MLSYSTEM 2019-06

READ AND SAVE
THESE INSTRUCTIONS

ML SERIES

ML-System

HIGH PRESSURE INSTALLATION GUIDE

Adiabatic humidification system

Humidification and Evaporative Cooling

condair

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ML PRINCESS 2

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APPENDIX

1 General information

1.1 Foreword

WARNING!

Instructions relating to safety.

CAUTION!

Instructions relating to the correct operation of the unit.

This manual has been written to ensure the safe use, performance and longevity of the equipment, and is intended for use by engineers and properly trained technical personnel. Please read this manual thoroughly before specifying, designing or installing an ML-System from Condair A/S. Keep for future reference.

As our policy is one of continuous research and development, we reserve the right to amend, without notice, the specifications provided in this document. Condair A/S does not guarantee nor accept liability for the accuracy of information in this document.

This installation and operation manual is supplemented by various separate items of documentation (installation drawings, technical specifications etc.). Where necessary, appropriate cross-references are made to these publications in this installation and operation manual.

1.2 Health and safety

WARNING!

Always isolate all supplies to the system before commencing any maintenance or repair.

Installation, maintenance, repair work or decommissioning should only be carried out by appropriately qualified and properly trained technical personnel. The users are responsible for ensuring their suitability. The customer is responsible for ensuring that the installation of the equipment complies with all local regulations.

Any risks or hazards relating to the system, including during installation and maintenance, should be identified by a competent health and safety representative who is responsible for introducing effective control measures.

All ideograms, signs and markings applied to the unit must be observed and kept in a readable state.

1.3 Hygeine

WARNING!

The ML-System must be installed, operated and maintained in accordance with this manual. Failure to do so could result in contamination that might cause Legionnaires' disease, which can be fatal.

WARNING!

To prevent water stagnation and microbial contamination, the systems power supply should be left switched on. If the system is switched off for more than 48 hours, the pipework and system must be disinfected as per the instructions, and a full risk assessment must be undertaken to ensure safe operation.

Please observe the local health and safety executive's technical guidance on the control of Legionellosis in water systems.

The user is responsible for ensuring that the water system complies with local regulations, bye-laws and guidelines (such as the HSE ACoP L8, VDI 6022, ISO 22000, HACCP or equivalent). If inadequately maintained, water systems, of which any humidifier is a part, can support the growth of microorganisms, including the bacterium that causes Legionnaires' disease.

ML-System components is produced according to the ISO 22000 standards, which means that we have considered all aspects of this equipment to reduce the risk of Legionnaires' disease and other similar conditions. However, the user is responsible for ensuring that the installation, operation and maintenance work on the equipment is performed in a manner ensuring that the system stays clean!

Any risks or hazards relating to the system, including during installation and maintenance, should be identified by a competent health and safety representative who is responsible for introducing effective control measures.

1.3.1 Guidelines to ensure your system stays clean and prevent the growth of Legionella

- Carry out a risk assessment of the water system using a competent person, and implement an appropriate monitoring and control programme.
- Initiate procedures for changing filters, disinfection etc.
- Enter into a service contract that suits your company.
- Stop the system if polluted drinking water is found in your area.
- Avoid water temperatures between 25°C and 45°C, which favour the growth of Legionella.
- Do not stop the system unless it is faulty or leaking (avoid water stagnation).
- Refrain from closing nozzles or sections, unless there is leakage or a fault (avoid water stagnation).
- Disinfect the high-pressure system at least once a year and after every maintenance or repair. Always carry out a complete system disinfection if it has been turned off for more than 48 hours.
- Have water samples taken and tested for harmful bacteria at least once a year.
- Conduct follow-up measurements until the system is clean if bacteria have been detected in the system.

1.3.2 The Condair service team can help you

Condair has expert technicians who can provide:

- Bacteriological troubleshooting on site *
- Cleaning and disinfecting
- Preventive maintenance
- Repair and fault finding
- Training and guidance

*Condair uses a fast method for measuring bacterial activity in the water; the approved and patented BactiQuant. Once the water sample has been taken, we can read the bacteriological quality of the water within 30 minutes, and disinfect the system if necessary.

Condair follows the guidelines in VDI 6022 for CFU counts in humidifiers. The CFU count in the humidification water must not exceed 150 CFU/ml, corresponding to a maximum BQ value of 40. Please contact your local Condair representative for further information about our services.

1.4 Intended use

WARNING!

Risk of electric shock! A person may come in contact with live parts when the pump station/ control unit is open. Touching live parts may cause severe injury or death.

Prevention: Before carrying out any work on the system, disconnect power and water supply.

WARNING!

Poorly maintained humidification systems may be hazardous.

Prevention: read, understand and follow maintenance guidelines to ensure your system stays safe.

WARNING!

High pressure! When running the system is pressurized at 70 bar. Inappropriately fastened hoses may be forced out of the screw connections when pressurised. Newer loosen hoses or screw connections in a pressurised system.

The ML-System is intended for adiabatic humidification and cooling. Any other, or further, application is not considered use for the intended purpose. Condair A/S cannot be made liable for any damage or injury attributable to inattentive, inappropriate, negligent or incorrect operation of the equipment, whether or not caused deliberately.

Operation of the equipment in the intended manner requires that all the information in this installation and operation manual be observed (in particular the safety instructions).

1.4.1 Ensure safe operation

If it is suspected that safe operation has been compromised, the ML-System should immediately be shut down and secured against accidental power-up.

Shut down the ML-System if:

- Components are damaged, worn or very soiled.
- Fans are stopped or noisy.
- Joints, pipes or hose are leaking.

No modifications must be made on the ML-System without the manufacturer's consent. All persons working with the system must report to the owner if any alterations arte detected.

Use only original accessories and spare parts available from your Condair representative.

1.5 Warrenty

ML-System parts are covered by a two-year warranty from the invoice date with the exception of the replacement parts listed in the routine maintenance section. Failure to observe the manufacturer's installation and maintenance recommendations and instructions will invalidate the warranty. Condair A/S cannot be made liable for damage or injury attributable to failure to observe the manufacturer's installation and maintenance recommendations and instructions.

1.6 Delivery and storage

To ensure consistent quality, vital part is tested and preserved before leaving the factory. If put into storage prior to use, the components must be covered and protected from physical damage, dust, frost and rain.

It is recommended that the components be kept in its transit packaging for as long as possible prior to installation.

Inspection
Upon receipt, remove the transit packaging and inspect the components to ensure that no damage has occurred during transit. Any visible damage must be reported to your Condair distributor immediately. If the components are put into storage, the packaging should be replaced.

1.7 Correct method of lifting

Lifting or handling must only be carried out by trained and qualified personnel. Ensure that the lifting operation has been properly planned and risk-assessed, and that all equipment has been checked by a skilled and competent health and safety representative.

The customer is responsible for ensuring that operators are trained in handling heavy goods, and to enforce the relevant lifting regulations. Refer to the weights and measures section for system weight.

1.8 Disposal

You must observe local laws and regulations when disposing of your ML-System at the end of its working life.

1.9 Water quality guide

The quality of water being used in the ML system should be checked prior to system commissioning and comply with the guidelines in the high pressure pump manual.

Water monitoring
The ML-System must be monitored for hygiene as part of the maintenance programme. Please refer to the maintenance section for further guidance.

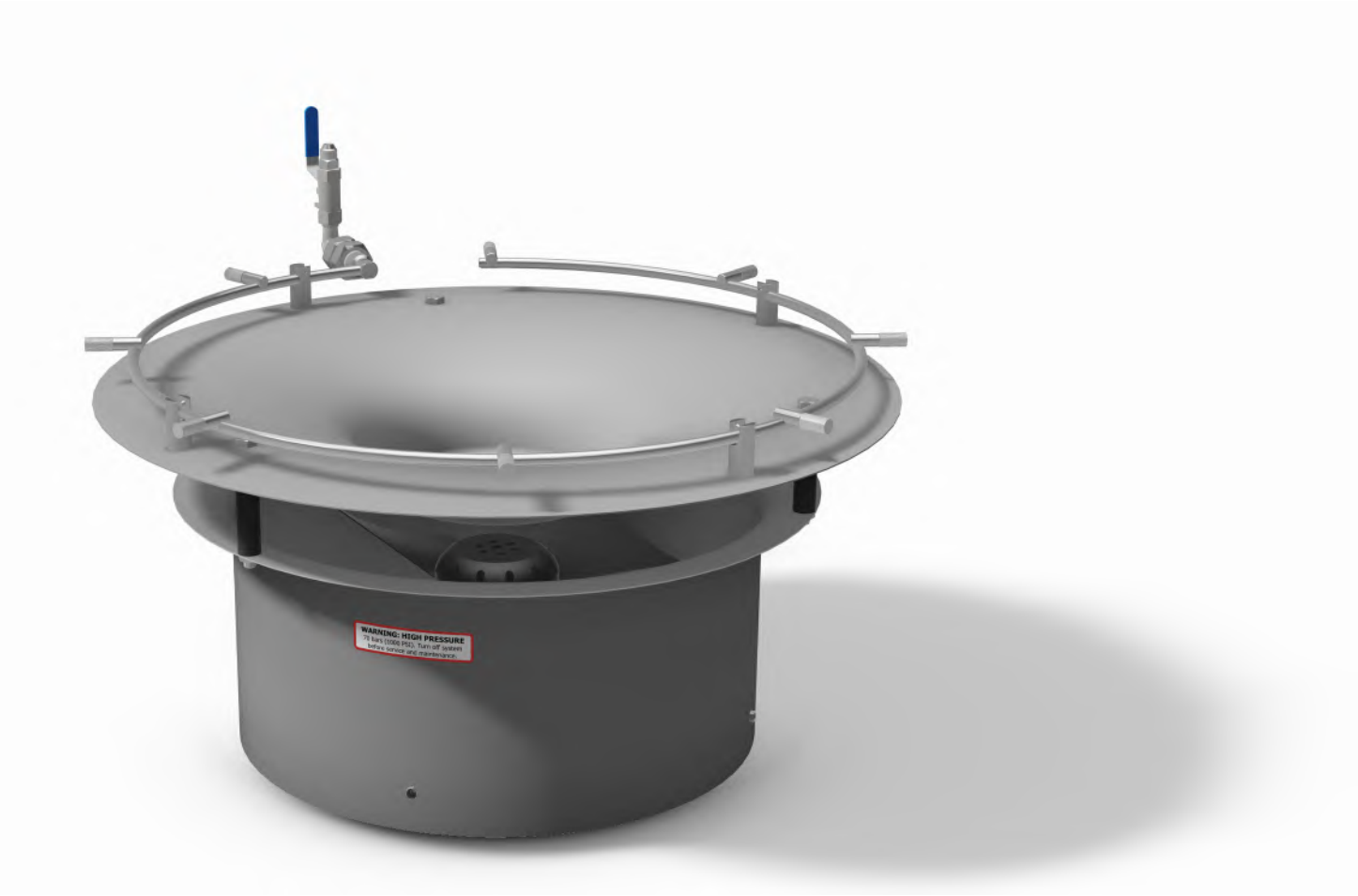
Disinfection
Depending on the system hygiene, it is advised that preventative disinfection fluid be added to the MLP RO water tank at an appropriate frequency, but at least once a year.

Condair A/S recommends usin the disinfection fluid SANOSIL S010 AG 5% (our code: 155404000) to the System via the high pressure pump, desired concentration 0.1%. DISIFIN is safe, non-toxic and eco-friendly which provides a prophylactic, disinfection dose and is effective against all types of microorganisms, including Legionella and E.coli.

Please read the pump manual for more information on disinfection.

If you are in any doubt about the suitability of water quality, please contact your Condair distributor who will be happy to support you.

ML SERIES



ML PRINCESS 2

humidification system

Humidification and Evaporative Cooling

condair

2 Technical data

2.1 Foreword

ML Princess 2 is part of a complete high pressure humidification system with one or more humidification units.

Every unit consists of a nozzle ring with 8 nozzles and a built-in fan.

Humidity is produced as water under high pressure is atomized into micro-sized particles. The fan distributes the fog particles, thus securing a uniform humidity throughout the entire room.

2.2 Technical data for ML Princess 2 / ML Princess 2 Max

Weight	9.2 kg
Number of nozzle	8 pcs.
Recommended nozzle size	2.5 - 4.5 L/h (6,5 L/h ML Princess 2 Max)
Material	Powder painted steel 37
Power connection	200-240 VAC, 50/60 Hz. IP44 100-130 VAC, 60 Hz. IP44
Power consumption	At highest speed 92W Princess 2 at nominel speed 26W Princess 2 Max at nominel speed 49W
Air speed	5 - 15 m/s
Noise level	40-56 dBA depending on speed
Wire guard	Epoxy treated
Colour	RAL 9006
RH working range	20-80% RH

2.3 Technical data for nozzles

Working pressure	35-70 bar
Material	Stainless steel
Anti-drip valve	Standard

2.4 Technical data for nozzle ring

Material	316 stainless steel
Pre-filter	20 micron

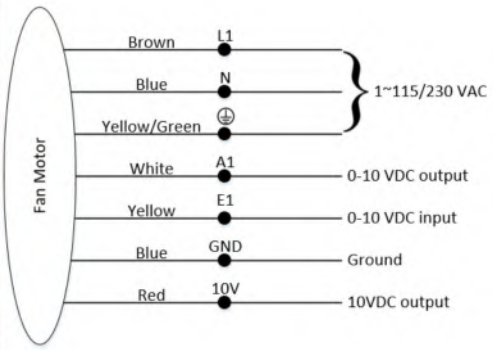
2.5 Sound power (LWA) 65.5 dB(A)

Converted to noise level in free field:

Distance to unit	1 m	2 m	3 m	5 m
dB(A)	58	55	52	45

3 Electrical connection of ML PRINCESS 2

The fan must be connected to power supply by an authorized electrician. The fan is normally connected through a prescribed switch for continuous operation so that the air in the room is constantly recirculated.



Electrical connection box placed on the fan motor.

4 Assembling PRINCESS 2

4.1 Installation of the nozzle ring on baffle plate (A)

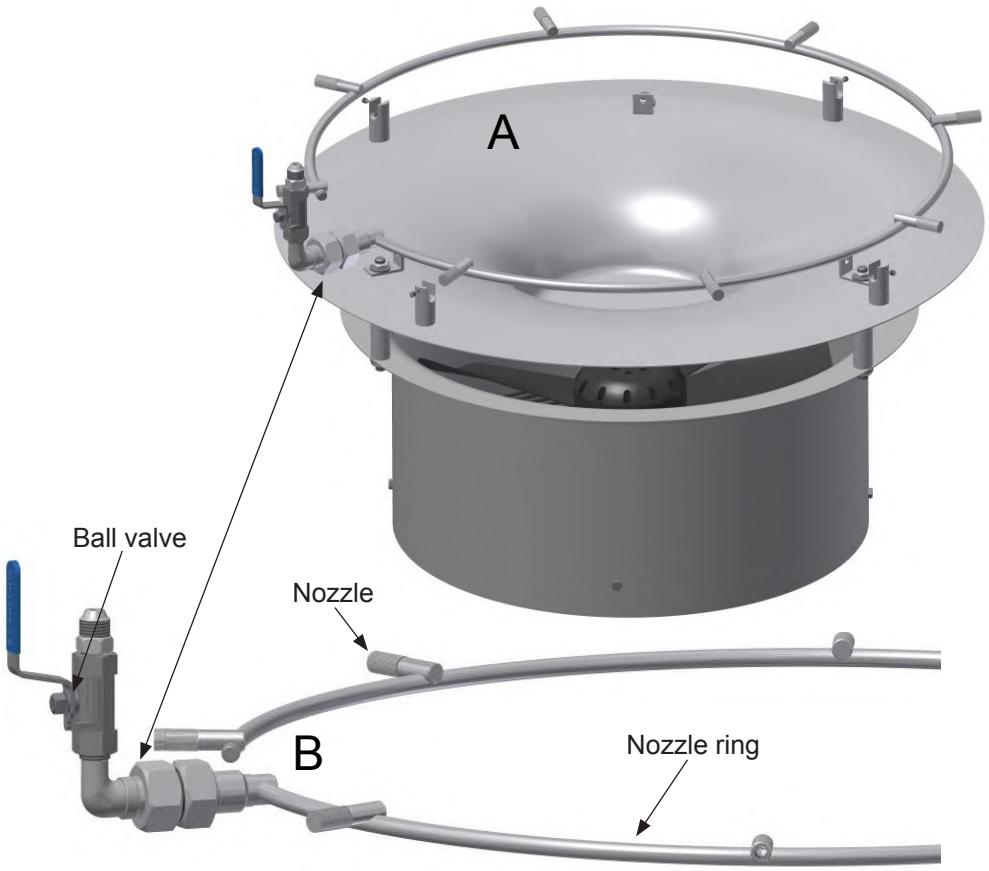
The nozzle ring is fastened on top of the baffle plate using the nozzle ring brackets. Standard nozzle rings are provided with ball valve, filter unit and nozzles.

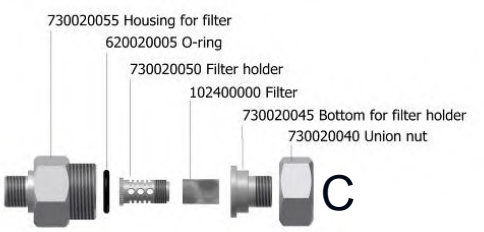
4.2 Final installation of nozzle ring (B)

Do not install the bleeding nozzle on each individual humidity unit until the system has been flushed through.

4.3 Installation of ball valve and filter union on nozzle ring (C)

Assemble ball valve and filter union as shown on the drawing. Make sure that the filter fixture is attached securely and the O-ring is in place before assembling the filter union. Close the ball valve when the unit is finally mounted.





5 Warning label

Mount warning label in a visible place

WARNING: HIGH PRESSURE
70 bars (1000 PSI). Turn off system
before service and maintenance

Inserting the nozzle

WARNING!

Never unscrew a nozzle on a pressurised unit. Disconnect power to the pump station when working on high-pressure system.

- Before inserting the nozzle, check that its threads and O-ring are intact.
- Screw the nozzle in by hand, tighten.
- Use a set of polygrip pliers to tighten the nozzle (approx. 1/8 turn) (torque: 2.1 Nm +/- 0.1 Nm)
- Always tighten on the tip of the nozzle too, to make sure it is also tight.

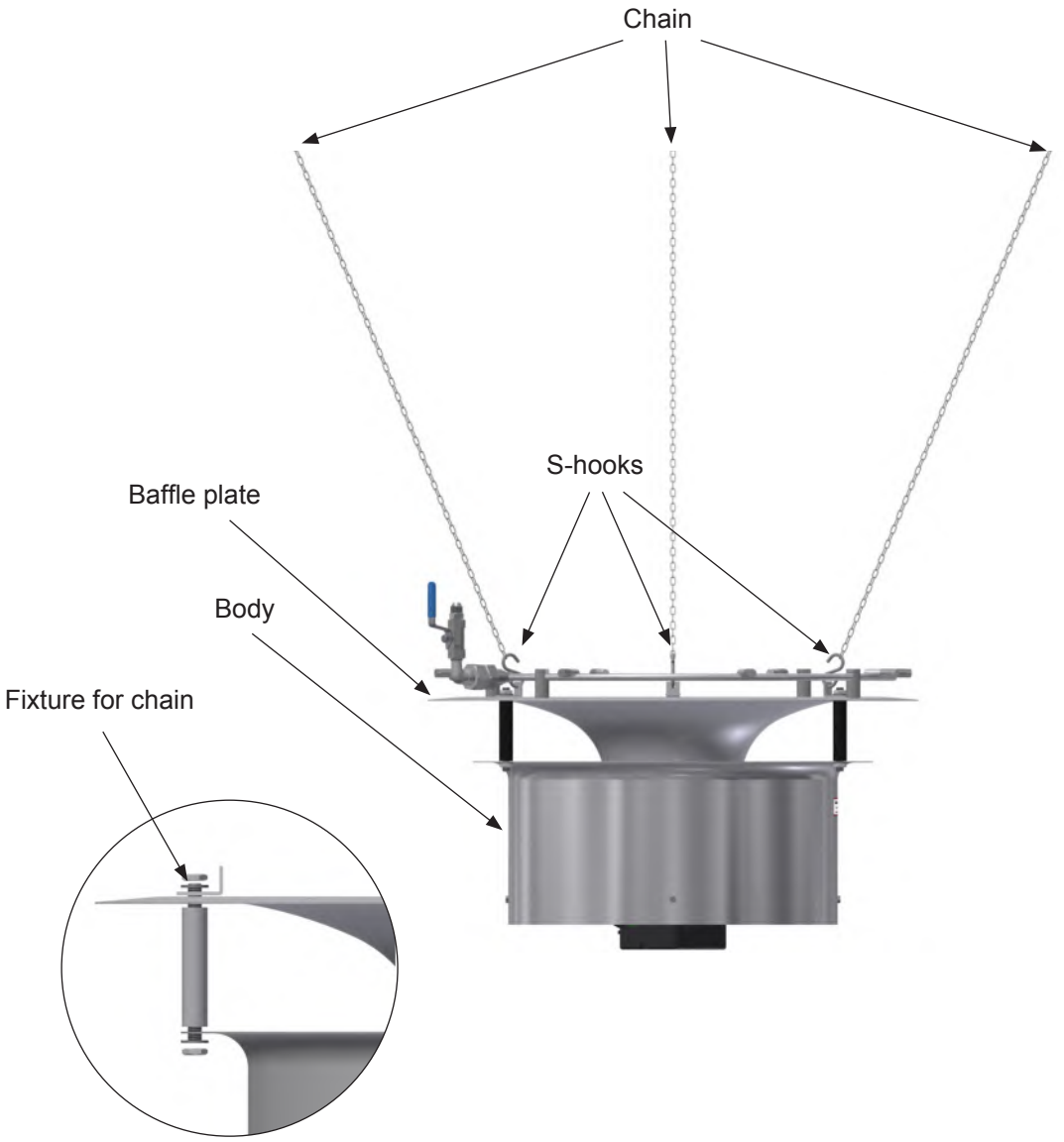
CAUTION!

Be careful! The threads on the nozzles break easily, the nozzle seals with an O-ring and hence does not need to be tightened very hard, just a little more than you can do by hand.

6 Ceiling mounted ML PRINCESS 2

Adjust the chains so that the unit is in level. After flushing and bleeding of ML Princess remove the excess chain and close S-hooks.

The chains have to be fastened to the ceiling with appropriate material (screws, raw plugs, concrete screw anchors etc.)



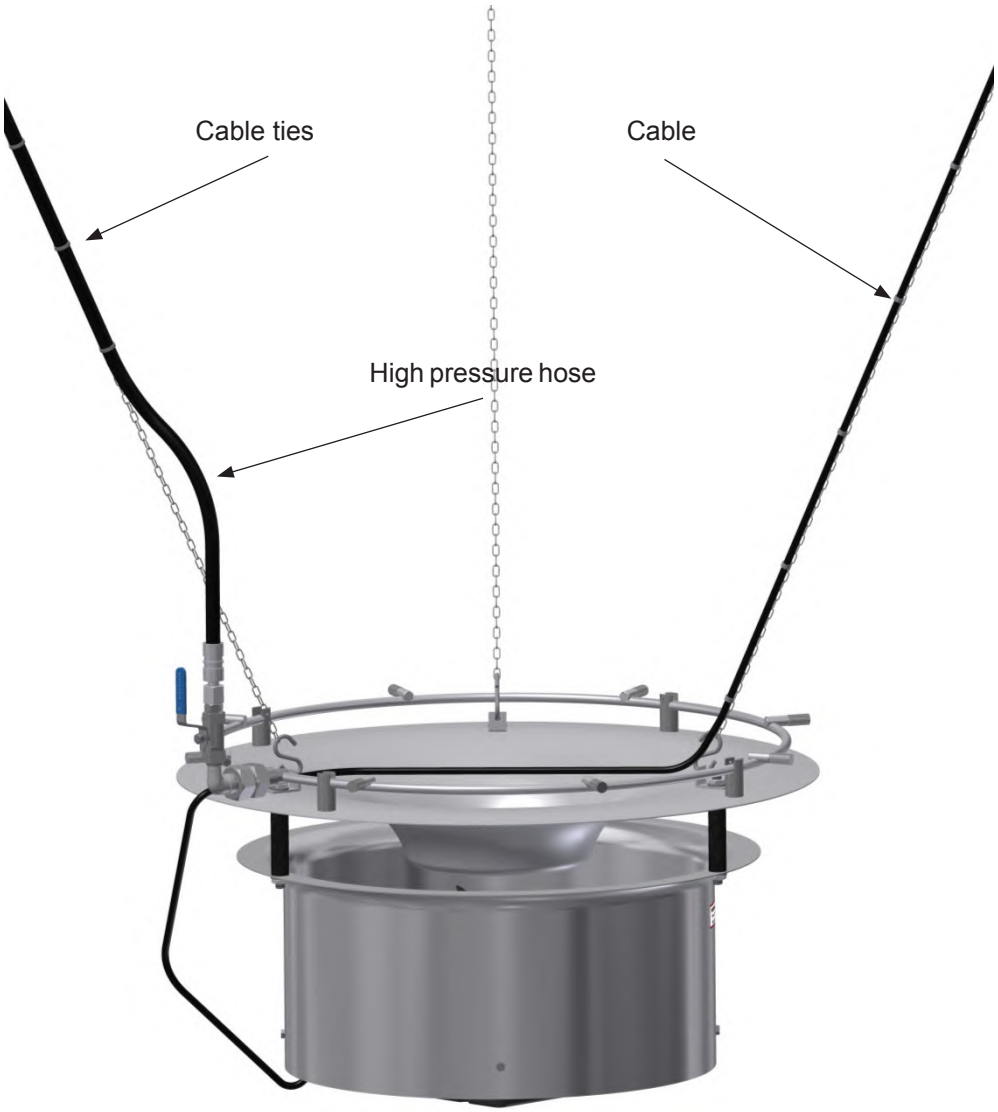
6.1 Note

The baffle plate must be positioned as indicated on the drawing and always with the pointed end turning towards the fan blades in order to secure correct operation.

6.2 Installation

Fit the baffle plate to the body of the unit as indicated and attach the chains to the housing.

7 Connecting water and power to the ML PRINCESS 2



The high pressure hose is connected to the ball valve. The hose can be strapped to the chain using cable ties. Avoid vertical U-turns on the hose. This might cause pockets of air in the hose.

The cable is connected to the power supply by an authorized person.

8 Wall mounted ML PRINCESS 2

The bracket is used for wall mounting of ML Princess 2, where only humidification out into the room is wanted.

Together with the wall bracket, a shielding for the fan is supplied, so that the air does not blow against the wall.

The distance between wall and module is adjustable from 30 to app. 55 cm.

Wall bracket and shielding are attached together with fitting for nozzle ring and dispenser plate spacer.

Using a wall mounted Princess 2 the three nozzles pointing towards the wall will be blind nozzles.

For fastening the bracket to the wall one always must use the correct screws and raw plugs if necessary in regard to which material the wall may consist of.

Technical specifications

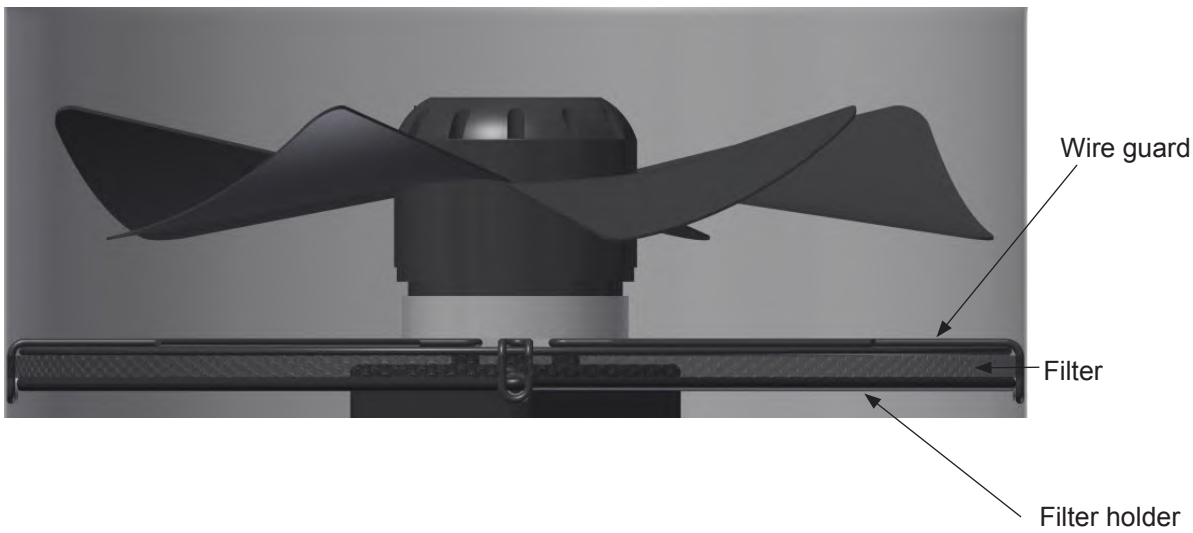
Part no.:	101102000
Material:	Powder painted steel
Colour:	Grey
Dimensions:	795 x 350 x 100 mm
Weight:	3.5 kg

9 Installation of air filter under fan (option)

The air filter serves as protection for the fan motor. In operating environments with much dust/dirt in the air (carpentry) it may be necessary often to clean filters due to the high dust loads that are carried with the conveying air.

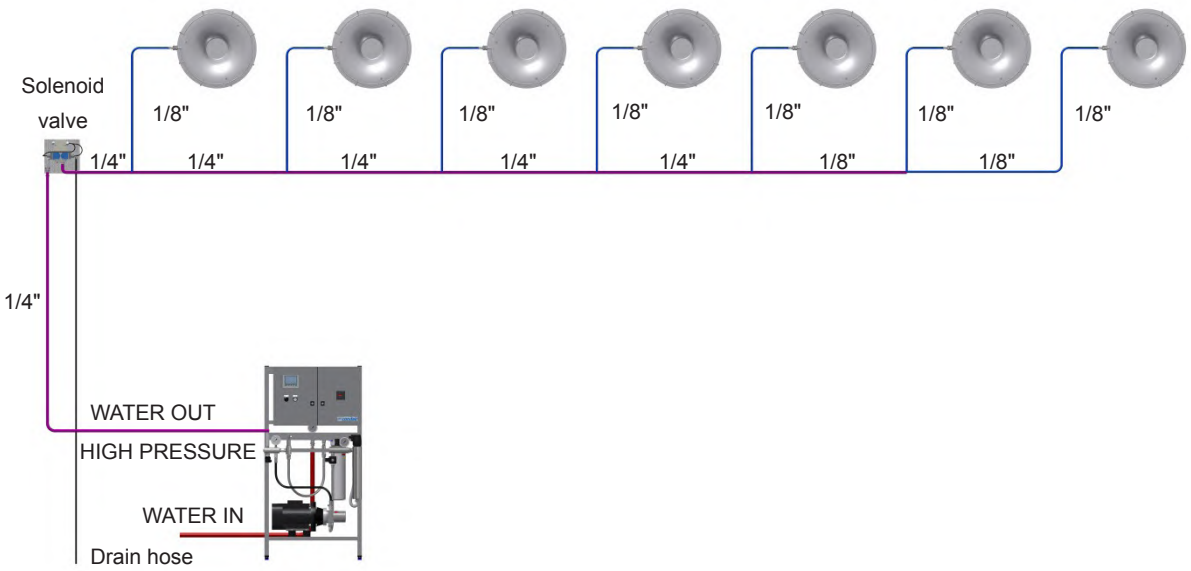
1. 2. 3.

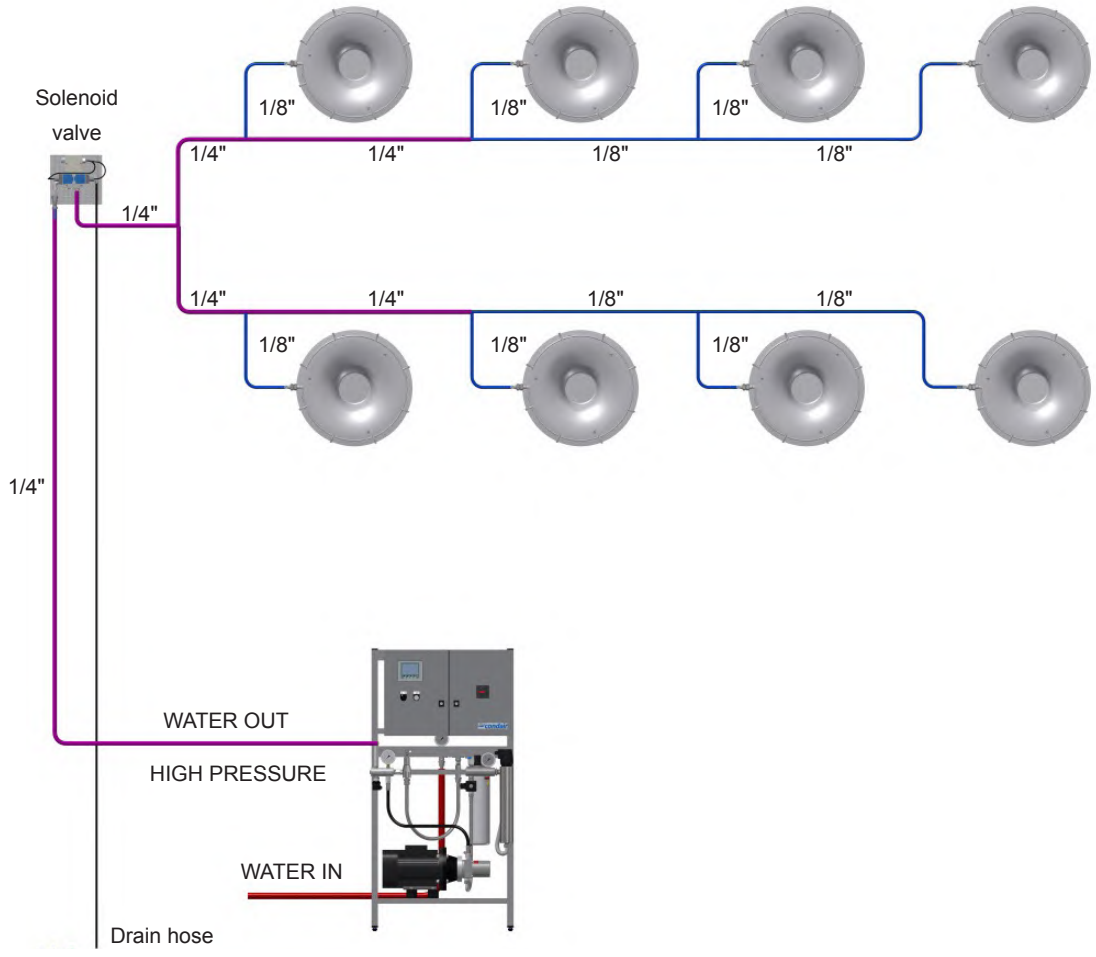
1. ML Princess seen from below without filter
2. Install the filter while the fan is in operation
3. Place the filter holder



10 Hose layout for 8 pcs. ML PRINCESS 2

NB. sizing of hoses should always be done according to TI013GB

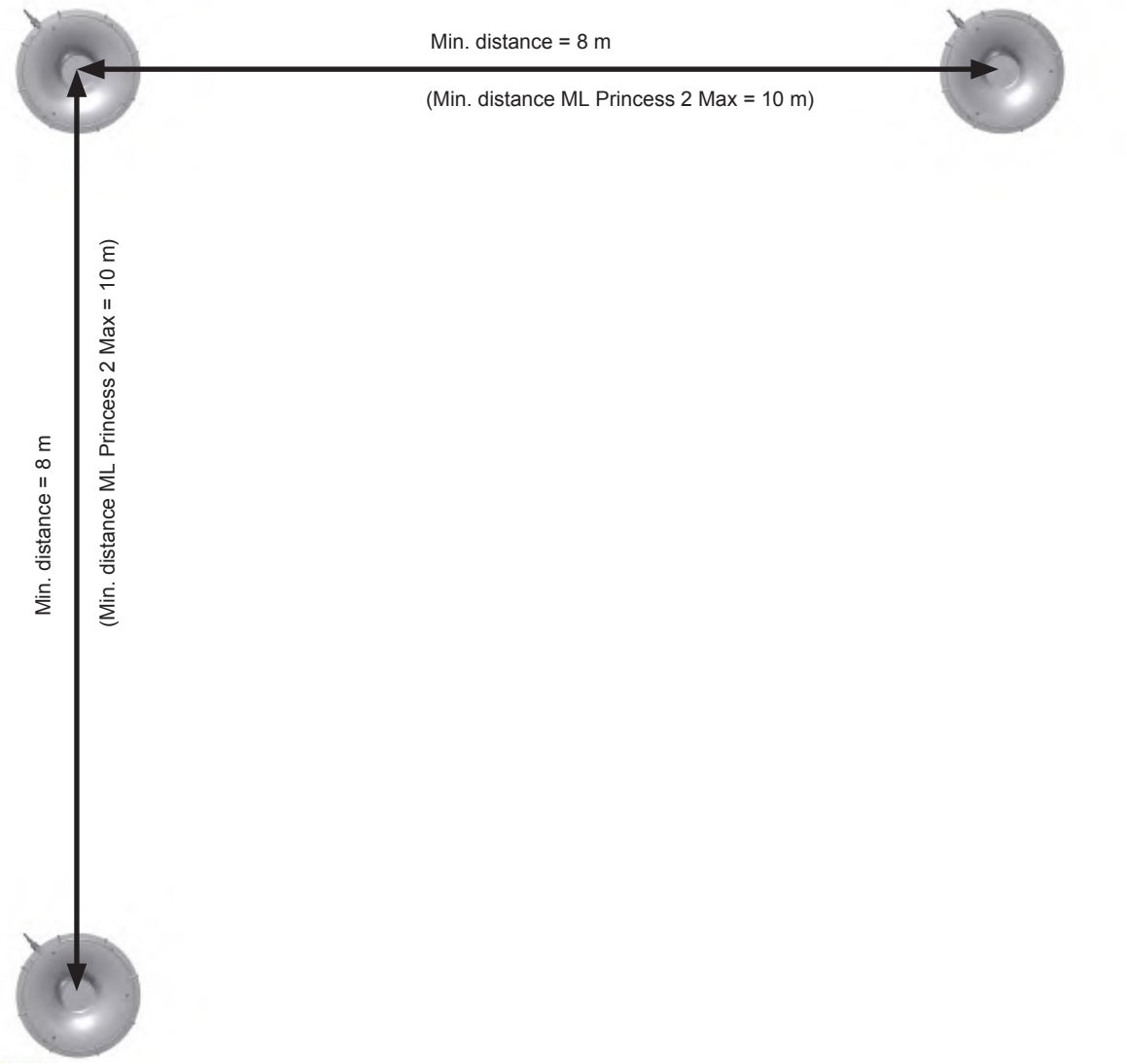




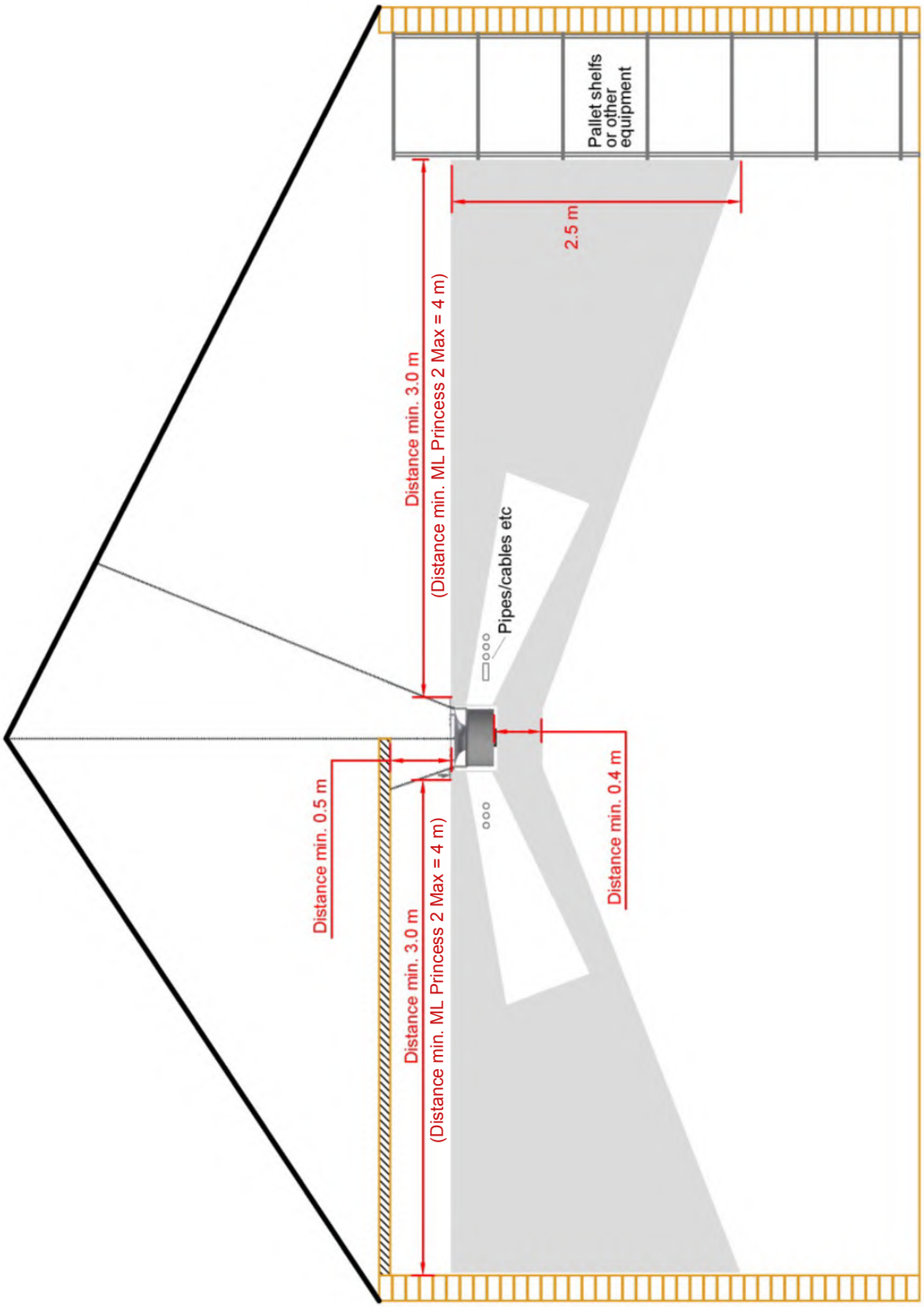
11 Spare parts

ITEM	PART NO.
Nozzle ring without ball valve, filter and nozzles	102 200 001
Ball valve, complete	102 910 000
Bracket set for nozzle ring ML Princess 2	102 901 000
Fan for ML Princess 2, 230 VAC	310 010 000
Fan for ML Princess 2, 115 VAC	310 010 002
Bag with 8 nozzles, 1.5 L/H	671 300 011
Bag with 8 nozzles, 2.5 L/H	671 300 012
Bag with 8 nozzles, 4.5 L/H	671 300 013
Bag with 8 nozzles, 6.5 L/H (ML Princess 2 max only)	671 300 014
Fan filter for Princess 2	100 400 000
Fan filter holder Princess 2	100 402 000
Filter 20 µ, short	102 400 000

12 Distances between modules



13 Miscellaneous mounting distances



EC - Declaration of Compliance

Manufacturer:
Condair A/S
Parallelvej 2
8680 Ry

Technical Manager.: Lasse Andresen

We hereby declare, that the following spray modules for humidification purposes with ML pump systems:

Model: ML Princess 2 (8 nozzles, 230 VAC or 115 VAC)
ML Princess 3 (12 nozzles, 230 VAC or 115 VAC)

are manufactured in accordance with the following EC directives:

- 2006/42/EC, Directive on machinery
- 2009/125/EC, ErP-directive – ecodesign requirements of energy-related products
- 2011/65/EC, ROHS Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The following harmonized standards have been applied:

- EN ISO 12100:2011, Safety of machinery – General principles for design – Risk assessment and risk reduction
- EN 60204-1:2006 + amendments, Safety of machinery – Electrical equipment of machines – Part 1: General requirements

And the following international standards have been applied:

- EN 60309-1:1999 + amendments, Plugs, socket-outlets and couplers for industrial purposes – Part 1: Gen. requirements.
- EN 61000-6-2:2005 + amendments, Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments
- EN 61000-6-3:2007 + amendments, Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

Installation and operation:

Description of the unit: See Technical data

Mounting and safety instructions

Should be placed at a height of minimum 2,0 m above floor-level to the lower edge of the unit, to eliminate danger caused by possible touching of the impeller/ fan when operating. The fan is not equipped with guard grill at the outlet side of the fan, therefore the power to the fan should be switched off if work is done within a 0,5 m safety area from the outlet of the fan.

Vibration-noise

Transmitted noise from vibrations is minimised during mounting, by equalizing the force in all hanging points. (See separate mounting instruction for ML Princess)

Electrical connection

Electrical connection should be made according to local rules by athorized people. The fan should be connected to an external voltage switch.

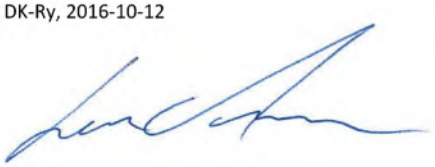
Service and maintenance

The impeller and the internal side of the cabinet/body should be cleaned for dust and dirt at least once every year, or when necessary. Should be cleaned in water and soap, or special cleaning solution for aluminum. Do not use organic dissolutions or other strong chemicals for the cleaning.
Before the cleaning procedure is started, the power supply must be safely switched off, and it must be secured that the power cannot be switched on again during the cleaning.

Sound level

Sound level measured 1 meter from motor: 55 dB(A) at 50 Hz supply.

DK-Ry, 2016-10-12



Lasse Andresen, Technical Manager

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ML SERIES

ML SOLO

humidification system

Humidification and Evaporative Cooling

condair

15 Description

15.1 ML Solo 1 & 2

ML Solo is used in subject-oriented humidification, fruit and vegetable sections, printing works, print shops and rooms with a low humidification requirement.

The humidification unit is particularly suitable for applications with low ceiling height. The unit has been developed with flexible and adjustable joints that make it possible to adapt the humidification direction.

ML Solo features a low noise level and an output that corresponds to traditional compressed air nozzles. In most places, ML Solo will be able to replace compressed air nozzles straight away.

Humidification takes place under high pressure (35-70 bar), whereby water is atomized into the room and immediately absorbed by the surrounding air.

15.2 ML Solo 3

A humidification unit consisting of 3 (x) ML Solo units mounted on a 2 meter long rail. This humidification unit is typically used in fruit and vegetable departments in supermarkets.

Humidification principle: Atomisation of water under high pressure (50-70 bar) to millions of microscopic particles, which quickly evaporate in the surrounding air.

Application: item humidification, fruit and vegetable areas and other premises with low humidity requirements. When used for room humidification, the recommended minimum floor-to-ceiling height is 2.5 m.

16 Technical data

	ML Solo 1	ML Solo 2	ML Solo 3
Weight	2 kg	2 kg	18 kg
Size (h x w x d)	180 x 150 x 170 mm	180 x 150 x 170 mm	(315-715) x 2000 x 170 mm
Noise level (50/60 Hz)	41/44.5 dB(A)	41/44.5 dB(A)	34/37 dB(A)
Material	Powder painted steel	Powder painted steel	Powder painted steel
Air capacity (50/60 Hz)	120/130 m³ per hour	120/130 m³ per hour	360/390 m³ per hour
Humidification capacity	1.5 – 2.5 l/h	3 – 5 l/h	4.5 – 7.5 l/h
Operating pressure	35 – 70 bar	35 – 70 bar	35 – 70 bar
Fan	Axial fan	Axial fan	Axial fan
Approvals (fan)	CE	CE	UL, CSA, CE, VDE
Connection, water	1/16" ML High pressure hose	1/16" ML High pressure hose	1/16" ML High pressure hose
Connection, electricity	Connect to switch according to regulations; supplied with approx. 1 m cable 2 x 0.75 mm²	Connect to switch according to regulations; supplied with approx. 1 m cable 2 x 0.75 mm²	Connect to switch according to regulations; supplied with approx. 1 m cable 3 x 0.75 mm²
Power consumption	24 VAC, 50/60 Hz, 15/16 W, IP55	24 VAC, 50/60 Hz, 15/16 W, IP55	24 VAC, 50/60 Hz, 45/48 W, IP55
Min. room height	2.5 m	2.5 m	2.5 m
Min. distance to ceiling	0.25 m	0.25 m	0.25 m
Min. clearance in front of nozzle	3 m	3 m	3 m
Colour	White / Grey / Black	White / Grey / Black	White / Black
Nozzles	1.5 and 2.5 l/h	1.5 and 2.5 l/h	1.5 and 2.5 l/h
Suspension from wall or ceiling	Wall or ceiling	Wall or ceiling	Ceiling

16.1 Noise level (50 Hz)

Sound power (LWA) 56.0 dB(A).

Converted to the noise level in free field:

Distance to unit	1 m	2 m	3 m	5 m
dB(A)	45	40	35	31

As an option the fan speed is reduced.

Sound power (LWA) at 75% voltage is 48.0 dB(A).

16.2 Nozzle

Nozzle size	Item number
1.5 l/h	103 200 001
2.5 l/h	103 160 000

16.3 Technical data for nozzle

Working pressure	35-70 bar
Material	Stainless steel
Anti-drip valve	Standard

16.4 Accessories for Solo 1 and Solo 2

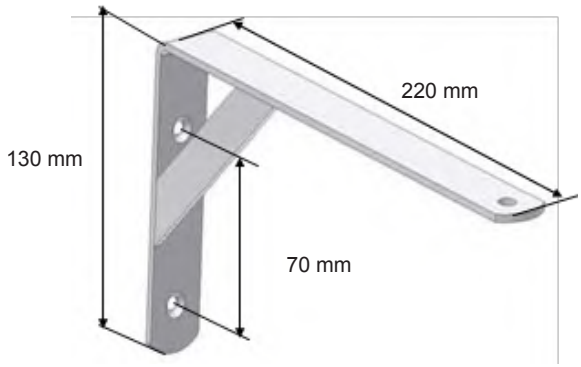
		Colour	Item number
Wall fixture	Solo 1 + 2	White	132 400 001
		Grey	132 400 002
		Black	132 400 003
		Colour	**Item number**
Ceiling fixture	Solo 1 + 2	White	132 401 000
		Grey	132 420 000
		Black	132 422 000

16.5 Power supply

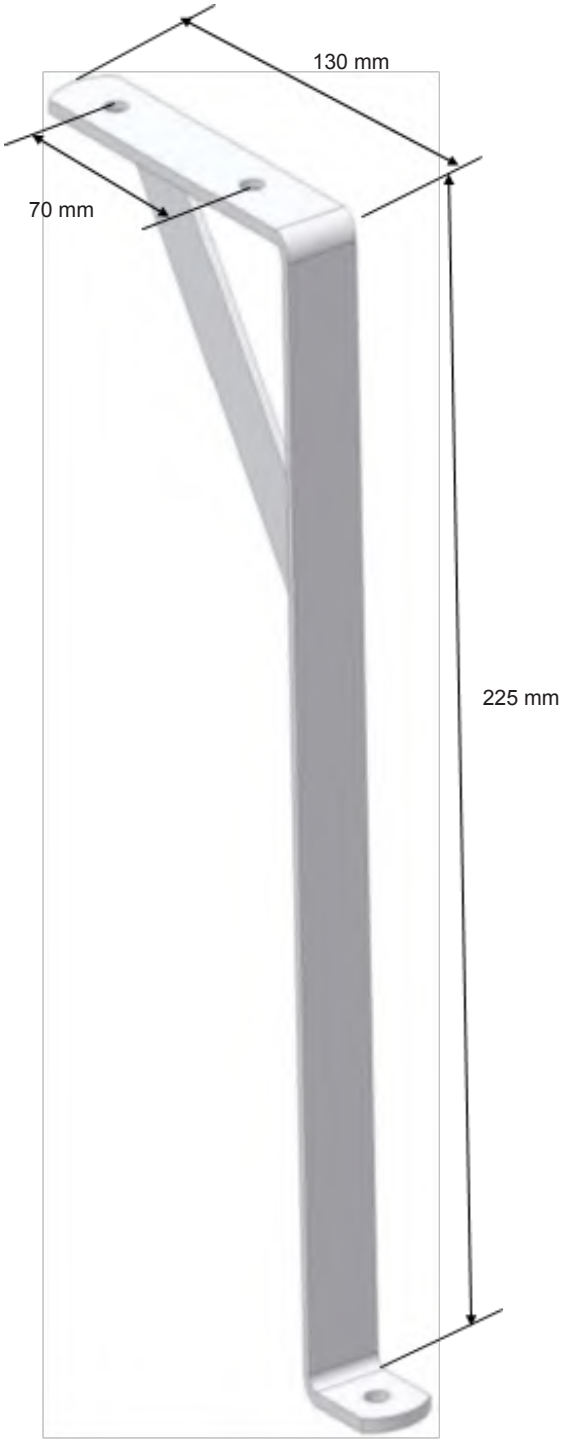
Power supply	Item number
24V AC Transformer for 3 pcs. ML Solo, 230-240 VAC 50 Hz, 60 W	132 419 000
24V AC Transformer for 7 pcs. ML Solo, 230-240 VAC 50 Hz, 150W	132 420 000
24V AC Transformer for 10 pcs. ML Solo, 230-240 VAC, 50 Hz, 210W	132 421 000
24V AC Transformer for 15 pcs. ML Solo, 230-240 VAC, 50 Hz, 300W	132 422 000

17 Wall and ceiling fixtures

Wall fixture

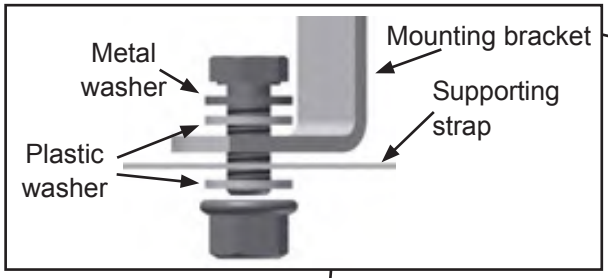


Ceiling fixture

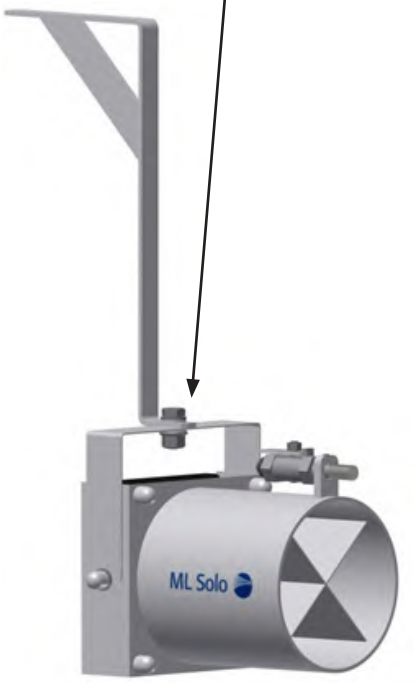


18 Mounting the ML Solo, wall or ceiling

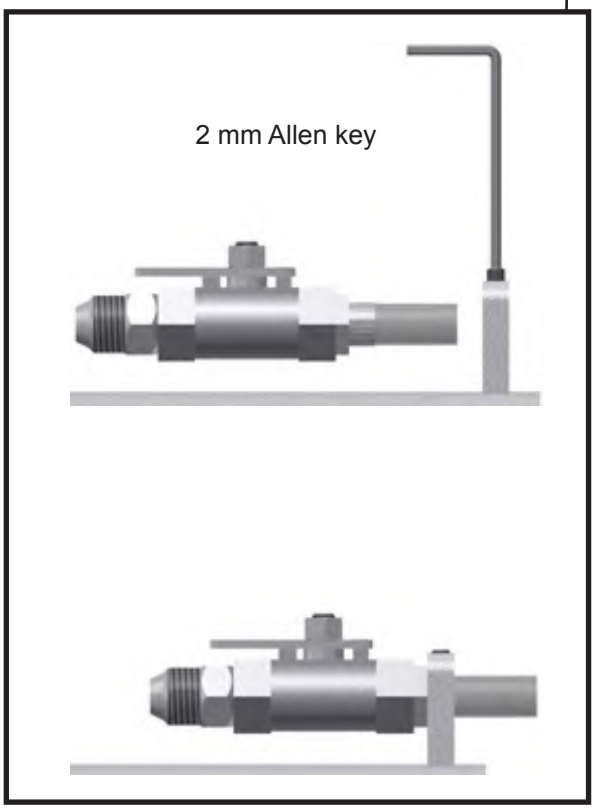
The fixtures have to be fastened to the wall/ceiling with appropriate material (screws, raw plugs, concrete screw anchors etc.)



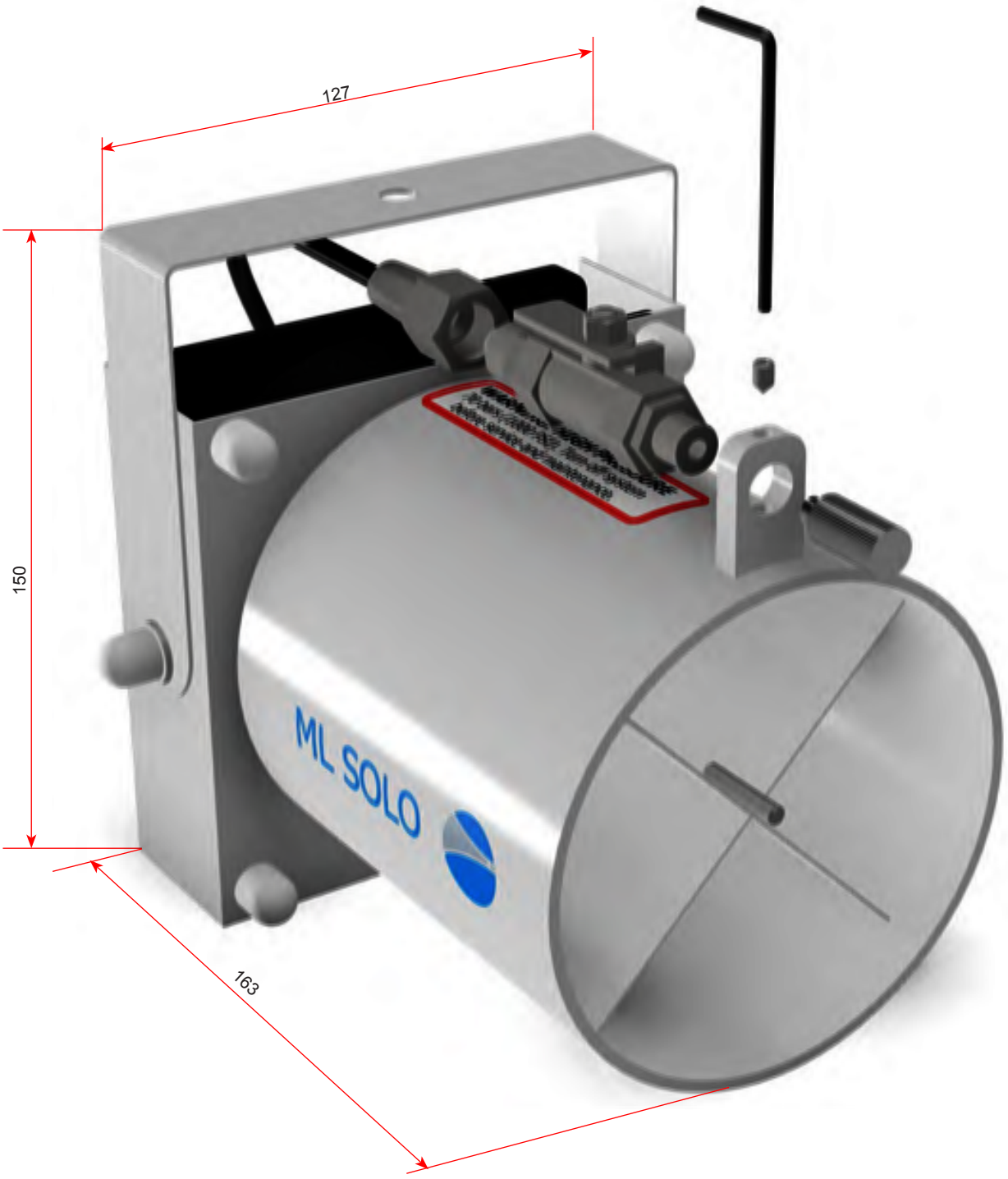
ML Solo with wall mounting



ML Solo with ceiling mounting



19 Assembling the ML Solo



The high pressure hose is connected to the ball valve. Avoid vertical U-turns on the hose. This might cause pockets of air in the hose.

19.1 Electrical connection of ML Solo

The ML Solo is supplied with a cable and must be connected to power supply by an authorized electrician.

19.2 Inserting the nozzle

WARNING!

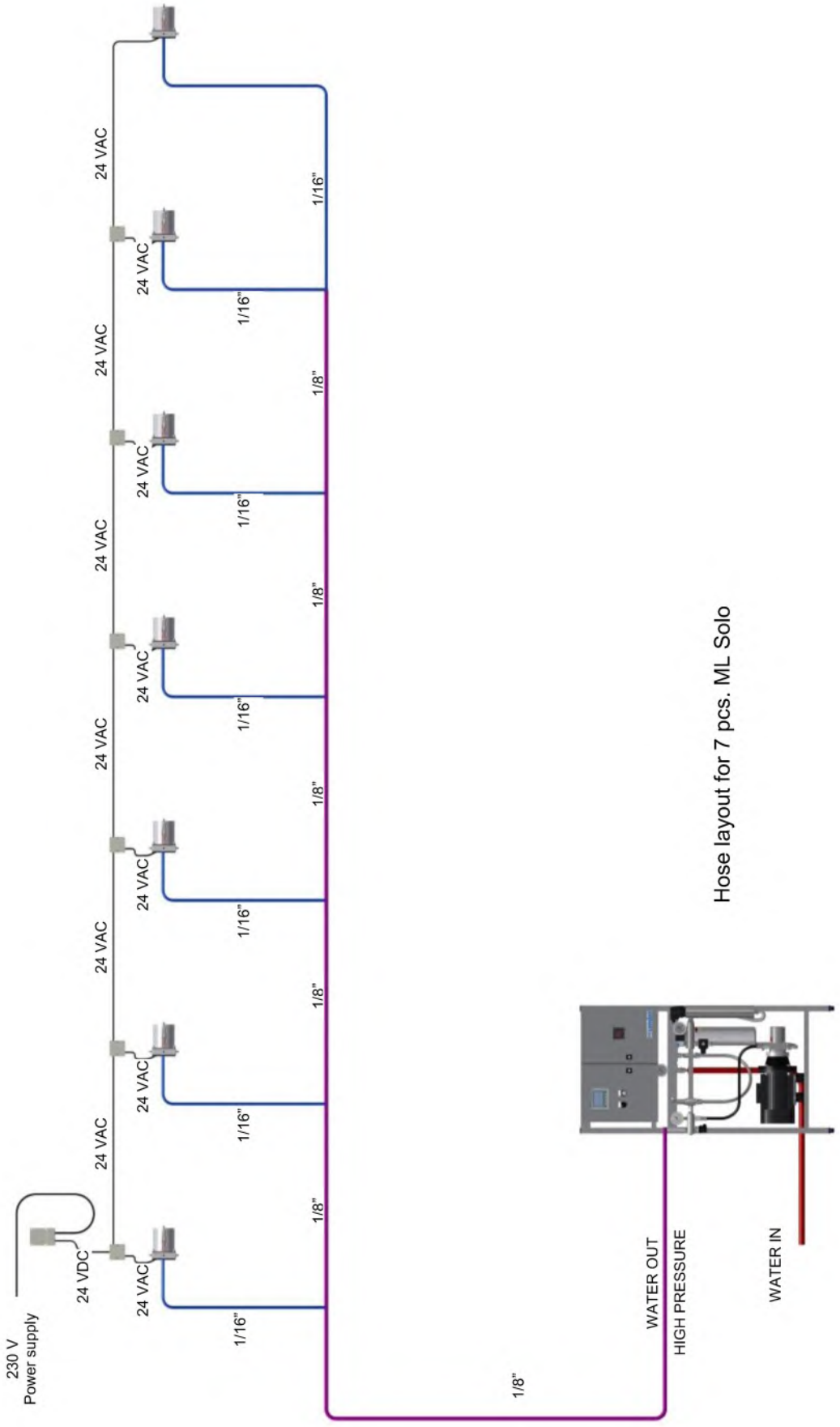
Never unscrew a nozzle on a pressurised unit. Disconnect power to the pump station when working on high-pressure system.

- Before inserting the nozzle, check that its threads and O-ring are intact.
- Screw the nozzle in by hand, tighten.
- Use a set of polygrip pliers to tighten the nozzle (approx. 1/8 turn) (torque: 2.1 Nm +/- 0.1 Nm)
- Always tighten on the tip of the nozzle too, to make sure it is also tight.

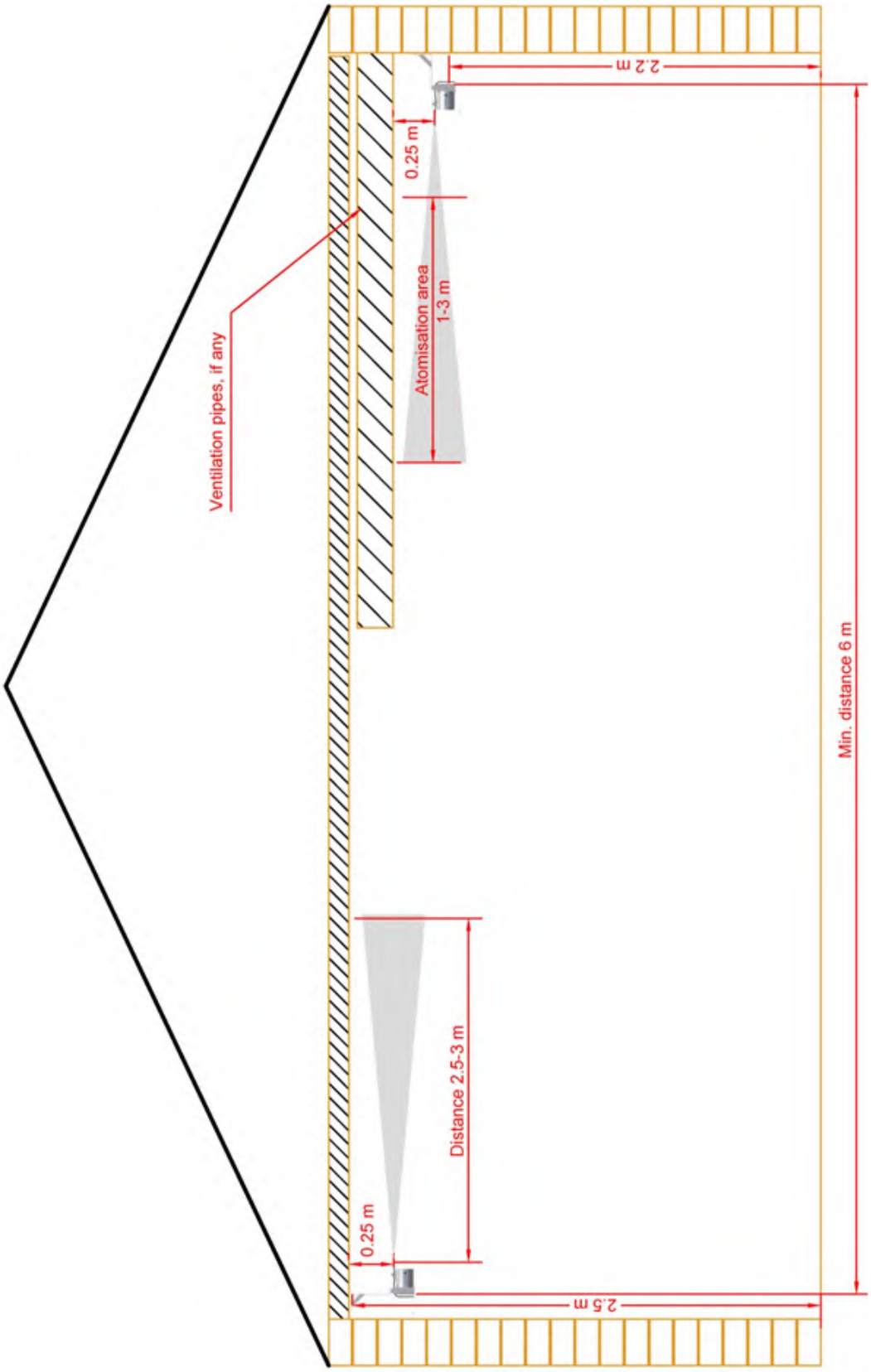
CAUTION!

Be careful! The threads on the nozzles break easily, the nozzle seals with an O-ring and hence does not need to be tightened very hard, just a little more than you can do by hand.

20 Hose layout for ML Solo

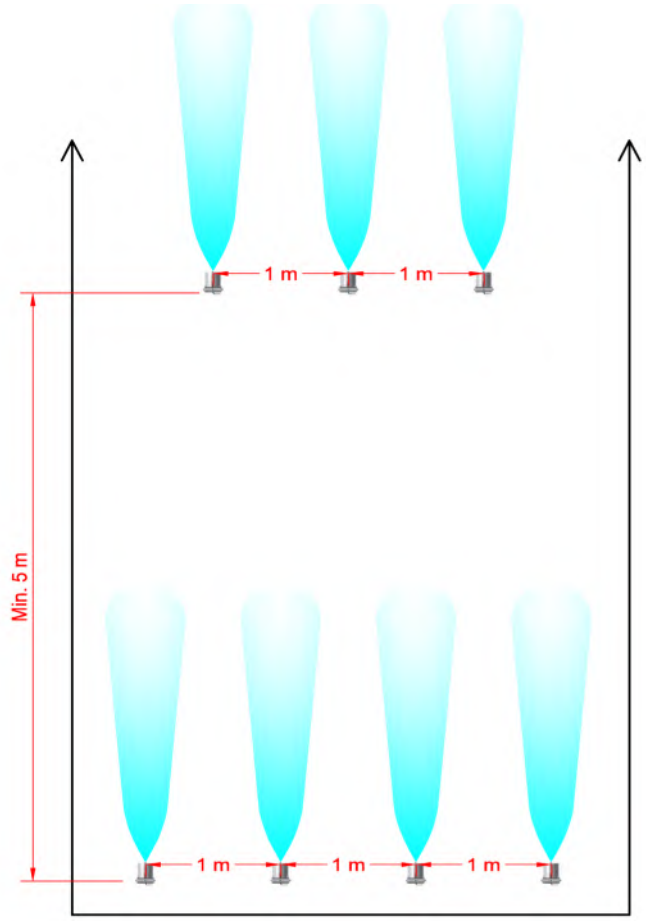


21 Miscellaneous mounting distances

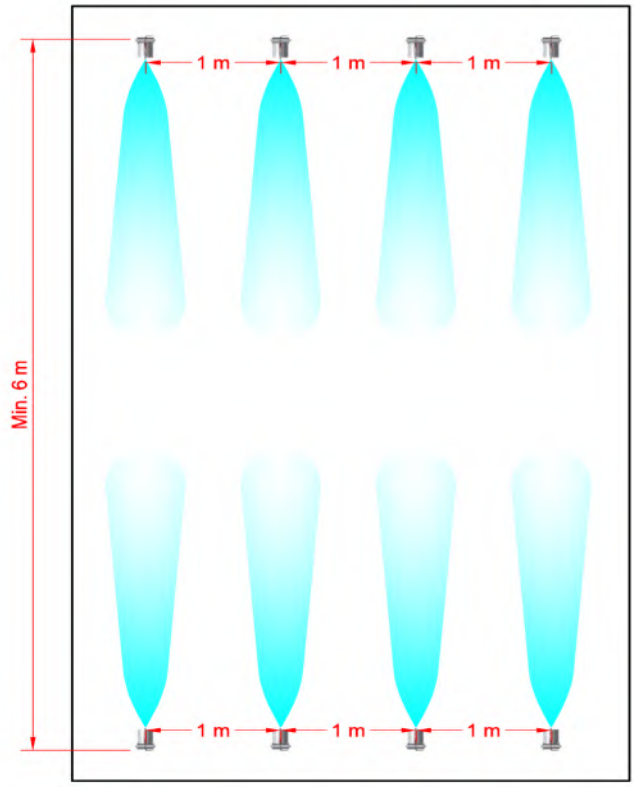


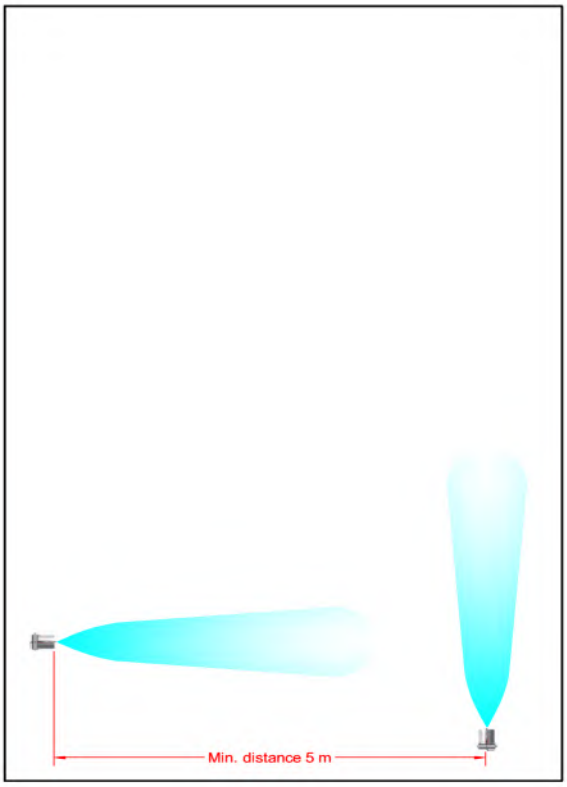
ML Solo is often placed at very low floor-to-ceiling heights. In rooms with a low floor-to-ceiling height, the following must be considered: Atomisation close to a person will often feel like being in a draught. This means that no stationary working places should be within the atomisation area of 1-3 m from the nozzle head. By way of example, the optimum placement for ML Solo is in passages in production rooms where the range of the nozzle is respected.

22 Distances between modules



If ML Solo units are placed one after another it must be ensured that the units placed ahead do not draw humidified air from those at the back.





EC – Declaration of Compliance

Manufacturer:
Condair A/S
Parallelvej 2
8680 Ry

Technical Manager: Lasse Andresen

We hereby declare, that the following spray modules for humidification purposes with ML pump systems:

Model: ML Solo 1 (1 nozzle, 24 VAC 50/60 Hz)
ML Solo 2 (2 nozzles, 24 VAC 50/60 Hz)

Are manufactured in accordance with the following EC directives:

- 2006/42/EC, Directive on machinery
- 2009/125/EC, ErP-directive – ecodesign requirements of energy-related products
- 2011/65/EC, ROHS Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

The following harmonized standards have been applied:

- EN ISO 12100:2011, Safety of machinery – General principles for design – Risk assessment and risk reduction
- EN 60204-1:2006 + amendments, Safety of machinery – Electrical equipment of machines – Part 1: General requirements

And the following international standards have been applied:

- EN 60309-1:1999 + amendments, Plugs, socket-outlets and couplers for industrial purposes – Part 1: Gen. requirements
- EN 61000-6-2:2005 + amendments, Electromagnetic compatibility (EMC). Generic standards. Immunity for industrial environments
- EN 61000-6-3:2007 + amendments, Electromagnetic compatibility (EMC). Generic standards. Emission standard for residential, commercial and light-industrial environments

Installation and operation:

Description of the unit: See Technical data

Mounting and safety instructions

Should be placed at a height of minimum 2,0 m above floor-level to the lower edge of the unit, to eliminate danger caused by possible touching of the impeller/ fan when operating. The fan is not equipped with guard grill at the outlet side of the fan, therefore the power to the fan should be switched off if work is done within a 0,5 m safety area from the outlet of the fan.

Vibration-noise

Transmitted noise from vibrations is minimized during mounting with the enclosed clamp. (See separate mounting instruction for ML Solo)

Electrical connection

Electrical connection should be made according to local rules by authorized people.
The fan should be connected to an external voltage switch.

Service and maintenance

The impeller and the internal side of the cabinet/body should be cleaned for dust and dirt at least once every year, or when necessary. Should be cleaned in water and soap. Do not use organic dissolutions or other strong chemicals for the cleaning.
Before the cleaning procedure is started, the power supply must be safely switched off, and it must be secured that the power cannot be switched on again during the cleaning.

Sound level

Sound level measured 1 meter from motor: 43 dB(A) at 50 Hz supply.

DK-Ry, 12-10-2016.

Lasse Andresen, Technical Manager

Condair A/S
Parallelvej 2, DK-8680 Ry
Tel. +45 8788 2100
www.condairsystems.dk

CONSULTING, SALES AND SERVICE:

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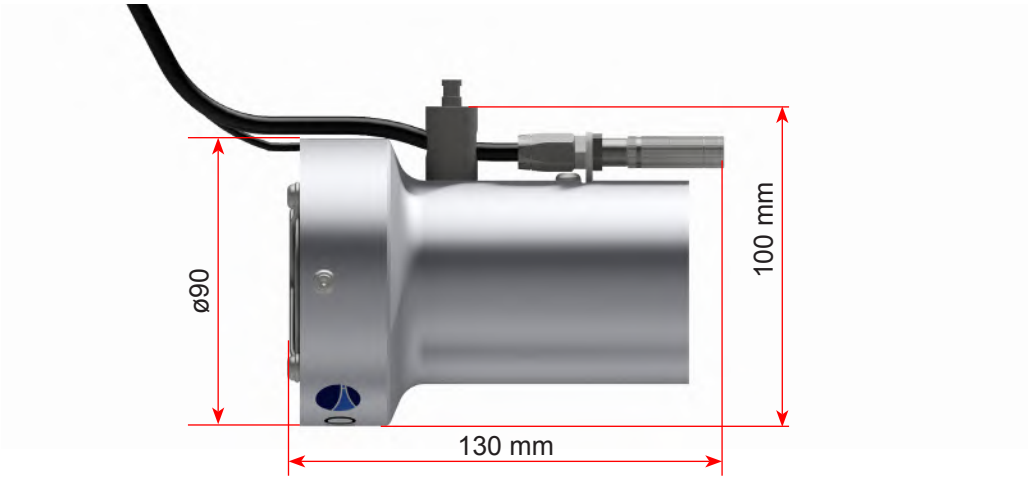
ML UNO

humidification system

condair

24 Description

ML Uno is the smallest unit from Condair A/S. The size of the unit is that of a small spot lamp.
It is well suited for low-ceilinged rooms, even where a high replacement of air is required, and is because of its invisibility well suited for any purpose.
ML Uno is installed directly on wall or ceiling at a height of min. 2 metres, and is connected to the ML pump station by flexible high-pressure hoses.
The water is atomized under high pressure into microscopic particles immediately evaporating.
ML Uno is compatible with other humidification systems from Condair A/S.
ML Uno is delivered as a unit with wall or ceiling brackets.

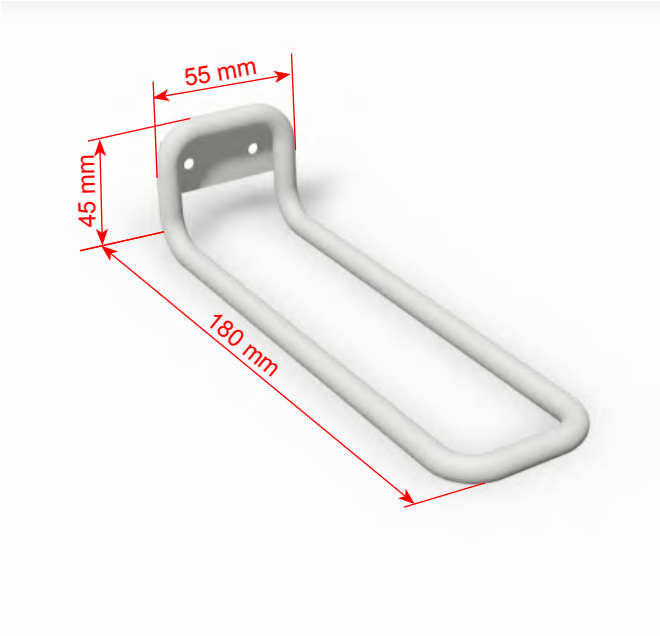


25 Technical

	1 pc. ML Uno unit	2 pcs. ML Uno units
Item no.	135 101 000	135 102 000
Weight	About 300 g	About 600 g
Size (HxWxD)	100 x 90 x 130 mm	100 x 90 x 130 mm
Material	Aluminium	Aluminium
Noise level	~ 40 dB	~ 40 dB
Humidity capacity	1.0 – 1.5 L/h	2.0 – 3.0 L/h
Working pressure	35 - 70 bars	35 – 70 bars
Power supply	24 VAC 50/60 Hz	24 VAC 50/60 Hz
Installation height	2 – 4 m	2 – 4 m
Min. distance to ceiling	200 mm	200 mm
Min. distance in front of nozzle	2 – 3 m	2 – 3 m
Nozzle type	1 pc. 103 200 001	2 pc. 103 200 001
Speed controller	Included	Included
Bracket for suspension	2578 752	2578 753

26 Mounting brackets

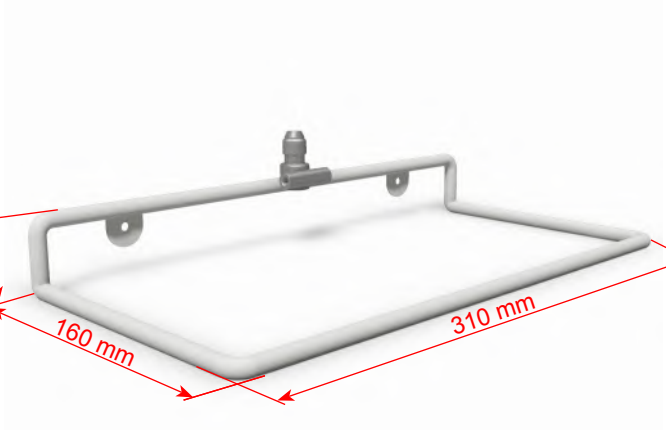
Bracket for a single Uno



Bracket for mounting on wall

Bracket for mounting on ceiling

Bracket for two Unos



Bracket for mounting on wall

Bracket for mounting on ceiling
(Min. distance to wall 200 mm)

CONSULTING, SALES AND SERVICE:

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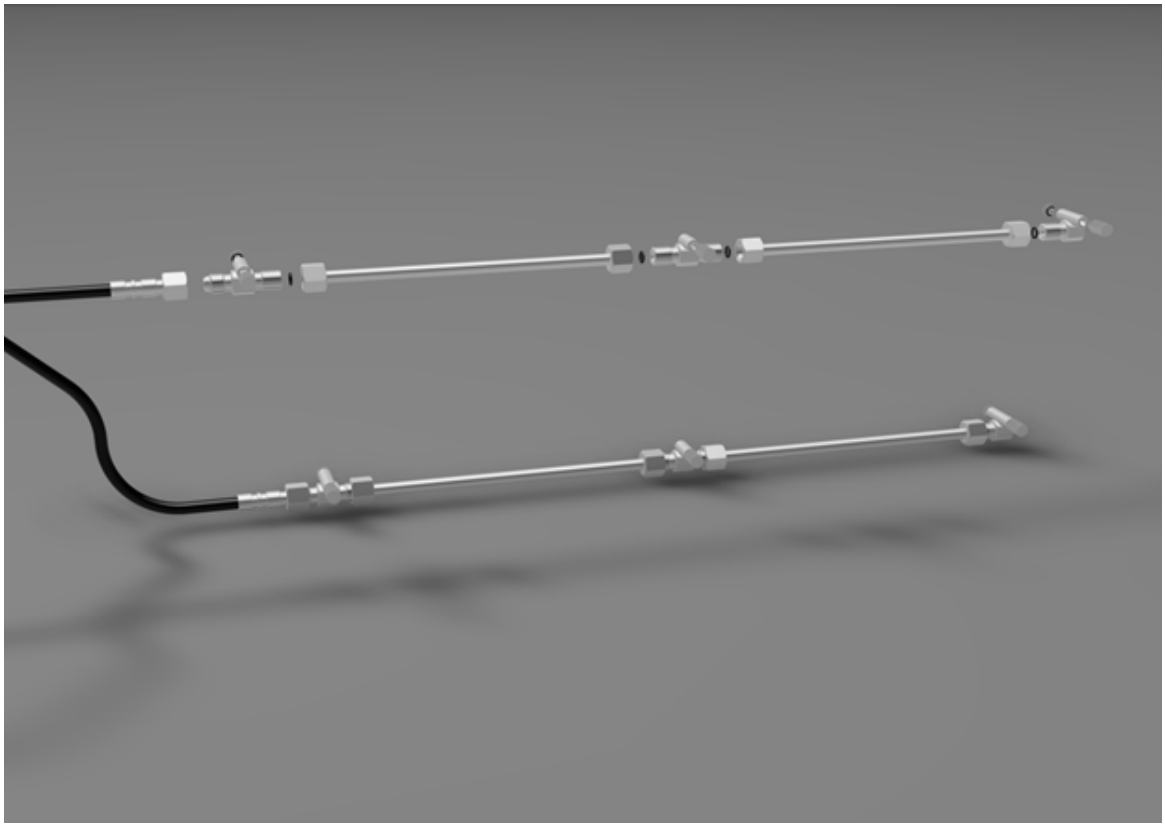
Parallelvej 2, DK-8680 Ry
Phone +45 8788 2100
condair.dk@condair.com, www.condair.dk



ML FLEX

humidification system

Humidification and Evaporative Cooling

27 Description

ML Flex System is suitable for humidification in industrial and horticultural industry, as well as for dust control in rooms with high dust load, such as the textile industry.

Can be used in hazardous areas as EX rooms.

The system is flexibly designed and can be dimensioned individually to suit the local conditions.

ML Flex System allows you to choose between wall and ceiling mounting.

The nozzles are mounted in the T-sections which can be rotated individually.

Humidity is produced as water under high pressure is atomized into micro-sized particles which are instantly absorbed into the surrounding air.

28 Technical

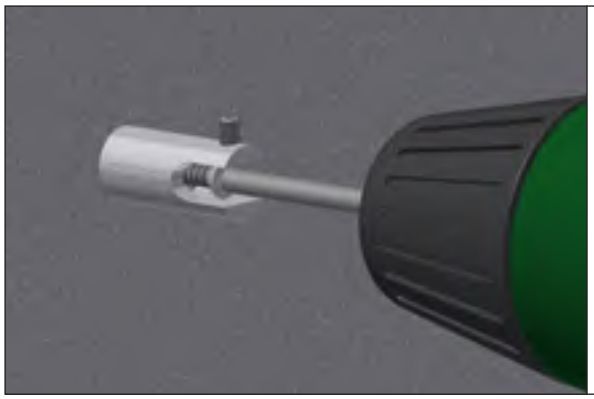
28.1 Technical data

Wall / ceiling fixture	≈ 1 per meter
Weight: g/metre	≈ 250 g
Material	Stainless steel
Sound pressure level	Approx. 32 dB
Working pressure	35-70 bar
Min. distance to ceiling	200 mm
Min. distance/ aerification zone	1.5 m
Max length	140 m
Max flow	180 L/h
Max no. of nozzles 2.5 L	70
Max no. of nozzles 4.5 L	40

28.2 Dimensioning

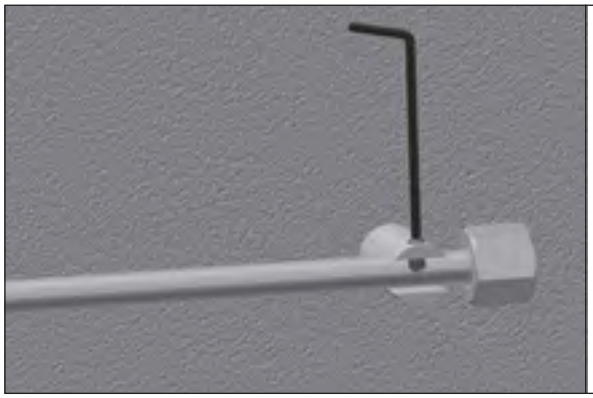
Floor to ceiling height in metres	Recommended nozzle sizes	Recommended operation setting
> 6m	4.5 L/h	≈ 70 %
4-6 m	2.5 L/h	50-60 %
2-4 m	1.5 L/h	50-60 %

29 Assembling ML Flex

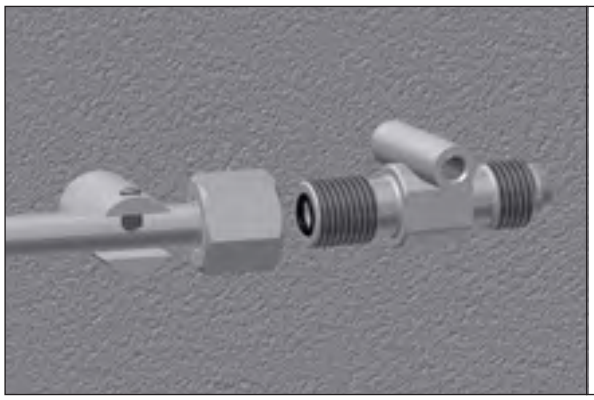


The wall suspension is fastened to the wall with an appropriate screw.

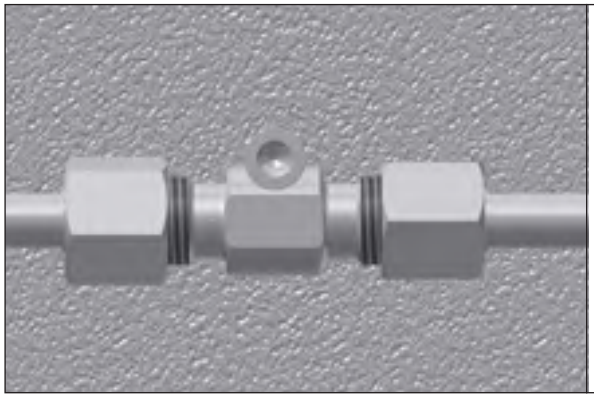
Max. distance between wall suspensions is 1 m and the tube has to be fastened with at least 2 wall suspensions even if it is shorter than 1 m.



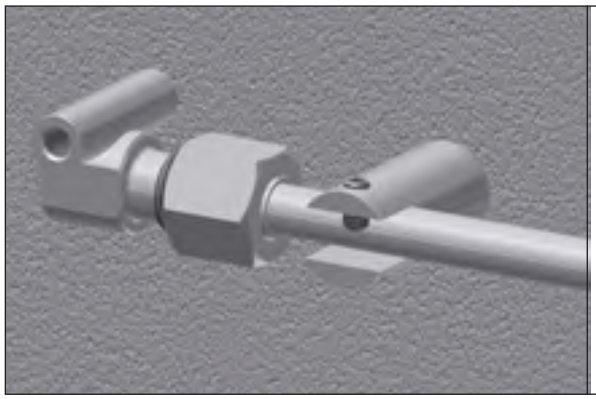
The tube is placed in the suspensions and secured by fastening the set screws by use of a 2 mm Allen key.



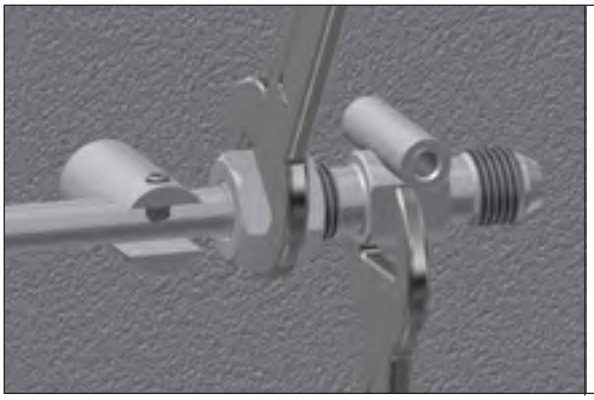
Mount the hose connection T-piece. Remember to place the O-ring.



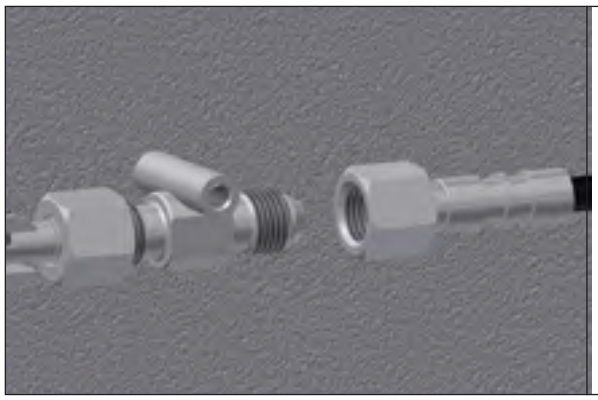
Join to flex tubes with T-pieces. Remember the O-rings. The nozzle fixture has to be on top of the assembly to avoid air pockets and to ensure the correct spray direction.



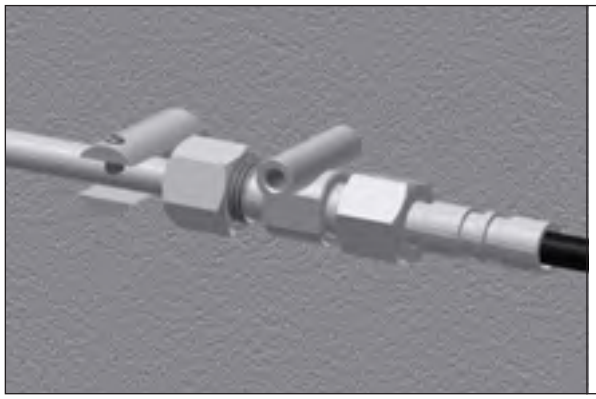
The end piece is mounted on the last tube in line. Remember the O-ring. The nozzle fixture has to be on top of the assembly to avoid air pockets and to ensure the correct spray direction.



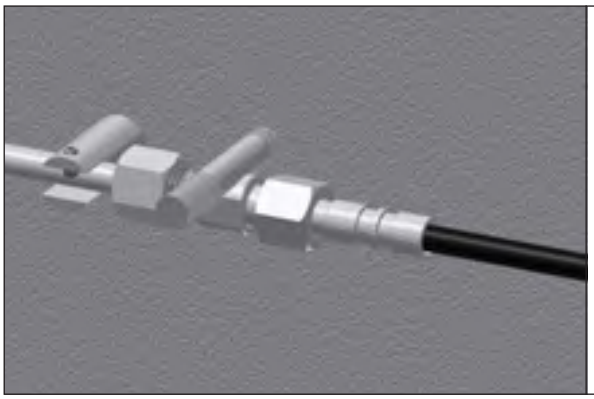
All joints are retightened by use of two fork wrenches NV17 (span of jaws).



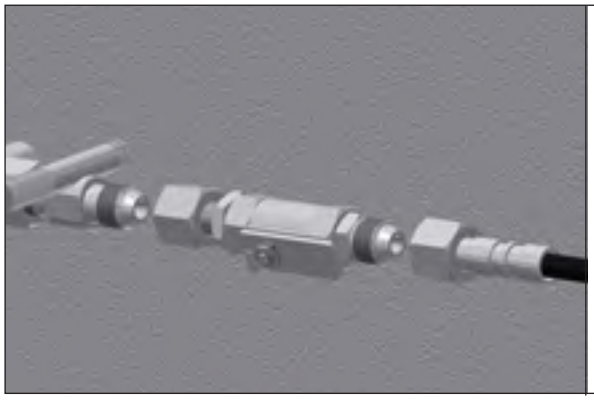
Connect the 1/8” high pressure hose to the hose nipple.



Flush the system thoroughly before fitting the nozzles.

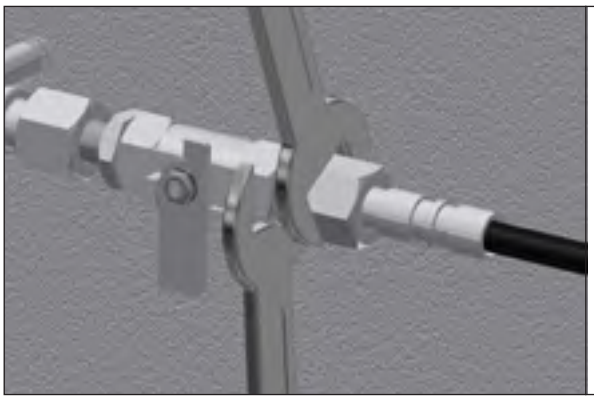


Please observe that the nozzle pointing towards the wall is fitted with a blind nozzle.

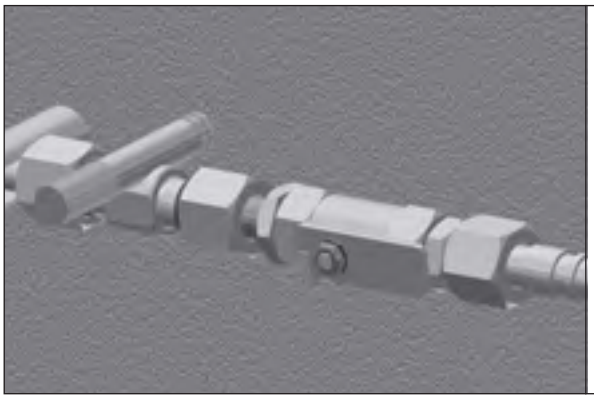


OPTIONAL BALL VALVE

If a ball valve is needed this is fitted between high pressure hose coupling and the hose coupling on the flex system.



Retighten by use of two fork wrenches NV17 (span of jaws).



Ceiling suspension

The system is hung up using the same fitting as for wall suspension and by means of either chains or wires.

NB! When the nozzles spray they create a oppositely directed force of up to 0,5 kg. if suspended without horizontally support the pipe will swing back and forth when spraying.

30 Inserting the nozzle

WARNING!

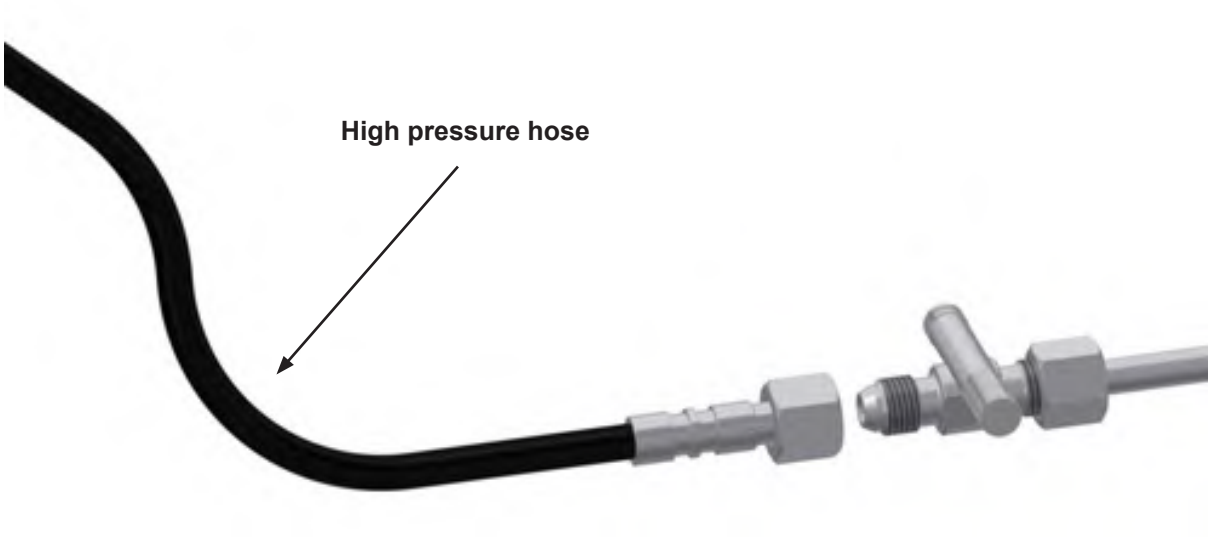
Never unscrew a nozzle on a pressurised unit. Disconnect power to the pump station when working on high-pressure system.

- Before inserting the nozzle, check that its threads and O-ring are intact.
- Screw the nozzle in by hand, tighten.
- Use a set of polygrip pliers to tighten the nozzle (approx. 1/8 turn) (torque: 2.1 Nm +/- 0.1 Nm)
- Always tighten on the tip of the nozzle too, to make sure it is also tight.

CAUTION!

Be careful! The threads on the nozzles break easily, the nozzle seals with an O-ring and hence does not need to be tightened very hard, just a little more than you can do by hand.

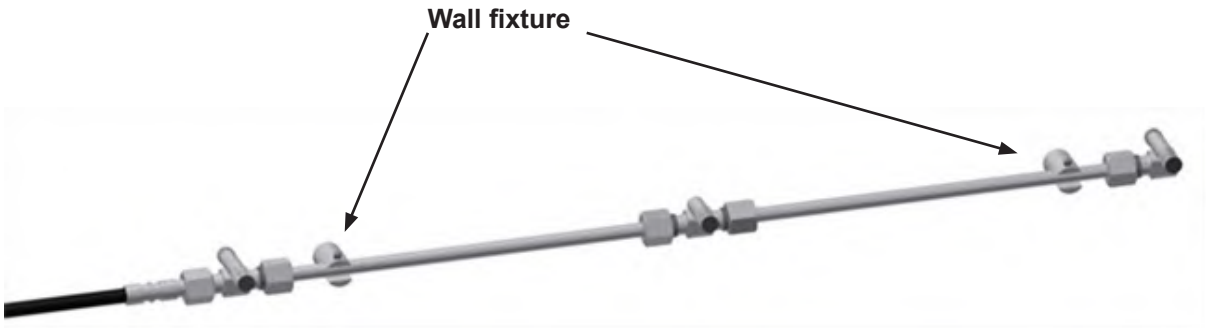
31 Connecting water to ML FLEX



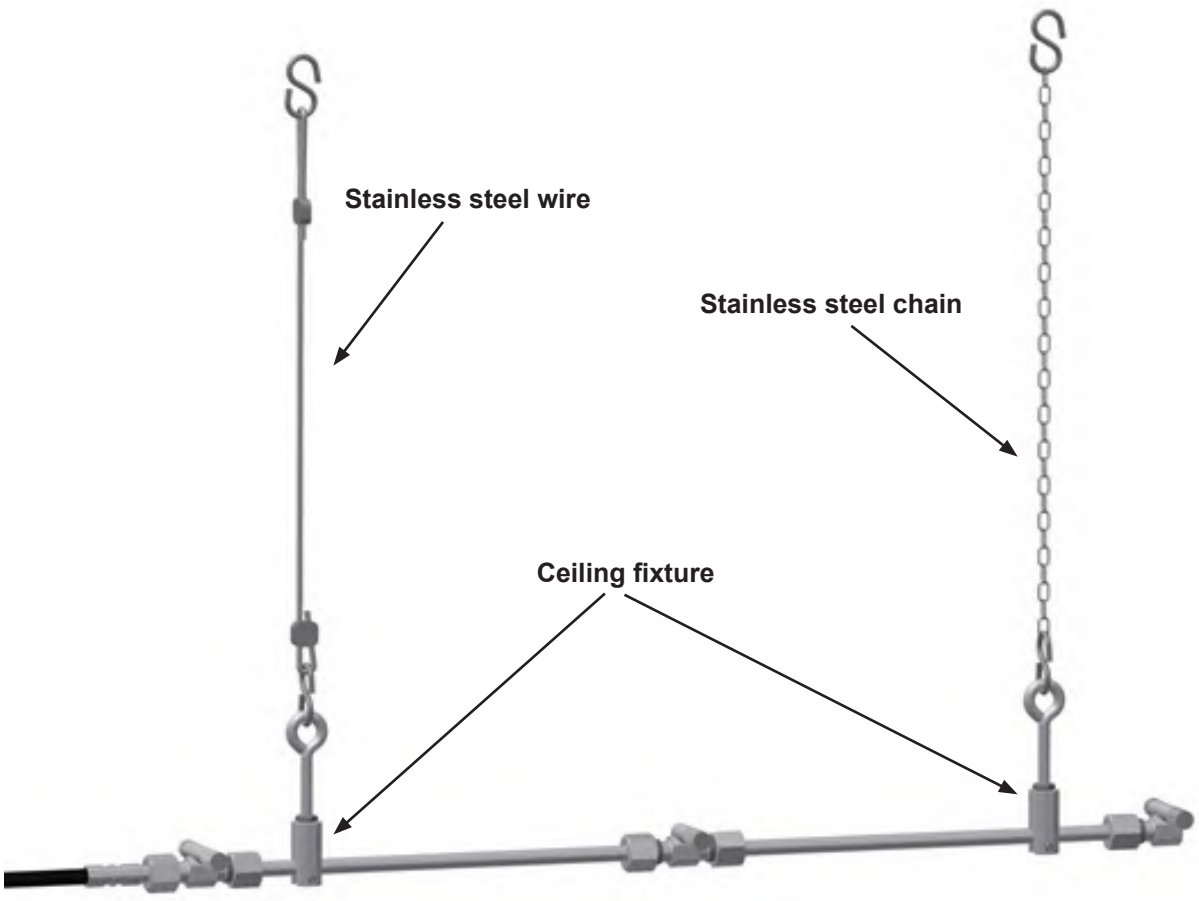
The high pressure hose is connected to the ball valve. The hose can be strapped to the chain using cable ties. Avoid vertical U-turns on the hose. This might cause pockets of air in the hose.

32 Mounting the ML FLEX, wall or ceiling

32.1 Wall mounted ML FLEX



32.2 Ceiling mounted ML FLEX

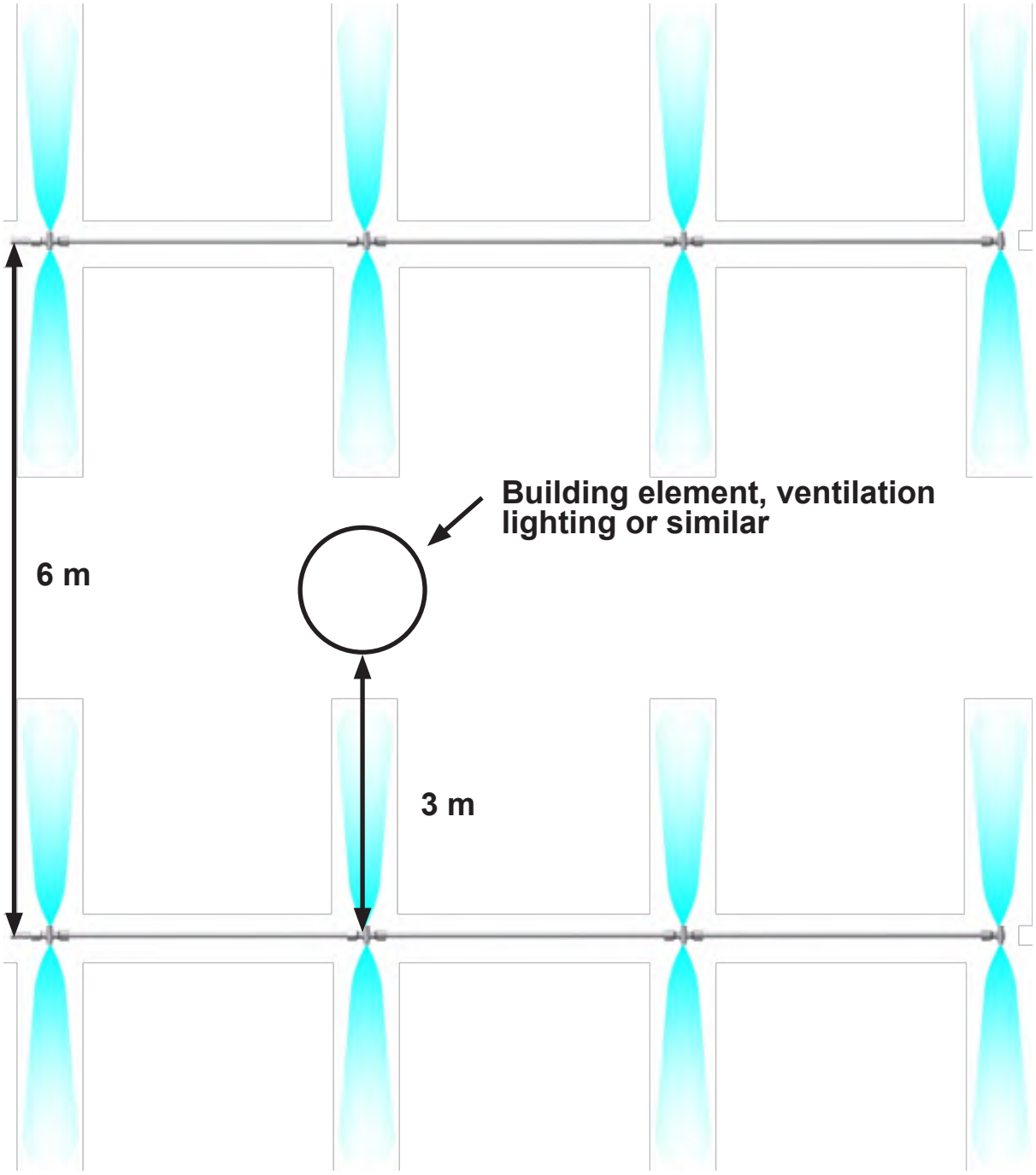


ITEM	PART NO.	
Standard tubes 0.25 m 0.50 m 0.75 m 1.00 m 2.00 m	 120 304 007 120 306 007 120 308 007 120 310 007 120 312 007	
Hose connection without nozzles Cone/flat	120 341 007	
Hose connection with double nozzles Cone/flat	120 342 007	
T-section single nozzle Flat/flat	120 320 007	
T-section Double nozzles Flat/flat	120 321 007	
Connection piece without nozzles Flat/flat	120 340 007	

ITEM	PART NO.	
End piece with double Nozzles	120 330 007	
Wall fixture	120 318 000	
Ceiling fixture	120 319 000	
Fixture for 3/8” tubes Used when mounting on a support pipe	730 020 280	
Stainless nozzles 2.5 L/H 4.5 L/H	 103 160 000 103 150 000	
Stainless nozzle 1.5 L/H	 103 200 001	
Blind nozzle	103 140 000	
Nozzle swivel adapter	25 81 276	

ITEM	PART NO.	
O-rings 50 pcs. 100 pcs.	 120 351 007 120 350 007	
Small ball valve	25 78 176	
Chain 6 m 10 m 100 m	 101 101 000 101 100 000 101 104 000	

34 Distances between modules

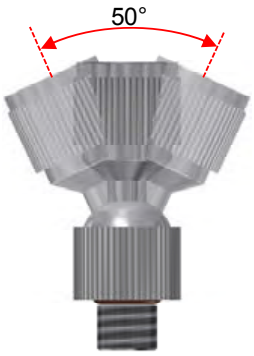


35 Nozzle swivel adapter

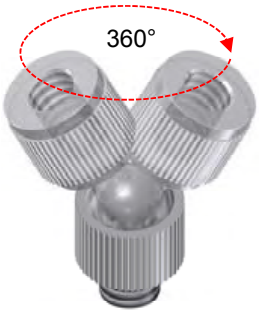
Female thread:
12/24unc/2B

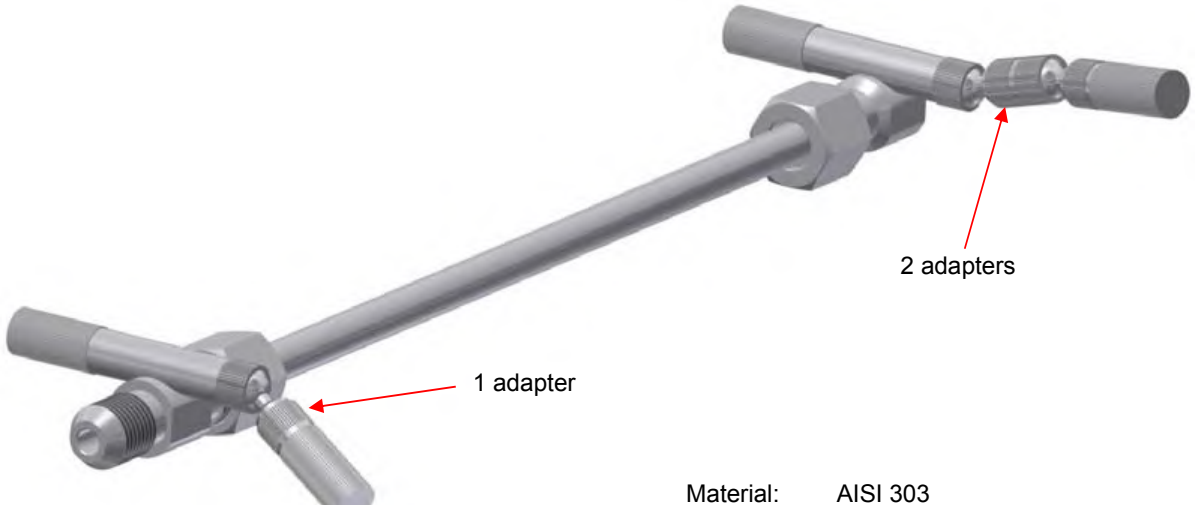
Male thread:
12/24unc/2A

Swing angle: 50°



Angle of rotation: 360°





Material: AISI 303

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condair.dk@condair.com, www.condair.dk

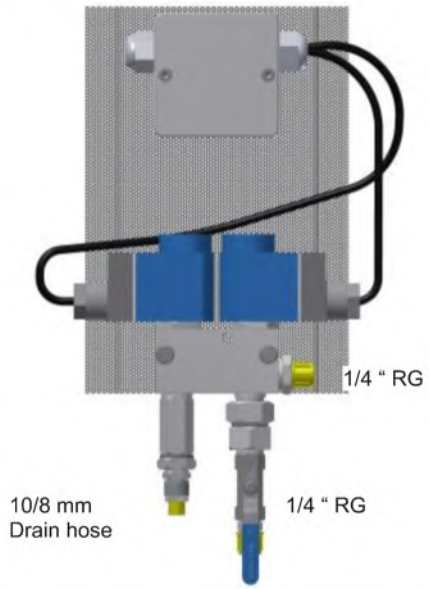
APPENDIX

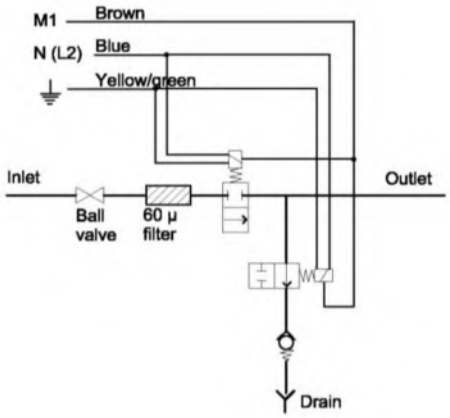
humidification system

36 Solenoid valve (zone valve)

Data Source : TD025GB

106.207.005
106.208.005
106.208.010

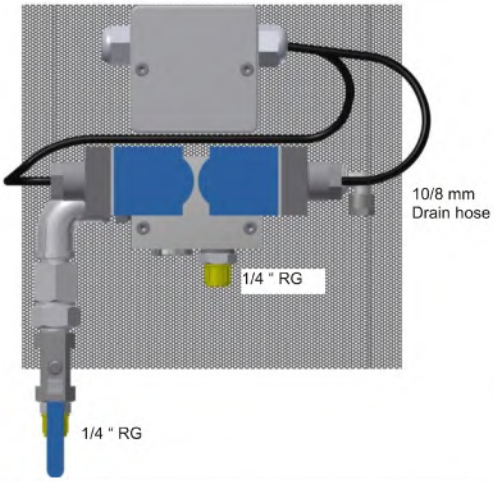


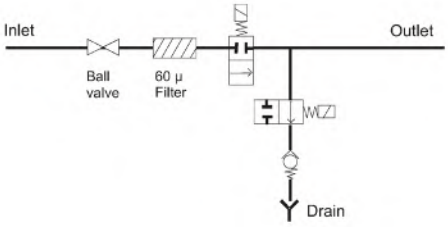


Spare parts:	
102.400.000	Filter for pre-filter at nozzle ring, length 15mm, 20 µ nominel absolute 23-26 µ
106.531.000	Coil, 240 VAC, 50 Hz
106.532.000	Coil, 200 VAC, 50/60 Hz 240 VAC, 60Hz
106.533.000	Armature NC
106.534.000	Armature NO
106.535.000	Piston kit (1 piston)
240.010.004	Pilot nozzle, 1.0 mm
240.010.003	Pilot nozzle, 1.4 mm

	106.207.005	**106.208.005**	**106.208.010**
Flow range	0-76 l/h		
Water type	All types		
Inlet and outlet fittings	1/4 "		
Connection for outlet hose	10/8 mm PA hose		
Filtration	20 µ		
Valve type	3/2-ways valve with built-in counter block, stainless steel		
Coil power	240 VAC/50 Hz	200 VAC 50/60 Hz 240 VAC/ 60 Hz	24 VDC
Power consumption	42 VA, 20 W		
Power consumption, cut-in	88 VA		

106.210.000
106.211.000
106.210.500



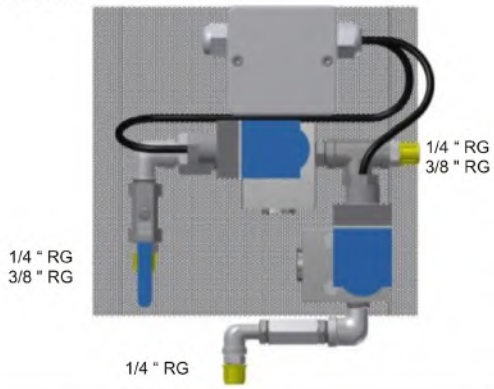


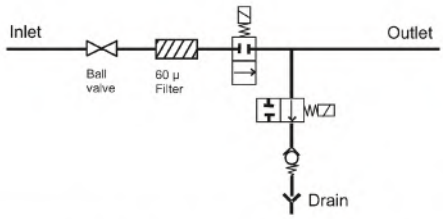
Spare parts:

106.500.000	Filter for pre-filter at solenoid valve set, length: 25 mm, 60 µ nom.
106.531.000	Coil 240 VAC, 50 Hz
106.532.000	Coil 200 VAC, 50/60 Hz 240 VAC, 60 Hz
106.533.000	Armature NC
106.534.000	Armature NO
106.535.000	Piston kit (1 piston)
240.010.004	Pilot nozzle, 1.0 mm
240.010.003	Pilot nozzle, 1.4 mm

	106.210.000	106.211.000	106.210.500
Flow range	60-360 L/h		
Water type	All types		
Inlet and outlet fittings	1/4 "		
Connection for outlet hose	10/8 mm PA hose		
Filtration	60 µ		
Valve type	Combination of NC and NO in a common block with stainless steel check valve		
Coil power	240 VAC/50 Hz	200 VAC 50/60 Hz 240 VAC 60 Hz	24 VDC
Power consumption	42 VA, 20 W		
Power consumption, cut-in	88 VA		

106.215.000 106.220.000
106.216.000 106.221.000





Spare parts:

106.500.000	Filter for pre-filter at solenoid valve, length: 25 mm, 60 µ nom.
106.531.000	Coil 240 VAC, 50 Hz
106.532.000	Coil 200 VAC, 50/60 Hz 240 VAC, 60 Hz
106.533.000	Armature NC
106.534.000	Armature NO
106.535.000	Piston kit (2 pistons)
240.010.004	Pilot nozzle, 1.0 mm
240.010.003	Pilot nozzle, 1.4 mm

	106.215.000	106.216.000	106.220.000	106.221.000
Flow range	120-1800 L/h			
Water type	All types			
Inlet and outlet fittings	1/4 "		3/8 "	
Connection for pressure release outlet hose	1/4 "			
Filtration	60 µ			
Valve type	Directional valve NC and NO with stainless steel check valve			
Coil power	240 VAC/ 50 Hz	200 VAC/ 50/60 Hz 240 VAC/ 60 Hz	240 VAC/ 50 Hz	200 VAC 50/60 Hz 240 VAC/ 60 Hz
Power consumption	42 VA, 20 W			
Power consumption, cut-in	88 VA			

36.1 Solenoid valve set

If the system consists of several different departments, one pump is sufficient to supply all the departments. Each department must be equipped with a solenoid valve set, which opens when the department need humidification and relieves the pressure in the high-pressure hose when the department stops.

All solenoid valve sets are mounted on a mounting plate and equipped with a filter and a ball valve on the inlet side. However, a few special models do not feature the filter and ball valve.

The filter protects the solenoid valves against contaminants and the valve enables the disconnection of one department when servicing the system. If the ball valve is closed, it is very important at the same time to disconnect the power to the department control cabinet. If this is not done, the pump may become overheated due to lack of flow and thus cooling of the pump.

A traditional solenoid valve set features two individually controlled solenoid valves; one solenoid valve for the on/off function and one solenoid valve for pressure relief. Another solution is a construction with 3/2 valves and a single control signal.

The advantages of 3/2 valves are that the electrical connection is more simple and that due to the valve, the system is constantly pressure relieved. Any leakage from the valve is directed to an outlet, thus no dripping from the nozzles.

Please note that the ML system facility featuring the PLC control can only be used with 3/2 valves.

A check valve is mounted on the pressure relief side to prevent the system from drainage in case of defect nozzles or in connection with replacement of nozzles.

Due to the check valve's 0.5 bar opening pressure, the maximum allowed vertical distance between the solenoid valve set and the upper nozzle of the installation is 5 meters.

36.2 Choosing size and type

The maximum flow of the department determines type and combination.

Softened water allows for the use of brass valves, while water from reverse osmosis (RO) requires the use of corrosion-proof valves.

Surface water with a conductivity less than 50 µS/cm requires the use of corrosion-proof valves.

36.3 Pressure release hoses

Important: Discharge hoses from pressure release valves must be conducted to a free outlet. Do not connect discharge hoses, make sure they run separately. Secure the hoses properly, as they are exposed to strong pressure impacts.

Please note that some of the largest solenoid valve sets require a 1/4" high-pressure hose for pressure release, while smaller valve sets require a 10/8 mm PA hose.

Data Source : TD150GB

HST2-010, item no. 105 501 001

The HST2-010 is an electric sensor for measurement of the relative humidity and temperature in atmospheric air. The relative humidity is transformed to a 0-10.0 VDC signal corresponding to 0-100 % RH. Furthermore the HST2-010 has a built in PT1000 temperature sensor element.

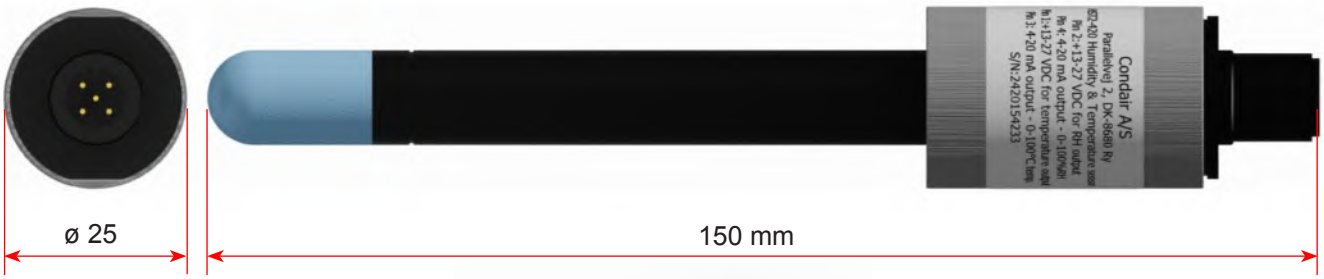
The HST2-010 is well suited for humidity controlling equipment and is easy to interface to electronic controllers and PLC's due to the standardized output signal and very low power consumption.

Suitable in greenhouses, printing houses, textile industry etc.

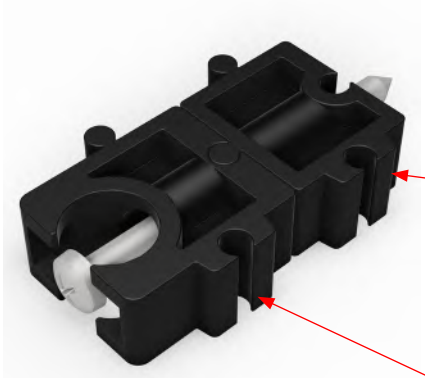
HST2-420, item no. 2583 695

The HST2-420 is an electronic sensor for measurement of the relative humidity and temperature in atmospheric air. The relative humidity is transformed to a 4 - 20 mA signal corresponding to 0 - 90 % RH. Furthermore the HST2-420 has a built-in PT1000 temperature sensor element with 4 - 20 mA signal converter.

The HST2-420 is well suited for humidity controlling equipment and is easy to interface to electronic controllers and PLC's due to the standardized output signal.



Mounting bracket used with both humidity sensors.



Part.no.
167 061 153

Part.no.
167 061 003

	HST2-10	HST2-420
General specifications		
Measuring range	0 – 90 % RH	
Tolerance @ 25 °C	±4.5 % RH @ 30 – 80 % RH +/-7 % RH @ 0 to 30 % RH & 80 to 100 % RH	
Tolerance, full temperature range	+/-5 % RH @ 30 to 80 % RH +/-8 % RH @ 0 to 30 % RH & 80 to 100 % RH	
PT1000 element	Class B tolerance standard; class A on	
Supply specifications		
Supply voltage	13 – 27 VDC	12 – 30 VDC
Current limitation	-	Max. 26 mA
Current consumption	<2.5 mA @ 27 VDC <1.5 mA @ 13 VDC	-
Environment		
Operating temperature	0 - +50 °C	
Storage temperature	-20 - +70 °C	
Connections		
Max. cable length	50 m: 3x0.5 mm^2 165 feet: 3x18 AWG For cables above 50 m use 4-20 mA converters (See accessories)	-
Connector	Standard sensor connector M12x1, 5 pins PIN1: +Supply voltage 13-27 VDC PIN2: 0 – 10.0 VDC output PIN3: - (reference) PIN4: PT1000 temp. sensor PIN5: PT1000 temp. sensor	Standard sensor connector M12x1, 4 pins PIN1: +Supply voltage 12-30 VDC, for temp. sensor PIN2: +Supply voltage 12-30 VDC, for humidity sensor PIN3: 4-20 mA output signal corresponding to 0-100 °C PIN4: 4-20 mA output signal corresponding to 0-100 % RH
Housing		
Dimensions	Ø13 x 110 mm	Ø13/26.5 x 150 mm
Material, housing	POM, black	POM, black & aluminium
Material, filter	PE, black/blue	
Weight	20 g	70 g
Accessories		
	105 502 000, 4-20 mA converter type U/I (to be used if cable length is above 50 m) 105 511 000, 2 m PVC cable with plug	**Incl. in standard package:** Binder M12, connector type 99 0436 10 05

NOTE: If RH is between 90 and 100% a DoI sensor is used, DOL114, item no. 105 525 000

DOL114, item no. 105 525 000

PRODUCT DESCRIPTION

DOL 114 is a high-precision sensor for measuring relative humidity and temperature. It is intended for application in livestock houses but is also well suited for a number of industrial applications.

MAINTENANCE

IMPORTANT

Clean DOL114 using water and a brush. Do not use:

- High-pressure cleaner
- Highly compressed air
- Solvents
- Corrosive/caustic agents
- Alcohol-based disinfectants

During cleaning and disinfection, the sensor must be protected using a protection cap and be placed in vertical position.

After the sensor has been exposed to water and condensation, the sensor requires time during which the relative humidity is less than 80% in order to measure correctly.

Do not bend the sensor as this would inflict permanent damage on the electronics of the sensor.

Dol-sensors reserve the right to change this document and the product herein described without further notice.

LED/LIGHT PROTOCOLL		
LED		**Status**
Green	**Red**	
ON		Operation OK
Flash		Outside normal range (below 10% RH or exceeding 95% RH)
	ON	Connection error Load < 500 Ω
	Flash	Sensor defect Over/under voltage alarm (below 11 V or exceeding 32 V) Overload

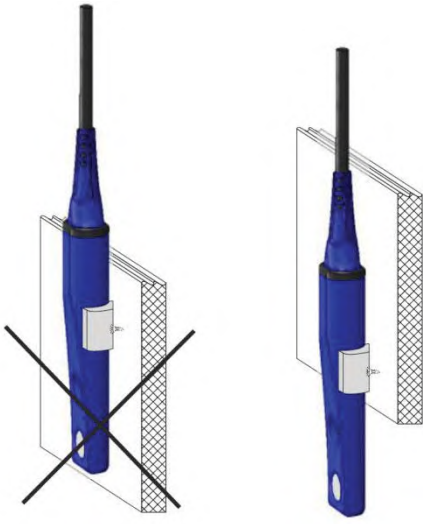


Fig. 1 Mounting

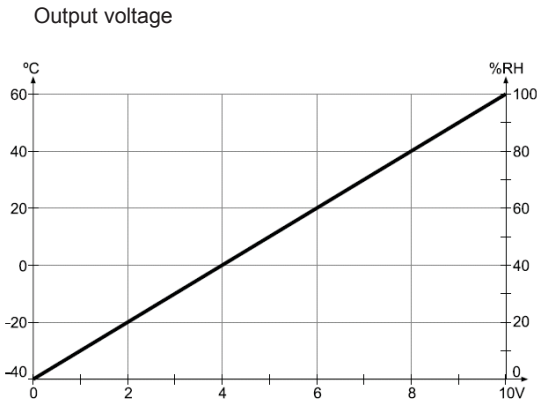


Fig. 2 Functional graph

INSTALLATION
For optimum mounting of the sensor, use mounting clips or mount it free-hanging in the cable.
The sensor element requires free air passage. See Fig. 1. Mount the sensor so it is not exposed to direct sunlight, as this would affect the measurement.

REMEMBER TO PUT ON A PROTECTION CAP BEFORE MOUNTING THE CABLE.

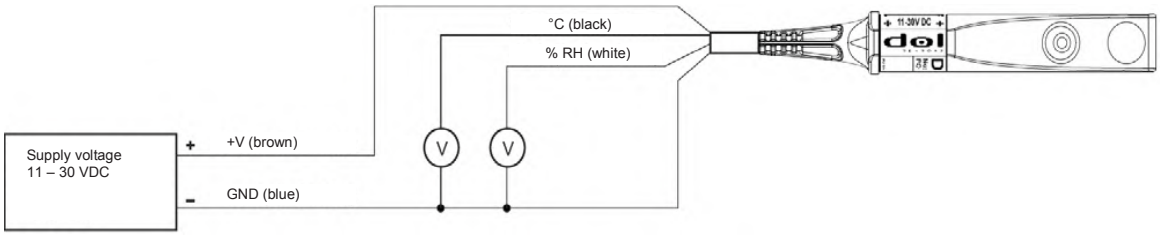
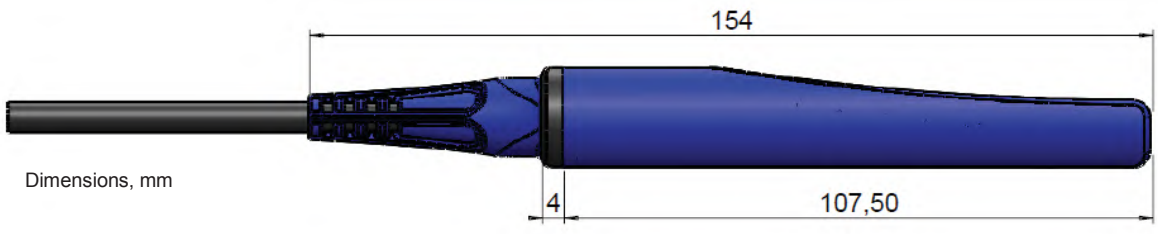


Fig. 1 Connection

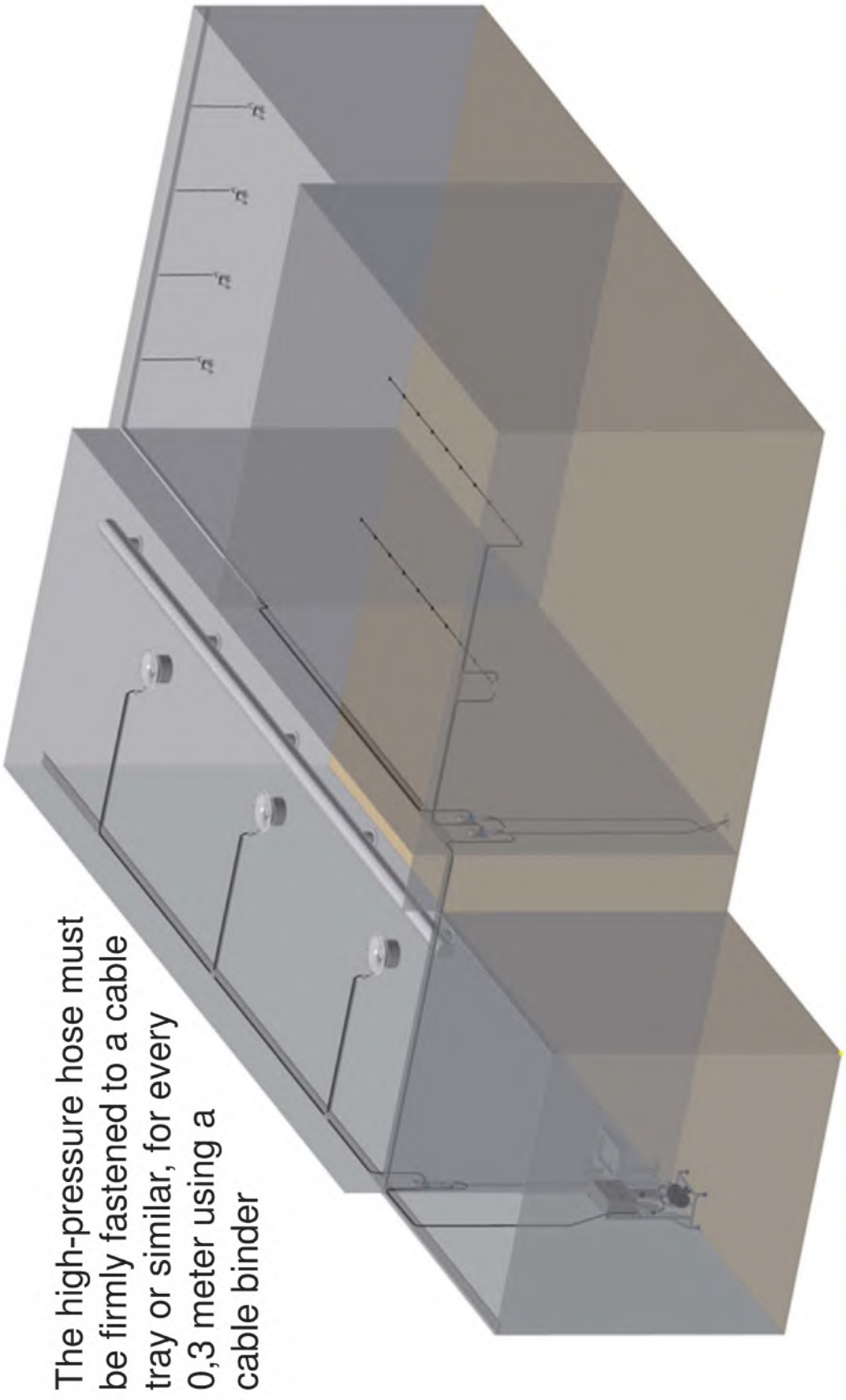
DOL 14		DOL 14 HQ		DOL 114
Black = +13-24 VDC	→	White = +13-28 VDC	→	Brown = +11-30 VDC
Brown = 0…10 V / %RH	→	Green = 0…10 V / %RH	→	White = 0…10 V / %RH
No temperature output		No temperature output		Black = 0…10 V / °C
Blue = GND (0 V)	→	Brown = GND (0 V)	→	Blue = GND (0 V)

Table 1: Signals and wire colours in other products

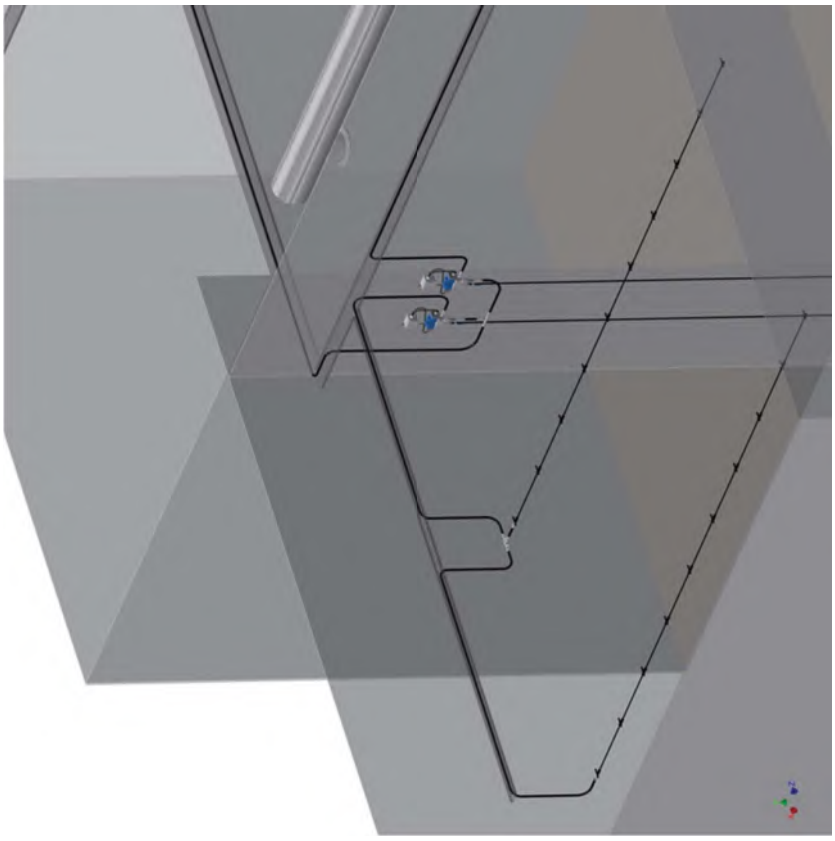
	Humidity	Temperature
Measuring range	0-100 %RH	-40 °C – 60 °C
Accuracy 1	±2 % RH (40-85 %) ±3 % RH (10-95 %) at 0-40 °C *	+10 °C – 40 °C: ±0.5 °C -30 °C – 60 °C: ±1.5 °C
Output signal	0.1 V / % RH	0.1 V / °C; 0 °C at 4 V
	Common	
Time constant	2 min.	
Supply voltage	11 -30 VDC	
Current **Load**	20 mA @ no load 70 mA @ max. load < 500 Ω -> 10 MΩ	
Recommended load	≥ 100 kΩ	
Output current	20 mA per output (current limited)	
Output impedance	< 1 Ω	
Temperature, operation	-40 °C – 60 °C	
IP classification	IP 67	
Cable	2 m, 4 x 22 AWG / 0.34 mm^2	
Max. cable length	100 m @ 0.75 mm^2, 200 m @ 1.50 mm^2	
Shipment weight ex. connector	150 g	
Measure, shipment	275 x 200 x 20 mm	
*: After direct water exposure and condensation a period with less than 80 % RH is needed for correct measurement		

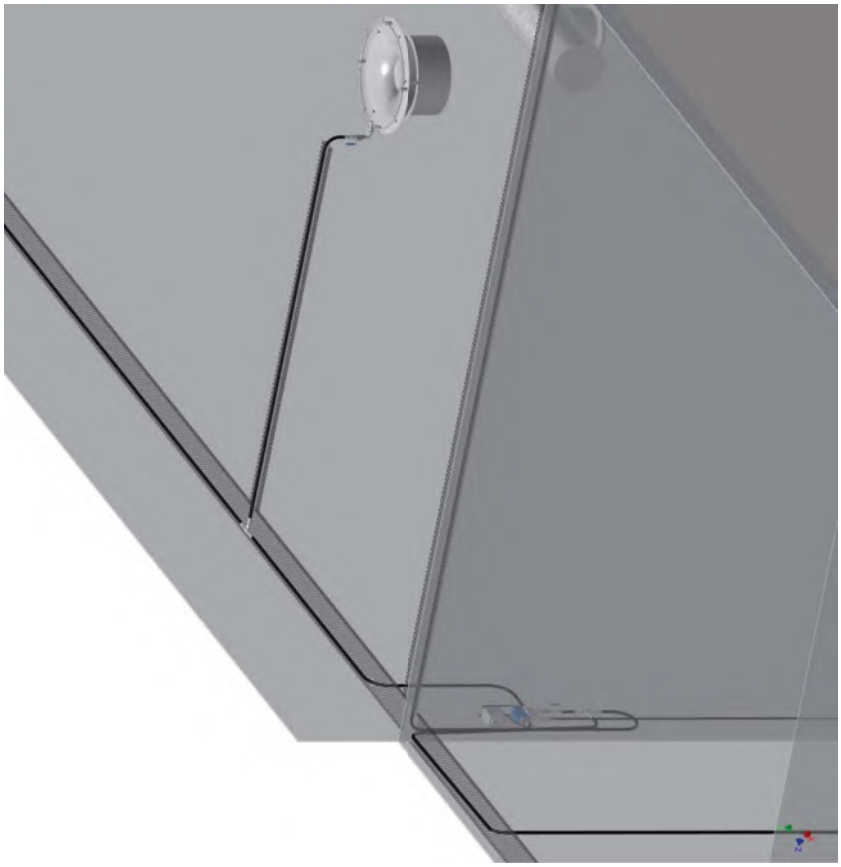


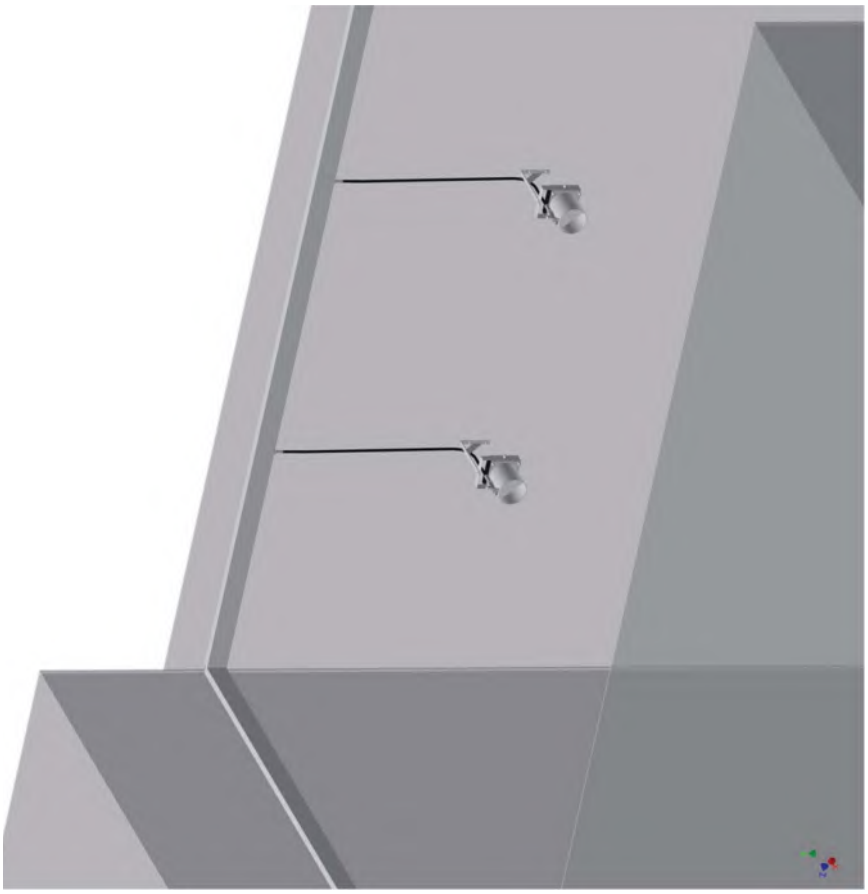
Dimensions, mm

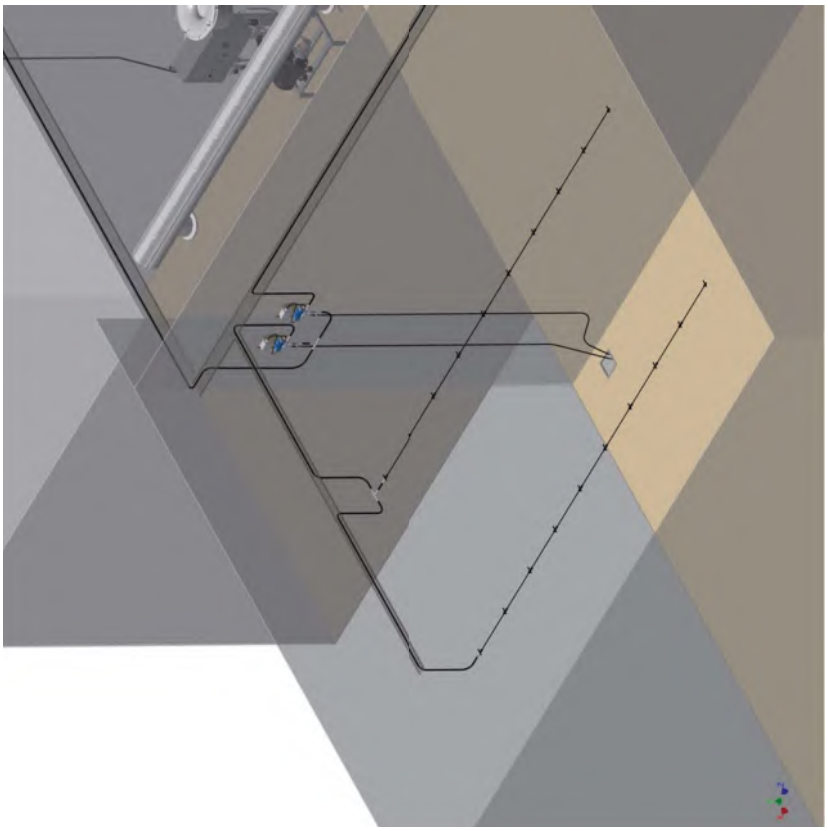


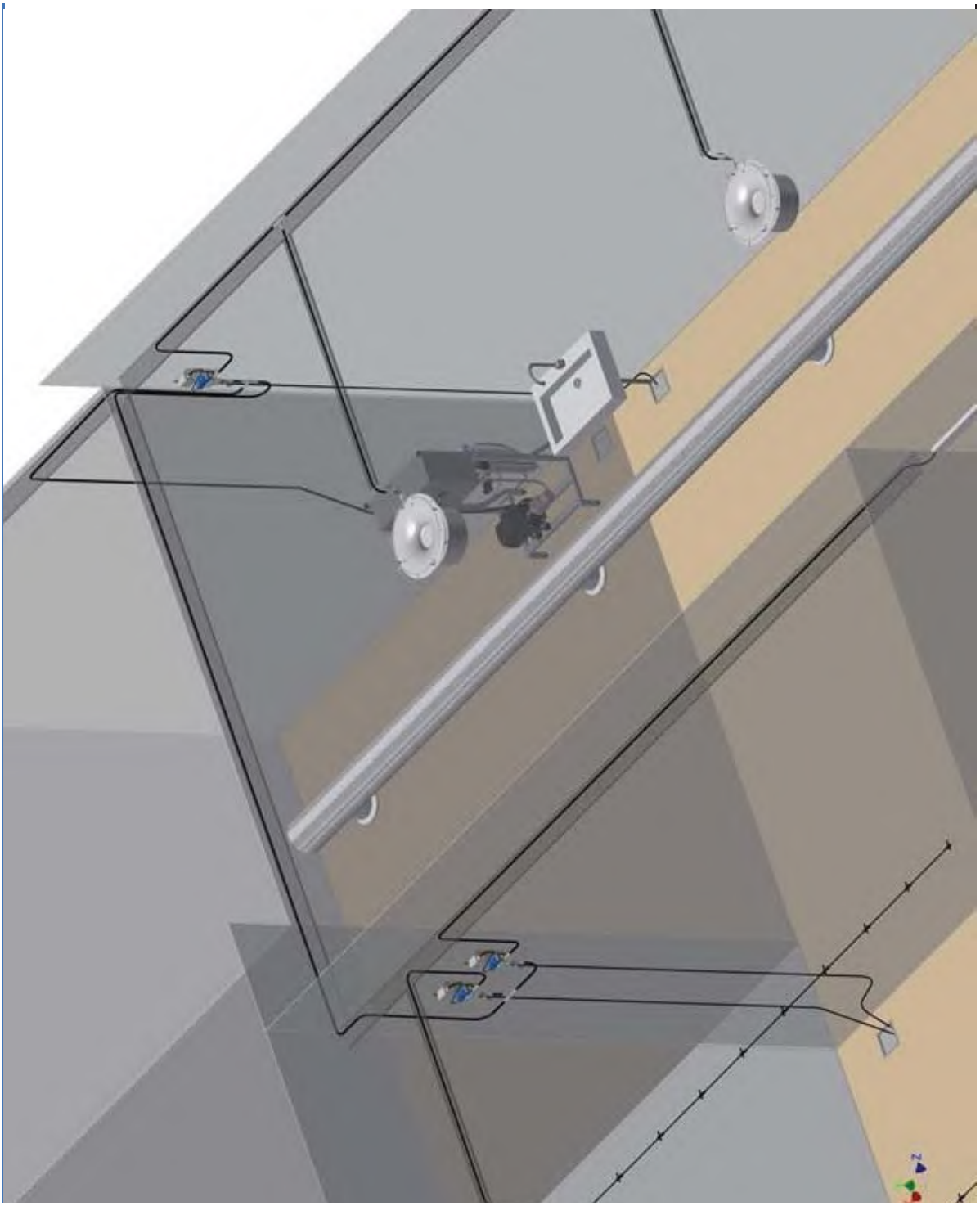
The high-pressure hose must be firmly fastened to a cable tray or similar, for every 0,3 meter using a cable binder



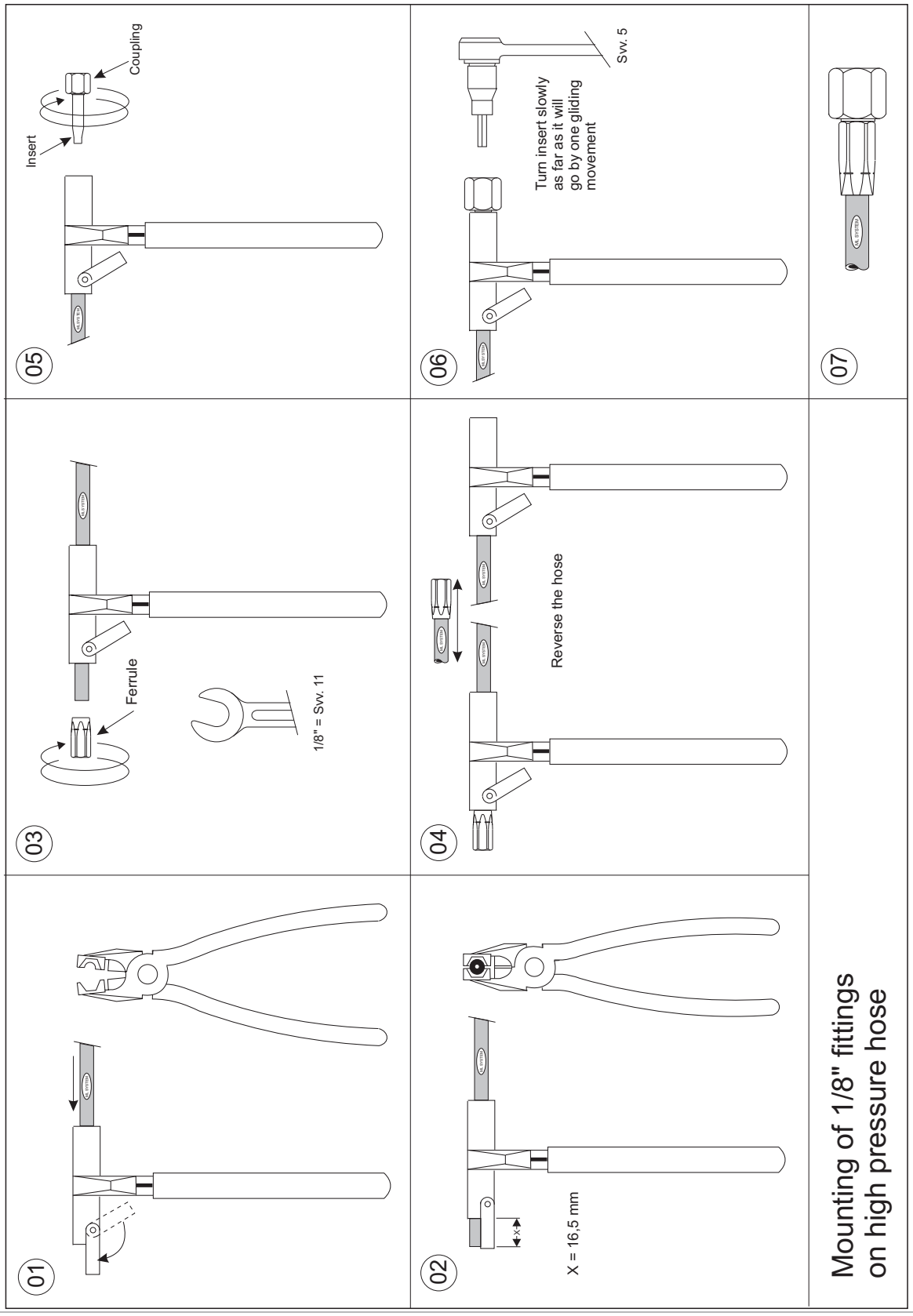




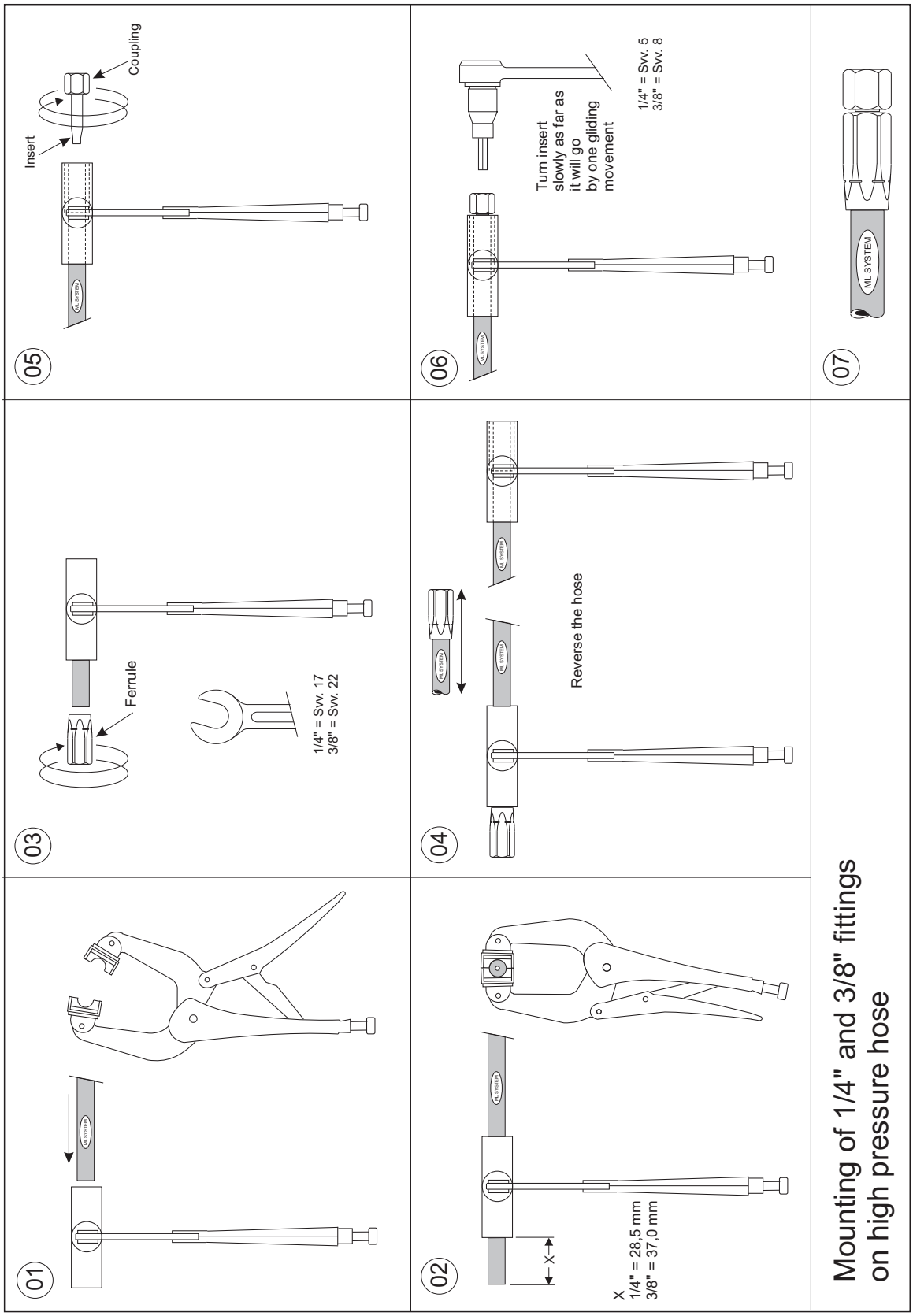




Data Source : MA048GB - 01

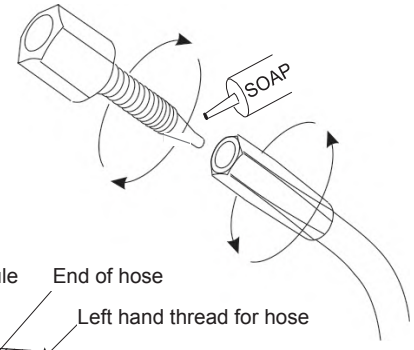


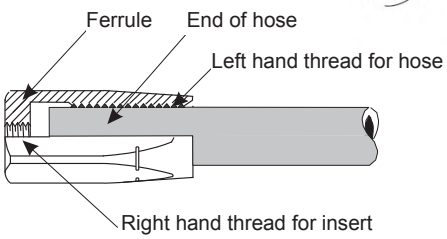
Data Source : MA063GB - 00

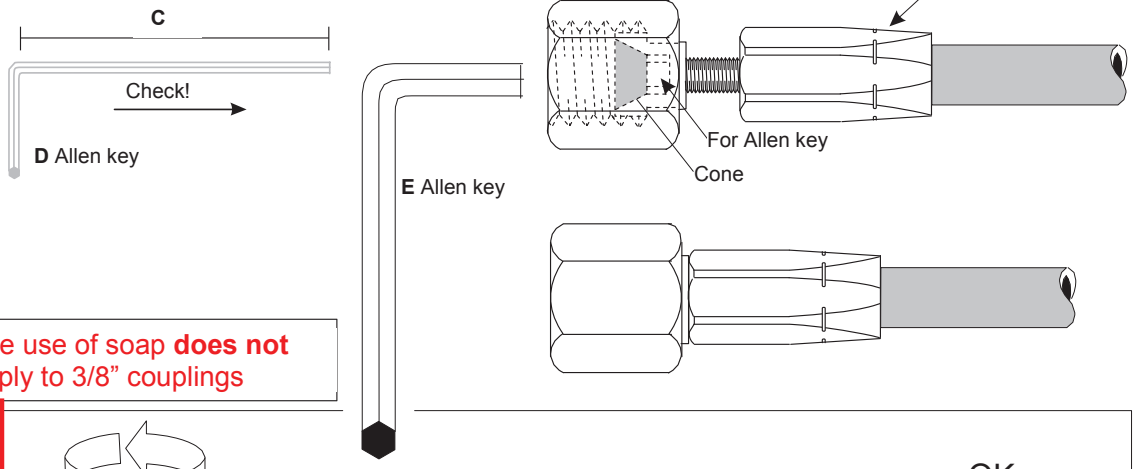


Data Source : MA074GB - 03

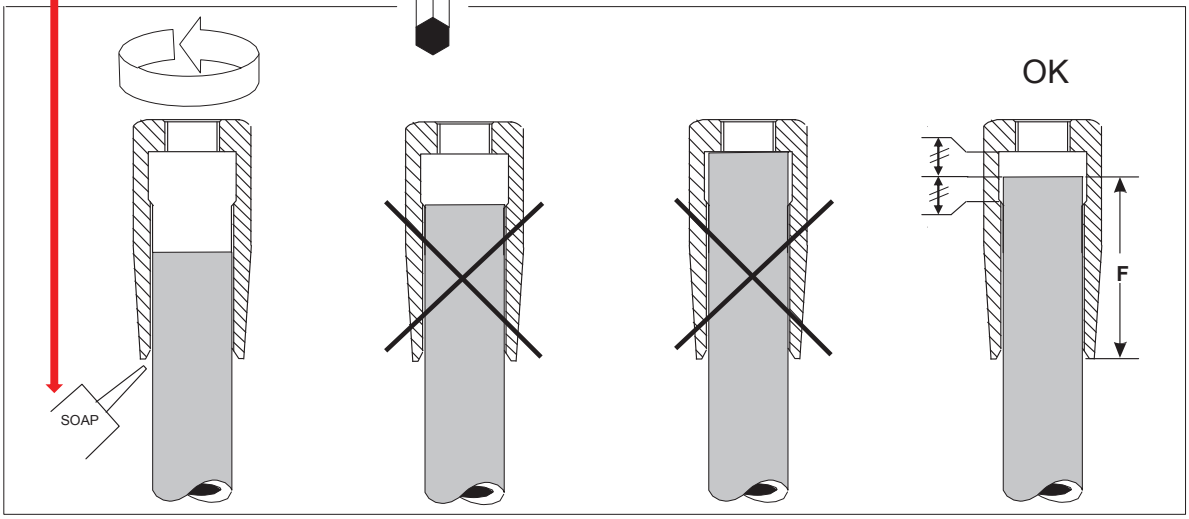
1) Saw or cut the hose in the right length.
   a) Check the hose diameter.
      Tolerance outside: **A**
      Tolerance inside: **B**
2) Clean the ends for metal filings.
3) Screw on the covering to the hose
   - note that the covering has left-hand thread.
4) Screw the covering as far as it will go and then back, so the hose is allowed to expand when the insert is screwed in (see drawing).
5) Lubricate the end of the insert with a detergent, and install the insert by means of an Allen key.
6) Do not allow the hose to turn around while the insert is being screwed in - use special tool from Condair and screw in the insert in one long movement.
7) Insert has to be screwed completely home, so it is locked.
8) Check with a **C** Allen key that there is a free passage through the insert. The key must be led completely through to the bottom without any resistance.







The use of soap **does not** apply to 3/8” couplings

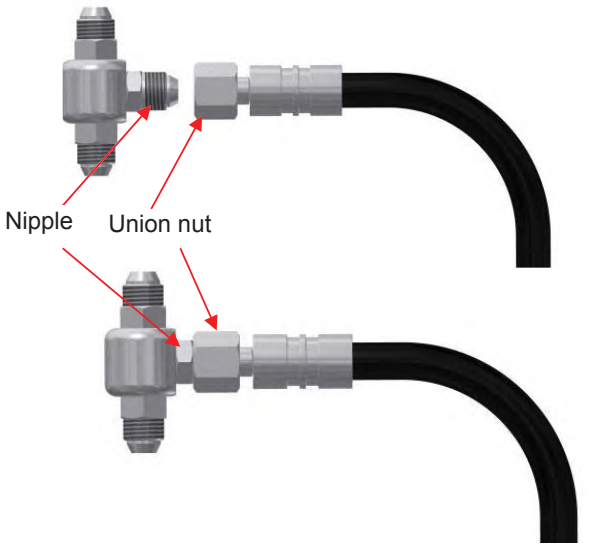


Coupling size	A	B	C	D	E	F
1/16”	5.0 mm ±0.2 mm	1.6 mm ±0.2 mm	Min. 35 mm	0.8 mm	5 mm	12.5 mm
1/8”	7.0 mm ±0.2 mm	3.4 mm ±0.2 mm	Min. 45 mm	1.5 mm	5 mm	16.5 mm
1/4”	11.8 mm ±0.2 mm	6.6 mm ±0.2 mm	-	-	5 mm	28.5 mm
3/8”	15.3 mm ±0.25 mm	9.8 mm ±0.3 mm	-	-	8 mm	37 mm

TORQUE VALUES

The following torque values have to be respected when assembling the hose to the nipple. Observe different values for 3/8” and 1/16”, 1/8” and 1/4” hoses.

Use two wrenches when tightening the union nut to the nipple.



Coupling size	Torque value*
3/8”	70 Nm ±2 Nm
1/16”, 1/8”, 1/4”	42 Nm ±2 Nm

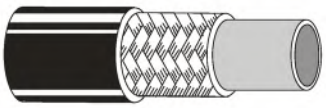
*Torque values are valid for both screw and press fittings

IMPORTANT

The high pressure hoses must be stored at max 40 °C and may not be exposed to direct sunlight. During cutting of hoses and mounting of couplings the max temperature is 40 °C.

41 High pressure hoses

Technical specifications for high pressure hose:



Construction
Inner tube: Polyester elastomer
Reinforcement: Wire of tensile carbon steel with brass
Cover: Polyurethane

Temperature range
- 40 °C to 98 °C
- 40 °F to 208 °F

		EX 1.1	EX 1.2	EX 1.4	EX 1.6
Item no.		107.100.000	107.101.000	107.104.000	107.105.000
Hose dimension	**inch**	1/16"	1/8"	1/4"	3/8"
Hose inner diameter	**mm**	1.91 ±0.1	3.35 ±0.1	6.48 ±0.15	9.65 ±0.15
Hose outer diameter	**mm**	5.54 ±0.1	6.98 ±0.15	11.68 ±0.15	15.11 ±0.15
Max.operating pressure	**bar**	100	350	325	250
	Psi	1,450	5,076	4,713	3,626
Min. burst pressure @20°C	**bar**	400	1.400	1.300	1.000
	Psi	5,801	20,305	18,855	14,504
Min.bend.radius	**mm**	30	35	55	70
Nominel weigth	**g/m**	38	60	165	230

Only to be used with stainless steel hose couplings supplied by **Condair A/S**

Coupling type	**Item no.**	108.100.000	108.101.000	108.102.000	108.103.000
Tool	**Item no.**	160.000.000	160.001.000	160.005.000	160.006.000

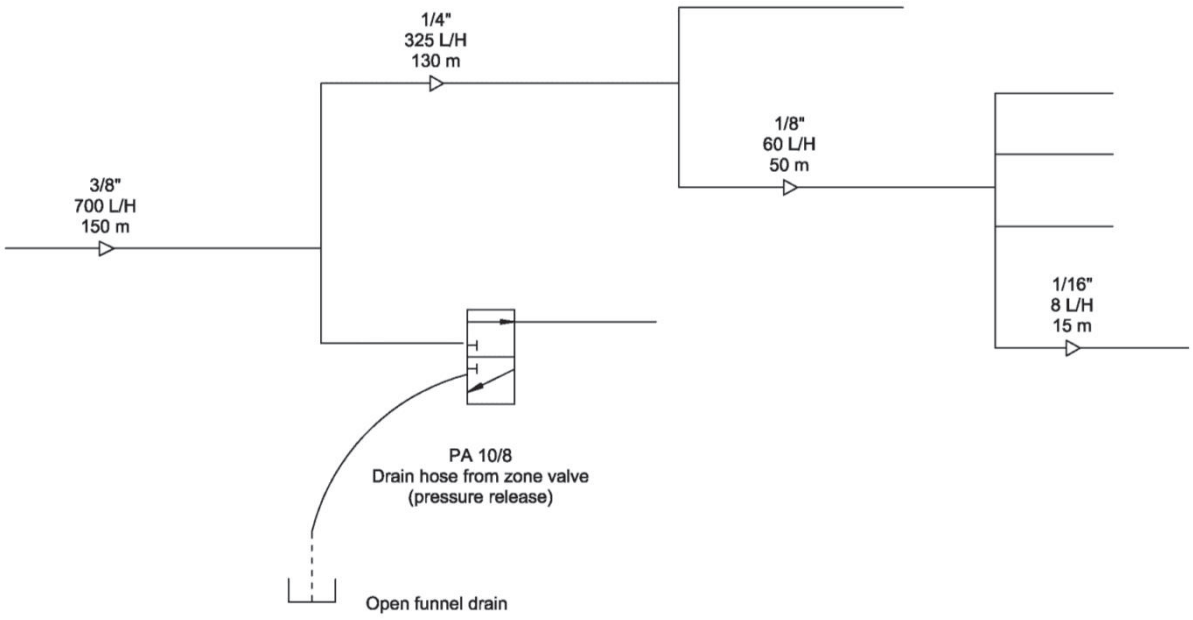
Properties

- Safety thermoplastic hose to work at high operating pressures
- Excellent flexibility and flex fatique
- Excellent resistance to chemicals and solvents
- UV and ozone resistant
- Suitable for water based hydraulics up to 70 °C
- Excellent abrasion resistance
- Low volumetric expansion for quick hydraulic response time
- Static free – 100 % electrical conductivity
- Exceeds SAE 100 R1, R2 and DIN requirements
- Min flow resistance
- Low weight per meter

Data Source : TI013GB

Hose dimension	Minimum flow l/h	Maximum flow l/h	Maximum lenght m	Minimum bending radius, mm @ 90°
1/16"	1	20	25	80
1/8"	10	90	60	100
1/4"	70	350	150	130
3/8"	200	800	200	180
PA 10/8 mm (pressure release hose)			20	150

Example:



NB! The high-pressure hose outer layer is PU. PU is a very stable material but can be damaged if it is installed in environments with solvents or if it is cleaned with heavy detergents. We therefore refer to the chemical resistant chart if the hoses are to be installed in areas where there may be strong chemicals.

42 ML nozzles (2.5 - 4.5 - 6.5 l/h)

Data Source : TD122GB

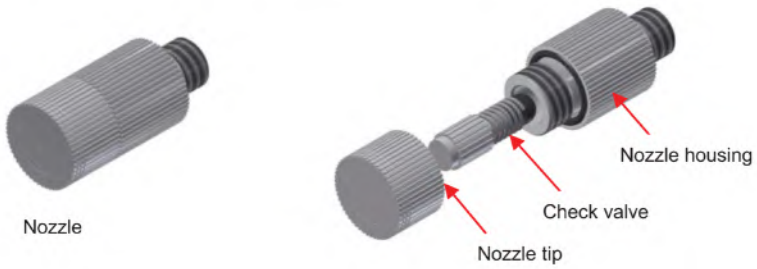
Description:

The ML standard nozzles are specifically designed nozzles of highest quality, which atomizes water under high pressure to millions of microscopic particles sized 5-10 microns, which immediately evaporate in to the surrounding air. The nozzle has a built in non-drip valve and can be used alone or mounted on the various ML System humidification modules.

The different nozzle sizes allows for all humidifying purposes to be solved as well as it is possible to reach an adiabatic cooling effect even in climates with a high relative humidity.

Typical use:

The ML System nozzles are typically used with the ML System humidification units for humidifying rooms where an invariable humidity throughout the year is demanded. The size of the nozzle is adjusted to the room height and ventilation conditions.



Specifications:

Nozzle	2.5 l/h	4.5 l/h	6.5 l/h
Capacity	1.7 – 2.5 l/h	3.5-5.0 l/h	6.3 – 6.7 l/h
Working pressure	35-70 bar	35-70 bar	35-70 bar
Material	Stainless steel AISI 303	Stainless steel AISI 303	Stainless steel AISI 303
Thread	12/24 UNC/2A	12/24 UNC/2A	12/24 UNC/2A
Non-drip valve	Standard	Standard	Standard
Filter	Option	Option	Option
Requirements for conductivity µS/cm *	5 < EC < 1000	5 < EC < 1000	5 < EC < 1000
Part number	103.160.000	103.150.000	103.180.000

Spare parts:

O-ring	103.115.000	103.115.000	103.115.000

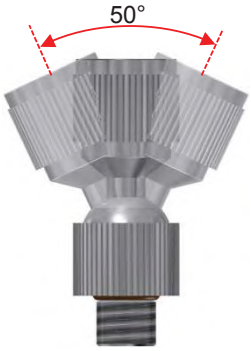
* The lower conductivity the longer service life and a lower risk for blockage.

Nozzle swivel adapter:
Using this adapter it is possible to rotate the nozzle in a direction to avoid spraying on other items.

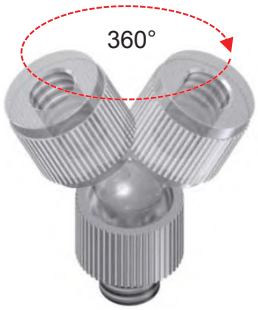
Female thread:
12/24unc/2B

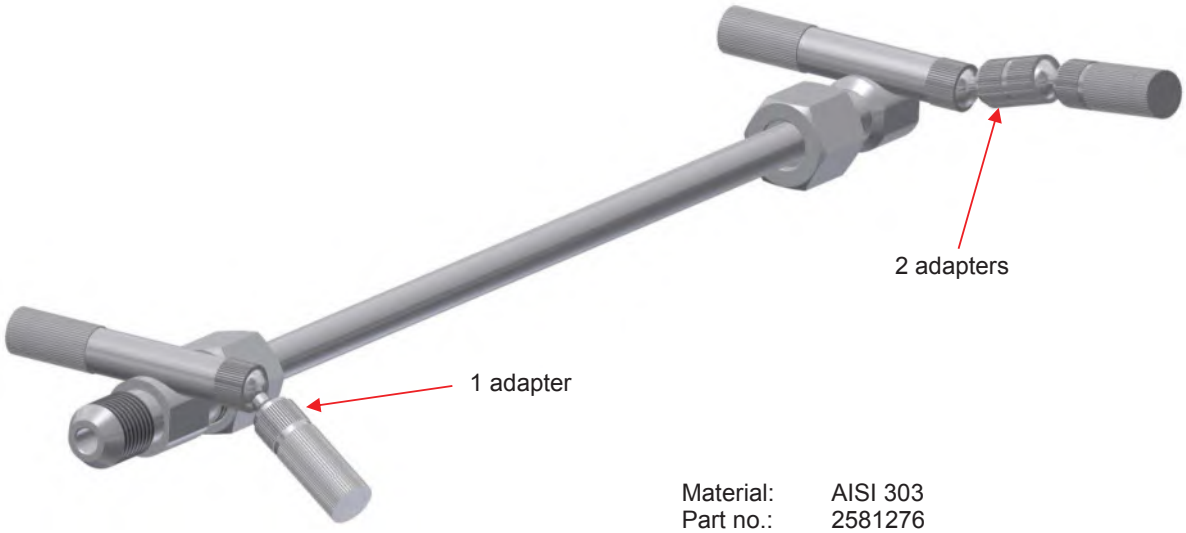
Male thread:
12/24unc/2A

Swing angle: 50°



Angle of rotation: 360°





Material: AISI 303
Part no.: 2581276

43 ML nozzle (1.5 l/h)

Data Source : TD116GB

- Unique high-technology nozzle from Condair A/S
- Extremely fine nebulization
- Minimum humidification power
- Optimum cooling and humidification effect

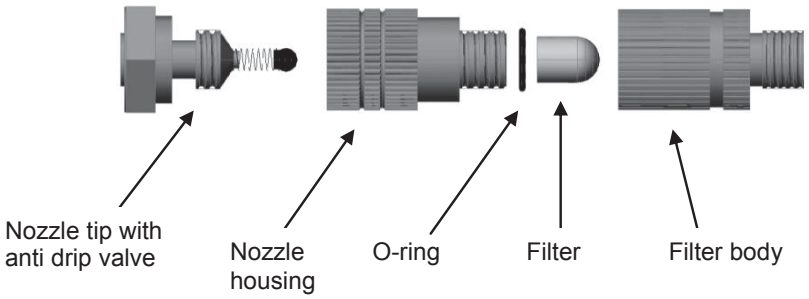
Description:

The nozzle nebulizes water under high pressure into millions of microscopic particles in sizes from 5-15 micron, which immediately evaporates into the ambient air. The nozzle has incorporated filter and anti-drip valve, and it can be used alone or in all the ML System humidification units.

The quick absorption in the air means that the nozzle can meet all humidification tasks and with the nozzle a cooling and humidification effect can be obtained, even in climates with high relative humidity.

Typical use:

The ML 1,5 L nozzle is used in rooms with the highest demands within humidification, such as in repro departments, in offices, or within the electronics industry. At the same time the nozzle is used for fog cooling of units or in zones where a significant cooling effect is required.



Specifications:

Nozzle	1.5 l/h
Capacity	1.2-1.5 l/h
Working pressure	35-70 bar
Material	Stainless steel
Thread	12/24 UNC/2A
Anti drip valve	Standard
Filter	Standard
Requirements for conductivity µS/cm	5 < EC < 80
Part number	103.200.001

Spareparts:

Filter	103.106.000
Filter body	103.137.012

Safety data sheet

Revision: 29-05-2013
Replaces: 01-03-2013
Version: 01.01/GBR

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name: Sanosil S010 Ag

1.2. Relevant identified uses of the substance or mixture and uses advised against

Recommended uses: Disinfection agent

Use biocides safely. Always read the label and product information before use.

1.3. Details of the supplier of the safety data sheet

Supplier: EcoCare ApS
Ellegårdsvej 18
DK-6400 Sønderborg
Denmark
Tel: +45 7442 4750
Fax: +45 7442 4786
Email: info@ecocare.dk

1.4. Emergency telephone number

0870 600 6266 (UK only) Only available to health professionals.

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

DPD-classification: Xi;R36

Please see section 16 for the full text of R-phrases and H-phrases.

Most serious harmful effects: Irritating to eyes.

2.2. Label elements

Irritant

Hazard designation: Irritant

R-phrases: Irritating to eyes.

S-phrases: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Other labelling: None.

Calculation of mixing ratio between water and chemical - 5% Sanosil S010 Ag to 0,1%

Wanted koncentration:		0,1 %		
Concentration of chemical:		5 %		
Mixed solution	Water	Chemical	Chemical part	
liter	liter	liter	liter	%
1	0,98	0,02	0,00	0,1
2	1,96	0,04	0,00	0,1
3	2,94	0,06	0,00	0,1
4	3,92	0,08	0,00	0,1
5	4,90	0,10	0,01	0,1
6	5,88	0,12	0,01	0,1
7	6,86	0,14	0,01	0,1
8	7,84	0,16	0,01	0,1
9	8,82	0,18	0,01	0,1
10	9,80	0,20	0,01	0,1
11	10,78	0,22	0,01	0,1
12	11,76	0,24	0,01	0,1
13	12,74	0,26	0,01	0,1
14	13,72	0,28	0,01	0,1
15	14,70	0,30	0,02	0,1
16	15,68	0,32	0,02	0,1
17	16,66	0,34	0,02	0,1
18	17,64	0,36	0,02	0,1
19	18,62	0,38	0,02	0,1
20	19,60	0,40	0,02	0,1
25	24,50	0,50	0,03	0,1
50	49,00	1,00	0,05	0,1
60	58,80	1,20	0,06	0,1
100	98,00	2,00	0,10	0,1
150	147,00	3,00	0,15	0,1
200	196,00	4,00	0,20	0,1
300	294,00	6,00	0,30	0,1
400	392,00	8,00	0,40	0,1
500	490,00	10,00	0,50	0,1
600	588,00	12,00	0,60	0,1
700	686,00	14,00	0,70	0,1
800	784,00	16,00	0,80	0,1
900	882,00	18,00	0,90	0,1
1000	980,00	20,00	1,00	0,1

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