M12
M15
M18

Installation Instructions

BÖWE

IA M12-M15-M18 2018-02 /GB
SN 707767

CE

This machine complies with the EC Machinery Directive 98/37 EC, the EC Low Tension Directive 73/23 EEC as amended by RL 93/68 EEC, EMV-recommendation 89/336/EWG
and the Harmonised Standards:

EN ISO 12100-1 and 12100-2
EN 60204-1 (DIN-VDE 0113 Part I)
EN 1127-1

BÖWE

Dear Customer,

It gives us great pleasure to present you with your **BÖWE** machine. You are acquiring a machine that has been designed and manufactured to meet the highest quality standards and that corresponds to the latest standards in research and technology.

Please do not put these installation instructions away without reading them!

This manual contains all of the important information that you need to operate your dry cleaning machine.

If the prescribed maintenance work is neglected or improperly performed, if repair work is carried out by service technicians other than those authorized by BÖWE or if parts other than original BÖWE spare parts are used, we naturally cannot fulfill the guarantee obligations according to our General Terms of Delivery.

Measurements and other values reflect the status as of the printing date.

We reserve the right to make technical changes at any time and without prior notice in the interest of continuing development or when changes are considered to be necessary for constructional reasons.

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Necessary Operating Materials and Chemical Additives

Dear Customer,

In order to prevent any delays in the commissioning of your M12/M15/M18 dry cleaning machine, we ask you to make sure that the following operating materials and chemical additives are available.

- Solvent

The solvents used must have a flash point that is higher than the temperature stated on the machine nameplate. The polycyclic aromatic compound content is not allowed to exceed 0.01% by weight. The solvent must be heat-resistant under operating conditions.

The solvent flash point must be checked every six months.

We recommend that only fresh solvent should be used in order to avoid contamination through dirt, foreign substances and smells.

Total filling amount for the first filling:	M12: approx. 220 l (58.1 US gal) M15: approx. 260 l (68.7 US gal) M18: approx. 300 l (79.2 US gal)
Total filling amount for the first filling For the 3-tank model:	M12: approx. 280 l (73.9 US gal) M15: approx. 330 l (87.1 US gal) M18: approx. 380 l (100.4 US gal)
Tank I: Minimum filling volume:	M12: 60 l (15.8 US gal) M15: 75 l (19.8 US gal) M18: 90 l (23.8 US gal)
Tank II: Minimum filling volume:	M12: 60 l (15.8 US gal) M15: 75 l (19.8 US gal) M18: 90 l (23.8 US gal)
Tank III: Minimum filling volume:	M12: 60 l (15.8 US gal) M15: 75 l (19.8 US gal) M18: 90 l (23.8 US gal)

For machines with 2 economy filters: + 40 l (10.5 US gal)
For machines with 2 economy filters and 1 cartridge filter: + 55 l (14.5 US gal)

- Chemical additives

The chemical additives used must be halogen-free and must have a flash point that is higher than the temperature stated on the machine nameplate. The polycyclic aromatic compound content is not allowed to exceed 0.01% by weight. The chemical additives must be heat-resistant under operating conditions.

Depending on the equipment, the following should be available:

- Dry cleaning detergent
- Waterproofing agent
- Pre- and post-spotting agents

Caution

Attention !

Important information regarding solvents

When delivered, this machine is released only for the solvent specified on the nameplate.

At the time this manual was printed, the following statements are valid:

It is generally possible to use the following solvents:

- Cyclosiloxane (such as GreenEarth) with a flash point > 75°C
- Hydrocarbons (such as DF 2000) with a flash point > 60°C
- Hydrocarbons (such as Total TDC 3, among others) with a flash point > 55°C
- Polyglycolether (such as Rynex) with a flash point > 95°C
- Solvon K4 (Kreussler) with a flash point > 60°C
- HiGlo (Christeyns) with a flash point > 60°C
- Intense (Seitz) with a flash point > 60°C
- SENSENE (Safechem) with a flash point > 60°C

The use of the solvent perchlorethylene is not permitted!

The following must be observed in this regard:
If you plan to use the machine with a solvent whose data differs from that given on the machine nameplate, you must first consult with BÖWE and obtain its written authorization. This will require different software and a different nameplate.

Permission to operate the machine becomes invalid in case of non-compliance.

BÖWE

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1 General Information 1

1.1 Technical Literature 1.1

We make particular reference here to the literature and leaflets of the trade and professional associations, research institutes and mutual indemnity associations, as well as safety data sheets provided by the solvent producers.

1.2 Laws, Ordinances, Regulations 1.2

To avoid health risks and environmental damage, you must strictly comply with all directives and regulations pertaining to the industry, particularly with regard to proper handling of solvents.
In any case, you must observe the applicable laws and regulations in the country in which the machine is installed.

The machine complies with the following regulations:
- EC Machinery Directive 98/37 EC
- EC Low Voltage Directive 73/23 EEC in the version RL 93/68 EEC
- EMC Directive 89/336/EEC
- Pressure Equipment Directive 97/23/EC
- Explosion protection guidelines 94/9EC

Applied harmonized standards:
- EN ISO 12100-1 und 12100-2
- EN 60204-1 (DIN-VDE 0113 Part 1)
- EN 1127-1

Applied national standards and directives:
- BGVD4- Accident Prevention Regulations for Refrigeration Plants, Heat Pumps and Cooling Equipment)
- CFC and Halon Prohibition Ordinance

When operating the system in Germany, the following laws and directives must be observed:

- BG-Regel “Betreiben von Chemischreinigungen” (BGR 500 chapter 2.14)
- Water Resources Law (WHG § 19)
- Waste Disposal Law
- VDI guidelines
- VDE regulations
- 31st BImSchV
- GefStoffV with technical rules (Regulation for hazardous material)
- Operating safety regulation

1.3 Corrective Maintenance Work 1.3

We recommend that you commission the customer service department of the BÖWE organization for the maintenance, servicing and operating safety of this valuable drycleaning machine. They use original BÖWE spare parts.

2 Safety Regulations 2

Each person who is charged with the installation, commissioning, operation, maintenance or repair of the dry cleaning machine must first have read and understood the operating and installation instructions. In particular, we refer to the observation of the relevant laws and regulations for the countries in question.

The cleaning machine has been built according to the latest state of the technology. Only persons who are familiar with the machine and informed of the possible risks are authorized to set up, install, commission, operate, maintain and repair this machine. The relevant accident prevention regulations and other regulations involving safety and medical care for workers must be strictly adhered to.

Safety Symbols

This safety symbol identifies particular information regarding occupational safety. It points out hazards and serves to protect personnel from physical injury. You must observe all applicable laws and regulations; the information on occupational safety only emphasizes particularly dangerous areas. Failure to observe this information can result in serious consequences for the health, up to and including life-threatening injuries.

This symbol provides important information on the correct use of the machine. Failure to observe this information can lead to disturbances in the machine or surrounding area.

You are not permitted to bypass or turn off safety devices or to make them otherwise inoperative. You must observe all applicable industrial safety regulations during installation and repair work. You must dispose of distillation residues and process water in accordance with regulations.

2.1 Safe Installation and Commissioning 2.1

You must install the dry cleaning machine according to the enclosed installation instructions. The room must be sufficiently ventilated.

You are not permitted to operate the machine in potentially explosive areas or in areas in which systems with open flames have been installed. All electrical systems within a radius of 2 m (approximately 6.5 feet) must comply with the IP 54 degree of protection.

The BÖWE Organization Customer Service department is responsible for carrying out the first startup.

2.2 Authorized Use 2.2

This dry cleaning machine is designed exclusively for operation with solvents with flash points higher than the temperature information on the machine nameplate. (See "Necessary Operating Materials and Chemical Additives"). Handle these solvents directly only when absolutely necessary and wear protective gloves and goggles.

2 Safety Regulations 2

This closed-circuit dry cleaning machine for industrial use (including use in cleaning shops) is intended for cleaning textile articles (also leather or fur or for treating skins). This dry cleaning machine is not intended for customer access (such as in self-service shops).

You are not permitted to treat textiles that are easily inflammable or poisonous or that contain radioactive materials.

The definition of authorized use includes compliance with the operating, maintenance and repair conditions prescribed by BÖWE.

The manufacturer is not liable for damages resulting from unauthorized use or from changes to the system made without proper authority.

The machines M12, M15, and M18 are not intended for use in a potentially explosive area! A classification by zones according to the explosion protection guidelines outside the machine is not necessary!
Inside the machine and the still, only the still is categorized as zone 2!

2.3 Operation and Maintenance 2.3

Only trained service personnel who are familiar with the machine are authorized to operate and maintain the BÖWE dry cleaning machine. Safety regulations must be observed during operation and maintenance.

Do not start the system unless all protective devices (belt guard for cage and filter drive) are in place and working.

Check the operating safety of the machine (sealing test) and the liquid levels daily before turning it on. Dispose of lint, process water and distillation residues according to the operating instructions.

Do not perform any maintenance work when the machine is in operation. Make sure that the solvents, lubricants and chemical additives meet the specified quality requirements.
Perform maintenance work only when the machine is turned off and secured and has cooled off.

When the machine is not in operation cooling water feed must be cut off by means of a stop valve to be fitted on site.

2 Safety Regulations 2

	**<u>Attention:</u> Drain distillation residues only when the green lamp on the still is lit.** **The collecting tank must hold the amount that is expected to be drained and must be temperature and solvent-resistant at up to 150 °C (302 °F)**
	<u>Attention:</u> Check the liquid level before opening the still door
	**<u>Attention:</u> Do not allow distillation residues to reach the sewer system or garbage. You must dispose of these residues according to country-specific regulations on special waste.**

Requirements for the owner and operating personnel

	According to the legal stipulations of the German accident prevention regulations (BGR 500 chapter 2.14), special knowledge is required for the operation and maintenance of dry cleaning systems. A person with this special knowledge must regularly be present during the operation of dry cleaning systems.

As a person / body who runs a plant one is obliged to have the refrigerating plant of the dry cleaning machine inspected annually with regard to tightness.

2.4 Repair Work 2.4

Only skilled workers with suitable protection devices and work tools are authorized to carry out repairs. Make sure that there are no solvent emissions.

During repair and cleaning work:
Turn main switch off
Close the stop valves on the supply lines (steam, condensate and compressed air).
Make sure that the system cannot be turned on without permission (close off and put up a sign "<u>DO NOT TURN ON - REPAIR WORK</u> ")
Always remove the main fuse when working on the electrical system.
Use only original fuses to replace defective ones.
When working on pneumatic control parts, make sure that there is no pressure in the system.
Only specially trained refrigeration technicians are authorized to make repairs to the refrigeration unit.

All spare parts used must comply with the technical standards set by the manufacturer.

2 Safety Regulations 2

2.5 Decommissioning and Disassembling 2.5

	Only skilled workers with suitable protection devices and work tools are authorized to decommission and disassemble the system.
	When decommissioning and disassembling the machine, drain all solvent from the machine, including the pipelines, valves and fittings. You must remove residues that could cause environmental pollution.
	You must separate electric lines and pipelines that were used to supply or drain the machine from the supply network. Make sure that they cannot be turned on by unauthorized persons.

Have an authorized customer service technician dispose of the cooling agent from the refrigeration unit.

2.6 Further Safety Regulations 2.6

	This BÖWE dry cleaning machine works with a solvent. These solvents are harmful to the health in the context of the Hazardous Substances Ordinance.

Drinking, eating and food storage are prohibited in the area where the machine is installed.

Open flames and fires are not allowed in the operating area. No smoking is allowed.

Install steam generators in such a way that they do not draw in air that contains solvent.

A BÖWE customer service representative must train the personnel in the operation of the machine before the first startup. This training must include information on safe operation and possible hazards.

The owner is responsible for employing trained personnel to load and unload the machine and must employ well-informed and expert personnel for maintenance work. No unauthorized personnel are allowed in the area of the machine.

The daily checks prescribed in the operating instructions represent the minimum requirements. Operating personnel must immediately report any changes in the machine that could affect the safety.

2 Safety Regulations 2

The owner is obligated:

- to draw up clear regulations regarding responsibility for operation and maintenance, to ensure that the machine is only operated when it is in perfect condition and to ensure the order, safety and cleanliness at the workplace by means of instructions and inspections.

The owner is obligated to make sure that no working method is used that could place the health of the personnel, the environment or the safety of the machine at risk.

Notice and warning signs must be placed on the machine or in the operating area in plain sight. Damaged or missing signs must be replaced immediately. The specified safety regulations must be followed at all times.

In the event of any kind of hazard, stop the machine immediately and turn off the main switch.

If there is a solvent leak:

Turn off the machine

Immediately send all personnel into the open air

Open windows and doors

Cut off the cause of the solvent leak

Change any clothing that is wet with solvent

If necessary, request a BÖWE customer service technician.

The escape of larger amounts of solvent is a reportable malfunction. It must be reported to the responsible authorities, industrial control group, fire department, water resources board or subordinate water authorities.

2 Safety Regulations 2

The proper handling of solvent is an important prerequisite for workplace safety.

Note the following potential hazards:

Solvents are very good grease removers; they also remove natural oils from unprotected skin.
Protection: Wear solvent-resistant protective gloves; apply skin cream with oil to the hands.

Liquid solvents are strongly irritating to the eyes.
Protection: Wear protective goggles.

Solvents are combustible.
Protection: Avoid ignition sources (smoking, sparks, fire).

Risk of explosion if the flash point is lowered.
Protection: You must use solvents that have a flash point that is higher than the temperature stated on the machine nameplate. Use only chemical additives that do not lower the flash point.

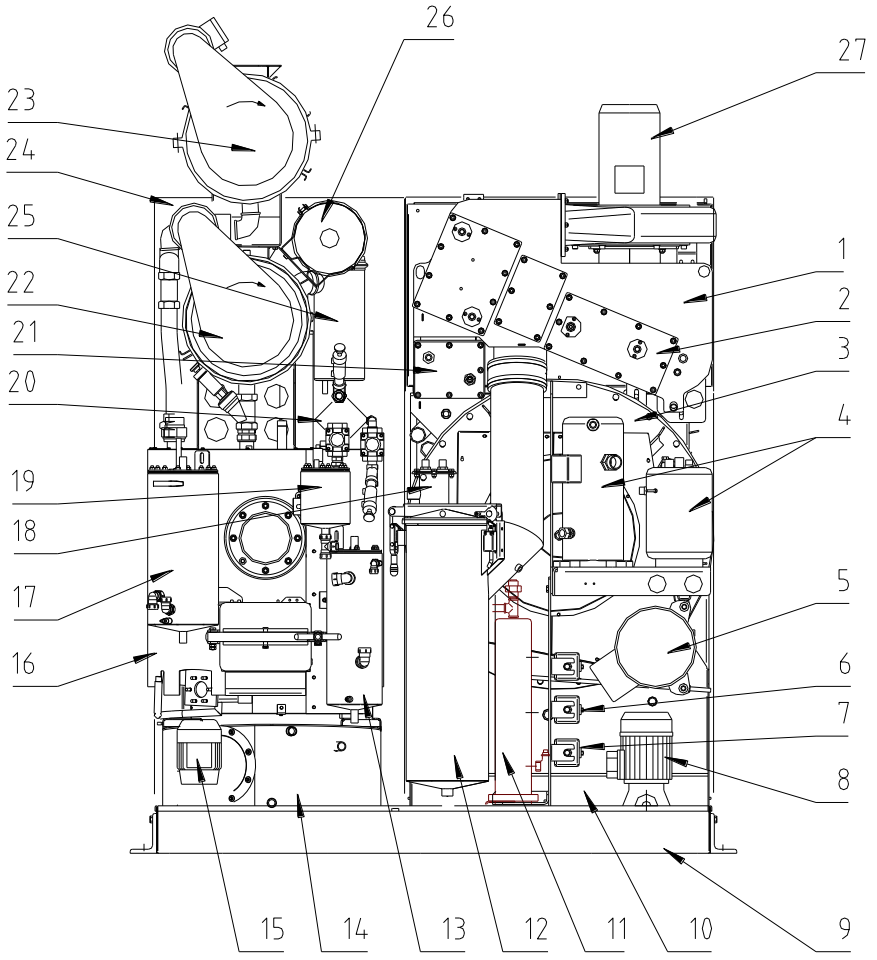
Ignition sources
Protection: Check pockets for cigarette lighters, matches and metallic objects.

Do not overload the machine!

You must hang up any operating instructions from the Clothing Mutual Indemnity Association in a visible location.

3 View of the Machine 3

Crossline



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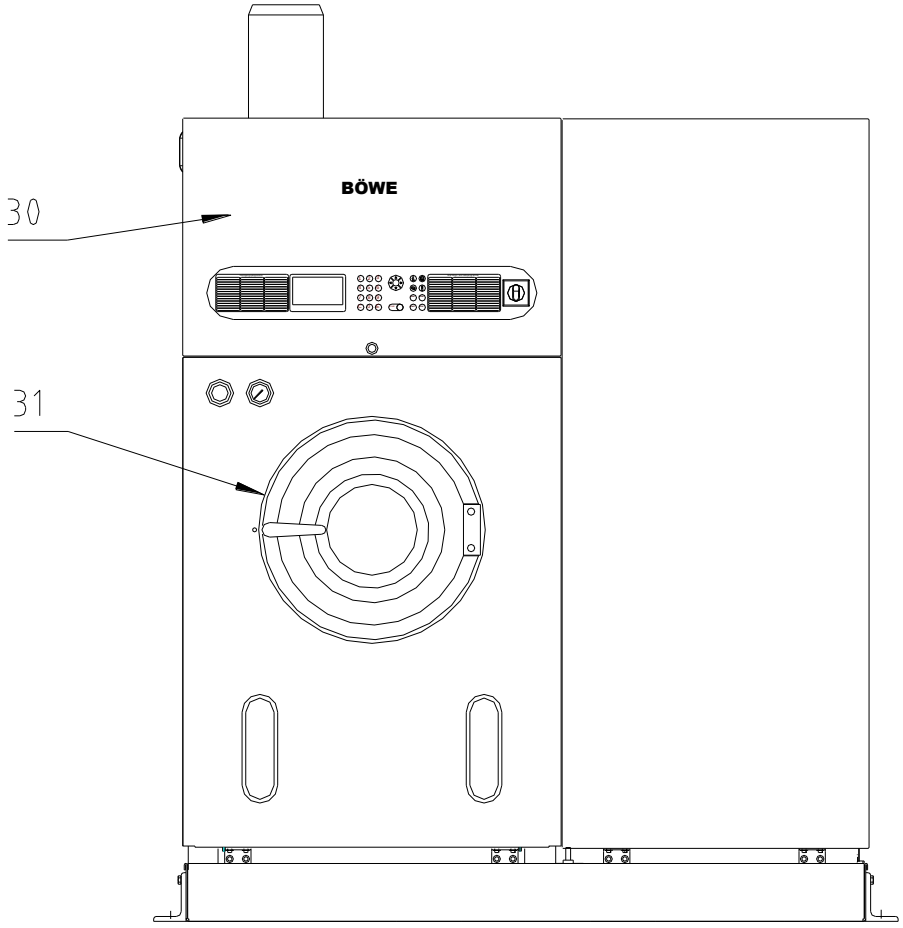
1	Airshaft	16	Still
2	Cooling register	17	Extraction tank
3	Cage housing with cage	18	Solvent cooling system
4	Refrigeration unit	19	Flash tank
5	Cage drive	20	Vacuum pump
6	Dosing unit	21	Heater battery
7	Sprayer *	22	Economy filter 1
8	Solvent pump	23	Economy filter 2 *
9	Safety trough	24	Filter drive
10	Tanks 1, 2	25	Condenser
11	Electric steam generator *	26	Adsorption cartridge filter 1*
12	Button trap with lint filter	27	Fan
13	Water separator		
14	Tank 3		
15	Pump for still rake out system		

* Option

3 View of the Machine 3

Crossline



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30 Switch box panel
31 Loading door

4 Transport 4

In order to guarantee that no damages result from the handling, we recommend that you consult with the appropriate experts for correct transport, installation and connection.

You must provide suitable tools and equipment for unloading, transporting, machine entry and installation. For example: crane, forklift, elevating truck, pulley block, rope, winch, crowbar, rollers, wooden block, wedges.

Caution

Attention: Note the center of gravity of the machine and secure against lateral tipping.

4.1 Entry 4.1

Normally the machine is packed in a crate or shipping box and kept in an upright position when being transported and brought in.

Package dimensions (box measurements)
M12/M15/M18

		Slimline	**Crossline**
Width	mm(in)	1150(45.3)	1970(77.6)
Depth M12-M15 /M18	mm(in)	2290(90.2) /2400(94.5)	1640(64.6) /1750(68.8)
Height	mm(in)	2410(94.9)	2460(96.8)
Entry dimensions after unpacking (without pallet, fan is dismantled)			
Width	mm(in)	1080(42.5)	1840(72.4)
Depth M12-M15 /M18	mm(in)	2165(85.2) /2275(89.5)	1406(55.3) /1540(60.6)
Height	mm(in)	1995(78.5)	1995(78.5)
Entry dimension without angle bracket for trough			
Width	mm(in)	935(36.8)	1695(66.7)

4 Transport 4

Package dimensions (box measurements)
M12/M15/M18 on **Softpad**

		Slimline
Width	mm(in)	1650(64.9)
Depth M12-M15 /M18	mm(in)	2400(94.5) /2500(98.4)
Height	mm(in)	2465(97.0)
Entry dimensions after unpacking (without pallet, fan is dismantled)		
Width	mm(in)	1500(59.0)
Depth M12-M15 /M18	mm(in)	2250(88.6) /2360(92.9)
Height	mm(in)	2050(80.7)

Seaworthy packing

Seaworthy packing without solvent	**Slimline (Kg / lbs)**	**Crossline (Kg / lbs)**
M12	1.255 / 2,766	1.355 / 2,987
M15	1.355 / 2,987	1.455 / 3,208
M18	1.525 / 3,362	1.555 / 3,428

Removing machine from the pallet:
Must be done by transport experts.
Lift the machine only at sturdy points.
Note the center of gravity of the machine and secure against lateral tipping.
To ensure a safe transportation of the machine,
the forklift should have the capacity to carry at
least 1.5(X) times of the weight of the machine.

5 Installation 5

5.1 Operating Environment 5.1

5.1.1 Regulations

You must observe applicable regulations for room ventilation and size, odor and noise emissions, accident prevention, etc. The switch panel contains contacts for the room ventilation control system (see Point 7.3.2).

Noise level: approx. 60 dB (A)
(Average value at 6 measurement points at a distance of 2 m (78.7 in) from the machine and 1.60 m (63.0 in) above the floor.

If there is an increase in the air-borne sound (for example, resonance) because of the spatial conditions at the place of installation (for example, the condition of and distances between walls and ceiling), you must take local sound insulation measures.

5.1.2 Temperature

Do not expose the machine to direct sunlight. Ensure that there is an adequate air supply for the heat exchange (heat buildup.)
Room temperatures under 5 °C (41 °F) are not permitted because of the risk that the water in the system will freeze.
During continuous operation, the room temperature is not permitted to exceed 35 °C (104 °F) because of increased solvent consumption and for safety reasons.

Heat dissipated to the surroundings: *				
		M12	M15	M18
kJ/cycle (approx.)		5100	7100	9000

* 2-bath procedure, precleaning bath low level for distillation

5.1.3 Structural Surroundings

Partitions, panels, suspended ceilings and other structures near the machine must be installed in such a way that they do not interfere with the operation, that no heat buildup occurs and that they can be easily removed for maintenance and repair work.

5 Installation 5

5.1.4 Machine Environment

Do not operate systems with open flames (such as gas-heated flatwork ironer, tumbler) in the same area (machine room)

In the machine room or within 2 m (78.3 inches) of the machine, no hot surfaces with temperatures above the ignition temperature of the solvent are permitted.
Use a hose to vent the machine system outside or connect to the room ventilation system.

You must ensure that the air from the machine room cannot escape into a heating room, if there is one in the area.
The air from the machine room is not permitted to be fed into the exhaust line of a furnace system.

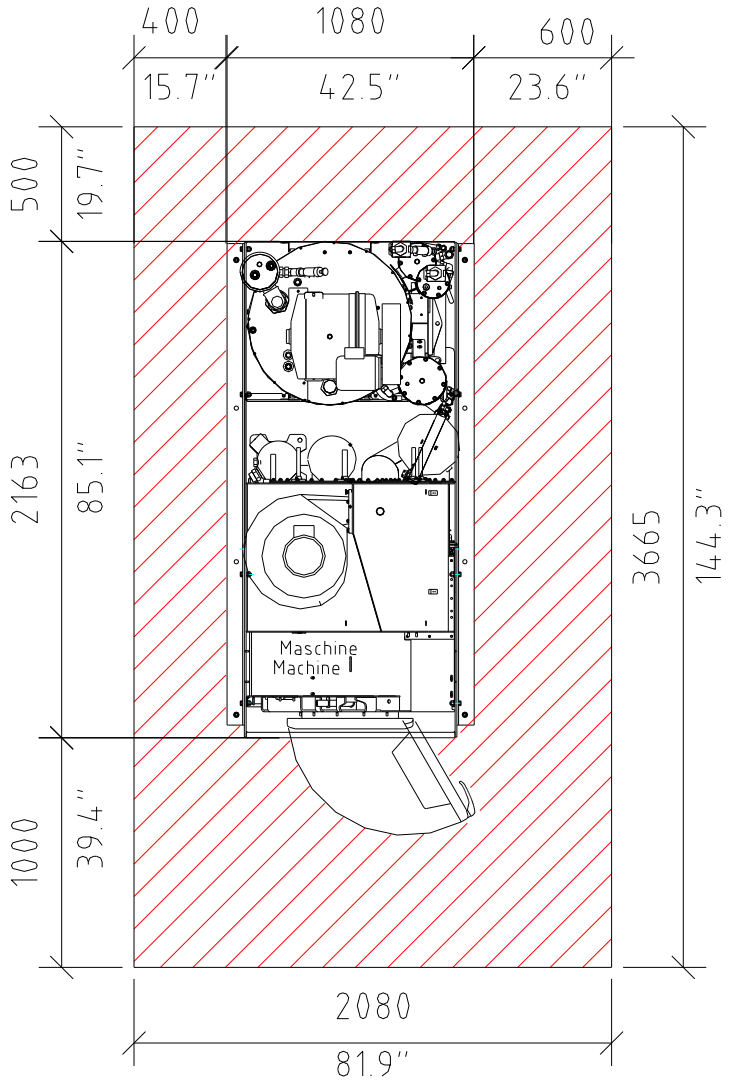
5 Installation 5

5.2 Place of Installation 5.2

5.2.1 Space Requirements

The machine must be accessible for operation and maintenance and repair work (see hatched areas).

Slimline M12-M15:



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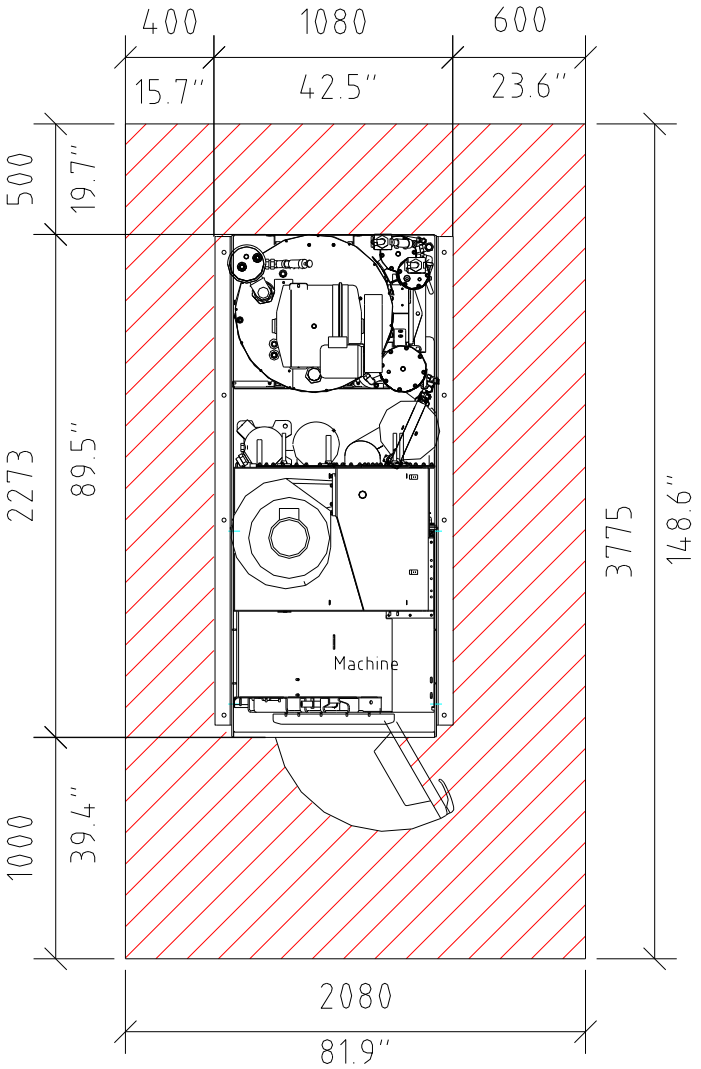
5 Installation 5

Slimline M18:



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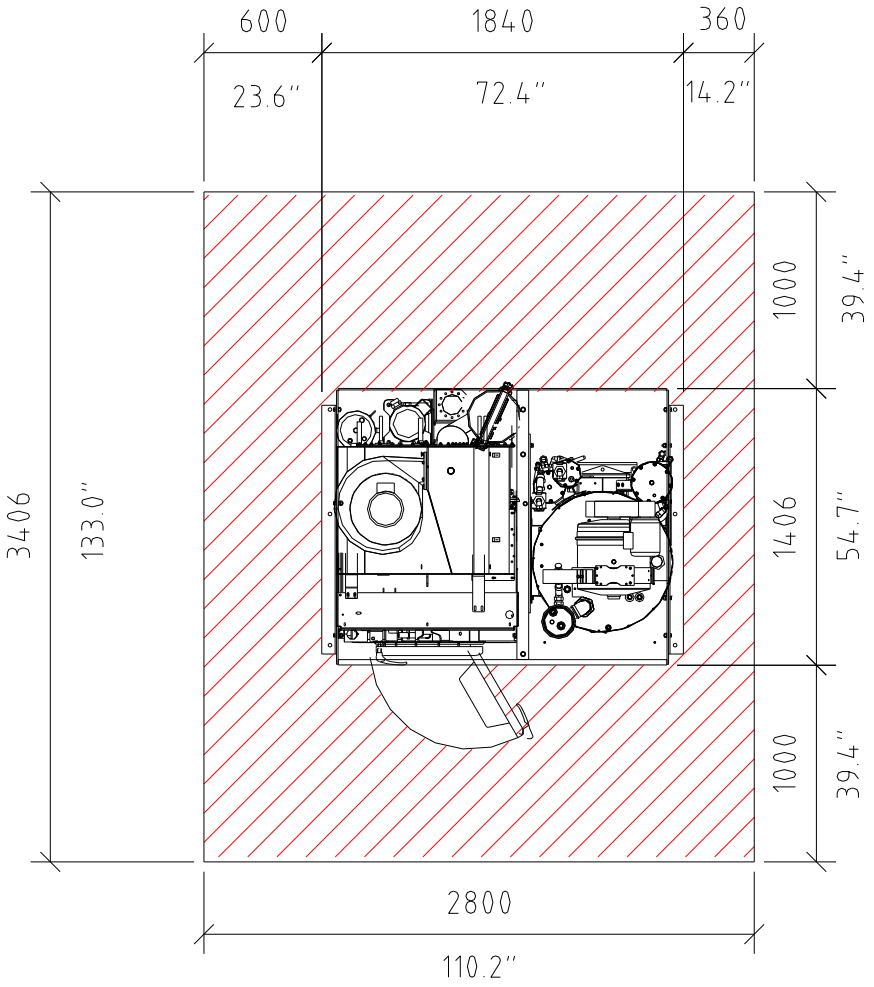
5 Installation 5

Crossline M12-M15:



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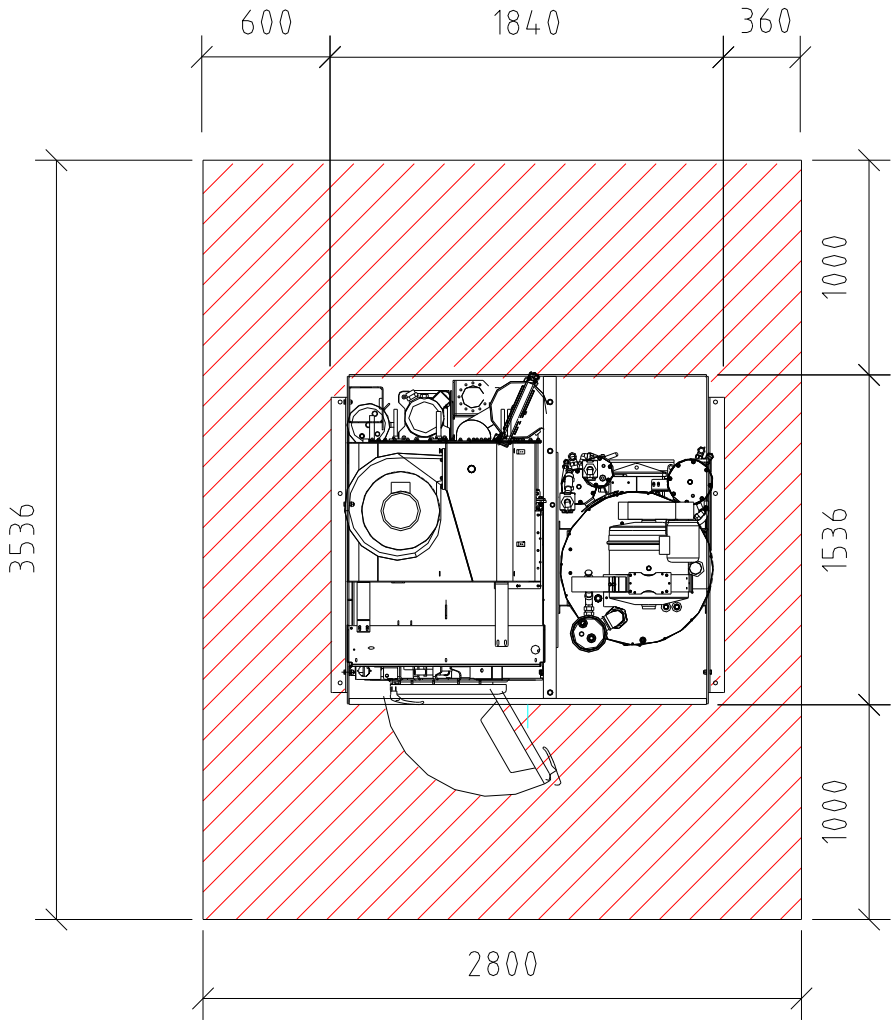
5 Installation 5

Crossline M18:



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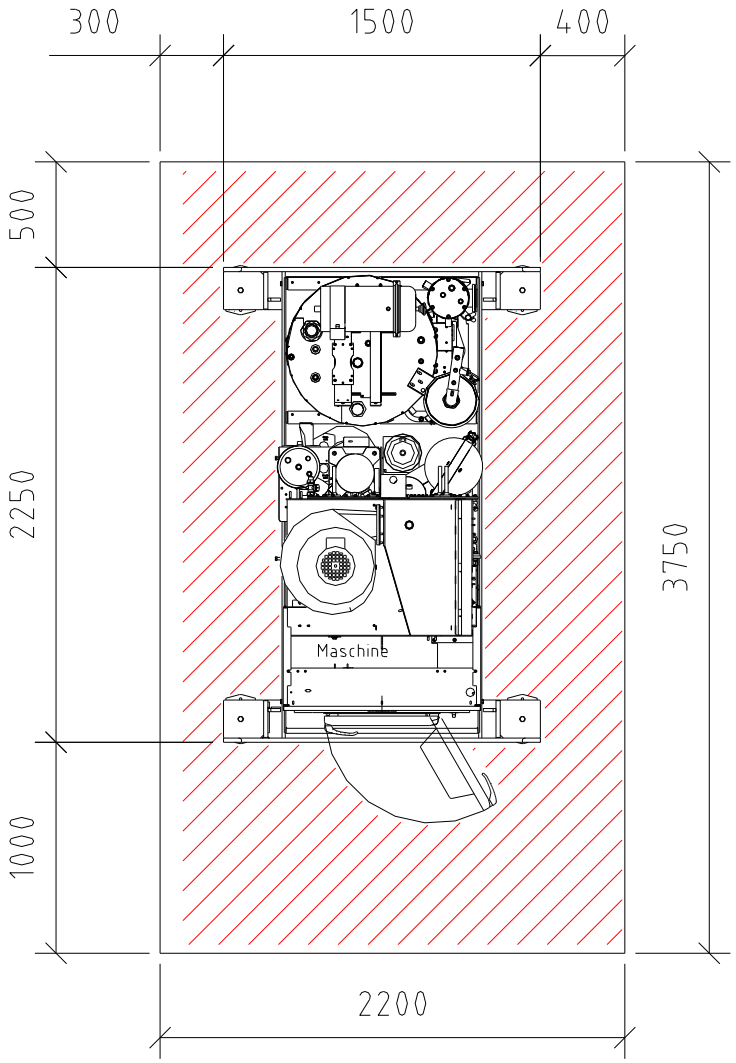
5 Installation 5

Slimline M12-M15 Softpad:



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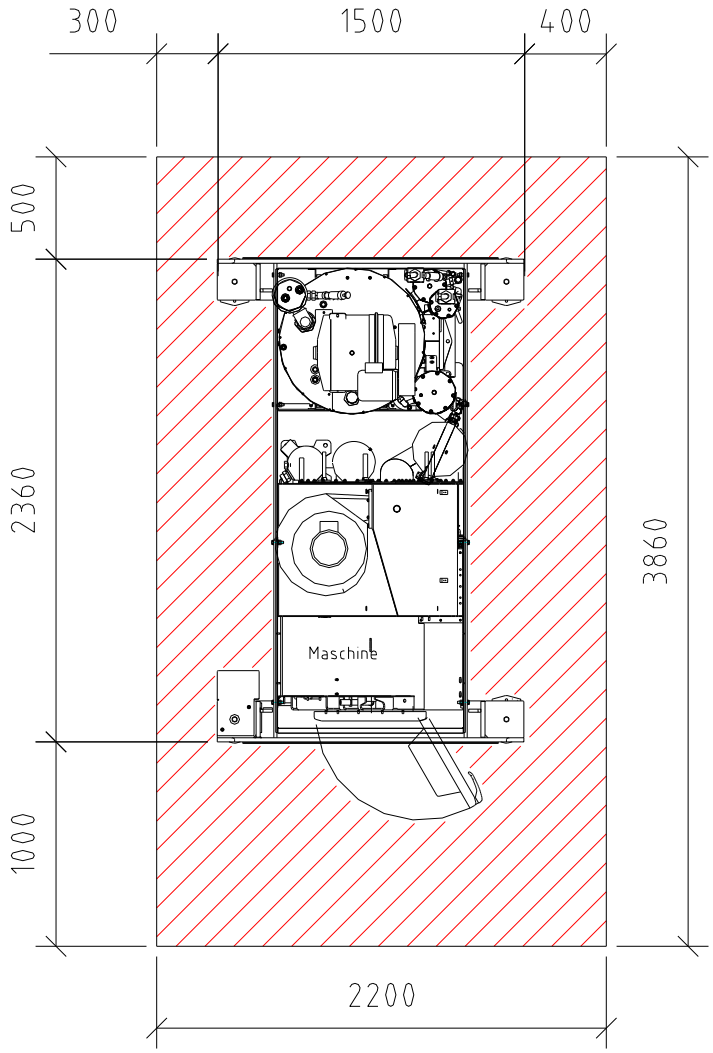
5 Installation 5

Slimline M18 Softpad:



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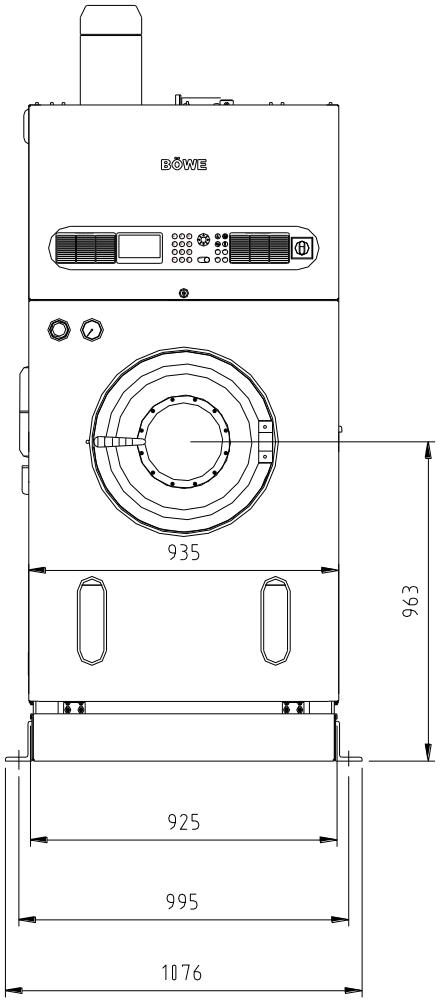
5 Installation 5

5.2.2 Machine Dimensions

M12-M15-M18		Slimline	Crossline
Width without angle bracket	mm (in)	935 (36.8)	1689 (66.4)
Width with angle bracket	mm (in)	1080 (42.5)	1840 (72.4)
Depth M12-M15	mm (in)	2162 (85.1)	1406 (55.3)
Depth M18	mm (in)	2273 (89.)	1536 (60.4)
Height inc. trough	mm (in)	2260 (88.9)	2260 (88.9)
Height inc. trough without fan motor	mm (in)	1995 (78.5)	1995 (78.5)

The dimensions given may differ if special options are used



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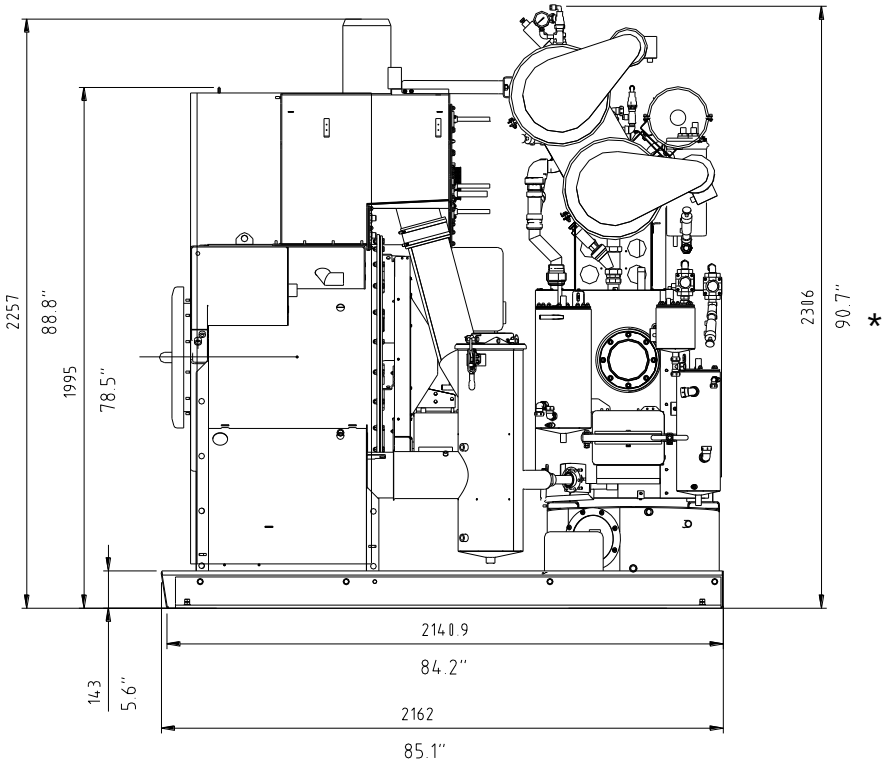
5 Installation 5

Slimline M12-M15



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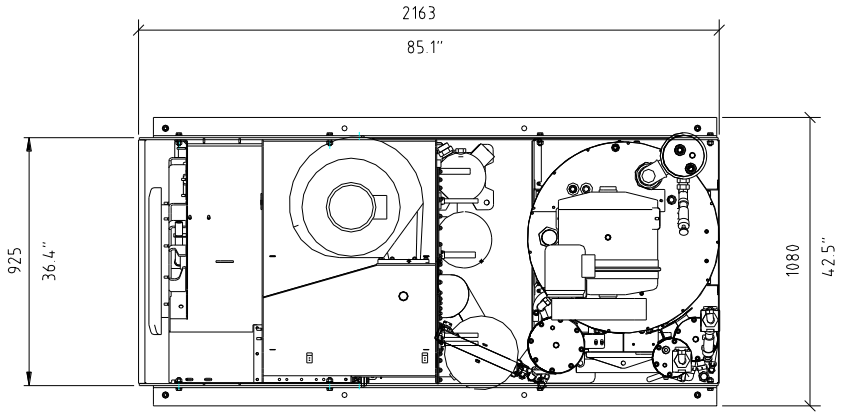

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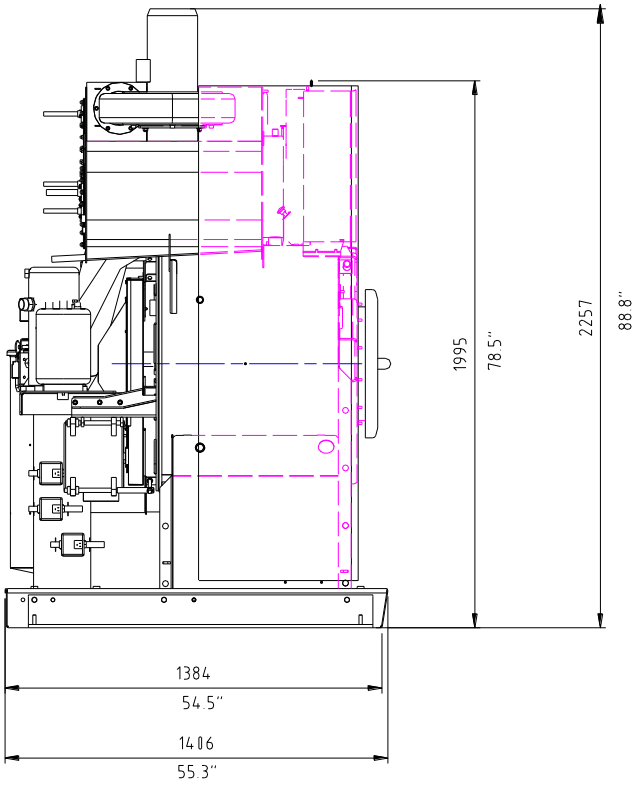
5 Installation 5

Crossline M12-M15



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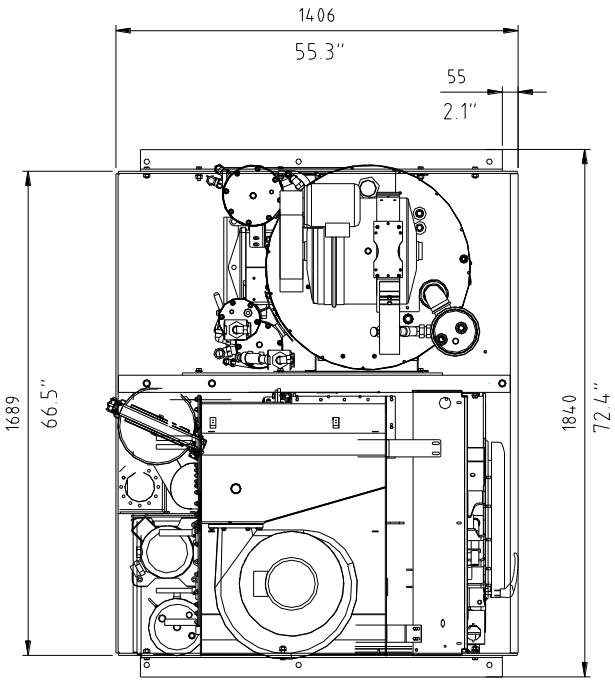

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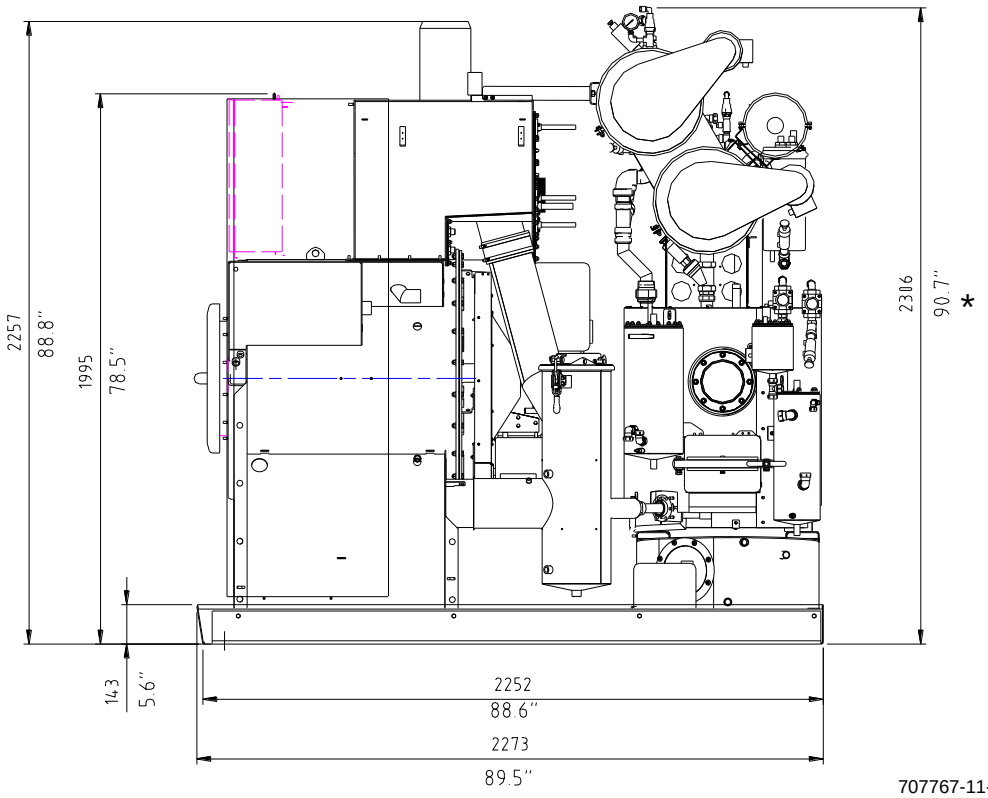
5 Installation 5

Slimline M18



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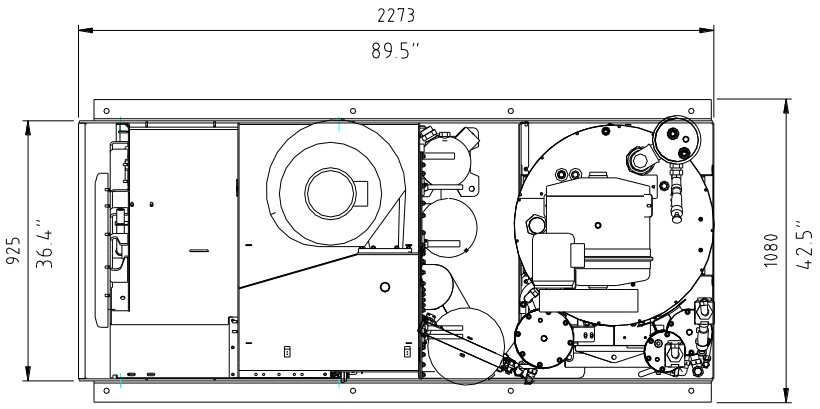
* only by second filter



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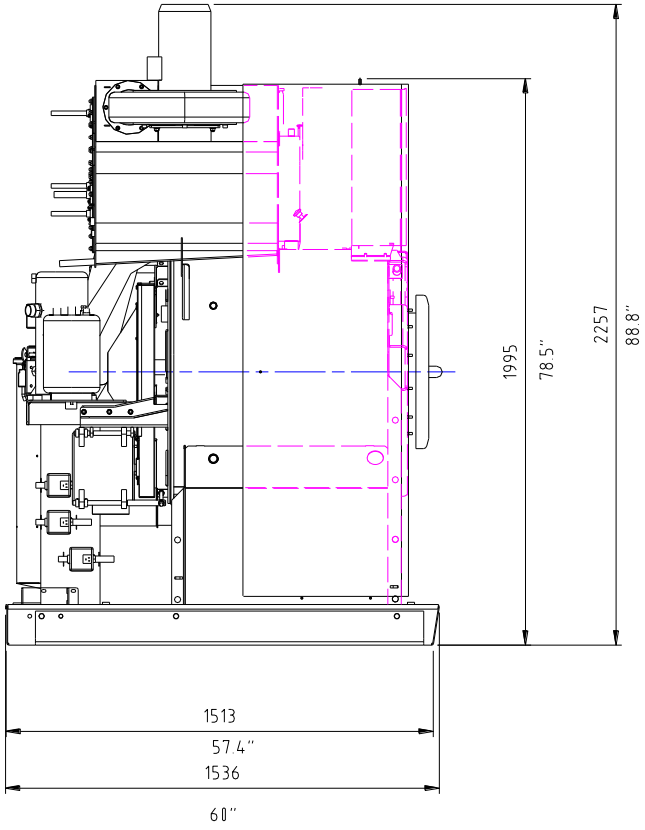
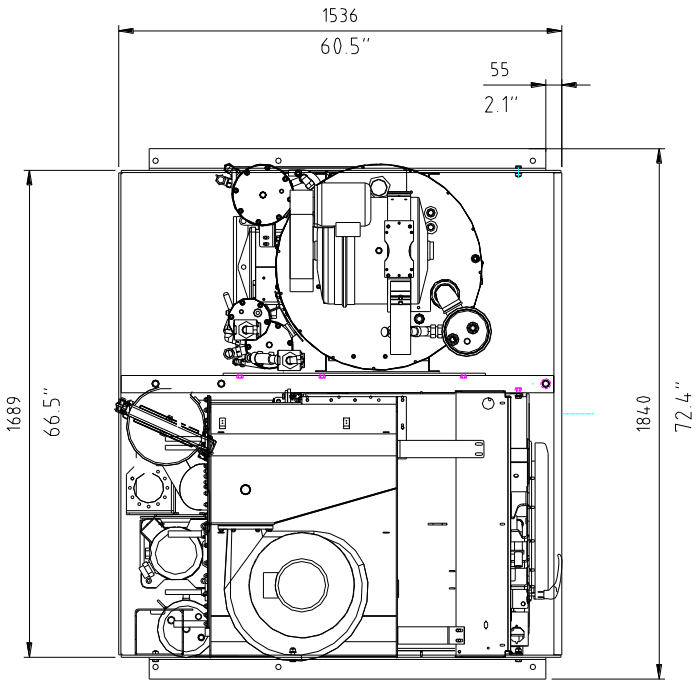
5 Installation 5

Crossline M18



707767-14-A



707767-15-A

5 Installation 5

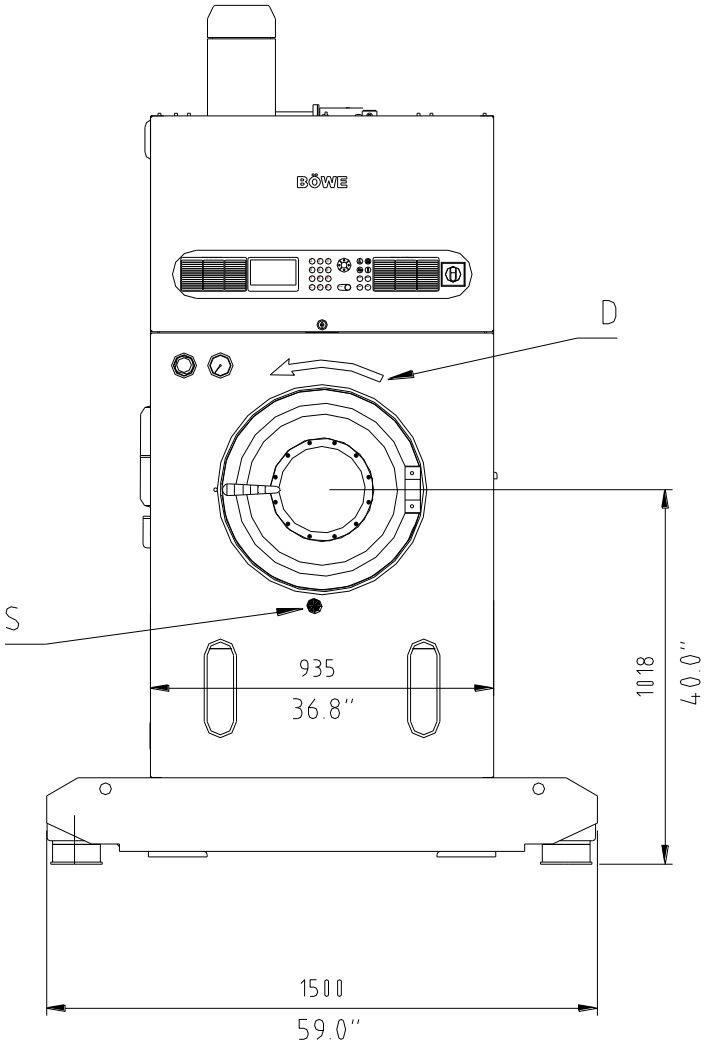
M12-M15-M18 on **Softpad**		**Slimline**
Width	mm (in)	1500 (59.0)
Depth M12-M15	mm (in)	2250 (88.5)
Depth M18	mm (in)	2360 (92.9)
Height	mm (in)	2315 (91.1)
Height without fan motor	mm (in)	2050 (80.7)

The dimensions given may differ if special options are used

Slimline M12-M15 on Softpad

Installation on Softpad will increase the height of the machine by 55 mm (2.1 in).

M12
M15
M18

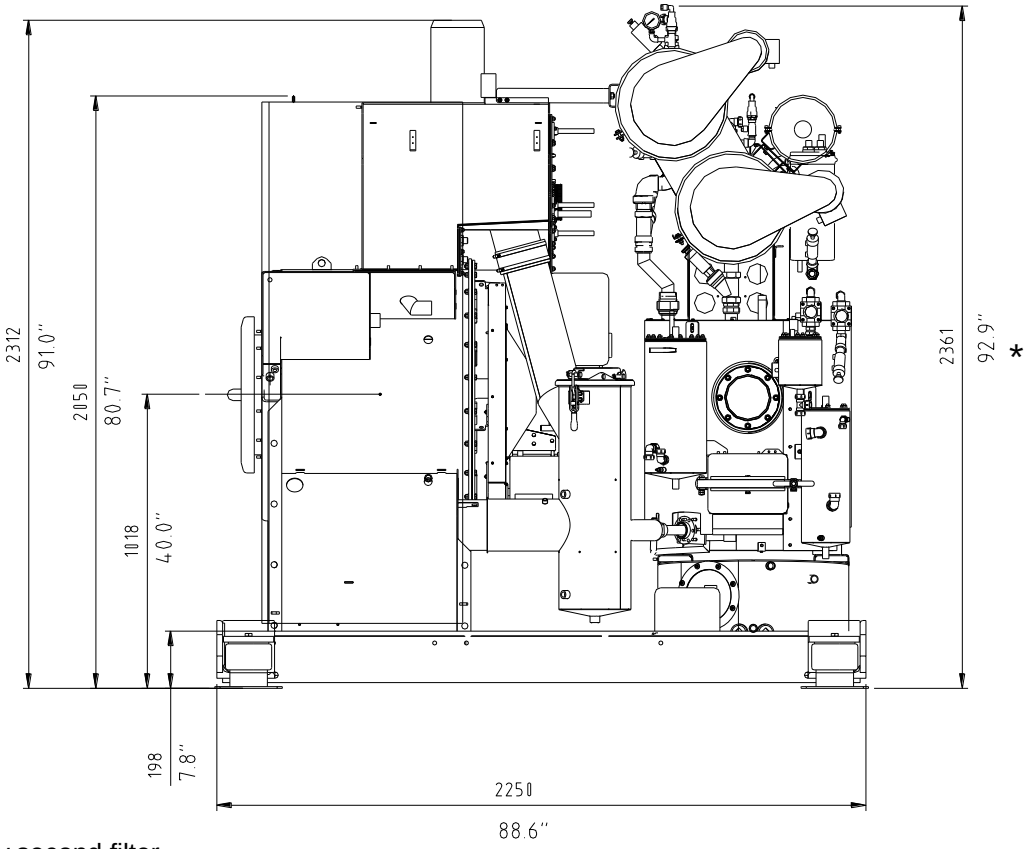


707767-26-0

S = Center of gravity
D = Direction of rotation of spinning

5 Installation 5

Slimline M12-M15 on Softpad



* only by second filter

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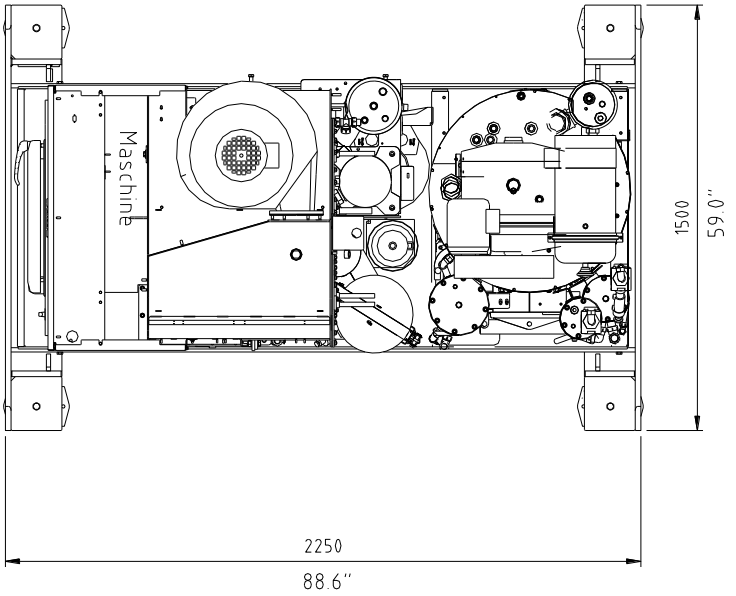

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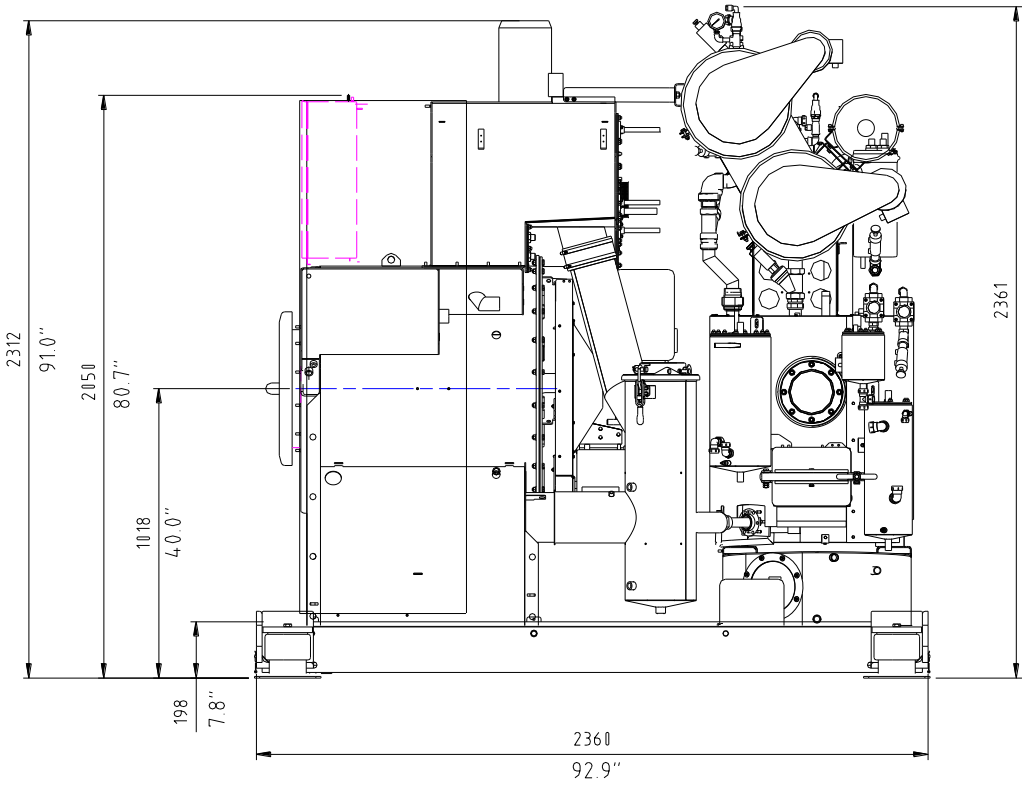
5 Installation 5

Slimline M18 on Softpad



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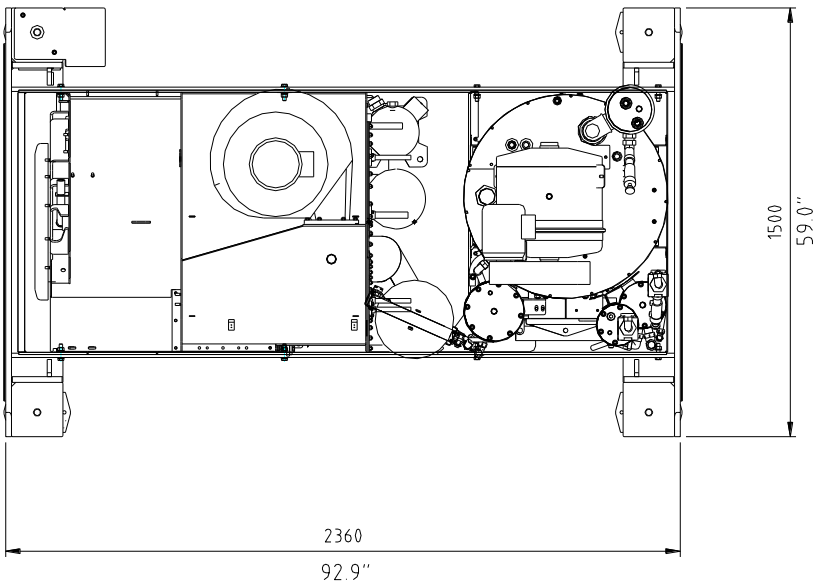

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5 Installation 5

5.3 Floor Load 5.3

The place of installation must be designed to comply with the specified floor load. This consists of:

Static load = machine weight + max. solvent filling

Dynamic load = cage centrifugal force with normally distributed, spin-damp garments

Do not forget to take into account the centrifugal forces that arise during the spin processes, according to the local conditions (ground, supporting walls, etc.). No resonance is permitted.
Please consult building specialists.

5.3.1 Dimensions

		Slimline			**Crossline**		
		M12	M15	M18	M12	M15	M18
Depth*	mm	1200	1310	1420	1200	1310	1420
	inches	47.2	51.6	55.9	47.2	51.6	55.9
Width*	mm	1080	1080	1080	1080	1080	1080
	inches	42.5	42.5	42.5	42.5	42.5	42.5
Portion of the floor surface for force transmission	m^2	1.3	1.41	1.53	1.3	1.41	1.53
	ft^2	14.0	15.2	16.5	14.0	15.2	16.5
Weight without solvent	kg	1055	1155	1325	1155	1255	1355
	lb	2326	2546	2931	2546	2767	2987
Weight with solvent (stat. load)	kg	1224	1355	1556	1324	1455	1586
	lb	2698	2987	3430	2919	3208	3497
Cage centrifugal force (dyn. load)	N	8500 **	10700 **	12800 **	8500 **	10700 **	12800 **
	lbs	1874 **	2359 **	2822 **	1874 **	2359 **	2822 **
Floor load (stat. + dyn. load)	N/m^2	15800 **	17000 **	18300 **	16600 **	17700 **	18500 **
	lbs/ft^2	330 **	355 **	382 **	346 **	369 **	386 **

* Portion of the machine dimensions that is decisive for the size of the cage centrifugal force and floor load.

** Calculated with:
- 12 kg-15 kg-18 kg (26.5-33.1 -39.7 lbs) loaded weight, with 50% of this unevenly distributed
- Mixed outer clothing
- EBS
- 600 rpm
- solvent weight 0.77 kg/l

Building specialists will find the best solution, from both a structural and economic point of view, for the design of the foundation. They take into consideration the system or machine-related conditions and the local particulars.
Use a load dispatcher frame if the permissible load for your floor is not sufficient.

5 Installation 5

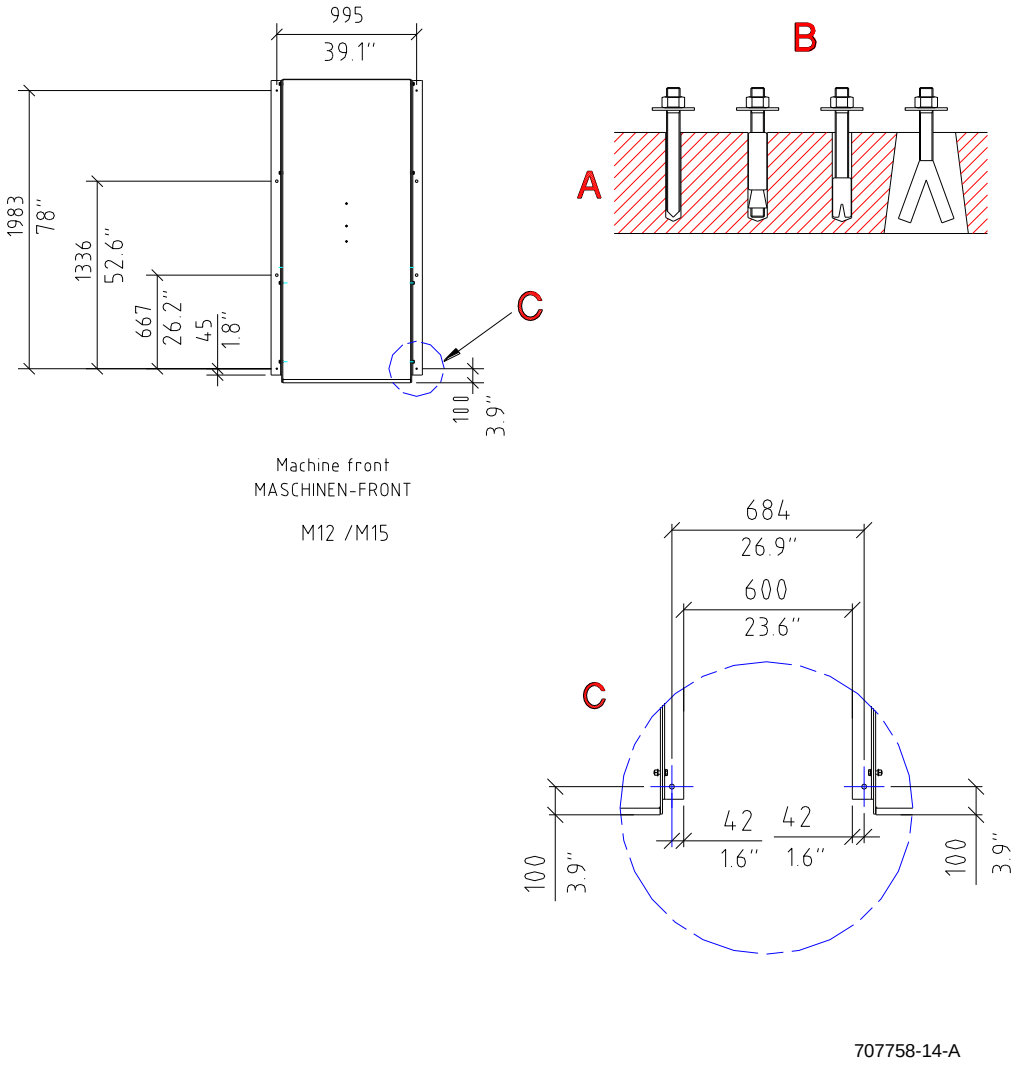
M12-M15-M18 on **Softpad**		**Slimline on Softpad**					
		M12	M15	M18			
Weight without solvent	kg lbs	1435 3164	1535 3384	1715 3781			
Weight with solvent (stat. load)	kg lbs	1604 3586	1735 3825	1946 4290			
Cage centrifugal force (dyn. load)	N lbs		2200 485				
Forces applied, per all 4 point of support: Static Dynamic	 N lbs N lbs		 4500 992 600 132				

5 Installation 5

5.4 Foundation 5.4

5.4.1 Foundations Dimensions

Slimline M12-M15



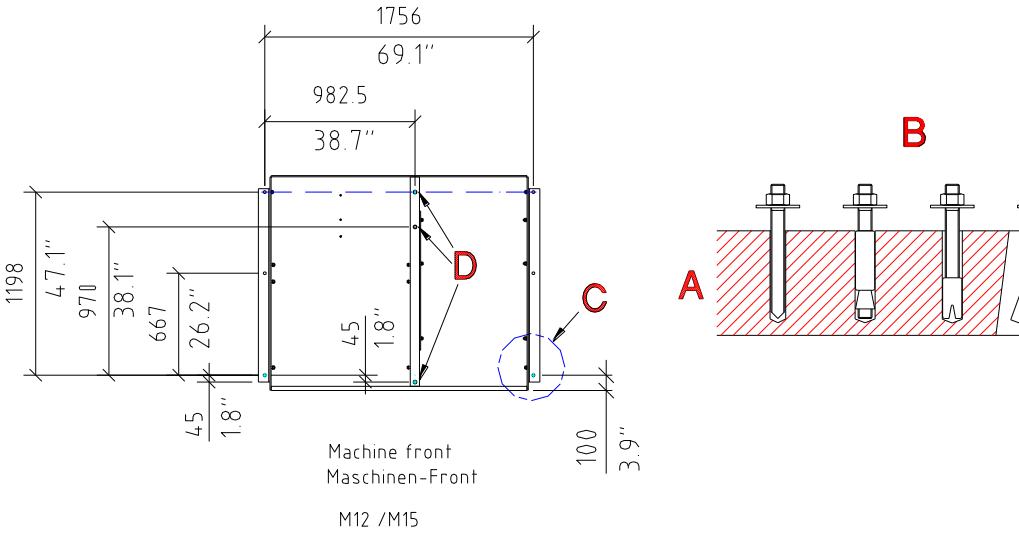
A ..... Reinforced concrete

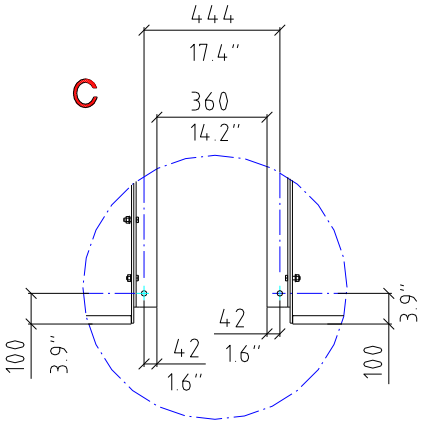
B ..... Examples for fixing the machine in place

C ..... Distance to the next machine

5 Installation 5

Crossline M12-M15





A ..... Reinforced concrete

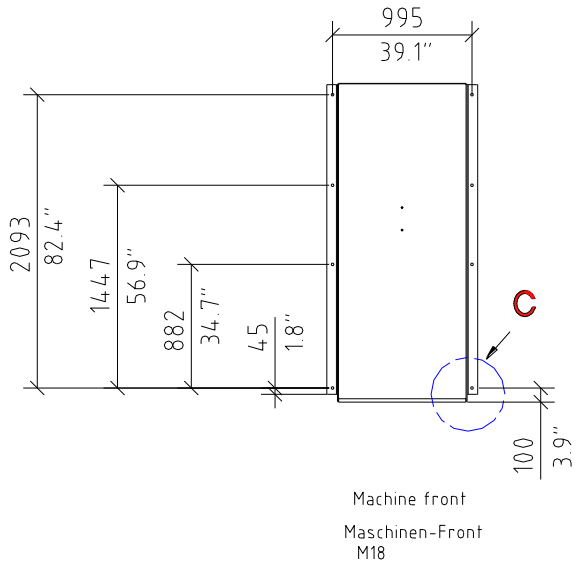
B ..... Examples for fixing the machine in place

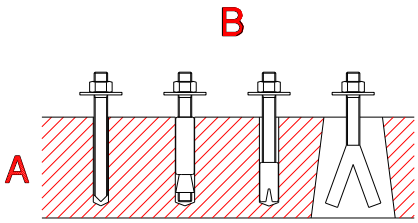
C ..... Room floor surface - concrete slab

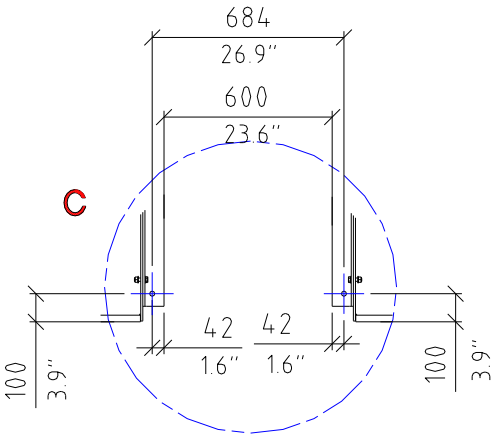
D ..... Use M12 x 300 foundation anchors

5 Installation 5

Slimline M18







707758-26-A

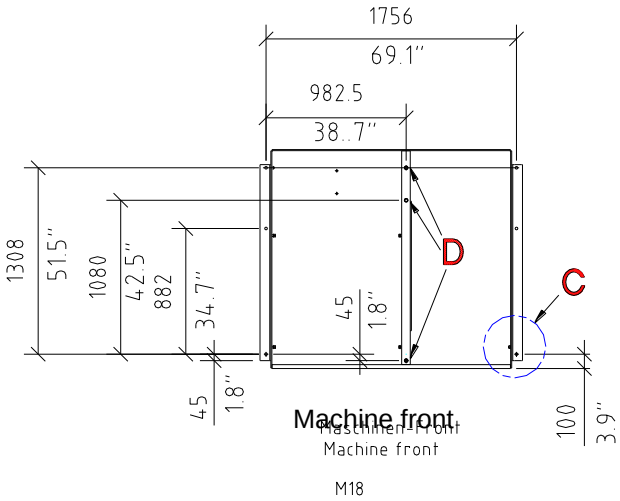
A ..... Reinforced concrete

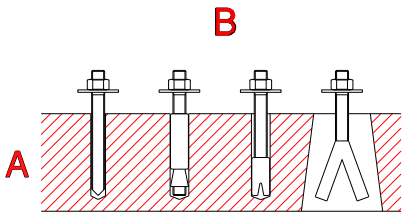
B ..... Examples for fixing the machine in place

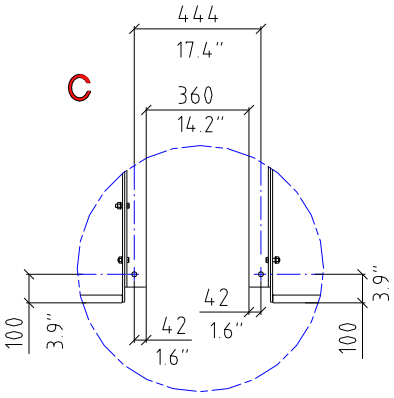
C ..... Room floor surface - concrete slab

5 Installation 5

Crossline M18







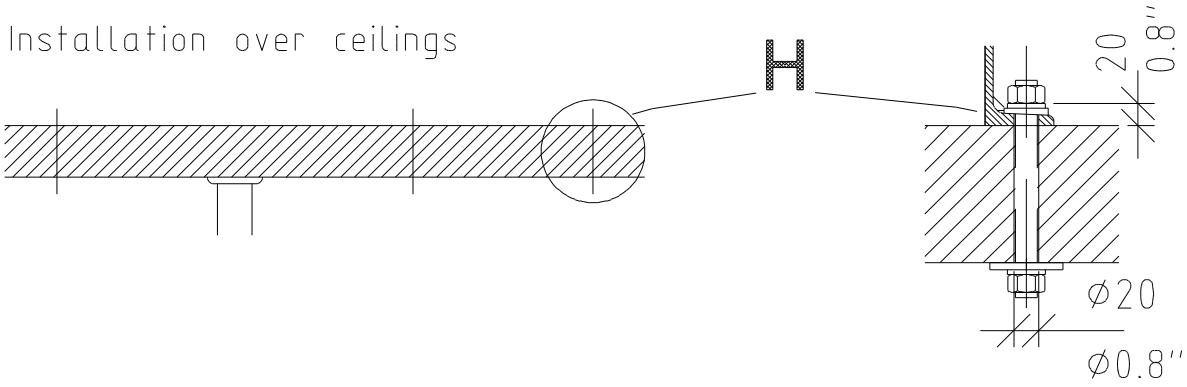
707758-27-A

A ..... Reinforced concrete

B ..... Examples for fixing the machine in place

C ..... Room floor surface - concrete slab

D ..... Use M12 x 300 foundation anchors



703871-22-0

H ..... Ceiling bore holes (∅ 20 mm or 3/4 in) for through bolt, length depending on the thickness of the ceiling. Support if necessary

5.4.2 Anchoring Surface

Correct anchoring is extremely important for low-noise, fault-free operation. When installing on the foundation, the use of stone bolts is preferable.

The anchoring surface must be horizontal and level.
Never place the machine directly on felt, bituminous coatings, rubber or cork.

On uneven concrete floor, you must level the machine or safety trough with leveling plates and even out the supporting surface with filler (epoxy resins).

5.4.3 Sound and Vibration Insulation

Consult with building and insulation specialists with regard to the use of special foundations, dampers, spring cups or similar devices for special vibration insulation.

6 Fixing the Machine in Place 6

6.1 Machine Trough 6.1

The machine trough is a permanently integrated component of the machine.
Collecting capacity: M12-M15: Slimline: 180 l (47.6 US gal), Crossline: 213 l (56.2 US gal)
M18: Slimline: 190 l (50.1 US gal), Crossline: 233 l (61.5 US gal)
Material: St1203 /1.0330.03 /3 mm(.1 in) /S235 JRG2 painted

6.2 Anchoring Methods 6.2

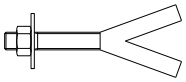
Alternatively, you can also use the following anchoring methods to fix the machine in place:

For ceiling installation:

- Through bolts (threaded rods) with washers and M12 nuts.

For foundation installation:

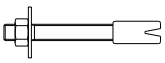
- Stone bolts (length 100 mm/3.9 in) for cementing into recessed or mortised holes



(The screws are not permitted to be longer than the thickness of the foundation).

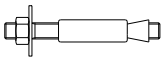
or

- Heavy-duty plug with threaded rod for deeper bore holes



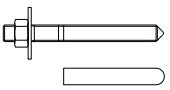
or

- Safety expansion anchors for use in bored holes



or

- Adhesive plugks/shear connectors.



703871-25-0

Thread for all anchoring methods: **M 12**
Quality: Property class 8.8 - DIN 267

The fixing nuts must be self-locking, with quality that complies with DIN 985.

We will not accept any liability for damages that result from failure to comply with our recommendations and instructions.
Attention:
Pay attention to the floor load of the machine floor space.
The bore holes must be drilled deeply enough that the plug stretches in the concrete.

6 Fixing the Machine in Place 6

Anchoring:

Cementing in stone bolts:

Steps:
Insert stone bolts in the holes of the angle bracket with spring washers and nuts.
Level the machine. If the floor is uneven, level the machine with wedges and even out the surface with filler (epoxy resins).
Fill anchoring holes with fast-drying cement.
After it sets, tighten the nuts evenly.

Safety expansion anchor:

Steps:
Position the machine in its intended position.
Use the holes of the angle bracket as a drilling template.
Pre-drill with a 14 mm (.5 in) stone drill. Minimum drilling depth 100 mm (3.9 in). Drill in vertically!
Remove the machine or angle bracket.
Drill the holes 140 mm (5.5 in) deep with the 18 mm (0.7 in) stone drill.
Remove the nuts and washers of the expansion anchor. Shorten the upper plug brush.
Insert the anchor in the bore hole.
Position the machine or attach the angle bracket and level.
If the floor is uneven, level the machine with wedges and even out the surface with filler (epoxy resins).

Tighten the nuts on the anchors evenly.

Threaded rod (bored through ceiling)

Steps:
Position the machine in its intended position.
Use the holes of the angle bracket as a drilling template.
Pre-drill with 14 mm (.5 in) stone drill. Drill in vertically!
Remove the machine or angle bracket.
Use a 20 mm (.8 in) stone drill to drill the holes for normal ceiling installation
(See foundation schematic, Point 5.4)
Position the machine or attach the angle bracket and level.
The angle bracket must lie flat against the ceiling.
If the floor is uneven, level the machine with wedges and even out the surface with filler (epoxy resins).

6 Fixing the Machine in Place 6

Adhesive plugs/shear connector

Steps:
Position the machine in its intended position.
Use the holes of the angle bracket as a drilling template.
Pre-drill with a 14 mm (.5 in) stone drill. Drill in vertically!
Remove the machine or angle bracket.

Bore holes: Drill the diameter and depth according the information provided by the plug manufacturer and blow out any dust..

For further steps, refer to the information provided by the plug manufacturer.

Note the hardening time.

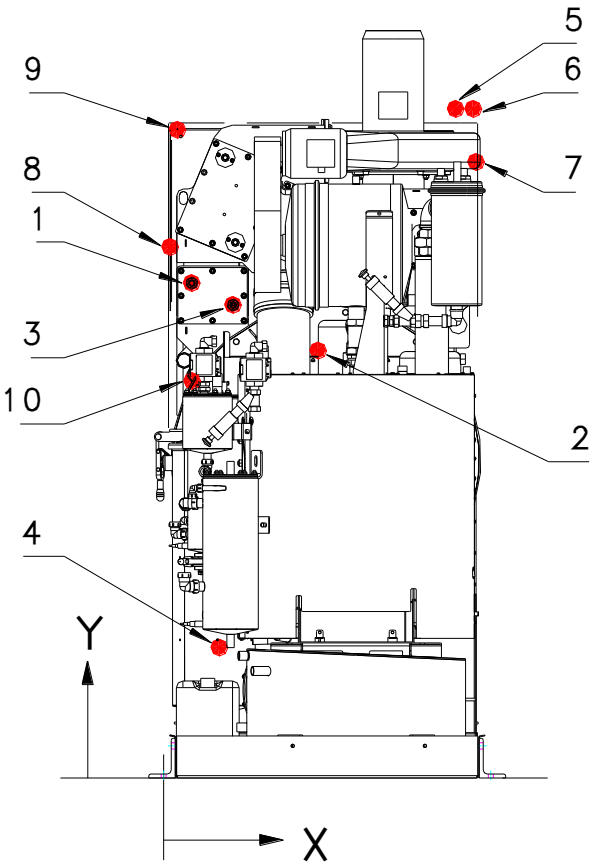
Position the machine or attach the angle bracket and level.
If the floor is uneven, level the machine with wedges and even out the surface with filler (epoxy resins).

Tighten the nuts evenly.

7 Connection 7

7.1 Dimensioned Drawing of the Machine Connections 7.1

Slimline M12-M15-M18



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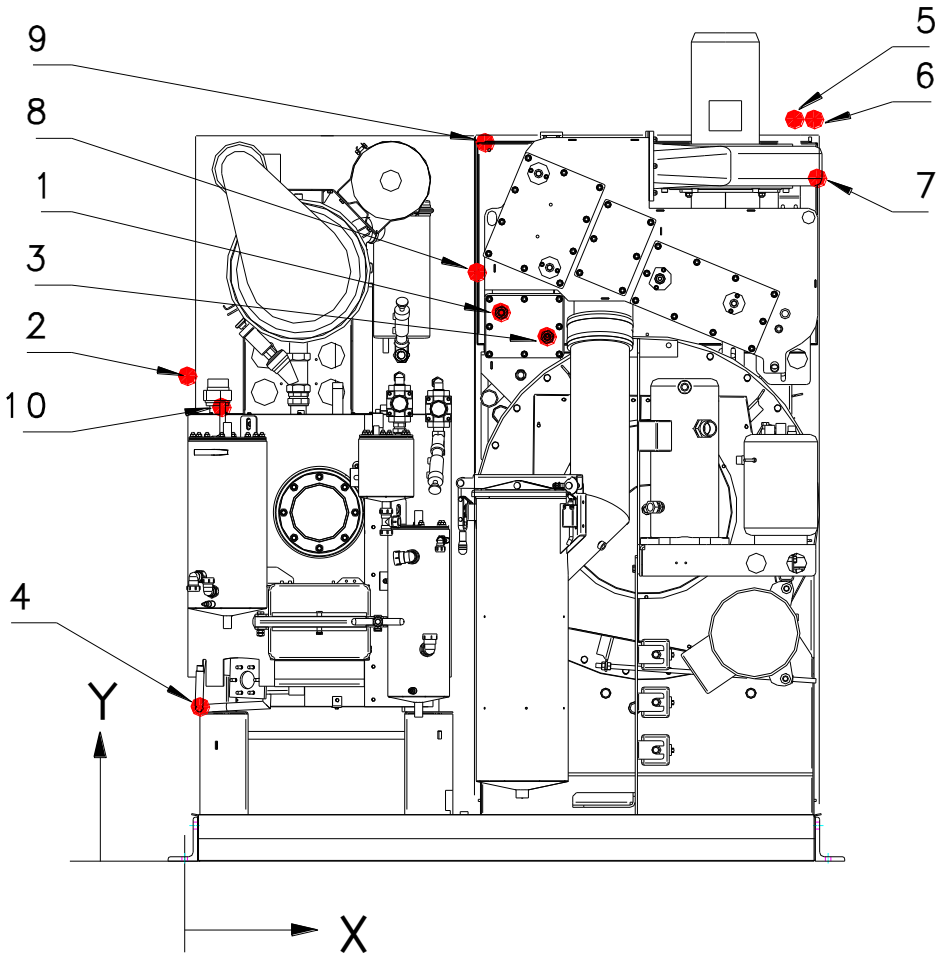
We reserve the right to change dimensions!

Item	Medium	NW mm	Inch	-X- mm (in)	-Y- mm (in)
1	Steam heater battery machine	15	1/2	85 (3.3)	1495 (58.8)
2	Steam distillation	15	1/2	470 (18.5)	1290 (50.7)
3	Condensate heater battery machine	15	1/2	210 (8.2)	1430 (56.3)
4	Condensate distillation	15	1/2	170 (6.6)	420 (16.5)
5	Cooling water inlet	20	3/4	880 (34.6)	2030 (80)
6*	Cooling water outlet, distillation	20	3/4	920 (36.2)	2030 (80)
7	Cooling water outlet, refrigeration unit	20	3/4	950 (3.4)	1860 (73.2)
8	Compressed Air	8	1/4	20 (0.8)	1600 (63)
9	Electric connection (front side top)	-		40 (1.6)	1950 (76.7)
10	Ventilation waterseparator /sluice tank	22		90 (3.5)	1220 (48)
--	Still rake out – pump out	-	-	-	-

* There must be a measuring potentiometer installed (on the machine) between the machine and customer wiring system.

7 Connection 7

Crossline M12-M15-M18



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We reserve the right to change dimensions!

Item	Medium	NW mm	Inch	-X- mm (in)	-Y- mm (in)
1	Steam heater battery machine	15	1/2	860 (33.8)	1495 (58.8)
2	Steam distillation	15	1/2	10 (0.4)	1320 (52)
3	Condensate heater battery machine	15	1/2	980 (38.5)	1430 (56.3)
4	Condensate distillation	15	1/2	40 (1.5)	420 (16.5)
5	Cooling water inlet	20	3/4	1660 (65.3)	2030 (80)
6*	Cooling water outlet, distillation	20	3/4	1710 (67.3)	2030 (80)
7	Cooling water outlet, refrigeration unit	20	3/4	1720 (67.7)	1860 (73.2)
8	Compressed Air	8	1/4	800 (31.5)	1600 (63)
9	Electric connection (front side top)	-		820 (32.3)	1950 (76.7)
10	Ventilation water separator /sluice tank	22		100 (3.9)	1220 (48)
--	Still rake out – pump out	-	-	-	-
11	Option: Loading door venting	50	2	1000 (39,3)	1360 (53,5)

* There must be a measuring potentiometer installed (on the machine) between the machine and customer wiring system.

7 Connection 7

7.2 Lines and Pipelines 7.2

Connect the customer-supplied supply and drain lines according to the information in the dimensioned drawing. Steam, condensate, compressed air and water must be equipped with stop valves. Follow DIN 1988 when connecting the water. To avoid transmission of structure-borne noise, you can connect the pipelines with a spacer of flexible metal tubing and insulate the pipe holders.

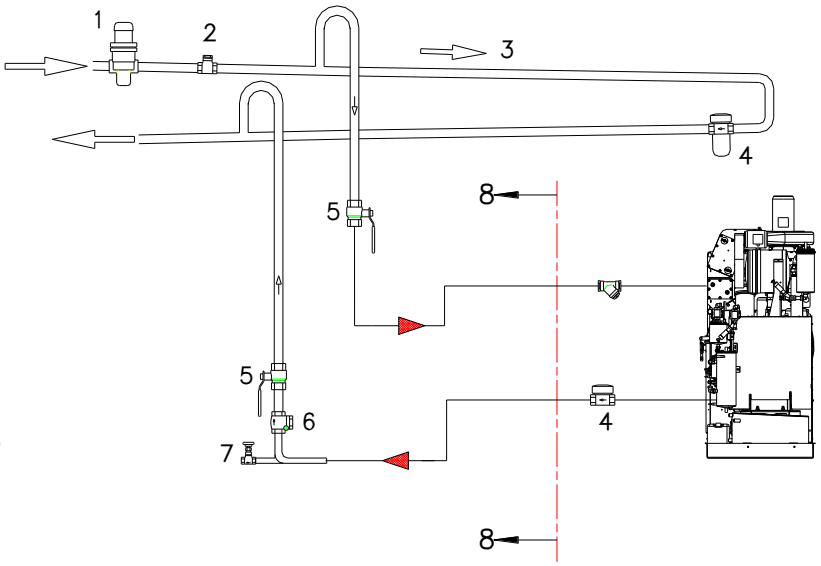
7.2.1 Steam

Install the wiring system and connections in such a way that they are insulated.
Operating pressure 4 - 5 bar (58 - 72.5 psi) saturated steam.
If the admission pressure is more than 5 bar (72.5 psi), build in a steam reducing valve with pressure gauge and safety valve. !!! Be careful overheated steam !!!

Peak steam demand (large steam generator):

M12, M15, M18

Drying	0.6 kg/min (1.3 lbs/min)
Distillation	0.6 kg/min (1.3 lbs/min)



1 = Reducing valve
2 = Vacuum breaker
3 = Descending slope
4 = Steam trap
5 = Stop valve
6 = Non-return valve
7 = Drain
8 = Customer side

707767-12-0

7.2.2 Condensate

Install condensate line so that it slopes away from the machine, if possible. If there is an ascending slope, provide a non-return valve and drain at the lowest point.

Attention:
Condensate counter-pressure must be at least 1.5 bar (21.8 psi) under the incoming steam pressure.

7 Connection 7

7.2.3 Cooling Water Supply

7.2.3.1 Mains water supply

The cross-sections of the lines to the machine should not get smaller and should be without bends and curves, if possible. The heat balance of the machine has been optimally designed for cooling water with an inlet temperature of 12 °C (53.6 °F) and uniform pressure of 2 - 4 bar (29 - 58 psi). (Minimum pressure 2.0 bar (29 psi), maximum pressure 6.0 bar (87 psi)

A manually operated stop valve should be fitted.

Peak cooling water demand 2 - 4 bar (29 - 58 psi) (12 °C/53.6 °F):

M12, M15, M18	
Drying/detergent solution cooler	9 l/min (2.4 US gal/min)
Distillation	10l/min (2.6 US gal/min)

According to DIN 1988, a water flowback stop and venting device must be installed on machines in the Federal Republic of Germany.

7.2.3.2 Cooling Tower Operation

For cooling tower or recooling operation, the nominal width of the feeding and drain lines must be dimensioned to be larger than the nominal width of the circulation pump or must be dimensioned according to the pump.

Inlet temperatures are not allowed to exceed 24 °C/ (75.2 °F) because otherwise the solvent consumption increases and the drying times are also longer.

Cooling water inlet temperatures that are too high can also overload the refrigeration unit.

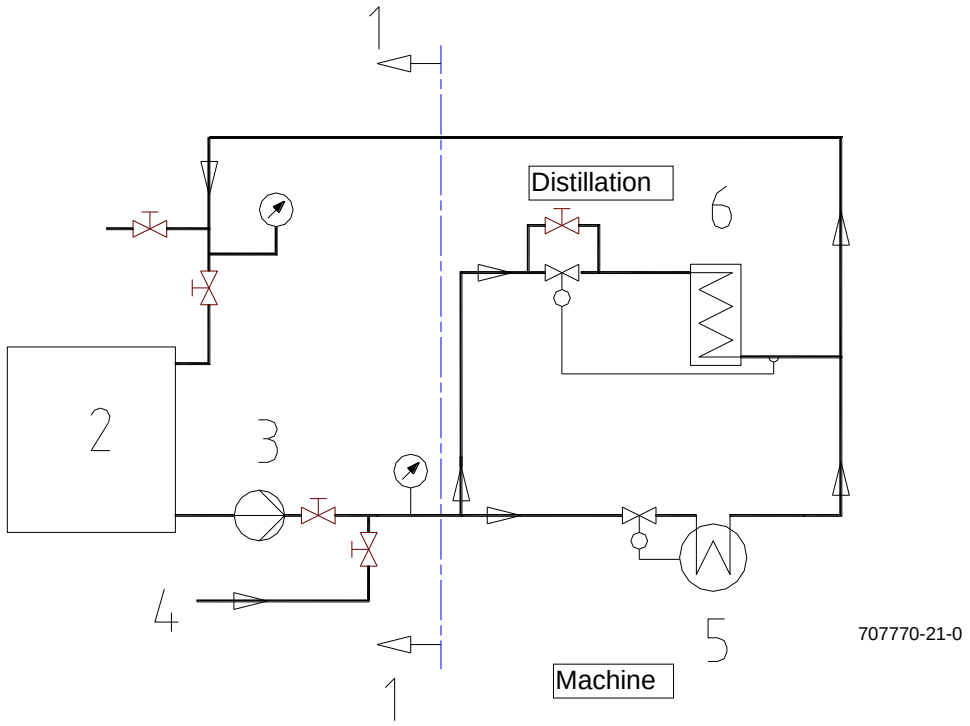
The water pressure must be adapted to the high inlet temperature, up to double the peak demand.

In cooling tower or recooling operation, correct installation is especially important. Consequently, some of the things that must be kept in mind are the cooler capacity, mains water supply switch-over, stored cooling capacity, pump size and cooling water by-pass.

The cooling water regulator (water economizer valve) for the machine and distillation system must be corrected or avoided with a bypass (manual valve) (= continuous water flow).

The cooling water supply or the backfeeding to the recooling unit must come from the mains water system or from a soft water system. The cooling water should be approx. 5° dH.

7 Connection 7



1 = Customer side
2 = Cooling tower
3 = Circulation pump
4 = Mains water supply
5 = Refrigeration unit
6 = Condenser

Data for temperatures up to 24 °C (75.2 °F)
(Nominal width NW at least 25 mm (1 inch)):

		M12	M15	M18
Pump throughput	m^3/h *	1.7	2.2	2.7
	US gal/h	449.1	581.2	713.3
Pump pressure	bar	4-6	4-6	4-6
	psi	58 – 87	58 - 87	58 - 87

Heat to be dissipated over cooling water* :

	M12	M15	M18
kJ/cycle (approx)	24800	30400	35900

* refers to water without additives

Also refer to the separate installation and operating instructions for the rechilller.

7 Connection 7

7.2.4 Cooling Water Outlet

The cooling water leaving the system can be directed to the sewer system, reused and recooled because it circulates through the machine in a closed system and does not come into contact with the solvent. You should endeavor to reuse the cooling water.

7.2.5 Compressed Air

The operating pressure is 6 bar (87 psi). The machine is equipped with a compressed air reducing valve, pressure gauge and compressed air water separator. The line pressure should be 10 bar (145 psi). The customer has to install at his air compressor an automatic water drain and an air cooler (refrigeration dryer). Otherwise BÖWE can not take any warranty on pneumatic parts. The compressor has to be located in a dry and cool area.

7.2.6 Process Water

Empty the process water collecting tank daily.
Dispose of the contents according to the regulations for your country.

7.2.7 Aeration Lines

The venting ducts of the machine must lead without diminished cross section into the open or via open funnel and cock valve to the room venting system (if existing).

It must be ensured that the venting does not lead to areas with high explosion risks or to ignitation sources.

7 Connection 7

7.3 Electrical Connection 7.3

Caution

Only trained electricians are permitted to work on the electrical system according to the relevant standards of the respective countries. The power supply must be provided by the customer/operator of the machine and is not included in the delivery.

Note the supply voltage (on the nameplate). Connect L1 /L2 /L3, neutral and ground wires with the appropriate cross section and fusing. Pass the cable into the switch panel through the PVC screwed union provided and connect to terminal.

Main switch connection

The main switch must be connected at the customer with an approved cable. Strip the cable right before the main switch only. Do not lay stripped cable in the cable trunking.

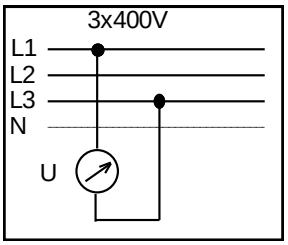
Ground-fault circuit interrupter at the customer
In case of a fault current breaker integrated in the building it is recommandable to make sure, if it is applicable to the machine with variable speed drive. As the manufacturer we recommend an all-current sensitive residual-current breaker (RCD) with at least 300 mA.

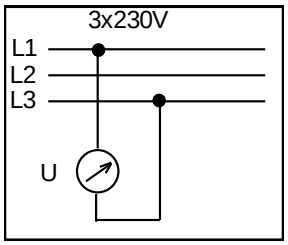
M12-M15-M18	Operating load kW	Max. current A	Fuse A
400 V, 50 Hz			
Steam /electric without distillation	7 /16	25 /38	32 /50
Steam /electric with distillation	8 /27	26 /53	32 /63
230 V, 60 Hz			
Steam /electric without distillation	7 /16	43 /65	50 /80
Steam /electric with distillation	8 /27	45 /91	50 /100

7 Connection 7

7.3.1 Permissible Voltage Range

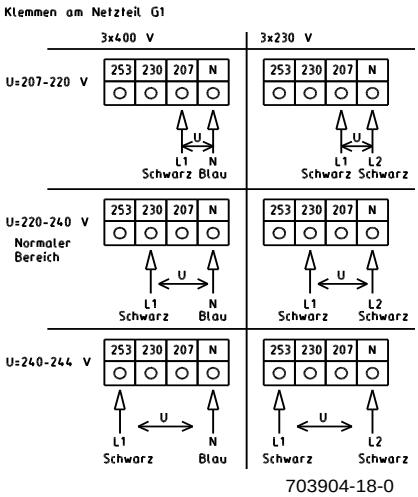
Attention:
The power supply must be measured at the machine before you turn the machine on. If it deviates from the standard voltage, you must adapt the machine to the local voltage with an autotransformer.





When making the electric connections for a drycleaning machine, you must observe the following voltage ranges:

1. Main supply (according to DIN IEC 38):		
Range	Primarily 400-V power system	Primarily 230-V power system
Not allowed; requires external adjustment	< 360 V	< 207 V
Normal working range MIN: -10.0 % MAX: + 6.0 %	360 V to 424 V	207 V to 244 V
Not allowed; requires external adjustment	> 424 V	> 244 V

Range	Primarily 230-V power system
Not allowed; requires external adjustment	< 207 V
Normal working range 207 V to 244 V	
Not allowed; requires external adjustment	> 244 V

7 Connection 7

7.3.2 Control of Room Ventilation

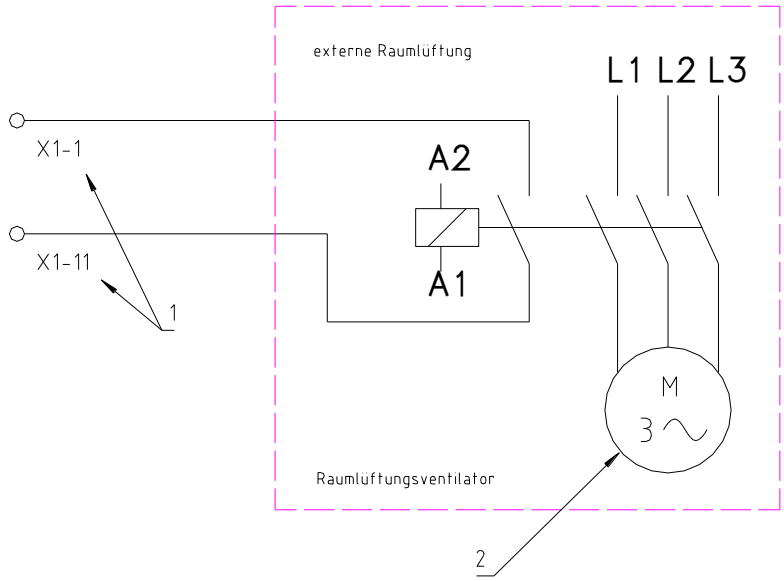
If there is already a room ventilation system, you can couple the automatic machine actions with the ventilation system.

In this case, the machine starts only when the room ventilation has been turned on.

Recommendation for renewing the room air:
The room ventilation must be sufficient to meet the requirements for your country.

Example: BGR 500 chapter 2.14

The minimum requirement for renewing the room air is achieved when the dissipated amount of air in m^3 /h is equal to 60 times the numerical value of the standard loaded amount in garments in kg. The air renewal rate can be limited to 5 per hour if the calculation results in a larger numerical value.



703904-17-0

1 = Terminals in switch panel
2 = External room ventilation - room ventilation fan

8 Important Information 8

8.1 First Startup 8.1

The BÖWE Customer Service department is responsible for carrying out the first startup.

	**<u>Attention:</u> Before opening the switch panel or removing paneling, set the main switch to "0".**

8.1.1 Preparatory Work

Set up the supply systems (electrical current, cooling water, compressed air, steam and condensate lines).

8.1.2 Filling Machine with Solvent

You must use solvents that have a flash point that is higher than the temperature stated on the machine nameplate.

The amount of solvent needed is:

Machine M12 tank I:	approx.60 l / 15.8 US gal
Machine M15 tank I:	approx.75 l / 19.8 US gal
Machine M18 tank I:	approx.90 l / 23.8 US gal
Machine M12 tank II:	approx.60 l / 15.8 US gal
Machine M15 tank II:	approx.75 l / 19.8 US gal
Machine M18 tank II:	approx.90 l / 23.8 US gal
Machine M12 tank III:	approx.60 l / 15.8 US gal
Machine M15 tank III:	approx.75 l / 19.8 US gal
Machine M18 tank III:	approx.90 l / 23.8 US gal
Total filling amount M12:	approx. 220 l / 58.1 US gal
Total filling amount M15:	approx. 260 l / 68.7 US gal
Total filling amount M18:	approx. 300 l / 79.2 US gal
Total filling amount M12 for the 3-tank model:	approx. 280 l / 73.9 US gal
Total filling amount M15 for the 3-tank model:	approx. 330 l / 87.1 US gal
Total filling amount M18 for the 3-tank model:	approx. 380 l / 100.4 US gal

For machines with 2 economy filters: + 40 l (10.5 US gal)
For machines with 2 economy filters and 1 cartridge filter: + 55 l (14.5 US gal)

	**<u>Attention:</u> This solvent is a powerful fat solvent. Wear gloves when handling solvent and apply protective skin ointment to hands when done. Do not smoke.** **Immediately change any clothing that is wet with solvent.** **If you get solvent in your eyes,:** • **rinse them thoroughly with water** • **and see a doctor.**

	**If there is no suction from the pump, pour about 5 liters (1.3 US gal) of solvent into the button trap. Check that the direction of rotation is correct.**

8 Important Information 8

To fill without emissions, proceed as follows:

- Remove the screw cap on the pump line.
- Connect a hose between the barrel and pump suction side.
- Open the ball valve.
- Start program P51
- The tanks fill up, with one overflowing into the other.
- Watch the level of the liquid in the tanks and stop program P51 when the tanks are full or when enough solvent has been filled in.
- Close the ball valve.
- Remove the connecting lines to the barrel.
- Screw the cap back on to the pump line.

With an additional 3rd tank:
- first fill up tank 1 and tank 2 (using program P51)
- fill tank 3 with P67
- fill tank 2 once more with P51

If may be necessary to refill with solvent after the filter is filled each time you replace a filter.

8.1.3 Refilling Solvent

Follow the procedure given in Point 8.1.2 for routine refilling of solvent.

Attention: Even empty containers can still hold solvent residues. Therefore tightly seal the container (barrel) again and store or dispose of in accordance with regulations!

8 Important Information 8

8.1.4 Vacuum Pump

The vacuum pump does not need any operating liquid and starts automatically after the machine is turned on.

8.2 Refrigeration Unit 8.2

	**<u>Attention:</u>** **No cooling agent is allowed to escape into the atmosphere during operation, servicing work and decommissioning of refrigeration units.** **You must keep a record of the quantities of cooling agent used and present this record to the authorities upon demand.** **Only people who have the necessary special knowledge and technical equipment are authorized to service and decommission refrigeration units.**

9 Technical Specifications 9

Machine		**M12**	**M12**
Heating		**Steam**	**Electric**
Filling quantity	kg (lb)	12 (26.5)	12 (26.5)
Cage volume	l/ US gal	240 (63.4)	240 (63.5)
Cage diameter	mm (in)	820 (32.3)	820 (32.3)
Cage depth	mm (in)	460 (18.1)	460 (18.1)
Load diameter	mm (in)	400 (15.7)	400 (15.7)
Cleaning speed/drying speed	RPM	40	40
Spinning speed:	RPM	600	600
Max. g-factor		165	165
Low level	l/ US gal	30 (7.9)	30 (7.9)
High level	l/ US gal	60 (15.8)	60 (15.8)
Operating load (max. at 400 V,50Hz)			
Without distillation	kW	7	16
With distillation	kW	8	27
Connected loads:			
Compressor capacity	kW	4.0	4.0
Fan capacity HLL /NLL	kW	2.5 /1.85	2.5 /1.85
Solvent pump capacity	kW	1.1	1.1
Cage drive capacity	kW	3.7	3.7
Filter drive capacity	kW	0.55	0.55
Vacuum pump capacity	kW	0.37	0.37
Steam generator capacity	kW	-	10 /8.5
Dimensions:			
Machine:			
Width: Slimline	mm(in)	1080(42.5)	1080(42.5)
Crossline	mm(in)	1840(77.4)	1840(77.4)
Depth: Slimline	mm(in)	2165(86.0)	2165(86.0)
Crossline	mm(in)	1406(55.3)	1406(55.3)
Height inc. trough	mm(in)	2257(89.0)	2257(89.0)
Height inc. trough without fan motor	mm(in)	1995(78.5)	1995(78.5)
Floor space: Slimline	$m^2(ft^2)$	2.3(24.8)	2.3(24.8)
Crossline	$m^2(ft^2)$	2.5(26.9)	2.5(26.9)
Filling volumes:			
Tank I filling	l/ US gal	120 (31.7)	120 (31.7)
Tank II filling	l/ US gal	80 (21.2)	80 (21.2)
Tank III filling	l/ US gal	90 (23.7)	90 (23.7)
Economy filter 1	l/ US gal	40 (10.6)	40 (10.6)
Economy filter 2	l/ US gal	40 (10.6)	40 (10.6)
Distillation filling	l/ US gal	120 (31.7)	120 (31.7)
Cartridge filter	l/ US gal	15 (6.6)	15 (6.6)
Jumbo Cartridge Filter	l /US gal	40 (10.5)	40 (10.5)

The dimensions given may differ if special options are used

9 Technical Specifications 9

Machine		**M12**	**M12**
Heating		**Steam**	**Electric**
Consumption for drying:			
Drying time incl. reduction	min.	24	26
Electric energy drying	kWh	2.1	5.3
Saturated steam drying	kg (lbs)	4.5 (9.9)	-
Cooling water dr.(12 °C/53.6 °F)	l (US gal)	80 (21.1)	80 (21.1)
Consumption for distillation(1x at low level):			
Electric energy distillation	kWh	0.25	3.3
Saturated steam distillation	kg (lbs)	6.5 (14.3)	-
Cooling water for dist. (12 °C/53.6 °F)	l (US gal)	100 (26.4)	100 (26.4)
Consumption per cycle: *			
Electric energy, total	kWh	2.85	9.1
Saturated steam, total	kg (lbs)	11.0 (24.2)	-
Cooling water, total (12 °C(53.6°F)	l (US gal)	180 (47.5)	180 (47.5)
Compressed air (6 bar/87 psi)	l (US gal)	6 (1.6)	6 (1.6)

9 Technical Specifications 9

Machine			**M12**	**M12**
Heating			**Steam**	**Electric**
Other:				
Distillation throughput (DIN 11916) max.		l/h (US gal/h)	80 (21.1)	80 (21.1)
Filter throughput		l/h (US gal/h)	4000 (1056)	4000 (1056)
Filter surface, economy filter 1		m^2 (ft^2)	2.4 (25.8)	2.4 (25.8)
Filter surface, economy filter 2		m^2 (ft^2)	2.4 (25.8)	2.4 (25.8)
Weight without solvent:	Slimline	kg(lbs)	1055(2326)	1100(2326)
	Crossline	kg(lbs)	1155(2547)	1155(2547)
Weight with solvent:	Slimline	kg(lbs)	1224(2699)	1224(2699)
	Crossline	kg(lbs)	1324(2919)	1324(2919)
Floor space:	Slimline	m^2(ft^2)	2.3(24.8)	2.3(24.8)
	Crossline	m^2(ft^2)	2.5(26.9)	2.5(26.9)
Floor surface: **	Slimline	m^2(ft^2)	1.3(14)	1.3(14)
	Crossline	m^2(ft^2)	1.3(14)	1.3(14)
Cage centrifugal force		N(lb)	8500(1910)	8500(1910)
Floor load, stat. and dyn:	Slimline	N/m^2 (lbs/ft^2)	15800(330)	15800(330)
	Crossline	N/m^2 (lbs/ft^2)	16600(346)	16600(346)
Noise level		dB (A)	60	60
Heat balance: *				
Heat to dissipate via cooling water ***:				
		kJ/cycle	24800	24800
Heat dissipated to the surroundings:				
		kJ/cycle	5100	5100

* Values apply to a standard 2-bath load, 1st bath low level for distillation at cooling water inlet temperature + 12 °C (53.6 °F), steam supply 4 – 5 bar (58.0 – 72.5 psi) overpressure saturated steam, ambient temperature +5 °C to + 40 °C (5 to 104 °F)

** For portion of the floor surface for force transmission, see Installation Instructions, Point. 5.3.1

*** Refers to water without additives

Subject to change!

All values were taken under testing conditions with HC and can deviate in practice! With silicones (e.g. GreenEarth) drying times will be extended by up to 10 minutes.

9 Technical Specifications 9

Machine		**M15**	**M15**
Heating		**Steam**	**Electric**
Filling quantity	kg (lb)	15 (33.1)	15 (33.1)
Cage volume	l (US gal)	300 (79.2)	300 (79.2)
Cage diameter	mm (in)	820 (32.3)	820 (32.3)
Cage depth	mm (in)	570 (22.4)	570 (22.4)
Load diameter	mm (in)	400 (15.7)	400 (15.7)
Cleaning speed/drying speed	RPM	40	40
Spinning speed	RPM	600	600
Max. g-factor		165	165
Low level	l (US gal)	35 (9.2)	35 (9.2)
High level	l (US gal)	75 (19.8)	75 (19.8)
Operating load (max. at 400 V, 50 Hz)			
Without distillation	kW	7	16
With distillation	kW	8	27
Connected loads:			
Compressor capacity	kW	4.0	4.0
Fan capacity HLL /NLL	kW	2.5 /1.85	2.5 /1.85
Solvent pump capacity	kW	1.1	1.1
Cage drive capacity	kW	3.7	3.7
Filter drive capacity	kW	0.55	0.55
Vacuum pump capacity	kW	0.37	0.37
Steam generator capacity Distill. /drying	kW	-	10 /8.5
Dimensions:			
Machine:			
Width: Slimline	mm(in)	1080(42.5)	1080(42.5)
Crossline	mm(in)	1840(77.4)	1840(77.4)
Depth: Slimline	mm(in)	2165(86.0)	2165(86.0)
Crossline	mm(in)	1406(55.3)	1406(55.3)
Height incl. trough	mm(in)	2257(89.0)	2257(89.0)
Height incl. trough without fan motor	mm(in)	1995(78.5)	1995(78.5)
Floor space: Slimline	m^2(ft^2)	2.3(24.8)	2.3(24.8)
Crossline	m^2(ft^2)	2.5(26.9)	2.5(26.9)
Filling volumes:			
Tank I filling	l/ US gal	145 (38.3)	145 (38.3)
Tank II filling	l/ US gal	95 25.1)	95 (25.1)
Tank III filling	l/ US gal	90 (23.7)	90 (23.7)
Economy filter 1	l/ US gal	40 (10.6)	40 (10.6)
Economy filter 2	l/ US gal	40 (10.6)	40 (10.6)
Distillation filling	l/ US gal	120 (31.7)	120 (31.7)
Cartridge filter	l/ US gal	15 (4)	15 (4)
Jumbo Cartridge Filter	l /US gal	40 (10.5)	40 (10.5)

The dimensions given may differ if special options are used

9 Technical Specifications 9

Machine		**M15**	**M15**
Heating		**Steam**	**Electric**
Consumption for drying:			
Drying time incl. reduction	min.	29	31
Electric energy drying	kWh	2.3	6.7
Saturated steam drying	kg (lb)	5.6 (12.3)	-
Cooling water drying (12 °C/53.6 °F)	l (US gal)	90 (23.7)	90 (23.7)
Consumption for distillation(1x at low level):			
Electric energy distillation	kWh	0.45	4.2
Saturated steam distillation	kg (lb)	8.4 (18.5)	-
Cooling water for distillation (12 °C/53.6 °F)	l (US gal)	130 (34.3)	130 (34.3)
Consumption per cycle: *			
Electric energy, total	kWh	3.25	11.4
Saturated steam, total	kg (lb)	14 (30.8)	-
Cooling water, total (12 °C(53.6°F)	l (US gal)	220 (58.1)	220 (58.1)
Compressed air (6 bar/87 psi)	l (US gal)	6 (1.6)	6 (1.6)

9 Technical Specifications 9

Machine			**M15**	**M15**
Heating			**Steam**	**Electric**
Other:				
Distillation throughput (DIN 11916) max.		l/h (US gal/h)	80 (21.1)	80 (21.1)
Filter throughput		l/h (US gal/h)	4000 (1056)	4000 (1056)
Filter surface, economy filter 1		m^2 (ft^2)	2.4 (25.8)	2.4 (25.8)
Filter surface, economy filter 2		m^2 (ft^2)	2.4 (25.8)	2.4 (25.8)
Weight without solvent:	Slimline	kg(lb)	1155(2546)	1155(2546)
	Crossline	kg(lb)	1255(2767)	1255(2767)
Weight with solvent:	Slimline	kg(lb)	1355(2987)	1355(2987)
	Crossline	kg(lb)	1455(3208)	1455(3208)
Floor space:	Slimline	m^2(ft^2)	2.3(24.8)	2.3(24.8)
	Crossline	m^2(ft^2)	2.5(26.9)	2.5(26.9)
Floor surface: **	Slimline	m^2(ft^2)	1.41(15.2)	1.41(15.2)
	Crossline	m^2(ft^2)	1.41(15.2)	1.41(15.2)
Cage centrifugal force		N(lb)	10700(2405)	10700(2405)
Floor load, stat. and dyn:	Slimline	N/m^2 (lbs/ft^2)	17000(355)	17000(355)
	Crossline	N/m^2 (lbs/ft^2)	17700(369)	17700(369)
Noise level		dB (A)	60	60
Heat balance: *				
Heat to dissipate via cooling water ***:				
		kJ/cycle	30400	30400
Heat dissipated to the surroundings *:				
		kJ/cycle	7100	7100

* Values apply to a standard 2-bath load, 1st bath low level for distillation at cooling water inlet temperature + 12 °C (53.6 °F), steam supply 4 – 5 bar (58.0 - 72.5 psi) overpressure saturated steam, ambient temperature +5 °C to + 40 °C (41 to 104 °F)

** For portion of the floor surface for force transmission, see Installation Instructions, Point 5.3.1

*** Refers to water without additives

Subject to change!

All values were taken under testing conditions with HC and can deviate in practice! With silicones (e.g. GreenEarth) drying times will be extended by up to 10 minutes.

9 Technical Specifications 9

Machine		**M18**	**M18**
Heating		**Steam**	**Electric**
Filling quantity	kg (lb)	18 (39.7)	18 (39.7)
Cage volume	l/ US gal	360 (95.1)	360 (95.1)
Cage diameter	mm (in)	820 (32.3)	820 (32.3)
Cage depth	mm (in)	680 (26.7)	680 (26.7)
Load diameter	mm (in)	400 (15.7)	400 (15.7
Cleaning speed/drying speed	RPM	40	40
Spinning speed	RPM	600	600
Max. g-factor		165	165
Low level	l/ US gal	45 (11.9)	45 (11.9)
High level	l/ US gal	90 (23.7)	90 (23.7)
Operating load (max. at 400 V,50Hz)			
Without distillation	kW	7	16
With distillation	kW	8	27
Connected loads:			
Compressor capacity	kW	4.0	4.0
Fan capacity HLL /NLL	kW	2.5 /1.85	2.5 /1.85
Solvent pump capacity	kW	1.1	1.1
Cage drive capacity	kW	3.7	3.7
Filter drive capacity	kW	0.55	0.55
Vacuum pump capacity	kW	0.37	0.37
Steam generator capacity	kW	-	10 /8.5
Dimensions:			
Machine:			
Width: Slimline	mm(in)	1080(42.5)	1080(42.5)
Crossline	mm(in)	1840(77.4)	1840(77.4)
Depth: Slimline	mm(in)	2275(89.5)	2275(89.5)
Crossline	mm(in)	1540(60.6)	1540(60.6)
Height incl. trough	mm(in)	2257(89.0)	2257(89.0)
Height incl. trough without fan motor	mm(in)	1995(78.5)	1995(78.5)
Floor space: Slimline	$m^2(ft^2)$	2.4(25.8)	2.4(25.8)
Crossline	$m^2(ft^2)$	2.7(29.0)	2.7(29.0)
Filling volumes:			
Tank I filling	l/ US gal	170 (44.9)	170 (44.9)
Tank II filling	l/ US gal	110 (29)	110 (29)
Tank III filling	l/ US gal	90 (23.7)	90 (23.7)
Economy filter 1	l/ US gal	40 (10.6)	40 (10.6)
Economy filter 2	l/ US gal	40 (10.6)	40 (10.6)
Distillation filling	l/ US gal	120 (31.7)	120 (31.7)
Cartridge filter	l/ US gal	15 (6.6)	15 (6.6)
Jumbo Cartridge Filter	l /US gal	40 (10.5)	40 (10.5)

The dimensions given may differ if special options are used

9 Technical Specifications 9

Machine		**M18**	**M18**
Heating		**Steam**	**Electric**
Consumption for drying:			
Drying time incl. reduction	min.	34	36
Electric energy drying	kWh	2.5	8
Saturated steam drying	kg (lbs)	6.7 (14.7)	-
Cooling water drying (12 °C/53.6 °F)	l (US gal)	100 (26.4)	100 (26.4)
Consumption for distillation(1x at low level):			
Electric energy distillation	kWh	0.65	5.0
Saturated steam distillation	kg (lb)	10.3 (22.7)	-
Cooling water for distillation (12 °C/53.6 °F)	l (US gal)	160 (42.2)	160 (42.2)
Consumption per cycle: *			
Electric energy, total	kWh	3.65	13.5
Saturated steam, total	kg (lb)	17.0 (37.5)	-
Cooling water, total (12 °C(53.6°F)	l (US gal)	260 (68.6)	260 (68.6)
Compressed air (6 bar/87 psi)	l (US gal)	6 (1.6)	6 (1.6)

9 Technical Specifications 9

Machine			**M18**	**M18**
Heating			**Steam**	**Electric**
Other:				
Distillation throughput (DIN 11916) max.		l/h (US gal/h)	80 (21.1)	80 (21.1)
Filter throughput		l/h (US gal/h)	4000 (1056)	4000 (1056)
Filter surface, economy filter 1		m^2 (ft^2)	2.4 (25.8)	2.4 (25.8)
Filter surface, economy filter 2		m^2 (ft^2)	2.4 (25.8)	2.4 (25.8)
Weight without solvent:	Slimline	kg(lb)	1325(2921)	1325(2921)
	Crossline	kg(lb)	1355(2987)	1355(2987)
Weight with solvent:	Slimline	kg(lb)	1556(3430)	1556(3430)
	Crossline	kg(lb)	1586(3497)	1586(3497)
Floor space:	Slimline	m^2(ft^2)	2.4(25.8)	2.4(25.8)
	Crossline	m^2(ft^2)	2.7(29.0)	2.7(29.0)
Floor surface: **	Slimline	m^2(ft^2)	1.53(16.4)	1.53(16.4)
	Crossline	m^2(ft^2)	1.53(16.4)	1.53(16.4)
Cage centrifugal force		N(lb)	12800(2877)	12800(2877)
Floor load, stat. and dyn:	Slimline	N/m^2 (lbs/ft^2)	18300(382)	18300(382)
	Crossline	N/m^2 (lbs/ft^2)	18500(386)	18500(386)
Noise level		dB (A)	60	60
Heat balance: *				
Heat to dissipate via cooling water ***:				
		kJ/cycle	35900	35900
Heat dissipated to the surroundings:				
		kJ/cycle	9000	9000

* Values apply to a standard 2-bath load, 1st bath low level for distillation at cooling water inlet temperature + 12 °C (53.6 °F), steam supply 4 – 5 bar (58.0 - 72.5 psi) overpressure saturated steam, ambient temperature +5 °C to + 40 °C (5 to 104 °F)

** For portion of the floor surface for force transmission, see Installation Instructions, Point. 5.3.1

*** Refers to water without additives

Subject to change!

All values were taken under testing conditions with HC and can deviate in practice! With silicones (e.g. GreenEarth) drying times will be extended by up to 10 minutes.

10 Settings and Optimum Operating Values 10

Machine		M12	M15
Basic value:			
Steam pressure (saturated steam)	bar(psi)	4–5(58–72.5)	4–5(58 – 72.5)
Steam temperature (max. permitted)	°C(°F)	150(302)	150(302)
Cooling water pressure	bar(psi)	2-4(29-58)	2-4(29-58)
Low cooling water level switch	bar (psi)	2 (29)	2 (29)
Cooling water temperature, max.	°C(°F)	25(77)	25(77)
Compressed air	bar(psi)	6(87)	6(87)
Low air pressure switch (if present)	bar (psi)	4 (58)	4 (58)
Cage speeds:			
Cleaning / drying	RPM	35	35
Spinning	RPM	400 /600	400/600
Reversing cycle (cleaning)	sec.	10/1/10	10/1/10
Low level	l(US gal)	30(7.9)	35(9.2)
High level	l(US gal)	60(15.8)	75(19.8)
Pump pressure (max.)	bar(psi)	1.5(22)	1.5(22)
Filter surface, economy filter	m^2 (ft^2)	2.4(34.8)	2.4(34.8)
Tank I+II: filling volume (high level) each tank	l(US gal)	60(15.8)	75(19.8)
Tank III: filling volume	l(US gal)	60(15.8)	75(19.8)
Detergent solution cooler:			
Detergent solution thermal sensor:			
Detergent solution cooler ON	°C(°F)	40(104)	40(104)
Alarm value	°C (°F)	45 (113)	45 (113)
Refrigeration technology:			
Filling capacity, cooling agent R 404A	kg(lb)	4.6(10.1)	4.6(10.1)
Expansion valve:			
Nozzle size: solvent cooling	no.	03	03
Drying /reduction	no.	01	01
High pressure control switch ON	bar(psi)	21(304)	21(304)
High pressure control switch OFF	bar(psi)	25(362)	25(362)
Drying:			
Cooling water regulator setting:			
Adjust 4 – 6 min. after start of drying	bar(psi)	18(261)	18(261)
Temp. sensor, cage entry (gentle drying)*	°C(°F)	75(167)	75(167)
Temp. sensor after cooler:			
Alarm value, 1	°C(°F)	30(86)	30(86)
Alarm value, 2	°C(°F)	35(95)	35(95)
Safety temperature limiter after cooler:*	°C(°F)	45 (113)	45 (113)
Safety temperature limiter cage inlet:*	°C(°F)	100 (212)	100 (212)

* at flash point >55°C (131°F)

10 Settings and Optimum Operating Values 10

Machine		M12	M15
Distillation			
Cooling water regulator condenser	°C (°F)	45 (113)	45 (113)
Thermal sensor:			
Cycle distillation OFF	°C (°F)	133 (271)	133 (271)
Still stripping OFF	°C (°F)	138 (280)	138 (280)
Residue draining	°C (°F)	55 (131)	55 (131)
Thermal sensor, distilled solvent *	°C (°F)	45 (113)	45 (113)
Restrictor in steam feeder	mm (in)	6 (.24)	6 (.24)
Vacuum pressure control	kPa	minus 75	minus 75
Temperature sensor heater element (electric)	°C(°F)	230 (446)	230 (446)

* at flash point >55°C (131 °F)

10 Settings and Optimum Operating Values 10

Machine		**M18**
Basic value:		
Steam pressure (saturated steam)	bar(psi)	4–5(58–72.5)
Steam temperature (max. permitted)	°C(°F)	150(302)
Cooling water pressure	bar(psi)	2-4(29-58)
Low cooling water level switch	bar (psi)	2 (29)
Cooling water temperature, max.	°C(°F)	25(77)
Compressed air	bar(psi)	6(87)
Low air pressure switch (if present)	bar (psi)	4 (58)
Cage speeds:		
Cleaning / drying	RPM	35
Spinning	RPM	400 /600
Reversing cycle (cleaning)	sec.	10/1/10
Low level	l(US gal)	45(11.9)
High level	l(US gal)	90(23.7)
Pump pressure (max.)	bar(psi)	1.5(22)
Filter surface, economy filter	m^2 (ft^2)	2.4(34.8)
Tank I+II: filling volume (high level) each tank	l(US gal)	90(23.7)
Tank III: filling volume	l(US gal)	90(23.7)
Detergent solution cooler:		
Detergent solution thermal sensor:		
Detergent solution cooler ON	°C(°F)	40(104)
Alarm value	°C (°F)	45 (113)
Refrigeration technology:		
Filling capacity, cooling agent R 404A	kg(lb)	4.6(10.1)
Expansion valve:		
Nozzle size: solvent cooling	no.	03
Drying /reduction	no.	01
High pressure control switch ON	bar(psi)	21(304)
High pressure control switch OFF	bar(psi)	25(362)
Drying:		
Cooling water regulator setting:		
Adjust 4 – 6 min. after start of drying	bar(psi)	18(261)
Temp. sensor, cage entry (gentle drying)*	°C(°F)	75(167)
Temp. sensor after cooler:		
Alarm value, 1	°C(°F)	30(86)
Alarm value, 2	°C(°F)	35(95)
Safety temperature limiter after cooler:*	°C(°F)	45 (113)
Safety temperature limiter cage inlet:*	°C(°F)	100 (212)

* at flash point >55°C (131 °F)

10 Settings and Optimum Operating Values 10

Machine		**M18**
Distillation		
Cooling water regulator condenser	°C (°F)	45 (113)
Thermal sensor:		
Cycle distillation OFF	°C (°F)	133 (271)
Still stripping OFF	°C (°F)	138 (280)
Residue draining	°C (°F)	55 (131)
Thermal sensor, distilled solvent *	°C (°F)	45 (113)
Restrictor in steam feeder	mm (in)	6 (.24)
Vacuum pressure control	kPa	minus 75
Temp. sensor heater element (el.)	°C(°F)	230 (446)

* at flash point >55°C (131 °F)

11 Safety Remarks Located on the Machine 11

Gemäß EN ISO 8230 befinden sich an der Maschine nachfolgende Sicherheitshinweise:

In accordance with EN ISO 8230 the machine is fitted with safety hints as given below:

Conforme à EN ISO 8230 les indications de sécurité suivantes se trovent à la machine:

Kontaktwasser kann geringe Spuren von Lösemittel enthalten.
Vorschriftsmäßig entsorgen!

Contact water may contain small quantities of solvent.
Please dispose of according to the regulations in your country!

L'eau de contact peut contenir une petite quantité de solvant.
Evacuer l'eau de contact conformément à la réglementation.

SN 708073

Nadelfänger täglich bzw. bei Bedarf öfter reinigen
(Nur bei ausgeschalteter Maschine und nach beendeter Trocknungsphase).

Clean button trap if necessary but at least once a day
(only if machine is switched off and the drying phase has been finished).

Nettoyer le filtre à épingle tous les jours et si nécessaire plus souvent
(seulement hors fonctionement de la machine et après une opération de séchage).

SN 708074

Reinigen der Destillation nur bei
- ausgeschalteter Maschine und
- kalter Destillierblase durchführen

Clean still only if
- machine is switched off and
- distillation is cold

Nettoyer l'alambic seulement si:
-La machine est hors de fonctionement
- Le distillateur est revenu à température ambiante

SN 708075

11 Safety Remarks Located on the Machine 11

Vorsicht!
Heiße Oberflächen

Attention!
Hot surfaces

Attention!
Surface chaude

SN 708076

Zulässige Füllmenge

Max. filling capacity

Capacité admissible

SN 708086

Filter täglich bzw. bei Bedarf öfter reinigen
(nur bei ausgeschalteter Maschine und nach beendeter Trocknungsphase)

Clean lint filter if necessary but at least once a day
(only if machine is switched off and the drying phase has been finished.)

Nettoyer le filtre tous les jours et si nécessaire plus souvent
(seulement hors fonctionement de la machine et après une opération de séchage).

SN 708087

Filter und Wasserabscheider dürfen manuell
nur bei leerer Destillation abgelassen werden.

Filter and water separator must only be drained manually
if the distillation is empty.

La vidange manuelle du filtre à solvant et du séparateur d'eau
est seulement permise quand le distillateur est vide.

SN 708077

12 kg /30 lbs **Zulässige Füllmenge** ***Max. filling capacity*** **Capacité admissible** SN 800195	**15 kg /35 lbs** **Zulässige Füllmenge** ***Max. filling capacity*** **Capacité admissible** SN 800196
18 kg /40 lbs **Zulässige Füllmenge** ***Max. filling capacity*** **Capacité admissible** SN 800197	

11 Safety Remarks Located on the Machine 11

For cleaning machines that operate with combustible solvent

Hazardous to humans and the environment:

- Risk of fire or explosion if any contact with open flames, embers or sparks
- Damages the skin, risk of eczema formation
- Serious damage to the lungs is possible if vapor is inhaled

Safety precautions:

- No source of fire near the solvent, absolutely no smoking
- Avoid skin contact, use protective gloves if possible
- No direct contact with the solvent
- Use protective skin cream regularly

- **Do not eat or drink in the work area**

What to do in case of fire:

- In case of fire, extinguish with a carbon dioxide or foam fire extinguisher
- If you spill solvent, use a suitable bonding agent

First aid:

- Immediately remove clothing wet with solvent
- If you inhale concentrated vapor, go out into the fresh air immediately
- If you get solvent in your eyes, rinse with water and contact a physician immediately

Disposal:

When stored, the solvent must be kept in closed containers and must be disposed of by experts only.

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