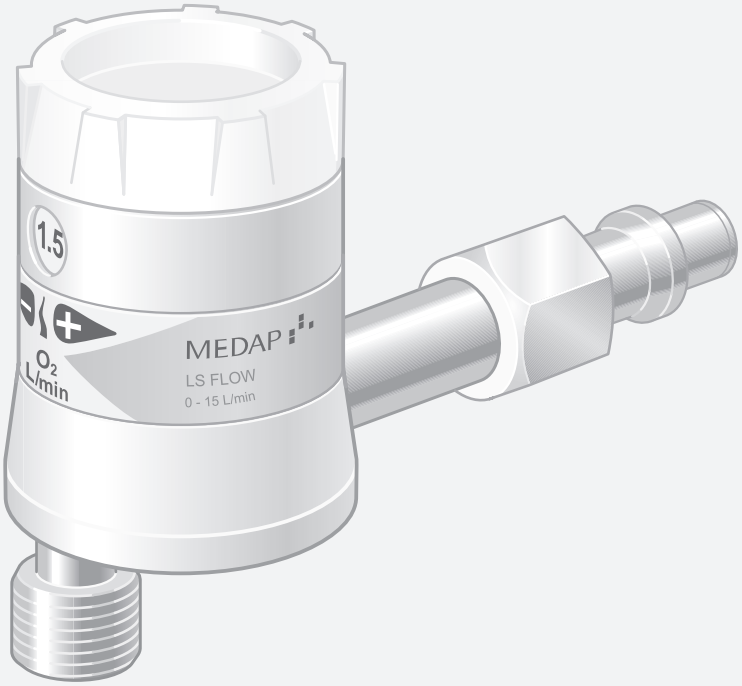
OPERATING INSTRUCTIONS

MEDAP
LS FLOW FLOWMETER



GA 5752 4981 GB 16

Subject to technical modification!

Illustrations and technical specifications may vary slightly from those in these Operating Instructions as a result of ongoing product development.

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1 Introduction

1.1 Foreword

Your facility has selected the leading-edge medical technology made by ATMOS. We sincerely appreciate the trust you have placed in us.

1.2 How to use these operating instructions

These operating instructions are provided to familiarise you with the features of this ATMOS product. They are subdivided into several chapters.

Please note:

- Please read these operating instructions carefully and completely before using the product for the first time.
- Always proceed in accordance with the information contained herein.
- Store these operating instructions in a location near the product.

1.2.1 Abbreviations

EN	European standard
EEC	European Economic Community
PD	Punched disc

1.2.2 Symbols

1.2.2.1 Cross-references

References to other pages in these operating instructions are identified with a double arrow symbol '⏭'.

1.2.2.2 Actions and responses

The '☒' symbol identifies an action taken by the user while the '✓' symbol identifies the reaction that this will induce in the system.

Example:

☒ Turn on the light switch.

✓ Lamp lights up.

1.2.3 Definitions

1.2.3.1 Design of safety notes

Pictogram	Descriptor	Text
	**DANGER!** Indicates a direct and immediate risk to persons which may be fatal or result in most serious injury.	The text for the safety note describes the type of risk and how to avert it.
	**WARNING!** Indicates a potential risk to persons or property which may result in a health hazard or grave property damage.	
	**CAUTION!** Indicates a potential risk to property which may result in property damage.	

Tab. 1: Design of safety notes

1.2.3.2 Structure of notes

Notes not referring to personal injury or property damage are structured as follows:

Pictogram	Descriptor	Reference to
	**NOTE**	Supplementary assistance or further useful information.
	**ENVIRONMENT**	Information regarding proper disposal.

Tab. 2: Structure of notes

1.2.4 Symbols used

Symbols are attached to products, type plates and packaging.

Symbols	Identification
	This device complies with the relevant requirements of EU regulations.
	Consult operating instructions
	Manufacturer
	Date of manufacture Country of manufacture: Spain

Symbols	Identification
	Warning; pay special attention
	Reference number
	Unique Device Identifier of a medical device
	Medical device
	Batch code
	Fragile, handle with care
	Keep dry
	Keep away from sunlight
	Temperature limit
	Humidity limitation
	Atmospheric pressure limitation

Tab. 3: Symbols

1.2.5 UDI application identifier

(01)	UDI-DI: Identification of the manufacturer and the device
(11)	Date of manufacture
(21)	Serial number

Tab. 4: UDI application identifier

1.3 Disposal

WARNING!
Infection hazard!
The product or some of its components may be contaminated after use.
Clean and disinfect the product before disposal.

1.3.1 ATMOS products

ATMOS will take back used products or those which are no longer in service.
Please contact your ATMOS representative for more detailed information.

1.3.2 Packaging

The packaging is made of materials compatible with the environment. ATMOS will dispose of the packaging materials upon request.

1.4 Overview of LS FLOW flowmeter

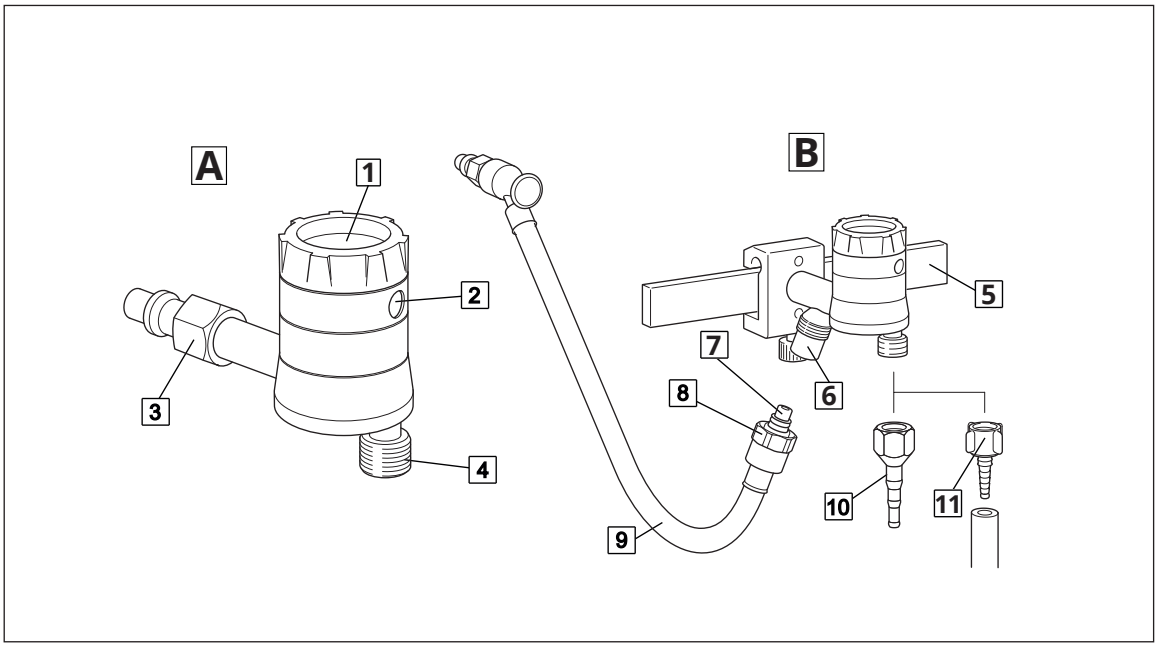


Fig. 1: Overview of LS FLOW flowmeter

Version A
Tapping unit with integrated gas pin

1 Hand wheel
2 Viewing window
3 Gas probe
4 Flowmeter outlet

Version B
Tapping unit with rail clamp and NIST connection

5 Equipment rail
6 NIST connection
7 NIST nipple
8 NIST screw connection
9 Connection tube
10 Tube adapter, 4 mm, 6 mm, 8 mm (REF HM57522746)
11 Tube adapter, plastic, 4 mm, 6 mm, 8 mm (REF HM57525316)

1.5 Basic requirements

1.5.1 Use in accordance with the intended purpose

Product

As per Annex IX to the Medical Devices Directive 93/42/EEC, this product belongs to class IIa.

In accordance with this directive, the product may only be used by persons who have been instructed how to use this product by an authorised person.

This product is to be used exclusively for human medicine.

When employed in a commercial or business use, this product must be entered in the inventory.

Accessories

Accessories or combinations of accessories may be utilised only as and when indicated in these operating instructions.

Other accessories, combinations of accessories and consumable items may be used only if they have a valid certification, are intended expressly for the particular use and will not adversely affect performance, the prescribed ambient conditions or safety requirements.

1.5.2 Applicable standards

The product fulfils the essential requirements according to Annex I of Council Directive 93/42/EEC concerning medical devices (Medical Devices Directive).

1.5.3 Intended purpose

Name:	LS FLOW LS DFLOW
Main function:	Designed for measuring the flow and determining the precise dosage for the supply of oxygen and compressed air. In conjunction with a hand-held nebuliser, the LS FLOW is used to provide metered administration of medication aerosols.
Medical indications / application:	Inhalation and insufflation of oxygen within the scope of oxygen enrichment via an inhalation mask or a nose latch for patients breathing by themselves Together with a hand-held nebuliser administration of water soluble drugs via an inhalation mask
Specification of the main function:	Supply of oxygen or compressed air. For oxygen / compressed air supply, the LS FLOW is connected to an oxygen / compressed air terminal unit of a central medical gas supply system having a supply pressure within the supply pressure specified on the product. For humidification of oxygen from the central gas supply system, a humidifier may additionally be connected. Supply of oxygen to the patient takes place via connection tubes and an inhalation mask or a nose latch. The administration of medication aerosols via compressed air takes place via connection tubes to a hand-held nebuliser. The patient presses the inhalation mask connected to the hand-held nebuliser onto the mouth and nose.
User profile:	Doctor, medically trained staff
Patient groups:	Patients of all ages
Application organ:	Lung

Application time:	For continuous operation; in practice, short-term use on the patient (< 30 days)
Application site:	The application site is the clinical environment and doctor's practices which have a central oxygen / compressed air system. The application of the product may only be performed by medically trained and instructed staff.
Contraindications:	The LS FLOW may not be used for the following purposes: • Outside the medical sector • In MR areas > 4.7 tesla • In the home care sector • Being operated directly by the patient • For exclusive respiration • For central gas supply systems with supply pressures other than that specified on the product. • When applying oxygen in its function as a medication, it is absolutely necessary to measure the flow rate.
The product is:	Not active
Sterility:	No sterile product
Single-use product / reprocessing:	The device and parts of the accessories are reusable. For information on reprocessing, cleaning and disinfection, please see the operating instructions.

1.5.3.1 Possible applications

The following usage options are made possible by connecting products or accessories which are contained in the list of accessories or which satisfy the specifications of the interface description:

- Appropriate tubes with inner diameters of 4 mm, 6 mm and 8 mm can be connected to the flowmeter via a tube adapter (metal REF HM57522746 or plastic REF HM57525316).
- With the bubble humidifier (REF HM57525315) for humidifying oxygen. The bubble humidifier is intended for inhalation. The bubble humidifier is connected without an adapter.
- Sterile water systems / disposable humidifiers (UNF 9/16") may be connected directly.

1.5.4 Versions of LS FLOW / LS DFLOW flowmeter

The connection of the tapping unit to the terminal unit depends on the type of product being used:

Version A: Tapping unit with integrated gas pin

- The tapping unit is plugged directly into the terminal unit.

Version B: Tapping unit with rail clamp and NIST connection

- The product is designed for mounting to an equipment rail 25–35 x 10 mm in accordance with DIN EN 19054 and is supplied from a terminal unit via a NIST connection according to DIN EN ISO 5359 with a connection tube with gas probe.

The product is available in the following versions:

LS FLOW	REF no.
LS FLOW O 15 Wall MEDAP	HM57524917
LS FLOW O 15 Wall DIN	HM57524916
LS FLOW O 15 Wall BS (Great Britain)	HM57524921

LS FLOW	REF no.
LS FLOW O 15 Wall NF (France)	HM57525161
LS FLOW O 15 Wall SS (Sweden)	HM57525162
LS FLOW O 15 Equipment rail	HM57525301
LS FLOW O 15 Wall DIN P5	HM57525705
LS FLOW O 15 Equipment Rail P5	HM57525704
LS FLOW O 05 Wall DIN	HM57525304
LS FLOW O 05 Equipment rail	HM57525305
LS FLOW O 01 Wall DIN	HM57525306
LS FLOW O 01 Equipment rail	HM57525307
LS DFLOW O 15 Wall MEDAP	HM57525706
LS DFLOW O 15 Wall DIN	HM57524919
LS DFLOW O 15 Wall SS (Sweden)	HM57525183
LS DFLOW O 15 Equipment rail	HM57525302
LS DFLOW O 15 Wall DIN P5	HM57525702
LS FLOW A 15 Wall MEDAP	HM57525450
LS FLOW A 15 Wall DIN	HM57525235
LS FLOW A 15 Equipment rail	HM57525303
LS FLOW A 15 Wall DIN P5	HM57525703
LS FLOW O 15 CSU TA	HM57525588
LS FLOW A 15 CSU TA	HM57525589
LS FLOW O 15 CSU NIST	HM57525590
LS FLOW A 15 CSU NIST	HM57525591
LS DFLOW A 15 Wall DIN	HM57525607
LS DFLOW A 15 Equipment rail	HM57525608

1.5.5 Interface description

All devices and accessories which are combined with the tapping unit must be listed in the accessories list or meet the specifications of the interface description. The configuration of the overall system as well as the functional testing are subject to the overall responsibility of the medical staff. Functionality and suitability of the connected accessory for each intended application must be checked by the operator before every use. This includes the functionality of the connector components, its air tightness and suitability regarding material properties, working pressure and flow rate.

1.5.5.1 Approved interface for compressed gas supply

In order to supply compressed gas, the tapping unit is connected to the central medical gas supply system (CGSS) with a pressure of 300–550 kPa (P5 versions: 500 kPa).

The pressure in the supply line must be indicated and in the event of improper functioning must be limited to 1000 kPa by an integrated pressure-relief valve.

1.5.5.2 Flowmeter outlet

The internal thread on the accessory must match the external thread on the flowmeter (UNF 9/16" 18 gear). Ensure that the connection between the flowmeter and the accessory is leak-free.

1.5.5.3 Connection tube

The connection tube with the inner diameter of 4, 6 or 8 mm is connected with the tube adapter.

The connection tube may not collapse or must be pressure-resistant and must comply with the hygiene standard of the hospital. The inside diameter of the connection tube must match the outside diameter of the tube adapter.

1.5.5.4 Tube adapter for Air and O2

The tube adapter is used to connect the tapping unit and the connection tube. The inner thread of the tube adapter must match the outer thread of the tube connector of the flowmeter output (UNF 9/16").

2 Safety notes

2.1 General safety notes



DANGER!

Incorrect use can result in fatalities!

Instructions for using components made by other manufacturers are not part of these operating instructions.

Ensure that the manufacturer's instructions are followed!



DANGER!

Observe hygiene guidelines!

Contaminated components may be hazardous to the patient's health.

Prepare the product according to the hygiene guidelines before using it for the first time. Clean and disinfect the product.



DANGER!

Fire/explosion hazard!

Air, oxygen and oxygen compounds react explosively with oils, greases and lubricants. Fire and explosion hazard due to compressed gases.

Always keep the product free of oils, greases and lubricants.



DANGER!

Fire hazard!

Escaping oxygen poses a fire hazard.

Never smoke near equipment which carries oxygen and avoid using open fires or glowing objects. Check the connector for leaks and tight fit when mounting accessories.



DANGER!

Defective product!

Using incorrect spare parts and accessories can cause injuries or equipment failure.

Only use original accessories or spare parts.



WARNING!

Risk of injury!

Hazard resulting from incorrect handling.

Follow the operating instructions for all accessories.

2.2 Product safety notes



CAUTION!

Malfunction!

Ensure that the connection between the product and the accessory is leak-free.



CAUTION!

Property damage

Exposure to UV rays can cause material fatigue. The stability would no longer be ensured.

Do not expose the product to strong UV light.



CAUTION!

Observe ambient conditions

The precision, operation, mechanical stability and tightness of the product cannot be guaranteed if the maximum upper and lower ambient temperatures are exceeded.



WARNING!

Impacts!

Impacts may cause damage to sensitive, precision mechanical components.

Do not expose the product to impacts.



WARNING!

Non-permissible load!

If the permissible load is exceeded, leakages may occur at the connection between the terminal unit and the gas probe.

In accordance with DIN EN ISO 9170-1, the overall weight of the product and accessories may not exceed 2 kg.



WARNING!

Allergic reaction due to contact!

The materials used were examined for their compatibility. In exceptional cases, allergic reactions to accessible materials on the unit and its accessories can occur. This applies in particular to contact injuries caused by prolonged contact. In this case, consult a doctor immediately.



Report all serious incidents that have occurred in connection with this product to the manufacturer and your national competent authority.

3 Initial operation

3.1 Equipment inspection

DANGER!

Product testing!

Only product parts which are in perfect condition can ensure proper functioning of the product.

The product parts will thus have to be carefully inspected before mounting.

☒ Check whether all tubes are undamaged.

☒ Check whether the unit has been properly cleaned and that there are no residues or soiling.

☒ Do not use damaged components.

3.2 Connection to the terminal unit

3.2.1 General

NOTE

Please refer to the manufacturer's instructions for the particular terminal unit for information on connecting the gas probe to the terminal unit.

3.2.2 Version A

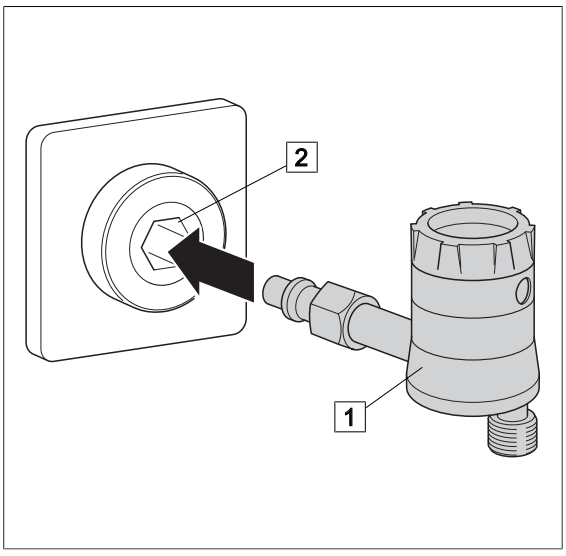


Fig. 2: Version A

Tapping unit with integrated gas pin

☒ The tapping unit (1) is plugged directly into the terminal unit (2).

3.2.3 Version B

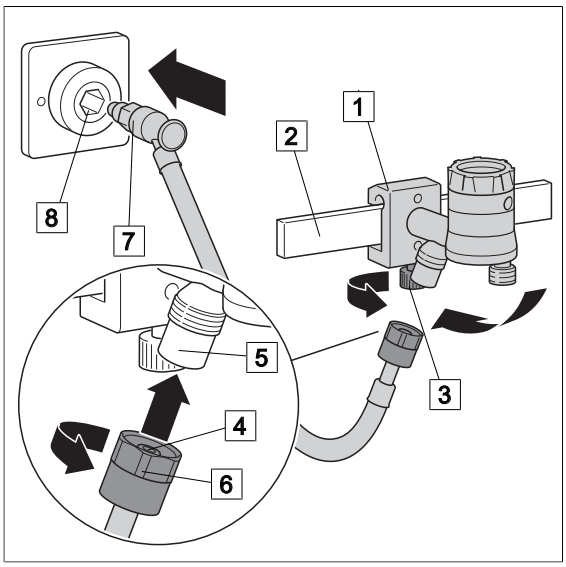


Fig. 3: Version B

Tapping unit with rail clamp and NIST connection

☒ With the upper edge of the guide groove at the front, position the rail clamp (1) at a slight angle on the equipment rail (2) and then press it against the equipment rail and allow it to click into place.

☒ Tighten the handle screw (3) of the rail clamp.

☒ Make sure that the rail clamp is correctly secured and that the tapping unit is in a stable position on the equipment rail.

☒ Insert the NIST nipple (4) of the connection tube into the NIST connection (5) of the tapping unit and tighten down the cap nut (6) by hand.

☒ Plug the gas probe (7) into the terminal unit (8).

3.3 Mounting accessories

3.3.1 General

WARNING!

Tensile forces!

The connected accessories must not exert any mechanical forces which could adversely affect the secure seating of the product.

WARNING!

Tensile forces!

Hold the basic unit with one hand when installing or removing accessories in order to compensate for the tensile forces which are created.

3.3.2 Connection of bubble humidifier (REF HM57525315)

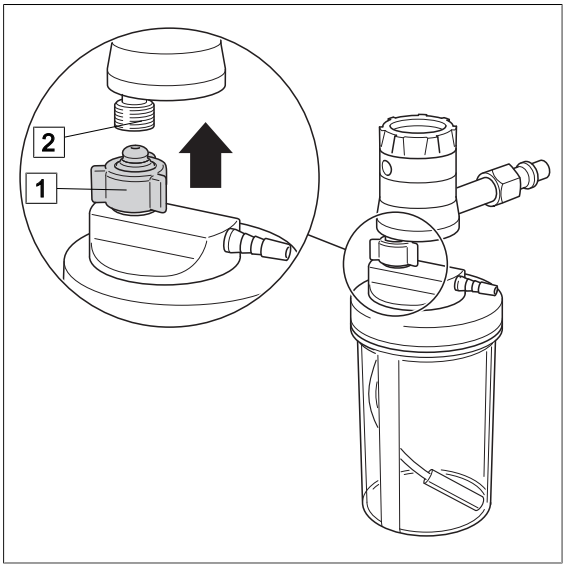


Fig. 4: Connection of bubble humidifier

Connecting the bubble humidifier

☒ Ensure that the NIST screw connection of the humidifier contains a flat seal.

☒ Fill the humidifier bottle up to the marking ‘Filling level’ with distilled water and screw the bubble humidifier cap into place.

☒ Screw the cap nut (1) of the bubble humidifier directly onto the flowmeter output (2) and tighten finger-tight until it stops.

☒ Pay attention that no tensile forces affect the bubble humidifier.

3.3.3 Connection of disposable humidifiers from other manufacturers

Disposable humidifiers complying with the interface description may be connected to the flowmeter outlet.

☒ Screw the disposable humidifier directly onto the flowmeter output (2) and tighten finger-tight until it stops.

3.3.3.1 Connection of Flow Selector (REF HM57525707)

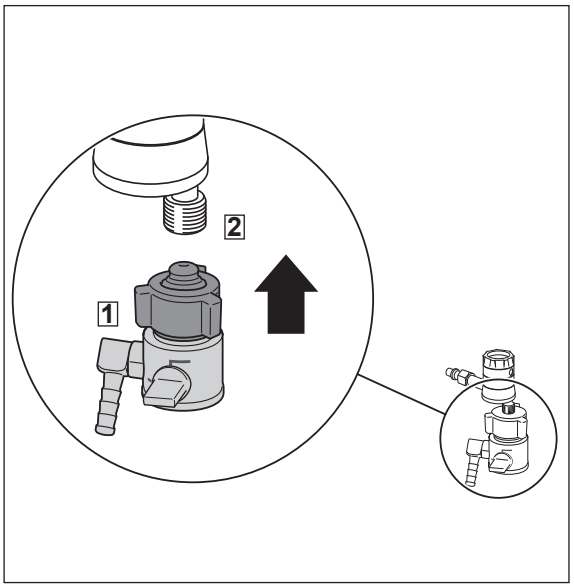
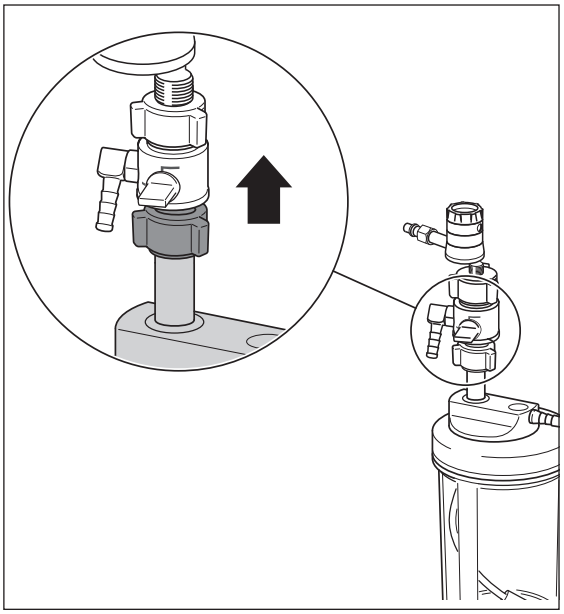


Fig. 5: Connection of Flow Selector

A Flow Selector can be connected to the flowmeter outlet. This enables the oxygen to be administered either directly via suitable connection tubes with an inner diameter of 4 mm, 6 mm or 8 mm, or via a humidifier with a UNF 9/16" input.

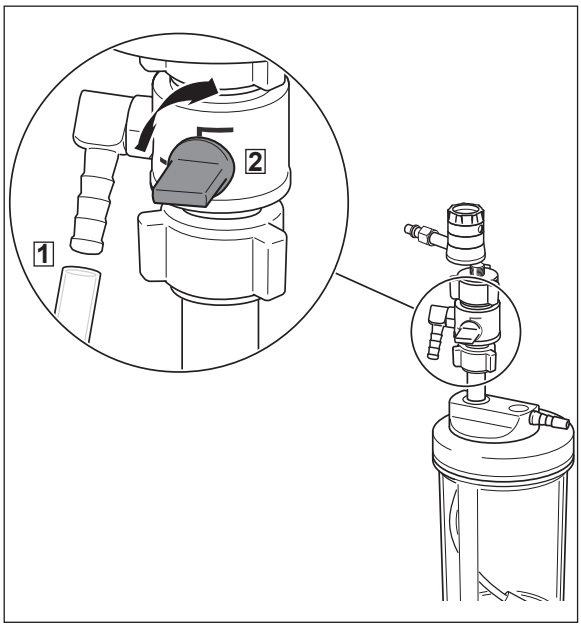
☒ Ensure that there is a seal in the thread with cap nut in the Flow Selector.

☒ Screw the Flow Selector (1) directly onto the flowmeter outlet (2) and tighten finger-tight until it stops.



☒ Screw the bubble humidifier (REF HM57525315) as described in chapter 3.3.2 or disposable humidifiers from other companies as described in chapter 3.3.3 directly onto the Flow Selector outlet and tighten finger-tight until it stops.

Fig. 6: Connection of bubble humidifier to Flow Selector



☒ Fit a suitable connection tube (1) onto the tube adapter of the Flow Selector

Operation of Flow Selector

☒ Turn the selector switch (2) on the Flow Selector to the desired position

☒ Vertical position – operation of the flowmeter via humidifier

☒ Horizontal position – operation of the flowmeter via connection tube

Fig. 7: Operation of Flow Selector

4 Operation

4.1 Function test



DANGER!

Function test!

The product is used in the treatment of patients. Any restriction in the unit's performance can result in serious complications in treatment.

Perform a complete function test every time before using the unit.

Perform a complete function test of the tapping unit prior to use.

Version A: Tapping unit with integrated gas pin

- The tapping unit is correctly plugged into the terminal unit.

Version B: Tapping unit with rail clamp and NIST connection

- The gas probe of the connection tube is correctly inserted into the terminal unit.
- The NIST nipple of the connection tube is correctly secured in the NIST connection of the tapping unit.
- The NIST screw connection is tightly fastened.
- The tapping unit is locked firmly to the equipment rail.

All versions:

- The tube connectors are firmly seated and tightly sealed and no mechanical forces are acting on the tubes.
- The plastic and rubber product parts are in perfect condition and show no signs of ageing.
- The accessories are correctly connected.
- The product is leak-free.
- It is possible to adjust the flow rate from zero to the maximum flow.
- The device is in good hygienic condition.

4.2 Use in conjunction with magnetic resonance imaging scanners



WARNING!

Danger to life!

Please strictly observe the operating instructions of your magnetic resonance imaging scanner.



WARNING!

Risk of injury!

Accessories of the product (e.g. humidifier, adapter, hand-held nebuliser, connection tubes, accessories) may be affected by the magnetic field.

If the product is used in conjunction with accessories within the 0.5 mT line, all connected accessories must be MR compatible. Observe the operating instructions of all connected accessories or consult the manufacturer of the product.



NOTE

If the product is used in conjunction with accessories outside the 100 mT line, the product does not create artefacts on the MR images.

4.3 Setting the flow for treatment

WARNING!

Compressed gas setting!

The regulating mechanism is sensitive. Make the compressed gas settings very carefully!

NOTE

The flow rate can be set to the following 14 values:
0; 0.2; 0.5; 0.7; 1; 1.5; 2; 3; 4; 5; 7; 10; 12; 15 (at 15 l/min),
0; 0.1; 0.2; 0.3; 0.4; 0.6; 0.8; 1; 1.5; 2; 2.5; 3; 4; 5 (at 5 l/min),
0; 0.1; 0.15; 0.2; 0.25; 0.3; 0.35; 0.4; 0.5; 0.6; 0.7; 0.8; 0.9; 1 (at 1 l/min).

NOTE

When applying oxygen in its function as a medication as per monograph in the European Pharmaceuticals Reference, it is absolutely necessary to measure the flow rate.

NOTE

The product only provides the patient with supplemental oxygen. Patient monitoring is the responsibility of the user.

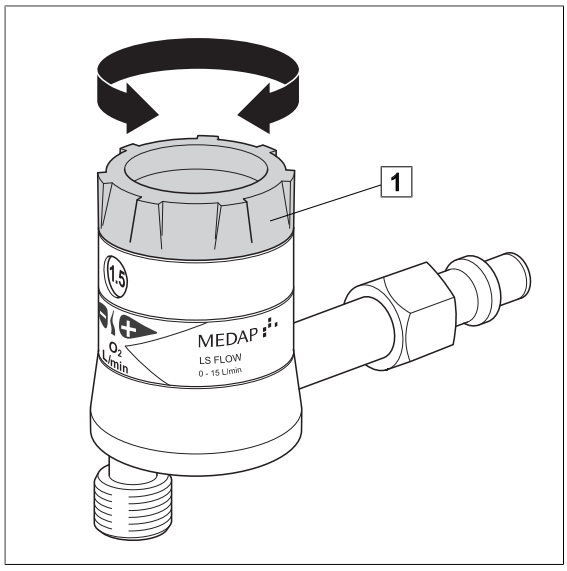


Fig. 8: Working with the unit

Use the rotation regulator to set the flow rate to the required value for the treatment.

Increasing the flow rate

☒ Turn the rotation regulator (1) anti-clockwise.

✓ The flow rate is increased.

Reducing the flow rate

☒ Turn the rotation regulator (1) clockwise.

✓ The flow rate is decreased.

5 Taking the unit out of operation

5.1 Taking the unit out of operation



WARNING!

Disengage!

When the product is disengaged (removed) from the terminal unit, the pressure energy may cause recoil.

Use the terminal unit in parking position or support when disengaging.



NOTE

To protect the product from damages, cover with cloths when storing.



NOTE

Please refer to the manufacturer’s instructions for the particular terminal unit for information on detaching the gas probe from the terminal unit.

All versions:

☒ After having completed the treatment, close the adjustment screw by turning it clockwise and check to ensure that it is closed.

☒ Disconnect the tapping unit / gas probe from the terminal unit.

Version B: Tapping unit with rail clamp

☒ Remove the unit from the equipment rail. For this purpose, open the handle screw and lift the unit off the equipment rail.

6 Cleaning and disinfection

6.1 General

The product must be wipe or spray disinfected after every use.



DANGER!

Risk due to incorrect use of detergents and disinfectants!

It is strictly advised to observe the manufacturer's instructions regarding how to use the detergents and disinfectants as well as to observe the valid hospital hygiene rules.



DANGER!

Infection hazard!

Product may be contaminated.

Always wear gloves for cleaning and disinfection.



DANGER!

Infection hazard!

Particles of grime may become encapsulated and lead to the product not reaching the desired germ-reduction after disinfection.

Before disinfection, the product must be cleaned thoroughly of contamination and encapsulated particles of grime.



DANGER!

Health hazard!

The product is also used to administer respiratory gas. Residues of sterilisation gases or other substances in the unit could endanger the patient's health.

Do not disassemble the product and do not clean it by gas sterilisation or any other mechanical cleaning or sterilisation method. Ensure that no disinfectant or cleaning agent enters the product.



CAUTION!

Improper cleaning and disinfection can cause property damage!

Do **not** use the following products for cleaning and disinfection:

- Products containing alcohol (e.g. hand disinfectants)
- Halogenides (e.g. fluorides, chlorides, bromides, iodides)
- Dehalogenating compounds (e.g. fluorine, chlorine, bromine, iodine)
- Products that may scratch the surface (e.g. scouring agents, wire brushes, wire wool)
- Standard commercial solvents (e.g. benzene, thinner)
- Water containing iron particles
- Cleaning sponges containing iron
- Products containing hydrochloric acid

Use a soft, lint-free cloth or a soft nylon brush to clean the product.



CAUTION!

Improper cleaning and disinfection can cause property damage!

Use only as much detergent and disinfectant as required.

CAUTION!

Improper cleaning and disinfection can cause property damage!

Perform visual and functional inspections after each cleaning and disinfection process.

6.2 Cleaning

6.2.1 General

NOTE

If product surfaces are very dirty, carry out an additional cleaning procedure before disinfecting the product.

NOTE

Use only all-purpose cleaners which are slightly alkaline (soap solution) and which contain surfactants and phosphates as the active cleaning agents.

In the event of heavily contaminated surfaces, use concentrated multi-purpose detergent.

CAUTION!

Improper cleaning can cause property damage!

Residues of physiological saline solutions (e.g. sodium chloride) can attack the surfaces of the product.

Remove residues of physiological saline solutions with a cloth dipped in clean water. Then dry the product with a dry, lint-free cloth.

CAUTION!

Improper cleaning can cause property damage!

Do not spray cleaning agent directly into the joints or gaps and never use a high-pressure cleaning unit!

6.2.2 Cleaning procedure

☒ Use the correct dose of multi-purpose detergent with water for the degree of surface contamination and in accordance with the instructions of the detergent manufacturer.

☒ Thoroughly wipe off the product with a soft cloth slightly wetted in a multi-purpose detergent solution.

☒ Ensure that the product is free from contamination and encapsulated particles of grime.

☒ Thoroughly wipe off the product with a soft cloth dipped in clean water.

☒ Ensure that the product is free of detergent residues.

☒ Dry product with a dry, absorbent and lint-free cloth.

☒ This will help to reduce pathogen growth on the product’s surface.

☒ Wipe or spray disinfect the product after every cleaning.

6.3 Disinfection

6.3.1 General

NOTE

If product surfaces are very dirty, carry out an additional cleaning procedure before disinfecting the product.

WARNING!

Property damage!

Disinfectants that contain volatile aromatic hydrocarbons, ammonia, amine, ester, halogenated hydrocarbons and/or ketone may attack plastics made of polycarbonate.

Do not use disinfectants with these ingredients.

CAUTION!

Material damage due to excessive exposure times!

Exceeding the specified exposure time of the disinfectant may damage the surfaces.

Observe the specified exposure time of the disinfectant manufacturer.

NOTE

Heavily diluted disinfectants may be used for disinfection.

6.3.2 Suitable disinfectants

Only surface disinfectants based on the following combinations of active ingredients may be used for disinfection:

- Aldehydes
- Quaternary compounds
- Guanidine derivatives

Ingredient group	Active ingredients
Aldehydes	2-ethyl-1-hexanal, formaldehyde, glutardialdehyde, glyoxal, o-phthaldialdehyde, succinaldehyde
Quaternary compounds	Alkyl-didecyl-polyoxyethyl ammonium propionate, alkyl-dimethyl-alkylbenzyl ammonium chloride, alkyl-dimethyl-ethyl ammonium chloride, alkyl-dimethyl-ethylbenzyl ammonium chloride, benzalkonium propionate, benzalkonium chloride (alkyl-dimethyl-benzyl ammonium chloride, coco-dimethyl-benzyl ammonium chloride, lauryl-dimethylbenzyl ammonium chloride, myristyl-dimethyl-benzyl ammonium chloride), benzethonium chloride, benzyl-dihydroxyethyl-coco-alkyl ammonium chloride, dialkyl-dimethyl ammonium chloride (didecyldimethyl ammonium chloride), didecyl-methyl-oxyethyl ammonium propionate, mecetronium-ethyl sulphate, methyl-benzethonium chloride, n-octyl-dimethyl-benzyl ammonium chloride

Ingredient group	Active ingredients
Guanidine derivatives	Alkyl-biguanide, chlorhexidine-digluconate, cocospropylene-diamine guanidinium diacetate, oligomeric biguanide, polyhexamethylene biguanide hydrochloride (oligo-diimino imido-carbonyl imino-hexamethylene, polyhexanide)

Tab. 5: Active ingredients of disinfectants

6.3.3 Disinfection procedure

☒ Wipe or spray disinfect the product in accordance with the instructions of the disinfectant manufacturer.

☒ Ensure that the product is free of disinfectant residue.

☒ Perform visual and functional inspections.

6.4 Special safety notes



DANGER!

Material damage!

Various components in the product are made of plastic materials. Solvents and some disinfectants and some cleaning agents can soften plastic or cause tension fissures.

Never use detergents that contain alcohol. Observe cleaning and disinfection standards.



CAUTION!

Property damage!

Using non-colour-fast surgical drapes can cause discolouration of surfaces.

Only use colour-fast surgical drapes.

7 Maintenance

7.1 General

Maintenance, repairs and periodic tests may only be carried out by persons who have the appropriate technical knowledge and are familiar with the product. To carry out these measures, the person must have the necessary test devices and original spare parts.

ATMOS recommends: Work should be carried out by an authorised ATMOS service partner. This ensures that repairs and testing are carried out professionally, original spare parts are used and warranty claims remain unaffected.



DANGER!

Health hazard!

The product is used in the treatment of patients. The product or some of its components may be contaminated.

Clean and disinfect the product before maintenance and repair. Repair work may be performed by personnel authorised by ATMOS.

7.2 Periodic tests

At least every 5 years a test must be performed.

7.3 Malfunctions and troubleshooting

Defect	Source of malfunction	Troubleshooting
No flow	Flow rate is set to the value ‘0’	Set the flow rate to the desired value
	Product defective	Have the equipment repaired by a service technician authorised by ATMOS
Flow does not stop	Flow rate is not set to the value ‘0’	Set the flow rate to the value ‘0’
	Product defective	Have the equipment repaired by a service technician authorised by ATMOS
The value of 15 l/min cannot be achieved even if the flow rate is adjusted to the max. value	The pressure from the central gas supply system is not high enough	Check the pressure supplied by the central gas supply installation
	Sintered filter is clogged	Have the equipment repaired by a service technician authorised by ATMOS
Gas probe does not fit into the terminal unit	Wrong terminal unit selected	Check the designation of the terminal unit
Full loss of pressure at the flowmeter	Seal is missing or defective	Have the equipment repaired by a service technician authorised by ATMOS
	There is a leak in the housing	
	Accessories are not tightened	Check seating of accessories

Tab. 6: Troubleshooting

7.4 Repairs

The following issues may require repairs to be made by the manufacturer or an authorised service partner:

- Liquid has penetrated the device.
- The performance has significantly decreased.
- Inexplicable notifications appear.
- Abnormal noises occur.
- Functional faults cannot be rectified according to the measures in chapter Malfunctions and troubleshooting [⏩ page 26].

If defects are detected, the product may not be used any longer.

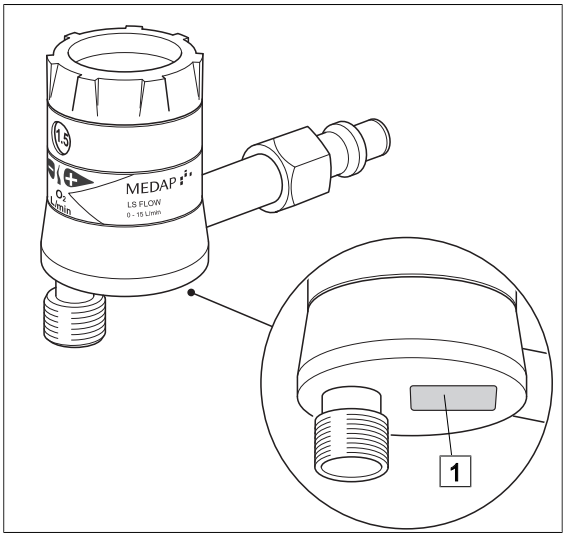
Make a note of the defects and the REF number on the type plate and inform your ATMOS representative.

Observe the information in chapter Sending in the device [⏩ page 27].

7.5 Service hotline

+49 7653 689-0

7.6 Type plate position



Position of the type plate (1).

Fig. 9: Type plate

7.7 Sending in the device

☒ Remove and properly dispose of consumables.

☒ Clean and disinfect the product and accessories according to the operating instructions.

☒ Place used accessories with the product.

☒ Fill in the form QD 434 ‘Delivery complaint / return shipment’ and the respective **decontamination certificate**.

This form is enclosed with each delivery and can be found at www.atmosmed.com.

☒ The device must be well padded and packed in suitable packaging.

☒ Place the form QD 434 ‘Delivery complaint / return shipment’ and the respective **decontamination certificate** in an envelope.

☒ Affix the envelope to the outside of the package.

☒ Send the product to ATMOS or to your dealer.

8 Technical specifications

8.1 General

Classification as per Annex IX to Directive 93/42/EEC	Class IIa

8.2 Technical specifications

Input pressure	300 to 550 kPa* P versions: 500 kPa*
Measurement range	0 - 15 l/min, 0-5 l/min, 0 - 1 l/min
Indication accuracy	Measuring range ≤ 0.5 l/min: ± 0.05 l/min Measuring range > 0.5 l/min: ± 10%
Input filter	Sintered metal 60 µm pore width
Use in MR environment	MR-safe to a limited extent (tapping unit without humidifier / adapter / accessories) up to 4.7 T**

* 100 kPa = 1 bar = 1000 mbar = 750 mmHg

** 1T = 1000mT = 10000 Gauss

8.3 Ambient conditions

Temperature	-40 °C to +60 °C (shipping / storage)
	-20 °C to +60 °C (operation)
Relative humidity	less than 100 % (shipping / storage)
	30 % to 75 % (operation)
Atmospheric pressure	700 hPa to 1060 hPa (shipping / storage)
	700 hPa to 1060 hPa (operation)

8.4 Dimensions and weights

LS FLOW Wall	Dimensions: 35 x 65 x 95 mm Weight: 180 g
LS FLOW Wall	Dimensions: 35 x 56 x 95 mm Weight: 166 g
LS FLOW Equipment rail	Dimensions: 40 x 100 x 120 mm Weight: 320 g
LS FLOW Equipment rail, P5 version	Dimensions: 40 x 100 x 120 mm Weight: 306 g
LS DFLOW Wall	Dimensions: 125 x 65 x 100 mm Weight: 540 g
LS DFLOW Wall, P5 version	Dimensions: 125 x 56 x 100 mm Weight: 512 g
LS DFLOW Equipment rail	Dimensions: 125 x 100 x 140 mm Weight 690 g

8.5 Expected service life

When used according to the operating instructions, the device has an expected service life of 8 years. Regular thorough cleaning and disinfection of the device and its applied parts as well as operation of the device according to the operating instructions are assumed.

9 Approved accessories

The following accessories are not part of the scope of delivery and must be ordered separately:

9.1 Accessories

HM57522746	Tube adapter, metal 4 mm, 6 mm, 8 mm
HM57525316	Tube adapter, plastic 4 mm, 6 mm, 8 mm
HM57525315	Bubble humidifier
HM57525707	Flow Selector

Tab. 7: Accessories

Notes

MEDAP

Manufacturer:

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