WACHENDORFF Elektronik
TOPCON POSITIONING GROUP

Industriestraße 7 · 65366 Geisenheim · Germany
www.wachendorff-elektronik.de · dl-opus@topcon.com

Technical Data Sheet
OPUS A8 ECO Basic

22.07.2015
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@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 A8** order numbers as follows:

	OPUSA8EN1CANB000	OPUSA8EN1CDSB000	OPUSA8EN1ISOB000
Wachendorff Projektor	•		
CoDeSys		•	
ISO-VT			•
Landscape	•	•	•
Portrait	•	•	•

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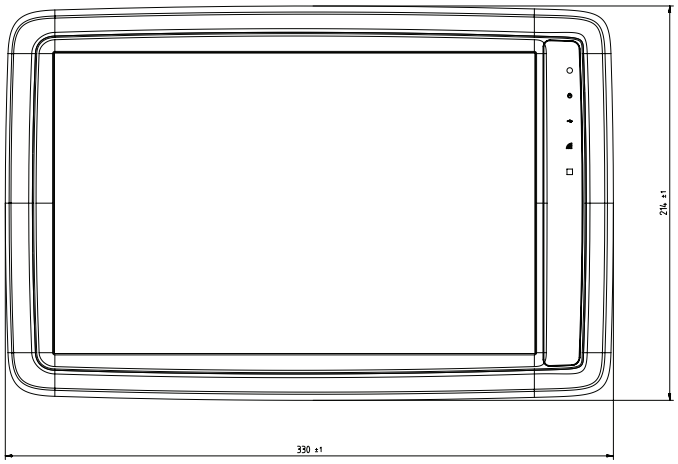
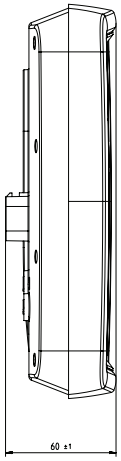
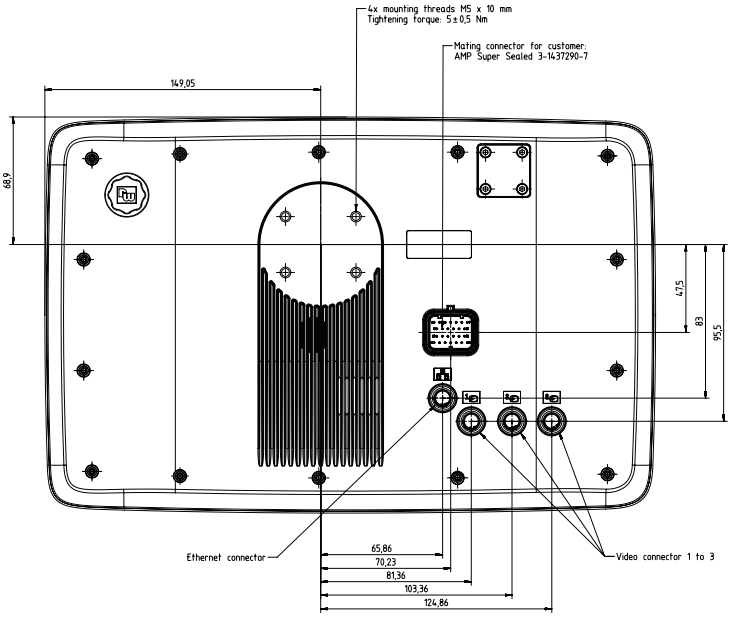
Dimensions







Housing

Aluminium back-housing, plastic front-housing, colored light grey (RAL 7035) with black rubber frame.

Mounting

- Landscape or portrait
- Standalone
- In-dash

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3 Display

Type:	TFT Color Graphic LCD with LED backlight	Colors:	24 bit
		Brightness:	typ. 400 cd/m²
Size:	12.1“, 261 mm (W) x 163 mm (H)	Contrast Ratio:	typ. 1,000:1
Resolution:	1280 x 800 px (WXGA), 16:10		

4 Input Devices

Touch

Analog resistive, glas/glas technology

Indicators and Sensors

- Light sensor
- 1 Multicolor-LED
- 3 Status-LED’s

5 Electronics

Processor platform

CPU:	Freescale I.MX6®, solo core, 800 MHz
Mass storage:	4 GByte
RAM:	512 MByte
RTC:	Buffered by gold cap

Speaker

• 80 dB(A) in 1m distance @ 1kHz

Power supply

Operating voltage range:	9 … 36 V DC
Protection:	Short circuit protection
Overvoltage resistance:	48V for max. 2 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
- ISO 11898, CAN-specification 2.0 B active
- Up to 1 Mbit/s (default 250 Kbit/s, 500 Kbit/s, 750 Kbit/s and 1 Mbit/s)

RS232

1 x RS232-Interface
Type: EIA232 (only RxD, TxD, GND)
Speed: max. 115 Kbps

USB

Main connector:	1 x Full speed OTG

Inputs

2 configurable analog/digital inputs

Input impedance:	> 3k Ohm
Resolution:	10 bit (1028 digits, 1 digit = 11,7 mV)
Input range:	0 … 12 V, 4-20 mA, 0-20 mA
Max. protectable input voltage:	36 V DC
Protection:	Short circuit protection
Frequency:	Max. signal frequency 50 Hz

Outputs

1 digital output

Short circuit protection:	Up to 36 V
I_{max}	300 mA open drain at 12V
$R_{DS,on}$	< 1 Ohm
$R_{DS,off}$	> 100 kOhm

Video-Interface

- 1 analog video input, 1 V_{ss}
- Camera control output (open drain) for special functionality (mirror, shutter, heating etc.), 300mA @ 12V DC
- Ampacity 500mA @ 12V DC

Ethernet-Interface

1 x 10/100 Mbit/s Base T

7 Connectors

Connectors

Main:	Tyco-AMP 3-1437290-7
Video:	M12 round connector, female, 5-pole, B-coded acc. to EN 61076-2-101
Ethernet:	M12 round connector, female, 4-pole, D-coded acc. to EN 61076-2-101

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8 Software

Operating System	Linux 3.x
Application Programming	• Wachendorff Projektor Tool • Optional: Codesys-Tools (3.5) • Optional: ISO-VT • Optional: C/C++

9 Testing and Verification

CE-Compliance

EU Directive 2004/108/EC (EMC) according to

- *EN 12895*: Industrial Trucks – Electromagnetic compatibility
- *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

e1 - Type approval

EU Directive 72/245/EWG (Jan-2013)

Protection Level (IP Code)

IP 6k5 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:

- *ISO 16750-2*: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Electrical loads
- *ISO 15003*: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

Mechanical

- According to *ISO 16750-3*: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Mechanical loads, Code L
- *ISO 15003*: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions
  - Mechanical Shock: Level 2
  - Random Vibration: Level 2
  - Sinusoidal Vibration: Level 2

Climate

- *ISO 16750-4*: Road Vehicles – Environmental conditions and testing for electrical and electronic equipment – Climatic Loads
  - Operating Temperature Range: -30 … +65°C
  - Storage Temperature Range: -40 … +85°C
- *ISO 15003*: Agricultural Engineering – Electrical and electronic equipment – Testing resistance to environmental conditions

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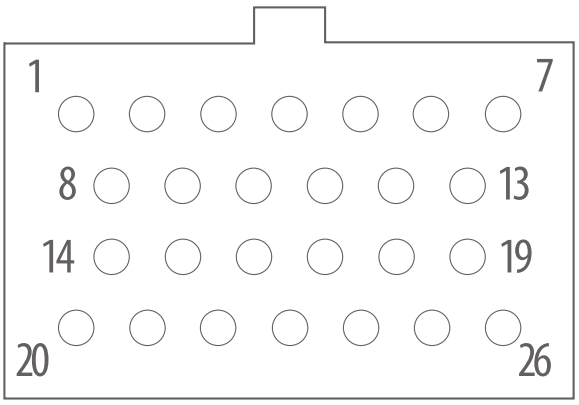
10 Pinout

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	CarGND	Car GND
5	AUDIO_L	NA
6	AUDIO_R	NA
7	AUDIO_GND	NA
8	CAN1H	CAN 1 high
9	CAN1L	CAN 1 low
10	CAN2H	CAN 2 high
11	CAN2L	CAN 2 low
12	USB_VCC	USB +5V supply
13	USB_GND	USB supply GND
14	USB_D-	USB Data -
15	USB_D+	USB Data +
16	RS232 RxD	RS232 receive data
17	RS232 TxD	RS232 transmit data
18	RS232 GND	RS232 GND
19	USB_ID	USB ID
20	A/DI1	analog/digital input 1, full frequency
21	A/DI2	analog/digital input 2
22	WoI	**w**ake-up **o**ver **i**nput
23	SERV_EN	service enable
24	NA	NA
25	DO1	digital output 1
26	NA	NA

View on rear side of the A8



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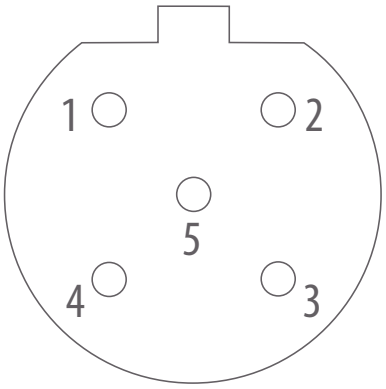
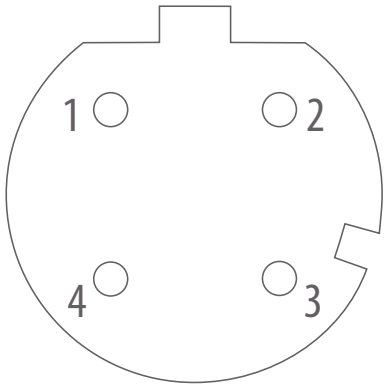
Video connector pinout

	Round Connector, 5 pins, M12
1	VidSig+
2	Mirror
3	Camera+
4	Camera -
5	VidSig GND

Ethernet connector pinout

	Round Connector, 4 pins, M12, acc. To IEC 61076-2-101
1	TD+
2	RD+
3	TD-
4	RD-

Video connector, M12, female, 5 pins, b-coded, **view on rear side of the A8**



Ethernet connector, M12, female, 4 pins, d-coded, **view on rear side of the A8**