Operating Manual

MSA AirElite 4h KO2-Trainer 2h

Training Device

Order No. 10151572/01

MSA AUER GmbH
Thiemannstrasse 1
D-12059 Berlin

Germany

Contents

1 Safety Regulations

1.1 Correct Use

The MSA AirElite 4h KO2-Trainer 2h training device - hereafter referred to as training device - is a training device with breathing air regeneration.

The MSA AirElite 4h KO2-Trainer 2h is only intended for training the use of breathing apparatus MSA AirElite 4h.

Warning!

The training device is only used to practise donning and breathing in emergency situations. The training device is NOT a respiratory protection device and may only be used in training sessions.

It is imperative that this operating manual be read and observed when using the product. In particular, the safety instructions, as well as the information for the use and operation of the product, must be carefully read and observed. Furthermore, the national regulations applicable in the user's country must be taken into account for a safe use.

Danger!

This product is supporting life and health. Inappropriate use, maintenance or servicing may affect the function of the device and thereby seriously compromise the user's life.

Before use the product operability must be verified. The product must not be used if the function test is unsuccessful, it is damaged, a competent servicing/maintenance has not been made, genuine MSA spare parts have not been used.

Alternative use, or use outside this specification will be considered as non-compliance. This also applies especially to unauthorised alterations to the product and to commissioning work that has not been carried out by MSA or authorised persons.

1.2 Liability Information

MSA accepts no liability in cases where the product has been used inappropriately or not as intended. The selection and use of the product are the exclusive responsibility of the individual operator.

Product liability claims, warranties also as guarantees made by MSA with respect to the product are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

1.3 Safety and Precautionary Measures

- Do not directly expose the training device to flames. It is not permitted to use the training device during drills where flashover, rollover, backdraft or similar phenomena are simulated. The training device may only be used under controlled conditions and supervision in non-explosive atmospheres.
- When starting the training, the temperature of the training device must not be below +5 °C. Lower temperatures could endanger the training device user.
- The trainer canisters may only be used with the MSA AirElite 4h if the revision number of the IC-Air software is 2.16 or higher and a pre-cooler built 2008 or later is installed (see section 2.2). To check the revision number, see section 4.2, step 8 of the AirElite 4h operating manual.
- The trainer canisters are for single use only, it is not permitted to reuse trainer canisters.

2 Description

2.1 Overview

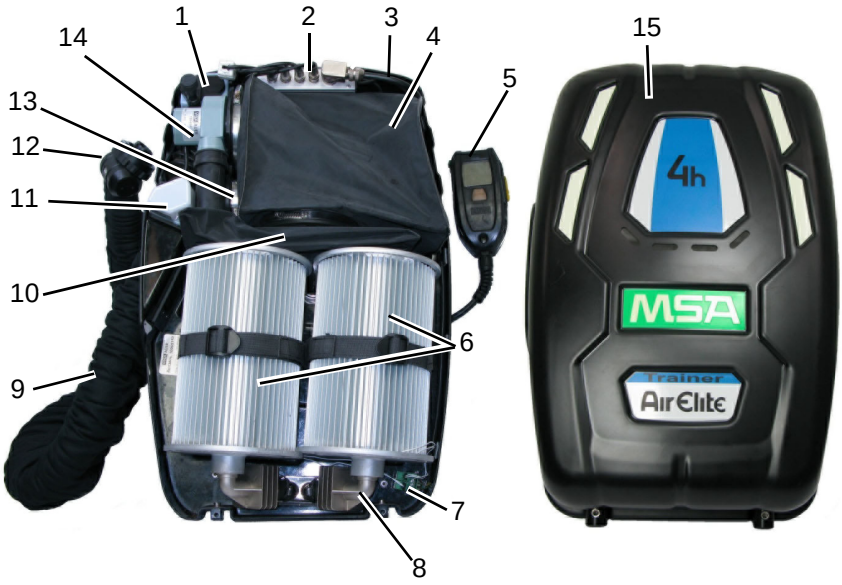

Fig. 1 Overview

1	*Battery (rechargeable)*	*9*	*Breathing hose assembly*
2	*Electronic distributor*	*10*	*Air distributor*
3	*Charging jack*	*11*	*Sensor assembly*
4	*Breathing bag (including surplus valve on reverse)*	*12*	*Mask connector with autostart (on left shoulder harness, harness not shown)*
5	*IC-Air (on the right shoulder strap)*	*13*	*Valve control*
6	*AirElite KO2-Trainer canister (2x)*	*14*	*Blower*
7	*Starter cable connector*	*15*	*AirElite KO2-Trainer housing cover*
8	*Pre-cooler*		

2.2 Converting a Breathing Apparatus into a Training Device

To convert an AirElite 4h into a training device, the KO2-Trainer canister set (Fig. 1, pos. 6) and the KO2-Trainer housing cover (Fig. 1, pos. 15) are required.

> Required for conversion of the AirElite 4h into a training device are IC-Air software with a version number 2.16 or higher and pre-coolers of the new type built 2008 or later.

Fig. 2 New type of pre-cooler, display of IC-Air software version

The training device contains two trainer canisters (Fig. 1, pos. 6) connected in parallel. These canisters contain potassium hyperoxide required for regenerating the breathing air. The trainer canisters can only be used once and have to be disposed of in accordance with local legislation after use.

The trainer canisters permit a training independent of ambient air with a breathing minute volume of 40 l/min for a duration of 2 hours.

The electronic control of the IC-Air recognises the trainer canisters, displays this and accordingly calculates the residual capacity in percent.

An AirElite full face mask (3 SR AirElite or Advantage AirElite) is necessary to use the training device (see the operating manuals for AirElite full face masks).

For a detailed description of the other device components, see operating manual for breathing apparatus MSA AirElite 4h.

2.3 Function

The training device is used to train and instruct users of the MSA AirElite 4h. The training device has comparable use characteristics (weight, breathing resistances as well as warm, dry, oxygen-rich inhalation air).

In use, the exhaled air is transferred to the canisters with the potassium hyperoxide. The potassium hyperoxide reacts with the humidity and the carbon dioxide of the exhaled air and, at the same time, develops oxygen and heat. The amount of resulting oxygen depends on respiration intensity. Increased respiration (more carbon dioxide, more humidity) increases the formation of oxygen or vice versa.

The breathing air temperature is reduced by coolers.

At any given time, more oxygen is developed than consumed. The breathing air provided is dry.

The residual capacity is monitored and displayed in percent by the electronic monitoring unit and consumption indicator (IC-Air). In addition to the display, acoustic and visual warnings are produced when reaching a residual capacity of 50 %, 20 % and 5 %.

The training device and the IC-Air start automatically as soon as the mask connector of the hose assembly is disconnected from the socket with autostart on the shoulder harness.

Warning!

Never remove the breathing hose assembly for trial from the socket of the shoulder harness.

When removing the breathing hose assembly from the socket on the left-hand shoulder harness the training device starts.

After the countdown ends the canisters get started and must be replaced before another use.

Warning!

Observe temperature limitations for use. The minimum temperature for starting must not be less than +5 °C.

3 Technical Data

Dimensions H x W x D (housing)	approx. 600 mm x 360 mm x 200 mm	
Weight ready for use	approx. 15 kg (without mask)	
Maximum service life	Depending on consumption 2 hours at BMV 40 l/min [1)]	
Standby storage and starting	+5 °C to +40 °C	
Operational temperature (after starting)	+5 °C to +40 °C	
Maximum storage duration of the trainer canister	Standby storage	24 months
	installed in MSA AirElite 4h	3 months
Inhalation Air	Temperature	up to +50 °C
	Relative humidity	20 % to 40 %
	Carbon dioxide	< 1.0 vol. % (mask not considered)
	Oxygen	up to 90 vol. %

[1)] BMV - Breathing minute volume according to DIN 58652-2

4 Use

4.1 Preparations for Use

(1) Remove housing cover.

(2) Connect battery to electronic distributor and charge the battery using the charging jack (see operating manual for MSA AirElite 4h).

4.2 Installing the Canisters

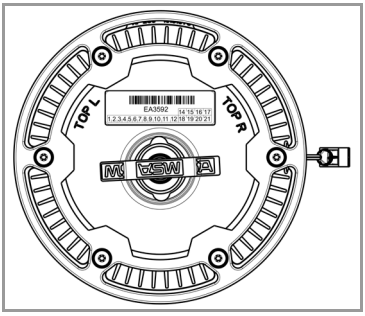

Fig. 3 Canister bottom

Fig. 4 Installation canister

(1) Adjust canister holding straps of MSA AirElite 4h to full length.

(2) Mark the installation date (month, year) on label on the canister bottom.

▷ The canister adjustment position is also shown on the bottom (Top L for installation on the left side, Top R for installation on the right).

(3) Start the installation with the left canister:

Remove both plugs before installation: Pull out with a slight turn.

■ Important: Always pull on both ears of the plug. Keep the plugs for canister disposal.

(4) Push the left canister through the canister holding strap from below.

(5) Adjust the canister roughly so that for the left canister Top L is in the top position.

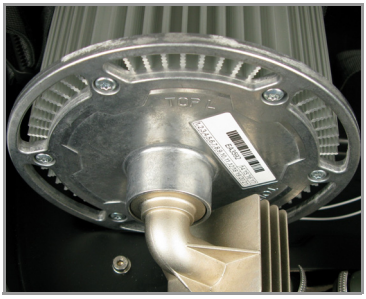

Fig. 5 Pre-cooler completely inserted in the canister

(6) Push the canister while slightly rotating it all the way to the stop onto the pre-cooler.

(7) Adjust the canister so that Top L is in the top position for the left canister.

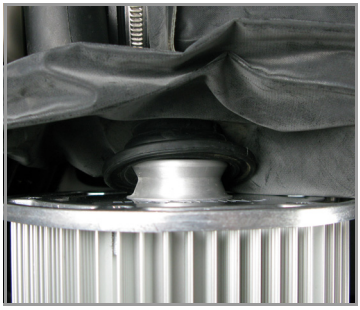

Fig. 6 Connecting the upper canister connection

(8) Button in the air distributor connection on the upper canister connection, ensure tight fit.

(9) Pull canister holding strap tight.

(10) Repeat these installation steps for the right canister, with Top R in the top position when adjusting the canister.

(11) Check device for tightness (see operating manual for MSA AirElite 4h, chapter 5.11)

Attention!

For the tightness test the battery must be disconnected from the electronic distributor. Otherwise the chemical canisters are started.

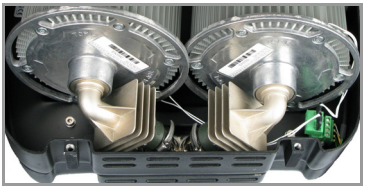

Fig. 7 Both canisters installed with connected cable plugs

Fig. 8 Symbol for battery connection (on electrical distributor)

(12) Connect trainer canister starter cable plugs.

(13) Connect the battery connection cable to the distributor and screw down.

(14) Press the test button on IC-Air until LED illuminates red/green, canister display shows 2htr and symbols on the display appear.
- ▷ Brief acoustic signal confirms readiness.
- ▷ Afterwards the device switches off again.

(15) Install housing cover and fix with screws.
(16) Adjust harness to full length.
(17) If applicable, lead seal housing cover and mask connector.
(18) Record overhaul.

4.3 Information for Training with the MSA AirElite 4h KO2-Trainer 2h

For information on donning and use, see operating manual for MSA AirElite 4h.

Attention!
The tight fit of the full face mask has to be tested with negative and positive pressure.

Attention!
When connecting the mask connector to the full face mask, start with exhaling.

4.4 Monitoring Unit and Consumption Indicator IC-Air

The IC-Air is used for the control and monitoring of the proper functioning of the device, the indication of operational data as well as indicating and signalling hazardous conditions. It also warns when detecting motionlessness of the device user and offers the possibility of activating the alarm manually.

	Symbol “spanner” - Calibration mode or error
	Symbol “running man” - Evacuation required.
	Symbol “cylinder” - Residual capacity in 8 stages
	Symbol “Battery” - Battery charging status
bAtt	Battery insufficiently charged
2h	2h canister
4h	4h canister
2htr	KO2-Trainer 2h
4htr	Trainer HD
pull	Breathing hose assembly not pulled out of socket entirely
100	Symbol “Number display” - Residual capacity or error code

Fig. 9 IC-Air and display symbols

1 Test button (green), display light
2 Display
3 LED button (red/green), manual alarm call
4 Reset button (yellow)

After starting the device and during training with the trainer canisters the IC-Air displays alternately the residual capacity in % and “2htr”.

Monitoring and Display Functions

- Displaying the IC-Air software version
- Identification of the canisters fitted (2h, 4h, trainer canister)
- Control of the battery charge level
- Digital capacity display in % (from 100 to 0 downwards)
- Residual capacity in 8 stages (“Cylinder” symbol)
- At 50 % residual capacity, a brief acoustic warning signal sounds
- Down from 20 % residual capacity, the LED flashes alternately red/green, an interval signal sounds and the retreat symbol (“Running Man”) appears on the display
- Down from 5 % residual capacity the LED flashes red, the retreat symbol flashes and a warning sound (rapid beep) is emitted

This warning sound can be turned off repeatedly for approx. 90 seconds by pressing the Reset button twice.

- At 0 % residual capacity, the warning function continues (LED flashing red, flashing retreat symbol, warning sound).

Warning!

The training must be finished at 0 % residual capacity.

Function Control after Assembly and before Use

- Press the test button on IC-Air until the LED lights up green and the symbols on the display appear (see MSA AirElite 4h operating manual, Section 4.2, step 8.)

Manual Alarm Call

The manual alarm call only functions if the device is in operation.

- Push LED button until the alarm sounds.

Switching off the Motion Alarm

(1) If automatically released and in the pre-alarm stage (3 stages), move the IC-Air.

(2) If automatically released and in full alarm, press the reset button twice.

(3) If manually activated, press the reset button twice.

Illuminating the Display

- Press Test button.
  ▷ The display is illuminated for about 6 seconds.

Error Display in Test Mode

Check the function of the training device after assembly and before use. To do so, press the test button until the IC-Air confirms readiness.

In case of a malfunction the following error codes are shown:

bAtt	Battery defective or insufficiently charged.
1 -	Autostart not connected to the distributor.
2 -	Starter cable not connected or canister already used.
4 -	Blower motor defective, blocked or disconnected.
8 -	Temperature sensor in the sensor assembly faulty.
20 -	Pressure sensor in the sensor assembly faulty or calibration not successful.
28 -	Complete sensor assembly faulty or not connected to the distributor (pressure sensor = 20 + temperature sensor = 8).

Several simultaneous errors are shown as a total, (e.g. Starter and blower = 6), except for the error bAtt. This is shown as a main error, always on its own.

In addition to the error code, there is also a visual (red LED) and acoustic (beep) alarm indication.

The error codes 50, 70, 75, 80 and 90 indicate a defect in the IC-Air. Return the device to the MSA Customer Service for repair.

4.5 End of Training Session

(1) After use, disconnect the breathing hose assembly from the full face mask.

Warning!

After an interruption of use, subsequent use of the training device (without reconditioning) is possible within the timeframe of the capacity indication. During the interruption the breathing hose connection **must not be plugged** into the socket on the left shoulder harness, as then the training device is switched off irreversibly and cannot be reused.

If the usage of the training device is interrupted, the capacity reduces by 1 %/min (2h canisters and KO2-Trainer 2h) or 0.7 %/min (4h canisters).

(2) Plug the breathing hose assembly into the socket on the left shoulder harness.

- ▷ The training device switches off.
- ▷ An acoustic double signal sounds.

(3) Open the waist belt by pressing on the buckle (from the inside) and remove the training device.

(4) Deinstall used canisters as soon as possible and seal with both plugs.

- For deinstallation carry out the installation process described in section 2.2 in reverse order.

Warning!

Chemical canisters become hot when used. Let canisters cool down before removal or use protective gloves.

(5) Hand over the used training device to service for reconditioning.

Attention!

After ending the training session it is necessary to keep the training device well ventilated until the canisters have cooled down to ambient temperature.

5 Maintenance and Service

For reconditioning a training device, it is necessary to carry out all required tests, especially the tightness test of the device and the function test.

For detailed information on maintenance and service, see AirElite 4h operating manual.

For cleaning and disinfection, read and observe the AirElite 4h operating manual.

6 Disposal

For disposal local regulations are to be observed.

Used canisters contain unused potassium hyperoxide and potassium peroxide. Therefore used canisters are considered hazardous waste, the recommended EU waste code is 160507.

Contact a local disposal company to correctly dispose of used trainer canisters.

Notes concerning the handling of the chemicals can be taken from the EU safety data sheets.

7 Converting the MSA AirElite 4h KO2-Trainer 2h into a Breathing Apparatus MSA AirElite 4h

For conversion, read and observe the AirElite 4h operating manual.

8 Ordering Information

Description	Article No.
MSA AirElite 4h KO2-Trainer 2h housing cover	10151861
MSA AirElite 4h KO2-Trainer 2h canister set 2h	10151860
Pre-cooler AirElite 4h (2 pcs.) incl. rubber bushes and clamps	10101077
Rubber bush, pre-cooler, complete with clamps (2 units)	10068517
Lead seals (pack. 25)	D1129859
AirElite 4h Air distributor	10068515
Alignment pins with screws (housing cover) (pack. 2)	10068286
Sticker kit housing cover AirElite KO2 - Trainer	10155108
Particle filter (pack. 10) for installation in breathing bag	10068499
Control valve discs (pack. 10)	D1118947
O-Ring AirElite 4h (pack of 10) for filter housing	10151749
Battery pack NiMH AirElite 4h replacement	10124201
O-Ring AirElite 4h (pack of 5) for sensor	10151869
Plug (pack of 2) for pre-cooler	10155107
Antimist agent klar-pilot Fluid Super Plus	10032164
Charging cable AirElite 4h for separately charging the battery pack	10068543
AirElite tool kit: 1 socket wrench 7 mm, 1 Allen key 4 mm, 1 lead seal pliers (neutral)	10068546

MSA in Europe

[***www.MSAsafety.com***]

Northern Europe

Netherlands
MSA Nederland
Kernweg 20
1627 LH Hoorn
Phone +31 [229] 25 03 03
Fax +31 [229] 21 13 40
info.nl@MSAsafety.com

Belgium
MSA Belgium N.V.
Duwijckstraat 17
2500 Lier
Phone +32 [3] 491 91 50
Fax +32 [3] 491 91 51
info.be@MSAsafety.com

Great Britain
MSA (Britain) Limited
Lochard House
Linnet Way
Strathclyde Business Park
BELLSHILL ML4 3RA
Scotland
Phone +44 [16 98] 57 33 57
Fax +44 [16 98] 74 01 41
info.gb@MSAsafety.com

Sweden
MSA NORDIC
Kopparbergsgatan 29
214 44 Malmö
Phone +46 [40] 699 07 70
Fax +46 [40] 699 07 77
info.se@MSAsafety.com

MSA SORDIN
Rörläggarvägen 8
33153 Värnamo
Phone +46 [370] 69 35 50
Fax +46 [370] 69 35 55
info.se@MSAsafety.com

Southern Europe

France
MSA GALLET
Zone Industrielle Sud
01400 Châtillon sur
Chalaronne
Phone +33 [474] 55 01 55
Fax +33 [474] 55 47 99
info.fr@MSAsafety.com

Italy
MSA Italiana S.p.A.
Via Po 13/17
20089 Rozzano [MI]
Phone +39 [02] 89 217 1
Fax +39 [02] 82 59 228
info.it@MSAsafety.com

Spain
MSA Española, S.A.U.
Narcís Monturiol, 7
Pol. Ind. del Sudoeste
08960 Sant-Just Desvern
[Barcelona]
Phone +34 [93] 372 51 62
Fax +34 [93] 372 66 57
info.es@MSAsafety.com

Eastern Europe

Poland
MSA Safety Poland Sp. z o.o.
Ul. Wschodnia 5A
05-090 Raszyn k/Warszawy
Phone +48 [22] 711 50 00
Fax +48 [22] 711 50 19
info.pl@MSAsafety.com

Czech republic
MSA Safety Czech s.r.o.
Dolnojircanska 270/22b
142 00 Praha 4 - Kamyk
Phone +420 241440 537
Fax +420 241440 537
info.cz@MSAsafety.com

Hungary
MSA Safety Hungaria
Francia út 10
1143 Budapest
Phone +36 [1] 251 34 88
Fax +36 [1] 251 46 51
info.hu@MSAsafety.com

Romania
MSA Safety Romania S.R.L.
Str. Virgil Madgearu, Nr. 5
Ap. 2, Sector 1
014135 Bucuresti
Phone +40 [21] 232 62 45
Fax +40 [21] 232 87 23
info.ro@MSAsafety.com

Russia
MSA Safety Russia
Походный проезд д.14.
125373 Москва
Phone +7 [495] 921 1370
Fax +7 [495] 921 1368
info.ru@MSAsafety.com

Central Europe

Germany
MSA AUER GmbH
Thiemannstrasse 1
12059 Berlin
Phone +49 [30] 68 86 0
Fax +49 [30] 68 86 15 17
info.de@MSAsafety.com

Austria
MSA AUER Austria
Vertriebs GmbH
Modecenterstrasse 22
MGC Office 4, Top 601
1030 Wien
Phone +43 [0] 1 / 796 04 96
Fax +43 [0] 1 / 796 04 96 - 20
info.at@MSAsafety.com

Switzerland
MSA Schweiz
Eichweg 6
8154 Oberglatt
Phone +41 [43] 255 89 00
Fax +41 [43] 255 99 90
info.ch@MSAsafety.com

European
International Sales
[Africa, Asia, Australia, Latin America, Middle East]

MSA Europe
Thiemannstrasse 1
12059 Berlin
Phone +49 [30] 68 86 0
Fax +49 [30] 68 86 15 58
info.de@MSAsafety.com

MSA
The Safety Company