POLYTROPIC

GUIDELINE FOR FAILURES DETECTION

Polytropic heat pumps

SUMMARY

I. Important information to consider before any intervention

1. Polytropic Heat pumps Serial Number related to the different models

Serial Number	Model	Power at 15℃
HP24XXXXXXXXX	PAC16	8 kW
HP36XXXXXXXXX	PAC22	12 kW
HP60XXXXXXXXX	PAC31	18 kW
4WHP24XXXXXXXXX	R-PAC16	8 kW
4WHP36XXXXXXXXX	R-PAC22	12 kW
4WHP60XXXXXXXXX	R-PAC31	18 kW

2. Heat pump selection

The heat pump power should correspond to the pool volume and dimensions.

Pool size (m^3)	Lenght (m)	Width (m)	Depth (m)	Heat pump capacity necessary to heat the pool (kW)
50	8	4	1.5	8
75	10	5	1.5	12
120	12	6	1.65	16

This power dimensioning depends also of the Geographic area and altitude where the swimming pool is located.

For a more precise dimensioning, you should verify www.polytropic.fr and use the “aquavariation” program.

The PAC is able to work correctly only if the pool has a thermal cover when is not used. The more commons covers are bubbles, solar, shutter, etc. This protection is essential in order to increase the thermal energy of the swimming pool.

For a correct calculation, the period of the swimming pool without a cover should be of around 8 hours per day. In the same sense it is necessary to know that the minimum time to increase the pool temperature at the beginning of the season is ONE WEEK (heat pump working 24/24h)

Once a correct dimensioning has boon done, the suggested time for the filtration pump to work properly is 12h per day. This will allow the heat pump to have enough time to heat the water.

In general, the following formula is used: to determine the filtration time:

(T℃ water) / 2 = Filtration Time

Example: Water temperature at 28℃: 24 / 2 = 14 h of filtr ation per day

At the end of the season, the heat pump will maintain the heat pump temperature; however it arrives the moment that the water temperature decreases as the air temperature decreases. At this point the heat pump arrives at its working limit and should be turn off.

3. Hydraulic system of PAC and swimming pool

The diameter of the piping connected to the PAC should be of 55mm

The filtration pump should be able to provide a power water flow between 5 and 7m³/h at the entrance of the heat pump.

The hydraulic installation should be equipped with a by-pass formed by 3 valves just after the heat pump in order to be able to regulate the water flow that passes trough the PAC and isolate it from the rest of the circuit if necessary. All the hydraulic system should be filtered to avoid clogging of the PAC (sand filter or other)

4. Electric circuit system

The PAC protection should be circuit breaker of 30mA respecting the current value necessary for each heat pump model.

The supply power cable size should allow passing the necessary current at the moment the heat pump is working.

Power (kW)	**Electrical conexion (V)**	**Line protection (A)**	**Maximum length of cable* avec the following diameters**			
			2,5 mm²	**4 mm²**	**6 mm²**	**10 mm²**
16 y 18	5G 400 V	3 x 16 A	27 m	39 m	57 m	96 m
8 kW	3G 230 V	20 A	21 m	33 m	48 m	81 m
12 kW	3G 230 V	25 A	15 m	27 m	39 m	69 m

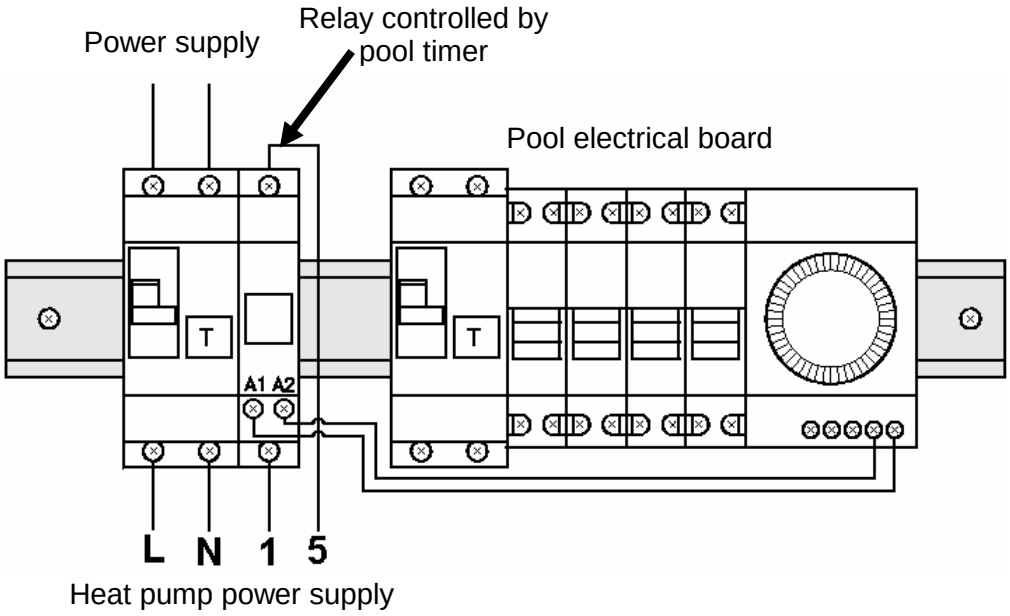
*Maximum cable length between heat pump and line protection (**D curve current protection**)

5. Electrical dependency

The PAC electrical connection should mandatory be dependent on the filtration pump.

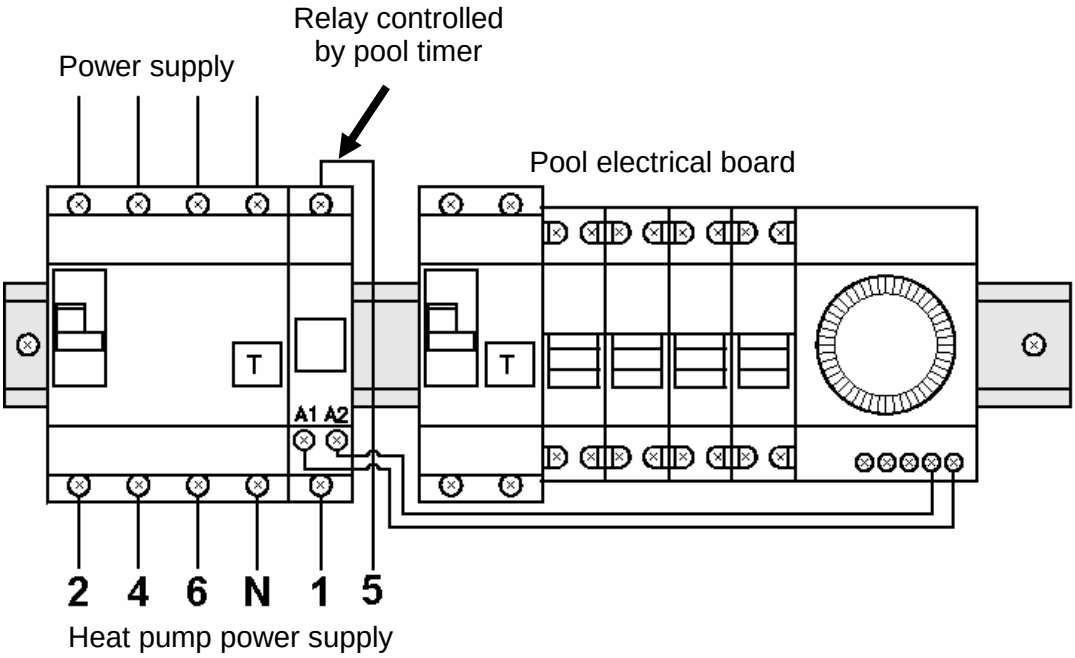
1. Electrical connection of the PAC. Mono phase system

Electrical dependency of the PAC to the pool electrical board



2. Electrical connection of the PAC. Three phase system

Electrical dependency of the PAC to the pool electrical board



6. Pool surroundings

The PAC should be installed regarding the manual recommendations.

The PAC should be positioned in a way that the cool air produced by the machine does not be re-aspirated.

7. Hydraulic settings

In first instance, the following verifications should be done:

1. Condition of Filtration

The filter should be clean:

- Generally a bag filter should be verified visually and cleaned with a water jet
- Generally a sand filter should be verified checking the pressure, that should be between 0.5 and 1 bar and should be cleaned when it is in position “clean” of the hydraulic sector

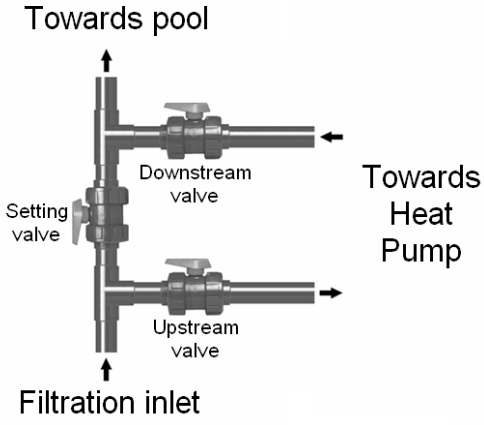
2. Filtration pump

The filtration pump should be powerful enough to provide to the PAC enough water flow. This will depend on the pump power, diameter of the piping and some other parameters.

In general, for a distance <=10m with a 50mm diameter of piping the following filtration pumps should be considered:

Machine at 8kW: 15 a 18 m³/h.
Machine at 12 kW: 18 a 25 m³/h.
Machine at 16 or 18 kW:25 a 50 m³/h.

3. By-pass



In this way, the settings for the by-pass should be:

- Setting valve adjusted to half
- Inlet and Outlet valves completely open

(Unless the filtration pump is overdimensioned)

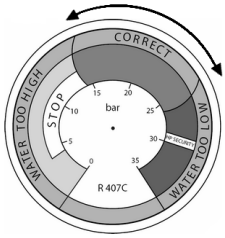
This by-pass adjustment impacts the high pressure gauge of the manometer on the machine:

- ***Close By-pass:*** All the filtration water flow is directed to the heat pump. The pressure on the manometer goes down and the indicator goes to the yellow zone (water too high).

- ***Open By-pass:*** The water flow is divided by two. Only one part passes trough the heat pump so that the manometer pressure goes up and the indicator goes to the red zone (water too low).

Recommended By-pass position:

- Indication of **Correct** water flow > Green area: Pressure **BETWEEN** 14 and 26 bars
- Indication of **Very strong** water flow > Yellow area: Pressure **LESS** than 14 bar
- Indication of **Very low** water flow > Red area: Pressure **MORE** than 26 bar



In the other hand if the filtration pump is correctly dimensioned regarding the heat pump, the by-pass should be adjusted on the following way:

Swimming pool temperature (℃)	Manometer pressure (bars)
20	5
24	17.5
28	20

NOTE: These values are indicated for an air temperature between 15℃ and 20℃
The manometer value is incremented regarding the pool temperature linearly.

- If the filtration pump is overdimensioned regarding the heat pump, then the by-pass should be adjusted on the following way:
    - Open the by-pass completely
    - Close smoothly again the Outlet valve (Upstram valve)

Adjust the setting and Outlet valve according to the pool temperatures mentioned above.

8. Refrigerating system

The manometer on the heat pump indicates the condensation of the refrigerating system. The correct pressure after the machine has been stopped (minimum 2h) should be between 5 and 10 bars for an air temperature between 10℃ and 15℃.
If it is not the case it should mean that there is a refrigerating charge problem.

II. Operating table

1. PAC16, PAC22 y PAC31

ON/OFF switch	Fan ventilator	Digital controller	Explanation	Action to be taken
○	**Do not work**	**Not lighted**	**Power supply is switch off**	**Check power supply conection**
☼	**Do not work**	**Not lighted**	**Relay contact does not work**	**Verify electric connections**
☼	**Do not work**	set 1 **Not lighted** set 2 **Not lighted**	**The desired temperature is off**	
☼	**Do not work**	set 1 **Blinking**	**Starting delay**	**Wait few minutes***
		set 2 **Lighted**	**Defrosting**	
☼	**Do not work**	set 1 **Lighted** set 2 **Not lighted**	**Fan ventilator out of order**	**Contact an specialist**
☼	**Works**	set 1 **Lighted** set 2 **Not lighted**	**Heating in progress**	

**** If the machine does not start up, contact the hotline technical service***.

2. R-PAC16, R-PAC22 y R-PAC31

ON/OFF switch	Fan ventilator	Digital controller	Explanation	Action to be taken
○	**Do not work**	**Not lighted**	**Power supply is switch off**	**Check power supply conections**
☼	**Do not work**	**Not lighted**	**Relay contact does not work**	**Verify electric connections**
☼	**Do not work**	**Lighted**	**The desired temperature is off**	
☼	**Do not work**	**Blinking**	**Starting delay**	**Wait few minutes***
☼	**Do not work**	**Lighted**	**Defrosting delay**	
☼	**Do not work**	**& Lighted**	**Defrosting**	**Wait few minutes***
☼	**Works**	**Lighted**	**Heating in progress**	

* If the machine does not start up, contact the hotline technical service

3. R-PAC16, R-PAC22 et R-PAC31 (> 05/2009)

ON/OFF switch	Fan ventilator	Digital controller	Explanation	Action to be taken
○	**Do not work**	**Not lighted**	**Power supply is switch off**	**Check power supply connections**
☼	**Do not work**	**Flow!**	**Relay contact does not work or heating priority ON**	**Verify relay connection or wait 200min for heating priority**
☼	**Do not work**	**Lighted**	**The desired temperature is off**	
☼	**Do not work**	**Blinking**	**Starting delay**	**Wait few minutes**
☼	**Do not work**	**Lighted**	**Defrosting delay**	
☼	**Works**	**Lighted**	**Defrosting**	**Wait few minutes**
☼	**Works**	**Lighted**	**Heating in progress**	

III. Refrigerating system diagnostic

1. Gas leak

a. Hypotesis

-The machine does not work (Low Pressure controller stops)
-The machine is working properly but it is not heating (pressure on manometer gauge when machine is stopped is not normal)
-The machine has a gas leak (pressure when machine is stopped is “0” with indicator at end stop)

b. Checking points

Verify the pressure gauge value. When the machine is stopped the value of the pressure should be the one of the R407c gas at the same temperature. For example in a specialized manometer, the pressure when the machine is stopped, at 15℃ of air temperature should be 7.4 bar. Atten tion! The machine does not have an accurate manometer gauge calibration for such precision.

c. Conclusion

Regarding a refrigerating problem on a PAC, it is necessary to:

- Detect the gas leak
- Repair the gas leak
- Vacuum refrigerant completely
- Make a refrigerant charge (quantity of gas indicated by the Polytropic technical service)
- Turn on the machine and verify the super-heat and sub-cooling
  The super-heat is the temperature difference between the measured temperature at the exit of the evaporator and the R407C gas temperature that normally corresponds to the Low Pressure value.
  - ✓ Super-heat: Between 7 and 10°

  The sub-cooling is the temperature difference between the R407c gas temperatures that corresponds to the high pressure value and the temperature measured at the exit of the condenser.
  - ✓ Sub-cooling: between 10 and 15°

2. Frosting presence

Before any action for a frosting problem, there is necessary to verify:

- That outdoor temperature is within the range for working conditions
- That the machine does not have gas leak
- That the ventilator works properly
- That the machine is not on defrost cycle
  - For PAC or HPN defrosting is when ventilator is working and compressor is stopped
  - For R-PAC defrosting is when ventilator is stopped and compressor working

There is necessary to differentiate between the frosting presence (white layer similar to snow but denser) that is normal before a defrost cycle and icing presence (transparent) that can be

acceptable in the short term but should not last. Actually it is possible that some ice appears, but should disappear after some defrost cycles.

d. Hypothesis

- Due to an installation, there is an ice layer thicker or bigger than normal.
- The defrosting cycle doesn't work or does not work enough time
- The programmed parameters are not correct
- The sensor is not at the correct place or there is necessary to be moved
- The expansion valve should be adjusted

e. Checking points

- Verify that the machine does not have a gas leak (a gas leak can provoke some frosting)
- Verify that the machine does not sucks again the cool air that rejects:
    - There should not be any obstacle in front of the ventilator (completely open space). If there is necessary, move the machine.
    - There should not be any obstacle for the aspiration air (wall that could be close, anything over the evaporator, etc). If necessary clean the evaporator or move the machine
    - There should not be water slugged on the bottom part of the evaporator. If necessary, verify that the machine is horizontal or bend it over so that the water can be evacuated

- Verify the programming parameters of the digital controller (See chapter "Components Verification")
- Verify the place of the defrost probe:
    - For the PACs, it is located over the evaporator at 5/10cm bottom up and 10/20cm from left to right. If there is necessary, should be placed in a way that detects better the ice (re-palce it where the ice appears in first instance)
    - For the R-PACs, it is located at the entrance of the exchanger with a heat isolation
    - For the HPN, it is located at the exit of evaporator collector tube.

PAC defrost probe

R-PAC defrost probe

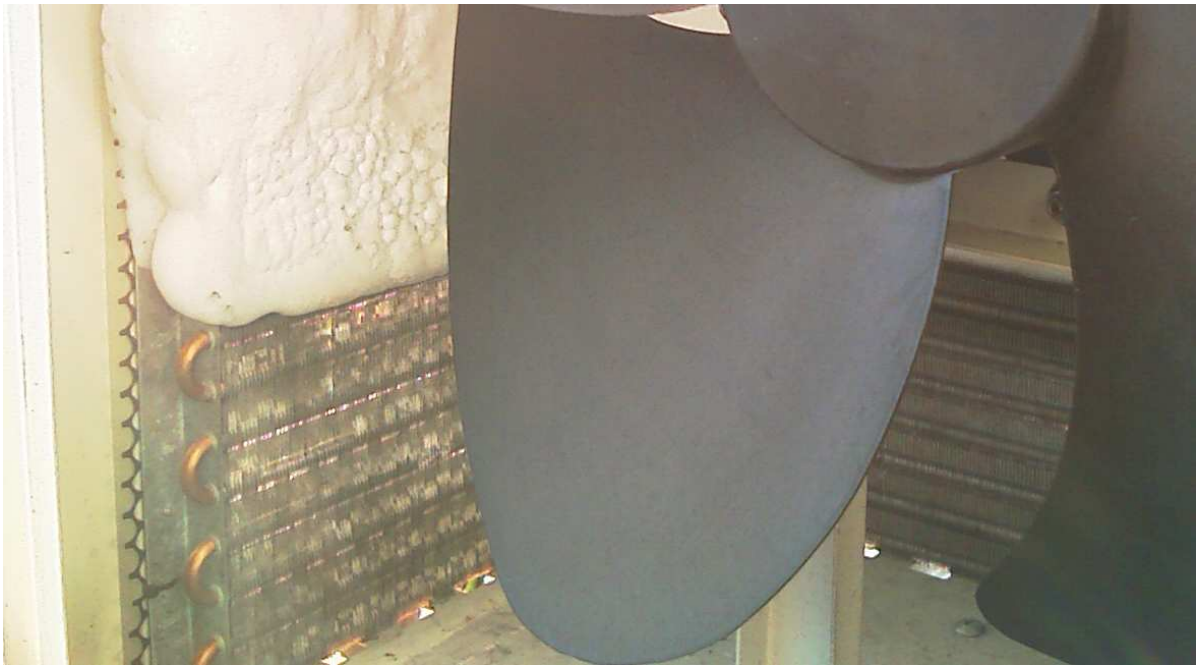
- Verify the adjustment of the expansion valve:
  Start up the machine and verify the super-heat and sub-cooling:
    - ✓ Super-heat: Between 7 and 10℃
    - ✓ Sub-cooling: Between 10 and 15℃

f. Conclusion

If all hypothesis are correct and all checking points have been done then the probable frosting that the machine may have should be normal

If even after all the checking points and adjustments the machine is still frosting, it could be due to a manufacturing fault originated by a wrong balancing of the battery.

This fault is easy to verify: one or several of the horizontal cooper tubes ice up abnormally forming a belt of ice getting ticker without melting. In the other hand, all the rest of the machine is free of ice as in the picture.

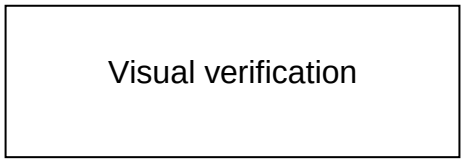


Example of a faulty evaporator

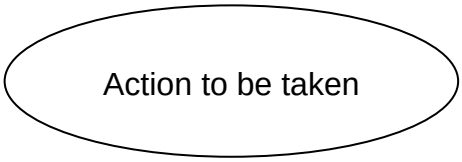
In this case it is necessary to take the machine back to Workshop in order change the battery.

IV. Electric problems diagnostic flowchart

Meaning of chart shapes

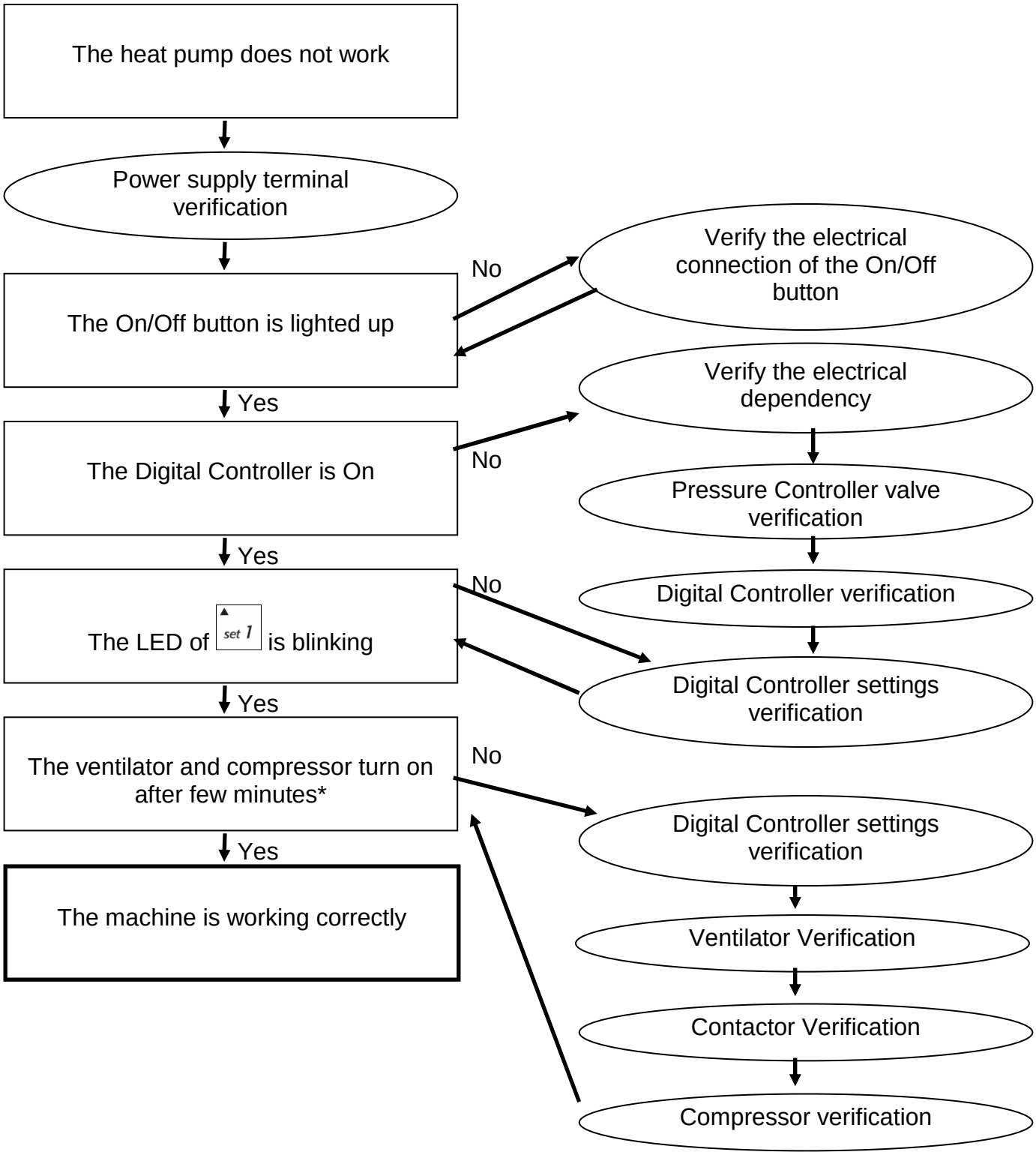


Every action in a square corresponds to a visual verification to be done.



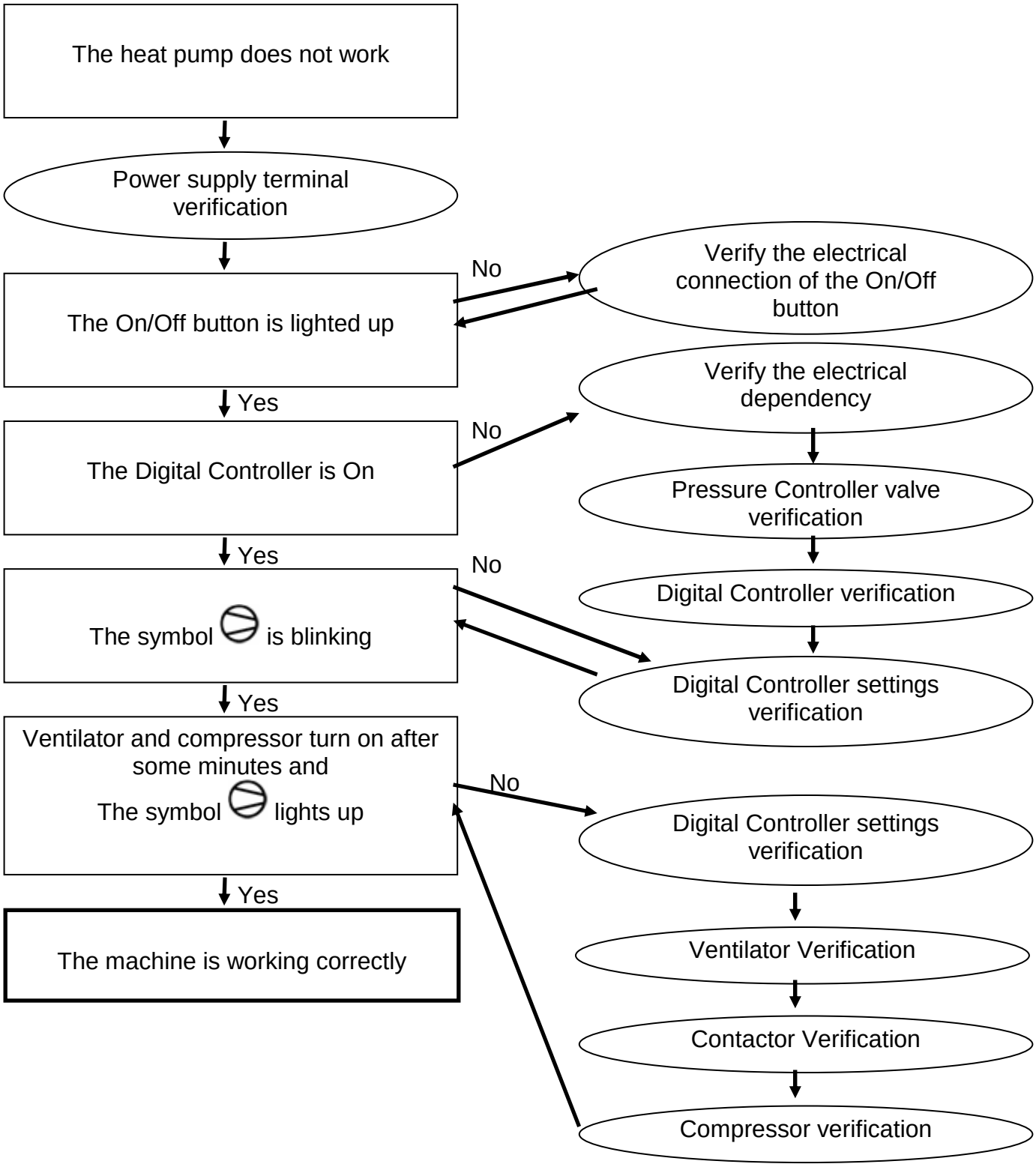
Every action in this circle corresponds to an Action to be taken and which detail is found in the chapter: “Components Verificatios”. *Make reference to the index in order to check the corresponding piece chapter.*

1. PAC16, PAC22 et PAC31



*If the compressor does not turn on and the LED of set 2 is on, verify that the air temperature is higher than 10℃. If it is not the case it means th at the defrost cycle is activated due to a low temperature.

2. R-PAC16, R-PAC22 et R-PAC31



*If the symbol lights up, means that the machine is on defrost cycle, which could be due to the low air temperature equal or less than 10℃ (Se e working table for more detail).

If the defrost cycle last more than 10min and the symbol do not disappear, it is necessary to verify the parameters of the Digital Controller.

V. Components Verification

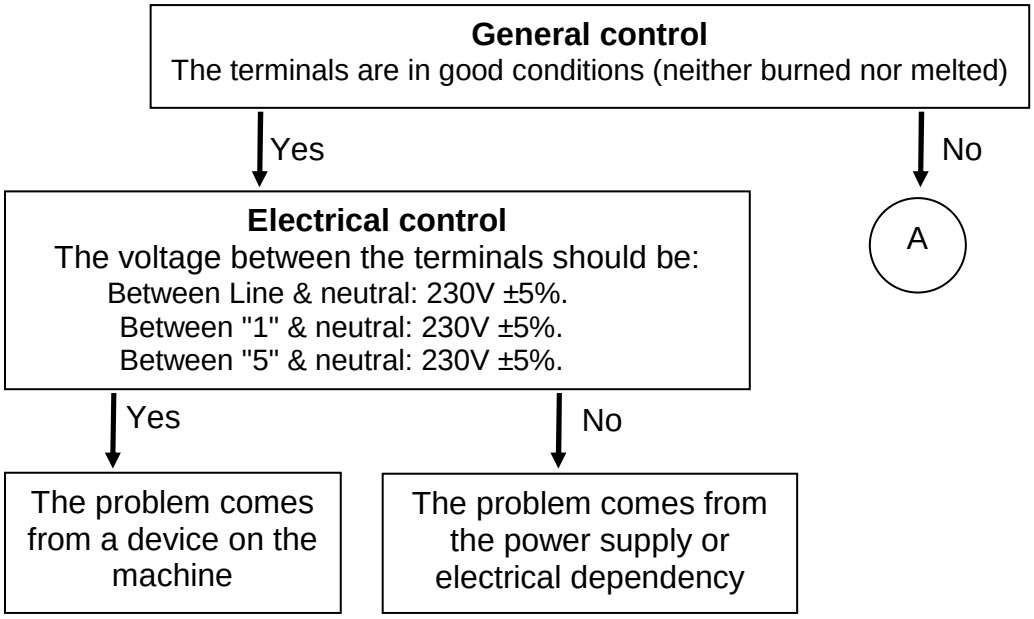
1. Power supply panel and electrical dependency

General power supply panel:
- Phase: Terminal marked by “R” or “L”
- Neutral: Terminal marked by “N”
- Electrical dependency: Terminals marked with “1” and “5”

a. Hypotesis

- The elements arriving to this connection have been verified and are working correctly
- The circuit breaker has been correctly connected and powered
- The heat pump power supply cables, between the neutral and the phase measure 230V ±5%.
- The cables are well connected and tighten up correctly to the panel (verify if needed pulling up manually the cables)
- The filtration pump relay (or other contactor used for electric dependency) is closed: There is a closed contact between “1” & “5”.

b. Control

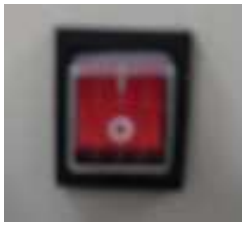


c. Conclusion

- A : Any damaged terminal should be changed.
  If necessary, contact Polytropic for a spare part

Verify that all steps of the hypothesis are correct

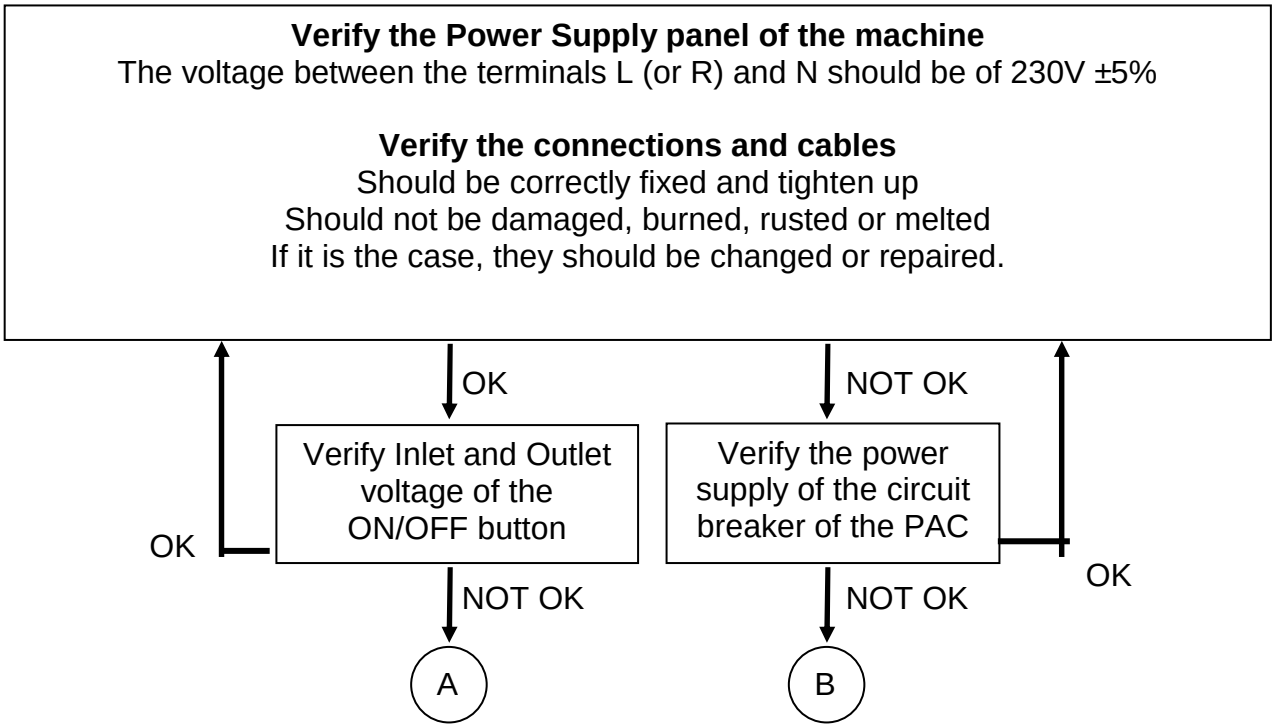
2. The ON/OFF switch



a. Hypothesis

- All components before the switch have been verified and work correctly
- The ON/OFF switch is not lighted up
- The PAC is well connected electrically
- The circuit breaker protection of 30mA is correctly connected

b. Verification



c. Conclusion

- A: The switch is out of service: Contact Polytropic for a new spare part
- B: The power supply of the circuit is not correct: Contact Polytropic to advise the installation technician.

3. The pressure controller valve

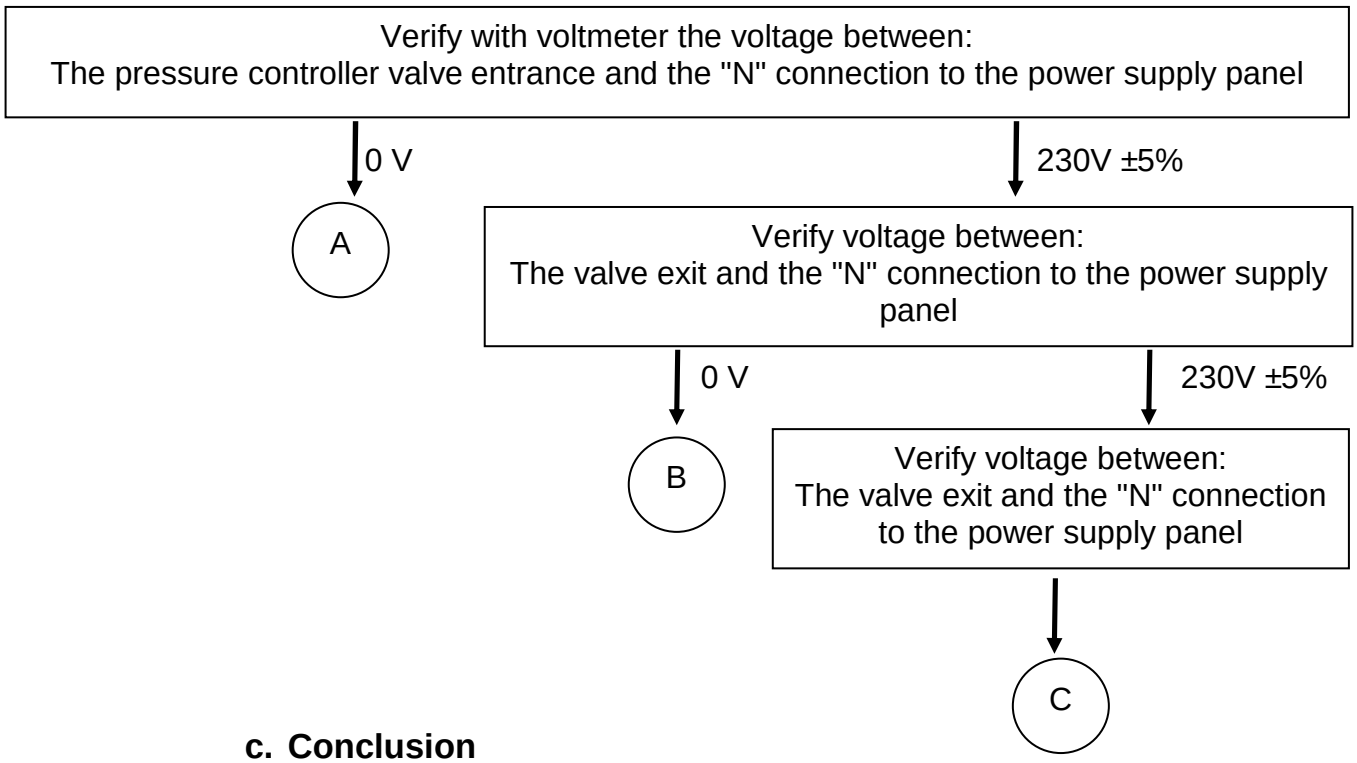
The initial adjustment should be:

- Cut off pressure: 25 bars
- Differential: 5 bars

a. Hypothesis

- All components before this device have been verified and work correctly
- The pressure controller valve is connected correctly and the connection cables are in good conditions
- The pressure on the circuit is correct
- The pressure controller valve has the correct adjustments

b. Verification



c. Conclusion

- A: Power supply is not working properly. Verify again the cables, connections and weldings
- B: The pressure controller valve is not working properly. Contact Polytropic for a spare part.
- C: The pressure controller valve is working properly.

4. The pressure controller valve (Not rechargeable High or Low pressure models)

Low pressure models:
- Blue cables
- Indicated by: YK 03 L

Values:
- Opening : 7±5 PSI
- Closure : 22±5 PSI

At:
- Cut off : 0.5 bars
- Differential : 1.0 bars

High pressure models:
- Black cables
- Indicated by YK 03 H

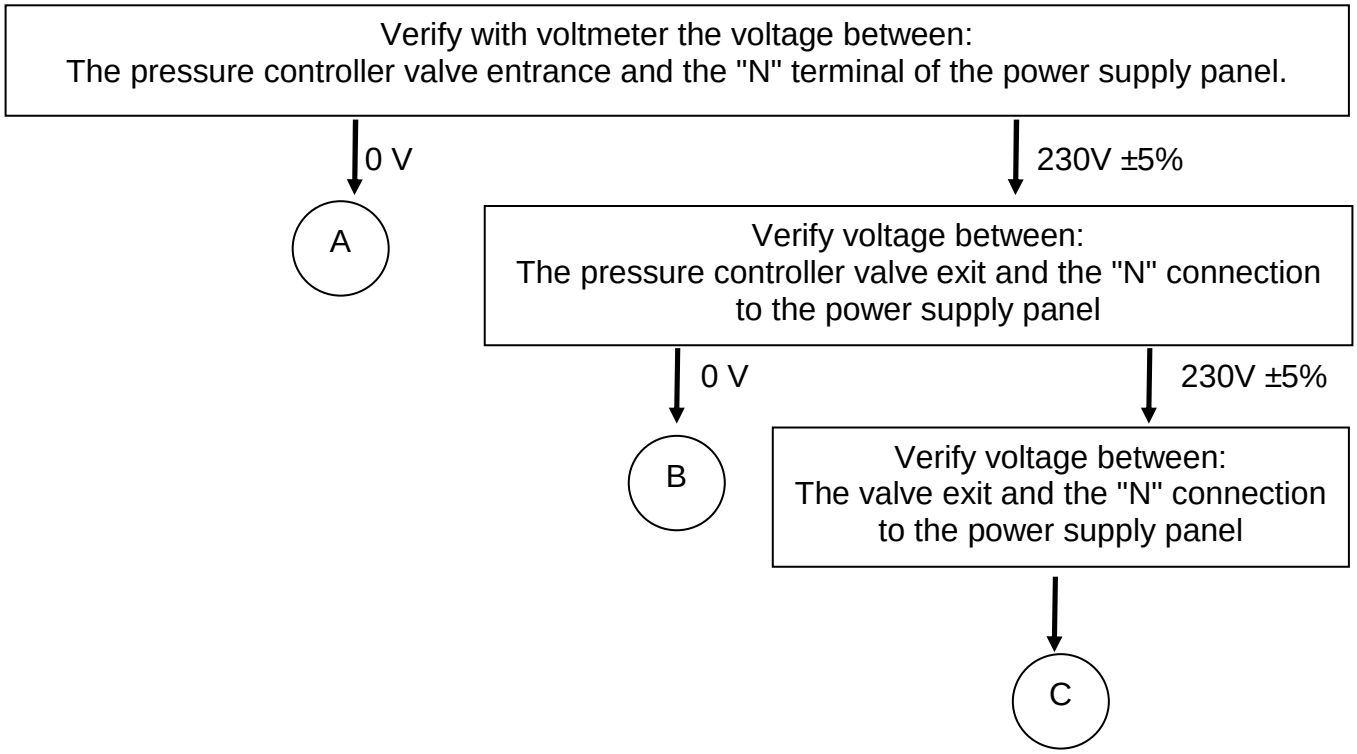
Values:
- Opening : 2.72 Mpa
- Closure : 2.03 Mpa

At:
- Cut off : 27 bars
- Differential : 7 bars

a. Hypothesis

- All components before this device have been verified and work correctly
- The pressure controller valve is connected correctly and the connection cables are in good conditions
- The pressure on the circuit is correct
- The pressure controller valve has the correct adjustments

b. Verification



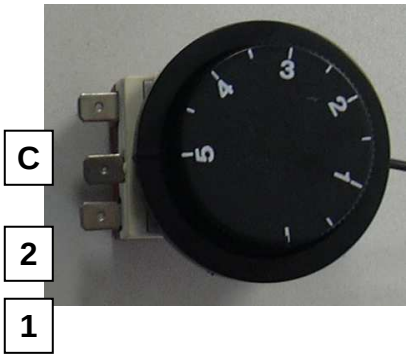
c. Conclusion

A: Power supply is not working properly. Verify again the cables, connections and welding

B: The pressure controller valve is not working properly. Contact Polytropic for a spare part.

C: The pressure controller valve is working properly.

5. The thermostat (HPN)



a. Hypothesis

- All components before this device have been verified and work correctly
- The thermostat has been connected correctly and the connection cables are in good conditions
- The setting is lower than water temperature (depending on the needs adjust to 5)
- The connectors are well connected on “C” and “1” of the thermostat

b. Verification

The machine starts up on “heating” position

Verify with voltmeter:

- The voltage between “C” of the thermostat and “N” of the power supply panel: Should be 230V ±5%

- The voltage between “1” of the thermostat and “N” of the power supply panel: Should be 230V ±5%

Yes → A

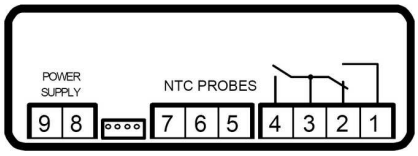
No → Does not matter which is the adjustment; verify that a contact exist before affirming the piece is defeated. → B

c. Conclusion

- A : The thermostat is working correctly.

- B: The thermostat is not working properly. Contact Polytropic for a spare part.

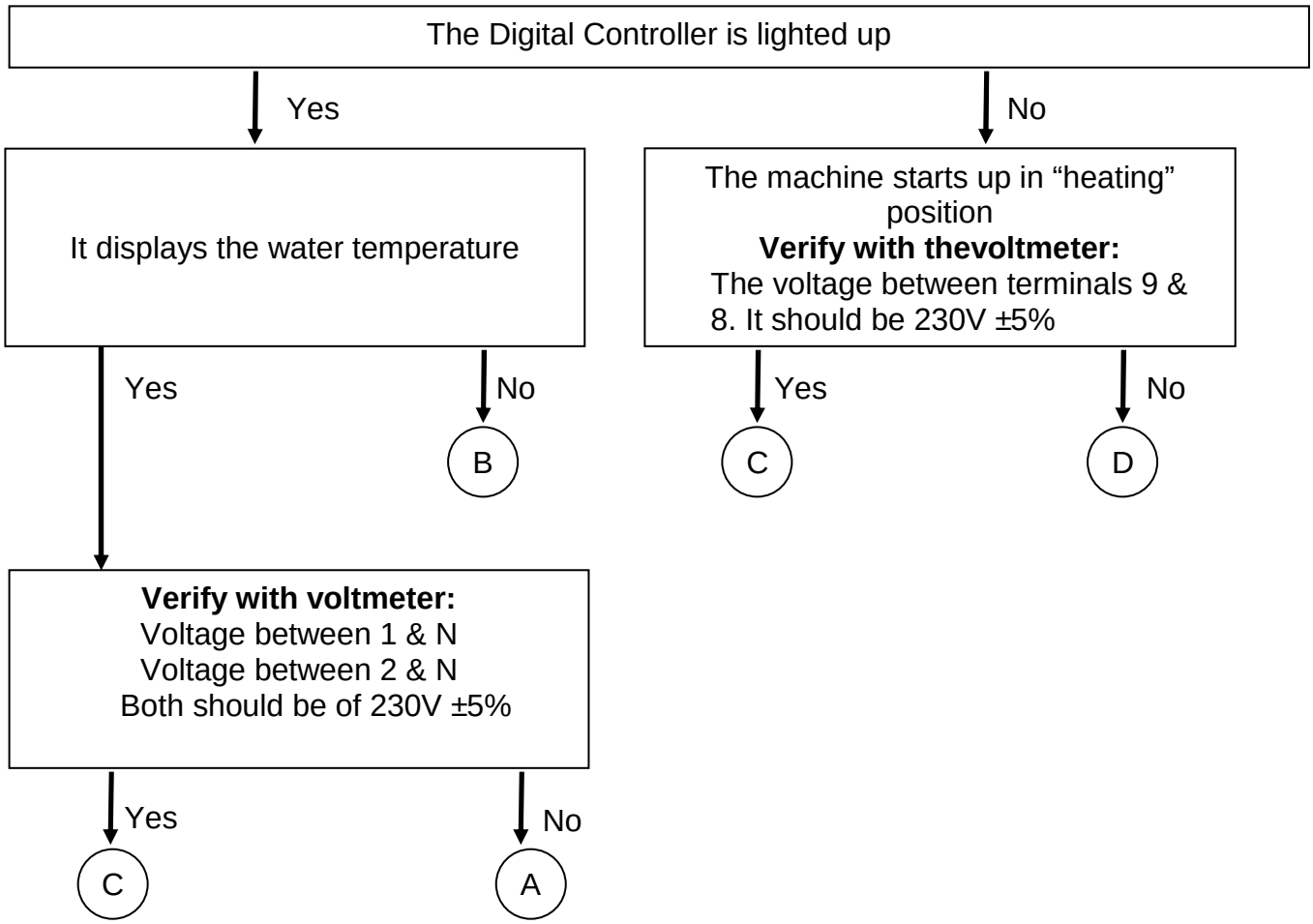
6. The Digital Controller for PAC. Carel PJ32W0000



a. Hypothesis

- All components before this device have been verified and work correctly
- The Digital Controller has been connected correctly and the connection cables are in good conditions
- The setting is lower than water temperature (Adjust if necessary)
- The connectors are well connected on “8” and “9” of the digital controller
- The air temperature is higher that 10℃

b. Verification

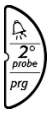


c. Conclusion

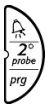
- A: Verify settings. The LED of “Set1” should be lighted up if the setting of the temperature is higher in 1℃ than the displayed temperature.
    - If there is voltage between “1” and “N”, but not between 2 and N and the LED of « Set 1 » is lighted up, verify conclusion D.
    - If there is not voltage between terminal 1 and N, verify conclusion C.
- B: If there are problems with the Digital Controller, verify the programming. If there is “EE” that is displayed even with the correct programming, contact Polytropic for a spare part
- C: If the problem does not come from the Digital Controller, verify the previous steps and the cable connections before the device
- D: If the Digital Controller is still having problems, contact Polytropic for a spare part

Digital Controller PJ32W0000 for PAC adjustments

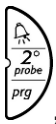
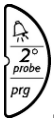
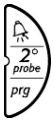
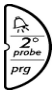
Adjustment Set 1:

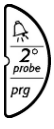
- Press  during 5 secs.
- Adjust with  &  . (28 by default)
- Press  during 10 secs for register.

Adjustment Set 2:

- Press  during 5 secs.
- Adjust with  &  . (8 by default)
- Press  during 10 secs for register.

Parameters adjustment:

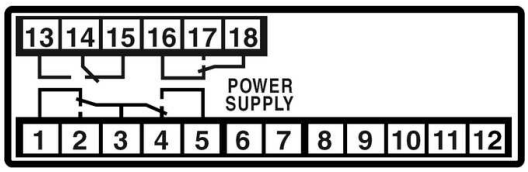
- Press  during 5 secs. « PS » will appear on display, press the  , « 0 » will be displayed.
- Set to « 22 » with  &  .
- Validate with  .
- Chose parameter with  &  .
- Validate with  .
- Adjust with  et  .
- Validate with  .

After adjustment of all parameters, press  during 10 secs to register

Carel PJ32W0000 setting adjustments

Parameter	Value	Meaning
Temperature Setting		
set1	28	Temperature 1 (> r4 & < r3)
set2	3	Temperature 2 (> r4 & < r3)
Temperature sensors parameters: /*		
/2	1	Measurement stability (> 1 & < 15)
/4	0	Selection of probe to be displayed (0 = S1 & 1 = S2)
/5	0	Value to be displayed 0 = ℃ & ℉ = 1
/6	-	Probe S2 measurement displayed
/C	0	Ambient probe calibration (x 1/10 ℃)
Hysteresis parameters: P*		
P1	1	Output 1 differential (0 = 0,5℃, < 1 & < 19)
P2	10	Output 2 differential (0 = 0,5℃, < 1 & < 19)
Regulation parameters: r*		
r1	1	Mode 1 regulation (0 = cool & 1 = heat)
r2	1	Mode 2 regulation (0 = cool & 1 = heat)
r3	-3	Minimum allowed set (> -50 & < r4)
r4	35	Maximum allowed set (> r3 & < 150)
r5	1	Probe 2 regulation (0 = probe 1 & 1 = probe 2)
Regulation time: c*		
c0	2	Output activation delay from start up of the instrument (min)
c1	2	Minimum start up time for Output regulation (min)
c2	5	Minimum shutting down time for Output regulation (min)
c3	0	Regulator start up interlock (0=no; 1=yes)
c4	2	Minimum time between the start-up of two outputs (min)
Alarm parameters: A*		
A0	0	Differential alarm (0 = 0,5℃, < 1 & < 19)
AL	-3	Low temperature alarm (> -50 & < AH)
AH	35	High temperature alarm (> AL & < 150)
At	0	Temperature alarm delay (min)
General parameters		
H0	0	Reserved
H1	1	Alarm signal output mode (0 = OFF & 1 = ON)
H2	1	Output 2 mode (0 = Alarm, 1 = Regulation)
H3	1	Keypad activation (0 = OFF & 1 = ON)
H4	0	Buzzer activation (0 = ON & 1 = OFF)
H5	-	ID code of the product
T	-	Reserved

7. The Digital Controller for R-PAC. Carel IR33COHB00)

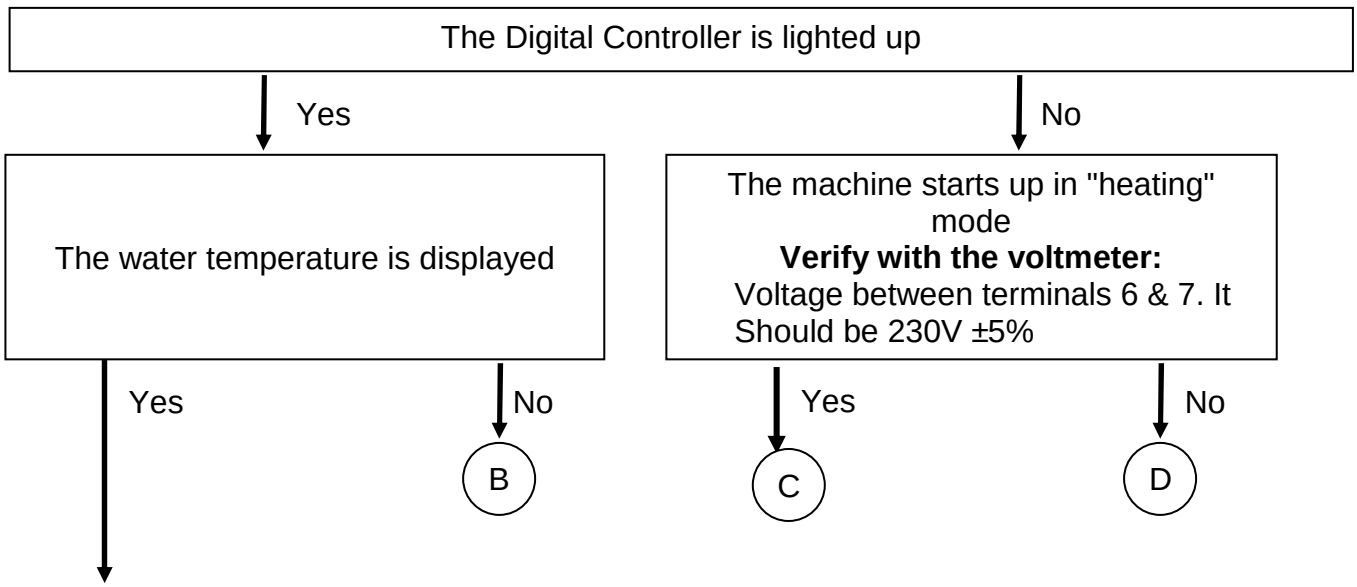


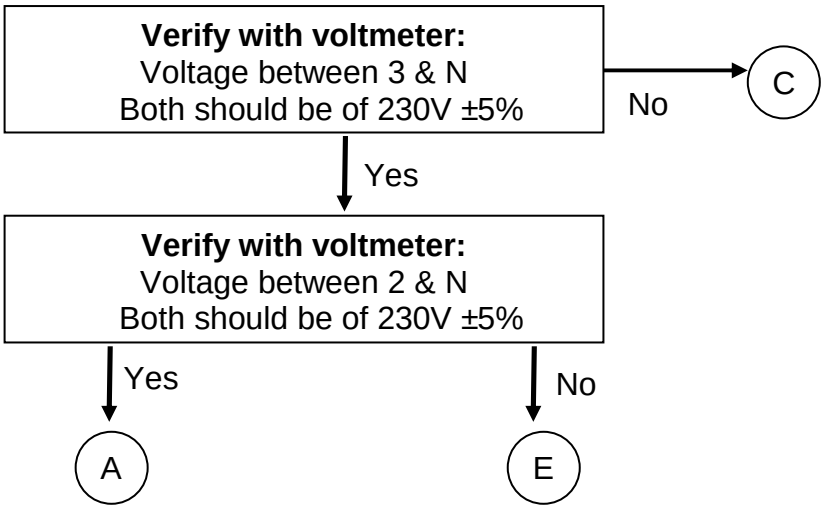
Related machines:
> R-PAC16 (< 05/2009)
> R-PAC22 (< 05/2009)
> R-PAC31 (< 05/2009)

a. Hypothesis

- All components before this device have been verified and work correctly
- The digital controller has been connected correctly and the connection cables are in good conditions
- The setting is lower than water temperature (Adjust if necessary)
- The connectors are well connected on “6” and “7” of the digital controller
- The air temperature is higher than -5℃

b. Verification





c. Conclusion

A: Verify settings. The symbol should be lighted up if the temperature is higher by 2℃ than the displayed temperature.

B: If the Digital Controller is not working properly, contact Polytropic for a spare part.

C: If the problem does not come from the Digital Controller, verify the previous steps and the cable connexions before the controller.

D: If the Digital Controller is not working properly, contact Polytropic for a spare part

E: If the problem does not come from the Digital Controller, verify the previous steps and the cable connexions before the controller

Digital Controller Carel IR33COHB00 adjustment

Temperature adjustment:

- Press [Set] during 5 secs
- Adjust with [▲ aux] & [def ▼].
- Press [Set] during 10 secs to register.

Settings Adjustment:

- Press [Set] & [Prg mute] during 5 secs, « 0 » will be displayed.
- Adjust at « 22 » with [▲ aux] & [def ▼].
- Validate pressing [Set].
- Chose parameter with [▲ aux] & [def ▼].
- Validate pressing [Set] .
- Adjust with [▲ aux] & [def ▼].
- Validate pressing [Set] .

After all parameters adjustment, press [Prg mute] during 10 secs to register

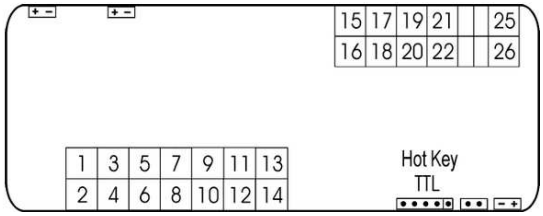
Carel IR33COHB00 setting adjustments

Parameter	Value	Unit	Parameter
			Probe Parameters
/2	4	-	Measurement stability
/3	0	-	Probe display response
/4	0	-	Virtual Probe
/5	0	-	Select ℃ (0) or ℉ (1)
/6	0	-	Decimal point visualization
/tl	1	-	Display on external terminal virtual probe (1 = Sonda 1 / 3 = Sonda 2)
/tE	0	-	Display on external terminal remote terminal not present virtual probe
/P	0	-	Select type of probe
/A2	2	-	Configuration of probe 2
/A3	0	-	Configuration of probe 3
/A4	0	-	Configuration of probe 4
/c1	0	℃/℉	Calibration of probe 1
/c2	0	℃/℉	Calibration of probe 2
/c3	0	℃/℉	Calibration of probe 3
/c4	0	℃/℉	Calibration of probe 4
			Regulation parameters
St	28	℃/℉	r1 < Temperature set point < r2
rd	2	℃/℉	Control Delta
rn	4	℃/℉	Dead band
rr	2	℃/℉	Reverse differential for control with dead band
r1	0	℃/℉	Minimum set point allowed
r2	35	℃/℉	Maximum set point allowed
r3	0	℃/℉	Operating mode (0 direct defrost control)
r4	3	℃/℉	Automatic night-time set point variation
r5	0	℃/℉	Enable temperature monitoring (0 disabled)
rt	0	℃/℉	Temperature monitoring interval
rH	-	℃/℉	Maximum temperature read
rL	-	℃/℉	Minimum temperature read

Parameter	Value	Unit	Parameter
	Compressor Parameters		CMP
c0	2	min	Compressor delay on start-up
c1	2	min	Minimum time between successive starts
c2	2	min	Minimum compressor OFF time
c3	2	min	Minimum compressor ON time
c4	0	min	Duty setting
cc	0	hr	Continuous cycle duration
c6	2	hr	Alarm by-pass after continuos cycle
c7	0	sec	Maximum "pump down" time
c8	0	sec	Compressor start delay after open "pump down" valve
c9	0	-	Enable autostart function in “pump down”
c10	0	-	Select "pump down" by time (1) or pressure (0)
c11	4	sec	Second compressor delay
	Defrost Parameters		dEF
d0	1	-	Type of defrost
d1	1	hr	Interval between defrost
dt1	50	℃/℉	End defrost temperature, evaporator
dt2	50	℃/℉	End defrost temperature, aux evaporator
dP1	250	min	Maximum defrost duration, evaporator
dP2	250	min	Maximum defrost duration, aux evaporator
d3	30	min	Defrost start delay
d4	0	-	Enable defrost on start-up
d5	0	min	Defrost delay on start-up
d6	1	-	Display on hold during defrost
dd	2	min	Dripping time after defrost
d8	1	hr	Alarm by-pass after defrost
d8d	0	hr/min	Alarm by-pass after door open
d9	0	-	Defrost priority over compressor protectors (0 if observed)
d/1	-	℃/℉	Display of defrost probe 1
d/2	-	℃/℉	Display of defrost probe 2
dC	1	-	Time base for defrost
d10	0	hr	Compressor running time
d11	1	℃/℉	Running time temperature threshold
d12	0	-	Advanced defrost
dn	65	-	Normal defrost duration (% of dt1 or dt2)
dH	50	-	Proportional factor, variation in dl

Parameter	Value	Unit	Parameter
		Parámetros de alarmas	
A0	20	℃/℉	Alarm and fan differential
A1	0	-	Type of Threshold (0 relative threshold)
AL	0	℃/℉	Low Temperature alarm Threshold
AH	0	℃/℉	High Temperature alarm Threshold
Ad	120	min	Low and high temperature signal delay
A4	0	-	Digital input 1 configuration (0 not active)
A5	10	-	Digital input 1 configuration
A6	0	min	Stop compressor from external alarm
A7	0	min	External alarm detection delay
A8	0	-	Enable Ed1 & Ed2 alarms (0 enabled)
Ac	70	℃/℉	High condenser temperature alarm
AE	10	℃/℉	High condenser temperature alarm differential
Acd	0	min	High condenser temperature alarm delay
AF	0	sec	Light sensor OFF time
ALF	-5	℃/℉	Anti-freeze alarm threshold
AdF	0	min	Antifreeze alarm delay
		Ventilation parameters	
F0	2	-	Fan management (2 fans controlled according to the evaporator temperature)
F1	10	℃/℉	Fan start temperature
F2	0	-	Fans always ON
F3	0	-	Fan operates during defrost
Fd	1	min	Fan OFF after dripping
F4	40	℃/℉	Condenser fan stop temperature
F5	5	℃/℉	Condenser fan start differential
		Configuration parameters	
H0	1	-	Serial ID
H1	1	-	Function of relay 4
H2	1	-	Disable keypad
H3	0	-	Remote control authorization
H4	0	-	Buzzer function
H6	0	-	Lock keypad
H8	0	-	Select activation of output with time band
H9	0	-	Enable set point variation with time band
Hdh	0	℃/℉	Anti-sweat heater offset

1. The Digital controller Dixell iChill 121C (R-PAC > 05/2009))



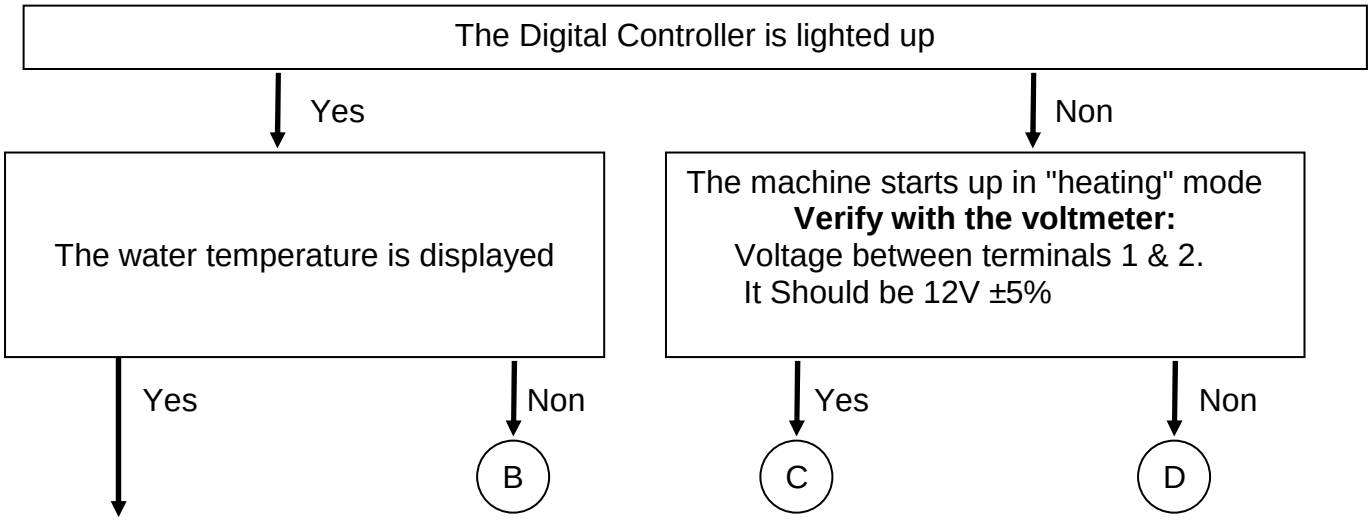
Concerned machines :

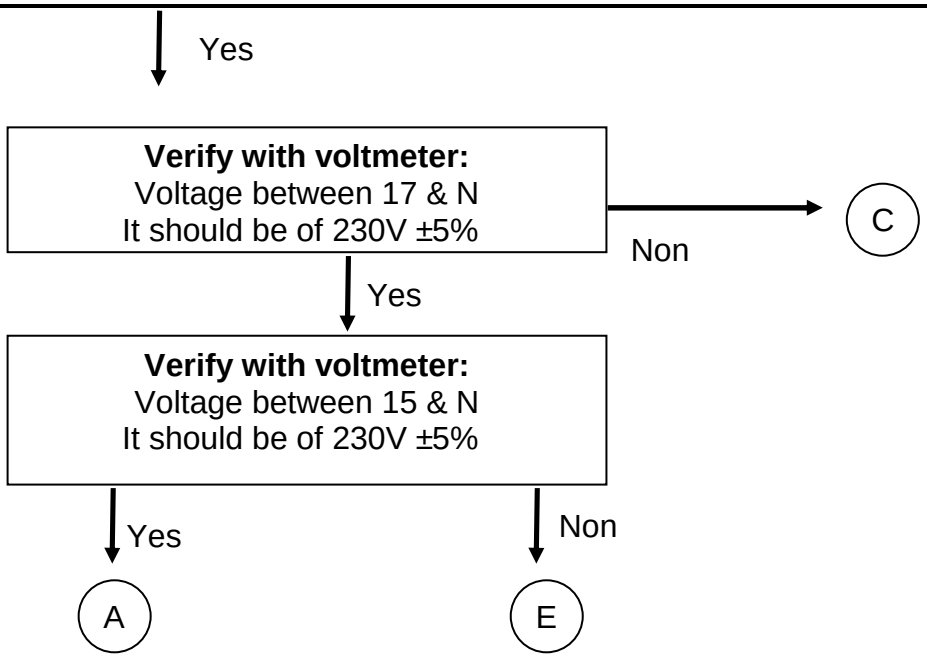
> R-PAC16 (> 05/2009)
> R-PAC22 (> 05/2009)
> R-PAC31 (> 05/2009)

a. Hypothesis

- All components before this device have been verified and work correctly
- The digital controller has been connected correctly and the connection cables are in good conditions
- The setting is lower than water temperature (Adjust if necessary)
  The connectors are well connected on “1” and “2” of the digital controller
  The air temperature is higher than -5℃

b. Verifications





c. Conclusion

- A: Verify settings, if the machine is on heating mode, there is a lighted point that should be bhind the sun symbol

- B: If the Digital Controller is not working properly, contact Polytropic for a spare part.

- C: If the problem does not come from the Digital Controller, verify the previous steps and the cable connexions before the controller.

  D: If the Digital Controller is not working properly, contact Polytropic for a spare part

  E: If the problem does not come from the Digital Controller, verify the previous steps and the cable connexions before the controller

Digital Controller Dixell iChill 121C pour R-PAC adjustments > 05/2009

Parameters:

If the machine is working, it should be forced to stand-by mode:

- If the machine is in heating mode:

  If the machine is on heating mode, a small light point is lighted under the heating symbol:
  

  That means that the botton  shoud be pressed until the stad-by symbol appears:
  

- If the machine is in chilling mode:

  If the machine is on chilling mode, a small light point is lighted under the chilling symbol::
  

  That means that the botton  shoud be pressed until the stad-by symbol appears:
  

When the machine is on stand-by mode; it is stopped and the symbol  is fixed. In this mode is then possible to access the parameters.

To access them, it is necessary to push at the same time the  &  buttons during few seconds until “ALL” appears.

Then it is possible to access the different parameters and its groups pressing

 or  .

To chosse a group of parameters, press  .

Once all parameters have been modified, to register and exit of the menu press  &  at the same time during few seconds (or do not touch anything during few seconds)

ATENTION: The parameter CF16 shoud not be adjusted before the CF10 to 3
If this happen, the machine will be blocked with the message « OFF » on the display.
To exit this mode, there are three solutions:

- Press the ON/OFF button of the remote control (optional accesory available under demand)
- Make contact between “ID5” and the common conection of the controller (cable 9 and 10 behind it)
- Redo the adjustments with an adjustment key

After that, in order to exit the stand-by mode the machine and put the machine on heating mode, press  or  to put the machine on freezing mode.

Alarmes:

Alarm	Meaning
bP &l	Pressure alarm. Automatic reset.
A02	Low Pressure alarm. It resets manually. Only if there has been more that 5 High Pressure alarms
A05	Too high temperature alarm. T°> +55℃ has been measured
A06	Too low temperature alarm. T°< -20℃ has bee n measured
A07	Antifreeze alarm. A water temperature < +3℃ ha s been measured on the condenser.
A09 &	High Pressure alarm. Manual reset. The High Pressure control valve has cut off.
A12	Defrost alarm. The defrost has last more than 20min
P1	Water temperature probe alarm. The water temperature probe does not work anymore
P3	Defrost temperature alarm. The defrost temperature probe does not work anymore
HP50	More than 55℃ has been measured (AL11)

In order to reset an alarm manually, press M. The messages « ALrM » will apear. Then press SET to validate.

The alarm code will apear and a message on the upper part :

- If it indicates « no », means that the error is still present and there is necessary to correct it before reset the alarm.
- If it indicates « rST », means that the error is not present anymore. Press then SET to reset the alarm.

In order to exit the alarm menu, press M.

Symbols that can appear besides the alarms :

- Defrost resistor
  If it appears means that it is meassuring less that 5℃
  If there is a defrost resistor connected, it will work in order to evacuete the ice, otherwise any incident.

-  • Defrost mode is active. A lighted point under the symbol is On
  It is active if the defrost probe measure less than -15℃

- **Flow!** The water flow is not enough
  It is active whenever there is an open contact between “1” and “5” (the filtration pump is stopped)

  In the case a Switch Flow is connected between “1” and “5”, the message means that the water flow is not enough for the machine to work

Heating priority

When the heating priority is being used, the normally open contact located between the terminals « 9 » and « 10 » of the heat pump should be connected in order to drive the relay of the filtration pump.

At this point the filtration is stopped (**Flow!** is lighted) and the machine starts a timer of 200min. At the end of this period, the filtration pump is activated during 10min in order for the water to circulate into the heat pump. After this period, if the machine detects that the water temperature is less than the desired one, it will force the filtration to work and will automatically starts on heating mode until the temperature reaches the desired value.

Heating and Chilling

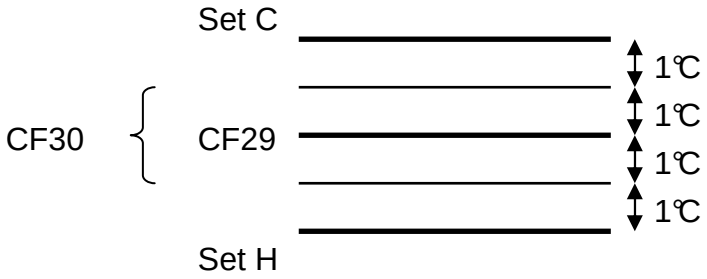
Whitout any modification, the machine is able to chill the water: it is necessary to put it on stand-by mode and restart it on chilling mode.

In order to have a heating and chilling mode; passing from automatic heating to chilling; there is necessary to make a modification on the digital controller, connecting a water temperature probe connected in “Pb4” and put the probe in a water Inlet to measure the tank water (exchanger).

In that moment, there is necessary to consider the following:

Heating setting:	ST3 (Set H)
Chilling setting:	ST1 (Set C)
Heating differential setting:	ST4
Chilling differential setting:	ST2
Neutral zone:	CF29
Neutral sone differential:	CF30

Then the values of CF29 and CF30 should be adjusted in order to have always:

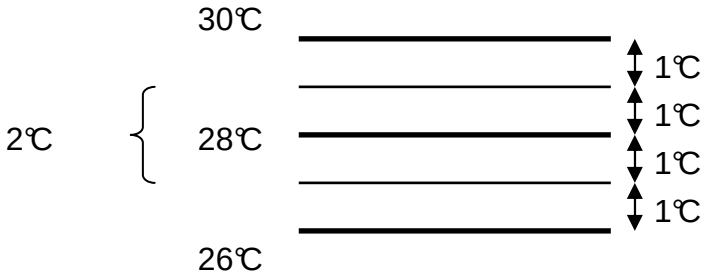


Example : For a desired temperature of 28℃, adjust : CF29 = 28℃, CF30 = 2℃, Set C = 28 + 2 = 30℃ and Set H = 28 – 2 = 26℃.

In this case the machine will heat the water and whenever it reaches 30℃ it will stop. It will not heat again unless the themperature decreases below 28℃

If the water temperature begins to be more than 30°C, the machine will turns on chilling mode until it reaches 26℃

Between 27 and 29℃, the machine will not work.



Complementary information (in case of test)

To avoid the compressor to start :

- Compressor 1: Set C012 to 1
- Compressor 2: Set C013 to 1

In the case the Digital Controller works normally but it does not turns on the compresor

Parameters value Table

Parameter	Value	Unit	Parameter description
Regulation parameters			
ST01	30	℃/℉	Setpoint in Chiller mode
ST02	2	℃	Differential of the Chiller mode
ST03	28	℃/℉	Setpoint in Heat Pump mode (range ST07..ST08)
ST4	2	℃	Differential of the Heat Pump mode
ST5	15	℃	Minimum limit value of ST01 settable for Chiller mode (range -40℃ / ℉…ST01). summer
ST6	35	℃	Maximum limit value of ST01 settable for Chiller mode (range ST01…110 ℃ / 230℉). summer
ST7	20	℃	Minimum limit value of ST03 settable for Heat Pump mode (range –40℃ / ℉...ST03). winter
ST8	35	℃	Maximum limit value of ST03 settable for Heat Pump mode (range ST03…110 ℃ / 230℉).winter
ST9	4	℃	Regulation band
Pr2	22		Access code
Configuration Parameters			
CF1	3		Configure the type of unit 0= Chiller air / air 1= Chiller air / air with heat pump 2= Chiller air / water 3= Chiller air / water with heat pump 4= Chiller eau / water 5= Chiller eau / water with heat pump
CF2	0		Motocondensing Unit 0= Non / 1= Yes
CF3	0		Regulation probe 0= Pb1 probe control / 1= Pb2 probe control
CF4	1		Pb1 analogue input configuration 0= No probe 1= NTC probe for evaporator water inlet / controlled air showed on the upper display 2= Digital input for Motocondensing unit 3= Digital input for motocondensing unit
CF5	0		Pb2 input configuration 0= no Probe 1= NTC probe temperature “evaporator water outlet”/ “evaporator out air”, it is showed on the upper display. 2= Digital input to generate the anti-freeze alarm 3= Digital input for motocondensing. If active it starts the unit in Heat mode
CF6	1		Pb3 input configuration 0=No Probe 1= NTC temperature probe to control the condenser fan speed, it is showed on the lower display. 2= 4.20mA condensing pressure input to control the condenser fan speed, it is showed on the lower display 3= 4.20mA Dynamic Setpoint input signal decided by the user. 4= NTC condenser probe anti-freeze alarm (water/water or water/water with Heat Pump)

Parameter	Value	Unit	Parameter description
CF7	0		Pb4 input configuration 0= no Probe 1= NTC temperature probe to control the condenser fan speed 2= Configurable digital input 3= NTC probe for outdoor air control 4= NTC probe for condenser anti-freeze alarm (water/ water) 5= NTC probe to detect the evaporator temperature in Heat Pump and control the Combined Defrost
CF8	10		ID1 configuration 0= 1st compressor thermal protection 1= Condenser fan thermal protection 2= Supply air fan thermal protection / alarm water flow 3= Remote On/off 4= Cooling/Heating 5= 2nd compressor thermal protection 6= 2nd compressor or step request (Motocondensing unit) 7= End defrost 8= Energy Saving 9= Anti Freeze alarm 10 = Water flow
CF9	0		ID2 configuration 0= 1st compressor thermal protection 1= Condenser fan thermal protection 2= Supply air fan thermal protection / alarm water flow 3= Remote On/off 4= Cooling/Heating 5= 2nd compressor thermal protection 6= 2nd compressor or step request (Motocondensing unit) 7= End defrost 8= Energy Saving 9= Anti Freeze alarm 10 = Water flow
CF10	3		ID5 configuration 0= 1st compressor thermal protection 1= Condenser fan thermal protection 2= Supply air fan thermal protection / alarm water flow 3= Remote On/off 4= Cooling/Heating 5= 2nd compressor thermal protection 6= 2nd compressor or step request (Motocondensing unit) 7= End defrost 8= Energy Saving 9= Anti Freeze alarm 10 = Water flow
CF11	8		Digital input configuration ID5 0= If active it generates a compressor 1 thermal protection alarm 1= If active it generates a condenser fan thermal protection alarm 2= If active it generates a supply air fan alarm thermal protection (air/air) / alarm water flow (water/air, water/water) 3= If active it generates a remote OFF command 4= Remote “Chiller / Heat Pump” command

			5= If active it generates a 2nd compressor thermal protection alarm 6= External call for 2nd compressor / stage (Motocondensing). 7= If active it determines the end defrost cycle 8= If active it enables the Energy Saving function 9= If active it generates an “Anti ice alarm”. 10= Water flow
CF12	1		Digital input polarity ID1 0= Active with close contact / 1= Active with open contact
CF13	1		Digital input polarity **ID2** 0= Active with close contact / 1= Active with open contact
CF14	0		Digital input polarity **ID3** 0= Active with close contact / 1= Active with open contact
CF15	1		Digital input polarity **ID4** 0= Active with close contact / 1= Active with open contact
CF16	0		Digital input polarity **ID5** 0= Active with close contact / 1= Active with open contact
CF17	0		Digital input polarity **Pb1** 0= Active with close contact / 1= Active with open contact
CF18	0		Digital input polarity **Pb2** 0= Active with close contact / 1= Active with open contact
CF19	0		Digital input polarity **Pb4** 0= Active with close contact / 1= Active with open contact
CF20	9		Configuration of the relay n°4 0= alarm 1= compressor 1 2 = compressor 2 3= ON/OFF condenser fan 4 = Solenoid valve for chiller / heat pump 5= Solenoid valve only in heat pump 6= water pump 7= antifreeze heater 8= reversing valve 9= short circuit filtration clock
CF21	7		Configuration RL5. Relay 5 0= General alarm 1= Compressor 1 2 = Compressor 2 3= ON/OFF condenser fan 4 = Solenoid valve for chiller / heat pump 5= Solenoid valve only in heat pump 6= Water pump 7= antifreeze heater 8= reversing valve 9= short circuit filtration clock
CF22	0	Bar	4mA corresponding to the pressure value of the transducer
CF23	30	Bar	20mA corresponding to the pressure value of the transducer
CF24	0	℃	Calibration Pb1
CF25	0	℃	Calibration Pb2
CF26	0	℃	Calibration Pb3
CF27	0	℃	Calibration Pb4
CF28	0		Starting priority Chillet or Heat pump

			0= Keyboard commands override the digital input commands
CF29	1	℃	Automatic change over Set point
CF30	2.5	℃	Change Over differential
CF31	0		Chiller and Heat Pump keys configuration 0= ❄ chiller / ✹ heat pump 1= ✹ chiller / ❄ heat pump
CF32	0		Select Celsius or Fahrenheit 0= ℃ / ℔BAR 1= ℉ / ℔psi
CF33	0		Selects the power supply frequency 0= 50 Hz 1= 60 Hz
CF34	1		Serial Address for monitoring system
CF35	0		Number of remote keyboards push buttons 0= 4 push buttons 1= 6 push buttons 2= 6 push buttons with NTC sensor
CF36	0		Default read-out of the display 0 = Dsup PB1 - Dinf PB2 1 = Dsup PB1 - Dinf PB3 2 = Dsup PB1 - Dinf PB4 3 = Dsup PB1 - Dinf clock 4 = Dsup PB2 - Dinf PB1 5 = Dsup PB2 - Dinf PB3 6 = Dsup PB2 - Dinf PB4 7= Dsup PB2 - Dinf clock
CF37	2,9		Firmware Release identification
CF38	2		Eeprom parameter map identification
CF39	3		Configuration of the relay n°2 0= General Alarm 1= compressor 1 2 = compressor 2 3= ON/OFF condenser fan 4 = Solenoid valve for chiller / heat pump 5= Solenoid valve only in heat pump 6= water pump 7= antifreeze heater 8= reversing valve 9= short circuit filtration clock
CF40	8		Configuration RL3 0= alarm 1= compressor 1 2 = compressor 2 3= ON/OFF condenser fan 4 = Solenoid valve for chiller / heat pump 5= Solenoid valve only in heat pump 6= water pump 7= antifreeze heater 8= reversing valve 9= short circuit filtration clock

Parameter	Value	Unit	Parameter description
Dynamic set point Parameters			
Sd01	0		Dynamic Setpoint configuration 0= Function disabled / 1= Function enabled
Sd02	-	℃	Maximum offset of the setpoint value reachable in Chiller mode (summer)
Sd03	-	℃	maximum offset of the setpoint value reachable in Heat Pump mode (winter)
Sd04	-	℃	External air temperature setpoint in Chiller mode.
Sd05	-	℃	External air temperature setpoint in H.P. mode.
Sd06	-	℃	External air temperature differential in Chiller mode.
Sd07	-	℃	External air temperature differential in Heat Pump mode.
Pr2	22		Access code
Energy saving Parameters			
ES01	0		Energy saving starting hour (0÷24)
ES02	-		Energy saving ending hour (0÷24)
ES03…ES09	-		Monday…Sunday 0 = Not enabled 1= Enabled
ES10	-		Energy saving setpoint offset in chiller
ES11	-		Energy saving differential in chiller
ES12	-		Energy saving setpoint offset in heat pump
ES13	-		Energy saving differential in heat pump
Pr2	22		Access code
Compresors Parameters			
CO01	0	Sec	Minimum ON time (sec x10)
CO02	12	Sec	Minimum OFF time (sec x 10)
CO03	60	Sec	ON delay time between two compressors or Comp. and valve
CO04	60	Sec	OFF delay time between two compressors or Comp. and valve
CO05	1	Min	Output time delay after power supply start-up
CO06	5	Sec	Compressor On delay time after Pump/"Supply fan" activation
CO07	5	Sec	Compressor OFF delay time after Pump/"Supply fan" de-activation
CO08	0		Compressor rotating control 0= Enabled 1= Fixed sequence
CO09	0	Sec	Time delay for solenoid valve of water side (CF39)
CO10	0		Stage valve polarity 0= Capacity stage ON 1= Capacity stage OFF
CO11	0		Pump/"Supply fan" operating mode 0= Not used 1= Continuously 2= Only for compressor demand
CO12	0		Compressor 1 0 = Enabled 1 = OFF
CO13	0		Compressor 2 / Stage valve. 0 = Enabled 1= OFF
CO14	0	Hr	Hour counter setpoint for 1st compressor
CO15	0	Hr	Hour counter setpoint for 2nd compressor
CO16	0	Hr	Hour counter setpoint for pump/"Supply fan"
CO17	200	Min	Delay time to force in ON the water pump
CO18	10	Min	Temps de marche forcée, (court circuit pour l'horloge de filtration)

Parameter	Value	Unit	Parameter description
Condenser Fan control parameter			
FA01	1		Fan output 0= Not enabled 1= Enabled
FA02	0		Fan regulation 0=On when compressor On 1=ON/OFF 2= Proportional speed control
FA03	**0**		Fan related to compressor 1= Independent from compressor 0= With compressor
FA04	5	Sec	Maximum speed time when the fan is starting
FA05	4	%	Phase difference fan
FA06	6		Not used
FA07	5	Sec	Cooling pre-ventilation before ON compressor
FA08	30	%	Minimum fan speed in summer (Chillier mode)
FA09	100	%	Maximum fan speed in summer (Chillier mode)
FA10	0	℃ / ℉ Bar / Psi	Temperature / pressure setpoint for minimum speed in summer
FA11	0	℃ / ℉ Bar / Psi	Temperature / pressure setpoint for maximum speed in summer
FA12	3	℃ / ℉ Bar / Psi	Proportional band in summer
FA13	1	℃ / ℉ Bar / Psi	CUT-OFF differential in summer
FA14	2	℃ / ℉ Bar / Psi	Override CUT-OFF in summer
FA15	5	Sec	Delay time for CUT-OFF
FA16	30	%	Fan speed in summer night function
FA17	30	%	Minimum fan speed in winter
FA18	100	%	Maximum fan speed in winter
FA19	7	℃ / ℉ Bar / Psi	Temperature / pressure setpoint for minimum speed in winter
FA20	45	℃ / ℉ Bar / Psi	Temperature / pressure setpoint for maximum speed in winter
FA21	2	℃ / ℉ Bar / Psi	Proportional band in winter
FA22	1	℃ / ℉ Bar / Psi	CUT-OFF differential in winter
FA23	2	℃ / ℉ Bar / Psi	Override CUT-OFF in winter
FA24	30	%	Fan speed in winter night function
FA25	25	℃	Hot Start Setpoint
FA26	5	℃	Hot Start differential

Parameter	Value	Unit	Parameter description
Paramètres Résistance / Anti-gel			
Ar01	-20	℃	Minimum value of Anti-Freeze Setpoint
Ar02	10	℃	Maximum value of Anti-Freeze Setpoint
Ar03	3	℃	Anti-freeze Setpoint in chiller mode
Ar04	4	℃	Anti-Freeze Differential in chiller mode
Ar05	10	Sec	Anti-Freeze alarm delay
Ar06	3		Maximum number of Anti-Freeze alarm events in 1 hour
Ar07	10	Sec	Anti-Freeze alarm delay after starting in Heat Pump
Ar08	33	℃	Anti-Freeze Setpoint of the electrical heater in Chiller mode
Ar09	3	℃	Anti-Freeze Setpoint of the electrical heater in Heat Pump mode
Ar10	3	℃	Anti-Freeze Setpoint of external electrical heater (water/water units)
Ar11	4	℃	Anti-Freeze Differential in Chiller
Ar12	4	℃	Anti-Freeze Differential in Heat Pump
Ar13	0		Anti-freeze electrical heater regulation 0= enabled during regulation control 1= enabled active during regulation an defrost
Ar14	0		Anti-freeze electrical heater regulation in Chiller mode 0= OFF in chiller 1= ON in chiller
Ar15	0		Anti-freeze electrical heater regulation in H.P. mode 0= OFF in Heat Pump 1= ON in Heat Pump
Ar16	0		Anti-freeze control probe in Chiller mode 0= Pb1 1= Pb2
Ar17	0		Anti-freeze control probe in Heat Pump mode 0= Pb1 1= Pb2
Ar18	1		“Water pump”/ “Anti-freeze electrical heater” control with unit in OFF or Stand-by 0= Regulation not enabled 1= Regulation enabled
Ar19	1		“Water pump”/ “Anti-freeze electrical heater” control for faulty probe 0= output OFF for faulty probe 1= output ON for faulty probe
Ar20	0		Boiler function 0= Integration control 1= Heating control
Ar21	5	℃	External air Setpoint for Boiler heater activation
Ar22	2	℃	Boiler function differential
Ar24	-5	℃ /℉	Anti-freeze setpoint alarm in heat pump mode
Ar25	4	℃	Anti-freeze alarm differential in heat pump mode
Pr2	22		Access code

Parameter	Value	Unit	Parameter description
Anti-freeze / Heater parameters			
DF01	1		Defrost control 0= No 1= Yes
DF02	0		Defrost type 0= Temperature / pressure 1= Time 2= External contact
DF03	-15	℃ / ℉ Bar / Psi	Temperature / pressure Setpoint for starting the defrost cycle
DF04	30	℃ / ℉ Bar / Psi	Temperature / pressure Setpoint for stopping the defrost cycle
DF05	0	Sec	Minimum delay time before starting a forced defrost cycle
DF06	10	Sec	Minimum defrost duration
DF07	25	Min	Maximum defrost duration
DF08	10	Sec	Compressor Off time before starting a defrost cycle
DF09	10	Sec	Compressor Off time after a defrost cycle
DF10	1	MIN	Interval time between defrost cycles
DF11	3	℃	Temperature setpoint to start a combined defrost cycle after the DF10 counting time
DF12	50	℃	Temperature Setpoint to stop a combined defrost
DF13	0		Forced activation of the 2nd compressor in defrost 0= Not enabled 1= Enabled
DF14	0		Forced fan activation during defrost and draining times 0= Not enabled 1= Enabled only for defrost 2= Enabled for defrost and draining time (dF09)
DF15	52	℃ / ℉ Bar / Psi	Temperature/Pressure Setpoint to start a forced condensing fan control in defrost cycle
DF16	0		Low alarm control during defrost 0= Not enabled 1= Enabled
DF17	10	Sec	Low alarm delay time after changing the status of the 4-ways valve
DF18	0		4-ways reversing valve 0= ON in cooling 1= ON in heating
DF19	-18	℃ / ℉ Bar / Psi	Temperature/pressure Setpoint to start a forced defrost cycle
DF20	0,5	℃	Forced defrost cycle differential

Parameter	Value	Unit	Parameter description
Alarm parameters			
AL01	5	Sec	Low pressure alarm delay time
AL02	3		Maximum low pressure alarm events in 1 hour
AL03	1		Low pressure alarm with off compressor 0= Not enabled when compressor Off 1= Enabled when compressor Off
AL04	5	Sec	“Water flow/Supply fan thermal protection” alarm delay after “water pump / supply air fan” starting.
AL05	10		Maximum number of “Water flow”/”Supply fan thermal protection” alarm events in 1 hour
AL06	5	Sec	“Water flow/Supply fan thermal protection” input activation duration
AL07	5	Sec	Water flow/Supply fan thermal protection” input de-activation duration
AL08	5	Sec	Thermal protection alarm delay after starting the compressor
AL09	3		Maximum number of compressor thermal protection alarm events in 1 hour
AL10	0		Compressor thermal protection alarm reset after AL09 parameter
AL11	55	℃ / ℉ Bar / Psi	Condensing temperature/pressure high alarm setpoint for input probe
AL12	2	℃ / ℉ Bar / Psi	Temperature/pressure high alarm differential for input probe
AL13	0	Sec	Low pressure alarm delay for input probe
AL14	-20	℃ / ℉ Bar / Psi	Low pressure alarm Setpoint for input probe
AL15	1	℃ / ℉ Bar / Psi	Low pressure differential for input probe
AL16	5	h	Maximum number of the low alarm events in 1 hour for input probe
AL17	0		Open collector and relay alarm output control with unit in Off or stand-by 0= Alarm outputs enabled 1= Alarm outputs not enabled
AL18	0		Alarm relay output polarity 0= Active alarm for closed contact 1= Active alarm for open contact
AL19	5	Sec	Delay for the high pressure alarm
AL20	5	Sec	Water flow input activation duration
AL21	5	Sec	“Water flow” input de-activation duration

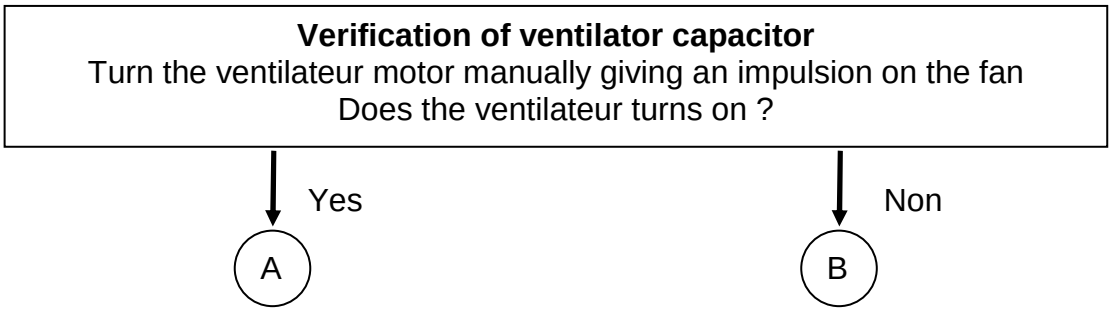
2. The ventilator

d. Hypotesis

All components before this device have been verified and work correctly

- The compressor in working properly
- The ventilator has been correctly connected to power supply (230V±5% to its terminals and connector in good conditions)

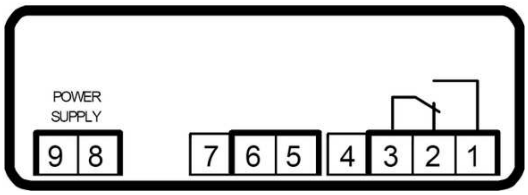
e. Verifications



f. Conclusion

- A: The ventilateur capacitor is not working properly. Contact Polytropic for a spare part.
- B: The ventilateur motor is not working properly. Contact Polytropic for a spare part.

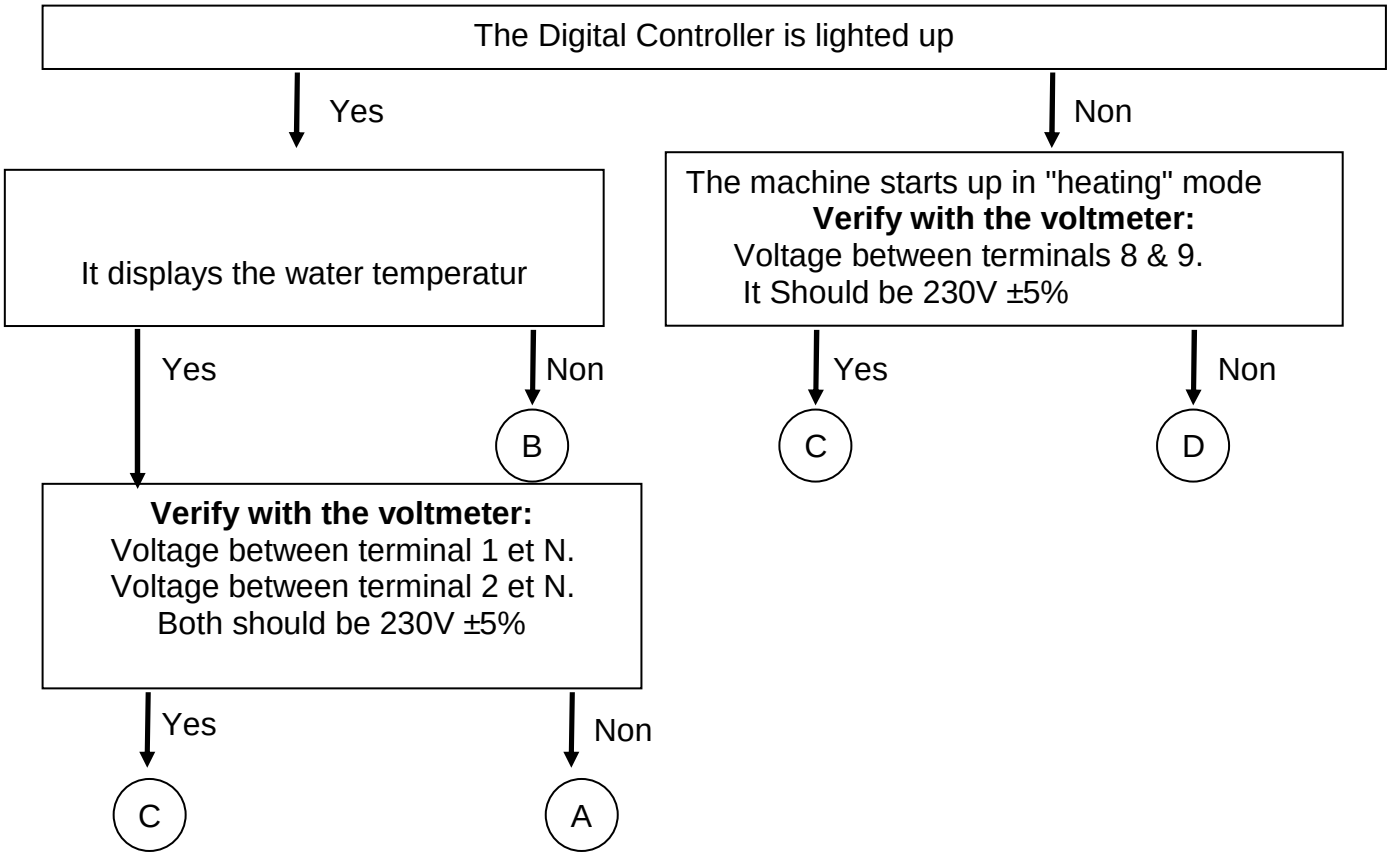
3. The defrost Digital Controller (HPN)



a. Hypothesis

- All components before this device have been verified and work correctly
- The digital controller has been connected correctly and the connection cables are in good conditions
- The thermostat setting is lower than water temperature (Adjust if necessary to 5)
- The connectors are well connected between “8” and “9” on the digital controller
- The air temperature is higher than 10℃

b. Verification



c. Conclusion

- A : Verify the settings, the LED of «Set 1» should be lighted up if the temperature is higher than 10℃.
    - If there is voltage between 1 & N, but not between 2 & N and «Set 1» is lighted up, go to conclusion D.
    - If there is not voltage between terminals 1 & N, go to conclusion C.
- B: The Digital Controller is not working properly. Verify the settings. If « EE » is displayed even after checking the settings, contact Polytropic for a spare part.
- C: The problem does not come from the Digital Controller. Verify previous steps and the cable conections before the Digital Controller.
- D: The Digital Controller is not working properly. Contact Polytropic for a spare part

Digital Controller PJ32S0Z00K settings

Adjustment setting (defrost)

- Press  during 2secs.
- Adjust with  &  to -2℃
- Press  during 10 secs to register

Parameters settings:

- Press  during 10 secs
- Chose the parameter with  &  .
- Validate with  .
- Adjust with  &  .
- Validate with  .
- After all prameter adjustments, press  during 10 secs to register.

Parameters value table

Parameter	Value	Unit	Parameter
Set	-2	℃/℉	Regulation temperature
Temperature sensor parameters: /*			
/C	0	℃/℉	Probe graduation (x 1/10 °)
/2	0	-	Measured stability
/5	4	-	Visualization ℃/℉ (0= ℃, 1= ℉)
Regulation parameters: r*			
rd	12	℃/℉	Differential regulator (hysteresis)
r1	-10	℃/℉	Minimum Set for user
r2	0	℃/℉	Maximum Set for user
Output Parameters: c*			
c0	2	min	Compressor delay after start up
c1	2	min	Min time between 2 turns compressor on
c2	5	min	Min time of cut off of compressor
c3	2	min	Min working time of compressor
c4	0	min	Security cycle of relay
cc	0	hr	Continus cycle duration
Alarm Parameters: A*			
A0	0	℃/℉	Alarm differential (0 = 0,5℃, < 1 & < 19)
AL	0	℃/℉	Low temperature alarm (> -50 & < AH)
AH	40	℃/℉	High temperature alarm (> AL & < 150)
Ad	0	min	Temperature retard alarm
rL	0	-	
General parameters			
H5	-	-	ID code of product

In certain machines, the defrost controller is different because of supplying issues. It is possible that there is a Digital Controller PJ32S0000 instead of the PJ32S0Z00K. The only difference is the color (black instead of white).

If it is the case, follow the next steps:

Digital Controller PJ32S0000 settings

Adjustment setting (defrost)

- Press  during 2 secs.
- Adjust to -2 with  &  .
- Press  during 10 secs to register.

Parameters settings:

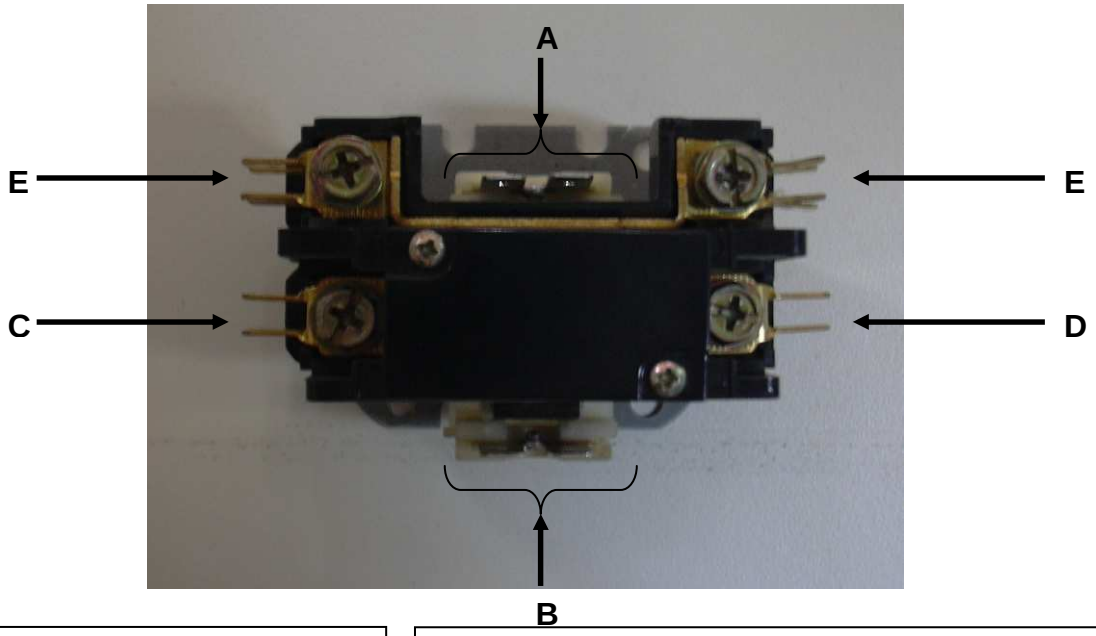
- Press  during 5 sec. « PS » will be displayed. Press then again  and« 0 » will be displayed.
- Adjust to « 22 » with  &  .
- Validate with  .
- Chose the parameter with  &  .
- Validate with  .
- Adjust with  &  .
- Validate with  .

After all prameter adjustments, press  during 10 secs to register

Parameters value table

Parameter	Value	Unit
Temperature sensor parameters: /*		
/C	0	Probe regulation (x 1/10 °)
/2	1	Measured stability (> 1 & < 15)
/4	0	Display probe selection (0 = air, 1 = defrost)
/5	0	0 = °C & °F = 1
Regulation parameters: r*		
rd	12	Différentiateur régulateur (hystérésis)
r1	-10	Minimum set for user
r2	0	Maximum set for user
r3	1	Activation alarm Ed (1= inactive)
r4	0	Automatic variation of night function (°C / °F)
Output parameters: c*		
c0	2	Compressor delay at start up (min)
c1	2	Min time between 2 turns compressor on
c2	5	Min time of cut off of compressor
c3	2	Max working time of compressor
c4	0	Security cycle of relay
cc	0	Continus cycle duration
c6	0	Exclusion alarm time cycle
Defrost parameters: d*		
d0	3	Defrost mode (0=res., 1=gas, 2=rés temp., 3=gas temp.)
d1	2	interval between 2 defrosts
dt	0	End of Defrost temperature
dP	1	Maximal duration of defrost or effective duration for d0=2 or d0=3
d4	0	Defrost at start up (1=YESi)
d5	0	Defrost delay
d6	0	Arrêt visualisation pendant le dégivrage (1=YES)
dd	0	Drip try temp after defrost
d8	0	Exclusion time alarm after defrost
d9	0	Defrost priority over the time compresor (1=YES)
d/	0	
dC	0	Time base (0 =hours/min, 1=min/s)
Alarm parameters: A*		
A0	0	Alarm differential (0 = 0,5°C, < 1 & < 19)
AL	0	Low pressure alarm (> -50 & < AH)
AH	40	High pressure alarm (> AL & < 150)
Ad	0	Temperature alarm delay
A7	0	Digital configuration
General parameters		
H0	0	ID address
H1	0	Active defrost
H2	1	Key pad desactivation, 0= desactivated
H3	0	Desactivation buzzer
H5	-	ID of product
t	-	Reserved

11. Magnetic contactor 230



Contactor terminals:

Terminal A:	solenoid power supply
Terminal B:	solenoid power supply
Terminal C:	Line arrival
Terminal D:	Line exit
Terminal E:	Neutre

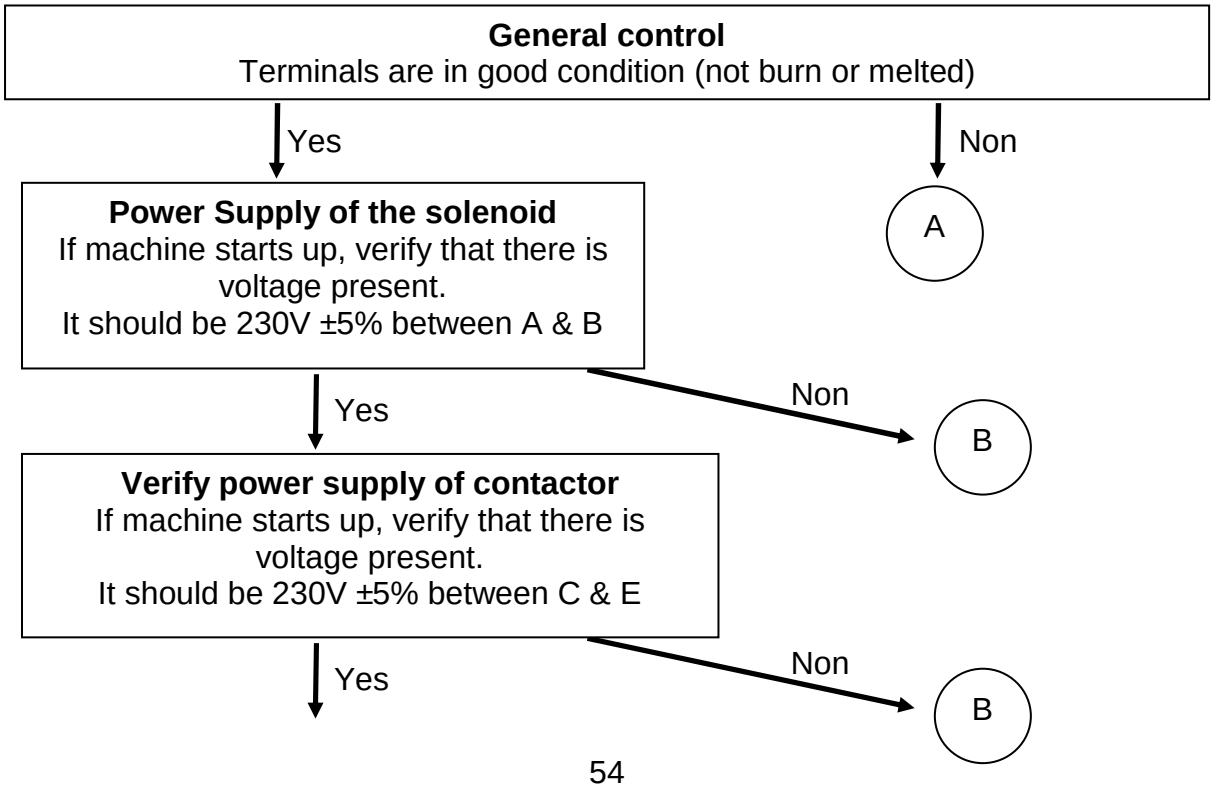
Magnetic contactor behaviour:

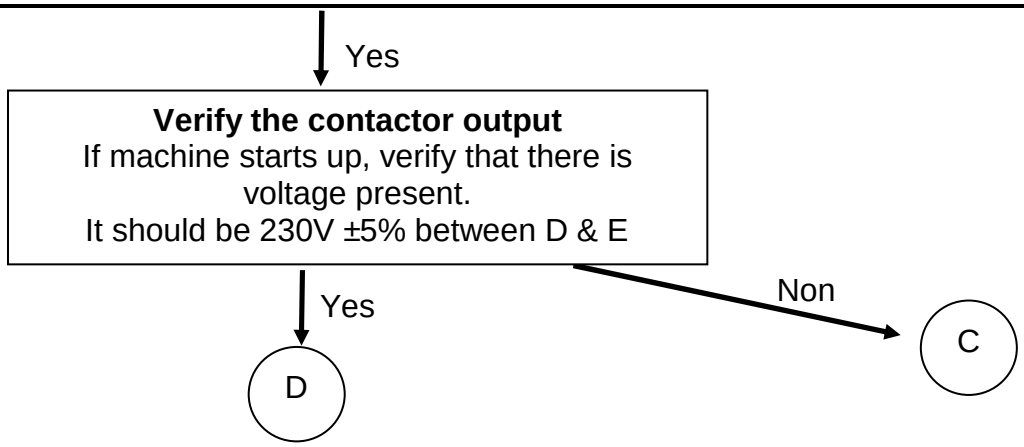
The terminals of the neutre (E) are all connected together.
When current arrives to the solenoid (between A & B), the contact between the line terminals (C & D) are close and then there is continuity.

a. Hypotesis

- All components before this element have been verified and are working correctly
- All terminals are well connected and screws tighten up.

b. Verifications





c. Conclusion

- A: Any dammaged contactor should be cleaned or replaces if necessary. Contact Polytropic for a spare part
- B: If the contactor is not well connected to the power supply, re-verify the components connected before it.
- C: If the contactor is not working properly, contact Polytropic for a spare part.
- D: The contactor is working properly

12. The compressor

d. Hypotesis

I. All components befote the compressor has been verified and are working properly.
- The Digital controller is working properly
- The electrical dependency is correctly connected
- The filtration pump is activated

e. Verifications

Verify compressor contactor
(See contactor chapter)

↓ OK

Verify that there is power supply arriving to the winding
Take out the cover of the compressor panel conection and measure the voltage between the different terminals;

.

	Mono phase	Three phase
Between R & C	230V ±5%	400V ±5%
Between C & S	230V ±5%	400V ±5%

↓ OK

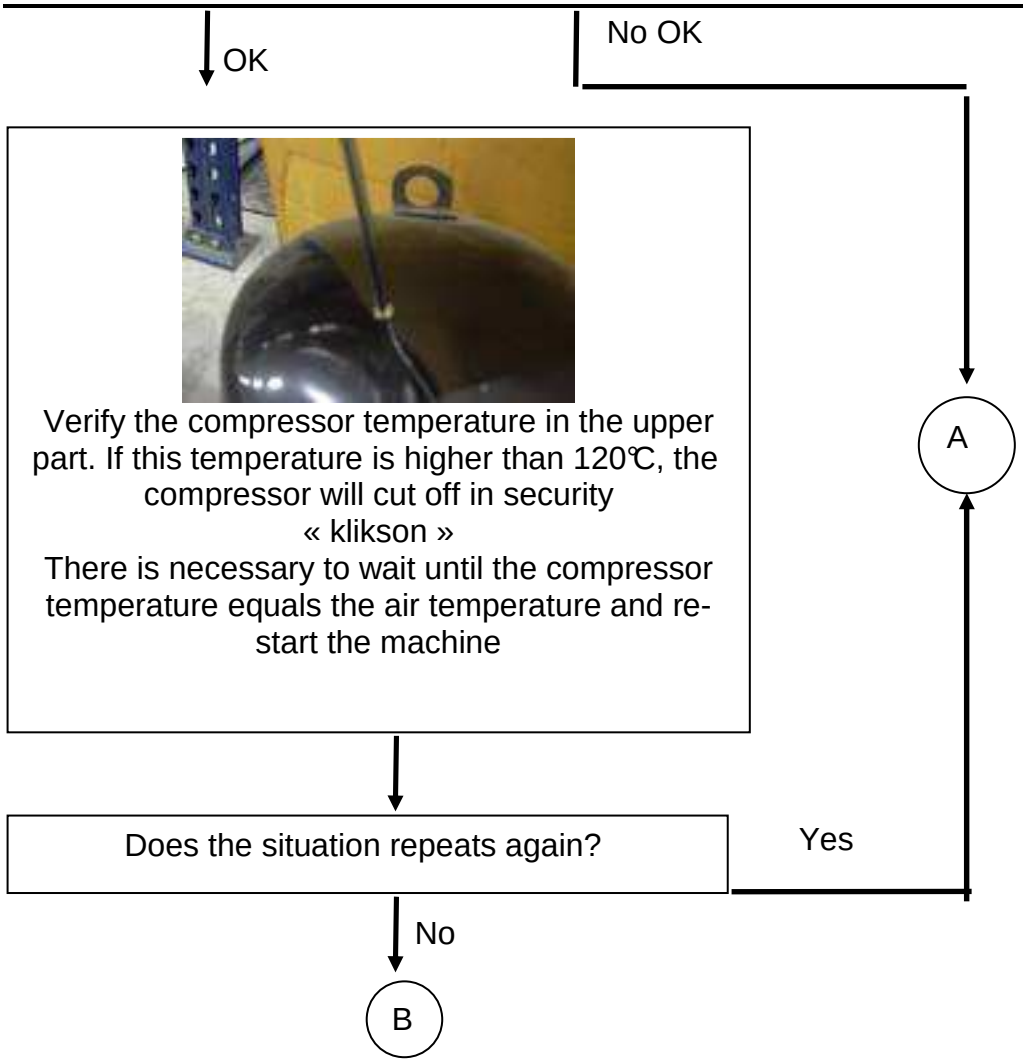
Winding verification
After disconnect the machine from power supply and disconnect the compressor terminals, check with an ohmmeter:
- Resistance between terminals:
There should be resistance

- Resistance between each terminal and earth: There should never be resistance

↓ OK

↓ No OK

If there is 0V between C & S, verify the electrical cables
If all electrical cable conections are correct, then the compressor condenser is not working. Contact Polytropic for a replacement device.



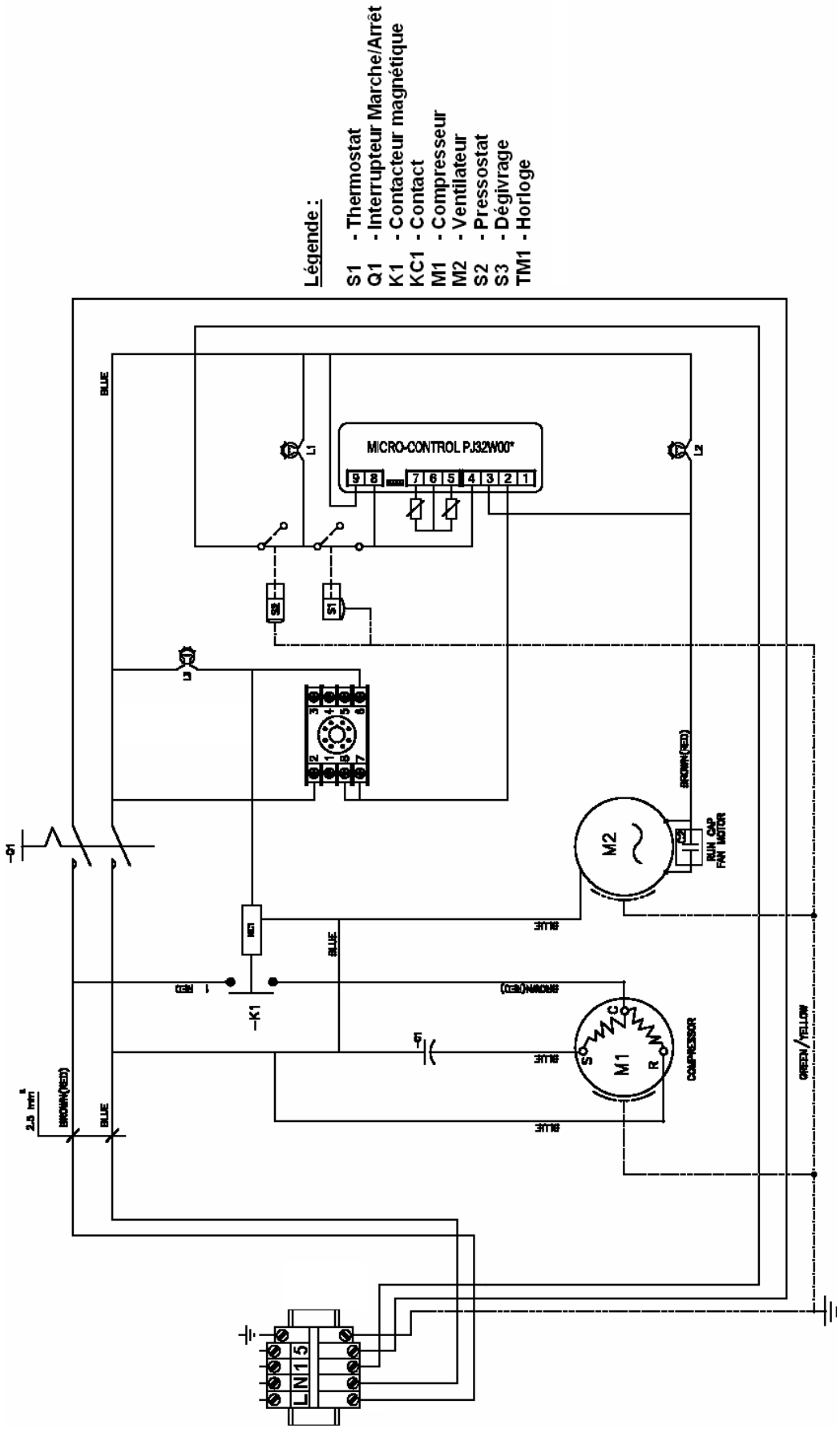
f. Conclusion

- A: The compressor is not working. Contact Polytropic for a spare part or return of the machine to workshop for reparation

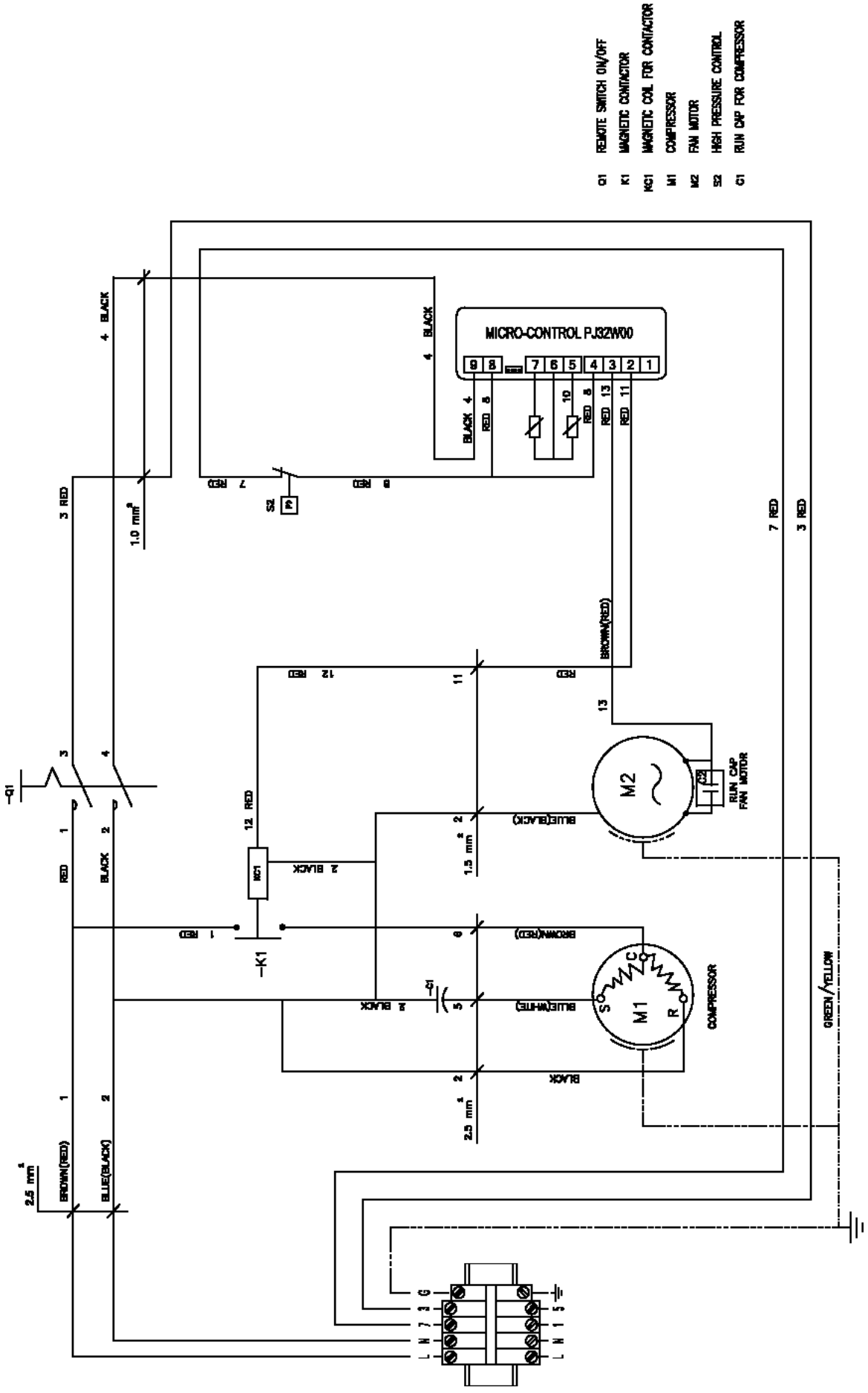
- B: The compressor has overheated: make a refrigeration verification

VI. Electric diagrams

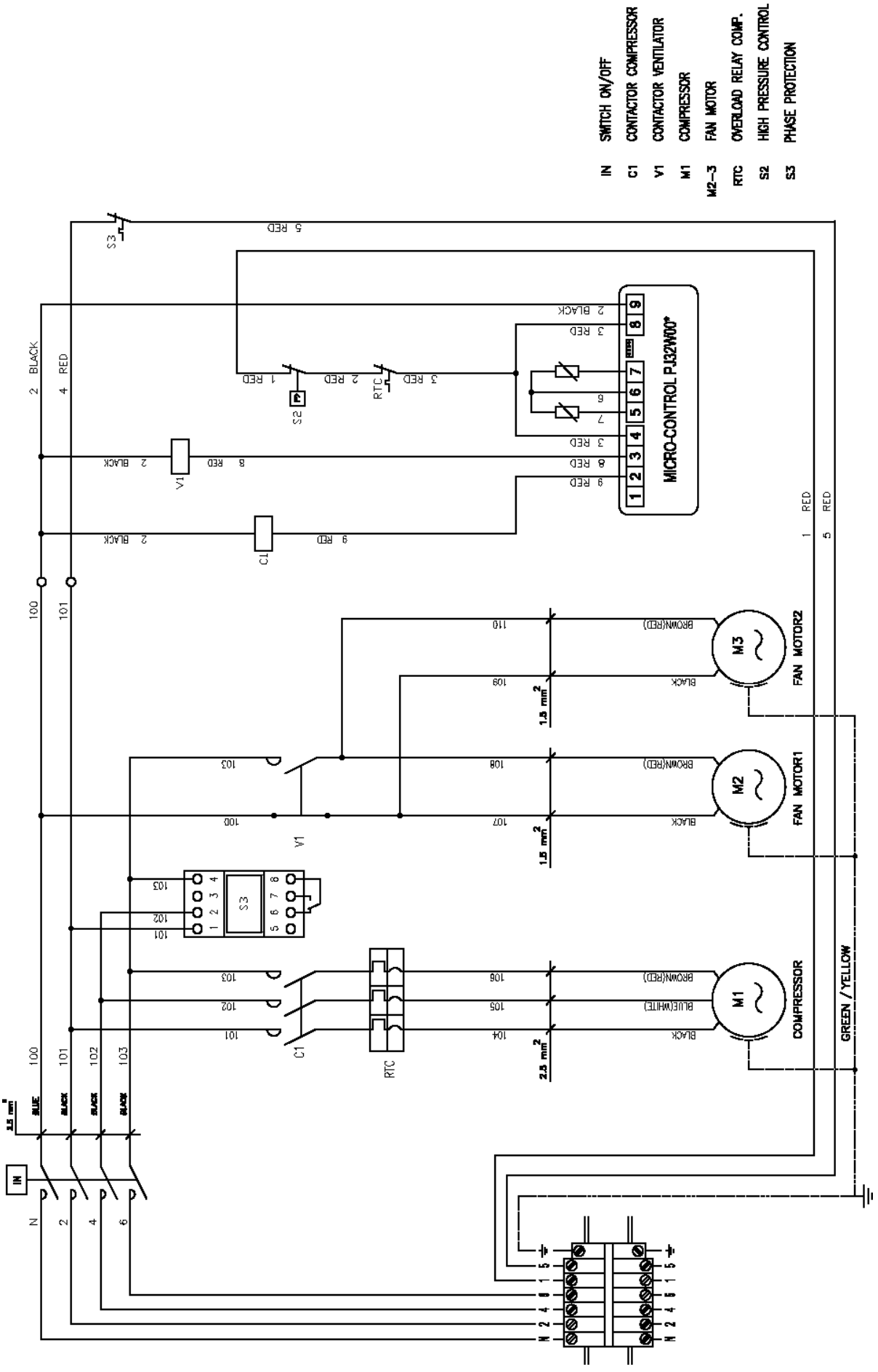
1. HPN16, HPN22, HPN36



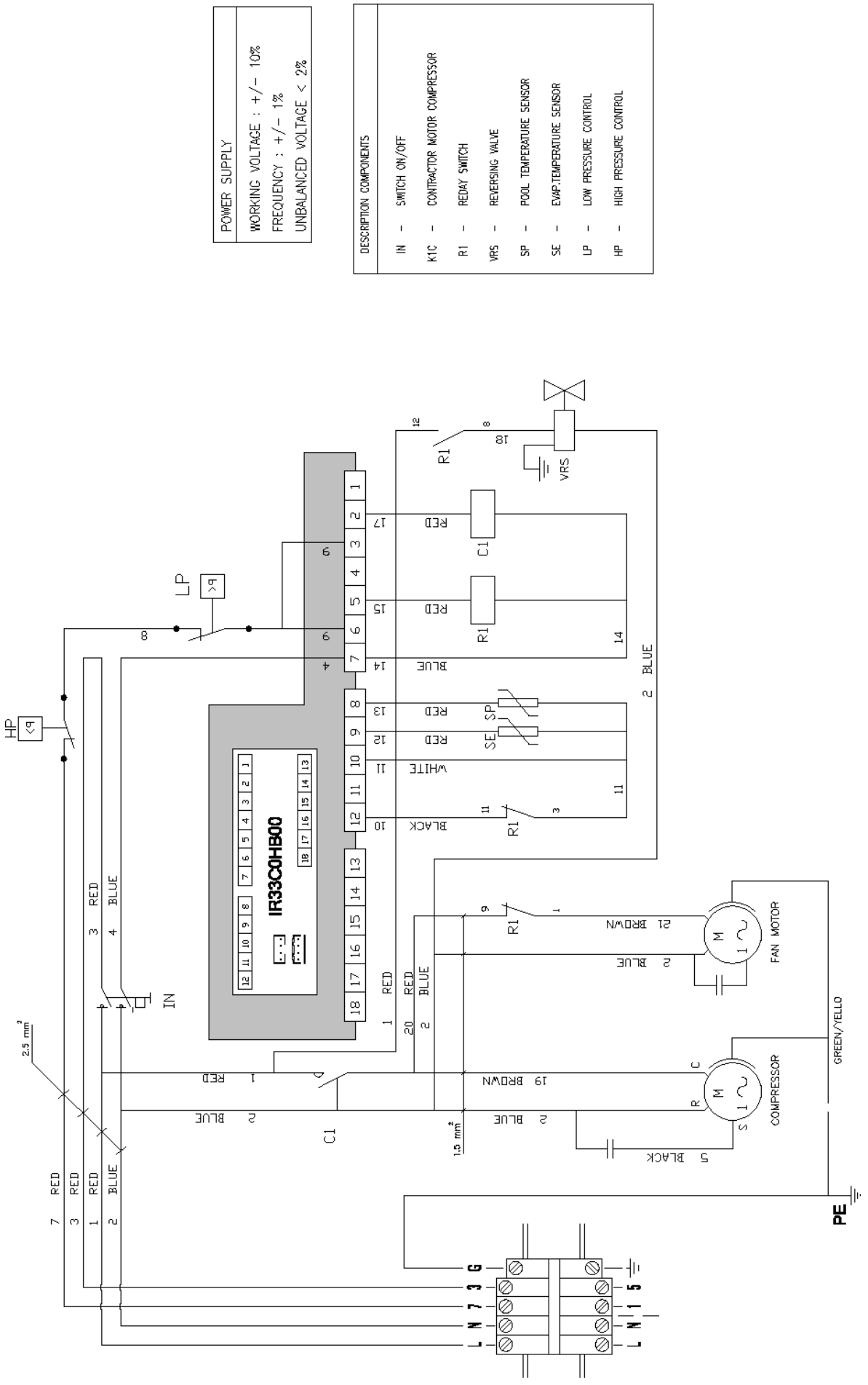
2. PAC16 et PAC22



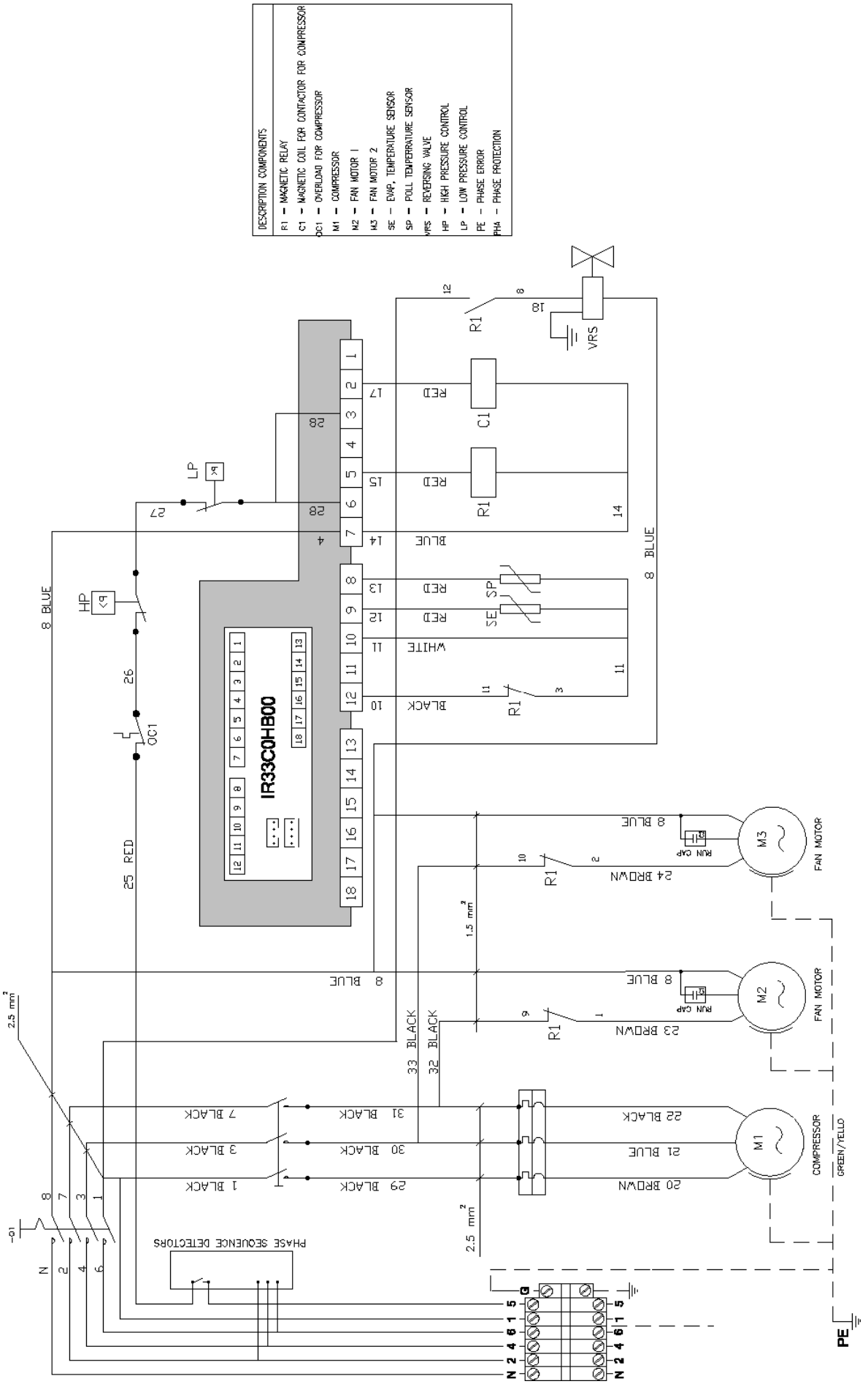
3. PAC31


IN SWITCH ON/OFF
C1 CONTACTOR COMPRESSOR
V1 CONTACTOR VENTILATOR
M1 COMPRESSOR
M2–3 FAN MOTOR
RTC OVERLOAD RELAY COMP.
S2 HIGH PRESSURE CONTROL
S3 PHASE PROTECTION
MICRO-CONTROL PJ32W00*
FAN MOTOR2
FAN MOTOR1
COMPRESSOR
GREEN / YELLOW
1.5 mm²
2.5 mm²

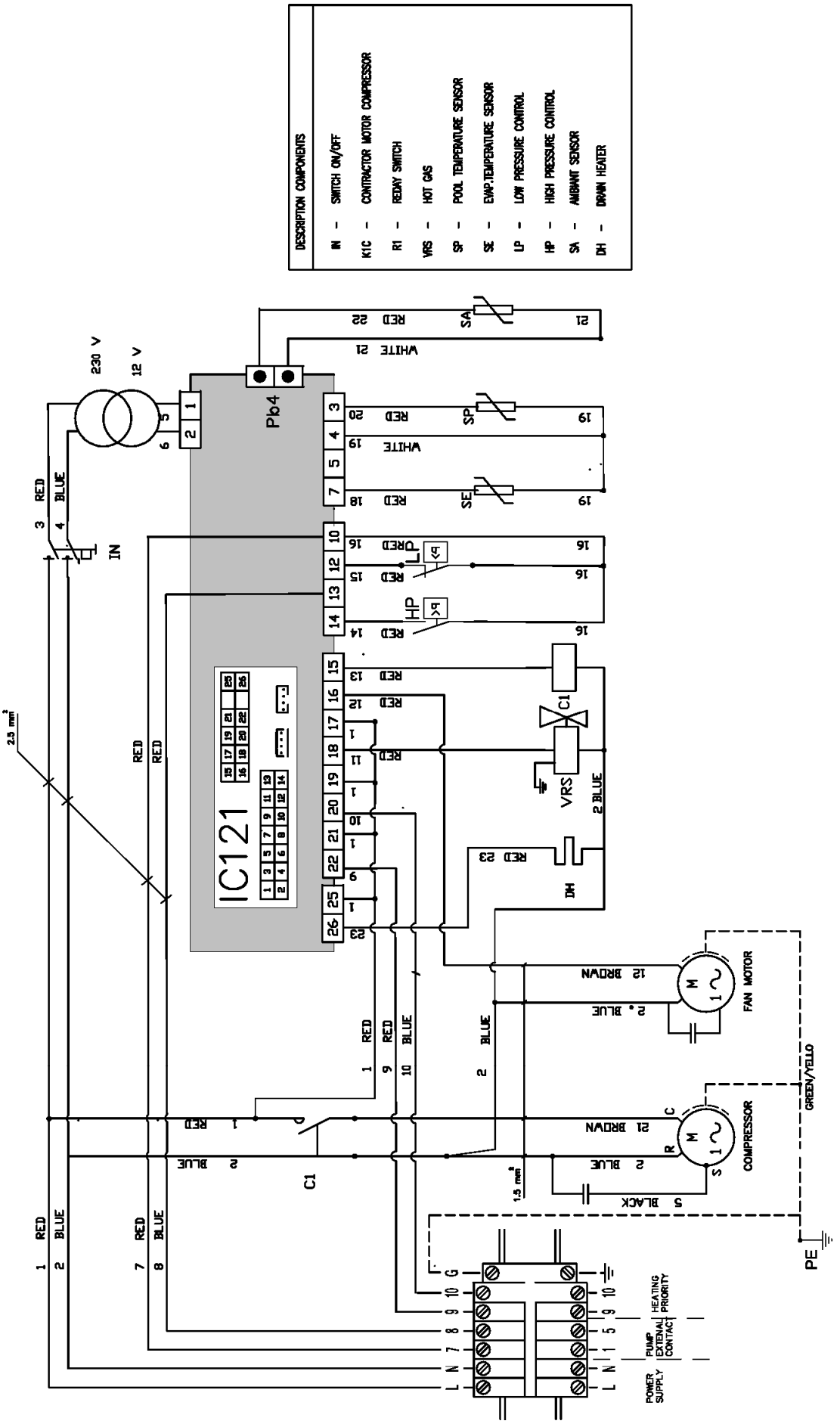
4. R-PAC16 et R-PAC22 (< 05/2009)



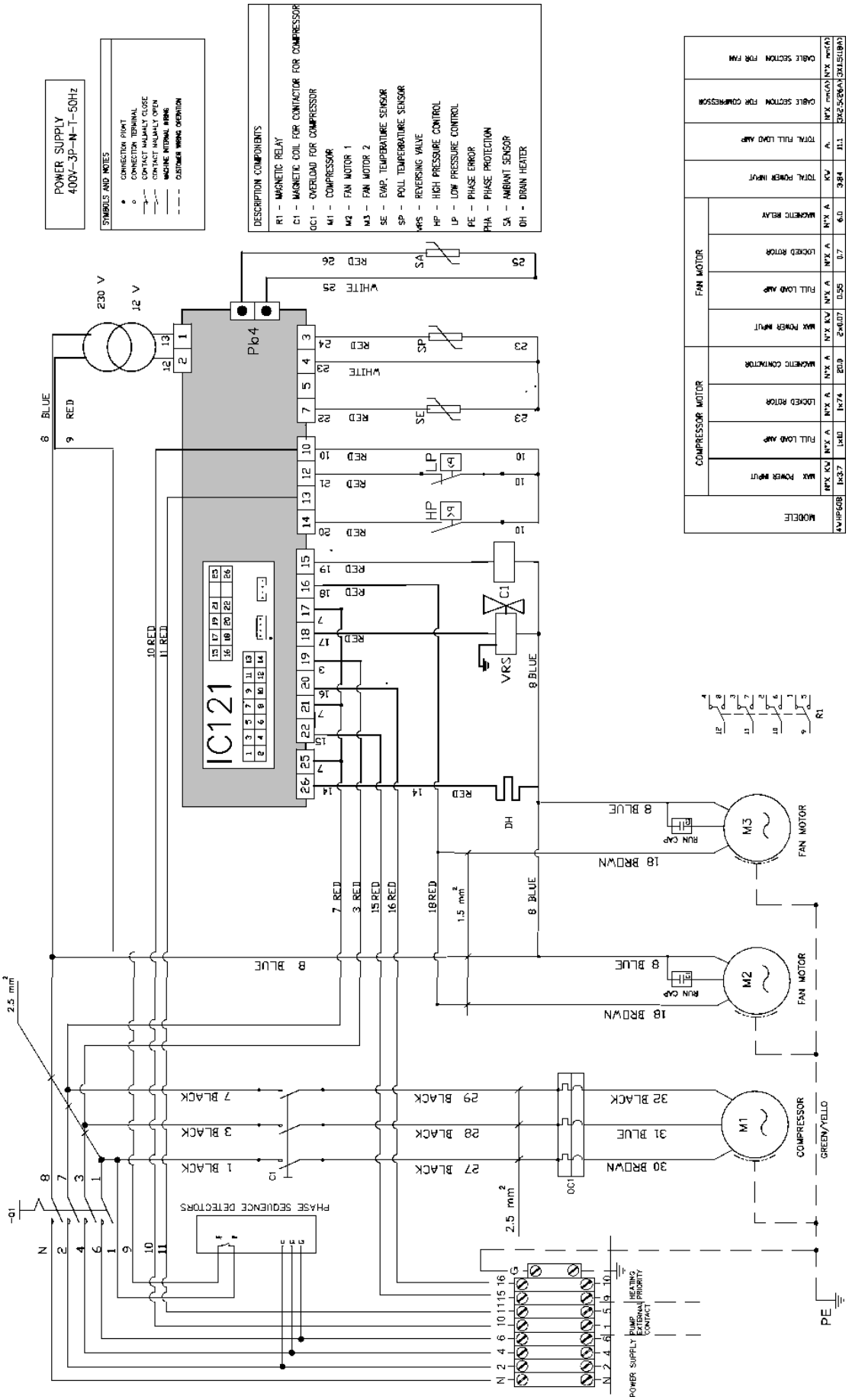
5. R-PAC31 (< 05/2009)



6. R-PAC16 et R-PAC22 (> 05/2009)

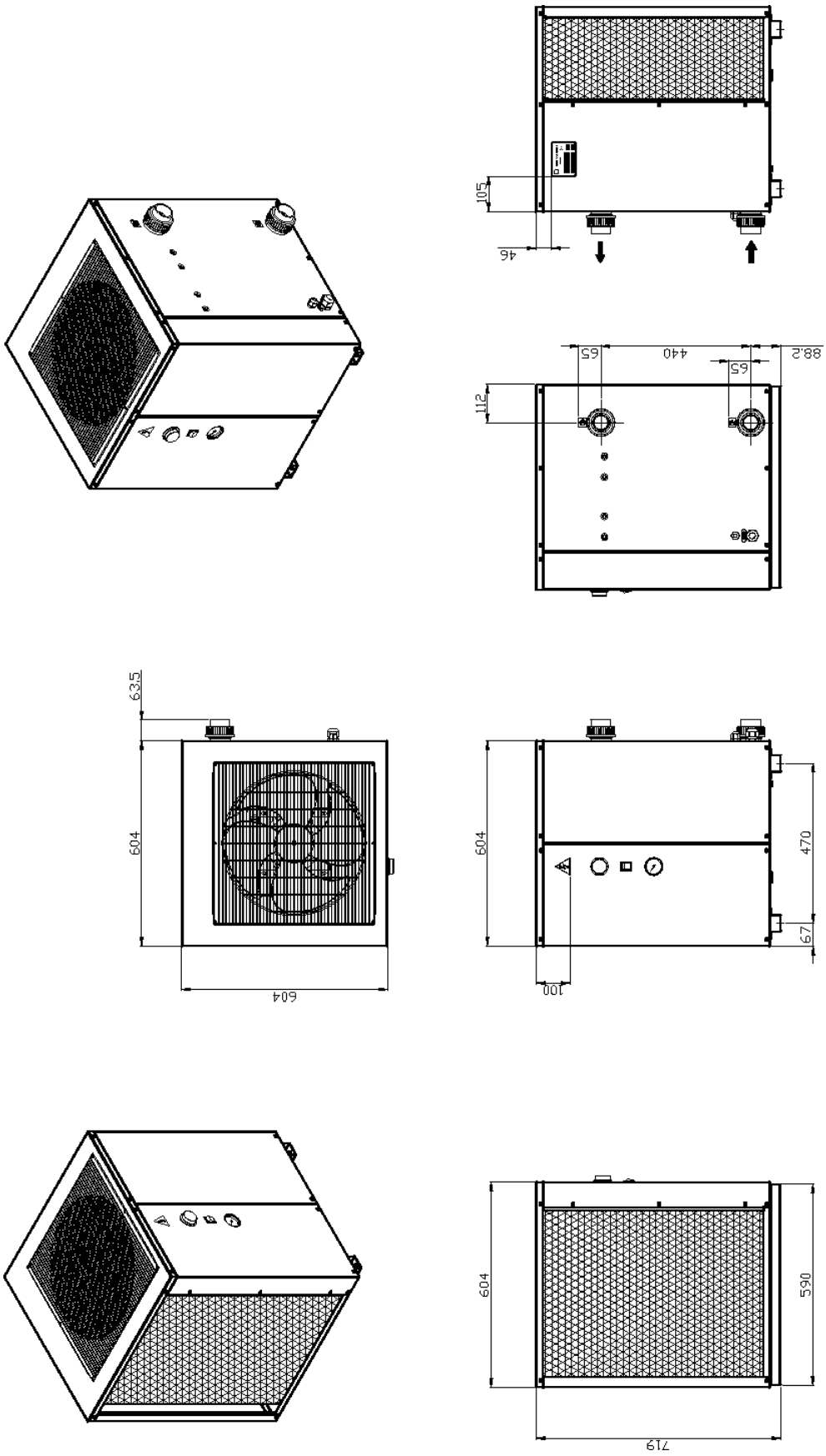


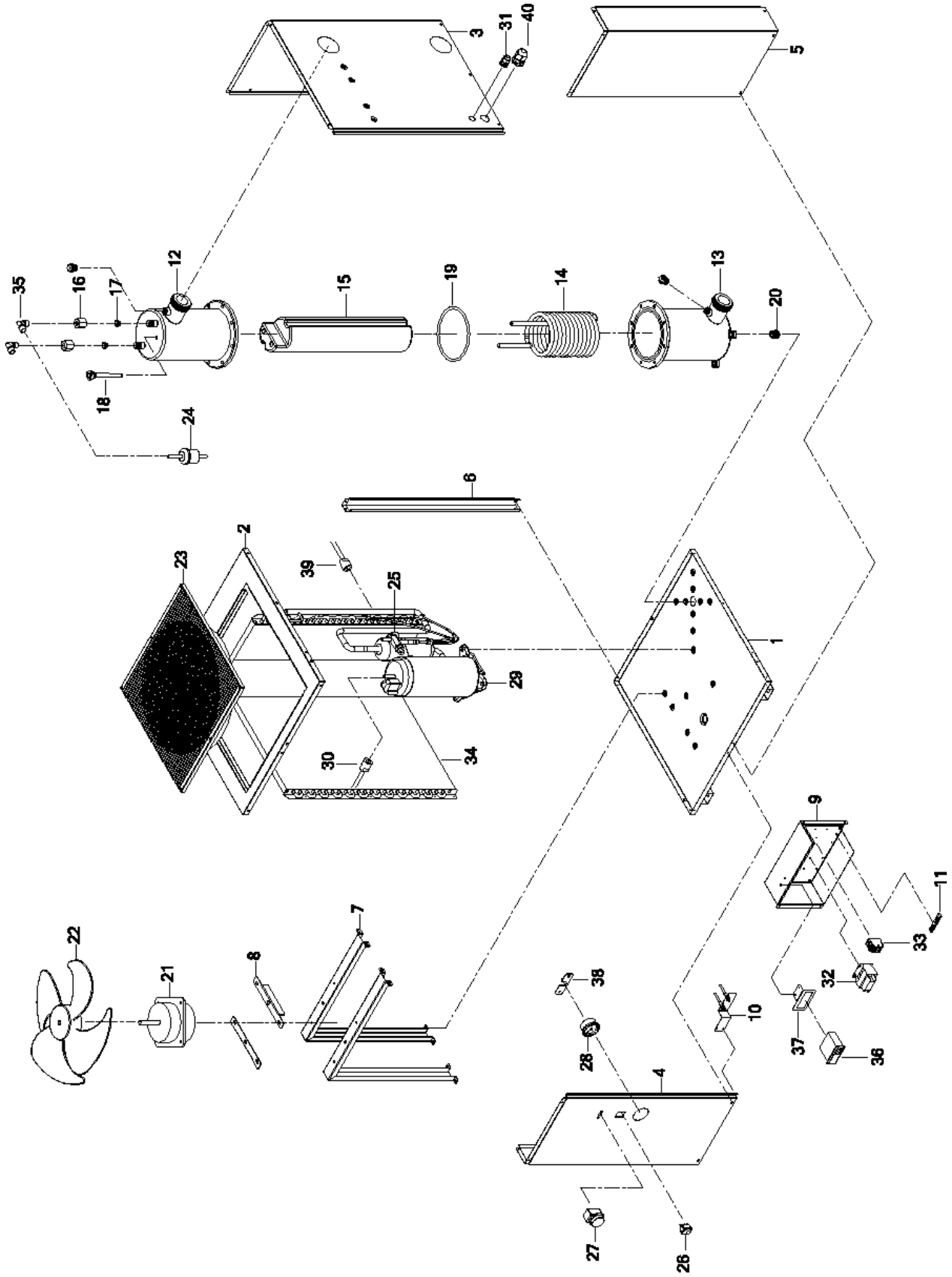
7. R-PAC31 (> 05/2009)



VII. Dimensions, explode diagrams and spere parts

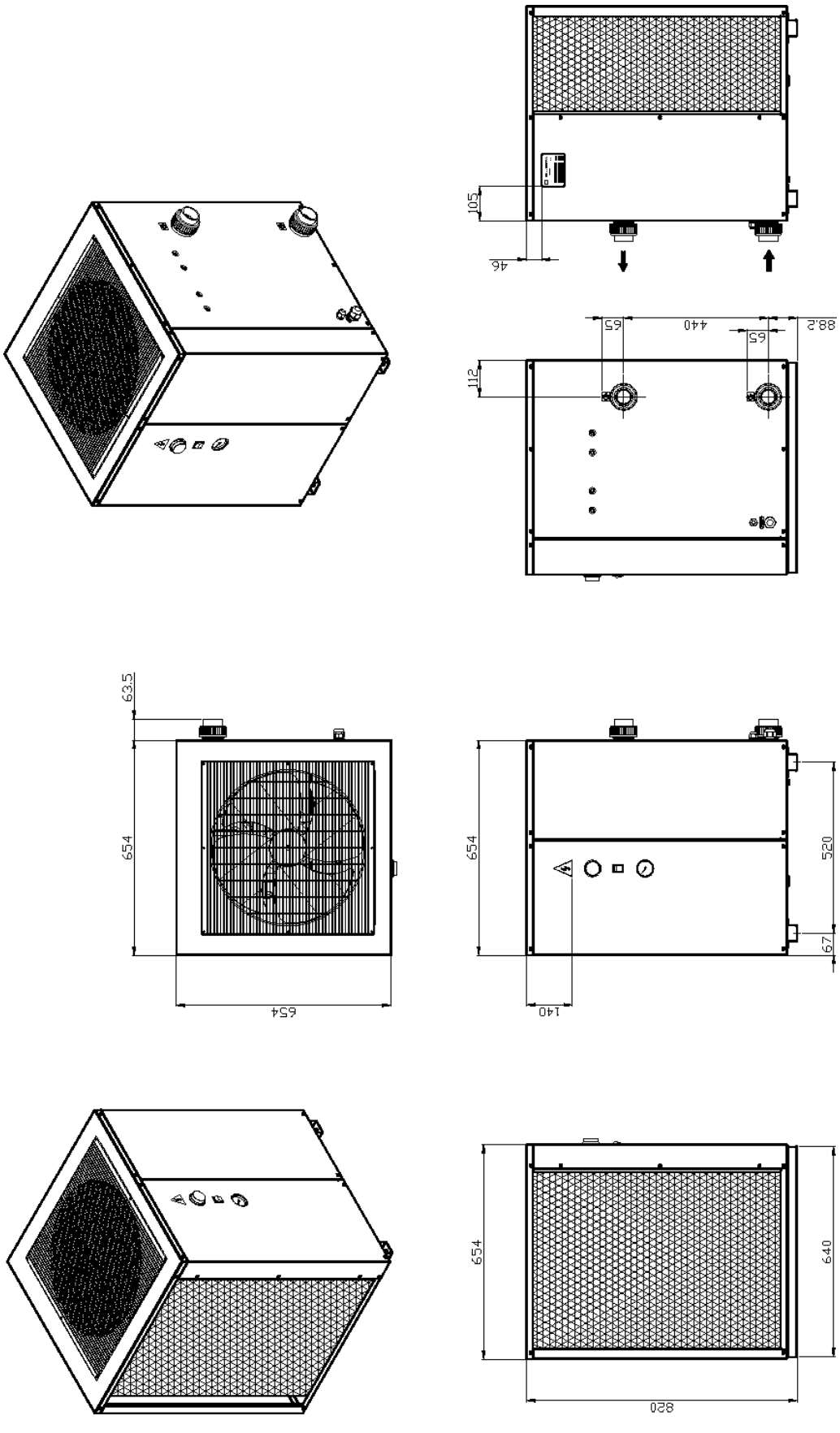
1. HPN16

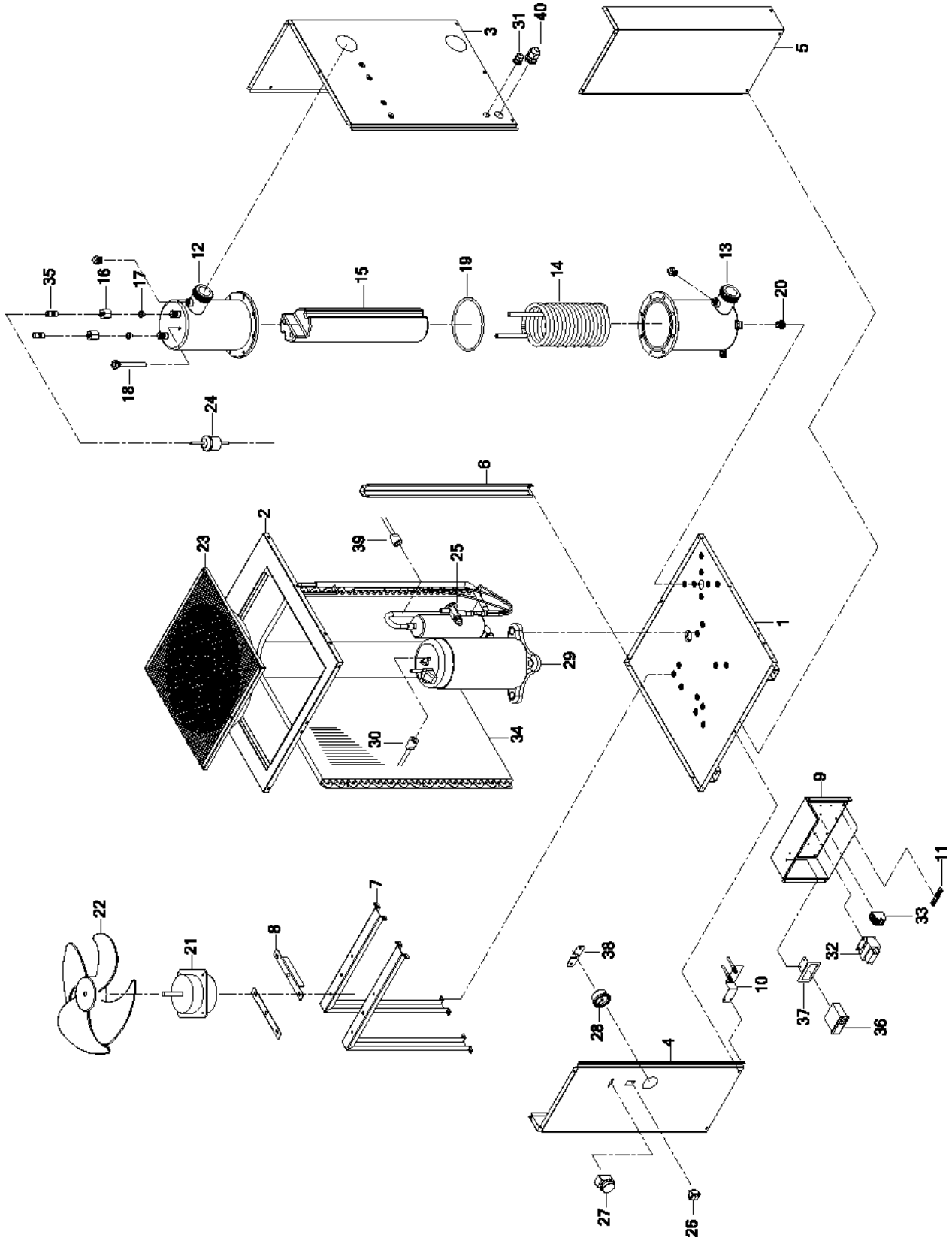



3
31
40
5
35
16
17
12
15
19
14
13
20
18
24
6
2
23
39
25
1
29
30
34
9
11
33
22
21
8
7
38
10
32
37
36
28
4
27
26

ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	Q'TY
1	BOTTOM PANEL ASS'Y	HPN16-1-100	-	-
	BOTTOM PANEL	HPN16-1-101	B0101-015	1 PC.
	BOTTOM LEG	HPN16-1-102	B0101-016	1 PC.
	SUPPORT BOTTOM	HPN16-1-103	B0101-017	1 PC.
2	TOP PANEL	HPN16-1-201	B0101-018	1 PC.
3	IN-OUT PANEL	HPN16-1-301	B0101-019	1 PC.
4	SWITCH PANEL	HPN16-1-401	B0101-020	1 PC.
5	SERVICE PANEL	HPN16-1-501	B0101-021	1 PC.
6	ANGLE PANEL	HPN16-1-601	B0101-022	1 PC.
7	MTG FAN	HPN16-1-701	B0101-023	2 PCS.
8	MTG STIFFENER	HPN16-1-801	B0101-009	2 PCS.
9	ELECTRIC BOX	HPN16-1-901	B0101-010	1 PC.
10	HLP PLATE	HPN16-1-1001	B0101-011	1 PC.
11	GROUND BAR	NHPT24-6-102	C0108-098	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT16-4-201	A0202-065	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSER	NHPT24-4-111	B0190-022	1 PC.
19	O-RING SEAL	NHPT24-4-108	B0190-019	1 PC.
20	PLUG	NHPT24-4-114	B0190-025	3 PCS.
21	MOTOR	RT925-68/3 OL	A0601-025	1 PC.
22	BLADE	16" x 28°	A0701-015	1 PC.
23	FAN GRILL	16"	A0501-013	1 PC.
24	FILTER	CK053	A1001-017	1 PC.
25	EXPANSION VALVE	AA (E) 2 HC	A0901-107	1 PC.
26	SWITCH	4P 16A	C0104-001	1 PC.
27	THERMOSTAT	0~35 °C	C0104-056	1 PC.
28	GAUGE	35 BAR	A1102-011	1 PC.
29	COMPRESSOR	RE277 VHSMT	A0106-011	1 PC.
30	HIGHT PRESSURE	YK-03H-059-2.72R2.03X	A0802-008	1 PC.
31	CABLE GRAND	EG 11	D0201-016	1 PC.
32	MAGNETIC CONTACTOR	1P 25 A	C0108-007	1 PC.
33	TERMINALS	AVK 2.5 - 304120	C0108-093	4 PCS.
34	EVAPORATOR	HPN16-2-101	A0303-097	1 PC.
35	LOCKRING NWK MS 50	1/2"x1/2"	A1702-008	2 PCS.
36	CONTROL CARD	PJ32S	C0104-072	1 PC.
37	PLATE CAREL	HPN16-1-1201	B0101-013	1 PC.
38	LOCK PRESSURE GAUGE	NHPT36-1-2101	-	1 PC.
39	PRESSURE SWITCH (LOW)	YK-03L 059-007E022G	A0801-016	1 PC.
40	CABLE GRAND	EG 21	D0201-020	1 PC.

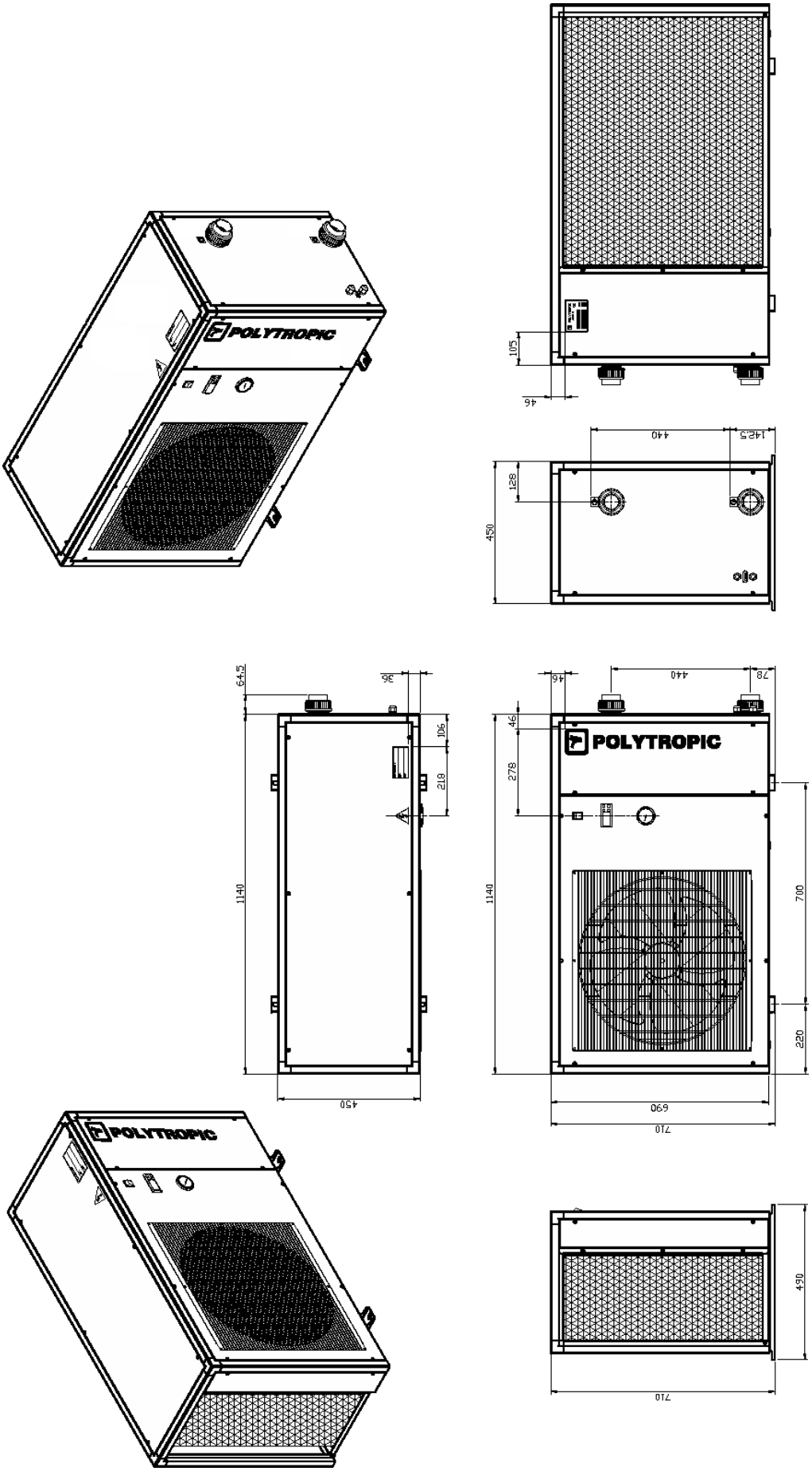
2. HPN24

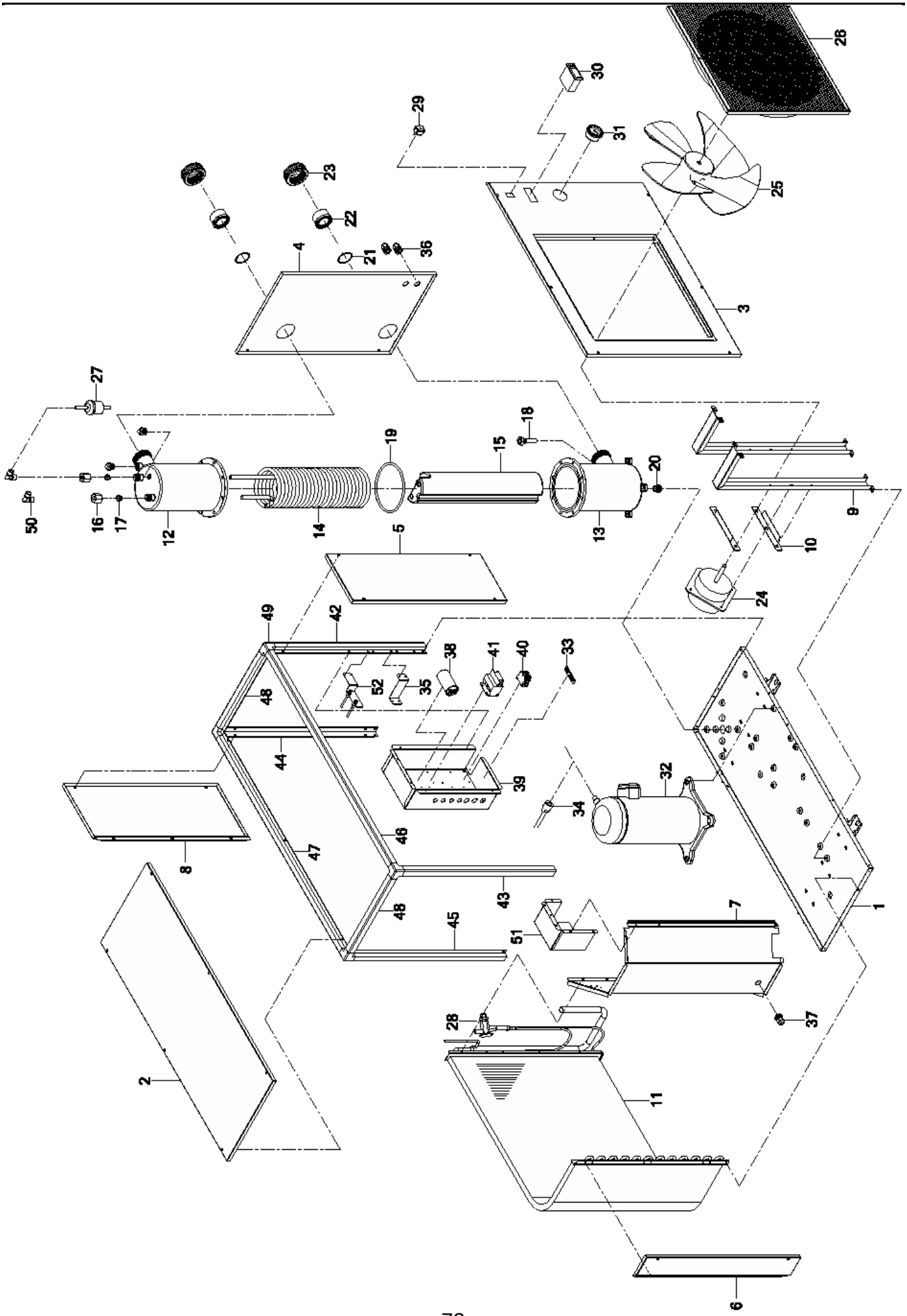

105
46
65
440
65
88.2
112
63.5
654
654
654
520
67
140
654
654
640
820


3
31
40
5
12
35
16
17
15
19
14
13
20
18
24
6
2
23
39
25
1
29
30
34
9
11
33
22
21
8
7
38
10
32
37
36
28
4
27
26

ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	Q'TY
1	BOTTOM PANEL ASS'Y	HPN24-1-100	-	-
	BOTTOM PANEL	HPN24-1-101	B0101-001	1 PC.
	BOTTOM LEG	HPN24-1-102	B0101-002	2 PCS.
	SUPPORT BOTTOM	HPN24-1-103	B0101-015	1 PC.
2	TOP PANEL	HPN24-1-201	B0101-003	1 PC.
3	IN-OUT PANEL	HPN24-1-301	B0101-004	1 PC.
4	SWITCH PANEL	HPN24-1-401	B0101-005	1 PC.
5	SERVICE PANEL	HPN24-1-501	B0101-006	1 PC.
6	ANGLE PANEL	HPN24-1-601	B0101-007	1 PC.
7	MTG FAN	HPN24-1-701	B0101-008	2 PCS.
8	MTG STIFFENER	HPN16-1-801	B0101-009	2 PCS.
9	ELECTRIC BOX	HPN16-1-901	B0101-010	1 PC.
10	HLP PLATE	HPN16-1-1001	B0101-011	1 PC.
11	GROUND BAR	NHPT24-6-102	C0108-098	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT24-4-201	A0202-066	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSER	NHPT24-4-111	B0190-022	1 PC.
19	O-RING SEAL	NHPT24-4-108	B0190-019	1 PC.
20	PLUG	NHPT24-4-114	B0190-025	3 PCS.
21	MOTOR	KDE3F4032	-	1 PC.
22	BLADE	18" x 28"	A0701-018	1 PC.
23	FAN GRILL	18"	A0501-016	1 PC.
24	FILTER	CK053	A1001-017	1 PC.
25	EXPANSION VALVE	AA (E) 2 HC	A0901-107	1 PC.
26	SWITCH	4P 16A	C0104-001	1 PC.
27	THERMOSTAT	0~35 'C	C0104-056	1 PC.
28	GAUGE	35 BAR	A1102-011	1 PC.
29	COMPRESSOR	NE41 VNHMT	A0106-001	1 PC.
30	HIGHT PRESSURE	YK-03H-059-2.72R2.03X	A0802-008	1 PC.
31	CABLE GRAND	EG 11	D0201-016	1 PC.
32	MAGNETIC CONTACTOR	1P 25 A	C0108-007	1 PC.
33	TERMINALS	AVK2.5-304120	C0108-093	4 PCS.
34	EVAPORATOR	HPN24-2-101	A0303-096	1 PC.
35	LOCKRING NK MS 50	1/2"x1/2"	A1702-007	2 PCS.
36	CONTROL CARD	PJ32S	C0104-072	1 PC.
37	PLATE CAREL	HPN16-1-1201	B0101-013	1 PC.
38	LOCK PRESSURE GAUGE	NHPT36-1-2101	-	1 PC.
39	PRESSURE SWITCH (LOW)	YK-03L 059-007E022G	A0801-016	1 PC.
40	CABLE GRAND	EG 21	D0201-020	1 PC.

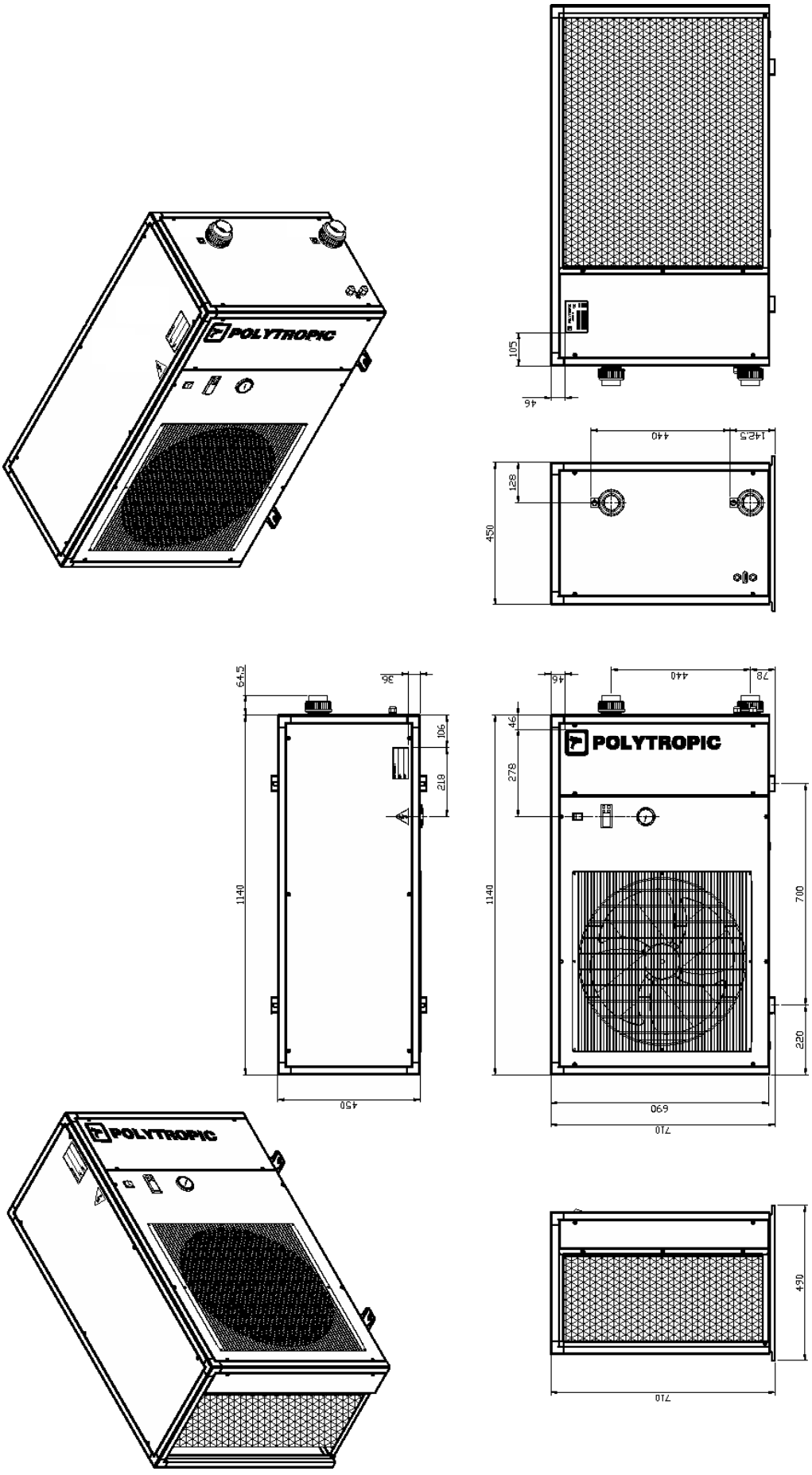
3. PAC16

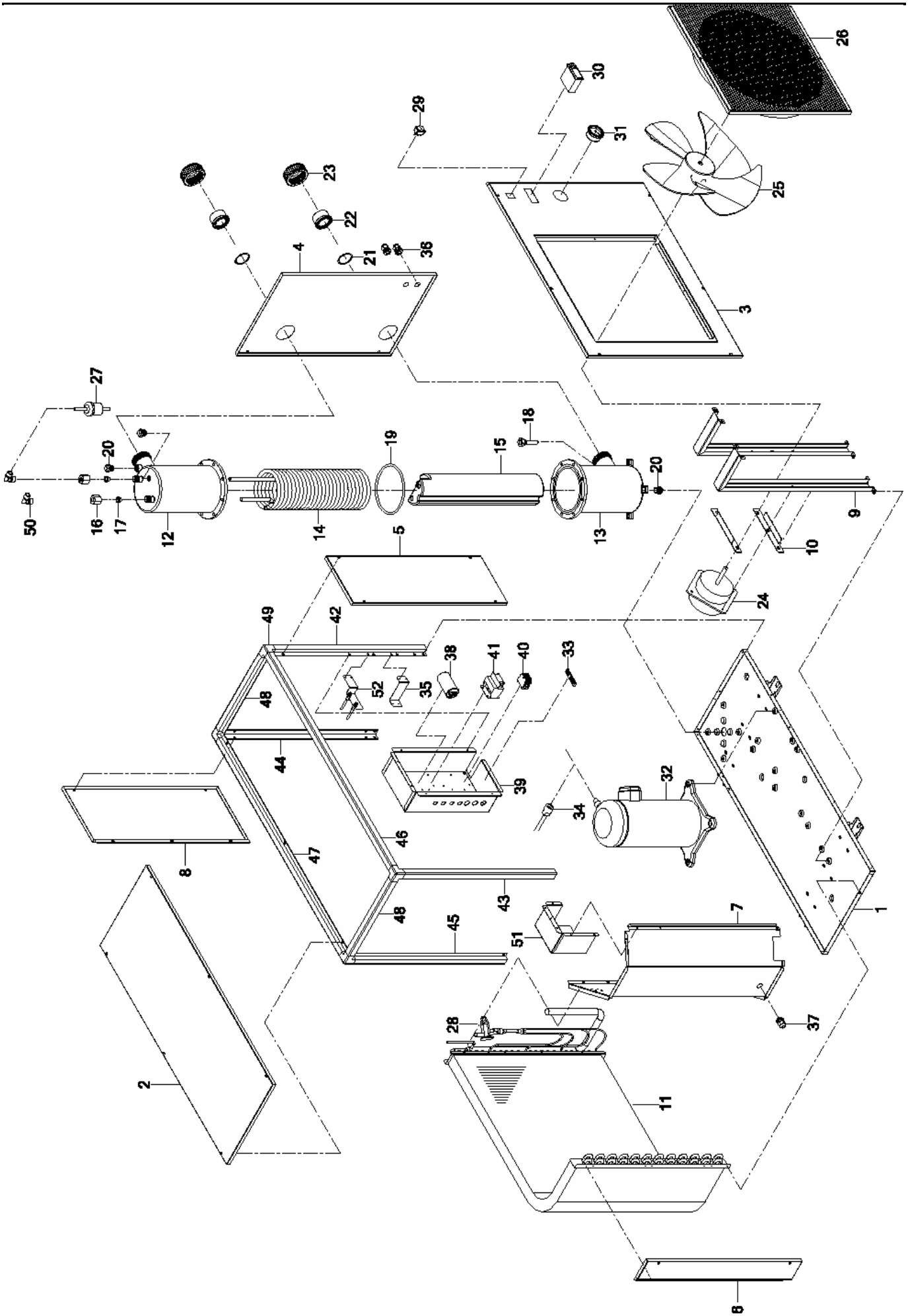

POLYTROPIC
105
46
440
142.5
128
450
64.5
36
106
219
1140
150
46
78
278
700
220
690
710
490


26
30
29
31
25
23
22
21
36
4
3
27
18
19
15
20
50
16
17
12
14
13
9
10
5
24
49
42
38
41
40
33
52
35
48
44
39
32
34
8
47
46
43
1
48
45
51
7
28
37
2
11
6

ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	Q'TY
1	BOTTOM PANEL ASS'Y	NHPT36-1-100	B0193-001	-
	BOTTOM PANEL	NHPT36-1-101	B0193-001	1 PC.
	BOTTOM LEG	NHPT36-1-102	B0181-002	1 PC.
	BOTTOM LEG #2	NHPT36-1-103	B0182-011	1 PC.
2	TOP PANEL	NHPT36-1-701	B0193-007	1 PC.
3	FRONT PANEL	HP247-1-301	B0193-013	1 PC.
4	IN-OUT PANEL	NHPT36-1-401	B0193-004	1 PC.
5	SWITCH PANEL	NHPT36-1-201	B0193-002	1 PC.
6	LEFT SIDE PANEL	NHPT36-1-501	B0193-005	1 PC.
7	PARTITION PLATE	NHPT36-1-1001	B0183-010	1 PC.
8	REAR PANEL	NHPT36-1-601	B0193-006	1 PC.
9	MTG FAN	NHPT36-1-801	B0193-008	2 PCS.
10	MTG STIFFENER	NHPT24-1-901	B0190-010	2 PCS.
11	EVAPORATOR	NHPT24-2-101	A0303-069	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT24-4-201	A0202-066	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSOR	NHPT24-4-115	B0190-026	1 PC.
19	O-RING SEAL	NHPT24-4-108	B0190-019	1 PC.
20	PLUG	NHPT24-4-114	B0190-025	3 PCS.
21	UNION PVC-SEAL	NHPT24-4-107	B0190-018	2 PCS.
22	U-PVC CONNECTOR	NHPT24-4-109	B0190-020	2 PCS.
23	UNION U-PVC	NHPT24-4-104	B0190-015	2 PCS.
24	MOTOR	RT925-68/3 OL	A0601-025	1 PC.
25	BLADE	18" x 28"	A0701-018	1 PC.
26	FAN GRILL	18"	A0501-016	1 PC.
27	FILTER	CK053	A1001-017	1 PC.
28	EXPANSION VALVE	AAE 2 HC	A0901-107	1 PC.
29	SWITCH	4P 16A	C0104-001	1 PC.
30	CAREL CONTROL CARD	PJ3ZW00000	C0104-062	1 PC.
31	GAUGE	35 BAR	A1102-011	1 PC.
32	COMPRESSOR	ZR28K3EPFJ	A0106-015	1 PC.
33	GROUND BAR	NHPT24-6-102	C0108-098	1 PC.
34	PRESSURE SWITCH	YK-03H-059-2.72R2.03X	A0802-008	1 PC.
35	SUPPORT WIREDUCT	NHPT36-1-1501	B0192-012	1 PC.
36	CABLE GRAND	EG 11	D0201-016	2 PCS.
37	CABLE GRAND	PG 9	D0201-012	1 PC.
38	RUN CAP (COMPRESSOR)	370 VAC 45 UF	C0112-001	1 PC.
39	ELECTRIC BOX	NHPT36-1-901	B0193-009	1 PC.
40	TERMINALS	AVK2.5	C0108-093	4 PCS.
41	MAGNETIC CONTACTOR	1P 25 A	C0108-007	1 PC.
42	COLUMN # FRONT-RIGHT	NHPT36-1-1301	B0122-002	1 PC.
43	COLUMN # FRONT-LEFT	NHPT36-1-1302	B0122-002	1 PC.
44	COLUMN # REAR-RIGHT	NHPT36-1-1303	B0122-002	1 PC.
45	COLUMN # REAR-LEFT	NHPT36-1-1304	B0122-002	1 PC.
46	TRUSS # FRONT	NHPT36-1-1305	B0122-002	1 PC.
47	TRUSS # REAR	NHPT36-1-1306	B0122-002	1 PC.
48	TRUSS # LEFT-RIGHT	NHPT36-1-1307	B0122-002	2 PCS.
49	ARC ANGLE AL.3-FOLK (C2516-6)	-	B0122-004	4 PCS.
50	LOCKRING NWK MS 50	1/2"	A1702-008	1 PC.
51	COVER	NHPT36-1-1601(3)	B0193-017	1 PC.
52	HLP PLATE	NHPT36-1-1701	B0193-018	1 PC.

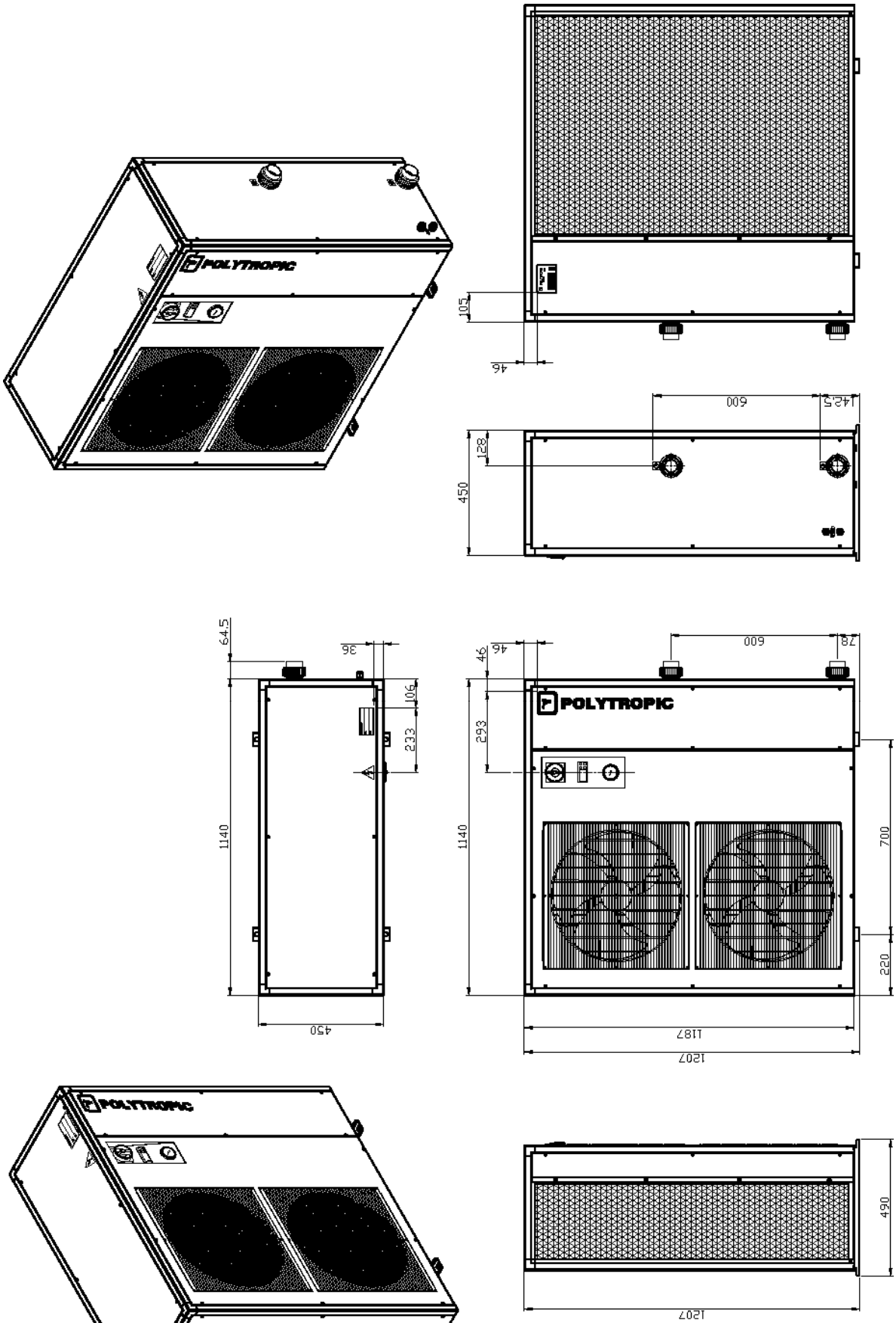
4. PAC22

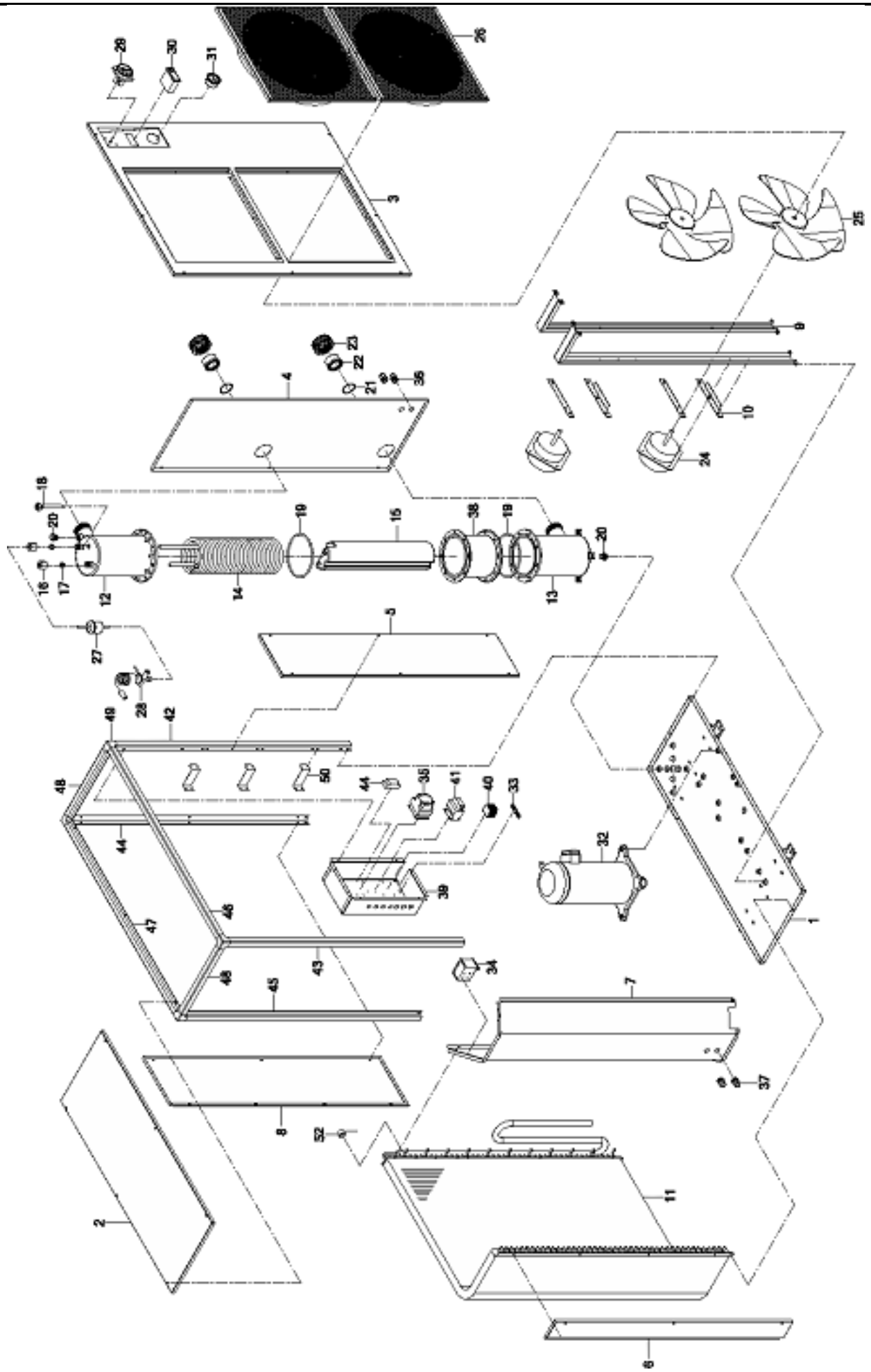

POLYTROPIC
105
46
440
142,5
128
450
64,5
36
106
219
1140
450
46
78
278
700
220
690
710
490


26
30
29
31
25
23
22
21
36
4
3
27
18
20
19
15
20
50
16
17
12
14
13
9
10
5
24
49
42
38
41
40
33
52
35
48
44
39
32
34
8
47
46
43
48
45
51
7
1
28
37
2
11
8

ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	Q'TY
1	BOTTOM PANEL ASS'Y	NHPT36-1-100	B0193-001	-
	BOTTOM PANEL	NHPT36-1-101	B0193-001	1 PC.
	BOTTOM LEG	NHPT36-1-102	B0191-002	1 PC.
	BOTTOM LEG #2	NHPT36-1-103	B0192-011	1 PC.
2	TOP PANEL	NHPT36-1-701	B0193-007	1 PC.
3	FRONT PANEL	HP247-1-301	B0193-013	1 PC.
4	IN-OUT PANEL	NHPT36-1-401	B0193-004	1 PC.
5	SWITCH PANEL	NHPT36-1-201	B0193-002	1 PC.
6	LEFT SIDE PANEL	NHPT36-1-501	B0193-005	1 PC.
7	PARTITION PLATE	NHPT36-1-1001	B0193-010	1 PC.
8	REAR PANEL	NHPT36-1-601	B0193-006	1 PC.
9	MTG FAN	NHPT36-1-801	B0193-008	2 PCS.
10	MTG STIFFENER	NHPT24-1-901	B0190-010	2 PCS.
11	EVAPORATOR	NHPT36-2-101	A0303-070	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT36-4-201	A0202-067	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSOR	NHPT24-4-115	B0190-026	1 PC.
19	O-RING SEAL	NHPT24-4-108	B0190-019	1 PC.
20	PLUG	NHPT24-4-114	B0190-025	3 PCS.
21	UNION PVC-SEAL	NHPT24-4-107	B0190-018	2 PCS.
22	U-PVC CONNECTOR	NHPT24-4-109	B0190-020	2 PCS.
23	UNION U-PVC	NHPT24-4-104	B0190-015	2 PCS.
24	MOTOR	RT925-68/3 OL	A0601-025	1 PC.
25	BLADE	18" x 28°	A0701-018	1 PC.
26	FAN GRILL	18"	A0501-016	1 PC.
27	FILTER	CK053	A1001-017	1 PC.
28	EXPANSION VALVE	AAE 3 HC	A0901-110	1 PC.
29	SWITCH	4P 16A	C0104-001	1 PC.
30	CAREL CONTROL CARD	PJ32W00000	C0104-062	1 PC.
31	GAUGE	35 BAR	A1102-011	1 PC.
32	COMPRESSOR	ZR45K3EPFJ	A0106-015	1 PC.
33	GROUND BAR	NHPT24-6-102	C0108-098	1 PC.
34	PRESSURE SWITCH	YK-03H-059-2.72R2.03X	A0802-008	1 PC.
35	SUPPORT WIREDUCT	NHPT36-1-1501	B0192-012	1 PC.
36	CABLE GRAND	EG 11	D0201-016	2 PCS.
37	CABLE GRAND	PG 9	D0201-012	1 PC.
38	RUN CAP (COMPRESSOR)	370 VAC 60 UF	C0112-001	1 PC.
39	ELECTRIC BOX	NHPT36-1-901	B0193-009	1 PC.
40	TERMINALS	AVK2.5	C0108-093	4 PCS.
41	MAGNETIC CONTACTOR	1P 25 A	C0108-007	1 PC.
42	COLUMN # FRONT-RIGHT	NHPT36-1-1301	B0122-002	1 PC.
43	COLUMN # FRONT-LEFT	NHPT36-1-1302	B0122-002	1 PC.
44	COLUMN # REAR-RIGHT	NHPT36-1-1303	B0122-002	1 PC.
45	COLUMN # REAR-LEFT	NHPT36-1-1304	B0122-002	1 PC.
46	TRUSS # FRONT	NHPT36-1-1305	B0122-002	1 PC.
47	TRUSS # REAR	NHPT36-1-1306	B0122-002	1 PC.
48	TRUSS # LEFT-RIGHT	NHPT36-1-1307	B0122-002	2 PCS.
49	ARC ANGLE AL.3-FOLK (C2516-6)	-	B0122-004	4 PCS.
50	LOCKRING NWK MS 50	1/2"	A1702-008	2 PCS.
51	COVER	NHPT36-1-1601(3)	B0193-017	1 PC.
52	HLP PLATE	NHPT36-1-1701	B0193-016	1 PC.

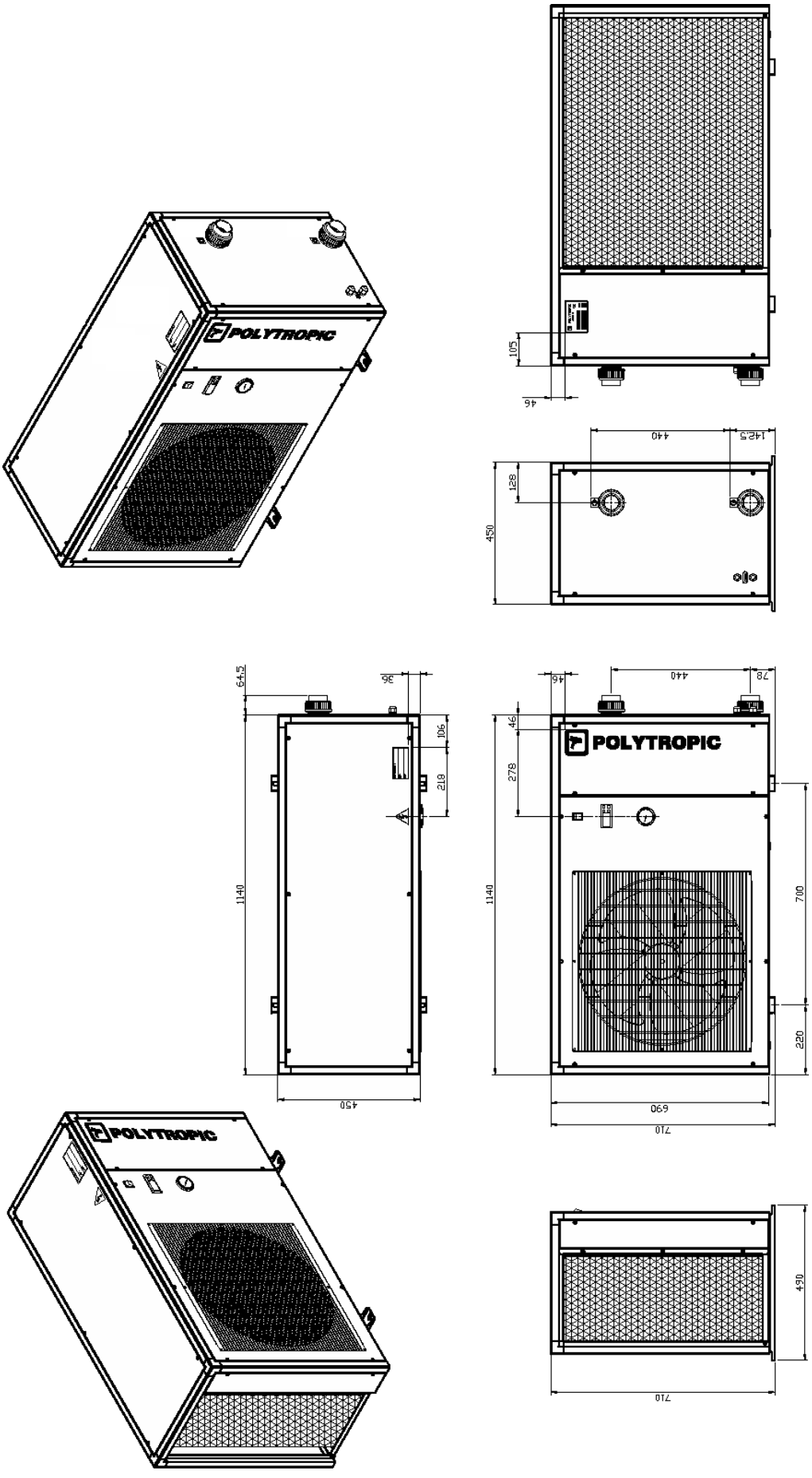
5. PAC31

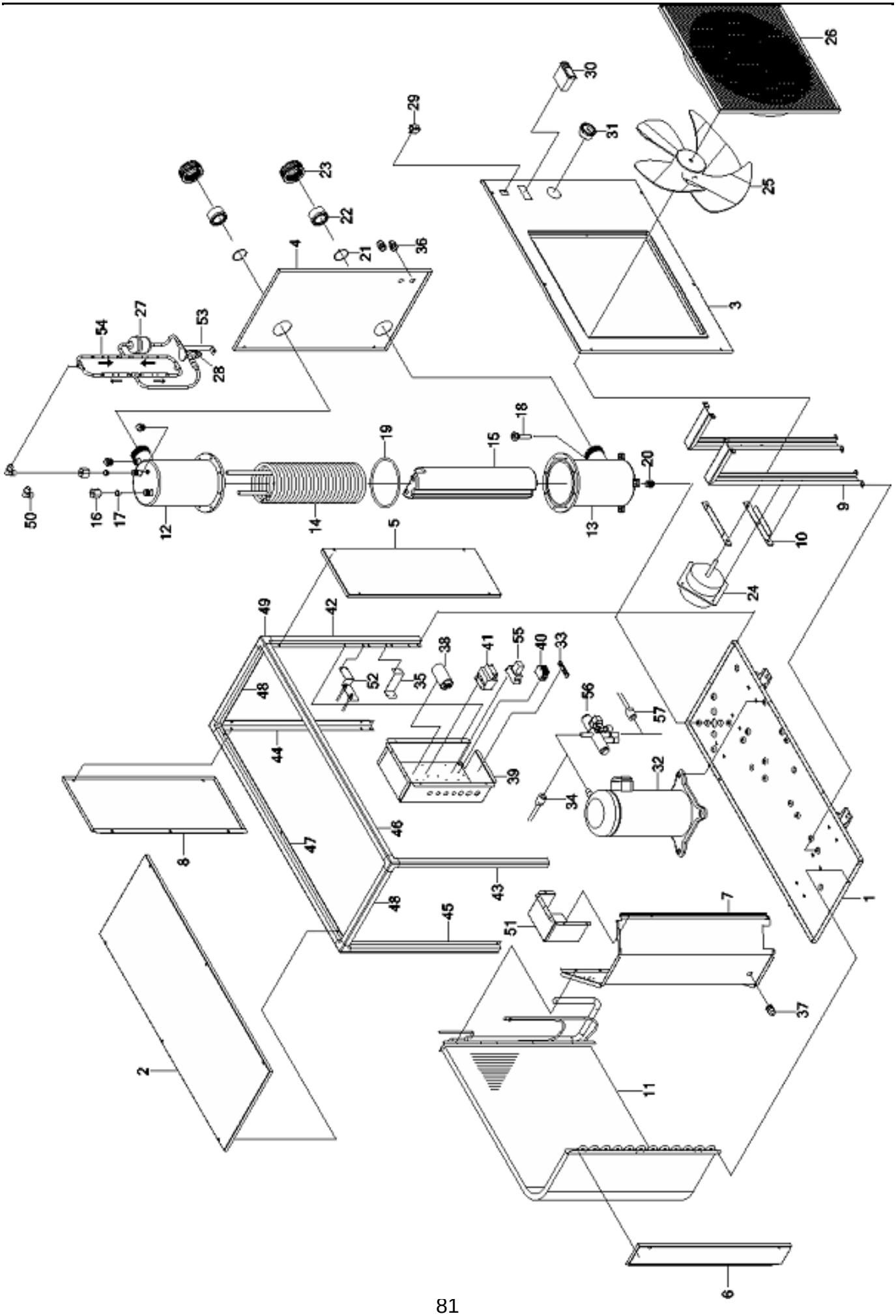

POLYTROPIC
105
46
600
142.5
128
450
64.5
36
106
233
1140
450
46
46
600
78
293
1140
700
220
1187
1207
POLYTROPIC
490
1207



ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	Q'TY
1	BOTTOM PANEL ASS'Y	NHPT36-1-100	B0193-001	-
	BOTTOM PANEL	NHPT36-1-101	B0193-001	1 PC.
	BOTTOM LEG	NHPT36-1-102	B0191-002	2 PCS.
2	TOP PANEL	NHPT36-1-701	B0193-007	1 PC.
3	FRONT PANEL ASS'Y	HP607-1-300	B0195-003	1 PC.
4	IN-OUT PANEL	HP607-1-401	B0195-004	1 PC.
5	SWITCH PANEL	HP607-1-201	B0195-001	1 PC.
6	LEFT SIDE PANEL	HP607-1-501	B0195-005	1 PC.
7	PARTITION PLATE	HP607-1-1001	B0195-008	1 PC.
8	REAR PANEL	HP607-1-601	B0195-006	1 PC.
9	MTG FAN	HP607-1-801	B0195-007	2 PCS.
10	MTG STIFFENER	NHPT24-1-901	B0190-010	4 PCS.
11	EVAPORATOR	NHPT60-2-101	A0303-071	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT60-4-201	A0202-069	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSER	NHPT24-4-111	B0190-022	1 PC.
19	O-RING SEAL	NHPT24-4-106	B0190-019	2 PCS.
20	PLUG	NHPT24-4-114	B0190-025	2 PCS.
21	UNION PVC-SEAL	NHPT24-4-107	B0190-018	2 PCS.
22	U-PVC CONNECTOR	NHPT24-4-109	B0190-020	2 PCS.
23	UNION U-PVC	NHPT24-4-104	B0190-015	2 PCS.
24	MOTOR	RT625-6B/3 OL	A0901-025	2 PCS.
25	BLADE	18" x 28°	A0701-018	2 PCS.
26	FAN GRILL	18"	A0501-018	2 PCS.
27	FILTER	EK1848	A1001-007	1 PC.
28	EXPANSION VALVE	TCLE 7 1/2" HC	A0901-022	1 PC.
29	CHANGE OVER SWITCH	CS-68-2P	C0104-011	1 PC.
30	CAREL CONTROL CARD	PJ32W00000	C0104-062	1 PC.
31	GAUGE	35 BAR	A1102-011	1 PC.
32	COMPRESSOR	ZR72KCE-TFD	A0107-006	1 PC.
33	GROUND BAR	NHPT24-8-102	C0108-008	1 PC.
34	PRESSURE SWITCH	S97300	A0901-013	1 PC.
35	CONTACTOR + OVERLOAD	SN21 (10A)	C0106-021	1 PC.
36	CABLE GRAND	EG 11	D0201-010	2 PCS.
37	CABLE GRAND	PG 9	D0201-012	2 PCS.
38	ASS'Y PVC EXT.	NHPT60-4-300	B0192-010	1 PC.
39	ELECTRIC BOX	NHPT36-1-901	B0193-009	1 PC.
40	TERMINALS	AWG2.5	C0108-003	6 PCS.
41	MAGNETIC CONTACTOR	1P 25 A	C0108-007	1 PC.
42	COLUMN # FRONT-RIGHT	HP607-1-1301	B0122-002	1 PC.
43	COLUMN # FRONT-LEFT	HP607-1-1302	B0122-002	1 PC.
44	COLUMN # REAR-RIGHT	HP607-1-1303	B0122-002	1 PC.
45	COLUMN # REAR-LEFT	HP607-1-1304	B0122-002	1 PC.
46	TRUSS # FRONT	HP607-1-1305	B0122-002	1 PC.
47	TRUSS # REAR	HP607-1-1306	B0122-002	1 PC.
48	TRUSS # LEFT-RIGHT	HP607-1-1307	B0122-002	2 PCS.
49	ARC ANGLE AL 3-FOLK (C2516-6)	-	B0122-004	4 PCS.
50	SUPPORT WIREDUCT	NHPT36-1-1601	-	3 PCS.
51	PHASE CONTROLLER	AC 400 V	C0111-001	1 PC.
52	THERMOSTAT	-5 °+5 °C	C0104-066	1 PC.

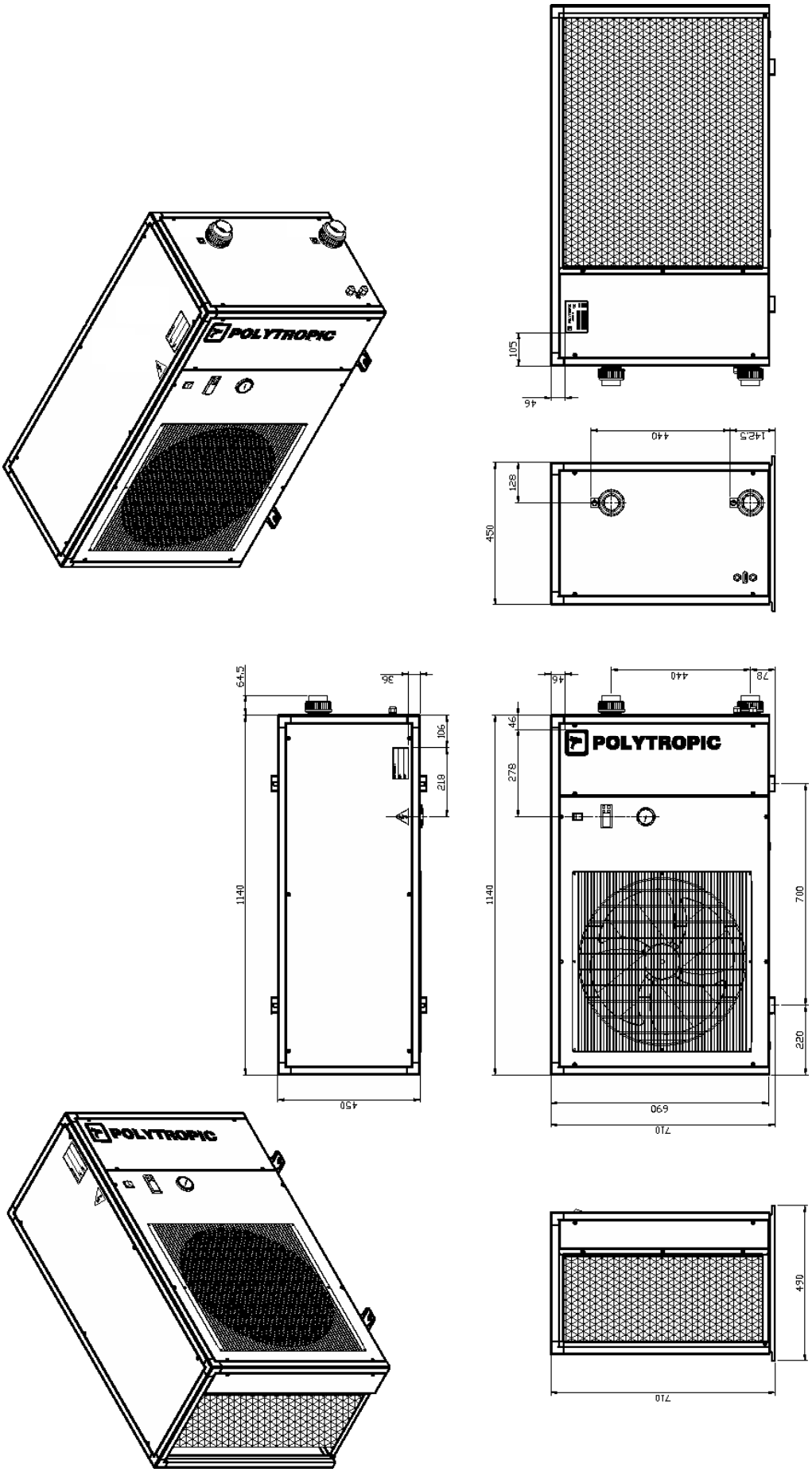
6. R-PAC16

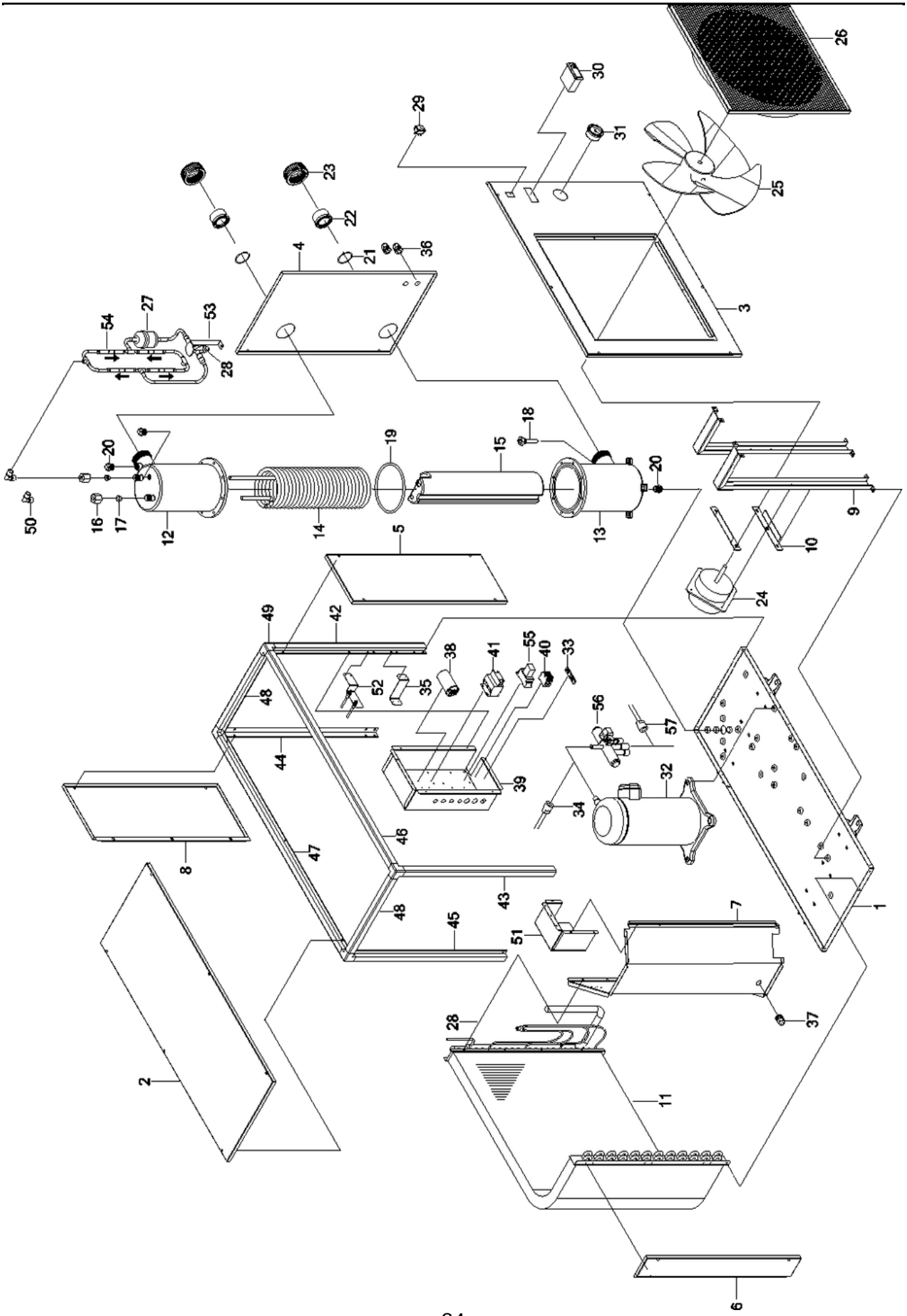

POLYTROPIC
105
46
440
142,5
128
450
64,5
36
106
219
1140
450
46
78
278
700
220
690
710
490


26
30
29
31
25
23
22
21
36
4
3
54
27
53
28
18
19
15
20
50
16
17
12
14
13
9
10
5
24
49
42
38
41
55
40
33
52
35
48
56
57
44
39
32
34
46
47
8
43
48
45
51
7
1
37
2
11
6

ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	QTY
1	BOTTOM PANEL ASS'Y	NHPT36-1-100	B0193-001	-
	BOTTOM PANEL	NHPT36-1-101	B0193-001	1 PC.
	BOTTOM LEG	NHPT36-1-102	B0191-002	1 PC.
	BOTTOM LEG #2	NHPT36-1-103	B0192-011	1 PC.
2	TOP PANEL	NHPT36-1-701	B0193-007	1 PC.
3	FRONT PANEL	HP247-1-301	B0193-013	1 PC.
4	IN-OUT PANEL	NHPT36-1-401	B0193-004	1 PC.
5	SWITCH PANEL	NHPT36-1-201	B0193-002	1 PC.
6	LEFT SIDE PANEL	NHPT36-1-501	B0193-005	1 PC.
7	PARTITION PLATE	NHPT36-1-1001	B0193-010	1 PC.
8	REAR PANEL	NHPT36-1-601	B0193-006	1 PC.
9	MTG FAN	NHPT36-1-801	B0193-008	2 PCS.
10	MTG STIFFENER	NHPT24-1-901	B0190-010	2 PCS.
11	EVAPORATOR	NHPT24-2-101	A0303-089	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT24-4-201	A0202-066	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSOR	NHPT24-4-115	B0190-026	1 PC.
19	O-RING SEAL	NHPT24-4-108	B0190-019	1 PC.
20	PLUG	NHPT24-4-114	B0190-025	3 PCS.
21	UNION PVC-SEAL	NHPT24-4-107	B0190-018	2 PCS.
22	U-PVC CONNECTOR	NHPT24-4-109	B0190-020	2 PCS.
23	UNION U-PVC	NHPT24-4-104	B0190-015	2 PCS.
24	MOTOR	RT925-6B/3 OL	A0001-025	1 PC.
25	BLADE	18" x 28"	A0701-018	1 PC.
26	FAN GRILL	18"	A0601-016	1 PC.
27	FILTER	CK053	A1001-017	1 PC.
28	EXPANSION VALVE	AAE 2 HC	A0901-107	1 PC.
29	SWITCH	4P 16A	C0104-001	1 PC.
30	CAREL CONTROL CARD	IR33C0H500	C0104-071	1 PC.
31	GAUGE	35 BAR	A1102-011	1 PC.
32	COMPRESSOR	2R28K3EPFJ	A0106-015	1 PC.
33	GROUND BAR	NHPT24-6-102	C0108-098	1 PC.
34	PRESSURE SWITCH (HIGHT)	YK-03H-059-2.72/R2.03X	A0902-008	1 PC.
35	SUPPORT WIREDUCT	NHPT36-1-1501	B0192-012	1 PC.
36	CABLE GRAND	PG 11	D0201-016	2 PCS.
37	CABLE GRAND	PG 9	D0201-012	1 PC.
38	RUN CAP (COMPRESSOR)	370 VAC 45 UF	C0112-001	1 PC.
39	ELECTRIC BOX	NHPT36-1-801	B0193-009	1 PC.
40	TERMINALS	AWG2.5	C0108-093	4 PCS.
41	MAGNETIC CONTACTOR	1P 25 A	C0108-007	1 PC.
42	COLUMN # FRONT-RIGHT	NHPT36-1-1301	B0122-002	1 PC.
43	COLUMN # FRONT-LEFT	NHPT36-1-1302	B0122-002	1 PC.
44	COLUMN # REAR-RIGHT	NHPT36-1-1303	B0122-002	1 PC.
45	COLUMN # REAR-LEFT	NHPT36-1-1304	B0122-002	1 PC.
46	TRUSS # FRONT	NHPT36-1-1305	B0122-002	1 PC.
47	TRUSS # REAR	NHPT36-1-1306	B0122-002	1 PC.
48	TRUSS # LEFT-RIGHT	NHPT36-1-1307	B0122-002	2 PCS.
49	ARC ANGLE ALJ-FOUK (C25IS-6)	-	B0122-004	4 PCS.
50	LOCKRING NWK MS 58	1/2"	A1702-008	1 PC.
51	COVER	NHPT36-1-1601[3]	B0193-017	1 PC.
52	HUP PLATE	NHPT36-1-1701	B0193-016	1 PC.
53	SUPPORT EXPAN.	NHPT24-1-1201	B0190-024	1 PC.
54	CHECK VALVE SCV-003	3/8"	B0904-036	4 PCS.
55	RELAY	REM4AB1P7	C0102-013	1 PC.
56	4WAY VALVE SHF-26A	20 kw.	A0904-049	1 PC.
57	PRESSURE SWITCH (LOW)	YK-03L-059-007E022Q	A0901-016	1 PC.

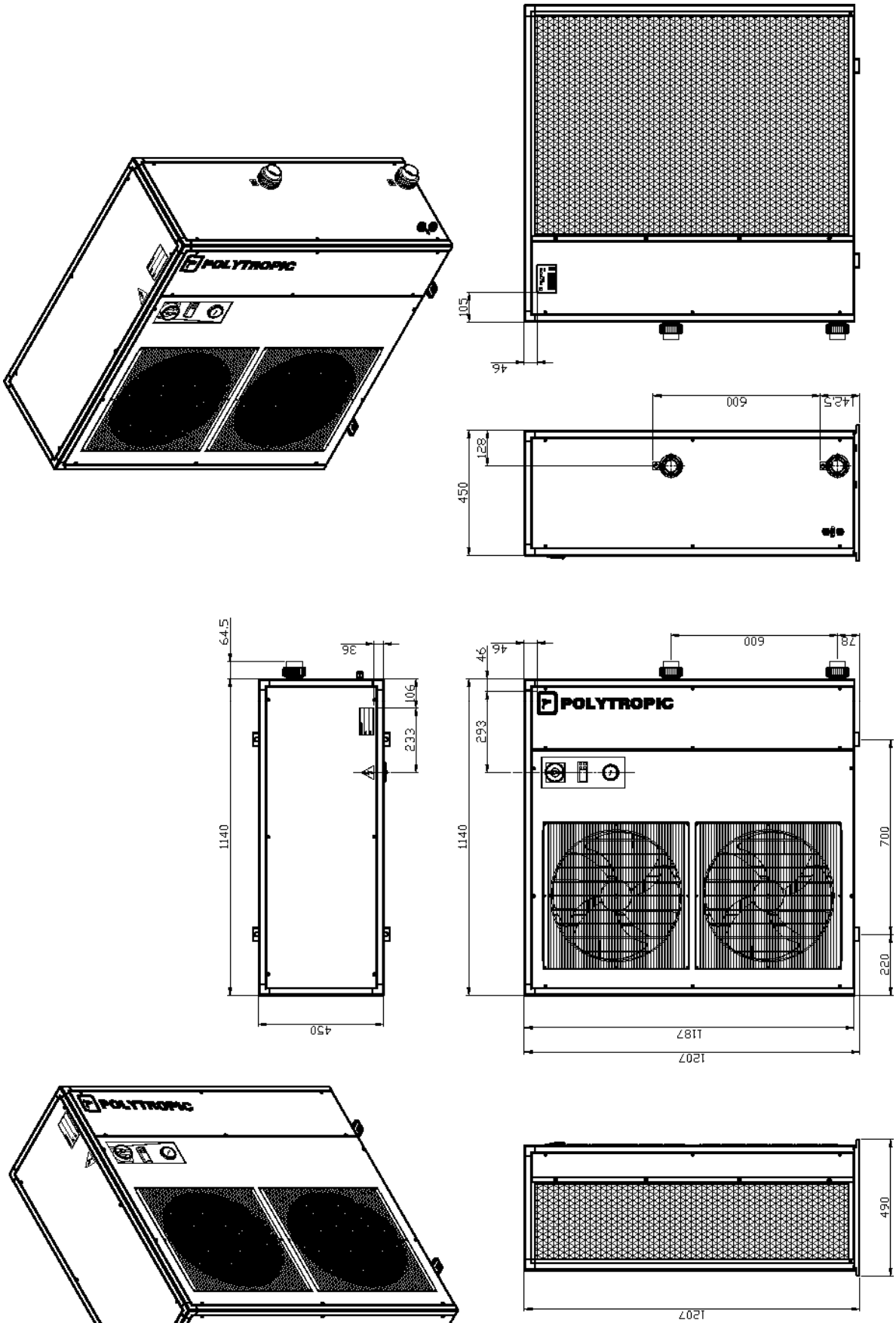
7. R-PAC22

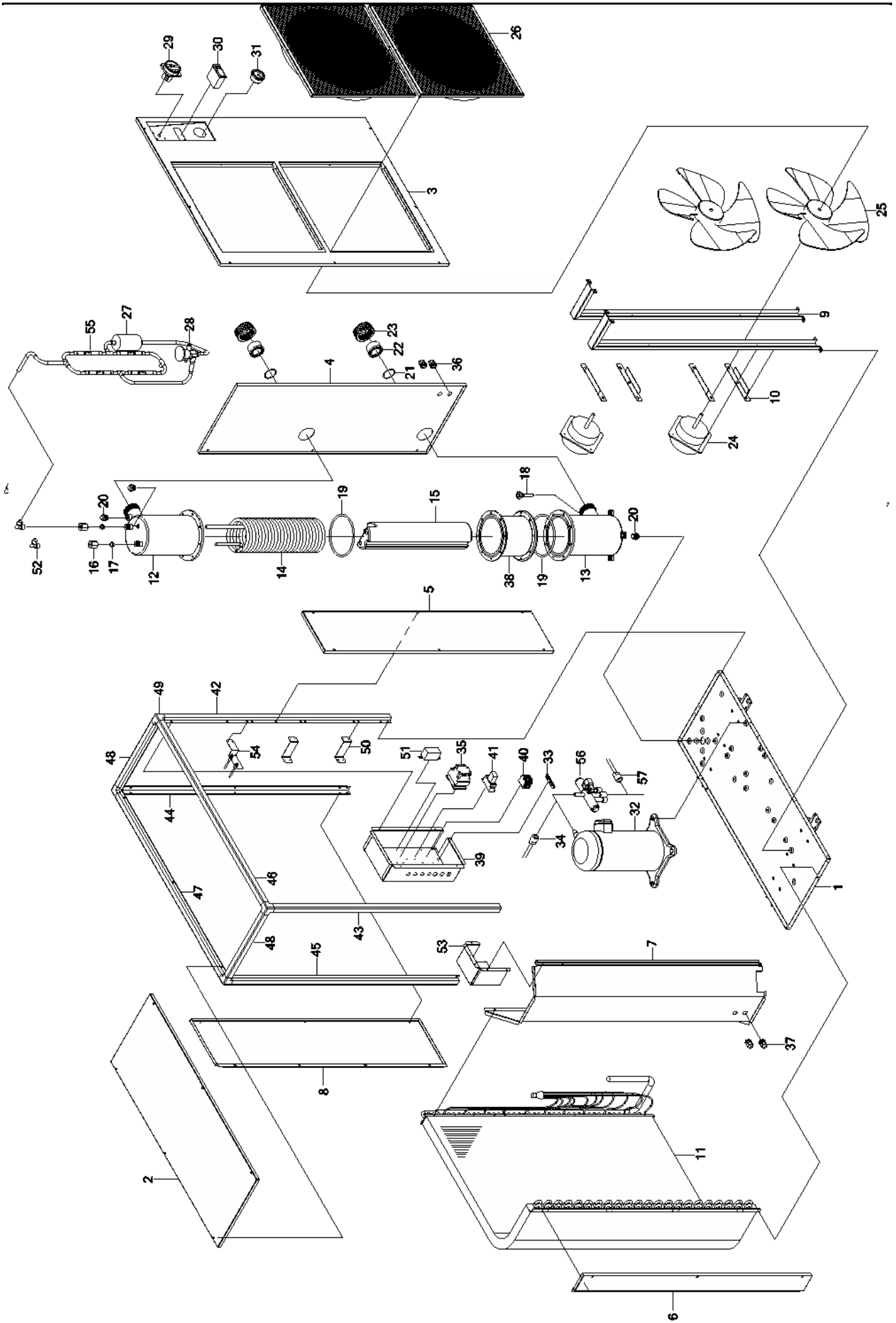

POLYTROPIC
105
46
440
142,5
128
450
64,5
36
106
219
1140
450
46
78
278
700
220
690
710
490


26
30
29
31
25
23
22
4
21
36
3
54
27
53
28
18
20
19
15
20
50
16
17
12
14
13
9
10
5
24
49
42
38
41
55
40
33
52
35
48
56
57
44
39
32
34
46
47
8
43
48
45
51
7
1
28
37
2
11
6

ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	QTY
1	BOTTOM PANEL ASS'Y	NHPT36-1-100	B0193-001	-
	BOTTOM PANEL	NHPT36-1-101	B0193-001	1 PC.
	BOTTOM LEG	NHPT36-1-102	B0191-002	1 PC.
	BOTTOM LEG #2	NHPT36-1-103	B0192-011	1 PC.
2	TOP PANEL	NHPT36-1-701	B0193-007	1 PC.
3	FRONT PANEL	HP247-1-301	B0193-013	1 PC.
4	IN-OUT PANEL	NHPT36-1-401	B0193-004	1 PC.
5	SWITCH PANEL	NHPT36-1-201	B0193-002	1 PC.
6	LEFT SIDE PANEL	NHPT36-1-501	B0193-005	1 PC.
7	PARTITION PLATE	NHPT36-1-1001	B0193-010	1 PC.
8	REAR PANEL	NHPT36-1-601	B0193-006	1 PC.
9	MTG FAN	NHPT36-1-801	B0193-008	2 PCS.
10	MTG STIFFENER	NHPT24-1-901	B0190-010	2 PCS.
11	EVAPORATOR	NHPT36-2-101	A0303-070	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT36-4-201	A0202-067	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSOR	NHPT24-4-115	B0190-026	1 PC.
19	O-RING SEAL	NHPT24-4-108	B0190-019	1 PC.
20	PLUG	NHPT24-4-114	B0190-025	3 PCS.
21	UNION PVC-SEAL	NHPT24-4-107	B0190-018	2 PCS.
22	U-PVC CONNECTOR	NHPT24-4-109	B0190-020	2 PCS.
23	UNION U-PVC	NHPT24-4-104	B0190-015	2 PCS.
24	MOTOR	RT925-68/3 OL	A0601-025	1 PC.
25	BLADE	18" x 28°	A0701-018	1 PC.
26	FAN GRILL	18"	A0501-016	1 PC.
27	FILTER	CK053	A1001-017	1 PC.
28	EXPANSION VALVE	AAE 3 HC	A0901-110	1 PC.
29	SWITCH	4P 16A	C0104-001	1 PC.
30	CAREL CONTROL CARD	IR33C0HB00	C0104-071	1 PC.
31	GAUGE	35 BAR	A1102-011	1 PC.
32	COMPRESSOR	ZR45K3EPFJ	A0106-015	1 PC.
33	GROUND BAR	NHPT24-6-102	C0108-098	1 PC.
34	PRESSURE SWITCH	YK-03H-059-2.72R2.03X	A0802-008	1 PC.
35	SUPPORT WIREDUCT	NHPT36-1-1501	B0192-012	1 PC.
36	CABLE GRAND	EG 11	D0201-016	2 PCS.
37	CABLE GRAND	PG 9	D0201-012	1 PC.
38	RUN CAP (COMPRESSOR)	370 VAC 60 UF	C0112-001	1 PC.
39	ELECTRIC BOX	NHPT36-1-901	B0193-009	1 PC.
40	TERMINALS	AVK2.5	C0108-093	4 PCS.
41	MAGNETIC CONTACTOR	1P 25 A	C0108-007	1 PC.
42	COLUMN # FRONT-RIGHT	NHPT36-1-1301	B0122-002	1 PC.
43	COLUMN # FRONT-LEFT	NHPT36-1-1302	B0122-002	1 PC.
44	COLUMN # REAR-RIGHT	NHPT36-1-1303	B0122-002	1 PC.
45	COLUMN # REAR-LEFT	NHPT36-1-1304	B0122-002	1 PC.
46	TRUSS # FRONT	NHPT36-1-1305	B0122-002	1 PC.
47	TRUSS # REAR	NHPT36-1-1306	B0122-002	1 PC.
48	TRUSS # LEFT-RIGHT	NHPT36-1-1307	B0122-002	2 PCS.
49	ARC ANGLE AL.3-FOLK (C2516-6)	-	B0122-004	4 PCS.
50	LOCKRING NWK MS 50	1/2"	A1702-008	2 PCS.
51	COVER	NHPT36-1-1601(3)	B0193-017	1 PC.
52	HLP PLATE	NHPT36-1-1701	B0193-016	1 PC.
53	SUPPORT EXPAN.	NHPT24-1-1201	B0190-024	1 PC.
54	CHECK VALVE BCV-603	3/8"	B0904-056	4 PCS.
55	RELAY	REM4AB1P7	C0102-013	1 PC.
56	4 WAY VALVE SHF-20A	20 kw.	A0904-049	1 PC.
57	PRESSURE SWITCH (LOW)	YK-03L-059-007E022G	A0801-016	1 PC.

8. R-PAC31


POLYTROPIC
105
46
600
142.5
128
450
64.5
36
106
233
1140
450
46
46
600
78
293
1140
700
220
1187
1207
POLYTROPIC
490
1207


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57

ITEM	PART NAME	DWG.No. / SPECIFICATION	CODE No.	Q'TY
1	BOTTOM PANEL ASS'Y	NHPT36-1-100	B0193-001	-
	BOTTOM PANEL	NHPT36-1-101	B0193-001	1 PC.
	BOTTOM LEG	NHPT36-1-102	B0191-002	1 PC.
	BOTTOM LEG #2	NHPT36-1-103	B0192-011	1 PC.
2	TOP PANEL	NHPT36-1-701	B0193-007	1 PC.
3	FRONT PANEL ASS'Y	HP607-1-300	B0195-003	1 PC.
4	IN-OUT PANEL	HP607-1-401	B0195-004	1 PC.
5	SWITCH PANEL	HP607-1-201	B0195-001	1 PC.
6	LEFT SIDE PANEL	HP607-1-501	B0195-005	1 PC.
7	PARTITION PLATE	HP607-1-1001	B0195-008	1 PC.
8	REAR PANEL	HP607-1-601	B0195-006	1 PC.
9	MTG FAN	HP607-1-801	B0195-007	2 PCS.
10	MTG STIFFENER	NHPT24-1-901	B0190-010	4 PCS.
11	EVAPORATOR	NHPT60-2-101	A0303-071	1 PC.
12	CONDENSER CASING-TOP	NHPT24-4-101	B0190-012	1 PC.
13	CONDENSER CASING-BOTTOM	NHPT24-4-102	B0190-013	1 PC.
14	SPIRAL CONDENSER COIL (TITANIUM)	NHPT60-4-201	A0202-069	1 PC.
15	CONDENSER CORE	NHPT24-4-103	B0190-014	1 PC.
16	NUT LOCK TUBE	NHPT24-4-105	B0190-016	2 PCS.
17	REFRIG. TUBE SEALING	NHPT24-4-110	B0190-021	2 PCS.
18	SUPPORT SENSOR	NHPT24-4-115	B0190-026	1 PC.
19	O-RING SEAL	NHPT24-4-108	B0190-019	2 PCS.
20	PLUG	NHPT24-4-114	B0190-025	3 PCS.
21	UNION PVC-SEAL	NHPT24-4-107	B0190-018	2 PCS.
22	U-PVC CONNECTOR	NHPT24-4-109	B0190-020	2 PCS.
23	UNION U-PVC	NHPT24-4-104	B0190-015	2 PCS.
24	MOTOR	RT925-68/3 OL	A0601-025	2 PCS.
25	BLADE	18" x 28"	A0701-018	2 PCS.
26	FAN GRILL	18"	A0501-016	2 PCS.
27	FILTER	EK164S	A1001-007	1 PC.
28	EXPANSION VALVE	TCLE 3 HC #4	A0901-020	1 PC.
29	CHANGE OVER SWITCH	CS-68-2P	C0104-011	1 PC.
30	CAREL CONTROL CARD	IR33C0HB00	C0104-071	1 PC.
31	GAUGE	35 BAR	A1102-011	1 PC.
32	COMPRESSOR	ZR72KCE-TFD	A0107-006	1 PC.
33	GROUND BAR	NHPT24-6-102	C0108-098	1 PC.
34	PRESSURE SWITCH (HIGHT)	YK-03H-059-2.72R2.03X	A0802-008	1 PC.
35	CONTACTOR + OVERLOAD	SN12 (11A)	C0108-100	1 PC.
36	CABLE GRAND	EG 11	D0201-016	2 PCS.
37	CABLE GRAND	PG 9	D0201-012	2 PCS.
38	ASS'Y PVC EXT.	NHPT60-4-300	B0192-010	1 PC.
39	ELECTRIC BOX	NHPT36-1-901	B0193-009	1 PC.
40	TERMINALS	AVK2.5	C0108-093	6 PCS.
41	RELAY	RXM4AB1P7	C0102-013	1 PC.
42	COLUMN # FRONT-RIGHT	HP607-1-1301	B0122-002	1 PC.
43	COLUMN # FRONT-LEFT	HP607-1-1302	B0122-002	1 PC.
44	COLUMN # REAR-RIGHT	HP607-1-1303	B0122-002	1 PC.
45	COLUMN # REAR-LEFT	HP607-1-1304	B0122-002	1 PC.
46	TRUSS # FRONT	HP607-1-1305	B0122-002	1 PC.
47	TRUSS # REAR	HP607-1-1306	B0122-002	1 PC.
48	TRUSS # LEFT-RIGHT	HP607-1-1307	B0122-002	2 PCS.
49	ARC ANGLE AL.3-FOLK (C2516-6)	-	B0122-004	4 PCS.
50	SUPPORT WIREDUCT	NHPT36-1-1501	B0192-012	2 PCS.
51	PHASE CONTROLLER	PH-400-FRECON	C0111-004	1 PC.
52	LOCKRING NWK MS 50	1/2"	A1702-008	2 PCS.
53	COVER	NHPT36-1-1601(3)	B0193-017	1 PC.
54	HLP PLATE	NHPT36-1-1701	B0193-016	1 PC.
55	CHECK VALVE	1/2"	A0904-052	4 PCS.
56	4 WAY VALVE SHF-20A	20 kw.	A0904-049	1 PC.
57	PRESSURE SWITCH (LOW)	YK-03L-059-007E022G	A0801-016	1 PC.