CE

Installation manual
Washer-extractors

WP4– WPB4 700–900–1100H

Electrolux PROFESSIONAL

05201052/EN

original instructions

Contents

The manufacturer reserves the right to make changes to design and component specifications.

1 . Safety precautions

CAUTION

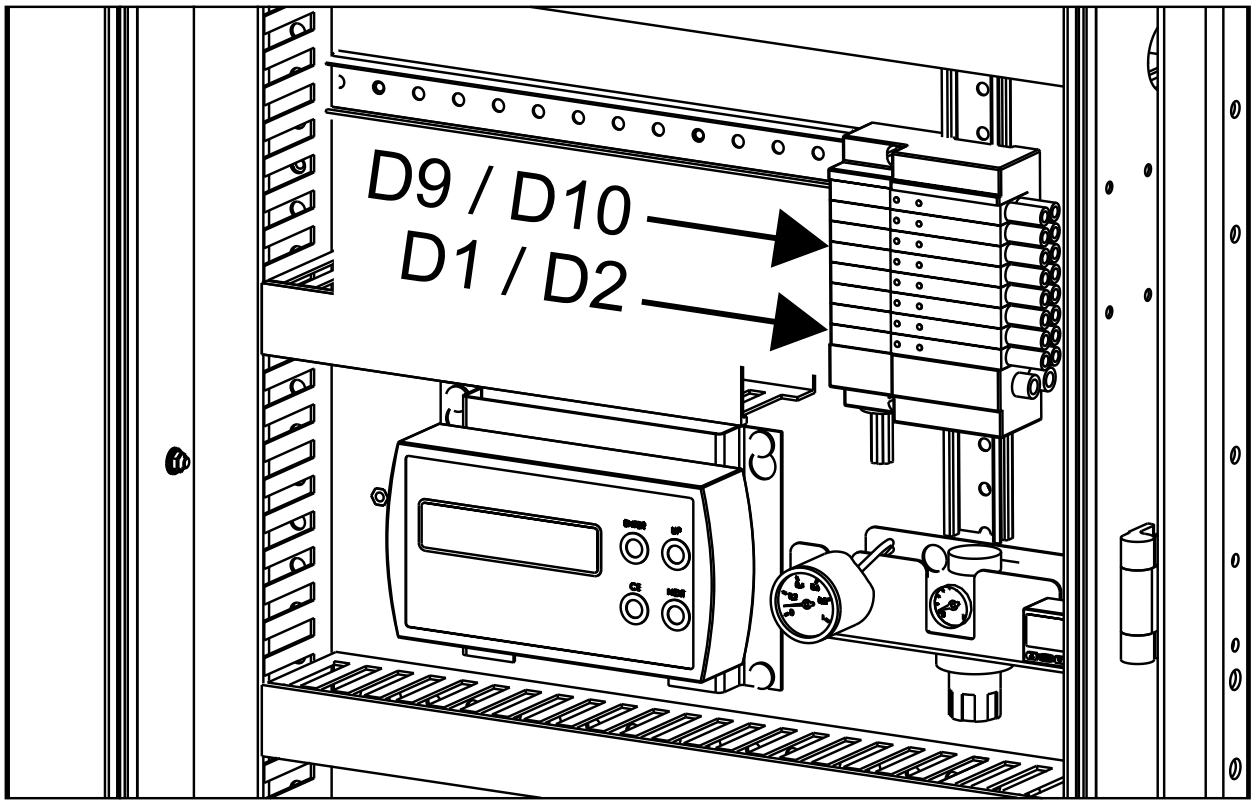
READ THIS ENTIRE MANUAL BEFORE USAGE

This machine should be installed in conformance to the health and safety regulations, and only used in a sufficiently aerated area. Check the instructions before installing or using the machine.

CAUTION

Before any use, to retire all the parts needed to install the machine put in the drum , please follow these actions

1. connect compressed air.
2. Remove the side housing cabinet.
3. Push on the orange button of the D9/D10 distribution unit in the electric cabinet. (see drawing below)
4. Open the loading door.
5. Open the drum doors , with precautions, maintain the 2 doors.
6. Get the package and instructions.



CAUTION

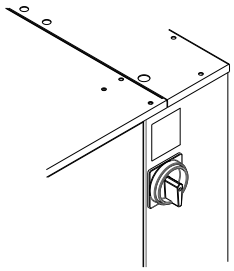
Users must have learnt how the machine operates.
This device must not be installed in places accessible to the public.
The machine is only intended for water-wash use.
Do not allow minors to use the machine.
Do not hose down the machine with water.
Only use detergent intended for water-wash of textiles Never use dry cleaning agents.
It is forbidden to wash textiles soaked with solvents.
The machine's door lock must under no circumstances be bypassed.
If the machine develops a fault, this must be reported to the person in charge as soon as possible. This is important both for your safety and that of others.
DO NOT MODIFY OR TAMPER WITH THIS APPLIANCE.
Servicing shall be carried out only by authorised personnel by ELECTROLUX PROFESSIONAL.
Only original spare parts shall be used.
When performing service or replacing parts, the power must be disconnected.
When the power is disconnected, the operator must see that the machine is disconnected (that the plug is removed and remains removed) from any point to which he has access. If this is not possible, due to the construction or installation of the machine, a disconnection with a locking system in the isolated position shall be provided.
In accordance with the wiring rules : mount a multi-pole switch prior to the machine to facilitate installation and service operations.
In order to prevent damage to the electronics (and other parts) that may occur as the result of condensation, the machine should be placed in room temperature for 24 hours before being used for the first time.
In case of a gas heated machine, do not assemble the machine on premises containing a dry cleaning machines or other similar machines.
Please wash only items offering appropriate distribution inside the drum.
Do not wash items such as mattresses or shoes.
Call our technical departments before washing nonstandard items. Noncompliance with these instructions may void the manufacturer's guarantee in case of abuse of the washer-extractor.

CAUTION

For the following countries : AT, BE, BG, HR, CY, CZ, DK, EE, FI, FR, DE, GR, HU, IS, IE, IT, LV, LT, LU, MT, NL, NO, PL, PO, PT, RO, SK, SI, ES, SE, CH, TR, UK : This appliance shall not be installed where the public has access.
For other countries : This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety and understand the hazards involved. Children should be supervised to ensure that they do not play with the appliance.

IMPORTANT

The identification plate is located on the right side near the main switch.



Never use the main switch as an emergency stop. Use it only when the machine does not work in progress. Instead of that, use the emergency stop buttons in both sides of the machine.

IMPORTANT

Sound pressure level is found in Technical data.

CAUTION

Your machine is equipped with an automatic weighing system which weighs the laundry during the loading and unloading cycle. For proper operation of this system, **you should not open the tank doors for the all duration of the wash program initiated** even if errors occurs.

IMPORTANT

Never try to open the outer drum door before the complete stop of the cage.

CAUTION

Disconnect all the sources of energy before any intervention on the machine.


The machines comply with the European Directive EMC (Electromagnetic Compatibility). They have been tested in laboratory and approved as such. It is so prohibited to add wires or nonshielded electric cables in the cabinets, strands or cables' troughs. Considering that the volume of the outer drum is superior to 150 litres, the standard kept for the electric part is the IN 60204.

CAUTION

With AIDO(Automatic Inner Door Opening) option, Take care of the disc of the opening system above your head. Risk of cutting with the edge of the disc!!
Take care also of the locking system on your side; risk of cutting with the edge of the plate!!

CAUTION

When you put your hands into the drum, take care of the edge of the outer drum doors on yours sides. Risk of cutting with the edge of the metal plate!!

CAUTION

The machine can work without the protective casing when the electric supply is not cut off.
Interlock the main isolating switch with a padlock.
Close the steam or gas inlet valves.

IMPORTANT

Ensure that the machine is not loaded beyond its maximum capacity (70 kg (154 lb) for WP(B)4700 ; 90 kg (198 lb) for WP(B)4900 and 110 kg (242 lb) for WP(B)41100).
An excessive load has consequences for the lifetime of the machine’s organs, as follows:

- Premature deterioration and failure of the suspension elements (springs, shock absorbers);
- Excessive fatigue of motorization elements (engine, belt);
- Rapid reduction of lifetime of drum bearings (rolling bearings);
- Opening and destruction of drum doors and tank doors during oil dehydration.

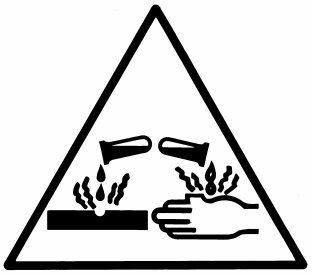
This is particularly important for your safety and that of others.
The consequence is an immediate cancellation of the warranty.

THINK OF THE ENVIRONMENT!

The use and handling of chemical products such as detergent, chlorine, acids, descaling agents, etc may create hazards for health and environment ; the following precautions should be taken:

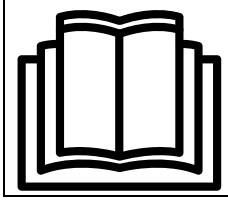
- Do not breathe the dusts or steam;
- Avoid contact with skin or eyes (may cause burns);
- In case of important spillage, wear a protecting mask, gloves, and eye protectors;
- Handle with care;
- Consult the use and first aid advice on the packing;
- Do not dispose pure products in the environment.

WARNING



The use and handling of chemical products such as detergent, chlorine, acids, antiliming agents etc... may create hazards for health and environment ; the following precautions should be taken.
- Do not breathe the dusts or steam.
- Avoid contact with skin or eyes (may cause burns).
- In case of important spillage, wear a protecting mask, gloves, and eye protectors.
- Handle with care.
- Consult the use and first aid advice on the packings.
- Do not dispose pure products in the environment.

1.1 Symbols

	Caution.
	Caution, presence of dangerous current.
	Read the instructions before using the machine.

1.2 Personal protection equipment

Given below is a summary table of the Personal Protection Equipment (PPE) to be used during the various phases of the machine's service life.

Phase	Protection garments	Safety footwear	Gloves	Glasses	Ear protectors	Mask	Safety helmet
Transport		X	O				
Handling		X	O				
Unpacking		X	O				
Installation		X	O				
Normal use	X	X	X	X			
Adjustments	O	X					
Routine cleaning	O	X	X	O			
Extraordinary cleaning	O	X	X	O			
Maintenance	O	X	O				
Dismantling	O	X	O				
Scrapping	O	X	O				

Legend : **X** : PPE required ; **O** : PPE available or to be used if necessary.

Normal use : Safety footwear must be defined for a use on a wet floor. And use glasses and gloves to manipulate chemical products.

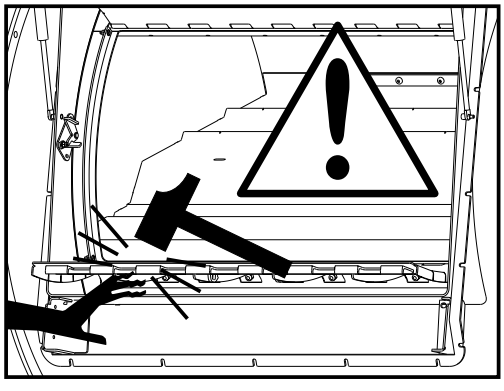
1.3 Preliminary instructions

WARNING

Risk of jamming when opening the lower door for unloading

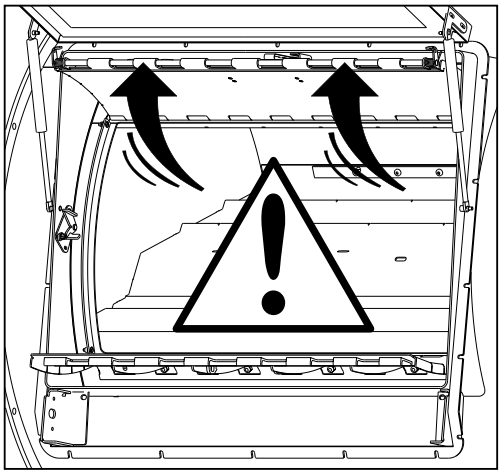
WARNING

Risk of jamming with trolley and lower door when opening (if trolley height = 900mm)



WARNING

Risk of the upper door being raised quickly on loading



WARNING

After the installation, Send back the commissionning form ,signed document, to Electrolux to validate the warrantly of the product.

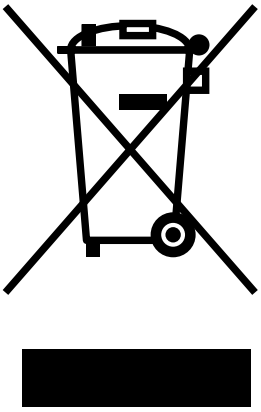
2 Environmental information

Concerned by providing the end user with useful and necessary environmental information, we wish to precise:

- Data about energetic consumptions, wastes (atmospheric and liquid) and sound level are indicated in the paragraph «Technical characteristics».
- Foreseeing its recycling, this machine is fully dismantable.
- This machine is free from any asbestos.
- In conformity with French regulations.
- In the other countries, we recommend that you comply with the legislation in force in the country where the machine is installed.
- In France, all owners of packing waste producing a weekly volume below 1100 litres can forward these to the local collection and treatment department. If exceeding this volume, the owners of packing waste will ensure their valuation by reuse, recycling or, any other action aiming at producing reusable materials or energy... or provide them contractually to a certified intermediate authorised to transport, trade or broke waste.

  Therefore, this forbid:
  - land filling raw waste;
  - open air burning or incineration without energy collection.
- Packaging of our machines are according with the french legislation related to environment requirements.

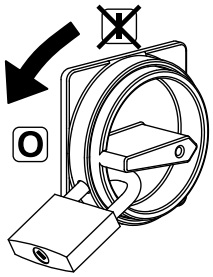
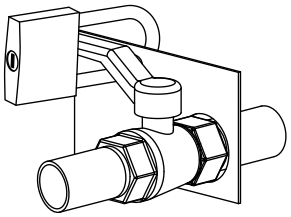
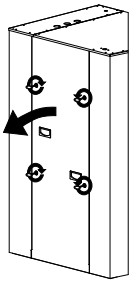
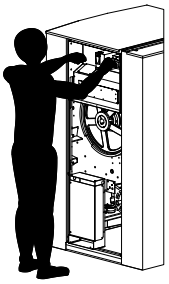
For additional information, do not hesitate to consult with our environmental department.

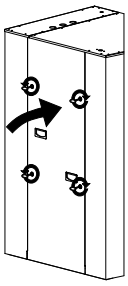


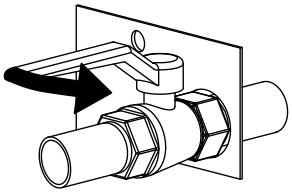
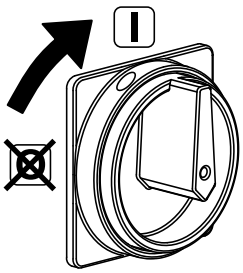
Scrapping of machine
When the machine is no longer to be used, it must be submitted to a recycling facility for destruction.
The majority of the components in the machine can be reused, but it also contains other materials that must be taken care of in the correct way.
Thererore, never mix the machine or its parts with domestic wa&ste as this may lead to health hazards or damage to the environment.

3 Locking and tagging procedure

A red insert at the beginning of this instruction handbook schematically shows the locking and tagging procedure described below. If you wish, you can detach this insert and display it close to the machine to remind maintenance personnel of the safety instructions.

1		Always respect items 2, 3 and 4 carefully before doing any repair or maintenance work on the machine.		
2		Put the main switch to Off and lock the handle with a padlock in one of the three holes provided for this purpose.		Close the stop valves for the other supplies (steam, gas, thermal fluid, compressed air) to stop and lock their handle with a padlock.
3		Open the fixed protectors (casings, doors) with the key provided or a special tool.		Do the maintenance.

4		Close and carefully lock the fixed protectors.

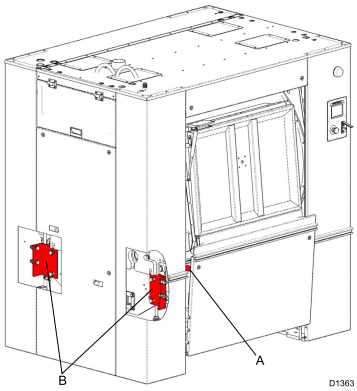
5			Unlock the stop valves and the main switch.

4 Handling

Important

It is obligatory that all these operations are undertaken by handling specialists.

Before any handling, check that the four transport locks fitted are still in place and well-tightened.
To do so, remove the side casings and check presence of four locks (B) and the down casings for the four locks (A).



Caution

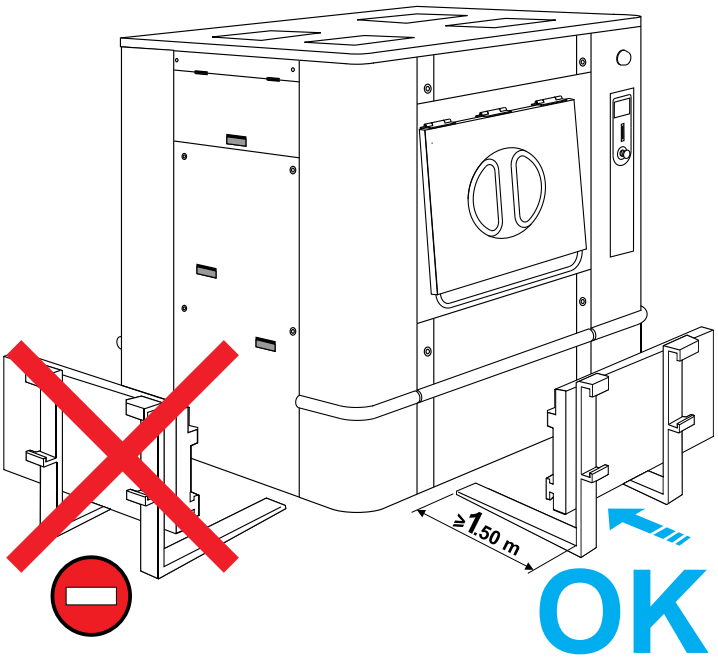
To handle the machine, you must imperatively reassemble the transport bridles and dis engage the load cells (proceed in reverse order or “remove of the transport locks fitted”)

4.1 Lifting with a fork-lift truck

Warning

You should never handle the machine in its longitudinal side (any other than shown on the drawing below) with a fork-lift truck. Important risk of parts deterioration for those fixed under the machine.

This can be carried out from the front or back, and at the centre of the machine using forks with minimum length of 1.50 m (59”)

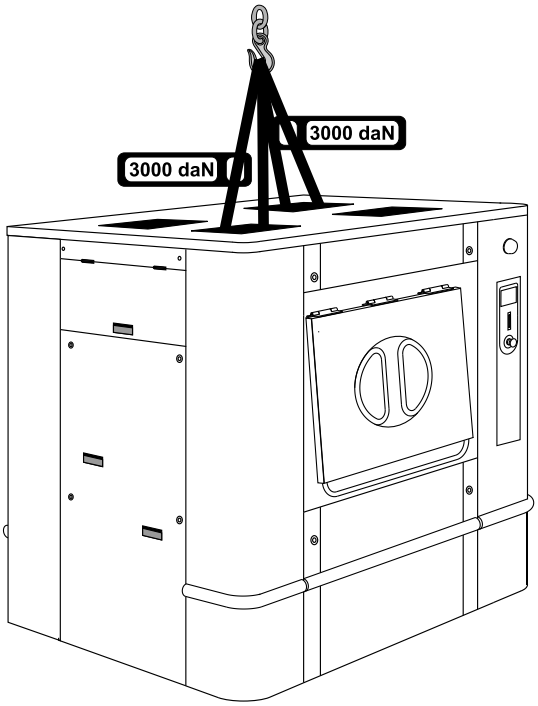


4.2 Lifting with handlings straps

Lifting in that case can only be done with handling straps (minimum capacity 3000 daN / 6600 lb) which bear weight of the machine.

Caution

Make sure to place the straps correctly to avoid any bending of parts of the machine.



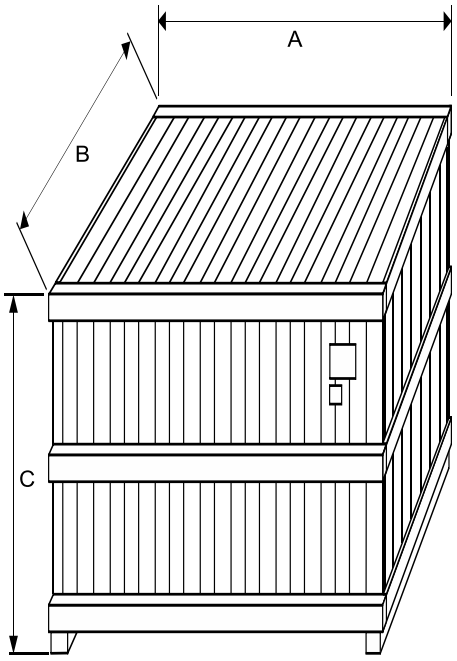
Caution

In order to avoid any bending of casings, you should never climb and stand on top of the machine.

5 Packing-Weight

5.1 Packing

Packing dimensions in mm/in	Size A	Size B	Size C
Washer extractor type WP/WPB4 700	1690 / 67”	1720 / 68”	2330 / 92”
Washer extractor type WP/WPB4 900	1670 / 66”	1970 / 78”	2330 / 92”
Washer extractor type WP/WPB4 1100	1680 / 66”	2180 / 86”	2330 / 92”



5.2 Weight

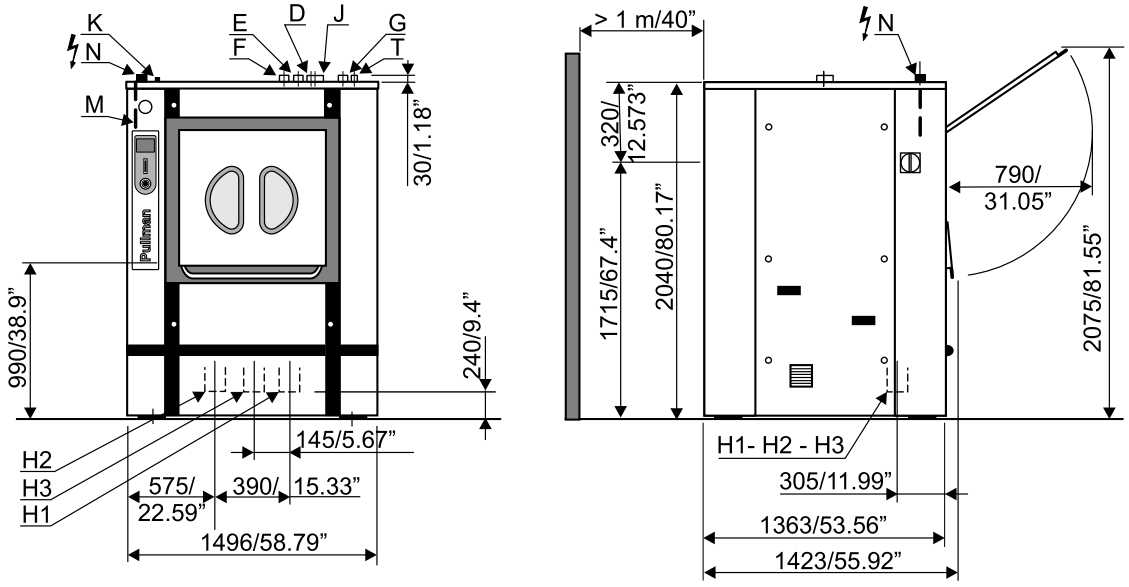
Weight in kg/lb (machine + crate)*	Electrical heating	Steam/ Thermal fluid heating
Washer extractor type WP/WPB4 700	2900 / 6395	2900 / 6395
Washer extractor type WP/WPB4 900	3100 / 6836	3100 / 6836
Washer extractor type WP/WPB4 1100	3280 / 7233	3280 / 7233

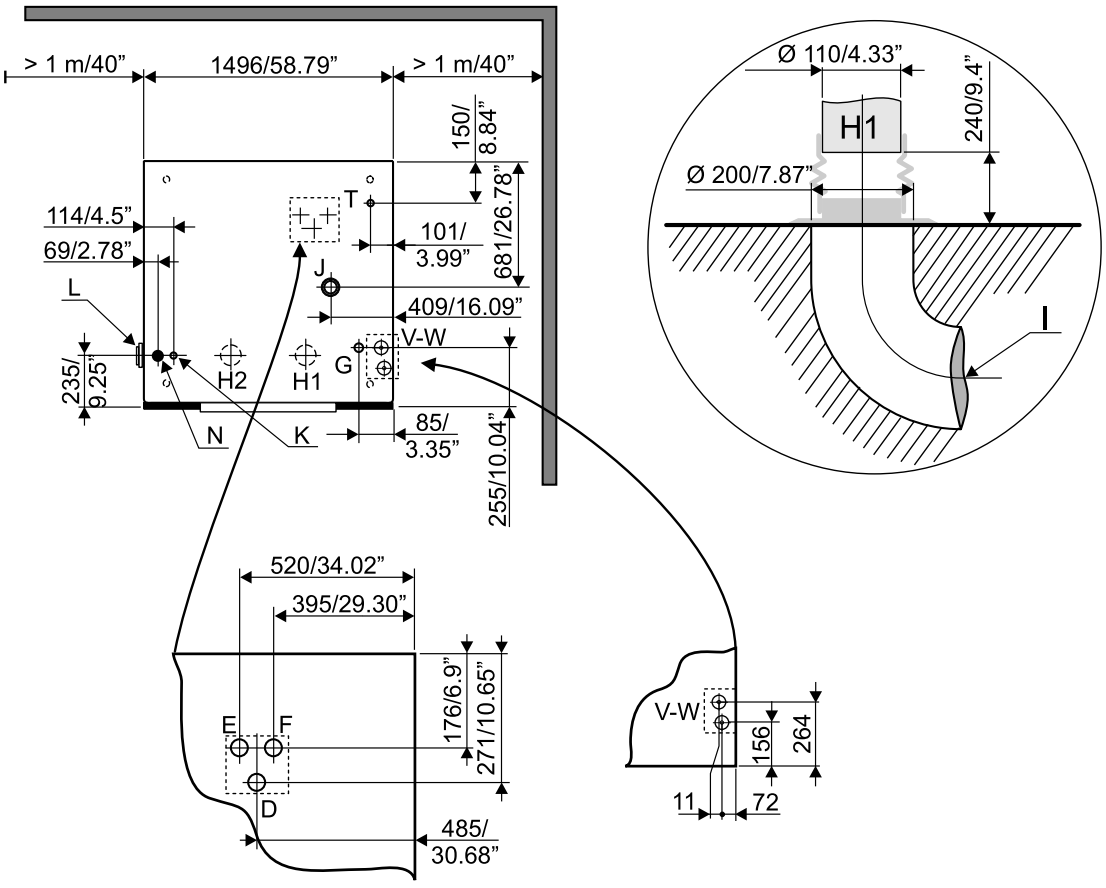
* Precise weight depends on accessories fitted.

6 Technical characteristics

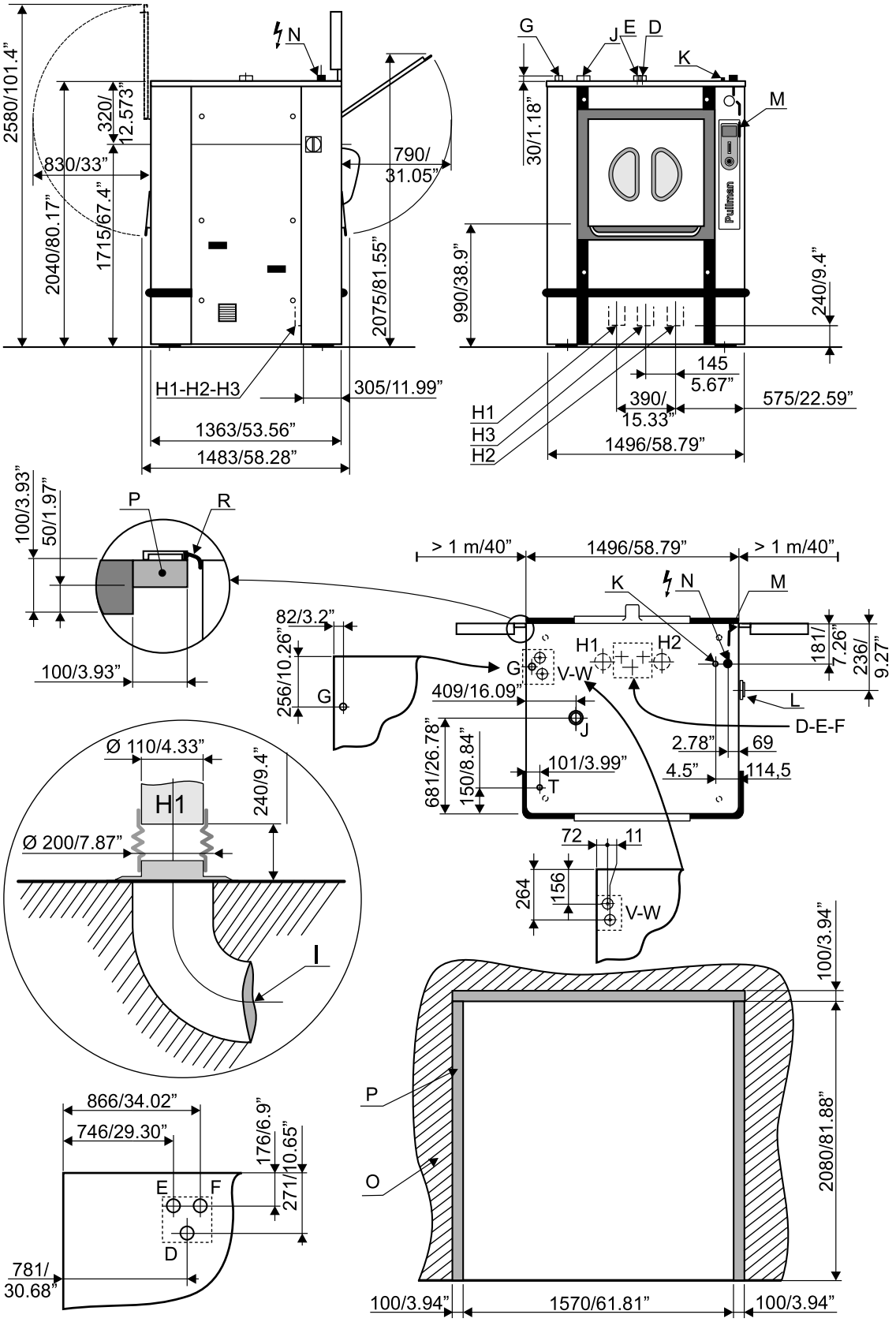
6.1 Washer extractor type 700

One door WP4 700H: Drawing 07100140





Barrier WPB4 700H: Drawing 07100141



Washer extractor type 700 one door (Diagram N° 07100140 and 07100141)			
	Units	**WP4 700**	**WPB4 700**
Drum diameter	mm / “	1050 / 41.33”	1050 / 41.33”
Drum length	mm / “	794 / 31.26”	794 / 31.26”
Drum volume	litre	685	685

Opening inner drum doors (LxH)	mm	670”490	670x490
Opening outer drum door (LxH)	mm	728”698	728”698
G-factor, max.		300	300
Specific load 1/10 ¹ ISO 93 98–4 standard type C	kg / lb	68.5 / 151.52	
Floor area	m²	2.04	2.04
Max. unbalance	kg	15	15
Net weight	daN	2530*	2530*
Weight loaded (high level)	daN	3010	3010
Water volume, washing (low level)	l	185	185
Water volume, washing (high level)	l	370	370
Heat loss		3 % of installed heating power	

* Precise weight depends on accessories fitted.

6.2 Connections WP-WPB4 700 :

Water	Units	**WP4 700**	**WPB4 700**
Water valves connection	mm-BSP	DN32–1”1/4″	DN32–1”1/4″
Capacity at 250 kPa	l/min	200	200
Functioning limits for water valve	kPa	50–300	50–300
Water consumption for a wash program[1]	l	990	990

Drain	Units	**WP4 700**	**WPB4 700**
Drain connection, outer ⌀	mm	110	110
Double drain connection (option) outer ⌀	mm	110	110
Maximum drain flow rate	l/min	380	380
Waste water collector	DN-mm	200	200

Air vent	Units	**WP4 700**	**WPB4 700**
Air vent connection, outer ⌀	mm	80	80

Liquid detergents	Units	**WP4 700**	**WPB4 700**
Liquid detergents connection, outer ⌀	mm	25	25

Steam	Units	**WP4 700**	**WPB4 700**
Steam inlet, standard	mm-BSP	DN25–1″	DN25–1″
Steam inlet, low pressure	mm-BSP	DN32–1″1/4	DN32–1″1/4
Recommended steam pressure	kPa	300–600	300–600
Recommended steam pressure (low pressure heating)	kPa	less than 50	less than 50
Functioning limits for steam valve (not for low pressure)	kPa	100–600	100–600
Steam instantaneous flow rate at 600 kPa	kg/h	240	240
Steam consumption for a normal cycle[1] ISO 93 98–4 standard type C	kg at 600 kPa	24	24
Steam consumption for a normal cycle[1] ISO 93 98–4 standard type C	kg at 50 kPa	26.5	26.5

Indirect steam	Units	**WP4 700**	**WPB4 700**
Thermic fluid inlet or indirect steam heating	mm-BSP	DN20–3/4″	DN20–3/4″
Thermic fluid return or indirect steam heating	mm-BSP	DN20–3/4″	DN20–3/4″
Maximum supply pressure	kPa	400	400
Inner volume thermic fluid	l	8	8

Electricity	Units	**WP4 700**	**WPB4 700**
Supply voltage	V	380/415	380/415
Frequency	Hz	50/60	50/60
Electric cable (section)	mm²	See chapter “Feeder cable section”	

1. ISO 93 98–4 standard type C.

Rated electric power, electric heating	kW	65.7	65.7
Rated electric power, steam heating / indirect steam heating	kW	11.7	11.7

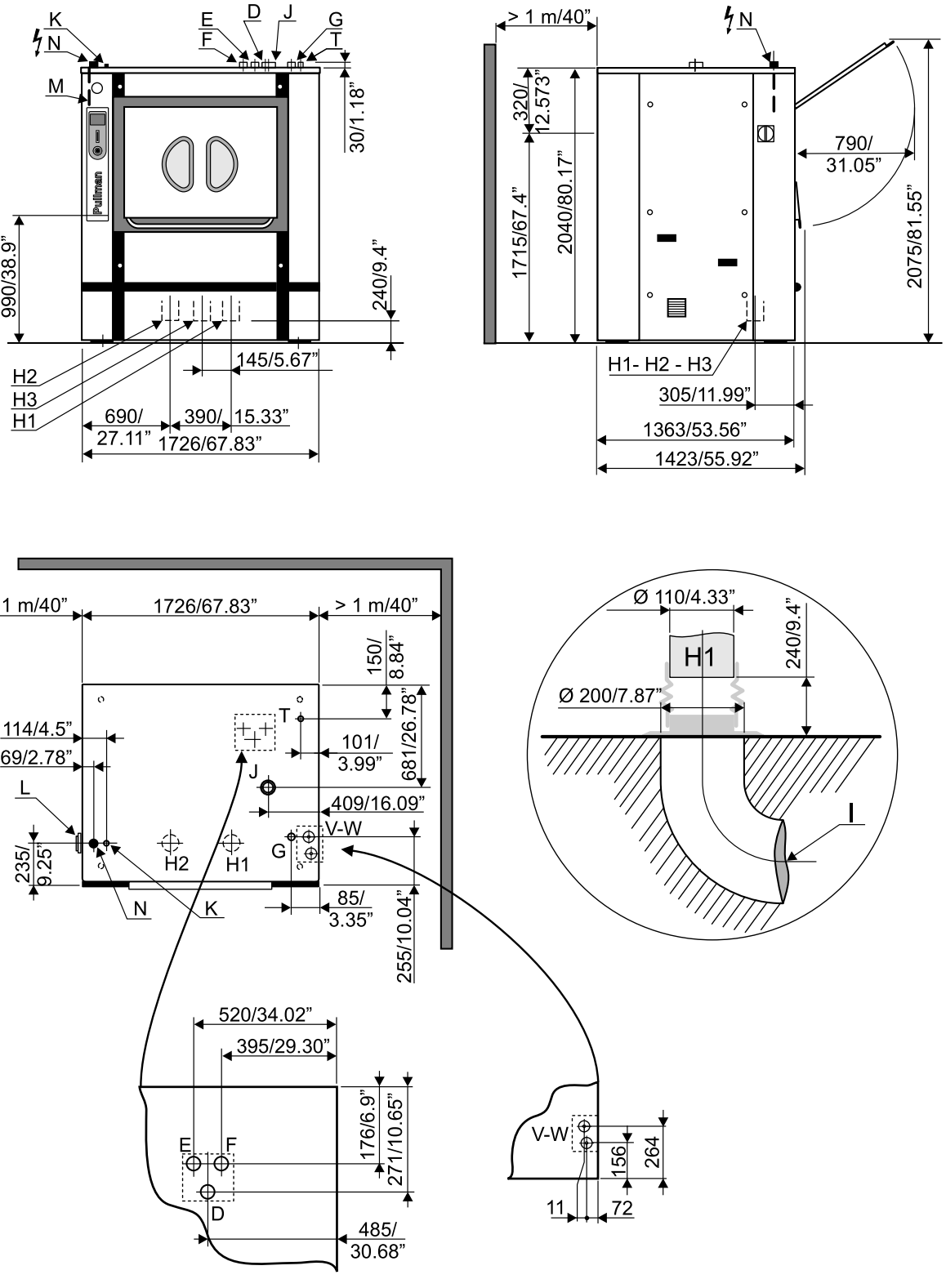
Heating	Units	**WP4 700**	**WPB4 700**
Installed heating power, electric heating	kW	54	54
Electric consumption for a standardized cycle, electric heating	kWh	17.8	17.8
Electric consumption for a standardized cycle, steam heating	kWh	1.8	1.8

Floor load	Units	**WP4 700**	**WPB4 700**
Max transmitted floor load	daN	3600	3600
Max. pressure transmitted to floor	kPa	144	144

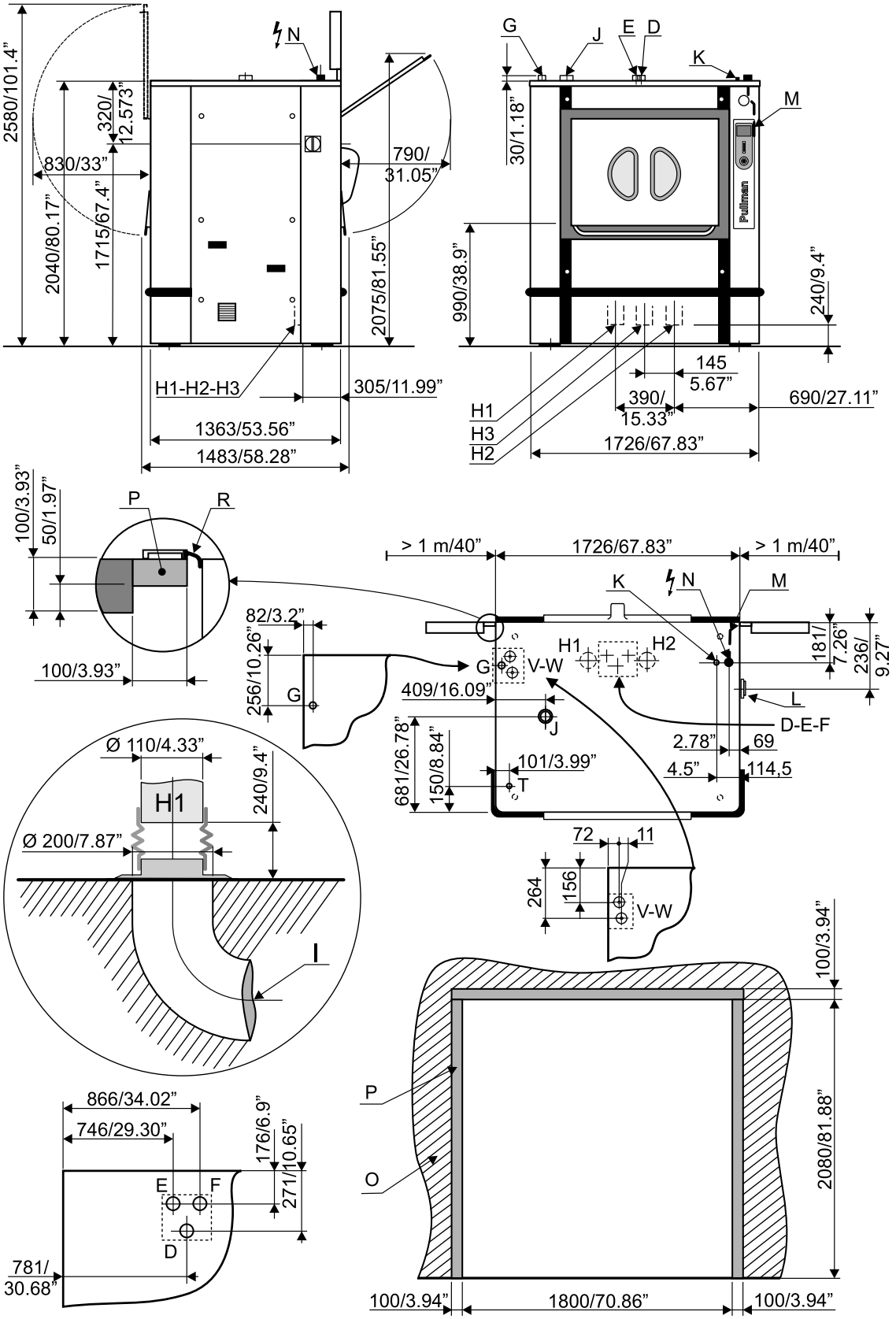
Compressed air	Units	**WP4 700**	**WPB4 700**
Compressed air inlet	mm	6/8	6/8
Min./max. compress air pressure	bar	5.5/7	5.5/7
Consumption	l/h	50	50

6.3 Washer extractor type 900

One door WP4 900H: Drawing 07100138



Barrier WPB4 900H: Drawing 07100139



Washer extractor type 900 (Diagram N° 07100138 and 07100139)			
	Units	**WP4 900**	**WPB4 900**
Drum diameter	mm / “	1050 / 41.33”	1050 / 41.33”
Drum length	mm / “	1026 / 40.39”	1026 / 40.39”

Drum volume	litre	885	885
Opening inner drum doors (LxH)	mm	900”490	900x490
Opening outer drum door (LxH)	mm	958”698	958”698
G-factor, max.		300	300
Specific load 1/10 ¹ ISO 93 98–4 standard type C	kg / lb	88.5 / 195.2	
Floor area	m²	2.35	2.35
Max. unbalance	kg	15	15
Net weight	daN	2725*	2725*
Weight loaded (high level)	daN	3345	3345
Water volume, washing (low level)	l	220	220
Water volume, washing (high level)	l	440	440
Heat loss		3 % of installed heating power	

* Precise weight depends on accessories fitted.

6.4 Connections WP-WPB4 900 :

Water	Units	**WP4 900**	**WPB4 900**
Water valves connection	mm-BSP	DN32–1”1/4″	DN32–1”1/4″
Capacity at 250 kPa	l/min	200	200
Functioning limits for water valve	kPa	50–300	50–300
Water consumption for a wash program[2]	l	1190	1190

Drain	Units	**WP4 900**	**WPB4 900**
Drain connection, outer ⌀	mm	110	110
Double drain connection (option) outer ⌀	mm	110	110
Maximum drain flow rate	l/min	380	380
Waste water collector	DN-mm	200	200

Air vent	Units	**WP4 900**	**WPB4 900**
Air vent connection, outer ⌀	mm	80	80

Liquid detergents	Units	**WP4 900**	**WPB4 900**
Liquid detergents connection, outer ⌀	mm	25	25

Steam	Units	**WP4 900**	**WPB4 900**
Steam inlet, standard	mm-BSP	DN25–1″	DN25–1″
Steam inlet, low pressure	mm-BSP	DN32–1″1/4	DN32–1″1/4
Recommended steam pressure	kPa	300–600	300–600
Recommended steam pressure (low pressure heating)	kPa	less than 50	less than 50
Functioning limits for steam valve (not for low pressure)	kPa	100–600	100–600
Steam instantaneous flow rate at 600 kPa	kg/h	240	240
Steam consumption for a normal cycle[1] ISO 93 98–4 standard type C	kg at 600 kPa	32	32
Steam consumption for a normal cycle[1] ISO 93 98–4 standard type C	kg at 50 kPa	35	35

Indirect steam	Units	**WP4 900**	**WPB4 900**
Thermic fluid inlet or indirect steam heating	mm-BSP	DN20–3/4″	DN20–3/4″
Thermic fluid return or indirect steam heating	mm-BSP	DN20–3/4″	DN20–3/4″
Maximum supply pressure	kPa	400	400
Inner volume thermic fluid	l	9	9

Electricity	Units	**WP4 900**	**WPB4 900**
Supply voltage	V	380/415	380/415
Frequency	Hz	50/60	50/60
Electric cable (section)	mm²	See chapter “Feeder cable section”	

2. ISO 93 98–4 standard type C.

Rated electric power, electric heating	kW	87.7	87.7
Rated electric power, steam heating / indirect steam heating	kW	15.7	15.7

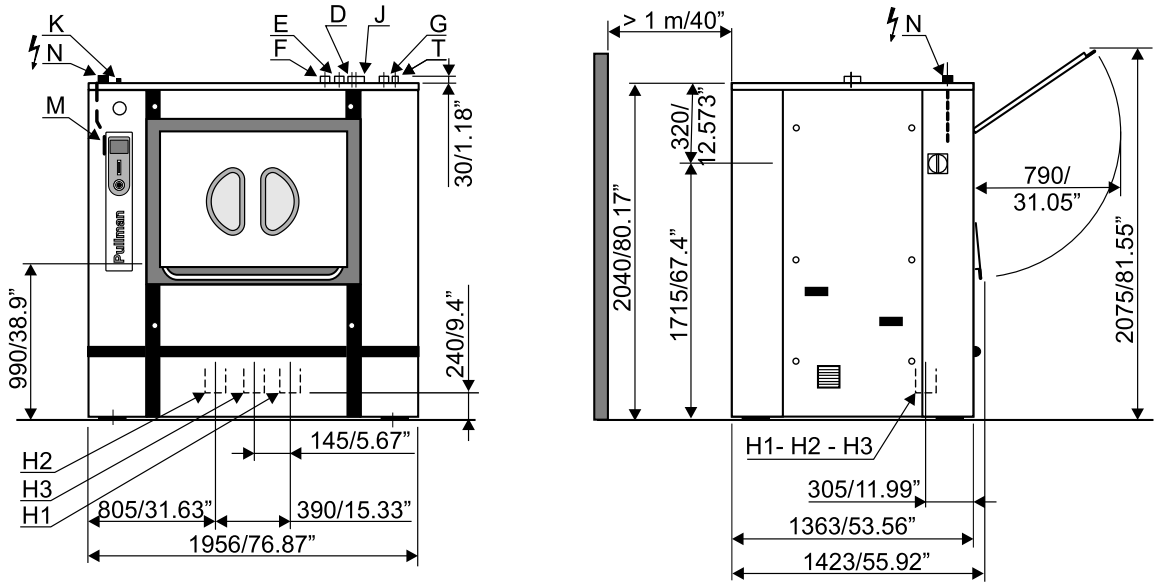
Heating	Units	**WP4 900**	**WPB4 900**
Installed heating power, electric heating	kW	72	72
Electric consumption for a standardized cycle, electric heating	kWh	24.3	24.3
Electric consumption for a standardized cycle, steam heating	kWh	2.3	2.3

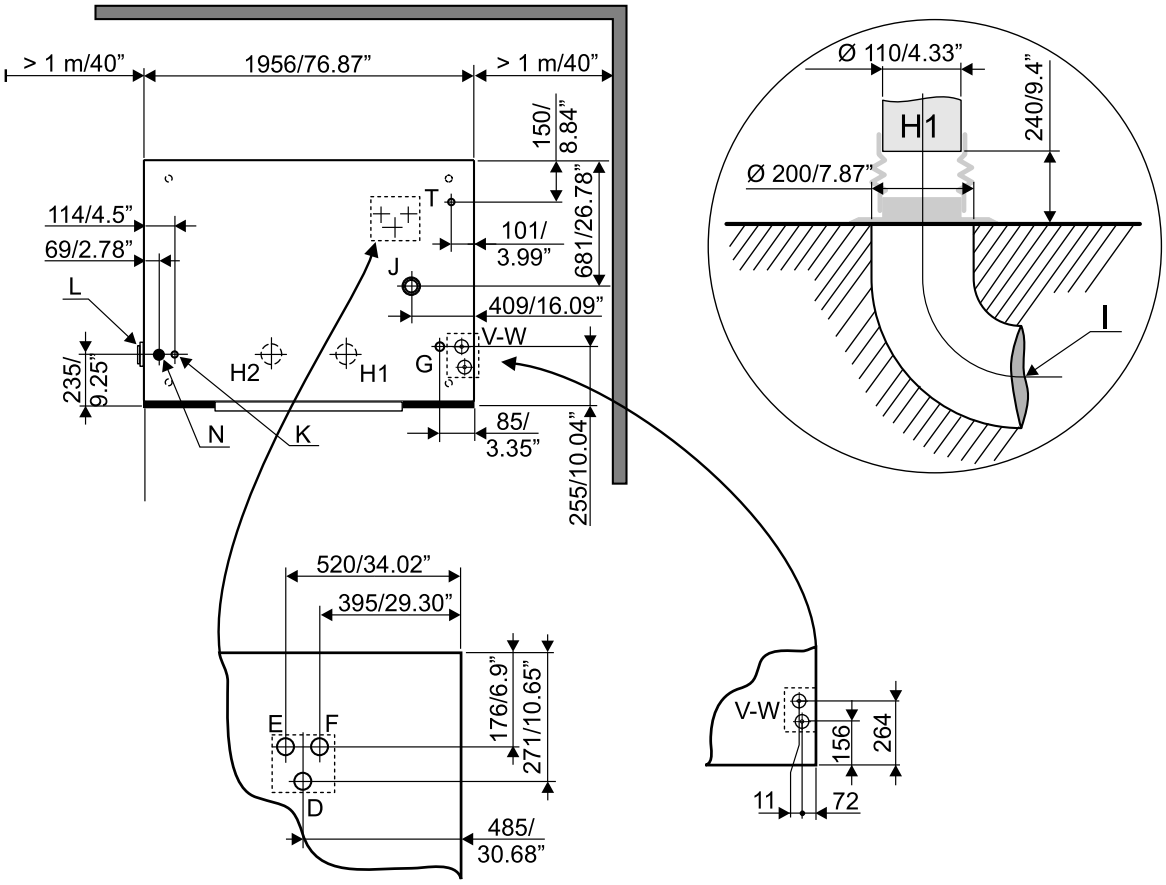
Floor load	Units	**WP4 900**	**WPB4 900**
Max transmitted floor load	daN	4100	4100
Max. pressure transmitted to floor	kPa	164	164

Compressed air	Units	**WP4 900**	**WPB4 900**
Compressed air inlet	mm	6/8	6/8
Min./max. compress air pressure	bar	5.5/7	5.5/7
Consumption	l/h	50	50

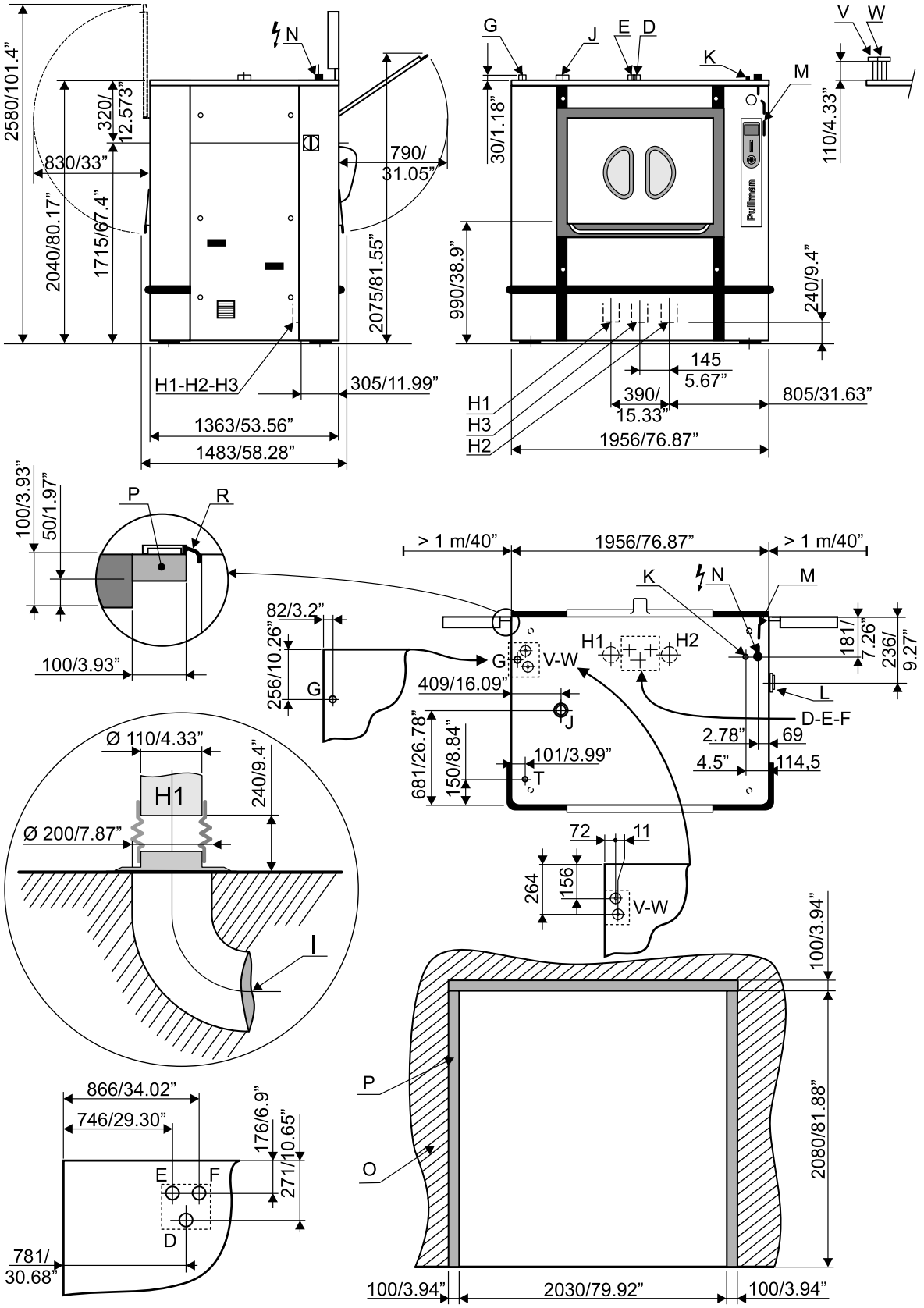
6.5 Washer extractor type 1100

One door WP4 1100H: Drawing 07100136





Barrier WPB4 1100H: Drawing 07100137



Washer extractor type 1100 (Diagram N° 07100136 and 07100137)			
	Units	**WP4 1100**	**WPB4 1100**
Drum diameter	mm / “	1050 / 41.33”	1050 / 41.33”
Drum length	mm / “	1256 / 49.45”	1256 / 49.45”

Drum volume	litre	1083	1083
Opening inner drum doors (LxH)	mm	900”490	900x490
Opening outer drum door (LxH)	mm	958”698	958x698
G-factor, max.		300	300
Specific load 1/10 ¹ ISO 93 98–4 standard type C	kg / lb	108.3 / 238.87	
Floor area	m²	2.67	2.67
Max. unbalance	kg	15	15
Net weight	daN	2850*	2850*
Weight loaded (high level)	daN	3608	3608
Water volume, washing (low level)	l	300	300
Water volume, washing (high level)	l	600	600
Heat loss		3 % of installed heating power	

* Precise weight depends on accessories fitted.

6.6 Connections WP-WPB4 1100 :

Water	Units	**WP4 1100**	**WPB4 1100**
Water valves connection	mm-BSP	DN32–1”1/4″	DN32–1”1/4″
Capacity at 250 kPa	l/min	200	200
Functioning limits for water valve	kPa	50–300	50–300
Water consumption for a wash program[3]	l	1490	1490

Drain	Units	**WP4 1100**	**WPB4 1100**
Drain connection, outer ⌀	mm	110	110
Double drain connection (option) outer ⌀	mm	110	110
Maximum drain flow rate	l/min	380	380
Waste water collector	DN-mm	200	200

Air vent	Units	**WP4 1100**	**WPB4 1100**
Air vent connection, outer ⌀	mm	80	80

Liquid detergents	Units	**WP4 1100**	**WPB4 1100**
Liquid detergents connection, outer ⌀	mm	25	25

Steam	Units	**WP4 1100**	**WPB4 1100**
Steam inlet, standard	mm-BSP	DN25–1″	DN25–1″
Steam inlet, low pressure	mm-BSP	DN32–1″1/4	DN32–1″1/4
Recommended steam pressure	kPa	300–600	300–600
Recommended steam pressure (low pressure heating)	kPa	less than 50	less than 50
Functioning limits for steam valve (not for low pressure)	kPa	100–600	100–600
Steam instantaneous flow rate at 600 kPa	kg/h	240	240
Steam consumption for a normal cycle[1] ISO 93 98–4 standard type C	kg at 600 kPa	36	36
Steam consumption for a normal cycle[1] ISO 93 98–4 standard type C	kg at 50 kPa	39	39

Indirect steam	Units	**WP4 1100**	**WPB4 1100**
Thermic fluid inlet or indirect steam heating	mm-BSP	DN20–3/4″	DN20–3/4″
Thermic fluid return or indirect steam heating	mm-BSP	DN20–3/4″	DN20–3/4″
Maximum supply pressure	kPa	400	400
Inner volume thermic fluid	l	10	10

Electricity	Units	**WP4 1100**	**WPB4 1100**
Supply voltage	V	380/415	380/415
Frequency	Hz	50/60	50/60
Electric cable (section)	mm²	See chapter “Feeder cable section”	

3. ISO 93 98–4 standard type C.

Rated electric power, electric heating	kW	91	91
Rated electric power, steam heating / indirect steam heating	kW	19	19

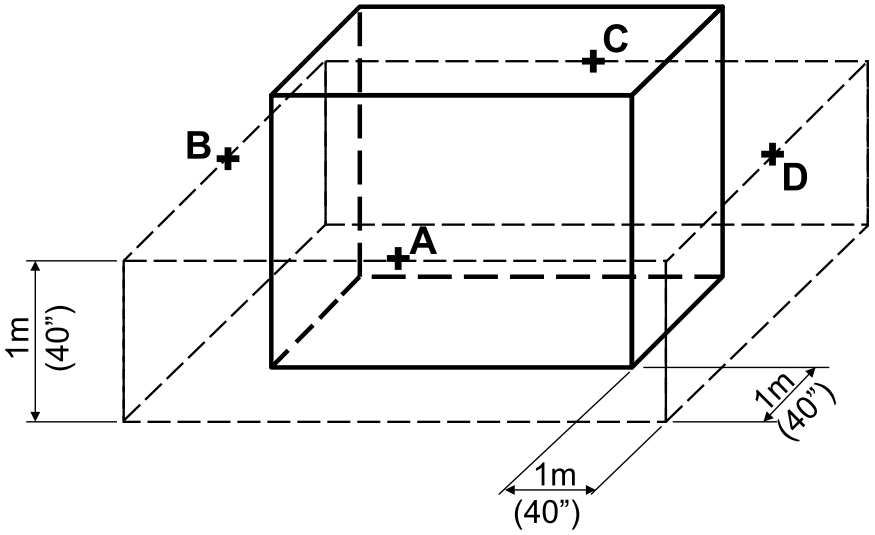
Heating	Units	**WP4 1100**	**WPB4 1100**
Installed heating power, electric heating	kW	72	72
Electric consumption for a standardized cycle, electric heating	kWh	25.3	25.3
Electric consumption for a standardized cycle, steam heating	kWh	2.4	2.4

Floor load	Units	**WP4 1100**	**WPB4 1100**
Max transmitted floor load	daN	4450	4450
Max. pressure transmitted to floor	kPa	178	178

Compressed air	Units	**WP4 1100**	**WPB4 1100**
Compressed air inlet	mm	6/8	6/8
Min./max. compress air pressure	bar	5.5/7	5.5/7
Consumption	l/h	50	50

7 Sound levels

The sound power level of the machine is determined by using ISO 3747:2012.



According to test code EN50571 : 2013 anex CC,the sound power level at extraction and during washing are according to the table:

Airbone noise emitted by the machine (values established from measurements made on machine at points A,B,C, and D)

Weighted sound pressure level in dB (A)	Washer 700 (Without insulation)		Washer 900 (Without insulation)		Washer 1100 (Without insulation)	
	Washing	High spin extraction	Washing	High spin extraction	Washing	High spin extraction
A	63.5	82.2	63.5	82	66	81.5
B	64	81.3	64.2	81	66	81.5
C	63	83.9	63.8	83	67	83
D	64	82.7	64.2	83	67	83

8 Working place lighting

The lighting should be designed so as to avoid eye strain for the operator ; it should be uniform without any glare, and should be sufficient to detect any hazards.

The average lighting value on the working place recommended by the clothing industry for inspecting linen is **500 lux**.

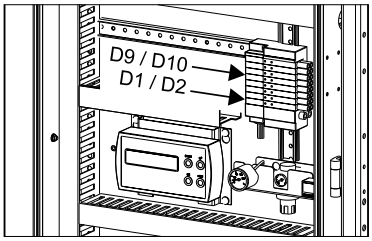
Whenever possible, the working place should be illuminated by daylight.

9 Supplies

Take the box placed inside of the inner drum.

Important

you must connect the compressed air to unlock the loading door.Then push on the orange button of the D9/D10 distribution unit in the electric cabinet.So you can access in the drum.



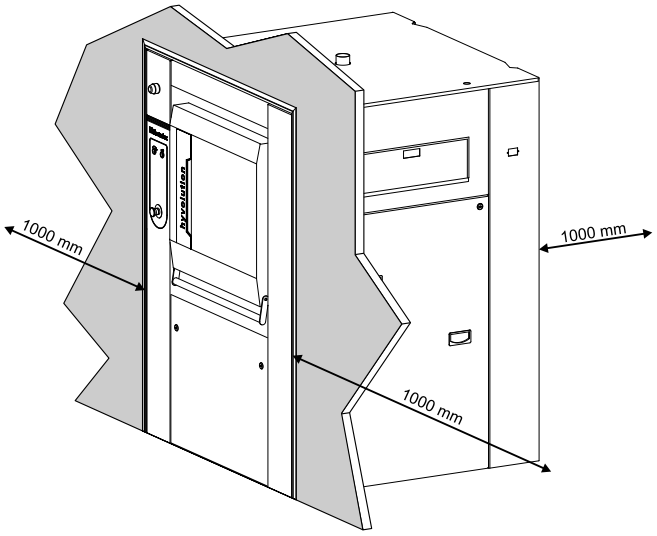
1. Accessories delivered with each machine
   - 1 instruction handbook + converter handbook + spare parts catalogue + 2 electrical schematics +1 maintenance poster
   - 3 keys for casings
   - 2 or 3 stainless steel flexible pipes 3/4″ + 4 or 6 fibre seals
   - 2 or 3 waters filters 1″
   - 2 or 3 male nipples 1″
   - 1 connection bellow ⌀ 110 + 1 collar
   - 1 hose ⌀ 110 mm + 1 collar for drain
   - 1 connection nozzle
   - 4 fixing dowels
   - 4 bolsters + 4 wedges (see explanation for the setting)

2. Accessories delivered with each steam heating machine
   - 1 steam electrovalve
   - 1 steam flexible
   - 1 steam filter
   - 1 pipe union

3. Accessories delivered with each gas heating machine
   - 4 meters blue flexible pipes
   - 2 pipes ⌀ 125 mm (5″), length 500 mm (20″) to be connect at the chimney
   - 1 T-square pipe ⌀ 125 mm (5″) and an anti-bursting chimney regulator to be connected over the gas exchanger
   - 1 draught accelerator to extract the exhaust of burn gas, to be connected at the chimney (in 3 parts)
   - 4 collars ⌀ 40–60

4. Accessories delivered with each barrier washers
   - 1 rubber seal + aluminium extruded sections + 40 screws
   - 4 flange safety locks (machines with weighing equipment)
   - 1 opening inner drum lever (with manual openning door)

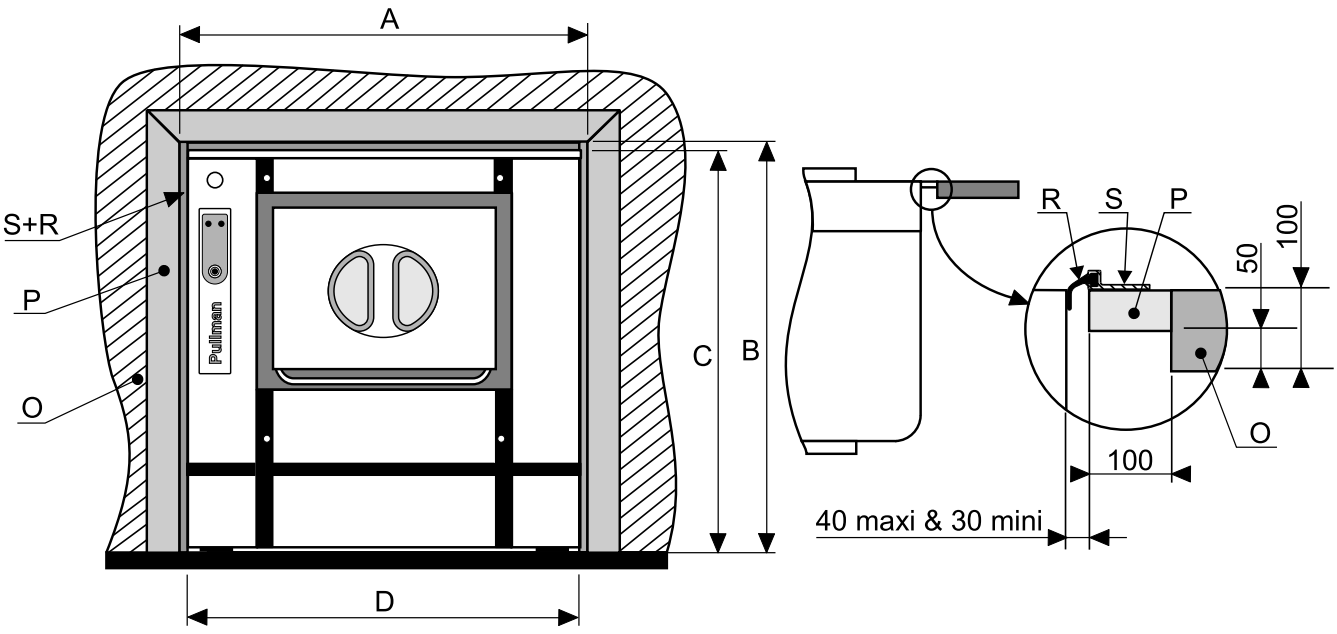
10 Barrier partition



Leave at least 1 m (40") (according to the recommendation in standard EN 60204) between the machine, a wall or any other machine at the sides.

mm/in	A	B	C	D
WPB4 700H	1570	2080	2040	1490
WPB4 900H	1800	2080	2040	1720
WPB4 1100H	2030	2080	2040	1950

* Minimum 70 mm (2.76″),, maximum 100 mm (4″),.



- The barrier partition (O) shall be built before the installation of the machine.
- Centre and align the washer-extractor with the frame (P) 60x100mm (2x4”) maximum (provided by customer)..
- Place the rubber seal (R) inside the aluminium extruded section (S).
- Screw the aluminium extruded section (S) on the frame or on the optional plates (P).

If machines are to be installed in an existing wall thicker than 100 mm (4″), we recommend you order our special aseptic frame kit.

11 Mechanical installation

Depending on its destination, the washer extractor is delivered bare or may be placed on a transport pallet and/or packed with plastic film.

In some cases, it may be delivered in a crate, or in maritime packing (wood box).

11.1 Unpacking

Take off the plastic film or remove the four wood socles with a spanner..

Please refer to the handling chapter in this instruction handbook for a description of handling operations.

Important

Check that no damage has been caused during transport.

11.2 Installation

The installation must be done by competent technicians in accordance with local codes and regulations. When there are not local codes and regulations, the installation **must be comply** with European standards applicable.

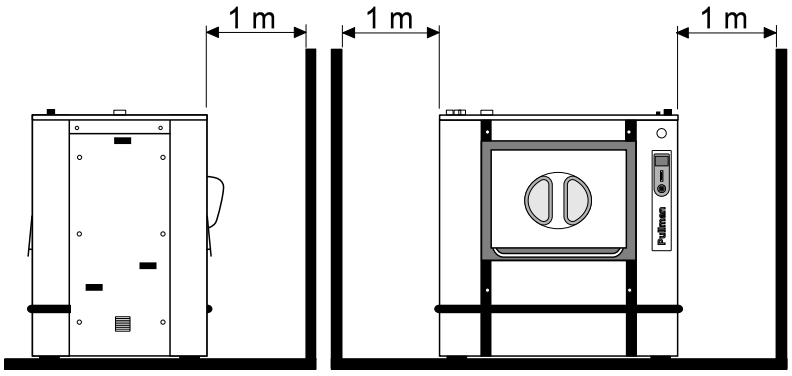
The machine must be installed on a perfectly even surface, strong and horizontal, capable resisting to the efforts shown in the technical characteristics.

Adjustment of the machine by addition of level plate should be avoided.

Control the horizontal level using a water level placed on the machine's sole.

Place the washer extractor so that it is easy for the user and the service technician to do their work.

Leave at least 1 m (40″) (**according to the recommendation in standard EN 60204**) between the machine, a wall or any other machine at the sides.



11.3 Installing the shock absorber runners

Preparation of the ground and the machine.

- Carefully degrease the ground and the machine’s base plates.

Positioning the shock absorber runners.

- Place each shock absorber runner (P) at its respective location (see diagram) raising each of the machine’s support points in series and taking care to let the runner inside of the base plates.

Commissioning the machine

- Time: before commissioning the machine, each support point must be embedded by being crushed in by the runner’s upper layer and the lower layer must have been pushed into the porosity in the ground.
  The crushing time is 2 hours at an ambient temperature of 18 °C.

Warning

Electrical safety device.
As rubber is a very good electric insulating material, the earthing of the machine is compulsory.

Moving machines sealed with the shock absorber runners

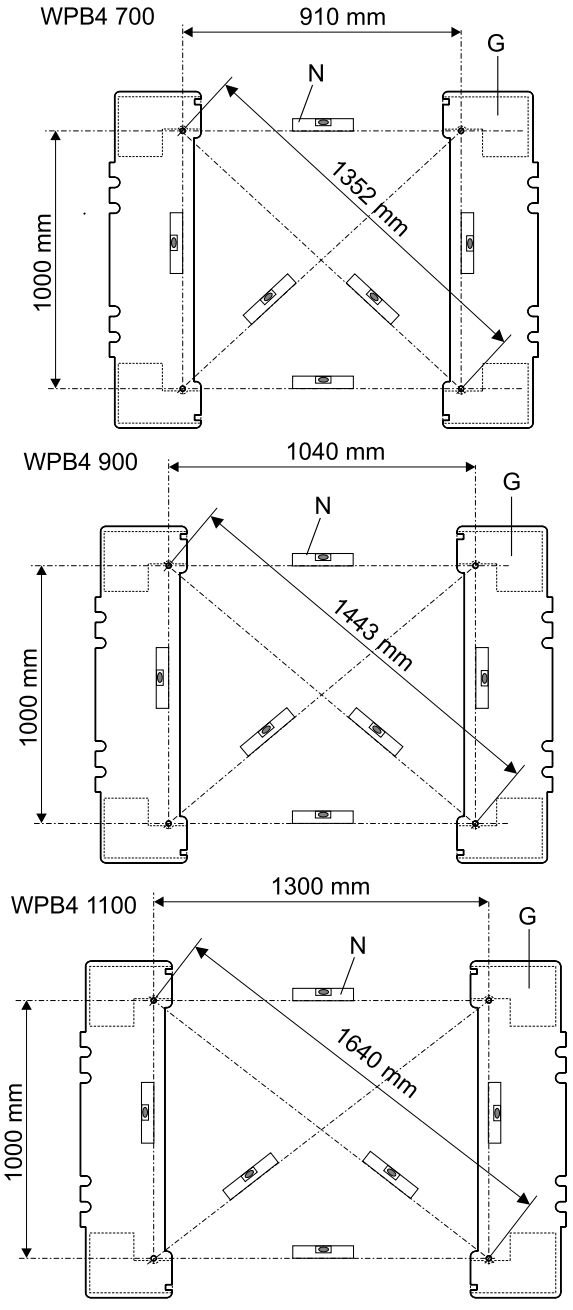
- Moving machines sealed with the shock absorber runners

11.4 Instructions for securing the machine on the ground

Caution

Only for machines without weighing equipment.

Place the machine on a perfectly even surface and horizontal.
Control this using a water level (see drawing).
Each point must be level.



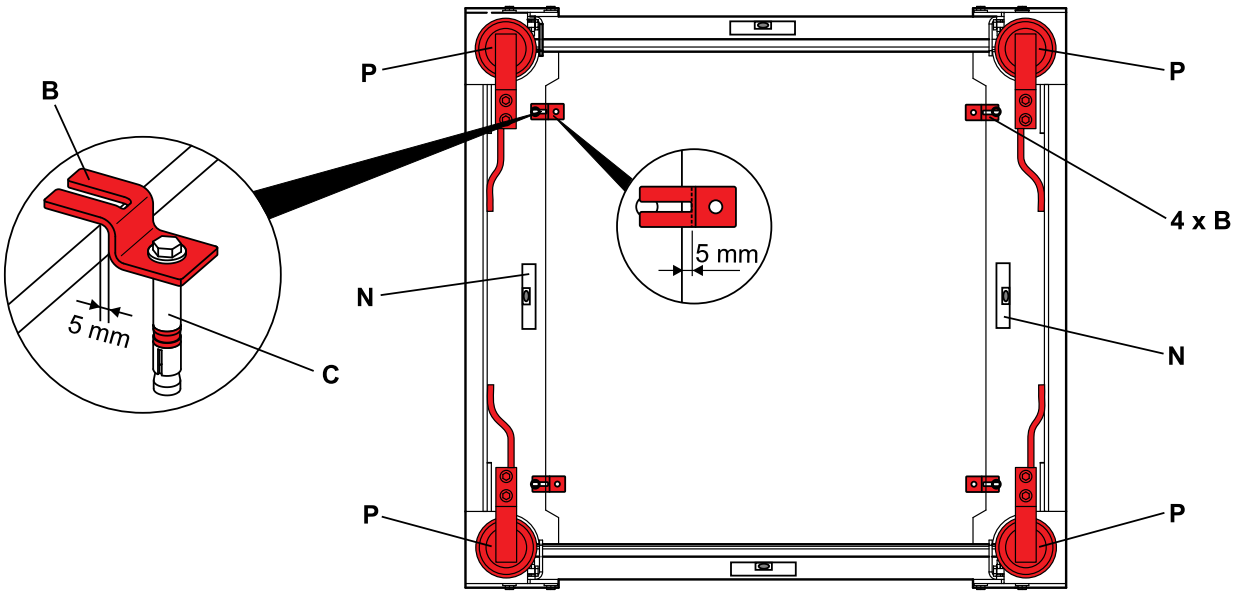
Mark out the drill holes for the securing dowels and drill them so as to insert the 4 dowels, they will secure the machine to the floor.

Put the machine in position and secure it with the dowels without tighten.
Bolsters: G
Water level: N

Caution

Only for machines with weighing equipment.

Place the machine on a perfectly even surface and horizontal.
Control this using a water level (see drawing).
Each point must be level.

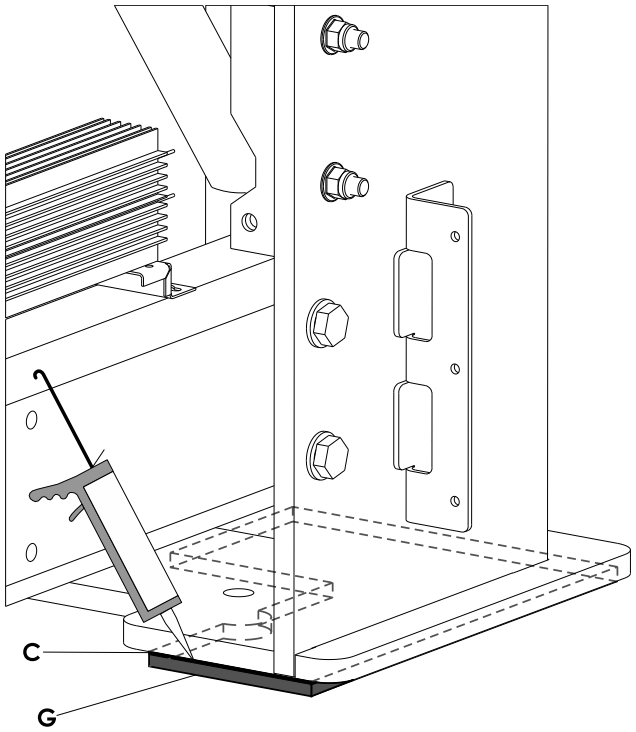


Weighing equipment: P
Water level: N
Fixing dowels: C
Flange safety locks: B

Mark the place of the drilling hole for the fixing dowels (C) and drill the holes for fixing of flanges (holes ⌀ 12 mm (1/2″), depth 80 mm (3″)). Put the dowels in the flanges, position the flanges and screw.

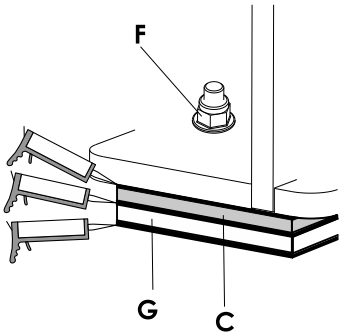
11.5 Setting the bolsters

Place each bolster (G) at its respective location (see drawing) and heave successively each bearing of the machine.
Verify the levels and place if necessary the wedges (C) between the bolster and the soles to stabilize the machine.
When the “trial “ stalling is realized, apply obligatory the glue (type SILICOMET) on every bolster face and under the soles of the machine (see drawing)



The indicated faces on the drawing must be aligned. Aplly equally glue to each face of the used wedges.

Put the machine in position and secure it with the bolts (F) **without tighten** .



Electrical safety device : As rubber is a very good electric insulating material, the earthing of the machine is mandatory.

To displace the machine sealed with bolsters : You must introduce a flat chisel between the ground and the bolsters by heaving the machine; you have to remove them and avoid to pull off the ground.

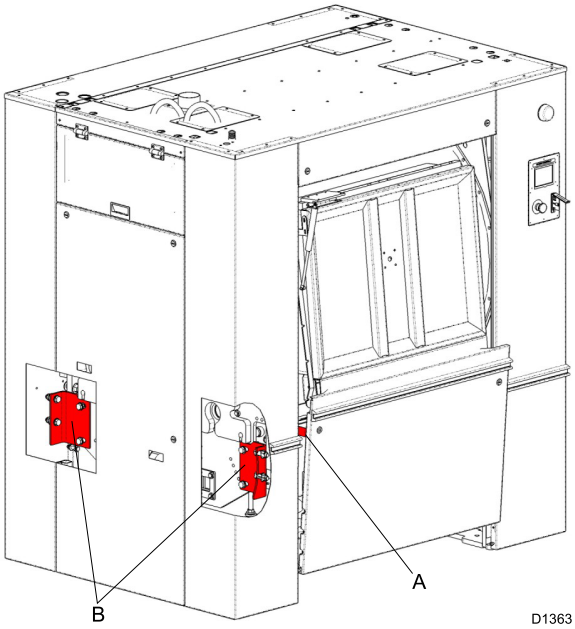
12 Remove of the transport locks fitted

Important

Before putting the machine into service, it is compulsory to remove the 4 transport locks fitted.

To do so, remove the side casings, then the fixing screws of the transportation bridles (B), as well as the transportation bridle screws of the down casings (A).

Keep the transport locks fitted with their screws and bolts to be able to assemble them again in case you would need to lift the machine.



Important

Never handling the machine without the transportation bridles.

13 Drain connection

The machine's exhaust sleeve outside diameter is of 110 mm (4.33″). It is located underneath the machine.

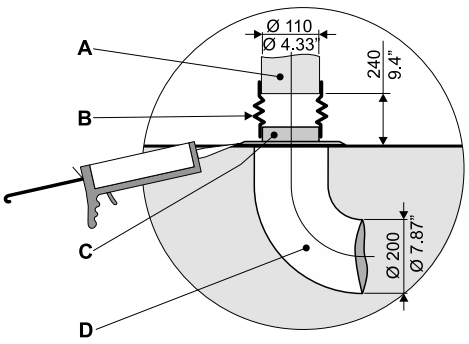
The waste water collector diameter 200 mm (7.87″) (manufactured by customer) should have a 3 cm/m (3 %) slope and resist to a temperature of 90 °C (194 °F). It should be connected to the waste water general network in accordance with local codes and regulations.

Adapt and connect the machine's exhaust sleeve to the waste waters' collector (rubber bend and connection nozzle are supplied in the machine with collars).

Drawing of drain connection to waste waters' collector

1. Connect the hose (B) to the connect nozzle (C).
2. Seal and fix the nozzle (C) using 2 screws.
3. Them connect the hose (B) to the drain's evacuation sleeve (A).

A	Drain's evacuation sleeve
B	Connection hose
C	Connection nozzle
D	Waste water collector



14 Waters connections

Washer extractors are assembled in standard execution with two waters inlet.

One hot water and one hard water. On option, a third water inlet (soft) is possible.

The supply pipes to the machine should be fitted with manual shut-off valves to facilitate installation and service. Fit filters to the manual shut-off valves with Teflon. Refer to local utilities regulations when fitting nonreturn valves. A screen at the entrance to the machine filter should be necessarily mounted, it must have a mesh size of 0.3 mm

Any malfunction of water solenoid or water pneumatic valves due to a absence or a poor maintenance of the filters will not be taken under warranty.

Caution

It is strictly forbidden to use the electrical control of the third water to drive any equipment. Only the pneumatic outlet can be used.

The following values apply to water pressure:

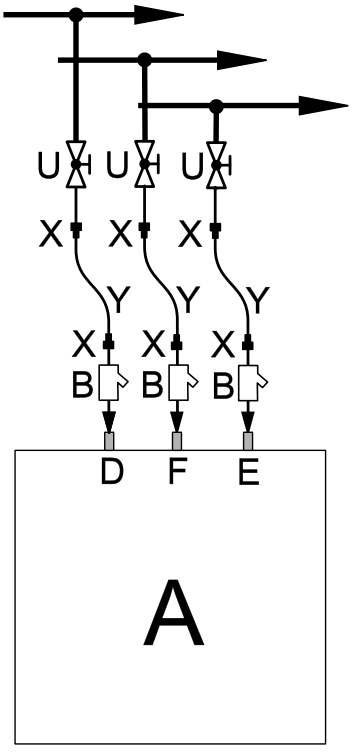
Water supply pressure, 50 kPa (7.25 psi) mini.

Water supply pressure, 300 kPa (43.5 psi) maxi.

The hoses should be flushed through before being connected to the machine.

The hereunder example sketch shows the connection of the machine to the different inlets.

A	Washer-extractor
E	Hard water inlet DN 32 (1"1/4 BSP female) only this one for Clean Room Option
D	Hot water inlet DN 32 (1"1/4 BSP female) (T max 60° C)
F	Cold soft water inlet (option) DN 32 (1"1/4 BSP female)
U	Manual stop valve DN 32 (1”1/4 BSP) (provided by customer)
B	Water filter (provided)
X	Nipple DN 32 (1”1/4 BSP) (provided)
Y	Flexible pipe DN 32 (1"1/4 BSP) length : 80 cm (provided)

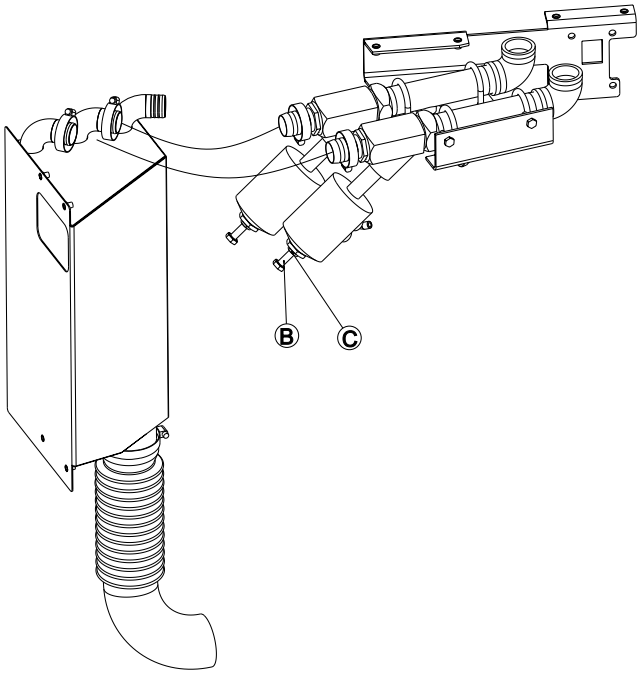


Adjustment of the water pressure (Kit 56000183)

The factory setting is 3 bar for the pressure.

You must adjust the electrovalves according to the water pressure of your network.

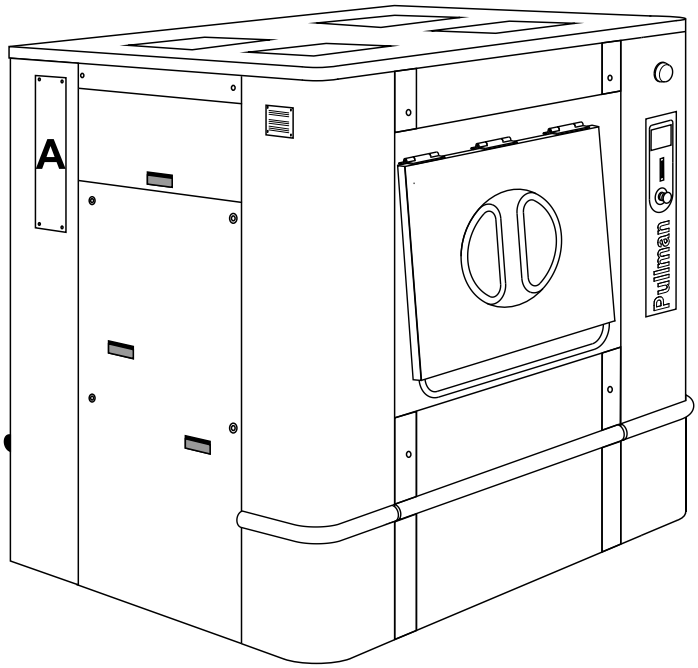
- Unscrew the nut (C) of each electrovalve and screw the screw (B) up to the end,
- For a 1 bar pressure, unscrews the screw (B) of 17 1/3 rounds (26 mm)
- For a 2 bars pressure, unscrews the screw (B) of 4 1/3 rounds (6 mm)
- For a 3 bars pressure, unscrews the screw (B) of 3 1/3 rounds (5 mm)
- For a 4 bars pressure, unscrews the screw (B) of 2 2/3 rounds (4 mm)
- For a 5 bars pressure, unscrews the screw (B) of 2 rounds (3 mm)
- For a 6 bars pressure, unscrews the screw (B) of 1 1/3 rounds (2 mm)
- Screw the nut (C) of each electrovalve.



According to the standard EN1717

The closing sheet (A) is normaly mounted on the machine. If not, ste the side sheet supplied with the machine(ref. 31105197 or ref. 31105124); this allow to reduce the water filling time.

If you must be comply with the standard EN1717, remove this sheet and reduce the water pressure to limit the splashes by the side hole.



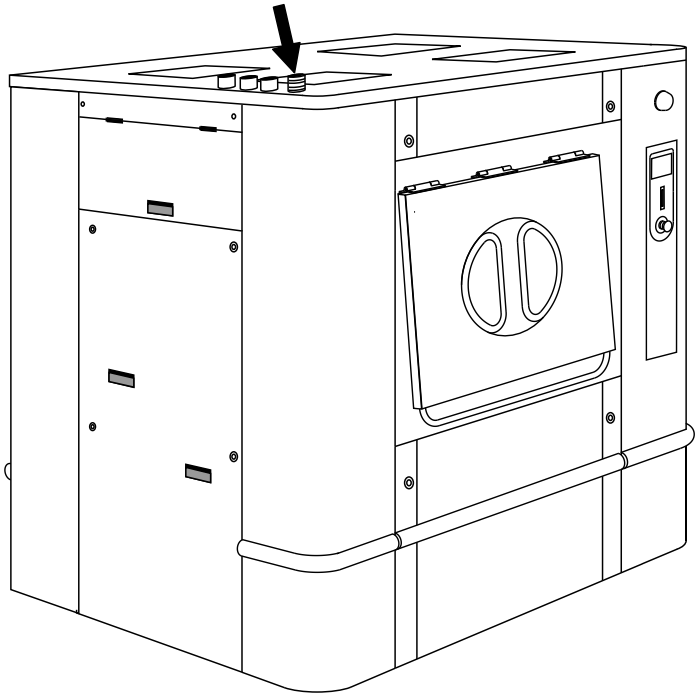
15 Liquid detergents connection

The machine is equiped with a connection for the use of external liquid detergents.

If you do not use the detergent box, please use the cap delivered with the machine in oder to avoid vapour from steaming out through the opening of the bow downpipe.

Installing :

Open the door of the detrgent box . Place the silicone cap in the hole of the bow downpipe.



Caution

In a view to avoid an overflowing risk, do not forget the remove the silicone cap if you use the detergent box.

Caution

Liquid detergents are particularly aggressive.
We advise you to use only products with pH lower than 9 in order to avoid the machine's rubbers from being attacked.
Dilute imperatively all of your detergents before letting them flow into the machine.

ADVISE IF USING LIQUID DETERGENTS
After use, there is always chemical remaining in the liquid detergents' dosing pipes.
When the machine is not running, this detergent may slowly drip and so, quickly corrode the parts in contact with.
In order to avoid (ex. corrosion of the drum or by bleach), we advise you to forecast a device to drain every night the distribution pipes of the liquid detergents.

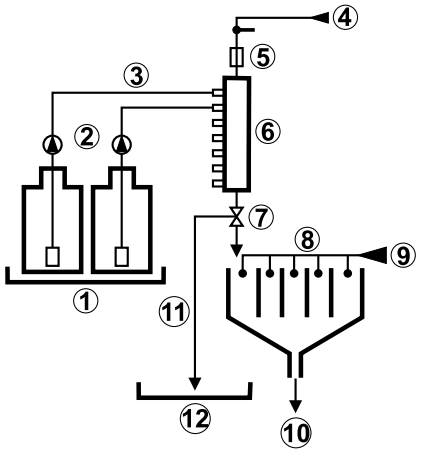
Caution

The running of detergents must be independent from the running of the machine.
The control information of detergents must imperatively be relayed.
It is imperative to use armoured wires for every connection in the electrical box.

15.1 Connection scheme of liquid detergents

We advise you to use one of the two systems shown hereby to connect your liquid detergents.
Single inlet dose controller with a compulsory rinsing device.

1	Retention tank	**7**	3 way valve
2	Pump	**8**	Scoops + Rinsing
3	Liquid detergents	**9**	Water
4	Water	**10**	Washer extractor
5	Soap box rinsing electrovalve	**11**	Toward retention tank
6	Dose controller	**12**	Retention tank



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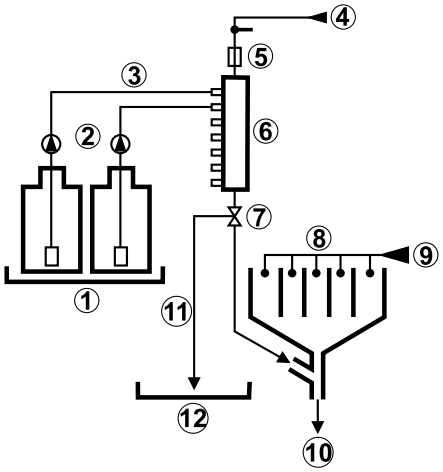
Multi-inlet dose controller with a compulsory rinsing device.

1	Retention tank	**7**	3 way valve
2	Pump	**8**	Scoops + Rinsing
3	Liquid detergents	**9**	Water
4	Water	**10**	Washer extractor
5	Soap box rinsing electrovalve	**11**	Toward retention tank
6	Dose controller	**12**	Retention tank



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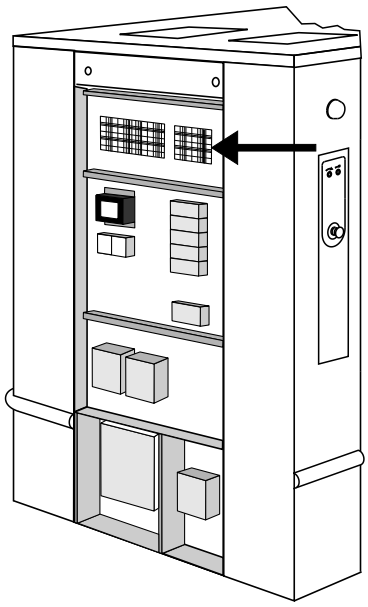
15.2 Electrical liquid detergents' connection

Electrical installation must be carried out by an authorized personnel.

The A8 output relay card allows to connect from 1 to 16 electrovalves of liquid detergents.
The card is situated on the up right side of the electric box.



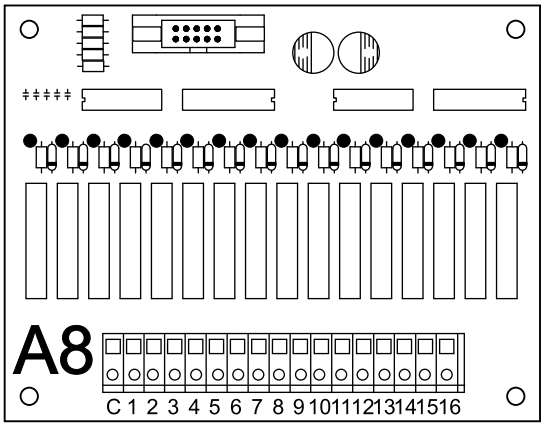
Carry the connection cables by the partition crossing and the cable through of the machine.
To connect the wires on the J802 terminal block, introduce a screwdriver in the upper aperture to open the cable clamp.

Caution

Be carefull, even machine power off, you can still have power on this board coming from detergent supplier. Secure it also before intervention.

Connection on the A8 output relay card

C	Common of signals
1	Signal 1
2	Signal 2
3	Signal 3
4	Signal 4
5	Signal 5
6	Signal 6
7	Signal 7
8	Signal 8
9	Signal 9
10	Signal 10
11	Signal 11
12	Signal 12
13	Signal 13
14	Signal 14 (controlled by water level)
15	Signal 15 (controlled by water level)
16	Signal 16 (reserved)

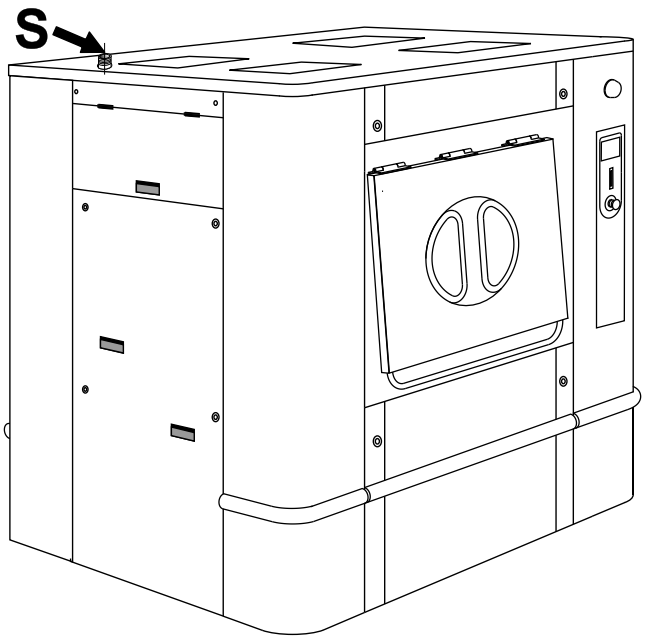


Supply voltage : 250 V~ maximum
Maximum intensity : 6 A.

16 Steam connection

For transport reasons, the steam electrovalve is dismantled and placed in the cardboard box supplies.

The inlet pipe to the machine has to be fit with a manual stopping valve to ease installation and maintenance and a flexible steam supply pipe to allow reliable running of automatic weighing system.



Hereunder values apply to the steam pressure:

Recommended pressure: 300 at 600 kPa (3 at 6 kg/cm²) (43.5 at 87 psi)

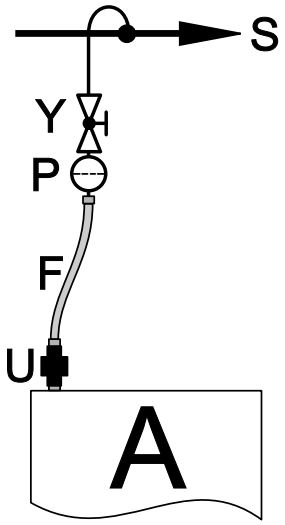
Limiting of values:

- **mini. 100 kPa (1 kg/cm²) (14.5 psi)**
- **maxi. 600 kPa (6 kg/cm²) (87psi)**

Connection size: DN 25 (1" BSP male).

Connect the steam installation on the top of the machine (see example sketch).

A	Washer-extractor
S	Steam inlet
Y	Manual stop wheel valve DN 25 (1" BSP) (provided by customer)
P	Steam filter DN 25 (1" BSP) (provided)
F	Steam special flexible pipe DN 25 (1" BSP) (provided) length : 70 cm
U	Pipe union DN 25 male/female (1" BSP) (provided)



Steam connection low pressure

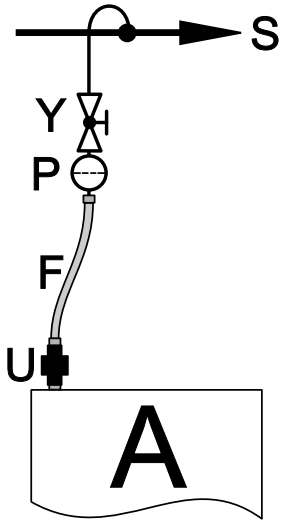
Hereunder values apply to the steam pressure:

Recommended pressure: 250 kPa (0.5 kg/cm²) (36 psi)

Connection size: DN 32 (1"1/4 BSP male).

Connect the steam installation on the top of the machine (see example sketch).

A	Washer-extractor
S	Steam inlet
Y	Manual stop wheel valve DN 32 (1"1/4 BSP) (provided by customer)
P	Steam filter DN 32 (1"1/4 BSP) (provided)
F	Steam special flexible pipe DN 32 (1"1/4 BSP) (provided) length : 70 cm
U	Pipe union DN 32 male/female (1"1/4 BSP) (provided)

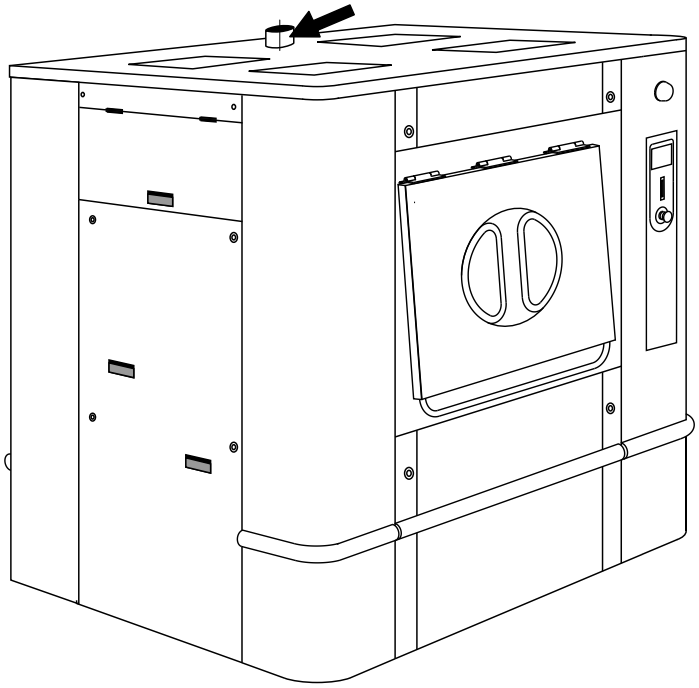


17 Air vent connection

The air vent of the outer drum opens on the top of the machine. Connect the bent hose to this opening.

Connect the air vent, to the outside of the laundry in accordance with the legislation.

The air vent should resist to 100 °C (212 °F) temperature and allow the condenses to return to the machine.



18 Note about the A.C. power

According to the EN 60204-1:1997 standard, the machine is provided for A.C. supplies corresponding to the extracted characteristics below :

4.3.2 A.C. supplies

Voltage:

Steady state voltage: from 0.9 to 1.1 of nominal voltage.

Frequency:

from 0.99 to 1.01 of nominal frequency continuously.

from 0.98 to 1.02 short time.

Harmonics:

Harmonic distortion not to exceed 10 % of the total r.m.s. voltage between live conductors for the sum of the second through to the fifth harmonic. An additional 2 % of the total r.m.s. voltage between live conductors for the sum of the sixth through to the 30th harmonic is permissible.

Voltage unbalance:

Neither the voltage of the negative sequence component nor the voltage of the zero sequence component in three-phase supplies shall exceed 2 % of the positive sequence component.

Voltage interruption:

Supply interrupted or at zero voltage for not more than 3 ms at any random time in the supply cycle. There shall be more than 1 second between successive interruptions.

Voltage dips:

Voltage dips shall not exceed 20 % of the peak voltage of the supply for more than one cycle. There shall be more than 1 second between successive dips.

19 Feeder cable sections

The feeder cable sections mentioned in our literature are given only as a guide.

To obtain a value perfectly suited to your own application and which takes account of the different correction factors in respect of your plant, refer to the tables below.

Table 1 (in accordance with EN Standard 60204-1)

Values given for:

- Cable with copper conductors
- Cable with PVC insulation (for other insulants see Table 3)
- Ambient temperature 40°C max. (for others see Table 2)
- Three-phase cable under load without including starting currents
- BT / C/ E cable layout.

Maximum Admissible Current

Cable section	Seated in Cable Duct or Cable trough	Wall fixing	Cable tray
	B2	BC	E
3 x 1.5 mm²	12.2 A	15.2 A	16.1 A
3 x 2.5 mm²	16.5 A	21 A	22 A
3 x 4mm²	23 A	28 A	30 A
3 x 6 mm²	29 A	36 A	37 A
3 x 10 mm²	40 A	50 A	52 A
3 x 16 mm²	53 A	66 A	70 A
3 x 25 mm²	67 A	84 A	88 A
3 x 35 mm²	83 A	104 A	114
3 x 50 mm²	-	123 A	123 A
3 x 70 mm²	-	155 A	155 A

Table 2 (correction factors for different ambient temperatures)

Ambient temperature	Correction factor
30 °C	1.15

35 °C	1.08
40 °C	1.00
45 °C	0.91
50 °C	0.82
55 °C	0.71
60 °C	0.58

Table 3 (correction factors for different cable insulating materials)

Insulating material	Max. Working temperature range	Correction factor
PVC	70°C (158 °F)	1.00
Natural or Synthetic Rubber	760°C (140 °F	0.92
Silicone Rubber	120°C (248 °F)	1.60

Table 4 (B2, C and correction factors for cable grouping)

	B2	E	E
Number of cables	**Seated in Cable Duct**	**Wall fixing or Cable trough**	**Cable tray**
1	1.00	1.00	1.00
2	0.80	0.85	0.87
4	0.65	0.75	0.78
6	0.57	0.72	0.75
9	0.50	0.70	0.73

The total current included for using Table 1 should be the maximum rated current for the machine divided by the product of the different correction factors. Other correction factors may also be applied ; consult the cable manufacturers.

Calculation : Example

- The machine has a rated current of 60 A.
- The ambient temperature is 45 °C ; Table 2 gives a correction factor of 0.91.
- Rubber cable insulant : Table 3 gives a correction factor of 0.92.
- The cable is fixed directly to the wall (Column C), with 2 cables side by side. Table 4 gives a correction factor of 0.85.

$$\text{Total current : } \frac{60\ \text{A}}{0.91 \times 0.92 \times 0.85} = 84\ \text{A}$$

Taking Column C in Table 1 (wall fixing), we obtain a minimum cable section of : 3 x 25 mm².

20 Electricity power supply

Prior to use, the washer-extractor should be connected to a multi-pole switch prior to the machine to facilitate installation and service operations.

Caution

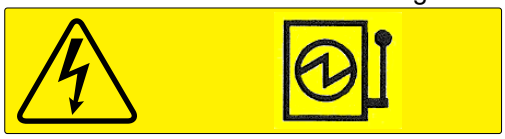
The electrical installation of the machine must be undertaken by qualified personnel.

Caution

Ensure that the electrical voltage is correct and that the power of your supply is sufficient, before connecting the machine.

Caution

The main switch is located on the right side of the machine , identified by this sticker.



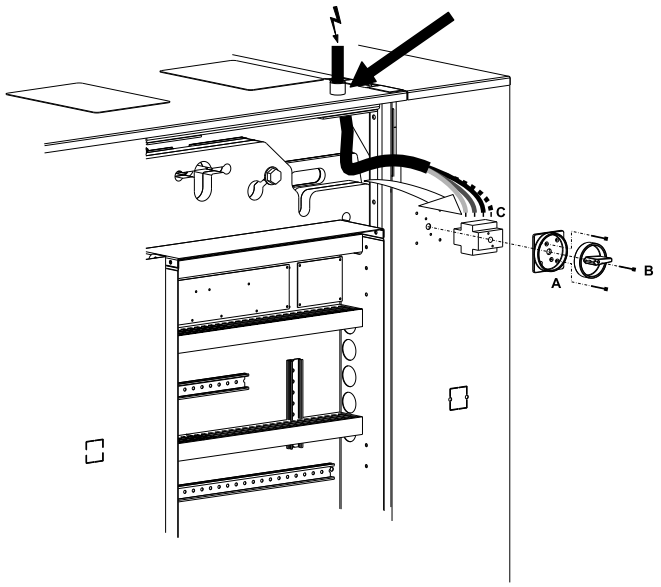
Note!

The use of power electronics (converter or filter for example) may lead to unexpected release of breakers with 30 mA differential current device.

Therefore a Type B residual differential protection system with reinforced immunity of 300 mA in accordance with standard NFC 15100 must be used for our washing machines.

To avoid these untimely activations, you ought to use differential protecting systems with residual current only, having a high level of reinforced immunity as regards leakage transient current.

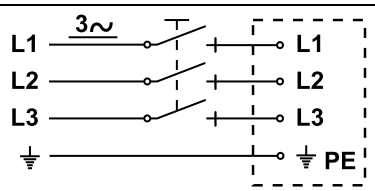
Pass the power supply cable of the machine through the stuffing box on the top of the machine.



Caution

The main switch must be removed in order to have easy access to the connections terminals.
Remove the outer sections (A) and the inner section (C) by unscrewing the screws (B). When the cables are attached, reassemble the switch in reverse order.

For each machine, install a fixed multipolar circuit breaker (or fuses protector) in the laundry main cabinet.



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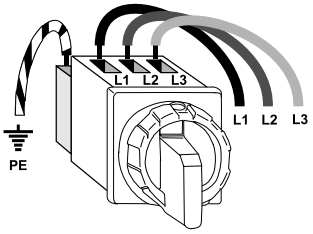
Connect the power supply cable on the machine main switch. Connect the 3 phases on the main switch (see marks L1, L2, L3) and connect the earth wire on the earth terminal (PE) of this main switch. (see chapter “Function checks”).

Caution

In case of a machine with integrated weighing, you must use a flexible power supply cable to connect the machine.



Machine type	Heating	Supply Voltage	Rated Power	Rated Intensity	Connection cable section	Protection
700	Electric	380/415 V 3+E ~ 50/60 Hz	65.7 kW	100.5 A	4 x 35 mm²	3 x 125 A
	Steam	380/415 V 3+E ~ 50/60 Hz	11.7 kW	27 A	4 x 10 mm²	3 x 32 A
900	Electric	380/415 V 3+E ~ 50/60 Hz	87.7kW	135 A	4 x 35 mm²	3 x 160 A
	Steam	380/415 V 3+E ~ 50/60 Hz	15.7 kW	33 A	4 x 10 mm²	3 x 40 A
1100	Electric	380/415 V 3+E ~ 50/60 Hz	91 kW	140 A	4 x 50 mm²	3 x 160 A
	Steam	380/415 V 3+E ~ 50/60 Hz	19 kW	42 A	4 x 10 mm²	3 x 50 A

21 Compressed air connection

The customer should arrange the installation of filter device, as well as a pressure regulator (manometer) on the machine's compressed air supply.

Caution

The machine must be supplied with dried and perfectly filtered compressed air.

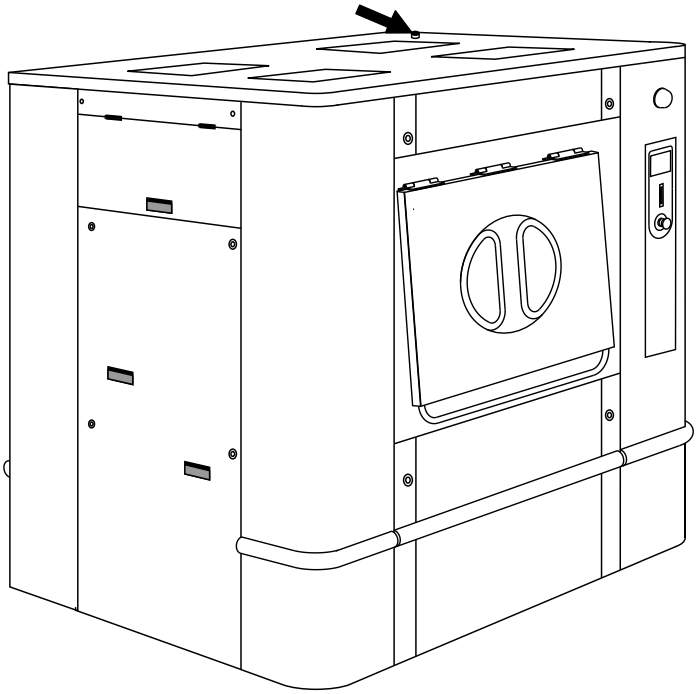
The manual stopping valve lockable in closed position (provided by customer) should be installed on the machine's compressed air supply.

The supply pipe should accept a pressure of at least 1 Mpa (10 bar) (145 psi).

- Connection diameter: rapid action hose coupling DN 6 (0.24") for hose Ø 6/8 mm.
- Advised pressure: 550-700 kPa (5,5-7 bar) (80-102 psi).
- Minimum pressure: 550 kPa (5,5 bar) (80 psi).
- Maximum pressure: 700 kPa (7 bar) (102 psi).
- Consumption 50 l/h.

Important

To avoid too big head losses, the compressed air supply pipe should be bigger in diameter than the coupling diameter (DN 8 for example); in this case, put a 6/8-8/10 adapter.



22 Function checks

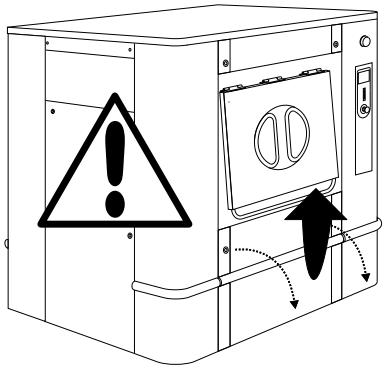
Caution

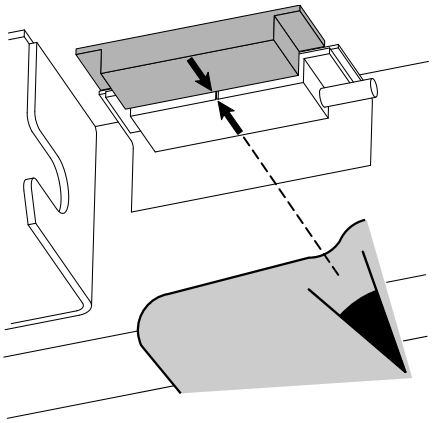
Before putting the machine into service, carry out the working tests.
The operating inspection must be done by an approved technician.

Magnetic detector for tank door safety

Caution

Before starting the appliance, please remove the bottom guard and check that the magnetic detector is correctly aligned.
For barrier machines, repeat this step on the second door.



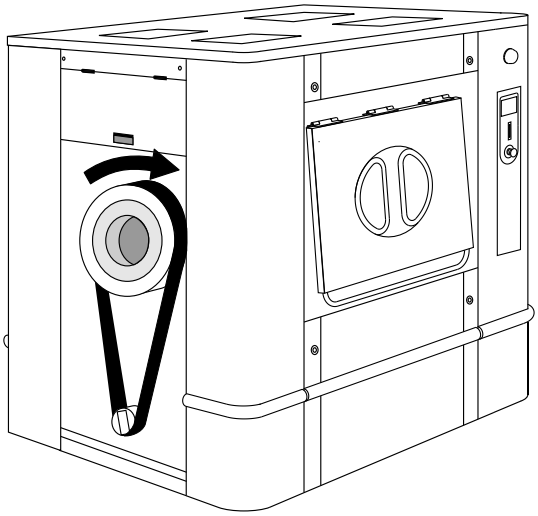


Manual operation

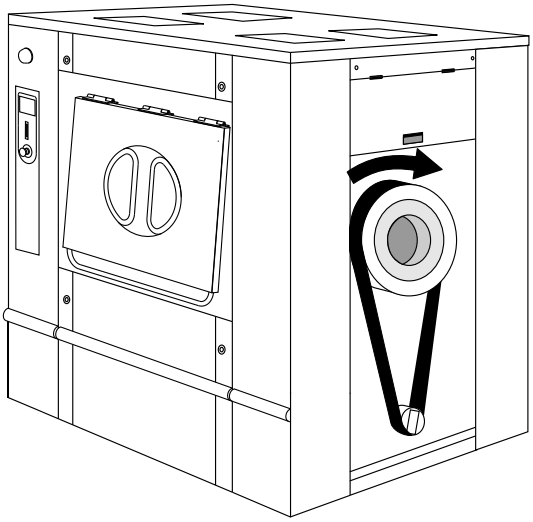
The procedure for operating the various machine functions manually is described in the chapter "Machine operation" under the heading "Manual operation".

- Switch on the machine's main switch and check the voltage on the three phases (3 x 400 volts).
- Check the direction of rotation of the **cage during spinning**. The inner drum should rotate as shown by the arrow on the drawing below. Check this point especially if you have changed the machine's motor or frequency converter.

Washer extractor barrier type :



Washer extractor standard type (one door) :



- Check the direction of rotation of motion motor fan . (see arrow stuck on the fan)
  Switch off the current and shift two phases on the main switch of the machine if the fan rotates in the wrong direction.
- Check that the inner drum is empty.
- Open the manual valves controlling the water and steam supplies (for steam heating machines).
- Operate the machine manually to fill with cold water, then hot water. Check that these water supplies are connected as they should be.
- Start the machine on wash action, and check that the motor is revolving alternately in the both ways, as normal for wash action.
- Start heating by programming a final temperature. Check that the steam valve opens or the heating element relay reacts, as appropriate.
- Check that the detergents container is working as they should.
- Check the water and steam connections and the drain valve for signs of any leakages.
- Empty the water from the machine and open its door.

Automatic operation

- Check that the external switch or switches are switched on and that the manual valves for water and steam (if the machine has steam heating) are open.
- Run one of the machine's built-in (standard) with heating.
- Check that the program proceeds normally, and the water filling, detergent filling, heating and motor action are all working in accordance with the program display on the display screen.

Final checking

If all function checks have been satisfactory, reassemble all protection casings.

23 Explanation of washing symbols

(ISO 3758:2005 standard)

To overcome language barriers, the following are symbols used internationally to give you guidance and recommendations when washing different textiles.

23.1 Washing

The tub symbolizes washing.

Symbols	Max. washing temperature in °C	Mechanical action
	95	normal
	95	mild
	70	normal
	60	normal
	60	mild
	50	normal
	50	mild
	40	normal
	40	mild
	40	very mild
	30	normal
	30	mild
	30	very mild
	40	wash by hand
	-	do not wash

23.2 Bleaching

The triangle symbolizes bleaching.

Symbols	Explanation
	Bleaching allowed (chlorine or oxygen).
	Bleaching allowed (only oxygen).
	Do not bleach.

23.3 Drying

The circle in a square symbolizes tumble drying.

Symbols	Explanation
	Can be put in a tumble dryer. Normal temperature.
	Can be put in a tumble dryer. Lower temperature.
	Do not put in a tumble dryer.

23.4 Ironing

The iron symbolizes the domestic ironing and pressing process.

Symbols	Explanation
	Max. temperature 200 °C.
	Max. temperature 150 °C.
	Max. temperature 110 °C. The steam can cause irreversible damages.
	Do not iron.

23.5 Dry or water cleaning

The circle symbolizes dry or water cleaning.

Symbols	Explanation
	Normal dry cleaning with perchloroethyl, solvent of hydrocarb.
	Mild dry cleaning with perchloroethyl, solvent of hydrocarb.
	Normal dry cleaning with solvent of hydrocarbon.

	Mild dry cleaning with solvent of hydrocarbon.
	Do not dry clean.
	Normal water cleaning.
	Mild water cleaning.
	Very mild water cleaning.

24 Conversion of measurement units

This following is a list of correspondences of the main frequency used units, to avoid the need to use measurement unit conversion table.

bar	1 bar = 100 000 Pa 1 bar = 1.019 7 kg/cm² 1 bar = 750.06 mm Hg 1 bar = 10 197 mm H2O 1 bar = 14.504 psi	**British thermal unit**	1 Btu = 1 055.06 J 1 Btu = 0.2521 kcal
calorie	1 cal = 4.185 5 J 1 cal = 10–6 th 1 kcal = 3.967 Btu 1 cal/h = 0.001 163 W 1 kcal/h = 1.163 W	**Continental horse power**	1 ch = 0.735 5 kW 1 ch = 0.987 0 HP
cubic foot	1 cu ft = 28 316 8 dm³ 1 cu ft = 1 728 cu in	**cubic inch**	1 cu in = 16.387 1 dm³
foot	1 ft = 304.8 mm 1 ft = 12 in	**gallon (U.K.)**	1 gal = 4.545 96 dm³ or l 1 gal = 277.41 cu in
gallon (U.S.A.)	1 gal = 3.785 33 dm³ or l 1 gal = 231 cu in	**horse power**	1 HP = 0.745 7 kW 1 HP = 1.013 9 ch
inch	1 in = 25.4 mm	**joule**	1 J = 0.000 277 8 Wh 1 J = 0.238 92 cal
kilogramme	1 kg = 2.205 62 lb	**kg/cm²**	1 kg/cm² = 98 066.5 Pa 1 kg/cm² = 0.980 665 bar 1 kg/cm² = 10 000 mm H2O 1 kg/cm² = 735.557 6 mm Hg
pound	1 lb = 453.592 37 g	**meter**	1 m = 1.093 61 yd 1 m = 3.280 83 ft 1 m = 39.37 in
cubic meter	1 m³ = 1 000 dm³ 1 m³ = 35.214 7 cu ft 1 dm³ = 61.024 cu in 1 dm³ = 0.035 3 cu ft	**pascal**	1 Pa = 1 N/m² 1 Pa = 0.007 500 6 mm Hg 1 Pa = 0.101 97 mm H2O 1 Pa = 0.010 197 g/cm² 1 Pa = 0.000 145 psi 1 MPa = 10 bar
psi	1 psi = 0.068947 6 bar	**thermie**	1 th = 1 000 kcal 1 th = 10+6 cal 1 th = 4.185 5 x 10+6 J 1 th = 1.162 6 kWh 1 th = 3 967 Btu
watt	1 W = 1 J/s 1 W = 0.860 11 kcal/h	**watt-hour**	1 Wh = 3 600 J 1 kWh = 860 kcal
yard	1 yd = 0.914 4 m 1 yd = 3 ft 1 yd = 36 in	**temperature degrees**	0 °K = —273.16 °C 0 °C = 273.16 °K t °C = 5/9 (t °F-32) t °F = 1.8 t °C + 32

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