
ROOFTOP Air Conditioners
D4IC-360, 480 (Cool only)
B4IH-360, 480 (Heat pump)
D4IG-360, 480 (Cool only + gas heating)

Ref.: N-27376 1208

Technical Information



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1 - Description

Adequate for installing outdoors, either on the roof or on ground level.

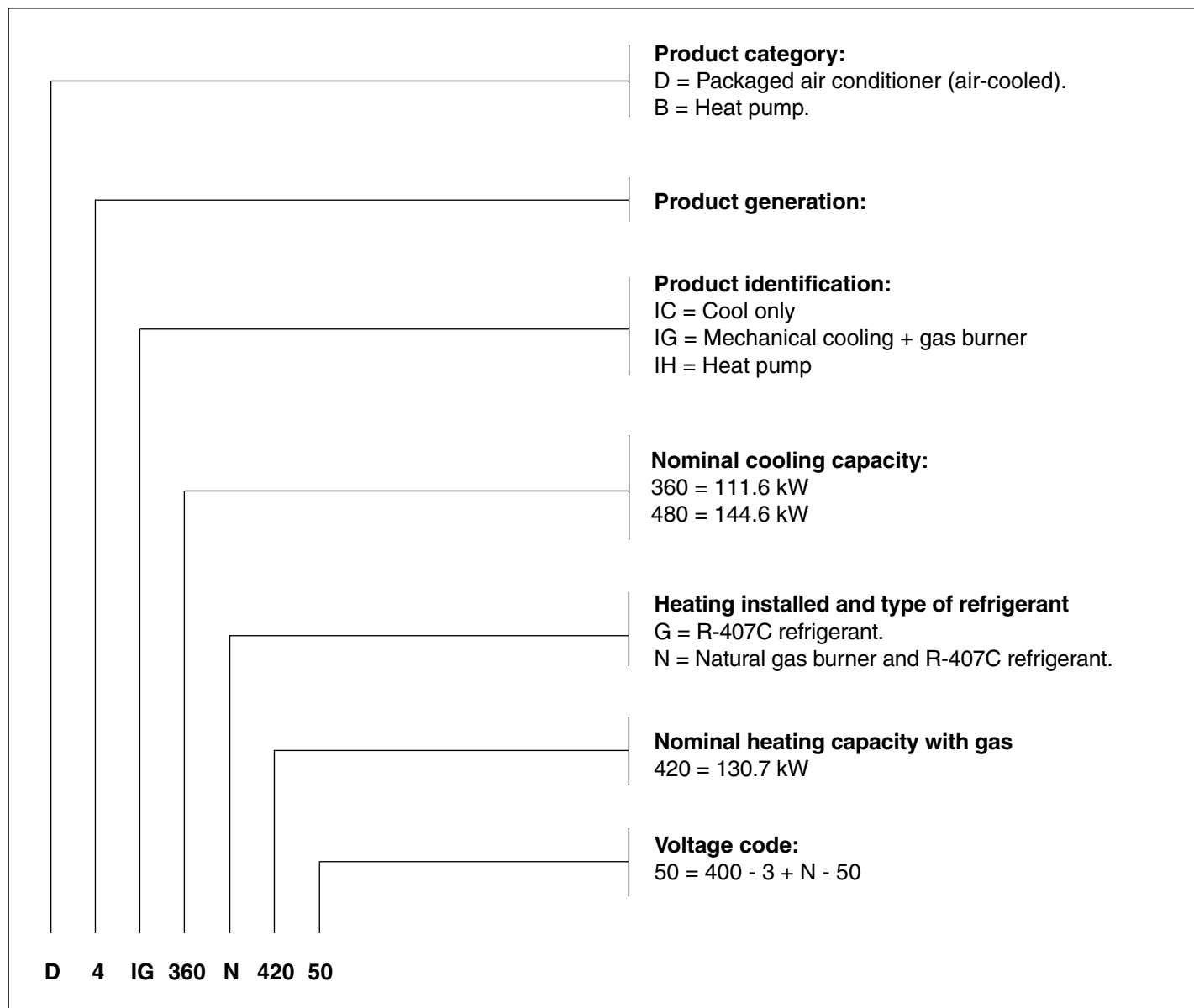
The D4IC series are cool only versions, but accept electric heaters for heating.

The D4IG series are cool only versions that include gas burner heating.

The B4IH series are reversible heat pump versions with optional electric heaters as backup.

Factory supplied completely assembled, with all necessary tubing, connected and loaded, in one single assembly for shipping and handling, making installation easier and faster.

2 - Product nomenclature



3 - Characteristics

3.1.- Structure

Designed to evacuate rainwater and condensed water easily from the unit.

The roofing surface of the evaporating section is slightly tilted to one side, and its entire perimeter overhangs the side panels.

3.2.- Durable construction

All metal parts are made of zinc-aluminium coated steel sheeting.

The outer surface is treated with oven-baked polymer-

ised paint RAL9002, which guarantees a quality finish for many years of service (800 H.N.S. in compliance with DIN 50021).

Blue-Fin type coils, as well as copper fin coils are also available as an option.

3.3.- Thermal/acoustic insulation

The evaporating, impulse/accessories and heating sections, as well as the gas burner and the compressor chamber are fully insulated. The outer surface of this 10 mm. thick insulation is protected by reinforced aluminium sheeting, with an M1 fireproof classification in compliance with UNE 23727.

This aluminium surface causes minimum friction with the air, and is easy to clean.

3.4.- Base beams

The base beams are fixed and provide a foundation for the entire unit.

The beams have suspension lugs on the front surface that allow using a crane to locate the unit.

3.5.- Condensed water tray

The bottom of the tray is tilted towards the drain connection on the side of the unit to ensure full evacuation of condensed water.

It can be cleaned easily through the side access door of the unit.

3.6.- Duct connections

All models are equipped for connecting upward or side return and impulse air ducts.

Simply remove the covers that correspond to each case (see Figs. 5 and 6).

For factory assembly of certain options, the arrangement of the return air duct (bottom or side) should be indicated when placing the order. These options are: economiser, barometric damper and extractor fan. The same is applicable to the impulse duct in the case of the hot water coil option and D4IG units with gas heating.

3.7.- Wide range of flows/fan starts

All units have belt-drive impulse fans, with adjustable pitch pulleys, to accurately cover air flow and static pressure conditions required by each installation.

The impulse fan is equipped with a smooth starter.

3.8.- Access for maintenance and servicing

These units are supplied with access doors equipped with hinges and ¼-turn locks.

They offer excellent access to all components that may require maintenance or servicing.

The liquid sight glasses, located between the outdoor coils of each one of the circuits, are visible from the outside without having to remove any panel.

Access to the control circuit and compressor section is independent of the cooling operation of the unit.

3.9.- Service connections

There are openings for the entry of power supply cables on the sides of the units to allow connection at the installation site with minimum labour.

3.10.- Electrical panel

- In compliance with the EN60204-1 and 60439-1 standards.
- Main switch with lever, as standard equipment.
- Motors protected by magneto thermal switches and motor guards.
- Sequence and phase failure detector: In the case it detects a phase sequence other than R-S-T or if, once the unit is on, one of the phases fails, this detector, by means of an internal volt-free contact, disconnects the power supply to the main board of the unit.

3.11.- Control circuit

24 V control circuit that can operate with the optional DPC-1 (communication) thermostat, or a 24 V thermostat with control signals (Y1, Y2, G, O/B, W).

Also allows the use of a system analyser (YKtool) for the purpose of simplifying commissioning, trouble shooting and resolving failures.

3.12.- Low noise level

The compressors, indoor fan and condensing unit fans are mounted on antivibratory supports.

The vertical discharge condensing unit fans direct the noise upwards and away from the surrounding structures.

The compressors of the 3 circuits are located inside a chamber, that has acoustic insulation on full outer surface.

3.13.- Multiple cooling circuits

All models are equipped with 3 independent circuits that ensure better temperature control and comfort level of the room, as well as improved performance with minimum operating costs.

The operating sequence of the circuits depends upon the control unit, and is alternated in accordance with the accumulation of operating hours of each circuit.

3.14.- Compressors

Hermetic Scroll type vertical compressors, with internal motor protection and an external sump heater included as standard equipment.

3.15.- System protection

All cooling circuits are equipped, as standard, with the following protection features:

- High and low pressure switches.
- Suction line antifreeze thermostat.
- Liquid line filter-dryer.
- Discharge temperature cut-off switch.
- Suction accumulator (on heat pumps).
- Liquid sight glasses.

3.16.- Gas burner (D4IG units)

Units with gas heating include 4 stages of capacity control. The group comprises an AISI 409 stainless steel pipe heat exchanger, adjustable gas valves, electronic ignition control, mechanical ventilation, as well as all safety controls needed in compliance with the EC standards.

The unit is supplied complete and ready for connection to a 20 mbar (2ND-H, G20) Natural Gas supply.

3.17.- Air filters

One single filter size for all models (4 units per unit).

As standard, equipped with metal frame filters and disposable 50 mm. filtering media, with 82% gravimetric efficiency (EU 3) and F1 class fire resistance (DIN 53438).

The filtering media can be changed easily without the use of tools.

Washable filtering media with 90% gravimetric efficiency (EU 4) is also available as an option.

3.18.- Defrost sequence (B4IH equipment)

Defrost is carried out only in heat pump function. Defrost start and end depend upon the value of the liquid probe in

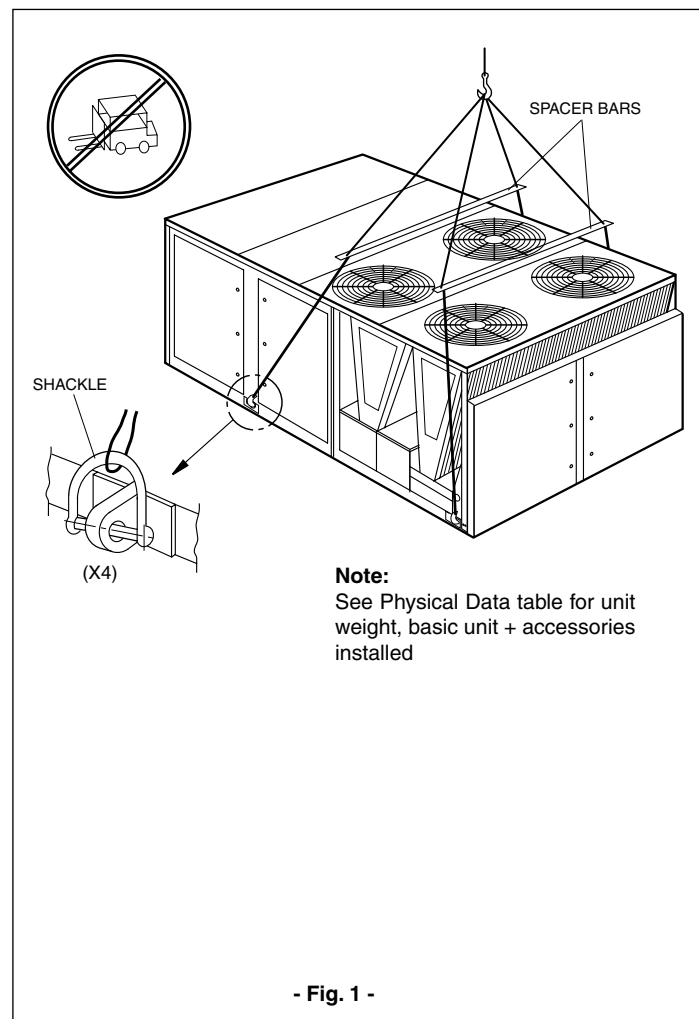
the outdoor coil.

On units with several compressors, it cannot defrost two circuits at the same time.

3.19.- Transportation and handling

Suspend the unit by the 4 points provided, using chain or cable slings (Fig. 1) and spacers longer than the width of the equipment. Do not use forklift trucks.

Typical elevation



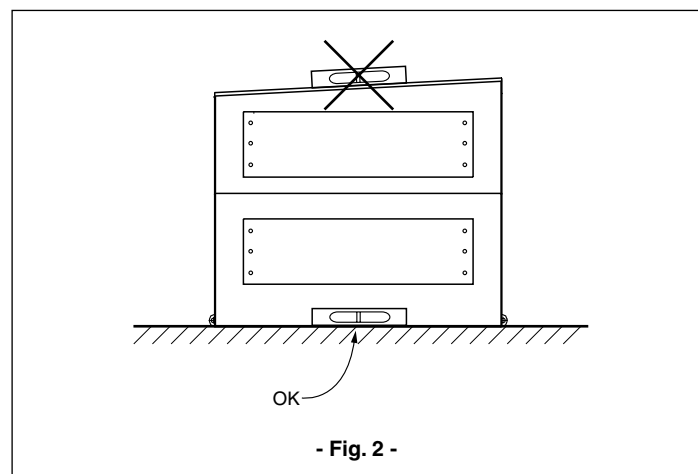
3.20.- Location

Use the following guidelines to select an adequate location for these units.

1. This equipment is designed for outdoor installation only.
2. The condenser requires an unlimited air supply. Whenever possible to choose a location, locate the equipment on the north or east side of the building.
3. For ground level installations, use a level concrete slab of at least 100 mm. thick. The length and width should be at least 150 mm. more than the base beams of the units. Do not fasten the bed frame to the foundation of the building.
4. For rooftop installation, the roof structure should be able to support the weight of the equipment, its options and/or accessories. The equipment should be installed on a mounting base or on an adequate frame of steel angles (the optional accessory "mounting base" or "Roof Curb" is available).
5. Maintain a maximum 10 mm. level tolerance along the entire length and width of the equipment.

Attention:

The roof of the unit is tilted slightly to drain rainwater. Never check the level of the unit along the width of same and using the roof of the unit as a point of reference. Use the base of the unit as a reference (Fig. 2).



3.21.- Sound level

Roof Top	OUTDOOR Spectrum per octave band dB (A)							Global sound power level dB (A)	Sound pressure level dB (A) at 5 m
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz		
360	77	87	88	87	86	79	75	93	71
480	77	88	90	90	89	80	75	96	74

Roof Top	INDOOR Spectrum per octave band dB (A)							Global sound power level dB (A)
	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	
360	73	78	80	81	80	76	72	86
480	73	78	81	81	80	76	72	87

4 - Technical specifications and physical data

4.1.- D4IC (Cool only) and D4IG (Cool only + gas heating)

Models			360	480
Heating and cooling capacities (1)	Nett cooling capacity	kW	111.6	144.6
	Nominal absorbed power in cool	kW	42.4	52.2
Heating (D4IC)	Optional electric heater heating capacity (400 V) (2)	kW	37 - 50 - 60	37 - 50 - 60
Gas heating (D4IG)	Heating capacity at 100% power	(P.C.I.) Total	kW	130.7
		(2) Nett	kW	117
	Gas consumption at 100% (Natural Gas 2ND-H, G20 at 20 mbar and 15° C)	m³/h	12.8	12.8
	Stages	Nº	4	4
Compressors	Nominal/start current	A	21(x3) / 167	21(x2)+38 / 167 / 272
	Type		SCROLL	SCROLL
	No. of circuits		3	3
Refrigerant (R-407C)	Circuit No. 1/2/3	kg	12.7 / 12.7 / 12.7	12.7 / 12.7 / 26
Power supply	V / ph / Hz		400 / 3 + N / 50	
Indoor fan (3)	Nominal air flow	m³/h	21 000	25 000
	Max. static pressure with nominal flow	Standard	Pa	300
		HPD	Pa	480
	Maximum flow	m³/h	23 000	28 000
	Minimum flow	m³/h	19 000	22 000
Standard motor	kW	9.2	11	
Indoor coil (evaporating unit)	No. of elements		4	4
	Distance between fins	mm	1.81	1.81
	Front surface	m²	2.9	3.7
Air filters	Amount per unit		4	4
	Dimensions	mm	1 000 x 760 x 50	1 000 x 760 x 50
Outdoor fan	Diameter/number	mm	630 / 3	630 / 4
	Nominal flow	m³/h	11 000	11 000
	Motor	kW	1.5	1.5
Outdoor coil (condensing unit)	No. of elements		2 / 3	3
	Distance between fins	mm	1.81	1.81 / 2.11
	Front surface	m²	7	8.5
Nett dimensions (4)	Height	mm	1 815	1 815
	Length	mm	4 580	4 580
	Width	mm	2 200	2 200
Net weight (basic unit without accessories) (4)	D4IC	kg	2 010	2 295
	D4IG	kg	2 124	2 409

(1) Data in compliance with Eurovent. Summer: Indoor DB 27° C / WB 19° C, outdoor DB 35° C.
(DB = dry bulb, WB = wet bulb)

(2) Add indoor motor consumption.

(3) See INDOOR FAN PERFORMANCES table for different pressure flows.

(4) See dimensions and weights of the accessories.

HPD: High pressure drive, optional.

P.C.I.: Lower heating capacity.

4.2.- B4IH (Heat pump)

Models		B4IH			
		360	480		
Cooling capacities (1)	Nett cooling capacity	kW	107.6	140	
	Nominal absorbed power in cool	kW	43	59.5	
Heating capacities (1)	Heating capacities (2)	kW	127.1	163.3	
	Nominal absorbed power in heat	kW	41.9	56.7	
	Optional electric heater heating capacity (400 V) (2)	kW	37 - 50 - 60	37 - 50 - 60	
Compressors	Nominal/start current	A	85 / 167	112 / 272	
	Type		SCROLL	SCROLL	
	No. of circuits		3	3	
Refrigerant (R-407C)	Circuit No. 1/2/3	kg	13.7 / 13.7 / 13.7	13.7 / 13.7 / 27.9	
Power supply	V / ph / Hz		400 / 3 + N / 50		
Indoor fan (3)	Nominal air flow	m ³ /h	21 000	25 000	
	Maximum static pressure with nominal flow	Standard	Pa	300	275
		HPD	Pa	480	465
	Maximum flow	m ³ /h	23 000	28 000	
	Minimum flow	m ³ /h	19 000	22 000	
	Standard motor	kW	9.2	11	
Indoor coil (evaporating unit)	No. of elements		4	4	
	Distance between fins	mm	1.81	1.81	
	Front surface	m ²	2.9	3.7	
Air filters	Amount per unit		4	4	
	Dimensions	mm	1 000 x 760 x 50	1 000 x 760 x 50	
Outdoor fan	Diameter/number	mm	630 / 3	630 / 4	
	Nominal flow	m ³ /h	11 000	11 000	
	Motor	kW	1.5	1.5	
Outdoor coil (condensing unit)	No. of elements		2 / 3	3	
	Distance between fins	mm	1.81	1.81 / 2.11	
	Front surface	m ²	7	8.5	
Nett dimensions (4)	Height	mm	1 815	1 815	
	Length	mm	4 580	4 580	
	Width	mm	2 200	2 200	
Net weight (basic unit without accessories) (4)		kg	2 060	2 350	

(1) Data in compliance with Eurovent. Summer: Indoor DB 27° C / WB 19° C, outdoor DB 35° C.

Winter: Indoor DB 20° C, outdoor DB 7° C/WB 6° C.

(DB = dry bulb, WB = wet bulb)

(2) Add indoor motor consumption.

(3) See INDOOR FAN PERFORMANCES table for different pressure flows.

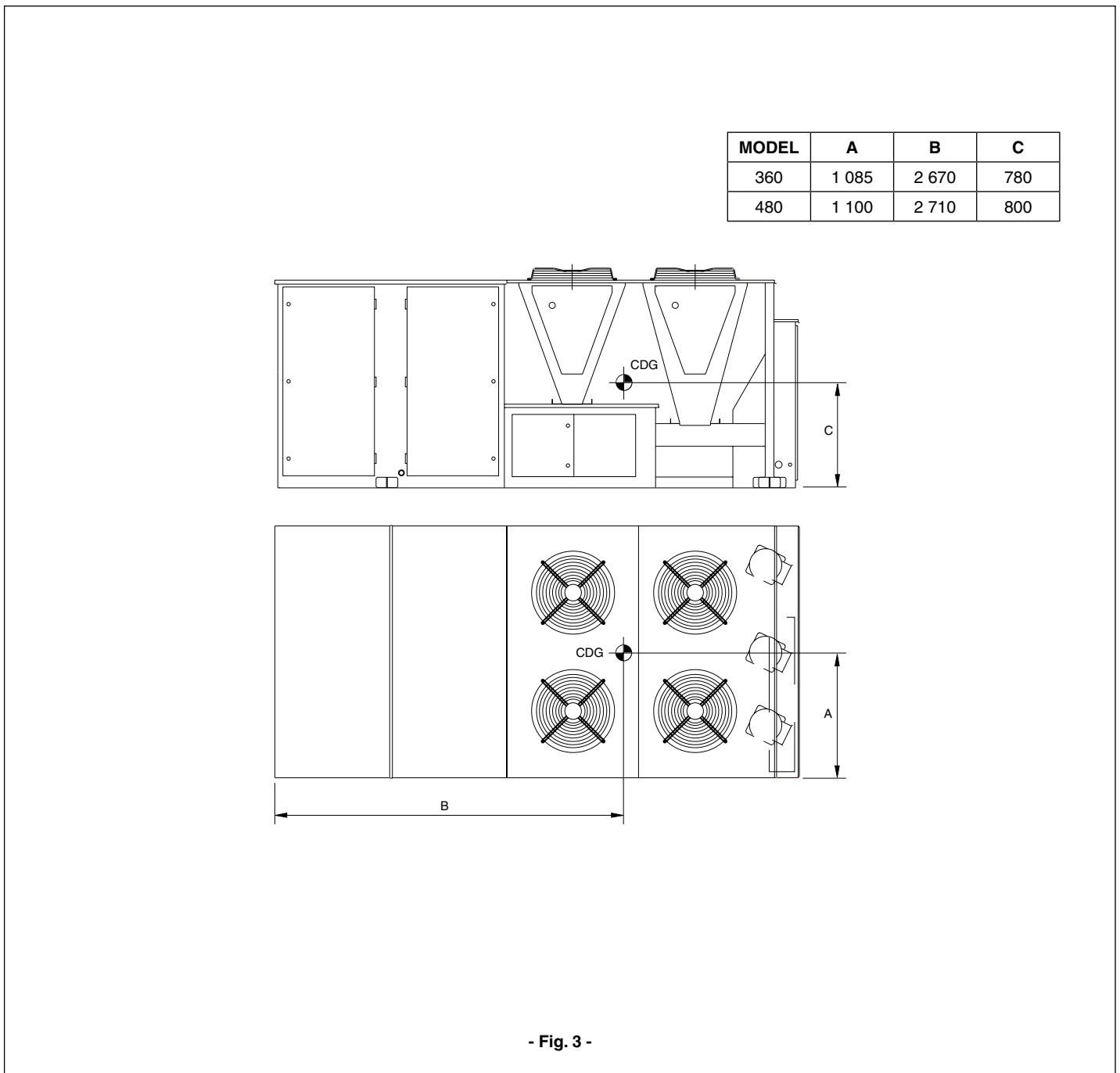
(4) See dimensions and weights of the accessories.

HPD: High pressure drive, optional.

4.3.- Weights of accessories

Models	kg	360	480
Economiser	kg	93	93
Fixed manual outdoor air damper	kg	75	75
Barometric extraction damper	kg	64	64
Extraction fan (axial)	kg	129	129
Mounting base (Roof Curb), fixed/adjustable	kg	117 / 220	117 / 220
Electric heater	kg	34	34
Hot water coil	kg	54	54
High pressure drive (HPD)	kg	0	44
Cu/Cu coils (evaporating + condensing units)	kg	205	251

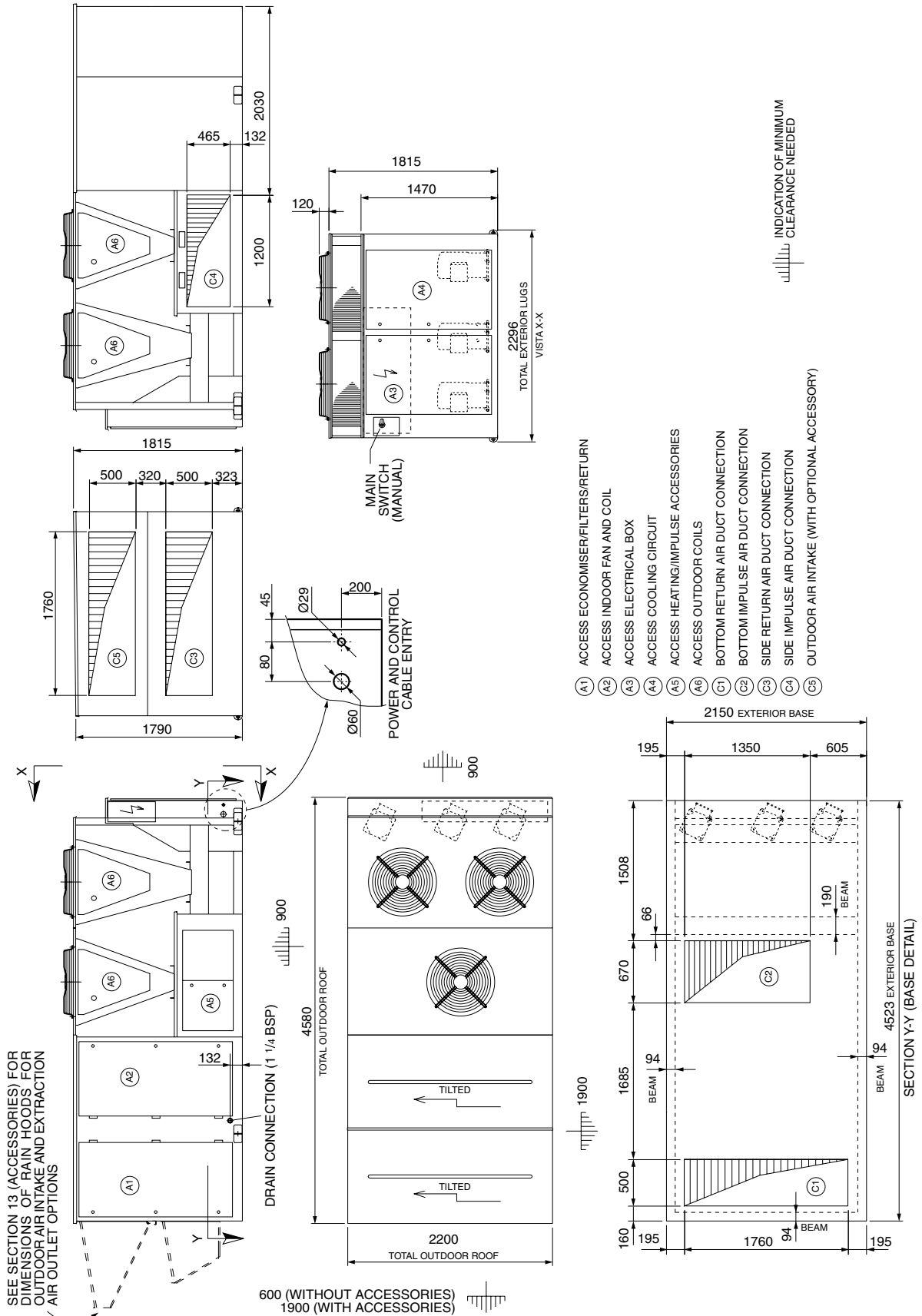
4.4 - Centre of gravity



- Fig. 3 -

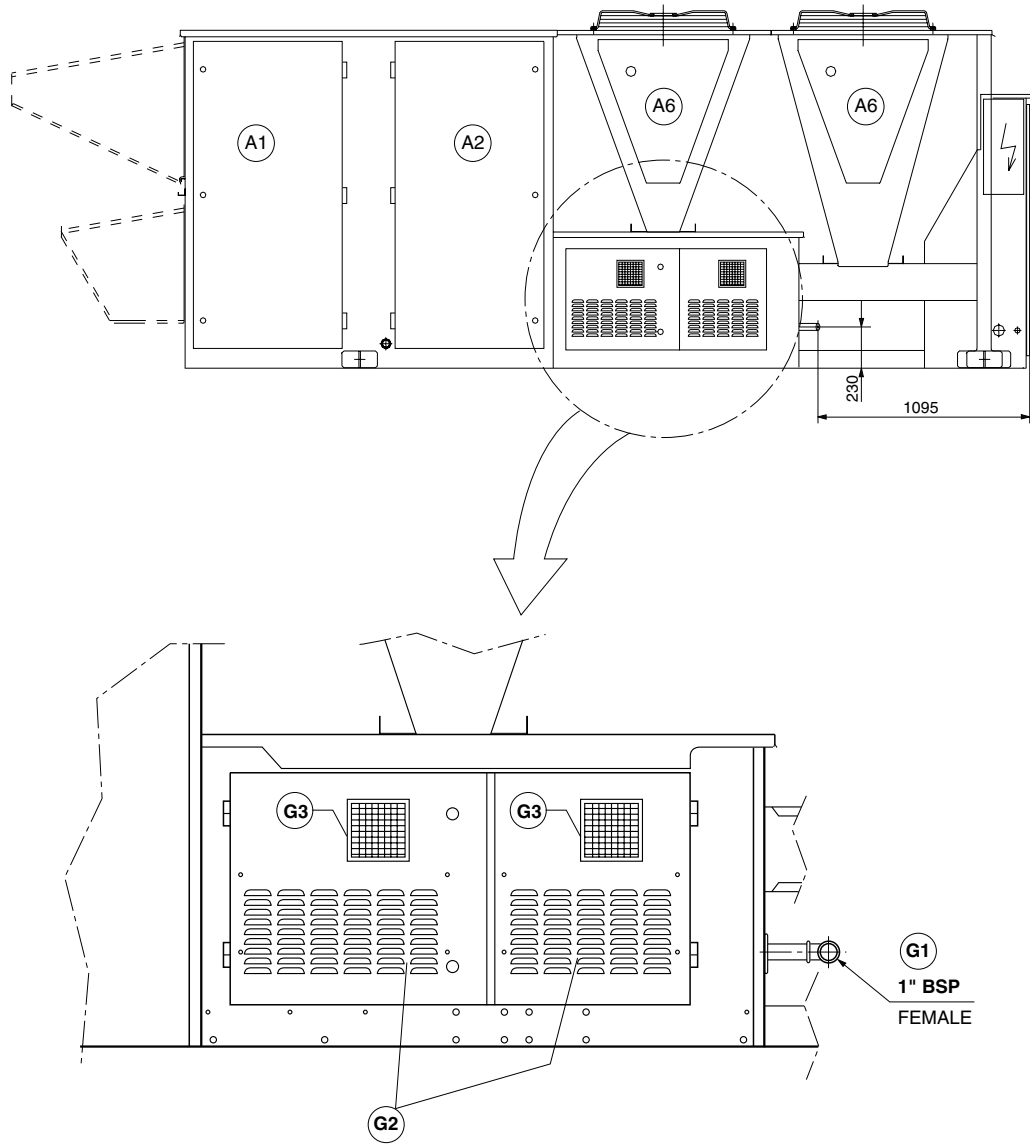
5 - Dimensions, clearances and accesses

Models D4IC, D4IG and B4IH
(Models only D4IG, see fig. 4B)



- Fig. 4 -

Model D4IG
(For further dimensions and details, as per Fig. 4A)



- G1** GAS SUPPLY LINE CONNECTION
- G2** AIR INTAKE FOR COMBUSTION
- G3** COMBUSTION GAS DISCHARGE

- Fig. 4 B -

5.1.- Applications of upward ducts (bottom)

(Fig. 5)

1. Return duct:

- Access the return section through the access door (A1).
- Loosen the 4 screws (8) that fasten the bottom return cover (C1) to the base of the unit.
- Slide the cover out and away from the unit, thus uncovering the opening for duct connection.
- Discard the cover.

2. Impulse duct:

- Access the impulse section through access doors (A5).
- Remove the inner cover (7) by loosening the screws that fasten it to the unit.
- Loosen the 2 screws (8) that fasten the bottom impulse cover (C2) to the base of the unit.
- Slide the cover out and away from the unit, thus uncovering the opening for duct connection.
- Discard the cover.
- **Very important:** The bottom cover (7) should be fitted back into place without forgetting any of the screws.

Attention: In the case of D41C/B41H units with optional hot water coil, or D41G units with gas heating:

- The lower impulse section (C2) cannot be accessed through access doors (A5).

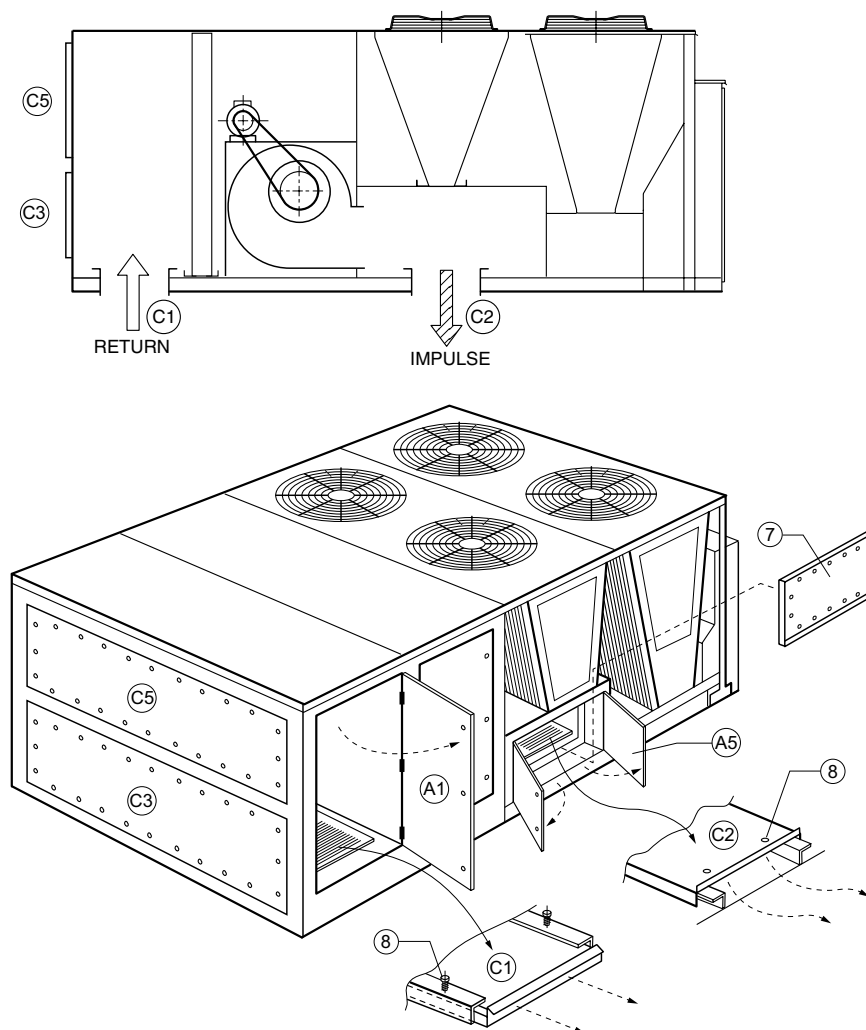
The unit is delivered without cover (C2), ready for connecting the impulse duct. For this purpose, please indicate impulse duct location when placing the order.

3. Access doors are equipped with ¼-turn locks, by means of an 8 mm. hexagonal key.

Once installation is finished, these must adjust correctly to their locks.

4. **Very important:**

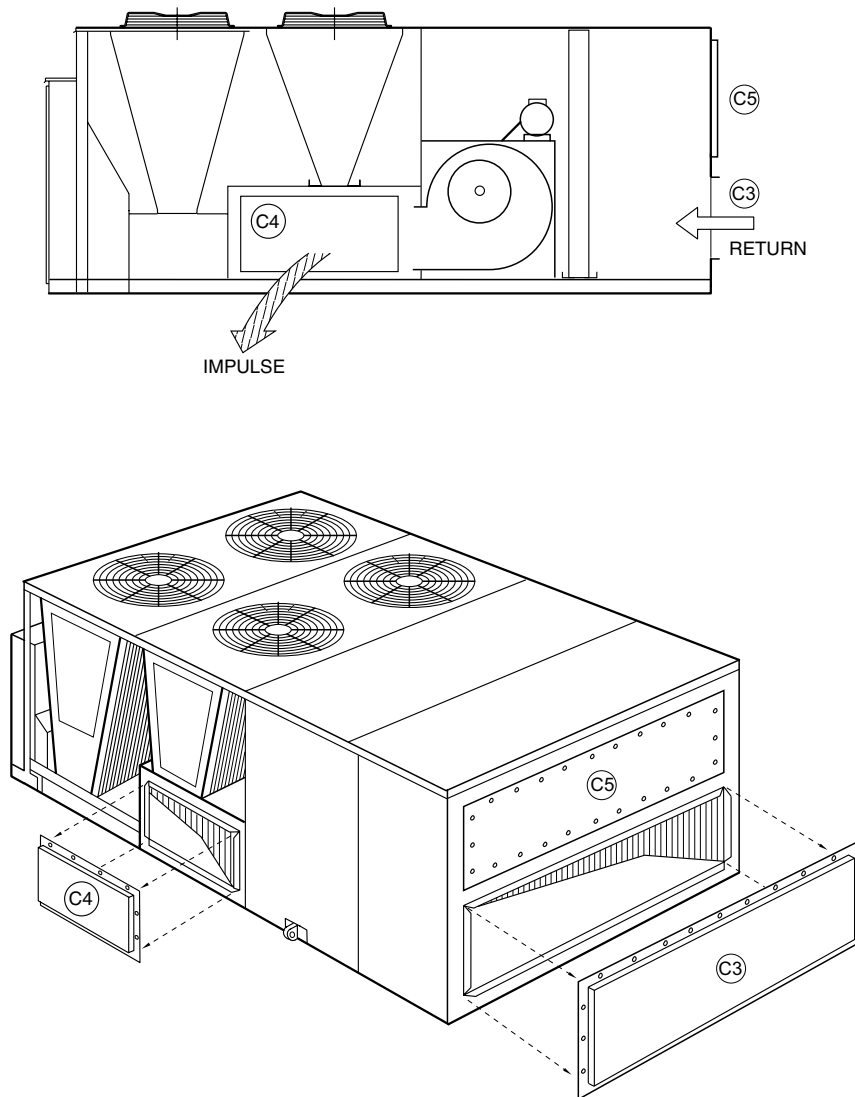
- Cover (C5) is related to the opening for the outdoor air intake when the unit is equipped with the economiser or manual damper optional accessory.
- Cover (C3) is related to the opening for the extraction air outlet when the unit is equipped with the barometric damper or axial extraction fan options.
- If the unit is not equipped with any of these accessories, it is supplied with the cover fitted into place and none of the screws that fasten it to the panel should be removed or loosened under any circumstance.



- Fig. 5 -

5.2.- Application of side ducts (Fig.6)

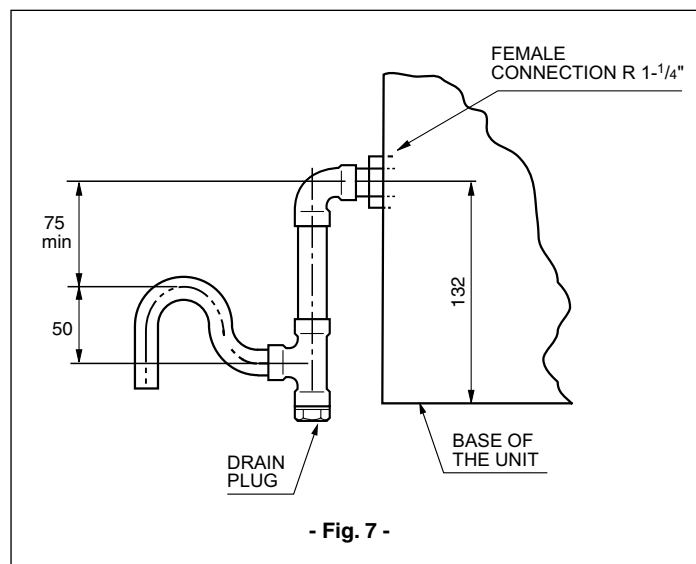
1. Return duct:
 - Remove and discard the cover (C3).
 - Connect the duct to the flange provided along the entire perimeter of the opening on the side of the unit.
2. Impulse duct:
 - Remove and discard the cover (C4).
 - Connect the duct to the flange provided along the entire perimeter of the opening on the side of the unit.
3. In both cases, make sure of air tightness between the duct and the panel of the unit.
4. **Very important:** Cover (C5) is related to the opening for the outdoor air intake when the unit is equipped with the corresponding accessory (economiser or manual outdoor air damper).
If the unit is not equipped with any of these accessories, it is supplied with the cover fitted into place and none of the screws that fasten it to the panel should be removed or loosened under any circumstance.



- Fig. 6 -

5.3.- Indoor coil condensed water drain

- The condensed water drain line **must** have a siphon for correct discharge (see Fig. 7).
- The diameter of the tubing used must be at least equal to the connection provided on the side of the unit.
- Use sealing putty on male threads.
- If it is necessary to install a drain line from the connection of the unit to a nearby drain, maintain a minimum 2 cm. pitch per each meter in length.
- It is recommended that the siphon be equipped with a plug at the bottom for draining and cleaning.
- Prior to unit start-up, the siphon should be primed (filled with water) and then checked during maintenance operations.



6 - Electrical characteristics and connections

6.1.- Basic units D4IC/D4IG/B4IH

Model	Power supply	Compressor		Outdoor fan motor		Indoor fan motor		Total nominal	Total nominal intensity (unit) amps	Total maximum intensity (unit) amps	Automatic switch (K curve) amps	Min. cable section mm ²
		Operating intensity each	Start intensity each	kW each	Nominal amps each	kW	Nominal amps	kW DIC/BIH				
360	400.3.50	21 (x3)	167	1.5 (x3)	2.8	9.2	16	42.4/43	87	108	125	50
480	400.3.50	21 (x2) + 38	167/272	1.5 (x4)	2.8	11	21	52.2/59.5	106	139	160	70

Important: Automatic switch sizing and power supply and control cable sections are orientative and should be corrected in accordance with job site conditions, length between units and legislation in force.

Notes: 1.- K curve (DIN, VDE 0660-104) 2.- Based on copper conductors

6.2.- Units with backup heaters

- D4IC/B4IH

Heater power supply should be independent of general unit power supply and have its own automatic switch, as per the following table:

Model	Power supply V. Ph. Hz.	Electric heater			Maximum automatic switch (K curve) ¹	Minimum cable section (mm ²)
		Capacity (kW)	Stages	Intensity (A)		
360/480	400.3.50	37	2	54	63	16
		50	2	75	80	25
		60	2	87	100	35

Notes: 1.- K curve (DIN, VDE 0660-104) 2.- Based on copper conductors, 105° C.

6.3.- Power and control wiring

Job site wiring and grounding of the unit should be carried out in compliance with national, local and city regulations.

The voltage tolerances to be maintained at the compressor terminals during start-up and operation appear on the Identification Plate and in the Table of sections 6.1 and 7.

The inner wiring hose supplied with the unit is an integral part of same. No variation at job site should be necessary for compliance with electrical regulations.

An automatic and differential switch should be installed on job site for the unit. This switch should be independent of all other circuits. Should any of the cables supplied with the unit need replacement, the replacement cable should be of the type shown on the wiring diagram. See Wiring Specifications Table.

The power supply line should be adequately sized for the load. **Use copper wires only.** Each one of the units should be connected to an independent circuit with an automatic and differential switch, supplied directly from the main panel.

CAUTION

When connecting the power supply and control wiring to the unit, waterproof type wires **must be used** to avoid water or humidity getting into the unit during normal operation. These waterproof conditions also apply when a switch is installed at job site.

See Fig. 8 for typical wiring on job site.

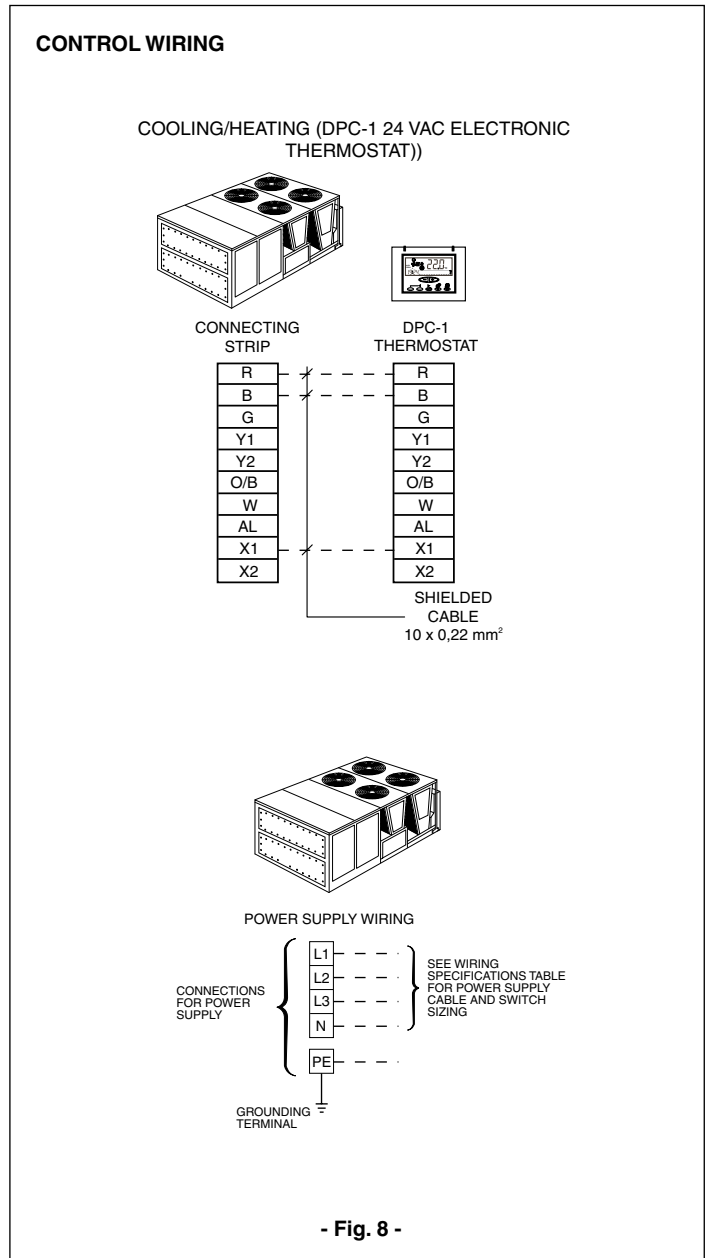
NOTES:

1. All job site wiring should be carried out in compliance with all city and local standards and/or regulations in force at the time of installing the unit.
2. Should it be necessary to remove any cables supplied with the unit, these should be replaced by cables of the HO5V-K, HO7V-K or equivalent type, and be numbered clearly for identification purposes.
3. Motors are intrinsically protected, except for the indoor fan motor, which has external protection.
4. This unit is wired for operation with a 415 V power supply.
5. See the Identification Plate for the maximum size of the automatic switch and minimum power supply cable section.
6. All motors are factory wired to rotate in the correct direction.

Thermostat

The ambient thermostat should be located on an inner wall, at about 1.5 m. above floor level, where it will not be exposed to air flows, direct sunlight or heat from other electric devices. For general installation, follow the instructions supplied by the manufacturer. To connect the thermostat to the unit, shielded colour-coded 10 x 0.22 mm² wires should be used.

Typical job site wiring



7 - Operating limits

Voltage limits			Min./Max.	342 / 457	
D4IC/D4IG	Cool	Indoor coil entering air temp.	WB°C Min./Max.	14 / 23	
			DB°C Min./Max.	20 / 32	
		Outdoor temp.	DB°C Min./Max.	7 / 46	
B4IH	Heat pump	Summer cycle	Indoor coil entering air temp.	WB°C Min./Max.	14 / 23
				DB°C Min./Max.	20 / 32
		Winter cycle	Outdoor temp.	DB°C Min./Max.	7 / 46
			Indoor coil entering air temp.	DB°C Min./Max.	10 / 25
				DB°C Min./Max.	-20 / 20
			Outdoor temp.	DB °C Min./Max.	-15 / 25

DB: Dry bulb temperature. WB: Wet bulb temperature.

8 - Performances D4IC/D4IG

8.1.- Cooling capacities D4IC/D4IG-360

Return air		Air temperature in outdoor coil (DB)														
		27°C						35°C				46°C				
		Total power kW	Sensible power kW				Total power kW	Sensible power kW				Total power kW	Sensible power kW			
Intake temp. DB				Intake temp. DB				Intake temp. DB								
m ³ /h	DB °C		30	27	24	22		30	27	24	22		30	27	24	22
Minimum flow 19.000	23	127.8	80.8	62.5	44.2	-	121.3	78.6	60.2	42.0	-	109.3	74.9	56.6	38.2	-
	19	115.8	108.2	89.8	71.5	59.3	109.3	105.6	87.2	68.9	56.7	98.3	98.3	83.3	65.0	52.7
	17	109.3	109.3	103.1	84.8	72.6	100.6	100.6	97.0	78.6	66.4	89.6	89.6	89.6	76.5	64.3
	15	98.4	98.4	98.4	95.3	83.1	94.0	94.0	94.0	88.9	76.6	84.2	84.2	84.2	84.2	76.8
Nominal flow 21.000	23	130.5	85.5	65.3	45.1	-	123.8	83.2	63.1	43.0	-	111.6	79.5	59.3	39.2	-
	19	118.2	115.3	95.1	75.0	61.6	111.6	111.6	92.5	72.3	59.0	100.4	100.4	88.6	68.4	55.0
	17	111.6	111.6	109.7	89.5	76.1	102.6	102.6	102.6	83.1	69.6	91.5	91.5	91.5	81.2	67.8
	15	100.4	100.4	100.4	100.4	87.8	96.0	96.0	96.0	94.3	80.9	85.9	85.9	85.9	85.9	81.5
Maximum flow 23.000	23	132.4	89.8	67.8	46.0	-	125.6	87.5	65.6	43.7	-	113.2	83.8	61.9	40.0	-
	19	120.0	120.0	100.1	78.2	63.6	113.2	113.2	97.5	75.6	61.0	101.8	101.8	93.6	71.6	57.0
	17	113.2	113.2	113.2	94.0	79.4	104.1	104.1	104.1	87.2	72.6	92.8	92.8	92.8	85.7	71.1
	15	101.8	101.8	101.8	101.8	92.3	97.3	97.3	97.3	97.3	85.0	87.2	87.2	87.2	87.2	86.0

8.2.- Cooling capacities D4IC/D4IG-480

Return air		Air temperature in outdoor coil (DB)														
		27°C						35°C				46°C				
		Total power kW	Sensible power kW				Total power kW	Sensible power kW				Total power kW	Sensible power kW			
Intake temp. DB				Intake temp. DB				Intake temp. DB								
m ³ /h	DB °C		30	27	24	22		30	27	24	22		30	27	24	22
Minimum flow 22.000	23	165.0	99.8	78.4	57.0	-	156.6	96.8	75.4	54.1	-	141.1	91.9	70.5	49.2	-
	19	149.5	131.9	110.5	89.1	74.9	141.1	128.5	107.1	85.7	71.5	127.0	123.3	101.9	80.5	66.3
	17	141.1	141.1	126.1	104.7	90.5	129.8	129.8	118.3	97.0	82.7	115.7	115.7	115.2	93.8	79.6
	15	127.0	127.0	127.0	116.6	102.4	121.3	121.3	121.3	108.7	94.5	108.6	108.6	108.6	108.3	94.1
Nominal flow 25.000	23	169.1	106.6	82.5	58.4	-	160.5	103.6	79.5	55.6	-	144.6	98.7	74.6	50.5	-
	19	153.2	142.5	118.4	94.3	78.3	144.6	139.1	115.0	90.9	74.8	130.1	130.1	109.8	85.7	69.6
	17	144.6	144.6	135.8	111.8	95.7	133.0	133.0	127.6	103.5	87.5	118.6	118.6	118.6	100.8	84.8
	15	130.1	130.1	130.1	125.6	109.5	124.3	124.3	124.3	117.0	100.8	111.3	111.3	111.3	111.3	101.2
Maximum flow 28.000	23	172.2	113.2	86.3	59.6	-	163.3	110.2	83.4	56.6	-	147.2	105.2	78.5	51.7	-
	19	156.0	152.8	126.0	99.2	81.3	147.2	147.2	122.5	95.8	77.9	132.4	132.4	117.3	90.6	72.7
	17	147.2	147.2	145.3	118.5	100.7	135.4	135.4	135.4	109.8	92.0	120.7	120.7	120.7	107.6	89.7
	15	132.4	132.4	132.4	132.4	116.3	126.6	126.6	126.6	124.8	107.0	113.4	113.4	113.4	113.4	108.0

Data in compliance with EUROVENT conditions.

9 - Performances B4IH

9.1.- Cooling capacities B4IH - 360

Return air		Air temperature in outdoor coil (DB)														
		27°C					35°C					46°C				
		Total power kW	Sensible power kW				Total power kW	Sensible power kW				Total power kW	Sensible power kW			
Intake temp. DB				Intake temp. DB				Intake temp. DB								
m ³ /h	DB °C		30	27	24	22		30	27	24	22		30	27	24	22
Minimum flow 19.000	23	123.3	79.3	61.0	42.6	-	117.7	77.1	58.9	40.5	-	105.4	73.6	55.2	37.0	-
	19	111.7	106.5	88.2	69.8	57.6	105.4	104.0	85.7	67.4	55.1	94.9	94.9	81.2	63.6	51.4
	17	105.4	105.4	101.5	83.1	70.9	97.0	97.0	95.5	77.2	65.0	86.4	86.4	86.4	75.2	63.0
	15	94.9	94.9	94.9	93.7	81.5	90.6	90.6	90.6	87.4	75.2	81.1	81.1	81.1	81.1	75.4
Nominal flow 21.000	23	125.9	83.9	63.7	43.6	-	119.4	81.7	61.6	41.4	-	107.6	78.1	58.0	37.9	-
	19	114.0	113.6	93.5	73.3	60.0	107.6	107.6	91.0	70.8	57.4	96.8	96.8	87.2	67.1	53.6
	17	107.6	107.6	107.6	87.9	74.4	99.0	99.0	99.0	81.6	68.2	88.2	88.2	88.2	80.0	66.5
	15	96.8	96.8	96.8	96.8	86.2	92.5	92.5	92.5	92.5	79.5	82.9	82.9	82.9	82.9	80.2
Maximum flow 23.000	23	127.7	88.3	66.3	44.3	-	121.2	86.1	64.2	42.2	-	109.2	82.5	60.6	38.7	-
	19	115.7	115.7	98.5	76.6	62.0	109.2	109.2	96.0	74.1	59.5	98.3	98.3	92.2	70.3	56.7
	17	109.2	109.2	109.2	92.3	77.8	100.5	100.5	100.5	85.8	71.2	89.5	89.5	89.5	84.4	69.7
	15	98.3	98.3	98.3	98.3	90.8	93.9	93.9	93.9	93.9	83.5	84.1	84.1	84.1	84.1	84.1

9.2.- Cooling capacities B4IH - 480

Return air		Air temperature in outdoor coil (DB)														
		27°C					35°C					46°C				
		Total power kW	Sensible power kW				Total power kW	Sensible power kW				Total power kW	Sensible power kW			
Intake temp. DB				Intake temp. DB				Intake temp. DB								
m ³ /h	DB °C		30	27	24	22		30	27	24	22		30	27	24	22
Minimum flow 22.000	23	159.8	97.9	76.6	55.2	-	151.6	95.1	73.7	52.3	-	136.6	90.4	69.0	47.6	-
	19	144.8	130.0	108.5	87.2	73.0	136.6	126.7	105.3	84.0	69.7	123.0	121.7	100.3	78.9	64.7
	17	136.6	136.6	124.1	102.7	88.5	125.6	125.6	116.7	95.3	81.1	112.0	112.0	112.0	92.3	78.1
	15	123.0	123.0	123.0	114.7	100.5	117.4	117.4	117.4	107.0	92.8	105.2	105.2	105.2	105.2	92.6
Nominal flow 25.000	23	163.8	104.8	80.7	56.6	-	155.4	102.0	77.8	53.7	-	140.0	97.2	73.1	49.0	-
	19	148.4	140.6	116.5	92.4	76.3	140.0	137.3	113.2	89.1	73.0	126.0	126.0	108.2	84.1	68.0
	17	140.0	140.0	133.9	109.8	93.7	128.8	128.8	126.0	101.8	85.8	114.8	114.8	114.8	99.3	83.2
	15	126.0	126.0	126.0	123.7	107.6	120.4	120.4	120.4	115.3	99.2	107.8	107.8	107.8	107.8	99.6
Maximum flow 28.000	23	166.7	111.3	84.5	57.8	-	158.2	108.5	81.7	54.9	-	142.5	103.7	77.0	50.2	-
	19	151.0	150.8	124.0	97.3	79.4	142.5	142.5	120.7	94.0	76.1	128.2	128.2	115.7	89.0	71.1
	17	142.5	142.5	142.5	116.6	98.7	131.1	131.1	131.1	108.3	90.3	116.8	116.8	116.8	106.0	88.2
	15	128.2	128.2	128.2	128.2	114.4	122.5	122.5	122.5	122.5	105.3	109.7	109.7	109.7	109.7	106.4

Data in compliance with EUROVENT conditions.

9.3.- Heating capacities B4IH - 360

m ³ /h	Return air DB °C	Outdoor air temperature (DB) °C								
		-15	-10	-5	0	5	7	10	15	20
Minimum flow 19.000	14	51.9	66.1	82.8	102.5	125.2	136.7	150.3	176.7	206.8
	17	49.6	63.5	79.8	98.8	121.1	130.4	143.4	169.1	197.7
	20	47.9	60.7	76.4	95.1	116.8	126.2	138.6	163.8	191.7
	23	46.1	57.9	73.1	91.2	112.1	121.5	133.2	157.3	184.1
	25	43.8	54.5	71.1	88.7	109.3	118.6	129.8	153.4	179.5
Nominal flow 21.000	14	52.2	66.4	83.3	103.2	126.1	137.6	150.7	178.1	208.4
	17	49.9	63.9	80.4	99.5	121.9	131.3	144.3	170.3	199.3
	20	48.2	61.2	77.1	95.7	117.7	127.1	139.8	165.1	193.2
	23	46.5	58.4	73.5	91.8	112.9	122.4	134.2	158.6	185.6
	25	44.1	54.9	71.6	89.3	110.1	119.4	130.8	154.7	181.1
Maximum flow 23.000	14	52.5	66.7	83.7	103.6	126.6	138.2	151.8	179.5	209.8
	17	50.1	64.2	80.6	99.8	122.4	131.8	144.3	170.8	199.8
	20	48.4	61.4	77.3	96.1	118.2	127.6	139.7	165.7	193.9
	23	46.7	58.6	73.8	92.2	113.4	122.9	135.1	159.7	186.5
	25	44.3	55.1	71.8	89.6	110.5	119.9	131.8	155.3	182.1

9.4.- Heating capacities B4IH - 480

m ³ /h	Return air DB °C	Outdoor air temperature (DB) °C								
		-15	-10	-5	0	5	7	10	15	20
Minimum flow 22.000	14	64.7	83.1	104.8	130.3	159.8	174.5	191.4	226.2	264.7
	17	61.4	79.4	100.8	125.5	154.4	166.9	183.1	216.4	252.6
	20	59.4	75.8	96.6	120.7	149.1	161.6	177.2	209.3	244.9
	23	56.4	71.5	91.1	114.2	141.5	153.5	168.3	198.9	232.7
	25	54.1	68.3	88.7	111.6	137.9	150.3	165.2	195.1	228.2
Nominal flow 25.000	14	65.4	83.9	105.9	131.7	161.5	176.3	193.6	228.8	267.7
	17	62.1	80.2	101.8	126.7	156.1	168.6	184.9	218.4	255.6
	20	60.1	76.7	97.6	121.9	150.7	163.3	179.3	211.9	248.1
	23	57.1	72.2	91.9	115.4	143.1	155.1	170.5	201.5	235.8
	25	54.6	69.1	89.7	112.7	139.3	151.8	166.3	196.9	229.8
Maximum flow 28.000	14	65.8	84.3	106.5	132.3	162.3	177.2	194.7	230.1	269.3
	17	62.3	80.6	102.3	127.4	156.8	169.5	186.1	219.7	257.1
	20	60.3	77.1	98.1	122.5	151.4	164.1	180.4	213.2	249.5
	23	57.3	72.6	92.3	115.9	143.6	155.8	170.6	201.8	235.8
	25	54.9	69.4	90.2	113.3	140.1	152.6	167.3	197.6	231.2

■ Data in compliance with EUROVENT conditions.

┌ - - - ┐
└ - - - ┘ Conditions out of compressor range.

10 - Characteristics of indoor fan

Dual turbine fan, driven by one single belt drive motor. Motor pulley is of adjustable diameter at ½ turn intervals.

Model		Motor ¹		Motor pulley (adjustable)		Fan pulley (fixed)		Belt		
		kW	Casing type	Ø pulley (mm)	Ø shaft (mm)	Ø pulley (mm)	Ø shaft (mm)	Length (mm)	Ref.	Amount
Standard drive	360	9.2	132MBA	152/190	38	250	25	1 790	BX69	2
	480	11	132MB	152/190	38	250	25	1 790	BX69	2
High pressure drive (HPD) (optional)	360	11	132MB	152/190	38	250	25	1 790	BX69	2
	480	15	160L	152/190	42	250	25	1 840	BX71	2

¹⁾ All motors are of the fully enclosed type, fan-cooled at 1.450 r.p.m., with a solid base and a 1.15 service factor.

See section No. 11 (Indoor fan performances) to determine motor pulley setting and the type of drive needed.

11 - Indoor fan performances

- For units with 0% outdoor air and 100% return, dry indoor coil and standard EU3 air filters.
- **Attention:** Before going on to the tables, do not forget to add the pressure drop due to the gas heating on models D4IG and the accessories included, whenever applicable (see tables in section No. 12) to the pressure needed for the installation.
- The motor pulley is factory set to 4 opening turns. See section No. 14 for belt adjustment and tensing procedure.
- **Attention:** When starting the installation up, and once air distribution is balanced in the conditioned space, impulse air flow should be checked.

11.1.- Models 360, applications with vertical ducts (bottom)

Opening adjustment of motor pulley (No. of turns)	Air flow m ³ /h									
	19 000		20 000		21 000		22 000		23 000	
	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW
0	615	10.3	570	10.8	525	11.6	480	12.2	445	12.8
1	530	9.6	490	10.2	450	10.8	410	11.4	365	11.9
2	460	8.9	420	9.4	385	10.0	350	10.6	300	11.3
3	395	8.5	365	9	325	9.6	285	10.2	240	10.7
4	350	7.8	310	8.3	275	8.9	230	9.5	195	10.0
5	295	7.2	260	7.7	220	8.3	185	8.7	145	9.5
6	250	6.6	215	7.1	175	7.5	135	8.2	100	8.9

ASP = Available static pressure

Standard drive (9.2 kW)

Optional HPD drive (11 kW)

Out of range area

11.2.- Models 360, applications with horizontal ducts (side)

Opening adjustment of motor pulley (No. of turns)	Air flow m ³ /h									
	19 000		20 000		21 000		22 000		23 000	
	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW
0	560	10.5	510	11.0	455	11.9	465	12.6	355	12.9
1	485	9.8	440	10.4	390	10.9	345	11.7	290	12.2
2	420	9.1	380	9.5	335	10.1	295	10.8	240	11.5
3	355	8.6	325	9.1	280	9.7	230	10.3	180	10.8
4	315	7.9	275	8.4	240	8.9	190	9.6	145	10.1
5	265	7.2	230	7.7	185	8.3	150	8.8	110	9.7
6	225	6.7	190	7.2	150	7.5	105	8.2	70	8.8

ASP = Available static pressure

Standard drive (9.2 kW)

Optional HPD drive (11 kW)

Out of range area

11.3.- Models 480, applications with vertical ducts (bottom)

Opening adjustment of motor pulley (No. of turns)	Air flow m ³ /h													
	22 000		23 000		24 000		25 000		26 000		27 000		28 000	
	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW
0	575	11.1	540	11.7	510	12.2	465	13.1	425	13.6	370	14.4	310	15.3
1	515	10.4	480	10.9	440	11.4	400	12.1	345	12.7	285	13.5	225	14.4
2	450	9.7	415	10.3	365	10.8	325	11.3	270	11.9	210	12.5	150	13.1
3	390	9.2	345	9.6	300	10.1	255	10.6	205	11.2	145	11.8	75	12.3
4	320	8.5	280	8.9	235	9.4	190	9.9	140	10.4	85	10.9	-	-
5	270	7.8	225	8.3	175	8.7	125	9.2	70	9.8	-	-	-	-
6	210	7.2	170	7.8	120	8.2	60	8.6	-	-	-	-	-	-

ASP = Available static pressure Standard drive (11 kW) Optional HPD drive (15 kW)

11.4.- Models 480, applications with horizontal ducts (bottom)

Opening adjustment of motor pulley (No. of turns)	Air flow m ³ /h													
	22 000		23 000		24 000		25 000		26 000		27 000		28 000	
	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW	A.S.P.	kW
0	470	11.6	440	12.1	415	12.5	385	12.9	355	13.4	310	14.2	265	14.9
1	420	10.8	395	11.2	365	11.6	335	12.1	290	12.7	250	13.5	205	14.3
2	375	10.0	350	10.3	320	10.8	290	11.3	235	12.0	190	12.8	135	13.5
3	320	9.3	285	9.7	250	10.2	220	10.7	175	11.3	130	12.0	75	12.7
4	275	8.6	245	8.9	215	9.3	175	9.9	125	10.5	70	11.0	-	-
5	230	8.1	195	8.2	155	8.7	105	9.2	-	-	-	-	-	-
6	175	7.3	145	7.5	95	8.1	-	-	-	-	-	-	-	-

ASP = Available static pressure Standard drive (11 kW) Optional HPD drive (15 kW)

12 - Pressure drop of accessories

12.1.- Models 360

Accessory	m ³ /h	Pressure drop (Pa)				
		19 000	20 000	21 000	22 000	23 000
Economiser (*)		31	35	40	45	52
Extraction fan / barometric damper (*)		18	20	22	24	27
EU4 air filters		17	20	23	26	29
Electric heater 37-50-60 kW		16	18	20	22	25
Hot water coil		120	130	141	152	163
Gas heating, D4IG	Bottom impulse	90				
	Side impulse	45				

(*) With 0% outdoor air and 100% return air.

12.2.- Models 480

Accessory	m ³ /h	Pressure drop (Pa)						
		22 000	23 000	24 000	25 000	26 000	27 000	28 000
Economiser (*)		45	52	57	60	65	72	78
Extraction fan / barometric damper (*)		24	27	30	36	38	38	40
EU4 air filters		26	29	36	39	42	45	49
Electric heater 37-50-60		22	25	28	32	37	42	48
Hot water coil		152	163	174	186	198	210	220
Gas heating, D4IG	Bottom impulse	90						
	Side impulse	45						

(*) With 0% outdoor air and 100% return air.

13 - Accessories

Definition: "OPTION" are factory fitted items supplied installed on the unit itself and ready for use; "ACCESSORY" are items that must be installed, fully or in part, at the job site.

Section	Description	Option/Accessory
13.1	Modulating economiser, temperature control	Option
13.2	Enthalpy probes for economiser	Option
13.3	Surge pressure barometric damper	Option or Accessory
13.4	Extraction fan (axial)	Option or Accessory
13.5	Fixed outdoor air intake damper	Option
13.6	Washable air filters, G4 (EU4)	Option
13.7	Dirty filter pressure switch	Option
13.8	High pressure drive (HPD)	Option
13.9	Low ambient temperature control	Option
13.10	Electric heater	Option
13.11	How water coil	Option
13.12	Indoor air quality probe (IAQ)	Option or Accessory
13.13	Smoke detector	Option
13.14	Firestat	Option
13.15	Copper fin coils	Option
13.16	"Blue Fin" coils	Option
13.17	Mounting base (Roof Curb), fixed	Accessory
13.18	Mounting base (Roof Curb), adjustable	Accessory

13.1.- Modulating economiser, temperature controlled

Comprised of a damper located at the return end of the unit, and another at the outdoor air intake.

This control compares the outdoor and return air values and adjusts the opening of both dampers proportionally by means of the 0-10v modulating actuator equipped with a return spring.

To ensure a good level of comfort, the impulse temperature is limited to 12° C.

The dampers are factory set for a minimum outdoor air volume of approximately 10%.

The outdoor air damper is equipped with a rain hood assembly, which includes an aluminium mesh, to avoid drops of water seeping into the unit.

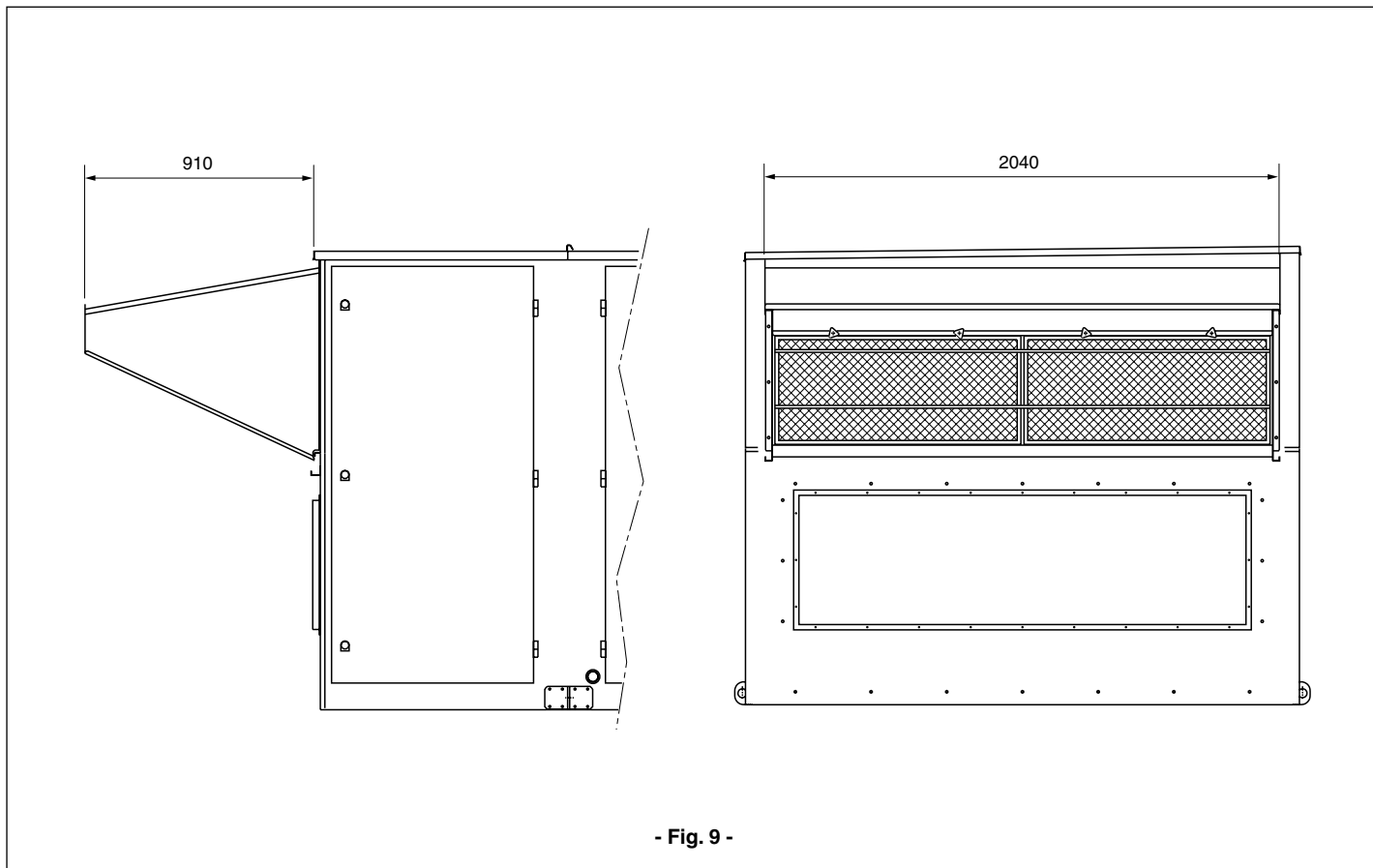
This rain hood is supplied fully installed on the unit, thus avoiding additional work at the job site. See Fig 9.

The unit is supplied with the return air damper installed at the bottom or side, in accordance with the needs of the duct connection (must be indicated upon placing the order, see Fig. 10).

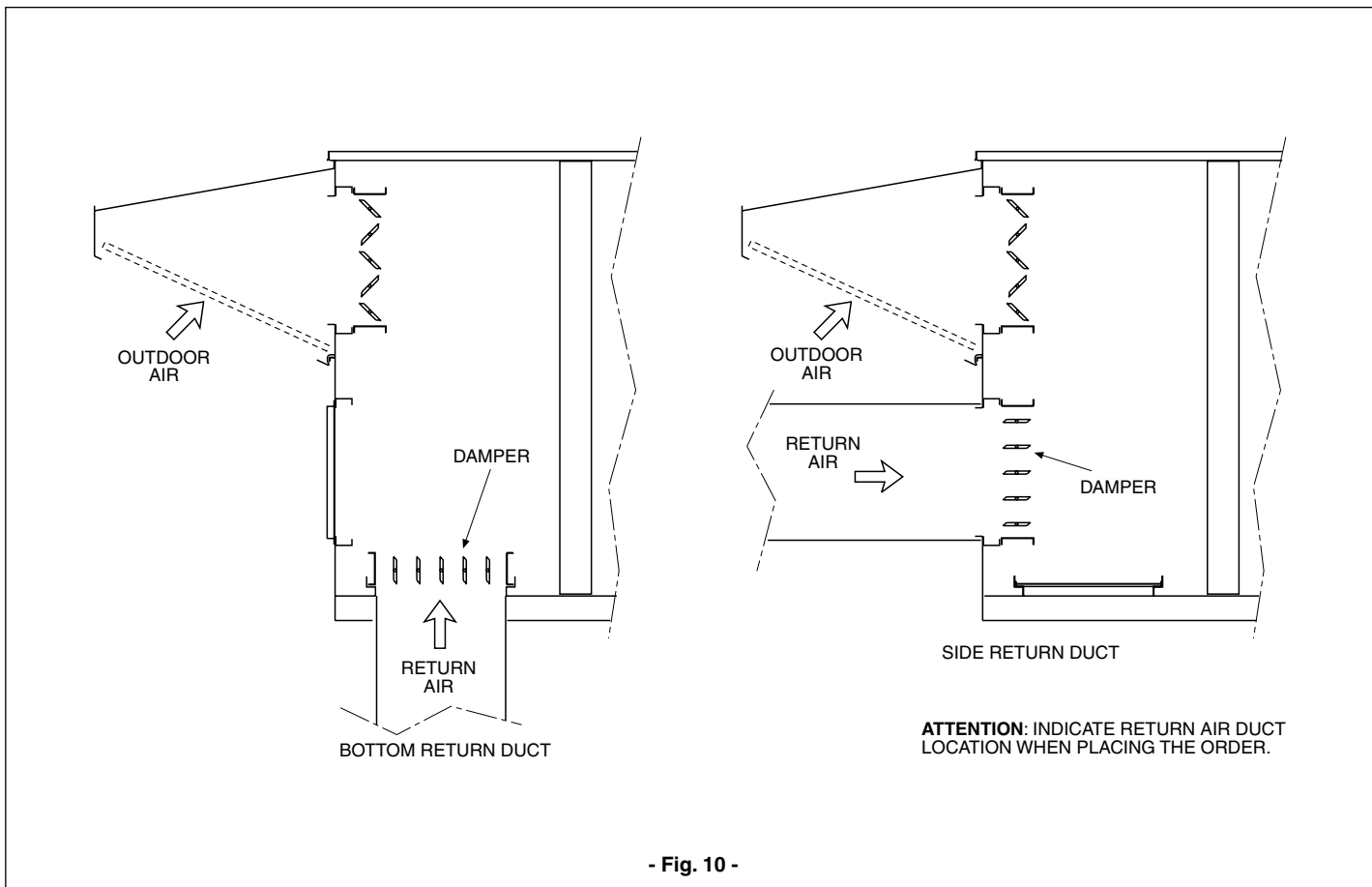
If necessary, the economiser can include, as options, the enthalpy probe control (see 13-2) as well as an excess air extraction system when required by the installation design (see 13-3 and 13-4).

The economiser can be adapted to operate as a motor-driven outdoor air damper, which makes it possible to adjust the minimum and maximum outdoor air volume values, depending upon installation requirements; always in accordance with the operating limits of the unit.

Dimensions of the economiser/fixed outdoor air intake rain hood



Location of economiser return air damper



13.2.- Enthalpy sensors for economiser

Applicable when requiring an economiser control system that adapts best to the areas in which the humidity level is important.

13.3.- Barometric relief damper

To relieve excess air pressure that can be generated within the building when an economiser or motor-driven damper is used. It is the most economic and adequate extraction system for installations in which return air is not ducted and an extraction of a maximum of 25% of the total impulse air flow is expected.

It comprises a surge pressure damper located at the return

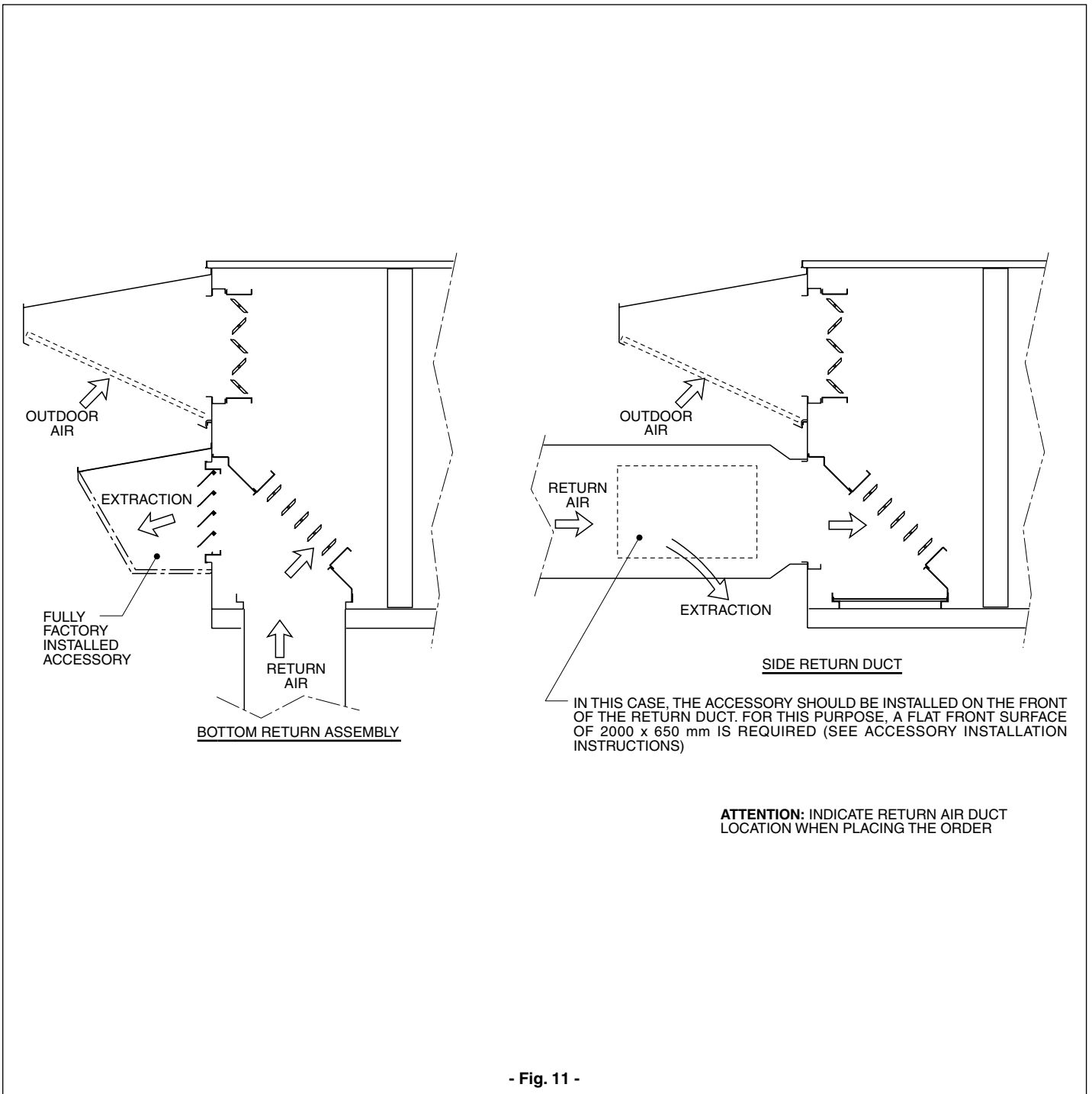
of the unit. Includes a rain hood with a grid for protection against birds.

When it opens, the entering outdoor air increases and the return air flow is decreased proportionally, the pressure within the building rises. When this pressure is greater than the atmospheric pressure, the damper opens, releasing excessive pressure directly outdoors.

When the return duct connection is at the bottom of the unit, the barometric damper assembly and rain hood are supplied fully installed on the unit.

If the return duct connection is on the side, it must be installed at the job site directly on the front surface of the return duct, as close as possible to the unit (see Fig. 11).

Economiser with surge pressure barometric damper



- Fig. 11 -

13.4.- Extraction fan (axial)

This is the adequate extraction system when using an economiser or motor-driven damper and an extraction of over 25% of total impulse air flow is required, and the return is ducted (see graph in Fig. 12).

The system comprises two axial fans located inside a rain hood, which also includes a surge pressure damper.

Up to approximately 30% of outdoor air intake, it acts as a barometric damper.

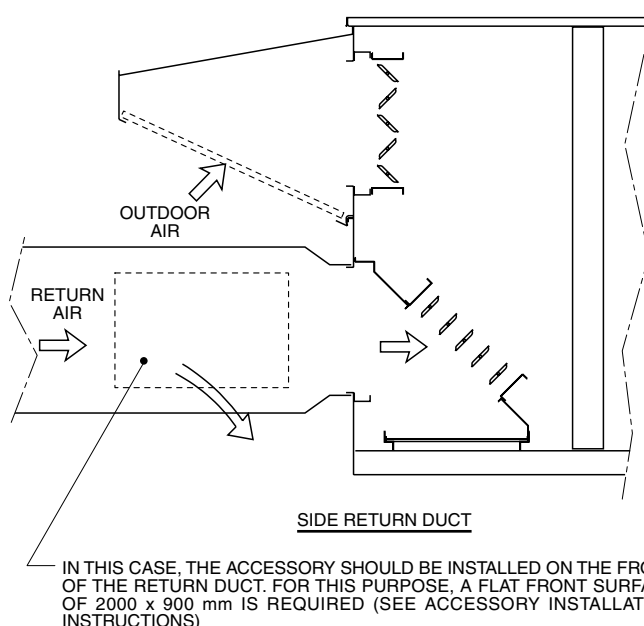
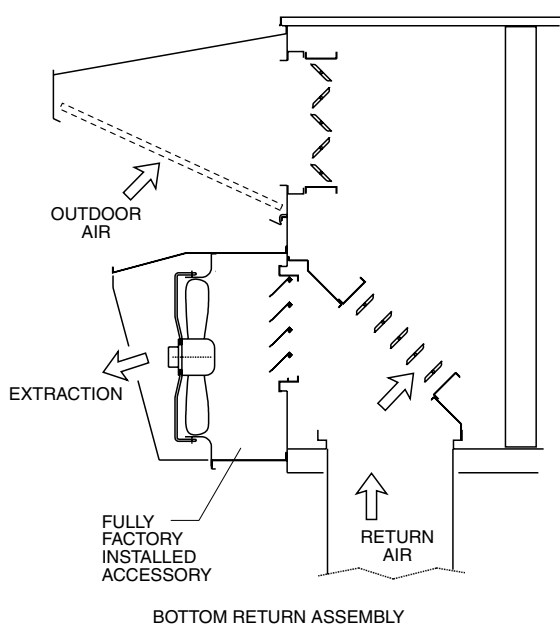
When this intake degree is reached, the fans become opera-

tive with direct outdoor discharge.

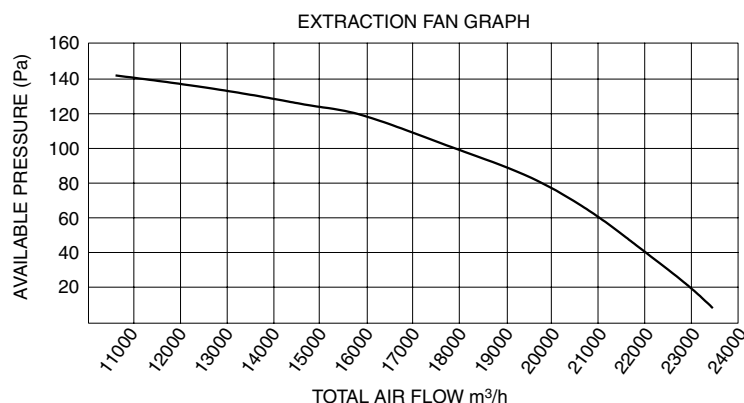
When the return duct connection is at the bottom of the unit, the extraction fan assembly is supplied fully installed on the side of the unit. It includes all wiring connections and is ready for use (see Fig. 12).

If the return duct connection is on the side of the unit, it must be installed at the job site directly on the front surface of the return duct, as close as possible to the unit. In this case, a wiring hose is included for the connection of the fans to the electrical box of the unit.

Economiser with axial extraction fan



ATTENTION: INDICATE RETURN AIR DUCT LOCATION WHEN PLACING THE ORDER.



- Fig. 12 -

13.5.- Fixed outdoor air intake damper

Comprises a damper located at the outdoor air intake, and includes the same rain hood and aluminium mesh filters as the economiser. The damper is equipped with a manual opening device, and mechanical locking to fix its position once the adequate outdoor air percentage is achieved; always in accordance with the operating limits of the unit (see Fig. 13).

13.6.- Washable air filters G4 (EU4)

The filtering media is synthetic fibre arranged in zig-zag, resistant to 5 washings and has the following characteristics: Filtering classification in compliance with CEN-EN779, G4 (EU4) - Gravimetric efficiency ASHRAE 52/76, 90% - Fire-proof classification DIN5348, F1.

13.7.- Dirty filter pressure switch

Allows establishing a dry contact when the filters are obstructed, thus indicating filters need maintenance or replacement. Connected to the DPC-1 thermostat, allows viewing the filter icon on its display.

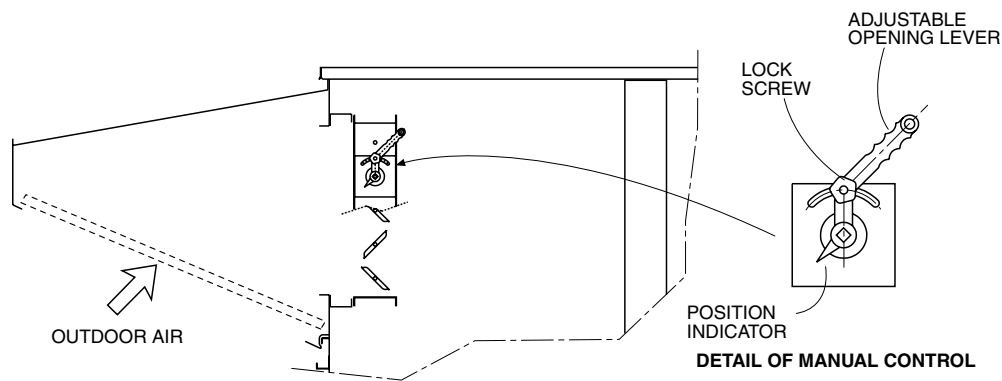
13.8.- High pressure drive (HPD)

Comprises a motor with greater capacity than the standard motor that allows the indoor fan performances with regard to flow and/or static pressure. See sections Nos. 10 and 11 for characteristics and performance tables.

13.9.- Low ambient temperature control

The rooftop units are designed to operate, in cool mode, at minimum outdoor temperatures of 7° C. With this accessory,

Fixed outdoor air intake damper



- Fig. 13 -

the unit can operate correctly at minimum outdoor temperatures of -18° C.

13.10.- Electric heater

Available for cool only and heat pump models. 37, 50 AND 60 kW capacities. Delivered assembled, inside the impulse plenum of the unit.

Power supply to the heater must be independent of the general power supply, and be equipped with its own automatic switch (not supplied). See section No. 6.2.

13.11.- Hot water coil

Located within the impulse plenum of the unit. Heating capacities of from 115 to 140 kW (with water at 80/65° C). Includes all necessary hydraulic and control components: 3-way mixing valve, 0-10v proportional actuator and antifreeze probe. See details in Fig. 14.

Location of the impulse duct should be indicated when placing the order.

Hot water coil

		Model 360			Model 480		
Air flow	m³/h	19 000	21 000	23 000	22 000	25 000	28 000
Heating capacity	kW	115	121	126	124	131	140
Water flow	m³/h	7	7.5	7.5	7.6	7.9	8.6
Pressure drop, water circuit	kPa	26	30	30	30	33	38

- Fig. 14 -

- Data with water temperature at 80/65° C and air intake at 18° C.
 - Total water volume: 10 l.

13.12.- Indoor air quality control probe

This option operates necessarily with the economiser. The probe determines the degree of air pollution due to different causes, such as occupation level of the room, cigarette smoke, kitchens, carbon monoxide, etc.

When the preset limits are exceeded, this control unit acts upon the economiser, adjusting the outdoor air damper, without hindering the air conditioning function. Up to three air quality levels can be selected on the probe. The normal level is selected by default.

13.13.- Smoke detector

The smoke detector is installed in the return air section of the unit.

If smoke particles are detected, the unit is locked out (off) and must be reset manually to resume operation.

The smoke detector is a protection device for the unit. It should not be used as protection system for the building or other installations. Use is subject to compliance with local regulations that affect the unit (with regard to ventilation systems, fire prevention, etc.). Depending upon these regulations, this option could require the use of an economiser or a motor-driven damper.

13.14.- Firestat

The unit includes, as standard equipment, an impulse air probe that locks out at 80° C and must be reset manually to resume operation.

Also available, as an accessory, is a manual adjust and reset temperature probe to be fitted in the impulse plenum of the unit. If the set temperature is reached in this area, the unit is locked out and the probe and control must be reset manually to resume operation.

The fire detecting thermostat (Firestat) is a protection device for the unit. It should not be used as protection system for the building or other installations. Use is subject to compliance with local regulations that affect the unit (with regard to ventilation systems, fire prevention, etc.). Depending upon these regulations, this option could require the use of an economiser or a motor-driven damper.

13.15.- Copper fin coils

Coils with copper fins achieve the greatest anticorrosion protection for installations in seaside areas, ensuring 100% efficiency. Applied to both condensing (outdoor) as well as evaporating (outdoor) units. See section No. 4.3. for weight increase on standard units.

13.16.- "Blue Fin" coils

Aluminium fins with a varnish type coating and a polyurethane base, offering anticorrosion resistance of up to 1000 H.N.S. (ASTM-B117).

13.17.- Mounting base, Roof Curb, fixed type

For installing on flat rooftops without any pitch. Structure made of galvanized steel sheeting, supplied as a kit to be assembled and installed on the job site.

Allows assembling the ducts directly from inside the building, prior to location of the rooftop unit, and provides an airtight bond between the unit and the roof.

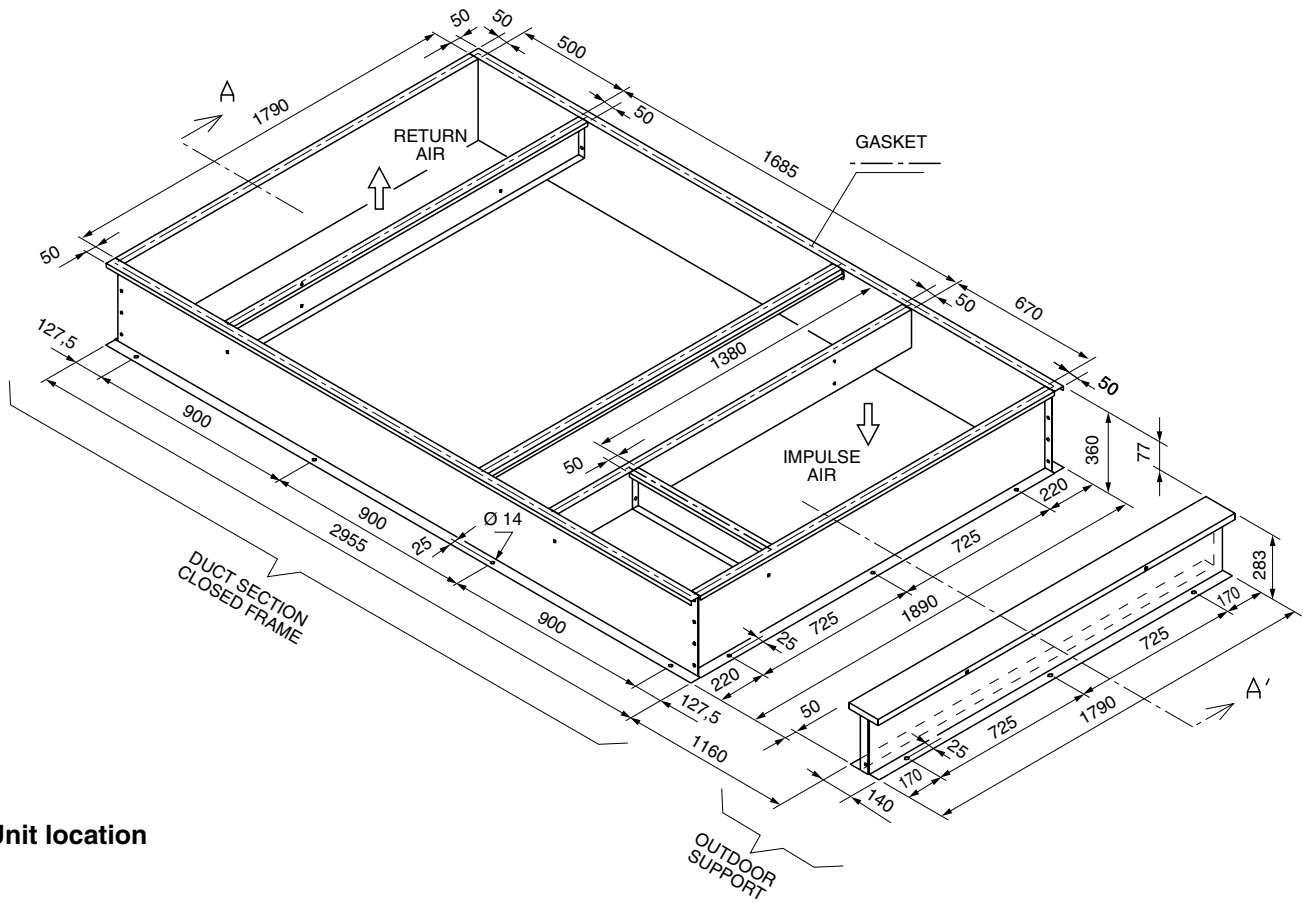
The roof curb assembly comprises two parts. In the duct connecting section, it forms a closed frame that fits beneath the base of the unit. A 40 x 25 mm. self-adhesive gasket is supplied for application along the entire contact perimeter of the frame with the base, thus achieving an airtight seal. For the condensing section, a support is supplied for location beneath the compressor compartment.

Both parts of the roof curb must be anchored to the supporting structure of the roof. The nuts and bolts supplied can be used for this purpose; or welding. To avoid water or humidity seeping into the interior of the building, the full external perimeter of both parts must be insulated and sealed with the same material used to finish the roof. See mounting details in Fig. 15a.

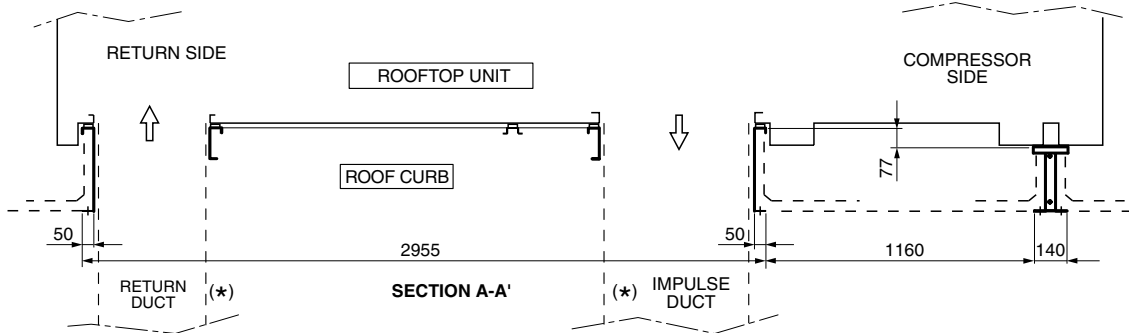
13.18.- Mounting base, Roof Curb, adjustable type

For installation on rooftops with pitches of up to 4° (7%) or 6.5° (11%), depending upon the location of the unit. With characteristics similar to those of the fixed version, but with the advantage of being able to level the supporting surface of the unit to compensate the pitch of the rooftop. See mounting details in Fig. 15b.

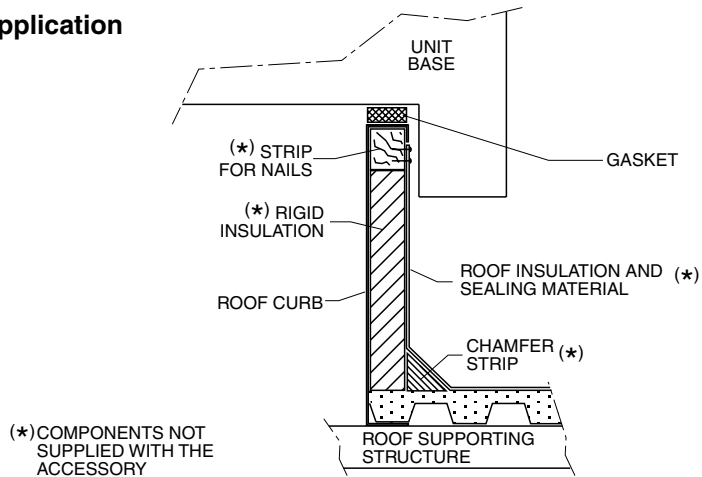
Fixed Roof Curb



Unit location

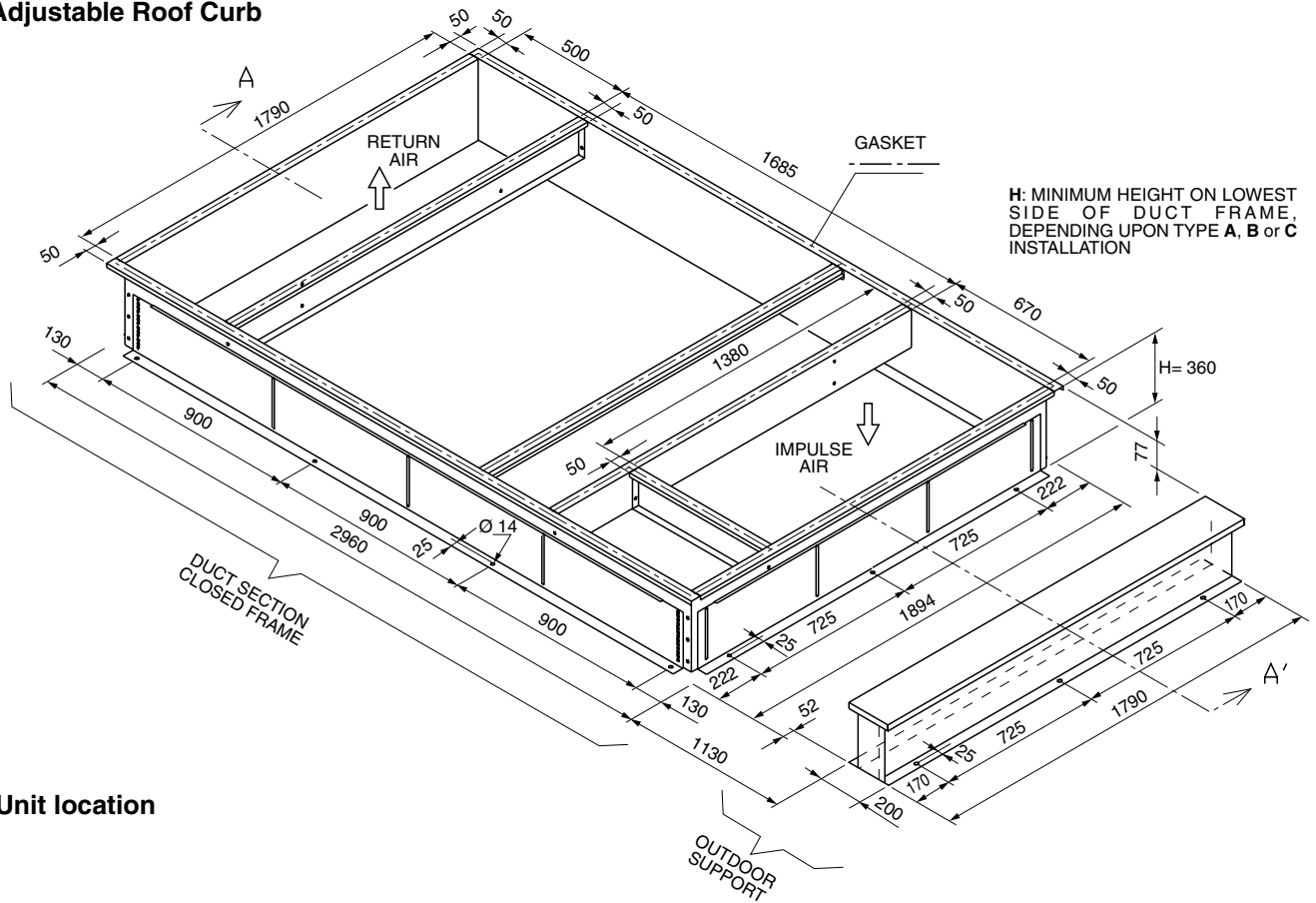


Detail of typical Roof Curb application (fixed or adjustable)



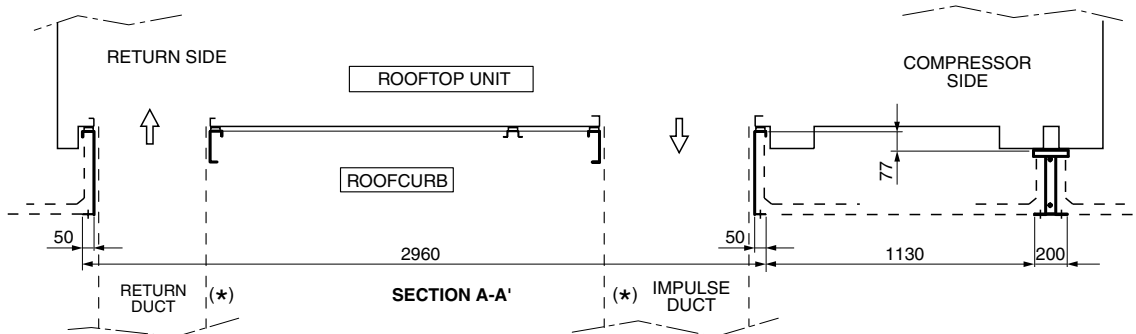
- Fig. 15a -

Adjustable Roof Curb

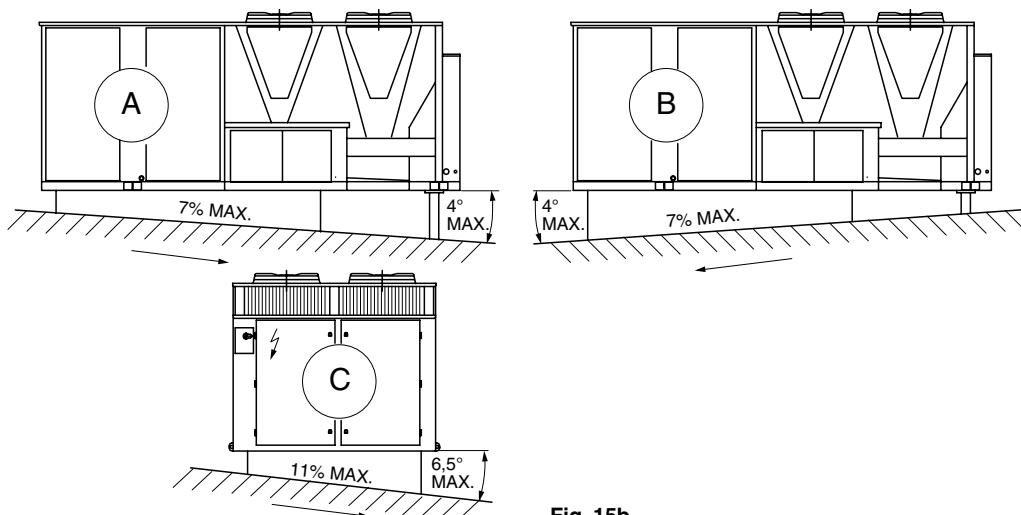


H: MINIMUM HEIGHT ON LOWEST SIDE OF DUCT FRAME, DEPENDING UPON TYPE A, B or C INSTALLATION

Unit location



Type of installation (indicate upon ordering)



- Fig. 15b -

14 - Pulley adjustment and belt tensing

1.- Adjusting pulley

- Loosen the belts. Loosen tensing screw "A".
- Loosen studs "B" to release mobile rims "C".
- Turn both rims, on the thread of the fixed core of the pulley, in the adequate direction to increase or decrease pulley aperture.

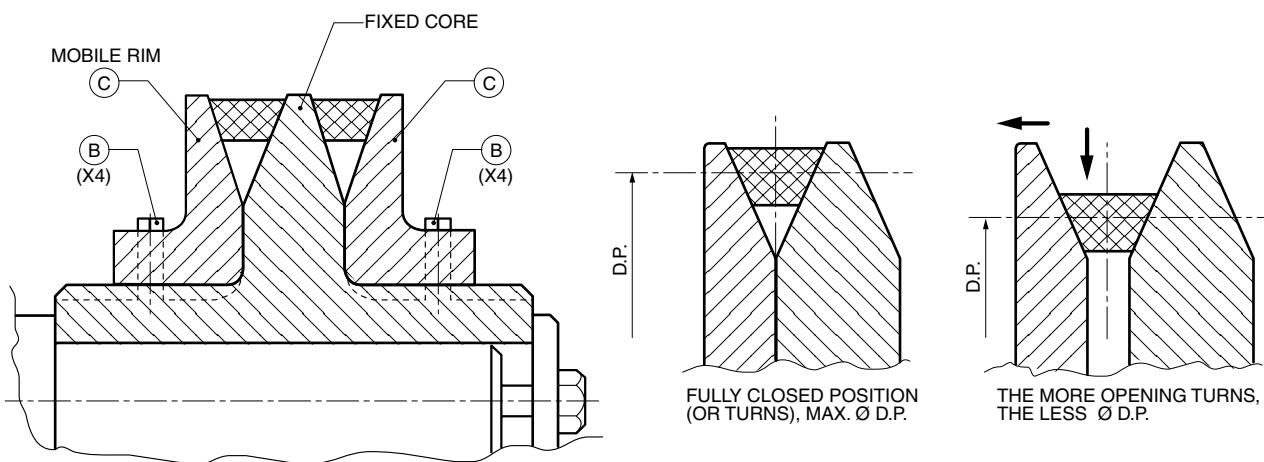
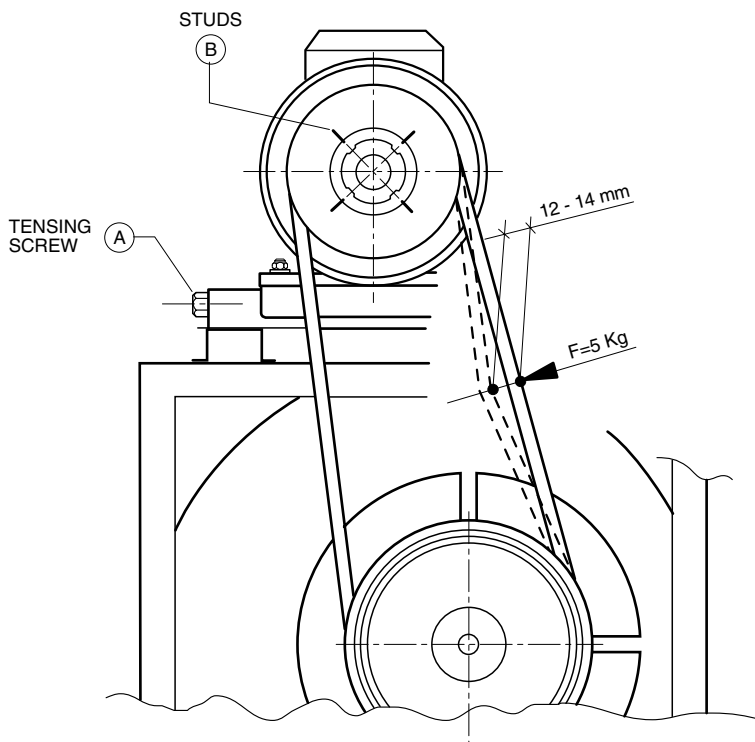
Attention: Both channels must have the same clearance (the same number of opening turns).

- Tighten studs to a maximum, coinciding with their seat in the fixed hub core of the pulley.

2.- Belt tensing

- Tense with tensing screw "A".
- If no belt strain gauge is available, use the following practical method:
- Apply a pressure of 5 kg on the midpoint of the belt, and perpendicular to same.
- With this pressure, the belt should move from 12 to 14 mm.

- 3.- It is recommendable to check belt tension twice during the first 24 operating hours.



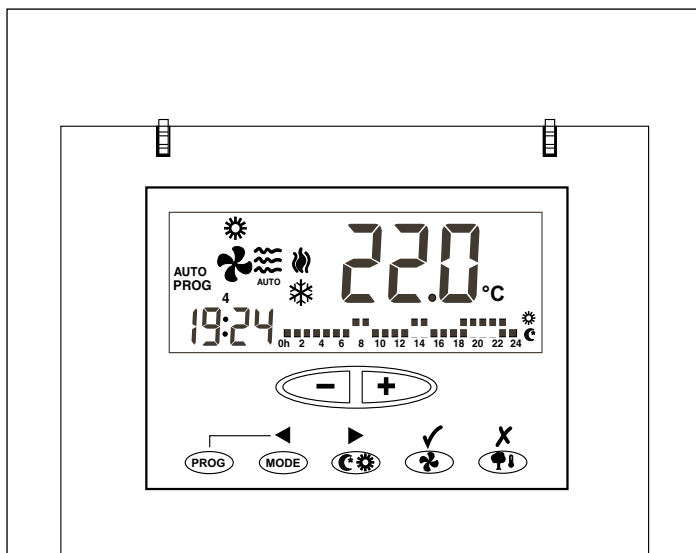
Caution:

Disconnect all power supply to the unit before carrying out any of these operations.

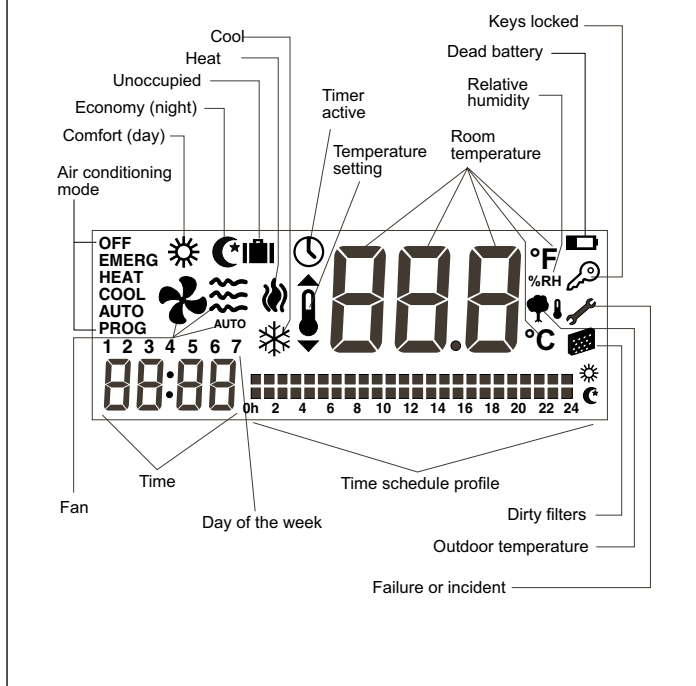
15 - DPC-1 programmable digital thermostat with communication

Internal view of the thermostat

With the front cover up, showing the front panel. The cover is lifted to access the controls only.



Description of the display



15.1.- Air conditioning modes

By pressing the **MODE** key repeatedly, the different air conditioning modes can be selected.

Off

In this mode the air conditioning system is off. **OFF** is displayed on screen.

Cool

COOL is displayed with the ❄️ icon (flashing if under demand, and static if not).

Heat

HEAT is displayed with the 🔥 icon (with the sides flashing if under demand, and without sides if not).

Auto

Both the system heating as well as cooling functions are enabled. The word **AUTO** and the 🔥 icon and ❄️, (flashing if there is a demand) are displayed.

Programmed

The programmed mode implies the previously described **AUTO** mode, but also includes the time schedule profile, and the **AUTO PROG** mode is displayed.

If pin 2 of the micro-switch is set to OFF, this option is not displayed (see Configuration micro-switches).

Emergency Heat

This mode avoids compressor operation in extreme outdoor conditions, and the 🔥 icon (flashing if the unit is on, and static without sides if the unit is off) and the words **EMERG HEAT** are displayed.

Fan Only

The fan only mode is accessed in the OFF mode by pressing the 🌀 key, which selects the fan speed. In this way the air conditioning system is off and only the fan is operative.

15.2.- Key functions

Programming key **PROG**

In the Normal Mode and by pressing this key, the Programming Mode is accessed, allowing the selection of one of the following options:

- 🕒 Clock setting (day of the week, hours and minutes).
- 🌀 Fan programming.
- 📊 Time schedule profile programming. A time schedule profile accepts *Comfort* and *Economy (Day and Night)* modes only.
- ☀️ Programming of set point temperatures for heat and cool in *Occupied, Comfort* or *Day Modes*.
- 🌙 Programming of set point temperatures for heat and cool in *Stand-by, Economy* or *Night Modes*.
- 📱 Programming of set point temperatures for heat and cool in *Unoccupied Mode*.

Plus and Minus keys, **-** and **+**

Pressing one of these two keys in *Normal Mode* accesses the *Adjust Mode*, displaying present temperature set point, with the 📏 icon flashing.

If pressed and held for over 1 second, or released and pressed again while still in the *Adjust Mode*, said set point will be increased or decreased in steps of 0.5° C or 1° F.






If both **-** and **+** keys are pressed at the same time, reading goes from °C to °F, and vice versa..

Air Conditioning mode key


Pressing this key in *Normal Mode* changes the current air conditioning mode (OFF, COOL, HEAT, AUTO, AUTO PROG, EMERG HEAT).

Occupation mode key

In *Normal Mode* it will change the current occupation or comfort mode (Day/Night), displaying the set point temperature next to the flashing thermometer. If pressed once again while still in the *Adjust Mode*, each occupation mode will be accessed one by one in a sequential and cyclic manner.

If the  key is pressed and held for over 1 second, the unoccupied mode will be accessed. If no other change is made in this mode, the unoccupied status will remain for an indefinite period of time. If the  key is pressed, the set point disappears and No. 0 is displayed in its place, indicating the number of days the unoccupied status should last. Keys  and  increase and decrease this number of days (with a maximum of 99), and the  is displayed.

Fan mode key

Pressing this  key accesses the *Adjust Mode*, which lasts 5 seconds. In this mode the fan flashes and the programmed speed is displayed, and whether in auto or permanent mode.

Outdoor Temperature key

Pressing this key in *Normal Mode* displays the outdoor temperature for 5 seconds.

16 - Operation

16.1.- Cooling system

The cooling system is a complete factory-mounted assembly that uses an air-cooled condenser. The system is delivered charged with refrigerant. The compressors are sealed airtight and have internal shock absorbency.

The compressors also have intrinsic (internal) protection. Should there be an unusual temperature increase in the compressor, the safety device will open, turning the compressor off.

16.2.- Preliminary cooling operation

Once installation is completed, connect the sump heaters during at least four hours prior to starting the unit up. After this initial heating operation, the compressors should undergo three false start-ups (sufficient for a few rotations), with a 5-7-minute delay between starts, prior to full operation.

16.3- Thermostat operation

VENTILATION (FAN) MODE: If the fan switch is set to "FAN", the indoor fan is in continuous operation. If not, the fan is

activated by means of the thermostat only during cool or heat operation.

AUTO MODE: If the thermostat selector is set to "AUTO", the unit operates both in the cooling as well as heating modes, as required by the thermostat. There is a differential of 1° C between the cool and heat set points (this value can be increased with the DPC-1 thermostat).

COOL/HEAT: If the thermostat is set to "COOL", the unit operates in the cooling mode when the thermostat requires cool, but does not operate in the heating mode. If set to "HEAT", the unit operates in the heating mode when required, but not in the cooling mode.

This cool or heat management varies in accordance with the type of thermostat in use: DPC-1 (communication) or a relay thermostat.

16.4.- Cooling operation sequence

Without economiser: If the unit is not equipped with an Economiser, the first demand of the thermostat starts the compressor with the lesser number of operating hours, or available.

If the thermostat generates a second demand, the compressor with the second lesser number of operating hours, or available, is started.

A third demand can be generated by starting the third compressor.

If relay thermostats are used, the third demand is generated by the control board by timing. This is deactivated once the second demand disappears.

With economiser: If the unit is equipped with an Economiser, the request for Cooling will depend upon whether conditions are favourable. In this case, the damper is modulated to achieve the lowest possible impulse temperature without going below 12° C. In the temperature mode, favourable conditions are understood as an outdoor temperature below 20° C, while remaining below the return temperature.

In enthalpy mode, favourable conditions are understood as an outdoor enthalpy below the return enthalpy by at least 5%, and an outdoor temperature below 20° C. Operation in enthalpy mode requires a jumper at S2 of the economiser board. Should the enthalpy probes fail, the unit operates on the conventional probes.

REQUEST FOR COOLING, 1: If conditions are favourable, the damper is modulated to achieve an impulse air temperature of 12° C.

If not favourable, one compressor is enabled.

REQUEST FOR COOLING, 2: If the thermostat is not satisfied by the operation of the economiser, the thermostat generates a second demand, starting a compressor.

Occupation detector

The occupation detector intake is pin 1 of connector J1 on the second compressor board. Open means unoccupied. In this case, there is an incidence of the green LED on the control board.

If thermostat DPC-1 is used, the night set points will be applied. In the case of a relay thermostat, the economizer will operate in cool mode only.

NOTE:

Before each cooling season, the sump heaters should be connected at least 10 hours prior to starting the system.

16.5.- Heating operation sequence with gas (models D4IG)

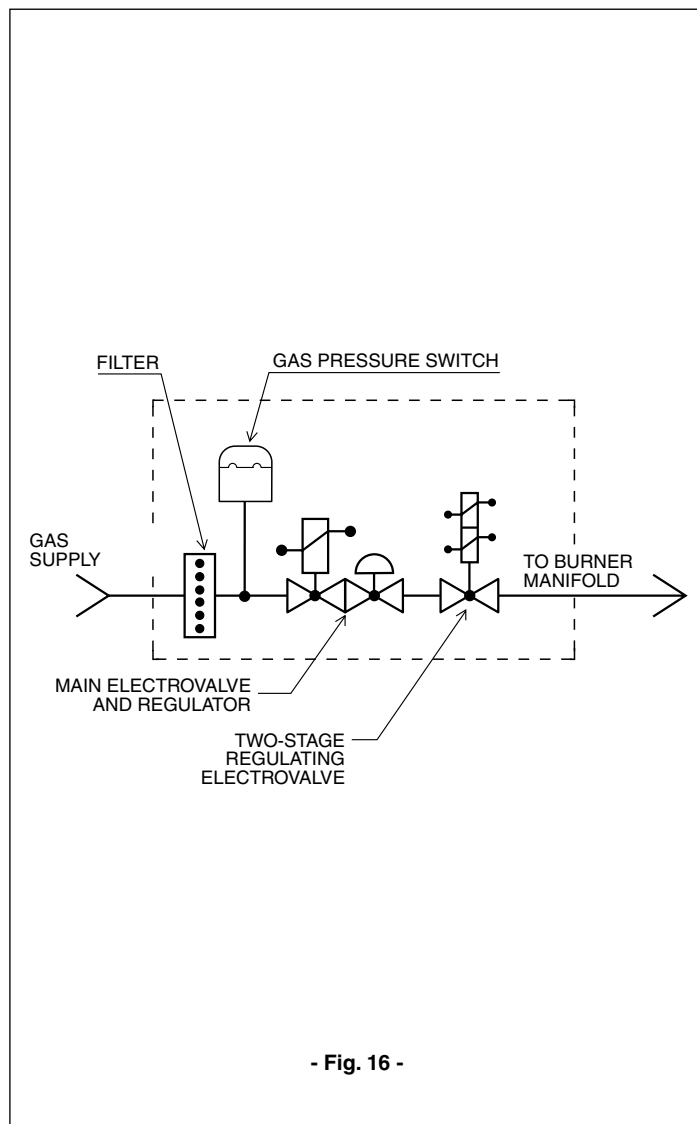
REQUEST FOR HEAT, 1: If the thermostat generates a demand for heat, the YKlon board activates the indoor fan and the gas control board (A6) generates a W1 output (terminal 41). If thermostat LS1 (manual reset) is closed and gas supply pressure is over the set point of the gas pressure switch (GS), start-up control (IC1) is activated and start-up begins.

See Fig. 16 for a typical layout of the gas valves.

START-UP SEQUENCE: The start-up control check to see that the Air Pressure Switch contact (AS1) is open. If it is, the burner fan motor is activated and a 30 second prepurge sequence is begun.

As long as contact AS1 closes and thermostats RS11, RS12 (manual reset) and LS11 (automatic reset) are also closed and the prepurge has ended, the start-up transformer is activated, and this generates a high frequency arch at the firing electrode. The main electrovalves and the 1st stage gas electrovalve are activated at a reduced flow, and the burner assembly ignites.

Gas valve layout



If the flame detector (ionizing electrode type) generates sufficient intensity in a 5-second interval, the gas valve is acti-

vated. If not, the start-up control is locked out and generates an alarm to the gas board, which resets IC1. The gas board can carry out a maximum of 5 resets while the thermostat generates the same demand for heat. Then the gas control is locked out and thermostat DPC-1 will display the failure. If the start-up sequence is correct but the flame goes out shortly after, the start-up the IC1 control is locked out and generates an alarm. If thermal switch LS11 or burner assembly switches RS11, RS12 were to open due to high temperature in the gas control compartment, or if air pressure switch (AS1) were to open due to a failure in the combustion air (for example, lock out or failure of the fan), the unit is locked out and an alarm is generated.

REQUEST FOR HEAT 2: If the thermostat generates a second demand, the gas control board (A7) generates a W2 output (terminals 44, 45), allowing the gas system to operate at 50% its capacity.

REQUEST FOR HEAT 3: If the thermostat generates a third demand, the gas control board (A6) generates a W3 output (terminals 42, 43), allowing the gas system to operate at 75% of its capacity. The smoke discharge motor relay M8 is activated.

REQUEST FOR HEAT 4: If the thermostat generates a fourth demand, the gas control board (A7) generates a W4 output (terminals 46, 47), allowing the gas system to operate at 100% of its capacity. Relay KGV2 is activated, switching to high speed of the smoke discharge motor M9.

16.6.- Heat operation sequence with electric heaters (models D4IC)

REQUEST FOR HEAT, 1: If the thermostat generates a demand for heat, the YKlon board activates the indoor fan and the output of auxiliary heater 1 or 2, depending upon the number of operating hours in use.

REQUEST FOR HEAT, 2: If the thermostat generates a second demand, the output of auxiliary heater 1 or 2 is activated, depending upon the number of operating hours in use.

16.7.- Heat operation sequence with heat pump (models B4IH) with electric heaters (optional)

REQUEST FOR HEAT, 1: If the thermostat generates a demand for heat, the YKlon board activates the indoor fan and the compressor with less operating hours, or available.

REQUEST FOR HEAT, 2: If the thermostat generates a second demand, the second compressor becomes operative.

REQUEST FOR HEAT, 3: If the thermostat generates a third demand, the third compressor becomes operative.

REQUEST FOR HEAT, 4: If the thermostat generates a fourth demand, the output of auxiliary heater 1 or 2 is activated, depending upon the number of operating hours in use.

REQUEST FOR HEAT, 5: If the thermostat generates a fifth demand, the output of auxiliary heater 1 or 2 is activated, depending upon the number of operating hours in use.

EMERGENCY HEAT: If the Emergency Heat mode is selected on the thermostat, the compressors are turned off. The first demand for heat starts one stage of the heater, and the second, the other stage.

16.8.- Defrost sequence (models B4IH)

The heat pumps are equipped with a defrost adjustable timer

controlled by microswitches (30, 60, 90 minutes). Factory-set to 30 minutes.

Defrost can be carried out only when the unit is in heat pump operation.

Start:

The following conditions should exist:

- The compressor is in operation.
- The liquid probe temperature is below -3° C for 3 minutes, or for 5 minutes if the outdoor temperature is below -5° C.
- That the time period from the last defrost, 30 minutes, has expired.

Operating procedure:

When starting defrost, the following operations are carried out:

- The 4-way valve is set to cool mode.
- The outdoor fan is turned off.
- The YKlon board call manager will decide whether another heat stage can be started.
- During defrost, do not turn off the compressor that is defrosting, even if called for by the thermostat.
- The indoor fan will turn off if there is no stage that can produce heat, and microswitch No. 8 is set to OFF. If set to ON, the indoor fan does not turn off. (Set to ON by default.)

End:

The operating procedure will last until one of the following conditions is present:

- Liquid temperature above 13° C for 2 seconds.
- Liquid temperature above 5° C for 30 seconds.
- Liquid temperature above 2° C for 2 minutes.
- Time expired since the start of the defrost over 10 minutes.
- A high pressure switch failure signal is generated.
- If liquid temperature drops below -25° C.

Operating procedure:

When the defrost is finished:

- The outdoor fan turns on and remains in standby for 10 seconds.
- The four-way valve is set to heat.
- The call manager will decide whether or not the compressor is to remain in operation.

To eliminate the drops of water from the coil, the outdoor fan will remain in operation for one minute, even if there is no call.

Simultaneous defrost of two stages is not allowed, and one of these remains in standby until the operating procedure of the other is over.

17 - Safety features and controls

17.1.- Cooling lock-out

The cooling circuit is protected against high pressure (HP), low pressure (LP), discharge temperature and repeated starts in cool by means of a suction probe in the summer cycle.

If a failure is detected, thermostat DPC-1 indicates the cooling circuit affected (two numbers) and type of failure. Furthermore, the YKlon board alarm relay is activated, with 24 VAC phase R at terminal AL.

If the cause of the failure has disappeared, the failure can be reset from the thermostat by setting the thermostat to OFF

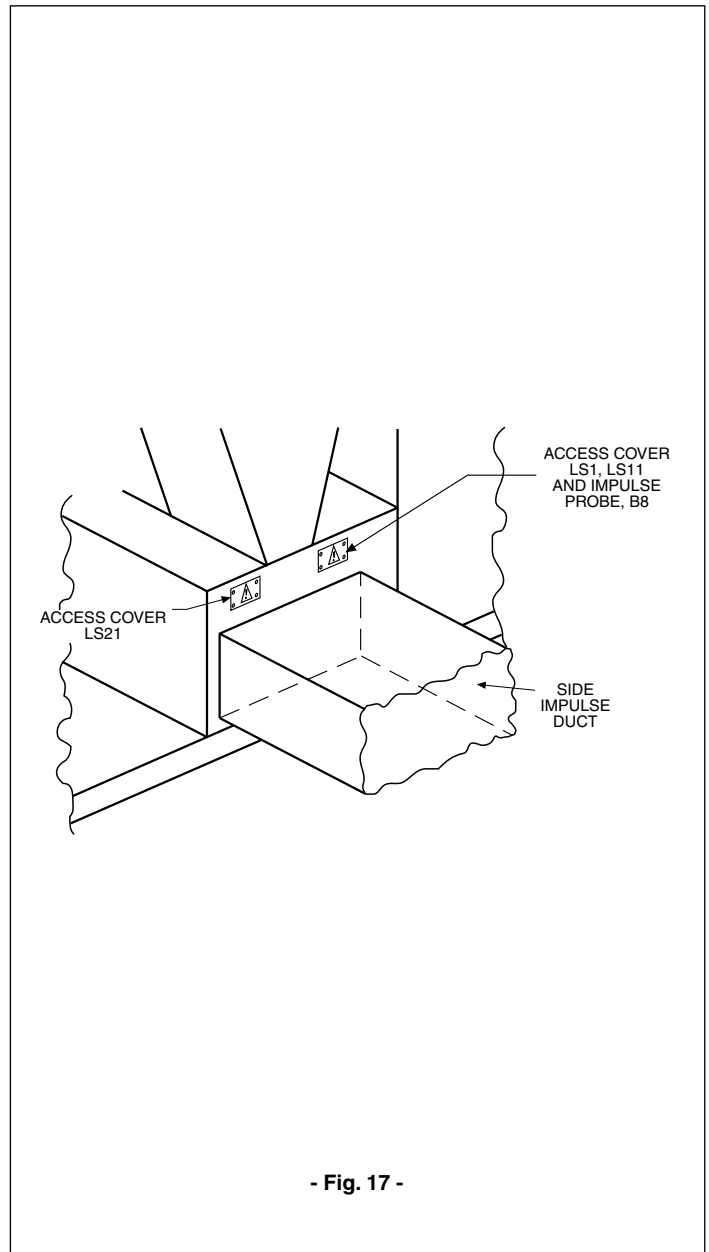
and then back to ON. Only three resets can be carried out in 24 hours.

17.2.- Gas heating lock-out (models D4IG)

In the case of IC1, IC2 control lock-out due to the activation of any of the LS11, LS21 (automatic reset thermal switch), RS11, RS12, RS21, RS22 (burner manual reset thermal switch) or AS1, AS2 (air pressure switch) devices, the control will remain in lock-out until the activated device is re-established and a reset is carried out. In the case of a lock-out due to non-detection of a flame, control IC1 generates an alarm and the gas board can carry out a maximum of 5 resets. Then the gas control will be locked out and thermostat DPC-1 will display the failure.

If the manual reset thermal switch LS1 opens, the start-up control will not be operative until it is reset manually.

Thermal switch LS1 can be accessed through the cover on the side panel of the unit, on the side opposite to the burner assembly access doors, right over the opening for the connection of the side impulse duct (see Fig. 17).



- Fig. 17 -

17.3.- Low gas pressure (models D4IG)

If gas supply pressure falls below the gas pressure switch (GS) set point, power supply to the ignition control circuit is cut off, and this circuit becomes inoperative. The gas equipment will reset automatically once the gas supply pressure goes above the pressure switch set point, and the start-up sequence will begin once again. See table 18.6 for gas valve and thermal switch adjustments.

17.4.- Heating lock-out (electric heaters)

Should any of the electric heater phases not operate, check heat protection devices F12 and F15 (105° C, manual reset heat switch). If F13 or F16 (77° C, automatic reset) fail three times, the control board will detect this, turn off the corresponding heater and display the failure on thermostat DPC-1.

Also check short circuit and overload protection automatic switches F21 and F22 (1st and 2nd stages). The heat switches and automatic switches can be accessed through the external access panel of the electric heater.

17.5.- Motor overload protection

All motors of the hermetic compressors and fan motors are protected against overloads by means of an internal heat line cut-off switch. This protection will reset automatically once the motor has cooled off sufficiently. Externally, they are protected against short circuits and overloads by means of automatic switches, curve K (DIN, VDE 0660-104).

The indoor fan motor is protected by a motor-guard, adjusted to the maximum amperage of the fan motor. In the case of excessive power consumption in the three phases, the motor-guard opens, interrupting the electric power supply to the Indoor Fan Contactor.

The motor-guard auxiliary contact opens and the control board detects this, turns the entire unit off and displays the failure on thermostat DPC-1.

18- Start-up of gas heating, models D4IG

Caution: To avoid possible damage to the gas valves, the burner assembly of the unit should be disconnected from the gas pipe system during the pressure test of said system.

All work on the gas system must be carried out by qualified personnel only.

18.1.- Check list prior to start-up

Caution: Prior to this operation, make sure unit impulse air flow is correct, in accordance with the minimum flow stipulated in the technical specifications in section 4.1.

1. Check the type of gas to be used. Make sure it is the same as shown on the identification plate located on the burner assembly access door.
2. Make sure both the combustion air intake and the gas discharge have no obstructions.
3. Make sure the gas supply line is in compliance with safety regulations and is prepared to supply adequate gas flow and pressure. (See technical specifications in sections 4.1 and 18.8.)
Gas supply pipes to the unit must be air purged

18.2.- Turning on

This burner is equipped with automatic ignition systems. Do not attempt to ignite it manually.

18.3.- Start-up, without the YKTOOL portable test tool (accessory)

1. Connect power supply to the unit.
2. Open the gas supply tap to the unit.
3. Set the ambient thermostat to its maximum temperature in heat.
4. The burner assembly will ignite. (It could take a few minutes, depending upon the mode established on the thermostat.)

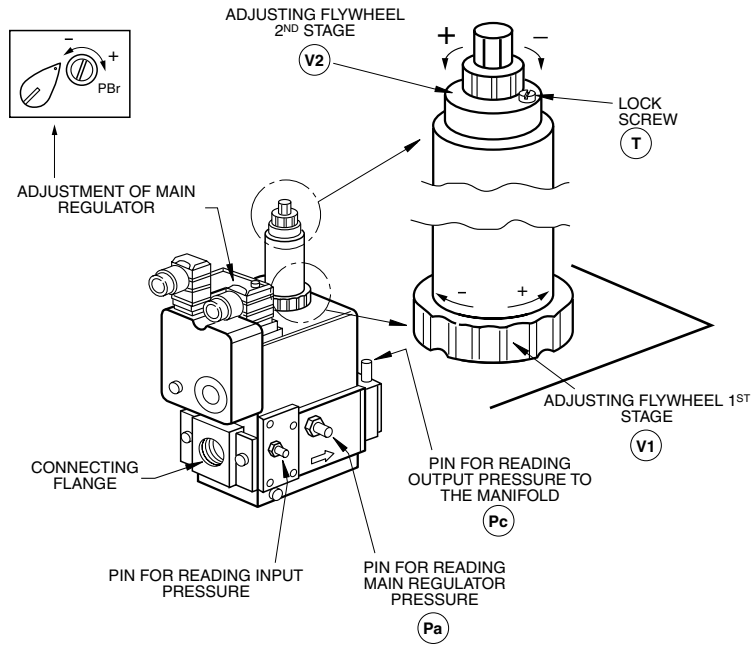
18.4.- Start-up, with YKTOOL (accessory)

1. Disconnect power supply to the unit.
2. Set the Yktool on connector J9 of the Yklon board A1.
3. Connect power supply to the unit.
4. Open the gas supply tap to the unit.
5. On the main menu, select Test heat (No. 7). Select Auxiliary 1 and activate (ON). Repeat with Auxiliary 2, 3 and 4.
6. The 4 stages of the burner assembly will go on.

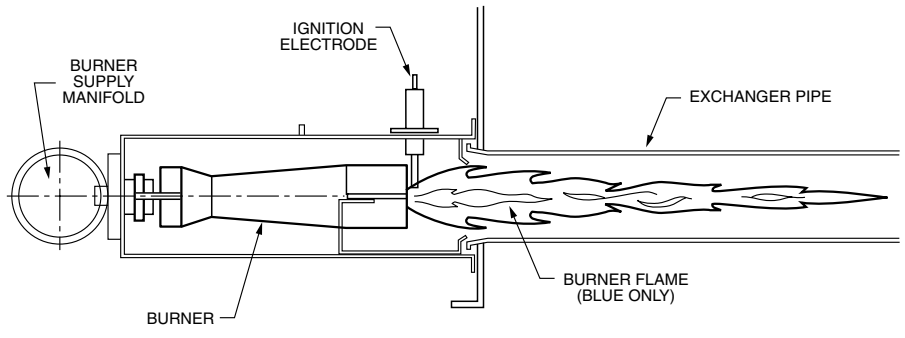
18.5.- Check list after start-up

After having activated the entire control circuit and the gas heating is in operation, check the following:

1. Make sure there are no leaks in the unit and supply pipes.
2. Check gas supply pressure with all gas units in the building operating at full capacity.
In no case should the pressure in the gas auxiliary line above 25 mbar, nor the incoming pressure in the burner assembly below 12.5 mbar.
3. Make sure the gas pressures in the manifold are correct. (See section 18.6 and Fig. 18.)
4. Visually check the flame at the burners (Fig. 19).
5. Using a combustion gas analyzer, check the CO and CO₂ content at both smoke discharges.
With the 4 heat stages in operation, the carbon monoxide (CO) content should be below 0.1% (1000 ppm), and the CO/CO₂ ratio should be below 0.02.



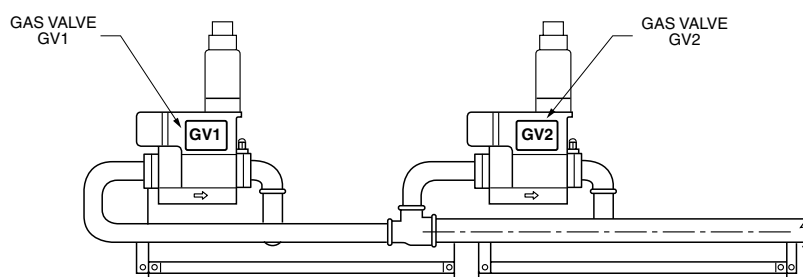
- Fig. 18 -



- Fig. 19 -

18.6.- Adjustment gas valve/thermal switches

D4IG model	Burner model	Heating capacity (kW)		Gas type	Gas valve adjustments (mbar)			Heat switch limits (°C)	
		Total (P.C.I.)	Nett		Main regulator	2 nd stage regulator	1 st stage regulator	Automatic reset	Manual reset
360/480	N420	130,7	117	2ND-H(G20)	10,5	GV1: 9 GV2: 8,8	4,5	82	93



- Fig. 20 -

Note: The GV1 gas valve corresponds to heat stages 1 and 3 of the unit.
The GV2 gas valve corresponds to heat stages 2 and 4 of the unit.

18.7.- Adjustment gas pressure at burner feed manifold

This equipment is dispatched from the factory tested and prepared for natural gas of the 2ND-H (G-20) type.

When adjustment is needed, it can be done in the following sequence:

Set the 2 gas valves to the values stipulated in section 18.6 and in compliance with Fig. 18.

- With the 4 heat stages in operation:
 - Adjust the main regulator (pressure reading in Pa).
 - Adjust the 2nd stage regulator V2 (pressure reading in Pc). Pay close attention to the different values in both valves GV1 and GV2.
- With heat stages 1, 2 and 3 in operation:
 - Adjust the 1st stage regulator V1 on valve GV2 (pressure reading in Pc).
- With heat stage 1 only in operation:
 - Adjust the 1st stage regulator V1 on valve GV1 (pressure reading in Pc).
- Once adjustments are finished, tighten lock screw (T) of the regulating flywheels.
- Turn the unit on, with the 4 heat stages, for at least 15 minutes, and check the CO and CO₂, as indicated in point No. 5 of section 18.5.

18.8- Gas consumption

Based on natural gas of the 2ND-H, G-20 type, at 20 mbar and 15° C.

D4IG model	Heat stages	Gas consumption mm ³ /h
360/480	100%	12,8
	75%	11
	50%	9
	25%	4,5

19 - Maintenance

19.1.- General

To ensure proper operation of the units with minimum energy consumption and a long service life, a maintenance plan should be established.

The following table recommends the frequency of regular maintenance operations, depending on work and environmental conditions of each unit.

Maintenance operations should be carried out by qualified technical personnel only, updating the maintenance log book of each unit regularly.

Attention:

Before opening any access to the interior of the unit, all power supply should be turned off.

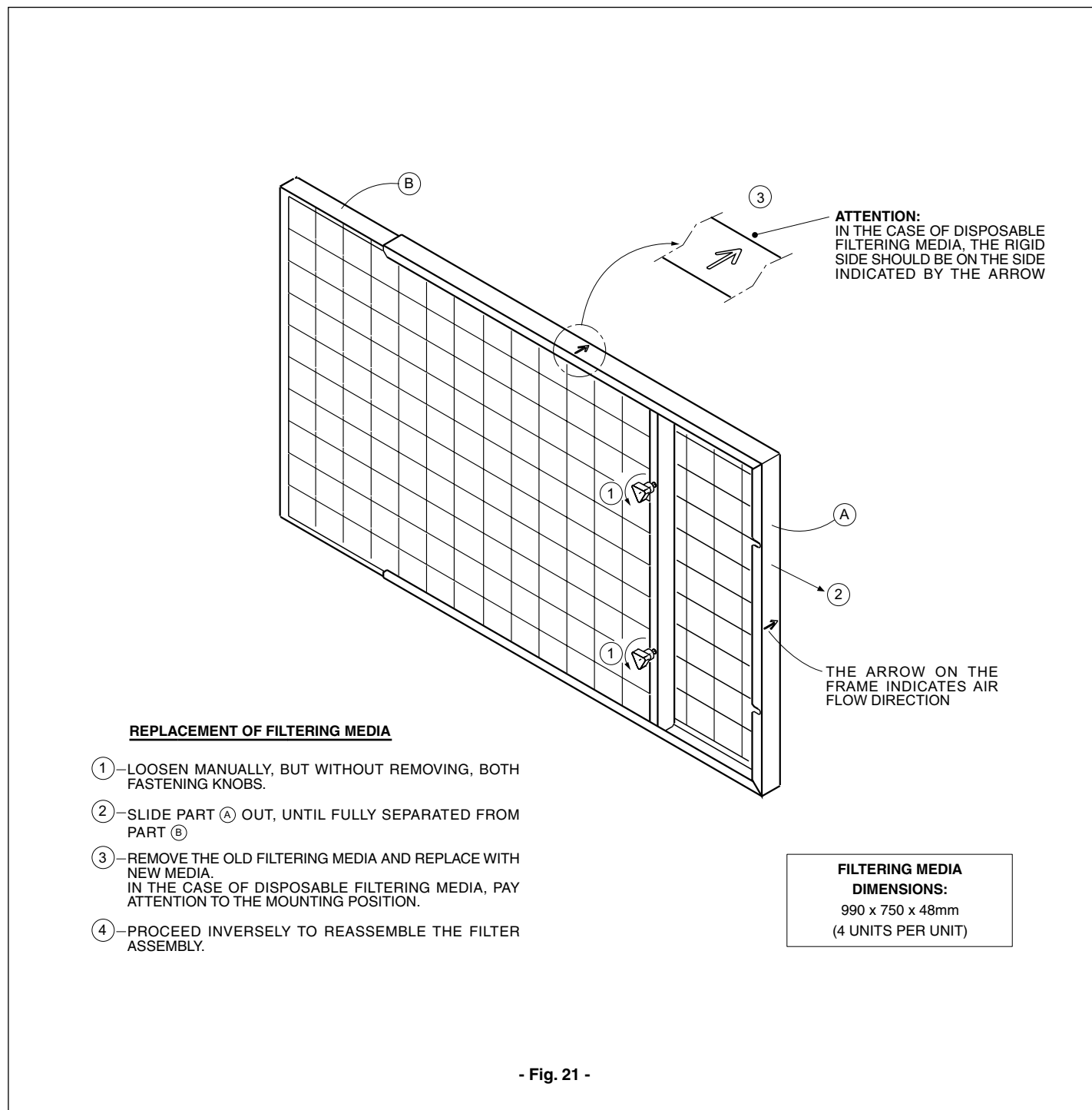
	Frequency			
	1 month	2 months	6 months	annually
Belts (indoor fan)		X		
Air filter	X			
Indoor coil (evap. unit)		X		
Condensed water tray and siphon		X		
Outdoor coils (cond. units)		X		
Outdoor air intake (accessory)	X			
Refrigerant circuit			X	
Mechanical and electric operation			X	
Structure integrity and unit components				X
Hot water coil (accessory)				X
Gas heating (models D4IG)				X

- **Indoor fan belts:** Check correct condition and tension. If these are to be replaced, the replacements must be of the same type and size as the originals (see section No. 10), and recheck tension within the first 24 operating hours. See section No. 14 for tensing procedure.
- **Air filters:** Replace disposable filters, or wash washable filters. For this purpose, remove the filters from the unit, sliding them out of their guide rails. The metal frame splits

in two without the need of any tools, for easy replacement of the filtering media.

The disposable filters should be installed in accordance with the current direction of air flow. To make this operation easier, there is an arrow on the filter frame that should always point towards the front of the coil. See Fig. 21.

Air filters



- **Indoor coil:** A visual inspection is recommended during the maintenance operation of the filters. The entire surface of the fins must be kept clean. If cleaning is needed, use a soft brush or vacuum cleaner, taking care not to damage

- **Condensed water tray and siphon:** Eliminate any dirt or residues. Make sure the water outlet and the siphon are not obstructed. Make sure the water discharge and the

siphon are not obstructed. Make sure the water evacuates correctly. Prime the siphon (fill with water) if necessary.

- **Outdoor coils:** Eliminate any dirt or residues on the surface of both sides of the coils, and in the V-shaped air passage section formed by the coils. Clean the surface of the fins with a soft brush or compressed air, taking care not to damage them. As these are exposed to outdoor environmental conditions, it might be necessary to use water with an adequate detergent for cleaning. In this case, and always from the inside out, apply from top to bottom.
- **Outdoor air intake:** If the unit is equipped with any of the economiser, motor-driven damper or fixed outdoor air intake accessories, maintenance should also be applied to the air filters included inside the rain hood. These are aluminium mesh filters. Make sure both the mesh as well as the frame are in good condition. Wash with water and an adequate detergent, if necessary. Pay attention to the arrow on the frame, which indicates the air flow direction and should point towards the interior of the unit. See Fig. 22.
- **Refrigerant circuit:** This circuit should be checked in depth at the beginning of each cooling or heating season: Operating pressures, control elements, temperature steps, etc.
- **Mechanical and electrical operation:** Also at the beginning of each season, check the amperage of all motors, the

conditions of electrical connections and operation of safety controls. The bearings of the outdoor as well as indoor fan motors are of the permanent lubrication type and, therefore, do not require maintenance.

If the unit is equipped with any of the economiser, motor-driven damper or extracting barometric damper accessories, check for correct operation of air dampers and motors.

If equipped with the axial extraction fan accessory, check the conditions and operation of the control unit.

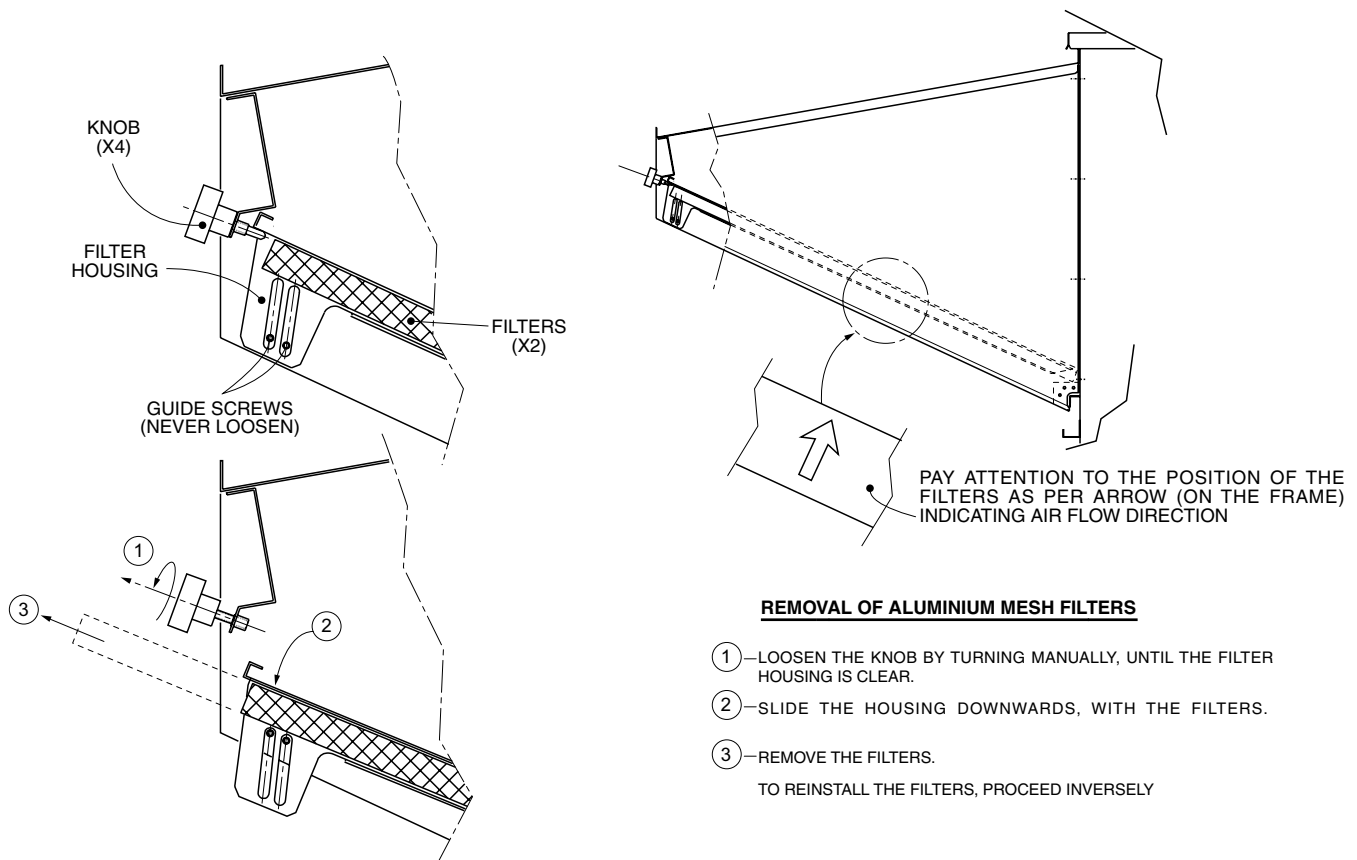
If equipped with fixed outdoor air intake, check the conditions of the air damper, and the reliability of remaining open.

- **Structure integrity and unit components:** Check the conditions of the structure and outdoor components of the unit, absence of bruises or dents, tightness of screws, etc.

Check correct closing of access doors, including conditions of the airtight gasket and locks.

- **Hot water coil:** If the unit is equipped with this accessory, check operation of the control elements, water level in the system and air purge of the coil, at the beginning of each heating season. Depending upon the area and the installation, and if necessary, make sure the proportion of antifreeze is correct

Outdoor air intake aluminium mesh filters



- Fig. 22 -

19.2.- Gas heating units, D4IG

Maintenance operations to be carried out by qualified personal at the beginning of the heating season:

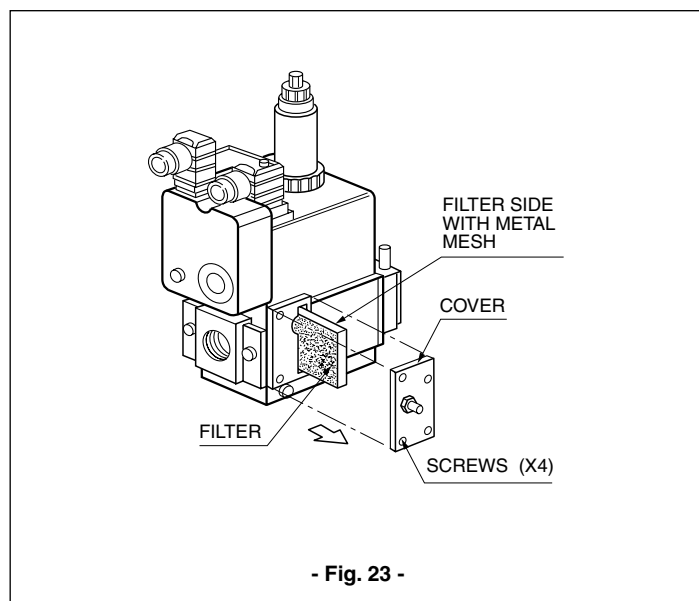
Gas valve filter

Caution: Close the gas supply tap to the unit before accessing the gas valves.

Check gas filter conditions in both valves, and clean or replace, as required.

These are under the side cover of the valve (Fig. 23).

Place the filter into its adequate position, replace the cover and tighten the 4 screws correctly to ensure air tightness..



Burners

Visually inspect the flame of the burners (see Fig. 19). If the flame is not correct, the burners could require cleaning. For cleaning purposes, remove the burner assemblies as indicated in section 19.3.

Gas injectors

Visually check for partial obstruction of the calibrated holes, and clean, if necessary (see section 19.3).

Combustion air intake:

Check for any obstruction by objects or dirt.

Combustion gas discharge:

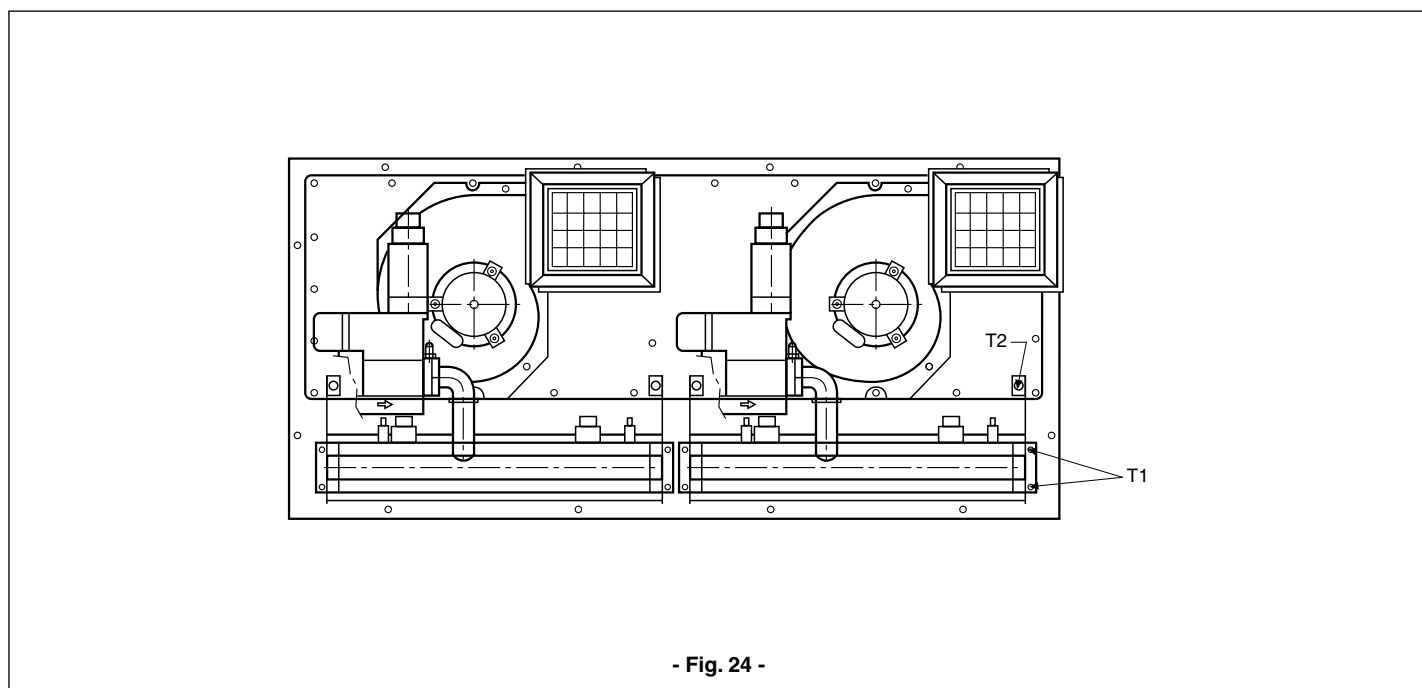
Make sure the grids are free of any obstruction by objects or dirt.

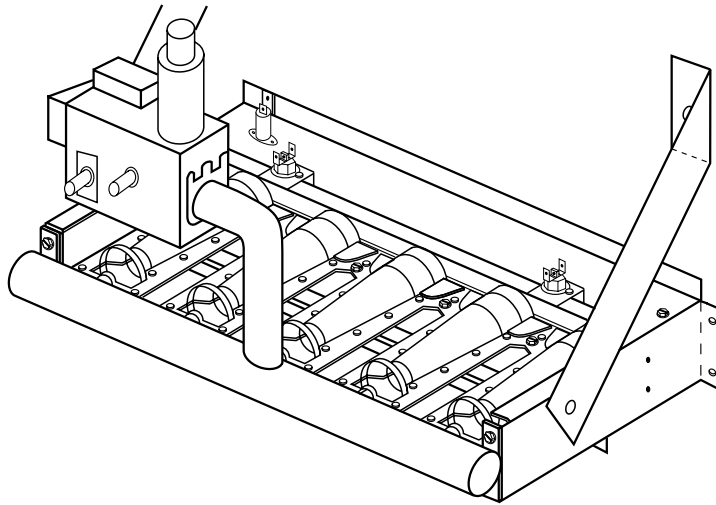
Make sure there is no accumulation of soot on the panels, around the smoke stacks. Should any exist, this could indicate incomplete combustion. This should be checked by following the indications appearing in section 18.5.

19.3.- Burner and injector inspection instructions

Before beginning this operation, turn the gas supply tap off, as well as the power supply to the unit.

1. Disconnect the gas supply pipes to the unit.
2. Disconnect the gas valve cables, ignition electrodes, flame sensors and temperature sensors.
3. Disassemble the feed manifold to the gas valves by loosening the 2 lock screws at the intake flange of each one, and remove from the unit.
4. Loosen the screws that fasten both assemblies, made up of the gas valve and the burner assembly, to the panel in the back of this section. First remove the 4 screws from the bottom (T1), and then the 2 from the top part (T2) (see Fig. 24).
5. Remove the assembly from the unit (Fig. 25).
6. Now the injectors and burners are accessible for inspection and cleaning.
7. Invert this process to reinstall both assemblies.



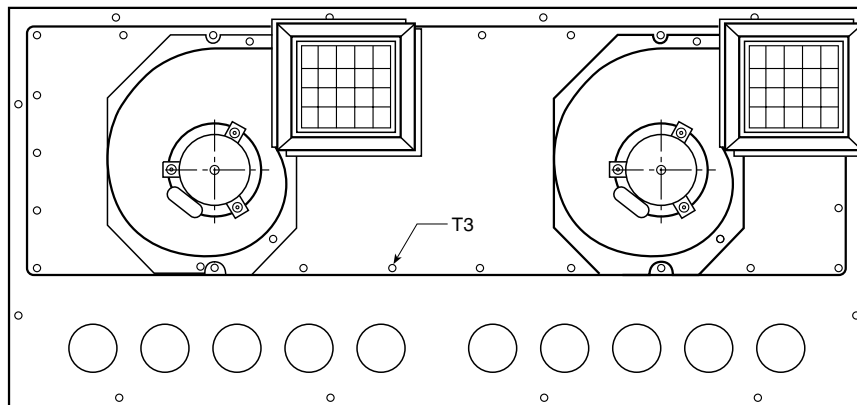


- Fig. 25 -

19.4.- Cleaning heat exchanger

With adequate combustion regulation, the heat exchanger pipes rarely require cleaning. If there is an accumulation of soot, these can be cleaned as follows:

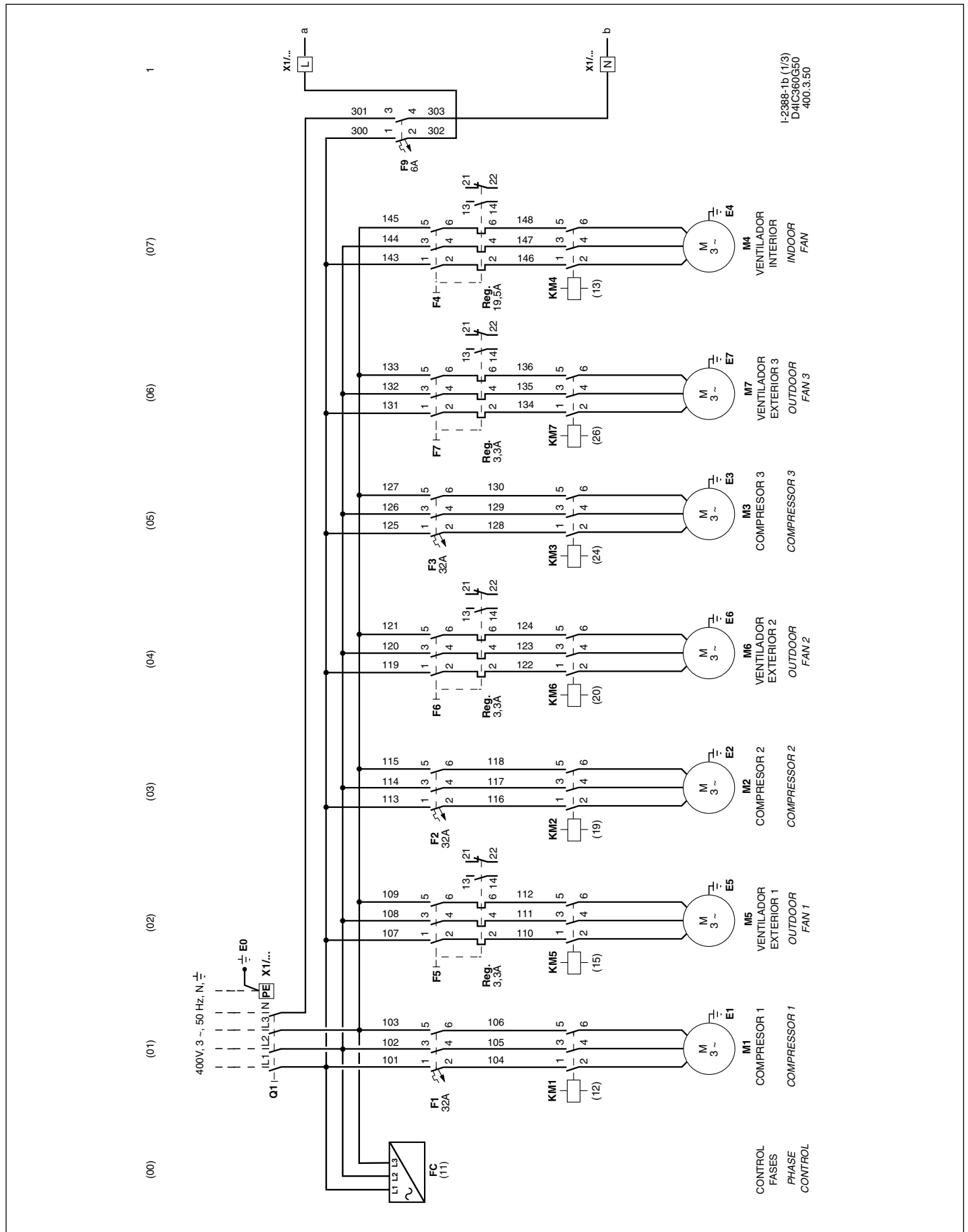
1. Disassemble the gas valve/burner assemblies as per section 19.3.
2. Disassemble the smoke stack front panel (screws T3). This panel includes the 2 impulse/extraction fans. Take special care in not damaging the air tightness gasket (Fig. 26).
3. The smoke stack interior and the end of the exchanger pipes are now accessible.
4. Using a metal brush with flexible rods, brush and sweep each one of the pipes in an outward direction, both at the end of the smoke stack as well as at the beginning of the burner section.
5. Also brush out the interior of the smoke stack.
6. Once brushing is finished, clean with compressed air or nitrogen. Use a vacuum cleaner, if necessary.
7. Invert this process to reinstall the assembly. Make sure the front panel of the smoke stack is airtight.



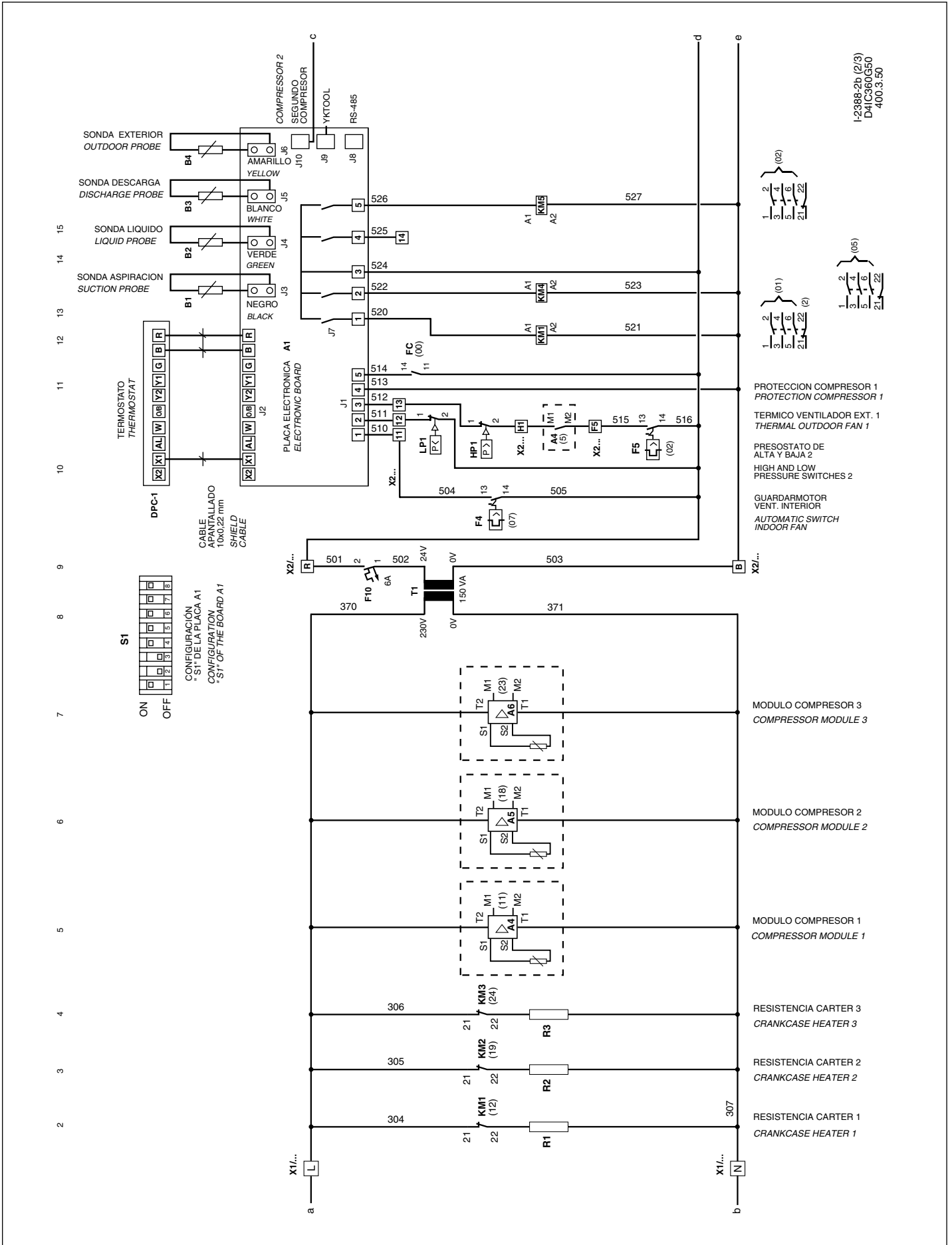
- Fig. 26 -

20- Wiring diagrams

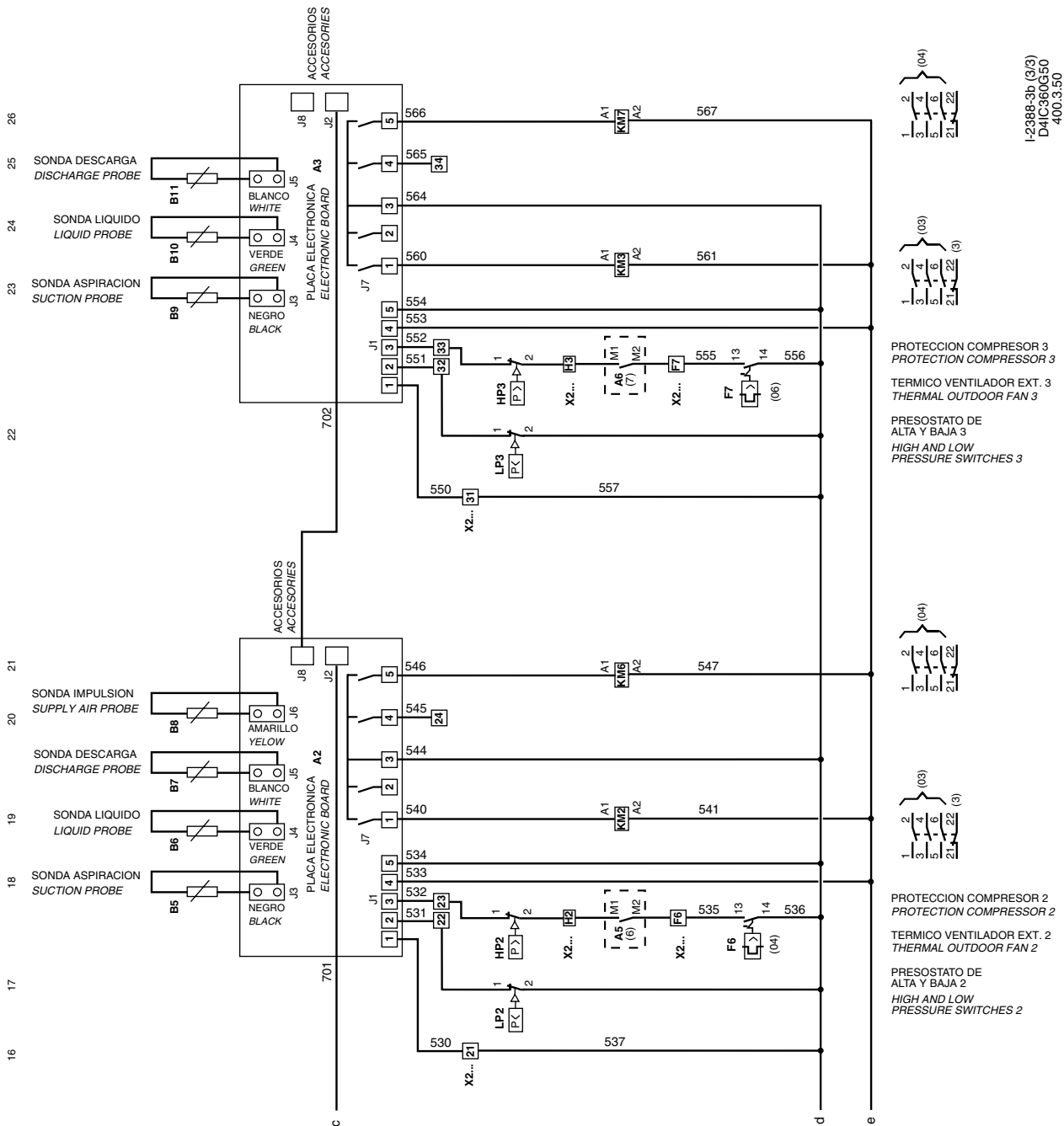
20.1.- Cool only models D4IC-360, D4IC-360G50 400.3.50 (1 of 3)



D4IC-360G50 400.3.50 (2 of 3)

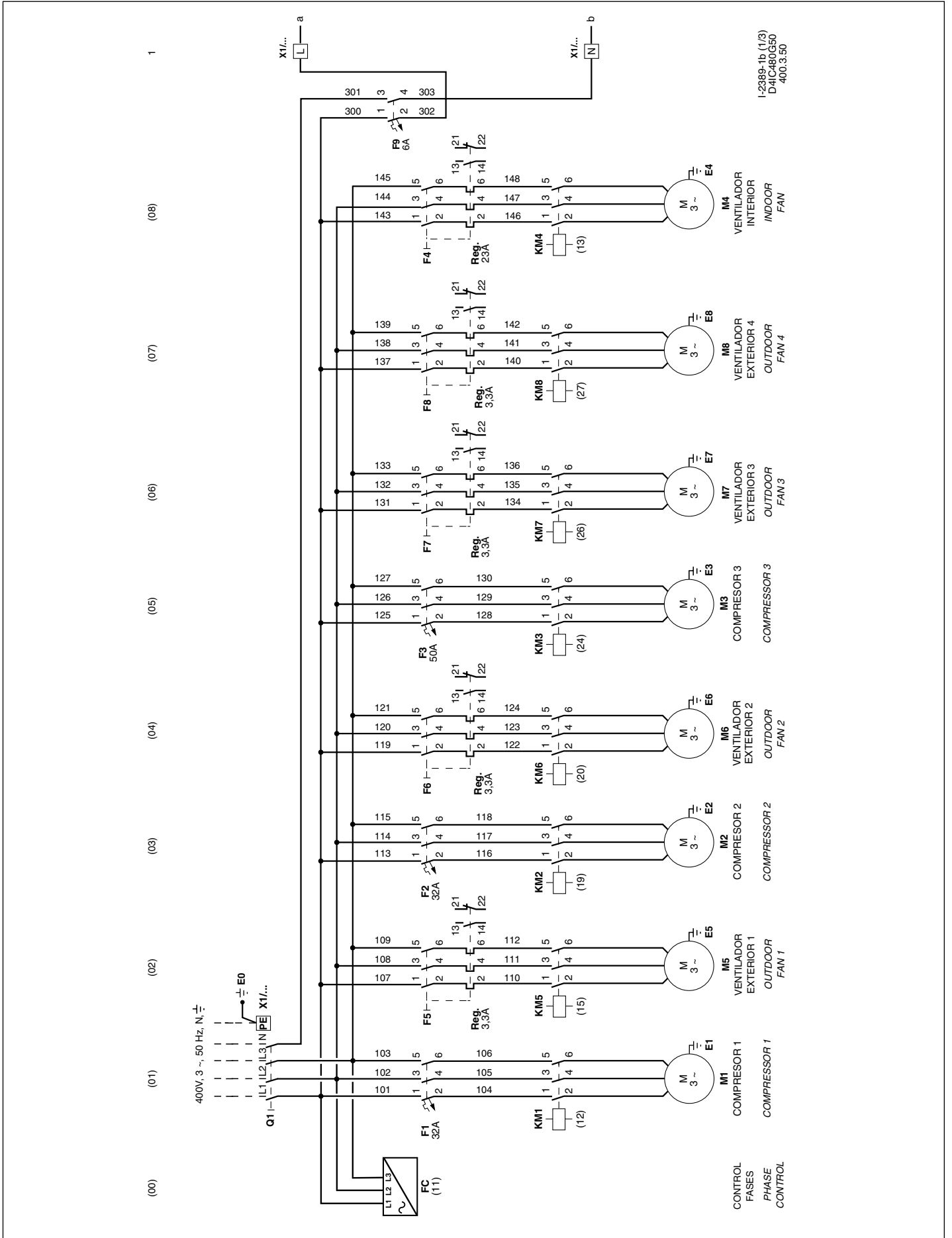


D4IC-360G50 400.3.50 (3 of 3)

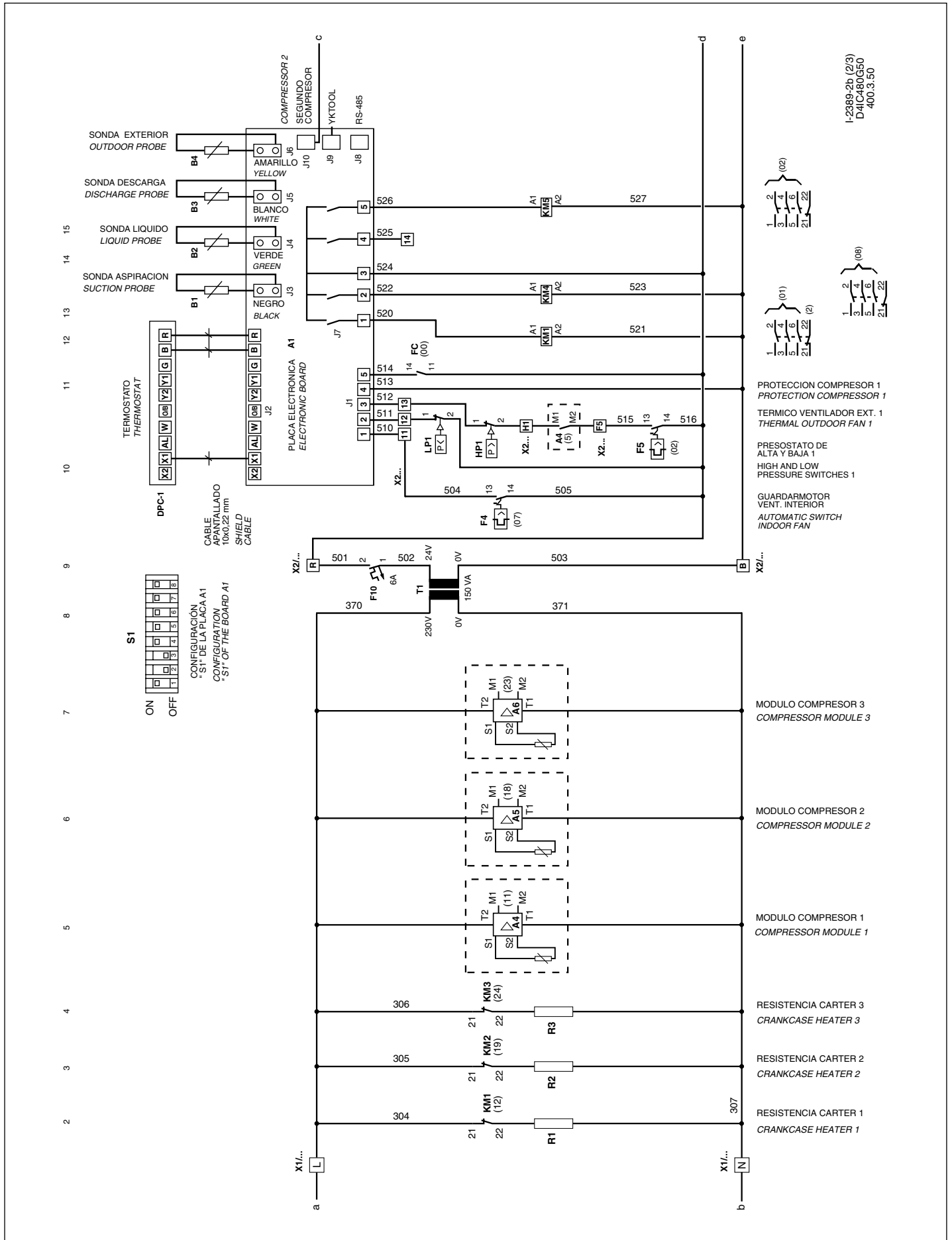


I-2388-3b (3/3)
D4IC360G50
400.3.50

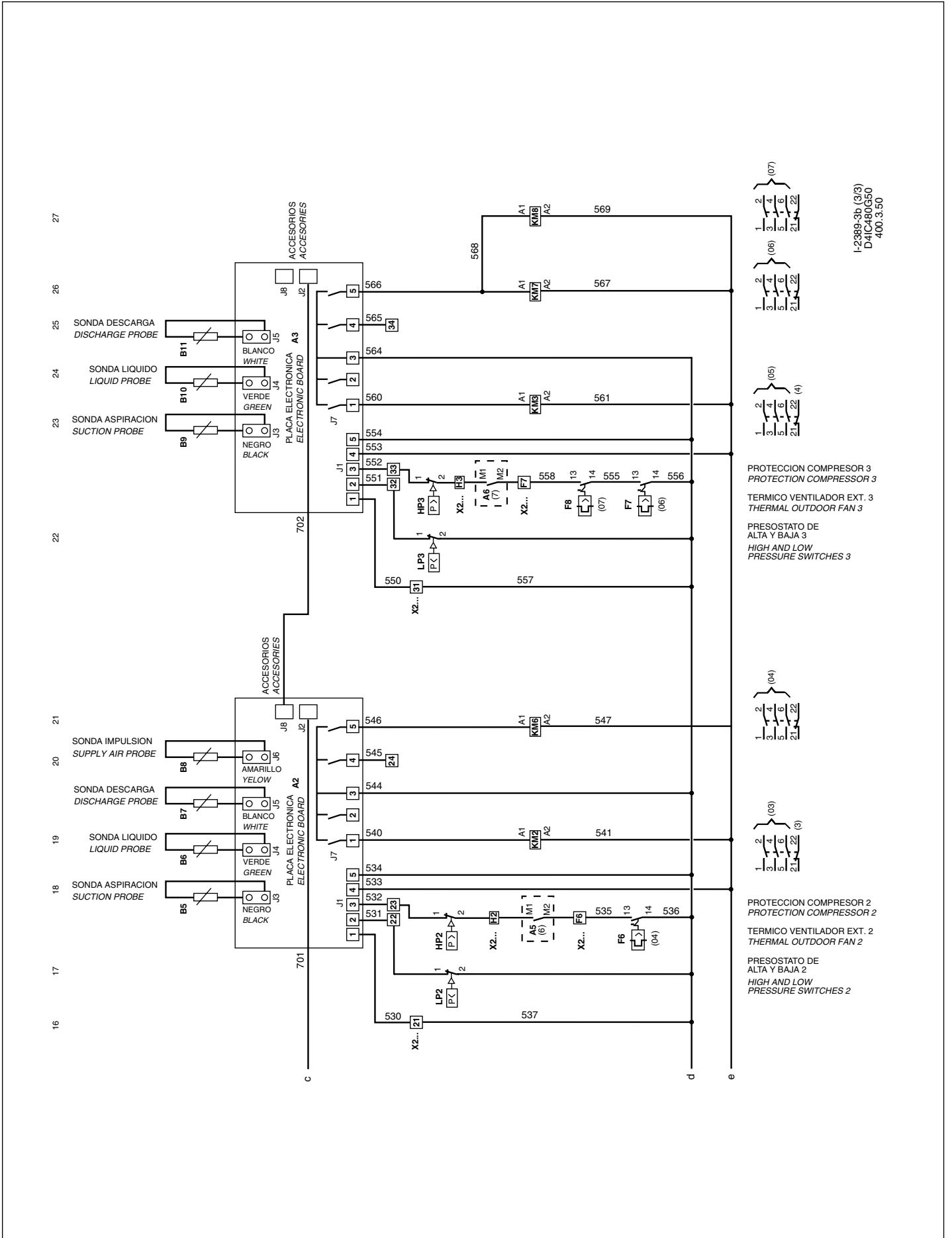
20.2.- Cool only models D4IC-480, D4IC-480G50 400.3.50 (1 of 3)



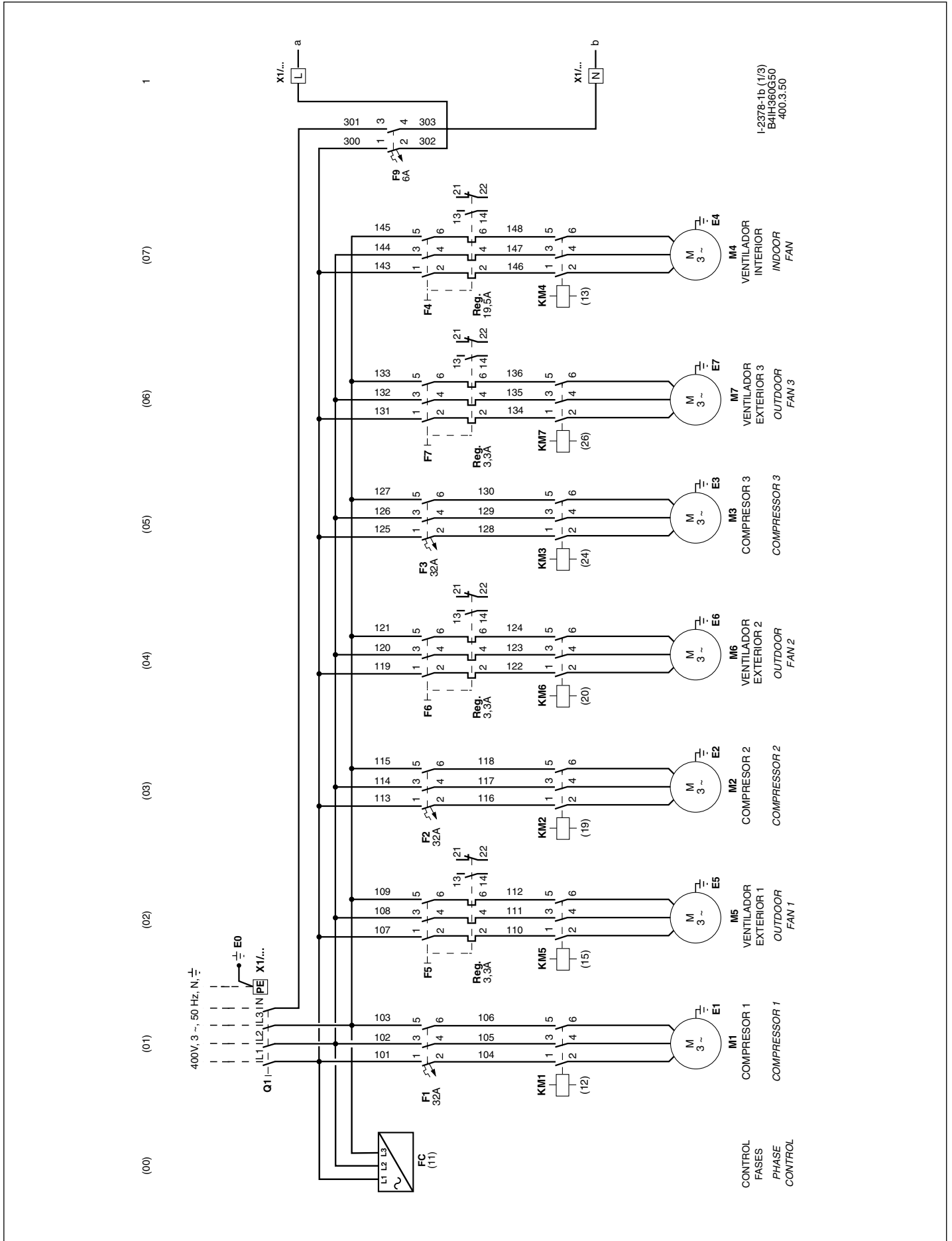
D4IC-480G50 400.3.50 (2 of 3)



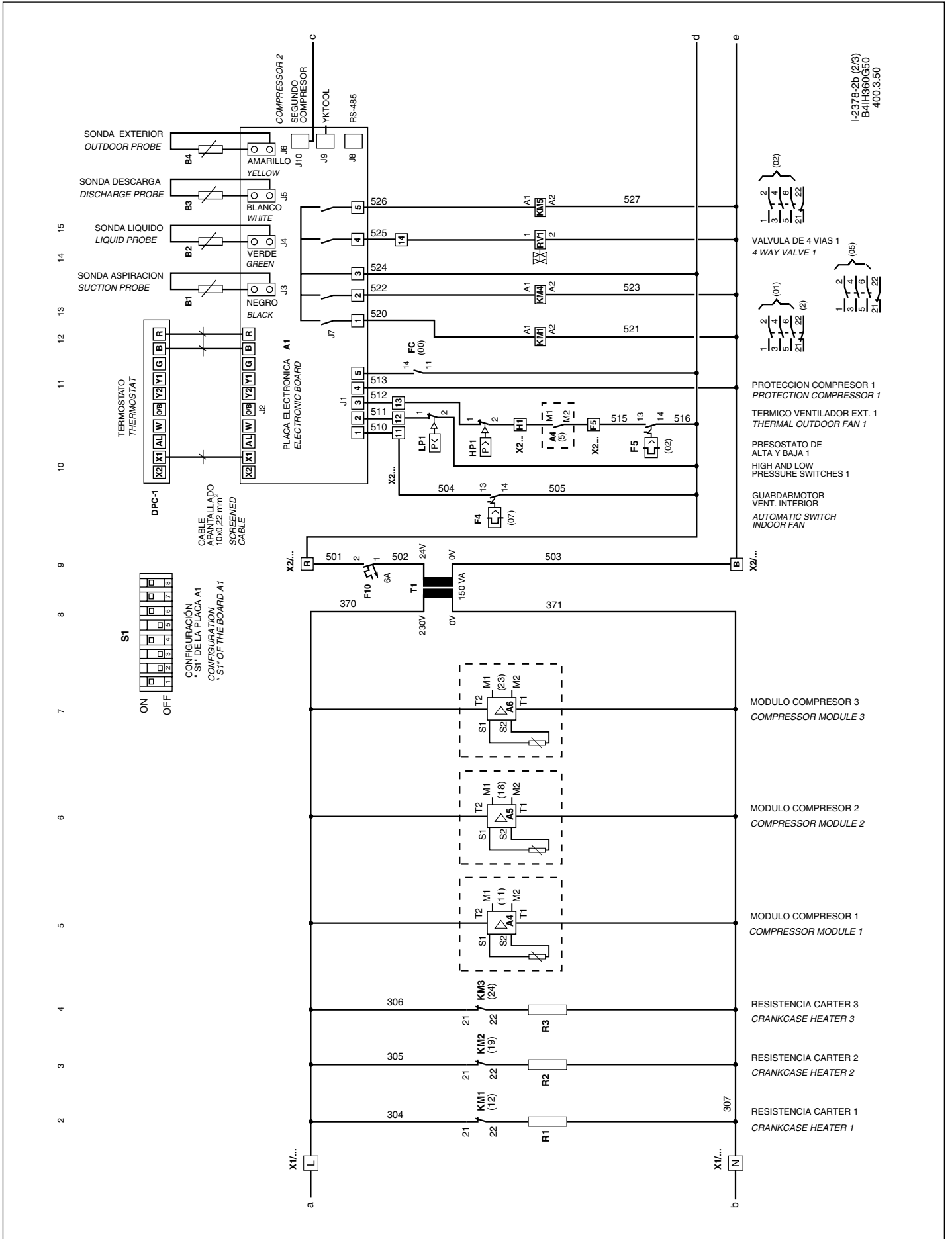
D4IC-480G50 400.3.50 (3 of 3)



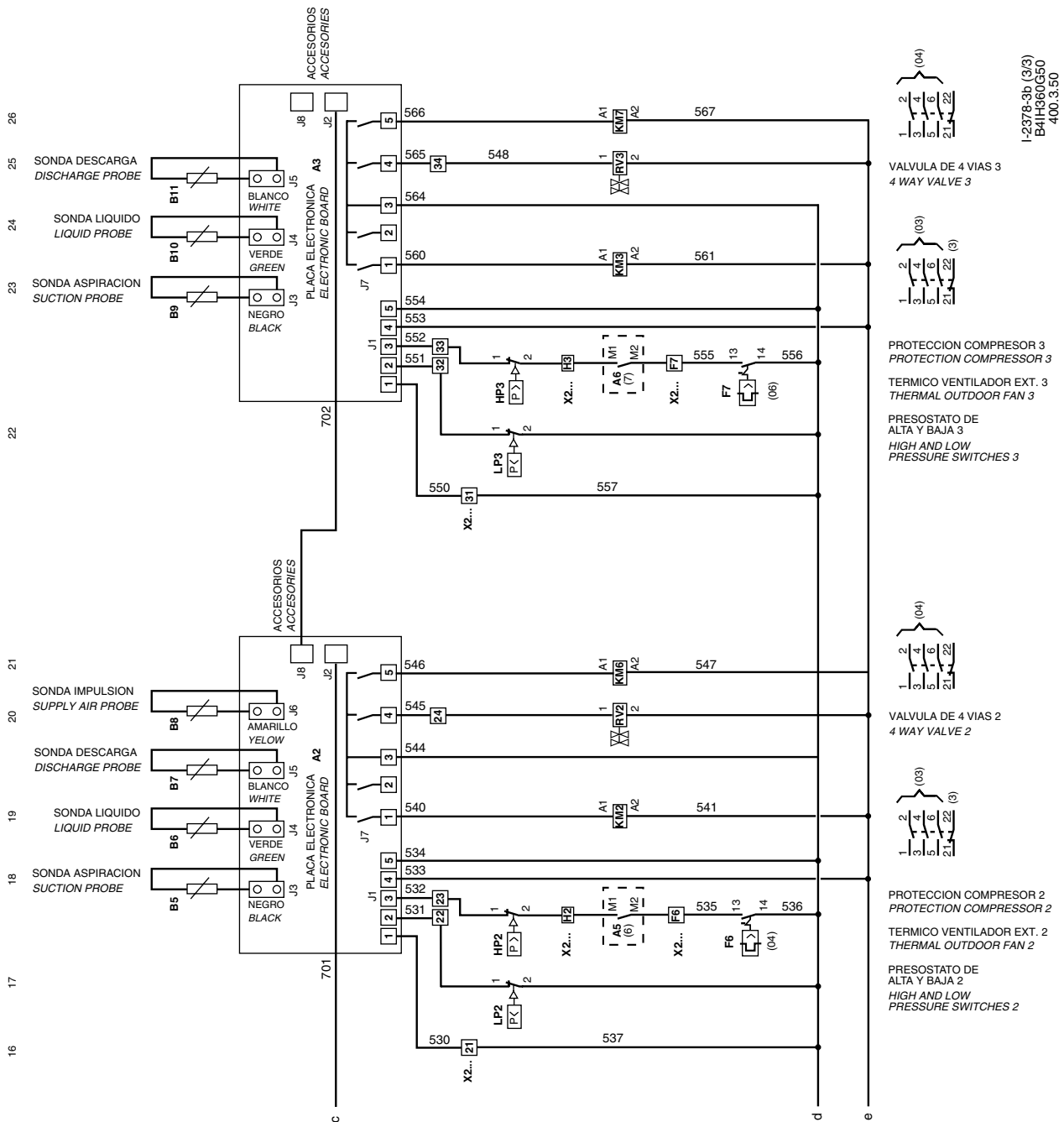
20.3.- Heat pump models B4IH-360, 400.3.50 (1 of 3)



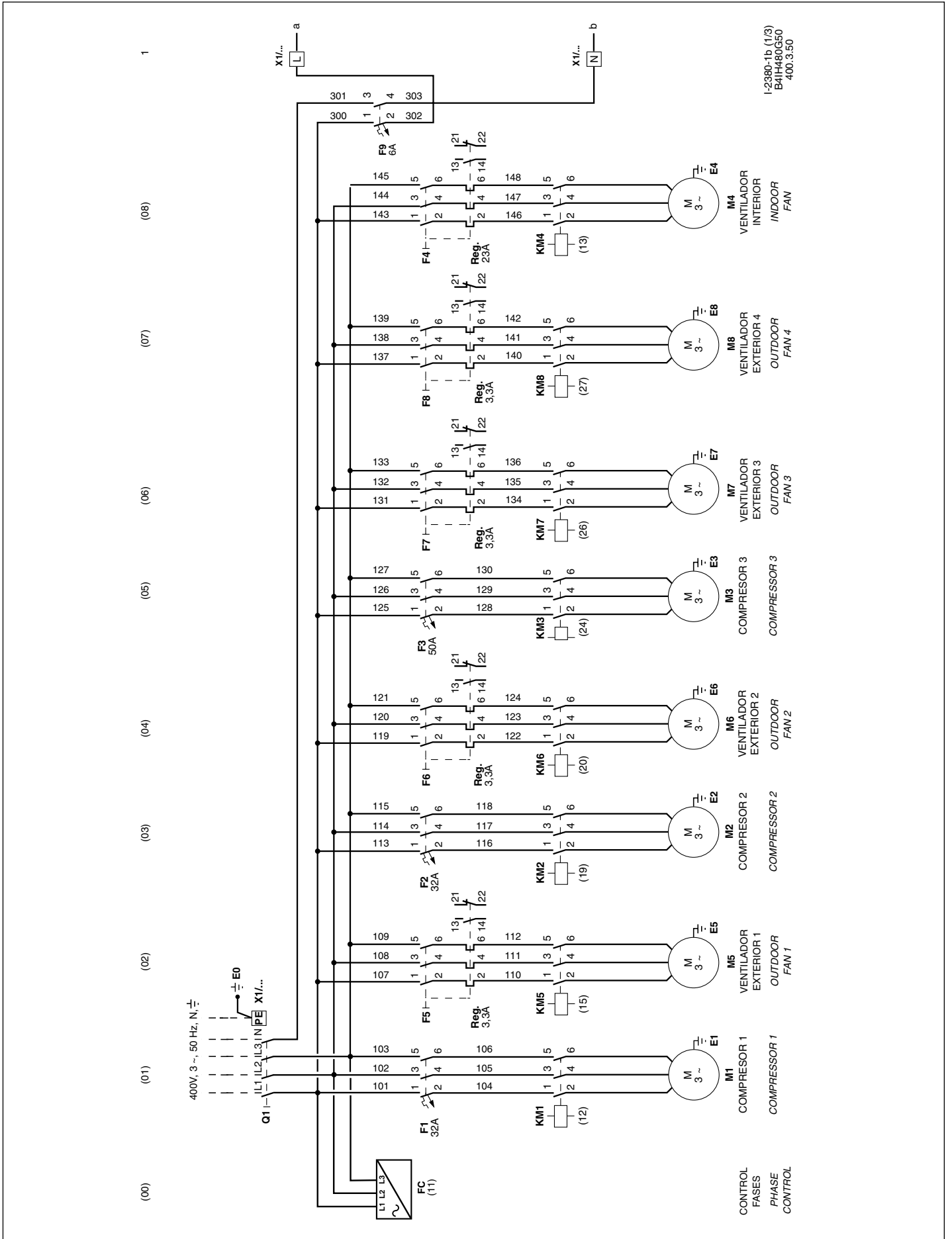
B4IH-360, 400.3.50 (2 of 3)



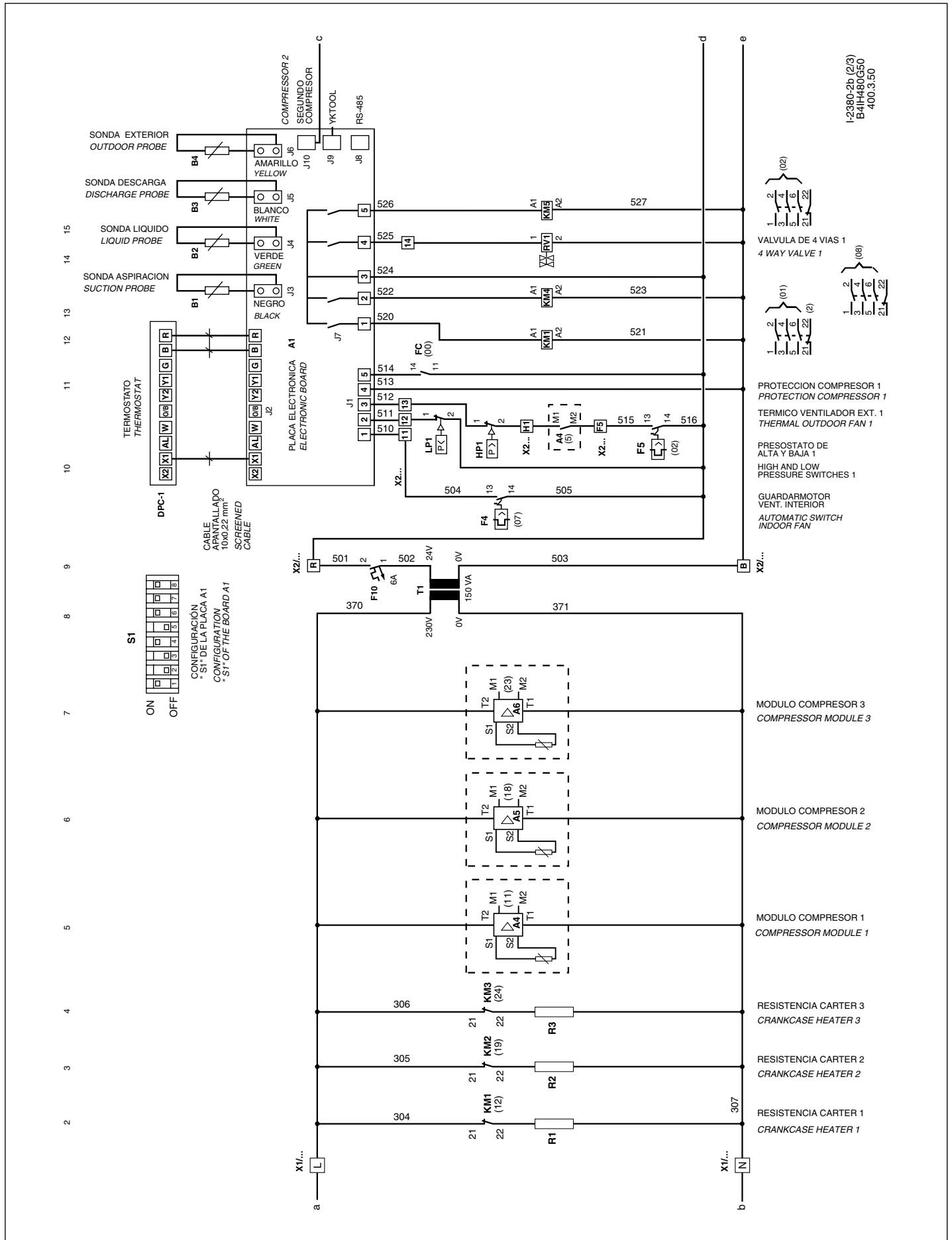
B4IH-360, 400.3.50 (3 of 3)



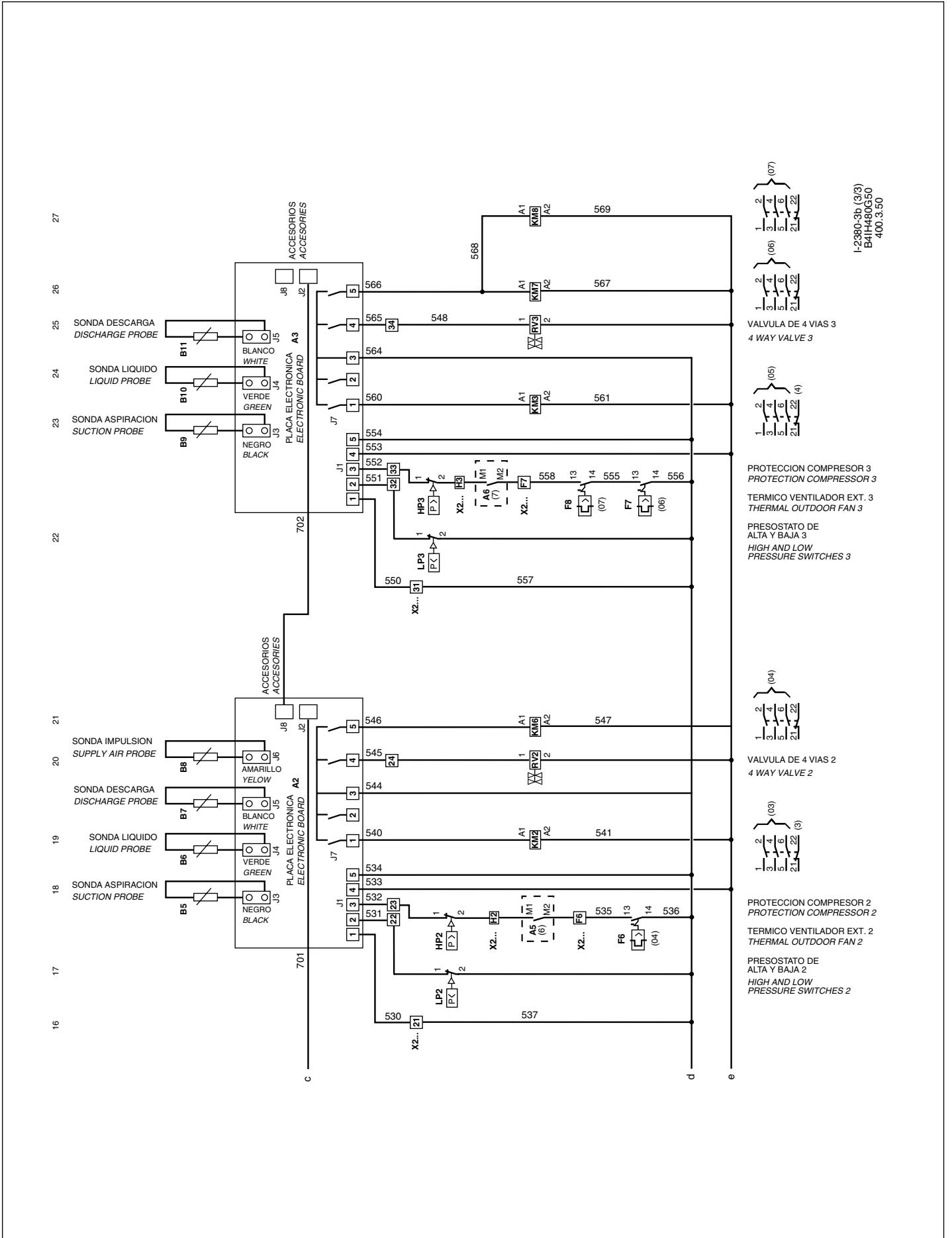
20.4.- Heat pump models B4IH-480, 400.3.50 (1 of 3)



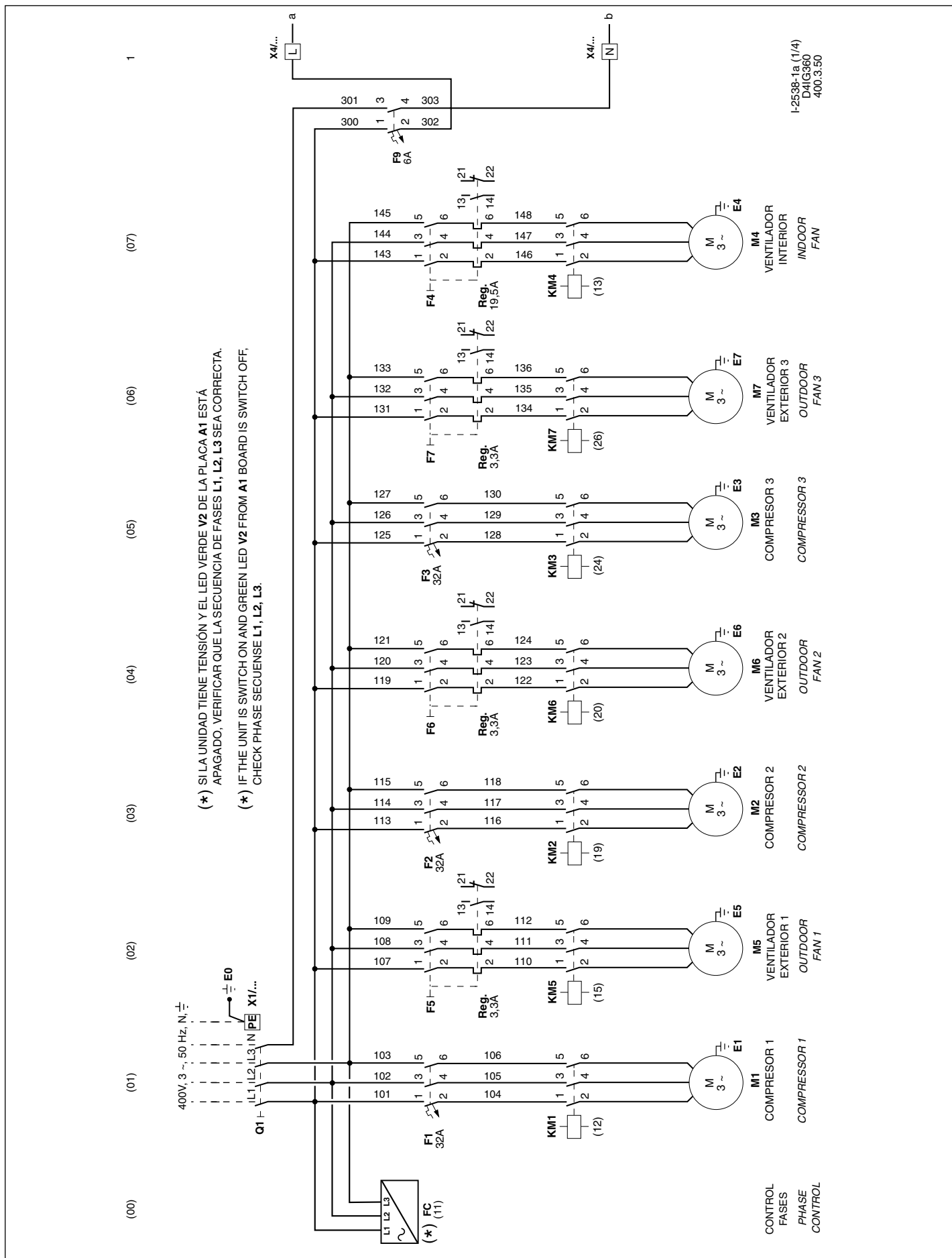
B4IH-480, 400.3.50 (2 of 3)



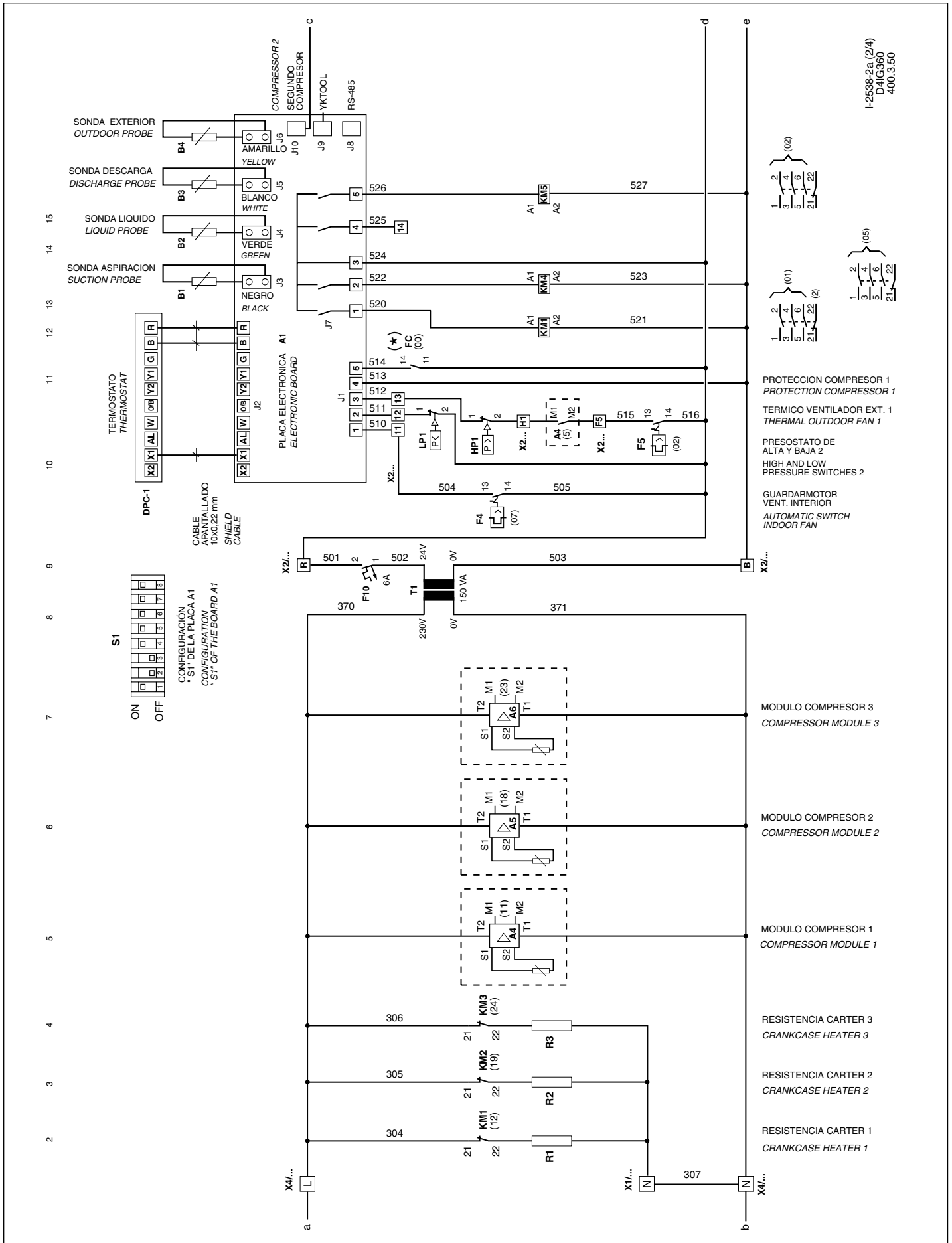
B4IH-480, 400.3.50 (3 of 3)



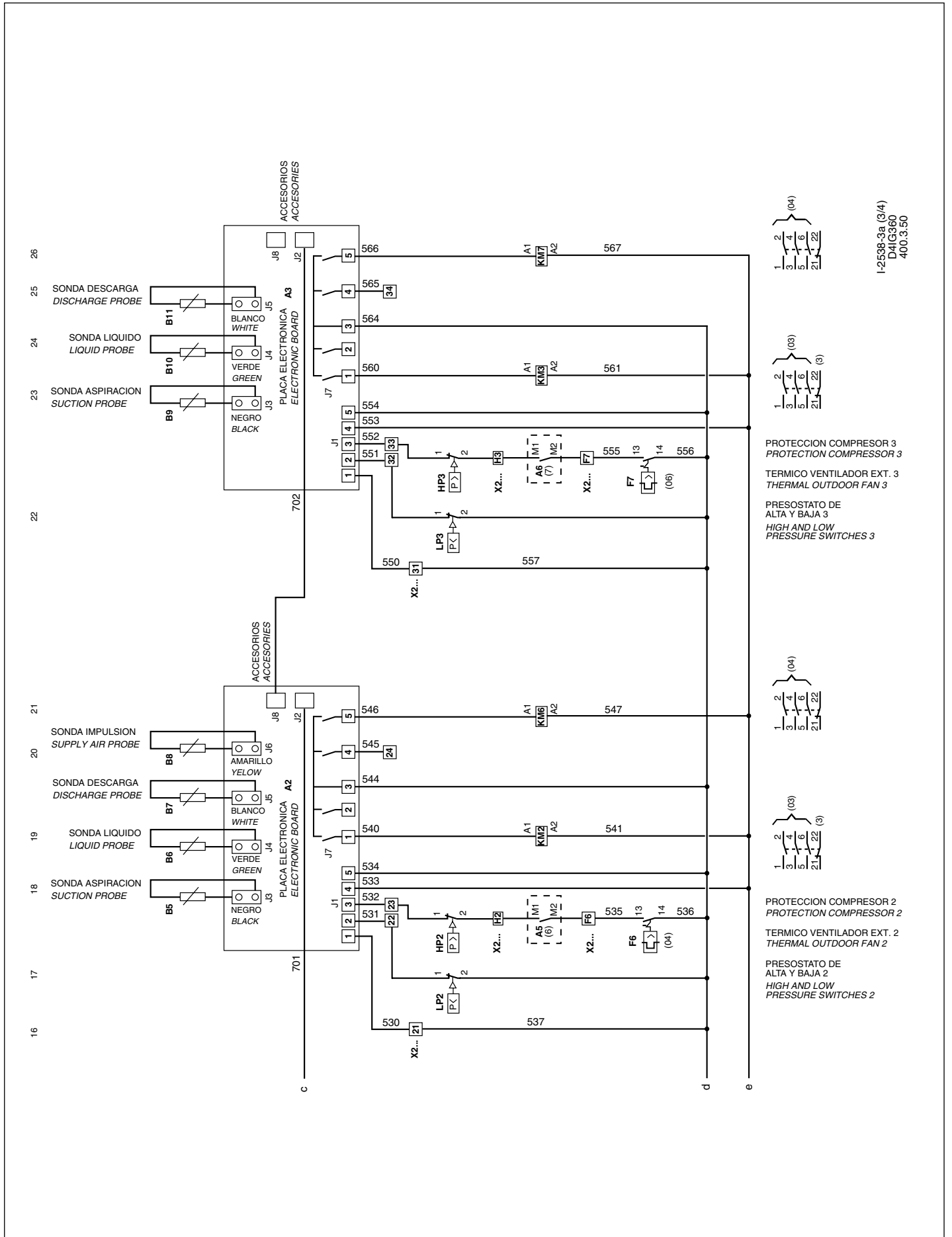
20.5.- Cool only + gas heating models D4IG-360, 400.3.50 (1 of 4)



D4IG-360, 400.3.50 (2 of 4)

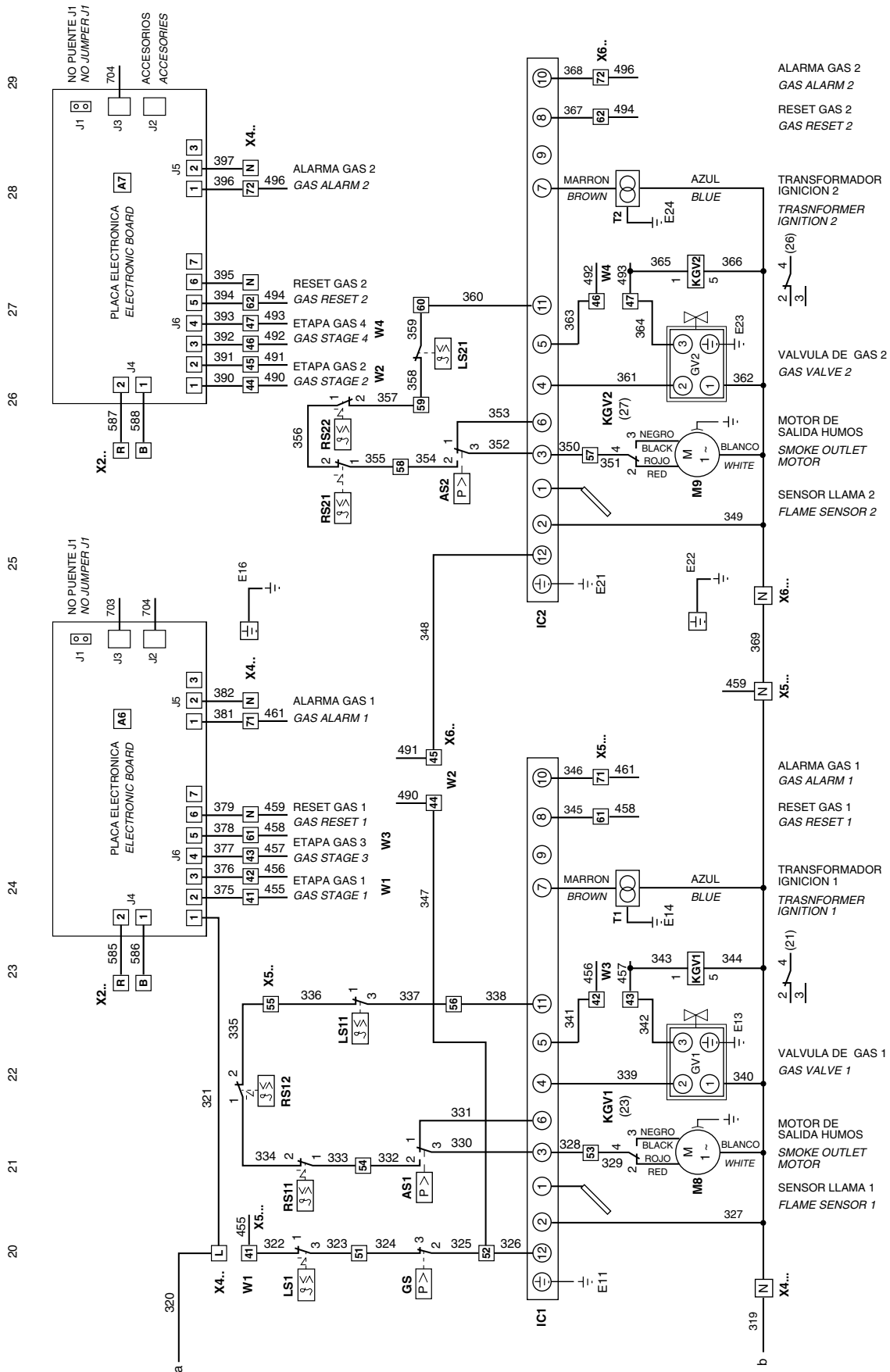


D4IG-360, 400.3.50 (3 of 4)



I-2538-3a (3/4)
D4IG360
400.3.50

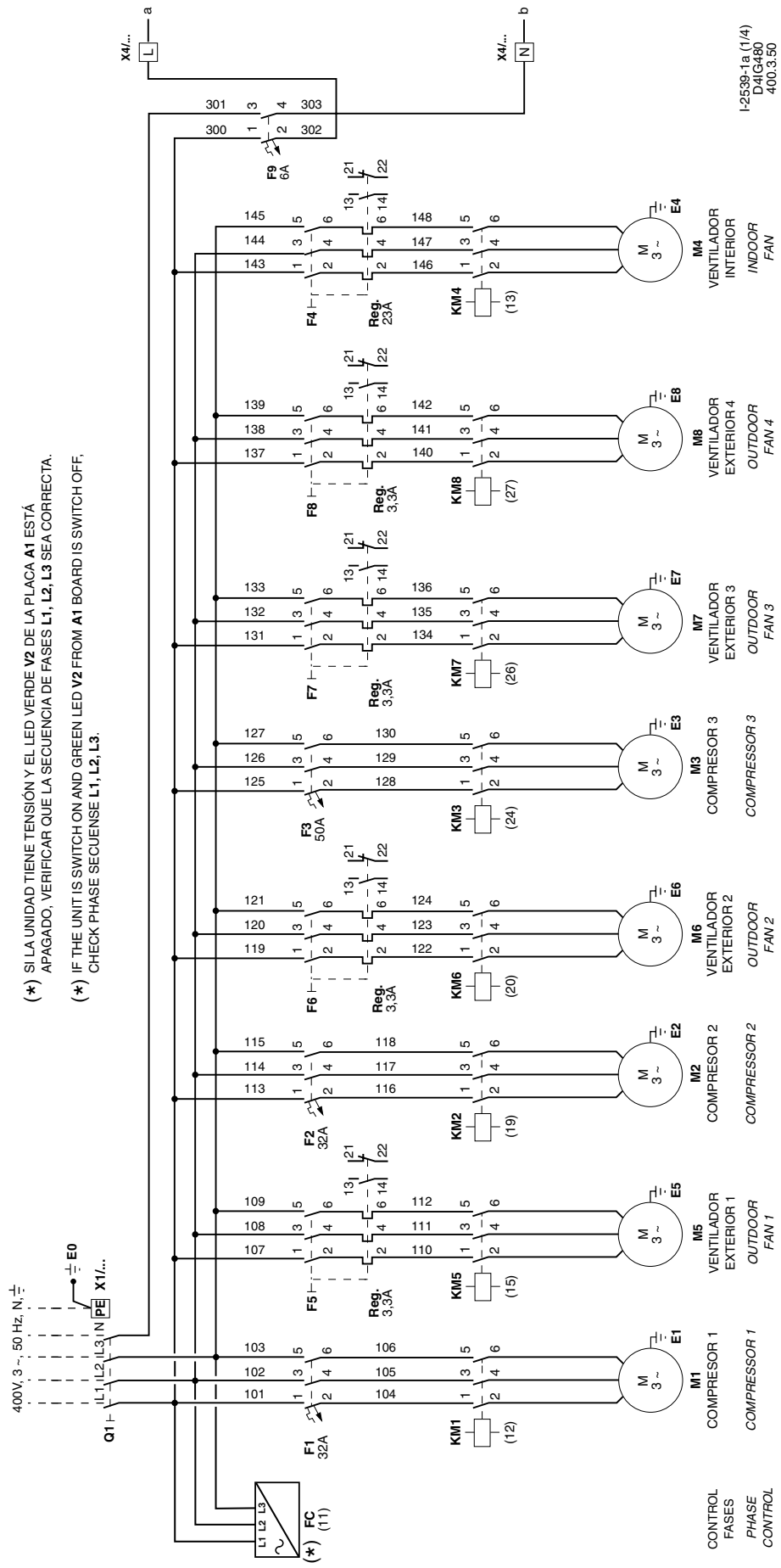
D4IG-360, 400.3.50 (4 of 4)



I-25384a (4/4)
D4IG360

20.5.- Cool only + gas heating models D4IG-480, 400.3.50 (1 of 4)

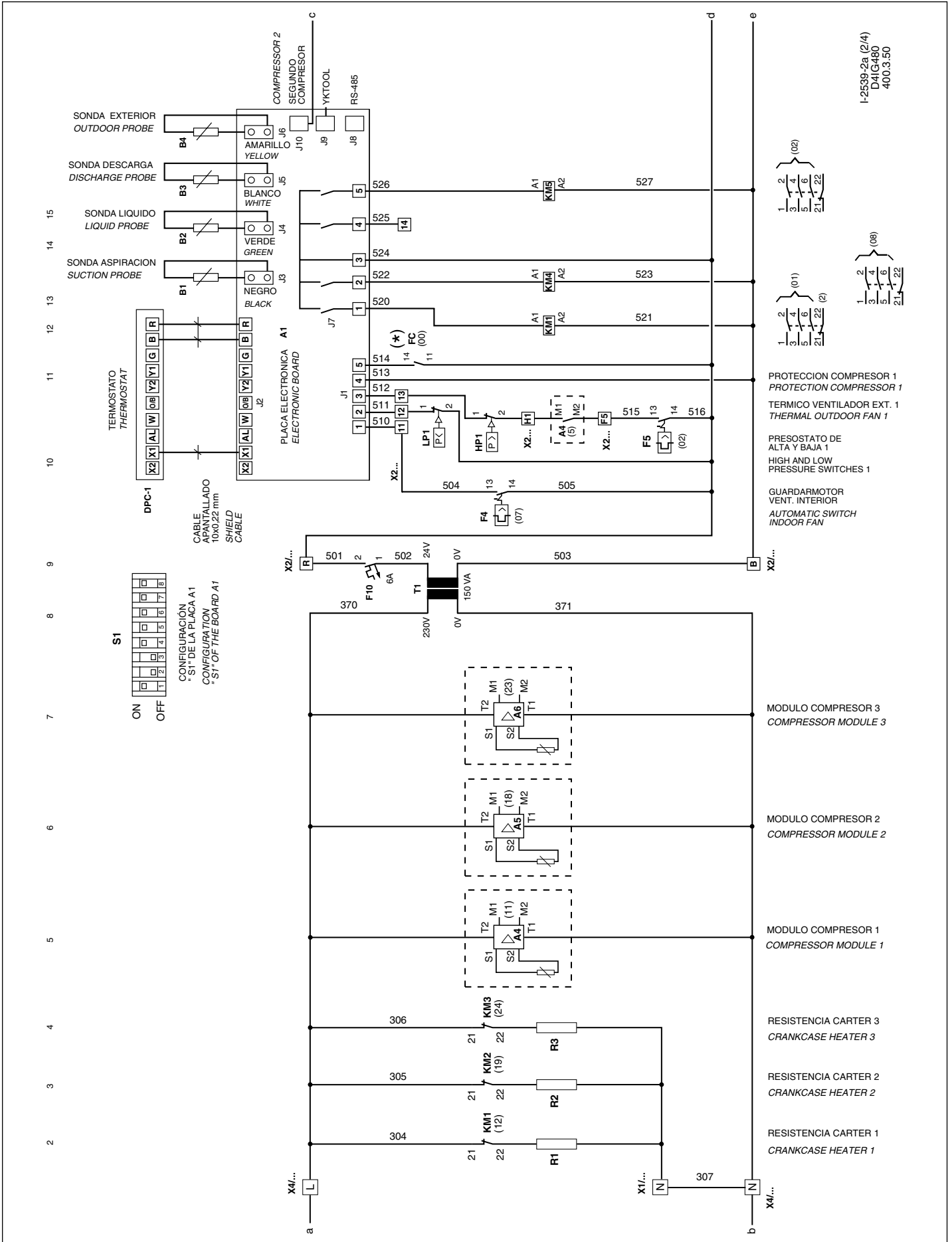
- (00)
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- (08)
- 1



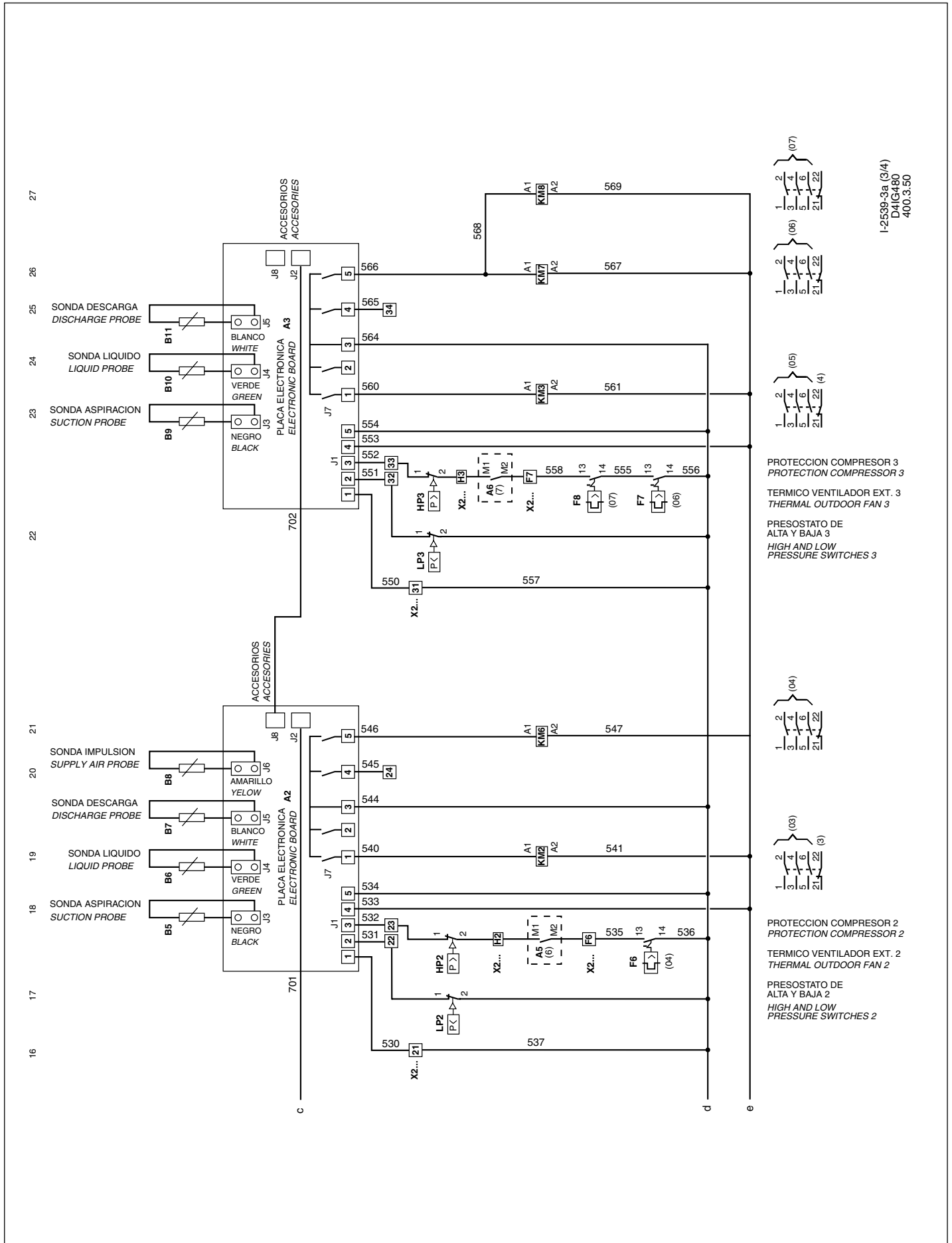
(*) SI LA UNIDAD TIENE TENSIÓN Y EL LED VERDE V2 DE LA PLACA A1 ESTÁ APAGADO, VERIFICAR QUE LA SECUENCIA DE FASES L1, L2, L3 SEA CORRECTA.
 (*) IF THE UNIT IS SWITCH ON AND GREEN LED V2 FROM A1 BOARD IS SWITCH OFF, CHECK PHASE SEQUENCE L1, L2, L3.

I-2539-1a (1/4)
D4IG480
400.3.50

D4IG-480, 400.3.50 (2 of 4)



D4IG-480, 400.3.50 (3 of 4)



Configuration of switches

Configuration of switches

The microswitches establish the following configurations:

Number	Status	Meaning
1 / 2	OFF/OFF	Ignore SW, programmed by communications
	ON/OFF	Time between defrosts 30'
3	OFF/ON	Time between defrosts 60'
	ON/ON	Time between defrosts 90'
3	ON	Crossed coils
3	OFF	Independent coils
4	ON	2' compressor delay
4	OFF	5' compressor delay
5	ON	Cool mode
5	OFF	Heat pump mode
6	ON	4-way valve active in heat
6	OFF	4-way valve active in cool
7	ON	Receives signal B from thermostat (active in heat)
7	OFF	Receives signal O from thermostat (active in cool)
8	ON	Fan operative during defrost
8	OFF	Fan inoperative during defrost

It is necessary to disconnect power supply to the board to read out the new configuration.

Failures (Lockouts)

Lockouts are indicated by the red LED on the YKLON board. If no lockouts exist, the LED remains off. When a lockout is generated, this LED produces two series of flashes with a constant sequence.

The first series indicates the affected circuit: one flash for the first compressor, two for the second, three for the third and four for the accessories. This is followed by a brief pause. The second series indicates the element or situation producing the lockout.

Lockout table (red LED)

Flashes	Failure
1	Discharge temperature surpassed.
1 2	High pressure switch, outdoor fan thermal switch or compressor module thermal switch.
6 3	Low pressure switch.
3 4	Indoor fan thermal switch.
5	Repeated start-ups in cool or suction temperature <-25° C.
1	Gas 1 control or heater 1 failure
2	Gas 2 control or heater 2 failure
3	Heater 3 stage failure
4	Heater 4 stage failure
5	Failure in economiser or hot water coil (outdoor impulse probe, water return)
6	Smoke detection or high temperature (accessories) or impulse temperature > 80°C

Incidence

Incidents are indicated by the green LED on the YKLON board. If no lockouts exist, this LED flashes at a constant frequency.

When an incident is generated, this LED produces three series of flashes with a constant sequence.

The first series indicates the affected circuit: one flash for the first compressor, two for the second, three for the third and four for miscellaneous incidences. This is followed by a brief pause. The second and third series indicate the direct cause of the incidence.

Incidence table

Flashes	Type	Incidence
1 1	1	Discharge probe open or short circuited
2 2	2	Liquid probe open or short circuited
3 3	3	Suction probe open or short circuited
6 2	1	Repeated defrosts
3 2	2	Temperature
1 1	1	Discharge temperature not recovered
2 2	2	Discharge temperature not recovered
3 3	3	Return probe open or short circuited
4 4	4	Outdoor probe open or short circuited
5 5	5	Water probe open or short circuited
2 1	1	Enthalpy probe error
2 2	2	Signal Y1 or Y2 without G
3 3	3	Thermostat
4 4	4	Signal W without G
4 4	4	Signal Y2 without Y1
4 3	1	Thermal switch of heater 1
2 2	2	Thermal switch of heater 2
3 3	3	Aux. heat
4 4	4	Thermal switch of heater 3
4 4	4	Thermal switch of heater 4
4 1	1	Water coil temp. not recovered
3 2	2	Temperature
4 4	4	Outdoor temp. too low
4 4	4	Water coil in antifreeze function
5 5	5	Impulse temp. over 55° C
5 5	5	Impulse temp. < 25° C with gas
5 1	1	Transceiver ID unknown
2 2	2	At least one accessory not found
3 3	3	Air quality demand
4 4	4	Dirty filters
5 5	5	Occupation sensor in unoccupied
6 6	6	Suction temperature < 0°C, economiser

Test button

- If pressed until the green LED goes on, certain timings are shortened and any detected failure is reset.

- If pressed until the red LED goes on, two accessories and optional probes connected to the board are identified.

- If there is communication between units and this button is pressed, the Neuron ID is sent by the LonWorks network.

DPC-1 thermostat

When a lockout is generated, and there is communication, the thermostat indicates, alternatively, the time and failure produced, in accordance with the lockout table of the unit.

Also indicates other incidences of the thermostat.

Type	Thermostat numbers	Incidence
Thermostat	9 1	Ambient probe open or short circuited
	9 2	Internal probe not calibrated
	9 3	Communication error
Thermostat	9 4	External entry of failure
	9 5	Digital probe S5 is not detected
	9 6	Digital probe S6 is not detected
	9 7	Digital probe S7 is not detected
	9 8	Digital probe S8 is not detected
	9 9	Digital probe S9 is not detected

I-2367c



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