USER MANUAL

Environmental Access Point - EAP

Single and triple connection with AkvaControl V9 and V10
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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This document can also be read and downloaded from our web site, see www.akvagroup.com/products/user-manuals

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1 Safety

Safety for the users of our products, is top focus when developing new products and user manuals in AKVA group.

Therefore, we strongly recommend that everyone that is going to be using it, carry out repairs, service and maintenance on the product, as well as everyone working in the area where the product is installed or being used, reads this entire manual, and especially this safety chapter.

This recommendation is based on both personnel safety, as well the desire to keep the products in order as long as possible, by avoiding any damages risked if the safety instructions are not followed.

1.1 Safety symbols used in the manual

The following symbols are used in this manual:

![Information](image)

Information

![Show caution, danger of damaging equipment and mild injuries to personnel](image)

Show caution, danger of damaging equipment and mild injuries to personnel

![Warning, may cause injures to personnel](image)

Warning, may cause injures to personnel

1.1.1 Other symbols used in this manual

Go to or see page or chapter for further instructions or more information
1.2 Receiving new equipment

Make sure that all parts are delivered according to the service note. If the order is not complete, or if any defects are discovered, contact AKVA immediately, contact information is found in the back of this manual.

1.3 Personnel safety

Owner and farm manager are responsible for that everyone who is working with or around the Akvasmart EAP must read and understand the contents of this manual.

Personal safety equipment, such as antiskid foot wear and floating garments, are mandatory when working on and by the cage, for instance when performing maintenance or repairs on the Akvasmart EAP.

To prevent personnel injuries and equipment damages during installation, maintenance and repairing processes, it is crucial that all instructions provided in this installation and maintenance manual are followed. All applicable safety laws and regulations in the country where the equipment is installed must be complied.

1.4 Bad weather

Check all equipment after periods of bad weather for damages. Make sure that all suspensions are intact, that surrounding equipment are ok, check nets especially.

If any damages have occurred, they must be repaired at once, contact AKVA group for assistance if needed. Contact information is found in the back of the manual.

1.5 Installation on site
When installing the EAP on site, usually on the cage edge, the following security actions must be followed:

- Assemble most of the EAP indoors before bringing it to the cage
- At least two people is needed to perform the installation
- Be careful and make sure that none of the loose parts used for assembling the EAP to the cage edge are lost into the water
- Use only acid resistant bolts on equipment that is used on and around the cage
- Installations must never be executed during stormy weather and any time where there is a risk of getting sea water in to the equipment. Be extra careful that no sea water enters the amphenol plugs.

1.6 Plug caps

Always keep the plug caps safe after installing the equipment. We recommend that all the loose plug caps are kept in one, safe place inside the barge. The caps need to be easy to locate when taking the equipment out of use for maintenance and repairs. Caps must also be replaced on the EAP as well as in cable ends, when any equipment is removed.

1.7 Amphenol plugs

These plugs have to be lubricated with siliconc grease to avoid corrosion if they should be exposed to sea water. Add grease before the sensors are connected, and regularly after this. Lubrication should be performed more often in periods with more stormy weather.

1.8 Connections
Make sure that all cables are connected to the correct plug:

- oxygen sensor connected to a O2-connection
- temperature sensor connected to a TEMP-connection
- current sensor connected to a CURRENT-connection:

If there are more than one sensor of each type, use several EAPs or one Triple EAP:

Make sure to have a good overview over which sensor is connected to which connection number (1,2 or 3) and connect it to the correct type connection (O2, temp or current).

All connections in the EAP are waterproof provided that they are connected correctly.
Avoid twirling the sensor cables! Coil them according to instructions in chapter 4. Make sure that there is no tension to the cable, and make sure that the cable is in order, without any tears or damages, when it is connected to the power source. The cable must not be installed if it has any bends, tears or breaks.

1.10 Disinfecting equipment

If any of the equipment, ropes or other belonging parts are being moved to a new location, it is decreed by law to disinfect everything to prevent contamination. We recommend rinsing with fresh water after disinfection, because the disinfectants are strong chemicals that may damage the surface materials.
2 Introduction

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

Thank you for choosing AKVA group ASA as supplier for your feed spreader. Do not hesitate contacting us for more information regarding installation, use or maintenance for Akvasmart EAP or any other AKVA product.

The purpose of this manual is to make the user install and maintain Akvasmart EAP in a safe and economical way. The manual will show how to install and maintain the product, as well as hopefully answer most day to day questions. If there is anything relevant this manual does not explain or answer, please contact us 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 install and maintain the Akvasmart EAP in the best and safest possible way. This entire manual must be read and understood by ALL users prior to installation of the product. Site owner and farm manager are responsible for training all personnel and users know and make sure they all understand the contents of this manual.

Before the first chapter, is the table of contents. The headlines works as links to their respective chapter in the .pdf-file.

Chapter 1 is the most important chapter of this manual, and includes safety precautions ensuring safest possible use. Chapter 2 contains information on AKVA group and Akvasmart EAP, as well as this manual instruction.

Chapter 3 describes the installation process of Akvasmart EAP on the cage edge, and instructions to how the sensor connections are tested are found in chapter 4. Form for configuration of data radio is found in chapter 5, and maintenance is described in chapter 6. Chapter 7 contains two forms slave-ID.

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

This entire manual must be read and understood, and used as aid during installation and maintenance of Akvasmart EAP
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 presumed to be the turn 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 agriculture industry. Our goal is to deliver the best possible and most cost efficient equipment in order to keep preserving sustainable 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 Akvasmart EAP 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 you can choose from, grouping collocation, testing and deliveries. Our production staff consists of people with great expertise and engagement for producing the best possible products. Having our own production site provides excellent service in case something should go wrong, or if assistance is required. Our service staff is available over telephone or on location to assist whenever necessary. Safety, both for users and equipment is main focus when AKVA group develops products and product manuals.
2.3 About Akvasmart EAP

When Akvasmart EAP is connected to the Akvasmart CCS Feed System via AkvaControl software, collecting, analysing and logging of environmental data from one or more depths, will provide optimal feed control for every single cage.

The Environmental Access Point (EAP) is a robust and active solution for when several environmental stations are being used in the same location.

Three or nine different sensors may be connected to one EAP, one of each type to the Single EAP and up to three of each type to the Triple EAP:

*Single connections:*

![Single connections image]

*Triple connections:*

![Triple connections image]

The EAP is connected directly to the CCS Feed System, either via radio or cable, and includes a two-way data communication. The system allows for connecting sensors for measuring oxygen, temperature and currents, as shown in the images above. These sensors provides a clear indication to the fish’s environment.

All connections (as shown above) are waterproof provided that they are connected properly. EAP connections are delivered with sealed connection points for all sensors, these are installed in a protective aluminium cabinet with cage bracket for installation on the cage with 63mm pipes for cabling.
2.3.1 Technical information

Similar for both single and triple EAP:

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Triple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range</td>
<td>-10C to +40C</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Radio or hard wired *</td>
<td></td>
</tr>
<tr>
<td>Connections</td>
<td>Amphenol-plugs and direct connections</td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>Fibre glass, acrylic and aluminium</td>
<td></td>
</tr>
<tr>
<td>Additional equipment</td>
<td>Cage bracket for installation on plastic- or steel cages</td>
<td></td>
</tr>
</tbody>
</table>

* Hard wired EAP can only be used with Akvasmart CCS Feed System. Radio allows independent use, with Akvasmart CCS, base radio and PC

<table>
<thead>
<tr>
<th>Sizes EAP</th>
<th>L x W x H 370 x 300 x 170mm</th>
<th>560 x 560 x 170mm</th>
</tr>
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<tr>
<td>Weight</td>
<td>5kg</td>
<td>8kg</td>
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<table>
<thead>
<tr>
<th>Sensor connections</th>
<th>Single</th>
<th>Triple</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen sensor</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Temperature sensor</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Current sensor</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>
3 Installation

Required equipment:

- Radio: 24V power supply for CSU
- Hard wired: Access to K-net
- CCS controller using firmware version:
  - V9.01.00.0161 or later if using AkvaControl V9
  - V10.01.00.0503 or later if using AkvaControl V10
- PC running AkvaControl 9.01n /10.01h or later and connected to the CCS controller
- Wireless: Command Radio Base Station connected to the CCS controller set to ‘Master’
- Wireless: Command Radio connected to EAP set to ‘Slave’

- Remember to switch NOD (Green wire) to Can LO and DO to Can HI (White wire) like shown below:

  Before (set to Master):

  ![Before Master Image]

  After (set to Slave):

  ![After Slave Image]
3.1 Configuring the PC

Ensure that power is connected to the EAP controller and that the serial cable (V9) or USB cable (V10) between the PC and the CCS controller is connected.

**Instructions:**

1. Start AkvaControl

2. Enter “System layout”

3. Add new system unit

4. Add a temperature, current and optical oxygen sensor as shown in the figure:
3.2 Establish communication to the EAP

3.2.1 Wireless
1  Set the radio channel on the command radio connected to the EAP to a different ID than other CSU’s connected (See attached sheet for how to configure the radio)
2  Connect power to the command radio
3  Within a few seconds, the 16-character unique ADIO number of the EAP should be visible on the display of the CCS, looking something like:

   New 180:#1441E3BC0000003A.

3.2.2 Cabled
1  Take a backup in AkvaControl:

2  Shut down AkvaControl
3  Shut down 24v power supply to K-net
4  Connect the EAP to K-net through terminal block –X5 (see the figure below)
5  Turn on 24V power supply
6  Open AkvaControl and restore backup
Three 16 characters ADIO numbers will appear if you have a triple EAP

If using V10 the ADIO numbers will only appear in the program AkvaNodeMonitor located in your AkvaControl CCS folder (see figure below). AkvaControl must be running while opening AkvaNodeMonitor.

If ADIO numbers do not appear, refer to the hints in page 17. (it is not possible to proceed until the ID is displayed like this)

There are 3 places that the communication might be broken (wireless):

1. Between the CCS controller and the radio base station, or within the radio base station itself (but if you can communicate with another CSU, this is not the problem)
2. Between the command radio and the EAP, due to a wiring or some other problem
3. The antenna/radio in the command radio connected to the EAP.
**Hint 1**
If there is a red flashing LED light on the ADIO, then it is not possible for the ADIO to communicate with the radio card. Check the radio card power and the connections between radio card and ADIO.
If there is a green LED light on the ADIO (either steady or flashing) then the radio and the ADIO are communicating.

**Hint 2**
On the radio card, there are 2 indicator lights; one to show the communication with the ADIO (either green for ok, red for not ok), and the other to show communication back to the radio base station (green for ok, red for not ok).
If one is red, the radio cannot talk to the ADIO.
If the other is red too, the radio cannot hear the radio master.

If there are several CSU’s on the radio link all at once, then there will be one entry in the list for each CSU. It is important to select the correct address from the ADIO card.

**Hint 3**
Is the ADIO address not in the list? Check that the CSU is shown on the display of the CCS controller. If the CSU is on the CCS display (or in AkvaNodeMonitor if using V10) but is not in the list, most likely the CCS is changing the program in the CSU. It will take about 3 minutes on the radio and it is necessary to wait until it is finished before you can go on.
4 Testing the sensor connections

When all communication is ok, the sensor connections must be tested. In AkvaControl, select the menu

Help → Troubleshooting → Control Machinery Directly

You should get a screen that looks like this one:

Click on the oxygen sensor, current sensor, and temperature sensor icons to see their values.

Don’t worry about the “manual override” message if it is there. This only affects how the readings are used in the software.
5 Data Radio Configuration Sheet

Status LEDs
- Radio Comms Good
- Radio Comms Bad
- Wire Comms Good
- Wire Comms Good

Radio Configuration (All Radios)
- 6. 0: High power 1: Low power (leave off)
- 7. 0: 8.68MHz 1: 433MHz (leave off)
- 8. Unused (leave off)

Unique Slave ID (CSU Radio only)
- 1-5, Refer to Table #1
- Slave ID: 5

Base Station or CSU Select
- MASTER SLAVE JP1 JP2
- RS485 CAN
- MASTER SLAVE JP1 JP2
- RS485 CAN

Radio Channel Selection (All Radios)
- Channel 1
- Channel 2
- 1-3, Refer to Table #2
- 4-8, Unused (leave off)

Drawn by: Brett Muir
Date: 5/3/03
AKVAsmart
6 Maintenance

The EAP requires very little maintenance. The exception is the amphenol plugs; they need regular silicone grease (DC4) lubrication to avoid corrosion. This is done when the sensors are connected for the first time, and thereafter every other month and more often during stormy seasons.

Check all cables frequently for gnaws, bends and cracks to the cable as often as possible and minimum once a month.

6.1 Check list for maintenance

*Make copies of this check list before it is filled in.*

<table>
<thead>
<tr>
<th>Check cables, every month</th>
<th>Lubricate plugs, every other month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Signature</td>
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# Tables for Slave-ID

Table 1: unique SlaveID-switches 1-5 of S1

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Table 2: Radio Channel Selection - Switches 1-3 of S2

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Appendix B - Deviation form

Make copies of this form before filling anything in

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