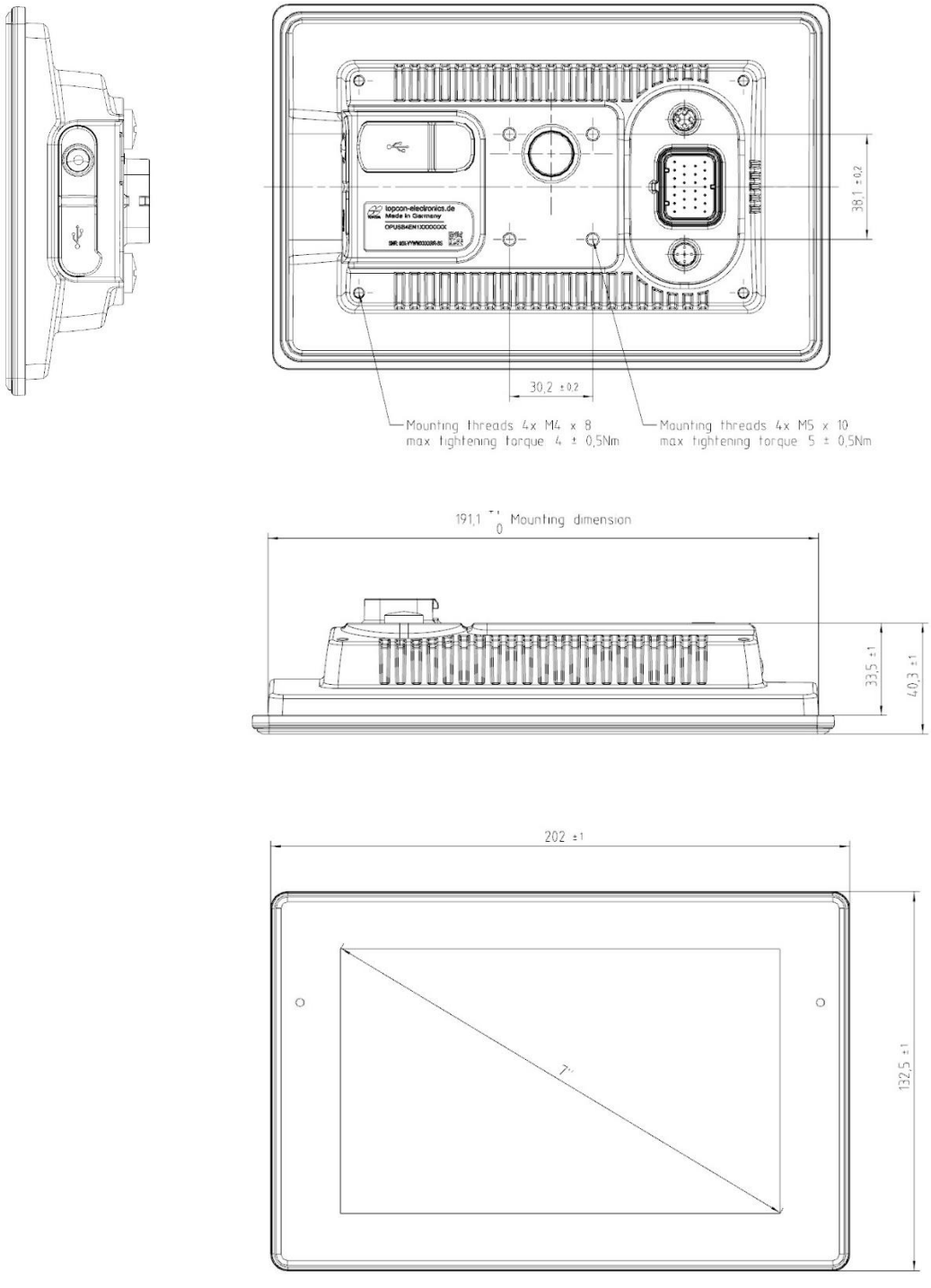
This documentation is valid for **OPUS B4** order numbers as follows:

	OPUSB4E**N**1CANT000	OPUSB4E**N**1CDST000
OPUS Projektor	●	
CODESYS©		●

The neutral version (**N**) will substitute the portrait (**P**) and landscape (**L**) versions.

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Dimensions



Housing

Aluminium die cast
Powder coated

Mounting

- Landscape or portrait
- Standalone
- In-dash

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3 Display

Type:	TFT Color Graphic LCD with LED backlight	Colors:	16.7 Mio.
		Brightness:	typ. 800 cd/m^2
Size:	7'', 152.4 mm (W) x 91.44 mm (H)	Contrast Ratio:	typ. 700:1
Resolution:	800 x 480 px (WQVGA), 15:9		

4 Input Devices

Touch	Capacitive Touch (only OPUS B4 Basic Touch)
Indicators and Sensors	Light sensor 1 Multicolor LED

5 Electronics

Processor platform

CPU:	Freescale I.MX6®, Solo, 800 MHz
Mass storage:	4 GByte (minus space for OS & application)
RAM:	512 MByte
RTC:	Buffered by gold cap Buffered for 2 weeks at Tambien Deviation max. 1 s/day

Speaker

Up to 90 dB @ 10 cm distance (max. @ ~8kHz)

Audio

1 x Audio output (left, right, GND)
AC97 compatible
Output power: approx. 50mW

Silent Wake-Input

Input which can be used for Silent-Wake-On of the OPUS to reduce visible boot-time
Active on positive edge

Current consumption (without external load), max

Power Mode	Current at 13,5 V DC	Current At 27 V
On	TBD	TBD
Low-power	TBD	TBD
Sleep	TBD	TBD
Off	TBD	TBD

Power supply

System supplied through terminal 30 (battery +, see pinout) and 31 (battery -, see pinout).
Terminal 15 (ignition) to be used to switch on/off.
Operating voltage range: 8 … 36 V DC.
Short circuit protection.
Over-voltage protection up to 48 V for max. 5 min.
Inverse polarity protection up to -48 V DC for max. 5 min.

6 Interfaces

CAN Bus

2 x CAN-Interface according to ISO 11898, CAN-specification 2.0 B active, up to 1 Mbit/s (default 250 Kbit/s, possible 10Kbit/s, 20Kbit/s, 50Kbit/s, 83.3Kbit/s, 111.1Kbit/s, 250Kbit/s, 500Kbit/s, 800Kbit/s, 1 Mbit/s)

RS232

1 x RS232-Interface
Type: EIA232 (only RXD, TXD, GND)
Speed: max. 115.200 Kbps

USB

Host 2.0
Side connector: 1 x Type A High speed
Guaranteed 900 mA @ 5V
Back connector: 1 x Type A High speed
Guaranteed 900 mA @ 5V

Wireless-Interface

Via the USB Back connector, a wireless interface can be optional added.
E.g. LM816 for WIFI

Ethernet-Interface

1 x 10/100 Mbit/s Base T

Alternative:
1 x Automotive Ethernet Interface

Video-Interface

1 x analog video input, 1Vss
Camera control output (open drain) for special functionality (mirror, shutter, heating etc.)
Camera supply output guaranteed 300mA @ 12VDC

7 Connectors

Connectors

Main	Tyco-AMP 6437288-6 Mating connector (customer) Tyco-AMP 3-1437290-7 Mating crimp contact (customer) Tyco-AMP 3-1447221-4

OPUS displays in the industrial sector are only intended to use with cable length less than 30 meters.

Video-Connector	M12 round connector, female, 5-pole, B-coded acc. to EN 61076-2-101
Ethernet-Connector	M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101

8 Software

Operating System	Linux Kernel 5.43.53 or higher
Application Programming	• OPUS Projektor • COESYS 3.x • C/C++ • ISO-Horizon

9 Testing and Verification

CE-Compliance

EU Directive 2014/30/EU (EMC) according to

● *EN 13766-1*: Earth-moving and building construction machinery – Electromagnetic compatibility (EMC) of machines with internal electrical power supply -
Part 1: General EMC requirements under typical electromagnetic environmental conditions

● *EN ISO 14982*: Agricultural and forestry machinery – Electromagnetic compatibility – Test methods and acceptance criteria

● *EN 50498*: Electromagnetic compatibility (EMC). Product family standard for aftermarket electronic equipment in vehicles.

● *EN 61000-6-2*: Electromagnetic compatibility (EMC). Generic standards – Immunity for industrial environment

● *EN 61000-6-4*: Electromagnetic compatibility (EMC). Generic standards – Emission standard for industrial environment.

EMC Emission radiated

30-75 MHz	62-52[1]dB(µV/m) – QP – 120kHz
	52-42[1]dB(µV/m) – AV – 120kHz
75-400 MHz	52-63[2]dB(µV/m) – QP – 120kHz
	42-53[2]dB(µV/m) – AV – 120kHz
400-1000 MHz	63dB(µV/m) – QP – 120kHz
	53dB(µV/m) – AV – 120kHz
1000-2500 MHz	73dB(µV/m) – P – 120kHz
	53dB(µV/m) – AV – 120kHz
2500-6000 MHz	80dB(µV/m) – P – 1000kHz
	60dB(µV/m) – AV – 1000kHz

QP: Quasi-Peak
AV: Average
P: Peak
1: Value decreases linearly with the logarithm of the frequency.
2: Value increases linearly with the logarithm of the frequency.

EMC Immunity radiated

20MHz to 800MHz with amplitude modulation 800MHz to 6GHz with pulse modulation.

30V/m for the radiated field (absorber lined chamber) testing method (ISO 11452-2) in vertical and horizontal polarization.

OR/AND

60mA for the Bulk Current Injection (BCI) testing method (ISO 11452-4)

EMC Emission conducted

	12V-System (Maximum values)	**24V-System** (Maximum values)
	Positive slow pulses: +37V	Positive slow pulses: +37V
	Negative slow pulses: -75V	Negative slow pulses: -150V
	Positive fast pulses: +75V	Positive fast pulses: +150V
	Negative fast pulses: -112V	Negative fast pulses: -150V

	12 V-System	**24 V- System**
Test Pulse 1	Us = 112 V; FS: C	Us=-450V; FS: C
Test Pulse 2a	Us=+55V; FS: B	Us=+55V; FS: B
Test Pulse 2b	Us=+10V; FS: C	Us=+20V; FS: C
Test Pulse 3a	Us=-165V; FS: A	Us=-220V; FS: A
Test Pulse 3b	Us=+112V; FS: A	Us=+220V; FS: A
Test Pulse 4 (Starting profile)	Us_6=6V; Us=6.5 V FS: B	Us_6=6V; Us=10V FS: B
Load Dump	Us=+79V; FS: C	Us=+151V; FS: C

FS: Function Status

Electrostatic Discharge

+/- 8kV contact discharge; FS: A
+/- 15kV air discharge; FS: A

EMV Susceptibility Conducted

Frequency: 150kHz–80MHz; U=10V; AM: 1kHz, 80%; FS: A

Burst

tr=5ns; td=50ns; Burst duration: 15ms;
Period: 300ms; t=5min; FS: B
Power-lines: US=+/-2kV
Signal-lines: US=+/-1kV

Surge

tr=1.2us; td=50us; Amount: 5; Wait-time: 60s; FS: B
Power-lines: US=+/-0.5kV
Reset permitted

E1 – Type approval

EU Directive ECE R 10.4

Protection Level (IP Code)

IP 66 according to *ISO 20653*: Road Vehicles – Degrees of protection (IP-Code) – Protection of electrical equipment against foreign objects, water and access

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Electrical

12 and 24V-Systems according to:

Inverse Polarity resistance
5min @ -48V (no defect)

Over voltage resistance
5min @ +48V (no defect)

Start behavior
Start over Temperature
Start at TRoom; decrease in 5°steps to TMin; go to TRoom; increase in 5°steps to THigh; Start DUT at each T;
Successful start expected

Short circuit strength
Connect each Pin of Main-, Video- and Ethernet-Connector for 5 Min to GND and for 5 Min to 36V; FS: C

Superimposed alternating volt-age
Triangle signal, frequency sweep: 50Hz-25kHz-50Hz inside 60s; FS: A

Level	12 V	24 V
AC peak-to-peak UPP1	1VAC	4VAC
AC peak-to-peak UPP2	2VAC	4VAC
AC peak-to-peak UPP3	4VAC	10VAC

De-/Increase Supply Voltage
Sweep Voltage UMin-0V-UMin with 0.5V/min; FS: D

Drop in Supply Voltage

12 V System	24 V System
UStart=UMin; US=4.5V td=100ms; FS: B	UStart=UMin; US=9V td=100ms; FS: B

Battery less Operation

12 V System	24 V System
U1=10V; U2=18V; t=5min; FS: A	U1=20V; U2=38V; t=5min; FS: A

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Mechanical

Vibration, noise

Frequency [Hz]	PSD [(m/s²)/Hz]
10	20
20	36
30	36
139	1.69
200	2
300	1
2000	1

32h per Axis; FS: A

Vibration, sinusoidal
Resonance sweep

Frequency	Displacement	Acceleration
2 Hz	+/- 1 mm (2 mm PtP)	(0.016 g)
10 Hz	-	2 g
2000 Hz	-	2 g

1 Octave/minute, 30min per resonance

Endurance Test:

Frequency	Displacement	Acceleration
5 Hz	+/- 0.75 mm (1.5 mm PtP)	(0.075 g)
57.5 Hz	-	5 g
2000 Hz	-	5 g

0.5 Octave/minute, 8 h per resonance. FS: A

Mechanical shock
Part 1: 300m/s², 18ms, 10 times per axis/direction; FS: A
Part 2: 500m/s², 11ms, 3 times per axis/direction; FS: A
Part 3: 500m/s², 6ms, 10 times per axis/direction; FS: A
Part 4: 400m/s², 6ms, 4000 times per axis/direction; FS: A

Drop Test
Drop the DUT on each side and each edge from a high of 1m on a concrete floor.
No damage or visible damage.

Package
Drop Test
Drop the DUT inside the package on each side and each edge from a high of 1m on a concrete floor.
No damage of the DUT
No cracks to the package

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Climate

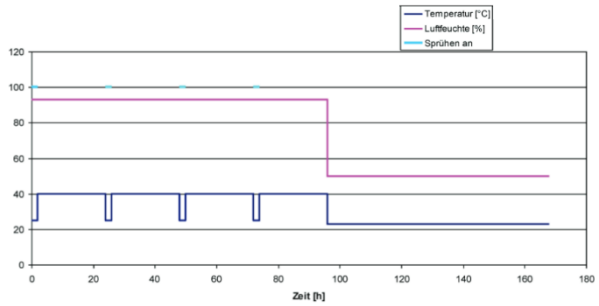
Start spray resistance

Part 1:

7 cycles at 24h (8h spraying; 16h rest)
salt concentration: 5%

Part 2:

4 cycles at 168H; 1 cycle:



Chemical resistance
Apply once a day, for three days, the following chemicals with a brush over the exposed surface. Inspect without rinsing immediately after-wards and after 100h.
Alcohol, Antifreeze liquid (Ethyl-glycol), Diesel oil, Domestic Ammonia, Gasoline, Hydraulic oil 10W40, Liquid lime, Motor oil, NPK Chemical fertilizers 20 10 20, Windscreen cleaning mixture, Ammonium Nitrate and Ammonium Phosphate fertilizers, Bovine Effluent - (up to 5% propionic acid), Diesel fuel, STOU (Super Tractor Universal Oil) lubricating oil.

Damp heat steady
21days @+40°C and 93%r.H.; FS: C

Damp heat cyclic
6 cycles (each 24h); TLow=+25°C; THigh=+55°C
Humidity: >= 93%r.H.; FS: A

Temperature/Humidity cyclic
10 cycles (each 24h); TLow=-10°C; THigh=+65°C
Humidity: = 80-96%r.H or uncontrolled.; FS: A

Operating temperature

24h @ -30°C; FS: A
96h @ +75°C; FS: A

Storage temperature

24h @ -40°C; FS: C
48h @ +85°C; FS: C

Max. value with reduced backlight brightness

Temperature cycling
30 cycles (each 8h); TLow=-30°C; THigh=+75°C; FS: A

Temperature shock
100 cycles (each 2h); TLow=-30°C; THigh=+75°C; Tchange: <30s; FS: C

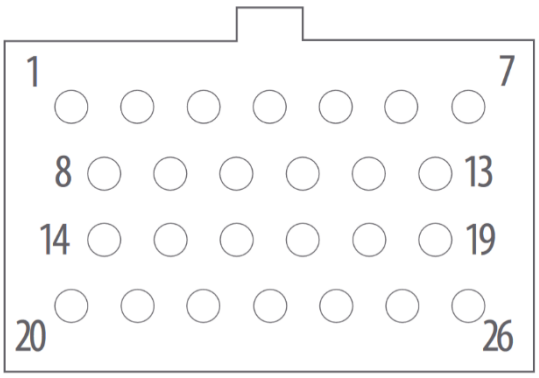
UV resistance
Over-all time: 1500h
Cycle: 8h UV at +60°C, 4h 95%r.H.
No material damage, No visible change

10 Pinout

Main connector pinout

Pin No.	Assignment	Description
1	VCC	supply voltage +; terminal 30
2	Ignition Input	ignition input; terminal 15
3	GND	supply voltage -; terminal 31
4	Wake	Wake Input, “Doorswitch”
5	Audio Out L	Audio line out, Stereo
6	Audio Out R	Audio line out, Stereo
7	Audio GND	Audio line out, Ground
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	Not connected
13	USB_GND	Not connected
14	USB_D-	Not connected
15	USB_D+	Not connected
16	RS232 RxD	RS232 receive data
17	RS232 TxD	RS232 transmit data
18	RS232 GND	RS232 GND
19	A/DI3	Not connected
20	A/DI1	Not connected
21	A/DI2	Not connected
22	A/DI4	Not connected
23	SERV_EN	service enable
24	DO3	Not connected
25	DO1	Not connected
26	DO2	Not connected

View on rear side of the OPUS B4

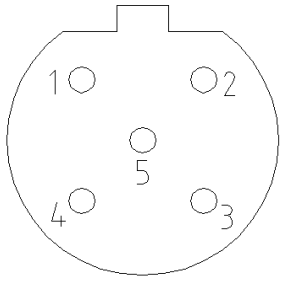


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Video connector pinout

Round connector, 5 pins, M12	
1	VidSig+
2	Switch
3	Power 12V
4	Power GND
5	VidSig GND

Video-Connector, M12, female, 5 pins, b-coded,
View on rear side of the OPUS B4-Eco



Ethernet connector pinout

100Base-Tx Round connector, 4 pins, M12	
1	TD+
2	RD+
3	TD-
4	RD-

Automotive Ethernet Round connector, 4 pins, M12	
1	D+
2	n.c.
3	D-
4	n.c.

Video-Connector, M12, female, 4 pins, d-coded,
View on rear side of the OPUS B4-Eco

