Camera HMOS
Camera EMOS Ethernet
Camera EMOS BroadR-Reach

Installation manual
Including specifications
No. IM0973570 A 05

11/2015
English

ORLACO
Specialised Camera Solutions

ORLACO Camera
Type HMOS/EMOS

Safety

In order to guarantee safe operation, these safety instructions must be read before you start using this equipment.

- Do not open the enclosure. This can cause damage, short-circuiting or electrical shocks.
- Do not expose the equipment to extreme temperatures. This can cause deformation of the enclosure or damage to internal components.
- Repairs may only be undertaken by the manufacturer.
- The equipment must be assembled as shown in this manual.

Before you start using this equipment, please read this manual carefully and follow all instructions. We recommend that you keep this manual in a safe place for reference purposes.

If you have any questions or issues concerning the operation of this equipment, consult the relevant section in the manual or contact the Orlaco Products BV Service department.

The camera/display systems from Orlaco comply with the latest CE, ADR, EMC and mirror-directive regulations. All products are manufactured in accordance with the ISO 9001 quality management, IATF 16949 quality automotive and ISO 14001 environmental management.

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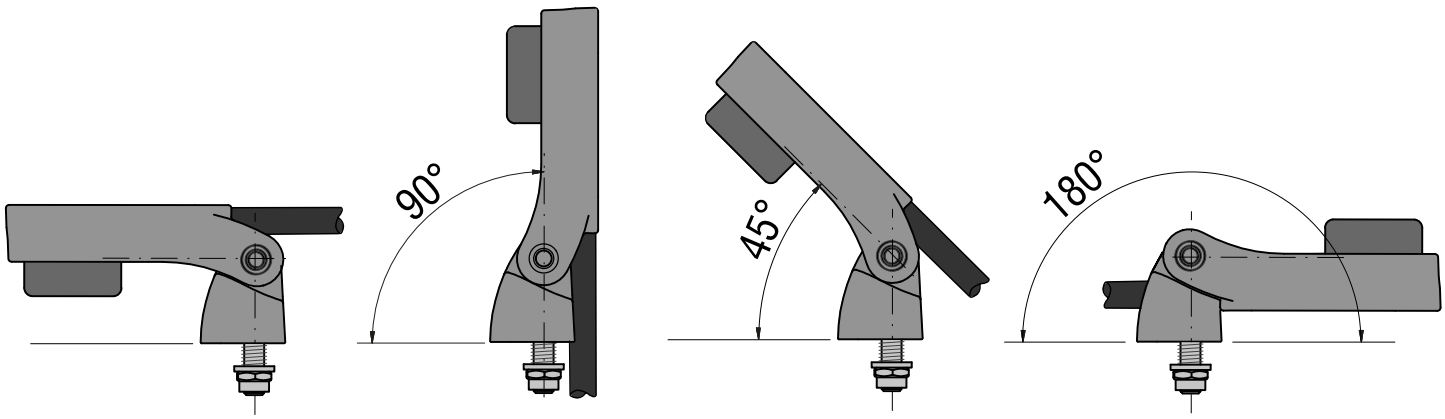
1. Mounting and connecting Camera

1.2. Camera attachment.

Recommendation:
The bracket should be tightened with a torque of 6 Nm nominal. (Screw and Bolts).
Tighten by hand or with very low speed, see figure 2.

Bracket adjustment; see figure 1.



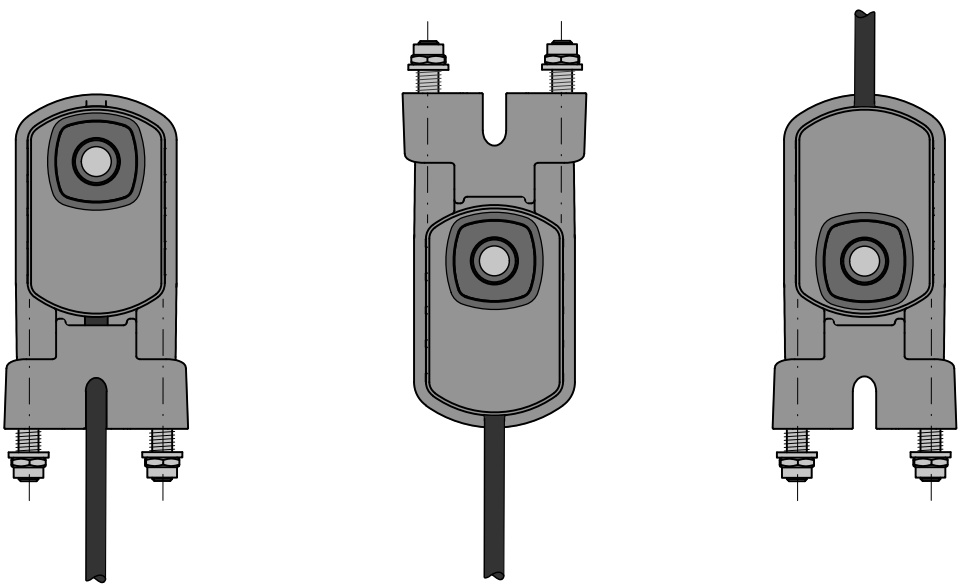


Figure 1

Very important:
The supplied serrated washers are to be installed **first** in the bracket

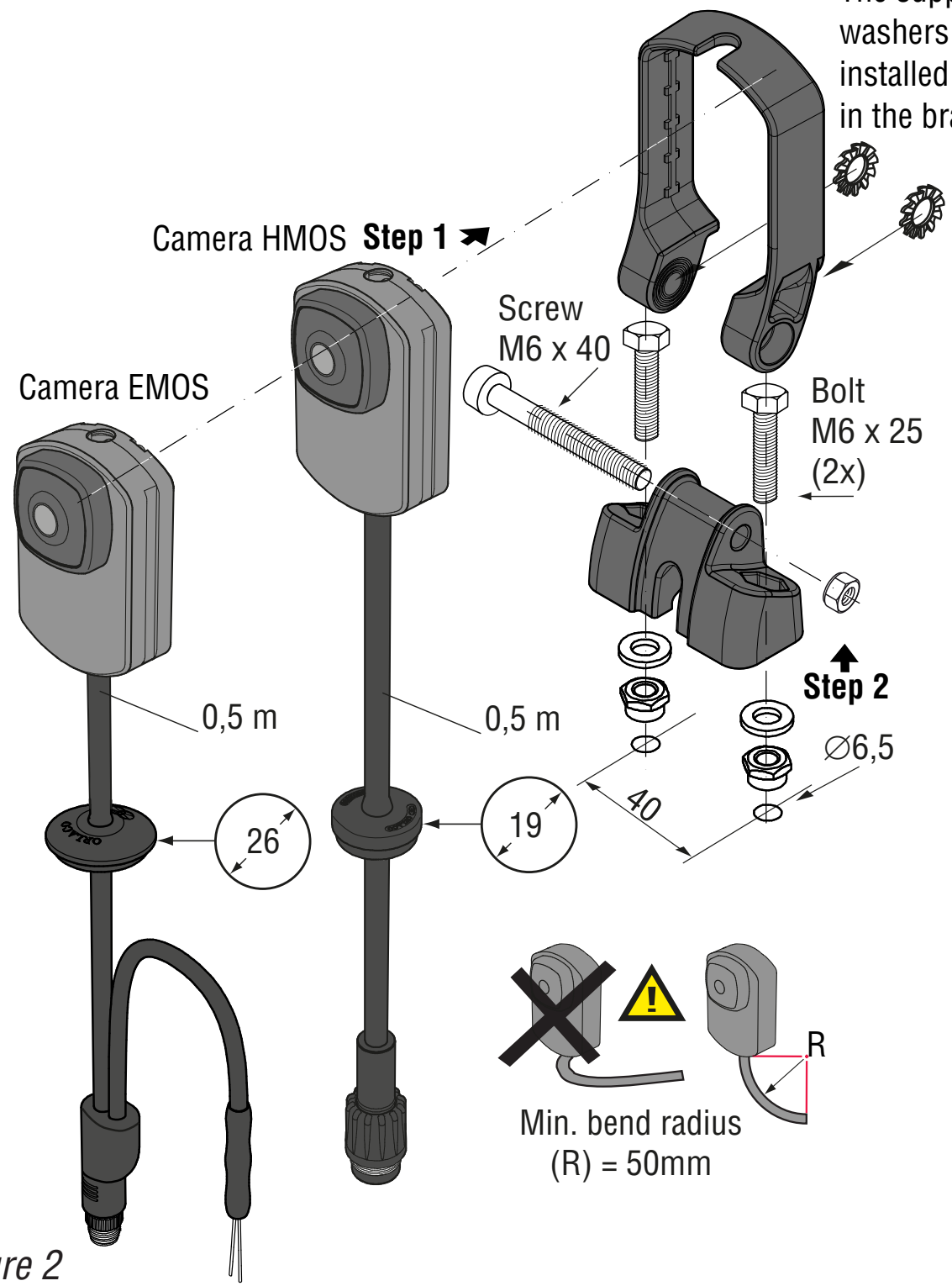
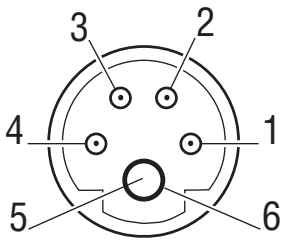


Figure 2

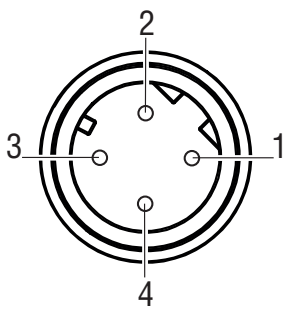
2. Pin connection

Camera HMOS Front side of Molded M16 4p + Coax connector:



1 = Black = 0V
2 = Red = Power
3 = Yellow = Aux 1
4 = Grey = Aux 2
5 = Coax core = Video signal
6 = Coax screen = Video GND
Overall shielding connected to connector housing.

Camera EMOS Ethernet Front side of Molded M12-D 4p connector:



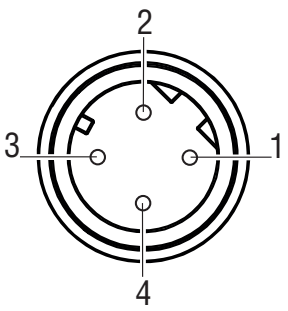
Connector

1 = Orange/white = +Tx
2 = Green/white = +Rx
3 = Orange = -Tx
4 = Green = -Rx
Overall shielding connected to connector housing.

Open wires

1 = Red = Power
2 = White = 0V

Camera EMOS BroadR-Reach Front side of Molded M12 4p connector:



Connector

1 = Orange/white = BR-
2 = Green/white = 0V
3 = Orange = BR+
4 = Green = 0V

Overall shielding connected to connector housing.

Open wires

1 = Red = Power
2 = White = 0V

3. Specifications Camera HMOS 30°/60°/90°/120°/180°

Description

Lens specified	Hor. lens angle	Ver. lens angle
HMOS 180° DigiCoax	180°	105°
HMOS 120° DigiCoax	120°	74°
HMOS 90° DigiCoax	90°	56°
HMOS 60° DigiCoax	60°	37°
HMOS 30° DigiCoax	30°	18,5°

Sensor

Sensor element: High resolution 1/3” CMOS rolling shutter, 1280H x 960V.
Video image: 50 fps SDR/HDR 1280 X 800.
Protocols: Uncompressed video over coax.
Latency: <6µs
Light sensitivity: Responsitivity 5.5V/lux-sec, Low light feature (<0,1 Lux).
High Dynamic Range: >115dB.
Interface: DigiCoax.
Image processing: Color and gamma correction, 3D noise correction, edge enhancement, digital WDR, advanced contrast enhancement, auto white-balance, auto exposure control, mirroring, flipping, photometric and geometric lens distortion correction.

Electrical

Power input: Camera HMOS may only be powered by Orlaco monitor HLED. The camera HMOS has no internal power protection.
Power consumption: <2W
Connector/Cable: 0,5m cable with Coax and molded male connector (camera power input and video output).
Min. cable bend radius: 50mm.

Mechanical

Housing: Anodised aluminium, black, UV resistant, light fastness >8, corrosion proof according IEC 60068-2-52 salt mist, cyclic.
Filling: Camera is potted with automotive potting resin
Ingress protection: IP67 according to IEC 60529; dust tight and protected against the effects of continuous immersion in water up to 1m under water for 30 minutes. IP69k according to DIN 40050-9: camera can withstand a high pressure cleaning with water: 14-16L/min. 80°C and 100 bars flow**.**
Mounting hardware: Standard stainless steel.
Shock constancy: Shock and vibration resistant for usage on trucks, cranes, fork-lifts, maritime applications, machinery.
Camera bracket: glass reinforced polyamide, test: 50 Nm at -40°C to +85°C.
Weight: 0,24kg. including cable, bracket and mounting material. 0,30kg. in standard packing.
Truck use: Withstand all fluids and materials used in and around trucks like: ammonia solution 5%, ethanol 80-100%, isopropanol 5-10%, soapy water (min. 50% soap per volume), alkaline degreasing compounds(used in high pressure washing equipment).

Operating temperature: -40°C to +85°C.
Storage temperature: -40°C to +125°C.

Certification

Approvals: Approvals in compliance with all relevant EMC- and Automotive directives. This device complies with Part 15 of the FCC Rules.
Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Certificates available upon request.
Compliant with RoHS and REACH.

4. Specifications Camera EMOS Ethernet 30°/60°/90°/120°/180°

Description

Lens specified	Hor. lens angle	Ver. lens angle
EMOS 180° Ethernet	180°	130°
EMOS 120° Ethernet	120°	91°
EMOS 90° Ethernet	90°	68°
EMOS 60° Ethernet	60°	45°
EMOS 30° Ethernet	30°	22°

Sensor

Sensor element: High resolution 1/3” CMOS rolling shutter, 1280H x 960V.
Video image:60fps at 720p SDR, 45fps at 960p SDR image processing and 56fps at 720p HDR, 43fps at 960p HDR image processing.
Protocols: RTP (MJPEG RFC2435 and h.264 RFC6184) over UDP, ISO17215-2014, IEEE1722 (AVB).
IP address: DHCPv4 or static IPv4 (IPv6 possible).
Latency: <100ms depending on hardware processing platform (50ms demonstrated on Orlaco hardware).
Light sensitivity: responsitivity 5,5V/lux-sec, Low light feature (<0,1Lux).
High dynamic range: >115dB.
Compression: MJPEG, H.264 (High 10 intra profile encoding).
Interface: 100Mb/s (Fast Ethernet).

Image processing: Color and gamma correction, 3D noise correction, edge enhancement, digital WDR, advanced contrast enhancement, auto white-balance, auto exposure control, mirroring, flipping, photometric and geometric lens distortion correction.

Electrical

Power input: 12/24V/DC. Below 7V: camera is non-functional. Above 33V the overvoltage protection is activated. This overvoltage protection is deactivated below 30V. Powercircuit is protected up to 80V/DC. Outputs are Short Circuit Protected.
In all these above mentioned values; a tolerance of +/-10% is applied.
Power consumption: <2W.
Transient protection: Camera may be powered directly from 12V or 24V battery without additional electrical protection since camera has an integrated circuit that protects the camera against over- and undervoltage, spikes, ripples and loaddumps.
Connector/Cable: 6 wire: 2x twisted pair for data and 2 wires for power supply. Connector 4-pin M12 d-coded for data and open wires for
power supply.
Min. cable bend radius: 50mm.

Mechanical

Housing: Anodised aluminium, black, UV resistant, light fastness >8, corrosion proof according IEC 60068-2-52 salt mist, cyclic.
Filling: Camera is potted with automotive potting resin
Ingress protection: IP67 according to IEC 60529; dust tight and protected against the effects of continuous immersion in water up to 1m under water for 30 minutes, IP69k according to DIN 40050-9: camera can withstand a high pressure cleaning/washing with water: 14-16L/min. 80°C and 100 bars flow.

Mounting hardware: Standard stainless steel.
Shock constancy: Shock and vibration resistant for usage on trucks, cranes, fork-lifts, maritime applications, machinery.
Camera bracket: Material: glass reinforced plastics, test: 50 Nm at -40°C to +85°C.
Weight: 0,24kg. including cable, bracket and mounting material. 0,30kg. in standard packing.
Truck use: Withstand all fluids and materials used in and around trucks like: ammonia solution 5%, ethanol 80-100%, isopropanol 5-10%, soapy water (min. 50% soap per volume), alkaline degreasing compounds(used in high pressure washing equipment).
Operating temperature: -40°C to +85°C
Storage temperature: -40°C to +125°C

Certification

Approvals: In compliance with all relevant EMC- and Automotive directives.
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Certificates available upon request.
Compliant with RoHS and REACH.

5. Specifications Camera EMOS BroadR-Reach 30°/60°/90°/120°/180°

Description

Lens specified	Hor. lens angle	Ver. lens angle
EMOS 180° BroadR-Reach	180°	130°
EMOS 120° BroadR-Reach	120°	91°
EMOS 90° BroadR-Reach	90°	68°
EMOS 60° BroadR-Reach	60°	45°
EMOS 30° BroadR-Reach	30°	22°

Sensor

Sensor element: High resolution 1/3” CMOS rolling shutter, 1280H x 960V.
Video image:60fps at 720p SDR, 45fps at 960p SDR image processing and 56fps at 720p HDR, 43fps at 960p HDR image processing.
Protocols: RTP (MJPEG RFC2435 and h.264 RFC6184) over UDP, ISO17215-2014, IEEE1722 (AVB).
IP address: DHCPv4 or static IPv4 (IPv6 possible).
Latency: <100ms depending on hardware processing platform (50ms demonstrated on Orlaco hardware).
Light sensitivity: responsitivity 5,5V/lux-sec, Low light feature (<0,1Lux).
High dynamic range: >115dB.
Compression: MJPEG, H.264 (High 10 intra profile encoding).
Interface: 100Mb/s (BroadR-Reach).

Image processing: Color and gamma correction, 3D noise correction, edge enhancement, digital WDR, advanced contrast enhancement, auto white-balance, auto exposure control, mirroring, flipping, photometric and geometric lens distortion correction.

Electrical

Power input: 12/24V/DC. Below 7V: camera is non-functional. Above 33V the overvoltage protection is activated. This overvoltage protection is deactivated below 30V. Powercircuit is protected up to 80V/DC. Outputs are Short Circuit Protected.
In all these above mentioned values; a tolerance of +/-10% is applied.
Power consumption: <2W.
Transient protection: Camera may be powered directly from 12V or 24V battery without additional electrical protection since camera has an integrated circuit that protects the camera against over- and undervoltage, spikes, ripples and loaddumps.
Connector/Cable: 4 wire: 1x twisted pair for data and 2 wires for power supply. Connector 4-pin M12 for data and open wires for power supply.
Min. cable bend radius: 50mm.

Mechanical

Housing: Anodised aluminium, black, UV resistant, light fastness >8, corrosion proof according IEC 60068-2-52 salt mist, cyclic.
Filling: Camera is potted with automotive potting resin
Ingress protection: IP67 according to IEC 60529; dust tight and protected against the effects of continuous immersion in water up to 1m under water for 30 minutesIP69k according to DIN 40050-9: camera can withstand a high pressure cleaning/washing with water: 14-16L/min. 80°C and 100 bars flow.

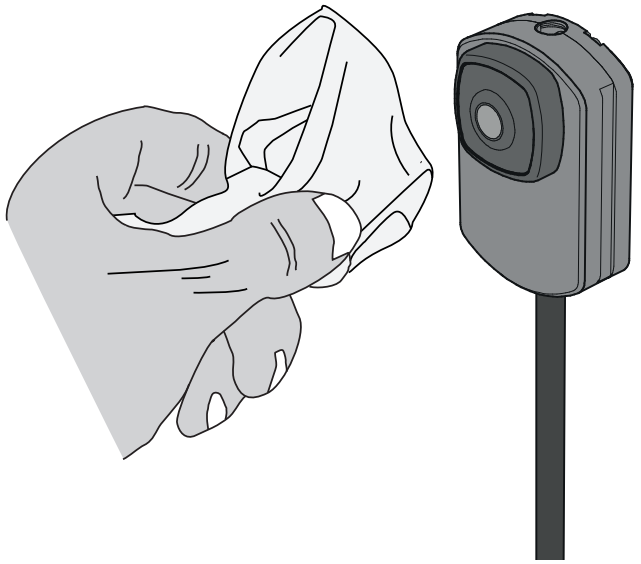
Mounting hardware: Standard stainless steel.
Shock constancy: Shock and vibration resistant for usage on trucks, cranes, fork-lifts, maritime applications, machinery.
Camera bracket: Material: glass reinforced plastics, test: 50 Nm at -40°C to +85°C.
Weight: 0,24kg. including cable, bracket and mounting material. 0,30kg. in standard packing.
Truck use: Withstand all fluids and materials used in and around trucks like: ammonia solution 5%, ethanol 80-100%, isopropanol 5-10%, soapy water (min. 50% soap per volume), alkaline degreasing compounds(used in high pressure washing equipment).
Operating temperature: -40°C to +85°C
Storage temperature: -40°C to +125°C

Certification

Approvals: In compliance with all relevant EMC- and Automotive directives. This device complies with Part 15 of the FCC Rules.
Operation is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Certificates available upon request.
Compliant with RoHS and REACH.

6. Maintenance and cleaning

Fixing a blurry image:
If the camera image is blurry, it is advisable to clean the camera.



Cleaning the lens glass:
Use a soft cloth to clean the lens glass of the camera. Use clean water or a high quality and safe foam cleaner. Rub the camera lens glass clean with the cloth.
Do absolutely not use aggressive chemicals or abrasive cleaning agents.

7. Disposal

Disassembly, removal and disposal. Local regulations for dealing with waste must be followed when disposing of disassembled components or entire units.

8. General terms and conditions

Orlaco Products BV is not liable for damage resulting from inadequate servicing, incorrect usage or alterations made to the equipment without informing the manufacturer in writing.

This installation manual has been made available by Orlaco Products BV.

Orlaco reserves the right to make changes to components at any time without informing customers beforehand or directly. All dimensions given are for commercial purposes.

For information regarding repairs that is not covered in this manual, please contact the Orlaco Products BV service department.

This manual has been prepared with all due care and attention. However, Orlaco Products BV cannot be held responsible for any errors in this manual or any consequences thereof.

9. Revision details

R1-0. First issue, November 2015.
R1-1. Added torque chapter 1, December 2015.
R1-2. Specifications: weight changed, March 2016.
R1-3. Specifications: compression Camera EMOS changed, August 2016.
A 01. Vertical lens angles added, March 2017.
A 02. Color of camera cable wiring changed, page 6; July 2017.
A 03. Camera EMOS BroadR-Reach added; January 2018.
A 04. Specs; ingress protection changed; January 2018.
A 05. Specs; EMOS Protocols PTP + gPTP deleted; June 2018.

ORLACO

Orlaco is a Manufacturing company that specializes in making cameras and monitor systems for commercial vehicles, fork-lift trucks, cranes, off shore and maritime. Our objective is to design and produce camera systems for the professional market that improve the drivers' view and increase operating efficiency.
At our facility in Barneveld we locate our design, manufacturing, warehousing and service department. Vision is our mission®. Orlaco therefore deploys the development, manufacture, supply and service of camera and display systems that will improve safety and efficiency of all vehicles, machinery and vessels. Our systems give the end user a view on each blind spot and will create comfort and improved working conditions. Our active approach will support market demands and innovations and will lead to enthusiastic ambassadors in the market; our customers.

For more information: www.orlaco.com

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