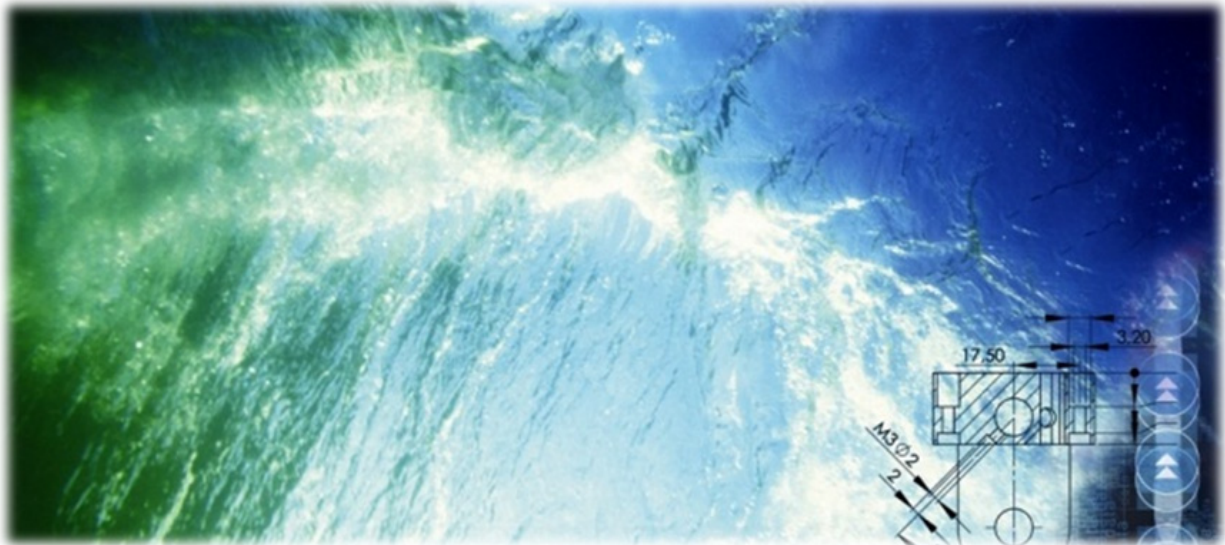


INSTALLATION AND MAINTENANCE MANUAL

Digital Cage Access Point - Digital CAP

| B | 14.04.16 | Re-approved (ECO-0000930) | EBL | IL/PAN |
|-----|----------|---------------------------|-----------|----------|
| A | 04.02.15 | Approved (ECO-0000702) | EBL | IL |
| Rev | Date | Issued | Issued by | Approved |

| | | | |
|----------------------|------------|---------------------------|----------|
| Document no.: | DC10000877 | Document part no.: | 10001525 |
|----------------------|------------|---------------------------|----------|



For a thorough introduction of Your AKVA product, we ask that all users read this entire manual. If questions occur, contact us!

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1 Safety

Safety for the users of our equipment is top focus when AKVA group ASA develop new products and product manuals.

We therefore strongly recommend that everyone who uses the equipment, all who perform any type of repairs, service or other maintenance to the product, and all who work in areas where the product is installed, read this entire manual and at least this safety chapter.

This recommendation is based on both personnel safety as well as a desire to keep the products in order and avoid the risk of damages as a result of the safety instructions not being followed.

1.1 Safety symbols

These safety symbols are used in this manual:



Information



Show caution, danger of minor personnel injuries and damages to equipment



Warning - may cause personnel injuries



Floating safety garments are mandatory when working on or by water or the sea

1.1.1 Other symbols used in this manual



Go to or see page or chapter for further instructions or more information

1.2 Plug-caps

Keep plug caps intact to avoid damages and to ensure long operating time for all products. If a plug cap is damaged or is not used as instructed in this manual, the product warranty may expire or be reduced.

We recommend keeping a storage of plug caps, to make sure that no connections stays unprotected if caps are broken or lost. New plug caps are easily ordered from AKVA.

1.3 Cables

Cables has to be treated with great caution, to avoid the risk of reducing the product operating time.

Do not bend or twist camera- and sensor cables, as this will affect the cable functions.

1.4 Installation

Floating safety garments are mandatory when working on or by water or the sea.

Never install equipment on cages during storms or bad weather.

Always control all attachments after bad weather, as well as regularly according to the site maintenance plan.

2 Introduction

This manual is part of the equipment delivered with Akvasmart Digital CAP. Keep the manual for as long as the CAP is used, and make sure that all changes to the equipment are noted in the back of this manual.

Thank you for choosing AKVA group ASA as supplier for your control access point. Do not hesitate to contact us for more information regarding maintenance for Akvasmart Digital CAP or any other AKVA products.

The purpose of this manual is to enable the user to install and maintain the Akvasmart Digital CAP in a safe and economical way. This manual instructs how to install and perform maintenance with the equipment, and will hopefully answer any day-to-day-questions regarding the Digital CAP.

If any necessary information is missing from this manual, please contact AKVA group for assistance and help to find a solution to any problems. Contact the AKVA service department, your subcontractor, your local AKVA office or our main office in Norway for assistance and help.

2.1 How to use this manual

This manual describes how to safely install and maintain the Akvasmart Digital CAP. This entire manual must be read and understood by ALL participants in the installation process prior to the installation.

The table of contents is listed in the start of the manual. The headlines in this list works as links to their respective chapters in the .pdf-version of the manual.

Chapter 1 is the most important chapter of the manual, listing all safety precautions, warnings and other safety information that ensures safe installation and maintenance. Everyone working with the Akvasmart Digital CAP must read and understand the manuals contents prior to working with or on the system.

Chapter 2 provides general information on AKVA group, and gives instructions for before starting up the Akvasmart Digital CAP. This current chapter also provides information about the system components and this "how to use the manual"- chapter.

Chapter 3 includes information and technical specifications for the Digital CAP. Chapter 4 describes how to install the Digital CAP to the cage edges and the various types of cage poles.

Chapter 5 instructs cleaning and maintenance, and also a registration form for all registration of all maintenance.

Four appendixes are found in the back of the manual: Index, with links to the rest of the manual in the .pdf-manual, a deviation form for all deviations with the system, note pages for new and extra information are also in the back of the manual, and contact information is found in the back of the manual.



This entire manual must be read and understood, and also be used during the maintenance work carried out on the Akvasmart Digital CAP

2.2 About AKVA group

With four main brands, AKVA group ASA is a world leading supplier of technical aquaculture equipment. Since 1980 we have developed and produced fish farming equipment, both for cages at sea and for land based hatcheries. AKVA represents an industrial standard, which is assumed to be the key to the future. Research, project management, fast deliveries and customer follow-up have been our focus to ensure that we contribute to a positive development within the aquaculture industry. Our goal is to deliver the best possible and most cost efficient equipment in order to keep preserving sustainable fish farming.

We have a wide variety of products, for example: plastic and steel cages, high pressure washers, net washers, boats, feed barges, feeding systems, cameras, sensor systems, under water lighting, software for fish farming and recycling systems.

AKVA has a continuous development of products, and we continue to improve product safety, functions, range of use and reliability. The purpose of this manual is to enable users to install and maintain the Akvasmart Digital CAP in a safe and economic way.

All of our equipment is pre-installed, tested and delivered from our own production department. This means that our customers have total control over which components to choose from, grouping collocation, testing and deliveries. Our production staff consists of people with great expertise and engagement for producing the best possible products for you. Having our own production site gives you excellent service in case something should go wrong, or if you are in need of any assistance. Our service staff is available on the telephone or on location in order to assist you if necessary. Safety, both for users and equipment is our main focus when developing products and product manuals.

2.3 About Akvsmart Digital CAP



The Akvsmart Digital CAP (Cage Access Point) is a wireless access point for under water cameras and winch.

With transmission of up to 6 parallel video channels, this system will fit any fish farm.

One under water video camera may be connected per unit, in addition to an integrated surface surveillance camera (mounted in the Digital CAP top).

The new Digital CAP has a powerful transmitter, external channel selector, 360 degree adjustable surface camera and directional antenna.

Video images are transmitted wireless from each cage edge to the main base.

Power transfer via 230V hard wired electricity from the feed barge. For short term backup, a 60Ah battery may be used. Battery size (l x b x h): 270 x 175 x 225mm.

Item numbers for battery options:

- Battery Gel 12V/60Ah: 0101887
- Battery 12V/80Ah: 10191

The Digital CAP house is made of aluminum, polycarbonate (PC)/Lexan and stainless steel. All is water proof and sprout safe.

All cables are connected inside the connection box.

2.3.1 Specifications for Akvsmart Digital CAP

| | |
|--------------------------------------|---|
| Built-in surface camera | 1 pcs. |
| Resolution | 704x576 |
| Light sensitivity | 1.0Lux (Colour) - 0.3Lux (B/W) |
| Angle of view | 360° Pan/Tilt 12x Zoom |
| Frequency - Ethernet | 5.8 GHz Cambium * |
| Power Supply | 12V/230VAC** |
| Power Consumption | 1-6A |
| Materials | Aluminum/PC/Stainless Steel |
| Size - width x height | Ø280 x 770mm (Ø10.9" x 30.3") |
| Weight | 12.5kg |
| Ethernet | 2 pcs. Phoenix contact 8 pin RJ45 w/clips |
| Underwater Camera connections | 1 pcs. Amphenol 7 pins female |
| Camera Winch connections | 1 pcs. Amphenol 7 pins female |
| Power connections | 1 psc. Amphenol 4 pins female |

* Frequency may vary from country to country

** Via AC adapter (extra)

3 Installation

Handle all equipment and parts with care, and make sure that none of them fall into the sea during the installation process
The Digital CAP top part contains a camera and must therefore be treated very carefully.



The Digital CAP top contains a camera and must therefore be treated very carefully



Floating safety garments are mandatory when working on or by water or the sea

3.1 Procedure before taking the Digital CAP to the cage

Two fastening rails are attached in the back of the connection box when delivered.

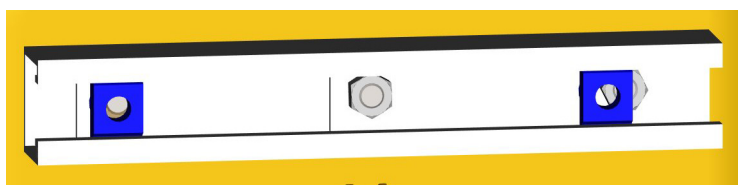
Procedure:

1 Read through this entire procedure before commencing the installation process

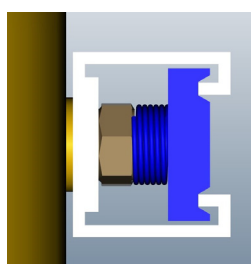
2 Ensure that both rails are attached to the back of the battery box (if they are not, attach them with 3 bolts per rail)



3 Tread the Unistrut nuts in to the rails, one in each side of each rail



Two Unistrut nuts (blue) placed correctly in a rail



*Unistrut nut placed correctly in a rail.
Side perspective.*



Unistrut nut



4 Proceed to chapter 3.2 for installation in single pole cages, or to chapter 3.3 for installation in double pole cages.

3.2 Polarcirkel and single pole steel cages

Use this method when installing Digital CAP in Polarcirkel plastic cages, as well as in single pole steel cage rails.

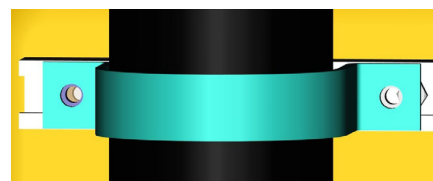
Required tools:

- 1 pc. 18mm (= 3/4 inch) open end spanner/wrench

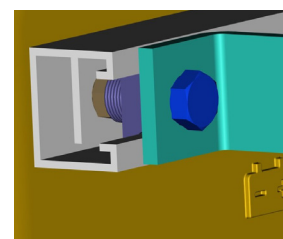
Procedure:

- 1 Read through this entire procedure before commencing this installation process
- 2 Bring all belonging parts to the cage edge
- 3 Place the connection box next to the desired cage pole

- 4 Place a pipe clamp around the pole, next to the upper rail, adjust the unistrut nuts so that their holes are linear with the holes in the clamp:



- 5 Attach clamps with M12 bolts (blue) through clamp hole and unistrut nut hole:



- 6 Tighten bolts well to make sure that the connection box stays in place also during and after larger cage movements



- 7 Proceed to chapter 3.4 for CAP assembling procedure.

3.3 Double poles

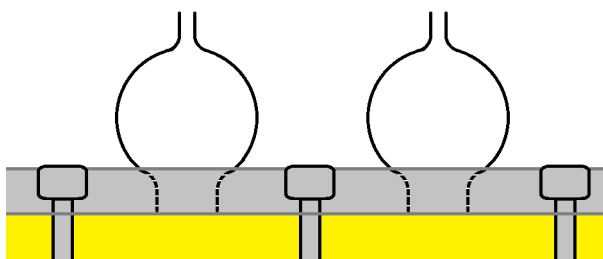
AKVA groups Wavemaster steel cages have double rail poles.

Required tools:

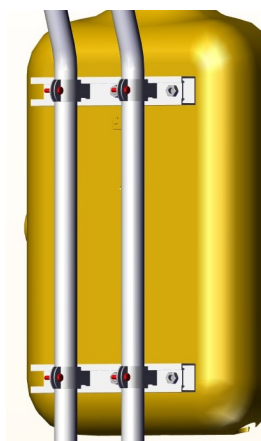
- 2 pc. 10mm (= 7/16 inch) open end spanner/wrench

Procedure:

- 1 Read through this entire procedure before commencing this installation process
- 2 Release the left and the right bolt in the upper rail and tread the clamps in to the rail as illustrated below:



- 3 Re-attach the left and the right bolts
- 4 Repeat procedures 2 and 3 for the lower rail
- 5 Bring all belonging parts to the cage edge
- 6 Place the connection box next to the desired cage pole
- 7 Place all pipe clamps around the pole, and fasten them with the M6 bolts by using one wrench on the bolt and the other on the nut
- 8 Tighten bolts well to make sure that the connection box stays in place also during and after larger cage movements
- 9 Proceed to chapter 3.4 for CAP assembling procedure.



3.4 Attaching the CAP top

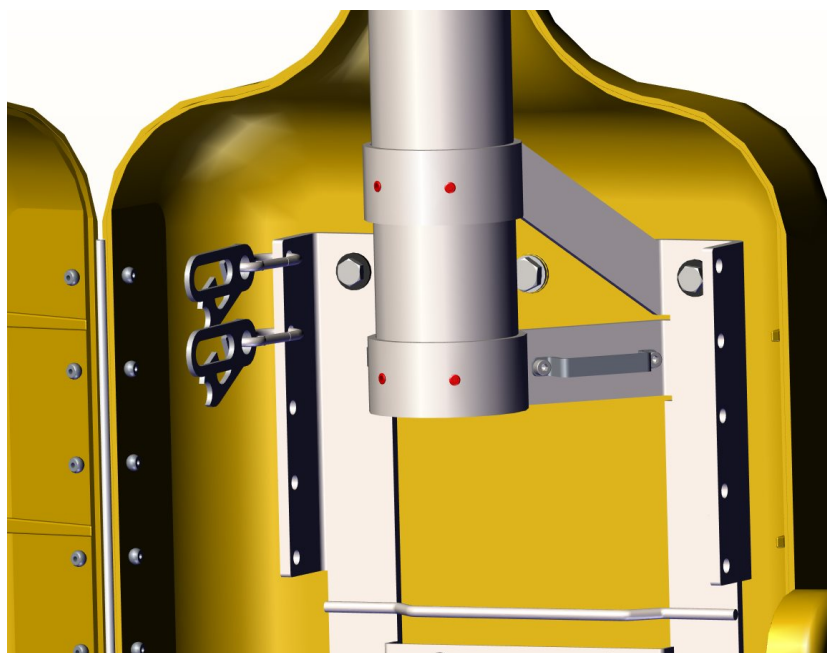
When the connection box is attached properly to the cage pole(s), and the extension pole is in place, the Digital CAP top may be attached.

Necessary equipment

- extension pole
- 3mm Umbraco key
- 4 x M6 bolts
- two M6 set screws
- 3mm hex-key

Procedure

- 1 Open the connection box
- 2 Tread the pole in the top opening of the connection box
- 3 Fasten all four bolts (red) to attach the extension pole to the connection box
- 4 Close the connection box

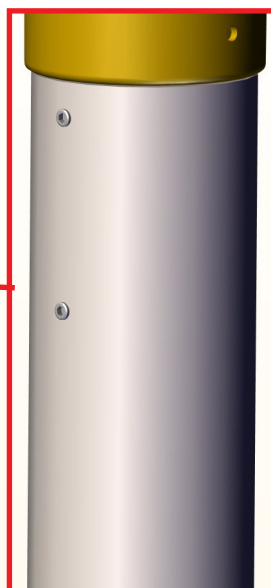


5 Tread the Digital CAP on to the extension pole



6 Align the signal symbol so that it points directly towards the barge (or the signal receiver)

7 Attach the CAP top to the extension pole, using the 2 set screws. Use the 3mm hex key to tighten the screws.



4 Maintenance



Safety garments, for instance safety vest, must be used during labour at or by cages

4.1 Cleaning

Clean the inside of the connection box once a month, use a soft cloth, warm water and a mild detergent. Wipe off all excessive water inside, remember to wipe the cables as well.

Hose the Digital CAP with fresh water once a week. Always use normal water pressure, no high pressure cleaner! Spray silicone grease to fastening bits, hinges and locks.



Make sure that the Digital CAP connection box is properly closed before hosing it down

4.2 Tighten up

Tighten up all fastening bits to avoid that the Digital CAP falls off the cage end after movements in the sea and cage. Check and tighten all fastening bolts at least once a month, and more often during bad weather seasons and periods.

Weekly maintenance: outside cleaning, spray fastening bits, hinges and locks with grease

Monthly maintenance: inside cleaning, check and tighten all fastening bolts, check cables and cable connections



All maintenance tasks must be performed more often during stormy seasons and periods

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Appendix B - Deviation form



Make copies of this deviation form before filling anything in

| | |
|-------------------------------|--|
| Deviation control no.: | |
|-------------------------------|--|

| Unit: | Producer: | Prod.no.: | Purchase year: |
|-------|-----------|-----------|----------------|
| | | | |

| |
|--------------------------------------|
| Deviation description: |
| |
| Follow up proposal: |
| |
| Date and signature, declarer: |
| |

| |
|---------------------------------------|
| Follow up directed: |
| |
| Status: |
| |
| New action for deviation no.: |
| |
| Date and signature, follow up: |
| |

Appendix D - Contact information

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