Checks to be made on delivery

WARNING! Dispose of the packaging in appropriate collection points.

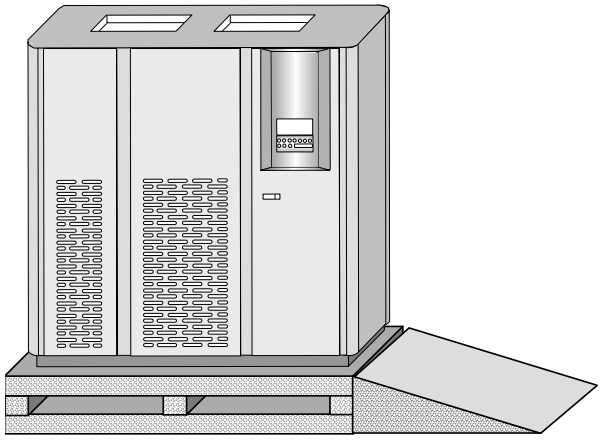
The Leonardo Evolution units are packaged in wooden crates or anchored to a pallet and covered in cardboard.
Check that the delivery is complete and inform the carrier of any damage to the unit which may be attributed too careless or inappropriate transportation. Check, in particular, any eventual damage to the panel in which the user terminal is mounted.
Lifting and moving the unit must be carried out by a mechanical lifter.
The following must be container within the packaging:

- The Leonardo Evolution unit;
- Leonardo Use and Installation Manual;
- Leonardo unit electrical diagrams;
- Leonardo unit cooling circuit diagrams;
- Leonardo unit installation diagrams;
- List of spare parts;
- CE declaration with a list of the European standards to which the machine must conform;
- guarantee conditions

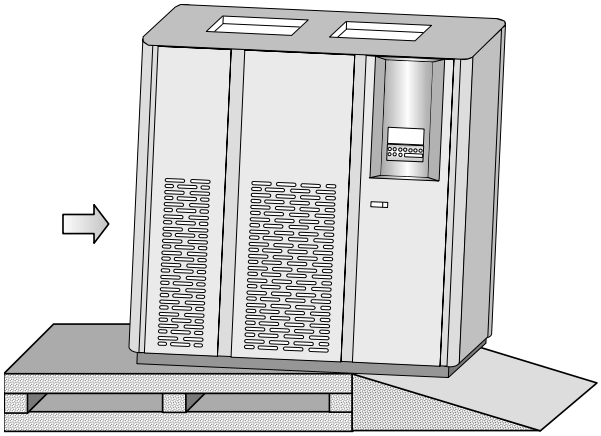
Unloading the unit

To unload the unit from the pallet, carry out the following procedure:

- move the pallet as near as possible to where the unit is to be installed;
- use a ramp to avoid any damage to the unit during unloading;



- remove the blocking screws which fix the unit to the pallet;
- carefully push the unit along the ramp until it reaches the floor.

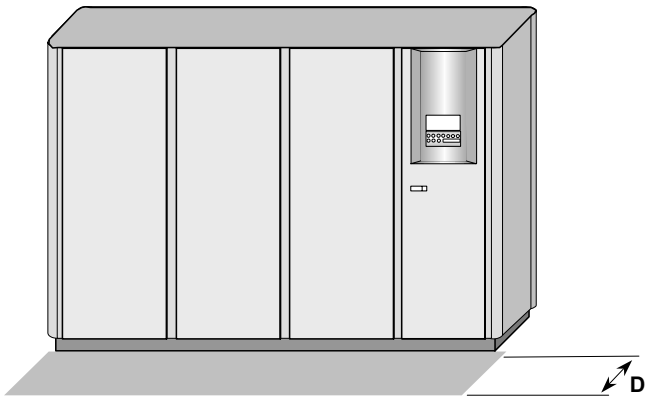


Characteristics of the installation area

WARNING! The unit must be installed internally and protected from adverse conditions.

The unit is predisposed to be installed on raised access flooring using mounting frames or appropriate floor stands supplied on request from Uniflair. However, the upflow units (upwards air flow) with air intake through the rear or front can be installed also on floors which are not raised.
The area of installation must have the following characteristics:

- to facilitate maintenance, leave a clearance (distance D) of at least 700mm free in front of the unit. Check that air intake and discharge connections are not blocked in any way, not even partially;



- a horizontal and even floor;
- the electrical energy distribution system has been produced in respect of CEI standards, suitable for the characteristics of the unit;
- a cold water distribution implant (if a humidifier is to be installed);
- implant for connection to the condensing unit;
- external air outlet (if a fresh air intake is to be installed);
- for the refrigerating gas drain see paragraph "Connection to gas drain";
- drainage system.

WARNING! The preparation of the installation area must be carried out as indicated in the installation drawing attached to the machine documentation.

Positioning of the unit

WARNING! If the surface where the unit is placed is not even and horizontal there, is a risk of an overflow from the condensation tray.

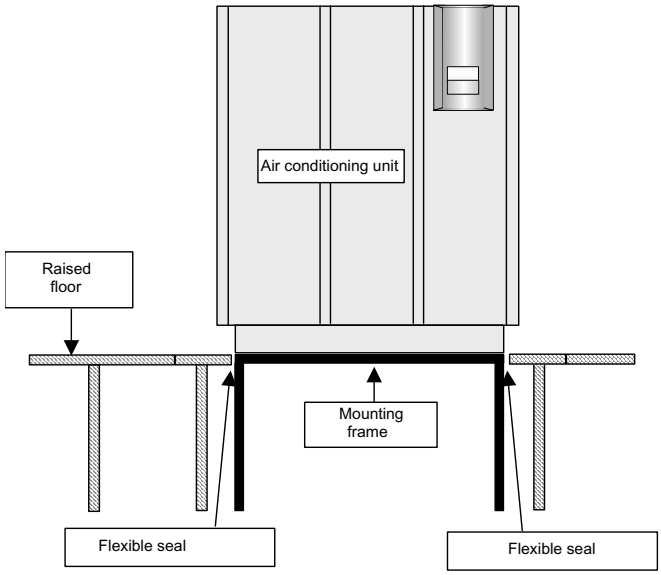
Installation on raised access flooring

Installation on raised access flooring occurs by means of a mounting frame. The frame enables the installation of the unit before the raised floor is installed, increased absorption of noise and vibrations and the facilitation of connecting pipes and cables.
The up flow models (upwards air flow) with rear or frontal air intake may be installed without using the mounting frame.

Installation of the mounting frame

To install the unit on raised flooring using the mounting frame, carry out the following procedures:

- a flexible seal at least 5 mm thick should be fitted between the raised floor panels and the mounting frame which should also be isolated from the metallic floor structure;
- position the unit of the mounting frame and fix it using the M8 screw inserts found on the base of the unit.



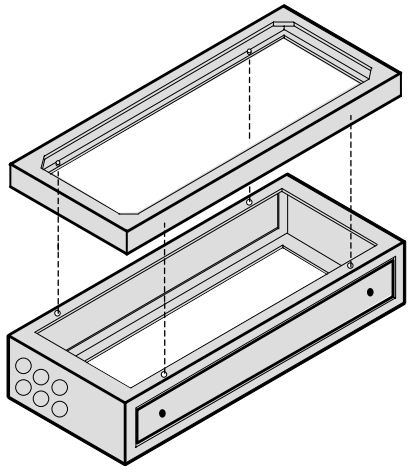
Installation on flooring which is not raised

Installation on flooring which is not raised can occur without using bases, but only on upflow models (upwards air flow) with rear or frontal air intake. Installation on this type of floor does not require any additional operation besides that of normal positioning.

Installation of the floor stand

To install the unit on the floor stand carry out the following procedures:

- position the unit on the floor stand;
- fix the unit to the floor stand using the M8 screw inserts found on the base of the unit.



Installation of discharge temperature limit probe (STM) - optional -

To install the discharge temperature limit probe, refer to the chapter entitled "Accessories**".**

Opening of the door and removal of the panels

Opening the door

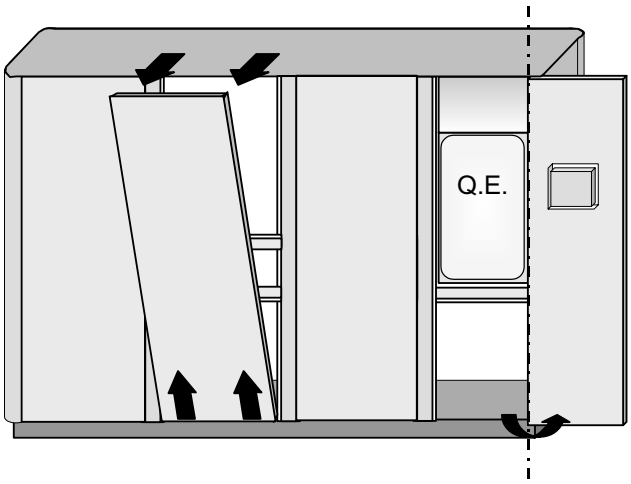
To open the door of the unit carry out the following procedures:

- push the button and pull the handle lightly outwards;
- turn the handle downwards until the door opens.

Removal of the front and side panels

To remove the front and side panels carry out the following procedure:

- firmly hold the panel;
- lift and incline the panel outwards until it is completely removed.

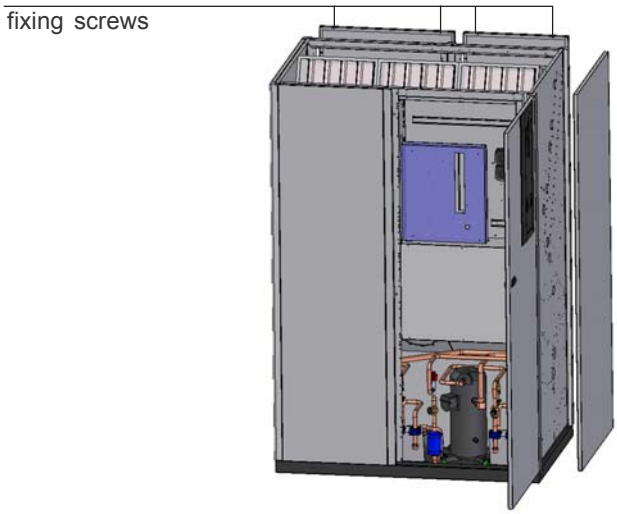


NOTE: After having removed the side panels, the non-removable protective panel, blocks accessibility to the inside of the machine.

Removal of the rear panels

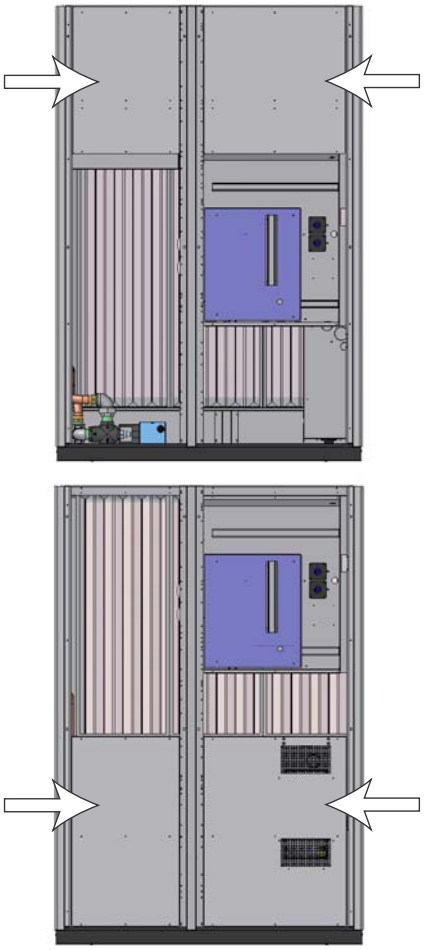
To remove the rear panels, carry out the following procedure:

- unscrew, using a star screwdriver, the screws which fix the panel at the top of the machine;
- firmly hold the panel;
- lift and incline the panel outwards until it is completely removed.



Internal protection panels

The technical compartment, the electric heaters and the autotransformer fans are protected by internal protection panels for safety reasons and to allow the opening of the external panels without triggering the unit's safety alarms. In the figures below the different types of internal protection panels are shown on various types of machines.



Before removing the internal protection panels, disconnect the power supply by turning the main isolating switch D5 to position "O", then wait until the fans stop and the electrical heaters cool down.

Electrical connections

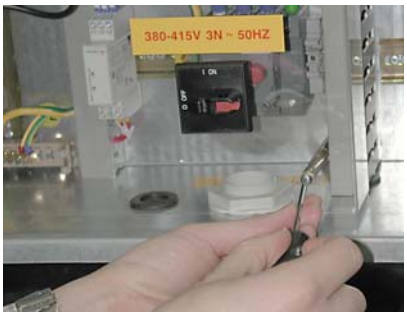
WARNING! Electrical connection to the machine to the power supply must ONLY be carried out by a qualified electrician.

WARNING! Electrical lines must be established in full respect of CEI standards.

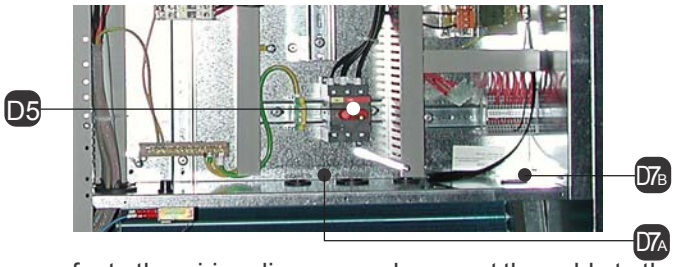
WARNING!mBefore establishing the electrical connection, make sure that the power supply is off. Also ensure that it is not possible to reconnect the power during the operation.

To carry out the electrical connections of the machine to the power supply, carry out the following procedures:

- use suitable equipment to check the efficiency of the grounding system;
- check that the voltage and network frequency correspond to those of the machine (see identification label);
- open the door of the electrical panel;
- remove the plastic screen of the electrical panel using a star screwdriver;

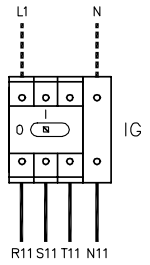


- pass the cables inside using the power supply cable inlet D7A which connects to the main switch D5;



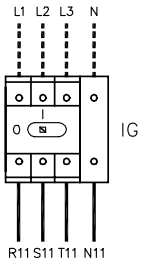
- refer to the wiring diagram and connect the cable to the main switch D5.

POWER SUPPLY CABLE
(at customers at care)

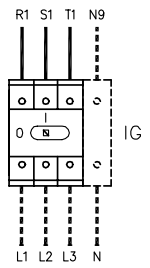


TD./TU.C (R)
0600B–0700B
Version C
230V/1Ph+N/50Hz

POWER SUPPLY CABLE
(at customers at care)



TD./TU.C (R)
0600A–0700A
Version D-T-H
400V/3Ph+N/50Hz



TD./TU.C (R; V)
1000A–1200A–1700A–2000A–2500A

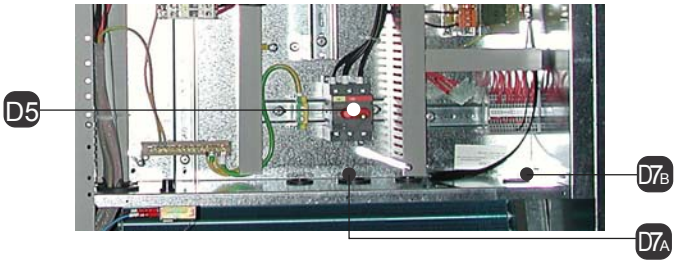
400V/3Ph+(N)/50Hz

POWER SUPPLY CABLE
(at customers at care)

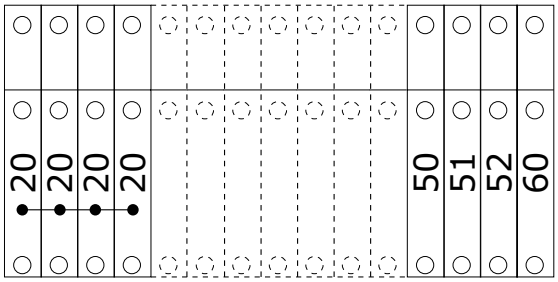
N: Neutralpole
Only with option:
- condensate drain pump
- Fresh air fan motor

To connect the auxiliary connections to the terminal board carry out the following procedures:

- pass the cables through the power supply cable inlet D7B;



- refer to the wiring diagram and carry out the connection to the terminal board.



DIGITAL CONFIGURABLE INPUTS

Terminal board 51-20
- User
- ON - OFF Remote
- Flooding sensor (SAS)
Terminal board 52-20
- User
- ON-OFF Remote
- Fire-smoke (SFF)
Terminal board 50-20
- User
- ON-OFF Remote
- Tools (ATA-BTA-AUA-BUA)
Terminal board 60-20
- Summer-Winter remote
- Water flow meter

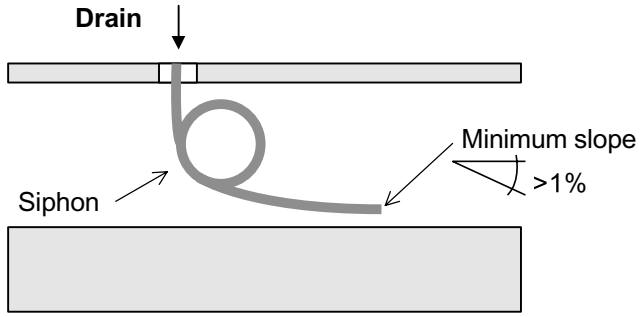
Connection to the water drain

Condensation water drains from the tray by means of a flexible siphoned tube, which is fitted in the unit. If the unit is fitted with a humidifier, the condensate drain tray and the humidifier drain connection must be connected to the drains of the building.

Direct connection to the drains of the building

Connect the drainage tube of the unit to the drains of the building using a rubber or plastic tube with an internal diameter of 25 mm.

The external drainage tube must be siphoned in order to avoid unpleasant odours. Maintain a minimum slope of 1% downstream of the siphon.



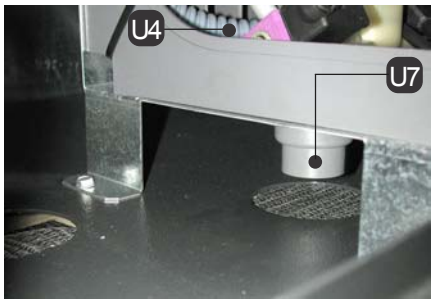
Once the connections have been made, pour water into the condensate collection tray until the siphons have been filled.

Connection of the humidifier (optional) to the drains of the building

WARNING! The water discharged from the humidifier is at a very high temperature. The drainage tube has to withstand high temperatures (at least 100°C) and must be kept away from electrical cables.

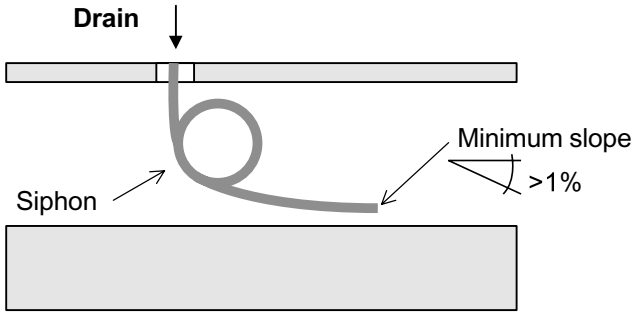
Connect the drainage tube of the unit to the collection tray (U4) of the humidifier.

Connect the drainage tube of the humidifier (U7) to the drains of the building using a rubber or plastic tube, which is resistant to high temperatures (minimum 100 °C) with an internal diameter of 22 mm.



The external drainage tube must be siphoned to avoid unpleasant odours and an overflow of the water from the tray of the humidifier.

Maintain a minimum slope of 1% downstream of the siphon.



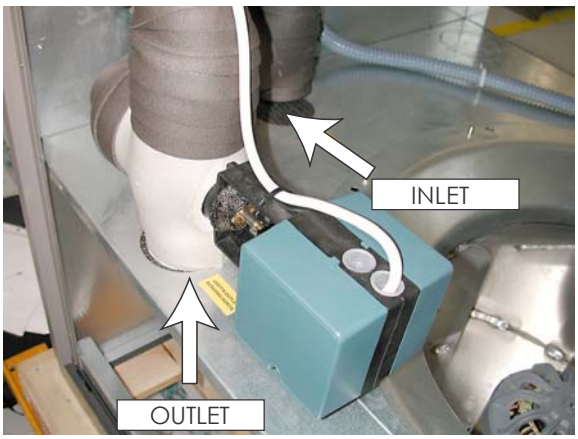
Once the connections have been made, pour water into the condensate collection tray of the Leonardo unit and in the condensate collection tray of the humidifier until both siphons are full.

Hydraulic connections

For all hydraulic connections (except for the condensate drain) it is recommended to use the following:

- flexible hoses to avoid the transmission of vibrations and to allow the unit to be moved;
- three piece joints near the connections;
- shut off valves to isolate the unit from the water circuit: if possible, use full sphere valves to minimise the pressure drop.

Check that the chilled water pipe sizes and the circulating pump characteristics are adequate: an insufficient water flow affects the performance of the unit.
Check that the water flow directions are respected.
Insulate all of the chilled water pipes with closed cell insulating material (e.g.: Armaflex or equivalent) to avoid condensation; the insulation must allow accessibility to the valves and three piece joints.
Check that the hydraulic circuits (both chilled and hot water) are fed with a maximum water pressure of 6 bar: to this purpose the installer must install a safety valve in the hydraulic with a set point of not more than 6 bar.
The minimum and maximum water temperatures inside the unit (for the chilled water circuit and the post- heating with hot water) are: 5°C ÷ 90°C.
The maximum amount of ethylene glycol is 50%.



Filling the hydraulic circuit

WARNING! The water used to fill the hydraulic circuit must be filtered.

WARNING! Filling the hydraulic circuit must only be carried out exclusively by a qualified hydraulic technician.

WARNING! Before carrying out any type of intervention, disconnect the power supply.

Filling the primary circuit

WARNING! The primary circuits must be equipped with mechanical filters.

WARNING! Check that all of the shut off valves are closed.

Open the drain valve of the primary circuit and regulate the pressure switch to 5 bar;
bleed the air from the circuits;
turn on the primary circulation pumps;
clean the circuits leaving the pumps on; check for any loss from the primary circuits.

Filling the hydraulic circuits of the conditioners

WARNING! Clean the primary circuits before filling the conditioners.

WARNING! Check that all of the bleeding valves on the conditioners are closed.

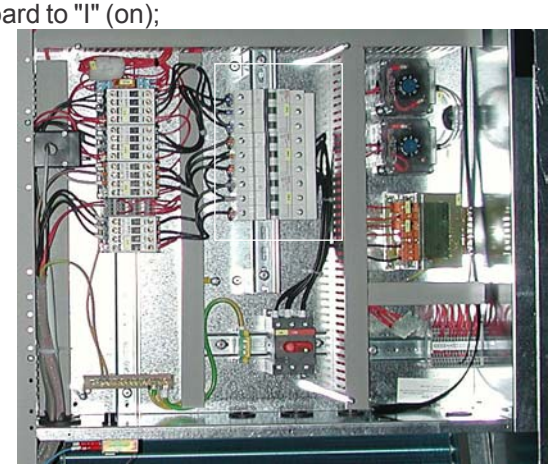
Open the shut off valves of the conditioner;
Open the bleeding valve (on the upper part of the cooling coil) and wait for the water to come out.

MANUAL START UP AND SHUT DOWN OF THE UNIT

WARNING! Check that the refrigerant circuit has been filled

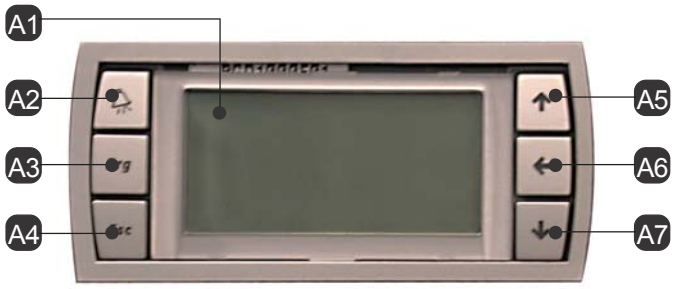
To start up the unit carry out the following procedure:

- open the door of the electrical panel and the front panels;
- position the automatic switch of the auxiliary circuit to "I" (on);
- position all of the automatic switches on the electrical board to "I" (on);



- fuel the unit by positioning the main switch to "I" (on);

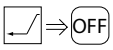
- check that the tracts of corrugated pipe with siphon, both internal and external to the conditioner, have been filled with water in the installation phase;
- close the door and the front panels;
- press the ENTER key (A6) of the user terminal; a sliding bar and a ventilator icon will appear on the display;



- if an alarm is indicated, consult the user interface manual UG40;
- check the rotation direction of the fans; the correct direction is indicated with an arrow which is on the fan itself. If the rotation is in the wrong direction, invert two of the three power supply phases following the instructions indicated in the paragraph entitled "Electrical connections" and then restart the start-up procedure

To turn the unit off, carry out the following procedure:

- on the first screen of the user terminal, press the A5 or A7 buttons until the SWITCH OFF UNIT screen appears;
- press the ENTER button to confirm;
- the following icons will appear



Press the ENTER button to confirm

SETTING AND ADJUSTMENT

Selecting the power supply of the fans

WARNING! Before establishing the electrical connection, make sure that the power supply is off. Also ensure that it is not possible to reconnect the power during the operation.

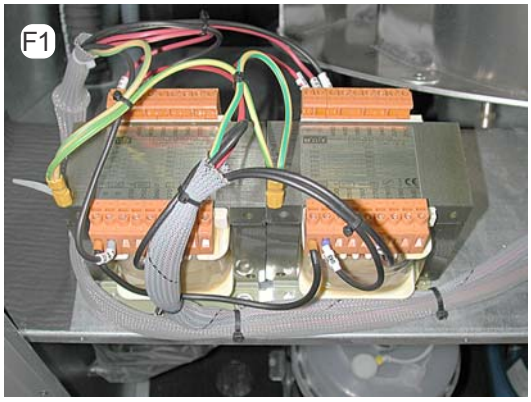
WARNING! In the case of a unit with ducts, the load loss from the exhaust duct must be less than 100 Pa.

In the following table the voltage levels for each model working in the standard version are given.

Models		V
TDCR - TUCR	0600	190
	0700	195
	1000 - 2000	310
	1200	340
	1700	260
	2500	320
TDCV - TUCV	1000 - 1200 - 1700 2000 - 2500	400

THREE PHASE MODELS

In the TD*R three phase models the rotation speed of the fans be varied by using the ATR transformer (F1).



To obtain the required prevalence of the implant, it is possible to vary the voltage by selecting one of the following levels:
230V - 250V - 260V - 270V - 280V - 290V - 300V - 310V - 320V - 340V - 360V - 380V - 400V.
In the following table the maximum pressure available (expressed in Pa) for each voltage level of the transformer is indicated. The values are given for the maximum air flow (expressed in m3/h)

TDCR1000						
FA[m³/h=]	5700	7000	8000	9000	10200	11440
V	Pa					
230	129	73	14	-	-	-
250	181	124	65	-	-	-
260	206	150	91	8	-	-
270	232	175	117	34	-	-
280	257	201	142	59	-	-
290	283	226	168	85	-	-
300	309	252	194	111	-	-
310	334	278	219	136	-	-
320	360	303	245	162	20	-
340	411	355	296	213	69	-
360	462	406	347	264	121	-
380	514	457	399	316	172	-
400	565	508	450	367	223	20

TDCR1200						
FA[m³/h=]	5700	7000	8000	9000	10200	11440
V	Pa					
230	123	64	3	-	-	-
250	174	115	54	-	-	-
260	200	141	80	-	-	-
270	225	166	105	20	-	-
280	251	192	131	46	-	-
290	277	218	157	71	-	-
300	302	243	182	97	-	-
310	328	269	208	123	-	-
320	354	294	234	148	-	-
340	405	346	285	199	20	-
360	456	397	336	251	71	-
380	507	448	387	302	122	20
400	559	499	439	353	189	56

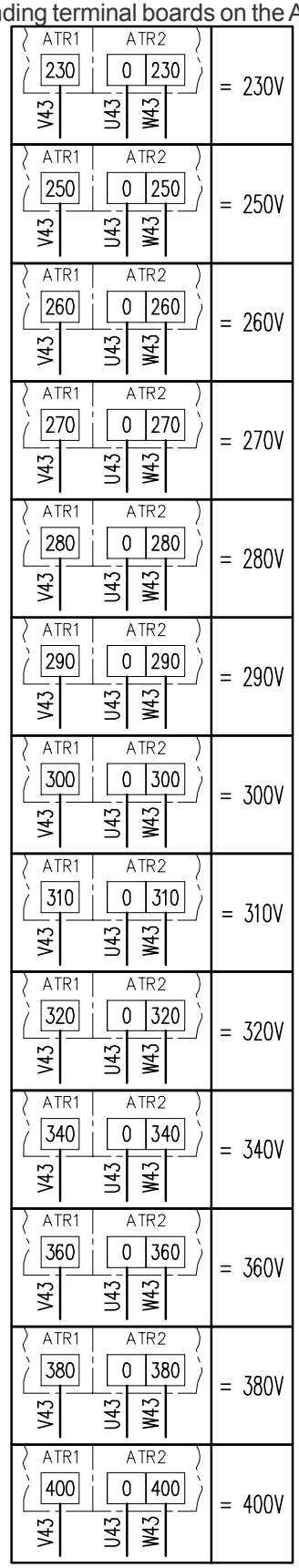
TDCR1700						
FA[m³/h=]	7800	9000	11000	14920	17000	19380
V	Pa					
230	125	70	-	-	-	-
250	184	129	68	-	-	-
260	213	159	90	-	-	-
270	243	188	119	-	-	-
280	272	217	149	-	-	-
290	301	247	178	20	-	-
300	321	276	208	60	-	-
310	360	306	237	93	-	-
320	390	335	267	152	-	-
340	449	394	326	211	50	-
360	507	453	384	270	109	-
380	566	512	443	300	168	-
400	611	569	503	352	230	20

TDCR2000						
FA[m³/h=]	10000	12000	15000	18680	19500	20810
V	Pa					
230	80	40	-	-	-	-
250	140	91	-	-	-	-
260	170	120	30	-	-	-
270	200	150	55	-	-	-
280	277	180	91	-	-	-
290	259	217	116	-	-	-
300	289	250	145	-	-	-
310	317	275	176	-	-	-
320	349	335	203	-	-	-
340	390	394	266	20	-	-
360	449	453	324	115	46	-
380	508	512	381	173	106	-
400	580	533	440	232	162	20

TDCR2500						
FA[m³/h=]	10000	12000	16000	18680	19500	20570
V	Pa					
230	58	20	-	-	-	-
250	117	59	-	-	-	-
260	147	89	-	-	-	-
270	176	118	-	-	-	-
280	205	147	20	-	-	-
290	235	177	60	-	-	-
300	264	206	94	-	-	-
310	294	236	124	-	-	-
320	323	265	153	-	-	-
340	382	324	212	20	-	-
360	441	383	271	88	20	-
380	500	442	330	157	80	-
400	579	523	379	205	137	20

After having selected the voltage level, carry out the connection in the following way:

- with the unit turned off, open the front panels and the door of the electrical panel and the internal protection panels;
- select the supply voltage by positioning the main switch to "0" (D5);
- following the screen below (ATR screen) connect the two electric wires which come from the fans or from the connector block, identified with V43 and W43 to the corresponding terminal boards on the ATR transformer.



MONOPHASE FAN MOTOR

To obtain the required prevalence in the MONOPHASE fan motors and EC fan motors, it is possible to vary the voltage by using the user terminal (A).

To select the voltage, carry out the following procedure:

- on the user terminal press the PRG button;
- using the UP or DOWN key select SERVICE MENU and confirm using the ENTER key;
- enter the password (see the envelope attached to the manual);
- using the UP or DOWN key select HARDWARE SETTING and confirm using the ENTER key;
- using the UP or DOWN key select EVAPORATING FAN and confirm using the ENTER key;
- set the amount and confirm using the ENTER key.

In the following table the maximum pressure available (expressed in Pa) for each voltage level of the transformer is indicated. The values are given for the maximum air flow (expressed in m3/h).

TDCR0600							
FA[m³/h=]		4310	4500	5000	5500	5990	6600
%	V	Pa					
40	142	68	56	20	-	-	-
50	168	139	124	77	23	-	-
55	180	179	162	111	52	-	-
60	195	237	217	160	94	25	-
70	215	333	309	240	164	84	-
80	222	373	347	274	193	108	-
90	227	401	374	298	214	126	5
100	230	424	396	317	231	140	20

TDCR0700							
FA[m³/h=]		4280	4500	5000	5500	6060	6500
%	V	Pa					
40	142	68	54	15	-	-	-
50	168	140	122	75	21	-	-
55	180	180	160	109	50	-	-
60	195	238	216	158	92	20	-
70	215	335	307	238	162	67	-
80	222	375	346	272	191	91	20
90	227	403	373	296	212	108	24
100	230	427	395	315	228	122	35

TDCV1000							
FA[m³/h=]		5700	7000	8000	10000	11000	11830
%	V	Pa					
50	400	47	-	-	-	-	-
55	400	105	-	-	-	-	-
60	400	167	47	-	-	-	-
65	400	233	122	4	-	-	-
70	400	304	201	90	-	-	-
75	400	380	283	178	-	-	-
80	400	459	368	269	-	-	-
85	400	543	457	362	75	-	-
90	400	631	549	457	180	-	-
95	400	724	643	555	285	94	-
100	400	821	741	654	391	204	20

TDCV1200							
FA[m³/h=]		5900	7000	8000	10000	11000	11740
%	V	Pa					
50	400	21	-	-	-	-	-
55	400	81	-	-	-	-	-
60	400	145	38	-	-	-	-
65	400	212	113	-	-	-	-
70	400	284	192	79	-	-	-
75	400	361	274	167	-	-	-
80	400	441	359	258	-	-	-
85	400	526	448	351	58	-	-
90	400	614	540	446	163	-	-
95	400	707	634	543	268	74	-
100	400	804	732	643	374	184	20

TDCV1700							
FA[m³/h=]		9790	11000	12000	14000	16000	20180
%	V	Pa					
50	400	20	-	-	-	-	-
55	400	69	-	-	-	-	-
60	400	125	55	-	-	-	-
65	400	186	120	63	-	-	-
70	400	252	189	135	4	-	-
75	400	323	264	212	86	-	-
80	400	400	343	293	171	20	-
85	400	481	426	378	260	110	-
90	400	568	514	467	352	205	-
95	400	660	606	560	446	302	-
100	400	757	703	657	555	402	21

TDCV2000							
FA[m³/h=]		11090	12000	14000	16000	18680	21600
%	V	Pa					
50	400	0	-	-	-	-	-
55	400	60	-	-	-	-	-
60	400	118	80	-	-	-	-
65	400	181	117	-	-	-	-
70	400	250	190	75	-	-	-
75	400	335	267	157	59	-	-
80	400	420	348	242	153	-	-
85	400	508	432	331	250	22	-
90	400	595	521	422	345	130	-
95	400	687	614	517	445	240	-
100	400	784	724	615	525	325	20

TDCV2500							
FA[m³/h=]		10540	12000	14000	16000	18680	21350
%	V	Pa					
50	400	20	-	-	-	-	-
55	400	80	0	-	-	-	-
60	400	140	70	-	-	-	-
65	400	202	137	14	-	-	-
70	400	269	205	95	-	-	-
75	400	341	280	175	41	-	-
80	400	419	337	258	136	-	-
85	400	501	422	347	234	-	-
90	400	587	511	448	324	90	-
95	400	679	604	543	424	200	-
100	400	763	712	621	504	280	20

Setting the regulation and safety devices

After starting up the conditioner, set the following set points (see Microprocessor Control Manual):

- Room temperature (cooling and heating set point);
- Relative room humidity (humidification and dehumidification set point);
- Dirty filter differential pressure switch: see paragraph "Setting the dirty filter sensor".

The settings of the safety devices must not be modified.

Code	Description	Opening	Differential	Re-set
TSR	Safety thermostat (T and H versions)	320 °C (opening)	-	Manual reset

Setting the air flow sensor

The FS differential pressure switch intervenes if the fan (or one of the fans) stops working.
The factory set point of the FS differential pressure switch is at 0.5 mbar (= 50Pa).
As the difference in pressure between the suction and discharge of the fans depends on the air flow, it may be necessary to set the instruments after installation, checking that the contact closes when the fans are in operation.
To set the FS pressure switch, carry out the following procedure:

- simulate a fan fault by stopping a fan; check that the pressure switch intervenes;
- if the pressure switch does not intervene, gradually increase the setting until the pressure switch switches off:
  - using an adjustment screw, set the differential pressure switch on a scale from 0.5 to 4.0 mbar (from 50 to 400 Pa).

Setting the dirty filter sensors

The PFS differential pressure switch is set according to the loss of load dependent on the dirt inside the filters and the air flow.
The PFS differential pressure switch must be set at 3 mbar (=300 Pa).
To set the PFS pressure switch, carry out the following procedure:

- gradually cover the surface of the air filter and check that the pressure switch intervenes when the filter is about 50-60 % covered;
- if the pressure switch does not intervene, gradually lower the setting, if it cuts in too soon, increase the setting:
  - using a star screw driver, turn the regulation screws of the pressure switch to the desired value.

MAINTENANCE

Weekly checks

Carry out the following checks weekly:

- check that the room conditions on the control panel display are normal;
- check that the noise level emitted by the compressor and by the fans is normal;
- check that the air filters are not clogged, clean or change the filters when the relative alarm comes on (see paragraph "Cleaning and replacing the filters");
- check the supply voltage.

Monthly checks

Carry out the following checks monthly:

- check that the cylinder and the feed and drain valves of the humidifier are not clogged (if present); replace the cylinder when the relative alarm comes on (see Microprocessor Control Manual);
- check that the flow of the condensate to the main drain is free.

Annual checks

Carry out the following checks annually:

- check that the electrical terminals are tightened and in good condition;
- check that the ethylene glycol level is correct.

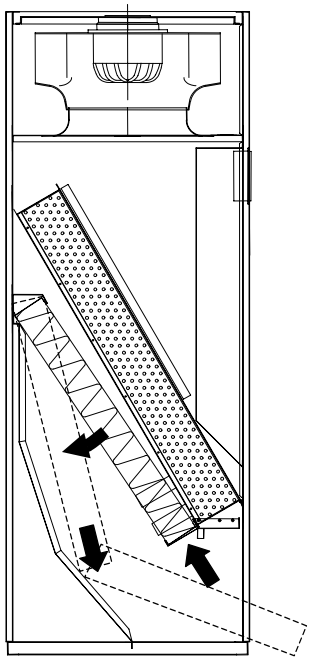
Cleaning and replacing the filters

To clean and replace the filters carry out the following procedure:

- open the front panels of the machine;

MODELS WITH REAR AIR INTAKE

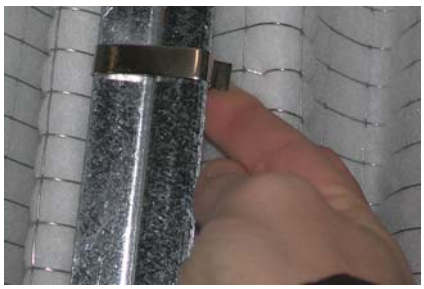
- follow the instructions below and check the direction of the air flow indicated with a sticker on each filter;



- clean them using a blast of compressed air or replace them;
- reposition the filters in the unit checking the direction of the air flow which was previously noted.

OTHER MODELS

- remove the filter blocking supports;



- remove the filters checking the direction of the air flow indicated with a sticker on each filter;

- clean them using a blast of compressed air or replace them;
- reposition the filters in the unit checking the direction of theair flow which was previously noted;
- reposition the filter blocking supports.

Servomotor and chilled water valve

If necessary (in the event of a fault in the servomotor or the control system) manually move the valve as described below:

- pull the manual control knob (G2);
- turn the knob clockwise to lower the valve stem (G3) (OPEN) and anti-clockwise to raise the valve stem (G3) (CLOSE).

In the 600 and 700 models the following servomotor is installed:

To manually move the valve, use the hexagonal key and screw to open and unscrew to close.

Alternatively, it is possible to remove the servomotor from the body of the valve and move the valve stem itself.

Servomotor and hot water valve

To manually move the valve by turning the control knob clockwise to open and anti-clockwise to close.

Alternatively, it is possible to remove the servomotor from the body of the valve and move the valve stem itself.

Troubleshooting

Troubleshooting is made easier by the indications on the control panel display: when an alarm signal is displayed, consult the control panel instruction manual. If necessary, call the nearest Service Centre describing the nature of the fault and its possible cause displayed on the control.

PROBLEM	POSSIBLE CAUSE	CHECK/CORRECTIVE ACTION
THE UNIT DOES NOT START	A) No power supply to the unit's electrical panel.	Check that the power is on and the unit main switch on the electrical panel is closed.
	B) No power to the auxiliary circuits.	1) Check that the IM automatic circuit breaker on the AUX circuit is set.
		2) Check the fuse on the main board.
	C) The control panel does not start the unit.	Check that the control panel connectors are correctly located in their sockets.

TEMPERATURE CONTROL

PROBLEM	POSSIBLE CAUSE	CHECK/CORRECTIVE ACTION
THE ROOM TEMPERATURE IS TOO HIGH	A) The parameter settings on the control panel are not correct.	See control panel instruction manual
	B) The air flow is low or absent.	See "LACK OF / ABSENT AIR FLOW".
	C) The temperature sensor is not working.	Check the electrical connections and the control configuration.
	D) The thermal load is higher than expected.	Check the room's thermal load.
	E) The three-way valve is not working.	Check the electrical connections of the servomotor valve.
		Open the valve by means of the manual control knob.
	E) Valvola a tre vie non funzionante.	Check the chilled water supply; check that the shut-off valves are open.
	F) There is an insufficient chilled water flow.	Check the chilled water funtion.
	G) The chilled water temperature is too high.	See "THE COMPRESSOR(S) DOESN'T / DON'T WORK".
ROOM TEMPERATURE TOO LOW	A) The parameter settings on the control are not correct	See the microprocessor control manual.
	B) There is insufficient power supply to the elcttric heaters or the heaters are not working	1) Check that the IM of the heating element is armed.
		2) Check the electric feeding circuit of the heaters.
		3) If there is a heater alarm, remove the cause and re-set the safety thermostat.
	C) The hot water coil is not working.	1) Check the hot water capacity and temperature.
		2) Check the function of the regulation valve (see valve and servomotor).
	D) The hot gas coil is not working during dehumidification with re-heat.	1) Check the hot gas 3 way valve function.
		2) Check the function of the compressor serving the re-heat. See "THE COMPRESSOR(S) DOESN'T / DON'T WORK".
	E) The three way valve of the chilled water circuit is blocked open.	Close the valve using the manual control knob and replace the servomotor.

HUMIDITY CONTROL

PROBLEM	POSSIBLE CAUSE	CHECK/CORRECTIVE ACTION
ROOM HUMIDITY TOO HIGH	A) The parameter settings on the control panel are not correct.	See control panel instruction manual.
	B) The latent load is higher then expected.	Check the latent load, fresh air conditions and volume; external air infiltration.
	C) The compressor does not function during dehumidification.	See "THE COMPRESSOR(S) DOESN'T / DON'T WORK".
	D) The chilled water is not sufficiently cold for the dehumidification function (in energy saving and twin cool units).	Lower the chilled water temperature until condensate is present on the surface of the coil.
ROOM HUMIDITY TOO LOW	A) The parameter settings on the control panel are not correct.	Check the room humidity settings (see control panel instruction manual).
	B) The latent load is lower than expected.	Check the quantity of latent heat.
	C) The humidifier doesn't work.	1) Check the water supply pressure.
		2) Check the function of the manual control system and of the steam production group (see panel instruction manual).
	D) The control system does not work.	See the control panel instruction manual; check that the control panel and/or sensors work properly.

FANS

PROBLEM	POSSIBLE CAUSE	CHECK/CORRECTIVE ACTION
ABSENT OR LOW AIR FLOW	A) There is no power to the fans.	Check the power supply to the fans
	B) The air filters are clogged (dirty filter alarm enabled).	1) Shake the dust out of the cartridge and clean with a vacuum cleaner. Replace the filter if it is completely blocked.
		2) Check the correct setting of the dirty filter pressure switch PFS.
	C) The air flow is obstructed.	Check that the air flow is not obstructed, not even partially.
	D) The fans' thermal protection intervenes.	Check the resistance of the fan motor windings. Re-set then measure the voltage and absorption.
	E) (In TD*R, TU*R units with backward curved blade fans). The power supply to the fans is insufficient.	Change the power supply voltage to the fans. (See paragraph. 'Setting and adjustment).
	F) The air distribution output pressure is too high.	Check the air pressure distribution (ducts, ceiling or floor plenum, grilles).

ELECTRIC HEATERS

PROBLEM	POSSIBLE CAUSE	CHECK/CORRECTIVE ACTION
ELECTRIC HEATER SAFETY THERMOSTAT INTERVENES	A) There is insufficient air flow.	See "LACK OF / ABSENT AIR FLOW".
	B) The thermostat connection wire is interrupted	Check the connection between the safety thermostat and the control system.
	C) The thermostat is faulty.	Replace the thermostat.

LEONARDO EVOLUTION ENERGY SAVING

Technical characteristics

ENERGY SAVING UNIT WITH BACKWARD CURVED BLADE FANS

Model TDER - TUER		511A	611A	721A	722A	921A	922A	1021A	1022A
Height	mm	1960	1960	1960	1960	1960	1960	1960	1960
Width	mm	1010	1010	1310	1310	1310	1310	1310	1310
Depth	mm	750	750	865	865	865	865	865	865
Weight	kg	280	310	430	447	430	447	430	447
Air flow	m^3/h	5550	5550	7970	7970	7970	7970	7970	7970
External static pressure	Pa	20	20	20	20	20	20	20	20
Total cooling capacity (*)	kW	19,5	22,9	25,7	26,5	30,0	30,8	34,1	35,4
Sensible cooling capacity (*)	kW	19,5	21,4	25,7	26,5	28,9	29,2	30,9	31,5
Number of refrigerating circuits		1	1	1	2	1	2	1	2
Number of compressors		1	1	2	2	2	2	2	2
Electric supply voltage	V	400V/3ph+N/50Hz							

Model TDER - TUER		1121A	1122A	1321A	1322A	1422A	1622A	1822A
Height	mm	1960	1960	1960	1960	1960	1960	1960
Width	mm	1720	1720	1720	1720	2171	2171	2171
Depth	mm	865	865	865	865	865	865	865
Weight	kg	548	559	575	585	698	714	714
Air flow	m^3/h	11390	11390	11390	11390	15320	15320	15320
External static pressure	Pa	20	20	20	20	20	20	20
Total cooling capacity (*)	kW	37,7	38,6	41,4	42,1	49,9	58,6	65,1
Sensible cooling capacity (*)	kW	37,7	38,6	41,4	42,1	49,8	56,8	59,6
Number of refrigerating circuits		1	2	1	2	2	2	2
Number of compressors		2	2	2	2	2	2	2
Electric supply voltage	V	400V/3ph+N/50Hz						

(*) Based on 24°C@50% air temperature, ESP=20Pa, Condenser water temperature=30/35°C

ENERGY SAVING UNIT WITH EC BACKWARD CURVED BLADE FANS

Model TDEV - TUEV		721	722	921	922	1021	1022	1121
Height	mm	1960	1960	1960	1960	1960	1960	1960
Width	mm	1310	1310	1310	1310	1310	1310	1720
Depth	mm	865	865	865	865	865	865	865
Weight	kg	430	447	430	447	430	447	548
Air flow	m^3/h	7940	7940	7940	7940	7940	7940	11650
External static pressure	Pa	20	20	20	20	20	20	20
Total cooling capacity (*)	kW	25,7	26,6	30,2	31,2	34,4	35,4	37,7
Sensible cooling capacity (*)	kW	25,7	26,6	29,2	29,9	31,8	31,6	37,7
Number of refrigerating circuits		1	2	1	2	1	2	1
Number of compressors		2	2	2	2	2	2	2
Electric supply voltage	V	400V/3ph+N/50Hz						

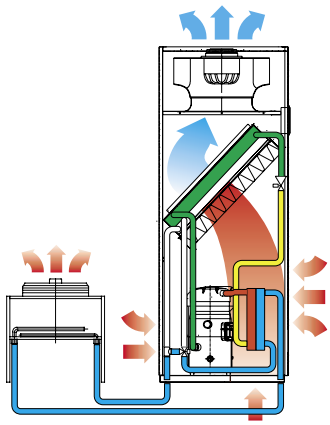
Model TDEV - TUEV		1122	1321	1322	1422	1622	1822
Height	mm	1960	1960	1960	1960	1960	1960
Width	mm	1720	1720	1720	2171	2171	2171
Depth	mm	865	865	865	865	865	865
Weight	kg	559	575	585	698	714	714
Air flow	m^3/h	11650	11650	11650	15420	15420	15420
External static pressure	Pa	20	20	20	20	20	20
Total cooling capacity (*)	kW	38,6	40,5	41,4	49,1	58,0	64,3
Sensible cooling capacity (*)	kW	38,6	40,2	40,6	49,1	55,0	57,6
Number of refrigerating circuits		2	1	2	2	2	2
Number of compressors		2	2	2	2	2	2
Electric supply voltage	V	400V/3ph+N/50Hz					

(*) Based on 24°C@50% air temperature, ESP=20Pa, Condenser water temperature=30/35°C

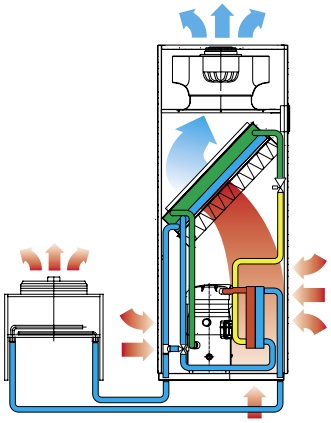
Operating description

ENERGY SAVING

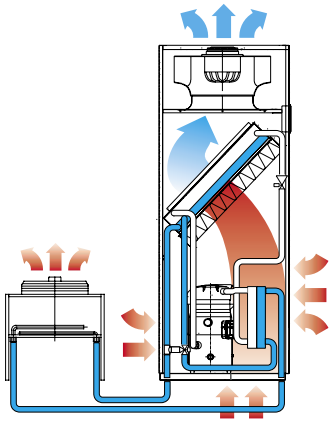
LEONARDO Energy -Saving units represent the ultimate energy saving efficient solution.
The operating principle exploits the "free cooling" effect available when the outside air temperature is lower than that in the conditioned space. The lower the outside temperature, the greater the energy saving is. The sophisticated microprocessor control manages the operation of the unit automatically in three different situations.
In summer, the unit operates as a normal closed circuit glycol cooled system (see the "Direct Expansion Operation" diagram). As the external temperature falls, the chilled water can be used directly for the free-cooling of the air. In this case the cold water is circulated in the coil inside the unit (see the "Mixed cooling operation" diagram); both the glycol circuit and the chilled water circuit contribute to the cooling, therefore reducing the energy used by the compressor. If the outside temperature falls further to a level where the coolant can dissipate the entire heat load from the room then the refrigerant circuit is shut down completely and the unit functions as a traditional chilled water unit with a regulating valve (see the "Free-cooling operation" diagram).
With this technology, LEONARDO Energy-Saving units provide significant reductions in operating costs and notably reduce the depreciation time of the units.



Direct expansion operation



Mixed cooling operation



Free cooling operation

Name and description of the principle parts

A User terminal
B Electric panel door
C Cover panels
D Electrical panel
E Filters
F Fans
G Cooling circuit

Description of the components

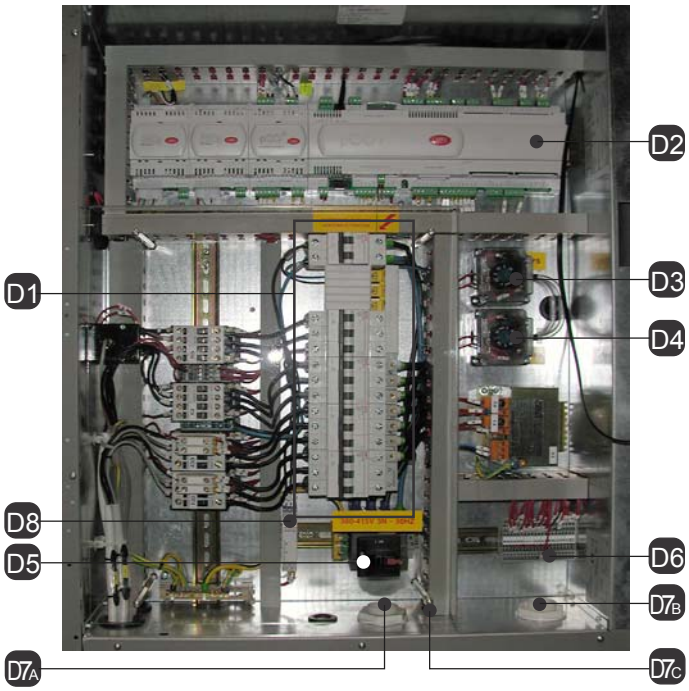
A - User terminal

Allows the unit to be turned on or off and the configuration and visualization of the condition of the machine.

- A1 Display LCD
- A2 ALARM key: visualization and re-set of alarms; when the alarm is activated it flashes red.
- A3 PRG key: access to the configuration menu
- A4 ESC key: exit from the screens
- A5 UP key: scroll through the menu
- A6 ENTER key: confirm
- A7 DOWN key: scroll through the menu

B - Electrical panel door

Allows access to the electrical panel of the machine.



C - Cover panels
Allow access to the internal components of the machine

D - Electrical panel
- D1 Magnetothermic
  - auxiliary
  - heater (optional)
  - humidifier (optional)
  - fans
  - compressors
- D2 Interface board
- D3 Dirty filter sensor
- D4 Air flow sensor
- D5 Main switch
- D6 Terminal board
- D7A Input/output electrical supply cables
- D7B Input/output electrical auxiliary cables
- D7C Input/output signal cables (RS485 and/or LAN)
- D8 Phase sequence relay

E - Filters
Filter the air released into the room,

F - Fans
Allow the diffusion of air into the room.
- F1 ATR transformer: allows the setting of the fan rotation speed

G - Cooling circuit

- G1 Compressor
- G2 High pressure switch
- G3 Schrader valve
- G4 Safety valve
- G5 Liquid receiver
- G6 Dehydrating filter
- G7 Flow sight glass
- G8 Electronic thermostatic valve
- G9 Brazed plate exchanger
- G10 Evaporating coil

H - Chilled water valve
- H1 Servomotor
- H2 Manual control knob
- H3 Valve stem

Installation and maintenance of the Energy Saving units should be carried out as described in the DIRECT EXPANSION section. For the water circuit, follow the instructions in the CHILLED WATER section.

For the paragraph "Selecting the supply voltage of the fans", refer to the table below.

STANDARD VOLTAGE LEVELS

Models	V
0511	203
0611	200
0721 - 0722 - 0921 0922 - 1021 - 1022	280
1121 - 1122 - 1321 - 1322	270
1422 - 1622 - 1822	280

MODELS WITH AUTOTRANSFORMERS

In the following table the maximum available pressures are indicated (expressed in Pa) for each voltage level of the transformer. The values are given for the maximum air flow (expressed in m3/h).

T*ER T*TR T*DR	**0721 0722 0921 0922 1021 1022**	**1121 1122 1321 1322**	**1422 1622 1822**
FA[m³/h=]	7970	11390	15320
V	**Pa**	**Pa**	**Pa**
230	0	0	0
250	0	0	0
260	0	0	0
270	0	24	0
280	3	53	5
290	29	82	34
300	55	112	63
310	80	141	93
320	106	171	122
340	157	230	181
360	208	288	240
380	260	347	299
400	311	406	358

MODELS WITH PHASE CONTROL VOLTAGE REGULATOR

In the following tables the maximum available pressures are indicated (expressed in Pa) for each supply voltage selected. The values are given for the maximum air flow (expressed in m3/h).

T*ER T*TR T*DR	0511	0611
FA[m³/h=]	5550	5550
%	Pa	Pa
40	0	0
50	0	0
55	0	0
60	0	0
70	58	58
80	86	86
90	106	106
100	123	123

T*EV T*TV T*DV	0721 0722 0921 0922 1021 1022	1121 1122 1321 1322	1422 1622 1822
FA[m³/h=]	7940	11650	15420
%	Pa	Pa	Pa
50	0	0	0
55	0	0	0
60	0	0	0
65	0	8	0
70	0	80	0
75	45	156	27
80	136	236	117
85	229	320	208
90	324	409	302
95	421	501	399
100	520	598	498

LEONARDO EVOLUTION TWIN-COOL

Technical characteristics

TWIN COOL UNIT WITH BACKWARD CURVED BALDE FANS

Model TDTR - TUTR - TDDR - TUDR		611	921	1321	1622	1822
Height	mm	1960	1960	1960	1960	1960
Width	mm	1010	1310	1720	2171	2171
Depth	mm	750	865	865	865	865
Weight	kg	310	430	575	714	714
Air flow	m^3/h	5550	7970	11390	15320	15320
External static pressure	Pa	20	20	20	20	20
Total cooling capacity (*)	kW	22,8	31,4	42,1	58,6	65,6
Sensible cooling capacity (*)	kW	21,3	29,6	42,1	56,8	59,7
Number of refrigerating circuits		1	1	1	2	2
Number of compressors		1	2	2	2	2
Electric supply voltage	V	400V/3ph+N/50Hz				

(*) Based on 24°C@50% air temperature, ESP=20Pa, condensation temperature = 48°C dew point with R407C

TWIN COOL UNIT WITH EC BACKWARD CURVED BLADE FANS

Model TDTV - TUTV - TDDV - TUDV		921	1321	1622	1822
Height	mm	1960	1960	1960	1960
Width	mm	1310	1720	2171	2171
Depth	mm	865	865	865	865
Weight	kg	430	575	714	714
Air flow	m^3/h	7940	11650	15420	15420
External static pressure	Pa	20	20	20	20
Total cooling capacity (*)	kW	31,4	44,0	58,6	65,1
Sensible cooling capacity (*)	kW	29,5	43,8	57,0	59,6
Number of refrigerating circuits		1	1	2	2
Number of compressors		2	2	2	2
Electric supply voltage	V	400V/3ph+N/50Hz			

(*) Based on 24°C@50% air temperature, ESP=20Pa, condensation temperature = 48°C dew point with R407C

TWIN-COOL

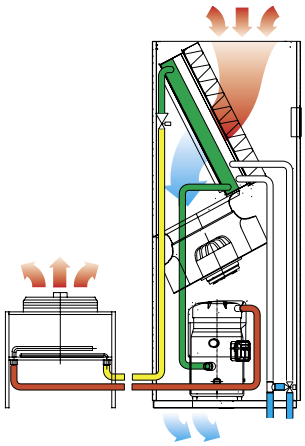
The LEONARDO Twin-Cool units are characterised by two completely different independent cooling circuits:

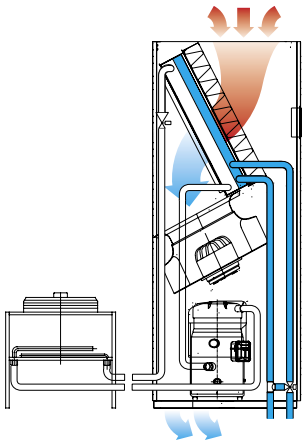
- A chilled water circuit.
- An air cooled or water cooled direct expansion circuit.

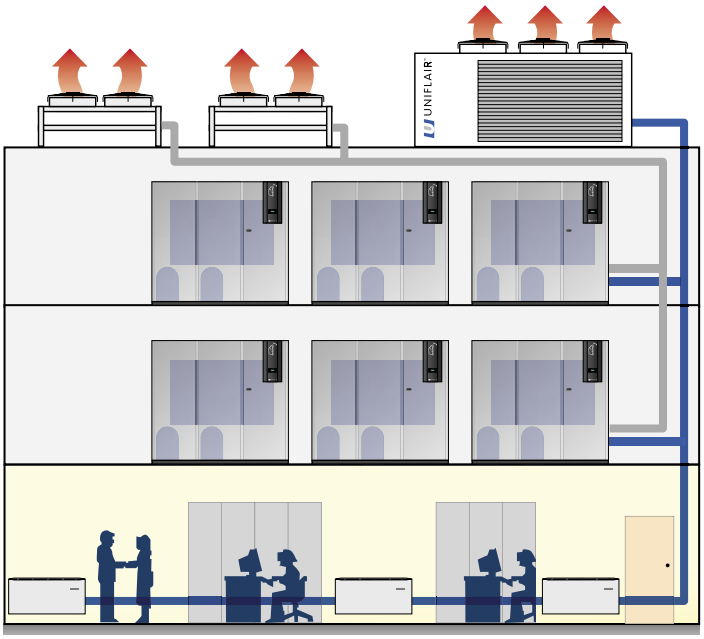
The unit is normally used where an installation has a chilled water source but the direct expansion circuit can be used according to demand.

The control system automatically starts the direct expansion circuit if the chilled water supply fails of if the water is not cold enough to dissipate the entire heat load. Alternatively, the unit control can be set to direct expansion, activating chilled water operation only in the event of a compressor malfunction, if the water temperature in relation to the room temperature allows it.

Twin-Cool units therefore provide a very high level of security, ensuring continuous system operation at all times and with the flexibility to manage the cooling resources in the best way for the particular installation.







Name and description of the principle components

A User terminal
B Electrical panel door
C Cover panels
D Electrical panel
E Filters
F Fans
G Cooling circuit

Description of the components

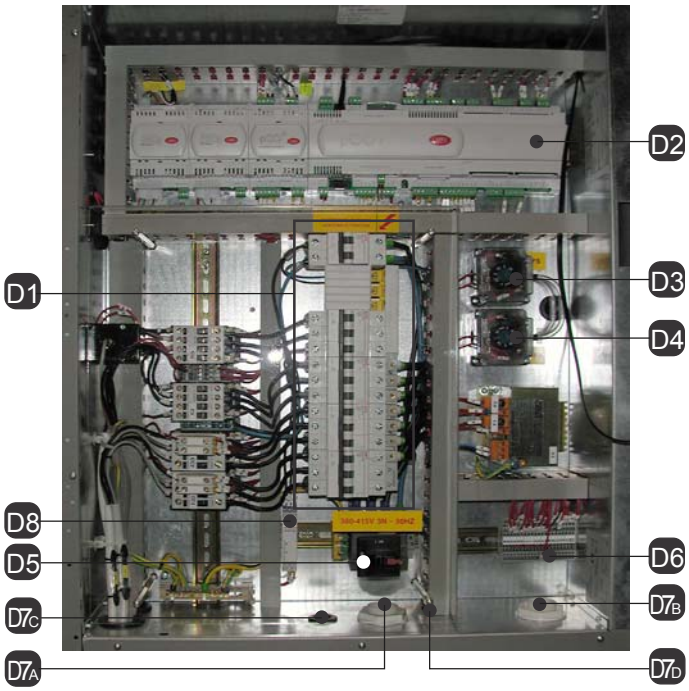
A - User terminal

Allows the unit to be turned on or off and the configuration and visualization of the condition of the machine.

- A1 LCD display
- A2 ALARM key: visualization and re-set of alarms; when the alarm is activated, it flashes red.
- A3 PRG key: access to the configuration menu
- A4 ESC key: exit from the screens
- A5 UP key: scroll through the menu
- A6 ENTER key: confirm
- A7 DOWN key: scroll through the menu

B - Electrical panel door

Allows access to the electrical panel of the machine.



C - Cover panels
Allow access to the internal components of the machine.

D - Electrical panel
- D1Magnetothermic
  - auxiliary
  - heater (optional)
  - humidifier (optional)
  - fans
  - compressors
- D2Interface board
- D3Dirty filter sensor
- D4Air flow sensor
- D5Main switch
- D6Terminal board
- D7AInput/output electrical supply cables
- D7BInput/output electrical auxiliary cables
- D7CInput/output condensing unit supply (optional) - (only on air cooled units)
- D7DInput/output signal cables (RS485 and/or LAN)
- D8Phase sequence relay

E - Filters
Filter the air released into the room.

F - Fans
Allow the diffusion of air into the environment.
- F1 ATR transformer allows the setting of the fan rotation speed.

G - Cooling circuit

- G1 Compressor
- G2 High pressure switch
- G3 Schrader valve
- G4 Safety valve
- G5 Liquid receiver
- G6 Dehydration filter
- G7 Flow sight glass
- G8 Electronic thermostatic valve
- G9 Brazed plate exchanger
- G10 Evaporating coil

H - Chilled water valve
H1 Servomotor
H2 Manual control knob
H3 Valve stem

Installation and maintenance of the Twin-cool units should be carried out as described in the DIRECT EXPANSION section. For the water circuit, follow the instructions in the CHILLED WATER section.

For the paragraph "Selecting the supply voltage of the fans", refer to the table below

STANDARD VOLTAGE LEVELS

Models	V
0511	203
0611	200
0721 - 0722 - 0921 0922 - 1021 - 1022	280
1121 - 1122 - 1321 - 1322	270
1422 - 1622 - 1822	280

MODELS WITH AUTOTRANSFORMERS

In the following table the maximum available pressures are indicated (expressed in Pa) for each voltage level of the transformer. The values are given for the maximum air flow (expressed in m3/h).

T*ER T*TR T*DR	**0721 0722 0921 0922 1021 1022**	**1121 1122 1321 1322**	**1422 1622 1823**
FA[m³/h=]	7970	11390	15320
V	**Pa**	**Pa**	**Pa**
230	0	0	0
250	0	0	0
260	0	0	0
270	0	24	0
280	3	53	5
290	29	82	34
300	55	112	63
310	80	141	93
320	106	171	122
340	157	230	181
360	208	288	240
380	260	347	299
400	311	406	358

MODELS WITH PHASE CONTROL VOLTAGE REGULATOR FAN MOTOR

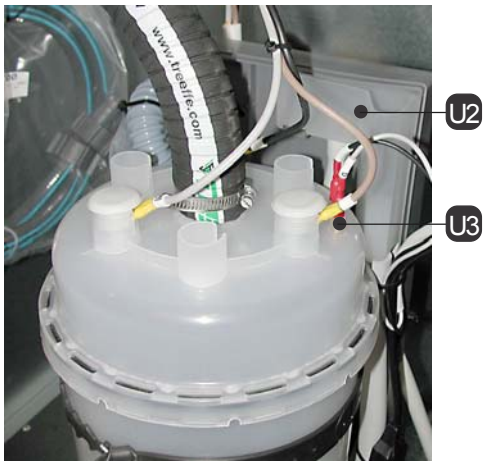
In the following tables the maximum available pressures are indicated (expressed in Pa) for each supply voltage selected. The values are given for the maximum air flow (expressed in m3/h).

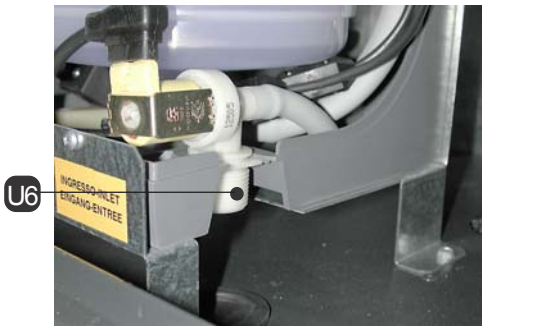
T*ER T*TR T*DR	0511	0611
FA[m³/h=]	5550	5550
%	Pa	Pa
40	0	0
50	0	0
55	0	0
60	0	0
70	58	58
80	86	86
90	106	106
100	123	123

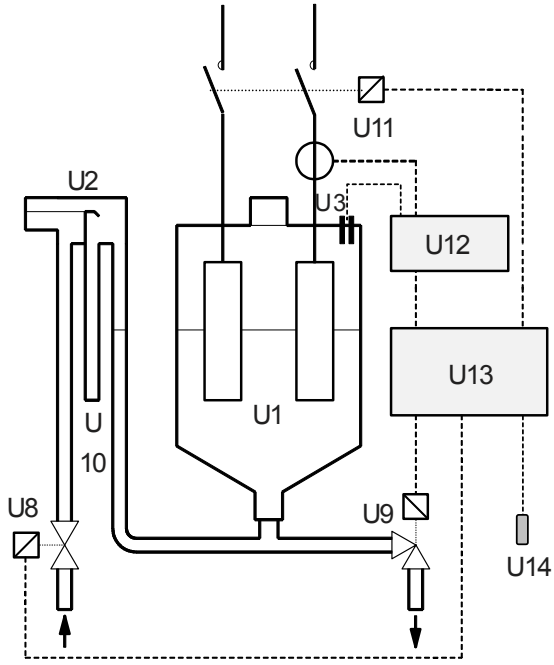
T*EV T*TV T*DV	0721 0722 0921 0922 1021 1022	1121 1122 1321 1322	1422 1622 1822
FA[m³/h=]	7940	11650	15420
%	Pa	Pa	Pa
50	0	0	0
55	0	0	0
60	0	0	0
65	0	8	0
70	0	80	0
75	45	156	27
80	136	236	117
85	229	320	208
90	324	409	302
95	421	501	399
100	520	598	498

ACCESSORIES

Humidifier







U1 Boiler cylinder
U2 Water supply tray
U3 High water level detector electrodes in the boiler cylinder
U4 Condenser drain
U5 Collector charge/discharge
U6 Water input
U7 Drain
U8 Feed water solenoid valve
U9 Boiler cylinder electric drainage valve
U10 Overflow pipe (behind the cylinder)
U11 Amperometric transformer for measuring the current (within the electrical panel)
U12 Humidifier interface board (inside the electrical panel)
U13 Microprocessor control board
U14 Temperature and humidity probe

Operating principle

In the electrode boiler humidifier, the current flowing between the electrodes in the water in the cylinder generates the heat necessary to boil the water.

By controlling the water level and the concentration of salt measured in the steam cylinder (U1) using the feed water solenoid valve (U8) and the boiler cylinder electric drainage valve (U9), the electric current is regulated by means of an amperometric transformer (U11).

When steam is needed, the humidifier contact is closed (see the electrical diagram) which provides power to the immersed electrodes. When the current falls below the value required as a result of the fall in the water level, the feed water solenoid valve is opened (U8).

The boiler cylinder electric drainage valve (U9) is opened at intervals depending on the characteristics of the feed water supply in order to maintain the optimum concentration of dissolved salts in the water in the cylinder (U1).

Feed water

Values for the feed water for medium-high level of conductibility of a humidifier with immersed electrodes.

				LIMITS	
				Min.	Max.
Hydrogen ion activity	pH	-		7	8.5
Specific conductibility at 20 °C	σ_R, 20 °C	-	µS/cm	300	1250
Total dissolved solids	TDS	-	mg/l	(1)	(1)
Residual fixed at 180 °C	R180	-	mg/l	(1)	(1)
Total hardness	TH	-	mg/l CaCO3	100(2)	400
Temporary hardness		-	mg/l CaCO3	60(3)	300
Iron + Manganese		-	mg/l Fe + Mn	0	0.2
Chlorides		-	ppm Cl	0	30
Silica		-	mg/l SiO2	0	20
Residual chloride		-	mg/l Cl-	0	0.2
Calcium sulphate		-	mg/l CaSO4	0	100
Metallic impurities		-	mg/l	0	0
Solvents, dilutents, soaps, lubricants		-	mg/l	0	0

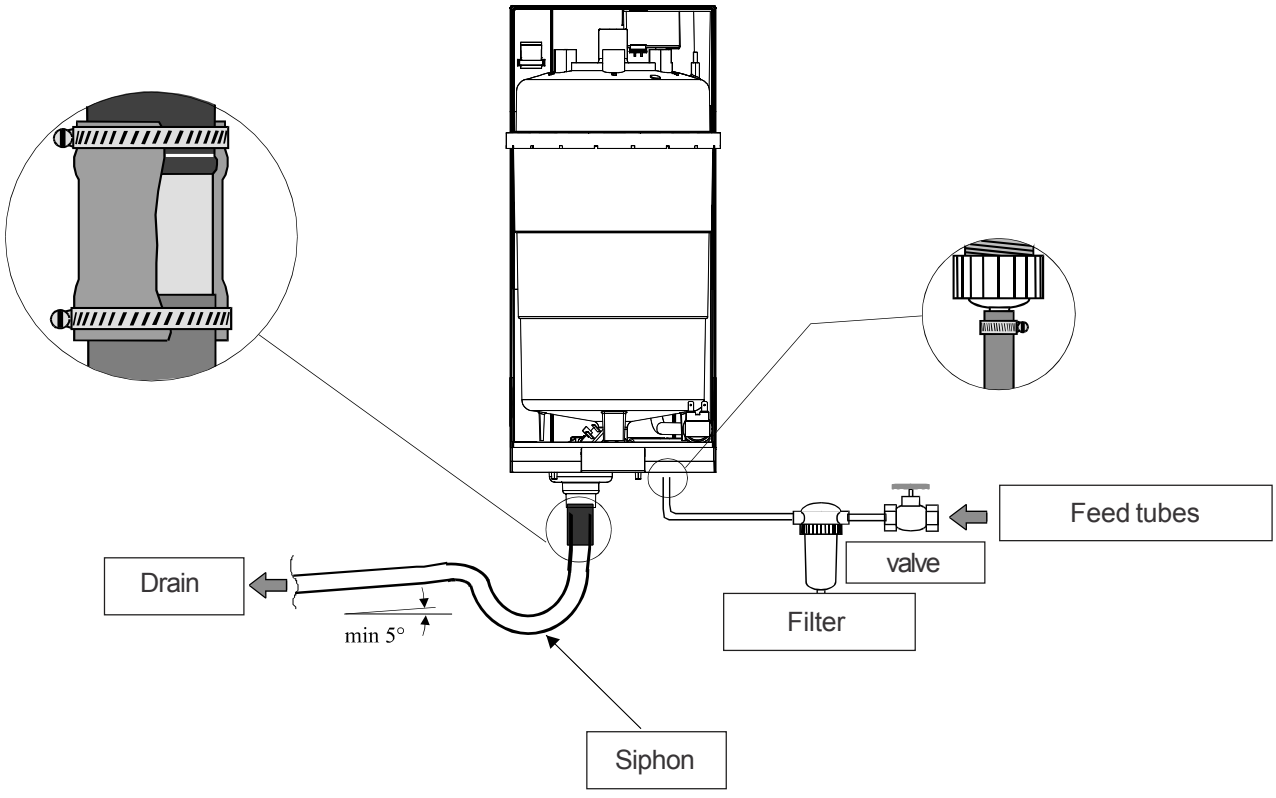
(1) Values dependent on the specific conductibility; in general: TDS @ 0,93 * s20; R180 @ 0,65 * s20

(2) not lower than 200% of the Chloride content in mg/l di Cl-

(3) not lower than 300% of the Chloride content in mg/l di Cl-

Connections

The installation of the humidifier requires connection to the feed tubes of the water drain.



Maintenance

The only maintenance required is periodic inspection and cleaning of the steam boiler components. This should be carried out at least once a year, preferably before the summer holiday shutdown.

BOILER CYLINDER

Limescale deposits must be cleaned periodically from the electrodes and particles of limescale must be removed from the filter at the base of the cylinder.
To dismantle the cylinder:

- - completely drain the water from the cylinder:
  - using the user terminal, press the UP or DOWN key until the INPUT/OUTPUT screen appears;
  - confirm by using the ENTER key;
  - press the UP or DOWN key until DO6 HUMIDIFIER DRAIN is selected;
  - confirm by using the ENTER key;
- disconnect the power supply by opening the main isolator on the electrical panel;
- disconnect the steam distributor hose from the top of the cylinder;
- disconnect the power connections to the electrodes by unscrewing the terminal connectors and pull off the connectors of the electrodes;
- unclip the cylinder fixing strap;
- pull the cylinder upwards.

The boiler cylinder can be used many times after the electrodes are cleaned: however, it will eventually require replacement when the electrode meshes are too worn out to make further cleaning worthwhile.
The spare part consists of only the cylinder itself (with the filter inside).

FEED AND DRAIN CONNECTIONS

Periodic inspections of the feed and drain connections are advisable in order to guarantee trouble-free operation of the humidifier.
Proceed as follows:

- - completely drain the water from the cylinder:
  - using the user terminal, press the UP or DOWN key until the INPUT/OUTPUT screen appears;
  - confirm by using the ENTER key;
  - press the UP or DOWN key until DO6 HUMIDIFIER DRAIN is selected;
  - confirm by using the ENTER key;
- disconnect the power supply by opening the main isolator on the electrical panel;
- disconnect the feed line at the ¾ GAS connection to the inlet solenoid valve connection (U8);
- extract, clean and replace the filter located inside the solenoid valve connection;
- remove the drain solenoid valve, clean out the water pathways and remove any particles of limescale from the drain siphon.

Electric heaters

Leonardo Evolution units can be equipped with electric heaters. For each model there are two levels available: standard and improved.

The finned elements are characterised by maintaining low power density of the surfaces in a highly efficient way, therefore limiting overheating of the elements and consequently increasing their lifespan.

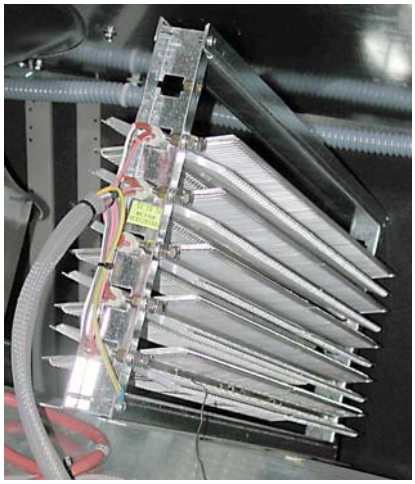
Thanks to the low surface temperature of the heating elements, the ionisation effect on the air is limited. This heating system has two functions:

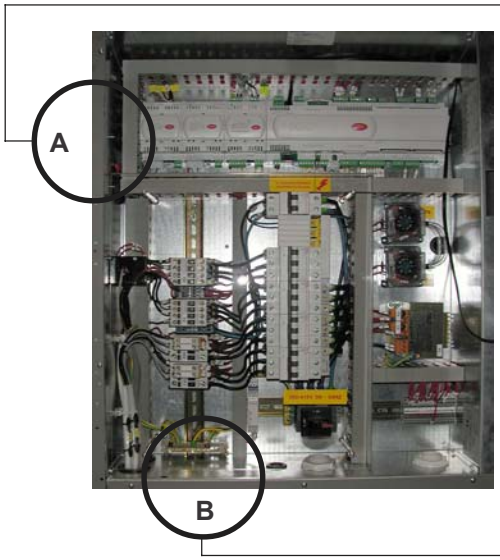
- heating the air to arrive at the set point conditions;
- post-heating during the phase of dehumidification, in such a way as to retain the air temperature at set point.

Therefore, the heating power installed is able to maintain the dry bulb temperature in the room during the dehumidification process.

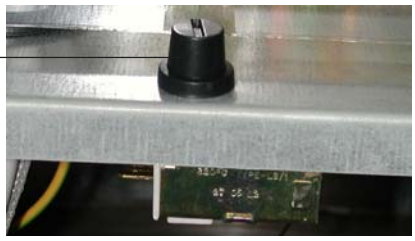
STANDARD CAPACITY	V	No	kW	OA
0511 - 0611	400/3/50	2	6	8,7
0721 - 0722 - 0921 0922 - 1021 - 1022	400/3/50	3	9	13,0
1121 - 1122 - 1321 - 1322 1422 - 1622 - 1822	400/3/50	5	15	21,7

IMPROVED CAPACITY	V	No	kW	OA
0511 - 0611	400/3/50	3	9	13,0
0721 - 0722 - 0921 0922 - 1021 - 1022	400/3/50	5	15	21,7
1121 - 1122 - 1321 - 1322 1422 - 1622 - 1822	400/3/50	6	18	26,0





THERMOSTAT
TSR



The TSR heater safety thermostat is fixed on the external edges of the electrical panel.
In position A for UPFLOW models
In position B for DOWNFLOW models

Replacing the electrical heaters

WARNING! Before replacing the electrical heaters, disconnect the power supply from the unit. Make sure that it is not possible for the power to be turned on again while they are being replaced.

WARNING! The heaters must only be replaced by a qualified electrician.

The total power of the electrical heaters is divided into different elements, each of 3 kW.

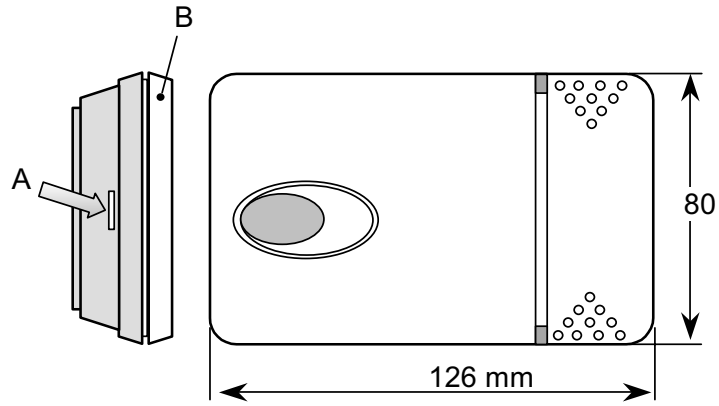
The colour of the wires on each element has the following meaning:

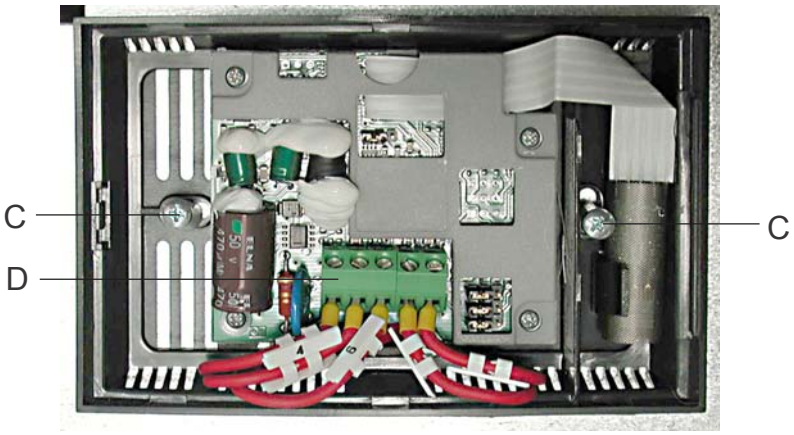
- BLACK wire = low power absorption (1 kW);
- WHITE wire = high power absorption (2 kW);
- RED wire = standard.

The wires of each element are connected to the CR1 and CR2 connectors on the electrical panel in such a way as to balance the load across the phases and create three stages of heating (refer to the electric diagram on the side of the machine).

Temperature and humidity sensor

The diagram shows an optional temperature and humidity sensor. When replacing the sensor, release the white plastic lid by pressing on point (A) with a screwdriver or a pointed tool; lifting the lid (B) to gain access to the fixing screws (C) and the terminals (D).
A screened cable is used for the electrical connections to the sensor; the connections to the terminals are shown on the electrical diagram.

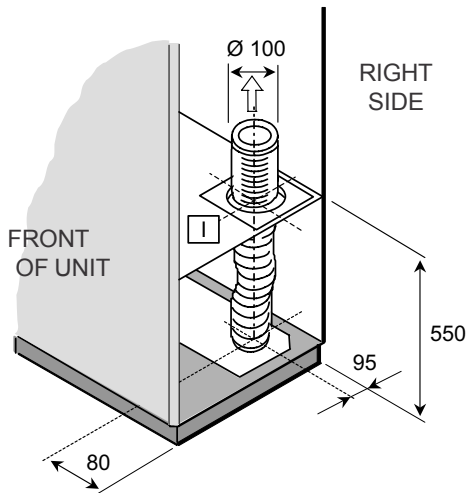




Connection to fresh air intake

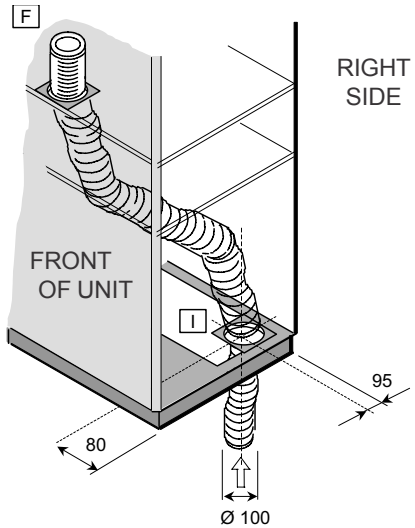
The unit can be fitted with an optional fresh air filter.
During installation, connect the intake of the fresh air filter to the nearest external air inlet with a flexible hose which has a diameter of 100mm and secure the hose to the fresh air intake with a fastening collar.
The connection from the unit to the external air inlet must have the shortest and straightest path possible.

TD*V Unit



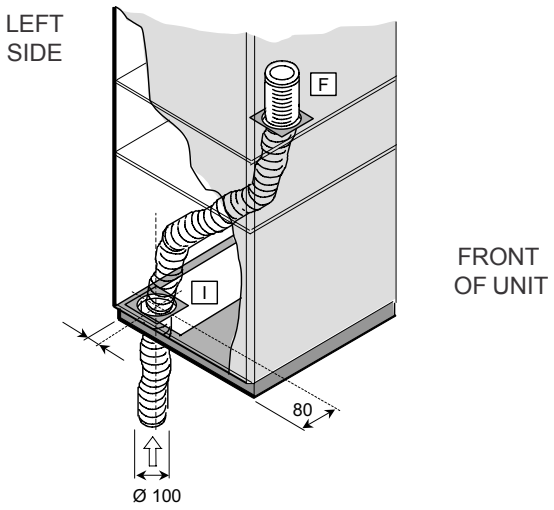
I Fresh air intake connection

TD*R 0511 - 0611 Unit



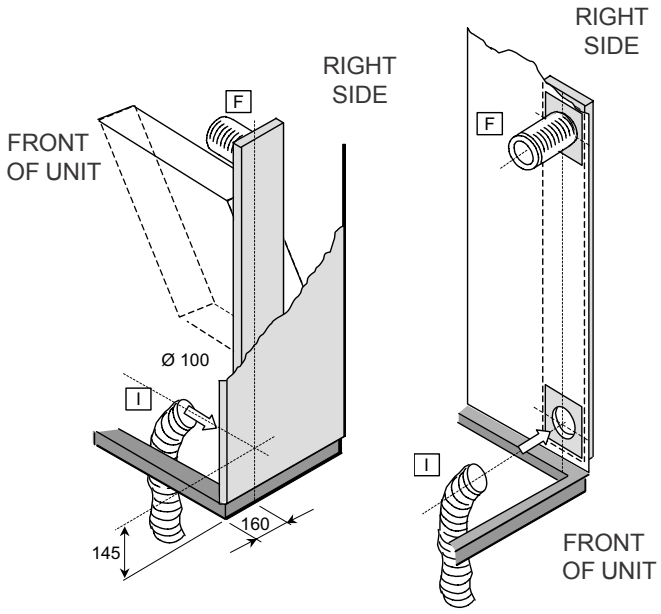
I Fresh air intake connection
F Position of the filter cartridge

TD*R 0721 - 1822 Unit



I Fresh air intake connection
F Position of the filter cartridge

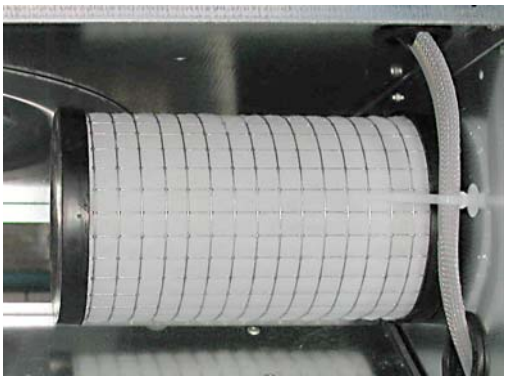
TU*V - TU*R Unit



I Fresh air intake connection
F Position of the filter cartridge

Maintenance

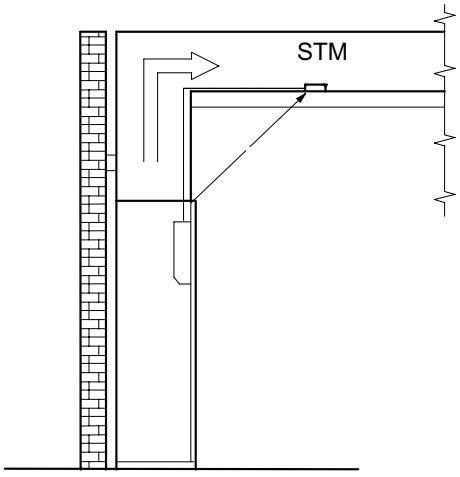
Clean, using a blast of compressed air, or replace the fresh air intake filters periodically.

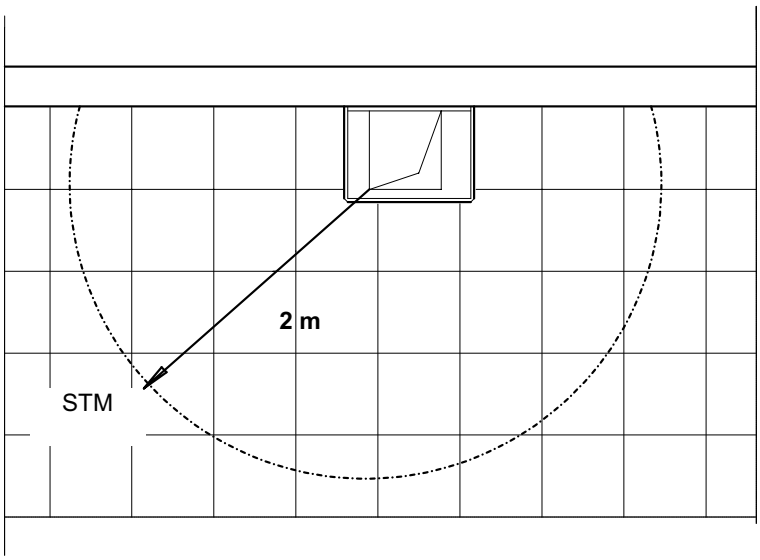


Discharge temperature threshold sensor (only on CHILLED WATER models)

An NTC temperature sensor is an optional accessory which maintains the supply air temperature of the unit above a threshold value. The sensor is connected to the microprocessor control system as described in the electrical diagram of the unit.

The sensor has a temperature range of -50°C and +50°C and a protection level of IP67; it can be installed outside the unit by means of a cable which is 3 metres long. A minimum distance of 2 metres is advisable from the unit discharge, as shown in the diagram for upflow units.





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