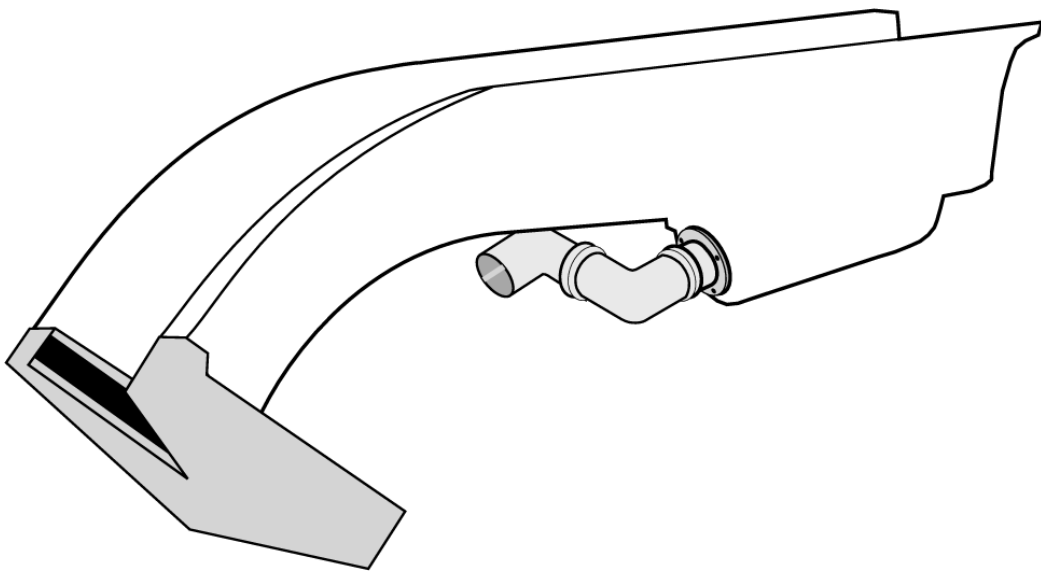
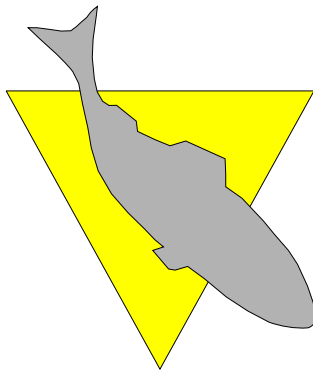


Single & Multi Channel Bioscanner Operation manual





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1. WARRANTY

Vaki Aquaculture Systems Ltd. offers warranty for defects that appear within two (2) years from the date of delivery by Vaki Iceland, on condition that the equipment has been assembled, used, and maintained in accordance with the instructions for assembly and use.

Vaki undertakes to repair all defects that are due to faults in the design, materials used, or manufacture of the equipment. These defects will be rectified by repairing the equipment, or replacing components. The complete unit or parts thereof may be required to return to the factory in Iceland for repair.

Vaki accepts corresponding warranty for original parts fitted by Vaki as replacements, for a period of one (1) year from the date supplied.

Vaki will *not* be liable for:

- * *Incorrect assembly and use, or inadequate maintenance.*
- * *Defects which result from the fitting of materials, components, or devices not supplied by Vaki, and which are purchased and fitted by the user.*
- * *Defects due to changes made to the equipment by the user, without the written consent of Vaki.*
- * *Faulty or inadequate repairs carried out by the user.*
- * *Normal wear and tear of the equipment.*
- * *Faulty connection of electrical equipment.*
- * *Faults caused by excessive voltage.*
- * *Damage or stoppage due to immersion of the computer or camera in water.*
- * *Damage to electrical supply cables.*
- * *Any economic loss that may arise from production stoppage.*

If faults or defects appear in the equipment, the user must report this in writing to Vaki or its appointed representative as soon as possible, and without unjustifiable delay. The report must be sent within two (2) weeks from the expiry of the deadline, which is two (2) year from the date of supply by Vaki Iceland.

If the purchaser does not inform Vaki or its representative within the time limits stated above, the purchaser shall forfeit the rights of the warranty.

2. INTRODUCTION



Your investment in high technology

Better information on number of fish and the fish size, gives a better ground for accurate feeding and reduced feed cost. Knowledge about the biomass in the cages/tanks will give you a better platform for planning the production and the sales, for better overall economy.

The Bioscanner is a sophisticated electronic device specially designed for counting both small and large fish on fish farms. Among the clear benefits of using the Bioscanner are:

- * Manpower saving
- * Increased efficiency
- * Accurate data on number of fish in each size category
- * Efficient feeding and accurate medical dosage
- * A safer basis for insurance assessment

The Bioscanner is very gentle and the fish is not touched by any mechanic parts when counted, and the fish are in water at all time. Correct set up and use of the Bioscanner fish counter is essential for accurate results. Please read this manual carefully.

General

The interface between the control unit and the user is meant to be as simple as possible. The theme is that the control unit displays some messages or options and a flashing cursor indicating that the user is to enter information. The user confirms that he has received the message by pressing **ENTER**, or choose between these options with the arrows keys **↑** , **↓** and confirms his selection with the **ENTER** key.

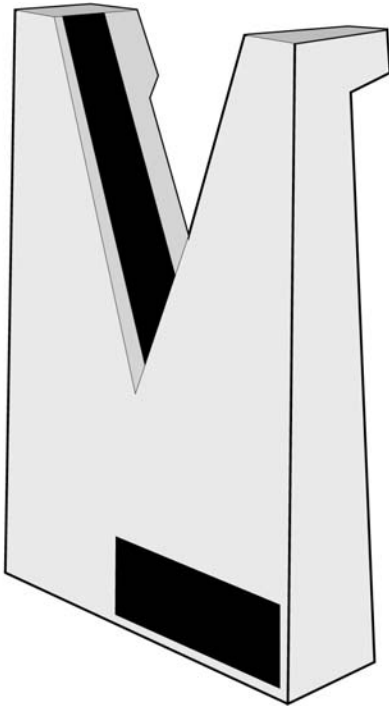
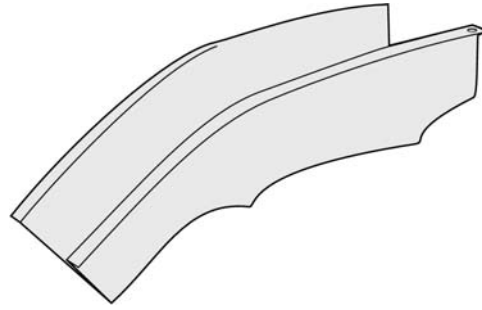
The Bioscanner consists of the following units



THE CONTROL UNIT gathers and displays data from the scanners. The multi control unit can handle up to four scanners. The control unit also supplies power to the scanners.



THE V-CHANNELS regulate the flow of fish and water, and separate the fish through the scanner, making it possible to count them. The channels are made of glass-fibre polyester and are delivered in two different versions, for small or big fish.



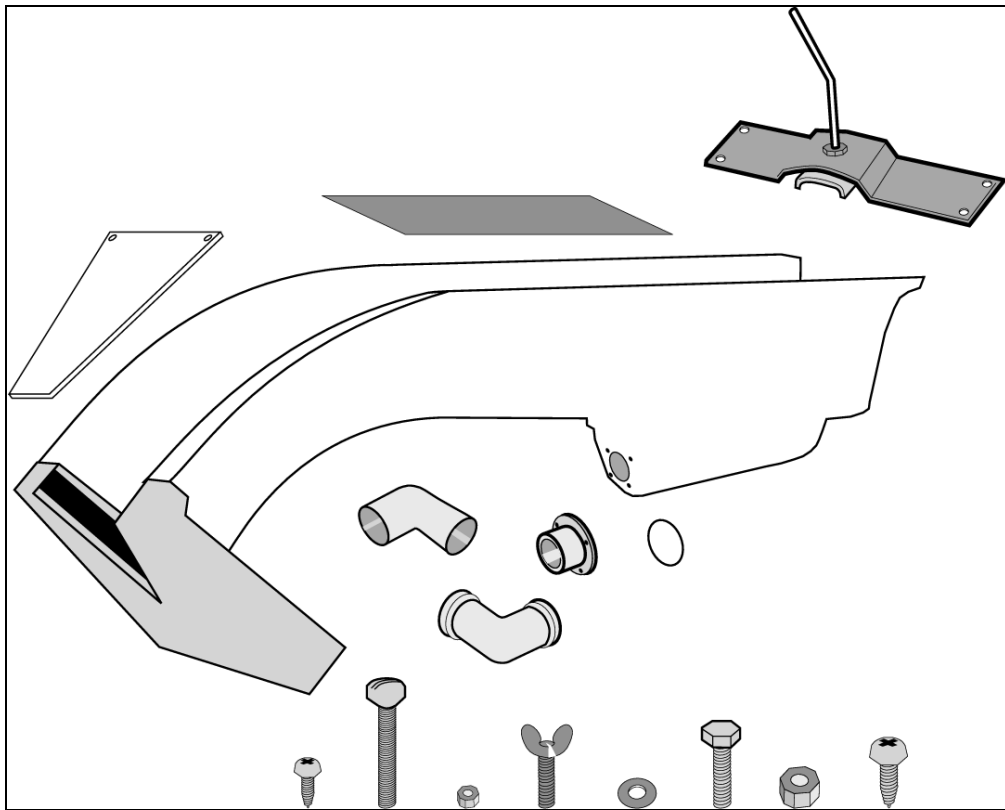
THE SCANNER "sees" the fish as they pass through the V-channel, counts them and relays data to the control unit via the connector lead.

THE CONNECTOR LEADS connect the scanners to the control unit for power and data transmission.



3. ASSEMBLY INSTRUCTIONS

The Bioscanner V-channel is manufactured and packed ready for assembly by the user. V-CHANNEL 1 is recommended for fish from 3 gr. - 750 gr. and V-CHANNEL 3 is recommended for fish from 500 gr. - 6.000 gr. Following are the parts for V-CHANNEL 1.

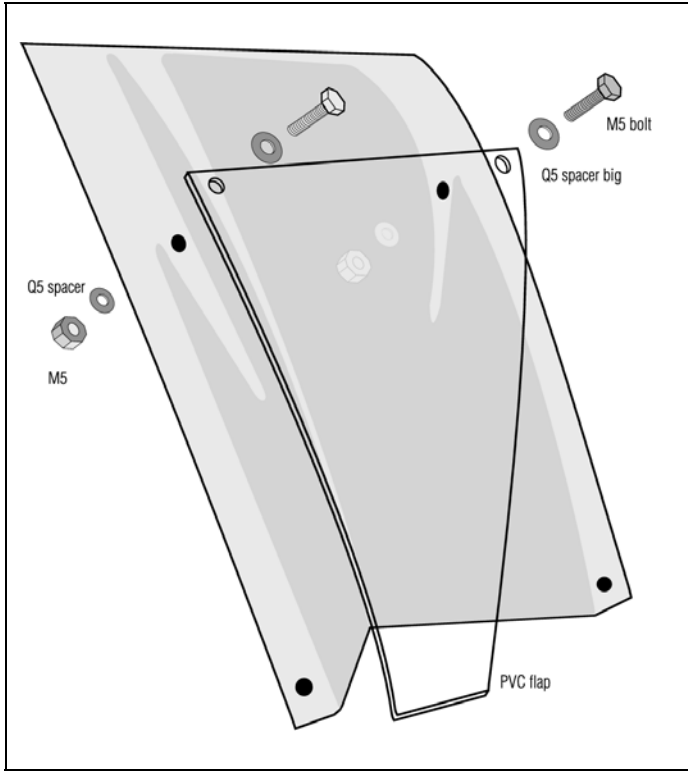


V-channel 1

1. Glass-fibre reinforced polyester channel
2. Polyurethane flange
3. Rubber O-ring
4. Two 90° PVC elbow joints
5. Aluminium grating
6. Transparent PVC flap
7. Stainless steel screws, bolts and nuts
8. Clamp



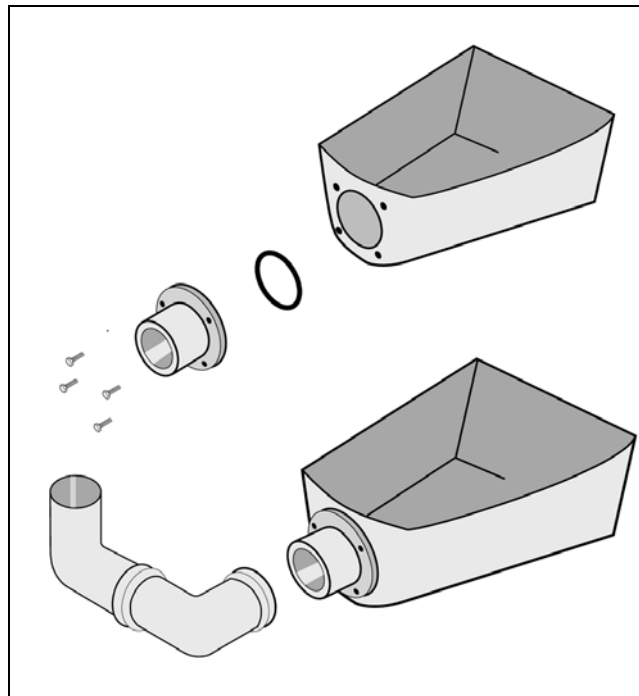
1. Attaching the PVC flap to V-CHANNEL 1



Parts: 2 x M5 bolts, 2 x M5 nuts, 4 x Ø5 washers. Place the flap in position at the end of the channel. Fasten the flap in position with the M5 bolts. Check that the flap is hanging straight. Adjust if necessary.

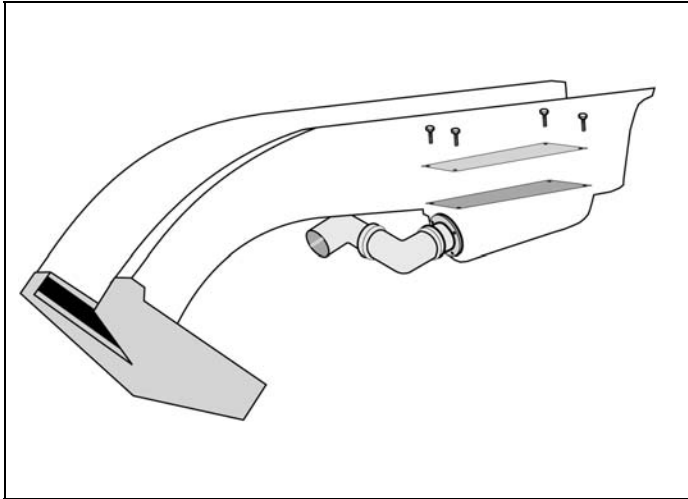
2. Attaching the flange and the 90° elbow joints to the V-CHANNEL

Prepare all the parts needed: The channel, the flange, the O-ring, 4 M5 bolts and nuts and the two elbow joints. Place the O-ring in the recess in the flange and fasten the flange to the channel with the four bolts and nuts shown, tighten the nuts evenly. Before fitting the 90° elbow joints to the flange, lubricate them with soap and/or water.



3. Fitting the aluminium grating to V-CHANNEL 1

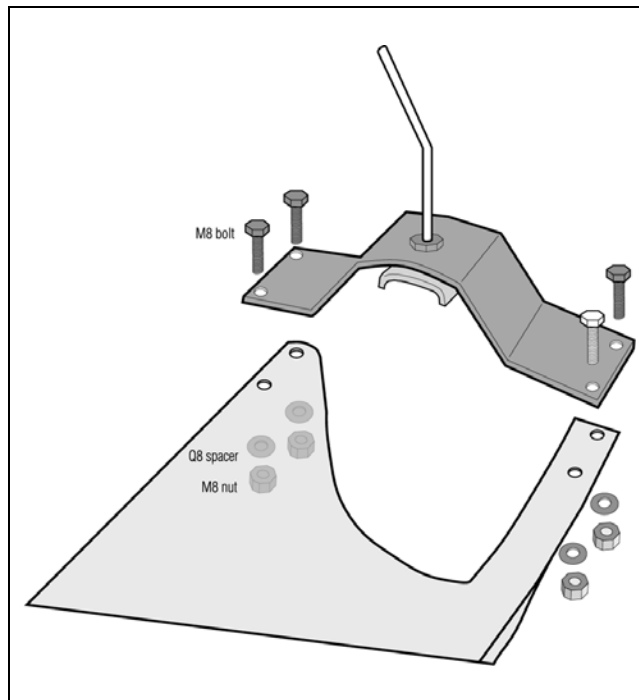




Tools required: Silicone gun. Prepare the grating and four M3 screws, spacers and nuts. Make sure that the smooth side of the grating faces upwards so as to avoid injuring the fish. The smooth side can be identified by running your fingers across the grating.

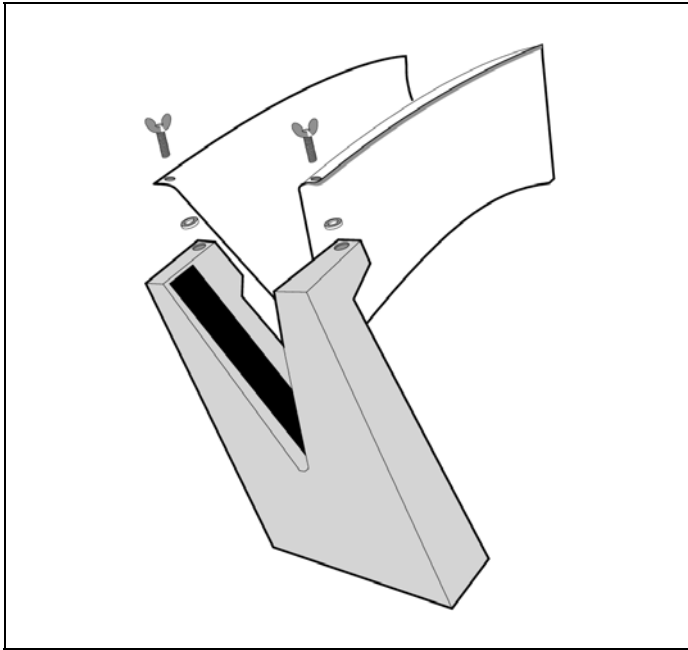
4. Fitting the clamp to the V-CHANNELS

Prepare all the parts needed: 4 M8 bolts, 4 washers and 4 M8 nuts. Place the clamp in the inlet of the channel, aligning the holes on the clamp. Place all 8 mm screws in position before tightening fully. To prevent all bolts from corroding, some grease has been put on the bolts and bushings.



5. Installing the scanner unit on V-CHANNELS 1 AND 3

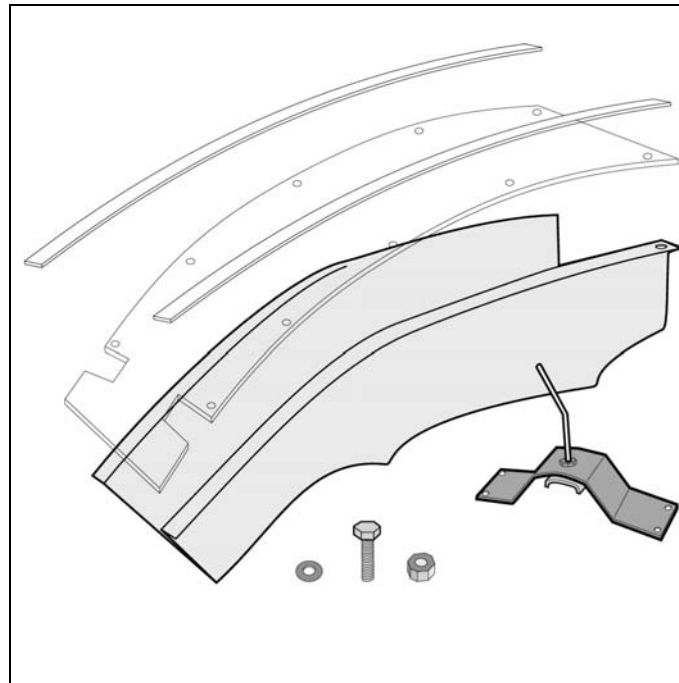




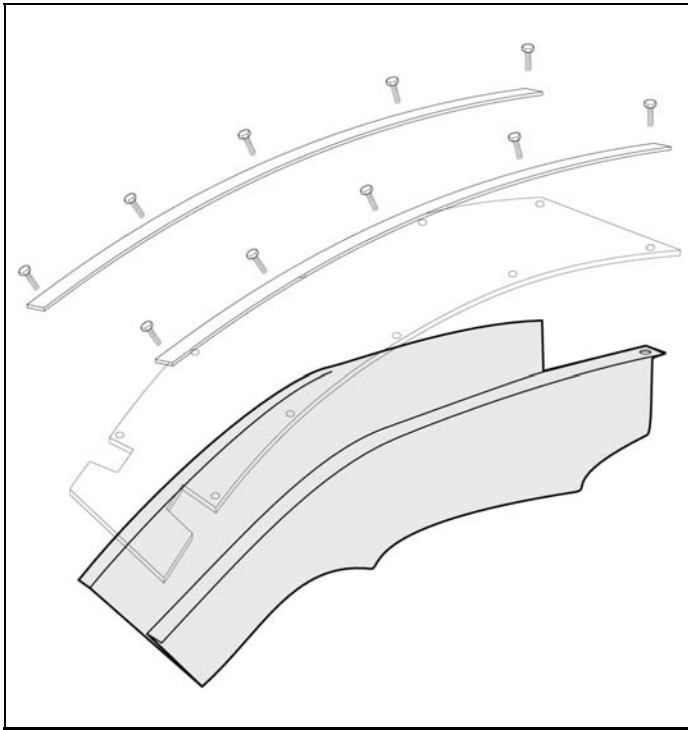
Place a washer on each of the two wing screws. Put the screws through the pre-drilled holes in the channel and secure them with the plastic locking washers. Place the scanner unit in position and secure it by tightening the wing screws.

V-CHANNEL 3

1. Glass-reinforced polyester channel
2. Plastic cover with two plastic strips
3. Clamp (with bolts and screws)
4. PVC flap
5. Stainless steel screws, bolts and nuts



1. Attaching the PVC plastic cover to V-CHANNEL 3



Prepare 10 M5 bolts and nuts, two strips, the plastic cover on top of the channel, aligning the holes in the cover and the channel, then place the strips on the top of the cover aligning the holes and put all the M5 bolts in before tightening fully with the M5 nuts on the other side.

2. Fitting the clamp to V-CHANNEL 3

See step no. 4 above

3. Installing the scanner unit on V-CHANNEL 3

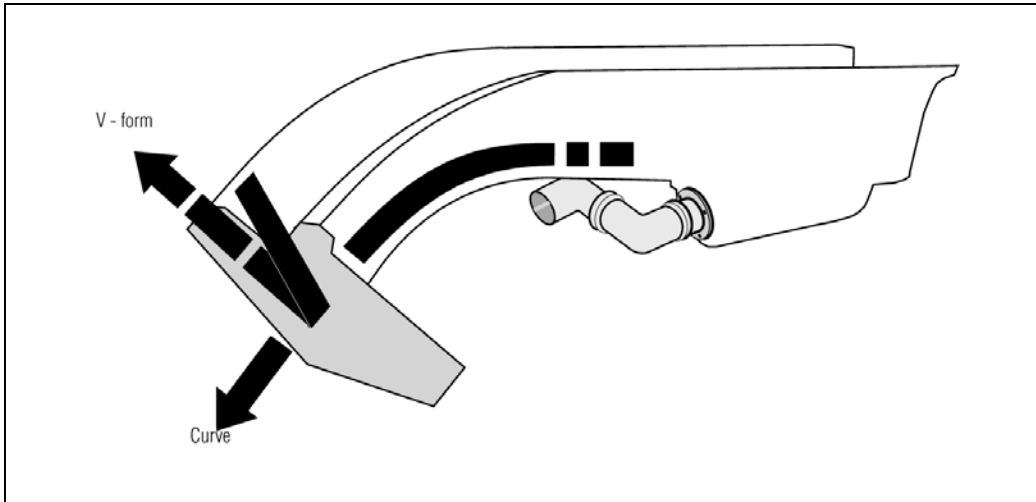
See step no. 6 above.



4. OPERATION

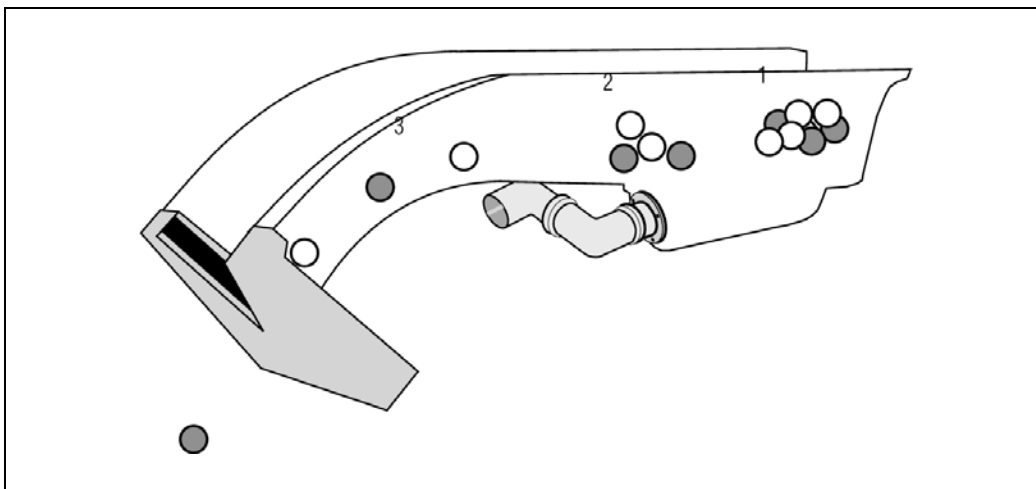
The principle functions of the Bioscanner channels

The V-channels of the Bioscanner are specially formed to separate the fish as they glide through.



The two main functions are the V-form and the curve form. As the fish come out of the basin they are close together, and have to be separated to be counted accurately. The V-form ensures that the fish can not turn around, and also that they are not crowded together.

The curved form accelerates the fish down the channel. If two fish are close together in the beginning the one that is little bit ahead will accelerate faster and this causes a separation of the fish. See figure 2.



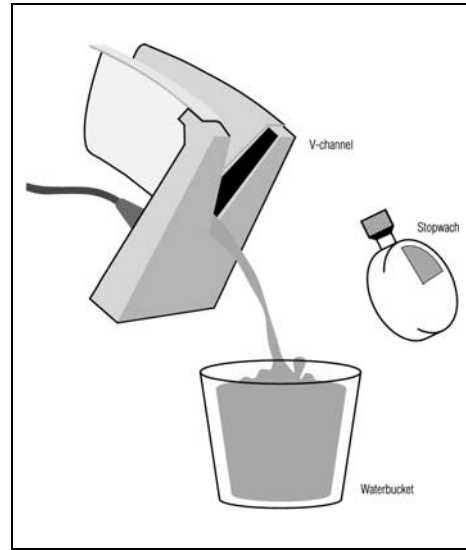
Controlling the water-flow



For correct operation the amount of water must be adjusted to the size of the fish. Generally speaking, better separation of the fish will be achieved if not too much water is used. On the other hand sufficient water must be used to flush the fish smoothly down the channel. The following table can be used as a rough guideline. The figures are for salmon, other fish species (different shape) may require slightly different amounts of water.

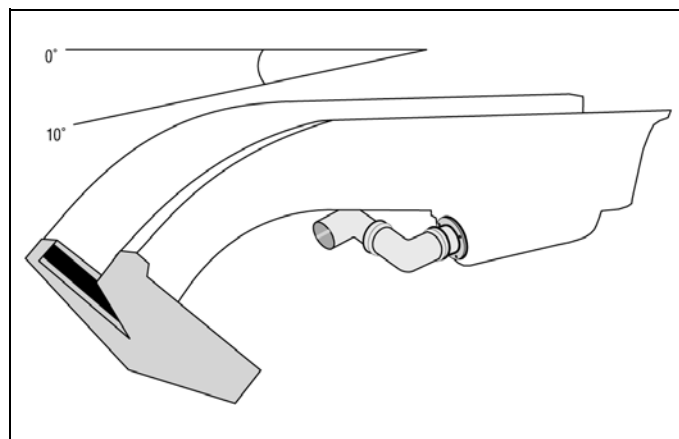
The figures shows how correct water flow can be achieved by using a stop watch and a water bucket (12 – 14 litres). The time is measured while the water flows from the channel and fills the bucket.

Fish size	Flow per channel
Up to 10 gr.	3 - 6 l./min.
10 - 30 gr.	6 - 10 l./min.
30 - 150 gr.	10 - 60 l./min.
150 - 1500 gr.	60 - 130 l./min.
1500 - 6000 gr.	130 - 210 l./min.



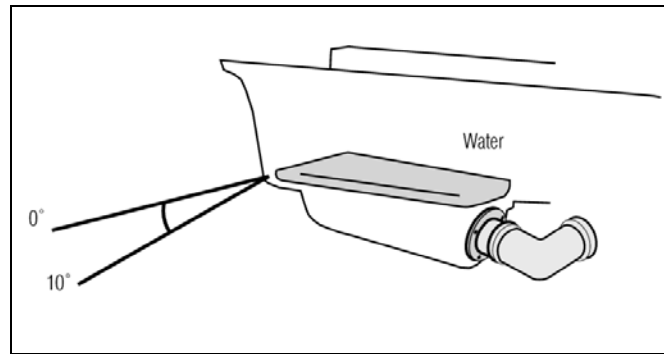
Slope of the channel

Generally, the slope of the V-channel should be about 0° - 5° for stable operation. For higher capacity (and lower accuracy) the slope can be increased to 10° - 15°.



Level of the channel

By pouring some water into the bottom of the V-channel, it is possible to use the channel itself as a level indicator.



Downloading a program

It is possible that if a scanner has not been used for a period of time, it may have lost its memory and program. Then the control unit must send a new program to the scanner. While this is in progress the control unit displays WAIT... 98 and you must wait for approximately one minute until the control unit has counted down to zero. When CH X appears on the display, channel X is ready to begin counting. (X = 1,2,3, or 4).

Counting

The Bioscanner is now ready for counting. It displays the number it had before the power was cut the last time, so you have to press **RESET** and **ENTER** to start counting from zero. Therefore, in the event of accidental power failure you can continue counting with the right figures when the power comes on again.

Power failure!

In the event of accidental power failure the counter will stop counting but it will remember the counting figures from when the power failed. Therefore the user must go through the start-up routine again and the counter will start counting from where it stopped.

End of operation

When the counting operation is completed, disconnect the leads and store the equipment in a dry place. Screw caps on connections and plug cables end to end. Clean and dry the scanners with a soft cloth.



5. CONTROL UNIT FUNCTIONS

The control unit is used to set up the counter according to the fish size and the way the counter is to be used.

5.1. SINGLE CHANNEL CONTROL UNIT

When the yellow control unit is turned on with a scanner connected, the following will be displayed on the screen.

To obtain maximum accuracy, it is necessary to tell the Bioscanner whether the fish to be counted have been graded by size, i.e. if the fish are of more or less the same size: (mean value +/- 30%).

GRADED FISH ?
NO

Use arrow keys to $\uparrow\downarrow$ select
YES or **NO** then **ENTER**

ENTER



SIZE :
UP TO 10gr _

Use arrow keys to $\uparrow\downarrow$ select the size range then **ENTER**. For optimal counting, an estimate of the size of fish is required. There are 5 size categories. To select a larger size, press \uparrow , for a smaller size \downarrow . When the desired size is shown, press **ENTER**.

ENTER



The results from the last count are then displayed on the control unit. The flashing battery icon shows that there is contact between the scanner and display unit.

 562

To reset the total count number in the display to zero, press **RESET**. The following message will be displayed:

RESET YES _

Use arrow keys to $\uparrow\downarrow$ select
YES or **NO** then **ENTER**

ENTER



 0

Pressing **ENTER** to confirm that you want to erase all data from memory the total count number will be set to 0 (zero). And a new counting session can begin.



5.1.1. SETTING THE ALARM

To set the audible alarm press **COUNT** on the control unit.

ALARM ? YES

Use arrow keys to $\uparrow\downarrow$ select
YES or **NO** then **ENTER**

ENTER



ALARM AT
2500_

Use arrow keys to $\uparrow\downarrow$ select the number at
which the alarm will sound and **ENTER**

ENTER

When the alarm sounds press **RESET** once to switch off. The alarm will be switched off and the count number will remain. Press **RESET** again to reset the count back to **0** if required.

To re activate the alarm press **COUNT** as described above.



5.2. MULTI CHANNEL CONTROL UNIT

When the yellow control unit is turned on (with up to 4 scanners connected to the 4 inputs) the set size function is displayed on the screen.

The size group for each channel can be selected using the arrow keys $\uparrow\downarrow$ and press **ENTER** to confirm.

After all the size groups have been confirmed, the results from the last count will be displayed on the count display screen:

Ch 1 Size :	
10- 30gr	—

5.2.1. COUNT DISPLAY SCREEN

Ch 1 is the channel number

152 is the total count for that channel

the flashing # symbol indicates the control unit and scanner are connected.

Ch 1	152
#	
Ch2	1214
#	

To reset the count numbers in the display to zero, press **RESET**. The following message will be displayed:

PRESS ENTER FOR RESET

Pressing **ENTER** to confirm that you want to *erase all data from memory* the count numbers will be set to 0 (zero).

5.2.2. SETTING THE ALARM

Pressing the **FNC** key on the Control Unit, you can set the audible alarm for each channel. When in this function, pressing the **FNC** key will move the flashing cursor between the channels and the number settings. Use the arrow keys $\uparrow\downarrow$ to switch the alarm **ON** and **OFF** for each channel and to set the number of fish which will sound the alarm.

Alarm ?	
Ch 1 ON	500
Ch 2 ON	1500
Ch 3 OFF	
Ch 4 OFF	
SUM ON	6000

Press **ENTER** after completing all the settings and to return to the count display screen. When the alarm sounds press **RESET** key once to turn off the alarm.

To reset the alarm you must re-enter the Alarm Settings function and switch the Alarm setting back to **ON**.



6. FAULT LOCALISATION

If the equipment is not functioning correctly, please go through the following fault localisation procedure.

Important: Neither the Control Unit or the scanners may be opened or repaired by the user. The warranty terms will then not cover the equipment.

If the problem is not fixed by following the procedure, contact Vaki or our nearest agent.

* **The POWER ON lamp is not on**

1. Check that the Control Unit is switched on and plugged to power supply.
2. Check the power supply and that all contacts are OK.
3. If the lamp is still not on, contact Vaki or our nearest agent.

* **Power failure**

If the power supply is broken when counting, the equipment automatically ensures that the number of fish is stored. For new start-up after power failure see chapter 4.

* **Message: NO CONNECTION**

1. Check that the cable is firmly plugged to the control unit
2. If the error messages does not disappear:
 - turn off the control unit
 - plug the cable into another input on the control unit
 - turn on the control unit
 - press RESET
3. If the error message still is displayed, the cable or the counter may be defective
4. Rinse the contacts – if this not helping you, try one of the other cables
5. If the problem can not be solved, contact Vaki or our nearest agent.

* **Message: CHANNEL X!!**

Channel X is dirty

Clean the scanner with water and a soft cloth. Then press RESET. The Control Unit will run the self test again.

If the problem is not solved, contact Vaki or our nearest agent.

* **Message: ?????**

The cables are not connected properly.

1. Turn off the control unit and unplug the power supply
2. Unplug the cables from both the control unit and the scanners
3. Check that the cable connectors are clean and plug the cables again to the control unit if clean.
4. Plug in the power supply and follow the start up procedure
5. If the error message does not disappear:
 - turn off the control unit
 - connect the cable to another input on the control unit
 - turn on the control unit
 - press RESET
6. If the error message ????? does not disappear from the display, contact Vaki or our nearest agent.

* **The equipment counts fish when there is only water running through the scanner**

There is too much water running through.

Regulate the water according to the table in chapter 4.

* **The counter registers too few fish**

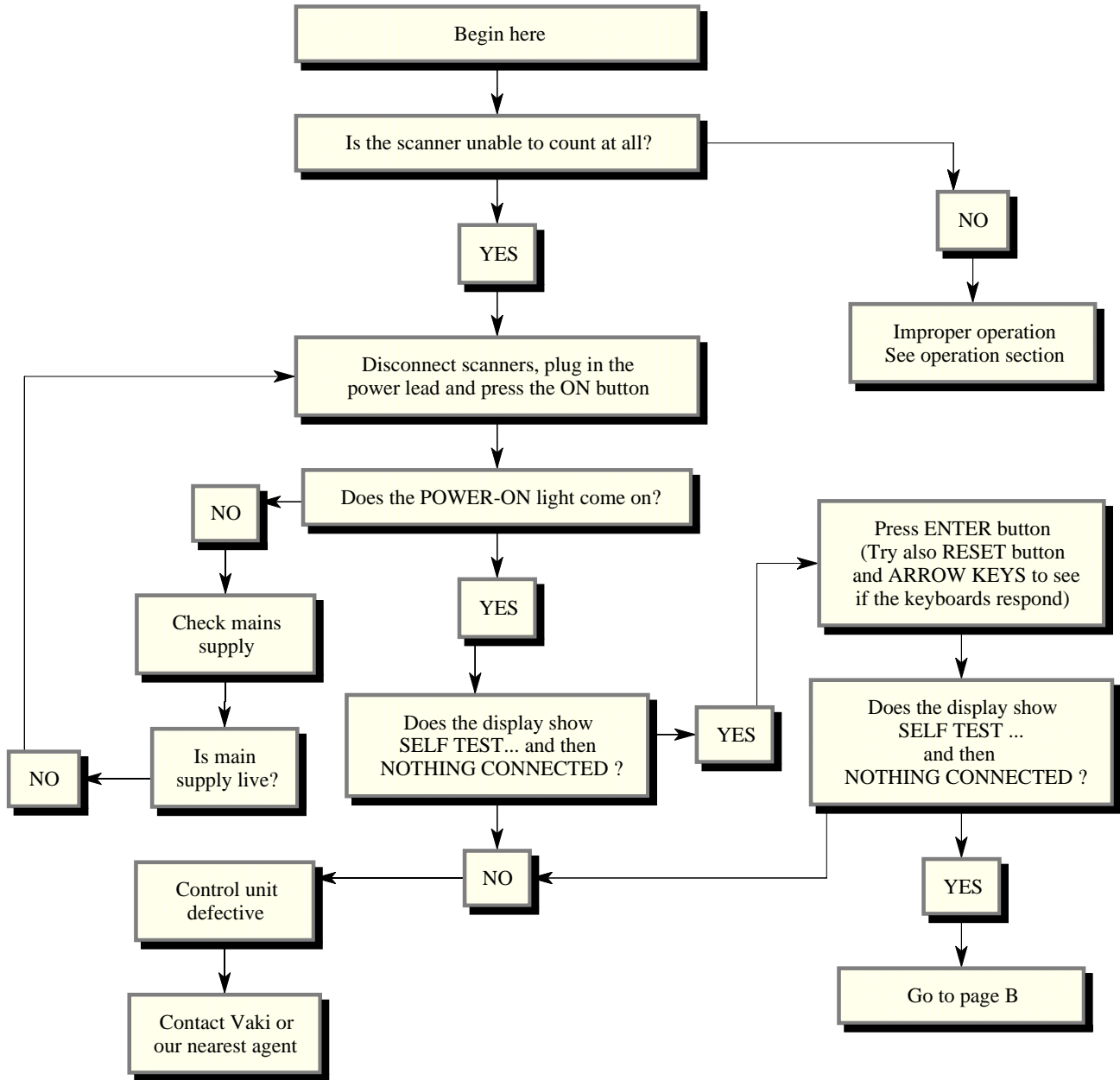
Be sure that the control unit is programmed with right fish size

* **Strong sunshine**

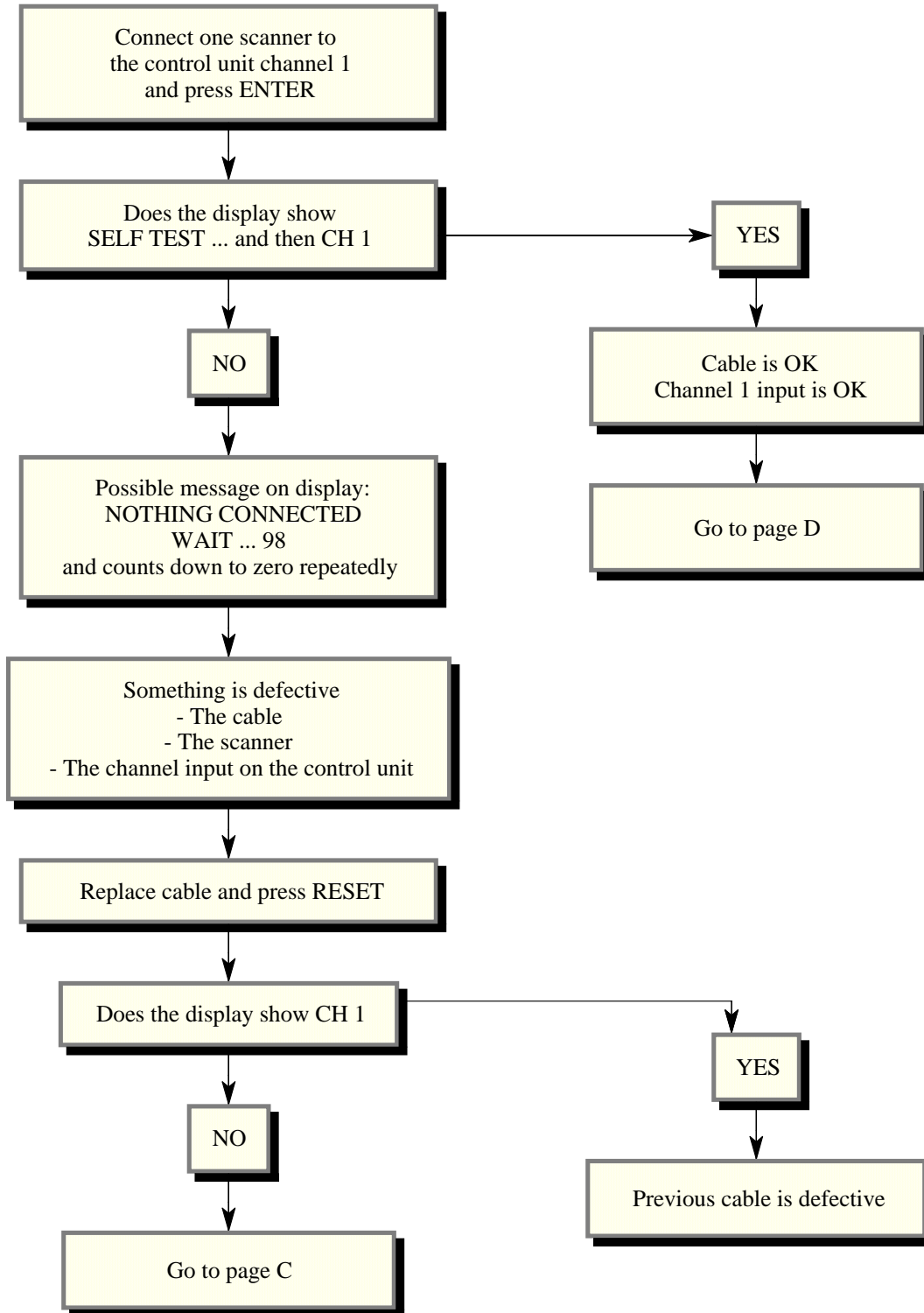
Strong sunshine can affect the counters accuracy

Try to place the counter under shadow.

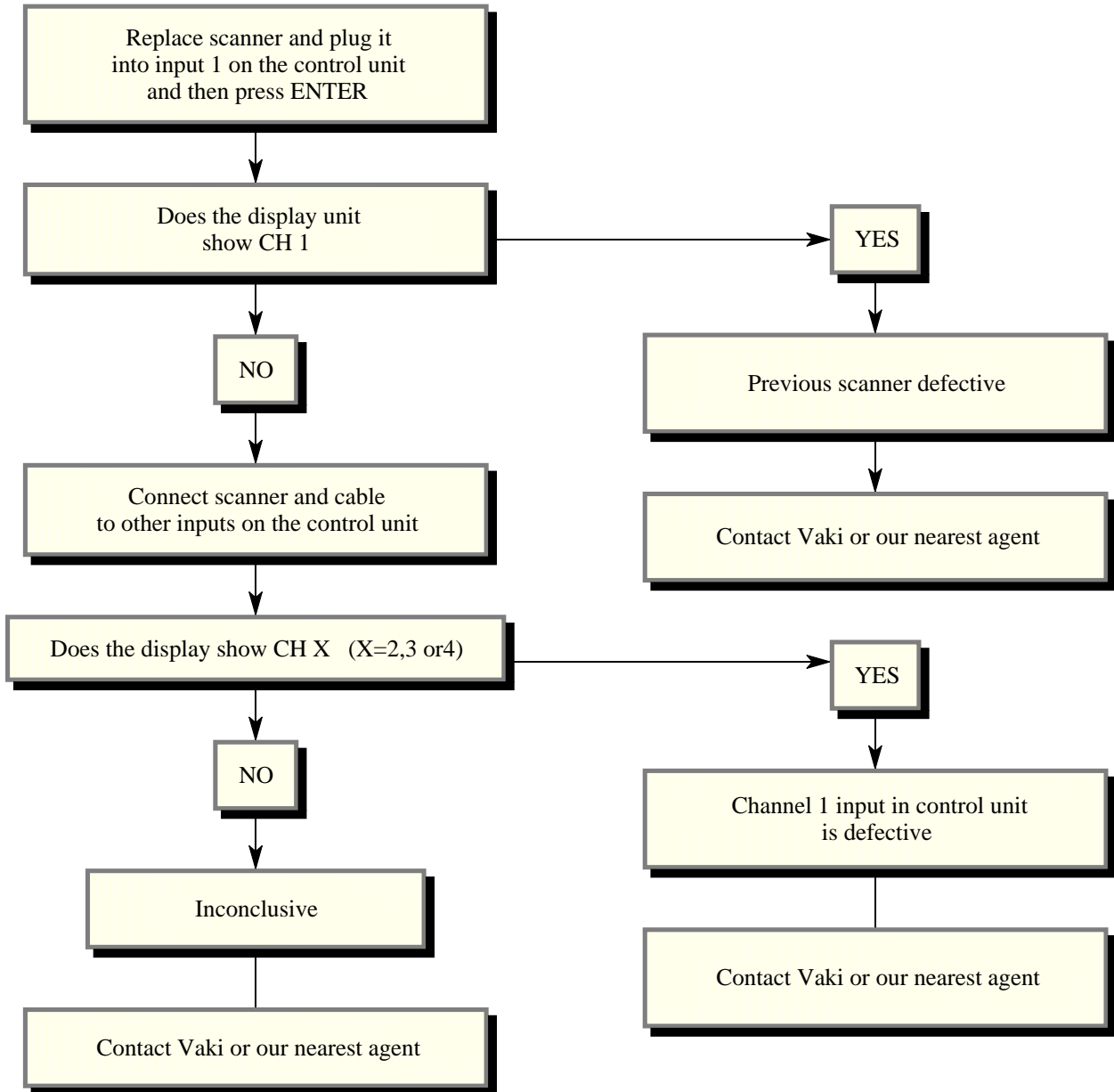
Fault localisation procedure - page A



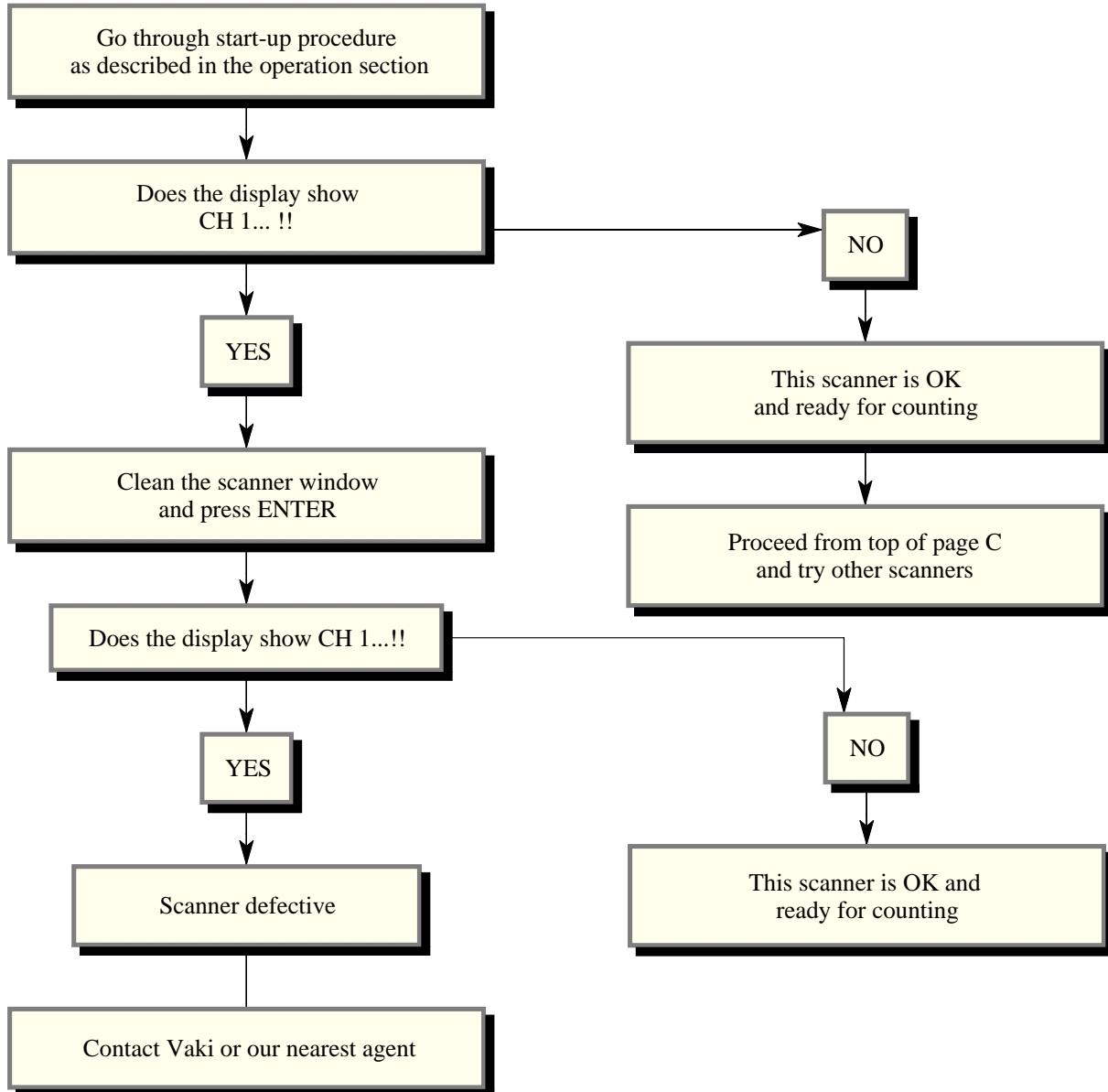
Fault localisation procedure - page B



Fault localisation procedure - page C



Fault localisation procedure - page D



7. TECHNICAL SPECIFICATIONS

* CONTROL UNIT	Dimensions: 280 x 135 x 50mm Weight: 2,0 kg
* Multi CONTROL UNIT	Dimensions: 300 x 180 x 50mm Weight: 3,0 kg
* SCANNER UNIT	Dimensions: 25x20x35 cm Weight: 3,0 kg
* V - CHANNEL 1	Dimensions: 150x40x32 cm Weight: 7,0 kg Fish size: 3 gram - 750 gram
* V - CHANNEL 3	Dimensions: 100x32x28 cm Weight: 5,0 kg Fish size: 500 gram - 6 kg
* ALARM	Optional
* LEADS / CABLES	Connector lead: 15 meter Control unit to power point: 2 meter Other lengths available on order
* RATING	Supply: 220 V (110) AC 48 – 68 Hz 12 V DC optional Max. power consumption: 12 W
* TEMPERATURE	0°-40° C.
* WATER PROTECTION	Control Unit - IP 65 Scanner Unit - IP 67
* CAPACITY	Fish per scanner unit per hour (continual flow of fish and with more than 98% counting accuracy)
	Fish size up to 15 g 10,000 fish/hour Fish size 15 g - 30 g ~8,000 fish/hour Fish size 30 g – 1,500 g ~5,000 fish/hour Fish size over 1,500 g ~3,000 fish/hour

AVOIDING PROBLEMS WITH CONNECTORS

Cleaning the connectors on scanners, cables and on the control unit after use with electronic cleaning solvent spray will prolong life and assure proper functioning of your equipment for a long time.

Another step is vital when using the Bioscanner:

- Keep the cables connected to the scanner at all time when working in salt water

The following maintenance procedure is recommended for all connectors on cables and equipment from Vaki.

- **Clean all connectors** after use with Electronic Cleaning Solvent Spray. (Ask your local electrician where you can buy cleaning solvent, type Electrolube or equal)
- **Inspect cables** for damage and make them up for storing. Check the O-ring rubber sealing in the female type connectors.
- Store equipment in a **dry place** when not in use.
- **Connect all cables** to scanners pre entering the site
- **Avoid disconnecting** the scanners at sea site
- Take precaution steps when installing at site. Keep cables **free of walkways** and other places where cable can accidentally be frayed or cut.