

Installation manual

Finishing cabinet

FC48



Translated from french



05306004/GB
26.2019

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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**".
- Forseeing its recycling, this machine is fully dismantable.
- This machine is free from any asbestos.
- In conformity with French regulations:
 - Law No. 76-663 of July 19th 1976
 - Decree No. 77-1133 of September 21st 1977
 - The decree of 7th July 1992
 - The decree of 29th December 1993
 - The decree of 28th December 1999
 - No. 2311 of the nomenclature for classified installations

Commercial linen cleaning laundries and laundrettes are subject to:

- prefectural authorisation if the washing capacity exceeds five tonnes per day.
 - a declaration to the prefecture if the washing capacity exceeds 500 kilos per day but is below or equal to five tonnes per day.
 - In application of the Law of 15 July 1975 and the decrees of 01 April and 13 July 1994 on the disposal of industrial and commercial packing waste «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, these texts forbid:
- land filling raw waste
 - open air burning or incineration without energy collection.
- Packaging of our machines are according with the provisions of decree 98-638 from July 20 1998 related to environment requirements.

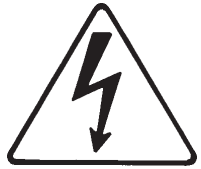
For additional information, do not hesitate to consult with our environmental department.

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.



SAFETY

The mechanical and electrical installation of the machine should only be done by qualified personnel.



CAUTION

Do not use the machine unless it is plugged into a correctly earthed power socket complying with standards in force.



CAUTION

Under no circumstances should a gas-heating machine be installed in a building which includes a dry-cleaning machine.



CAUTION

Evacuation duct must never be connected to the evacuation used for a dry cleaning machine or other machine of the same type.



CAUTION

When embedding the finishing cabinet in a technical area, it is recommended to use temperature and fire resistant materials.

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2. Preliminary instructions

INSTALLATION
MANUAL



CAUTION

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

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Note about the A.C. power

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

4.3.2 AC 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 3ms at any random time in the supply cycle. There shall be more than 1s 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 1s between successive dips.

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3. Handling

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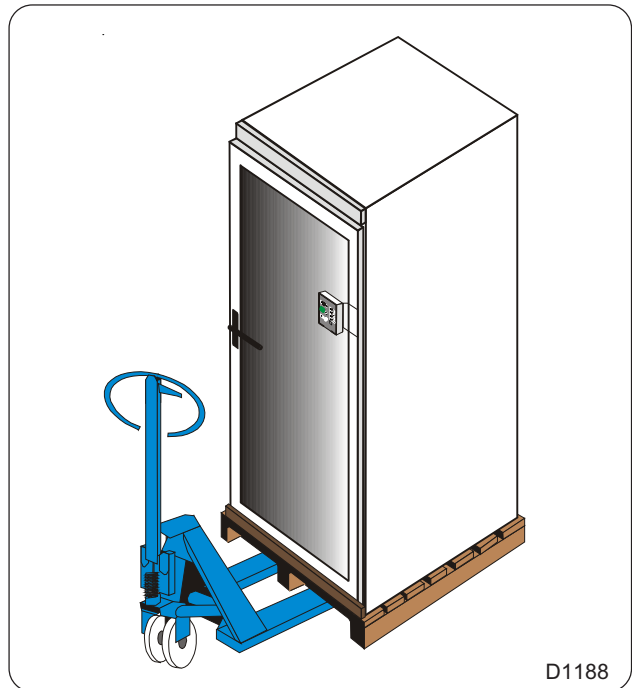


WARNING

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

Lifting with a fork-lift truck

The machine is delivered secured on a transport pallet.

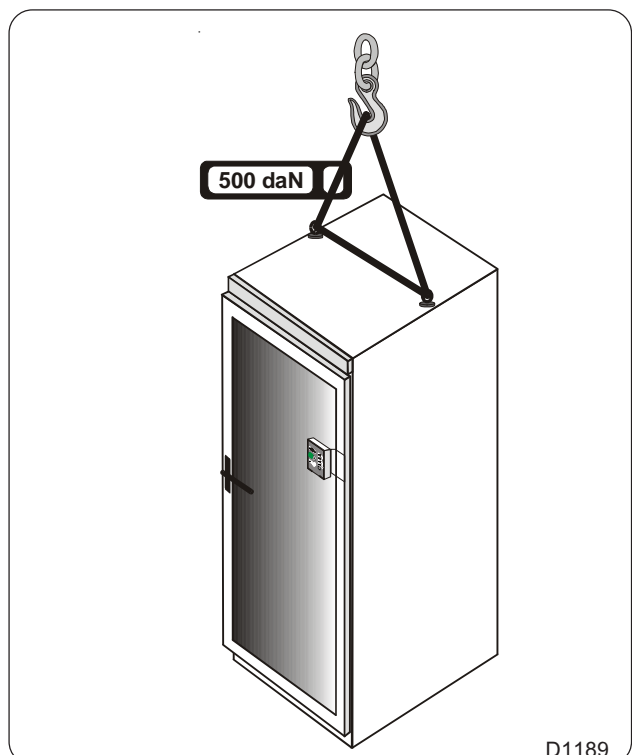


D1188

Lifting with handling straps

Lifting in that case can only be done with handling straps (minimum capacity 500 daN) which bear weight of the machine (350 daN).

Use the two rings on top of the machine to attach the handling straps and to lift the machine.



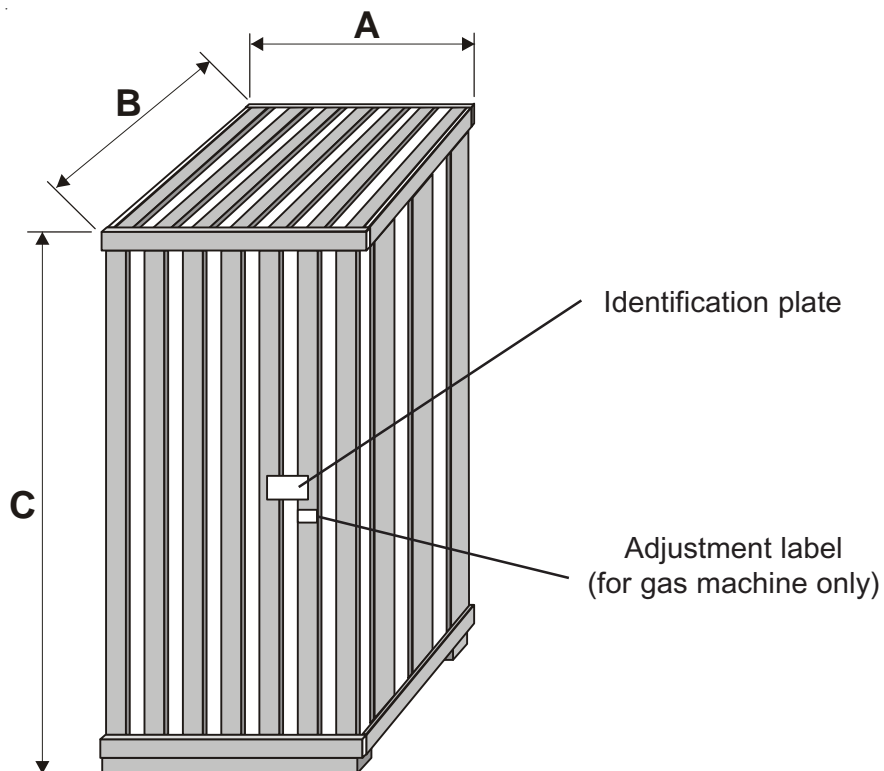
D1189

Packing

Packing dimensions	Size A	Size B	Size C
	1060	1500	2200

Weight in daN

	Gas	Electric	Steam
(machine + pallet) (without boiler)	345	340	350
(machine + pallet) (with boiler)	415	410	420
(machine + box) (without boiler)	-	-	-
(machine + box) (with boiler)	-	480	-



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5. Technical characteristics

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Setting up dimensions

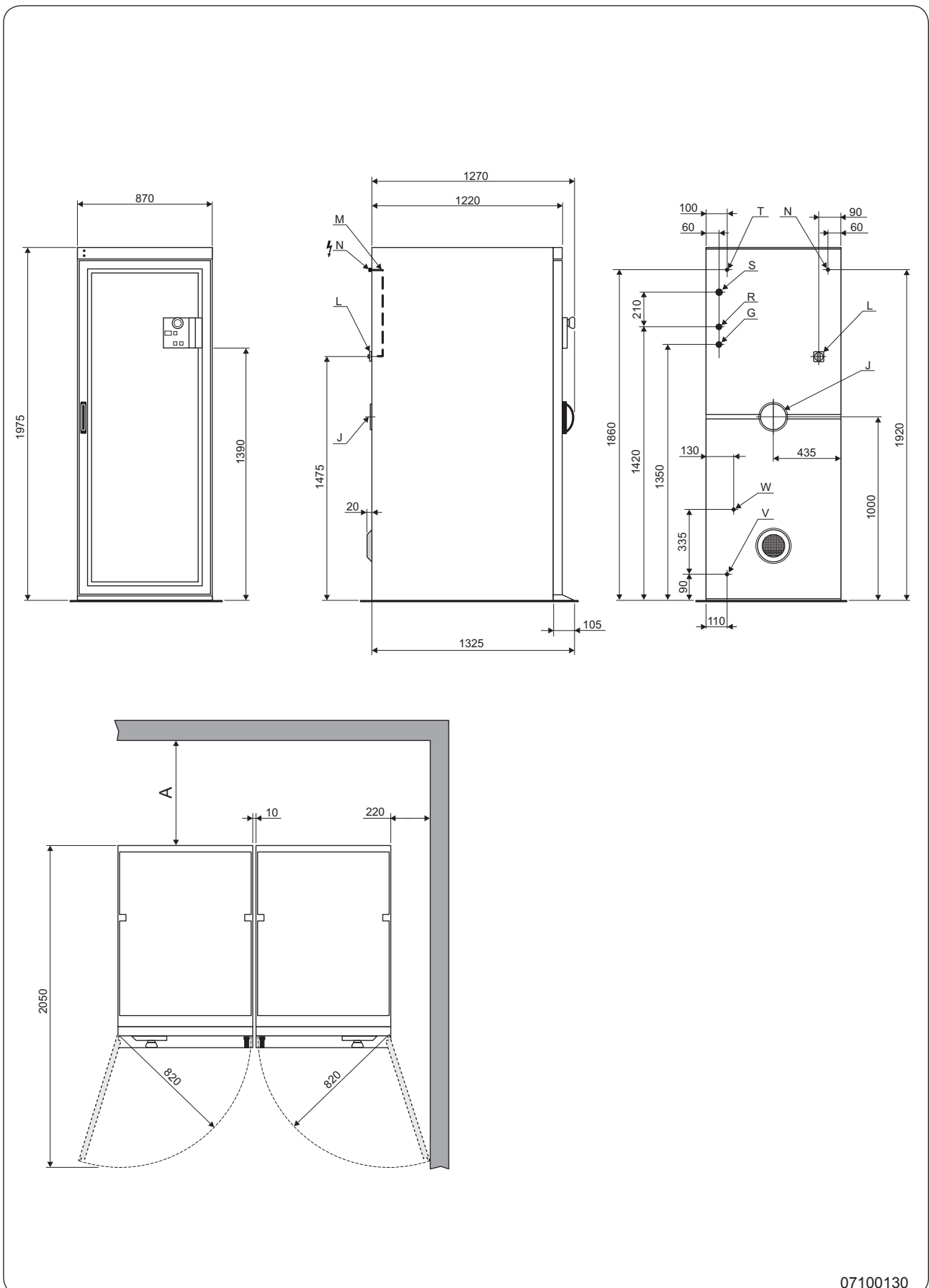


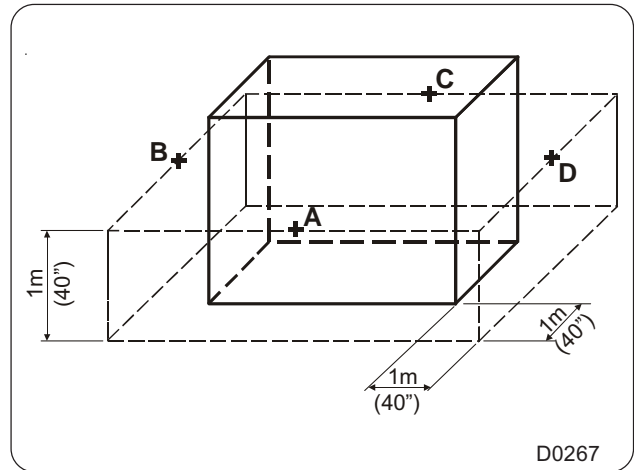
Diagram no. 07100130

Heating		Electric	Gas	Steam
	units			
External dimensions				
Height	mm	1975	1975	1975
Width	mm	870	870	870
Depth	mm	1310	1310	1310
(A) Space between the machine and a wall	mm	1000	1000	1000
(according to the recommendation in standard EN 60204)				
Internal dimensions				
Inside volume	litre	896	896	896
Inside usefull width	mm	750	750	750
Inside usefull depth	mm	680	680	680
Inside usefull height	mm	1800	1800	1800
Opening size (WxH)	mm	-----870x1820-----		
Floor area	m ²	1.14	1.14	1.14
Net weight	daN	320	335	330
Production for one operation				
Loading capacity	piece	8	8	8
Production for one type cycle*	pieces/hour	56	56	56
<i>(Production achieved with no cool cycle and with (gloves) EPI (Individual Protect Equipment) to manipulate the hanging rack and hangers.)</i>				
Drying time for one type cycle*	min	6	6	6
Fan motor				
Power	kW	1.1	1.1	1.1
Rotation speed	rpm	2850	2850	2850
(L) Main switch to connect electric main cable				
(M) Electric cable (section)	mm ²	see table		
(N) Stuffing box for electric main cable				
Supply voltage	V	400	400	400
Fuse (without steam boiler)	A	40	12	12
Fuse (with steam boiler)	A	50	16	16
Installed electric power	kW	19.8	1.8	1.8
Installed electric power with steam boiler	kW	25.8	7.8	7.8
Installed heating power	kW	18	20	40
Electric consumption for a normal cycle*	kWh	2.9	0.29	0.29
Heat loss	3 % of installed heating power			
(J) Connection of the evacuation pipe	mm	Ø 160	Ø 160	Ø 160
(G) Gas connection	mm	-	DN20 (3/4")	-
(S) Steam inlet (female)	mm	-	-	DN20 (3/4")
(R) Condensate return (female)	mm	-	-	DN15 (1/2")
Supply pressure	kPa	-	600 to 1000	
Steam instantaneous flow rate at 800 kPa	kg/h	-	-	x
Steam consumption for a normal cycle*	kg/h	-	-	5
(T) Steam inlet for vaporization (option)	mm	----- (1/4" BSP male) -----		
Max. supply pressure		600 to 1000		
(V) Water inlet, steam independent boiler (option)	mm	-----DN10 (3/8") female----		
(W) Drain of the steam independent boiler	mm	-----DN10 (3/8") female----		

*typical cycle : 8 65/35 polyester-coton overalls of 550g, 29-34% retention rate, drying temperature 70-85°C, 6min cycle, with 4min recirculation cycle and 1min cool cycle.

Sound level

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



Weighted sound pressure level (A) in dB (A).

	A	B	C	D
Finishing cabinet	70,8	74,1	77,9	74,1

You should have found this instruction handbook and eight coathangers.

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

Unpacking

Release the machine from its packing.



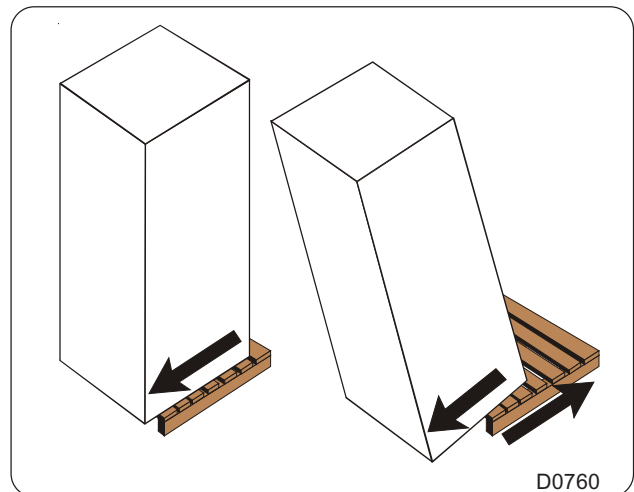
Check that no damage has been caused during transport.

If any damage is found, it must immediately be reported to the transport company.



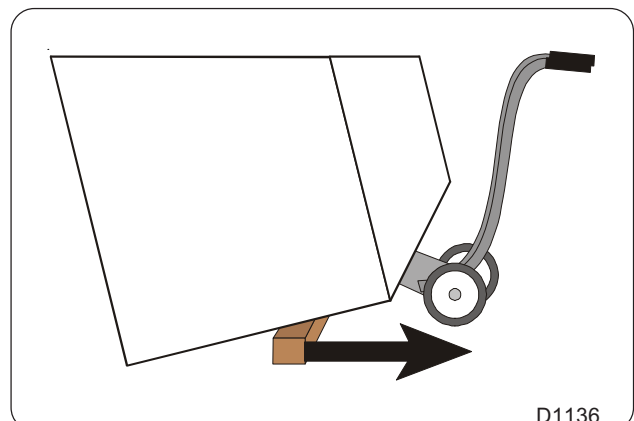
D1137

Carefully lower the machine off the pallet, tipping it backwards enough to be able to remove the pallet.



D0760

Then install the machine in its place.



D1136

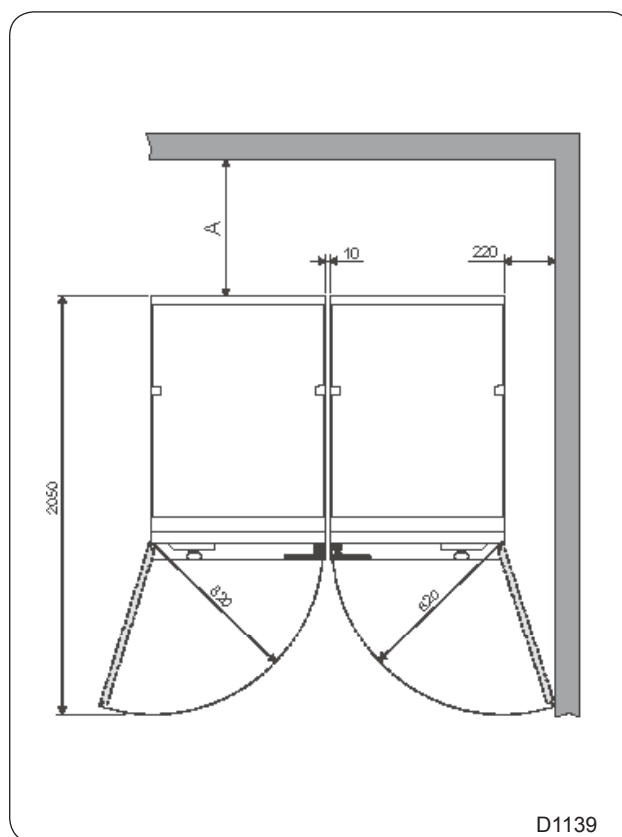
Installation

The installation must be done by competent technicians in accordance with local codes and regulations. When there is no local code or regulation, the installation **must be comply** with european standards applicable.

The machine must be installed on a horizontal and firm floor, capable of supporting its weight.

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

- **According to the recommendation in standard EN 60204**, the distance between the machine and the wall or any other machines behind it must be at least 1000 mm.



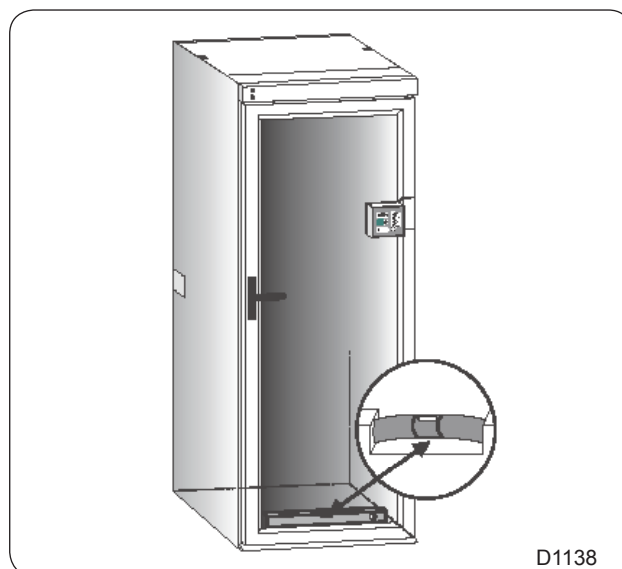
Mechanical installation

Carefully level the machine using a spirit-level on the base of the machine, and ensure that it is resting firmly.

Retrieve the sole nose with its 2 fixing lugs and fixing screws.

Screw the 2 fixing lugs onto the sole plate (standard or long).

Screw the assembly to the front and the bottom of the machine.



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 feeding table recommended by the clothing industry for inspecting linen is **300 lux**.

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

Gas connection



CAUTION

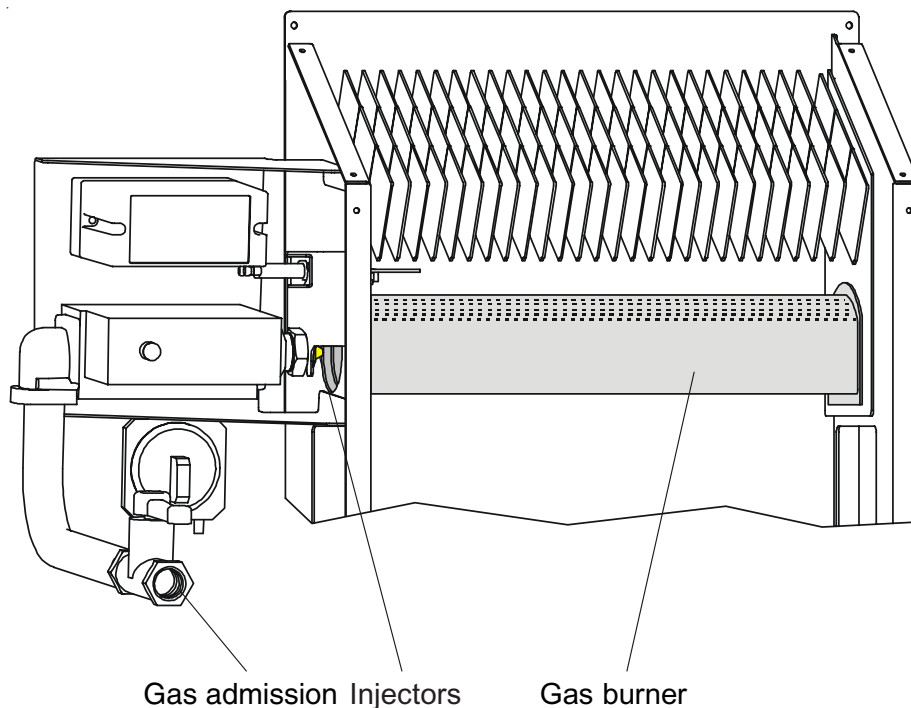
The installation, connection and gas arrival adjustments for the machine must be done by qualified personnel only.

The customer must install a filter and a manual stop valve on the supply side of the machine if NATURAL GAS is used.

For BUTANE 28-30 mbar or PROPANE 37 or 50 mbar, the customer must install a filter, a manual closing valve and a pressure reducer.

Check that the diameter of injectors is adequate for the kind of gas of your installation (see table). The machine is delivered with extra injectors in a plastic envelope. There is also a sheet metal plate with a cork joint or an adjusting head to feed the machine with another gas.

Connect the installation at the exchanger DN 20 ($\frac{3}{4}$ " BSP).

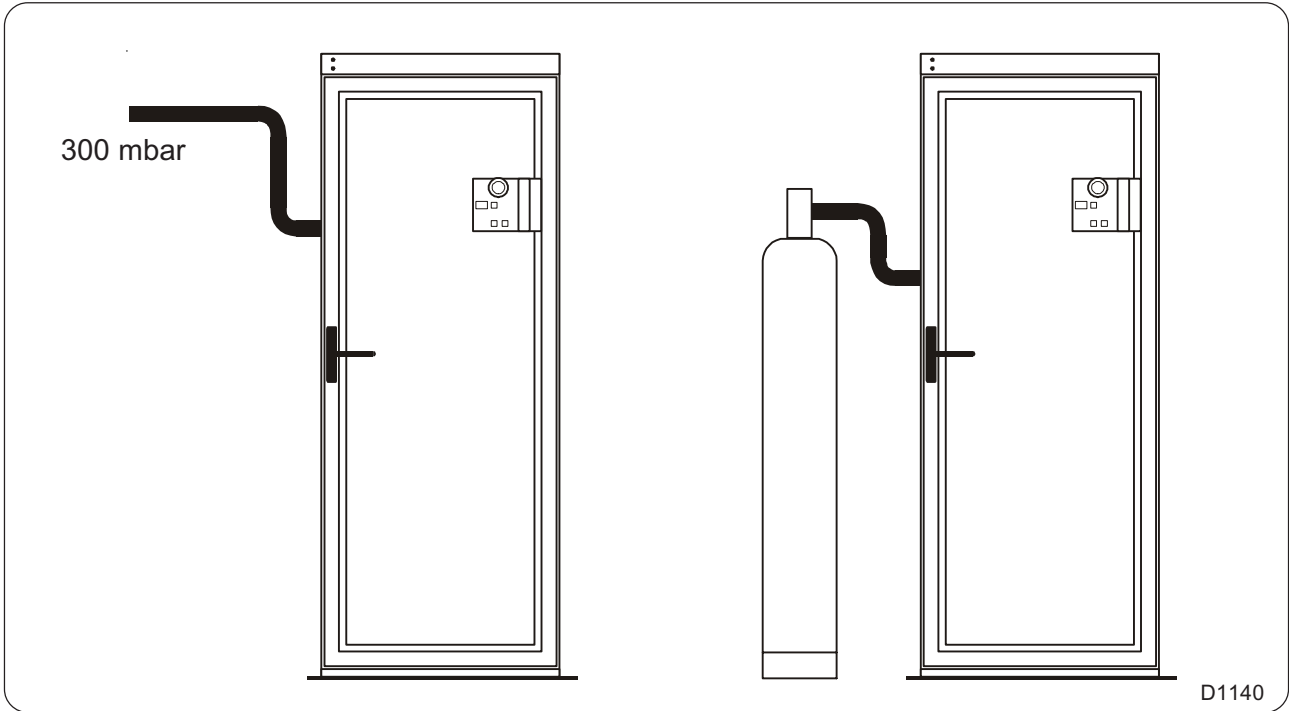


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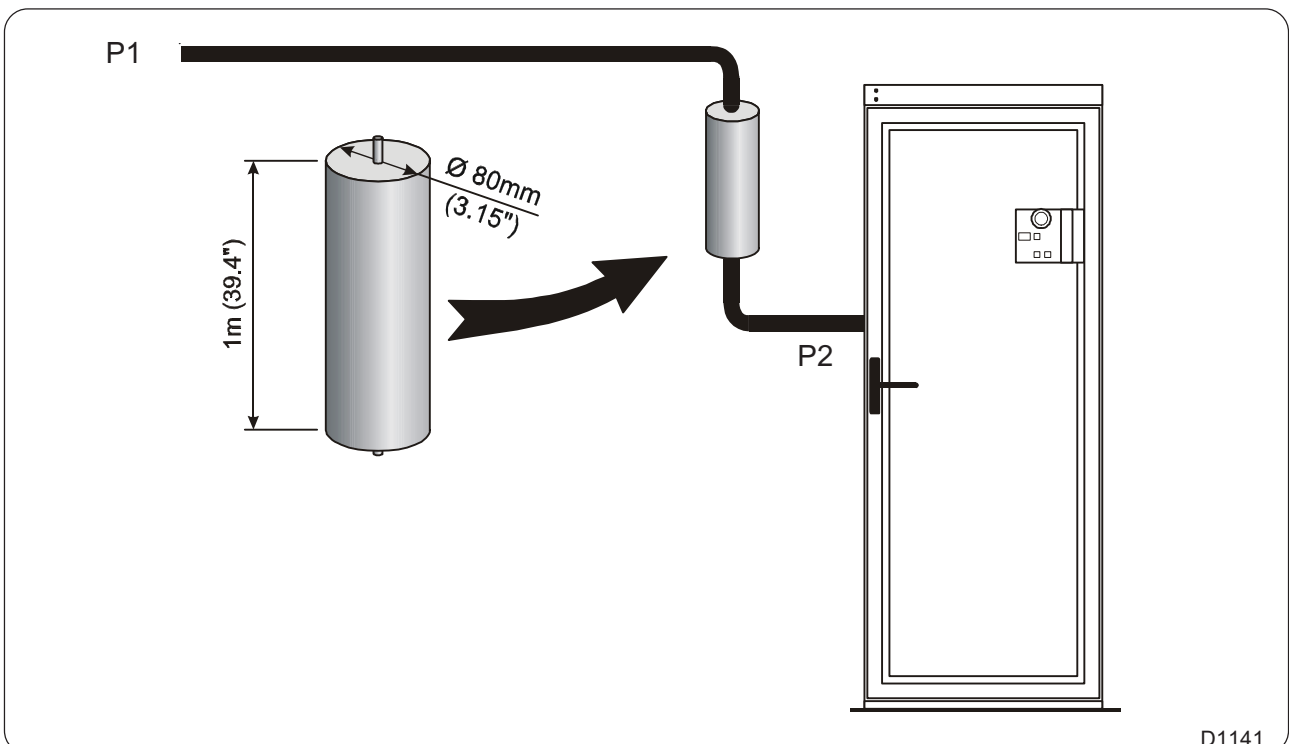
6. Installation/ Putting into service

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If the machine is connected to gas mains of 300 mbar or directly behind a gas bottle, it is vital that a pressure reducing valve be added as close as possible to the machine.



If the gas inlet pressure (P1) is identical to the nominal pressure of the machine (P2), it is possible to insert a reservoir as close as possible to the machine in order to protect against any falls in pressure when the machine starts up.



The machine is adjusted at the plant to be suitable for the kind of gas specified on the order. If you have to supply your machine with gas in a family different from the gas for which your machine was adjusted, proceed as follows.

Testing pressures

According to the EN 437 standard, the values of the testing pressures mentioned in our various documents are values for static pressure taken at the gas inlet connection of the machine ; the heating of the machine being on.

Changing to a gas in the same family (type H or L)

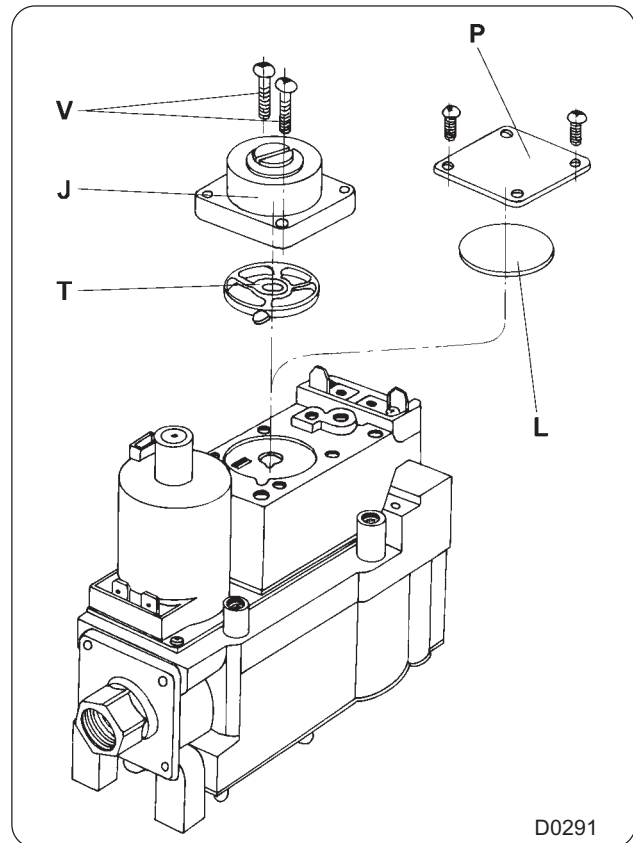
- Change the injector and its joint and if necessary do the air adjustment (see tables of correspondences).

Changing to a gas in a different family (from type H or L to propane)

- Change the injector and its joint (see tables of correspondences).
- Unscrews the fixing screws (V) and remove the adjusting head (J) as well as its cork (T), keep these parts in case a change would be by necessary.
- Replace it by the cork (L) and the plate (P).
- Screw the two screws and block.

Changing a gas from one family to another (from propane to type H or L)

- Change the injector and its joint (see tables of correspondences).
- Unscrews the fixing screws (V) and remove the plate (P) as well as the cork (L), keep these parts in case a change would be by necessary.
- Set the cork (T) and the adjustment head (J).
- Screw the two screws and block.



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IMPORTANT

Adjustments should be made by qualified personnel only.

Adjustment and checking of the outlet pressure

The gas outlet pressure of the electrovalve is adjusted at the factory. If you have to make another adjustment, proceed as follows.

- A Inlet
- B Outlet
- D Outlet pressure regulator adjustment screw plug
- E Inlet pressure tapping
- F Outlet pressure tapping
- T Regulation head

1- Close the gas inlet and remove the binding screw from the pressure tapping (F) and connect the manometer tube.

2- The electricity supply must be energized otherwise gas will not be supplied to the burner.

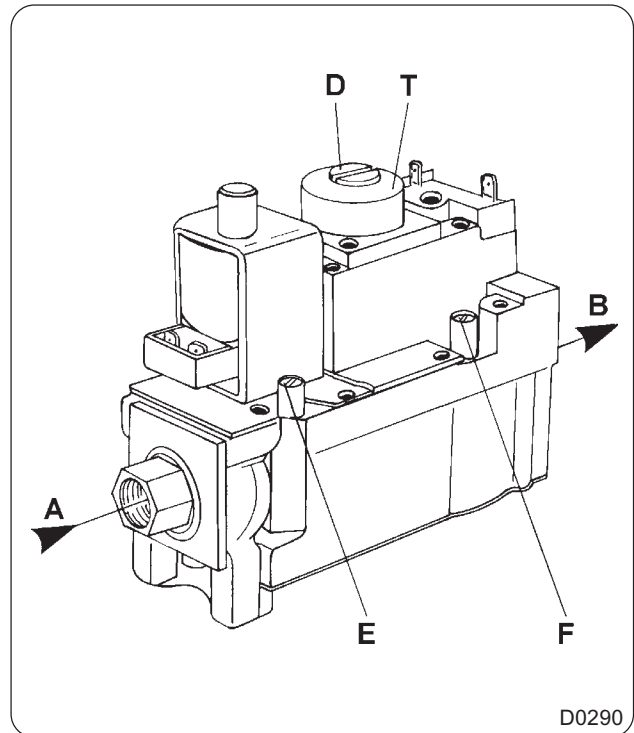
3- Open and check the gas inlet main burner using the manometer on the pressure tapping (F).

4- Remove the pressure regulator cap (D).

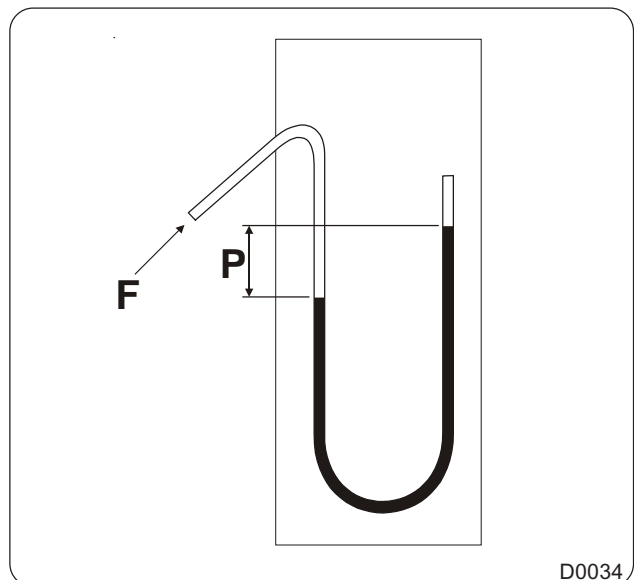
5- Using a screwdriver, slowly turn the adjustment screw until the required pressure (P) is indicated on manometer (see tables on the following pages).

Turn the adjustment screw clockwise to increase and counter-clockwise to decrease gas pressure.

6- Reset the pressure regulator cap, close off the gas inlet, remove the manometer tube and put the binding screw back in (F).



D0290



D0034

Legend of symbols used

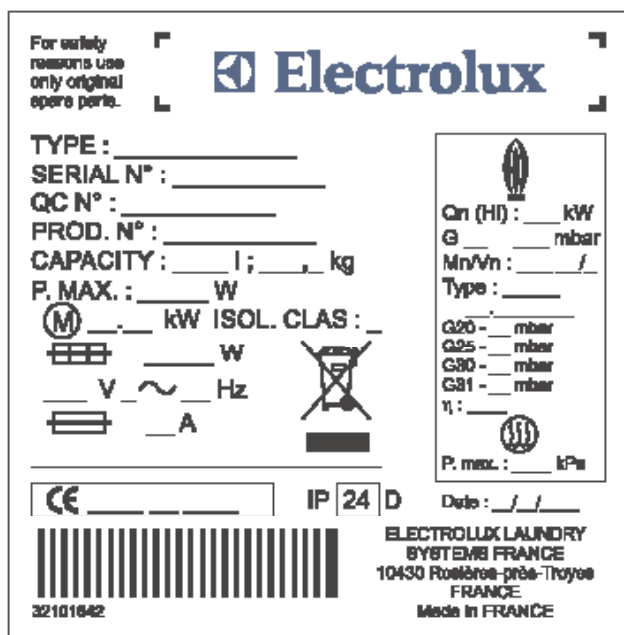
- I: machine working with only one gas family
- II: machine working with two gas families
- 1: 1st family : coal gas or town gas (for information : not used here)
- 2: 2nd family : natural gas
- 3 : 3th family : liquefied petroleum gas (LPG)
- H : natural gas with high calorific value (type G20)
- L : natural gas with low calorific value (type G25)
- E : natural gas with high and low calorific value (type G20)
- LL : natural gas with low calorific value (type G25)
- Esi : natural gas with high and low calorific value with adjustment (type G20)
- B : butane gas (type G30)
- P : propane gas (type G31)
- B/P : butane and propane gas (type G30 and G31)
- 3+ : butane/propane gas with couple of pressure 30/37 (type G30 and G31)

- | | | |
|---------------------|--------------------|------------------|
| AT : Austria | FR : France | MT : Malta |
| BE : Belgium | GB : Great Britain | NL : Netherlands |
| BG : Bulgaria | GR : Greece | NO : Norway |
| CH : Switzerland | HU : Hungary | PL : Poland |
| CY : Cyprus | HR : Croatia | PT : Portugal |
| CZ : Czech Republic | IE : Ireland | RO : Romania |
| DE : Germany | IS : Iceland | SE : Sweden |
| DK : Denmark | IT : Italy | SI : Slovenia |
| EE : Estonia | LT : Lithuania | SK : Slovakia |
| ES : Spain | LU : Luxembourg | TR : Turkey |
| FI : Finland | LV : Latvia | |

Qn (Hi) : nominal heat emission expressed in relation to the net calorific value

Mn : nominal mass (for butane/propane gas)

Vn : nominal volume (for natural gas)



Country Category		Gas	Pressure (mbar)
AT-DK-FI-IT-SE-BG-CZ-HU-LT-LV-NO-RO	I2H	G20	20
BE	I2E(S)B ; I3P	G20/G25	20/25
		G31	37
DE-LU-MT-PL	I2E ; I3P	G20	20
		G31	50
FR	II2Esi3P	G20/G25	20/25
		G31	37/50
BG-CH-CY-CZ-ES-EE-GB-GR-HU-HR-IE-LT-LV-PT-PL-RO-SI-SK-TR	II2H3P	G20	20
		G31	37/50
NL	II2L3P	G25	25
		G31	50

TABLE OF CORRESPONDENCES - Finishing cabinet FC48

Category index	Type of gas	Working supply pressure in mbar	Hi	Ø of injectors in mm	Pressure at injectors	Heat emission Qn in kW (Hi)	Consumption Mn in kg**	Consumption Vn in m ³ **
*2E, 2H, 2ESI	G 20	20	34,02 MJ/m ³	3,30	184 mmH ₂ O or 18 mbar	20	-	0,23
2L, 2ESI	G25	25	29,25 MJ/m ³	3,70	184 mmH ₂ O or 18 mbar	20	-	0,27
3 P	G31	37	46,34 MJ/kg	2,20	regulator out of operation	20	0,16	-
3 P	G31	50	46,34 MJ/kg	2,10	regulator out of operation	20	0,16	-

* For Belgium, no work is allowed between G20 and G25.

****8 min typical cycle** : 8 60/40 polyester-coton overalls of 550g, 61% retention rate, "high" drying temperature (85°C), with no cool cycle, unit preheated for 3 min. at 85°C, loading/unloading time estimated at 2 min.

Note : G20 (H) = natural gas, Lacq type (20 mbar)
G25 (L) = natural gas, Groningue type (20 or 25 mbar)
G31 = propane gas (37 or 50 mbar)

IMPORTANT



Tightness test after installation
The gas leak test is performed as follows :

- 1/ Paint pipe joints, pilot gas tubing connections and inspect outlets with rich soap and water solution ; do not use an aggressive soap.
- 2/ Put the machine into service. Bubbles indicate a gas leak.
- 3/ Eliminate this leak.



NOTE : After all intervention, re-seal (red varnish) the following adjustment organs :
- regulator of pressure.

In case of changing of gas, the stick for the adjustment has to be modified.



Check-out

Before leaving, put the appliance into operation and allow to run a complete cycle. Watch to ensure that all burner system components function correctly.

Connection of the ironer evacuation system

Fresh air inlet

To allow the machine to work at its best, it is important that the laundry air inlet passes through an opening from the outside.

The fresh air arrival must be equivalent to the volume of evacuated air (référez vous au débit des ventilateurs à pression nulle dans les caractéristiques techniques).

Note: in the case of several machines, these values should be added together. In the case of a machine with gas heating, it is essential that the rooms should be ventilated.

In order to prevent drafts in the room, the best solution is to place the air inlet behind the machine.

The free section* of the air inlet must be five times greater than the section of the evacuation pipe.

*(The free section corresponds to the unrestricted air passage surface area through the grill).

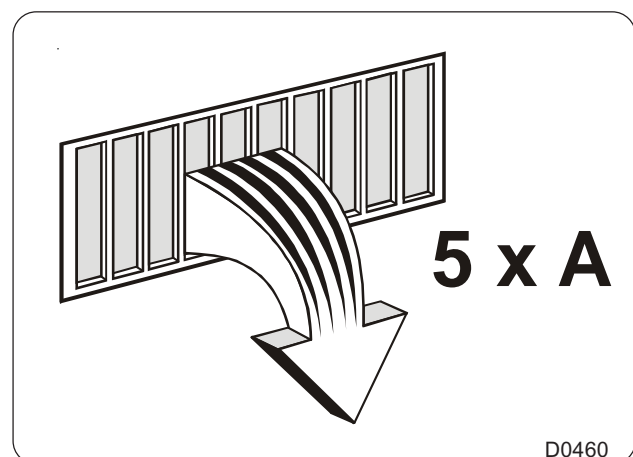
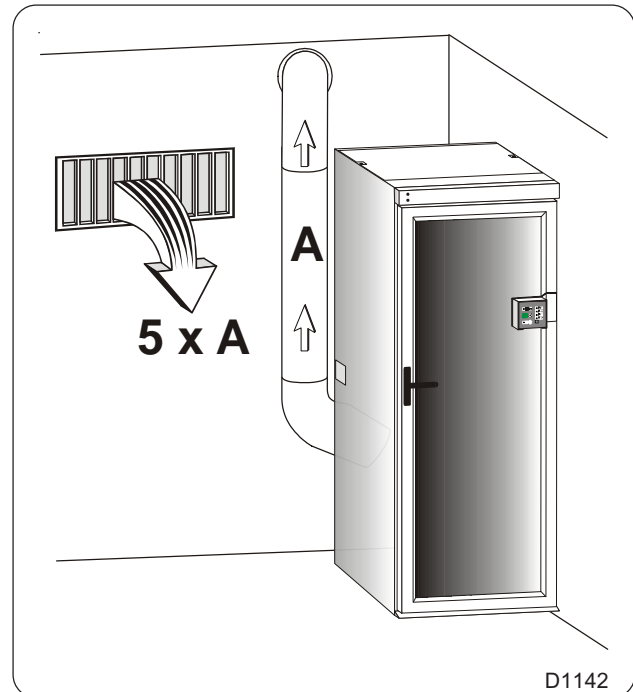
Do not forget to allow for the fact that grills often occupy half the total area of the free air opening.

Evacuation duct

It is recommended that a separate smoothwalled evacuation duct should be connected to each machine, providing the least possible resistance to air.

Check that the shaft flow is at least twice the capacity of the blower output.

These conditions are **ABSOLUTELY ESSENTIAL** for correct working of the ironer.



It is essential that the diameter of the evacuation pipe should be selected as a function of each installation so that the pressure loss never exceed 206 Pa (value measured at ambient temperature).

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6. Installation/ Putting into service

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To prevent any risk of burnings, the vapours' evacuation duct of the finishing cabinets has to be temperature insulated (to be done by the customer).

Electric and steam heating specifications.

- Fan maximum flow rate with no pressure : 525 m³/h
- Maximum pressure available with no flow : 85 mm H₂O
- Average temperature of exhaust at the machine outlet : 90 °C.

Provided (for each machine) an **upper ventilation of 7 dm²** and a **lower one of 14 dm²** in your laundry.

Gas heating specifications.

- Fan maximum flow rate with no pressure : 360 m³/h
- Pression maximum disponible à débit nul : 16 mm H₂O
- **Minimum static depression (natural draught) of the evacuation system : 2 mm H₂O per machine**
- Average temperature of exhaust at the machine outlet : 85 °C.

Provided (for each machine) an **upper ventilation of 7 dm²** and a **lower one of 14 dm²** in your laundry.

For gas heating, the required combustion fresh air supply should be not less than 2 m³/h per kW, either 40 m³/h minimum.

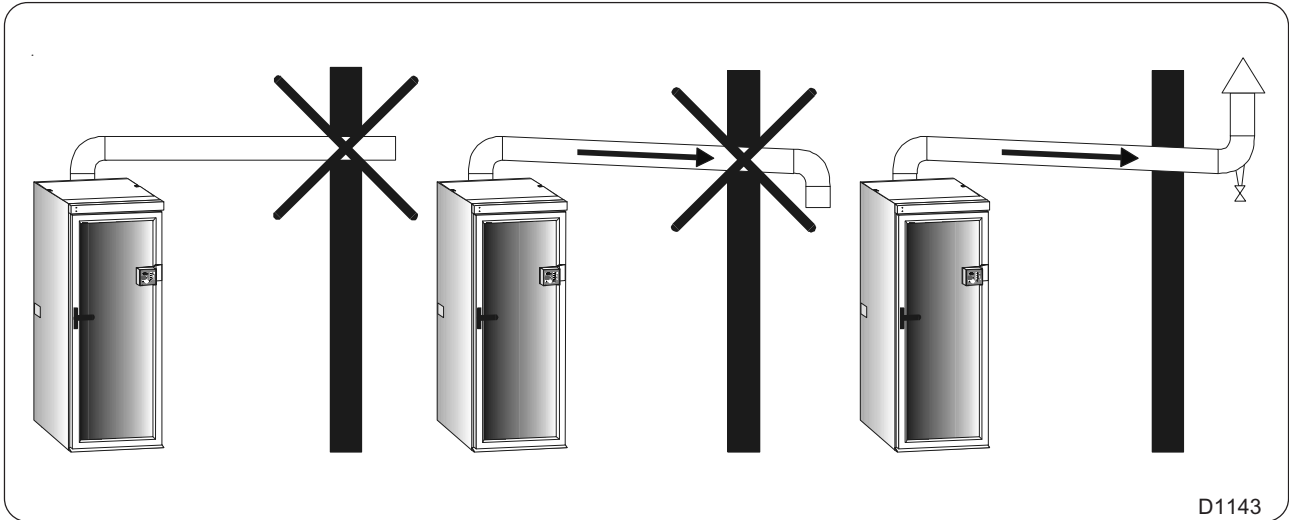
NOTE : the finishing cabinets must have a separate vapours evacuation duct of any other evacuation (dryer or other equipment).

It is necessary that the fitter carries out a connection dedicated to the finishing cabinets.

NOTE : if the flow is insufficient due to an excessive pressure loss, a safety pressure switch will automatically switch the heating off.

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The duct must lead to the outside and must be fitted with protection against the weather and foreign bodies.



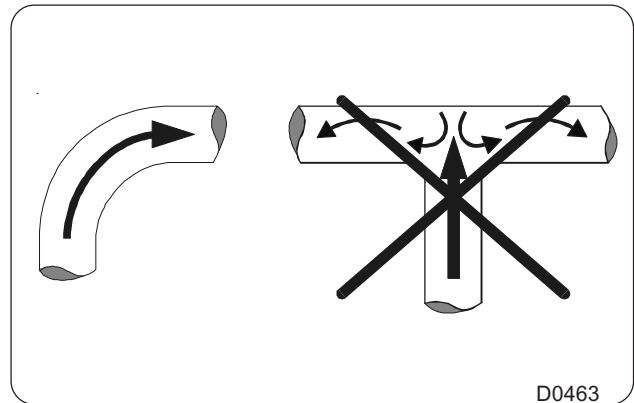
D1143

Evacuation system if several dryers are connected to a common evacuation duct (except for the gas heating machines).

If several dryer ironers are installed with a common evacuation duct, the cross-section of the evacuation duct must increase as a function of the number of installed machines so that each of them operates at the same value of air resistance.

Use elbows (and not Tees) to allow the air to pass forwards.

The simplified figure below shows the principle on which the evacuation duct shape is designed.



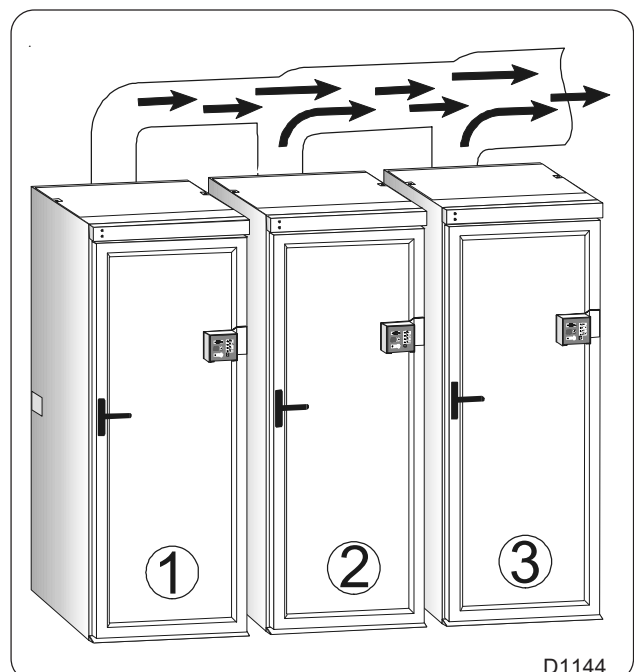
However, for greatest efficiency, we recommend the use of separate outlets for each machine.

Number of ironers	1	2	3
Outlet diameter of the exhaust pipe in (mm)	160	225	315
Ventilation aperture required section	2 dm ²	4 dm ²	8 dm ²

The indicated evacuation diameter is the dryer outlet diameter.

Cross-sections of ducts between dryers and the outside of the building must be designed taking account of the flow and the allowable pressure loss on each machine and the routing of ducts (elbows and lengths).

It is imperative to make sure of the presence of a minimum static depression (natural draught) of 2 mm H₂O per duct.

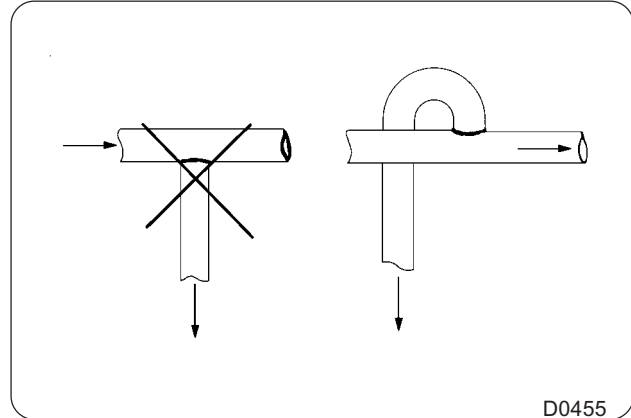


Steam connection

There is always a risk that a certain amount of water will be carried in steam.

Water is carried in the lower parts of the supply tubes, and steam in the upper parts.

Make a swan neck branch-T on the main tube to prevent this water damaging the machine heating system. This will ensure that only steam is retrieved without any condensed water.



D0455

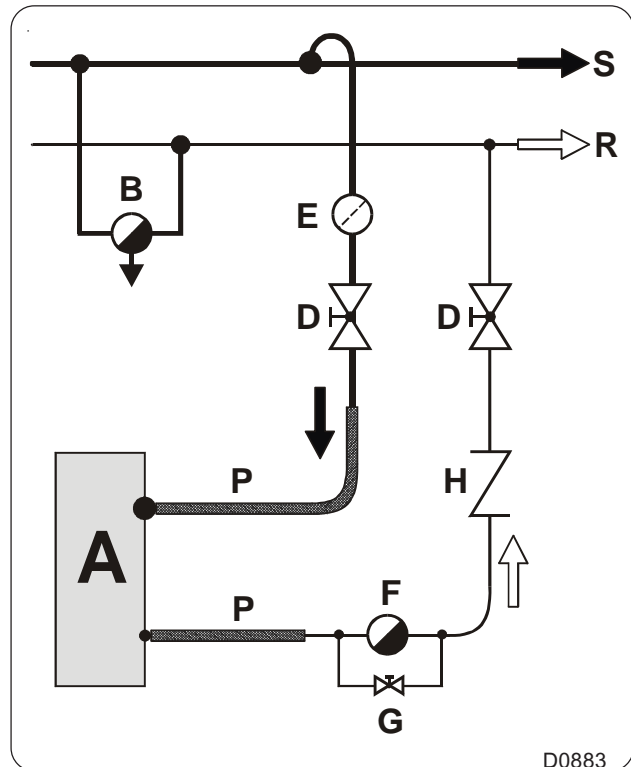
Steam connection DN 20 (3/4" BSP) female

Maximum supply pressure 1000 kPa max.

The customer must install a steam flexible pipe, a manually closing valve lockable in off position (do not use a 1/4 valve), a filter and a line steam trap on the supply side of the machine.

Condensate connection DN 15 (1/2" BSP) female

The customer must install a steam flexible pipe, a purge valve with float closed with an incondensibles drainage device, a by-pass, a non-return valve and a manual closing valve lockable in off position (do not use a 1/4 valve).



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- | | | | |
|----------|-------------------------|----------|-----------------------------------|
| A | Finishing cabinet | G | By-pass (needle valve) |
| B | Line trap (recommended) | H | Non-return valve |
| D | Manual stop valve | P | Steam flexible pipe (recommended) |
| E | Filter | R | Return of condensates |
| F | Steam trap | S | Steam inlet |

The customer must supply and install the necessary apparatus for the good running of the steam installation following the skeleton diagram of this page and in conformity with the present legislation.

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6. Installation/ Putting into service

INSTALLATION MANUAL

Vaporization steam connection (option)

(lettre T on the layout drawing)

Steam supply (1/4" BSP) male

Admissible steam pressure 1000 kPa maxi.

This option is to be quoted when the customer already has a steam supply for the laundry. It then just require to connect the machine to the main steam supply.

The customer must install prior to the machine, a flexible (recommended) steam pipe, and a stop valve lockable in closed position (1/4 turn valve to be banished).

Autonomous internal steam boiler connection (option)

Water supply connection for the autonomous steam boiler, DN10 (3/8") female

(lettre V on the layout drawing)

This option is to be quoted when the customer is not equipped with a main steam supply for the laundry.

The customer must install prior to the boiler, a flexible pipe, a filter, and a tap onto the cold soft water, or hot soft water supply of the laundry.

It is vital that softened water is used to prevent tartar building up around heating equipment. The hardness of soft water must be 7 and 15 TH (°f).

The water hardness, or total hardness (TH), is expressed in French degrees (°f) or ppm.

One °f is equivalent to 4 mg of calcium per litre and 2.4 mg of magnesium per litre.

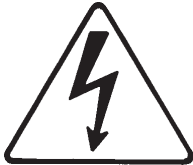
Caution: it is not enough to just know the TH to know water's tartar capacity. This requires knowledge of all the characteristic parameters of water and complex calculations.

Autonomous boiler purge connection, DN10 (3/8") female

(lettre W on the layout drawing)

The customer must connect the boiler to the waste water collector of the laundry using a tube and in respect to the local legislation on waste waters.

Electricity power supply



CAUTION

Prior to use, the ironer should be plugged into a correctly earthed power socket complying with the standards in force.



SAFETY

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

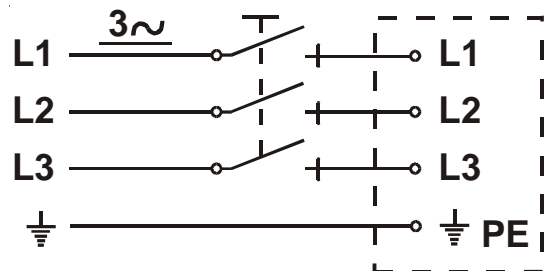


CAUTION

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

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

For each machine, install a fixed multipole circuit breaker in the laundry main cabinet.



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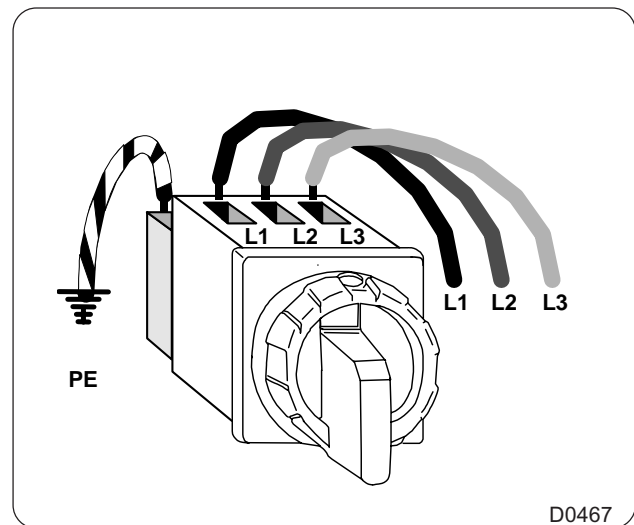
6. Installation/ Putting into service

INSTALLATION MANUAL

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.

(check operation, see chapter No. 10).



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

This type of breaker should thus be avoided, or a value of **300 mA** maximum should be observed according to standard NFC 15100 paragraph 532.2.6.

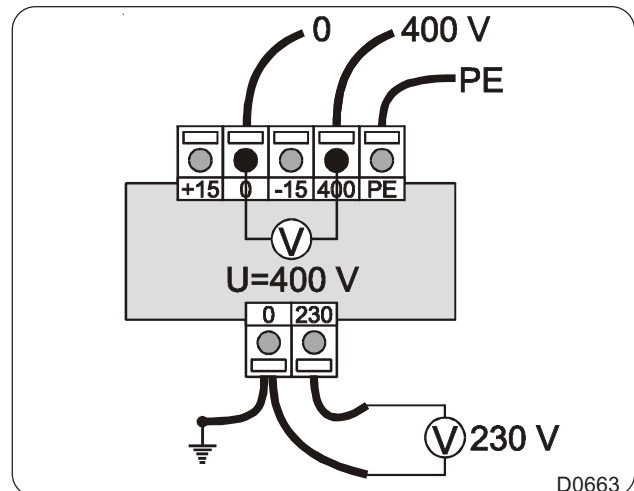
The machines comply with the European Directive EMC (Electromagnetic Compatibility). They have been tested in laboratory and approved as such. It is so prohibited to add wires or non shielded electric cables in the cabinets, strands or cables' troughs.

Connection diagrams for the control circuit power supply transformer (T1) as a function of the various customer power supply voltages (only for the machines without neutral).

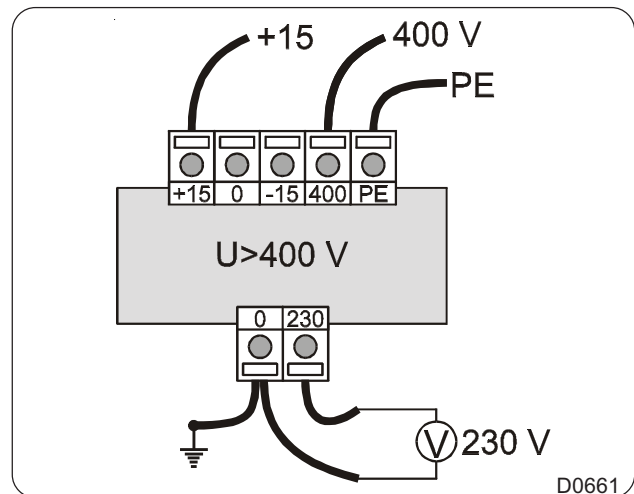
The tension of the control circuit delivered by the transformer must be 230 volts, single-phase. The supply tension for your machine is normally of 400 volts between 2 phases, this tension can however be different. The following schemes show how to adjust the tension at the secondary of the transformer.

Measure the power supply voltage at the transformer primary with a voltmeter between the transformer 0 and 400 volt terminals.

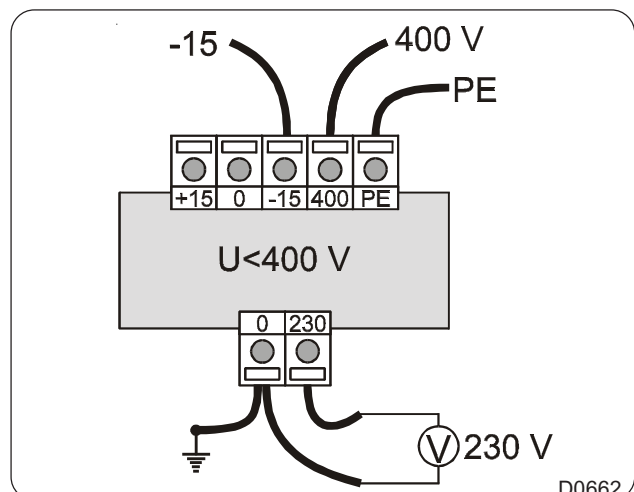
- If the voltage is equal to 400 volts, do not touch the transformer connection which must be as shown in the adjacent figure.



- If the voltage is > 400 volts (for example : 420 or 430 volts), connect the wires to the transformer as shown in the adjacent figure.



- If the voltage is significantly < 400 volts (for example: 370 or 380 volts), connect the wires to the transformer as shown in the adjacent figure.



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 60204-1-1992)

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.

Cable Section (mm ²)	Maximum Admissible Current (amperes)		
	Seated in Cable Duct or Cable Trough	Wall Fixing	Cable Tray
	B2	C	E
3 x 1,5	12,2	15,2	16,1
3 x 2,5	16,5	21	22
3 x 4	23	28	30
3 x 6	29	36	37
3 x 10	40	50	52
3 x 16	53	66	70
3 x 25	67	84	88
3 x 35	83	104	114
3 x 50	-	123	123
3 x 70	-	155	155

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 factor for different cable insulating materials)

Insulating material	Max. Working Temperature range	Correction factor
PVC	70 °C	1,00
Natural or Synthetic Rubber	60 °C	0,92
Silicone Rubber	120 °C	1,60

Table 4

(B2, C and E correction factors for cable grouping)

Number of Cables	B2 Seated in Cable Duct	C Wall Fixing or Cable Trough	E 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.
- Cable with rubber insulation : 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.

$$\text{Total current : } \frac{60 \text{ A}}{0,91 \times 0,92 \times 0,85} = 84 \text{ A}$$

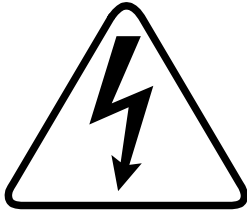
Taking Column C in Table 1 (wall fixing), we obtain a minimum cable section of : **3 x 25 mm²**.

Machine type	Heating	Supply voltage	Installed electrical power	Rated intensity	Main switch	Connection cable section	Fuse
FC48	Gas/Steam	380/415 V 3+E ~ 50/60 Hz	1.8 kW	3.5 A	3 x 12 A	4 x 2.5 mm ²	3 x 12 A
FC48	Gas + boiler	380/415 V 3+E ~ 50/60 Hz	7.8 kW	13.7 A	3 x 16 A	4 x 2.5 mm ²	3 x 16 A
FC48	Steam + boiler	380/415 V 3+E ~ 50/60 Hz	7.8 kW	13.7 A	3 x 16 A	4 x 2.5 mm ²	3 x 16 A
FC48	Electric	380/415 V 3+E ~ 50/60 Hz	19.8 kW	30 A	3 x 40 A	4 x 6 mm ²	3 x 40 A
FC48	Elec. + boiler	380/415 V 3+T ~ 50/60 Hz	25.8 kW	40 A	3 x 50 A	4 x 10 mm ²	3 x 50 A

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Operating inspection

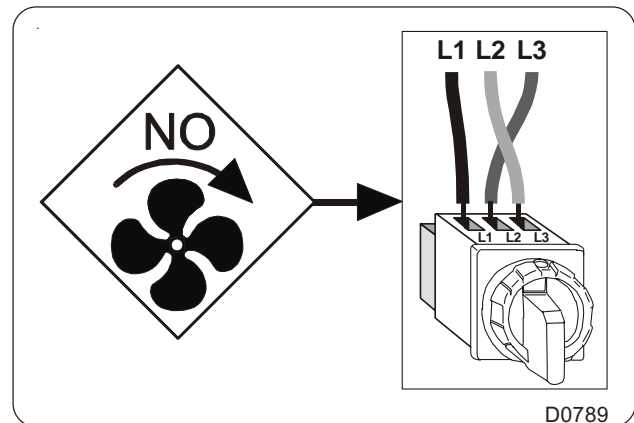
The operating inspection must be done by an approved technician.



WARNING

Always make sure that the fan is rotating in the right direction. The fan must rotate in the direction shown on the arrow glued inside the right compartment (see illustration).

If it is rotating in the wrong direction, invert two of the three phases on the power supply isolating switch to reverse the direction of rotation of the fan.



Check again the direction of rotation of the fan. Allow the machine to run with the heating on for 5 minutes, and check on the control panel to ensure that the heating is working correctly.

If the tests carried out on the various points mentioned above are satisfactory, the machine is ready for use.



Conversion of measurement units

The following is a list of correspondences of the main frequently used units, to avoid the need to use measurement unit conversion tables.

bar :	1 bar = 100 000 Pa 1 bar = 1.019 7 kg/cm ² 1 bar = 750.06 mm Hg 1 bar = 10 197 mm H ₂ O 1 bar = 14.504 psi	1 kg/cm ² = 0.980 665 bar 1 kg/cm ² = 10 000 mm H ₂ O 1 kg/cm ² = 735.557 6 mm Hg
british thermal unit :	1 Btu = 1 055,06 J 1 Btu = 0.252 1 kcal	pound : 1 lb = 453.592 37 g
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	meter : 1 m = 1.093 61 yd 1 m = 3.280 83 ft 1 m = 39.37 in
continental horse-power :	1 ch = 0.735 5 kW 1 ch = 0.987 0 HP	cubic meter : 1 m ³ = 1 000 dm ³ 1 m ³ = 35.314 7 cu ft 1 dm ³ = 61.024 cu in 1 dm ³ = 0.035 3 cu ft
cubic foot :	1 cu ft = 28.316 8 dm ³ 1 cu ft = 1 728 cu in	pascal : 1 Pa = 1 N/m ² 1 Pa = 0.007 500 6 mm Hg 1 Pa = 0.101 97 mm H ₂ O 1 Pa = 0.010 197 g/cm ² 1 Pa = 0.000 145 psi 1 MPa = 10 bar
cubic inch :	1 cu in = 16.387 1 dm ³	psi : 1 psi = 0.068 947 6 bar
foot :	1 ft = 304.8 mm 1 ft = 12 in	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
gallon (U.K.) :	1 gal = 4.545 96 dm ³ or l 1 gal = 277.41 cu in	watt : 1 W = 1 J/s 1 W = 0.860 11 kcal/h
gallon (U.S.A.) :	1 gal = 3.785 33 dm ³ or l 1 gal = 231 cu in	watt-hour : 1 Wh = 3600 J 1 kWh = 860 kcal
horsepower :	1 HP = 0.745 7 kW 1 HP = 1.013 9 ch	yard : 1 yd = 0,914 4 m 1 yd = 3 ft 1 yd = 36 in
inch :	1 in = 25.4 mm	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
joule :	1 J = 0.000 277 8 Wh 1 J = 0.238 92 cal	
kilogramme :	1 kg = 2.205 62 lb	
kilogramme per square centimeter :	1 kg/cm ² = 98 066.5 Pa	



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