


KDPHY024

Description

The **KDP** units are monobloc units for wall installation, to be combined with radiant systems for moisture control with possible integration of sensible available power.

Versions and product codes

Units

Product code	Dehumidification	Cooling integration	Ventilation	Technical communication ref.
KDPHY024	YES	NO	NO	0930EN
KDPRHY024	YES	YES	NO	0931EN

Accessories

Product code	Description
KDPCY024	Outer casing
KDPFY024	Front panel

Technical data

CONSTRUCTION CHARACTERISTICS	
Refrigeration compressor	Airtight, single-cylinder alternative
Refrigerant gas	R290 - 95 g
Electricity supply	230 V 50 Hz
Pre-cooling coil	Copper pipes (2 rows) and aluminium fins with hydrophilic treatment
Evaporator coil	Copper pipes and aluminium fins with hydrophilic treatment
Post-heating coil	Copper pipes and aluminium fins
Water connections	2 x 1/2" F
Fan	Dual suction centrifuge with direct-coupled 3-speed motor
Air filter	With filtering material in synthetic fibre class G3 (EN 779:2002)
Nominal operating temperature range	15÷30 °C
Safety features	Inlet water temperature check, evaporator, condenser, alarm signal LED and relay

CHARACTERISTIC DATA

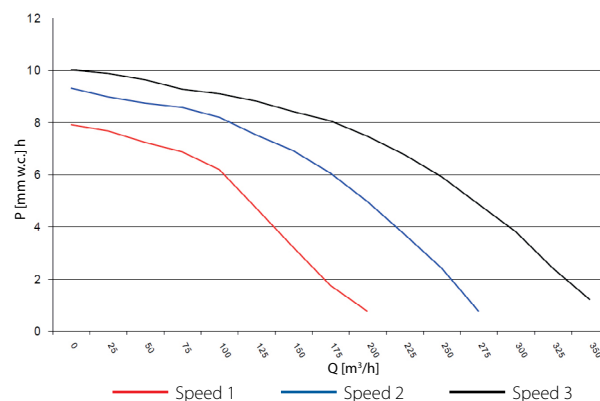
Nominal air flow rate [m³/h]	200-350
Moisture removed (26 °C - 65% R.H. - inlet water 15 °C) [l/24h]	23
Max. absorbed electric power [W]	250
Electric power absorbed by fan [W]	30
Total water flow rate [l/h]	220
Water circuit loss of pressure [kPa]	11
Weight [kg]	31

NOISE DATA

Sound power level db (A) (ISO 3747)	Speed 1	Speed 2	Speed 3
Ventilation	39,6	41,4	46,2
Dehumidification	46	47,5	49,2

NB: the equivalent sound pressure level depends on the room where the unit is installed, and the presence or absence of ducts and/or plenums. Generally speaking, the value is 7-10 db (A) lower than the sound power level, and this value falls further when there are ducts and/or plenums.

FAN AIR FLOW RATE



PERFORMANCE

Dehumidification - Air flow rate 200 m³/h [air conditions 24 °C - 55 % UR]						
T	A	B	C	D	E	F
12	1358	923	435	15,0	642	237
15 *	1209	839	370	12,8	578	239
18	1084	747	337	11,6	548	241
Dehumidification - Air flow rate 200 m³/h [air conditions 24 °C - 65 % UR]						
T	A	B	C	D	E	F
12	1481	839	642	22,2	851	239
15 *	1276	757	519	17,9	731	242
18	1117	680	437	15,1	651	244
Dehumidification - Air flow rate 200 m³/h [air conditions 26 °C - 55 % UR]						
T	A	B	C	D	E	F
12	1537	979	558	19,3	767	239
15 *	1341	898	443	15,3	653	241
18	1210	812	398	13,7	612	244
Dehumidification - Air flow rate 200 m³/h [air conditions 26 °C - 65 % UR]						
T	A	B	C	D	E	F
12	1689	894	795	27,5	1006	242
15 *	1479	814	665	23,0	879	244
18	1251	730	521	18,0	738	247

T: supply water temperature [°C] (* Design temperature)

A: total cooling capacity [W]

B: sensible cooling capacity [W]

C: latent cooling capacity [W]

D: dehumidification capacity [l/24h]

E: power required for the water cooler [W]

F: electric power absorbed [W]

Main components

STRUCTURE: in galvanised metal panels entirely covered with a sound-absorbent coating in foam polyurethane with open cells.

FILTERING SECTION: filtering structure in galvanised metal, with G3 filter that can be removed from every side of the unit.

COOLING CIRCUIT: in copper pipes, finned aluminium coils with copper pipes, alternative piston-operated cooling compressor - 10 cc; moisture filter.

HYDRAULIC CIRCUIT: in copper pipes, with finned aluminium coil and copper pipes for air pre-treatment; plate exchanger for refrigerant cooling; on-off valve for operating mode change. The galvanised metal unit frame contains the finned coils for air treatment, the cooling circuit for dehumidification, the suction air filter, the condensate collection basin, the delivery fan, and the electric command panel.

FAN: dual suction centrifuge with forward blades, with direct-coupled 3-speed motor; the operating speed is set by choosing the wires to be connected to the electricity supply.

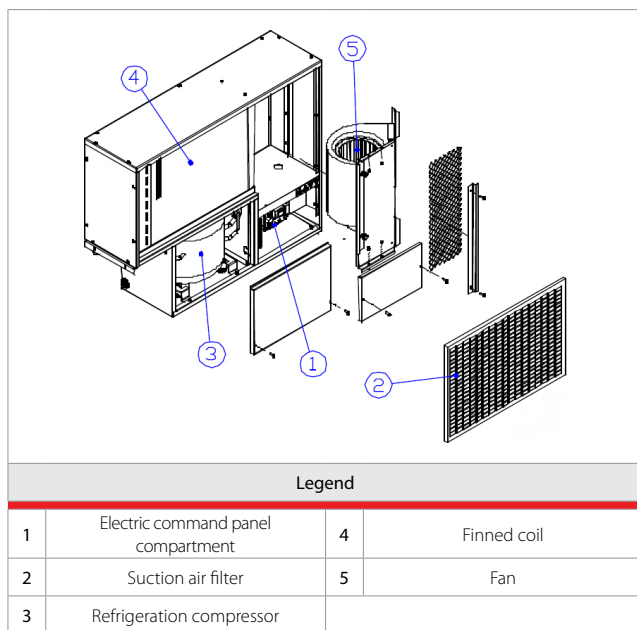


Figure 1 -Components

Operation

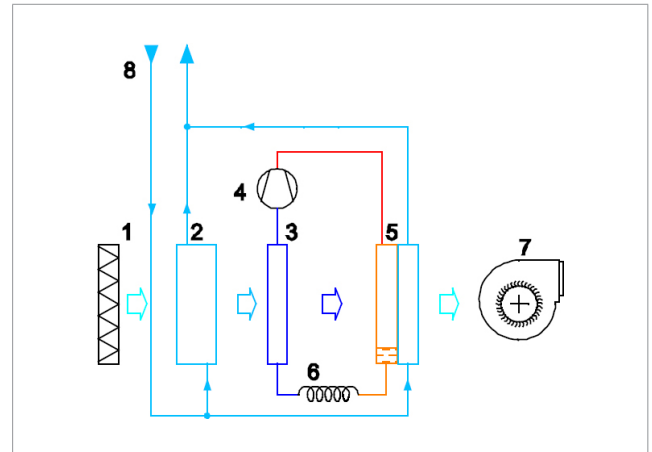


Figure 2 - Operating diagram with neutral air

The KDPHY024 dehumidifier is a cooling cycle unit designed as a system component. Cooling systems use cooled water at temperatures between 15 and 20 °C, which is sufficient to bring the rooms to the required temperature but not sufficient to dehumidify them. Dehumidification requires water at 7 °C, produced by the chiller at a notably lower flow rate than water at 15-20 °C. Water-chilled dehumidifiers with a cooling cycle keep the air humidity in the room at optimum values (55-65%), offering the following advantages compared with other systems:

- they use the cooled water from the radiant panel system;
- they allow the air to be treated without altering its temperature, so without any negative effect on the behaviour of the radiant panels and their adjustment system.

Fig.2 shows neutral air operation.

The air is filtered via the filtering section (1) and is pre-cooled via the cooled water exchanger (2) from the collector of the radiant system (8). The use of cooled water to pre-cool the air is fundamental for the efficiency of the process, as it minimises the use of electricity by the cooling compressor (4). The air is then dehumidified by passing through the finned coils of a cooling circuit: the actual dehumidification takes place in the first coil (3 - **evaporator**), while in the second (5 - **condenser**) the post-heating operation uses the heat developed by the cooling circuit. The coil (5) has a second row, called "post-treatment", located just downstream from the cooling circuit condenser. Its job is to reduce the temperature of the air expelled from the unit so the value is no higher than the inlet temperature.

LED display diagnostics

Red "POWER" LED: a fixed light indicates that the power supply is enabled.

Green "COMPR" LED: indicates dehumidification consent. A fixed light indicates that the compressor is working. A flashing light indicates that the compressor is in standby following start-up or a fault.

Alarm LEDs 3 and 4: see the table below

○ = LED off ● = LED on ◐ = LED flashing

Yellow LED ALARM1	Red LED ALARM2	Diagnosis	Permanency
○	○	No alarm	
◐	○	Room temperature too high, or empty circuit	Permanent alarm
●	○	Room temperature too low	Permanent alarm
○	◐	Maximum cooling pressure lockout	Permanent alarm
○	●	Delivery water temperature higher than 30 °C	It resets by itself, if the temperature falls

Yellow LED ALARM1	Red LED ALARM2	Diagnosis
fast flashing ◐		One of the probes is faulty: 1 flash: evaporator probe 2 flashes: water probe 3 flashes: condenser probe
	fast flashing ◐	One of the probes is disconnected: 1 flash: evaporator probe 2 flashes: water probe 3 flashes: condenser probe



Nota.

In the event of a permanent alarm, the compressor stops and does not restart. To reset the alarm, disconnect the electricity supply to the electronic card and then reconnect it again.

Connections

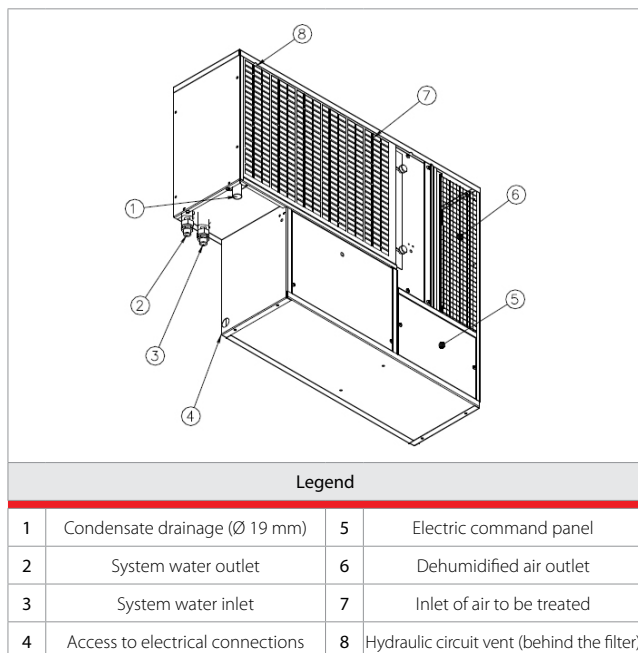


Figure 3 - Connections

Electric connections

WIRE SECTION

The electricity supply line and the disconnection devices must be determined by qualified electricity design experts; in any case, the cable section must be at least 3x1,5 mm², L + N + E. For operating consent: the cable must have a minimum section of 0,5 mm².

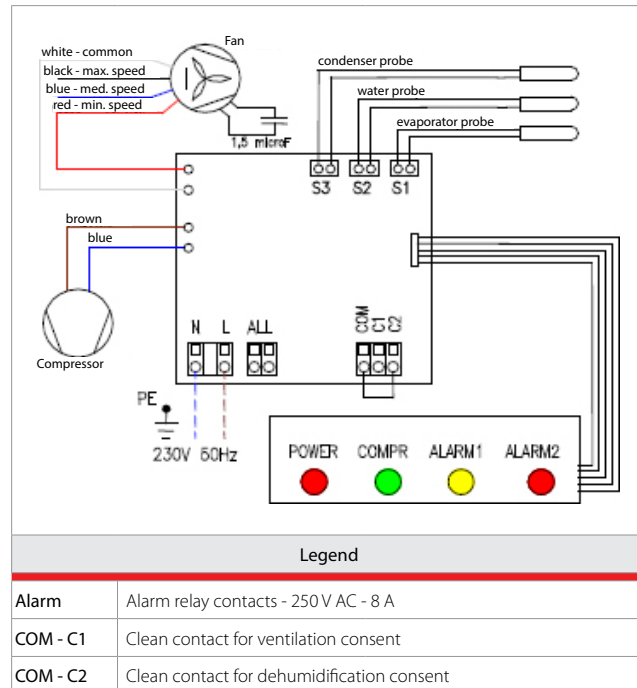


Figure 4 - Electric connections

The unit is supplied with the fan connection at its minimum speed (red wire). Depending on the type of system and the losses of pressure in the pipes, you can increase the fan speed by connecting the blue wire (average speed) or the black wire (maximum speed) in place of the red one. The white wire must never be disconnected. The condenser (1,5 microF) is next to the motor on the fan.

The temperature probes are NTC, 10 kΩ at 25 °C; the electronic card fuse is 250 V - 8 A.

Operating consent

The unit operates by means of two digital inputs (clean contact).

Ventilation consent: contact between the COM-C1 terminals. Not usually used, but by closing the contact you can activate the fan only (to force the movement of the air).

Dehumidification consent: contact between the COM-C2 terminals. Usually jumpered if there is no room humidity adjustment system. The unit interrupts operation when the contact between the two terminals opens.

Water-free operation



Warning.

The dehumidifier can operate without cooled water, but the suction air temperature must not be higher than 22 °C. The dehumidifying capacity of the unit will anyway be lower (reduced by up to 40%).

Warning.

Do not circulate cooling water when the unit is not working for long periods, as condensate could form on the outer surface of the unit itself.

Warning.

After filling the system with water, you are advised to carefully check the seal not only of the connections but also of the unit's hydraulic circuit.



Accessories

KDPCY024 outer casing

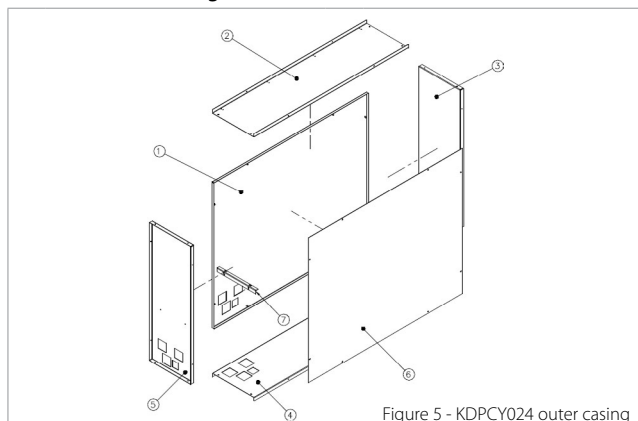


Figure 5 - KDPCY024 outer casing

Legend

1	Rear panel	5	Left side
2	Upper panel	6	Anti-plaster panel
3	Right side	7	Angle iron for unit fixing
4	Lower panel		

The outer-casing is made on steel. Its dimensions are: 760x619x219 mm (LxHxP).

KDPFY024 front panel

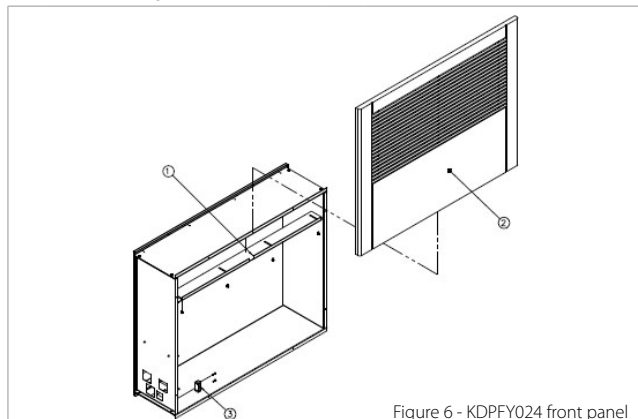


Figure 6 - KDPFY024 front panel

Legend

1	Fixing guide	3	Magnet
2	Front panel		

The panel is made of white-painted MDF. Its dimensions are: 790x630x18 mm (LxHxW).

The front panel is supplied with a guide (1) that must be fixed to the upper panel of the outer casing with four self-threading screws (3,9 x 9,5 mm). The slots on the guide ensure the panel rear is perfectly aligned with the finished wall surface. On the left side of the outer casing you can fit a magnet (using two screws 2,8 x 12 mm) to hold the panel in place; the panel can subsequently be removed by raising it after detaching it from the magnet. The front panel has no anchorage screws and is removed by simply raising it by a couple of centimetres.

Dimensions

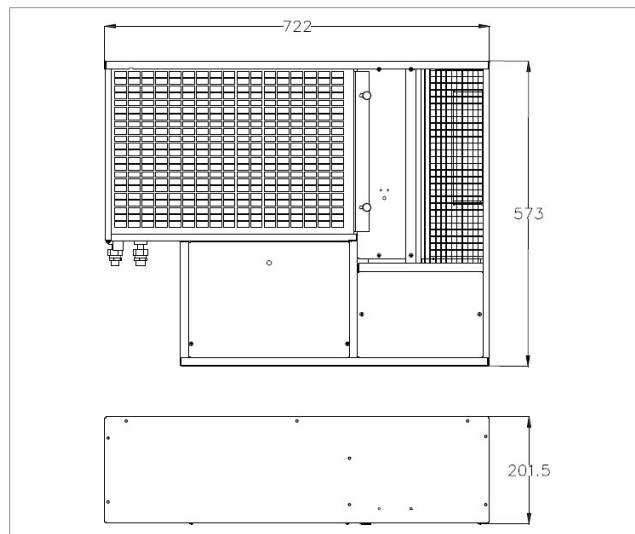


Figure 7 - Dimensions in mm



NB.

It is important to leave a gap of at least 1,5 m from the front of the grille, so the dehumidified air can circulate freely. The condensate drainage incline must be suitable for the size and length of the pipe. You must fit a drain-trap of at least 50 mm (only one, to prevent air being sucked back in via the drain pipe).

Product specifications

KDPHY024

Monobloc dehumidification unit for flush-mounting wall installation, to be combined with radiant cooling systems. Complete with removable filtering section in synthetic material, class G3 (EN779:2002), centrifuge fan with direct-coupled 3-speed motor, cooling circuit with R134a refrigerant gas, hydraulic circuit, treatment coils with copper pipe and aluminium fins, outer casing and front panel in white-painted wood. Dehumidification capacity 23,0 l/24h, air flow rate 200 m³/h. Ambient temperature working range 15÷30 °C. Water connections 2x1/2" F. 230 V power supply.

Additional information

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KDPRHY024

Description

The **KDP** units are monobloc units for wall installation, to be combined with radiant systems for moisture control with possible integration of sensible available power.

Versions and product codes

Units

Product code	Dehumidification	Cooling integration	Ventilation	Technical communication ref.
KDPHY024	YES	NO	NO	0930EN
KDPRHY024	YES	YES	NO	0931EN

Accessories

Product code	Description
KDPCY024	Outer casing
KDPFY024	Front panel

Technical data

CONSTRUCTION CHARACTERISTICS	
Refrigeration compressor	Airtight, alternative
Refrigerant gas	R290 - 105 g
Electricity supply	230 V 50 hz
Pre-cooling coil	Copper pipes (2 rows) and aluminium fins with hydrophilic treatment
Evaporator coil	Copper pipes and aluminium fins with hydrophilic treatment
Post-heating coil	Copper pipes and aluminium fins
Water connections	2 x 1/2" F
Fan	Dual suction centrifuge with direct-coupled 3-speed motor
Air filter	With filtering material in synthetic fibre class G3 (EN 779:2002)
Nominal operating temperature range	15÷30 °C
Safety features	Inlet water temperature control, evaporator, condenser, maximum pressure switch, alarm signal LED and relay

CHARACTERISTIC DATA	Dehumidif.	Integration
Air flow rate [m³/h]	200	300
Moisture removed (26 °C - 65% R.H. - inlet water 15 °C) [l/24h]	23	23
Max. absorbed electric power [W]	250	290
Electric power absorbed by fan [W]	30	40
Pre-cooling water flow rate [l/h]	180	180
Total water flow rate [l/h]	220	300
Water circuit pressure drop [kPa]	12	12
Weight [kg]	34	34

NOISE DATA			
Sound power level db (A) (ISO 3747)	Speed 1	Speed 2	Speed 3
Ventilation	39,6	41,4	46,2
Dehumidification	46	47,5	49,2

NB: the equivalent sound pressure level depends on the room where the unit is installed, and the presence or absence of ducts and/or plenums. Generally speaking, the value is 7-10 db (A) lower than the sound power level, and this value falls further when there are ducts and/or plenums.

PERFORMANCE											
[air conditions 24 °C - 55 % UR]											
Dehumidification - Air flow rate 200 m³/h						Integration - Air flow rate 300 m³/h					
T	A	B	C	D	E	F	A	B	C	D	E
12	1358	923	435	15,0	642	237	1533	1130	403	13,9	1762
15 *	1209	839	370	12,8	578	239	1351	1005	346	12,0	1583
18	1084	747	337	11,6	548	241	1184	879	305	10,5	1419
[air conditions 24 °C - 65 % UR]											
Dehumidification - Air flow rate 200 m³/h						Integration - Air flow rate 300 m³/h					
T	A	B	C	D	E	F	A	B	C	D	E
12	1481	839	642	22,2	851	239	1652	1008	644	22,2	1885
15 *	1276	757	519	17,9	731	242	1402	914	488	16,9	1637
18	1117	680	437	15,1	651	244	1213	796	417	14,4	1451
[air conditions 26 °C - 55 % UR]											
Dehumidification - Air flow rate 200 m³/h						Integration - Air flow rate 300 m³/h					
T	A	B	C	D	E	F	A	B	C	D	E
12	1537	979	558	19,3	767	239	1736	1200	536	18,5	1969
15 *	1341	898	443	15,3	653	241	1511	1097	414	14,3	1746
18	1210	812	398	13,7	612	244	1344	970	374	12,9	1582
[air conditions 26 °C - 65 % UR]											
Dehumidification - Air flow rate 200 m³/h						Integration - Air flow rate 300 m³/h					
T	A	B	C	D	E	F	A	B	C	D	E
12	1689	894	795	27,5	1006	242	1892	1068	824	28,5	2128
15 *	1479	814	665	23,0	879	244	1617	973	644	22,2	1856
18	1251	730	521	18,0	738	247	1369	878	491	17,0	1610

T: supply water temperature [°C] (* Design temperature)

A: total cooling capacity [W]

B: sensible cooling capacity [W]

C: latent cooling capacity [W]

D: dehumidification capacity [l/24h]

E: power required for the water cooler [W]

F: electric power absorbed [W]

Main components

STRUCTURE: in galvanised metal panels entirely covered with a sound-absorbent coating in foam polyurethane with open cells.

FILTERING SECTION: filtering structure in galvanised metal, with G3 filter that can be removed from every side of the unit.

COOLING CIRCUIT: in copper pipes; finned aluminium coils with copper pipes, water-freon heat exchanger in braze-welded stainless steel plates. Alternative piston-operated cooling compressor - 10 cc; moisture filter.

HYDRAULIC CIRCUIT: in copper pipes, with finned aluminium coil and copper pipes for air pre-treatment; plate exchanger for refrigerant cooling; on-off valve for operating mode change. The galvanised metal unit frame contains the finned coils for air treatment, the cooling circuit for dehumidification, the suction air filter, the condensate collection basin, the delivery fan, and the electric command panel.

FAN: dual suction centrifuge with forward blades, with direct-coupled 3-speed motor; the operating speed is set by choosing the wires to be connected to the electricity supply.

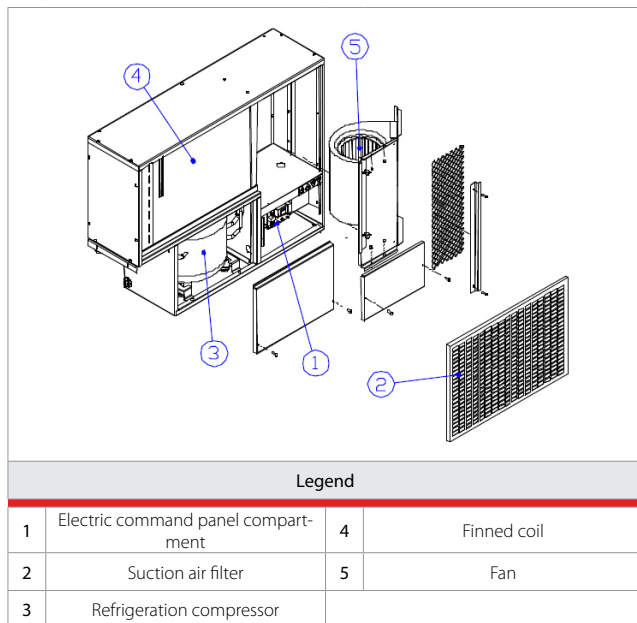


Figure 1 - Components

Operation

Operation with neutral air

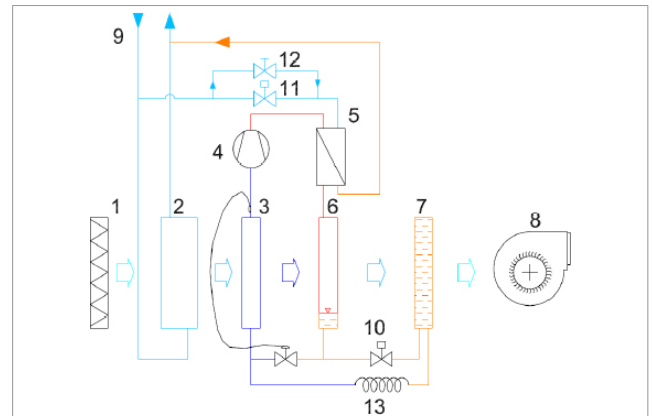


Figure 2 - Operating diagram with neutral air

The air is filtered via the filtering section (1) and is pre-cooled via the cooled water exchanger (2). The use of cooled water to pre-cool the air is fundamental for the efficiency of the process, as it minimises the use of electricity by the cooling compressor (4). The air is then dehumidified by passing through the finned coils of a cooling circuit: the actual dehumidification takes place in the first coil (3 - **evaporator**), while in the second (6 - **condenser**) the post-heating operation uses the heat developed by the cooling circuit. The outlet air is neutral compared with the unit inlet temperature; this effect is obtained thanks to the transit of calibrated water in the plate exchanger (5) to remove the excess heat. The finned exchanger (7) acts as a cooling liquid accumulator and has a limited effect in this operating mode. The manual valve (12) has a partial opening and permits limited water transit to take out the excess heat compared with the neutral outlet air. The unit is able to function with this configuration even without water; with no pre-cooling or heat dispersal however, the outlet air temperature will be higher than that of the inlet air.

Integration operation

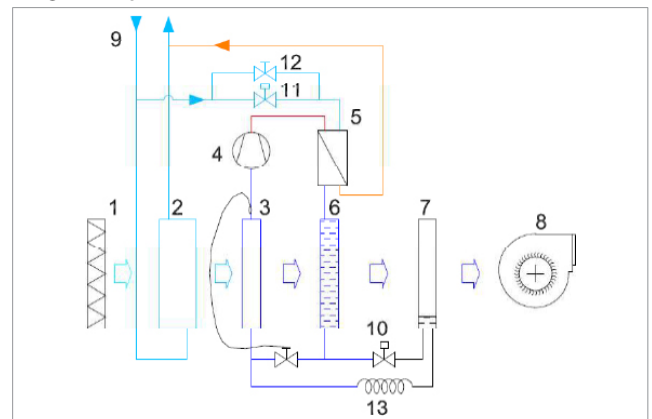


Figure 3 - Operating diagram in integration mode

In this mode, the solenoid valve (10) is closed and the solenoid valve (11) is opened; the accumulator (7) drains towards the capillary pipe (13) and the freed liquid accumulates in the condenser (6). When the condenser is completely full of liquid, heat dispersal is inhibited and takes place almost entirely in the plate exchanger (5) where the cooled water freely flows via the open valve (11). In integration operation, there is also a switch to a higher fan speed, which is factory-set to provide 200 mc/h in dehumidification mode and 300 mc/h in integration mode. Integration operation is only possible with a cooled water supply.



LED display diagnostics

Red "POWER" LED: a fixed light indicates that the power supply is enabled.

Green "COMPR" LED: indicates dehumidification consent. A fixed light indicates that the compressor is working. A flashing light indicates that the compressor is in standby following start-up or a fault.

Alarm LEDs 3 and 4: see the table below

○ = LED off ● = LED on ◐ = LED flashing

Yellow LED ALARM1	Red LED ALARM2	Diagnosis	Permanency
○	○	No alarm	
◐	○	Room temperature too high, or empty circuit	Permanent alarm
●	○	Room temperature too low	Permanent alarm
○	◐	Maximum cooling pressure lockout	Permanent alarm
○	●	Delivery water temperature higher than 30 °C	It resets by itself, if the temperature falls

Yellow LED ALARM1	Red LED ALARM2	Diagnosis
fast flashing ◐		One of the probes is faulty: 1 flash: evaporator probe 2 flashes: water probe 3 flashes: condenser probe
	fast flashing ◐	One of the probes is disconnected: 1 flash: evaporator probe 2 flashes: water probe 3 flashes: condenser probe



NB.

In the event of a permanent alarm, the compressor stops and does not restart. To reset the alarm, disconnect the electricity supply to the electronic card and then reconnect it again.

Connections

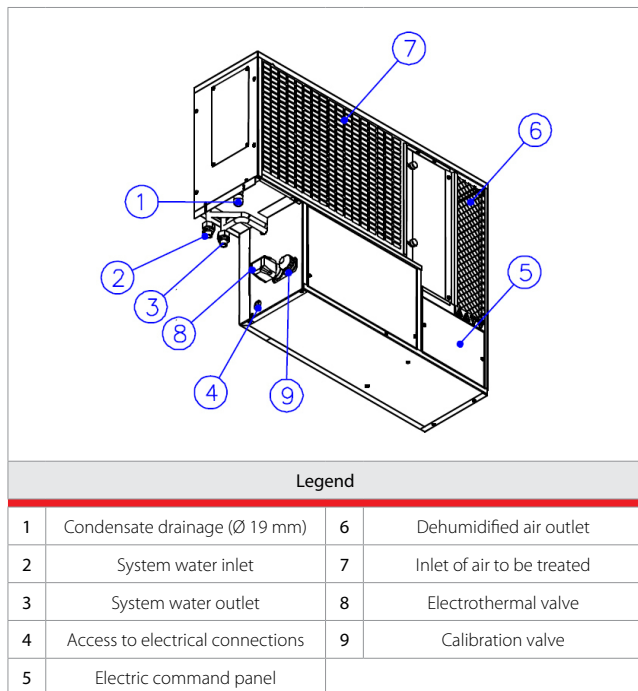


Figure 4 - Connections

Electric connections

WIRE SECTION

The electricity supply line and the disconnection devices must be determined by qualified electricity design experts; in any case, the cable section must be at least 3x1,5 mm², L + N + E.

For operating consent: the cable must have a minimum section of 0,5 mm²

ELECTRIC LAYOUT

The unit is usually supplied with the fan connection at its minimum speed, but the speeds for the dehumidifier or cooling dehumidifier can be set during the installation phase.

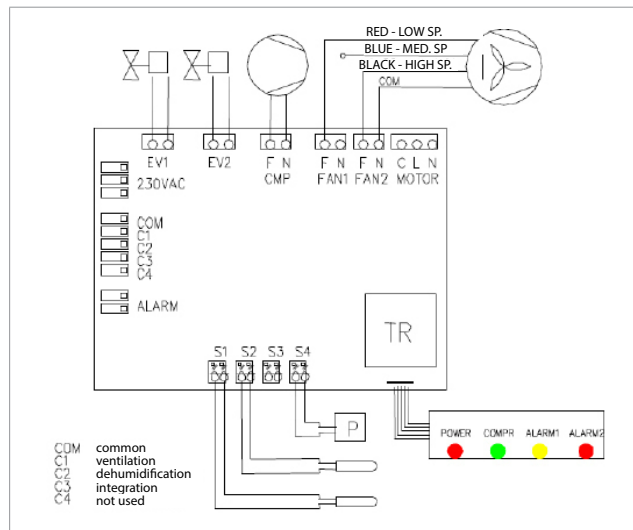


Figure 5 - Electric connections

OPERATING CONSENT

The unit operates by means of three digital inputs (clean contact).

Ventilation consent: contact between the COM-C1 terminals. Not usually used, but by closing the contact you can activate the fan only (to force the movement of the air).

Dehumidification consent: contact between the COM-C2 terminals. Usually jumpered if there is no room humidity adjustment system. The unit interrupts operation when the contact between the two terminals opens.

Integration consent: contact between the COM-C3 terminals. The unit activates the dehumidification and integration function, with the fan at its higher speed.

Water-free operation



Warning.

The dehumidifier can operate without cooled water, but the suction air temperature must not be higher than 22 °C. The dehumidifying capacity of the unit will anyway be lower (reduced by up to 40%).

Warning.

Do not circulate cooling water when the unit is not working for long periods, as condensate could form on the outer surface of the unit itself.

Warning.

After filling the system with water, you are advised to carefully check the seal not only of the connections but also of the unit's hydraulic circuit.

Accessories

KDPCY024 outer casing

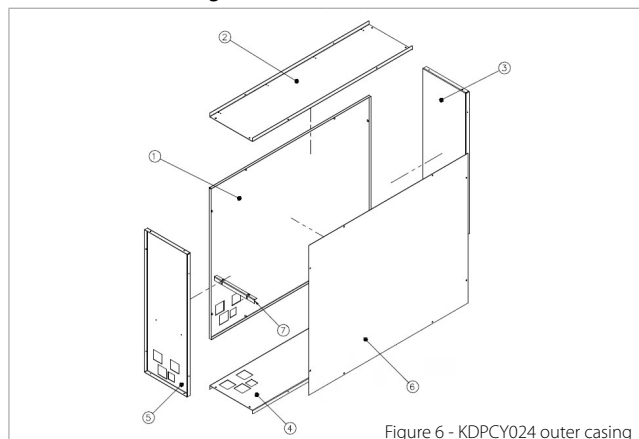


Figure 6 - KDPCY024 outer casing

Legend

1	Rear panel	5	Left side
2	Upper panel	6	Anti-plaster panel
3	Right side	7	Angle iron for unit fixing
4	Lower panel		

The outer-casing is made on steel. Its dimensions are: 760x619x219 mm (LxHxP).

KDPFY024 front panel

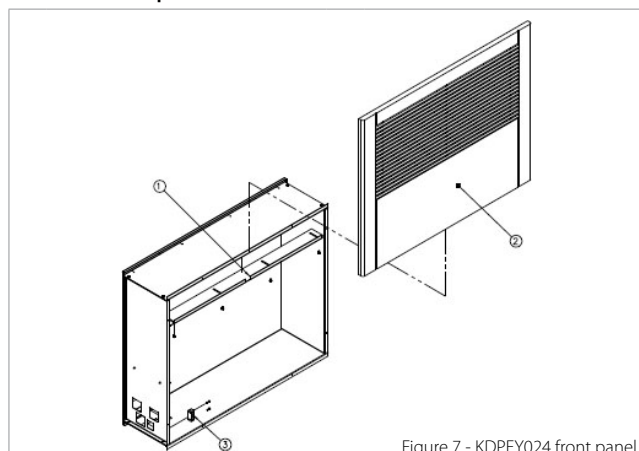


Figure 7 - KDPFY024 front panel

Legend

1	Fixing guide	3	Magnet
2	Front panel		

The panel is made of white-painted MDF. Its dimensions are: 790x630x18 mm (LxHxW).

The front panel is supplied with a guide (1) that must be fixed to the upper panel of the outer casing with four self-threading screws (3,9x9,5 mm). The slots on the guide ensure the panel rear is perfectly aligned with the finished wall surface. On the left side of the outer casing you can fit a magnet (using two screws 2,8x12 mm) to hold the panel in place; the panel can subsequently be removed by raising it after detaching it from the magnet. The front panel has no anchorage screws and is removed by simply raising it by a couple of centimetres.

Dimensions

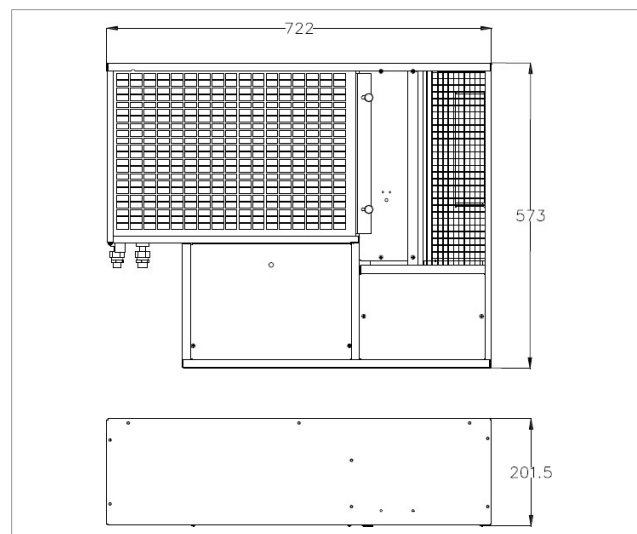


Figure 8 - Dimensions in mm



NB.

It is important to leave a gap of at least 1,5 m from the front of the grille, so the dehumidified air can circulate freely. The condensate drainage incline must be suitable for the size and length of the pipe. You must fit a drain-trap of at least 50 mm (only one, to prevent air being sucked back in via the drain pipe).

Product specifications

KDPRHY024

Monobloc unit for dehumidification and integration of sensible available power, for flush-mounting wall installation, to be combined with radiant cooling systems. Complete with removable filtering section in synthetic material, class G3 (EN779:2002), centrifuge fan with direct-coupled 3-speed motor, cooling circuit with R290 refrigerant gas, hydraulic circuit, treatment coils with copper pipe and aluminium fins, outer casing and front panel in white-painted wood. Dehumidification capacity 23 l/24h, air flow rate 200 m³/h in dehumidification mode and 300 m³/h in integration mode. Ambient temperature working range 15÷30 °C. Water connections 2x1/2" F. 230 V power supply.

Additional information

For more information, go to www.giacomini.com or contact our technical assistance service: ☎ +39 0322 923372 📞 +39 0322 923255 ✉ consulenza.prodotti@giacomini.com
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