

TwinCom

User Information

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a) Introduction Offshore ear plug EM2140DC-S version B, custom made ear plugs EN 352-2:2020 and EN 352-9:2020

This product is moulded to fit your ears and to protect your hearing against unwanted noise. Connected to the headset AK5850BS or AK5850BHS the ear plugs have built in communication (listen only). To ensure correct use and to get all the advantages of the product, please read this manual carefully.

Wrong use can cause hearing damages. The ear-plugs shall be fitted, adjusted and maintained in accordance with the manufacturers` manual. The hearing protection shall be worn at all times in noisy environments. Be aware of that this ear plug is personally molded to fit your ears. Since the shape of the inner ear is changing it is recommended to take new molds every 4th year to achieve the best attenuation and shall be regularly inspected for serviceability. If distortion or failure is detected, the user should refer to the manufacturers advice for maintenance.

The Offshore Ear Plug is made of medical grade Flexit (polydimethylsiloxane) and the cable is made of medical grade PUR (polyurethane) which will decrease the danger of allergic reactions. This model of ear-plugs has satisfied the optional requirements at -40°C to +60°C. **Warning:** If the recommendations in this user manual are not adhered to, the protection of this PPE may be severely impaired!

b) Before use

Before use, please be sure that the ear plugs are clean. If necessary, use the attached wax loop to remove wax and other pollution from the sound opening. A small quantity of ear cream in the ear can make it easier to make a correct placement of the ear plug.

c) Right and left orientation

The Offshore ear plugs are marked with the letter "R" or a red dot for right ear and the letter "L" or a blue dot for left ear. The cable shall point upwards, in front of the upper ear when the plug is correctly placed.



d) How to place the earplug into the ear

Seize the back side of the ear plug between your index finger and thumb. The cable shall point upwards in front of the ear. Slide the earplugs sound opening into the ear with rotating motions until it feels comfortable. Add a light pressure by the index finger on the earplug until the plug is thoroughly into the ear. It is important to not use too much force.

e) How to remove the plug from the ear

Seize the back side of the ear plug and pull by a slightly forward rotation.

f) Correct placement

The Offshore earplug shall achieve a tight connection to the ear without being uncomfortable or making a pressure in the ear.

It may take some weeks to get used to the ear plug.

Please take contact with Safe Sound Audio AS if you get lasting problems.

Warning: These ear-plugs should not be used where there is a risk that the connecting cord could be caught up during use.



g) Earplug fit test

A: You can perform fit testing with VeriPRO equipment. Please see details about the product below:

<https://sps.honeywell.com/au/en/products/safety/hearing-protection/fit-testing/veripro-fit-testing-system>

B: You can also perform a fit test online on the following Elacin website:

<https://www.elacin.com/de/funktionskontrolle-de/>.

h) How to connect the ear plug into the earmuffs

The Offshore earplug shall preferably be used together with AK5850BS or AK5850BHS headset to get maximum protection.

Connect the ear plug jack connector into the inlet on the left cup of the earmuffs.

Warning: Do not connect or disconnect the device to the ear muffs or the PTT unit or switch on/off the radio while the equipment is placed in the ears. Sudden or fast removal of out of the ear channel may damage the ear drum. It is also important that the interconnecting cable is not damaged. Shortcuts or other disturbances may cause high noise that can damage the hearing. Do not remove earplugs by pulling the interconnecting cord.



Warning: The electrical audio output of this hearing protector may exceed the daily limit sound level. Electric input level for which the mean minus one standard deviation. The usage time for maximum input voltage that corresponds to an A-weighted equivalent diffuse-field related SPL of 82 dB(A) over 8 h is 7 seconds at 8732,1 mV_{rms}. The A-weighted diffuse-field related SPL for the maximum input voltage is 118 dB(A) at 8732.1 MV_{rms}. When the offshore Earplug is used alone the A-weighted diffuse-field related sound pressure level is equal to 82 dB at 66 mV_{rms}. The dependence between A-weighted equivalent diffuse-field related SPL and input voltage:

Sound Pressure Level dB(A)	Input Voltage (mV _{rms})
70	23,5
75	48,0
80	83,7
85	150,6
90	261,5
95	440,3
100	788,7
105	1375,7
110	2433,0
115	4749,6
118	8732,1

i) The complete setup

The earmuffs shall be placed over the ear outside the earplugs. The cables shall be between the ear muffs and the skin, just in front of the upper ear.



j) Cleaning and maintenance

This product can deteriorate with use and shall regularly be inspected for serviceability. The Offshore earplug can be cleaned with a brush or wax loop. To remove heavy pollution special cleaning clothes are available. Please contact Safe Sound Audio AS (see address below) to get more information.

This product may adversely be affected by certain chemicals. Do never use water, oil or other detergents and cleaning compounds. This may damage the equipment.

Always store the Offshore Ear plug in the carrying bag when it is not in use.

k) Sound attenuation

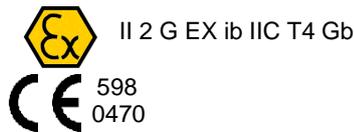
Offshore Ear Plug EN 352-2

Frequency (Hz)	125	250	500	1000	2000	4000	8000
Mean attenuation(dB)	26,3	23,6	25,0	28,0	29,6	35,1	34,9
St.dev. (dB)	5,7	3,7	3,7	2,9	4,0	4,0	6,1
APV (84%)	20,6	19,9	21,3	25,1	25,6	31,1	28,7

H₈₄ = 27 dB **M₈₄** = 25 dB **L₈₄** = 22 dB **SNR₈₄** = 27 dB
H_m = 30,4 dB **M_m** = 27,1 dB **L_m** = 25,1 dB **SNR_m** = 29,5 dB
H_s = 3,3 dB **M_s** = 2,6 dB **L_s** = 3,0 dB **SNR_s** = 2,6 dB

l) ATEX and CE certification

This product is ATEX Certified under certificate no. Nemko 12ATEX1277, Nemko 03ATEX1351 and IECEx PRE 15.0063 (Ui:9.0V, Ii:300mA, Pi:0.6W, Ci:Negligible, Ri:828Ω, Li=3.497mH, Li/Ri: 4.22μH/Ω), and CE approved as PPE under CE type examination certificate no. 0589/PPE/22/2875 and 0598/22/2931 according to EN 352-1:2020, EN 352-2:2020, EN 352-3:2020 and EN352-9:2020 by 0598 SGS Fimko Ltd., Takomotie 8, FI-00380, Helsinki, Finland.



1. Headset AK5850BS (helmet attachment) EN 352-3:2020 AK5850BHS EN 352-1:2020 (headband) both with audio communication EN 352-6:2020 and may have connection to ear-plug EN352-2:2020.



a) Introduction

The headset AK5850BS and AK5850BHS is made for use in noisy areas. It can be used together with helmet (AK5850BS, helmet attachment) or without helmet (AK5850BHS, headband). To achieve the best attenuation, it is recommended to use the AK5850BS/AK5850BHS together with the Offshore ear plug. The hearing protection shall be worn at all times in noisy environments. The headset cups are made of ABS. The parts in contact with the skin (ear cushions) are made of PVC and the helmet attachment is made of stainless steel supported by nylon plastic sleeves. **Warning:** If the recommendations in this user manual is not adhered to, the protection of this PPE may be severely impaired!

b) How to mount and adjust the headset before use

The headset shall be fitted and adjusted according to the manual to achieve maximum protection. Use of glasses, beard or other items that can course leakage between the skin and the ear cushions may impair the attenuation.

For AK5850BS: Place the helmet attachment (1) into the slots on the helmet and put the helmet on to your head. These earmuffs attached to head protection and/or face protection devices shall be fitted, and used only with the following carriers/helmets: 3M G3000 (primary helmet), 3M X5500V, Auboueix IRIS 2, Petzl Vertex 1000V, MSA V-GARD 520 1000V and Sundström SR580 (secondary helmets). The AK5850BHS headband version can be put directly over the top of your head. For AK5850BHS: Place the headband over the center of the head. There is no mandatory left and right direction for placement of the cups. However. To be connected to audio communication with duplex communication the microphone has to be in the front of the mouth within a distance of 1 cm. to achieve the best noise reduction.

Adjust the moving steel rods (6) up and down until the cups are perfectly covering your ears.

Ear-muffs complying with EN 352-1 and EN 352-3 are of "medium size range" or "small size range" or "large size range". "Medium size range" ear-muffs will fit the majority of wearers. "Small size range" or "large size range" ear-muffs are designed to fit wearers for whom "medium size range" ear-muffs are not suitable. **Warning:** AK5850BS is in the small, medium and large size range (see size ranges for primary and supplementary helmet combinations under 2. g), and the AK5850BHS is for medium and large size range.

The cups can be set in rest position by pulling them straight out from the ears. This shall only be done in areas without noise since it will be a gap between the earmuffs and the ears. The normal position can be maintained by pressing the cups back again towards the ears.

Adjust the microphone (3) to a position straight in front of the mouth. The distance shall not exceed 10 mm. to achieve the optimal noise attenuation.

c) How to connect the headset to a 2-way radio

The headset can be connected to a 2-way radio by connecting the connector (4) into a PTT-unit made for the different radios. The headset cannot be connected directly to the radio. Ask your supplier for the right PTT-unit made for each radio brand. This headset is provided with electrical audio input. Check correct operation before use. **Warning:** Do not connect or disconnect the device to the PTT unit or turn on/off the radio while the equipment is placed over the ears. It is also important that the interconnecting cord is not damaged.

Short cuts or other disturbance may course high noise that can damage the hearing. **Warning:** The electrical audio output of this hearing protector may exceed the daily limit sound level. The usage time for maximum input voltage that corresponds to an A-weighted equivalent diffuse-field related SPL of 82 dB(A) over 8 h is 47 seconds at 8710 mV_{rms}. The A-weighted diffuse-field related SPL for the maximum input voltage is 110 dB(A) at 8710 mV_{rms}. When the earmuffs AK5850BS/AK5850BHS are used alone the electric input level for which the mean minus one standard deviation A-weighted diffuse-field related sound pressure level is equal to 82 dB is 336 mV_{rms}. The dependence between A-weighted equivalent diffuse-field related SPL and input voltage:

Sound Pressure Level dB(A)	Input Voltage (mV _{rms})
70	85
75	152
80	268
85	467
90	832
95	1531
100	2661
105	4519
110	8710

d) How to connect the headset to the Offshore Ear Plug

Connect the 3.5 mm. jack plug on the Offshore ear plug into the 3.5 socket on the left cup. This shall be done before the Offshore ear plug is placed into the ears.



e) Maintenance and storage

This product can deteriorate with use and shall regularly be inspected for serviceability. Both helmet mounted ear-muffs and the over the head band ear-muffs shall be fitted, adjusted and maintained in accordance with the manufacturer's instructions.

The headset shall be kept clean and free of damage. Otherwise, the attenuation can be poor. This product may adversely be affected by certain chemicals. The headset can be cleaned by ordinary soap and water and can be disinfected with alcohol or clorehexidine. Avoid liquids into the headsets foam parts. This product can be adversely affected by certain chemicals. The headset can be used in temperatures from -40°C to + 60°C. Keep the headset stored in a temperate and dry place.

Hygienic kits (Article no. AK6501), included foam parts and cushions) and other spare parts can be ordered from your supplier or directly from the factory. The hygienic kits are easy to replace. No tooling is required. Just grab the snap old ear cushion from inside by your fingers and snap it out. Replace the outer foam plate with the new one and push the new ear cushion back in place by hand force. The fitting of the ear cushions may affect the acoustic performance and you shall hear a click when it is in the right position. It shall be no gap between the cushions and the headset cups.

Ear-muffs, and in particular cushions, may deteriorate with use and should be examined at frequent intervals for cracking and leakage, for example. The fitting of hygienic covers to the cushions may affect the acoustic performance of the earmuffs. Additional information and ordering of spare parts can be ordered from A-KABEL AS (se contact information below). Under normal use the headset should last for several years. If used at daily basis, renewal after 5 years is recommended. If distortion or failure is detected, the user should refer to the manufacturer's advice for maintenance.

f) Sound attenuation and mass

AK5850BHS/AK5850BH, EN 352-1

Frequency (Hz)	125	250	500	1000	2000	4000	8000
Mean attenuation(dB)	18,3	23,5	30,4	41,4	31,4	37,8	39,9
St.dev. (dB)	3,0	3,4	2,9	2,6	2,9	2,5	3,3
APV (84%)	15,3	20,1	27,6	38,8	28,4	35,3	36,6

H₈₄ = 31 dB **M₈₄** = 30 dB **L₈₄** = 23 dB **SNR₈₄** = 32 dB
H_m = 34,0 dB **M_m** = 31,5 dB **L_m** = 25,0 dB **SNR_m** = 32,9 dB
H_s = 2,7 dB **M_s** = 1,3 dB **L_s** = 2,4 dB **SNR_s** = 1,3 dB
 Mean mass: 416 g.

AK5850BS, AK5850B, EN352-3

Frequency (Hz)	125	250	500	1000	2000	4000	8000
Mean attenuation(dB)	19,6	24,2	29,0	41,2	29,8	35,3	36,0
St.dev. (dB)	2,7	3,5	3,4	3,0	3,8	2,1	3,1
APV (84%)	16,9	20,7	25,6	38,2	26,0	33,2	32,8

H₈₄ = 29 dB **M₈₄** = 29 dB **L₈₄** = 23 dB **SNR₈₄** = 30 dB
H_m = 32,0 dB **M_m** = 30,8 dB **L_m** = 25,7 dB **SNR_m** = 31,9 dB
H_s = 3,3 dB **M_s** = 2,0 dB **L_s** = 2,2 dB **SNR_s** = 2,1 dB
 Mean mass: 438 g.

g) Size ranges for primary and supplementary helmet combinations

Helmet Type	Headset Type	Size range
3M G3000	AK5850BS	S/M/L
3M securifix X5500V	AK5850BS	S/M/L
Auboueix IRIS 2	AK5850BS	M/L
MSA V-GARD 520/500	AK5850BS	L
Petzl VERTEX 1000V	AK5850BS	L
Sundström SR580	AK5850BS	S/M/L

h) ATEX and CE-approval

These products are certified under certificate no Nemko 03ATEX1351 and IECEx PRE 15.0063.

(U_i:9V, I_i:291mA, P_i:1,2W C_i:Negligible, L_i=0,9Mh or L_i/R_i: 6uH/Ohm) and CE type examination certificate no. 0598/PPE/22/2891 and 0598/PPE/2931 issued by 0598 SGS Fimko Ltd., Takomotie 8, FI-00380, Helsinki, Finland



II 2 G EX ib IIC T4 Gb -40°C≤T_a≤60°C



2. General information for Offshore Ear Plug EM2140DC-S and headset AK5850BHS/AK5850BS used together

a) Sound attenuation (headset and ear plug used in combination)

AK5850BHS Over-the-head headband TwinCom with custom molded earplug

Frequency (Hz)	125	250	500	1000	2000	4000	8000
Mean attenuation(dB)	33,4	30,0	38,6	39,3	36,2	48,5	46,4
St.dev. (dB)	4,7	3,6	3,0	3,2	4,8	4,6	4,4
APV (84%)	28,8	26,4	35,7	36,1	31,4	43,9	42,0

H₈₄ = 34 dB **M₈₄** = 34 dB **L₈₄** = 31 dB **SNR₈₄** = 36 dB
H_m = 38,6 dB **M_m** = 37,2 dB **L_m** = 33,6 dB **SNR_m** = 38,9 dB
H_s = 4,2 dB **M_s** = 3,0 dB **L_s** = 3,0 dB **SNR_s** = 3,2 dB

AK5850BS Helmet attached hearing protector TwinCom with custom moulded earplug

Frequency (Hz)	125	250	500	1000	2000	4000	8000
Mean attenuation(dB)	29,9	29,5	31,9	38,6	33,9	50,7	46,1
St.dev. (dB)	5,4	2,0	4,7	4,8	3,8	4,1	4,3
APV (84%)	24,5	27,5	27,2	33,8	30,1	46,6	41,9

H₈₄ = 33 dB **M₈₄** = 32 dB **L₈₄** = 29 dB **SNR₈₄** = 34 dB
H_m = 36,6 dB **M_m** = 33,8 dB **L_m** = 30,8 dB **SNR_m** = 35,9 dB
H_s = 3,6 dB **M_s** = 2,1 dB **L_s** = 2,1 dB **SNR_s** = 1,9 dB

If you use the ear plug wrong, it may give poor protection and sound quality. Be sure that the Offshore ear plug always is placed correctly and remember to use the hearing protection at all times in noisy environments. After a period of 4 years the shape of the inner ear changes and the attenuation can be reduced. It will then be necessary to renew the offshore ear plug.

b) Auxiliary input (AUX)

Warning: This equipment has safety related input without limitation for innocuousness level. This equipment shall not be used for entertainment or be connected to other amplifying devices than described in this manual since the output level is not limited to the necessary innocuousness level.

The dependence between A-weighted equivalent diffuse-field related SPL and input voltage.

Sound Pressure Level dB(A)	Input Voltage (mV _{rms})
70	23,5
75	48,0
80	83,7
85	150,6
90	261,5
95	440,3
100	788,7
105	1375,7
110	2433,0
115	4749,6
118	8732,1

The usage time for maximum input voltage that corresponds to an A-weighted equivalent diffuse-field related SPL of 82 dB(A) over 8 h is 7 seconds at 8732,1 mV_{rms}.

The A-weighted diffuse-field related SPL for the maximum input voltage is 118 dB(A) at 8732.1 MV_{rms}.

Criterion voltage when A-weighted diffuse-field related sound pressure level is equal to 82 dB(A) is 66 mV_{rms}.

Do not connect or disconnect the equipment or turn on/off the radio while the equipment is placed into/over the ears. Be careful with the volume control! If distortion or failure is detected, the user should refer to the manufacturers advice for maintenance.

Warning: The electrical audio output of this hearing protector may exceed the daily limit sound level.

3. EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer and includes The whole TwinCom system - Offshore Ear Plug EM2140DC-S and headsets AK5850B, AK5850HB, AK5850BS and AK5850BHS. The system is manufactured to work as an ear defender for use in noisy and explosive environments.

The objects of the declaration described below is in conformity with the relevant Union harmonization legislation:

PPE Regulation (EU) 2016/425 and the harmonized standards EN 352-1:2002, EN 352-2:2020, EN 352-3:2020, EN 352-6:2020 and EN 352-9:2020.

The EU type-examination under certificate no. 0598/PPE/22/2875, 0598/PPE/22/2931 and 0598/PPE/22/2891 are performed according to module B and the certificates are issued by Notified Body no. 0598 SGS Fimko, Finland. This PPE equipment risk group III is subject to the conformity assessment procedure module C2 under surveillance of Notified Body no. 0598 SGS Fimko Ltd., Takomotie 8, FI-00380, Helsinki, Finland.

Directive 2014/34/EU and the standards EN 60079-0:2018 & EN 60079-11:2012.

The equipment is certified under EU Certificate of Conformity no.:

Nemko 03ATEX1351 and Nemko 12ATEX1277, performed by Notified body no. 0470 Nemko AS.

Further the manufacturing of this product is in conformity of the RoHS directive 2002/95/EC and 2011/65/EU for restrictions of the use of certain hazardous substances in electrical and electronic equipment and the risk assessment has been conducted according to harmonized standard EN50581:2012 and the equipment is evaluated to be in accordance with Directive 2014/53/EU and standards EN61000-6-2:2005 + AC:2005.

The products are made in Norway by:

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On behalf of both companies:

Årnes, 01.04.2022

A-KABEL AS



Managing Director