AMD 3-168

REFRIGERATING AIR DRYER

EN | ***USER'S MAINTENANCE AND SPARE PARTS MANUAL***

7425MUM073_EN_2008-05

CE

Dear Customer,

thank you for choosing our product. In order to get the best performances out of this product, please read this manual carefully.

To avoid incorrect operation of the equipment and possible physical risk to the operator, please read and strictly follow the instructions contained in this manual.

Note, these instructions are in addition to the safety rules that apply in the country where the dryer is installed. Before packing for shipment each **AMD** series refrigerated air dryer undergoes a rigorous test to ensure the absence of any manufacturing faults and to demonstrate that the device can perform all the functions for which it has been designed.

Once the dryer has been properly installed according to the instructions in this manual, it will be ready for use without any further adjustment. The operation is fully automatic, and the maintenance is limited to few controls and some cleaning operations, as detailed in the following chapters.

This manual must be maintained available in any moment for future references and it has to be intended as inherent part of the relevant dryer.

Due to the continuous technical evolution, we reserve the right to introduce any necessary change without giving previous notice.

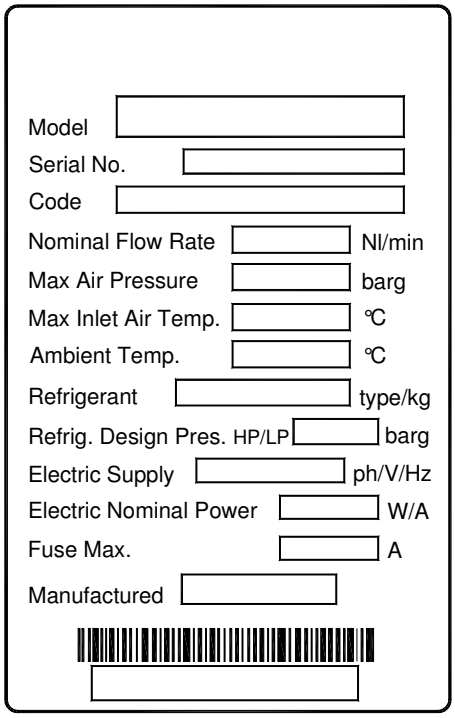
Should you experience any trouble, or for further information, please do not hesitate to contact us.

DATA NAMEPLATE

The data nameplate is located on the back of the dryer and shows all the primary data of the machine. Upon installation, fill in the table on the previous page with all the data shown on the data nameplate. This data should always be referred to when calling the manufacturer or distributor.

The removal or alteration of the data nameplate will void the warranty rights.

Model ⇨
Serial No. ⇨
Code ⇨
Nominal Flow Rate ⇨
Max Air Pressure ⇨
Max Inlet Air Temp. ⇨
Ambient Temp. ⇨
Refrigerant (Type and qty) ⇨
Refrig. Design Pres. HP/LP ⇨
Electric Supply ⇨
Electric Nominal Power ⇨
Fuse Max. ⇨
Manufactured ⇨



WARRANTY CONDITIONS

For 12 months from the installation date, but no longer than 14 months from the delivery date, the warranty covers eventual faulty parts, which will be repaired or replaced free of charge, except the travel, hotel and restaurant expenses of our engineer.

The warranty doesn't cover any responsibility for direct or indirect damages to persons, animals or equipment caused by improper usage or maintenance, and it's limited to manufacturing faults only.

The right to warranty repairs is subordinated to the strict compliance with the installation, use and maintenance instructions contained in this manual.

The warranty will be immediately voided in case of even small changes or alterations to the dryer. To require repairs during the warranty period, the data reported on the identification plate must be notified.

1. SAFETY RULES

1.1. DEFINITION OF THE CONVENTIONAL SIGNS USED IN THIS MANUAL


Carefully read instruction manual before attempting any service or maintenance procedures on the dryer.


Caution warning sign. Risk of danger or possibility of damage to equipment, if related text is not followed properly.


Electrical hazard. Warning message indicates practices or procedures that could result in personal injury or fatality if not followed correctly.


Danger hazard. Part or system under pressure.


Danger hazard. High temperature conditions exist during operation of system. Avoid contact until system or component has dissipated heat.


Danger hazard. Treated air is not suitable for breathing purposes; serious injury or fatality may result if precautions are not followed.


Danger hazard: In case of fire, use an approved fire extinguisher, water is not an acceptable means in cases of fire.


Danger hazard. Do not operate equipment with panels removed.


Maintenance or control operation to be performed by qualified personnel only [1].

Compressed air inlet connection point.

Compressed air outlet connection point.


Condensate drain connection point.


Operations which can be worked out by the operator of the machine, if qualified [1].

NOTE : Text to be taken into account, but not involving safety precautions.


In designing this unit a lot of care has been devoted to environmental protection:

- CFC free refrigerants
- CFC free insulation parts
- Energy saving design
- Limited acoustic emission
- Dryer and relevant packaging composed of recyclable materials

This symbol requests that the user heed environmental considerations and abide with suggestions annotated with this symbol.

1 Experienced and trained personnel acquainted with the relevant rules and laws, capable to perform the needed activities and to identify and avoid possible dangerous situations while handling, installing, using and servicing the machine.

1.2. WARNINGS

Compressed air is a highly hazardous energy source.
Never work on the dryer with pressure in the system.
Never point the compressed air or the condensate drain outlet hoses towards anybody.
The user is responsible for the proper installation of the dryer. Failure to follow instructions given in the “Installation” chapter will void the warranty. Improper installation can create dangerous situations for personnel and/or damages to the machine could occur.

Only qualified personnel are authorized to service electrically powered devices. Before attempting maintenance, the following conditions must be satisfied :

- Ensure that main power is off, machine is locked out, tagged for service and power cannot be restored during service operations.
- Ensure that valves are shut and the air circuit is at atmospheric pressure. De-pressurize the dryer.

These refrigerating air dryers contain R134a or R404A HFC type refrigerant fluid. Refer to the specific paragraph - maintenance operation on the refrigerating circuit.

Warranty does not apply to any unit damaged by accident, modification, misuse, negligence or misapplication. Unauthorized alterations will immediately void the warranty.

In case of fire, use an approved fire extinguisher, water is not an acceptable means in cases of electrical fire.

1.3. PROPER USE OF THE DRYER

This dryer has been designed, manufactured and tested for the purpose of separating the humidity normally contained in compressed air. Any other use has to be considered improper.

The Manufacturer will not be responsible for any problem arising from improper use; the user will bear responsibility for any resulting damage.
Moreover, the correct use requires the adherence to the installation instructions, specifically:

- Voltage and frequency of the mains.
- Pressure, temperature and flow-rate of the incoming air.
- Ambient temperature.

This dryer is supplied tested and fully assembled. The only operation left to the user is the connection to the plant in compliance with the instructions given in the following chapters.

The purpose of the machine is the separation of water and eventual oil particles present in compressed air. The dried air cannot be used for breathing purposes or for operations leading to direct contact with foodstuff.

This dryer is not suitable for the treatment of dirty air or of air containing solid particles.

1.4. INSTRUCTIONS FOR THE USE OF PRESSURE EQUIPMENT ACCORDING TO PED DIRECTIVE 97/23/EC

To ensure the safe operation of pressure equipments, the user must conform strictly to the above directive and the following :

1. The equipment must only be operated within the temperature and pressure limits stated on the manufacturer's data nameplate.
2. Welding on heat-exchanger is not recommended.
3. The equipment must not be stored in badly ventilated spaces, near a heat source or inflammable substances;
4. Vibration must be eliminated from the equipment to prevent fatigue failure.
5. Automatic condensate drains should be checked for operation every day to prevent a build up of condensate in the pressure equipment.
6. The maximum working pressure stated on the manufacturer's data nameplate must not be exceeded. Prior to use, the user must fit safety / pressure relief devices.
7. All documentation supplied with the equipment (manual, declaration of conformity etc.) must be kept for future reference.
8. Do not apply weights or external loads on the vessel or its connecting piping.

TAMPERING, MODIFICATION AND IMPROPER USE OF THE PRESSURE EQUIPMENT ARE FORBIDDEN. Users of the equipment must comply with all local and national pressure equipment legislation in the country of installation.

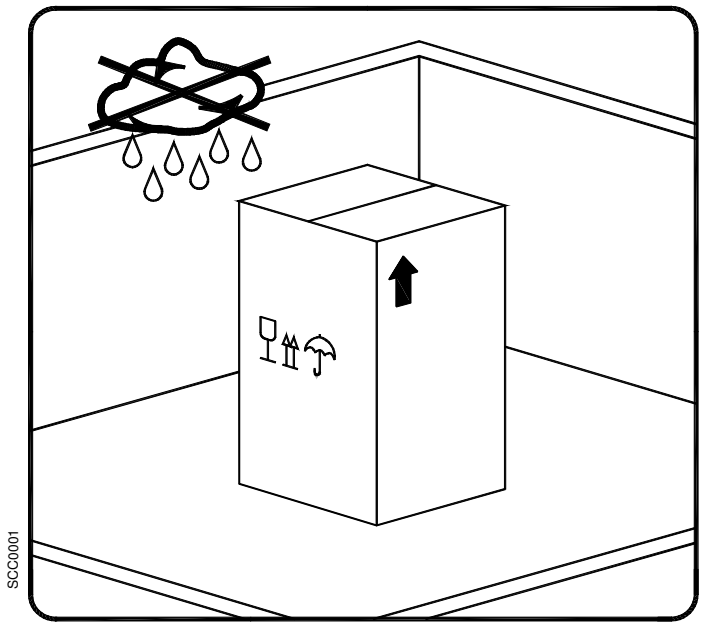
2. INSTALLATION

2.1. TRANSPORT

Check for visible loss or damage, if no visible damage is found place the unit near to the installation point and unpack the contents.

- Always keep the dryer in the upright vertical position. Damage to components could result if unit is laid on its side or if placed upside down.
- Store machine in a clean, dry environment, do not expose to severe weather environments.
- Handle with care. Heavy blows could cause irreparable damage.

2.2. STORANGE



Even when packaged, keep the machine protected from severity of the weather.

Keep the dryer in vertical position, also when stored. Turning it upside down some parts could be irreparably damaged.

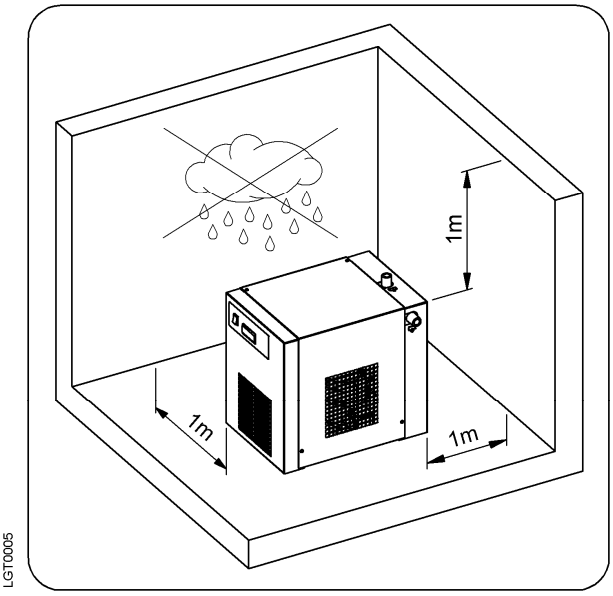
If not in use, the dryer can be stored in its packaging in a dust free and protected site at a maximum temperature of 50 °C, and a specific humidity not exceeding 90%. Should the stocking time exceed 12 months, please contact the manufacturer.

The packaging materials are recyclable. Dispose of material in compliance with the rules and regulations in force in the destination country.

2.3. INSTALLATION SITE

Failure to install dryer in the proper ambient conditions will affect the dryer's ability to condense refrigerant gas. This can cause higher loads on the compressor, loss of dryer efficiency and performance, overheated condenser fan motors, electrical component failure and dryer failure due to the following: compressor loss, fan motor failure and electrical component failure. Failures of this type will affect warranty considerations.
Do not install dryer in an environment of corrosive chemicals, explosive gasses, poisonous gasses; steam heat, areas of high ambient conditions or extreme dust and dirt.

Don't use water to extinguish fire on the dryer on in the surrounding area.

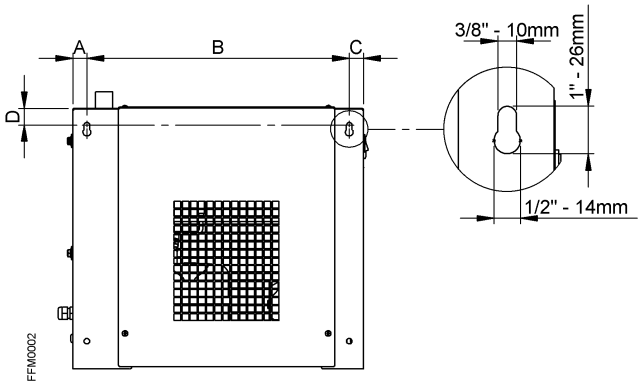


Minimal installation requirements :

- Select a clean room dry, free from dust, and protected from atmospheric disturbances.
- The supporting area must be smooth, horizontal and able to hold the weight of the dryer.
- Minimum ambient temperature +1 °C.
- Maximum ambient temperature +45°C.
- Leave at least 1 meter of free space on every side of the drier for ventilation purposes and maintenance operations.

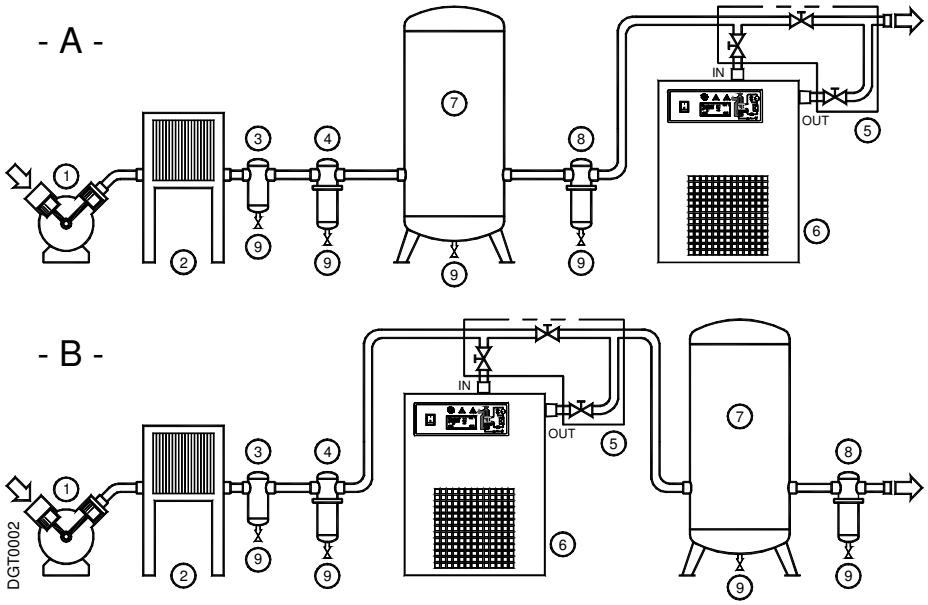
The dryer doesn't require to be fixed to the supporting surface. The dryer needs to be fixed to the supporting surface only with particular installation procedures (dryer on brakets, hanging units, etc.)

Dryer hanging (AMD 3-32 only):



Dryer	A [mm]	B [mm]	C [mm]	D [mm]
AMD 3	20	305	20	30
AMD 6-18	25	465	25	30
AMD 25	40	360	20	30
AMD 32	40	385	20	30

2.4. INSTALLATION LAYOUT



1. Air compressor
2. Final refrigerator
3. Condensate separator
4. Pre-Filter (min. 5 micron)
5. By-pass group
6. Dryer
7. Compressed air tank
8. Final filter
9. Condensate drain

In case of heavily polluted inlet air (ISO 8573.1 class 3.-.3 or worse quality), we recommend the additional installation of a pre-filter (5 micron minimum) to prevent a clogging of the heat exchanger.

Type A installation is suggested when the compressor operates at reduced intermittence and the total consumption equals the compressor flow rate.

Type B installation is suggested when the air consumption can consistently change with peak values highly exceeding the flow rate of the compressors. The capacity of the tank must be sized in order to compensate eventual instantaneous demanding conditions (peak air consumption).

2.5. CORRECTION FACTORS

Correction factor for operating pressure changes :										
Inlet air pressure barg	4	5	6	7	8	10	12	14	15	16
Factor (F1)	0.77	0.86	0.93	1.00	1.05	1.14	1.21	1.27	1.30	1.33

Correction factor for ambient temperature changes (Air-Cooled):					
Ambient temperature ºC	≤ 25	30	35	40	45
Factor (F2)	1.00	0.98	0.95	0.88	0.80

Correction factor for inlet air temperature changes:						
Air temperature ºC	≤ 30	35	40	45	50	55
Factor (F3)	1.15	1.00	0.84	0.71	0.59	0.50

Correction factor for DewPoint changes:				
DewPoint ºC	3	5	7	10
Factor (F4)	0.91	1.00	1.10	1.26

How to find the air flow capacity:

Air flow capacity = Nominal duty x Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)

Example:
An **AMD 18** has a nominal duty of **1800 l/min**. What is the maximum allowable flow through the dryer under the following operating conditions:

- Inlet air pressure = 7 barg
- Ambient temperature = 35°C
- Inlet air temperature = 40°C
- Pressure DewPoint = 3°C
- Factor (F1) = 1.00
- Factor (F2) = 0.95
- Factor (F3) = 0.84
- Factor (F4) = 0.91

Each item of data has a corresponding numerical factor which multiplied by the design air flow is as follows:

Air flow capacity = 108 x 1.00 x 0.95 x 0.84 x 0.91 = 1307 l/min

1307 l/min This is the maximum flow rate that the dryer can accept under these operating conditions.

How to select a suitable dryer for a given duty:

$$\textbf{Minimum std. air flow rate} = \frac{\textbf{Design air flow}}{\textbf{Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)}}$$

Example:
With the following operating parameters:

- Design air flow = 1100 l/min
- Inlet air pressure = 7 barg
- Ambient temperature = 35°C
- Inlet air temperature = 40°C
- Pressure DewPoint = 3°C
- Factor (F1) = 1.00
- Factor (F2) = 0.95
- Factor (F3) = 0.84
- Factor (F4) = 0.91

In order to select the correct dryer model the required flow rate is to be divided by the correction factors relating to above mentioned parameters:

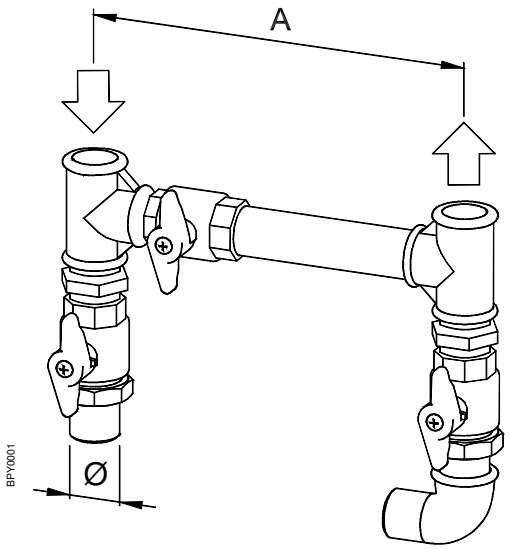
$$\textbf{Minimum std. air flow rate} = \frac{\textbf{1100}}{\textbf{1.00 x 0.95 x 0.84 x 0.91}} = \textbf{1515 l/min}$$

Therefore the model suitable for the conditions above is **AMD 18** (**1800 l/min** - nominal duty).

2.6. CONNECTION TO THE COMPRESSED AIR SYSTEM

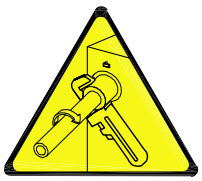
Operations to be performed by qualified personnel. Never operate with plants under pressure.
The user is responsible to ensure that the dryer will never be operated with pressure exceeding the nominal values.
Eventual over-pressure could be dangerous both for the operator and the machine.

The temperature and the amount of air entering the dryer must comply with the limits reported on the data plate. In case of treatment of air at particularly high temperatures, the installation of a final refrigerator could result necessary. The cross section of the connecting piping, which must be free from dust, rust, chips and other impurities, must be consistent with the flow-rate of the dryer.
In order to facilitate the maintenance operations, a by-pass group has been installed, as shown in the following illustration.



Dryer	Ø [BSP-F]	A [mm]	By-Pass Code
AMD 3	G 3/8” BSP-F	40	2240GBP019
AMD 6-18	G 1/2” BSP-F	210	2240GBP021
AMD 25	G 1” BSP-F	205	2240GBP022
AMD 32-52	G 1.1/4” BSP-F	205	2240GBP023
AMD 61-75	G 1.1/2” BSP-F	235	2240GBP024
AMD 105-130	G 2” BSP-F	345	2240GBP025
AMD 168	G 2.1/2” BSP-F	410	2240GBP026

In realising the dryer, particular measures have been taken in order to limit the vibration which could occur during the operation. Therefore we recommend to use connecting pipes able to insulate the dryer from possible vibrations originating from the line (flexible hoses, vibration damping fittings, etc.).



CAUTION:

PIPING THE DRYER, INLET/OUTLET CONNECTIONS MUST BE SUPPORTED AS SHOW IN THE DIAGRAM.
FAILING WILL RESULT IN DAMAGE

2.7. ELECTRICAL CONNECTIONS

Qualified personnel should carry out connecting unit to the main power. Be sure to check the local codes in your area.

Before connecting the unit to the electrical supply, verify the data nameplate for the proper electrical information. Voltage tolerance is +/- 5%.
AMD 3-75 dryers are supplied with a standard VDE 16A - Shucko power cord and plug assembly (two poles and a ground). **AMD 105-168** dryers are supplied with a junction box.
Be sure to provide the proper fuses or breakers based on the data tag information located on the back of the unit. The main power receptacle must be protected with a **thermal overload/differential relay** (IΔn=0.03A), rated to the power consumption of the dryer (refer to data nameplate for nominal values). The power supply cord must meet or exceed ratings for the total amp draw of the unit.

Connect to a properly grounded outlet. Improper connection of the equipment-grounding conductor can result in risk of electric shock.

Do not use adapters on the plug receptacle - if it does not fit the outlet, have a proper outlet installed by a qualified electrician.

2.8. CONDENSATE DRAIN

The condensate is discharge at the system pressure.
Drain line should be secured
Never point the condensate drain line towards anybody.

The dryer comes with a flexible plastic drain tube.
The condensate drain occurs through a solenoid valve protected with a mechanical strainer.
The condensate coming from the separator is previously filtered, then discharged.
The solenoid valve coil is operated by electronic instrument (dryer controller).
If an electronic drainer is installed, the intervention times are determined by the internal capacitive sensor (see specific paragraph).
The drainers cannot be connected to pressurized systems.

Don't dispose the condensate in the environment.
The condensate collected in the dryer contains oil particles released in the air by the compressor.
Dispose the condensate in compliance with the local rules.
We suggest to install a water-oil separator where to convey all the condensate drain coming from compressors, dryers, tanks, filters, etc.

3. START UP

3.1. PRELIMINARY OPERATION

Verify that the operating parameters match with the nominal values reported on the data plate of the dryer (voltage, frequency, air pressure, air temperature, ambient temperature, etc.).

Before delivery, each dryer is submitted to accurate tests simulating real operating conditions. Nevertheless, the unit could be damaged during transportation. We therefore suggest to check the integrity of the dryer upon arrival and to keep it under control during the first hours of operation.

The start-up must be performed by qualified personnel.
It's mandatory that the engineer in charge adopt safety operational conditions complying with the local safety and accident prevention requirements.

The same engineer will be responsible for the proper and safe operation of the dryer.
Never operate the dryer if the panels are not in place.

3.2. FIRST START-UP

This procedure should be followed on first start-up, after periods of extended shutdown or following maintenance procedures.
Qualified personnel must perform the start-up.

Sequence of operations (refer to paragraph 5.1 Control Panel) :

- Ensure that all the steps of the “Installation” chapter have been observed.
- Ensure that the connection to the compressed air system is correct and that the piping is suitably fixed and supported.
- Ensure that the condensate drain pipe is properly fastened and connected to a collection system or container.
- Ensure that the by-pass system (if installed) is open and the dryer is isolated
- Ensure that the manual valve of the condensate drain circuit is open.
- Remove any packaging and other material which could obstruct the area around the dryer.
- Activate the mains switch.
- Turn on the main switch - pos. 1 on the control panel.
- Ensure that the DMC15 electronic instrument is ON.
- Ensure the consumption matches with the values of the data plate.
- **Ensure the fan work properly - wait for its first interventions.**
- Allow the dryer temperature to stabilise at the pre-set value.
- Slowly open the air inlet valve.
- Slowly open the air outlet valve.
- Slowly close the central by-pass valve of the system (if installed).
- Check the piping for air leakage.
- Ensure the drain is regularly cycling - wait for its first interventions.

3.3. START-UP AND SHUT DOWN

Start-up (refer to paragraph 5.1 Control Panel) :

- Check the condenser for cleanliness.
- Verify that the system is powered.
- Turn on the main switch - pos. 1 on the control panel.
- Ensure that DMC15 electronic instrument is ON.
- Wait a few minutes; verify that the DewPoint temperature displayed on DMC15 electronic instrument is correct and that the condensate is regularly drained.
- Switch on the air compressor.

Shut down (refer to paragraph 5.1 Control Panel) :

- Verify that the DewPoint temperature displayed on DMC15 electronic instrument is correct.
- Switch OFF the air compressor.
- After a few minutes, switch off the main switch on the control panel of the dryer (pos. 1).

NOTE : A DewPoint included in the green operating area of the electronic controller is correct according to the possible working conditions (flow-rate, temperature of the incoming air, ambient temperature, etc.)

During the operation, the refrigerating compressor will run continuously. The dryer must remain on during the full usage period of the compressed air, even if the air compressor works intermittently.

The number of starts must be no more than 6 per hour. The dryer must stop running for at least 5 minutes before being started up again.
The user is responsible for compliance with these rules. Frequent starts may cause irreparable damage.

4. TECHNICAL SPECIFICATIONS

4.1. TECHNICAL SPECIFICATIONS AMD 3-25 / 230V / 50-60 HZ

		Air-Cooled					
AMD MODEL		**3**	**6**	**9**	**12**	**18**	**25**
Air flow rate at nominal condition [1]	[l/min]	350	600	950	1200	1800	2500
	[m^3/h]	21	36	57	72	108	150
	[scfm]	12	21	34	42	64	88
Pressure DewPoint at nominal condition [1]	[°C]	+5 equal to 0.85 g/m^3 di H_2O					
Nominal ambient temperature (max.)	[°C]	+25 (+45)					
Min. ambient temperature	[°C]	+1					
Nominal inlet air temperature (max.)	[°C]	+35 (+55)					
Nominal inlet air pressure	[barg]	7					
Max. inlet air pressure	[barg]	16					14
Air pressure drop - □p	[bar]	0.15	0.04	0.09	0.14	0.32	0.24
Inlet - Outlet connections	[BSP-F]	G 3/8”	G 1/2”				G 1”
Refrigerant type		R134.a					
Refrigerant quantity [2]	[kg]	0.20		0.22	0.25	0.30	0.33
Cooling air flow	[m^3/h]	200			300		
Standard Power Supply[2]	[Ph/V/Hz]	1/230/50-60					
Nominal electric absorption 50Hz (60Hz)	[W]	150 (180)	160 (190)	190 (210)	210 (250)	290 (330)	390 (460)
	[A]	1.1 (1.1)	1.1 (1.2)	1.3 (1.3)	1.4 (1.5)	1.9 (2.0)	2.4 (2.5)
Max. electric absorption 50Hz (60Hz)	[W]	170 (220)	200 (250)	270 (290)	280 (340)	390 (460)	610 (670)
	[A]	1.2 (1.3)	1.2 (1.4)	1.5 (1.6)	1.7 (1.8)	2.2 (2.5)	3.3 (3.4)
Max. level noise at 1 m	[dbA]	< 70					
Weight	[kg]	21	25	26	28	32	34

[1] The nominal condition refers to an ambient temperature of +25 °C with inlet air at 7 barg and +35 °C.

[2] Check the data shown on the identification plate.

		Air-Cooled							
AMD MODEL		**32**	**43**	**52**	**61**	**75**	**105**	**130**	**168**
Air flow rate at nominal condition [1]	[l/min]	3200	4300	5200	6100	7500	10500	13000	16800
	[m^3/h]	192	258	312	366	450	630	780	1008
	[scfm]	113	152	184	216	265	371	459	594
Pressure DewPoint at nominal condition [1]	[°C]	+5 equal to 0.85 g/m^3 di H_2O							
Nominal ambient temperature (max.)	[°C]	+25 (+45)							
Min. ambient temperature	[°C]	+1							
Nominal inlet air temperature (max.)	[°C]	+35 (+55)							
Nominal inlet air pressure	[barg]	7							
Max. inlet air pressure	[barg]	14							
Air pressure drop - □p	[bar]	0.16	0.24	0.34	0.19	0.25	0.14	0.20	0.15
Inlet - Outlet connections	[BSP-F]	G 1.1/4”			G 1.1/2”		G 2”		G 2.1/2”
Refrigerant type		R134.a	R404A						
Refrigerant quantity [2]	[kg]	0.44	0.40	0.42	0.57	0.70	1.10	1.30	1.90
Cooling air flow	[m^3/h]	350	380	600	400	450	1900		
Standard Power Supply[2]	[Ph/V/Hz]	1/230/50							
Nominal electric absorption	[W]	480	750	930	950	740	940	1550	1590
	[A]	2.9	3.3	4.6	4.7	3.6	4.3	7.4	7.5
Max. electric absorption	[W]	700	1150	1350	1400	1050	1350	2100	2350
	[A]	3.8	5.4	6.6	6.8	4.8	6.3	9.8	11.3
Max. level noise at 1 m	[dbA]	< 70							
Weight	[kg]	39	40	41	54	56	94	96	144

[1] The nominal condition refers to an ambient temperature of +25 °C with inlet air at 7 barg and +35 °C.

[2] Check the data shown on the identification plate.

		Air-Cooled							
AMD MODEL		**32E**	**43E**	**52E**	**61E**	**75E**	**105E**	**130E**	**168E**
Air flow rate at nominal condition [1]	[l/min]	3200	4300	5200	6100	7500	10500	13000	16800
	[m^3/h]	192	258	312	366	450	630	780	1008
	[scfm]	113	152	184	216	265	371	459	594
Pressure DewPoint at nominal condition [1]	[°C]	+5 equal to 0.85 g/m^3 di H_2O							
Nominal ambient temperature (max.)	[°C]	+25 (+45)							
Min. ambient temperature	[°C]	+1							
Nominal inlet air temperature (max.)	[°C]	+35 (+55)							
Nominal inlet air pressure	[barg]	7							
Max. inlet air pressure	[barg]	14							
Air pressure drop - □p	[bar]	0.16	0.24	0.34	0.19	0.25	0.14	0.20	0.15
Inlet - Outlet connections	[BSP-F]	G 1.1/4”			G 1.1/2”		G 2”		G 2.1/2”
Refrigerant type		R134.a	R404A						
Refrigerant quantity [2]	[kg]	0.44	0.45	0.47	0.68	0.85	1.20	1.40	2.10
Cooling air flow	[m^3/h]	350	380	600		900	2400		2600
Standard Power Supply[2]	[Ph/V/Hz]	1/230/60							
Nominal electric absorption	[W]	630	970	1000	1050	910	1150	2070	2250
	[A]	3.8	4.4	4.5	4.6	4.1	5.1	9.6	10.3
Max. electric absorption	[W]	720	1350	1400	1460	1260	1550	2890	2950
	[A]	4.3	5.9	6.2	6.6	5.7	7.2	13.2	14.5
Max. level noise at 1 m	[dbA]	< 70							
Weight	[kg]	39	42	45	54	56	94	96	144

[1] The nominal condition refers to an ambient temperature of +25 °C with inlet air at 7 barg and +35 °C.

[2] Check the data shown on the identification plate.

4.4. TECHNICAL SPECIFICATIONS AMD 3P-25P / 115V / 60 HZ

		Air-Cooled					
AMD MODEL		**3P**	**6P**	**9P**	**12P**	**18P**	**25P**
Air flow rate at nominal condition [1]	[l/min]	350	600	950	1200	1800	2500
	[m^3/h]	21	36	57	72	108	150
	[scfm]	12	21	34	42	64	88
Pressure DewPoint at nominal condition [1]	[°C]	+5 equal to 0.85 g/m^3 di H_2O					
Nominal ambient temperature (max.)	[°C]	+25 (+45)					
Min. ambient temperature	[°C]	+1					
Nominal inlet air temperature (max.)	[°C]	+35 (+55)					
Nominal inlet air pressure	[barg]	7					
Max. inlet air pressure	[barg]	16					14
Air pressure drop - □p	[bar]	0.15	0.04	0.09	0.14	0.32	0.24
Inlet - Outlet connections	[BSP-F]	G 3/8”	G 1/2”				G 1”
Refrigerant type		R134.a					
Refrigerant quantity [2]	[kg]	0.20	0.21	0.22	0.25	0.30	0.33
Cooling air flow	[m^3/h]	200			300		
Standard Power Supply[2]	[Ph/V/Hz]	1/115/60					
Nominal electric absorption	[W]	180	190	220	280	420	490
	[A]	2.2	2.4	2.6	3.0	3.5	5.1
Max. electric absorption	[W]	220	240	280	320	460	650
	[A]	2.4	2.8	3.1	3.5	3.9	6.0
Max. level noise at 1 m	[dbA]	< 70					
Weight	[kg]	21	25	26	28	32	34

[1] The nominal condition refers to an ambient temperature of +25°C with inlet air at 7 barg and +35 °C.

[2] Check the data shown on the identification plate.

		Air-Cooled				
AMD MODEL		**32P**	**43P**	**52P**	**61P**	**75P**
Air flow rate at nominal condition [1]	[l/min]	3200	4300	5200	6100	7500
	[m^3/h]	192	258	312	366	450
	[scfm]	113	152	184	216	265
Pressure DewPoint at nominal condition [1]	[°C]	+5 equal to 0.85 g/m^3 di H_2O				
Nominal ambient temperature (max.)	[°C]	+25 (+45)				
Min. ambient temperature	[°C]	+1				
Nominal inlet air temperature (max.)	[°C]	+35 (+55)				
Nominal inlet air pressure	[barg]	7				
Max. inlet air pressure	[barg]	14				
Air pressure drop - □p	[bar]	0.16	0.24	0.34	0.19	0.25
Inlet - Outlet connections	[BSP-F]	G 1.1/4”			G 1.1/2”	
Refrigerant type		R134.a	R404A			
Refrigerant quantity [2]	[kg]	0.44	0.45	0.47	0.68	0.85
Cooling air flow	[m^3/h]	350	380	600		900
Standard Power Supply[2]	[Ph/V/Hz]	1/115/60				
Nominal electric absorption	[W]	630	970	1000	1050	910
	[A]	6.5	8.8	9.0	9.2	8.2
Max. electric absorption	[W]	720	1350	1400	1460	1260
	[A]	7.6	11.8	12.4	13.2	11.4
Max. level noise at 1 m	[dbA]	< 70				
Weight	[kg]	39	42	45	54	56

[1] The nominal condition refers to an ambient temperature of +25°C with inlet air at 7 barg and +35 °C.

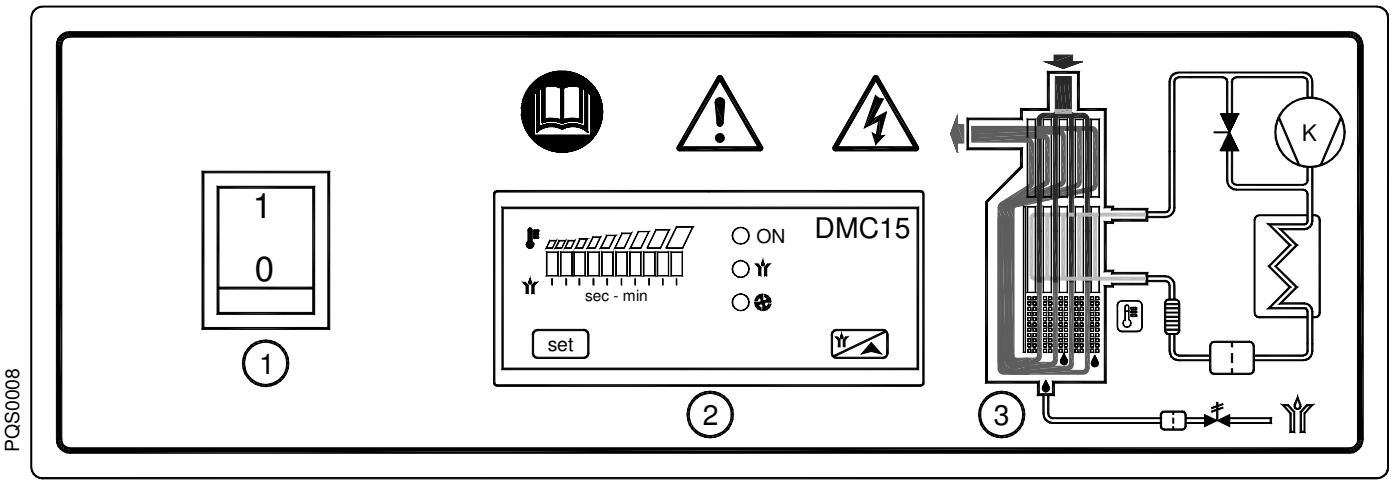
[2] Check the data shown on the identification plate.

5. DESCRIZIONE TECNICA

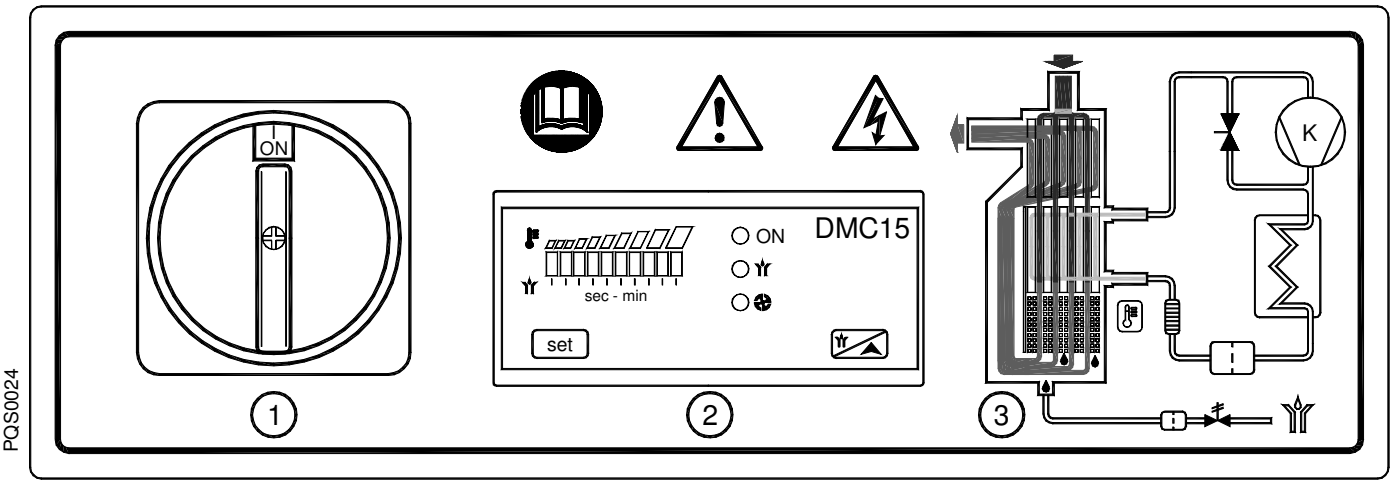
5.1. CONTROL PANEL

The control panel illustrated below is the only dryer-operator interface.

AMD 3-61



AMD 75-168



① Main switch

② Air Dryer Controller DMC15

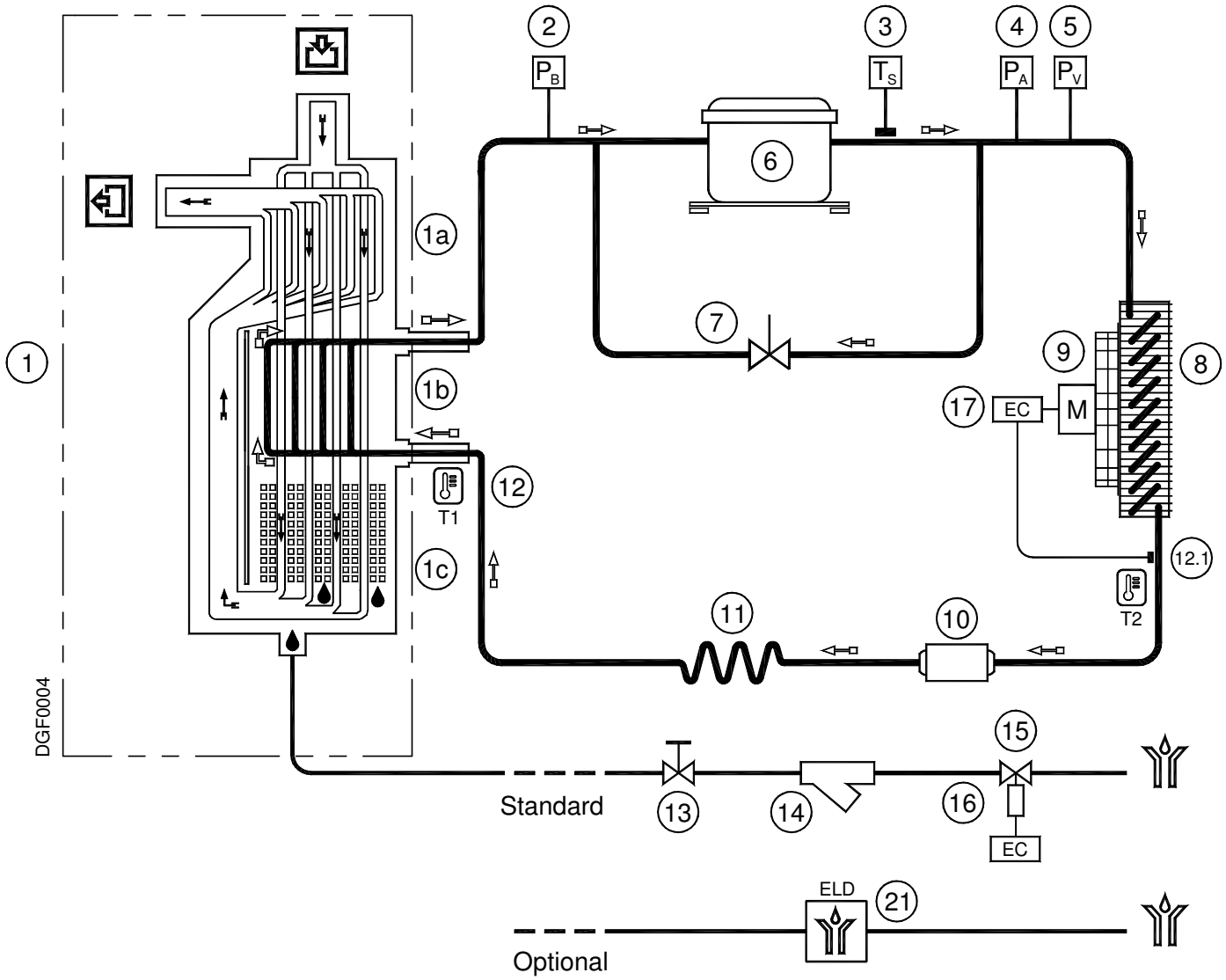
③ Air and refrigerating gas flow diagram

5.2. OPERATION

Operating principal –The dryer models described in this manual operate all on the same principal. The hot moisture laden air enters an air to air heat exchanger. The air then goes through the evaporator, also known as the air to refrigerant heat exchanger. The temperature of the air is reduced to approximately 2°C, causing water vapor to condense to liquid. The liquid is continuously coalesced and collected in the separator for removal by the condensate drain. The cool moisture free air then passes back through the air to air heat exchanger to be reheated to within 8 degrees of the incoming air temperature as it exits the dryer.

Refrigerant circuit - Refrigerant gas is cycled through the compressor and exits at high pressure to a condenser where heat is removed causing the refrigerant to condense to a high-pressure liquid state. The liquid is forced through a capillary tube where the resulting pressure drop allows the refrigerant to boil off at a predetermined temperature. Low-pressure liquid refrigerant enters the heat exchanger where heat from the incoming air is transferred causing the refrigerant to boil; the resulting phase change produces a low pressure, low temperature gas. The low-pressure gas is returned to the compressor, where it is re-compressed and begins the cycle again. During those periods when the compressed air load is reduced the excess refrigerant is by-passed automatically back to the compressor via the Hot Gas By-pass Valve circuit.

5.3. FLOW DIAGRAM



1. Alu-Dry Module
   - a - Air-to-air heat exchanger
   - b - Air-to-refrigerant exchanger
   - c - Condensate separator
2. Refrigerant pressure-switch P_B(AMD 168)
3. Safety thermo-switch T_S (AMD 43E-168E) - (AMD 43P-168P)
4. Refrigerant pressure-switch P_A (AMD 105-168)
5. Refrigerant Fan pressure-switch P_V (AMD 43-168)
6. Refrigeration compressor
7. Hot gas by-pass valve
8. Condenser
9. Condenser fan
10. Filter drier
11. Capillary tube
12. T1 Temperature probe (DewPoint)

12.1 T2 Temperature probe (fan control) (AMD 3-32)

13. Condensate drain isolation valve
14. Condensate drain strainer
15. Condensate drain solenoid valve
16. Coil for cond. drain solenoid valve
17. Air Dryer Controller

…

21. Electronic level drain

Compressed air flow direction

Refrigerating gas flow direction

5.4. REFRIGERATING COMPRESSOR

The refrigerating compressor is the pump of the system where the gas coming from the evaporator (low pressure side) is compressed up to the condensation pressure (high pressure side). All the compressors used are manufactured by primary companies and are designed for applications where high compression ratios and wide temperature changes are present.
The fully sealed construction is perfectly gas tight, so ensuring high-energy efficiency and long useful life. The pumping unit is supported by dumping springs, in order to consistently reduce the acoustic emission and the vibration diffusion. The electric motor is cooled down by the aspirated refrigerating gas, which goes through the coils before reaching the compression cylinders. The internal thermal protection protects the compressor from overheating and overcurrents. The protection is automatically restored as soon as the nominal temperature conditions are reached.

5.5. CONDENSER

The condenser is the element in which the gas coming from the compressor is cooled down and condensed becoming a liquid. Mechanically, it is formed by a copper tubing circuit (with the gas flowing inside) immersed in an aluminium blades package.
The cooling operation occurs via a high efficiency axial ventilator which, in applying pressure on the air contained within the dryer, forces it into the blades package.
It's mandatory that the temperature of the ambient air will not exceed the nominal values. It's important **TO KEEP THE UNIT FREE FROM DUST AND OTHER IMPURITIES**.

5.6. FILTER DRIER

Traces of humidity and slag can accumulate inside the refrigerating circuit. Long periods of use can also produce sludge. This can limit the lubrication efficiency of the compressor and clog the expansion valve or capillary tube. The function of the Filter Drier, located before the capillary tubing, is to eliminate any impurities from circulating through the system.

5.7. CAPILLARY TUBE

It consists of a piece of reduced cross section copper tubing located between the capacitor and the evaporator to form a throttling against the flow of the refrigerating fluid. This throttling creates a pressure drop, which is a function of the temperature to be reached within the evaporator: the lower the capillary tube outlet pressure, the lower the evaporation temperature. The length and the diameter of the capillary tubing are accurately sized with the performance to be reached by the dryer; no maintenance/adjustment operations are necessary.

5.8. ALU-DRY MODULE

The heat exchanger module houses the air-to-air, the air-to-refrigerant heat exchangers and the demister type condensate separator. The counter flow of compressed air in the air-to-air heat exchanger ensures maximum heat transfer. The generous cross section of flow channel within the heat exchanger module leads to low velocities and reduced power requirements. The generous dimensions of the air-to-refrigerant heat exchanger plus the counter flow gas flow allows full and complete evaporation of the refrigerant (preventing liquid return to the compressor). The high efficiency condensate separator is located within the heat exchanger module. No maintenance is required and the coalescing effect results in a high degree of moisture separation.

5.9. HOT GAS BY-PASS VALVE

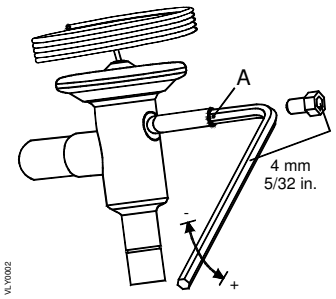
This valve injects part of the hot gas (taken from the discharge side of the compressor) in the pipe between the evaporator and the suction side of the compressor, keeping the evaporation temperature/pressure constant at approx. +2 °C. This injection prevents the formation of ice inside the dryer evaporator at every load condition

ADJUSTMENT

The hot gas by-pass valve is adjusted during the manufacturing testing phase. As a rule no adjustment is required; anyway if it is necessary the operation must be carried out by an experienced refrigeration engineer.

WARNING : the use of ¼" Schrader service valves must be justified by a real malfunction of the refrigeration system. Each time a pressure gauge is connected, a part of refrigerant is exhausted.

Without compressed air flow through the dryer, rotate the adjusting screw (position A on the drawing) until the following value is reached:



Hot gas setting (R134.a) : temperature 0.5 °C (+0.5 / -0 °K)
pressure 2.0 barg (+0.1 / -0 bar)

Hot gas setting (R404A) : temperature 0.5 °C (+0.5 / -0 °K)
pressure 5.2 barg (+0.1 / -0 bar)

5.10. REFRIGERANT PRESSURE SWITCHES P_A- P_B- P_V

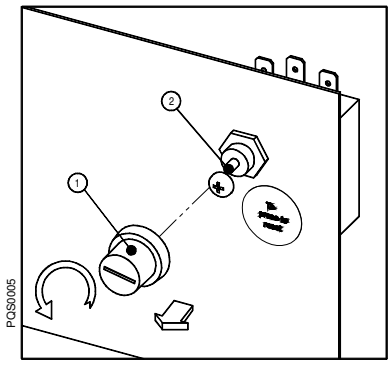
As operation safety and protection of the dryer a series of pressure switches are installed in the gas circuit.

P_B : Low-pressure controller device on the suction side of the compressor, is enabled only if the pressure drops below the pre-set value. The values are automatically reset when the nominal conditions are restored.
Calibrated pressure : R 404 A Stop 1.0 barg - Restart 5.0 barg

P_A : This high-pressure controller device is located at the pushing side of refrigeration compressor, and it is activated when the pressure exceeds the pre-set value. It features a manual-resetting button mounted on the controller itself.
Calibrated pressure : R 404 A Stop 32 barg - Manual reset

P_V : Fan control pressure switch is located at the pushing side of refrigeration compressor. It keeps the condensation temperature/pressure constant within preset limits (Air-Cooled).
Calibrated pressure : R 404 A Start 20 barg (45°C) - Stop 16 barg (36°C) - Tolerance ± 1 bar

5.11. SAFETY THERMO-SWITC T_S

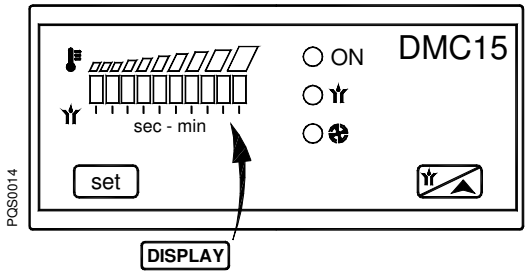


To protect the operating safety and the integrity of the dryer, a thermo-switch (TS) is installed on the refrigerant gas circuit. The thermo-switch sensor, in case of unusual discharge temperatures, stops the refrigerating compressor before it is permanently damaged.

Manually reset the thermo-switch only after the nominal operating conditions have been restored. Unscrew the relative cap (see pos.1 in the figure) and press the reset button (see pos.2 in the figure).

TS setting : temperature 100 °C (+2 / -2 °K)

5.12. DMC15 ELECTRONIC INSTRUMENT (AIR DRYER CONTROLLER)



set Button - access the set-up.

Button - condensate drain test / value increment.

ON Green LED - glowing = power on.

Yellow LED - glowing = condensate drain solenoid valve on.

Yellow LED - glowing = condenser fan on.

(AMD 3-32)

The DMC15 electronic controller performs the following functions : it shows the current operating DewPoint through the digital led display which is detected from the (T1) probe located at the end of the evaporator, while a second (T2) probe, located on the discharge side of the condenser, activates the relevant fan; eventually it controls the functioning of condensate drain solenoid valve through the cyclic electronic timer.

OPERATION - During the dryer operation, the LED ON is on.

Thermometer - The 10 LED display indicates the current operating DewPoint, shown by means of a two colours (green - red) bar over the display itself.

- Green section - operating conditions ensuring an optimal DewPoint;
- Red section - DewPoint of the dryer too high, the dryer is working with elevated thermal load (high inlet air temperature, high ambient temperature, etc.). The treatment of the compressed air may be improper.

Too high DewPoint temperature, value exceeding the upper limit of the instrument range, is indicated by the intermittent flashing of the last LED; whereas the intermittent flashing of the first LED shows too low DewPoint temperature.
A possible (T1) probe failure is indicated by the intermittent flashing of the first and last LED of the display, whereas the dryer keeps on working correctly.

Thermostat (AMD 3-32) - The fan condenser is activated when the condensate temperature reaches or exceeds 35°C (FAN_{ON}) - LED on - and it is deactivated when the temperature goes down to 30°C (FAN_{ON} - Hys) - LED off. In case of (T2) probe failure, the fun will run continuously and the LED will intermittent flash.

Timer - The condensate drain solenoid valve is activated for 2 seconds (T_{ON}) - LED on - each minute (T_{OFF}), if standard setting. To perform the manual test for the condensate drain, press the button.

SET-UP - The DMC15 is adjusted during the final test of the dryer. In case of particular requirements concerning the operation management, the user can change the setting of the programmed parameters.
The parameters which can be set up are the following :

- FAN_{ON} **(AMD 3-32)** - activation temperature of condenser fan. It is adjustable inside the following range of values, with step of 1°K; whereas the Hys hysteresis is fixed and equal to -5°K.
- T_{ON} - activation time of the condensate drain solenoid valve.
- T_{OFF} - pause time between two consecutive activation of the condensate drain solenoid valve.

To access the set-up, keep the button set pressed for at least 2 seconds; ON LED flashing confirms the command. First appears the (FAN_{ON}) parameter; to access the other parameters, press sequentially the set button. To change the value of the selected parameter, keep the set button pressed and operate on button ; the current value is shown on the LED display. For the value range and the resolution (value of each single LED), see the following table :

Parameter	Description	Display	Value range	Resolution	Set value
FAN_{ON}	**(solo AMD 3-32)** Activation temperature of condenser fan	Synchronous flashing LED ON + LED	31 - 40 °C	1°K	35°C
T_{ON}	Activation time of the condensate drain solenoid valve	Synchronous flashing LED ON + LED	1 - 10 sec	1 sec	2 sec
T_{OFF}	Pause time of the condensate drain solenoid valve	Non-Synchronous flashing LED ON + LED	1 - 10 min	1 min	1 min

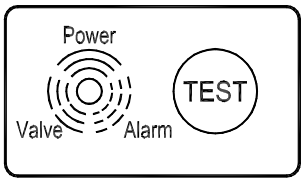
To exit the set-up condition in any moment, press the button. If no operations are performed for 2 minutes, the system automatically exits the set-up condition.

5.13. ELECTRONIC LEVEL DRAIN

Instead of the usual drain system (a solenoid valve controlled by means of electronic instrument); an electronic level controlled drain can be installed as option. This drain consists of a condensate accumulator where a capacitive sensor continuously checking liquid level is placed: as soon as the accumulator is filled, the sensor passes a signal to the electronic control and a diaphragm solenoid valve will open to discharge the condensate. For a complete condensate discharge the valve opening time will be adjusted exactly for each single drain operation. No condensate strainers are installed. No adjusting is required. A service valve is installed before the electronic drain in order to make check and maintenance easily.

AT DRYER START-UP VERIFY THAT THIS VALVE IS OPEN.

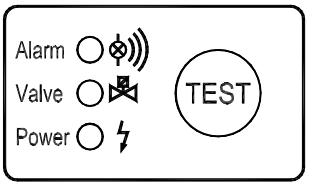
CONTROL PANEL for Dryers AMD 3-105



The control panel here illustrated allows checking of drain working.

Power : LED - drain ready to work / supplied
Valve : slow blinking led - membrane solenoid valve open / discharging
Alarm : fast blinking led - drain in alarm condition
Test : button - discharge test (keep pushed for 2 seconds)

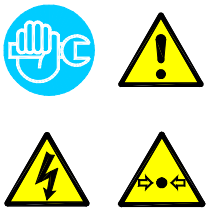
CONTROL PANEL FOR DRYERS AMD 3-105



The control panel here illustrated allows checking of drain working.

Power : LED - drain ready to work / supplied
Valve : led - membrane solenoid valve open / discharging
Alarm : blinking led - drain in alarm condition
Test : button - discharge test (keep pushed for 2 seconds)

TROUBLE SHOOTING



Only qualified personnel should perform troubleshooting and or maintenance operations.
Prior to performing any maintenance or service, be sure that:

- **no part of the machine is powered and that it cannot be connected to the mains supply.**
- **no part of the machine is under pressure and that it cannot be connected to the compressed air system.**
- **Maintenance personnel have read and understand the safety and operation instructions in this manual.**

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆No led lighting up.	⇨ Verify that the system is powered. ⇨ Verify the electric wiring (internal and/or external). ⇨ Check internal printed circuit board for possible damage.
◆Pressing of Test button, but no condensate discharge.	⇨ The service valve located before the drain is closed - open it. ⇨ The dryer is not under pressure - restore nominal condition. ⇨ Solenoid valve defective - replace the drain. ⇨ The internal printed circuit board is damaged - replace the drain.
◆Condensate discharge only when Test button is pressed.	⇨ The capacitive sensor is too dirty - open the drain and clean the sensor plastic tube.
◆Drain keeps blowing off air.	⇨ The diaphragm valve is dirty - open the drain and clean it. ⇨ The capacitive sensor is too dirty - open the drain and clean the sensor plastic tube.
◆Drain in alarm condition.	⇨ The capacitive sensor is too dirty - open the drain and clean the sensor plastic tube. ⇨ The service valve located before the drain is closed - open it. ⇨ The dryer is not under pressure - restore nominal condition. ⇨ Solenoid valve defective - replace the drain.

NOTE : When the drain is in alarm condition, the diaphragm solenoid valve will open 7.5 sec every 4 min.

6. MAINTENANCE, TROUBLESHOOTING, SPARES AND DISMANTLING

6.1. CONTROLS AND MAINTENANCE


Only qualified personnel should perform troubleshooting and or maintenance operations. Prior to performing any maintenance or service, be sure that:

- **no part of the machine is powered and that it cannot be connected to the mains supply.**
- **no part of the machine is under pressure and that it cannot be connected to the compressed air system.**
- **Maintenance personnel have read and understand the safety and operation instructions in this manual.**


Before attempting any maintenance operation on the dryer, shut it down and wait at least 30 minutes.

Some components can reach high temperature during operation. Avoid contact until system or component has dissipated heat.

DAILY

- Verify that the DewPoint displayed on the electronic instrument is correct.
- Check the proper operation of the condensate drain systems.
- Verify the condenser for cleanliness.

EVERY 200 HOURS OR MONTHLY


- With an air jet (max. 2 bar / 30 psig) blowing from inside towards outside clean the condenser; repeat this operation blowing in the opposite way; be careful not to damage the aluminium fins of the cooling package.

- Close the isolation valve for the condensate drain, remove the mechanical filter and clean it with compressed air and a brush. Reinstall the filter, make sure it is secure, and open the isolation valve.
- At the end, check the operation of the machine.

EVERY 1000 HOURS OR YEARLY

- Verify for tightness all the screws of the electric system and that all the “Faston” type connections are in their proper position, inspect unit for broken, cracked or bare wires.
- Inspect refrigerating circuit for signs of oil and refrigerant leakage.
- Measure and record amperage. Verify that readings are within acceptable parameters as listed in specification table.
- Inspect condensate drain flexible hoses, and replace if necessary.
- At the end, check the operation of the machine.

6.2. TROUBLESHOOTING




Only qualified personnel should perform troubleshooting and or maintenance operations.
Prior to performing any maintenance or service, be sure that:

- **no part of the machine is powered and that it cannot be connected to the mains supply.**
- **no part of the machine is under pressure and that it cannot be connected to the compressed air system.**
- **Maintenance personnel have read and understand the safety and operation instructions in this manual.**


Before attempting any maintenance operation on the dryer, shut it down and wait at least 30 minutes.
Some components can reach high temperature during operation. Avoid contact until system or component has dissipated heat.

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ The dryer doesn't start.	⇨ Verify that the system is powered. ⇨ Verify the electric wiring.
◆ The compressor doesn't work.	⇨ Activation of the compressor internal thermal protection - wait for 30 minutes, then retry. ⇨ Verify the electric wiring. ⇨ **Where installed**- Replace the internal thermal protection and/or the start-up relay and/or the start-up capacitor and/or the working capacitor. ⇨ **Where installed**- The pressure switch PA has been activated - see specific point. ⇨ **Where installed**- The pressure switch PB has been activated - see specific point. ⇨ **Where installed**- The safety thermo-switch TS has been activated - see specific point. ⇨ If the compressor still doesn't work, replace it.
◆ The fan of the condenser doesn't work.	⇨ Verify the electric wiring. ⇨ **AMD 3-32 -** The DMC15 electronic controller is faulty - replace it. ⇨ **AMD 43-168 -** PV pressure switch is faulty - replace it. ⇨ If the fan still doesn't work, replace it.
◆ DewPoint too low.	⇨ **AMD 3-32 -** The fan is always ON - the ○ yellow LED of DMC15 controller is glowing continuously - see specific point. ⇨ **AMD 43-168 -** The fan is always ON - PV pressure switch is faulty - replace it. ⇨ Ambient temperature is too low - restore de nominal condition. ⇨ The hot gas by-pass valve is out of setting - contact a refrigeration engineer to restore the nominal setting.
◆ DewPoint too high.	⇨ The dryer doesn't start - see specific point. ⇨ The T1 DewPoint probe doesn't correctly detect the temperature - ensure the sensor is pushed into the bottom of copper tube immersion well. ⇨ The refrigerating compressor doesn't work - see specific point. ⇨ The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation. ⇨ The inlet air is too hot - restore the nominal conditions. ⇨ The inlet air pressure is too low - restore the nominal conditions. ⇨ The inlet air flow rate is higher than the rate of the dryer - reduce the flow rate - restore the normal conditions. ⇨ The condenser is dirty - clean it. ⇨ The condenser fan doesn't work - see specific point. ⇨ The dryer doesn't drain the condensate - see specific point. ⇨ The hot gas by-pass valve is out of setting - contact a refrigeration engineer to restore the nominal setting. ⇨ There is a leak in the refrigerating fluid circuit - contact a refrigeration engineer.
◆ Excessive pressure drop within the dryer.	⇨ The dryer doesn't drain the condensate - see specific point. ⇨ The DewPoint is too low - the condensate is frost and blocks the air - see specific point. ⇨ Check for throttling the flexible connection hoses.

◆ The dryer doesn't drain the condensate.	⇨ The condensate drain service valve is closed - open it. ⇨ The condensate drain strainer is clogged - remove and clean it. ⇨ The drain solenoid valve is jammed - remove and clean it. ⇨ Verify the electric wiring. ⇨ The coil of the condensate drain solenoid valve burned out - replace it. ⇨ The DewPoint is too low - the condensate is frozen - see specific point. ⇨ The DMC15 electronic controller is faulty - replace it.
◆ The dryer continuously drains condensate.	⇨ The drain solenoid valve is jammed - remove and clean it. ⇨ Try to remove the electric connector on the solenoid valve - if drain stops verify the electric wiring or the electronic instrument is faulty - replace it.
◆ Water within the line.	⇨ The dryer doesn't start - see specific point. ⇨ **Where installed -** Untreated air flows through the by-pass unit - close the by-pass. ⇨ The dryer doesn't drain the condensate - see specific point. ⇨ DewPoint too high - see specific point.
◆ **Where installed** - The PA high-pressure switch has been activated.	⇨ Check which of the following has caused the activation : 1. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled). 2. The condenser is dirty - clean it (Air-Cooled). 3. The condenser fan doesn't work - see specific point (Air-Cooled). ⇨ Reset the pressure-switch pressing the button on the controller itself - verify the dryer for correct operation. ⇨ The PA pressure switch is faulty - contact a refrigeration engineer to replace it.
◆ **Where installed** - The PB low-pressure switch has been activated.	⇨ There is a leak in the refrigerating fluid circuit - contact a refrigeration engineer. ⇨ The pressure switch restores automatically when normal conditions are restored - check the proper operation of the dryer.
◆ **Where installed** - The TS safety thermo-switch has been activated.	⇨ Check which of the following has caused the activation : 1. Eccessive thermal load – restore the standard operating conditions. 2. The inlet air is too hot - restore the nominal conditions. 3. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation. 4. The condenser unit is dirty - clean it. 5. The fan doesn't work - see specific point. 6. There is a leak in the refrigerating fluid circuit - contact a refrigeration engineer. ⇨ Reset the thermo-switch by pressing the button on the thermo-switch itself – verify the correct operation of the dryer. ⇨ The TS thermo-switch is faulty - replace it.
◆ **DMC15-** The first and the last LED of the display of electronic instrument blink simultaneously.	⇨ Verify the electric wiring of (T1) DewPoint probe. ⇨ The (T1) DewPoint probe is faulty - replace it. ⇨ The DMC15 electronic controller is faulty - replace it.
◆ **DMC15-** The ○ yellow LED of the electronic controller is flashing continuously.	⇨ **AMD 3-32 -** Verify the electric wiring of (T2) fan control probe. ⇨ **AMD 3-32** - The (T2) fan control probe is faulty - replace it. ⇨ **AMD 43-168 –** Verify the electric wiring of resistance on terminal 1 and 2. ⇨ The DMC15 electronic controller is faulty - replace it.
◆ **DMC15-** The first LED of the display of electronic instrument is flashing continuously.	⇨ DewPoint too low - see specific point. ⇨ The (T1) DewPoint probe is faulty - replace it. ⇨ The DMC15 electronic controller is faulty - replace it.
◆ **DMC15-** The last LED of the display of electronic instrument is flashing continuously.	⇨ DewPoint too high - see specific point. ⇨ The (T1) DewPoint probe is faulty - replace it. ⇨ The DMC15 electronic controller is faulty - replace it.

6.3. SPARE PARTS

The suggested spare parts list will enable you to promptly intervene in case of abnormal operation, so avoiding to wait for the spares delivery. In case of failure of other parts, for example inside the refrigerating circuit, the replacement must be worked out by a refrigerating systems specialist or in our factory.

NOTE : To order the suggested spare parts or any other part, it's necessary to quote the data reported on the identification plate.

			AMD / 230V / 60Hz						AMD / 230V / 50Hz							
N.	**DESCRIPTION OF THE SPARE PARTS**	**CODE**	**3**	**6**	**9**	**12**	**18**	**25**	**32**	**43**	**52**	**61**	**75**	**105**	**130**	**168**
2	Refrigerant gas pressure switch P_B	5655NNN085												1	1	1
3	T_S safety thermo-switch	56141NN005											1	1	1	1
4	Fan pressure switch P_A	5655NNN087														1
5	Fan pressure switch P_V	5655NNN170								1	1	1	1	1	1	1
6	Compressor	5015110101	1	1												
6	Compressor	5015110104			1											
6	Compressor	5015110107				1										
6	Compressor	5015110113					1									
6	Compressor	5015110115						1								
6	Compressor	5015110016							1							
6	Compressor	5025116105								1						
6	Compressor	5025116010									1	1				
6	Compressor	5030116010											1			
6	Compressor	5030116015												1		
6	Compressor	5030115025													1	1
7	Hot Gas By-pass Valve	64140SS155								1	1	1	1	1	1	1
7	Hot Gas By-pass Valve	64140SS160	1	1	1	1	1	1	1							
9	Complete fan	5250110055									1					
9	Complete fan	5250110071												1	1	1
9.1	Fan motor	5210110005	1	1	1											
9.1	Fan motor	5210110011				1	1	1								
9.1	Fan motor	5210110017							1							
9.1	Fan motor	5210110022											1			
9.1	Fan motor	5210110025								1		1				
9.2	Fan blade	5215000010	1	1	1											
9.2	Fan blade	5215000019				1	1	1								
9.2	Fan blade	5215000023							1	1						
9.2	Fan blade	5215000025										1				
9.2	Fan blade	5215000033											1			
9.3	Fan grid	5225000010				1	1	1	1	1						
9.3	Fan grid	5225000027										1	1			
10	Filter Drier	6650SSS007	1	1	1	1	1	1	1							
10	Filter Drier	6650SSN150								1	1					
10	Filter Drier	6650SSN160										1	1	1	1	1
12	DewPoint probe . DMC15	5625NNN033	1♦	1♦	1♦	1♦	1♦	1♦	1♦							
12	DewPoint probe . DMC15 (T1)	5625NNN035	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦
13+14	Condensate drain valve/strainer	64355MN012	1	1	1	1	1	1	1	1	1					
14	Condensate Y strainer	64355FF011										1	1	1	1	1
15	Condensate drain solenoid valve	64320FF080	1♦	1♦	1♦	1♦	1♦	1♦	1♦							
15	Condensate drain solenoid valve	64320FF081														
15	Condensate drain solenoid valve	64320FF082								1♦	1♦	1♦	1♦	1♦	1♦	1♦
16	Coil for cond. drain solenoid valve	64N22MM001	1♦	1♦	1♦	1♦	1♦	1♦	1♦							
16	Coil for cond. drain solenoid valve	64N22MM002														
16	Coil for cond. drain solenoid valve	64N22MM003								1♦	1♦	1♦	1♦	1♦	1♦	1♦
17	Air Dryer Controller DMC15	5620110104	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦
21	Electronic drain	2210BEK001A	1	1	1	1	1	1	1	1	1	1	1	1		
21	Electronic drain	2210BEK002A													1	1
22	Main switch 2P 0/1	5450SZN010	1	1	1	1	1	1	1	1	1	1				
22	Main switch	5450SZN117											1	1	1	1

♦ Suggested spare part.

			AMD / 230V / 60Hz							
N.	**DESCRIPTION OF THE SPARE PARTS**	**CODE**	**32E**	**43E**	**52E**	**61E**	**75E**	**105E**	**130E**	**168E**
2	Refrigerant gas pressure switch P_B	5655NNN085						1	1	1
3	Safety thermo-switch T_S	56141NN005		1	1	1	1	1	1	1
4	Fan pressure switch P_A	5655NNN087								1
5	Fan pressure switch P_V	5655NNN170		1	1	1	1	1	1	1
6	Compressor	5015115011	1							
6	Compressor	5030115005		1	1	1				
6	Compressor	5030115015					1	1		
6	Compressor	5030115025							1	1
7	Hot Gas By-pass Valve	64140SS155		1	1	1	1	1	1	1
9	Complete fan	5250110055			1					
9	Complete fan	5250110100						1	1	
9	Complete fan	5250115005								1
9.1	Fan motor	5210110017	1							
9.1	Fan motor	5210110025		1						
9.1	Fan motor	5210110018				1				
9.1	Fan motor	5210110022					1			
9.2	Fan blade	5215000022	1	1						
9.2	Fan blade	5215000025				1				
9.2	Fan blade	5215000032					1			
9.3	Fan grid	5225000010	1	1						
9.3	Fan grid	5225000027				1	1			
10	Filter Drier	6650SSS007	1							
10	Filter Drier	6650SSN150		1	1					
10	Filter Drier	6650SSN160				1	1	1	1	1
12	DewPoint probe . DMC15 (T1)	5625NNN033	1♦							
12	DewPoint probe . DMC15 (T1-T2)	5625NNN035	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦
13+14	Condensate drain valve/strainer	64355MN012	1	1	1					
14	Condensate Y strainer	64355FF011				1	1	1	1	1
15	Condensate drain solenoid valve	64320FF080	1♦							
15	Condensate drain solenoid valve	64320FF082		1♦	1♦	1♦	1♦	1♦	1♦	1♦
16	Coil for cond. drain solenoid valve	64N22MM001	1♦							
16	Coil for cond. drain solenoid valve	64N22MM003		1♦	1♦	1♦	1♦	1♦	1♦	1♦
17	Air Dryer Controller DMC15	5620110104	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦
21	Electronic drain	2210BEK001A	1	1	1	1	1	1		
21	Electronic drain	2210BEK002A							1	1
22	Main switch	5450SZN010	1							
22	Main switch	5450SZN117		1	1	1	1	1	1	1

♦ Suggested spare part.

			AMD / 115V / 60Hz										
N.	**DESCRIPTION OF THE SPARE PARTS**	**CODE**	**3P**	**6P**	**9P**	**12P**	**18P**	**25P**	**32P**	**43P**	**52P**	**61P**	**75P**
3	Safety thermo-switch T_S	56141NN005								1	1	1	1
5	Fan pressure switch P_V	5655NNN170								1	1	1	1
6	Compressor	5015135101	1	1									
6	Compressor	5015135103			1								
6	Compressor	5015135105				1							
6	Compressor	5015135007					1						
6	Compressor	5015135010						1					
6	Compressor	5015135011							1				
6	Compressor	5030135005								1	1	1	
6	Compressor	5030135015											1
8	Hot Gas By-pass Valve	64140SS160	1	1	1	1	1	1	1				
8	Hot Gas By-pass Valve	64140SS155								1	1	1	1
9	Complete fan	5250135001									1		
9.1	Fan motor	5210135005	1	1	1								
9.1	Fan motor	5210135010				1	1	1					
9.1	Fan motor	5210135015							1				
9.1	Fan motor	5210135020								1		1	
9.1	Fan motor	5210135021											1
9.2	Fan blade	5215000010	1	1	1								
9.2	Fan blade	5215000019				1	1	1					
9.2	Fan blade	5215000022							1	1			
9.2	Fan blade	5215000025										1	
9.2	Fan blade	5215000032											1
9.3	Fan grid	5225000010				1	1	1	1	1			
9.3	Fan grid	5225000027										1	1
10	Filter Drier	6650SSS007	1	1	1	1	1	1	1				
10	Filter Drier	6650SSN150								1	1		
10	Filter Drier	6650SSN160										1	1
12	DewPoint probe . DMC15	5625NNN033	1♦	1♦	1♦	1♦	1♦	1♦	1♦				
12	DewPoint probe . DMC15 (T1)	5625NNN035	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦
13+14	Condensate drain valve/strainer	64355MN012	1	1	1	1	1	1	1	1	1		
14	Condensate Y strainer	64355FF011										1	1
15	Condensate drain solenoid valve	64320FF081	1♦	1♦	1♦	1♦	1♦	1♦	1♦				
15	Condensate drain solenoid valve	64320FF083								1♦	1♦	1♦	1♦
16	Coil for cond. drain solenoid valve	64N22MM002	1♦	1♦	1♦	1♦	1♦	1♦	1♦				
16	Coil for cond. drain solenoid valve	64N22MM004								1♦	1♦	1♦	1♦
17	Air Dryer Controller DMC15	5620130104	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦	1♦
21	Electronic drain	2210BEK001P	1	1	1	1	1	1	1	1	1	1	1
22	Main switch2P 0/1	5450SZN010	1	1	1	1	1	1	1				
22	Main switch	5450SZN117								1	1	1	1

♦ Suggested spare part.

6.4. MAINTENANCE OPERATION ON THE REFRIGERATING CIRCUIT

Maintenance and service on refrigerating systems must be carried out only by certified refrigerating engineers only, according to local rules.
All the refrigerant of the system must be recovered for its recycling, reclamation or destruction.
DO NOT DISPOSE THE REFRIGERANT FLUID IN THE ENVIROMENT.

This dryer comes ready to operate and filled with R134a or R404A type refrigerant fluid.

In case of refrigerant leak contact a certified refrigerating engineers. Room is to be aired before any intervention.
If is required to re-fill the refrigerating circuit, contact a certified refrigerating engineers.
Refer to the dryer nameplate for refrigerant type and quantity.

Characteristics of refrigerants used:

Refrigerant	Chemical formula	TLV	GWP
R134a - HFC	CH2FCF3	1000 ppm	1300
R404A - HFC	CH2FCF3/C2HF5/C2H3F3	1000 ppm	3784

6.5. DISMANTLING OF THE DRYER

If the dryer is to be dismantled, it has to be split into homogeneous groups of materials.

Part	Material
Refrigerant fluid	R404A, R134a, Oil
Canopy and Supports	Carbon steel, Epoxy paint
Refrigerating compressor	Steel, Copper, Aluminium, Oil
Alu-Dry Module	Aluminium
Condenser Unit	Aluminium, Copper, Carbon steel
Pipe	Copper
Fan	Aluminium, Copper, Steel
Valve	Brass, Steel
Electronic Level Drain	PVC, Aluminium, Steel
Insulation Material	Synthetic gum without CFC, Polystyrene, Polyurethane
Electric cable	Copper, PVC
Electric Parts	PVC, Copper, Brass

We recommend to comply with the safety rules in force for the disposal of each type of material.
The chilling fluid contains droplets of lubrication oil released by the refrigerating compressor.
Do not dispose this fluid in the environment. Is has to be discharged from the dryer with a suitable device and then delivered to a collection centre where it will be processed to make it reusable.

7. LIST OF ATTACHMENTS

7.1. DRYERS DIMENSIONS

7.2. EXPLODED VIEW

Exploded view table of components - Dryers AMD 3-168

① Alu-Dry Module
1.1 Insulation Material
② Refrigerant pressure-switch P_B
③ T_S safety thermo-switch
④ Refrigerant pressure-switch P_A
⑤ Refrigerant pressure-switch (fan) P_V
⑥ Refrigerating compressor
⑦ Hot gas by-pass valve
⑧ Condenser
⑨ Condenser fan
9.1 Motor
9.2 Blade
9.3 Grid
⑩ Dehydration filter
⑪ Capillary tube
⑫ T1 Temperature probe (DewPoint)
⑬ Condensate drain service valve
⑭ Y-shaped condensate drain strainer
⑮ Condensate drain solenoid valve
⑯ Coil for cond. drain solenoid valve
⑰ Electronic control instrument
…
㉑ Electronic level drain
㉒ Main switch
…
㊶ Front panel
㊷ Back panel
㊸ Right lateral panel
㊹ Left lateral panel
㊺ Cover
㊻ Base plate
㊼ Upper plate
㊽ Support beam
㊾ Support bracket
㊿ Control panel
(61) Electric connector
(62) Electric box
…
(81) Flow diagram sticker

7.3. ELECTIC DIAGRAMS

7.3.1 Electrical Diagram of Dryers AMD 3-168 - Electronic Instrument DMC15

Electrical Diagram table of components

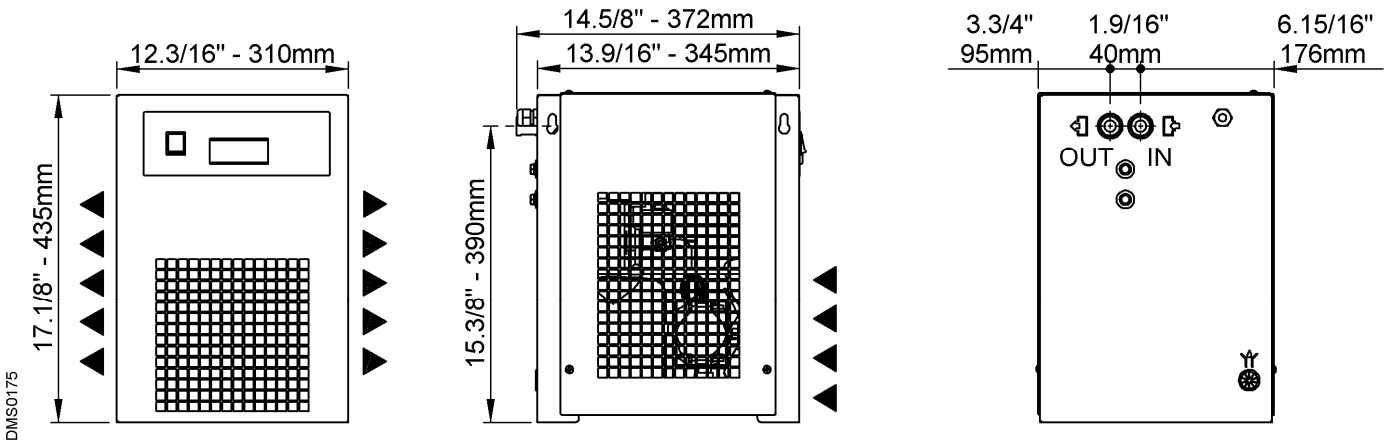
IG : Main switch
K : Refrigerating compressor
- **KT** : Compressor thermal protection
- **KR** : Compressor starting relay (if installed)
- **CS** : Compressor starting capacitor (if installed)
- **CR** : Compressor run capacitor (if installed)

V : Condenser fan
- **CV** : Fan starting capacitor (if installed)

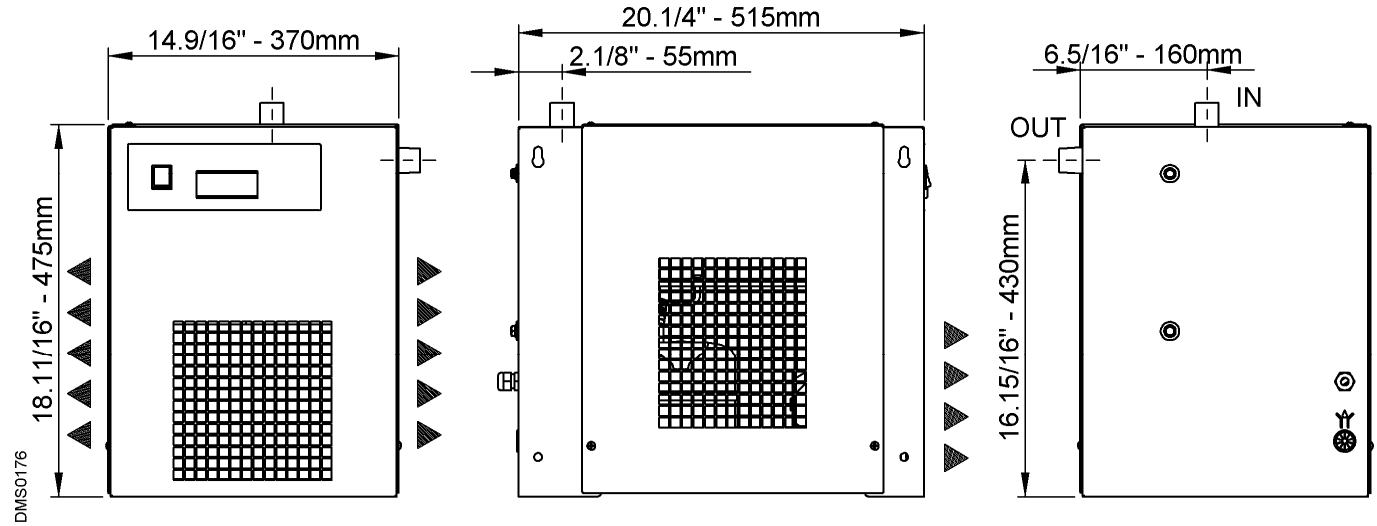
DMC15 : DMC15 Electronic Instrument - Air Dryer Controller
T1 : T1 Temperature probe (DewPoint)
T2 : T2 Temperature probe (Fan control)
PV : Pressure switch - Fan control
PA : Pressure switch - Compressor discharge side - high-pressure
PB : Pressure switch - Compressor suction side - low-pressure
TS : T_S safety thermo-switch
BOX : Electric box
EVD : Condensate drain solenoid valve
ELD : Electronic level drain

BN = BROWN
BU = BLUE
BK = BLACK
YG = YELLOW/GREEN

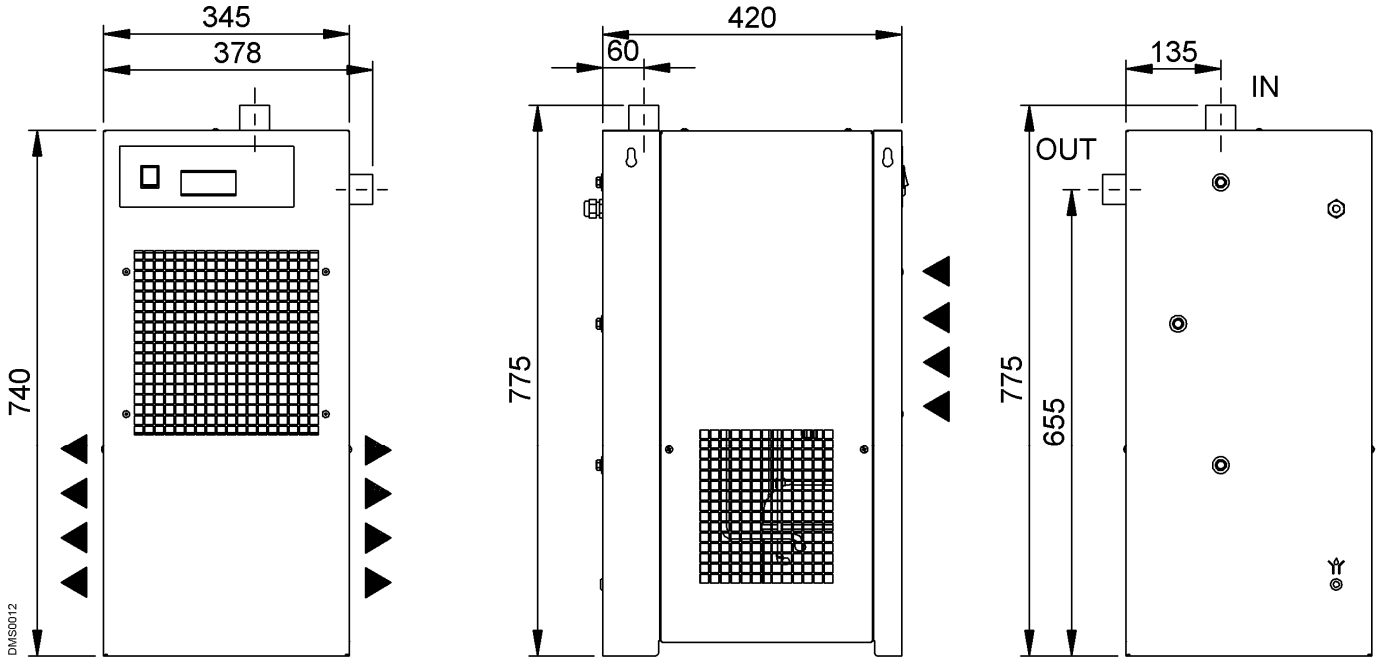
7.1.1 AMD 3



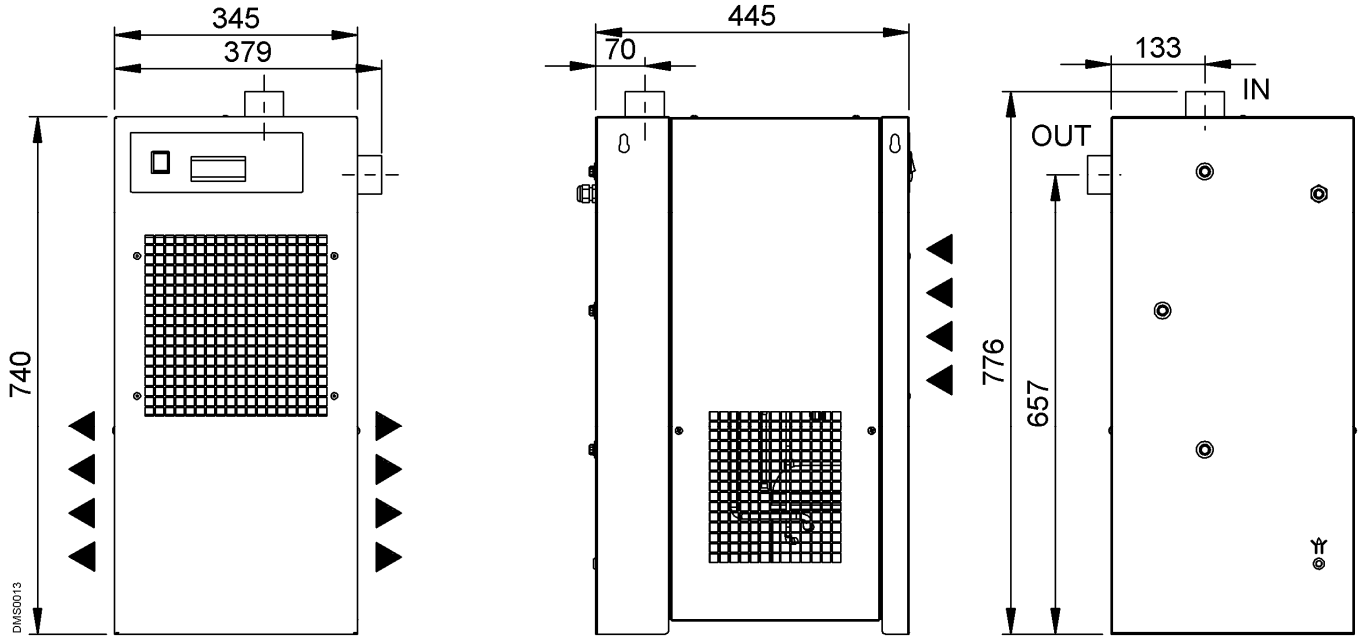
7.1.2 AMD 6-18



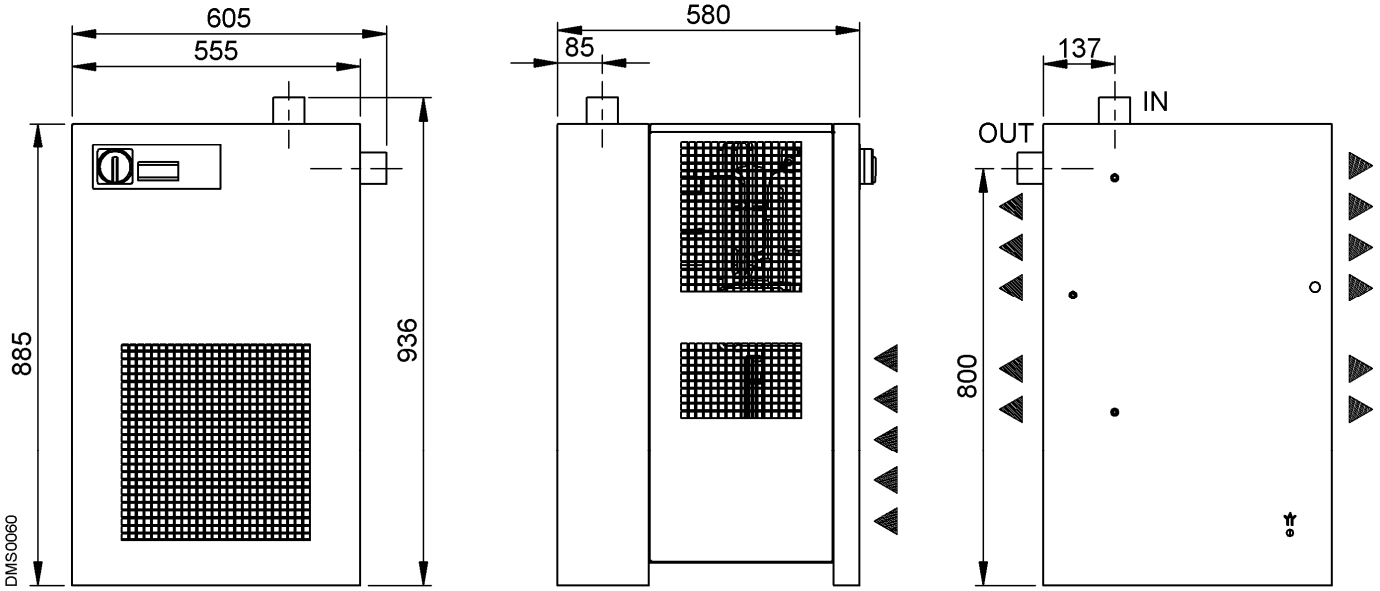
7.1.3 AMD 25



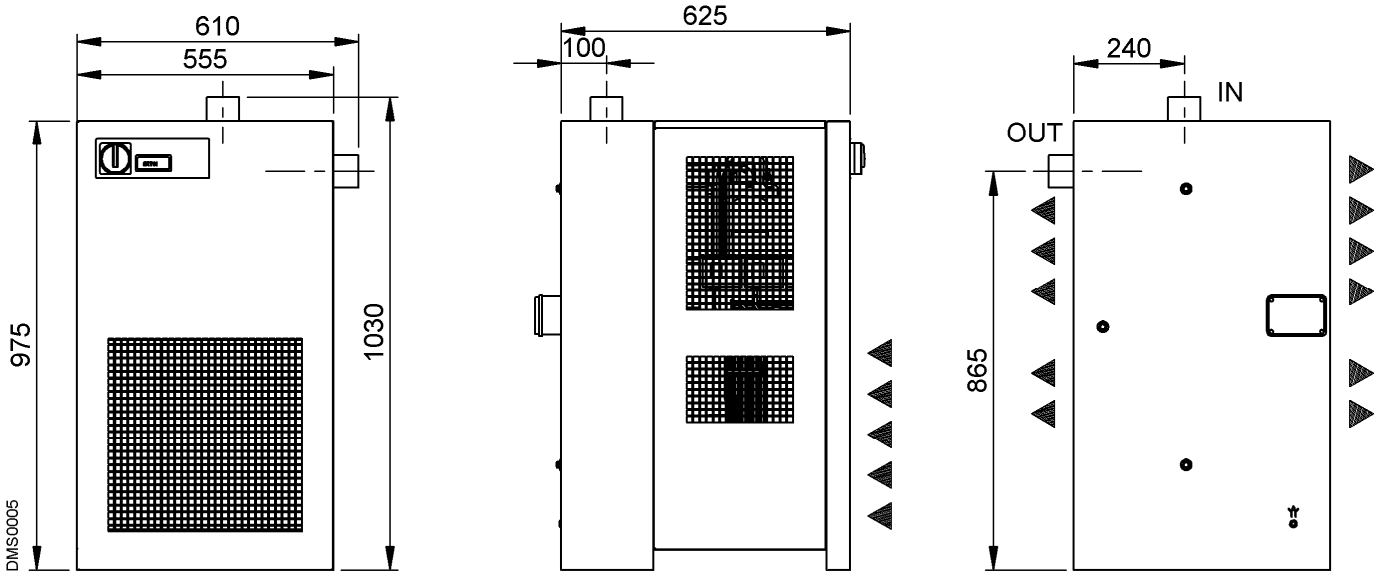
7.1.4 AMD 32-52



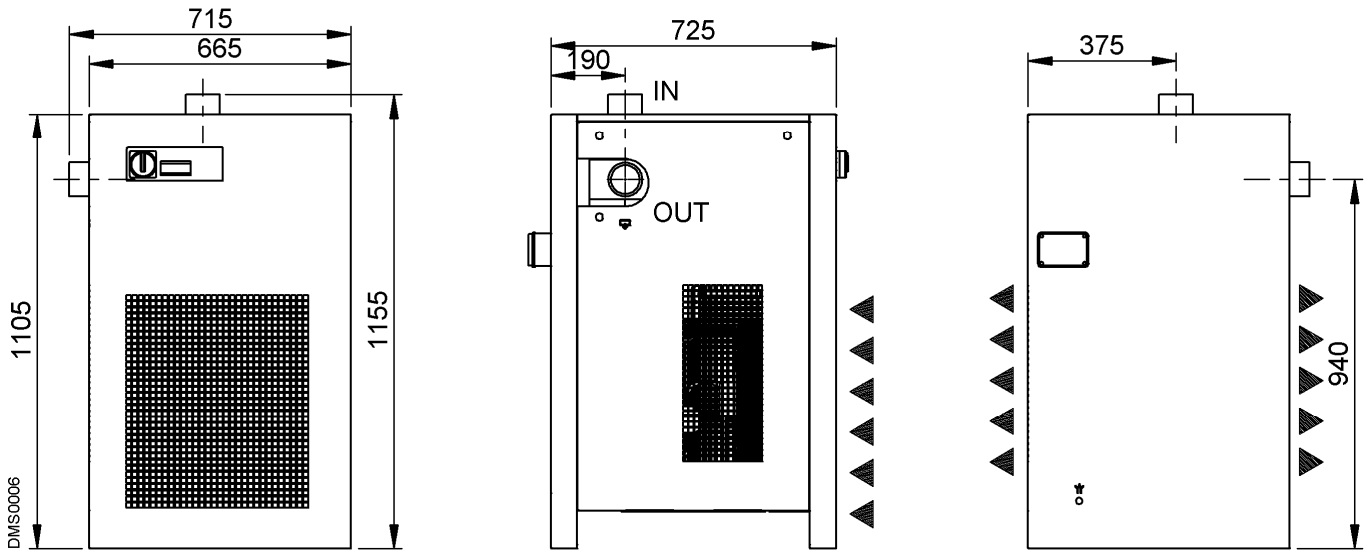
7.1.3 AMD 61-75



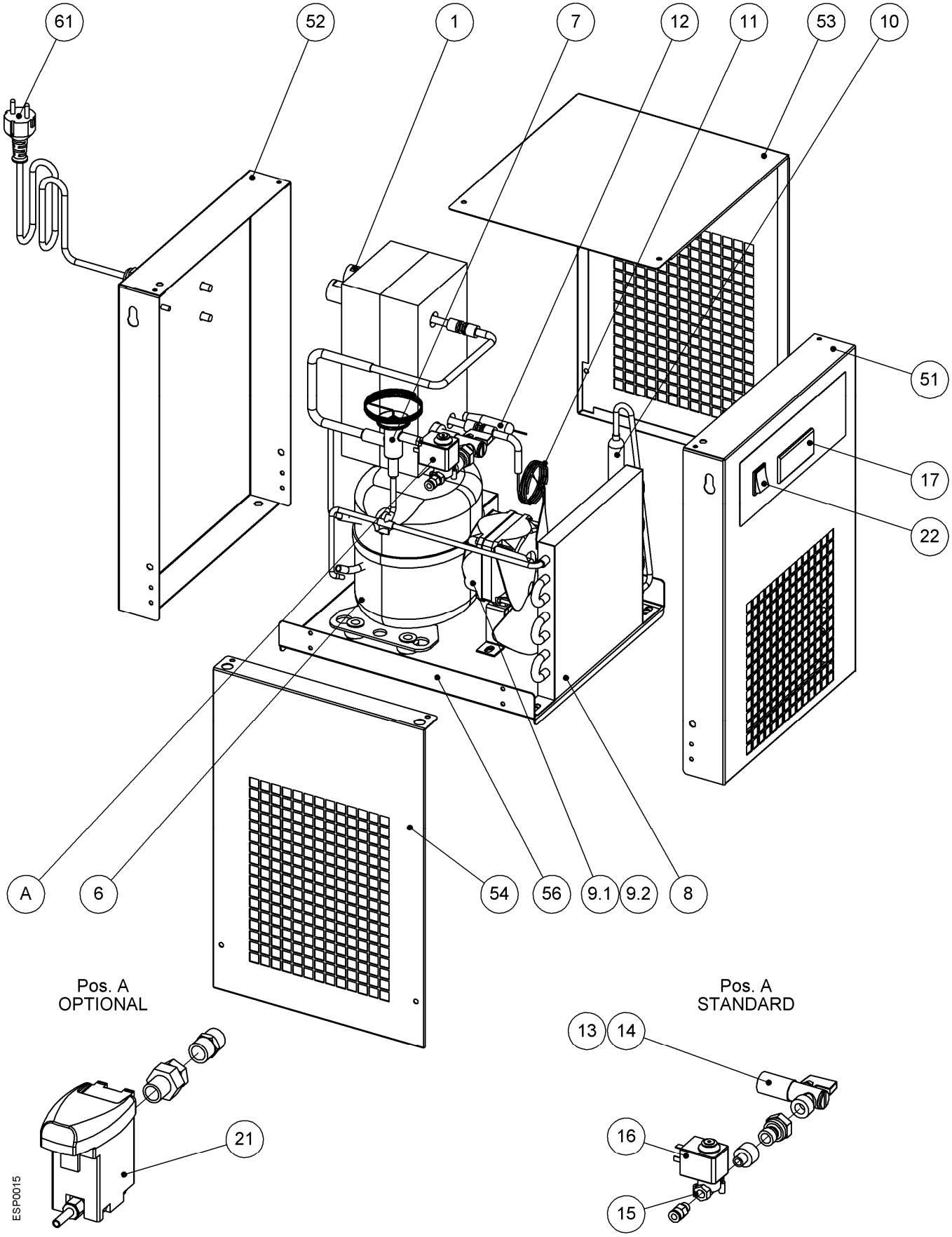
7.1.4 AMD 105-130



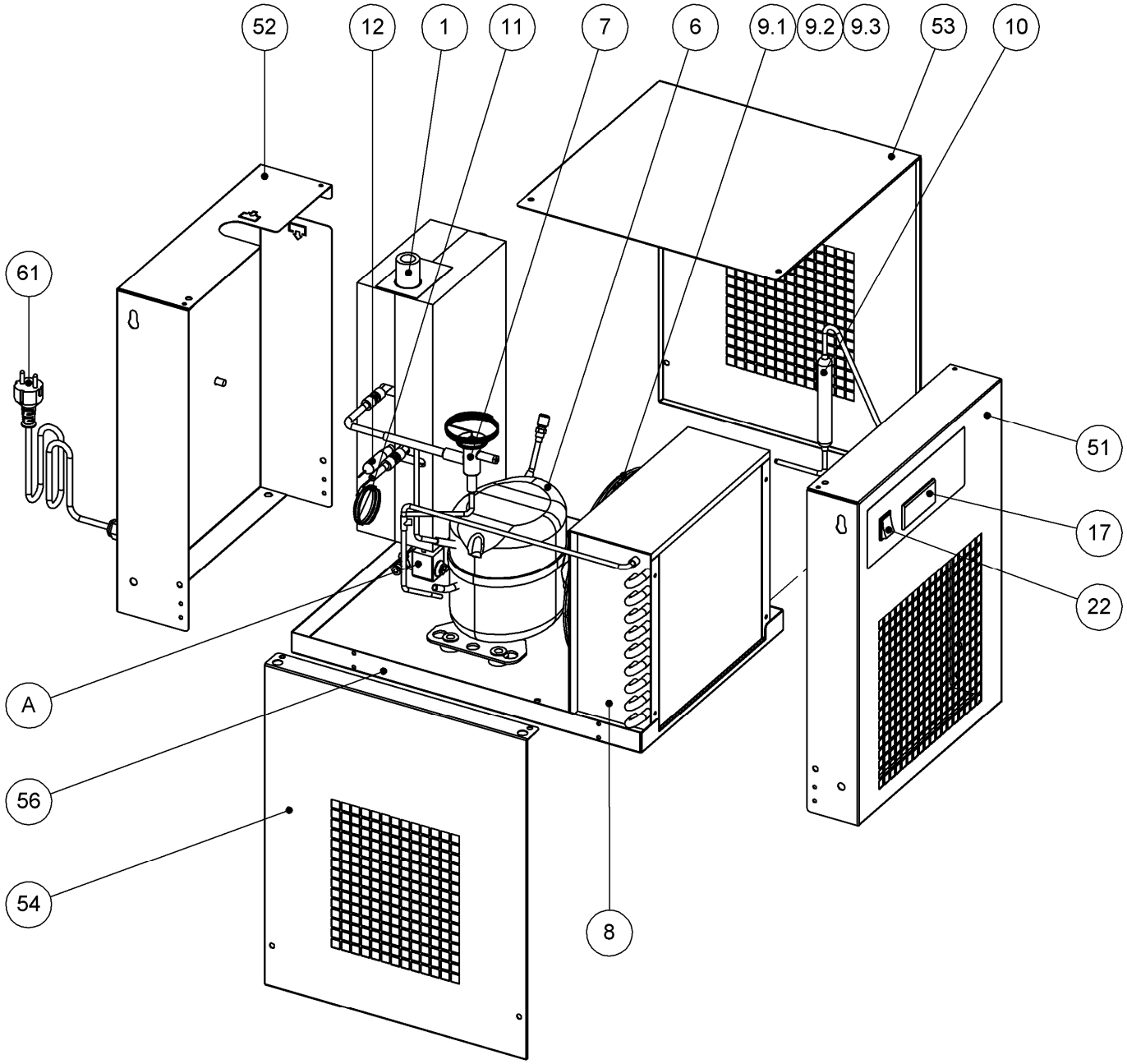
7.1.5 AMD 168

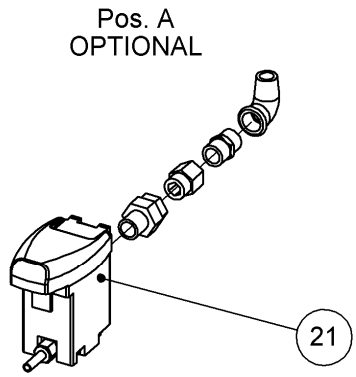


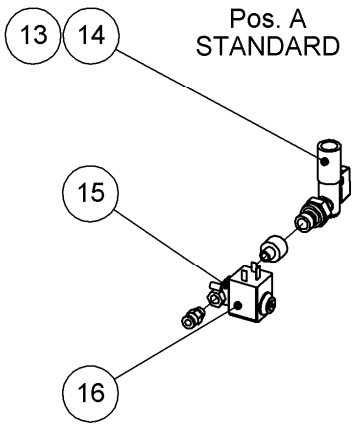
7.1.3 AMD 3 / 3E /3P



7.1.3 AMD 6-18 / 6E-18E / 6P-18P

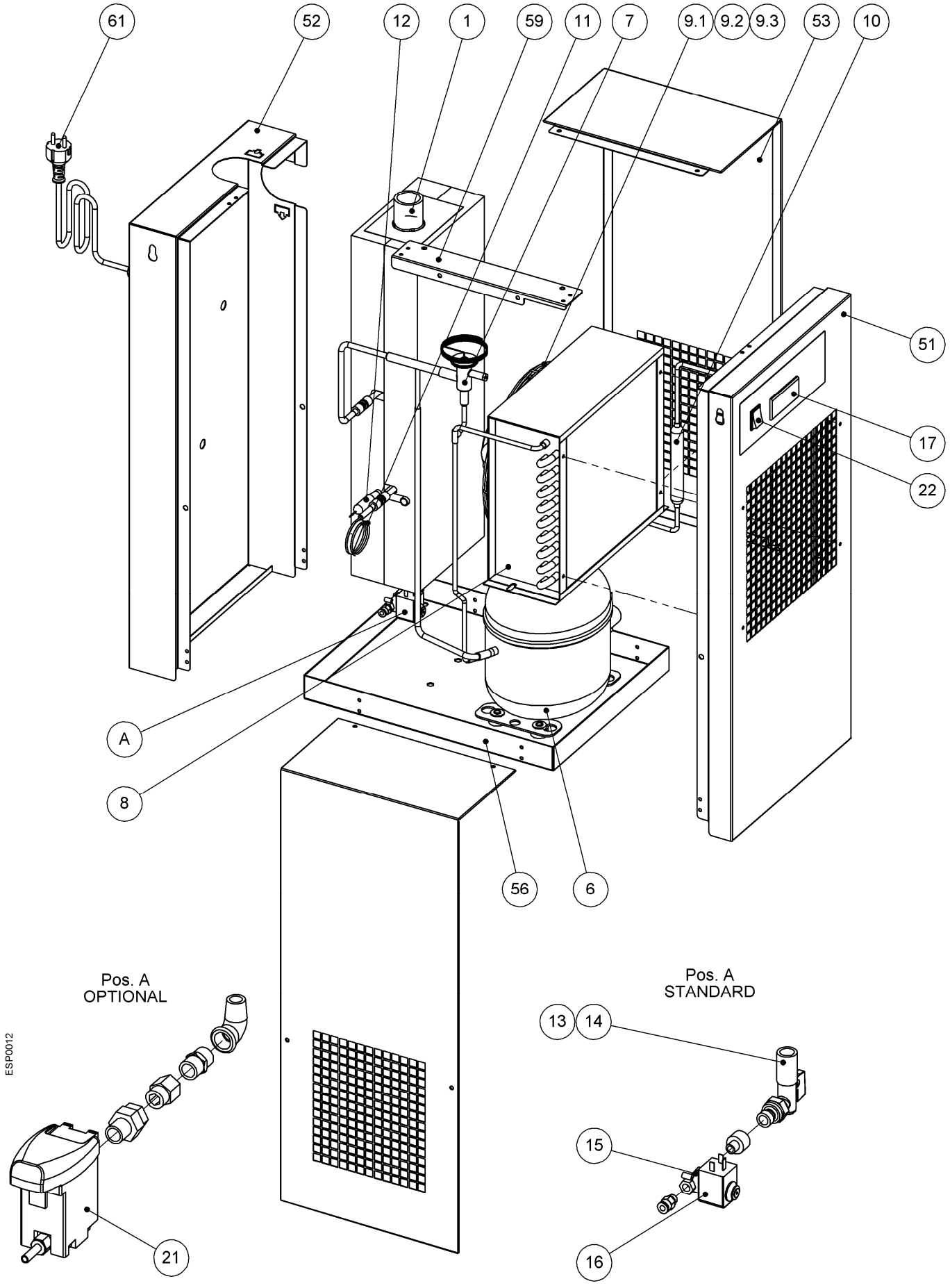




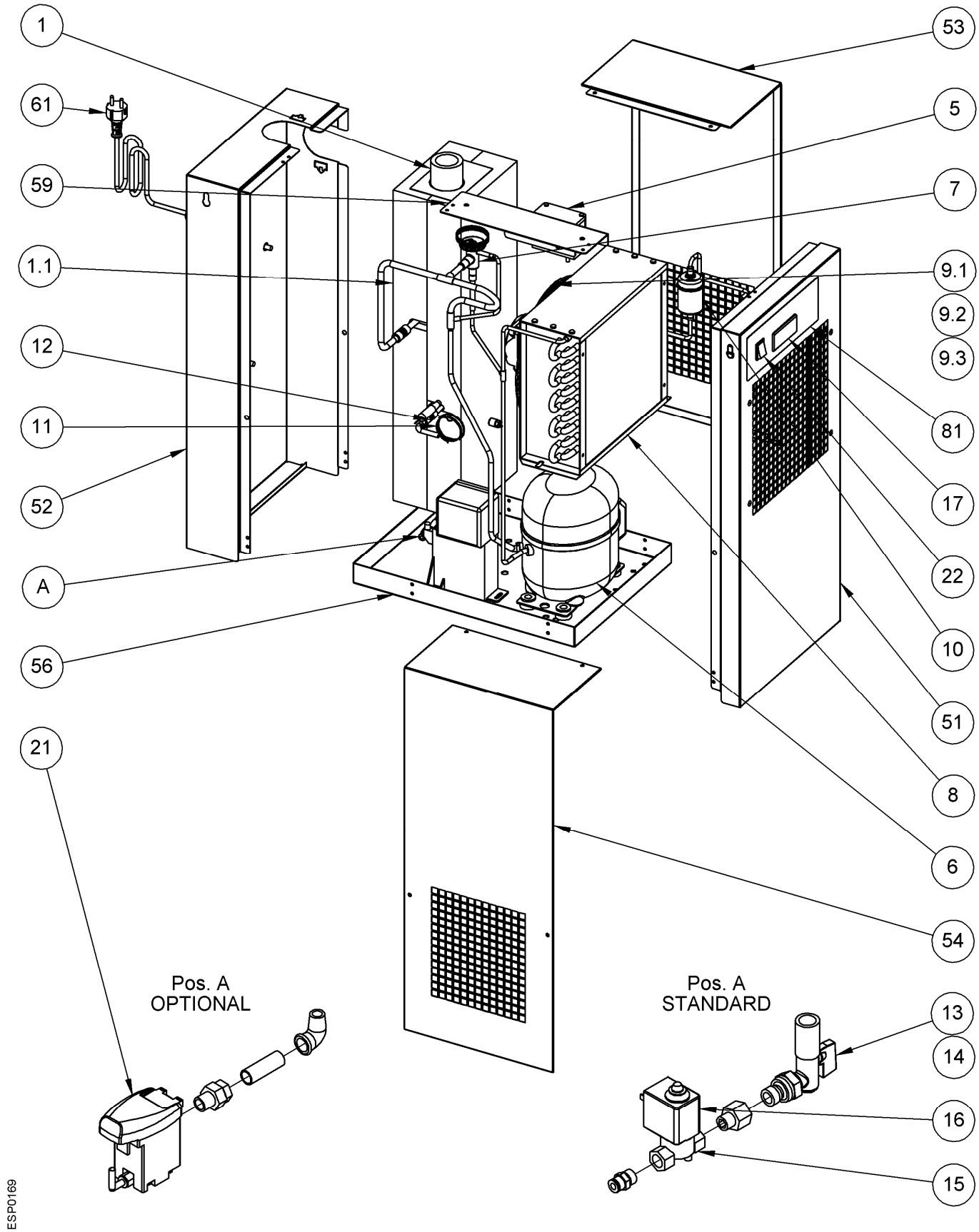


ESP0011

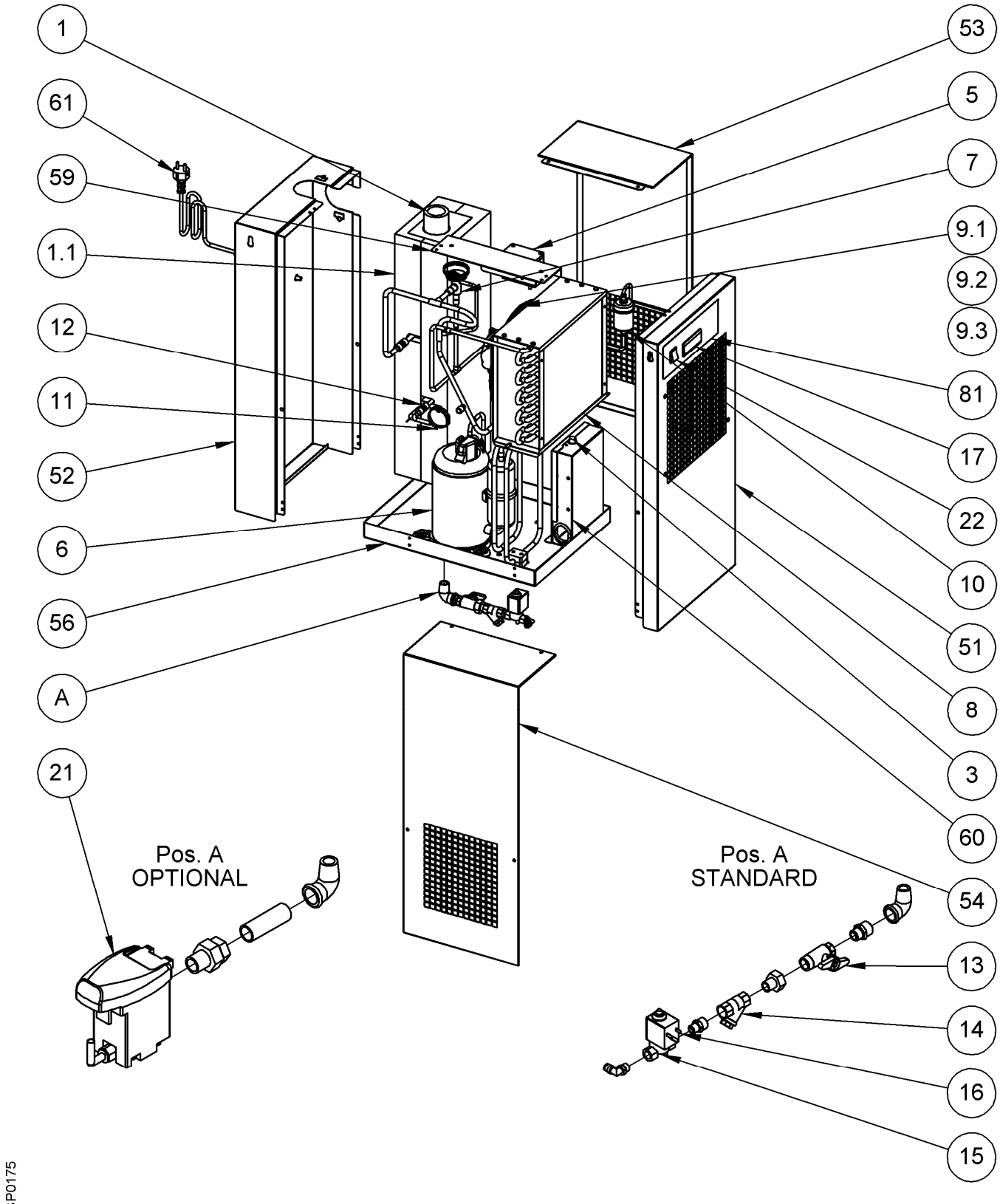
7.1.3 AMD 25-32 / 25E-32E / 25P-32P



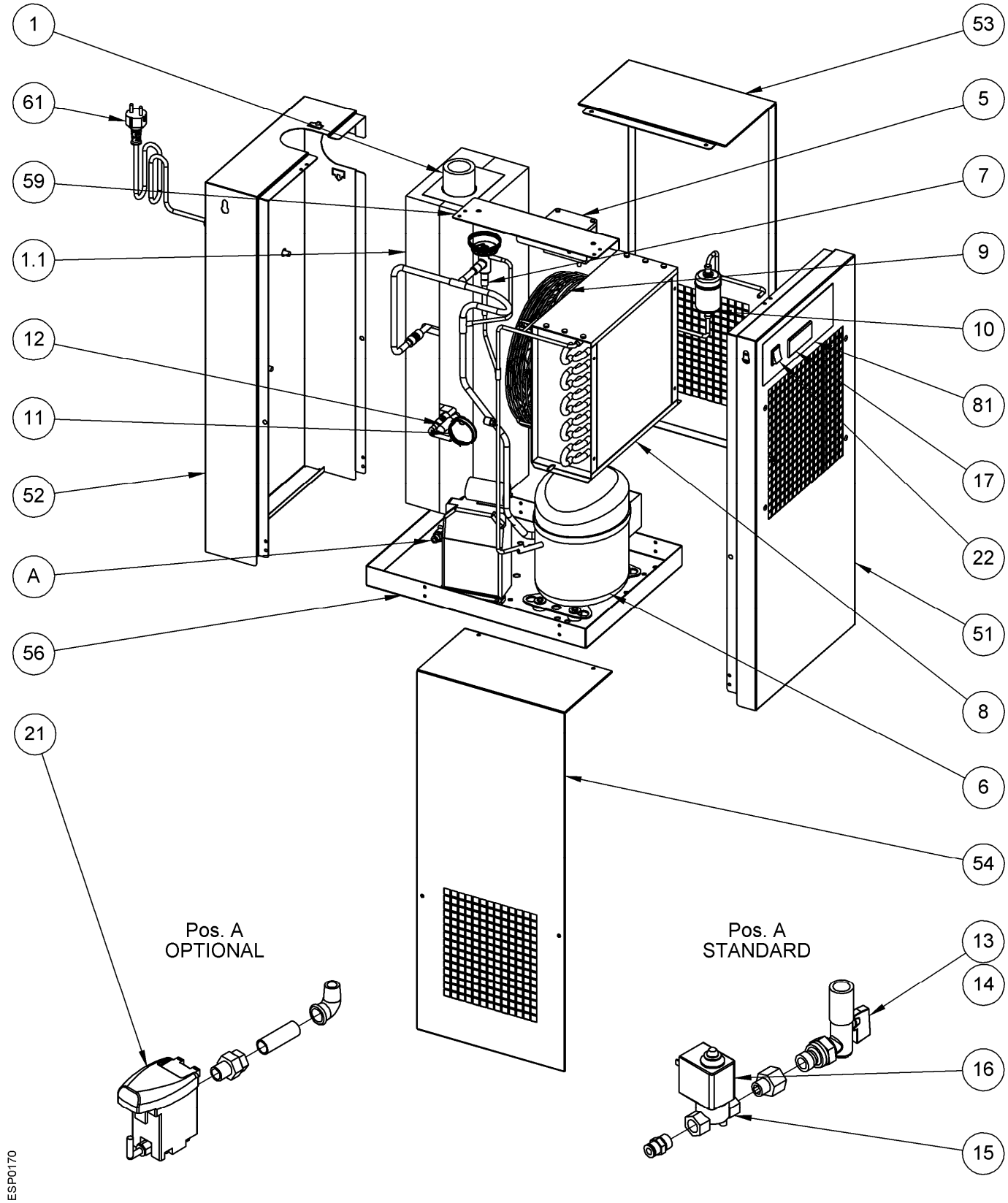
7.1.3 AMD 43


1
61
59
1.1
12
11
52
A
56
21
53
5
7
9.1
9.2
9.3
81
17
22
10
51
8
6
54
Pos. A
OPTIONAL
Pos. A
STANDARD
13
14
16
15
ESP0169

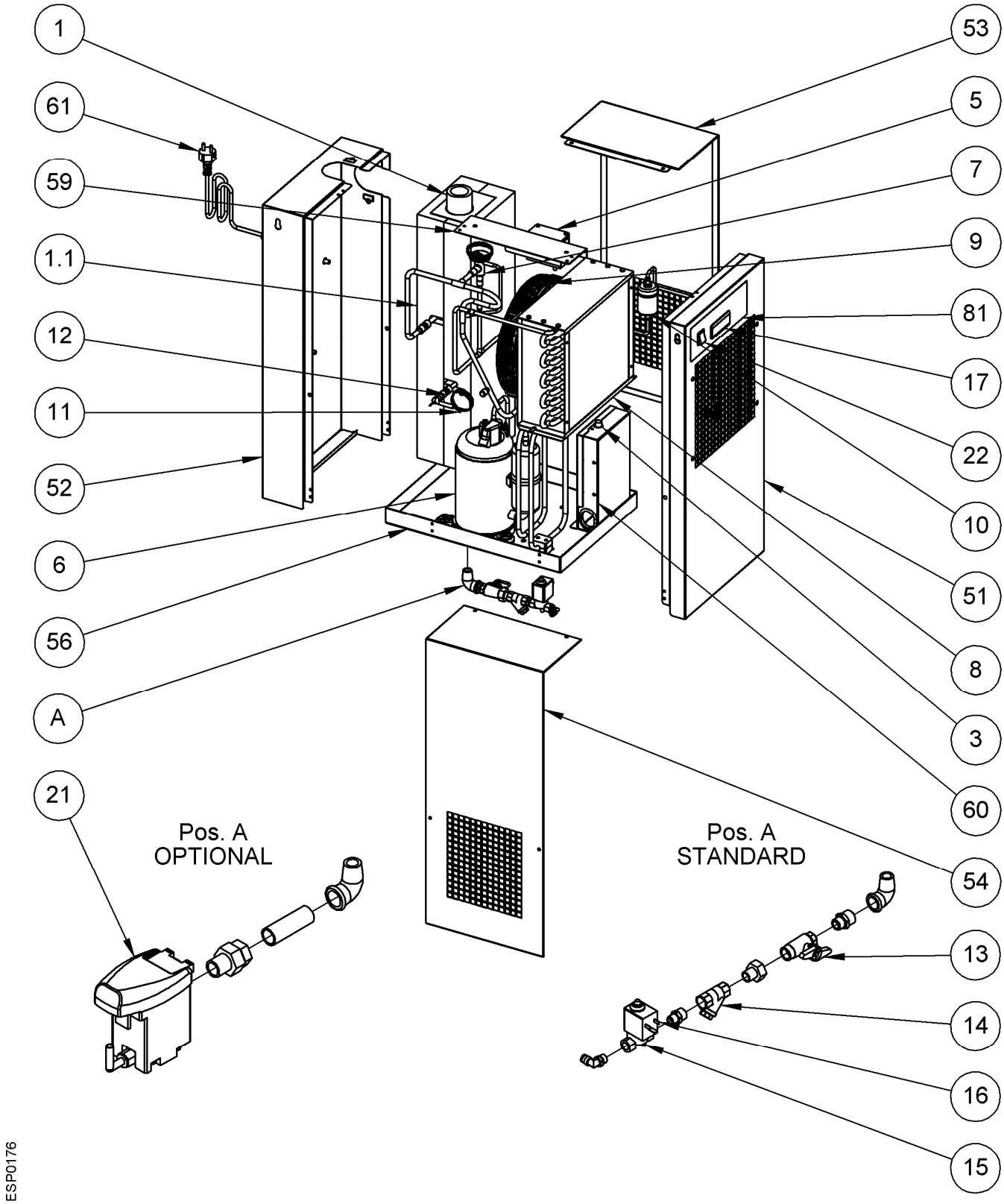
7.1.3 AMD 43E / 43P



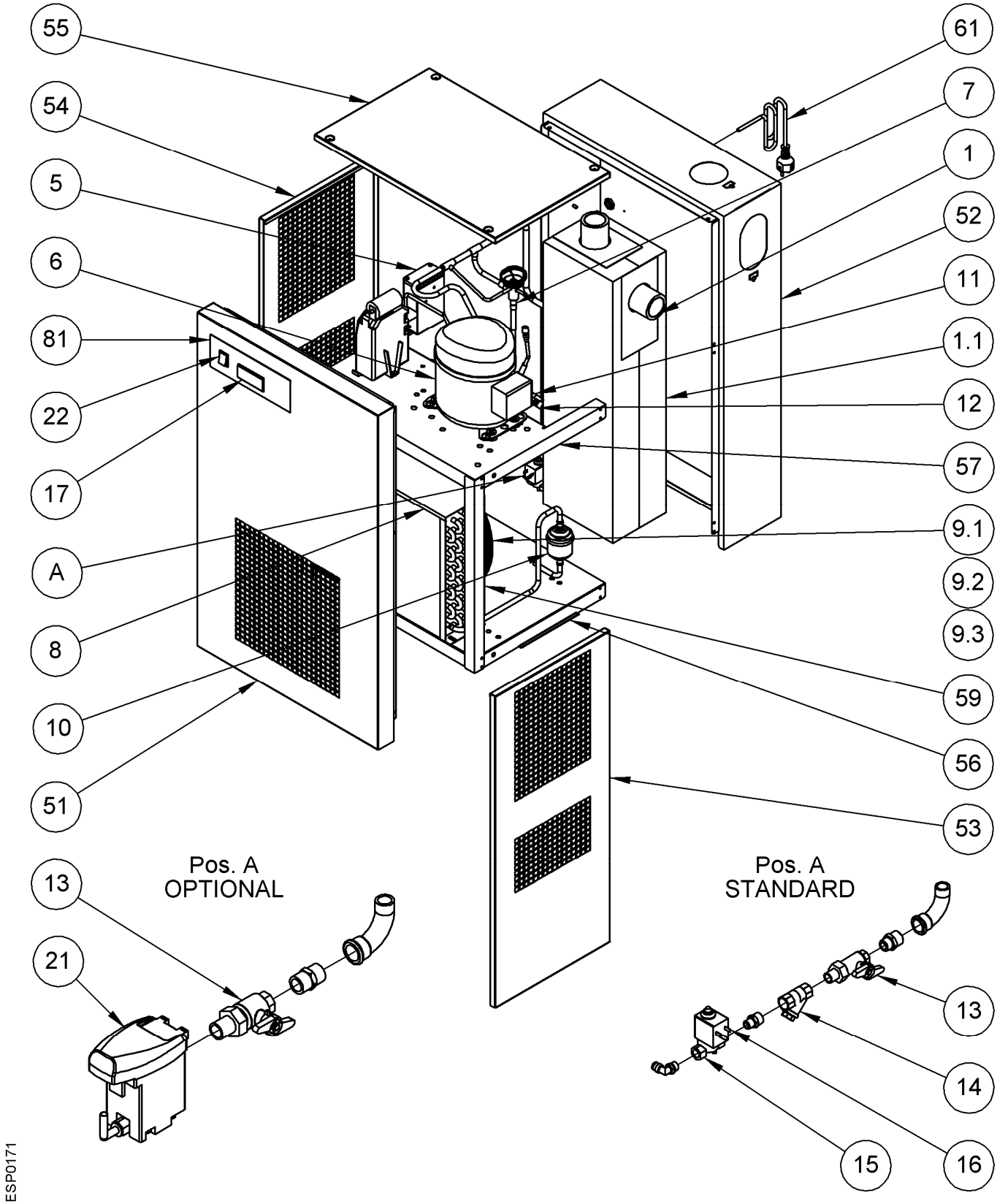
7.1.3 AMD 52


1
61
59
1.1
12
11
52
A
56
21
53
5
7
9
10
81
17
22
51
8
6
54
Pos. A
OPTIONAL
Pos. A
STANDARD
13
14
16
15
ESP0170

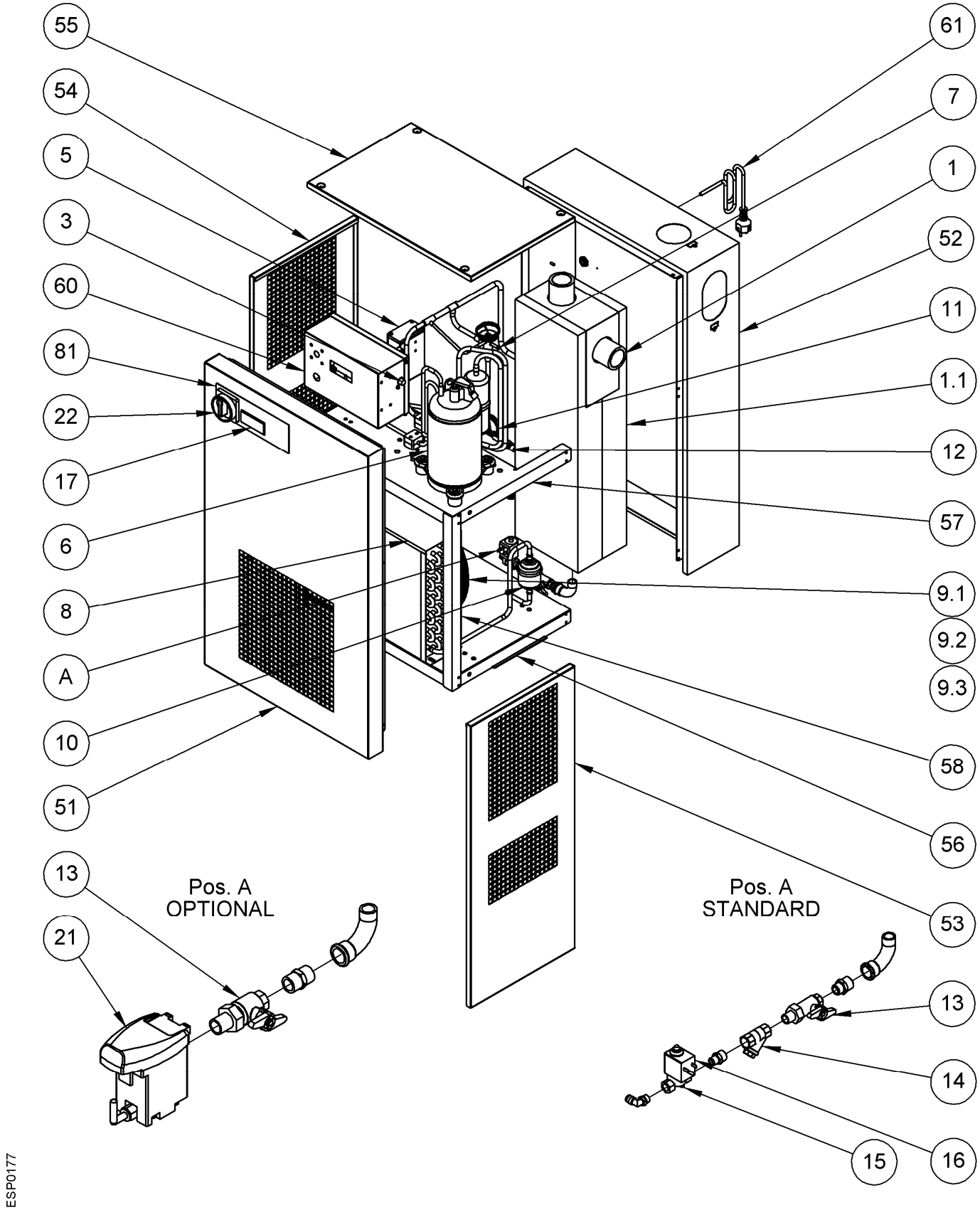
7.1.3 AMD 52E / 52P



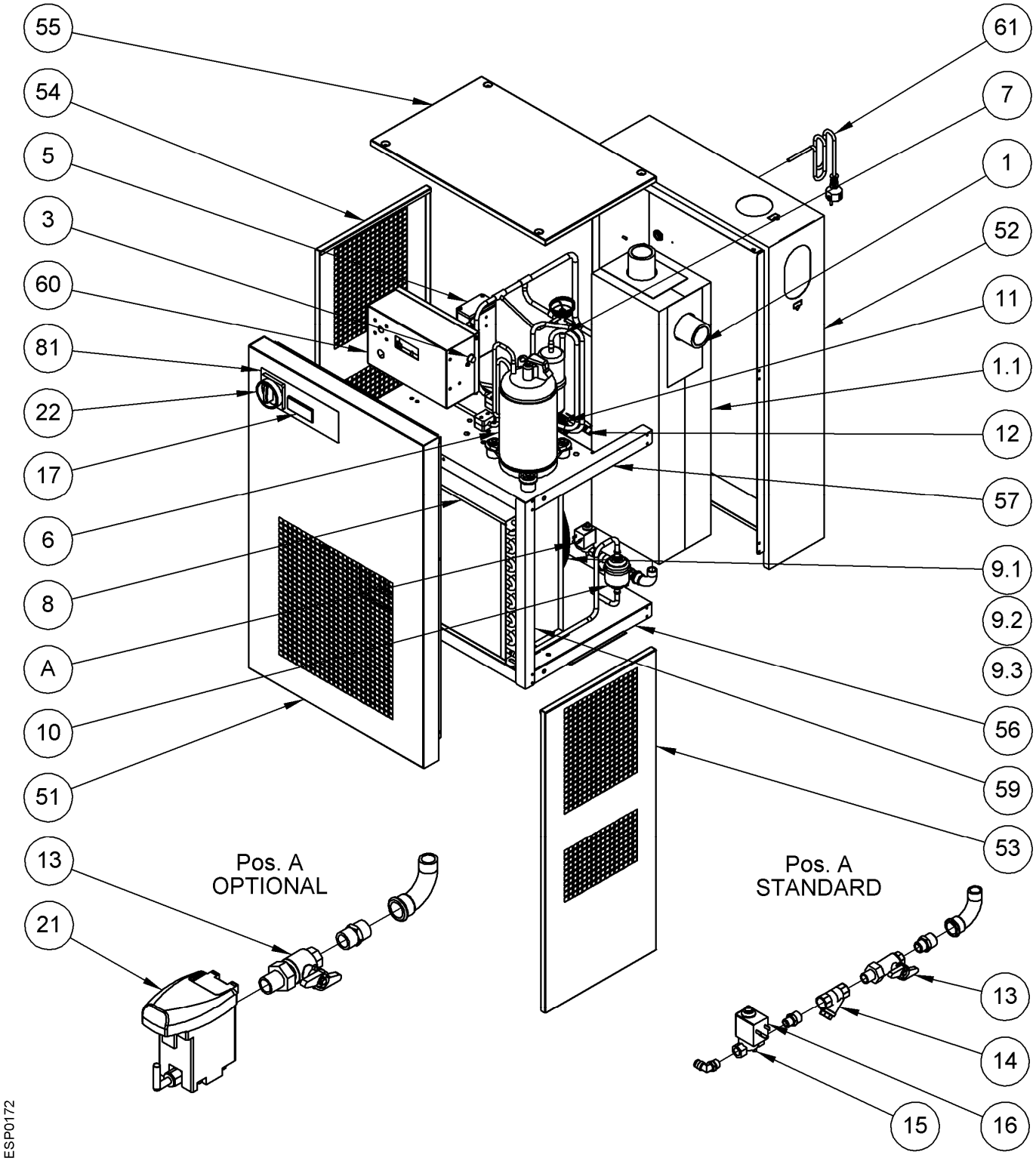
7.1.3 AMD 61


55
54
5
6
81
22
17
A
8
10
51
61
7
1
52
11
1.1
12
57
9.1
9.2
9.3
59
56
53
Pos. A
OPTIONAL
13
21
Pos. A
STANDARD
13
14
15
16
ESP0171

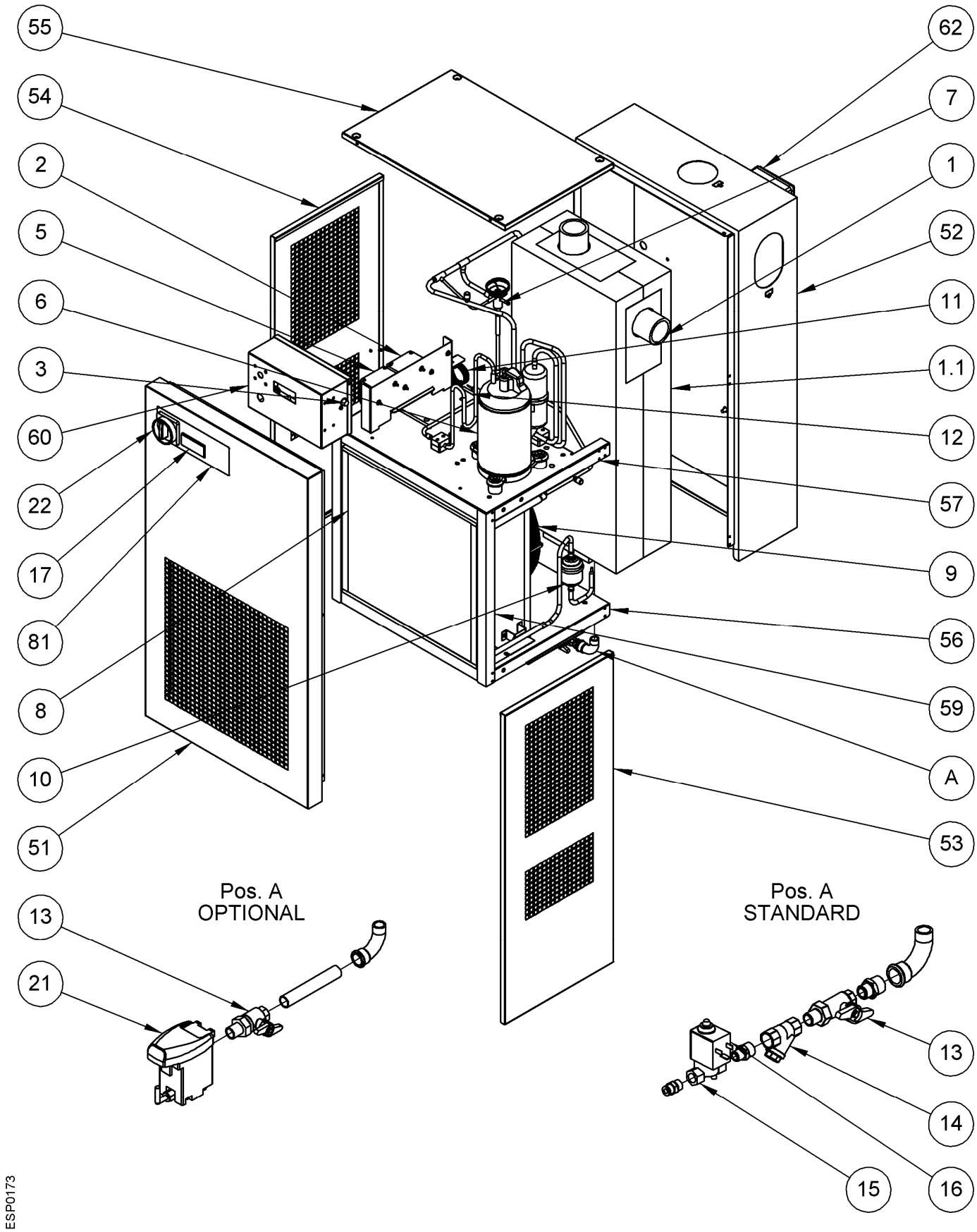
7.1.3 AMD 61E / 61P



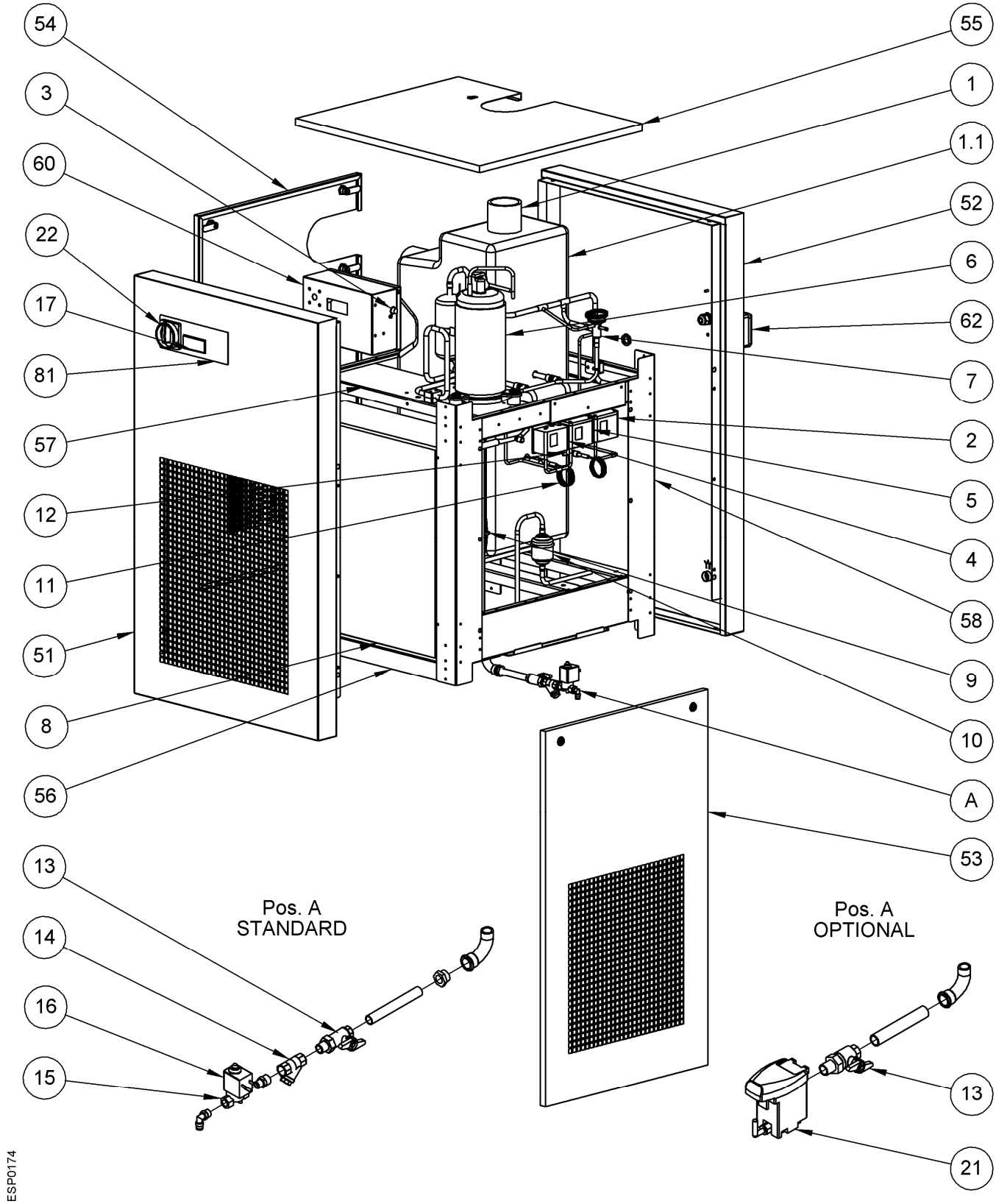
7.1.3 AMD 75 / 75E / 75P



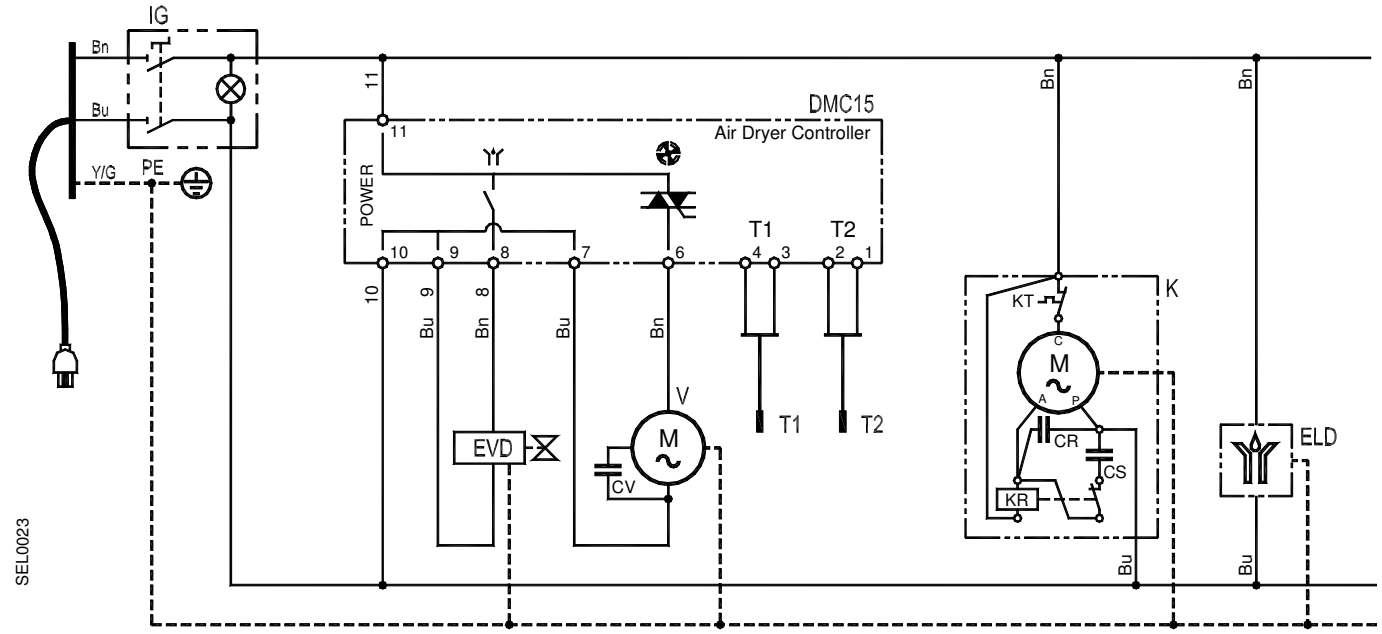
7.1.3 AMD 105-130 / 105E-130E



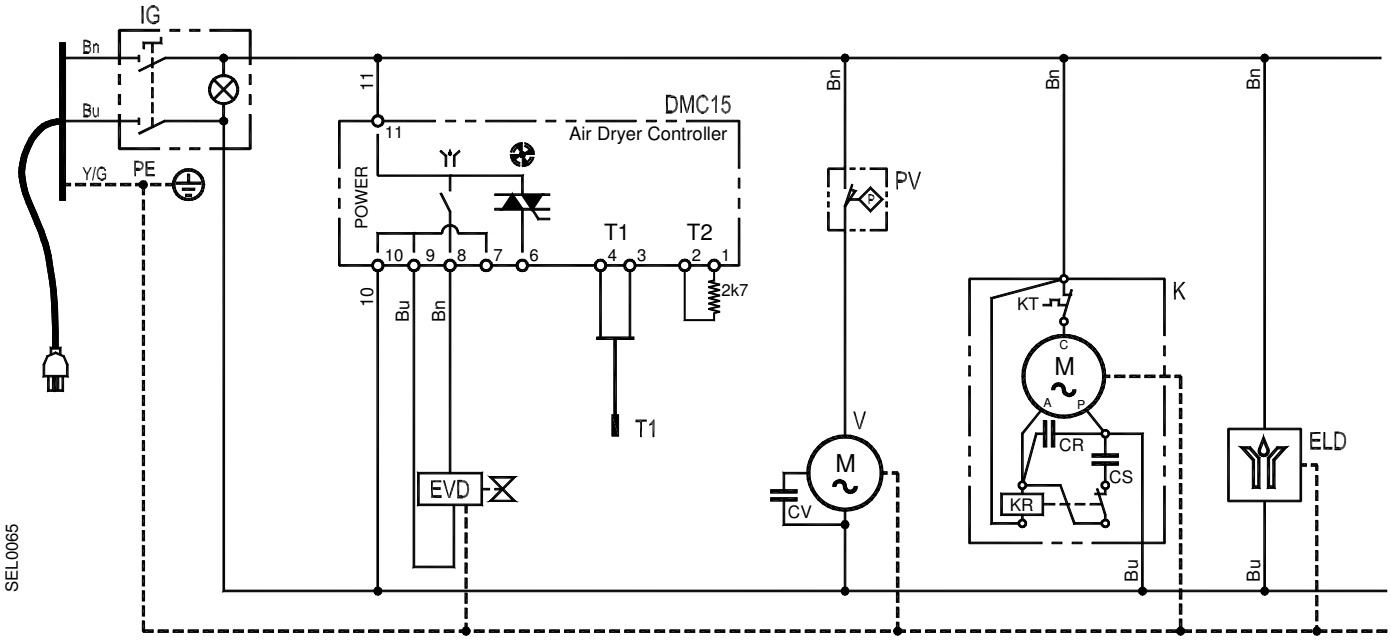
7.1.3 AMD 168 / 168E



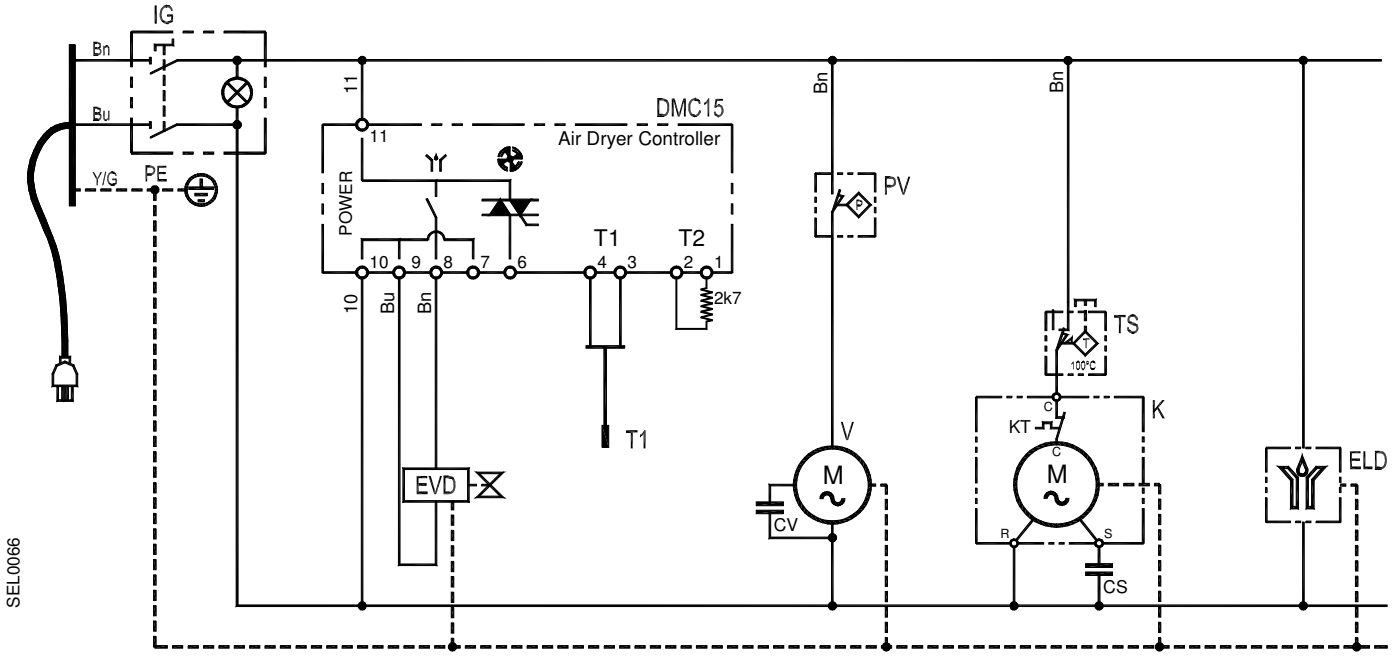
7.3.1 AMD 3-32



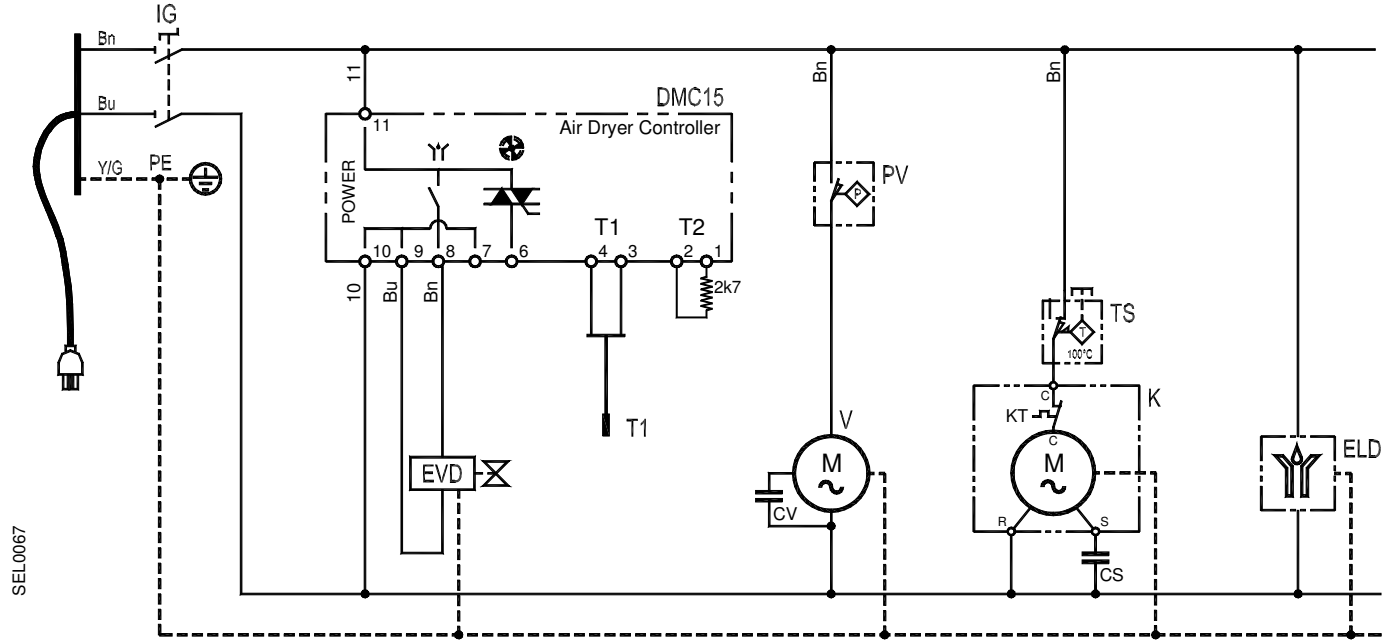
7.3.2 AMD 43-61



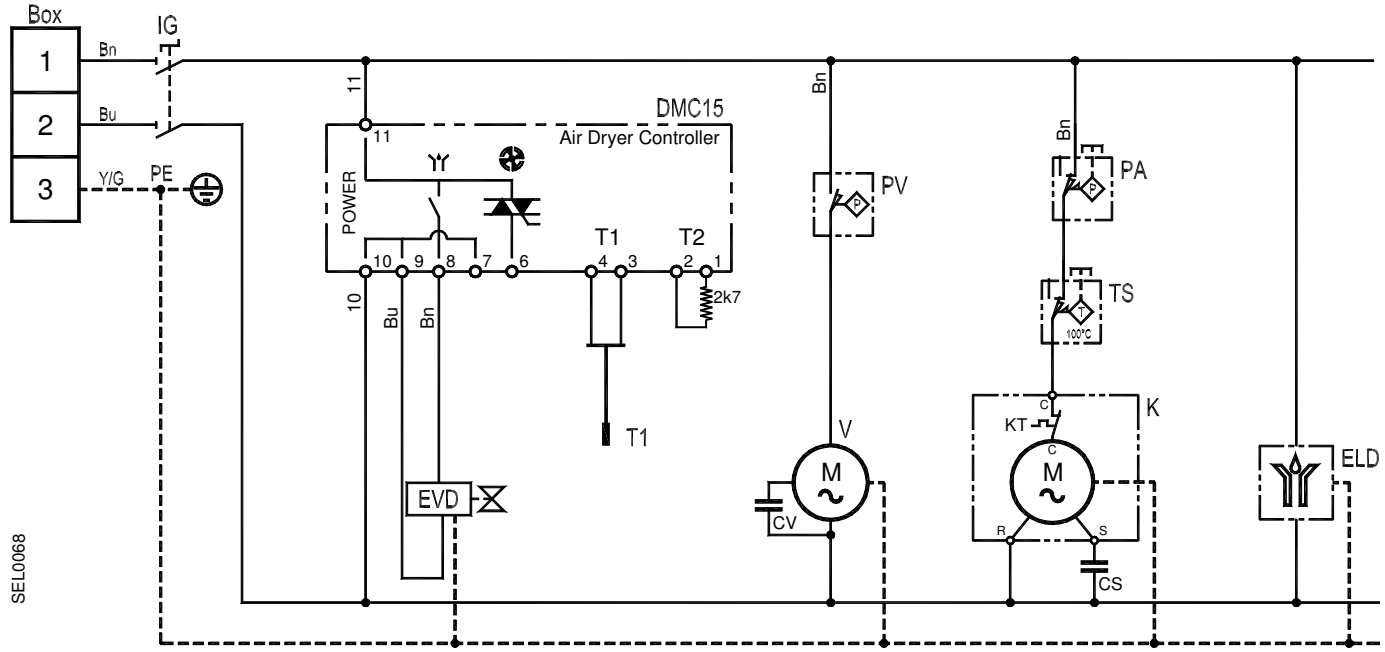
7.3.3 AMD 43E-61E / 43P-61P



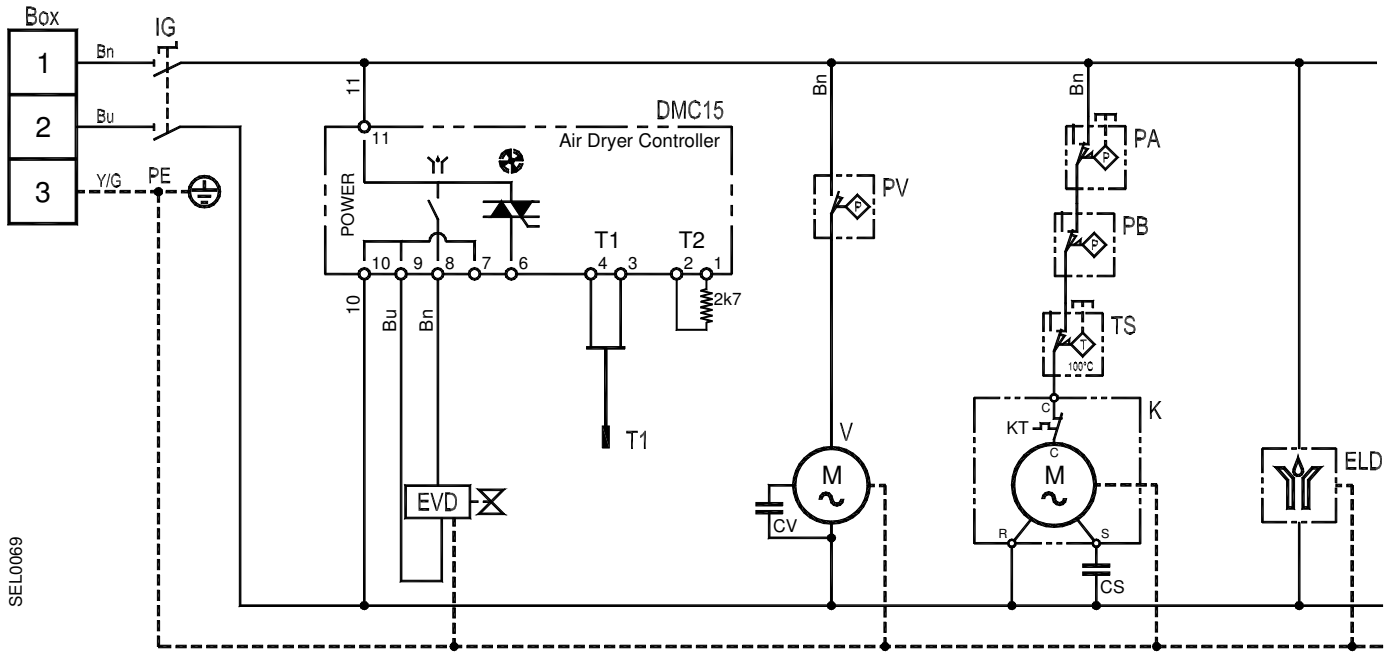
7.3.4 AMD 75 / 75E / 75P



7.3.3 AMD 105-130



7.3.4 AMD 168




iAMD