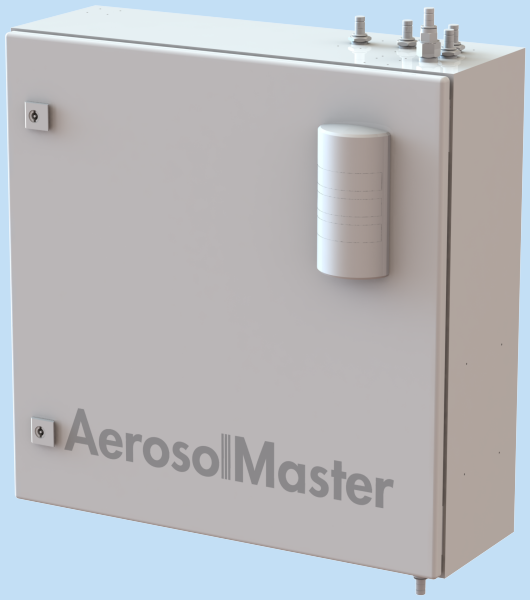
KNOLL
.It works

AerosolMaster 4000 ATS

EN

Installation and
operating instructions



KNOLL Maschinenbau GmbH
Schwarzachstrasse 20
D-88348 Bad Saulgau
Tel. + 49 7581/2008-0
Fax + 49 7581/2008-90140
info.itworks@knoll-mb.de
www.knoll-mb.de

Translation of the original operating instructions

KNOLL
.It works

Table of contents

1 User information

1.1 User guide

- Please read the installation and operating instructions prior to initial commissioning in order to prevent damage due to operator error.
- Make sure that the installation and operating instructions are readily available at the installation site.

1.2 Symbols used

See chapter on safety

Important information for operators and technicians

⇨ Prerequisites

➢ Results

1.3 General information

Unqualified personnel are forbidden from working on the product!

- Do not remove safety devices.
- Follow all legal instructions.

1.4 Warranty conditions

The warranty does not apply to improper handling, natural wear and non-compliance with the maintenance and operating instructions.

Use only genuine KNOLL spare and wearing parts. The use of other (lower-quality) parts can have an effect on warranty claims.

1.5 Customer service

Service

Tel.	+49 7581 / 2008-0	during business hours
Tel.	+49 160 / 2822008	outside business hours
	Monday - Thursday	5:00 p.m. - 9:00 p.m.
	Friday	3:00 p.m. - 9:00 p.m.
	Saturday	7:00 a.m. - 12:00 noon
E-mail	service.itworks@knoll-mb.de	

Spare parts

Tel.	+49 (0) 7581 / 2008-0
E-mail	ersatzteile.itworks@knoll-mb.de

2 Safety

2.1 Safety instruction labels

DANGER	
	Identifies a danger with a high risk that will result in a severe or fatal injury if it is not avoided.

WARNING	
	Identifies a danger with a moderate risk that can result in a severe or fatal injury if it is not avoided.

CAUTION	
	Identifies a low-risk danger that can lead to minor or moderate injury if it is not avoided.

NOTICE
Identifies a risk that can result in property damage if it is not avoided.

2.2 Personnel qualification and training

Operation, maintenance, inspection and installation personnel must have the appropriate qualifications for each of the aforementioned tasks.

The operator must specify exact areas of responsibility and appoint supervisors responsible for monitoring personnel.

If personnel do not have the necessary knowledge, they must be trained and instructed accordingly. This can be provided for the operator by the manufacturer or supplier.

The operator must ensure that the personnel understand the operating manual.

2.3 Arbitrary modification and spare part manufacture

Modification and changes of the product are only permissible following consultation with the manufacturer.

Use only accessories and spare parts approved by the manufacturer.

2.4 Dangers resulting from nonobservance of safety instructions

Ignoring safety instructions can pose a danger to personnel, the environment and product.

Hazard examples

Failure of important product functions.

Danger to persons due to electrical, mechanical, thermal and chemical hazards.

Danger to the environment due to the leakage of hazardous substances.

2.5 Protective devices

Before each machine start-up, all protective devices must be properly attached and functional.

Protective devices may be removed after a shutdown and removed once the machine has been secured to prevent restart.

On delivery of components, the protective devices must be attached by the user in accordance with the instructions.

2.5.1 Integration into EMERGENCY STOP devices

The AerosolMaster is interchangeable equipment and designed for retrofitting on or in existing metal-processing systems.

Therefore, there are no Emergency Stop devices on the system.

The user must ensure that the AerosolMaster is integrated into existing Emergency Stop devices and that the solenoid valves close when the Emergency Stop devices are actuated.

2.5.2 Installing an external pressure relief valve

NOTICE

Pressure trapped in the tool spindle

If the installation principles given below are followed, trapped pressure and/or back pressure can be prevented.

However, the design decision always lies with the system builder.

With 2/2-way aerosol switchover valve

A Aerosol Master
B 2/2-way aerosol switchover valve
C Tool spindle
D Pressure relief valve
E Aerosol line, e.g. machine compartment
F Interface by the customer

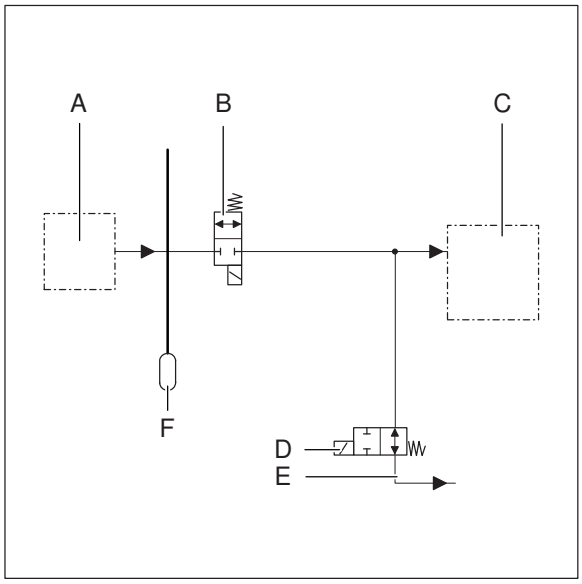


Fig. 3.5.2.1

Option for installing depressurization.

The pressure relief valve is energized during processing so that the valve shifts to the blocked position.

After the workpiece has been processed and/or when a tool change is pending, the valve must no longer be energized so that the aerosol can flow out through this valve, thereby allowing depressurization.

With 3/2-way aerosol switchover valve

A Aerosol Master
B 3/2-way aerosol switchover valve
C Tool spindle
D Pressure relief valve
E Aerosol line, e.g. machine compartment
F Interface (by the customer)

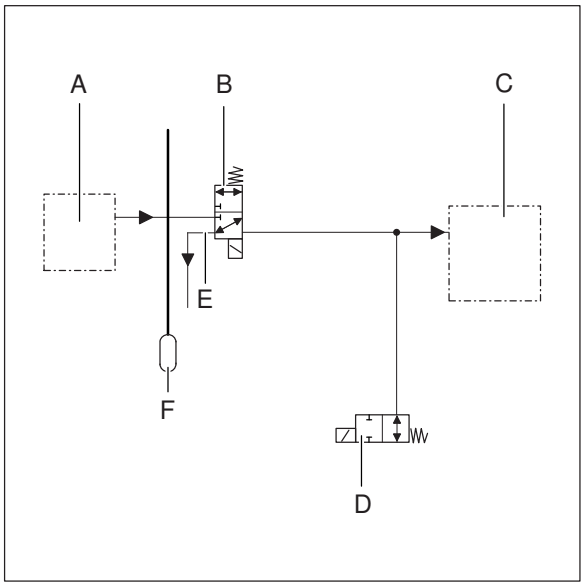


Fig. 3.5.2.2

Option for installing depressurization.

The pressure relief valve is energized during processing so that the valve shifts to the blocked position.

After the workpiece has been processed and/or when a tool change is pending, the valve must no longer be energized so that the aerosol can flow out through this valve, thereby allowing depressurization.

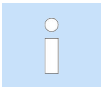
This 3/2-way switching valve can be used to block the aerosol and cooling lubricant supply to the tool.

This switchover valve is able to achieve the required spindle depressurizing without having to install a pressure relief valve, if cooling lubricant is not fed via this valve by the customer.

3 Description of machine and functions

3.1 Normal use

- Generation of an oil-air mixture (aerosol) for cooling and lubricating a cutting or non-cutting machining operation (drilling, reaming, milling, ...)
- Supply of the aerosol through the tool spindle and the tool up to the machining location.
- Supply through external spray nozzles to the machining location
- Use of media approved for the use with AerosolMaster (see operating instructions and BGI GUV718)
- Operation inside of the specified performance limits.
- Operation in industrial environments in compliance with the established instructions for Occupational Safety and air purity
- Operation with an appropriately dimensioned extraction system
- Use for mobile applications



If this product is integrated into or fitted to a machine or system, commissioning is prohibited until it has been established that the machine or system complies with the provisions of EU directive 2006/42/EC.

3.2 Foreseeable misuse

- Any other use or use exceeding normal use
- Modifications or incorrect assembly, installation, startup, operation, maintenance or repair
- Use of non-approved MQL cooling lubricants and/or lubricants
- Use of non-approved spare parts and accessories
- Operation in food sectors
- Operation in potentially-explosive environments - Operation in potentially-flammable environments.
- Operation outdoors

3.3 Applications area

Minimal quantity lubrication (MMS).

Cooling and lubricating of tools during metal-cutting processes.

3.4 Layout

3.4.1 Overview - AerosolMaster

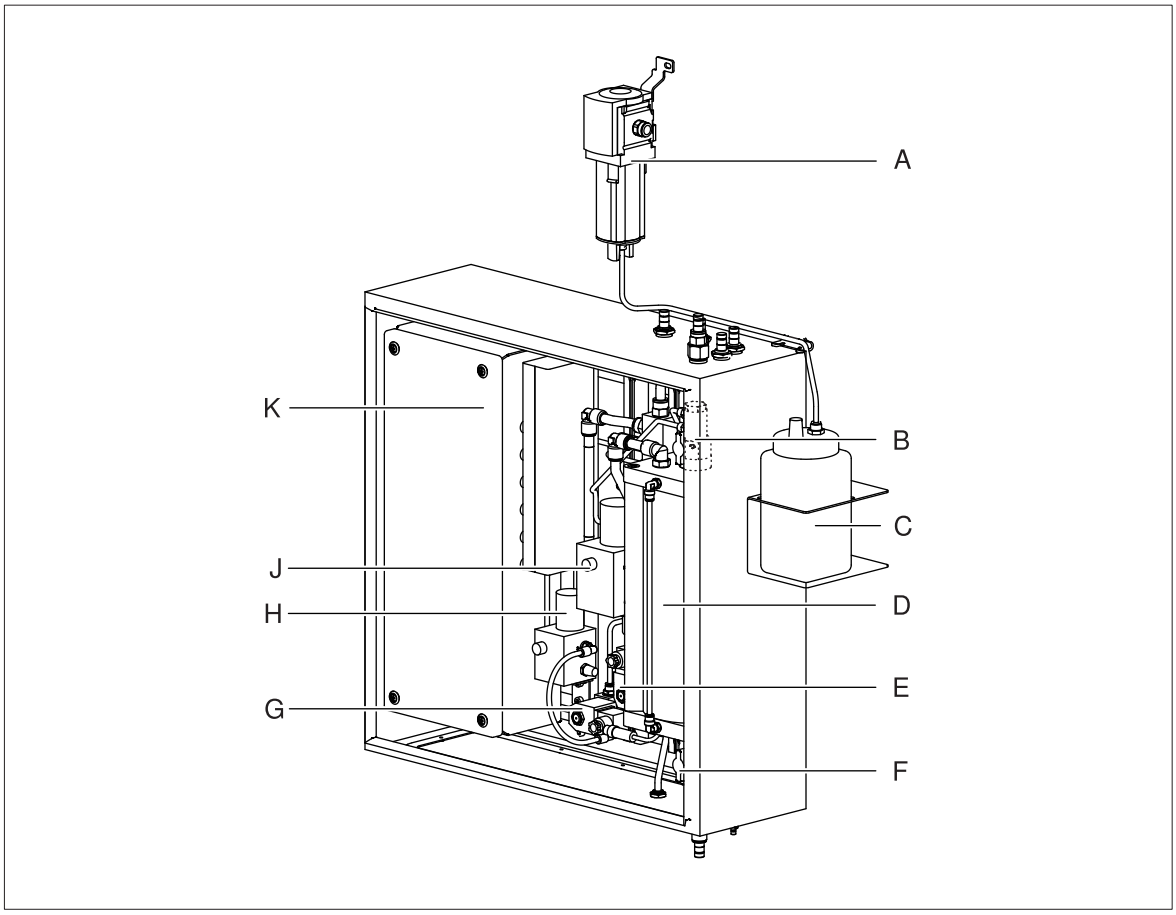


Fig. 4.4.1

A	Oil separator (optional)	F	Ball valve for emptying
B	Aerosol generation (venturi nozzle)	G	Air directional control valve
C	Oil return container	H	Air pressure control valve
D	Oil tank	J	Aerosol pressure control valve
E	Oil directional control valve	K	Integrated control/ electric I/O modules (optional)

A replenishing unit can be installed as an option.
In this case, the return from the oil separator can be connected to the replenishing unit.

3.5 Mode of operation

A Pressure module (optional)
B Compressed-air supply
C AerosolMaster
D Venturi nozzle
E Aerosol line
F Aerosol switchover valve/ball valve
G Rotary feedthrough
H Spindle
J Tool holder
K Tool
L Replenishing unit (optional)
M Oil tank
N Air pressure control valve
O Aerosol return
P Aerosol pressure control valve

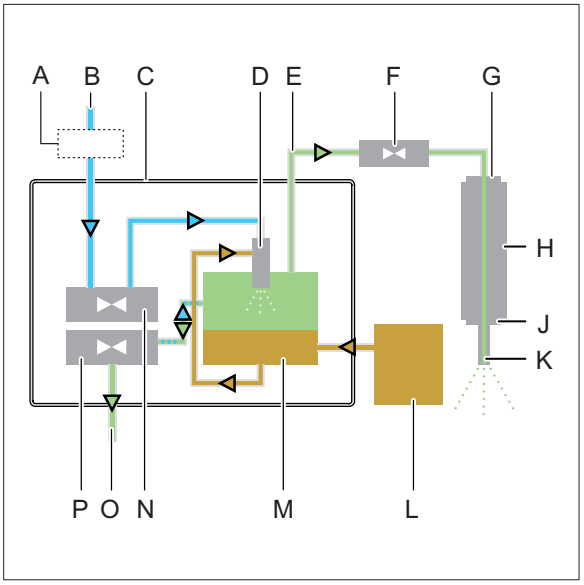


Fig. 4.5.1

The AerosolMaster operates according to the pressure tank principle.

Compressed air is fed into the container from outside.

The aerosol generated by the venturi nozzle is fed from the container via the aerosol outputs through the spindle and routed to the tool.

If the aerosol switching valve is opened, the medium reaches the tool.

The medium supply to the oil tank is guaranteed by an automatic replenishing unit (optional).

This feeds the medium into the AerosolMaster and removes excess oil again.

The pressure module (optional) improves optimal chip removal when the existing line pressure is insufficient.

3.6 Type plate

A Type
B Order number and year of manufacture
C Serial number
D Drawing no.
E Customer identification number
F Customer drawing no.
G Customer reference number

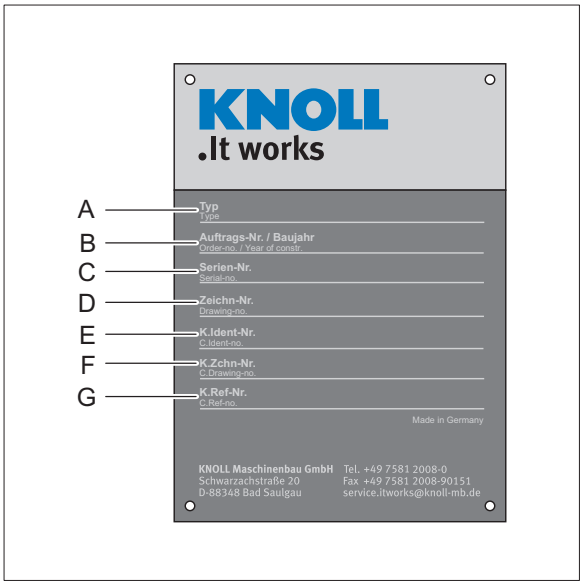


Fig. 4.6.1

To order the correct spare parts, all of the information on the type plate are necessary.

When used in a harsh environment, it is recommended that the data be recorded prior to installation, since the legibility can decrease over time.

3.7 Model key

A Drawing no.
B Version
C Feature 1/Cryo
D Feature 2/ Control
E Feature 3/ Pressure range

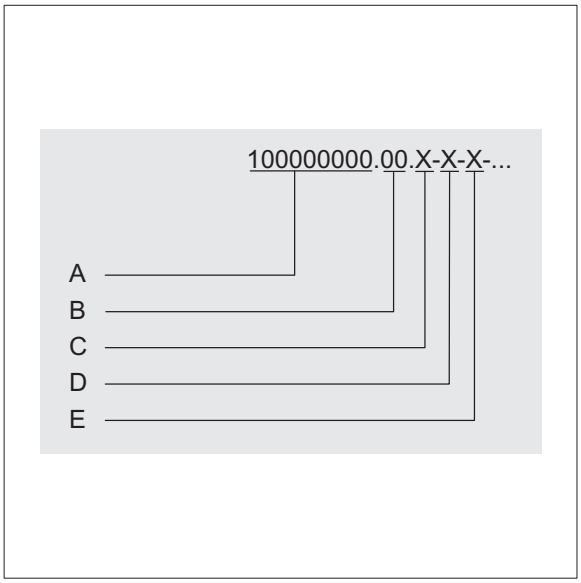


Fig. 4.7.1

Example: 100438462.00.**X-X-X-X-X...**

Feature 1/Cryo		**Feature 2**/ Control		Feature 3/ Pressure range		Feature 4/ Mounting plate	
0	No	1	Digital	1	10 bar	1	with mounting plate
1	Yes	2	Profibus	2	16 bar	2	without mounting plate
		3	Profinet				
		4	Profibus for external control				
		5	Profinet for external control				

Drawing number/Model

The particular model is identified in the overall layout of the AerosolMaster and in the order confirmation as well as on the type plate of the system {customer-specific).

Become familiar with the model key and with **Feature 2** so that installation of the AerosolMaster can be carried out correctly. Also see the "Installation" chapter [→ 24].

3.8 Technical data

Mechanical

Dimensions (WxHxD)	600 x 600 x 210 mm
Space requirement (WxHxD)	750 x 640 x 830 mm
Weight	approx. 40 kg
Fill capacity	approx. 2.3 l
Usable volume	approx. 1.7 l
Protection class	IP54
Aerosol outputs	3 pcs.

Electrical

Power supply	24 V DC
Current draw	2, 4 A
Level monitoring	4-point (2 min. and 2 max. sensors), 24 V DC

Pneumatic

Compressed-air connection	6-10 bar, drained, oil-free
Compressed air quality class	5 ISO 8573-1
Compressed air connection line	1 Nm3/min at 6 bar
Air consumption	10 nl/min - 1200 nl/min depending on the internal cooling bore diameter and the inlet pressure
Oil quantity	0 ml/min - 350 ml/min depending on the internal cooling bore diameter, the inlet pressure and the lubricant
Aerosol container pressure	max. 10 bar
Aerosol pressure	max.0.5 bar - 9 bar

NOTICE

Fuse (by the customer)

This module can be configured with different modules to customer requirements.

To add any optional additional features at a later date, the equipment operator must check whether the energy supply / electrical protection on the processing or machine tool has been modified accordingly.

Please always consult with KNOLL in this regard.

3.8.1 Replenishing unit (optional)

Mechanical

	ARU 25	ARU 10
Dimensions (WxHxD)	495 x 600 x 345 mm	310 x 500 x 246 mm
Fill capacity	approx. 25 l	approx. 10 l
Number of medium supplies	up to 6 AerosolMasters	1 AerosolMaster

Electrical

	ARU 25	ARU 10
Power supply	24 V DC	24 V DC
Safety	6 A - 16 A	6 A - 16 A
Level monitoring	2-point, 24 V DC	2-point, 24 V DC
Protection category	IP55	IP55

3.9 Approved lubricants

AerosolMaster lubricant has been developed for minimum quantity lubrication.
It permits resource-saving and energy-efficient production with the lowest oil consumption.
The lubricant properties with cryo-suitable oils are guaranteed down to -78 °C.
Safety data sheets for the cooling lubricant are included in the overall documentation.
Alternatively, the operator can purchase lubricants from other manufacturers.
In this case, KNOLL has prepared a list with approved and recommended cooling lubricants.
These can be provided for the customer upon request.

Company	Lubricant	Area of use	Properties
KNOLL	lubricant c-st	Heavy-duty machining, steel, Inconel	Cryolub-capable down to -78 °C
KNOLL	lubricant c-al	Aluminum, plastic, nonferrous metal, steel	Cryolub-capable down to -78 °C
KNOLL	lubricant c-ti	Titan	Cryolub-capable down to -78 °C
KNOLL	lubricant ht	universal	high temperature-capable
KNOLL	lubricant basic	Soft materials, e.g. aluminum (Si<1%)	-

3.10 Noise emission data

For systems produced by KNOLL Maschinenbau GmbH, a sound pressure level at the workplace (sound pressure level at the measurement surface) of Lpa =< 78 dB(A) is specified.

This is defined as an energy-equivalent A-rated total noise level determined according to DIN 45635 Part 1 Class 2 with the enveloping surface method.

Unfavorable environmental conditions and flow noise can require additional sound protection measures.

4 Transport and storage

DANGER

Suspended loads

Risk of injury from falling parts.

– Do not stand beneath suspended loads.

4.1 Transport

Transport only by authorized personnel with certified qualifications.

– Ensure that the lifting gear has a sufficient load capacity.
– Always inspect the lifting gear prior to use.
– Empty the oil tank.
– Refer to the "Technical data" section for the empty weight.
– Never lift assembled machines by the attached components.
– If damage from transportation is noted, do not alter the product or packaging.
– Report damage to transport company.
– Report damage to KNOLL Maschinenbau GmbH.

A Lifting gear
B Mounting plate/transport device (optional)
C AerosolMaster
D Mounting frame with rollers (optional)

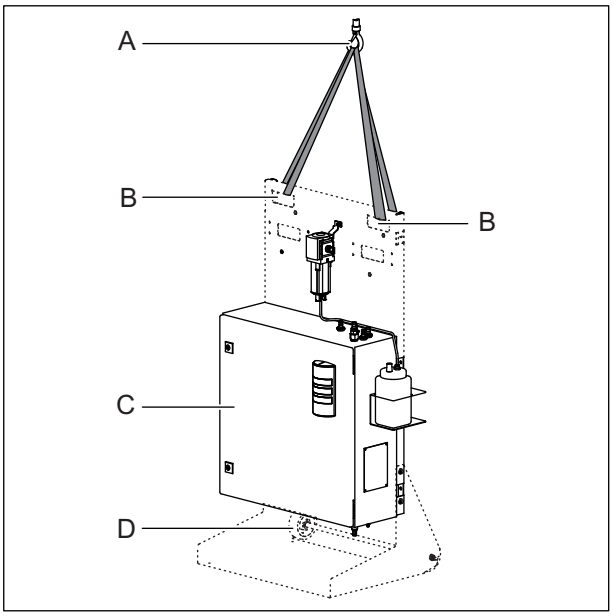


Fig. 5.1.1

4.2 Storage

Products that have already been filled or that have been in operation must be thoroughly cleaned and re-protected before storage.

– Protect products against impacts.
– Protect products against moisture, frost and heat.
– Protect products against dust, dirt and other potentially harmful external influences.

When storing for longer than 6 months

1. Drain system and products.
2. Clean and preserve the product.

5 Setup and installation

DANGER

Electricity

Risk of injury from electric shock.

– Only qualified electricians may work on the electrical equipment.

CAUTION

Hazardous fluids

Health risk from contact with cooling lubricant. Contamination of the environment.

– Wear personal protective gear.
– Avoid skin contact with cooling lubricant.
– Do not inhale the aerosol or spray into eyes.
– Follow the safety instructions of the cooling lubricant manufacturer.
– Heed the legal provisions for setup of the system and the disposal of cooling lubricants.

CAUTION

Containers and components that tip over

Risk of injury from toppling parts.

– Check the stability of containers and components.

CAUTION

Harmful or irritating substances

Risk of injury from gases/aerosols (aerosol particles size 0.1 - 0.5 µm).

– Use a suitable exhaust system to maintain workplace limits and minimize the risk of fire and explosion at the machine tool.

NOTICE

Pneumatic components

Bursting/exploding of components.

– Use pneumatic components (e.g. rotary feedthrough, hoses...) that are designed for the max. pressure of the specific system and resistant to chemicals.

5.1 Setup

AerosolMaster is manufactured and assembled to customer requirements.

Equipment with valves, fill level monitoring and higher pressure ranges differs, depending on requirements.

Replenishing units, pressure modules and various installation devices can be installed as an option.

– For additional information, see the Optional accessories [➞ 47] chapter; the model key [➞ 15] can be found under your drawing number.

A Mounting plate (optional)
B Oil separator (optional)
C Oil return line
D AerosolMaster
E Mounting frame with rollers (optional)
F Return container

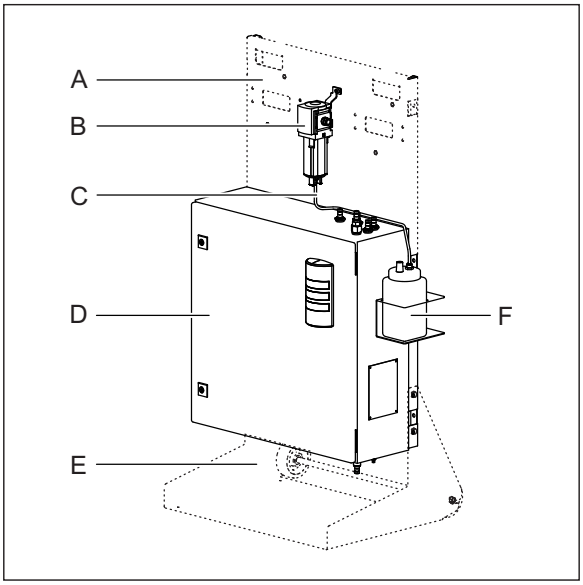


Fig. 6.1.1

⇨ Foundation and mounting brackets check for load-bearing capacity and stability.

⇨ Product placed on a level surface.

1. Remove all packaging material and dispose of it in an environmentally responsible manner.
2. Set up the product according to the illustrated documentation.
3. Keep escape routes and maintenance access free of obstructions.
4. Secure product and mounting frame or mounting plate to a wall or floor.

NOTICE

Oil separator installation requirements

Operation with the program numbers 25 to 27 (see Parameter list [→ 42]) is not possible.

➢ Oil return line between oil separator and return container/replenishing unit is max. 2 meters long.

– Install the oil separator above the return container or replenishing unit (optional).

– Note the pressure connection direction on the oil separator:

➢ 1 = Inlet, 2 = Outlet

Return container

The AerosolMaster can also be supplied without return container if so requested by customer.

If there is no return container, the oil separator oil return line must be routed to the replenishing unit or machine compartment.

Hole pattern for wall bracket

A Wall bracket (4x Ø 10.2 mm)

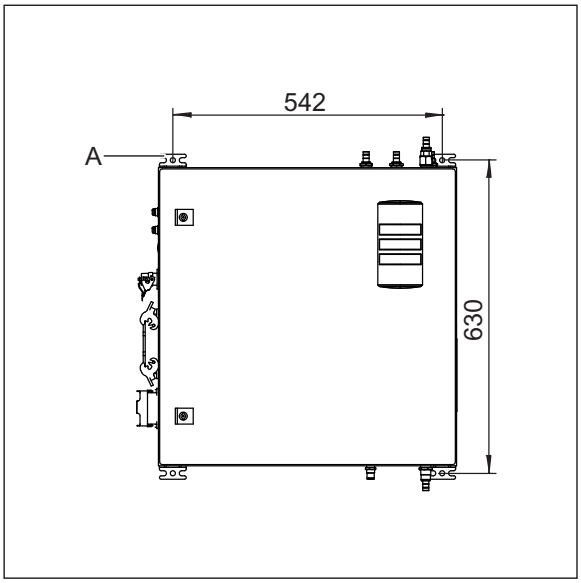


Fig. 6.1.2

⇨ Fasteners are designed on the basis of the weight.

⇨ Wall has been checked for load-bearing capacity.

⇨ Oil separator installation requirements are satisfied.

1. Mount AerosolMaster using the hole pattern in the wall.

The AerosolMaster can be supplied without mounting plate or mounting frame if so requested by customer.

In this case, the operator of the system must install the oil separator (supplied as a loose accessory) on the AerosolMaster.

All indicated dimensions are millimeters.

5.2 Installation

Drawing number/Model

The particular model is identified in the overall layout of the AerosolMaster and in the system documentation (customer-specific).

Feature 2 in the model key is the determining factor for selection of the correct installation diagram and electrical connections.

Become familiar with the model key [→ 15] so that installation of the AerosolMaster can be carried out correctly.

5.2.1 Connection diagram for dry-film lubrication system

Example of internal cooling lubrication for single-spindle machining (see Feature 2, models 4 and 5 [➔ 15])

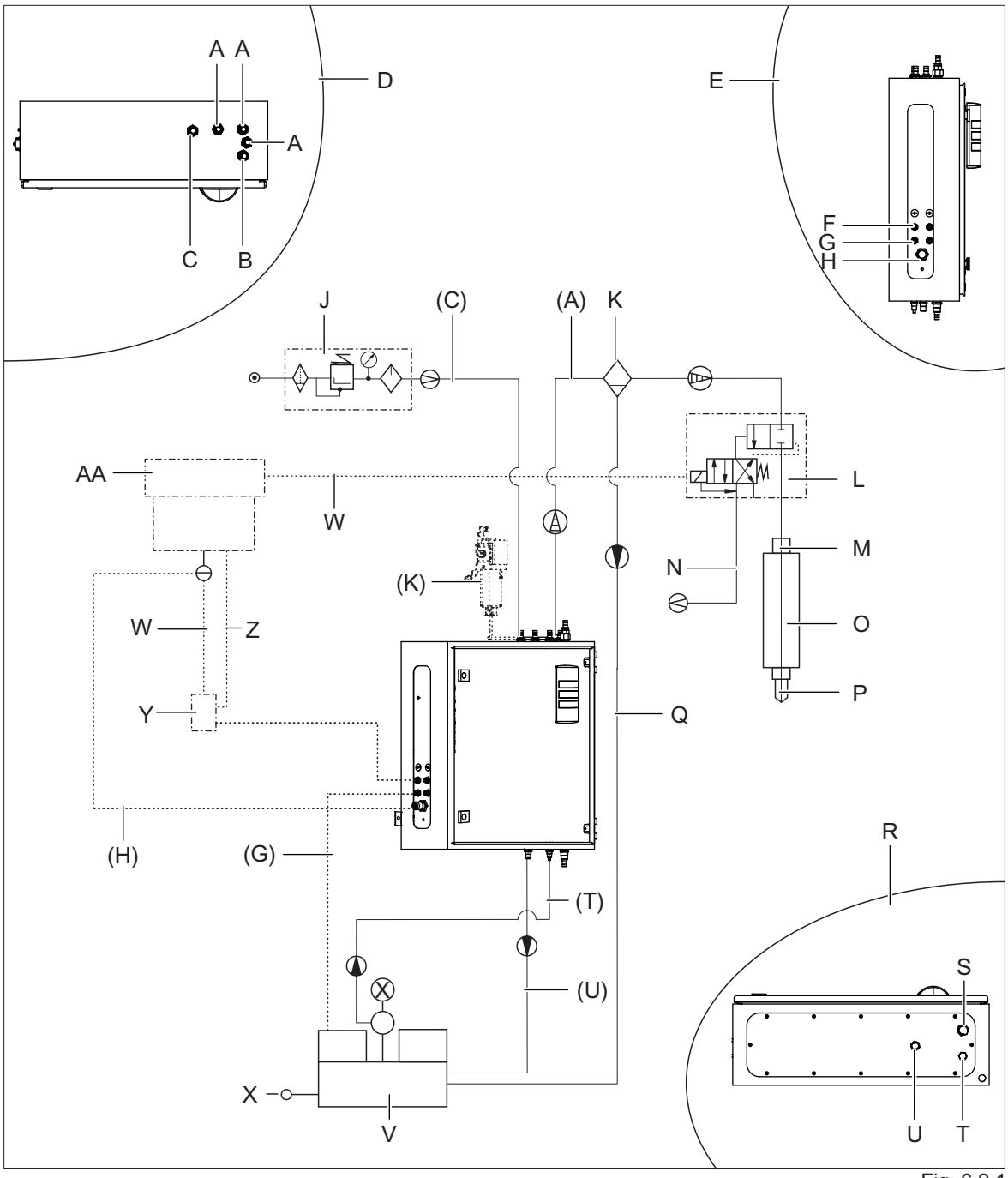


Fig. 6.2.1

A	Connection for aerosol line (hose size PA-AD 12 mm)	O	Machine tool spindle
B	Manual fill opening	P	Tool
C	Connection for compressed-air line (hose size PA-AD 12 mm)	Q	Oil return (hose size PA-AD 8 mm)
D	"Top" view	R	"Bottom" view

E	"Lateral" view	S	Connection for oil tank drain valve Ø 12 mm
F	Profinet/Profibus slot	T	Connection for replenishing unit oil supply (hose size PA-AD 6 mm, max. 25 bar)
G	Slot XS40 XS41, M12 connector for replenishing unit	U	Connection for aerosol control return (hose size PA-AD 8 mm)
H	Slot XS1, 5-pole for machine control (power supply)	V	Replenishing unit (optional)
J	Servicing unit (recommended)	W	Control line (24 V)
K	Oil separator (optional)	X	Mains connection (24 V)
L	Aerosol switchover valve (ball valve)	Y	PLC box (optional)
M	Rotary feedthrough	Z	Control line (Profibus/-net)
N	Compressed-air line Ø 6 mm (4–6 bar)	AA	Machine control/machine tool (by the customer)

Pneumatic connection

1. Connect compressed-air line via hose coupling.

➢ Hose size PA-AD 12 mm.

2. Connect to the compressed air/power supply, slowly open the supply of compressed air from the customer.
3. Set the air pressure to at least 6 bar at the pressure control valve on the servicing unit **J**.

NOTICE

It is advisable to route the compressed air through a servicing unit before use.

Aerosol connection on oil separator (optional)

⇨ Instructions in the "Installation" chapter have been followed [➞ 21].

1. Attach hose line to connection **A** on the AerosolMaster and to the oil separator **K** (inlet 1).

➢ Hose size PA-AD 12 mm

2. Attach hose line to connection **K** (outlet 2) and to the aerosol switchover valve **L**.
3. Repeat procedure for all other tool connections.

NOTICE

Oil separator option

Operation of the AerosolMaster with the program numbers 25 to 27 (see Parameter list [➞ 42]) is not possible.

If there is no replenishing unit or machine compartment available, the oil return line must be routed into the oil return container.

Medium connection (replenishing unit optional)

⇨ The system is switched off.

1. Connect the supply and return lines.

➢ Connections and pipework must not exert any stress on other parts.

2. Connect the replenishing unit **V** to the AerosolMaster via the medium hose **T**.

➢ Hose size PA-AD 6 mm.

3. Connect the aerosol return line **U** from the AerosolMaster to the replenishing unit.

➢ Hose size PA-AD 8 mm and 2 meters maximum length.

4. Using M12 connector, make electrical connection from XS40 and XS41 **G** (AerosolMaster) to XS34/XS35 (ARU10) or XS34.1-6/XS35.1-6 (ARU25).

➢ Follow the handling instructions in the "Replenishing unit" chapter. [→ 49]

Example of internal cooling lubrication for single-spindle machining (see Feature 2, models 1-3 [→ 15])

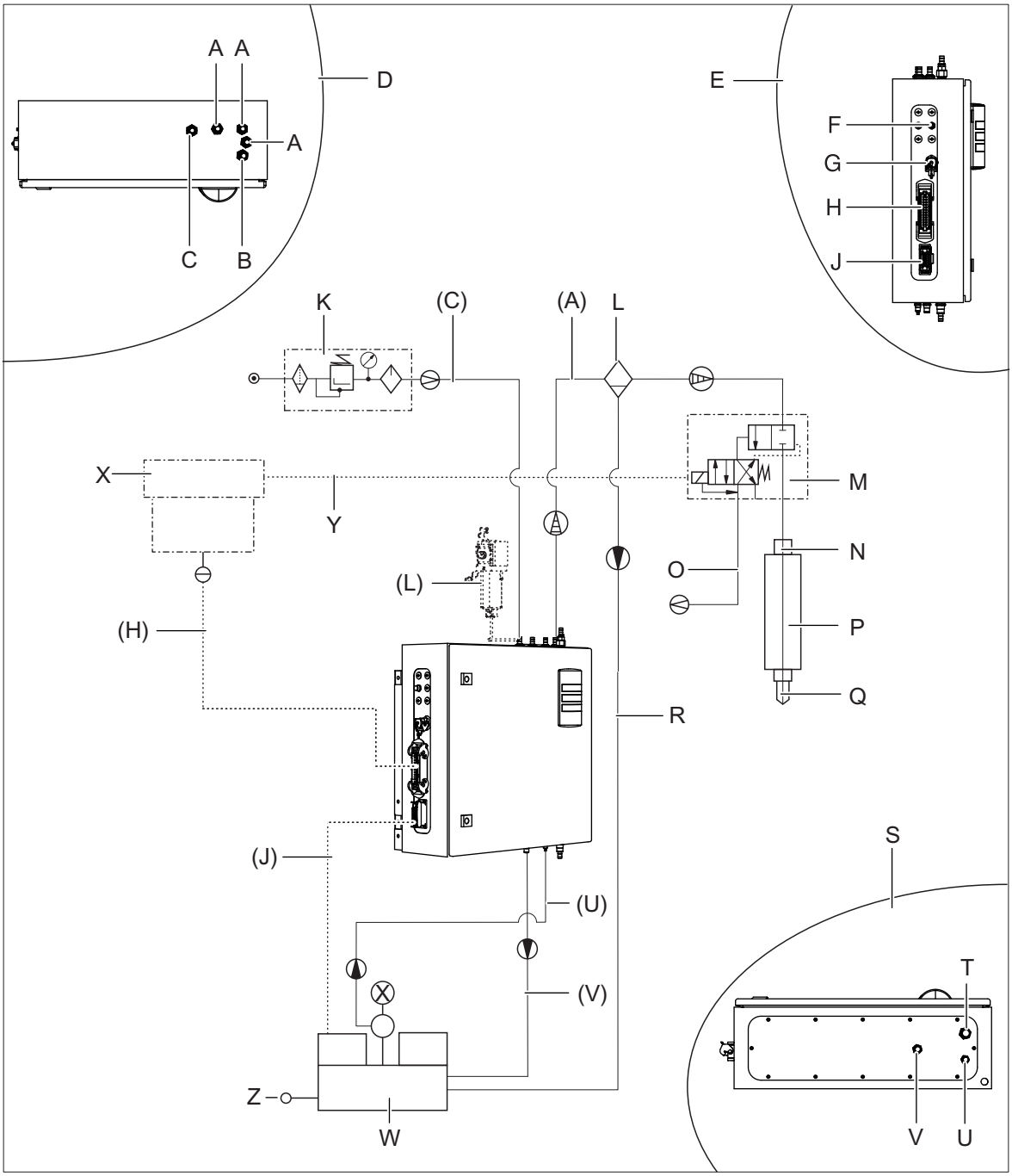


Fig. 6.2.2

A	Connection for aerosol line (hose size PA-AD 12 mm)	O	Compressed-air line Ø 6 mm (4–6 bar)
B	Manual fill opening	P	Machine tool spindle
C	Connection for compressed-air line (hose size PA-AD 12 mm)	Q	Tool
D	"Top" view	R	Oil return (hose size PA-AD 8 mm)
E	"Lateral" view	S	"Bottom" view

F	Slot for ball valve power supply (XS3), for set-up and test operation only!	T	Connection for oil tank drain valve Ø 12 mm
G	Slot for manual control unit	U	Connection for replenishing unit oil supply (hose size PA-AD 6 mm, max. 25 bar)
H	Slot XS1, 24-pole for machine control (power supply and digital interface)	V	Connection for aerosol control return (hose size PA-AD 8 mm)
J	Slot XS4, 10-pole for replenishing unit	W	Replenishing unit (optional)
K	Servicing unit (recommended)	X	Machine control/machine tool (by the customer)
L	Oil separator (optional)	Y	Signal line (24 V)
M	Aerosol switchover valve (ball valve)	Z	Mains connection (24 V)
N	Rotary feedthrough		

Connection for manual control unit (optional)

Connection for manual control unit (only with **Feature 2, model 1**)

– Connect manual control unit via LAN connector to XD1 **G** on the AerosolMaster.

Pneumatic connection

1. Connect compressed-air line via hose coupling.

➢ Hose size PA-AD 12 mm.

2. Connect to the compressed air/power supply, slowly open the supply of compressed air from the customer.
3. Set the air pressure to at least 6 bar at the pressure control valve on the servicing unit **K**.

NOTICE

It is advisable to route the compressed air through a servicing unit before use.

Aerosol connection on oil separator (optional)

⇨ Instructions in the "Installation" chapter have been followed [→ 21].

1. Attach hose line to connection **A** on the AerosolMaster and to the oil separator **L** (inlet 1).

➢ Hose size PA-AD 12 mm

2. Attach hose line to connection **L** (outlet 2) and to the aerosol switchover valve **M**.
3. Repeat procedure for all other tool connections.

NOTICE

Oil separator option

Operation of the AerosolMaster with the program numbers 25 to 27 (see Parameter list [→ 42]) is not possible.

If there is no replenishing unit or machine compartment available, the oil return line must be routed into the oil return container.

Medium connection (replenishing unit optional)

⇨ The system is switched off.

1. Connect the supply and return lines.

➢ Connections and pipework must not exert any stress on other parts.

2. Connect the replenishing unit **W** to the AerosolMaster via the medium hose **U**.

➢ Hose size PA-AD 6 mm.

3. Connect the aerosol return line **V** from the AerosolMaster to the replenishing unit.

➢ Hose size PA-AD 8 mm and 2 meters maximum length.

4. Using connector XS4 (AerosolMaster) **J** 10-pole (Harting), make electrical connection to XS34/XS35 (ARU10) or XS34.1-6/XS35.1-6 (ARU25).

➢ Follow the handling instructions in the "Replenishing unit" chapter. [➞ 49]

5.2.1.1 Connections for electrical interface

DANGER

Electricity

Risk of injury from electric shock.

Only qualified electricians may work on the electrical equipment.

A detailed description of the electrical connections and the electrical model key can be found in the circuit diagram.

Overview of controls/models

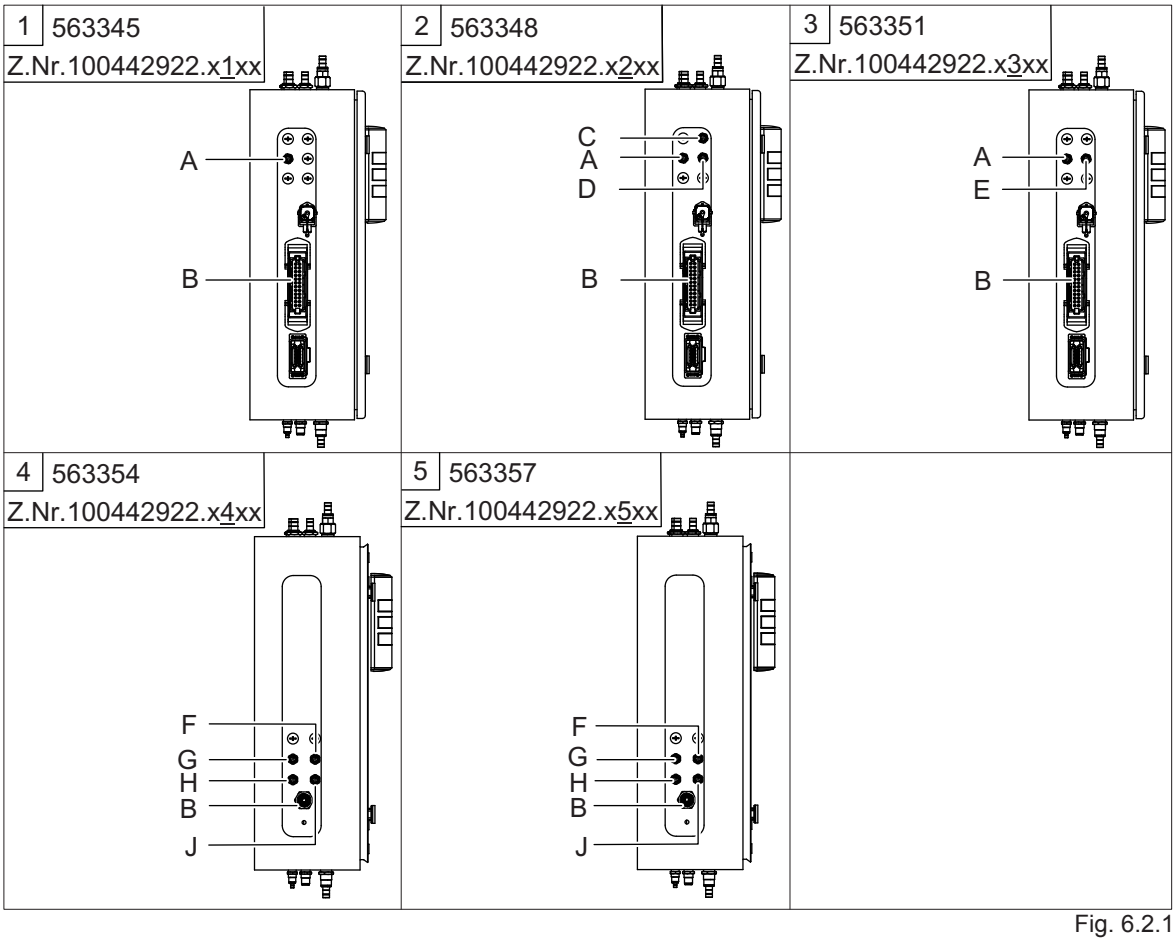


Fig. 6.2.1

A	Connection for aerosol switchover valve (XS3)= for set-up/test purposes only!	F	Connection for the replenishing unit (XS41)
B	Power supply/machine control system (XS1)	G	Connection for the replenishing unit (XS40)
C	Profibus connection (XS22)	H	Profibus/Profinet connection (XS21)
D	Profibus connection (XS21)	J	Profibus/Profinet connection (XS22)
E	Profinet connection (XS21)		

Drawing number/Model

The particular model is identified in the overall layout of the AerosolMaster and in the order confirmation as well as on the type plate of the system {customer-specific).

Become familiar with the model key and with **Feature 2** so that installation of the AerosolMaster can be carried out correctly. Also see the "Model key" chapter [→ 15].

Connection for the machine control system (power supply)

The connector required is included in the scope of delivery.

The AerosolMaster is controlled by the machine control system digitally or via a Profibus or Profinet interface.

30 parameter sets can be selected in the control system, sets 4-30 are permanently stored and cover most machining processes.

Positions 1-3 can be assigned their own parameters for special applications (see operating instructions for the manual control unit).

– Connect the power supply to the higher-level machine via connector XS1 (**B**).

NOTICE

Integration with machine control system by the customer

The AerosolMaster can be integrated into the specific machine control system with the aid of an interface description.

An exact breakdown of the interface description is included in the appendix to the operating instructions.

5.2.1.2 Pressure module connections (optional)

A Compressed air inlet connection
B Electrical connection for 3/2-directional control valve (M12x1)
C Connection for compressed-air outlet to the Aerosol Master
D Pressure module

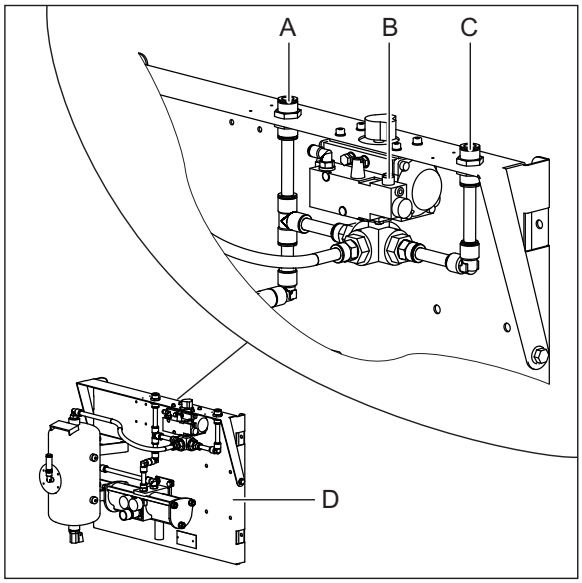


Fig. 6.2.1.2.1

The pressure module can be used as required with 10 bar or 16 bar to suit customer requirements.

The graphic serves as an example and can differ, depending on the system.

5.2.1.3 Connections for aerosol switchover valves/ball valve (optional)

2/2 way valve

A Electrical connection (M12x1), plug connector
B Auxiliary control air plug-in connection
C Plug-in connections for aerosol lines

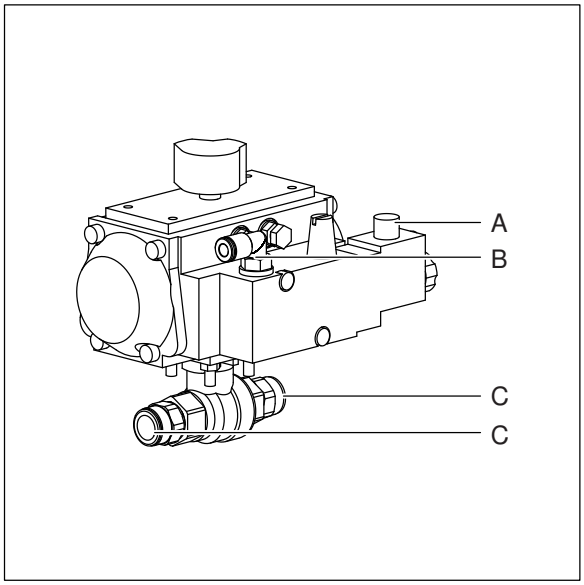


Fig. 6.2.1.3.1

The aerosol switchover valve is installed in the aerosol line between the AerosolMaster and the rotary feedthrough and/or the revolver or the external nozzle.

This switching valve can be used to block the aerosol supply to the tool.

The aerosol switchover valve is controlled by the machine control system (by the customer).

– Connect the aerosol switchover valve to the machine control system via connector M12x1.

NOTICE

Electrical control and cabling must be provided by the system builder.

Actuating the aerosol control valve by means of the manual control unit (optional) is allowed only for test purposes.

3/2 way valve

A Electrical connection (M12x1), plug connector
B Auxiliary control air plug-in connection
C Rotary feedthrough connection
D Cooling lubricant or depressurizing connection
E AerosolMaster connection

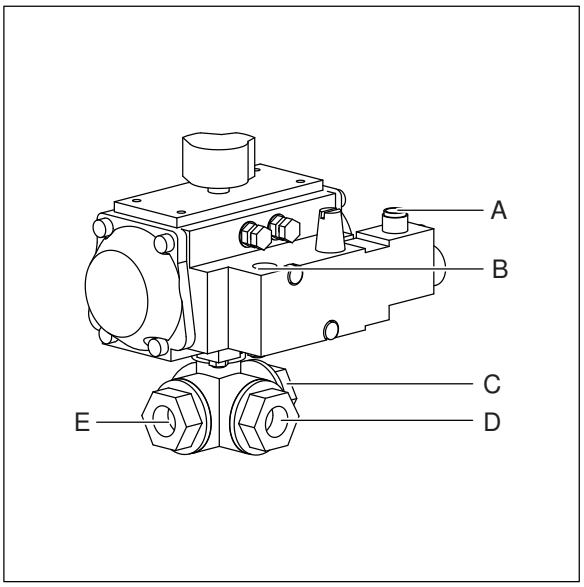


Fig. 6.2.1.3.2

The aerosol switchover valve is installed in the aerosol line between the AerosolMaster and the rotary feedthrough and/or the revolver or the external nozzle.

This switching valve can be used to block the aerosol and cooling lubricant supply to the tool.

This valve is able to achieve the required spindle depressurizing without having to install a pressure relief valve, if cooling lubricant is not fed via this valve by the customer.

However, the design decision always lies with the system builder and/or user.

The aerosol switchover valve must be controlled by the machine control system (by the customer).

– Connect the aerosol switchover valve to the machine control system via connector M12x1.

NOTICE

Electrical control and cabling must be provided by the system builder.

Actuating the aerosol control valve by means of the manual control unit (optional) is allowed only for test purposes.

6 Startup

DANGER

Electricity

Risk of injury from electric shock.

– Only qualified electricians may work on the electrical equipment.

CAUTION

Hazardous fluids

Health risk from contact with cooling lubricant. Contamination of the environment.

– Wear personal protective gear.
– Avoid skin contact with cooling lubricant.
– Do not inhale the aerosol or spray into eyes.
– Follow the safety instructions of the cooling lubricant manufacturer.
– Heed the legal provisions for setup of the system and the disposal of cooling lubricants.

CAUTION

Harmful or irritating substances

Risk of injury from gases/aerosols (aerosol particles size 0.1 - 0.5 µm).

– Use a suitable exhaust system to maintain workplace limits and minimize the risk of fire and explosion at the machine tool.

NOTICE

Pneumatic components

Bursting/exploding of components.

– Use pneumatic components (e.g. rotary feedthrough, hoses...) that are designed for 10 bar or 16 bar and resistant to chemicals.

6.1 Prior to initial startup

⇨ All attached components are installed (see connection diagram [➞ 25]).

⇨ The system container and replenishing unit (optional) were correctly connected and filled.

⇨ The aerosol switchover valve is pneumatically and electrically connected [➞ 34].

⇨ System is connected pneumatically and hydraulically.

⇨ At least 6 bar and max. 10 bar air pressure and air purity are guaranteed.

1. Connect the supply and return lines.

➢ Connections must not exert any stress on other parts.

2. Check the voltage of the power supply.
3. Connect the AerosolMaster and control system (XS1) electrically.
4. Connect the oil return from the oil separator correctly.
5. Install optional accessories.

NOTICE

Trapped pressure

Pressurized aerosol can be trapped between the AerosolMaster and tool.

This can be caused by tools without coolant bores and/or clogged coolant bores.

The system builder/operator of the system must ensure that depressurization occurs [➞ 9] as soon as the minimum quantity lubrication system (MMS) is switched off.

NOTICE

The connection and the optimization of the setting values must only be carried out by qualified and instructed technical experts.

NOTICE

Observe maximum filling height!

The current fill level can be read from the fill level indicator on the oil container.

Leakage decreases the performance of the system. Air cleanliness of the supply line ISO 8573-1.

6.2 Filling the system

Filling without replenishing unit

CAUTION

Risk of injury to eyes and face from pressurized line between ball valve/ aerosol switchover valve and AerosolMaster

The processing machine must not be in operation during the filling process.

– Switch off the AerosolMaster and the machine system.

NOTICE

Mixing of cooling lubricants in the MMS system

Damage to the minimum quantity lubrication system

– Do not mix different cooling lubricants for minimum quantity lubrication systems.
– Use only approved or recommended cooling lubricants.
– Prior to changing the medium, empty the oil tank.

– Fill the oil tank prior to initial startup.
– Replenish the oil tank when requested to do so on the display.
– The fill level can be checked via the fill level indicator on the oil tank.

A Fill opening plug
B Oil tank
C Drain connection Ø 12 mm
D Ball valve for filling
E Fill level indicator
F Ball valve for emptying

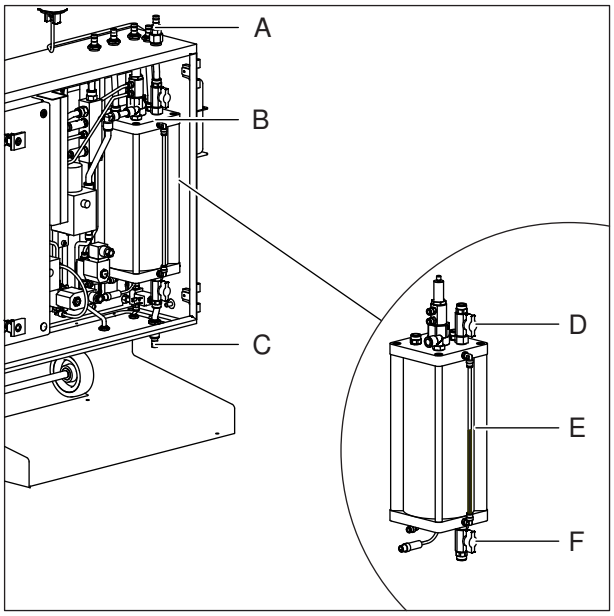


Fig. 7.2.1

Model 1

⇨ The system is switched off.
⇨ Aerosol switchover valve/ball valve is vented and switched off.
1. Remove the plug from the fill opening.
2. Open the ball valve for filling the container.

3. Fill the container with oil via the fill opening using a funnel for example.

➢ To 2000 ml scale.

4. Check fill level during filling.

➢ The fill level can be observed via the fill level indicator.

5. After filling, reinstall plug in fill opening.
6. Close the ball valve for filling.

Model 2

1. Using the machine control system, set the "manual filling" bit, e.g. while the emergency-stop button is pushed.

➢ AerosolMaster is depressurized.

2. Remove the plug from the fill opening.
3. Open the ball valve for filling.
4. Fill the container with oil via the fill opening using a funnel, for example.

➢ To 2000 ml scale.

5. Check fill level during filling.

➢ The fill level can be observed via the fill level indicator.

6. After filling, reinstall plug in fill opening.
7. Close the ball valve for filling.
8. Using the machine control system, reset the "manual filling" bit, e.g. by releasing the emergency-stop button.

➢ Tank pressure is built up.

Filling with replenishing unit (optional)

⇨ System may be switched on.

1. Fill the oil tank prior to initial startup.

➢ Filling can take place during operation.

2. Replenish the oil tank when requested to do so on the display.
3. The fill level can be checked via the fill level indicator on the oil tank.

➢ See also the "Layout of replenishing unit" chapter [➞ 49].

Recommended lubricants see the "Approved lubricants" chapter [➞ 17].

Alternatively, other oils can be used for minimum quantity lubrication (customer-specific).

The list of approved oils can be requested from KNOLL.

– During operation, re-check the fill level and, if necessary, refill with oil.
– Make sure that returning oil does not exceed the capacity of the system.
– Refill only with the oil used previously.
– When changing the oil, empty the system completely.

6.3 Switching on

The operating mode is selected via the menu.
During normal operation, the AerosolMaster is controlled from the machine tool.
Manual mode for testing or set-up of the system.

1. Switch on by means of the mains disconnect switch on the customer's machine tool.
2. Check whether the shut-off valve (manual) on the servicing unit is open; open if necessary.

➢ The system is ready for operation.

6.4 Switching off

1. Stop machining with the machine tools.
2. Switch off by means of the mains disconnect switch on the customer's machine tool.

For times of system non-operation or downtime, see Storage [→ 20].

7 Operation

NOTICE

Unwanted operating situation

Operation by trained personnel only.

During normal operation, the AerosolMaster is controlled from the machine tool.

7.1 Interface description

A detailed interface description is provided in the appendix as an additional document.

7.2 Signal indicator lamp

A Signal indicator lamp

B Red=Fault (continuous signal)
Red=Warning (flashing)

C Yellow=System switched on (continuous signal)

D Green=System ready for operation (continuous signal)

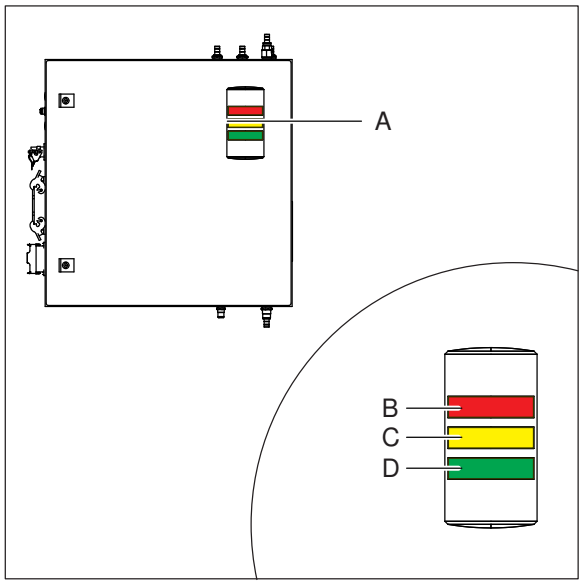


Fig. 8.2.1

Learn the meaning of the signal colors so that you can react faster in an emergency.

7.3 Aerosol program

7.3.1 Parameter list

Cooling channel diameter (mm)	< 0.5		0.5-1.5		1.5-2.5		2.5-3.0		3.0-3.5		3.5-4.0		4.0-4.5		4.5-5.0		5.0-6.0	
AerosolMaster	O	p	O	p	O	p	O	p	O	p	O	p	O	p	O	p	O	p
Program number																		
1 (variable)	-	-																
2 (variable)	-	-																
3 (variable)	-	-																
4			*	5.4														
5			**	5.4														
6			***	5.4														
7					*	4.7												
8					**	4.7												
9					***	4.7												
10							*	4.0										
11							**	4.0										
12							***	4.0										
13									*	3.3								
14									**	3.3								
15									***	3.3								
16											*	2.6						
17											**	2.6						
18											***	2.6						
19													*	1.9				
20													**	1.9				
21													***	1.9				
22															*	1.2		
23															**	1.2		
24															***	1.2		
25																	*	0.5
26																	**	0.5
27																	***	0.5
28	Air program 2.5 bar																	
29	Air program 5.0 bar																	
30	Air program 7.5 bar																	

Fig. 8.3.1

* Oil content, low
** Oil content, medium
*** Oil content, high
O = Nozzle pressure [bar]
p = Container pressure [bar]

7.3.1.1 Aerosol program setting aid

The parameter list can be used to select 30 programs on the AerosolMaster for aerosol generation.

Program numbers 1 – 3: Values can be specified variably via the machine control system (Profibus/Profinet coupling).

Program numbers 4 – 30: Values are permanently stored in the AerosolMaster software and cannot be changed.

Programs 28 – 30 are defined as air programs without oil aerosol generation (e.g. for dry processing).

The program number is selected from the parameter list, the selection is determined by the cooling bore diameter of the tools.

This setting aid can be used for all tool types.

A Parameter list
B Cooling bore diameter Ø 0.5 - Ø 1.5 mm
C Selection program number group
D Container pressure

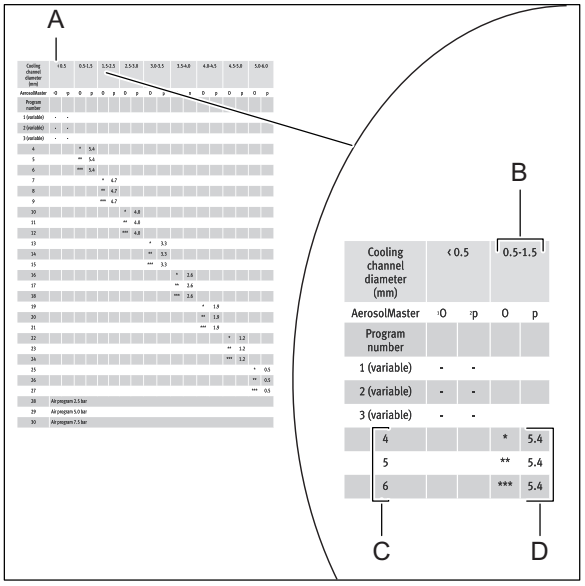


Fig. 8.3.1.1.1

Reamer as an example:

⇨ 2 internal cooling bores, each Ø 1.0 mm.

⇨ Only one cooling bore is considered for the program selection.

1. Selection program number Group 4 – 6.

➢ Program 4 = Low oil content.

➢ Program 5 = Medium oil content.

➢ Program 6 = High oil content.

If the cooling bore diameters of the tool are < Ø 0.5 mm, program numbers 1 – 3 should be used in preference by specifying pneumatic pressures on the basis of the maximum pressure.

It must be ensured that the nozzle pressure is higher than the container pressure.

This differential pressure is monitored in the AerosolMaster software.

NOTICE

The nozzle pressure must be higher than the container pressure.

This setting aid is not compulsory and may deviate from the required setting values.

If the program number group increases for the same tool (lower container pressure), less oil content is applied to the cutting edge.

If the program number group reduces for the same tool (higher container pressure), more oil content is applied to the cutting edge.

8 Maintenance

DANGER

Electricity

Risk of injury from electric shock.

– Only qualified electricians may work on the electrical equipment.

CAUTION

Compressed air

Risk of injury from pressurized parts.

– Before performing maintenance tasks, depressurize the unit.

CAUTION

Hydraulics

Risk of injury from pressurized parts.

– Before performing maintenance tasks, depressurize the unit.

CAUTION

Hazardous fluids

Health risk from contact with cooling lubricant. Contamination of the environment.

– Wear personal protective gear.
– Avoid skin contact with cooling lubricant.
– Do not inhale the aerosol or spray into eyes.
– Follow the safety instructions of the cooling lubricant manufacturer.
– Heed the legal provisions for setup of the system and the disposal of cooling lubricants.

CAUTION

Harmful or irritating substances

Risk of injury from gases/aerosols (aerosol particles size 0.1 - 0.5 µm).

– Use a suitable exhaust system to maintain workplace limits and minimize the risk of fire and explosion at the machine tool.

NOTICE

Pneumatic components

Bursting/exploding of components.

– Use pneumatic components (e.g. rotary feedthrough, hoses...) that are designed for 10 bar or 16 bar and resistant to chemicals.

NOTICE

Improper maintenance

Damage to the product.

– Modification and changes of the product are only permissible following consultation with the manufacturer.
– Use only accessories and spare parts approved by the manufacturer.

Identify hoses when replacing them.

9 Optional accessories

9.1 Pressure module

Layout

A Air pressure "inlet'
B 3/2 way Ball valve
C Air pressure "outlet"
D Mounting plate
E Pressure amplifier
F Pressure tank (10 or 16 bar)
G Safety valve

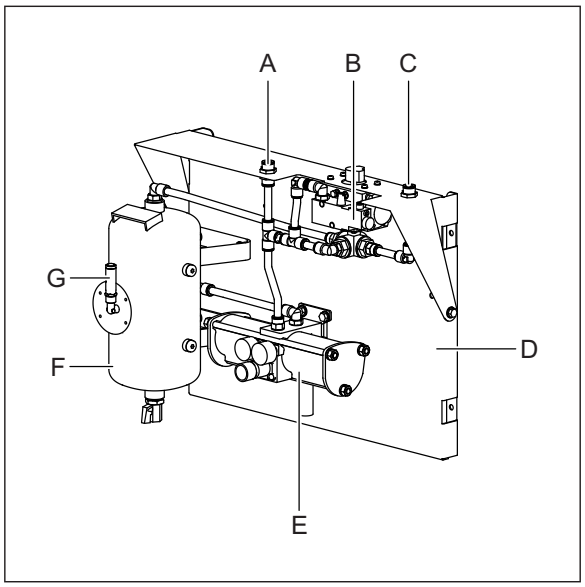


Fig. 10.1.1

The pressure module is used when the available line pressure is insufficient for the corresponding processing.

Pressure modules are operated at 10 or 16 bar to meet customer requirements and assembled to customer requirements.

For additional information, see the section Drawings [➞ 56].

9.1.1 Connecting the pressure module

⇨ The system is switched off.
⇨ Pneumatic components are designed for the desired output pressure.
⇨ Min. 6 bar air pressure supply is guaranteed.
1. Connect 3/2-way directional control valve electrically via M12x1 connector on the machine control system.
2. Connect 'Inlet" and "Outlet" air pressure lines.

➢ Electrical control and cabling must be provided by the system builder.

3/2-way ball valve control

The 3/2-way ball valve valve must be controlled by the machine control system (by the customer).

➢ The 3/2-way ball valve can be set between:

– Output pressure = Inlet pressure

– Output pressure = 10 bar or 16 bar

9.2 Replenishing units

Layout of ARU 10

A Electrical connection/24 V
B Level float switch
C Fill port
D Inspection glass
E Pump
F AerosolMaster oil supply connection
G Oil separator oil return connection
H Filter
J AerosolMaster oil return connection

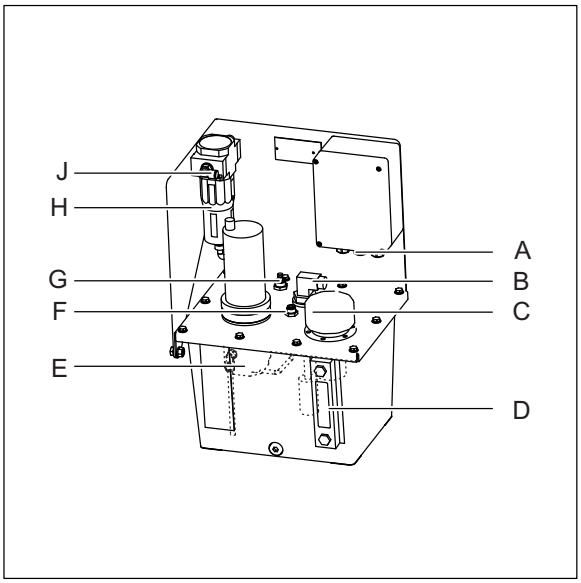


Fig. 10.2.1

Layout of ARU 25

A Electrical connection/24 V
B Level float switch
C Fill port
D Inspection glass
E Pump
F AerosolMaster oil supply connection
G Oil separator oil returns connection
H Filter
J AerosolMaster oil return connection

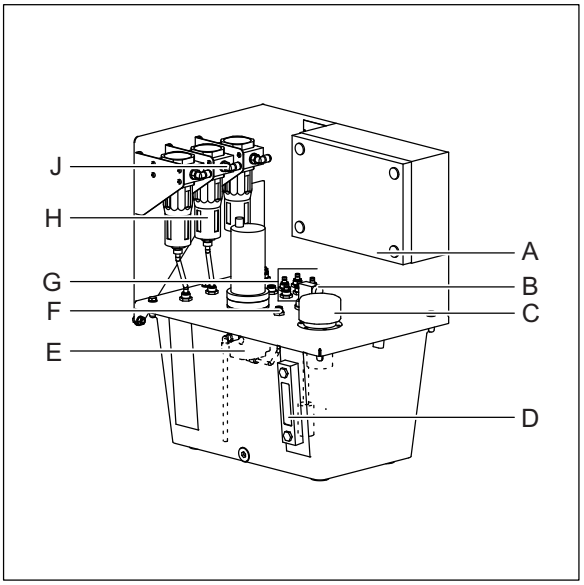


Fig. 10.2.2

The replenishing unit is used for automatic filling of the oil tank in the AerosolMaster.

The replenishing unit can be filled during operation.

When necessary, the cooling lubricant is pumped into the oil/liquid container via the AerosolMaster connection.

ARU 10 can automatically fill 1 AerosolMaster and ARU 25 up to 6 AerosolMasters.

The fill capacities for the 2 variants below are:

ARU 10 = 10 liters

ARU 25 = 25 liters

9.2.1 Connecting the replenishing unit

⇨ The system is switched off.

⇨ Oil return line (**G**) between oil separator and replenishing unit is max. 2 meters long.

1. Connect oil return (**G**) between oil separator and replenishing unit.

➢ (Hose size PU-AD 8 mm).

2. Attach Aerosolmaster oil return to connection (**J**).

➢ (Hose size PU-AD 8 mm).

3. Connect the oil supply (**F**) to the lubricant supply connection.

➢ (Hose size PA-AD 6 mm at max. 25 bar).

4. Connect the line current.

➢ (power supply 24 V DC)

10 Eliminate faults

Fault	Possible cause	Remedy
No aerosol exits the tool or the external nozzle.	Insufficient medium in the pressure tank	Check content of the pressure tank and refill if required.
	Medium supply interrupted	Check the medium and ball valve connection. Check aerosol lines for damage and kinks.
	Compressed-air supply interrupted	Check the compressed-air supply and ensure that 6–10 bar compressed air is present.
		Check hose lines for damage and kinks.
	Valves do not open	Have the valves checked by an electrician and replace if required.
		Check control system.
		Check compressed air supply.
	Hose lines are kinked	Lay hose lines without kinks.

10.1 Alarm messages

NOTICE

Faults may only be dealt with by trained personnel in conformance with the relevant safety instructions of the corresponding operating instructions.

Message:	Possible cause:	Remedy:
Warning message: Refill replenishing container	The fill level prewarning indicates that the fill capacity is not reached.	Refill replenishing container
	Electrical connection interrupted.	Check the electrical connection.
	Level monitoring switch faulty.	Replace level monitoring switch.
Warning message: Replenishing container empty	The lower fill level warning indicates that the fill capacity is not reached	Refill replenishing container.
	Electrical connection interrupted.	Check the electrical connection.
	Level monitoring switch faulty.	Replace level monitoring switch.
Liquid container fill level fault message	Liquid container is empty or overfilled.	Check fill level and correct if necessary.
	Level monitoring switch is faulty	Contact KNOLL Service.
Fault message: No aerosol generation	Pre-selection of incorrect pressure parameter for program numbers 1-3 for nozzle pressure and container pressure.	The nozzle pressure must be higher than the container pressure.
Fault message: Inlet pressure	Compressed air supply is interrupted.	Check the connection.
	Supply output is too low.	Increase supply output.
		Enlarge supply line cross-section.

11 Maintenance

11.1 Maintenance intervals

Maintenance intervals during normal operation:

Daily

Weekly

After 500 operating hours (at least monthly)

After 1500 operating hours (at least quarterly)

After 3000 operating hours (at least semiannually)

After 6000 operating hours (at least annually)

Multiple-year intervals

– When operating under stringent requirements, correspondingly shorten the intervals.

– For service activities and intervals for third-party accessories, see the manufacturer's operating instructions.

11.2 Qualification

Maintenance and service personnel must have the appropriate qualifications for the arising tasks.

The activities in the maintenance charts are corresponding identified:

B: Operator

I: Maintenance technician

E: Electrician

11.3 Maintenance chart

After 500 operating hours

Component	Action	Comment	
AerosolMaster system	Visual check for leakage, check hose connections if required. Check all connections for firm seating.	Exchange if necessary.	I

After 1500 operating hours

Component	Action	Comment	
Servicing unit (optional)	Clean/replace filter.	See manufacturer's operating instructions.	I

After 6000 operating hours

Component	Action	Comment	
Replenishing unit (optional)	Replace the filter for the lubricant supply and aerosol return.		I

12 Drawings

12.1 Replacement part drawing

AerosolMaster

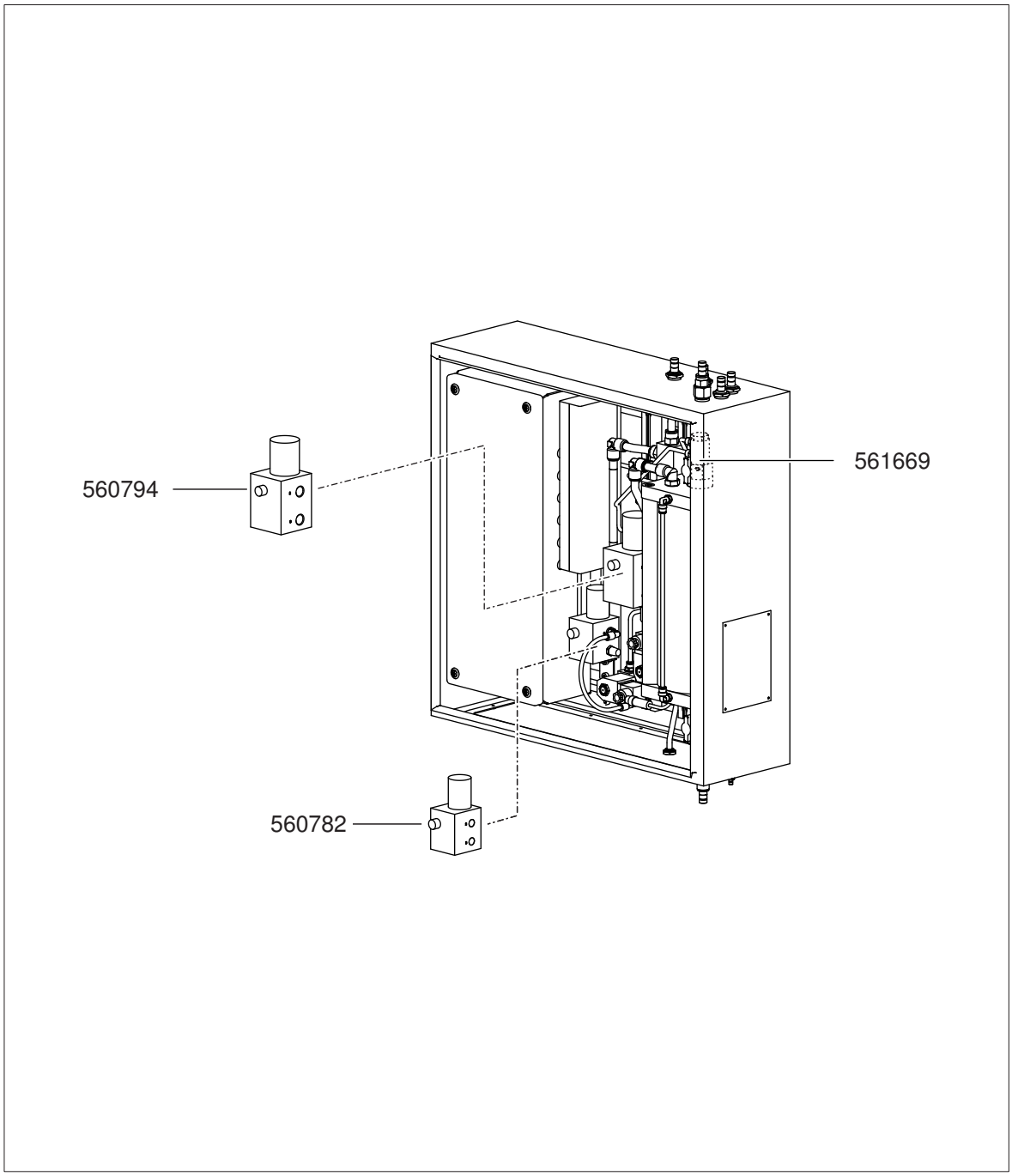


Fig. 13.1.1

The identification number listed and the identification number in the spare parts list must match.

In case of deviations from the standard, the identification number from the spare-parts list is binding.

12.2 Replacement part drawing - Pressure modules (optional)

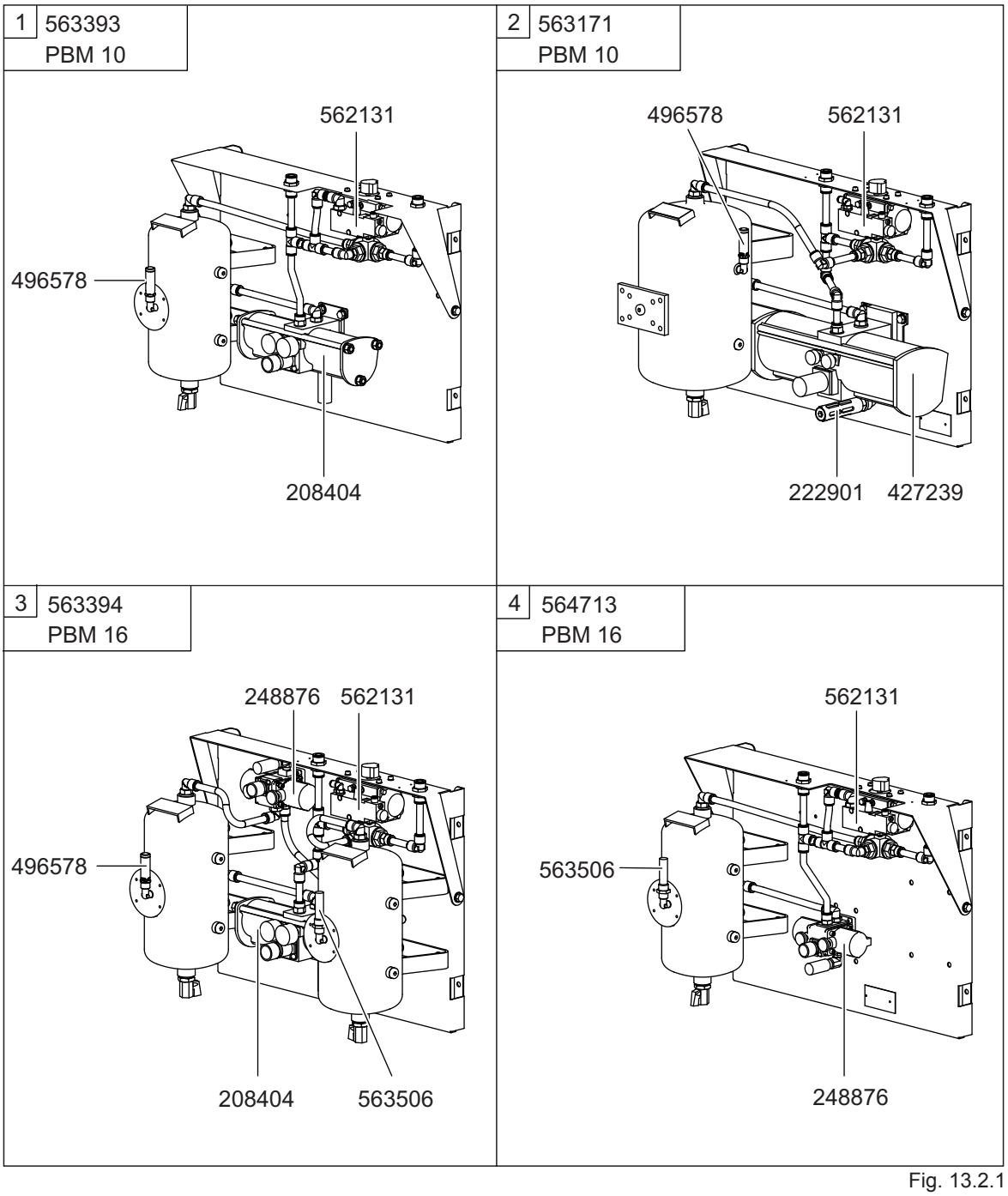


Fig. 13.2.1

The identification number listed and the identification number in the spare parts list must match.

In case of deviations from the standard, the identification number from the spare-parts list is binding.

12.3 Replacement part drawing - Accessories (optional)

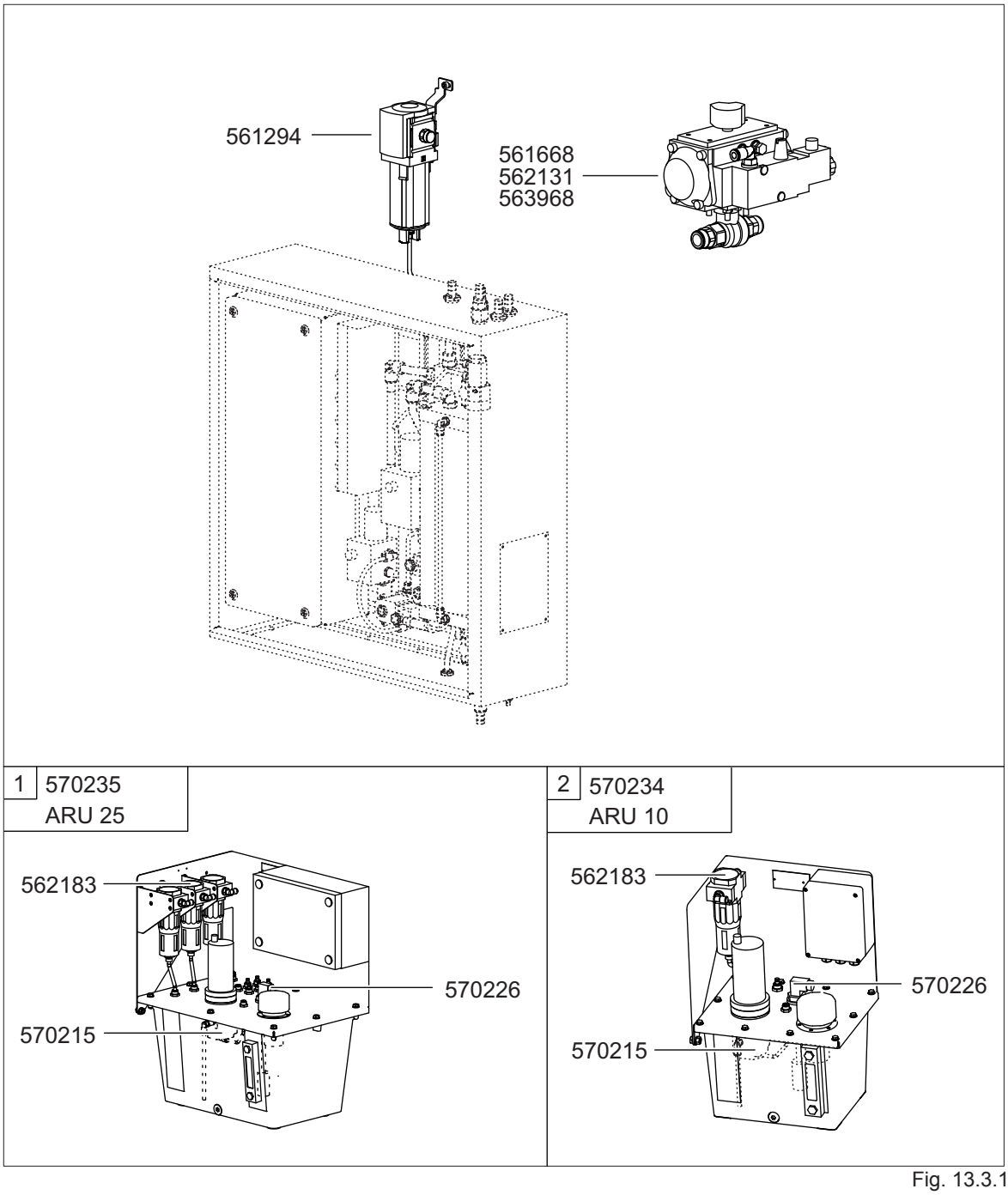


Fig. 13.3.1

The identification number listed and the identification number in the spare parts list must match.

In case of deviations from the standard, the identification number from the spare-parts list is binding.

13 Disposal

CAUTION	
	**Hazardous fluids** Health risk from contact with cooling lubricant. Contamination of the environment. – Wear personal protective gear. – Avoid skin contact with cooling lubricant. – Follow the safety instructions of the cooling lubricant manufacturer. – Heed the legal provisions for setup of the system and the disposal of cooling lubricants.

This product as well as its parts must be disposed of properly in an environmentally friendly manner in accordance with national and local regulations.

1. Remove all fluids from the unit.
2. Dispose of materials and liquids separately.
   - Metals
   - Plastics
   - Greases and lubricants
   - Electrical assemblies

Electronic assemblies and their parts may not be disposed of as urban waste.

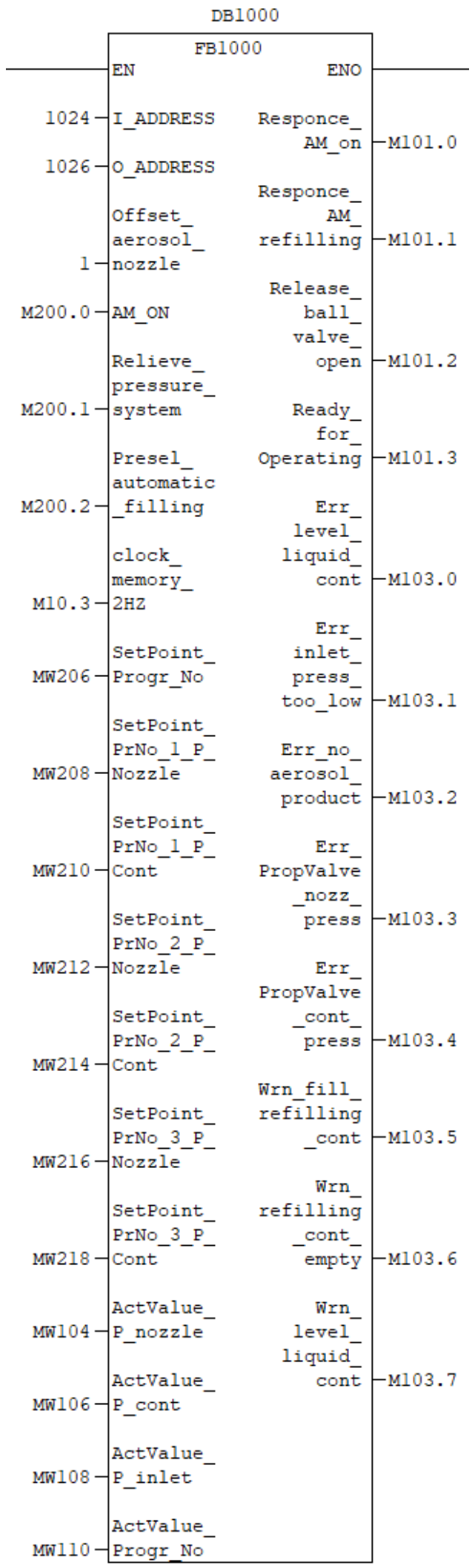
14 Appendix

14.1 Interface description

KNOLL
.It works

KNOLL Maschinenbau GmbH
Schwarzachstrasse 20
D-88348 Bad Saulgau
Tel. + 49 7581/2008-0
Fax + 49 7581/2008-90140
info.itworks@knoll-mb.de
www.knoll-mb.de

Call Function Module AEROSOL MASTER



Function module
AEROSOL MASTER® 4000 ATS for external control

KNOLL .It works

Parameter	Interface	Data type	Comment
I_ADDRESS	IN	INT	Start address input periphery
O_ADDRESS	IN	INT	Start address output periphery
Offset_aerosol_nozzle	IN	INT	Offset aerosol nozzle [0-3] Read off the value to be set on the nozzle
AM_ON	IN	BOOL	Switch on aerosol generation
Relieve_pressure_system	IN	BOOL	e.g. in case of emergency stop or manual filling, only when AEROSOL MASTER is switched off
Presel_automatic_filling	IN	BOOL	"0" = without refilling unit (manual filling) "1" = with refill unit
clock_memory_2HZ	IN	BOOL	Pulse flag 0.5 seconds
SetPoint_Progr_No	IN	INT	Set point program number 1-30
SetPoint_PrNo_1_P_Nozzle	IN	INT	Set point program number 1: Nozzle pressure [max 10,0 / 16,0 bar]
SetPoint_PrNo_1_P_Cont	IN	INT	Set point program number 1: Aerosol container press. [max 10,0/16,0bar]
SetPoint_PrNo_2_P_Nozzle	IN	INT	Set point program number 2: Nozzle pressure [max 10,0 / 16,0 bar]
SetPoint_PrNo_2_P_Cont	IN	INT	Set point program number 2: Aerosol container press. [max 10,0/16,0bar]
SetPoint_PrNo_3_P_Nozzle	IN	INT	Set point program number 3: Nozzle pressure [max 10,0 / 16,0 bar]
SetPoint_PrNo_3_P_Cont	IN	INT	Set point program number 3: Aerosol container press. [max 10,0/16,0bar]
ActValue_P_nozzle	INOUT	INT	Actual value nozzle pressure [bar]
ActValue_P_cont	INOUT	INT	Actual value aerosol container pressure [bar]
ActValue_P_inlet	INOUT	INT	Actual value inlet pressure [bar]
ActValue_Progr_No	INOUT	INT	Actual value program number
Responce_AM_on	OUT	BOOL	Response AEROSOL MASTER on
Responce_AM_refilling	OUT	BOOL	Feedback AEROSOL MASTER is automatically filled
Release_ball_valve_open	OUT	BOOL	Release open the ball valve Integrate the bit into the control of the ball valves
Ready_for_Operating	OUT	BOOL	Ready for Operating
Err_level_liquid_cont	OUT	BOOL	Error: Level liquid container
Err_inlet_press_too_low	OUT	BOOL	Error: Inlet pressure too low
Err_no_aerosol_product	OUT	BOOL	Error: No aerosol generation
Err_PropValve_nozz_press	OUT	BOOL	Error: Proportional valve nozzle pressure
Err_PropValve_cont_press	OUT	BOOL	Error: Proportional valve container pressure
Wrn_fill_refilling_cont	OUT	BOOL	Warning fill refilling container
Wrn_refilling_cont_empty	OUT	BOOL	Warning refilling container empty
Wrn_level_liquid_cont	OUT	BOOL	Warning level liquid container

Note: **In connection with a Heidenhain / Fanuc control the bytes have to be rotated**

Output Signals AEROSOL MASTER

Word	Byte	Bit	output signals	Data Type	Comment
0	0	0	Response AEROSOL MASTER on	BOOL	Aerosol generation activ
		1	Response AEROSOL MASTER is refilled	BOOL	
		2	Release open the ball valve	BOOL	Integrate the bit into the control of the ball valves
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
	1	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
2	2	0	Ready to switch on	BOOL	High-signal = message
		1	Error: Level liquid container	BOOL	"
		2	Warning: Filling system refill	BOOL	"
		3	Warning: Filling system empty	BOOL	"
		4	Error: Inlet pressure too low	BOOL	"
		5	Error: No aerosol production	BOOL	"
		6	Error: Proportional valve nozzle pressure	BOOL	"
		7	Error: Proportional valve container pressure	BOOL	"
	3	0	Warning: Level liquid container	BOOL	"
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
4	4		Actual value nozzle pressure [bar]	INT 16	max 10,0 bar / 16,0 bar
	5				
6	6		Actual value aerosol container pressure [bar]	INT 16	max 10,0 bar / 16,0 bar
	7				
8	8		Actual value inlet pressure [bar]	INT 16	max 10,0 bar / 16,0 bar
	9				
10	10		Actual value program number	INT 16	max 30
	11				
12	12		** spare **	INT 16	
	13				
14	14		** spare **	INT 16	
	15				
16	16		** spare **	INT 16	
	17				
18	18		** spare **	INT 16	
	19				
20	20		** spare **	INT 16	
	21				
22	22		** spare **	INT 16	
	23				
24	24		** spare **	INT 16	
	25				
26	26		** spare **	INT 16	
	27				
28	28		** spare **	INT 16	
	29				
30	30		** spare **	INT 16	
	31				

Input Signals AEROSOL MASTER

Word	Byte	Bit	Input Signals	Data Type	Comment
0	0	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
	1	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
2	2	0	AEROSOL MASTER on	BOOL	Switch on aerosol generation
		1	Depressurise the pressure system	BOOL	e.g. in case of emergency stop or manual filling, only when AEROSOL MASTER is switched off
		2	Preselection: Automatic filling	BOOL	"0" = without refilling unit (manual filling) "1" = with refill unit
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
	3	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
4	4		Set point program number	INT 16	1-30
	5				
6	6		Set point program number 1: Nozzle pressure	INT 16	max 10,0 bar / 16,0 bar
	7				
8	8		Set point program number 1: Aerosol container pressur	INT 16	max 10,0 bar / 16,0 bar
	9				
10	10		Set point program number 2: Nozzle pressure	INT 16	max 10,0 bar / 16,0 bar
	11				
12	12		Set point program number 2: Aerosol container pressur	INT 16	max 10,0 bar / 16,0 bar
	13				
14	14		Set point program number 3: Nozzle pressure	INT 16	max 10,0 bar / 16,0 bar
	15				
16	16		Set point program number 3: Aerosol container pressur	INT 16	max 10,0 bar / 16,0 bar
	17				
18	18		Offset aerosol nozzle	INT 16	from 0-3 Read off the value to be set on the nozzle
	19				
20	20		** spare **	INT 16	
	21				
22	22		** spare **	INT 16	
	23				
24	24		** spare **	INT 16	
	25				
26	26		** spare **	INT 16	
	27				
28	28		** spare **	INT 16	
	29				
30	30		** spare **	INT 16	
	31				

Pin Assignment (Digital)
AEROSOL MASTER® 4000

KNOLL
.It works

Pin Assignment XS1

PIN	Connection AEROSOL MASTER	Direction	Connection Machine	Comment
1	+24VDC / 4A	←		
2	0V / GND	←		
3	Program Number BCD 1 / Input 1	←		
4	Program Number BCD 2 / Input 2	←		
5	Program Number BCD 4 / Input 3	←		
6	Program Number BCD 8 / Input 4	←		
7	Program Number BCD 16 / Input 5	←		
8	Program Number Input 6	←		
9	+24VDC for Inputs	→		
10	AEROSOL MASTER On	←		Switch on aerosol generation
11	Depressurise the pressure system	←		only when AEROSOL MASTER is switched off
12	** spare **			
13	** spare **			
14	** spare **			
15	Warning: Level liquid container	→		
16	Ready to switch on	→		
17	Error: Level liquid container	→		
18	Warning: Filling system refill	→		
19	Warning: Filling system empty	→		
20	Error: Inlet pressure to low	→		
21	** spare **			
22	** spare **			
23	** spare **			
24	0V / GND for Outputs	→		

Pin Assignment XS4

PIN	Connection AEROSOL MASTER	Direction	Connection Filling System	Comment
1	0V / GND	→	1	
2	Filling system extern (Motor On)	→	2	
3	+24V DC	→	3	
4	** spare **		4	
5	Filling system not minimum	←	5	
6	Filling system not empty	←	6	
7	** spare **		7	
8	** spare **		8	
9	** spare **		9	
10	** spare **		10	

Note: **In connection with a Heidenhain / Fanuc control the bytes have to be rotated**

output signals AEROSOL MASTER

Word	Byte	Bit	Output Signals	Data Type	Comment
0	0	0	Response AEROSOL MASTER on	BOOL	Aerosol generation activ
		1	Response AEROSOL MASTER is refilled	BOOL	
		2	Response ball valve open	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
	1	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
2	2	0	Ready to switch on	BOOL	High-signal = message
		1	Error: Level liquid container	BOOL	"
		2	Warning: Filling system refill	BOOL	"
		3	Warning: Filling system empty	BOOL	"
		4	Error: Inlet pressure to low	BOOL	"
		5	Error: No aerosol production	BOOL	"
		6	Warning: Level liquid container	BOOL	"
		7	** spare **	BOOL	"
	3	0	** spare **	BOOL	"
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
4	4		Actual value nozzle pressure [bar]	INT 16	max 10,0 bar / 16,0 bar
	5				
6	6		Actual value aerosol container pressure [bar]	INT 16	max 10,0 bar / 16,0 bar
	7				
8	8		Actual value inlet pressure [bar]	INT 16	max 10,0 bar / 16,0 bar
	9				
10	10		Actual value program number	INT 16	max 30
	11				
12	12		** spare **	INT 16	
	13				
14	14		** spare **	INT 16	
	15				
16	16		** spare **	INT 16	
	17				
18	18		** spare **	INT 16	
	19				
20	20		** spare **	INT 16	
	21				
22	22		** spare **	INT 16	
	23				
24	24		** spare **	INT 16	
	25				
26	26		** spare **	INT 16	
	27				
28	28		** spare **	INT 16	
	29				
30	30		** spare **	INT 16	
	31				

input signals AEROSOL MASTER

Word	Byte	Bit	Input Signals	Data Type	Comment
0	0	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
	1	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
2	2	0	AEROSOL MASTER on	BOOL	Switch on aerosol generation
		1	Depressurise the pressure system	BOOL	only when AEROSOL MASTER is switched off
		2	Preselection: Automatic refilling on	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
	3	0	** spare **	BOOL	
		1	** spare **	BOOL	
		2	** spare **	BOOL	
		3	** spare **	BOOL	
		4	** spare **	BOOL	
		5	** spare **	BOOL	
		6	** spare **	BOOL	
		7	** spare **	BOOL	
4	4		Set point program number	INT 16	1-30
	5				
6	6		Set point program number 1: Nozzle pressure	INT 16	max 10,0 bar / 16,0 bar
	7				
8	8		Set point program number 1: Aerosol container pressur	INT 16	max 10,0 bar / 16,0 bar
	9				
10	10		Set point program number 2: Nozzle pressure	INT 16	max 10,0 bar / 16,0 bar
	11				
12	12		Set point program number 2: Aerosol container pressur	INT 16	max 10,0 bar / 16,0 bar
	13				
14	14		Set point program number 3: Nozzle pressure	INT 16	max 10,0 bar / 16,0 bar
	15				
16	16		Set point program number 3: Aerosol container pressur	INT 16	max 10,0 bar / 16,0 bar
	17				
18	18		** spare **	INT 16	
	19				
20	20		** spare **	INT 16	
	21				
22	22		** spare **	INT 16	
	23				
24	24		** spare **	INT 16	
	25				
26	26		** spare **	INT 16	
	27				
28	28		** spare **	INT 16	
	29				
30	30		** spare **	INT 16	
	31				