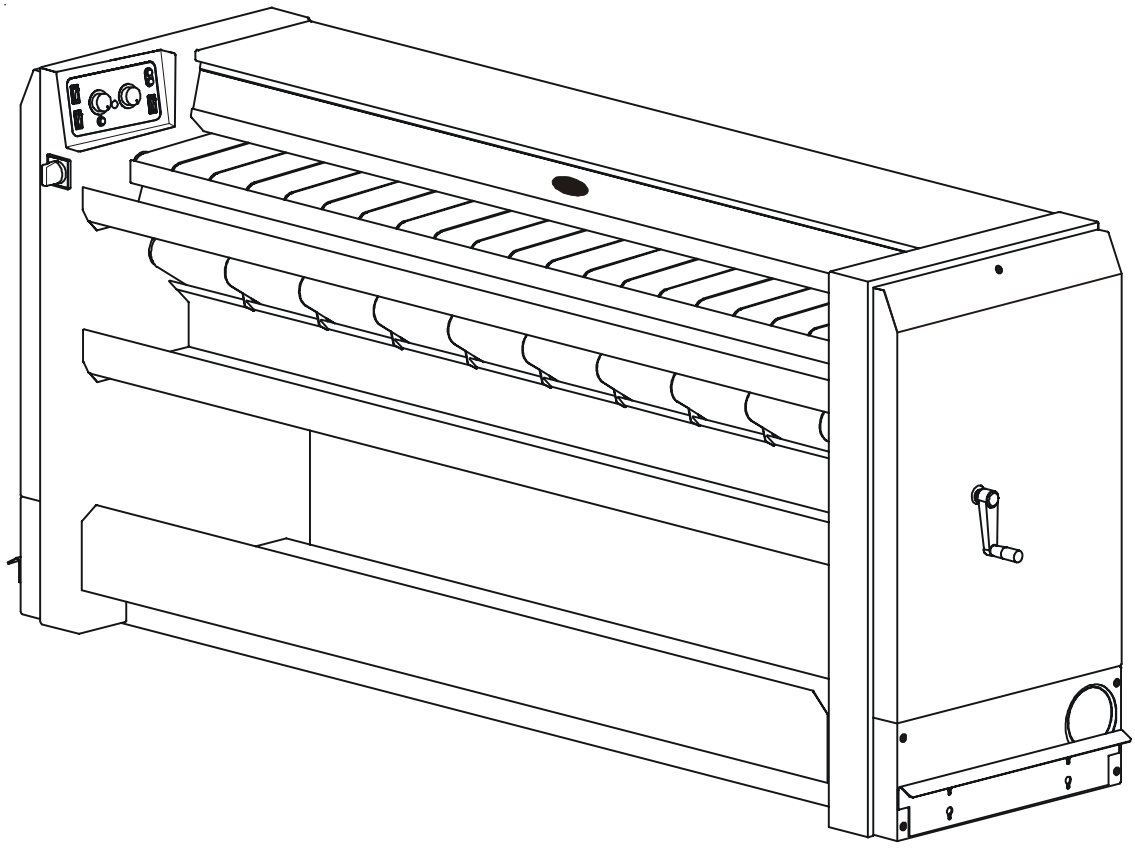
INSTALLATION MANUAL

FLATWORK IRONERS

IC43316 - IC43320



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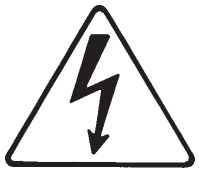
Pages/Chapters

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

Any repairing or maintenance operation should be carried out by a specialist.

CAUTION

It is specially advised not to install the machine on a synthetic floor covering. The frictional electricity may hinder the good working of the machine.
Earthing is compulsory.
Te warranty might be cancelled if these instructions are not complied with.

WARNING

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

1/ Lifting with a fork-lift truck

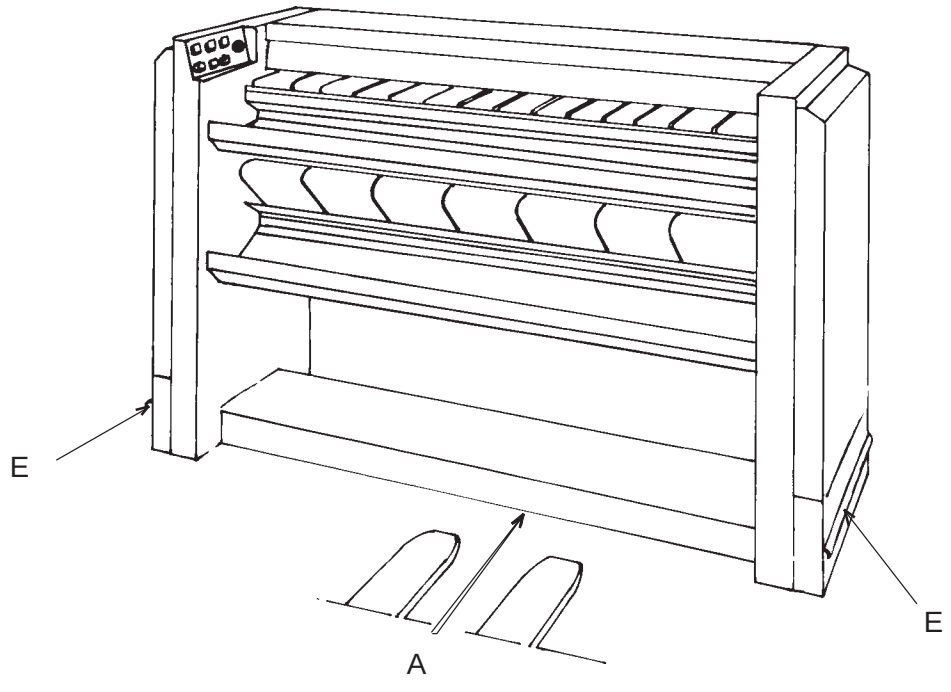
Always lift at the centre of the machine at (A).

2/ Moving along the groung

The machine frame includes a girder, so that the machine can be moved along the ground using rollers, grinding tracks or a trolley.

The two handling angles (B) can be used to lift the machine using hydraulic jacks or poles, so that rollers can be slipped under the girder.

These two handling angles are also designed to lift the machine with handling straps (C).



D0248

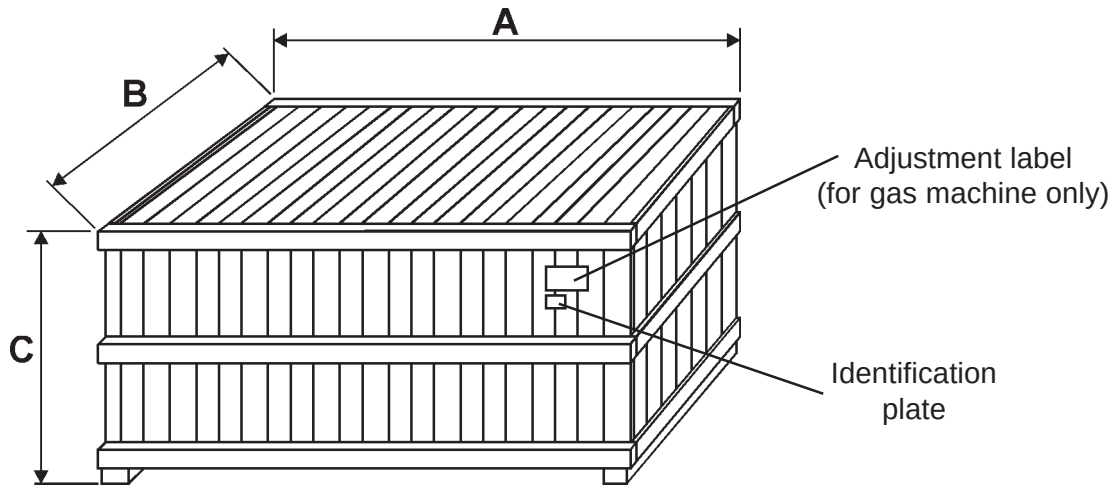
Dryer-ironer

Packing

Packing dimensions	IC43316	IC43320
Box full		
A	2280 mm / 89.76"	2695 mm / 106.10"
B	830 mm / 32.68"	830 mm / 32.68"
C	1430 mm / 56.30"	1430 mm / 56.30"
Machine + crate		
A	2230 mm / 87.80"	2630 mm / 103.54"
B	770 mm / 30.31"	770 mm / 30.31"
C	1430 mm / 56.30"	1430 mm / 56.30"
Machine + pallet		
A	2170 mm / 85.43"	2585 mm / 101.77"
B	720 mm / 28.34"	720 mm / 28.34"
C	1310 mm / 51.57"	1310 mm / 51.57"

Weight in daN

	IC43316	IC43320
Weight, box full		
Gas	480 daN / 1059 lb	525 daN / 1158 lb
Electric	470 daN / 1037 lb	510 daN / 1125 lb
Machine + crate		
Gas	450 daN / 993 lb	485 daN / 1070 lb
Electric	440 daN / 971 lb	470 daN / 1037 lb
Machine + pallet		
Gas	350 daN / 772 lb	380 daN / 839 lb
Electric	340 daN / 750 lb	365 daN / 805 lb



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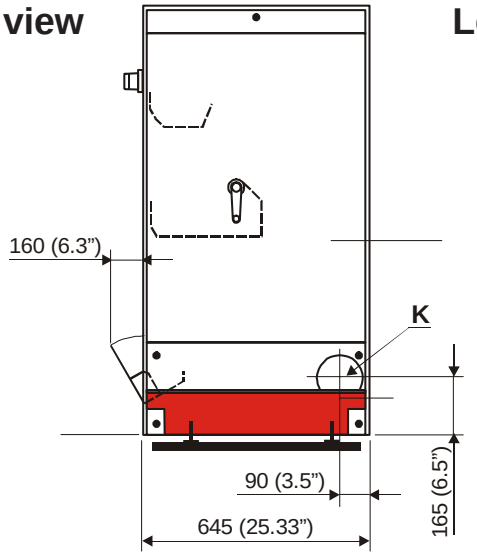
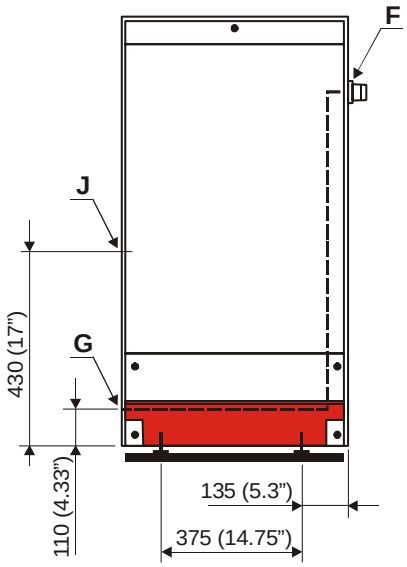
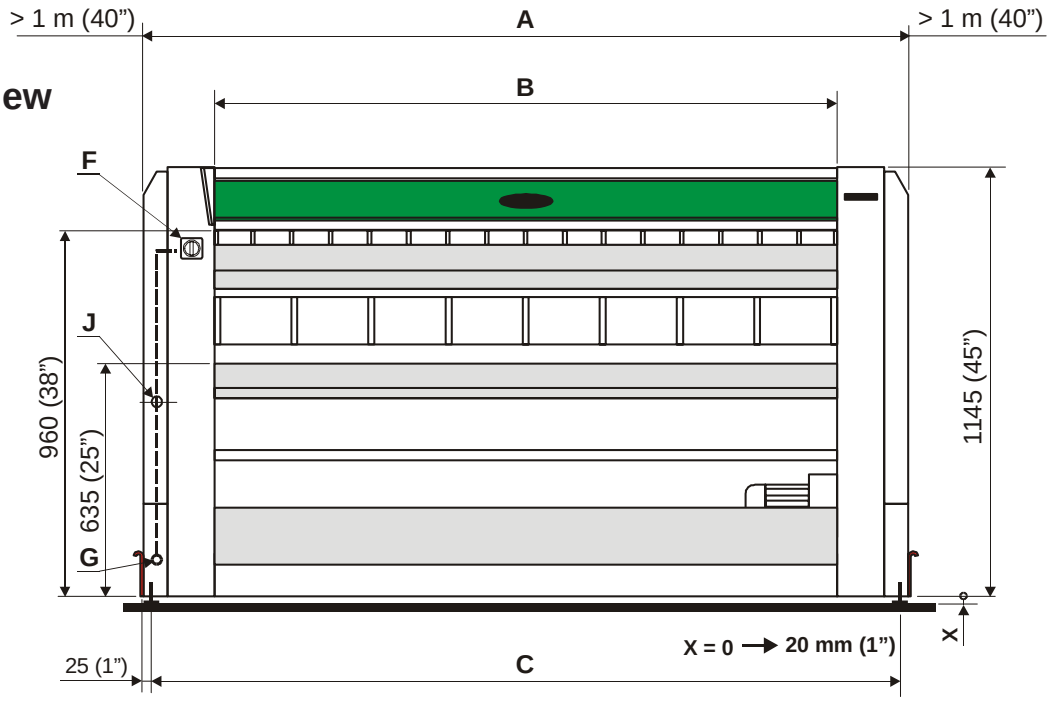
Right view



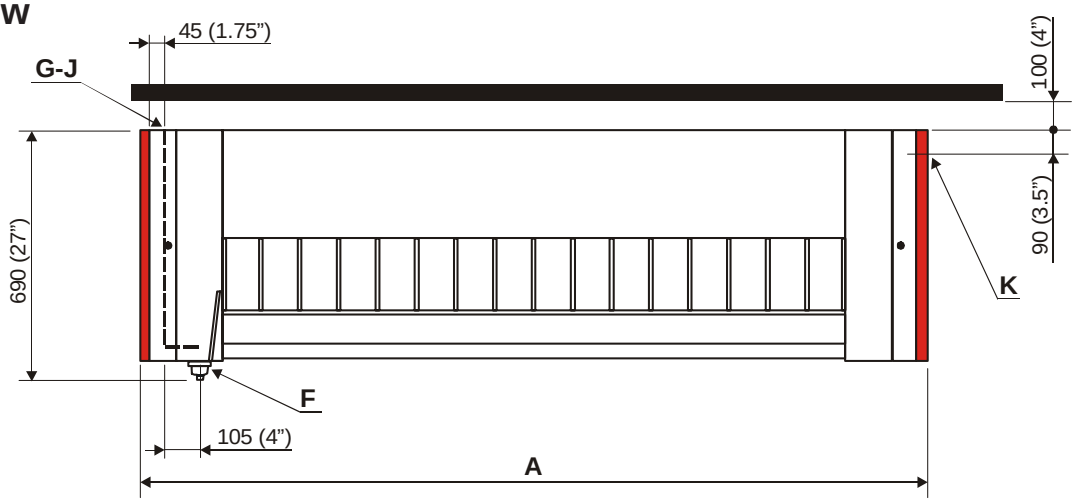
Left view



Front view



Top view



07100129

Diagram no. 07100131

Ironer

Characteristics		IC43316	IC43320
Ø cylinder	mm	325 (12.80")	325 (12.80")
Effective working width	mm	1650 (64.96")	2065 (81.30")
Ironing speed			
Mini	m/min	0,5 (1.64 f/min)	0,5 (1.64 f/min)
Maxi	m/min	5,5(18.04 f/min)	5,5(18.04 f/min)
Heating surface	m²	1,1 (11.84 f²)	1,4 (15.07 f²)
Capacity max. water evaporation, with 50 % residual moisture and 100 % cylinder utilization (according to ISO 9398-1)	kg/h	19,5	24,5
Net weight			
Gas heating	kg	295 (651 lb)	325 (717 lb)
Electric heating	kg	290 (640 lb)	315 (695 lb)
Floor area	m²	1,4 (15.07 f²)	1,7 (18.30 f²)
Dimensions			
(A) Overall width	mm	2090 (82.28")	2505 (98.62")
(B) Feeder width	mm	1650 (64.96")	2065 (81.30")
(C) Width between feet	mm	1975 (77.75")	2390 (94.09")

Connections

(F) Main switch to connect electric main cable
(G) Inlet for electric main cable
(J) Gas inlet DN 20 (3/4" BSP)
(K) Drain of vapour or burnt gas Ø 125 mm (5")

Consumptions

Gas heating			
Installed electric power	kW	0,5	0,5
Maximum electrical consumption	kWh	1,2	1,2
Installed heating power	kW	20	25
Electric heating			
Installed electric power	kW	18,5	23
Maximum electrical consumption	kWh	18,5	22,5

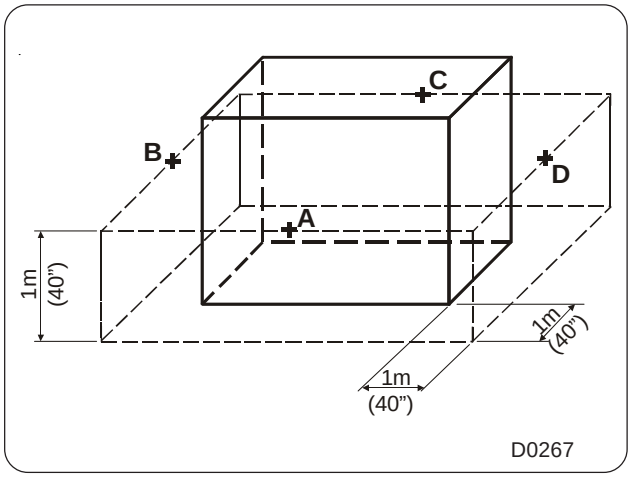
Heat loss : 3 % of installed heating power

Exhaust air max. with no pressure at 15 °C (59 °F)			
	m³/h	426(251 f³/min)	515(251 f³/min)

Total pressure with no flow : 540 Pa (0.07832 PSI)
Admissible head loss on evacuation : 200 Pa (0.029 PSI)

Sound level

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



Weighted sound pressure level (A) in dB (A) for an IC433.

	A	B	C	D
IC43316	63	62	63	65
IC43320	63	62	63	65

Unpacking

Release the machine from its pallet by cutting the plastic film and remove the pallet, removing the red transport clamps with an appropriate spanner.

Check that no damage has been caused during transport.

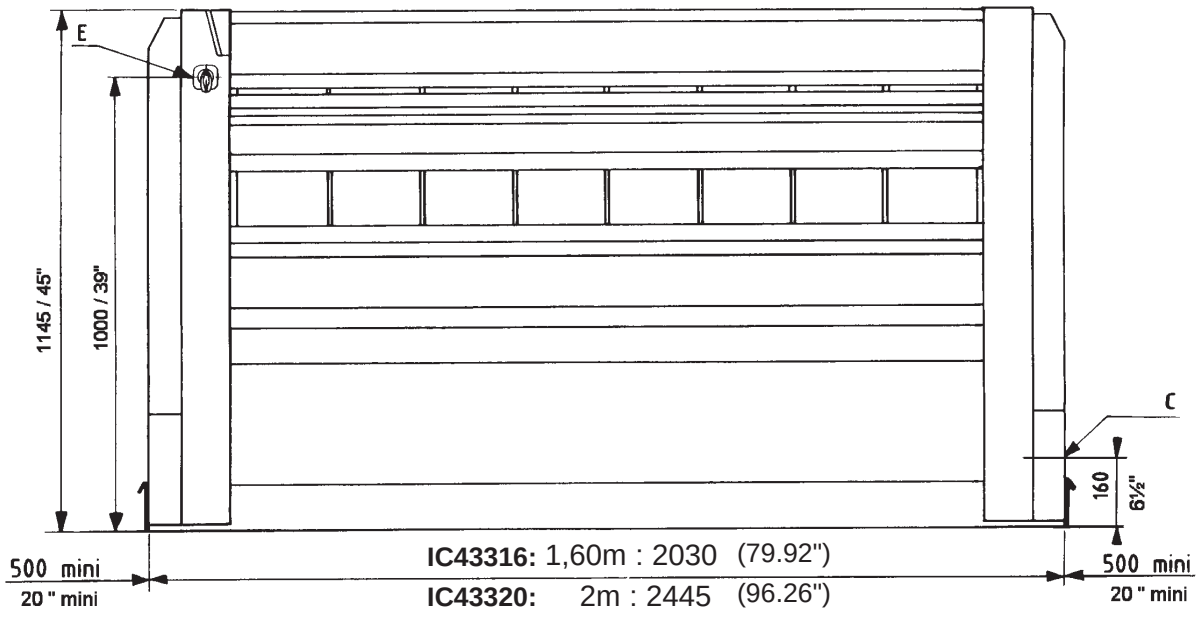
Installation

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 horizontal and firm floor, capable of supporting its weight.
Ironers are provided with four leveling screws to facilitate leveling (one on each corner of the sole plate).

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

- Leave at least 0.1 m (4") between the machine and the wall against which it is placed.
- Leave at least 1 m (40") between the machine and a wall or another machine on the left side in order to be able to carry out an intervention on the caisson.

However, note that if you can, it is recommended that you should leave sufficient space for maintenance of the heating box to avoid having to move the dryer (minimum length A on the left side).



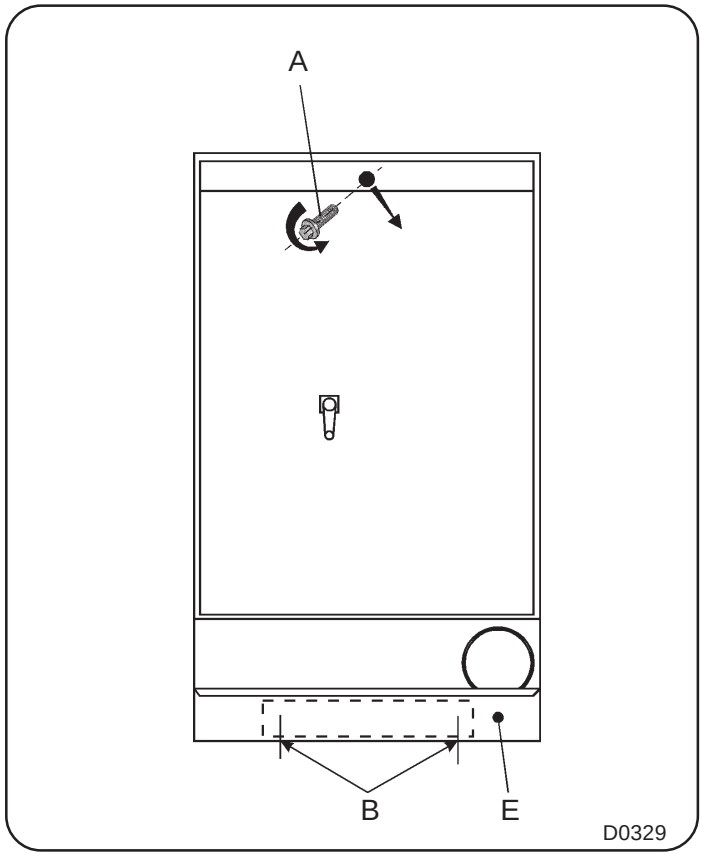
Screw off the screws to remove the red transport angles (benchmark E) with a key.

CAUTION :
do not remove these screws.

Keep these angles to eventually lift the machine.

Block the screws which maintained these angles.

Dismantling of the casing :
Remove the black shutter and then the screw (A).

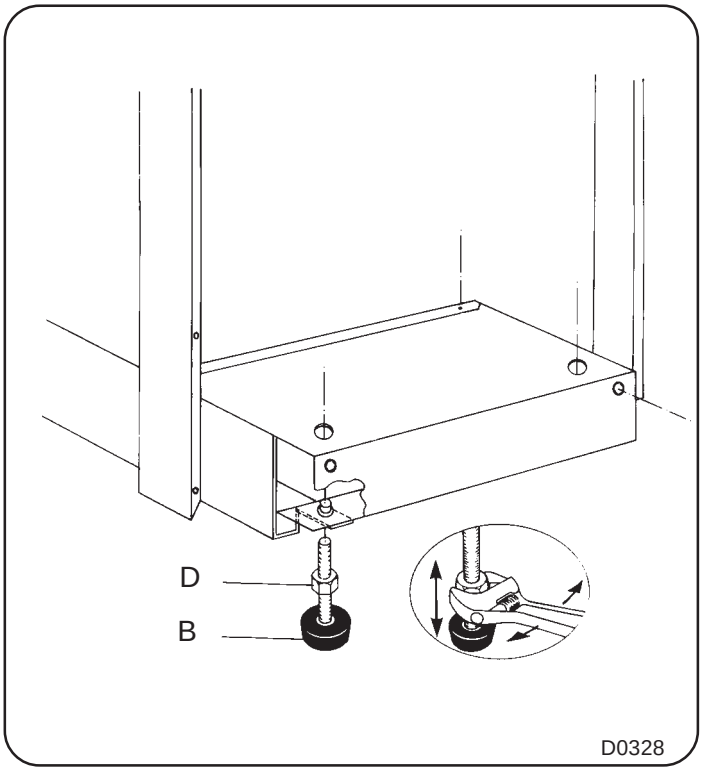


Levelling the machine

Assemble the four adjustment feet (B) to make the levelling possible.

They are to be fitted on each side of the machine and can be reached from outside underneath.

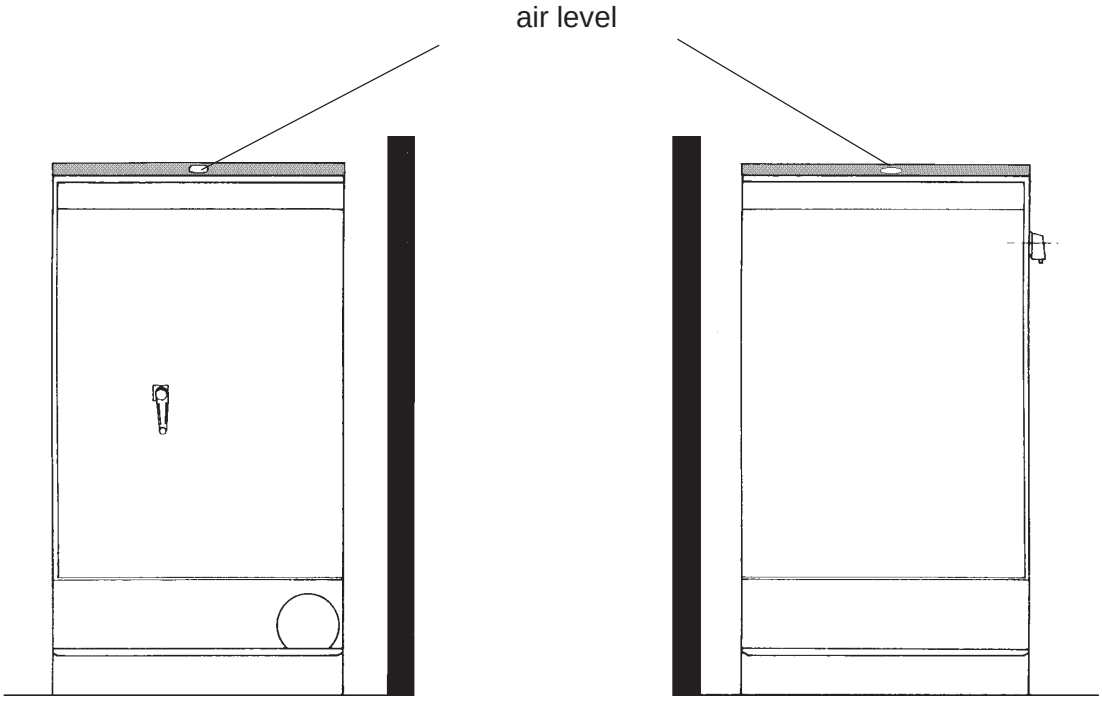
Act on the adjusting feet (B), and level the machine and then fix by the locknut (D).



Mechanical installation

Check with a spirit level placed on the sole plate for the longitudinal direction and the machine top cover for the transverse direction (see sketch).

D0250



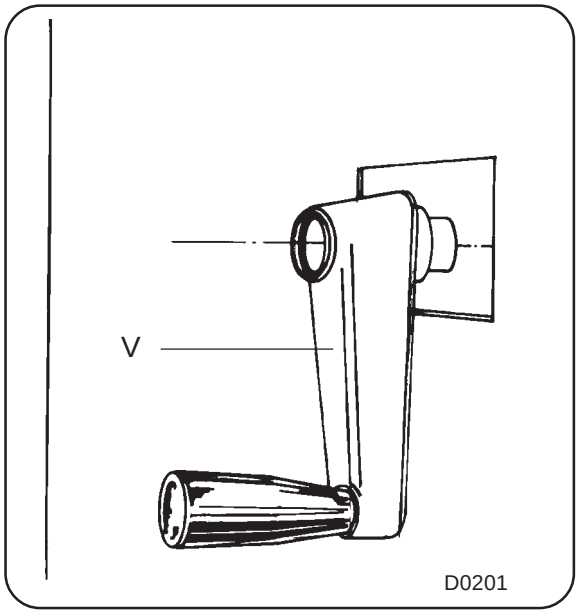
D0251

Machine with steel cylinder option

Before the very first starting operation, it is necessary to take off the protective paper rolled round the heating cylinder (for steel cylinder only).

To do so, you have to install the crank (V) that you have found in the caisson together with this instruction handbook (see photo).

Turn the crank to make the cylinder rotate and remove the protective paper.



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.

Electricity power supply

CAUTION

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

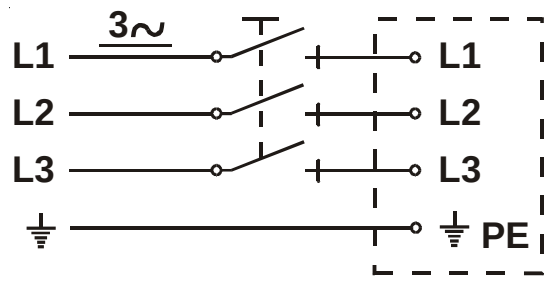
SAFETY

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.

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



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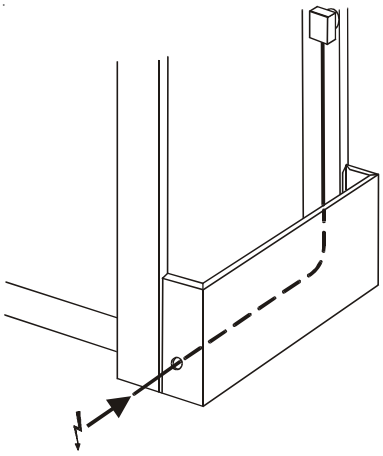
Pass the machine power supply cable through the orifice (see sketch).



D1039

Electricity power supply

IMPORTANT : Check that the mains voltage is correct and that your installation is powerful enough before connecting the machine (see chapter 5 page 2 for the cross sectional areas of cables).

Insert the feeding cable in the designed port (letter B on the foundation plan on the rear left side of the caisson).

Dismantle (following the pattern) the general switch (E) by activating the red lever (M) downward **or** push the red button (K) to separate the body from the head of the switch, and then pull it backward following arrow (F).

Connect this cable on the general switch (E) diagram D0180 observing the location of the threads.

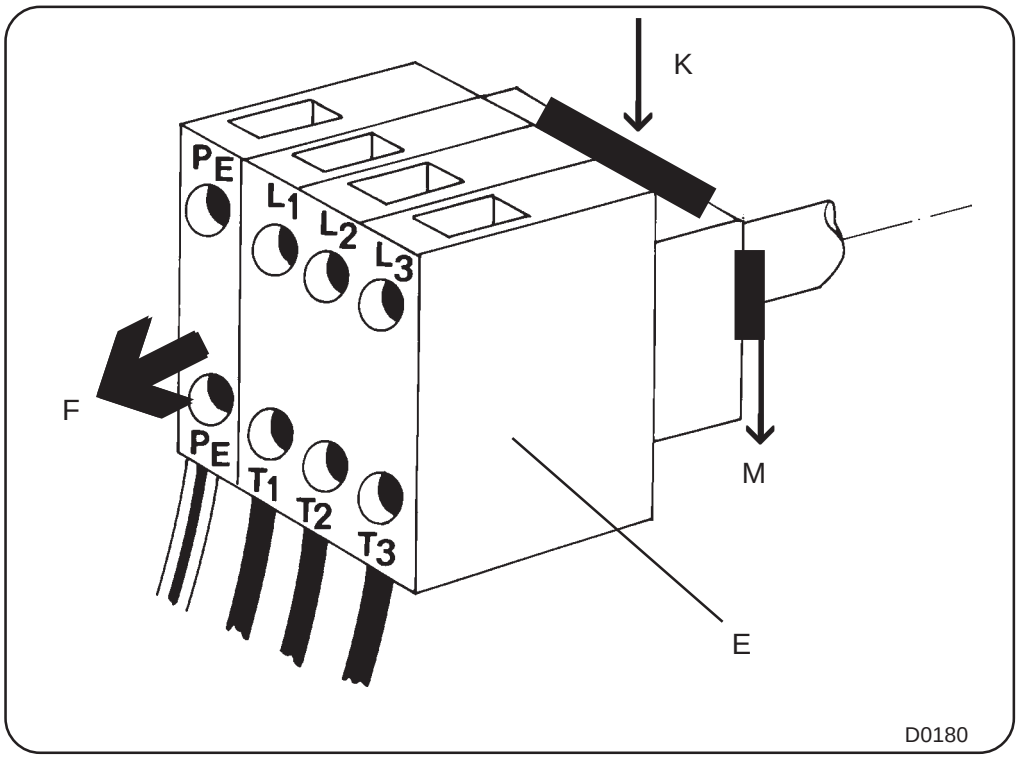
L1 Phase no 1

L2 Phase no 2

L3 Phase bo 3

PE Earth connection

To reassemble the body of the switch, reverse the operation (activate (M) upward to lock).



Connect the power supply cable on the machine main switch.

Check the order of phases on the switch terminals (see marks L1, L2, L3 and PE on the switch).

(Check operation, see chapter no.10).

NOTE : you must respect the fan rotation direction.

Connection diagrams for the control circuit power supply transformer (T1) as a function of the various customer power supply voltages.
400 volt power supply.

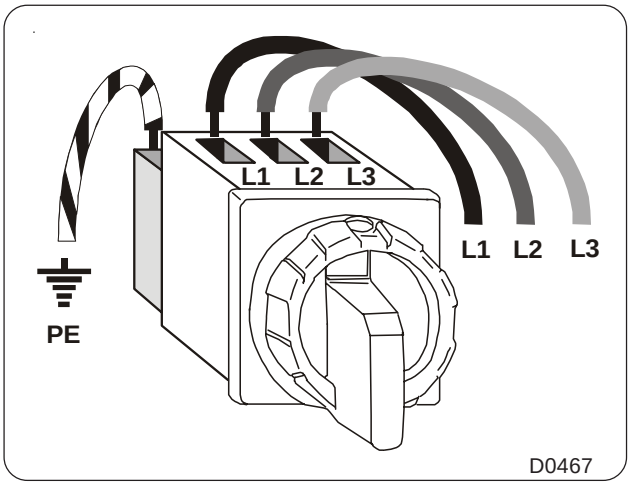
Measure the power supply voltage at the transformer primary with a voltmeter between the transformer 0 and 400 volt terminals.

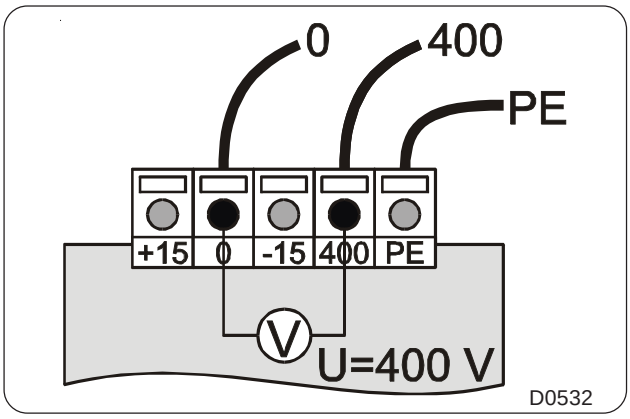
- If the voltage is equal to 400 volts, do not touch the transformer connection which must be as shown in the adjacent figure.

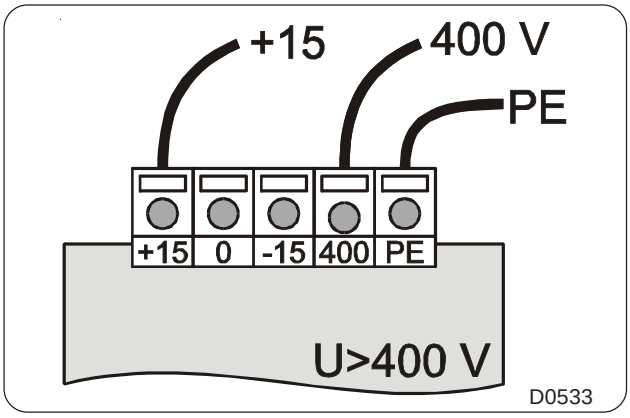
- If the voltage is > 400 volts (for example: 420 or 430 volts), connect the wires to the transformer as shown in the adjacent figure.

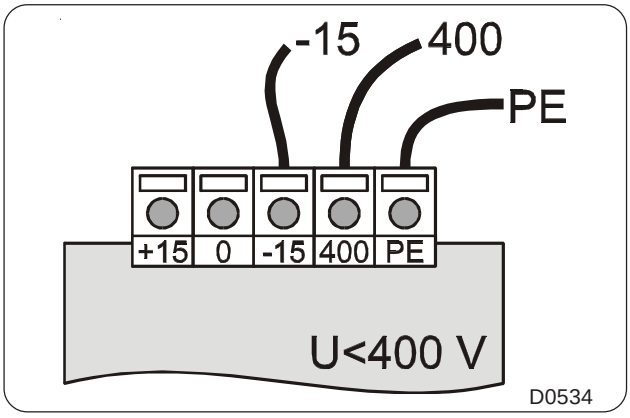
Note : we recommend that you should adopt this solution even if the voltage is normally equal to 400 volts but may be subjected to temporary variations, so that you do not apply an overvoltage to the electrical equipment in your machine.

- 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. - 104 °F max. (for others see Table 2)
- Three-phase cable under load without including starting currents
- BT / C/ E cable layout.

Cable Section (mm²)	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 / 86 °F	1.15
35 °C / 95 °F	1.08
40 °C / 104 °F	1.00
45 °C / 113 °F	0.91
50 °C / 122 °F	0.82
55 °C / 131 °F	0.71
60 °C / 140 °F	0.58

Table 3

(correction factor for different cable insulating materials)

Insulating Material	Max. Working Temperature range	Correction Factor
PVC	70 °C / 158 °F	1.00
Natural or Synthetic Rubber	60 °C / 140 °F	0.92
Silicone Rubber	120 °C / 248 °F	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.
- 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.

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

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

Machine type	Supply Voltage	Installed Power	Heating	Rated intensity	Main Switch	Connection Cable Section	Fuse
3316	380/415 V 3+E ~ 50/60 Hz	0,5 kW	Gas	1 A	3 x 12 A	4 x 2,5 mm²	3 x 12 A
3316	380/415 V 3+E ~ 50/60 Hz	18,5 kW	Electric	26,7 A	3 x 32 A	4 x 6 mm²	3 x 32 A
3316	220/240V P+N ~ 50/60 Hz	0,5 kW	Gas	2,5 A	2 x 12 A	3 x 2,5 mm²	2 x 12 A
3316UL	208&240V P+N ~ 50/60 Hz	0,5 kW	Gas	2,5 A	2 x 12 A	3 x 2,5 mm²	2 x 12 A
3320	380/415 V 3+E ~ 50/60 Hz	0,5 kW	Gas	1 A	3 x 12 A	4 x 2,5 mm²	3 x 12 A
3320	380/415 V 3+E ~ 50/60 Hz	23 kW	Electric	32,5 A	3 x 40 A	4 x 10 mm²	3 x 40 A
3320	220/240V P+N ~ 50/60 Hz	0,5 kW	Gas	2,5 A	2 x 12 A	3 x 2,5 mm²	2 x 12 A
3320UL	208&240V P+N ~ 50/60 Hz	0,5 kW	Gas	2,5 A	2 x 12 A	3 x 2,5 mm²	2 x 12 A

Gas connection

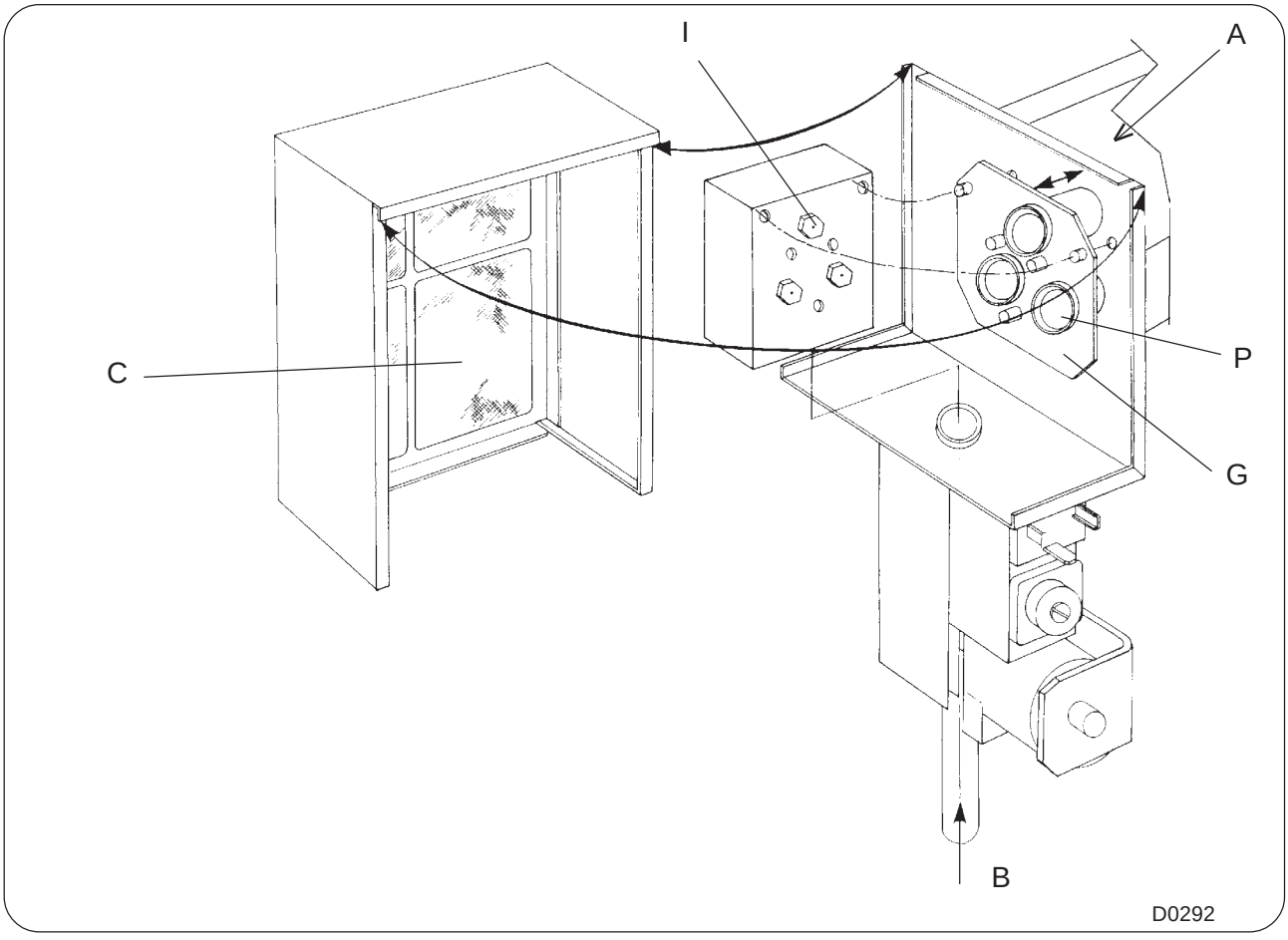
The installation of the gas supply should be carried out by trained staff.

To be provided by the customer a filter, a manual stop valve and a pressure reducing valve BUTANE 29 gr., PROPANE 37 or 50 gr. or NATURAL GAS according to the kind of gas used.

Check that the diameter of injectors (I) is adequate for the kind of gas of your installation (see table t0134). 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 back of the machine (B on the foundation plan) to diameter DN 20 (¾" BSP).

A Gas burner
B Gas admission
C Filter
I Injectors
P Venturis
G Venturis support plate



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 :

Check that the diameter of the injectors is adequate for the kind of gas of your installation (see table of injectors). The machine is delivered with extra injectors in a plastic envelope.

Testing pressures

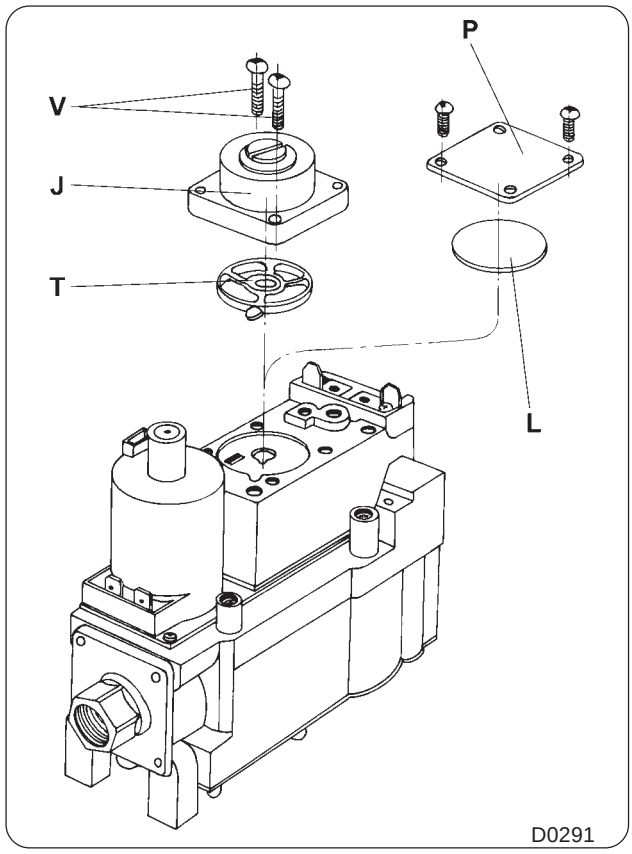
According to the EN 437 standard, the values of the testing pressures mentioned in our various documents are values for static pressures taken at the gas inlet connection of the machine; the heating of the machine being on.

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

- Adjust the gas outlet pressure (see correspondence in the tables).

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

- Change the 3 injectors with joints (see correspondence in the tables).
- Unscrew 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 necessary.
- Replace it by the cork (L) and the plate (P).
- Screw the two screws and block.
- Adjust the air flow (see correspondence in the tables).



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

- Change the 3 injectors with joints (see correspondence on the tables).
- Unscrew the fixing screws (V) and remove the plate (P) as well as the cork (L), keep these parts in case a change would be necessary.
- Set the cork (T) and the adjustment head (J).
- Screw the two screws (V) and block.
- Adjust the air flow (see correspondence in the tables).

IMPORTANT

Adjustments should be made by qualified personnel only.

Adjustment and checking of the outlet pressure

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

A Inlet

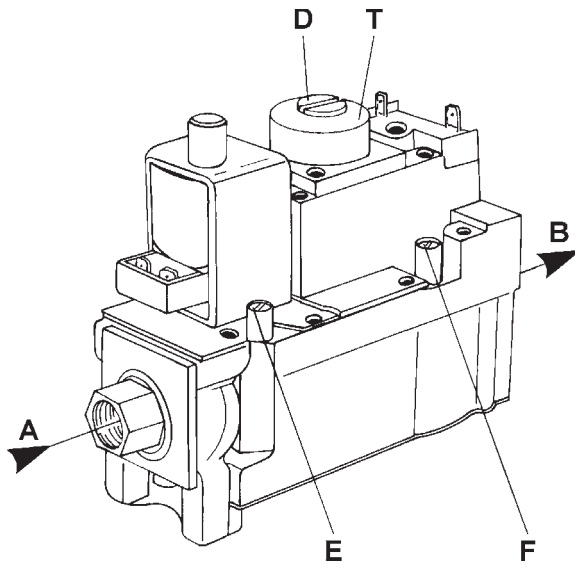
B Outlet

D Outlet pressure regulator adjustment screw plug

E Inlet pressure tapping

F Outlet pressure tapping

T Head regulation



D0290

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.

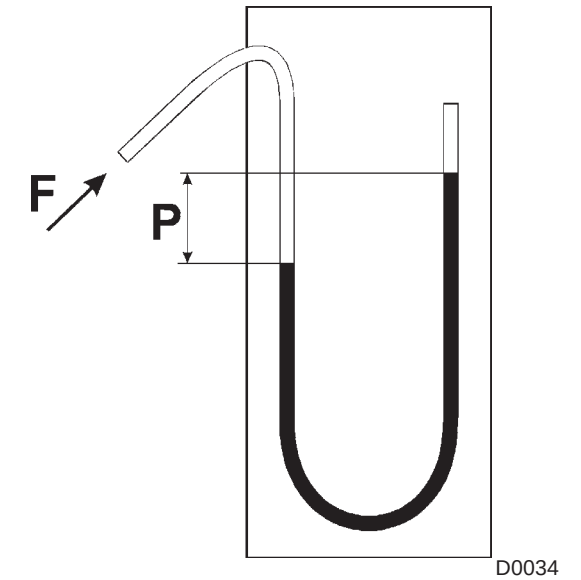
3/ Open and check the gas inlet main burner using the manometer on the pressure tapping (F).

4/ Remove 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).



D0034

TABLE OF CORRESPONDENCES - IC43316

Categorie index	Type of gas	Working supply pressure in mbar	Hi	Ø of injectors in mm	Pressure at injectors in mmH_2O	Heat emission Qn in kW (Hi)	Consumption Mn in kg/h	Consumption Vn in m³/h
*2E, 2H, 2ESI	G 20	20	34,02 MJ/m³	2.30	112	20	-	2,115
2L, 2ESI	G25	25	29,25 MJ/m³	2.30	142	20	-	2,459
3 +	G30	28-30	45,65 MJ/kg	1,4	-	20	1,58	-
	G31	37	46,34 MJ/kg	1,4	-	20	1,55	-
3 B / P	G30	50	45,65 MJ/kg	1,10	-	20	1,58	-
	G31	50	46,34 MJ/kg	1,10	-	20	1,55	-
3 B / P	G30	30	45,65 MJ/kg	1,4	-	20	1,58	-
	G31	30	46,34 MJ/kg	1,4	-	20	1,55	-
3 P	G31	50	46,34 MJ/kg	1,20	-	20	1,55	-

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

t0134

TABLE OF CORRESPONDENCES - IC43320

Categorie index	Type of gas	Working supply pressure in mbar	Hi	Ø of injectors in mm	Pressure at injectors in mmH_2O	Heat emission Qn in kW (Hi)	Consumption Mn in kg/h	Consumption Vn in m³/h
*2E, 2H, 2ESI	G 20	20	34,02 MJ/m³	2,70	97	25	-	2,64
2L, 2ESI	G25	25	29,25 MJ/m³	2,70	117	25	-	3,07
3 +	G30	28-30	45,65 MJ/kg	1,5	-	25	1,97	-
	G31	37	46,34 MJ/kg	1,5	-	25	1,94	-
3 B / P	G30	50	45,65 MJ/kg	1,30	-	25	1,97	-
	G31	50	46,34 MJ/kg	1,30	-	25	1,94	-
3 B / P	G30	30	45,65 MJ/kg	1,5	-	25	1,97	-
	G31	30	46,34 MJ/kg	1,5	-	25	1,94	-
3 P	G31	50	46,34 MJ/kg	1,40	-	25	1,94	-

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

t0134

Note : **G20 (H) = naturel gas, Lacq type (20 mbar)**
G25 (L) = naturel gas, Groningue type (20 or 25 mbar)
G30 = butane gas (28/30, 50 mbar)
G31 = propane gas (28/30, 37, 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.

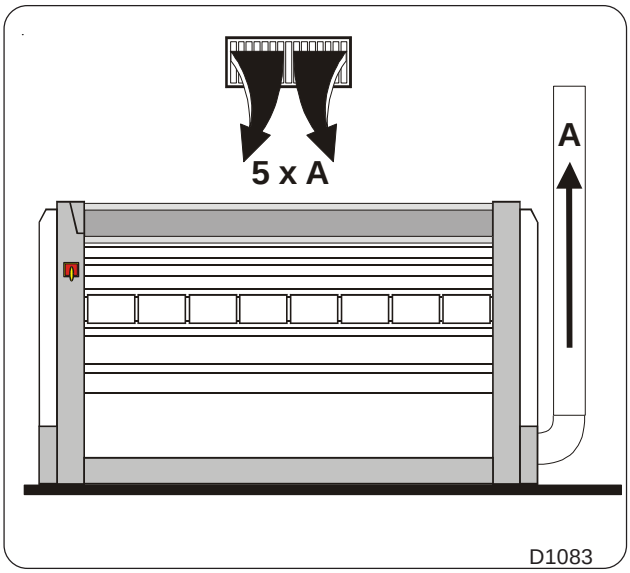
2/ Put the machine into service. Bubbles indicate a gas leak.

3/ Eliminate this leak.

Connection of the ironer evacuation system

Fresh air inlet

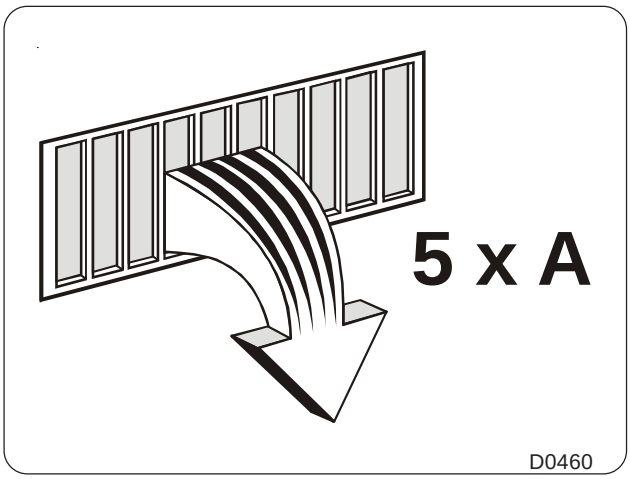
To allow the dryer ironer to work at its best, it is important that the laundry air inlet passes through an opening from the outside.
The fresh air arrival must be equivalent to the volume of evacuated air(please refer to the output of the fans at zero pressure in the technical characteristics).
Note: in the case of several machines, these values should be added together.
In order to prevent drafts in the room, the best solution is to place the air inlet behind the machine.



In the case of a machine with gas heating, it is essential that the rooms should be ventilated.

The free section of the air inlet must be 5 times greater than the section of the evacuation pipe.

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 smooth-walled evacuation duct should be connected to each dryer, providing the least possible resistance to air.

Check that the shaft flow is at least twice the capacity of the ironer exhaust fan.

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

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 200 Pa (0.029 psi) (value measured at ambient temperature).

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

CAUTION

The machine should be installed in conformity with the regulations and standards enforced and situated in a correctly ventilated room.

Connect the vapour exhaust nozzle with the flexible pipe (Ø 125 mm / 5") and the two collars to your flue.

The vapour exhaust must be separated from any other shaft, as direct as possible and installated according to diagram D0252 (see previous page).

Check that the shaft flow is at least twice that of the exhaust fan.

These conditions are absolutely essential for the correct working of the machine.

Fan maximum flow rate with no pressure :

- 426 m³/h (250 cfm) for a IC43316 machine.
- 515 m³/h (303 cfm) for a IC43320 machine.

Maximum pressure available with no flow : 54 mm H_2O (2.2 inH_2O).

Maximum admissible head loss on evacuation : 20 mm H_2O (0.8 inH_2O).

WARNING : the diameter of the vapour, gas or electrical exhaust pipe must be calculated for each installation in order to avoid pressure drop higher than 20 mm H_2O (0.8 inH_2O).

Average temperature of exhaust coming out of machine : 64 °C (150 °F) for electric heating.
Average temperature of exhaust and products of combustion coming out of machine : 95 °C (200 °F) for gas heating.

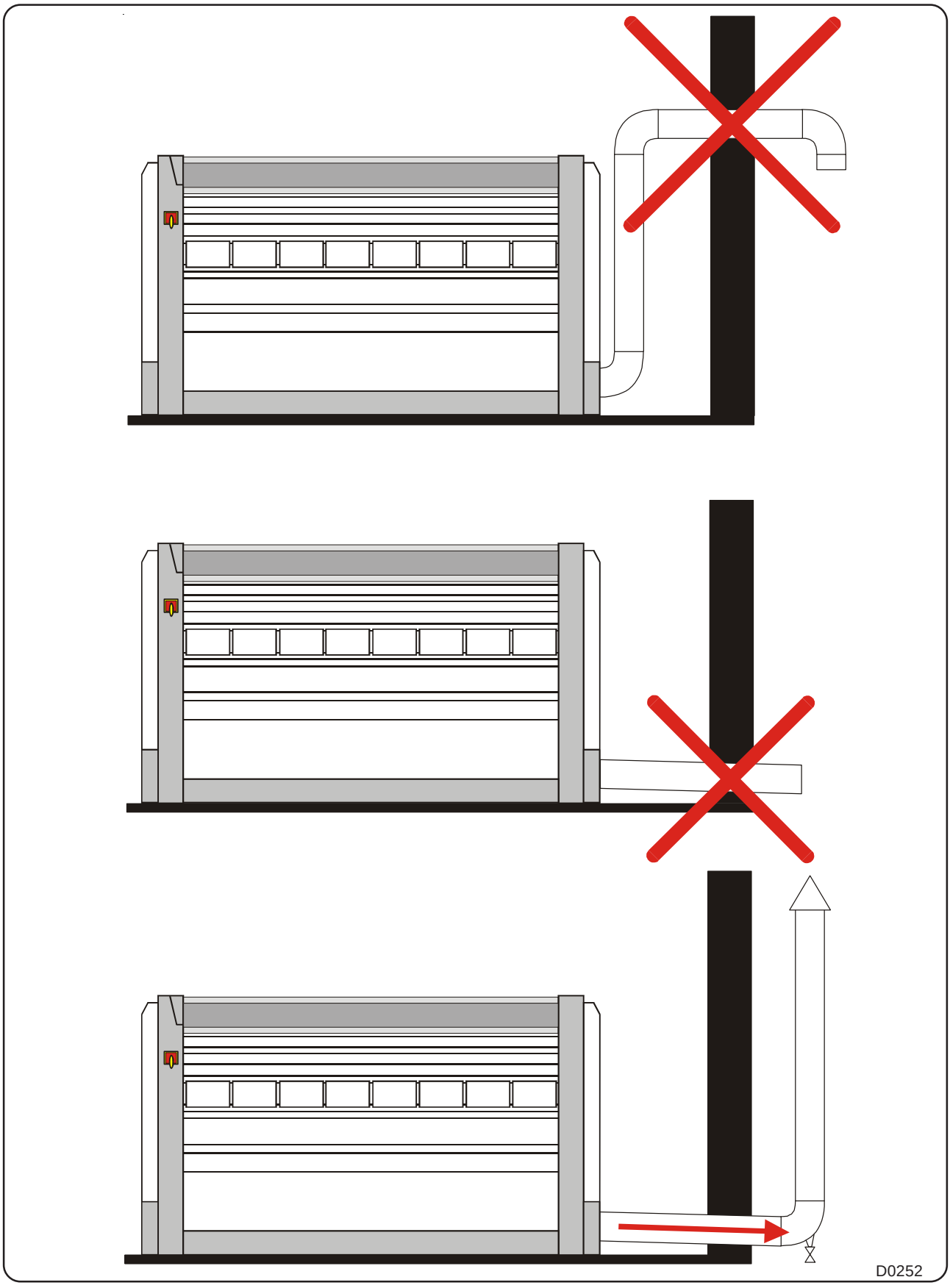
Provide an **upper ventilation of 7 dm² (108 sq. in)** and a **lower one of 14 dm² (217 sq. in)** in your laundry.

The fresh air supply area should be five times that of the vent pipe.

In case of gas heating, the fresh air rate requested for the combustion air supply should be not less than 2 m³/h (1.2 cfm) per kW,

- either 40 m³/h (24 cfm) minimum for a IC43316 machine.
- or 50 m³/h (30 cfm) minimum for a IC43320 machine.

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

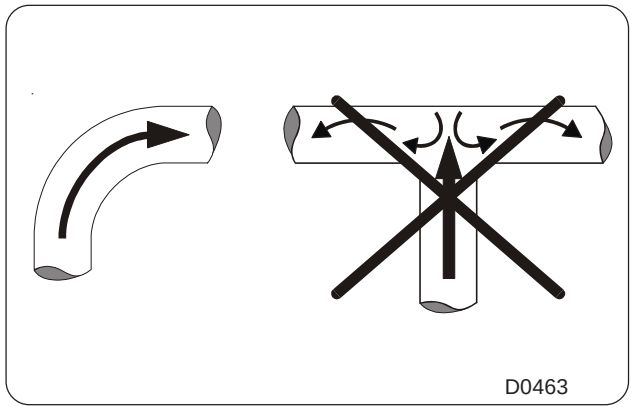


Evacuation system if several dryers are connected to a common evacuation duct **(except for the gas heating machines).**

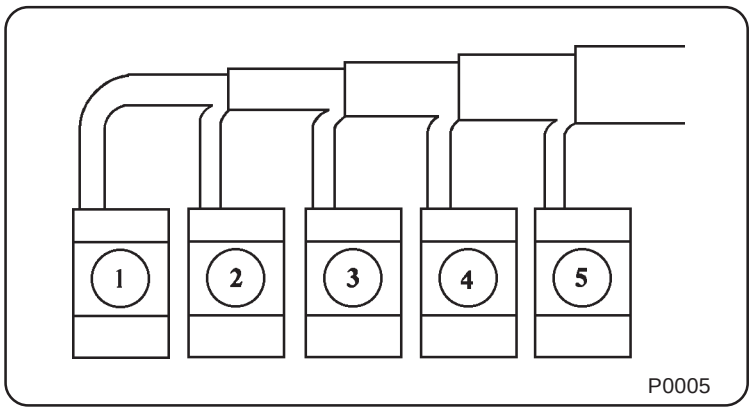
If several dryer ironers are installed with a common evacuation duct, the cross-section of the evacuation duct must increase as a function of the number of installed machines so that each of them operates at the same value of air resistance.

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.



Number of ironers	**D1**	**D2**	**D3**	**D4**
Outlet diameter of the exhaust pipe (mm)	125	160	225	315
	4.92"	6.30"	8.86"	12.40"
Outlet section of the exhaust pipe	1.25 dm²	2.5 dm²	4 dm²	8 dm²
	1346 f²	2691 f²	4306 f²	8612 f²



The indicated evacuation diameter is the dryer outlet diameter.

Please call us if you are in any doubt about the layout of your exhaust device if you are modifying an existing installation.

Operating inspection

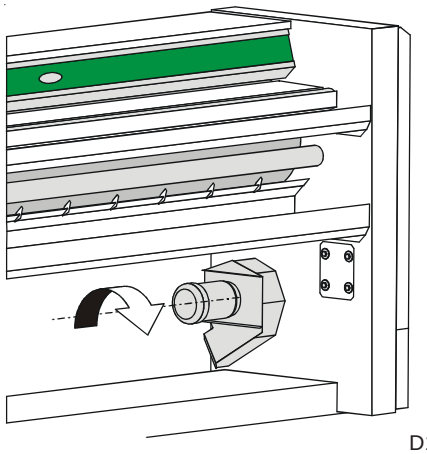
The operating inspection must be done by an approved technician.

WARNING

Always make sure that the fan is rotating in the right direction.

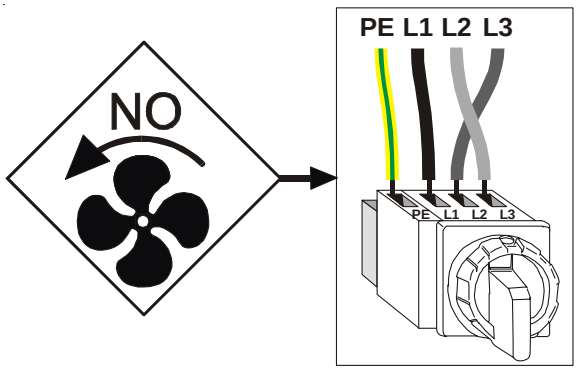
The fan must rotate in the direction shown on the arrow glued inside the right compartment (see illustration).

Check the direction of rotation of the fan and the arrow indicating the direction of rotation on the fan.



D1128

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.



D1129

Check again the direction of the rotation of the fan then replace the hose and its collar.

D0573

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.

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/cm²
1 bar = 750.06 mm Hg
1 bar = 10 197 mm H_2O
1 bar = 14.504 psi

british thermal unit : 1 Btu = 1 055,06 J
1 Btu = 0.252 1 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

horsepower :
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

kilogramme per square centimter :
1 kg/cm² = 98 066.5 Pa
1 kg/cm² = 0.980 665 bar
1 kg/cm² = 10 000 mm H_2O
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 = 35.314 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 H_2O
1 Pa = 0.010 197 g/cm²
1 Pa = 0.000 145 psi
1 MPa = 10 bar

psi : 1 psi = 0.068 947 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 = 3600 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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ELECTROLUX LAUNDRY SYSTEMS

Rue Pasteur, B.P. 6, 10430 Rosières-près-Troyes, France.
Téléphone +33 (0)3 25 82 91 33. Fax 33 (0)3 25 82 50 44.

SE- 341 80 Ljungby, Sweden. Telephone +46 (0)372 661 00. Telefax +46 (0)372 133 90.

DK- 5690 Tommerup, Denmark. Telephone +45 63 76 20 00. Telefax +45 63 76 22 00.

Internet: www.electrolux.com/laundrysystems