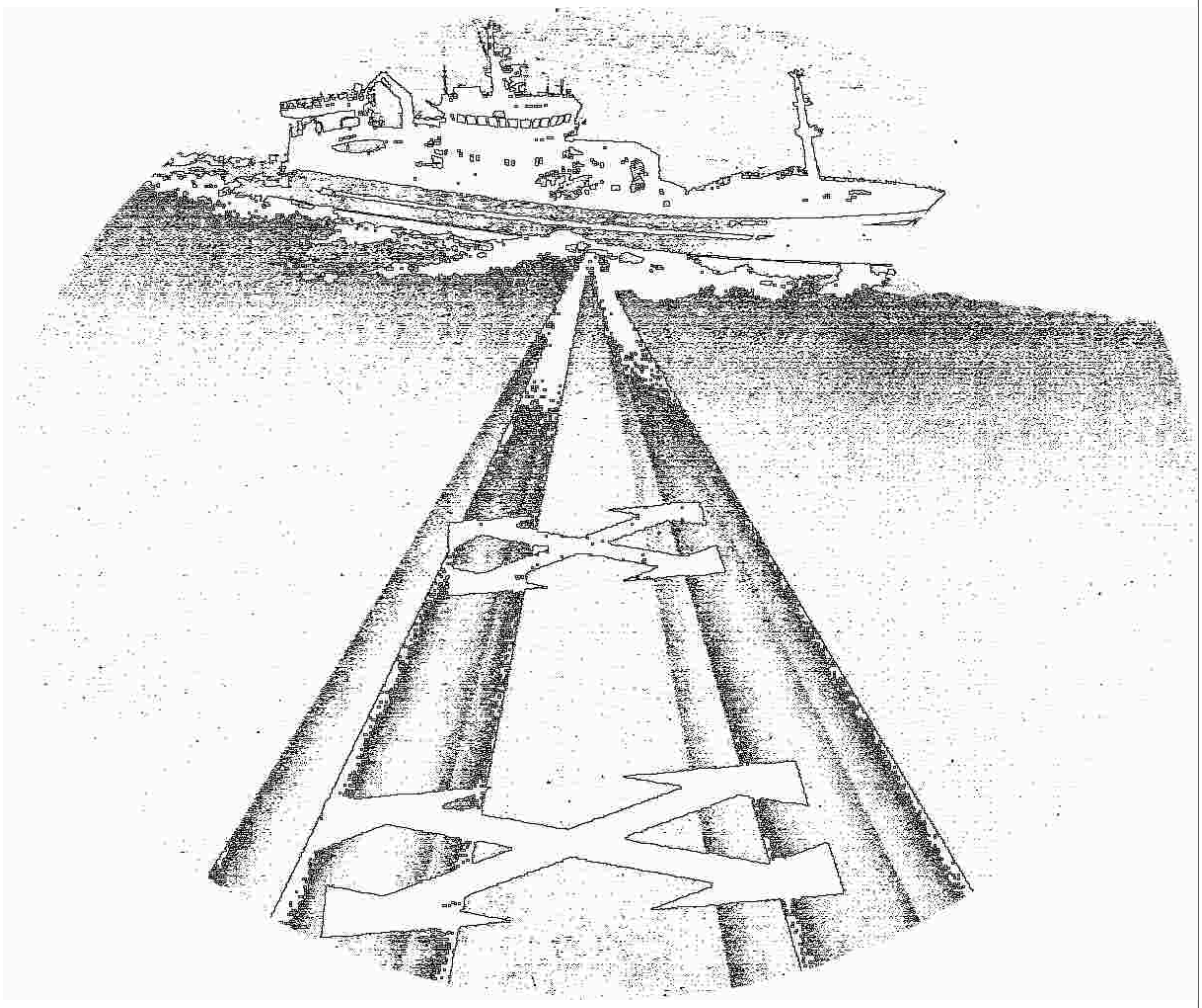
MOLTECH



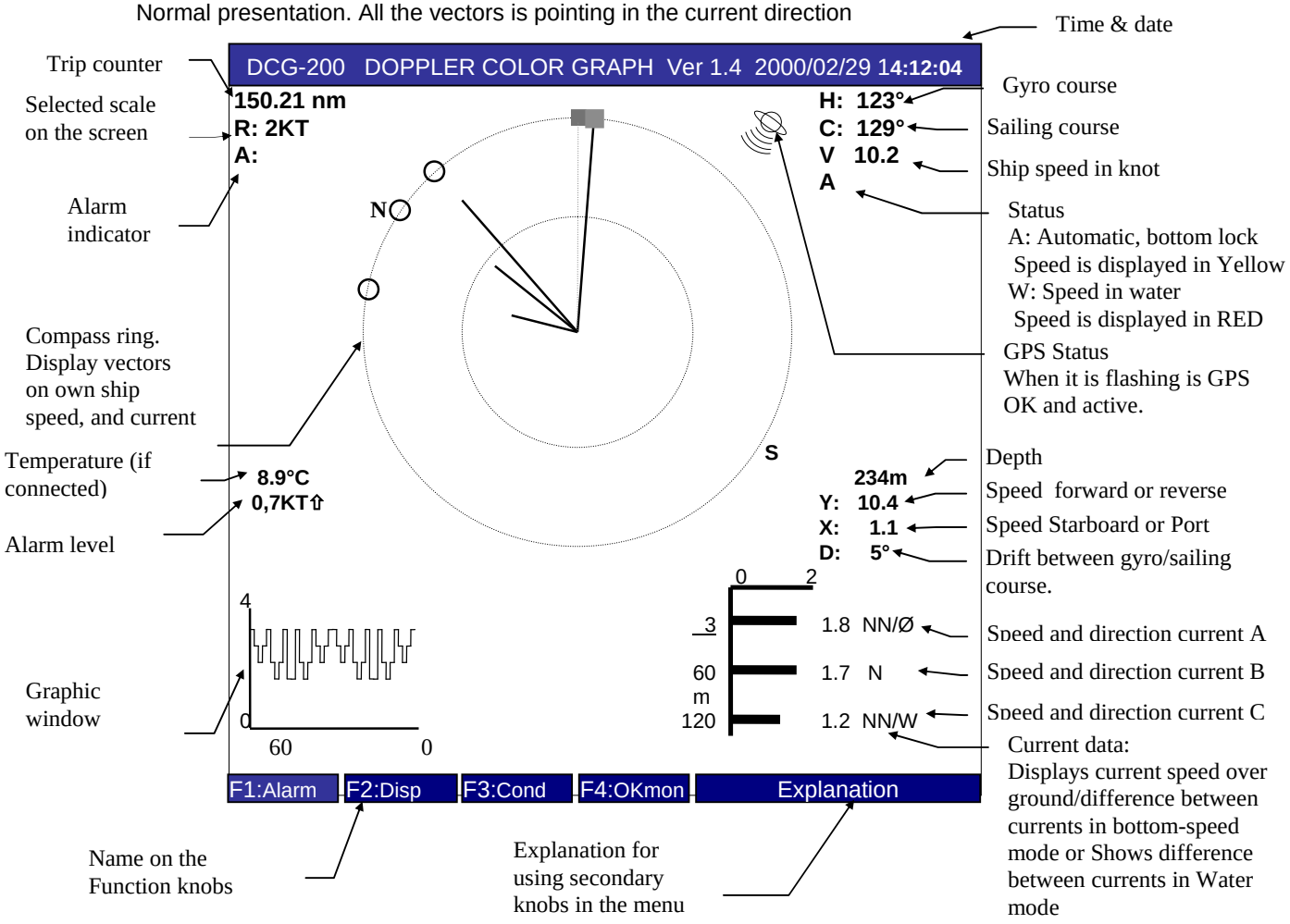
English Usermanual

CONTENTS

1 Introduction

1.2 Display

Normal presentation. All the vectors is pointing in the current direction



NOTE: Please note that the log ALWAYS is switched off during docking.
If the transmitters are running when the transducers are in free air, will the transducers be damaged permanently?

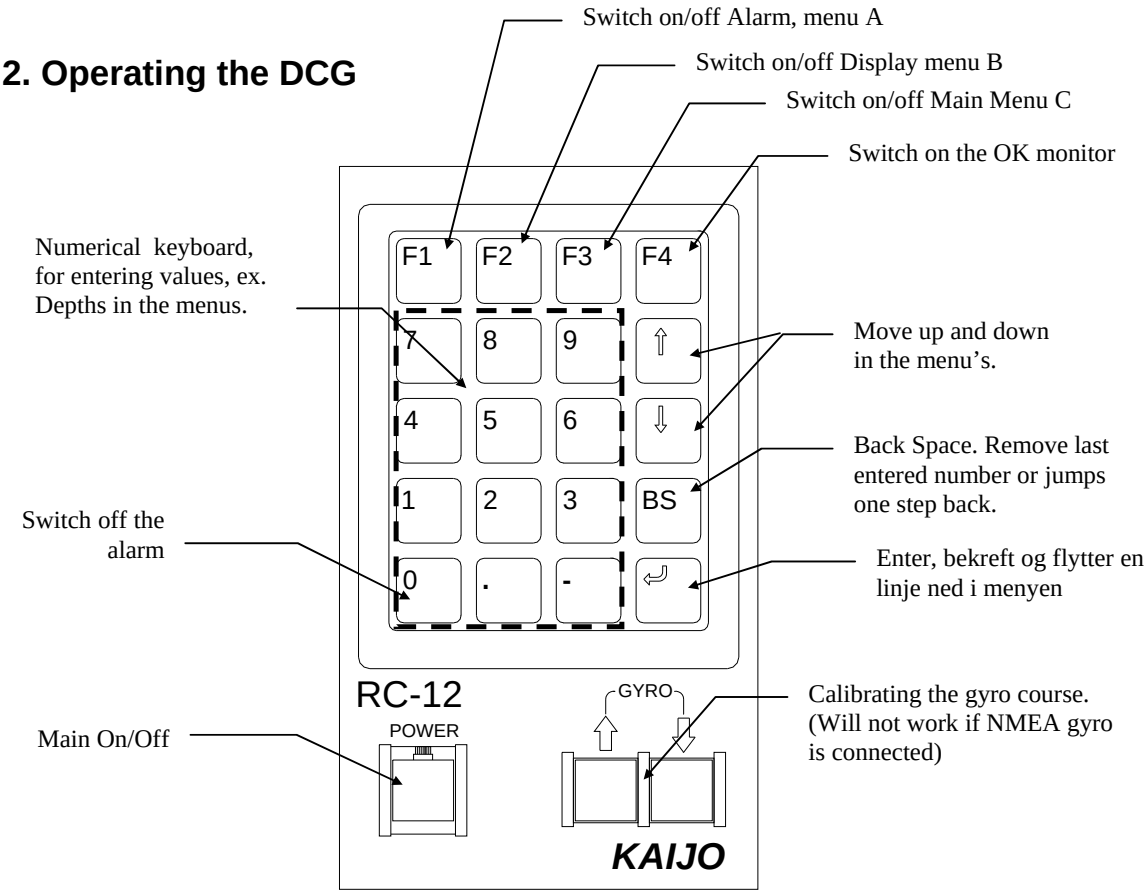
1.3 What is a DCG-200 Doppler log?

The DCG-100 is a 4-axe speed log and current machine that measures the ship speed forward, aft, starboard and port. It uses 2 separate double transducers who create 4 beams angled 30° to each side. The advantage with 4 beams is that the correct speed is updated fast and accurate. In bad weather is the angle between 2 beams always 60° so the log compensates automatic for rolling and pitching. The log can measure current speeds down to 80% of the water depth.
The ship speed can be measured in 3 different ways:

- **GPS**. The speed is feed from the GPS and the log is using this speed to calculate the current speed and direction out of this information. Be aware that the current speed can be wrong in bad weather and when the ship is turning fast since the GPS measure speed from the mast, and the log is measuring from the keel. Also is the GPS speed and course filtered to avoid rapid course errors, but the log is correcting the course instantly from the gyro.
- **Bottom** Over bottom from 3 to 400 - 450 meter
- **Water** Speed true water from 15 - 120 meter stabile. (The log can measure from 1 meter depth with some errors (use the upper reference around 15 meters), and down to 200 meters if the conditions is present with plankton or echoes in the water) I the arctic with extremely clear water can the max depth be limited to 50 meters.

The log measure 3 current layers by calculate the Doppler speed of particles in the sea. These can be plankton, salt/fresh water layers, particles or fish. These can also be used as reference to measure the ship speed in water. The current speed can be calculated from 2 meters down to 80% of the depth. The water depth had to be more than 20 meters.
The log is made to work together with the KAIJO sonar's and equipment who can read NMEA.

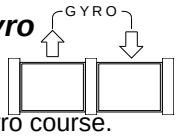
2. Operating the DCG



2.1. Switch On/Off

The main On/Off switch. Please note that the log ALWAYS is switched off during docking. If the transmitters are running when the transducers are in free air, will the transducers be damaged permanently?

2.2 Calibrating the gyro



When the log has been switched off is it necessary to calibrate the gyro so the DCG display the correct gyro course.
If there is an unwanted difference between them, use the up/down switches. The out reading on the screen is only updated once every second, so take care. If the DCG is running on the GPS is it very important that the course is calibrated 100.
Is NMEA gyro connected, is these switches disabled.

2.3a Select Bottom speed (Auto) or Water speed (W)

The log is normally running in Auto, where it measure the speed over ground down to app. 450 meters, and then switches automatically over to water speed. If the depth is varieties a lot (Norwegian coast), is it recommended to use water or GPS as reference, since the automatic will then switch constantly between water and bottom speed.

12➢	**Auto / W**	**AUTO W**

F3 Press F3 and select line 12 by operating the up and down arrow buttons.
For each switching between the modes will the log stop recording speed for app 30 sec.
To switch, press - or 0 to select AUTO for automatic or W for water
Press **F3** to switch off the menu.

2.3b Select GPS as speed reference

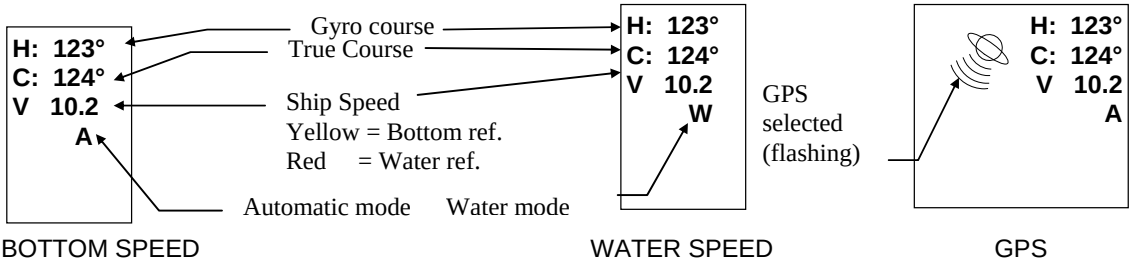
You can lock the log to use GPS speed and drift. The speed out reading on the screen will then be the same as the GPS speed. This speed will then override the bottom/water speed selection. The currents will now be calculated out of the GPS speed. Be aware that the current data can be wrong during bad weather and turning of the ship since the GPS measure the antenna speed and the log measure the transducer speed.

2➢	**GPS**	**OFF ON**

F3 Press F3 and select line 2 by operating the up and down arrow buttons.
The switching between GPS or normal log will not stop the speed recording
To switch, press - or 0 to select OFF or ON
Press **F3** to switch off the menu.

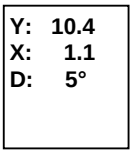
2.4 Speed display

2.4.1 Display the ship speed



Note: When GPS is selected will the sonar screen position be displayed, when off will only zeros be displayed. (Position set to GPIF on the sonar)

2.4.2 Drift display.



On the screen is the detailed ship speed displayed.
The for and aft speed is called the **Y:** axe and the
Side way speed is called the **X:** axe.

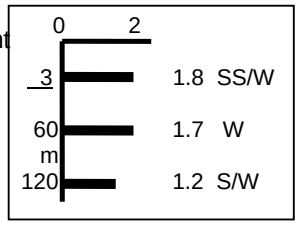
It also shows the drift angle **D:**
All the out reading can give a positive or a negative value.

Y: axes	Positive = Forward	Negative (-)= Aft
X: axes	Positive = Starboard	Negative (-)= Port
Drift	Positive = To starboard	Negative (-)= To port

2.5 Adjusting current depths

The current machine can measure current speeds from 2 to app 150 meters, depending on the sea conditions. These is measured and displayed as current A, B and C

Current depths is shown in the lower right corner of the screen.



1	**Current Depth➢**	**A**	**5**
		B	**40**
		C	**120**

F3 Press F3 and select line 1 and Select current A, B or C with the Up /Down arrows.
The selected digit is then marked.
Enter the new depth by operating the keyboard. Use the digits from 0 to 9. Please note that you always had to enter 3 digits, for 5 meters, enter **005**.

Press ↵ for next line. Press **F3** to switch off the menu.

The depths can be adjusted totally in depended, but for easier understanding, select the shallowest at the top and the deepest at the bottom. Normally is current C set to follow the bottom automatic. If automatic is selected will that setting override the depth set here for current C

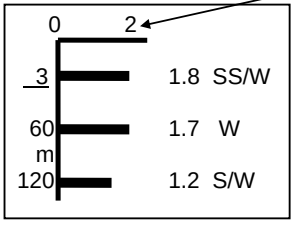
2.6 Vector display.

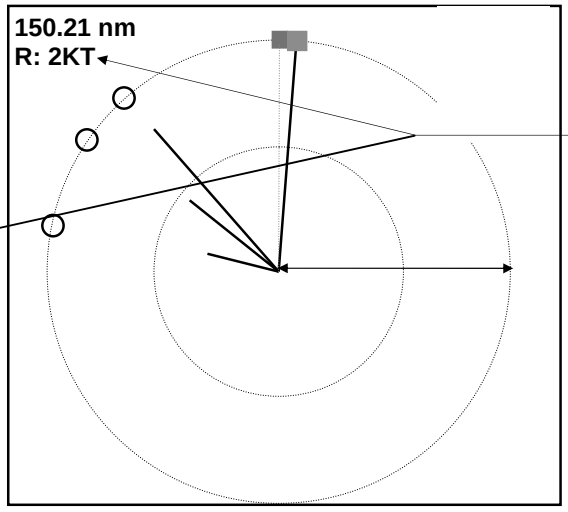
2.6.1 Vector scale

In the compass circle is all the vectors displayed. You normally select a scale so it is possible to se the difference on the current speed, 2 or 4 knot. The ship speed vector will then normally reach outside the scale.

Press: F2

Press F2 and select line 1 by using the arrows up or down.
Press - or 0
to switch between 1->2->4->10 knot
Press **F2** to switch off the menu.





2.6.3 North up/ Bow up

Vectors on currents and own ship can be displayed in bow or north up.

Press: F2 Press F2 and select line 2 by using the arrows up or down.

Press - or 0 to switch between North or Bow up

Press **F2** to switch off the menu

2.7 Select current display

The DCG can display the current in 3 different modes depending on the information's available and what the user want to see. The vectors are separated in different colours and are displayed in parallel in the compass ring and in the vector window. All modes can only be selected in Bottom speed and GPS.
The current directions are displayed in the same way as holding a rope in the sea. The rope direction is the current direction and the speed is the length the rope is stretched.
13. Current/Deviation
1) **Normal Current "C":**
Shows the true current speed in 3 depths ref to Bottom or GPS.
2) **Deviation (& Normal in Water speed) "D":**
Display the deviation currents ref. to one layer. The reference current depth is then underlined. The displayed current speed is then the difference from the reference speed that always is zero.
3) **Normal + Deviation:**
Display both

Press: F3 and select line 13 by using the arrows up or down

Press - or 0 to switch between C+D (Normal+ Deviation), C (normal) or D (Deviation).
Press **F3** to switch off the menu

2.6.1 Normal current display "C"

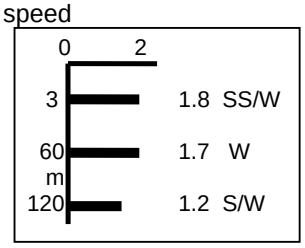
Display normal current speed. This is only working in Bottom and GPS speed

Upper layer A in GREEN colour

Middle layer B in WHITE colour

Deepest layer C is in BLUE colour

You read the current speed and direction directly.



If the DCG loose contact with the layer, or if the water depth is less than the selected depth, will the depth out reading start flashing.

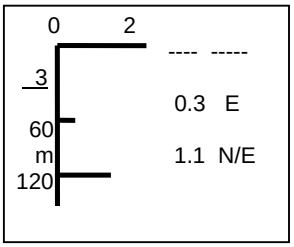
2.6.2 Deviation (& Normal in water speed) "D"

Displays the difference between the reference current and the 2 other.

Reference current is underlined

Middle layer B in ORANGE colour

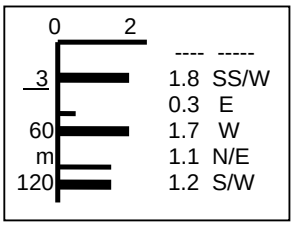
Deepest layer C is in PINK colour



The upper layer is the reference and is always 0 knot. As displayed here is the current on 60 meters moving at 0.3 knot to east and 1.1 knot at 120 meters.

2.6.3 Normal + Deviation "C+D"

This is only possible in bottom speed or GPS. You can see the current speed and deviation at the same time



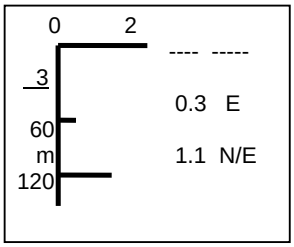
2.8 Read the current direction in water speed (W)

When the DCG is running in water mode is the current speeds relative since it doesn't read the bottom.
It is still possible to read the current direction since the upper current normally moves faster than the lower layers. We normally use the upper layer as reference (the reference layer is underlined)

Reference current is underlined

Middle layer B in ORANGE colour

Deepest layer C is in PINK colour



When we know that the upper layer is moving fastest is the current in this example moving to **West** at 60 meters and **South/West** at 120 meters. (The opposite of East and North/East)
When the depth is more than the fishing depth is the current difference more important than the current speed over bottom.

Exemptions:

If the wind is strong and this have been going on for some time is the upper current more or less the wind direction. This can be seen on the wave pattern.

2.9 Read the Fish speed and direction

The DCG measure the speed of particles in the sea. These particles can be plankton, layers of cold/warm/fresh/salt water or Fish. If the Fish is spread can it be very difficult to find any edge to measure the course and speed on the sonar screen. For this is the DCG a very accurate instrument when it is used in the correct way.
To measure the Fish is there following criteria's:

- The size of the fish cool had to cover minimum 3 beams. The best is 4.
- The Fish cannot bee to deep. The deeper it is, the larger it had to be.
- You had to move slowly over the Fish so the DCG get time to calculate the speed and direction.
- The Fish cannot be too shallow since the boat will scare it.
- Is the fish cool too compact can the DCG detect it as bottom and refuse to measure it. The ship speed will then be measured ref. to Fish, not bottom. For this use Water or GPS as reference.

2.9.1 How to operate the DCG for measurement

1) Find the depth of the Fish school before you move the ship over it, The DCG measure the speed in a layer app 5 meters over and under the set depth. Set this depth on the middle layer (B).
2) Is the Fish school very small is it necessary to adjust the Current filter down. This is done in the main menu. select line 13 by using the arrows up or down Press F3 and use ↑up or ↓down to select:

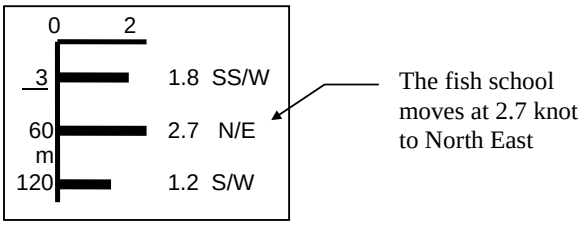
5 ➢	**Current filter**	**0/1/2/3/4**

Press **0** or **–** for selecting a new filter value. Normally are 2 or 3 selected, but on small schools, select **1** to get a faster update. Then press F3 to switch off the menu. For details, see section 3.

3) Check on the screen. After 10 –30 sec depending on the filter, can you see the course and speed of the Fish.

Example:

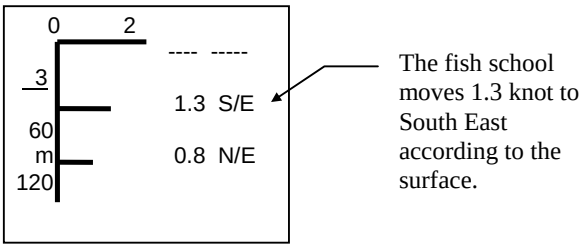
Course and speed on the Fish ref. to ground



Press F3 and select Deviation D

13➢	**Current/Deviation**	**C+D C D**

The speed will now be the true fish speed In water measured from the surface and to the water below.
For purse net is this measurement very important since it tell how the net will sink in the water.



2.10 Operating the trip counter and timer.

In the upper left corner of the screen is a number displayed. Ex: 150.00nm
You can select following in the main menu. Press F3 and select line 17.

17➢	**Cruise/Trip/Timer**	**Cruise Trip Timer**

150.00nm	Yellow or Red colour: **Cruise** Total mileage counter for the log. Depending on the speed ref.
24.33nm	White colour: **Trip** counter who can be reset.
00:00	White colour: **Timer** who displays hour and minutes. (hh:mm)

2.10.1 Total mileage counter

The total mileage counter display the total nautical miles travelled. It can be measured over bottom (Yellow) or true water (Red). The counter can be reset in the menu.

Select reference:

This is done in the same menu. Press F3 and use the ↑up or ↓ down to select line 4.

4 ➢	**Trip ref.**	**G W**

Press **0** or **–** for selecting Ground or Water. Then press F3 to switch off the menu.
(Normal Ground)

Reset the counter:
Before this can be done, switch off the Mileage Lock in the menu

Press F3 and use the ↑up or↓ down to select line 3

3 ➢	**Mileage Lock**	**OFF/ ON**

Press **0** or **–** to switch on or off.
Remember to switch it on afterwards.

Then use the ↑up or↓ down to select line 14

14➢	**Cruise Reset**	**OFF/ON**

Press **0** or **–** to switch off and reset the counter.

2.10.2 Trip counter (white)

The total mileage counter display the total nautical miles travelled since last reset.

15➢	**Trip Reset**	**OFF/ON**

Press **0** or **–** to switch off and reset the counter.

2.10.3 Timer

The timer display how many hours and minutes since last reset. The clock display max 99 hours and 59 minutes.

16	**Timer Reset**	**OFF/ON**

Press **0** or **–** to switch off and reset the timer.

2.11 Alarm

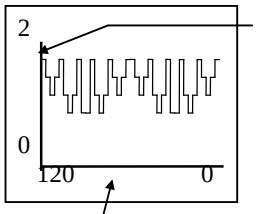
The DCG have an alarm who can be set ton all variable values as speed, currents, deviation, time etc. over and above set value. The alarm is switched off by pressing 0

In the upper left corner is **A:|** displayed when the alarm is off and **A:|)))** when it is on.
If the alarm is current or speed will an alarm ring be displayed on the compass ring to display the alarm level.
To display the alarm symbol, see F2 MENU B
To set up the alarms see F1 MENU A

2.12 Graphic window

In the lower left of the screen is the window that displays statistics up to the last 480 minutes. Normally is this window used to display the currents. You can then see if the current is raising or lowering. The colour of the lines is the same as used on the other displays.

1.Time Graph	Data A B C A->B A->C C->A C->B TEMP ABC A->BC C->AB Time 12 24 60 120 240 480



The scale is the same as the display scale (see chap 2.61)

Time: Select between 12->24->60->120->240->480 minutes.

You can select between:
Single currents = A, B, C
Deviation = A->B, A->C, C->A, C->B
Temperature (if connected) = TEMP
All currents = ABC
Difference between currents = A->BC C->AB

3 MENUS

The DCG have 4 menus. You enter them by F1, F2, F3 or F4

The main menu is F3 SET-UP
F1 Menu A ALARM, Enter the alarms.
F2 Menu B SCREEN, Enter what is displayed on the screen.
F3 Menu C SET UP. Set up all the main functions on the DCG.
F4 Menu D CHECK, Test display also for the GPS

You operate the menu by using the ↑ up or ↓ down buttons to select a function.
Then use [-] or [0] to change the setting of the function.

If the function is a value, as draft, current, depth or time is the keyboard used to enter the digits from 0 to 9.

Press [↵] for the nest line.

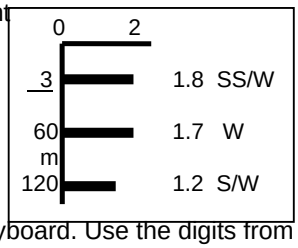
3.1 F3 MAIN MENU "C" SET-UP

MENU C SET-UP

1	Current Depth A B C	 5 40 120	10	Clock Set	2000 Y 2 M 24 D 12 T 30 M
2	GPS speed	OFF ON AUTO	11	Current C Set	MANUEL **AUTO** 120m
3	Mileage Lock	OFF **ON**	12	Auto / Water	**AUTO** W
4	Trip ref.	Ground Water	13	Current/Deviation	**C+D** C D
5	Current filter	0 1 2 **3** 4	14	Cruise Reset	**OFF** ON
6	Draft	0	15	Trip Reset	**OFF** ON
7	Printer Interval	**OFF** ON CONT 10 30 S 1 10 30 M 1 2 T	16	Timer Reset	**OFF** ON
8	Check	**OFF** ON	17	Cruise/Trip/Timer	**Cruise** Trip Timer
9	Master Reset	**OFF** ON	18	Trans Average	0
A	GPS Filter	0	19	GPS Serial Baud (GPS 4800,NONE)	1200 2400 **4800** 9600 Parity **NONE** EVEN ODD

3.1.1 Current depth

The current machine can measure current speeds from 2 to app 150 meters, depending on the sea conditions. These is measured and displayed as current A, B and C
Current depths is shown in the lower right corner of the screen.



1	Current Depth➢	A	5
		B	40
		C	120

F3 Press F3 and select line 1 and Select current A, B or C with the ↑up or ↓ down buttons
The selected digit is then marked.
Enter the new depth by operating the keyboard. Use the digits from 0 to 9. Please note that you always had to enter 3 digits, for 5 meters, enter **005**.

Press ↵ for next line. Press **F3** to switch off the menu.
The depths can be adjusted totally in depended, but for easier understanding, select the shallowest at the top and the deepest at the bottom. Normally is current C set to follow the bottom automatic. If automatic is selected will that setting override the depth set here for current C

3.1.2 GPS speed

You can lock the log to use GPS speed and drift. The speed out reading on the screen will then be the same as the GPS speed. This speed will then override the bottom/water speed selection. The currents will now be calculated out of the GPS speed. Be aware that the current data can be wrong during bad weather and turning of the ship since the GPS measure the antenna speed and the log measure the transducer speed.

2➢	GPS	OFF ON AUTO

F3 Press F3 and select line 2 by operating the ↑up or ↓ down buttons.
The switching between GPS or normal log will not stop the speed recording
To switch, press - or 0 to select OFF or ON or AUTO
Press **F3** to switch off the menu.
NOTE: To avoid the blocking of fishshools when measureing fish speed use Watermode and GPS

3.1.3 MILEAGE LOCK

When Off can the trip counter be reset
Press F3 and use the ↑up or ↓ down to select line 3

3 ➢	Mileage Lock	OFF/ ON

Press **0** or **–** to switch on or off. Remember to switch it on afterwards.

3.1.4 TRIP REF.

Select the reference for the trip counter. You can select Water or Ground. *(Normally Ground)*

3.1.5 CURRENT FILTER.

Selection of the current filter for the current out reading. If this is set wrong can the current out reading be wrong or inaccurate.

- **0** The filter is switched off. The out reading will be updated unfiltered every 10 sec. (never used)
- **1** Minimum filter. The out reading will use a 10 sec filter. Used for calculating the fish speed on small fish schools.
- **2** Medium filter. The out reading will use a 30 sec filter. This setting is for fast current updating and for fish speed calculation.
- **3** Strong filter. The out reading will use a 1-minute filter. This setting is for stabile current calculation. The filter is not recommended for calculating fish schools, only sped fish layers.
- **4** Extra strong filtering. The out reading will use a 2-minute filter. This setting is used for average current measurement only. *(Normally 2 or 3)*

3.1.6 DRAFT

Enter the keel depth for displaying the depths from the surface.

3.1.7 PRINTER

If a printer is connected to C-82 can a printout of all data's be done in intervals from continuous to every 2. Hour. Any standard parallel centronic printer can be connected.

3.1.8 CHECK

Test of the log. This test is testing the computing of currents and speed. The test will also give out a simulated speed for external instruments when the boat is laying still. The test is testing everything without the transducers, transmitter and first stage of the receiver.
OFF the test is off and the log is operating normally.
ON. Following values is present on the screen and the data output:

Gyro	H: 0°	Current A	1,7 kn NV/N
Ship course	C: 356°	Current B	1.4 kn NV/N
Ship speed	V: 11,5kn	Current C	1,8 kn NNV
Depth	D: 145 - 155m		

(Normally OFF)

3.1.9 Master Reset

Total reset of the log memory. All the settings will be set back to factory standard when this function is set to ON and the log is switched off and on again. Also take care that the mileage counter also will be reset back to zero. *(Always OFF)*

3.1.A GPS filter

Filter on the GPS speed and course input. Normally is this filter preset in the GPS receiver. You can set an average filter from 0 to 99 seconds. *(Normally 0)*

3.1.10 CLOCK

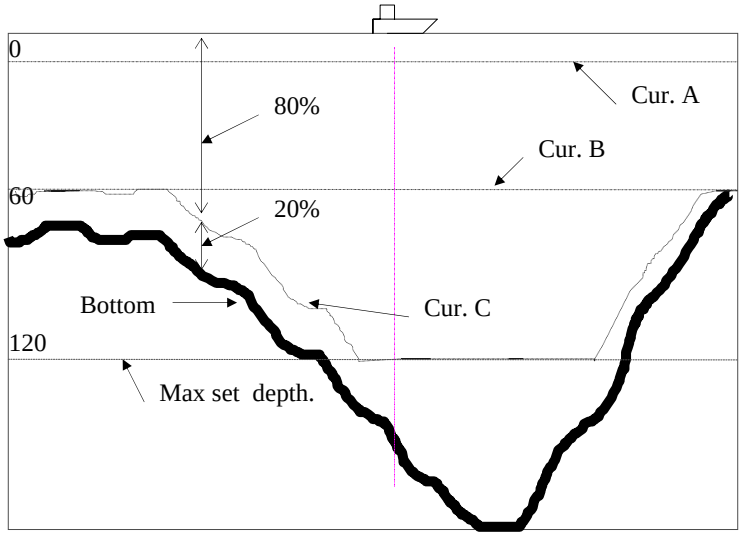
Adjustment of the time and date in C-84 for the screen and printer.

3.1.11 CURRENT C SET

Auto or Manuel set of current C. You can select auto or manual depth..

- **Manuel** The current depth is set manually. If the sea depth is shallower than the set depth will the current not work and flash
- **Auto** The current follow the bottom automatically down to the set maximum depth, ex 120 meters, and up to current B (+ 5 meters).

(Normal Auto and 120 meter)



3.1.12 Bottom speed (Auto) or Water speed (W)

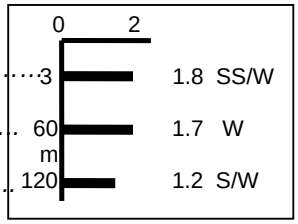
The DCG is normally running in auto where it measure the bottom speed down to app 450 meters and then switch automatically over to water speed or permanent GPS speed.
If the bottom depth is variating a lot (Norwegian coastline) is it recommended to switch over to water speed or GPS. If the DCG is set to auto will it switch between bottom and water speed rapidly.
Note: when the log switches from water to bottom will it be inaccurate in app 30 sec.

3.1.13 Displaying currents

Normal in bottom speed "C":

Displays simply the true current speed on 3 depths ref to bottom or GPS.
If the log loose contact with a current Layer, or the depth is less than the set value, will the depth number flash.

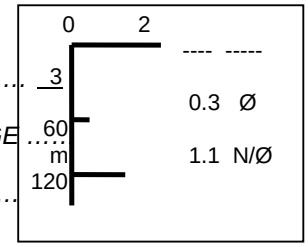
Upper layer A in GREEN colour……
Middle layer in displayed in WHITE….
Lowest layer is displayed in BLUE …..
You read the current speed directly.



Deviation (& Normal in Water speed) "D":
Displays the speed difference compared with the reference layer. The reference layer is underlined and always "zero" since the other currents is measured against this layer.

The upper layer is 0 knot. As displayed here is the current at 60 meters moving against east at 0,3 knot according to the surface, and at 120 meters to north east at 1,1 knot.

The reference layer is underlined…….
Middle layer in displayed in ORANGE …..
Lowest layer is displayed in PINK.....



Normal + Deviation : "C+D"
Display both above.

3.1.14 Cruise Reset

Before this can operate is it necessary to switch off the lock in point 3 in the menu.
When this is switched on is the total mileage counter in the top left corner reset to zero. Remember to switch on the lock in point 3 afterwards.

3.1.15 Trip Reset (white)

The trip counter is displaying how many nautical miles the boat have travelled since last reset
When this is switched on is the trip mileage counter in the top left corner reset to zero.

3.1.16 Timer Reset (Stop watch)

The timer display how many minutes and hours since last reset. Max 99 hours and 59 minutes.
When it is reset start the clock at zero.

3.1.17 Cruise/Trip/Timer

Selection of displaying one of the 3 above in the upper left corner of the screen.

3.1.18 Trans Average

Normally is the filter in point 5 used for currents. This filter can be set for all speed data own and currents. This filter will then be added to this filter. If you set "10",
0.9 seconds x 10 times = 9 seconds (average . *(*Normally *0-5)*

3.1.19.GPS Serial Baud

Setup for the GPS data speed. *(*Normally always *4800/None)*

3.2 F2 MENU B SCREEN

Set-up for the items displayed on the screen. Press F2 to open and close the menu

MENU B SCREEN

1	**Range**	**1 2 4 10**
2	**North/Head**	**NORTH HEAD**
3	**Direction**	**32p/360p**
4	**Depth**	**OFF ON**
5	**Temp**	**OFF ON**
6	**M/T**	**OFF ON**
7	**Y/X/D**	**OFF ON**
8	**R/T**	**AV/RING/TEMP**
9	**RING**	**OFF ON**
10	**Base Layer**	**A/C**
11	**Time Graph**	**Data A B C A->B A->C C->A C->B TEMP ABC A->BC C->AB** **Time 12 24 60 120 240 480**

3.2.1 Compass ring scale and the current data scale

In the compass ring is all the vectors displayed. The scale is normally adjusted for the current vectors. The ship speed vector is normally outside the scale. Select between 1, 2, 4 or 10 knot.

3.2.2 North up/ Bow up

Vectors on currents and own ship can be displayed in bow or north up.

3.2.3 Direction

Selection of the direction out reading of the currents.

- 32 point The course is displayed in 32 directions as N,E,W,S,N/W,NNE etc.
- 360 point The course is displayed from 0° t0 359°

3.2.4 DEPTH

On/Off for depth out reading on the screen.
(Always ON)

3.2.5 TEMP

On/Off for temperature out reading on the screen only works if a special temperature indicator is connected to C-50.
(Always OFF

3.2.6 M/T

On/Off for trip counter, total mileage counter or timer out reading on the screen.
(Always ON)

3.2.7 Y/X/D

On/Off for X &Y speed and the drift (D) out reading on the screen.
(Always ON)

3.2.8 R/T

Selection of the alarm value un the screen.

- OFF No alarm out reading.
- RING Display the value on the alarm ring
- TEMP Display the value on the temperature alarm.

(Normally Ring)

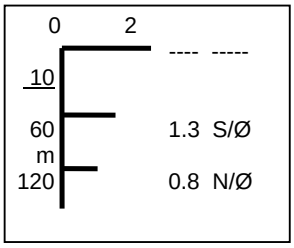
3.2.9 RING

On/Off for alarm ring out reading on the screen.

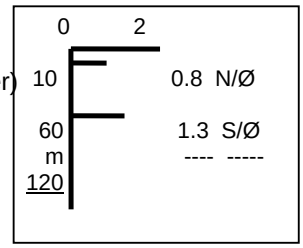
3.2.10 BASE LAYER

Selection of the reference layer during Deviation in bottom and GPS speed, reference layer for ship speed and current speed in water.

- **A** When A is selected is the reference-depth A(10 meters)



- **C** When A is selected is the reference-depth C (120 meter)

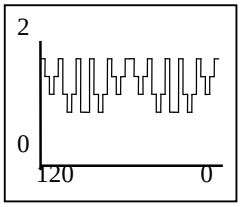


(Normally is A selected)

3.2.11 TIME GRAPH

Select the data in the graphic window in the lower left corner of the screen.

- **A** Only current A
- **B** Only current B
- **C** Only current C
- **A➔B** Speed at current B against current A.
- **A➔C** Speed at current C against current A
- **C➔A** Speed at current A against current C
- **C➔B** Speed at current B against current C
- **TEMP** History of the temperature if connected.
- **A•B•C** Display all 3 currents together, A, B and C in 3 lines
- **A➔B•C** Speed at current B and C against current A
- **C➔A•B** Speed at current A and B against current C.



(Normally is **A•B•C** *selected)*

3.3 F1 MENU A ALARM

Set-up of the alarms. An alarm can be reset by pressing [0] on the keyboard. You can select between 4 alarms.
All can be used at the same time and can be separated with different alarm rhymes.

Alarm 1 Ring	Bip, Bip, Bip,…..
Alarm 2 Time	Beep, …, Beep, …, Beep
Alarm 3 Trip	Beep, Bip, Beep, Bip, Beep,
Alarm 4 Temperature	Beep, …, Beep, …, Beep

MENU A ALARM

1	**RING**	
	Alarm	**OFF ON**
	Mode	**V/C/C'**
	Set	**02.8**
	U/D	**Up Dn**
2	**Time**	**04:30**
	Alarm	**OFF ON**
	Set	**07:00**
3	**TEMP**	**- 00.0°C**
	Alarm	**OFF ON**
	Set	**0.0°**
	U/D	**Up Dn**
4	**Trip**	
	Alarm	**OFF ON**
	Set	**0000.00**

3.3.1 RING

On/Off for the alarm in the compass ring:
- V Alarm on the ship vector.
- C Alarm on the current speed vectors.
- C' Alarm on the deviation vectors.
- SET Value of the alarm in knot.
- Up/Dn Select alarm above or under the set value.

3.3.2 TIME

On/Off for the timer alarm displayed in the upper left corner.
- TIME The timer at the moment, can be set.
- ALARM Alarm On/Off.
- SET Set time for the alarm.

3.3.3 TEMP

On/Off for the temperature alarm.
- TEMP Set the alarm temperature.
- ALARM Alarm On/Off.
- Up/Dn Select alarm above or under the set value..

3.3.4 TRIP

On/Off. for the trip counter alarm. You get an alarm when you have reached a set distance.
- ALARM Alarm On/Off..
- SET Set value for the alarm.

3.3 F4 MENY D Test

D 6*201111.5015* G-V	D 8 22 m DEP&TMP
D *6601510.0015* W-V	D E 0300 /12 /27 DATE
D 10160.466666 Trip	D E 0209:31:1100 TIME
D 7233101.7 m A	D 20000000000 N
D 7232501.4 m B	D 50000000000 E
D 7233401.9 m C	D E62111.6000.9 XY-G
D 7600000.0 m A->A	D E66110.0100.0 XY-W
D 7617800.4 m A->B	D F12345678901 C-SUM
D 7635900.2 m A->C	
D 7717900.2 m C->A	
D 7712900.6 m C->B	
D 7700000.0 m C->C	
GPS: 12.4kn 123.4° N62 28 000 E006 18 000	

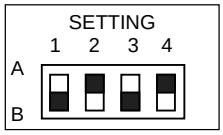
Display all the data in to the C-82 display processor. This is the raw data from the C-50 processor. The fields is colored and labeled to make the reading easier.

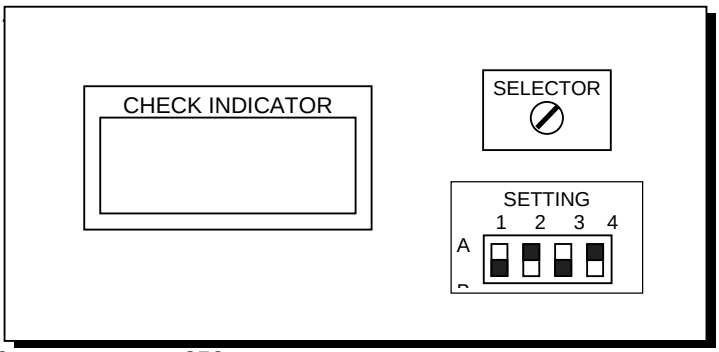
At the lower line is the GPS data displayed. This field is only displaying a value when the GPS is selected in the F3 menu.. The DCG read the VTG and GLL string from the GPS. (see 5.3)

4. Other settings in the DCG.

4.1 Set max depth for bottom speed.

The dipswitches on the "Check Indicator" in the C-50 Processor. You can adjust the PRF and then select the maximum depth. If the PRF is changed will the reaction time for the DCG be changed since the filter is based on the number of pings.





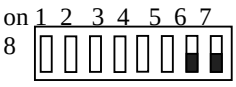
Normal max depth 450 meters

Switch 1 is test, Off(B) / On(A), Switch 4 is not used.

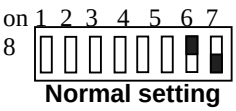
4.2 Adjust the filtering of ship own speed.

The Dip switches is fitted on the DPU card inside C-50.
This should only be done by qualified personnel. Switch off the C-50 and take out the DPU PCB. Take care of static electricity. You find the SW1 together with all the other switches on the board
SW1: **Note: Never change the settings on1-6**

20 ping filter bottom
40 ping filter water

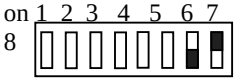


30 ping filter bottom
60 ping filter water

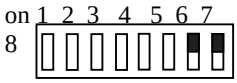


Normal setting

40 ping filter bottom
80 ping filter water



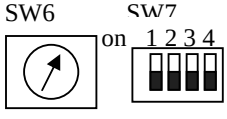
50 ping filter bottom
100 ping filter water



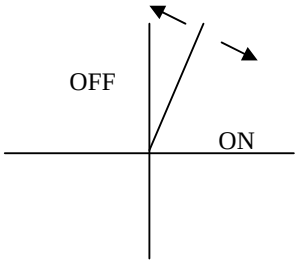
4.2 Bow adjustment.

During the transducer installation is the angling of the transducer done as accurate as possible. If there is a fix error on the own ship vector due to this can that be +/- 15°. This is done on the IF card in the C-50 processor.The switches are located on the card edge and can be adjusted when the DCG is running.

SW 6 adjust the angle in degrees form
0° =0 to 15° =F.
SW7 –1 is used to select port or starboard.
On = to starboard, Off = to port.



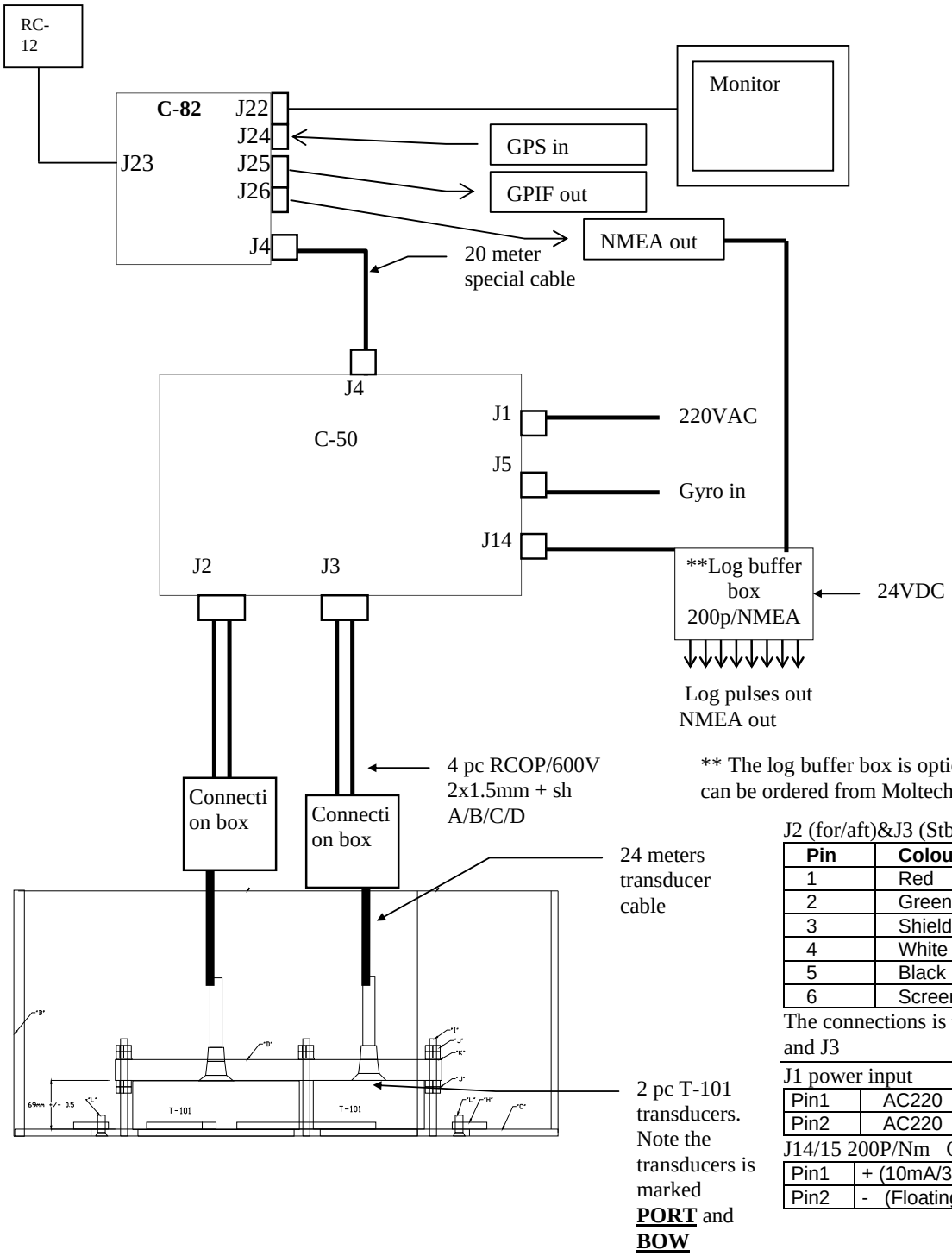
Normally is SW6 set to 0°



5 Installation

The DCG-200 consists of: Monitor, controller RC-12, processor C-50 and C82, a monitor, transducer housing with 2pc T-101 transducers.

5.1a DCG-200 Standard installation



** The log buffer box is option and can be ordered from Moltech Norge.

J2 (for/aft)&J3 (Stb/Port)

Pin	Colour	Cable
1	Red	A/C
2	Green	A/C
3	Shield	A/C
4	White	B/D
5	Black	B/D
6	Screen	B/D

The connections is the same for J2 and J3

J1 power input

Pin1	AC220
Pin2	AC220

J14/15 200P/Nm Out

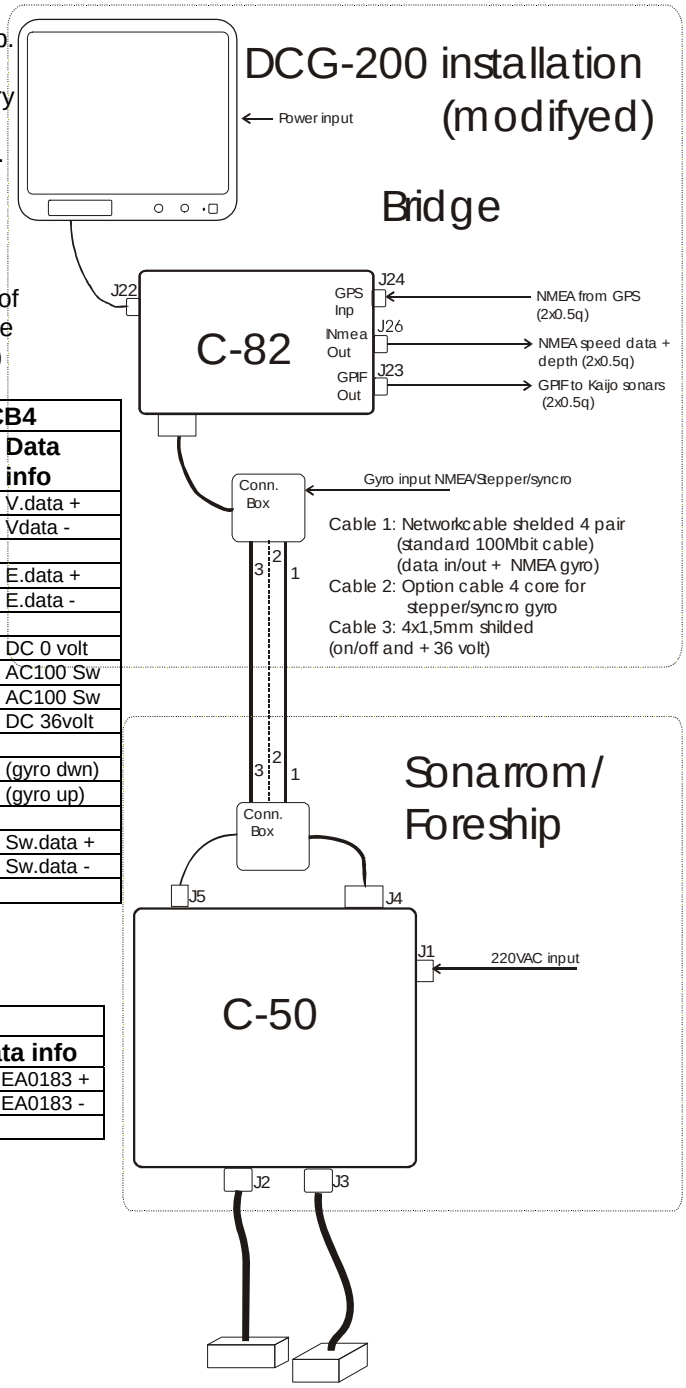
Pin1	+ (10mA/30V max)
Pin2	- (Floating minus)

5.1b DCG-200 Installation with C-50 in the foreship

On boats with variable speed fishpump is it nessesary to install the C-50 in the foreship. The speed regulators on these pumps is extremly noisy and to avoid them is it nessesary to move the C-50 in the foreship.
CB4 is only 20 meters and had to be extended.

This can be done in 2 ways depending on the gyro connection.

Use an DM-24 interface on the NMEA line out of C-82 if 200 p/nm or special combinations on the Nmea string is needed. (ordered from Moltech)



DCG 200 interconnection when extending CB4			
CB 4 C-82	**Extending cable**	**CB 4 C-50**	**Data info**
Pin 1 red1	Blue netw.cable	Pin 1 red1	V.data +
Pin 2 black1	Blue/w. netw.cable	Pin 2 black1	Vdata -
Pin 3 shield	Shield netw.cable	Pin 3 shield	
Pin 4 yellow2	Green netw.cable	Pin 4 yellow2	E.data +
Pin 5 black2	Green/w. netw.cable	Pin 5 black2	E.data -
Pin 6 shield	Shield netw.cable	Pin 6 shield	
Pin 7 brown	Powercable #1	Pin 7 brown	DC 0 volt
Pin 8 white	Powercable #2	Pin 8 white	AC100 Sw
Pin 9 orange	Powercable #3	Pin 9 orange	AC100 Sw
Pin10 red	Powercable #4	Pin10 red	DC 36volt
Pin11 shiled4	Shield option cable	Pin11 shiled4	
Pin12 black3	(Orange netw.cable)*	Pin12 black3	(gyro dwn)
Pin13 green3	(Or/w. netw.cable)*	Pin13 green3	(gyro up)
Pin14 shield4	(Shield netw.cable)	Pin14 shield4	
Pin15 black4	Brown netw.cable	Pin15 black4	Sw.data +
Pin16 blue4	Brown/w. netw.cable	Pin16 blue4	Sw.data -
Shield CB4	Powercable shield	Shield CB4	

DCG 200 for NMEA Gyro signal			
Bridge	**Extended cable**	**C-50**	**Data info**
NMEA Gyro +	Orange netw.cable	J-5 pin 3	NMEA0183 +
NMEA Gyro -	Orange/w. netw.cable	J-5 pin 4	NMEA0183 -
Shield	Shield netw.cable		

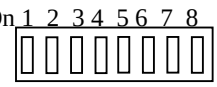
Note: Need a modified DCG IF pcb

DCG 200 for Step/syncro Gyro signal		
Bridge	**Extended cable**	**C-50**
Gyro S1	Optioncable #1	J-5 pin 3
Gyro S2	Optioncable #2	J-5 pin 4
Gyro S3	Optioncable #3	J-5 pin 5
Gyro Ref	Optioncable #4	J-5 pin 6

- Note: Gyro up/down uses the orange pair in the netw.cable

5.2a Connection of Gyro 1:36 - 360

To set the gyro type and rate, take out the DCG IF card from C-50. Remember to switch off C-50 first. You find the switch 8x switch on the edge of the card. Switch 1-7 select the gyro ratio and Sw8 select Step/ Syncro.
The gyro course can be read on the PCB. If the out reading is counting the wrong direction, reverse S1 and S2.



Display function in **ON**:

1	2	3	4	5	6	7	8
1:36		1:90		1:180	1:360		Stepper

You can test the ratio by pressing inn the Up/down buttons on the board simultaneity. The ratio is then displayed. If the gyro is off or not connected will the display be dark if Syncro is select

Stepper gyro 24-115V positive or negative (Switch 8 ON)

Connection to J5 at C-50	S1 pin 3	S2 pin 4	S3 pin 5	Com pin 6	Ratio
Sperry	1	2	3	5	1:360 or 1:180
Plath 7/8/9	10	9	11	4	1:360
Anshutz digital	S1	S2	S3	Ref	1:360
SGBrown *	1	2	3	5	1:360
Robertson	S1	S2	S3	Ref	1:360

Syncro gyro 24-115VAC 50-400Hz (Switch 8 OFF)

Connection to J5 at C-50	S1 pin 3	S2 pin 4	S3 pin 5	Ratio
Anshutz 4/6	3	4	5	1:360
Plath Navig.	7	8	9	1:360
SGBrown *	1	2	3	1:360
Hokusnin C, Anshutz K3/K4, Microtechnica	67	68	69	1:360
Hokusnin GYROpet	S2	S3	S1	1:360
Sagem	S1	S2	S3	1:360
Amur	C1	C2	C3	1:360

*SGB 1000 deliver modulated M-type stepper. If problems connect the gyro as Syncro.

5.2b Connection of NMEA Gyro

The DCG IF PCB in the C-50 processor HAD to be modified to NMEA gyro.

NMEA 0183 $xxHxx,		
Connection to J5 at C-50	pin 3	pin 4
NMEA 0183	Data +	Data-

5.3 Connection of GPS

GPS is connected to J24 at C-82 true a 9 pin subD female plug. The DCG reads and use the NMEA messages VTG and GLL, version 1.5,2.0,2.1. For test, see chapter 3.3

Connection of J24 on C-82	pin 2	pin 5
GPS NMEA 0183 in	Data +	Data -

Note: The C-82 is delivered standard from Japan with an RS232 input. Then is pin 5 ground. Moltech can deliver a simple rebuilding set for optho isolated input.

5.4 Speed data out

5.41 Log pulses out

Standard 200 pulses/Nm:

C-50 J14 pin 1	Log pulse +
C-50 J14 pin 2	Log pulse -
C-50 J15 pin 1	Log pulse +
C-50 J15 pin 2	Log pulse -

Note: Log pulses only gives speed true water and bottom, not GPS. If GPS is selected is the speed here from bottom or water.

Log pulses from the Log buffer box

This box is connected to one of the 2 outputs, J14 or J15. For connection, see inside the box.

5.42 NMEA out

J26 (subD 9pin) on C-82 gives following data:
Header $VD Datastrings: GLL,VTG,VHW,VLW,VBW,VCD,VCD,VCD,DBT,MTV
NMEA version 1.5. 4800N81 PRF= 1 sec

a) $VDGLL Own position. The string is only transmitted with correct values when GPS is selected in the log, If GPS is switched off gives this string N00.00.00, E00.00.00. Good indication on the sonar for informing if GPS speed is used or not.
b) $VDVTG Vector true ground. Gives the log speed against ground or GPS. Gives nothing if waterspeed is selected.
c) $VDVHW. Ship speed true water. Gives nothing if ship speed is ground or GPS.
d) $VDVLW. Trip counter value from the log
e) $VDVBW. Ship speed for, aft, starboard and port. Gives speed in al modes. Water, Ground and GPS.
f) $VDVCD. Vector Current The current speed on 3 depths. (3 messages) This data string is special, and the spesifications is as follow:
   $VDVCD,,f,xxx,M,y.y,N,zzz,T,a *(example)*
   xxx= set depth in meters (002 to 200 meters) *(5 meters)*
   y.y= current speed in knot (0.0 to 9.9 knot) *(1.3 knot)*
   zzz= true course in degrees (000 to 359°) *(234°)*
   a= status A= valid, V= not valid *(valid)*
   example: *$VDVCD,,f,005,M,1.3,N,234,T,A*
g) $VDDBT. Water depth. Gives depth from 3 to app. 450 meters when bottom or GPS is used.
h) $VDMTW. Seawater temperature. Works if an temperature indicator is connected to C-50.

Connection to J26 on C-82	pin 3	pin 5
NMEA 0183 out	data +	GND

The output is standard RS-232 and can be connected to max 20mA load and can be connected to RS232, RS422 and NMEA optho couplers. For better capacity on this output is it recommended to connect an NMEA buffer box. *This output can feed data in to instruments as non-KAIJO sonar's since the output is identical to a GPS.*

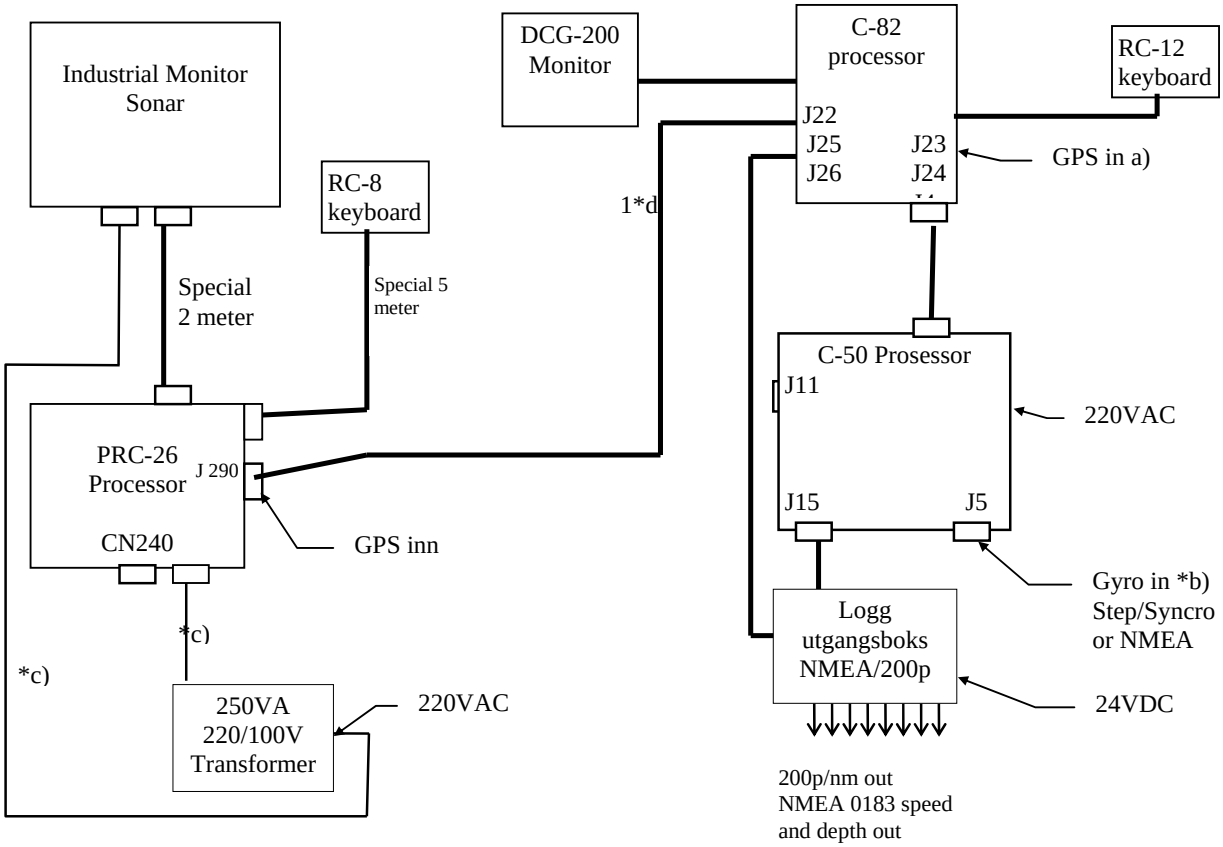
5.42 GPIF out

Data out in KAIJO 1200-baud format. The data's is compressed to 6 byte hex strings and is used to feed data in to KAIJO instruments. The data format is identical to the IF-17 interface.

Connection to J25 on C-82	pin 3	pin 5
GPIF 0ut	data +	GND

For other inputs and outputs, see the original English KAIJO manual.

5.5 Typical installation together with KAIJO KCS-228/KCH-1828



Pin J290	Data in from	Data	Cable type
A	C-82 J25 pin 2	GPIF data +	2x0.5□ cable 1
B	C-82 J25 pin 5	GPIF data -	2x0.5□ cable 1
s	GPS data +	GPS data +	2x0.5□ cable 3
t	GPS data -	GPS data -	2x0.5□ cable 3

GPIF can be connected in parallel in to maximum 3 sonar's

6 Fault tracing

Normally is the fault tracing limited to check that the different functions works. The user can upgrade the software on the Display processor true a diskette.
Qualified persons had to do repairs..

6.1 C-82 processor

C-82 is an 133Mhz Pentium PC who control and calculate the display and data in/out. The unit consist of an single card PC with a ram disk (no moving parts), floppy disk and 5 communication ports. The unit has one fuse and is feed with 36 volt DC from the C-50.

Since this unit is made of an PC can all program updates be done true an floppy diskette. The PC it self run on PC dos Japanese version 7. Moltech or the agent normally supply a boot diskette for software updates. To reload anew software is it necessary to remove the end cover on the C-82. Loose 4 set screws with an Phillips screwdriver. Insert the floppy diskette. Switch On the DCG-200. Follow the instructions on the menu. Use the F1,F2, F3, F4 buttons on the keyboard. If the menu disappear, Press F2

6.2 Fuses C-50

The C-50 have 4 fuses. F1 & F2, 5 Amp, 220VAV input. These fuses are OK if the green lamp is lit on C-50. F3 is the fuse for +130 volt for the transmitter. This fuse should be removed if the DCG is tested without transducers or in a the dry dock.. The last fuse, 5 amps, is not labelled and is for the 35-volt power to C-82. Inside C-50 is 2 fuses on the TX board. Never handle these if there is power on the C-50. After the power is switched off, wait minimum 5 minutes before the +130 volt capacitors are completely discharged.

6.3 Self test

Test DCG performance. The DCG-200 have no calibration of the speed since everything is digital. It is possible to test that the computers and the PLL's is running correctly. This test is switched on in the menu C (Press F3) Select 8.Check, and select ON. This test will not test the transmitters, receivers and transducers. Switch OFF GPS before you run this test.
This test is suitable to simulate an fixed speed and dataflow to other instruments..

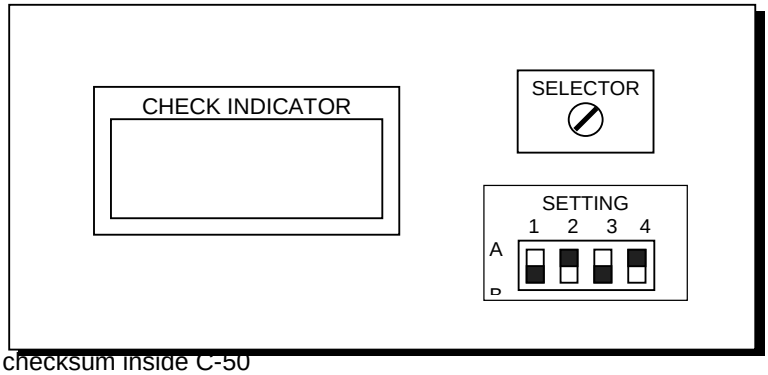
- OFF The test is off, and the DCG is running normally.
- ON Following values is displayed and send out to other instruments:

Gyro	H:	0°	Tide A	1,7 kn NV/N	2-20m
Course	C:	0°	Tide B	1.4 kn NV/N	30-60m
Speed	V:	11,5kn	Tide C	1,8 kn NNV	70-150m
Depth	D:	145 - 155m			

For water speed, red out reading, is the speed 10.0 knot.
The current depths had to be set manually.
If the out readings is wrong, contact your dealer.

6.4 Check panel

The check panel is located in the C-50 behind the front cover. On this panel can all the information about the DCG performance be read. Use the selector switch to select the mode. There is also a light-switch under the panel



0: Display the software test and checksum inside C-50

```
ROM CHK_SUM     DATA
                60AB

0
```

1: Display the speed raw data unfiltered on the ship X- and Y-axes. True G (ground) and W (water). The speed should be quite stabile during sailing.
A * after the value indicate that the value is inaccurate due to lack of signal noise etc..

```
Ship    GY:     11.5kn
SPD     GX:     11.5kn
        WY:     10.0kn
1       WX:     10.0kn
```

2: Display the current speed raw data unfiltered on the set depths.). The speed should be quite stabile during sailing.
A * after the value indicate that the value is inaccurate due to lack of signal noise etc..

```
Current    kn      kn
    003   1.5    -0.8
    040   1.1    -0.7
2   080   1.7    -0.8
```

3:Display the measured depth from each transducer., F= Forward, A= Aft, P= Port and S= Starboard. After >, is the correct depth displayed since the transducers is measuring the depths 30° out. On a flat bottom should all depths be equal, and stabile.
A * after the value indicate that the value is inaccurate due to lack of signal noise etc..

```
DEPTH F 147m    > 132
AVE.  A 147m    > 132
      P 147m    > 132
3     S 147m    > 132
```

4: Display the echo level from the bottom echo on all 4 channels. The AGC value is read directly and display the AGC voltage from 100 to 500 (1.00 to 5.00 volt). Normally should the value be between 150 and 350 depending on the bottom conditions and noise. The value will rise up to 450~500 when the depths goes down to 450 meters, and up to 120-150 in the harbour.
A difference more that 20% can indicate a faulty transducer or bad grounding on the cable.

```
AGC  230   MG   012m
     227   75%  119m
     218
4    222
```

5: Display the Doppler frequency on the signal from the receiver VCO in to the PLL circuit for W (water reference depth) and G (ground/bottom) For water is the reference frequency 48000 Hz and the value will vary around this, and 40000 Hz for ground.

```
   W47672    G39687
   W48000    G40000
   W48000    G39979
5  W48000    G40000
```

6: Display the gyro course and if connected the temperature. (Navigator is never used here)

```
  GYRO 151°
  TEMP -00.0°C
  LORAN N000°00.00
6       W000°00.00
```

7: Display the raw data from the C-82 processor + date and time in C-50

```
 >003040080534300
 880428105000
    DATE 00/03/10
7   TIME 12:02:14
```

8: Display the settings on the dipswitches on the DPU card. Normal values are displayed here.
o = off

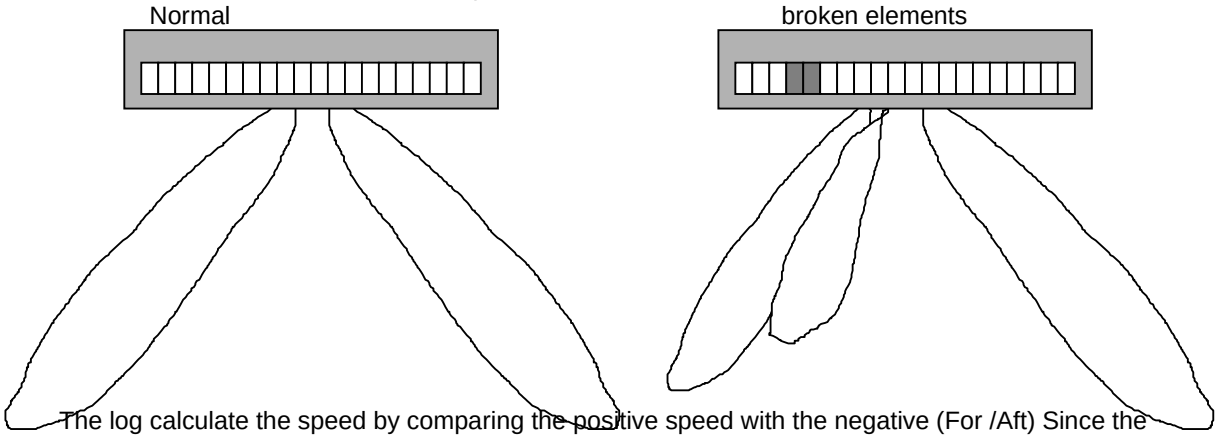
```
DIPSW  SW 12345678
       1:   oo   o
       2:  ooo o o
8      3: o      o
```

9: Display the software version during start-up.

```
VER.3.2  *A B C
  D E F G H J K
  L M N O P Q R
9 T U V
```

6.5 Transducers

The DCG-200 have 2 double transducers. These are installed in a 90° angle. One measure the for7aft direction and the other measure starboard and port. (See chapter 5.1) the DCG can test if they are working, but it can be difficult to check them for damage.
The transducers is made of several crystal staves who is installed side by side and interconnected so they make 2 perfect beams angled 30° out on each side. If the transducer is damaged so one or more elements is broken, will the shape of these beams be deformed.



The log calculate the speed by comparing the positive speed with the negative (For /Aft) Since the angle between them is always 60° will the rolling and pitching be automatically compensated. If the transducer is damaged will the angle change and the speed out reading will be wrong. The error can also be displayed in "Check panel" since the damaged transducer will loose its sensitivity and the AGC value will rise. Also the depth reading from this transducer will be unstable.
The dealer can measure the transducer impedance, who is the only way to confirm if the transducer is damaged.

7 Drawings

7.1 C-82 Display processor