Industriestraße 7 · 65366 Geisenheim · Germany
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Technical Data Sheet
OPUS B3 ECO Basic / OPUS B3 ECO Basic Touch

17.10.2019
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 ***dl-opus-info@topcon.com***. Only properly trained personnel with the correct qualification are allowed to handle the device.

⚠ Attention!

Do not open the housing to avoid danger to high voltages. 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 the 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

1. Do not use the cable as a handle to carry the device.
2. Mounting in clean working environment only. Dust and oil can harm the electric contacts and compromise the functionality.
3. Do not mount the device under the use of violence because it can cause damage.
4. The device must be mounted by trained personnel only into especially designed and tested systems.
5. The device must not be opened or disassembled.
6. The device is to be cleaned with a moist fuzz free cotton cloth. If necessary a mild cleaning agent can be used. Do not use acid or abrasive cleaning agents.
7. The device is to be stored in a cool and dry environment and to be protected against sun shine.
8. 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 B3** order numbers as follows:

	OPUSB3E**N**1CANB000	OPUSB3E**N**1CANT000	OPUSB3E**N**1CDSB000	OPUSB3E**N**1CDST000	OPUSB3E**N**1UTST000
OPUS Projektor	•	•			
CoDeSys			•	•	
ISO-Horizon					•

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

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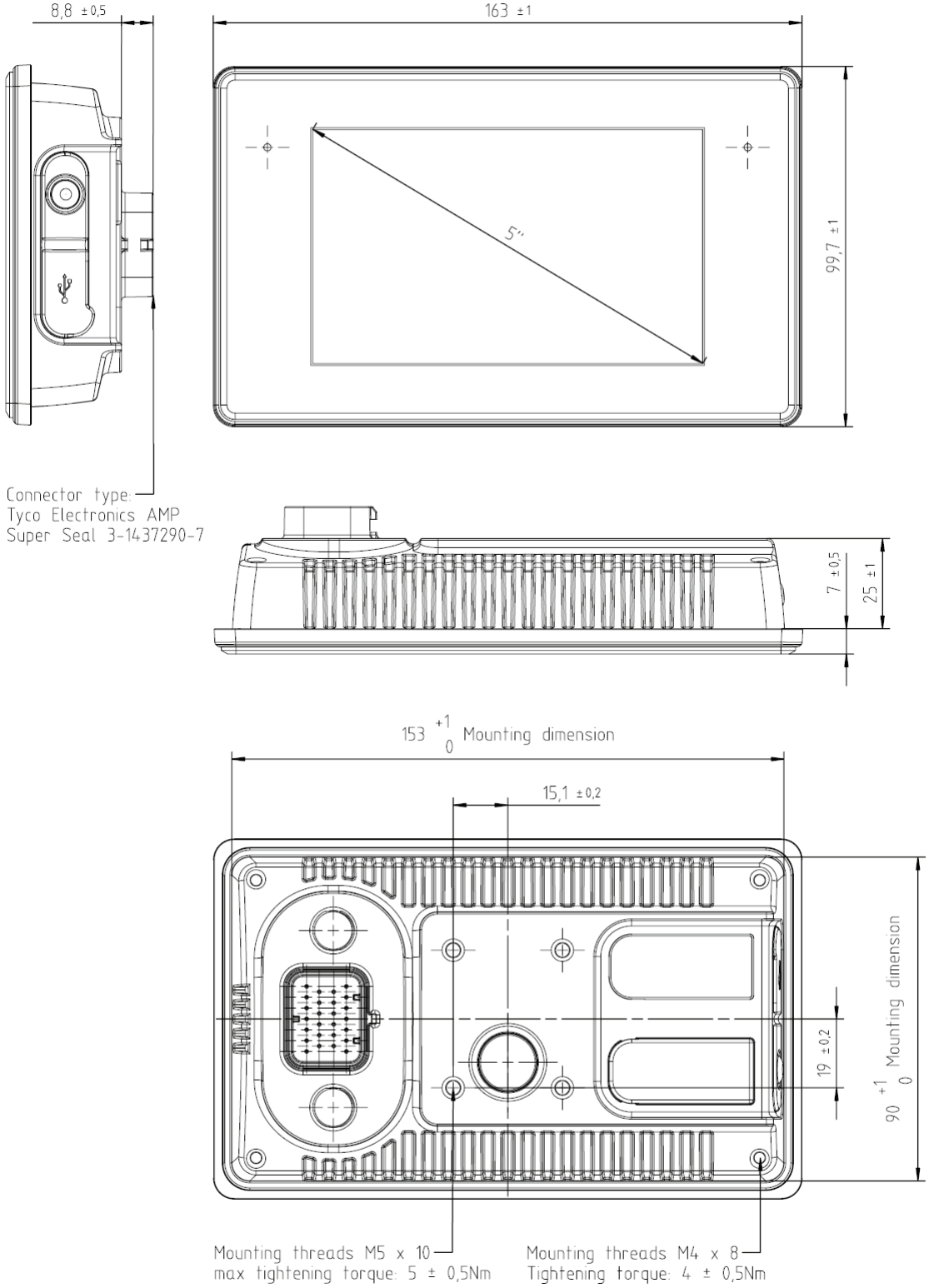
Dimensions



Housing

Aluminium die cast, powder coated front-glass

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/m²
Size:	5″, 108 mm (W) x 64.8 mm (H)	Contrast Ratio:	typ. 700:1
Resolution:	800 x 480 px (WVGA), 15:9		

4 Input Devices

Indicators and Sensors
- Light sensor
- Multi-Color LED

Touch
Capacitive Touch (only OPUS B3 Eco Basic Touch)

5 Electronics

Processor platform

CPU:	Freescale I.MX6®, 800 MHz
Mass storage:	2 GByte (approx. 700 MB for customer use)
RAM:	512 MByte
RTC:	Buffered by gold cap
	Buffered for 2 weeks at Tambient
	Deviation: max. 1s/day

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

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 48V for max. 5 minutes.

Inverse polarity protection up to -48 V DC for max. 5 minutes.

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

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6 Interfaces

CAN Bus

2 x CAN-Interfaces 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, 111.11kbit/s, 250kbit/s, 500kbit/s, 800kbit/s and 1Mbit/s

RS232

1 x RS232-Interface
Type: EIA232 (only RxD, TxD, GND)
Speed: max. 115.200baud

USB

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

7 Connectors

Connectors

Main: Tyco-AMP 1437288-6

Mating connector (customer)
Tyco-AMP 3-1437290-7

Mating crimp contact (customer)
Tyco-AMP 3-1447221-4

Dummy Plug (customer)
Tyco AMP 4-1437284-3

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

8 Software

Operating System	Linux Kernel 4.14.0 or higher
Application Programming	• OPUS Projektor • Codesys-Tools (3.X) • ISO-Horizon • C/C++

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9 Testing and Verification

CE-Compliance

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

- *EN 13309*: Construction machinery – Electromagnetic compatibility of machines with internal electrical power supply
- *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 environments
- *EN* 61000-6-4: Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments

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EMC Emission radiated

• *30–75MHz:*	*62-521dB(µV/m) – QP – 120kHz*
	52-421dB(µV/m) – AV – 120kHz
• *75-400MHz:*	*52-632dB(µV/m) – QP – 120kHz*
	42-532dB(µV/m) – AV – 120kHz
• *400-1000MHz:*	*63dB(µV/m) – QP – 120kHz*
	53dB(µV/m) – AV – 120kHz
• *1000-2500MHz:*	*73dB(µV/m) – P – 120kHz*
	53dB(µV/m) – AV – 120kHz
• *2500-6000MHz:*	*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 verti-cal and horizontal polarization

OR/AND

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

9 Testing and Verification

Test Pulse 1

12V-System:	24V-System:
Us=-112V; FS: C	Us=-450V; FS: C

Test Pulse 2a

12V-System:	24V-System:
Us=+55V; FS: B	Us=+55V; FS: B

Test Pulse 2b

12V-System:	24V-System:
Us=+10V; FS: C	Us=+20V; FS: C

Test Pulse 3a

12V-System:	24V-System:
Us=-165V; FS: A	Us=-220V; FS: A

Test Pulse 3b

12V-System:	24V-System:
Us=+112V; FS: A	Us=+220V; FS: A

Test Pulse 4 (Starting profile)

12V-System:	24V-System:
Us_6=6V; Us=6.5 V FS: B	Us_6=6V; Us=10V FS: B

Load Dump

12V-System:	24V-System:
Us=+79V; FS: C	Us=+151V; FS: C

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

EMC Emission conducted

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

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

FS: Function Status

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9 Testing and Verification

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

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	12V	24V
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

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

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

Battery less Operation

12V-System:
U1=10V; U2=18V;
t=5min; FS: A

24V-System:
U1=20V; U2=38V;
t=5min; FS: A

FS: Function Status

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9 Testing and Verification

Mechanical

Vibration, noise

Frequency [HZ]	PSD [(m/s²)²/HZ]
10	20
20	36
30	36
141	1.64
200	1.93
300	1
2000	1

32h per axis; FS: A

Vibration, sinusoidal

Resonance sweep:

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

1 Octave/minte, 30min per resonance

Endurance Test:

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

0.5 Octave/minte, 8h 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

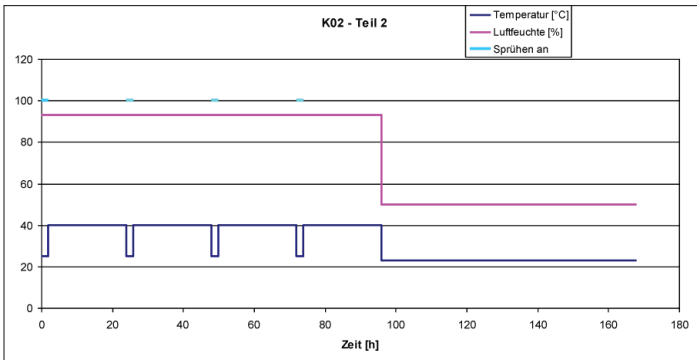
FS: Function Status

9 Testing and Verification

Climate

Salt 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 sur-face. 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 mix-ture, Ammonium Nitrate and Ammonium Phos-phate fertilizers, Bovine Effluent - (up to 5% pro-pionic acid), Brake fluid - both mineral and vege-table types, 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

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

FS: Function Status

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10 Pinout

Main connector pinout

Pin. No.	Assignment	Description
1	VCC	Supply, Clamp 30
2	Ignition Input	Wake-Input; Clamp 15
3	GND	Supply, Clamp 31
4	n. c.	Not connected
5	n. c.	Not connected
6	n. c.	Not connected
7	n. c.	Not connected
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	n. c.	Not connected
13	n. c.	Not connected
14	n. c.	Not connected
15	n. c.	Not connected
16	RS232 RxD	RS232 receive data
17	RS232 TxD	RS232 transmit data
18	RS232 GND	RS232 ground
19	n. c.	Not connected
20	n. c.	Not connected
21	n. c.	Not connected
22	n. c.	Not connected
23	ENA	Service enable
24	n. c.	Not connected
25	n. c.	Not connected
26	n. c.	Not connected

View on rear side of the B3