EN - english

Instructions for installation and operation

Compressed air refrigeration dryer
DRYPOINT® RAc 3 – 220_R513A

05-320 03_00

Dear customer,

Thank you for deciding in favour of the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer. Please read these installation and operating instructions carefully before mounting and starting up the DRYPOINT® RAc 3 – 220_R513A and follow our directions. Perfect functioning of the DRYPOINT® RAc 3 – 220_R513A and thus reliable compressed-air drying can only be guaranteed when the provisions and notes stipulated here are strictly adhered to.

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1 Name plate

The name plate is on the back of the dryer and comprises all primary data of the device. Always refer to these when contacting the manufacturer or the sales department.

All guarantee claims will expire in the event that the name plate is modified or removed.

2 Safety instructions

Please check whether or not these instructions correspond to the device type.

Please adhere to all advice given in these operating instructions. They include essential information which must be observed during installation, operation and maintenance. Therefore, it must be ensured that these operating instructions are read by the fitter and the responsible operator / certified skilled personnel prior to installation, start-up and maintenance**.**

The operating instructions must be accessible at all times at the place of application of the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer.

In addition to these operating instructions, local and national regulations need to be observed, where required .

Ensure that operation of the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer only takes place within the permissible limit values indicated on the name plate. Any deviation from these limit values involves a risk for persons and for the material, and may result in malfunction or a breakdown.

After installing the device correctly and in accordance with the instructions in this manual, the dryer is ready to operate, further settings are not required. Operation is fully automatic and maintenance is limited to several examinations and cleaning measures which are described in the following chapters.

This manual must be available at all times for future reference and is a constituent part of the dryer.

If you have any queries regarding these installation and operating instructions, please contact BEKO TECHNOLOGIES GMBH.

2.1 Safety pictograms in accordance with DIN 4844


Observe operating instructions


General danger symbol


Supply voltage


Danger: component or system under pressure


Hot surfaces


Non-breathable air


Do not use water to extinguish the fire


Do not operate with open cover (housing)


Maintenance works or controlling measures must only be carried out by qualified personnel[1]


Do not smoke


Note

Connection point compressed-air inlet

Connection point compressed-air outlet


Connection point condensate drain

[1] Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance. Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the refrigeration system, with experience and technical training, and who are well-grounded in the respective provisions and laws.

Works can be carried out by the operator of the plant, provided that they are skilled accordingly[2].

NOTE: Text that contains important specifications to be considered – does not refer to safety precautions.

The device was carefully designed with particular attention paid to environmental protection:

- CFC-free refrigerants
- CFC-free insulation material
- Energy-saving design
- Limited acoustic emissions
- Dryer and packaging comprise reusable materials

This symbol advises the user to observe the environmental aspects and comply with the recommendations connected with this symbol.

2.2 Signal words in accordance with ANSI

Danger!	Imminent hazard Consequences of non-observance: serious injury or death
Warning!	Potential hazard Consequences of non-observance: possible serious injury or death
Caution!	Imminent hazard Consequences of non-observance: possible injury or property damage
Notice!	Potential hazard Consequences of non-observance: possible injury or property damage
Important!	Additional advice, info, hints Consequences of non-observance: disadvantages during operation and maintenance, no danger

[2] Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance. Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the refrigeration system, with experience and technical training, and who are well-grounded in the respective provisions and laws.

2.3 Overview of the safety instructions

Certified skilled personnel

Installation works must exclusively be carried out by authorised and qualified skilled personnel. Prior to undertaking any measures on the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer, the certified skilled personnel shall read up on the device by carefully studying the operating instructions. The operator is responsible for the adherence to these provisions. The respective directives in force apply to the qualification and expertise of the certified skilled personnel.

For safe operation, the device must only be installed and operated in accordance with the indications in the operating instructions. In addition, the national and operational statutory provisions and safety regulations, as well as the accident prevention regulations required for the respective case of application, need to be observed during employment. This applies accordingly when accessories are used.

Danger!

Compressed air!

Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting and/or unsecured plant components.

Compressed air is a highly dangerous energy source.

Never work on the dryer when the system is under pressure.

Never direct the compressed-air outlet or condensate drain hoses at persons.

The user is responsible for the proper installation of the dryer. Non-observance of the instructions in the "Installation" chapter leads to the expiration of the guarantee. Improper installation may result in dangerous situations for the personnel and/or the device.

Danger!

Supply voltage!

Contact with non-insulated parts carrying supply voltage involves the risk of an electric shock resulting in injuries and death.

Only qualified and skilled personnel are authorised to run electrically-operated devices. Prior to undertaking maintenance measures at the device, the following requirements must be met:

Make sure that the power supply is switched off and that the device is off and marked for maintenance measures. Please also ensure that the power supply cannot be re-established during the works.

Caution!

Refrigerant!

The compressed-air refrigeration dryer uses HFC-containing refrigerants as a coolant.

Please observe the corresponding paragraph entitled "Maintenance works at the refrigeration cycle".

Warning!

Refrigerant leak!

A refrigerant leak involves the danger of serious injury and damage to the environment.




The DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer contains fluorinated greenhouse gas/refrigerant.

Installation, repair and maintenance works at the refrigeration system must only be carried out by certified skilled personnel (specialists). A certification in accordance with EC regulation 303/2008 must be available.

The requirements of the EC 842/2006 directive must be met under all circumstances.

Please refer to the indications on the name plate as regards the type and amount of refrigerant.

Comply with the following protective measures and rules of conduct:

1. **Storage:** Keep the container tightly closed. Keep it in a cool and dry place. Protect it against heat and direct sunlight. Keep it away from ignition sources.
2. **Handling:** Take measures against electrostatic charging. Ensure good ventilation/suction at the workplace. Check fittings, connections and ducts for tightness. Do not inhale the gas. Avoid contact with the eyes or the skin.
3. Prior to carrying out works on refrigerant-carrying parts, remove the refrigerant to such an extent that safe working is possible.
4. Do not eat, drink or smoke during work. Keep out of the reach of children.
5. **Breathing protection:** ambient-air-independent respirator (at high concentrations).
6. **Eye protection:** sealing goggles.
7. **Hand protection:** protective gloves (e.g. made of leather).
8. **Personal protection:** protective clothing.
9. **Skin protection:** use protective cream.

In addition, the safety data sheet for the refrigerant needs to be observed!

Caution!

Hot surfaces!

During operation, several components can reach surface temperatures of more than +60°C. There is the risk of burns.

All components concerned are installed inside of the closed housing. The housing must only be opened by certified skilled personnel[3].

Caution!

Improper use!

The device is intended for the separation of water in compressed air. The dried air cannot be used for breathing-air purposes and is not suitable for the direct contact with food.

This dryer is not suitable for the treatment of contaminated air or of air containing solids.

[3] Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance. Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the refrigeration system, with experience and technical training, and who are well-grounded in the respective provisions and laws.

Note!

Contaminated intake air!

In the event that the intake air is strongly contaminated (ISO 8573.1 class 3.-3 or poorer quality), we recommend the additional installation of a prefilter (e.g. CLEARPOINT F040), to avoid clogging of the heat exchanger.

Caution!

Heating-up through fire!

In the event of a heating-up through fire, the containers and pipes of the refrigerant system can burst.

In this case, please proceed as follows:
Switch off the refrigeration plant.
Switch off the mechanical ventilation of the machinery compartment.
Use ambient-air-independent respirators.
Containers and plants which are filled with refrigerant can burst violently in the event of fire.
The refrigerants themselves are incombustible, but they are degraded to very toxic products at high temperatures.
Remove the container/plant from the fire zone, as there is the risk of bursting!
Cool down containers and bottles via a directed water jet from a safe position.
In the event of fire, please use an approved fire extinguisher. Water is not a suitable agent to extinguish an electrical fire.

This must only be carried out by persons who are trained and informed about the hazards emanating from the product.

Caution!

Unauthorised intervention!

Unauthorised interventions may endanger persons and plants and lead to malfunction.

Unauthorised interventions, modification and abuse of the pressure devices are prohibited.
The removal of sealings and leadings at safety devices is prohibited.
Operators of the devices must observe the local and national pressure equipment regulations in the country of installation.

Note!

Ambient conditions!

In the event that the dryer is not installed under suitable ambient conditions, the ability of the device to condense refrigerant gas is impaired. This can result in a higher load of the refrigerating compressor, and in a loss of efficiency and performance of the dryer.

This in turn leads to overheated condenser fan motors, to malfunction of electric components and to a breakdown of the dryer. Failures of this type will affect warranty considerations.

Do not install the dryer in an environment in which chemicals with a corrosive effect, explosive gases, toxic gases, evaporation heat, high ambient temperatures or extreme dust and dirt can be found.

3 Proper use

This dryer was designed, manufactured and tested to separate the moisture which normally exists in compressed air. Any other use is considered improper.

The manufacturer shall not be liable for problems occurring as a consequence of improper use. The user alone is responsible for any damage resulting from that.

Furthermore, the correct use includes the compliance with the installation instructions, in particular in respect of:

- The voltage and frequency of the main voltage supply.
- The pressure, temperature and flow rate of the inlet air.
- The ambient temperature.

When delivered, the dryer is tested and fully assembled. The customer only needs to connect the device to the system in accordance with the instructions in the following chapters.

4 Exclusion from a field of application

Note!

Improper use!

The device is intended for the separation of water in compressed air. The dried air cannot be used for breathing-air purposes and is not suitable for the direct contact with food.

This dryer is not suitable for the treatment of contaminated air or of air containing solids.

5 Instructions for the use of pressure equipment according to PED directive 2014/68/EU

The DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer contains pressure equipment in the sense of the 2014/68/EU Pressure Equipment Directive. Therefore, the entire plant needs to be registered with the supervisory authority if required in accordance with the local regulations.

For the examination prior to the start-up and for periodic inspections, the national regulations need to be observed, such as the industrial safety regulation in the Federal Republic of Germany. In countries outside the EU, the respective regulations in force there need to be adhered to.

The proper use of pressure devices is the basic requirement for safe operation. As regards pressure devices, the following points need to be observed:

- The DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer must only be employed within the pressure and temperature range limits indicated by the manufacturer on the name plate.
- No welding must be carried out on the pressure parts.
- The DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer must neither be installed in insufficiently ventilated rooms nor near heat sources or inflammable substances.
- To avoid fractures resulting from material fatigue, the refrigeration dryer should not be exposed to vibrations during operation.
- The maximum operating pressure indicated by the manufacturer on the name plate must not be exceeded. It is the installer's responsibility to install the appropriate safety and control devices. Prior to the start-up of the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer, the connected pressure generator (compressor etc.) must be set to the max. permissible operating pressure. The integrated safeguard needs to be checked by an approved inspection agency.
- The documents related to the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer (manual, operating instructions, manufacturer's declaration etc.) must be kept safe for future reference.
- No objects whatsoever must be installed at or placed on the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer and the connecting lines.
- Installation of the plant in frost-free places only.
- Operation of the plant is only permissible with fully closed and intact housing and cover panels. Operation of the plant with damaged housing/cover panels is prohibited.

6 Transport

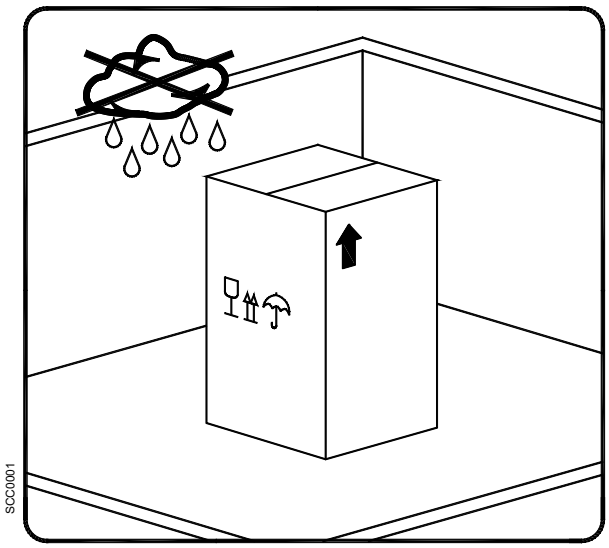
Check the packaging for visible loss or damage. If no visible damage can be ascertained, place the unit in close proximity to the place of installation and unpack the device.

During this procedure, the dryer must always remain in an upright position. The components may be damaged when the unit is tilted or turned upside down.

Store the device in a dry environment and do not expose it to extreme weather conditions.

Handle with care. Strong shocks can cause irreparable damage.

7 Storage



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 temperature of +1°C…50°C, and a specific humidity not exceeding 90%. Should the stocking time exceed 12 months, please contact the manufacturer.

The packaging material is recyclable. Dispose of the material in accordance with the directives and provisions in force in the country of destination

8 Installation

8.1 Place of installation

Note!

Ambient conditions!

In the event that the dryer is not installed under suitable ambient conditions, the ability of the device to condense refrigerant gas is impaired. This can result in a higher load of the refrigerating compressor, and in a loss of efficiency and performance of the dryer.

This in turn leads to overheated condenser fan motors, to malfunction of electric components and to a breakdown of the dryer. Failures of this type will affect warranty considerations.

Do not install the dryer in an environment in which chemicals with a corrosive effect, explosive gases, toxic gases, evaporation heat, high ambient temperatures or extreme dust and dirt can be found.

Minimum installation requirements:

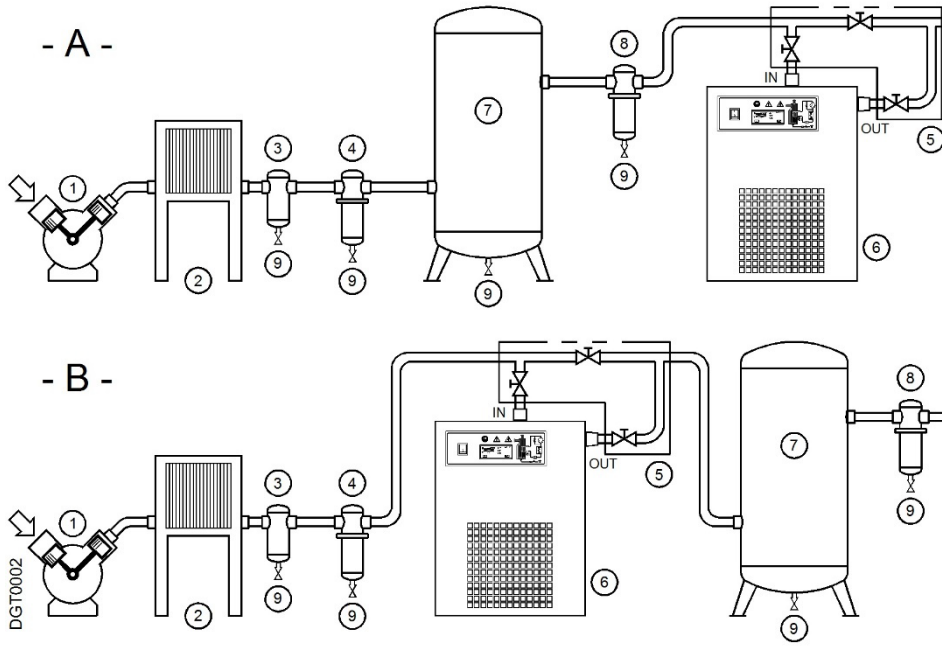
- Choose an area which is clean and dry, free from dust and protected against atmospheric disturbances.
- The load-bearing zone must be even, horizontal and able to bear the weight of the dryer.
- Minimum ambient temperature +1°C.
- Maximum ambient temperature +45°C.
- Ensure a proper cooling air replacement.
- Allow a sufficient clearance on each side of the dryer for proper ventilation and to facilitate maintenance operations. The dryer does not require attachment to the floor surface.

Do not obstruct the ventilation grille (not even partially).

Prevent any recirculation of the outgoing cooling air.

Protect the dryer against draughts.

8.2 Installation plan



1 Air compressor
2 Aftercooler
3 Condensate separator
4 Prefilter
5 Bypass group
6 Dryer
7 Compressed-air tank
8 Final filter
9 Bekomat condensate drain

Installation **type A** is recommended when the total consumption corresponds to the throughput rate of the compressor. Installation **type B** is recommended when the air consumption constantly varies, with peak values which considerably exceed the throughput rate of the compressor. The storage capacity of the tank must be dimensioned in such a way that a possible short-term high air demand (peak air consumption) can be compensated.

Do not obstruct the ventilation grille (not even partially).

Prevent any recirculation of the outgoing cooling air.

Protect the dryer against draughts.

Note!

Contaminated intake air!

In the event that the intake air is strongly contaminated (ISO 8573.1 class 3.-3 or poorer quality), we recommend the additional installation of a prefilter (e.g. CLEARPOINT F040), to avoid clogging of the heat exchanger.

8.3 Correction factors

Correction factor for operating pressure modifications:									
Air inlet pressure	bar(g)	4	5	6	7	8	10	12	14	16
Factor (F1)		0.77	0.86	0.93	1.00	1.05	1.14	1.21	1.27	1.33

Correction factor for ambient temperature modifications (air cooling):						
Ambient temperature	°C	≤25	30	35	40	45
Factor (F2)		1.00	0.95	0.88	0.79	0.68

Correction factor for air inlet temperature modifications:							
Air temperature	°C	≤30	35	40	45	50	55
Factor (F3)		1.11	1.00	0.81	0.67	0.55	0.45

Correction factor for dew point modifications:					
Pressure dew point	°C	3	5	7	10
Factor (F4)		1.00	1.09	1.19	1.37

Calculation of the actual air throughput:

Actual air throughput = air throughput acc. to planning x factor (F1) x factor (F2) x factor (F3) x factor (F4)

Example:

The DRYPOINT RAc 18 has a planned nominal capacity of 108 m³/h. The highest achievable air mass under the following operating conditions is:

Air inlet pressure = 8 bar(g) ⇨ Factor (F1) = 1.05
Ambient temperature = 35°C ⇨ Factor (F2) = 0.88
Air inlet temperature = 40°C ⇨ Factor (F3) = 0.81
Pressure dew point = 5°C ⇨ Factor (F4) = 1.09

Every function parameter corresponds to a numerical factor which, multiplied by the planned nominal capacity, determines the following:

Actual air throughput = 108 x 1.05 x 0.88 x 0.81 x 1.09 = 88 m³/h

88 m³/h is the maximum flow rate of the dryer under the aforementioned operating conditions.

Selection of the best suitable model in accordance with the operating conditions:

$$\textbf{Air throughput acc. to planning} = \frac{\textbf{Requ. air throughput}}{\textbf{Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)}}$$

Example:

The following operating parameters are known:

Required air mass = 100 m3/h
Air inlet pressure = 8 bar(g) ⇨ Factor (F1) = 1.05
Ambient temperature = 35°C ⇨ Factor (F2) = 0.88
Air inlet temperature = 40°C ⇨ Factor (F3) = 0.81
Pressure dew point = 5°C ⇨ Factor (F4) = 1.09

To find out the correct dryer version, the required air mass must be divided by the correction factors of the parameters indicated above:

$$\textbf{Air throughput acc. to planning} = \frac{\textbf{100}}{\textbf{1.05 x 0.88 x 0.81 x 1.09}} = \textbf{122 m³/h}$$

The suitable model for these requirements is **DRYPOINT RAC 25** (with a spec. nominal capacity of 150 m³/h).

8.4 Connection to the compressed-air system

Danger!
Compressed air!

All works must only be carried out by qualified skilled personnel.

Never work on compressed-air systems which are under pressure.

The operator or the user must ensure that the dryer is never operated with a pressure exceeding the maximum pressure value indicated on the name plate.

Exceeding the maximum operating pressure can be dangerous for the operator but also for the device.

The air temperature and the air flow at the inlet of the dryer must lie within the limit values indicated on the name plate. The connecting lines must be free from dust, iron rust, shards and other contaminations and correspond to the flow rate of the dryer. Should air with a very high temperature be treated, the installation of an aftercooler may be necessary. For the implementation of maintenance works, the installation of a bypass system is recommended.

The dryer was designed in such a manner that vibrations that may occur during operation are limited. Therefore, it is advisable to employ connecting lines (flexible hoses, vibration-inhibiting fittings etc.) which protect the dryer against possible vibrations in the pipework.

Note!

Contaminated intake air!

In the event that the intake air is strongly contaminated (ISO 8573.1 class 3.-3) or poorer quality, we recommend the additional installation of a prefilter (e.g. CLEARPOINT F040), to avoid clogging of the heat exchanger.

8.5 Electrical connections

Danger!
Supply voltage!

The connection to the electric mains should only be carried out by qualified skilled personnel and must correspond to the legal provisions in force in your region.

Prior to connecting the device, please check the name plate to avoid exceeding the indicated values. The voltage tolerance is +/- 10%.

Dryers are supplied with a VDE 16A standard power cord and safety plug (two-pole and earth connection).

Make sure that suitable fuses or circuit breakers in accordance with the indications on the name plate are available.

A residual-current device (RCD) with I∆n =0.03A is suggested. The cross-section of the power supply cable must correspond to the power consumption of the dryer. In this respect, the ambient temperature, the cable laying conditions, the length of the cables and the requirements of the local electricity supplier need to be considered.

RAc 190 – 220

CAUTION:

ATTENTION SHOULD BE PAID ON THE ROTATING DIRECTION OF THE COMPRESSOR !

The rotating direction of the compressor in this machine is cheched out by a Reverse Phase Protector (RPP).

If the compressor does not run, the rotating direction must be changed by swapping two phases. These changes have to be done only by a qualified electrician.

DO NOT BY PASS RPP PROTECTION: BY OPERATING THE MACHINE IN WRONG ROTATING DIRECTION, THE COMPRESSOR WILL FAIL IMMEDIATELY AND THE WARRANTY WILL BE VOIDED.

Danger!
Supply voltage and missing earth connection!

Important: ensure that the plant is connected to earth.

Do not use plug adapters at the power plug.

Possible replacement of the power plug must only be carried out by a qualified electrician.

8.6 Condensate drain

Danger!

Compressed air and condensate under pressure!

The condensate is discharged at system pressure.

The drain pipe needs to be secured.

Never direct the condensate drain pipe at persons.

The dryer is delivered with an already integrated electronically level-controlled BEKOMAT condensate drain. Connect the condensate drain with a collection system or container by properly screwing it on.

Do not connect the drain with pressurised plants.

Do not discharge the condensate into the environment.

The condensate accumulating in the dryer contains oil particles which were released into the air by the compressor.

Dispose of the condensate in accordance with the local provisions.

It is advisable to install a water-oil separator, to which the total amount of condensate from the compressors, dryers, tanks, filters etc. is supplied.

We recommend ÖWAMAT oil-water separators for dispersed compressor condensate and BEKOSPLIT emulsion-splitting plants for emulsified condensate.

9 Start-up

9.1 Preliminary stages

Note!

Exceeding of the operating parameters!

Ensure that the operating parameters comply with the nominal values indicated on the name plate of the dryer (voltage, frequency, air pressure, air temperature, ambient temperature etc.).

Prior to delivery, this dryer was thoroughly tested, packed and checked. Please verify the soundness of the dryer during the initial start-up and check the perfect functioning during the first operating hours.

The initial start-up must be carried out by qualified personnel.

During the installation and operation of this device, all national regulations regarding electronics and any other federal and state ordinances, as well as local provisions, need to be adhered to.

The operator and the user must ensure that the dryer is not operated without panels.

9.2 Initial start-up

Note!

The dryer **must not be started up more than six times an hour**. Wait at least five minutes prior to every restart.

The user is responsible for the compliance with these provisions. Irreparable damage can be caused by starting up the device too often.

The method below should be applied during the first start-up, after longer downtimes or subsequent to maintenance works.

The start-up must be carried out by certified skilled personnel.

Processing sequence (see Section 11.1 "Control panel")

- Ensure that all steps of the "Installation" chapter have been carried out.
- Ensure that the connection to the compressed-air system is in accordance with the provisions and that the lines are fixed and supported properly.
- Ensure that the condensate drain pipe is fixed in accordance with the provisions and that it is connected with a collection system or a container.
- Ensure that the bypass system (if installed) is open and that the dryer is disconnected from the compressed-air system.
- Ensure that the manual valve of the condensate drainage cycle is open.
- Remove any packaging material and other items which may block the space around the dryer.
- Establish the mains connection (plug into socket).
- RAc 190 – 220 - Turn on the main switch - pos. A on the control panel
- RAc 190 – 220 - Wait at least two hours before starting the dryer (compressor crankcase heater must heat the oil of the compressor).
- Start the dryer by switching on the main switch on the control panel (pos. 1).
- Make sure that the DMC 36 electronic control unit is switched on.
- RAc 190 – 220 - If the compressor does not run, the rotating direction must be changed by swapping two phases. These changes have to be done only by a qualified electrician
- Ensure that the power consumption complies with the values on the name plate.
- RAc 190 – 220 - Check the rotation direction of the fan – wait for its first interventions
- Wait until the dew point remains stable.
- Slowly open the air inlet valve.
- Slowly open the air outlet valve.
- Slowly close the central bypass valve of the system (if installed).
- Check the pipes for air leakage.
- Ensure the proper functioning of the condensate drain cycle (wait for the first condensate discharges).

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 runs continuously. The dryer needs to be switched on during the entire compressed-air usage time, even if the compressed-air compressor works periodically.

RAc 190 – 220

CAUTION:

ATTENTION SHOULD BE PAID ON THE ROTATING DIRECTION OF THE COMPRESSOR !

The rotating direction of the compressor in this machine is cheched out by a Reverse Phase Protector (RPP).

If the compressor does not run, the rotating direction must be changed by swapping two phases. These changes have to be done only by a qualified electrician.

DO NOT BY PASS RPP PROTECTION: BY OPERATING THE MACHINE IN WRONG ROTATING DIRECTION, THE COMPRESSOR WILL FAIL IMMEDIATELY AND THE WARRANTY WILL BE VOIDED.

9.3 Shut down and restart

RAc 190 – 220 - For short periods of inactivity, (max 2-3 days) we recommend that power is maintained to the dryer and the control panel. Otherwise, before re-starting the dryer, it is necessary to wait at least 2 hours for the compressor crankcase heater to heat the oil of the compressor.

Shut down (see Section 11.1 "Control panel")

- Ensure that the dew point temperature indicated on the DMC 36 electronic control unit is stable.
- Interrupt the compressed-air supply.
- After a few minutes, stop the dryer by switching off the main switch on the control panel (pos. 1).

Restart (see Section 11.1 "Control panel")

- Make sure that the condenser is clean
- Check whether or not voltage is applied at the dryer.
- Start the dryer by switching on the main switch on the control panel (pos. 1).
- Ensure that the DMC 36 electronic control unit is switched on.
- Wait a few minutes and then check, whether or not the dew point temperature indicated on the DMC 36 electronic control unit is stable and whether or not the condensate is drained off at regular intervals.
- Establish the compressed-air supply.

RAc 190 – 220 - Dryer remote control ON-OFF

- Remove jump on terminals 1 and 2 of the terminal strip and wire a dry contact – potential free (see electric diagram).
- Turn ON the switch - pos. 1 on the control panel.
- Close contact on terminal 1 and 2 switch ON the dryer
- Open contact on terminal 1 and 2 switch OFF the dryer

Use dry contacts only (potential free) suitable for 230 Vac. Assure an adequate isolation of potentially dangerous powered parts.

CAUTION :
AUTO-RESTART / REMOTE ON-OFF.
THE DRYER MAY POWER UP WITHOUT BEING ACTED UPON.
THE USER WILL BE RESPONSIBLE FOR THE INSTALLATION OF PROPER PROTECTIONS FOR POSSIBLE SUDDEN POWER RESTORATION TO THE DRYER.

During the operation, the refrigerating compressor runs continuously. The dryer needs to be switched on during the entire compressed-air usage time, even if the compressed-air compressor works periodically.

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.).

Note!

The dryer **must not be started up more than six times an hour**. Wait at least five minutes prior to every restart.

The user is responsible for the compliance with these provisions. Irreparable damage can be caused when starting up the device too often.

MODEL RAc		3	6	9	12	18	25	32	43	52	61	75	105	130	168	190	220
Air flow rate at nominal condition (1)	[m3/h]	21	36	57	72	108	150	192	258	312	366	450	630	780	1008	1140	1320
	[l/min]	350	600	950	1200	1800	2500	3200	4300	5200	6100	7500	10500	13000	16800	19000	22000
	[scfm]	12	21	34	42	64	88	113	152	184	216	265	371	459	594	671	777
Pressure DewPoint at nominal condition (1)	[°C]	3															
Nominal ambient temperature	[°C]	25															
Min...Max ambient temperature	[°C]	1 ... 45															
Nominal inlet air temperature (max.)	[°C]	35 (55)															
Nominal inlet air pressure	[barg]	7															
Max. inlet air pressure	[barg]	16															
Air pressure drop - Δp	[bar]	0,23	0,07	0,18	0,09	0,20	0,11	0,07	0,13	0,19	0,11	0,17	0,16	0,25	0,14	0,18	0,25
Inlet - Outlet connections	[BSP-F]	G 1/2"					G 1"	G 1.1/4"			G 1.1/2"		G 2"		G 2.1/2"		
Refrigerant type		R513A															
Refrigerant quantity (2)	[kg]	0,12	0,11	0,12	0,17	0,19	0,23	0,31	0,35	0,38	0,60	0,60	0,85	1,05	1,50	1,30	1,40
Cooling air fan flow	[m3/h]	200	200	200	200	300	300	300	300	400	400	450	450	2400	2600	3100	3000
Heat Rejection	[kW]	0,32	0,55	0,86	1,1	1,6	2,3	2,8	3,8	4,6	5,4	6,6	9,0	11,0	14,0	16,0	19,0
Standard Power Supply (2)	[Ph/V/Hz]	1/230/50-60						1/230/50								3/400/50	
Nominal electric consumption @50Hz	[kW]	0,11	0,16	0,18	0,19	0,31	0,33	0,54	0,49	0,49	0,66	0,80	1,20	1,60	1,70	1,90	2,00
	[A]	0,8	1,2	1,3	1,3	2,1	2,1	3,3	2,2	2,2	3,2	4,0	5,6	7,4	7,6	3,7	3,8
Nominal electric consumption @60Hz	[kW]	0,12	0,17	0,20	0,21	0,37	0,39	[-]									
	[A]	0,8	1,1	1,2	1,2	2,1	2,1	]-]									
Full Load Amperage FLA	[A]	1,0	1,4	1,5	1,5	2,7	2,7	3,8	3,9	4,9	5,9	7,7	9,2	12,2	14,1	6,2	6,2
Max. noise level at 1 m	[dbA]	< 70															
Weight	[kg]	22	24	24	25	30	34	38	41	60	62	64	90	101	114	119	121

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

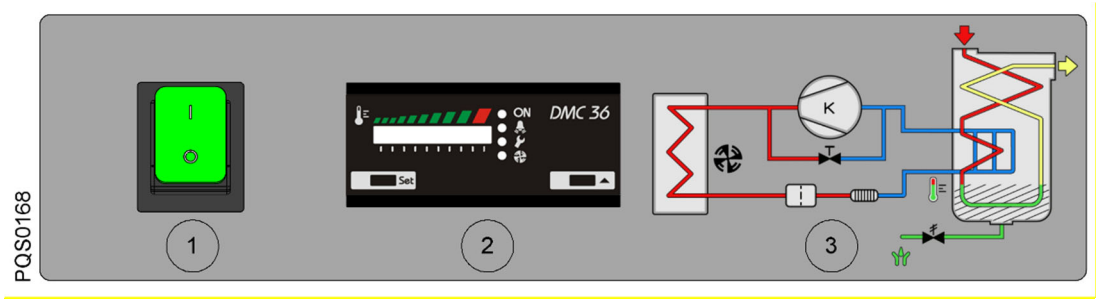
(2) Check the data shown on the identification plate.

11 Technical description

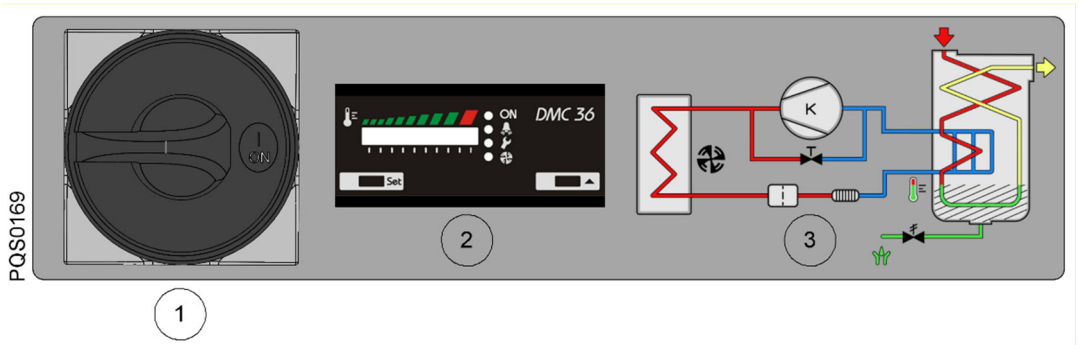
11.1 Control panel

The control panel explained below is the only dryer user interface.

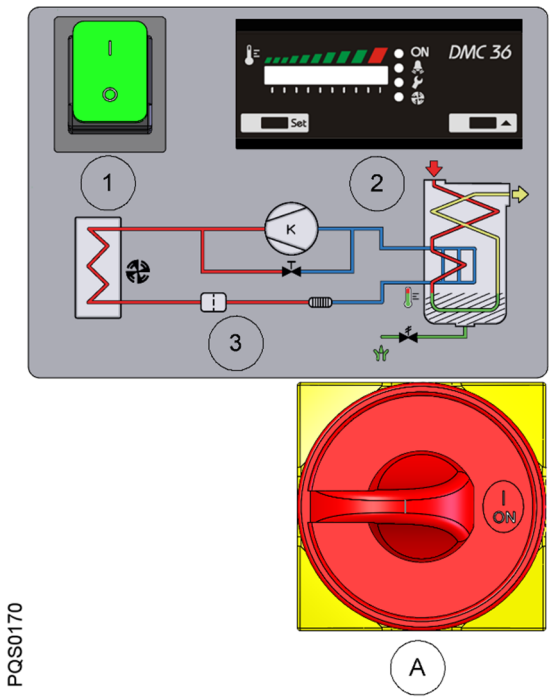
RAc 3 – 75



RAc 105 – 168



RAc 190 – 220



A Main switch

1 ON-OFF Switch

2 Electronic instrument

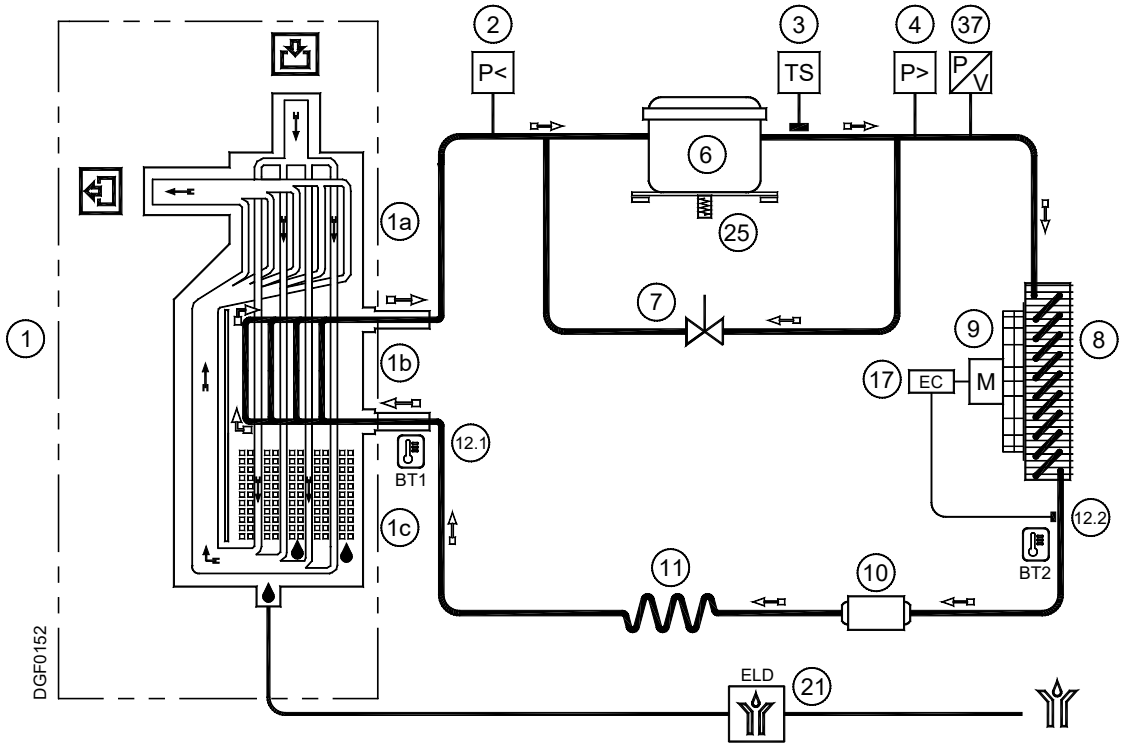
3 Air and refrigerant flow diagram

11.2 Functional description

Operating principle – All dryer models described in this manual function according to the same principle. The hot and moisture-loaded air is led into an air/air heat exchanger. Afterwards, the air flows through an evaporator, which is also known as an air/refrigerant heat exchanger. The air temperature is reduced to approximately 2°C, so that water vapour condenses to liquid. The continuously accumulating condensate is collected in the separator to be discharged via the condensate drain. Subsequently, the cold and dry air is led through the air/air heat exchanger, so that it is reheated to up to 8°C below the inlet temperature when leaving the dryer.

Refrigeration cycle – The refrigerant is conducted through the compressor and reaches a condenser under high pressure. There, cooling-down takes place, making the refrigerant condense to a liquid state which is under high pressure. The liquid is pressed through a capillary tube where the resulting pressure drop ensures that the refrigerant evaporates at a defined temperature. The liquid refrigerant which is under low pressure is led into the heat exchanger, where it expands. The cold resulting from the expansion serves to cool down the compressed air in the heat exchanger. During this process, the refrigerant evaporates. The low-pressure gas is resupplied to the compressor, where it is compressed again. It then re-enters the cycle. In phases of a reduced compressed-air load, the excess refrigerant is resupplied automatically to the compressor via the hot gas bypass valve.

11.3 Flow chart



1	Alu-Dry module	**9**	Condenser fan
1a	Air-to-air heat exchanger	**10**	Filter dryer
1b	Air-to-refrigerant heat exchanger	**11**	Capillary tube
1c	Condensate separator	**12.1**	Temperature probe BT1 – DewPoint
2	Refrigerant pressure switch LPS (RAc 168-220)	**12.2**	Temperature probe BT2 – Fan control (RAc 3 - 32)
3	Safety thermo switch TS (RAc 75 - 220)	**13**	Condensate drain service valve
4	Refrigerant pressure switch HPS (RAc 105 - 220)	**17**	Electronic instrument
6	Compressor	**21**	Electronic drainer
7	Hot gas by-pass valve	**37**	Press. Transducer BP2 – Fan control (RAc 43-220)
8	Condenser		

Compressed air flow direction

Refrigerant gas flow direction

11.4 Refrigerating compressor

The employed refrigerating compressors are constructed by leading manufacturers. The hermetically sealed construction is absolutely gastight. The integrated safeguard protects the compressor against overheating and excess current. The protection is automatically reset as soon as the nominal conditions are reached again.

11.5 Condenser

The condenser is the component in which the gas coming from the compressor is cooled down, condensed and liquefied. Under no circumstances must the temperature of the ambient air exceed the nominal values. It is also important that the condenser unit is kept free from dust and other impurities.

11.6 Filter dryer

Despite controlled vacuuming, traces of moisture can accumulate in the refrigeration cycle. The filter dryer serves to absorb this moisture and to bond it.

11.7 Capillary tube

The capillary tube is a copper tube with a reduced diameter which is located between the condenser and the evaporator, serving as a restrictor to reduce the pressure of the refrigerant. The pressure reduction serves to reach an optimum temperature inside of the evaporator. The lower the outlet pressure at the capillary tube, the lower the evaporation temperature.

The length and the inner diameter of the capillary tube are exactly dimensioned to ensure the performance of the dryer. Settings or maintenance works are not required.

11.8 Compressed air heat exchanger

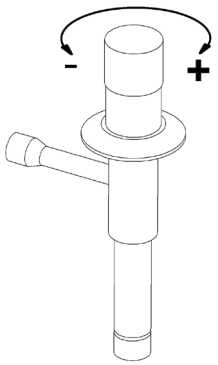
The heat exchanger module consists of an air/air heat exchanger, an air/refrigerant heat exchanger, and of a high-performance separator. The compressed air flows top-down through the heat exchanger. The large cross-sections of the flow passages cause low flow rates and low compressed-air losses. In the air/air heat exchanger, the heat exchange is effected in a reverse current. This guarantees maximum heat transfer. The heat transfer in the air/refrigerant heat exchanger also takes place in a reverse current. This allows full evaporation of the refrigerant. The high-performance separator ensures almost complete separation of the condensate. Maintenance of the high-performance separator is not required.

11.9 Hot-gas bypass valve

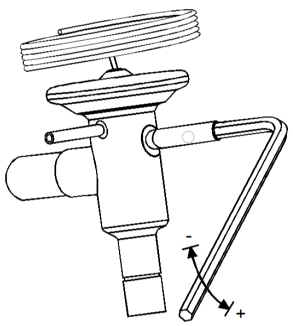
At partial load, the valve directly returns a part of the hot gas to the suction line of the refrigerating compressor. The evaporation temperature and the evaporation pressure remain constant.

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 refrigerating engineer.
WARNING
the use of ¼" Schrader service valves must be justified by a real malfunction of the refrigerating 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 : R513A pressure 2.3 barg (+0.1 / -0 bar)

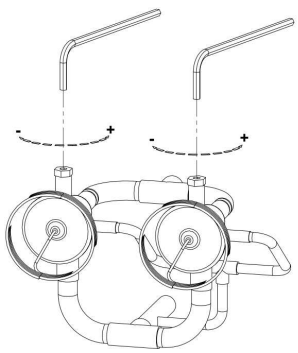
RAc 3 – 32



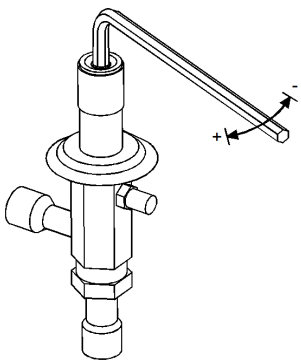
RAc 43 – 52



RAc 61 – 75



RAc 105 – 220



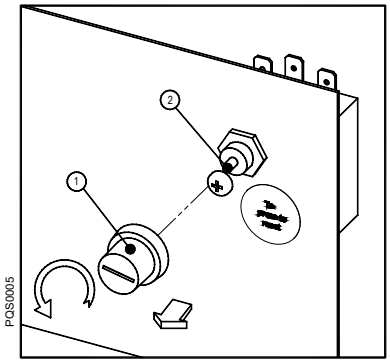
11.10 Refrigerant pressure switches LPS – HPS

To ensure the operational reliability and the protection of the dryer, a series of pressure switches are installed in the gas cycle.

LPS : Low-pressure guard on the suction side of the compressor, which is triggered when the pressure drops below the predetermined value. The values are reset automatically as soon as the nominal conditions are re-established.
Calibrated pressure : R513A Stopp 0.7 barg - Restart 1.7 barg

HPS : The high-pressure control unit on the discharge side of the compressor is activated when the pressure exceeds the predetermined value. It has a manual reset button on the control itself.
Calibrated pressure : R513A Stopp 20.8 barg - Manuell reset

11.11 Safety temperature switch TS



To ensure the operational safety and the soundness of the dryer, a safety temperature switch (TS) is installed at the refrigeration cycle. In the event that the pressure gas temperature is too high, the sensor of the temperature switch will stop the refrigerating compressor to prevent the pressure gas temperature getting too high.

The temperature switch is reset manually, but only when the normal operating conditions are reached again. Unscrew the cover (see pos. 1 in the illustration) and press the reset button (see position 2 in the illustration).

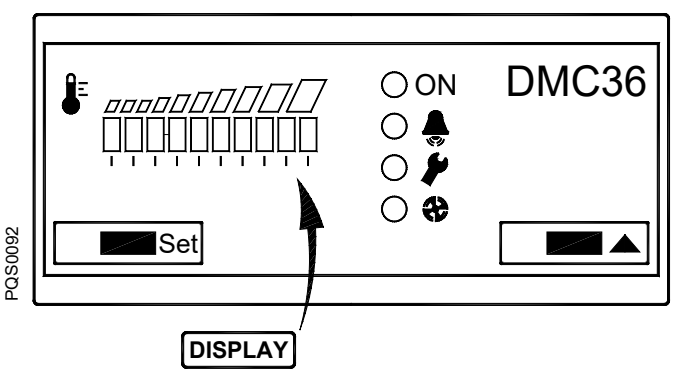
TS setting : temperature 113 °C (+0 / -6 °K)

11.12 Compressor crankcase heater (RAc 190-220)

At low temperatures oil can more easily be mixed with the refrigerant gas. So, when the compressor starts, oil can be drawn into the refrigeration circuit and liquid hammering could occur.
To prevent this, an electrical resistance heater is installed in the suction side of the compressor. When the system is powered and the compressor is not running, this heater keeps the oil at the correct temperature.
This heater is controlled by a thermo switch which prevents overheating the oil.

NOTE : The heater must be powered at least a couple of hours before the start up of the refrigeration compressor

11.13 Electronic instrument DMC36



ON Led – Power ON

Led – Alarm active

Led – Service reminder

Led – Condenser fan ON

Set Button – Setup menu access

Button – Increase

The DMC36 displays DewPoint temperature, controls the condenser fan activation, handles a service reminder and keep record of the total hours of operation of the dryer.

11.13.1 How to switch on the dryer

Power the dryer and switch it on using the ON-OFF switch (pos.1 paragraph 7.1).

During normal operation led ON is ON and the display shows the DewPoint temperature by means of two coloured areas (green and red) above a 10 Led display :

- Green area - operating conditions ensuring an optimal DewPoint;
- Red area - DewPoint too high, the dryer is operating with high thermal load (high inlet air temperature, high ambient temperature, etc.). Compressed air treatment may be improper.

Led shows that one or more service warnings / alarms are active.

Led shows that dryer requires the scheduled service/controls.

Led shows that condenser fan is ON.

11.13.2 How to switch off the dryer

Switch it off using the ON-OFF switch (pos. 1 paragraph 7.1).

11.13.3 How a service warning / alarm is displayed

A service warning / alarm is an unusual event that must recall the attention of the operators / maintenance technicians. It does not stop the dryer.

Service warnings / alarms are automatically reset as soon as the problem is solved and dryer is powered again. Scheduled Service reminder requires manual reset.

NOTE: the operator / maintenance technician must inspect the dryer and verify / solve the problem that generated the service warning.

Service Warning / Alarm	Description
Led and display 1st (left) and 10th (right) led are flashing	Failure BT1 (DewPoint) temperature probe.
Led and led are flashing	Failure BT2/BP2 (fan control) probe. NOTE : fan is forced always ON.
Led and display 1st (left) led are flashing	DewPoint too low (lower than -1°C / 30°F).
Led is flashing, display shows actual DewPoint	DewPoint too high (Higher than activation temperature - see setup)
Led and led are flashing	Service reminder timer has expired

11.13.4 How is controlled the condenser fan

RAc 3 - 32 A temperature probe BT2 is located on the discharge side of the condenser. The condenser fan is activated (ON) when the BT2 temperature is higher than FANon setting (approx. 35°C/96°F) and led ○ is ON. Condenser fan stops when BT2 temperatures is lower than FANoff setting (approx. 30°C/86°F).

RAc 43 - 220 A pressure probe BP2 is located on the discharge side of the compressor. The condenser fan is activated (ON) when the BP2 pressure is higher than FANon setting (approx. 18 barg/260 psig) and led ○ is ON. Condenser fan stops when BP2 pressure is lower than FANoff setting (approx. 14 barg/203 psig).

11.13.5 How the service reminder timing is displayed

Keep pressed [▲] button to display the time elapsed since the last reset of the service reminder timer (factory set 8000 hours).

Led ○ is lit up and the numbers of led in the 10 led bar indicates the number of hours :

Led	*Hours*
1	0…800
2	801…1600
3	1601…2400
4	2401…3200
5	3201…4000
6	4001…4800
7	4801…5600
8	5601…6400
9	6401…7200
10	7201…8000
10 blinking	>8001

After expiring time (8000 hours) leds 1…10 are lit up and ○ led is lit up and dryer requires service.
After service, service warning need to be reset

11.13.6 How to reset the service reminder timer

With dryer OFF keep pressed buttons [Set] and [▲], power the dryer and switch it on using the ON-OFF switch (pos.1 paragraph 7.1).

After 5 seconds ○ led is lit up and 10 led bar if OFF, release buttons [Set] and [▲], keep pressed button [▲] for 5 seconds. Timer has been reset and controller start to operate regularly.
Service reminder timing can be reset at any time, even before the timing has expired

11.13.7 How to display the total hours of operation

Total hours of operation are recorded into DMC36 and are shown through the dew point indication bar (max value 109900 hours, cannot be reset).

With dryer ON press buttons [Set] and [▲] for at least 5 seconds.

Led ○ ON is lit and a certain numbers of leds of dew point indication bar are light up. The number of leds lit define the 1st digit of hour counter (ie : no leds lit → 1st digit =0)

Press [▲] button, led ○ is lit and a certain numbers of leds of dew point indication bar are light up. The number of leds lit define the 2nd digit of hour counter (ie : n.3 leds lit → 2nd digit = 3)

Press [▲] button, led ○ is lit and a certain numbers of leds of dew point indication bar are light up. The number of leds lit define the 3rd digit of hour counter (ie : n.8 leds lit → 3rd digit = 8)

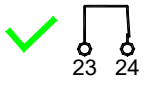
Total operating hours : 0 3 8 x 100 (fixed multiplying ratio) = 3800 hours

Press [▲] button repeatedly to scroll the displaying of 3 digits again.

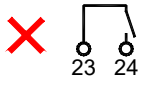
Press [Set] button to exit total hours display (if no button is pressed after 30 seconds the menu is exited automatically).

11.13.8 Operation of the failure / alarm dry contact

The DMC36 is equipped with a dry contact (potential free) to display failure and/or alarm conditions.



Dryer powered and no service warning / alarm is active.



Dryer not powered or service warning / alarm is active.

11.13.9 How to change the operating parameters – SETUP menu

The setup menu can be used to change the dryer's operating parameters.

Only qualified personnel must be allowed to access to the setup menu. The manufacturer is not responsible for malfunctioning or failure due to modification to the operating parameters.

With dryer ON press button Set for at least 2 seconds to enter the setup menu.

Access to the menu is confirmed by led ○ ON flashing.

Keep Set pressed and use arrows ▲ to change the value. Release the button Set to confirm the value. Press shortly Set to skip to following parameter.

Press ▲ to exit setup menu (if no button is pressed after 2 minutes the menu is exited automatically).

Display	Description	Limits	Standard setup
Flashing led ○ ON + led ○ 🔔	High DewPoint alarm activation temperature	Led 1… 10	Led 9
Flashing led ○ ON + led ○ 🔧	Service - Service warning configurator	Service warning is : Led 1 = displayed and activates alarm contact Led 3 = displayed and DO NOT activates alarm contact Led 5 = NOT displayed and DO NOT activates alarm contact	Led 1

11.14 Electronically level-controlled BEKOMAT condensate drain

The electronically level-controlled BEKOMAT condensate drain boasts a special condensate management which ensures that condensate is discharged safely and without an unnecessary loss of compressed air. This drain has a condensate collection container in which a capacitive sensor continuously monitors the liquid level. As soon as the switching level is reached, the capacitive sensor transmits a signal to the electronic control and a membrane solenoid valve opens to discharge the condensate. The BEKOMAT closes before compressed air emerges.

Note!

These BEKOMAT condensate drains were designed in particular for the operation in a **DRYPOINT RAc** refrigeration dryer. The installation in other compressed-air processing systems or the replacement with another drain brand can lead to malfunction. The maximum operating pressure (see name plate) must not be exceeded!

Ensure that the upstream valve is open when the dryer starts operation.

To obtain detailed information regarding drain functions, troubleshooting, maintenance and spare parts, please read the installation and operating instructions of the BEKOMAT condensate drain.

12 Maintenance, troubleshooting, spare parts and dismantling

12.1 Checks and maintenance

Certified skilled personnel

Installation works must exclusively be carried out by authorised and qualified skilled personnel. Prior to undertaking any measures on the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer, the certified skilled personnel[4] shall read up on the device by carefully studying the operating instructions. The operator is responsible for the adherence to these provisions. The respective directives in force apply to the qualification and expertise of the certified skilled personnel.

For safe operation, the device must only be installed and operated in accordance with the indications in the operating instructions. In addition, the national and operational statutory provisions and safety regulations, as well as the accident prevention regulations required for the respective case of application, need to be observed during employment. This applies accordingly when accessories are used.

Danger!

Compressed air!

Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting and/or unsecured plant components.

Compressed air is a highly dangerous energy source.

Never work on the dryer when the system is under pressure.

Never direct the compressed-air outlet or condensate drain hoses at persons.

The user is responsible for the proper maintenance of the dryer. Non-observance of the instructions in the "Installation" and "Maintenance, troubleshooting, spare parts and dismantling" chapters leads to the expiration of the guarantee. Improper maintenance may result in dangerous situations for the personnel and/or the device.

Danger!

Supply voltage!

Contact with non-insulated parts carrying supply voltage involves the risk of an electric shock resulting in injuries and death.

Only qualified and skilled personnel are authorised to run electrically-operated devices. Prior to undertaking maintenance measures at the device, the following requirements must be met:

Make sure that the power supply is switched off and that the device is off and marked for maintenance measures. Please also ensure that the power supply cannot be re-established during the works.

Prior to carrying out maintenance works at the dryer, switch it off and wait for at least 30 minutes.

Caution!

Hot surfaces!

During operation, several components can reach surface temperatures of more than +60°C. There is the risk of burns.

All components concerned are installed inside of the closed housing. The housing must only be opened by certified skilled personnel.

Some components can reach high temperatures during operation. Avoid any contact until the system or the component has cooled down.

[4] Certified skilled personnel are persons who are authorised by the manufacturer, with experience and technical training, who are well-grounded in the respective provisions and laws and capable of carrying out the required works and of identifying and avoiding any risks during the machine transport, installation, operation and maintenance. Qualified and authorised operators are persons who are instructed by the manufacturer regarding the handling of the refrigeration system, with experience and technical training, and who are well-grounded in the respective provisions and laws.

DAILY:

- Check whether the dew point indicated on the electronics is correct.
- Ensure that the condensate drain system functions properly.
- Make sure that the condenser is clean.

EVERY 200 HOURS OR MONTHLY

- Clean the condenser using an air jet (max. 2 bar / 30 psig) inside out. Make sure not to damage the aluminium lamellae of the cooling package.
- Finally, verify the operation of the device.

EVERY 1,000 HOURS OR ANNUALLY

- Verify all screws, clamps and connections of the electric system to make sure that they are fastened securely. Check the device for broken and ruptured cables or cables without insulation.
- Check the refrigeration cycle for signs of oil and refrigerant leaks.
- Measure the current strength and note it down. Ensure that the read values are within the permissible limit values, as indicated in the specification table.
- Check the hose lines of the condensate drain and replace them, if required.
- Finally, verify the operation of the device.

EVERY 8,000 HOURS

- Replace BEKOMAT Service Unit.

12.2 Troubleshooting

Certified skilled personnel

Installation works must exclusively be carried out by authorised and qualified skilled personnel. Prior to undertaking any measures on the DRYPOINT® RAc 3 – 220_R513A compressed-air refrigeration dryer, the certified skilled personnel shall read up on the device by carefully studying the operating instructions. The operator is responsible for the adherence to these provisions. The respective directives in force apply to the qualification and expertise of the certified skilled personnel.

For safe operation, the device must only be installed and operated in accordance with the indications in the operating instructions. In addition, the national and operational statutory provisions and safety regulations, as well as the accident prevention regulations required for the respective case of application, need to be observed during employment. This applies accordingly when accessories are used.

Danger!

Compressed air!

Risk of serious injury or death through contact with quickly or suddenly escaping compressed air or through bursting and/or unsecured plant components.

Compressed air is a highly dangerous energy source.

Never work on the dryer when the system is under pressure.

Never direct the compressed-air outlet or condensate drain hoses at persons.

The user is responsible for the proper maintenance of the dryer. Non-observance of the instructions in the "Installation" and "Maintenance, troubleshooting, spare parts and dismantling" chapters leads to the expiration of the guarantee. Improper maintenance may result in dangerous situations for the personnel and/or the device.

Danger!

Supply voltage!

Contact with non-insulated parts carrying supply voltage involves the risk of an electric shock resulting in injuries and death.

Only qualified and skilled personnel are authorised to run electrically-operated devices. Prior to undertaking maintenance measures at the device, the following requirements must be met:

Make sure that the power supply is switched off and that the device is off and marked for maintenance measures. Please also ensure that the power supply cannot be re-established during the works.

Prior to carrying out maintenance works at the dryer, switch it off and wait for at least 30 minutes.

Caution!
Hot surfaces!

During operation, several components can reach surface temperatures of more than +60°C. There is the risk of burns.

All components concerned are installed inside of the closed housing. The housing must only be opened by certified skilled personnel.

Some components can reach high temperatures during operation. Avoid any contact until the system or the component has cooled down.

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ The dryer doesn't start.	⇨ Verify that the system is powered. ⇨ Verify the electric wiring. ⇨ **RAc 190-220** - Blow of fuse (FU2 on the electric diagram) of the auxiliary circuit - replace it and check the proper operation of the dryer
◆ The compressor doesn't work.	⇨ Activation of the compressor internal thermal protection - wait for 30 minutes, then retry. ⇨ Verify the electric wiring. ⇨ **If installed** - Replace the internal thermal protection and/or the start-up relay and/or the start-up capacitor and/or the working capacitor. ⇨ **If installed** - The pressure switch HPS has been activated - see specific point. ⇨ **If installed** - The pressure switch LPS has been activated - see specific point. ⇨ **RAc 190-220 - during first startup** – power phases of compressor are not connected properly (see RPP on the electric diagram) – Change rotating direction swapping two phases of the power supply of dryer. These changes have to be done only by a qualified electrician. **DO NOT BY PASS RPP PROTECTION: BY OPERATING THE MACHINE IN WRONG ROTATING DIRECTION, THE COMPRESSOR WILL FAIL IMMEDIATELY AND THE WARRANTY WILL BE VOIDED** ⇨ **RAc 190-220** – one phase of power supply is missing (see RPP on the electric diagram) – restore the missing phase. ⇨ The safety thermo switch TS has been activated - see specific point ⇨ If the compressor still doesn't work, replace it.
◆ Condenser's fan doesn't work.	⇨ Verify the electric wiring. ⇨ The electronic instrument is faulty – replace it. ⇨ **RAc 190-220** - Blow of fuse (FU1 on the electric diagram) - replace it and check the proper operation of the dryer ⇨ There is a leak in the refrigerant circuit - contact a refrigeration engineer. ⇨ If the fan still doesn't work, replace it.
◆ DewPoint too high.	⇨ The dryer doesn't start - see specific point. ⇨ The DewPoint probe BT1 doesn't correctly detect the temperature - ensure the sensor is pushed into the bottom of probe well. ⇨ The 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 nominal conditions. ⇨ The inlet air pressure is too low - restore nominal conditions. ⇨ The inlet air flow rate is higher than the rate of the dryer - reduce the flow rate - restore nominal 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 nominal setting. ⇨ There is a leak in the refrigerant circuit - contact a refrigeration engineer.
◆ Dew Point too low	⇨ The fan is always ON - the yellow LED of electronic instrument is flashing - see specific point. ⇨ Ambient temperature is too low - restore nominal conditions. ⇨ The hot gas by-pass valve is out of setting - contact a refrigeration engineer to restore nominal setting.

◆ 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. ⇨ Verify the electric wiring. ⇨ The DewPoint is too low - the condensate is frost and blocks the air - see specific point. ⇨ Inlet compressed air pressure is too low and condensate is not drained – restore nominal conditions. ⇨ Electronic drainer is not operating correctly (see paragraph 7.14).
◆ The dryer continuously drains condensate.	⇨ Electronic drainer is dirty (see paragraph 7.14).
◆ Water within the line.	⇨ The dryer doesn't start - see specific point. ⇨ **If 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.
◆ **If installed** –HPS 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. 2. The condenser is dirty - clean it. 3. The condenser fan doesn't work - see specific point. ⇨ Reset the pressure switch pressing the button on the controller itself - verify the dryer for correct operation. ⇨ HPS pressure switch is faulty - contact a refrigeration engineer to replace it.
◆ **If installed** – LPS low pressure switch has been activated.	⇨ There is a leak in the refrigerating fluid circuit - contact a refrigeration engineer. ⇨ The pressure switch reset automatically when normal conditions are restored - check the proper operation of the dryer.
◆ TS safety thermo switch has been activated.	⇨ Check which of the following has caused the activation : 1. Excessive 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. The hot gas by-pass valve requires re-adjusting – contact a specialized technician to restore nominal setting. 7. Refrigerant gas leak - contact a refrigeration engineer. ⇨ Reset the thermo switch by pressing the button on the thermo switch itself – verify the correct operation of the dryer. ⇨ TS thermo switch is faulty - replace it.
◆ DMC36 - Led ○ 🔔 and display 1st (left) and 10th (right) led are flashing.	⇨ Verify the electric wiring of BT1 DewPoint probe. ⇨ The BT1 DewPoint probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC36 Led ○ 🔔 and led ○ ✣ are flashing	⇨ Verify the electric wiring of BT2/BP2 fan control probe. ⇨ The BT2/BP2 fan control probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC36 Led ○ 🔔 and display 1st (left) led are flashing	⇨ DewPoint too low - see specific point. ⇨ The BT1 DewPoint probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC36 Led ○ 🔔 and is flashing	⇨ DewPoint too high - see specific point. ⇨ The BT1 DewPoint probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC36 Led ○ 🔔 and ○ 🔧 are flashing	⇨ Service reminder timer has expired – dryer requires service. ⇨ Perform the proper service to the dryer. ⇨ Reset the service reminder timer.

12.3 Recommended spare parts

Spare parts list is printed on a dedicated sticker applied inside the dryer. On this sticker each spare part is identified with its ID Number and related Spare Part Number. Here below the cross reference table between ID Numbers and exploded drawings Ref. with their description and quantity installed in the dryers

ID N.		DESCRIPTION	RAc																
			3	6	9	12	18	25	32	43	52	61	75	105	130	168	190	220	
1-1.1		Complete heat exchanger	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
2	LPS	Pressure switch														1	1	1	
3	TS	Safety thermo switch											1	1	1	1	1	1	
4	HPS	Pressure switch												1	1	1	1	1	
37		Pressure transducer								1	1	1	1	1	1	1	1	1	
6	MC	Compressor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
7		Hot gas by-pass valve	1	1	1	1	1	1	1	1	1	2	2	1	1	1	1	1	
8		Condenser	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
9	MV	Complete fan												1	1	1	1	1	
9.1	MV	Fan motor	1	1	1	1	1	1	1	1	1	1	1						
9.2		Fan blade	1	1	1	1	1	1	1	1	1	1	1						
9.3		Fan grid					1	1	1	1	1	1	1						
10		Filter drier	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
12	BT	Temperature probe	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	
13-14		Condensate drain valve/strainer	1	1	1	1	1	1	1	1	1								
14		Y strainer										1	1	1	1	1	1	1	
15	EVD	Condensate drain solenoid valve	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
16		Coil for condensate drain solenoid valve	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
17	DMC36	Electronic instrument	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
21	ELD	Electronic drainer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
		Service unit for electronic drainer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
22	S1	Lighted switch	1	1	1	1	1	1	1	1	1	1	1				1	1	
	QS	Main switch												1	1	1	1	1	
60	KC-KV	Contactor															2	2	
	TF	Transformer															1	1	
	RPP	Reverse phase protector															1	1	
	KF	Solid state relay												1	1	1	1	1	

12.4 Maintenance works at the refrigeration cycle

Caution!

Refrigerant!

Maintenance and repair works at refrigeration systems must only be carried out by BEKO service technicians in accordance with the local provisions.

The total amount of refrigerant in the system must be collected for recycling purposes, resource recovery or disposal.

The refrigerant must not be discharged into the environment.

When delivered, the dryer is ready to operate and filled with a refrigerant of the R513A type.

Should you detect a refrigerant leak, please contact a BEKO service technician. Prior to any intervention, the room needs to be ventilated.

When the refrigeration cycle needs to be refilled, please also contact a BEKO service technician.

You will find the refrigerant type and amount on the name plate of the dryer.

Properties of the refrigerants used:

Refrigerant	Chemical formula	MIK	GWP
R513A - HFC	56% $C_3H_2F_4$ · 44% $C_2H_2F_2$	1000 ppm	631

12.5 Dismantling the dryer

When the dryer is dismantled, all parts and operating materials related to the plant need to be disposed of separately.

Component	Material
Refrigerant	R513A, oil
Roof and supports	Structural steel, epoxy paint coat
Refrigerating compressor	Steel, copper, aluminium, oil
Aluminium heat exchanger	Aluminium
Condenser unit	Aluminium, copper, structural steel
Pipe	Copper
Fan	Aluminium, copper, steel
Valve	Brass, steel
BEKOMAT condensate drain	PVC, aluminium, steel
Insulant	Synthetic rubber without CFCs, polysterene, polyurethane
Electric cable	Copper, PVC
Electric parts	PVC, copper, brass

We recommend observing the safety provisions in force for the disposal of each material type.

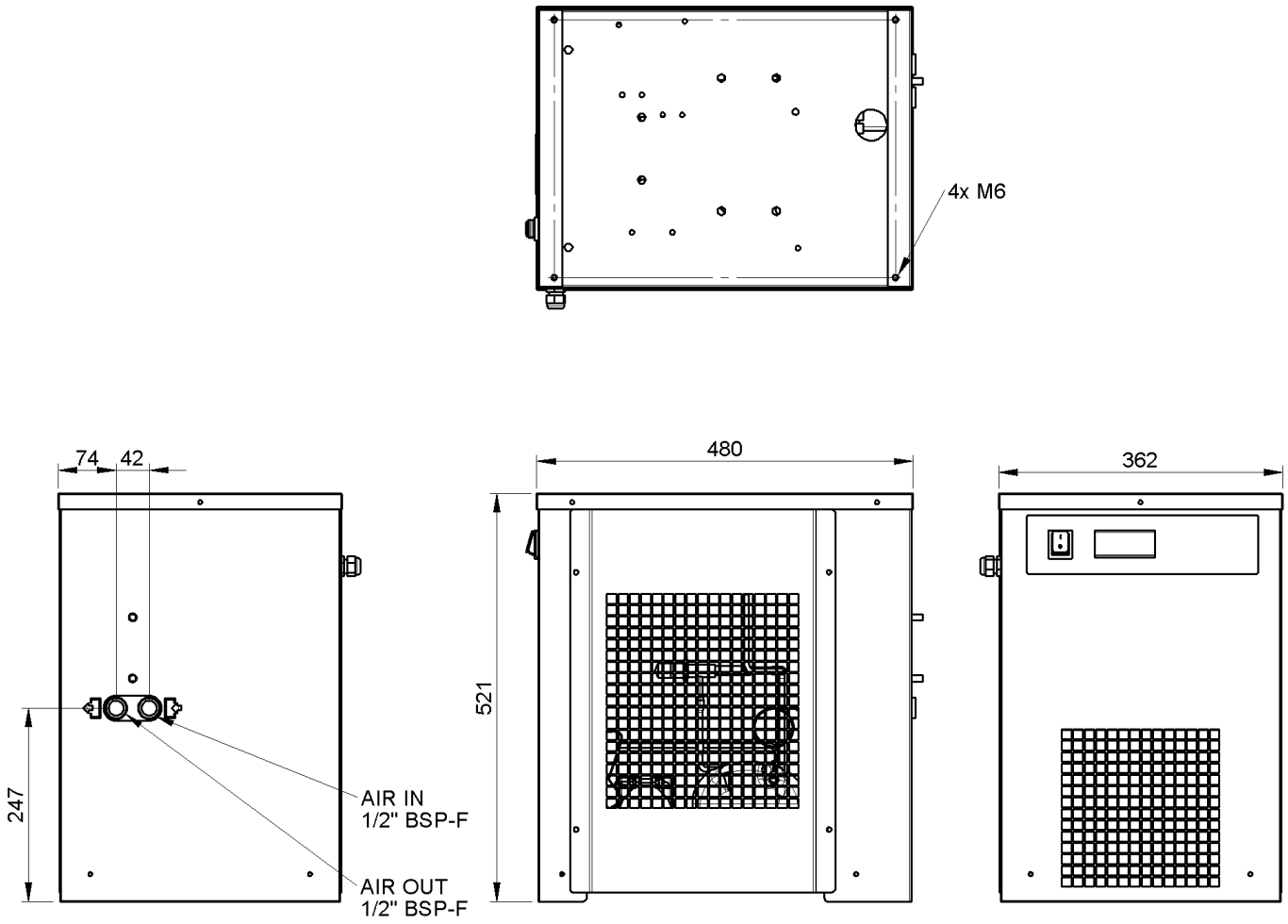
The refrigerant contains lubricating-oil droplets which are released by the compressor.

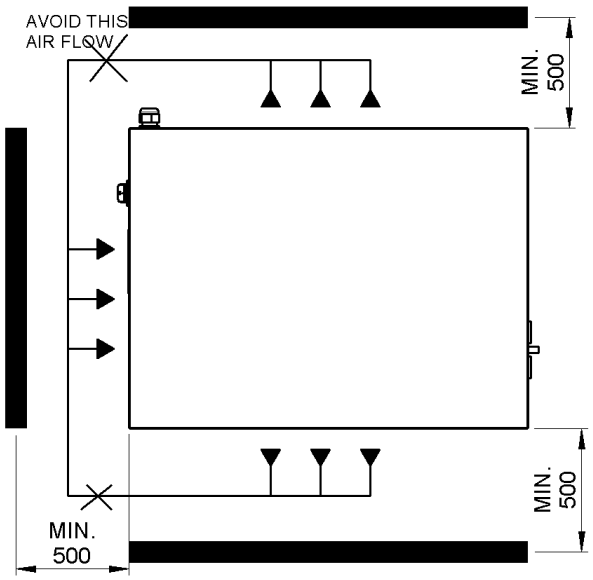
The refrigerant must not be discharged into the environment. It must to be sucked off from the dryer using a suitable device, and then needs to be supplied to a collection point.

13 Appendices

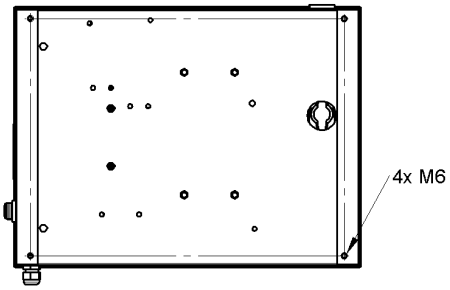
13.1 Dryer dimensions

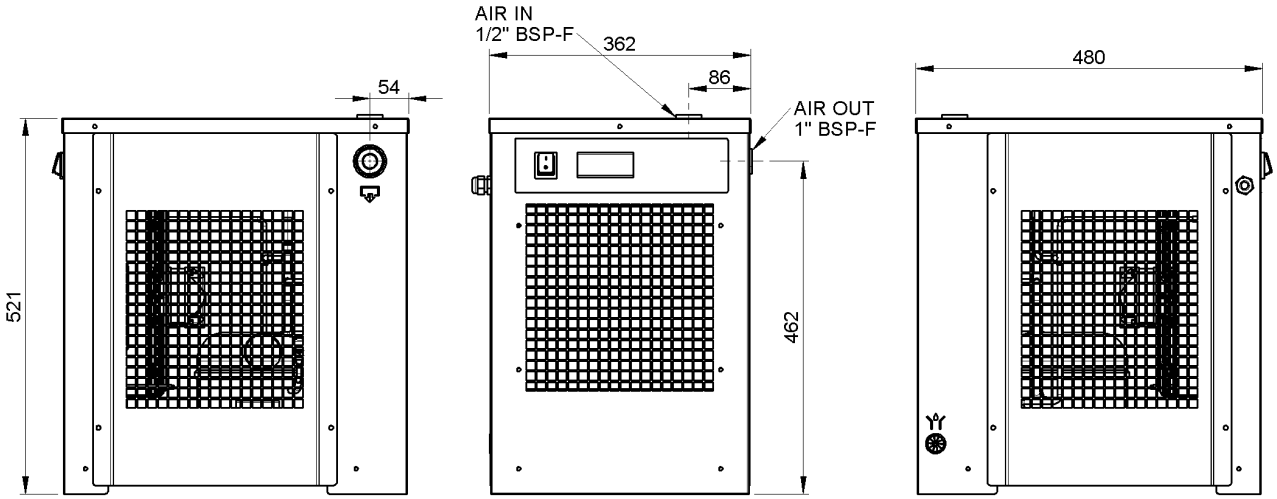
13.1.1 Dryer dimensions DRYPOINT RAc 3

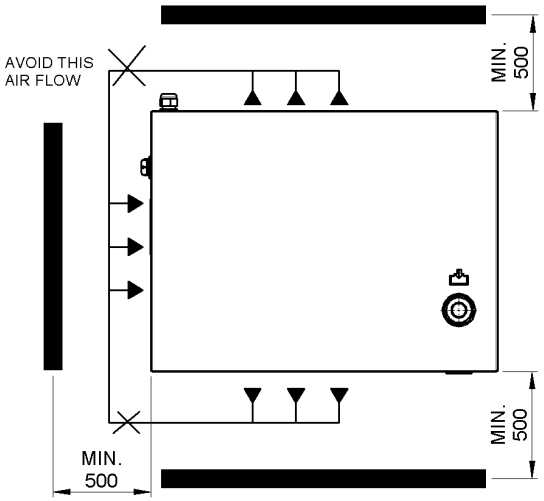




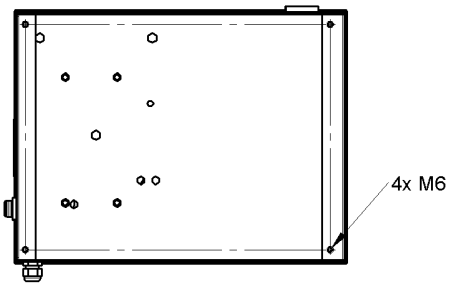
13.1.2 Dryer dimensions DRYPOINT RAc 6-18

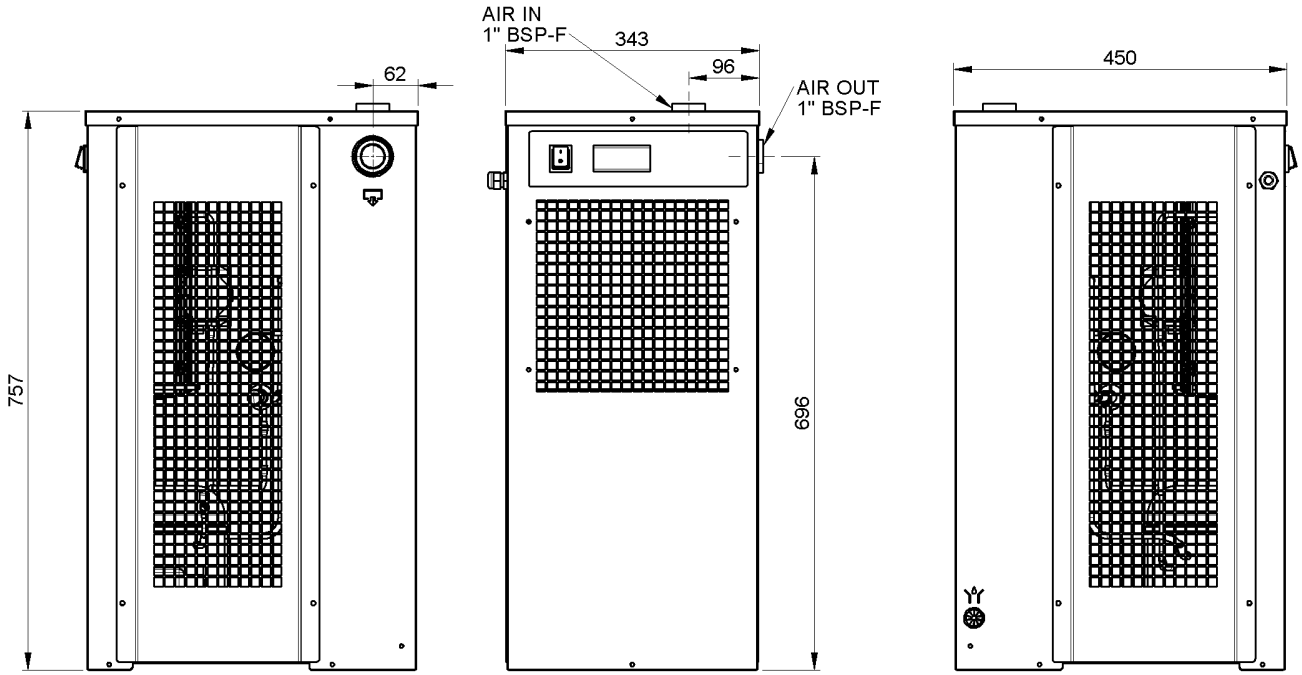


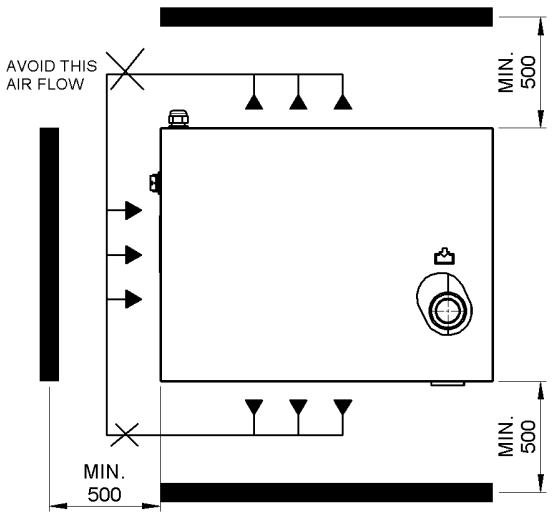




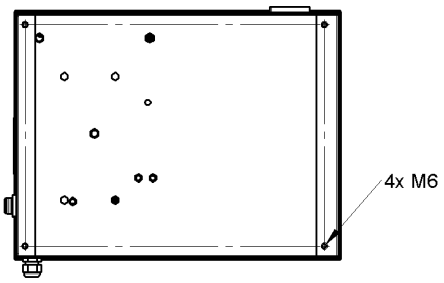
13.1.3 Dryer dimensions DRYPOINT RAc 25

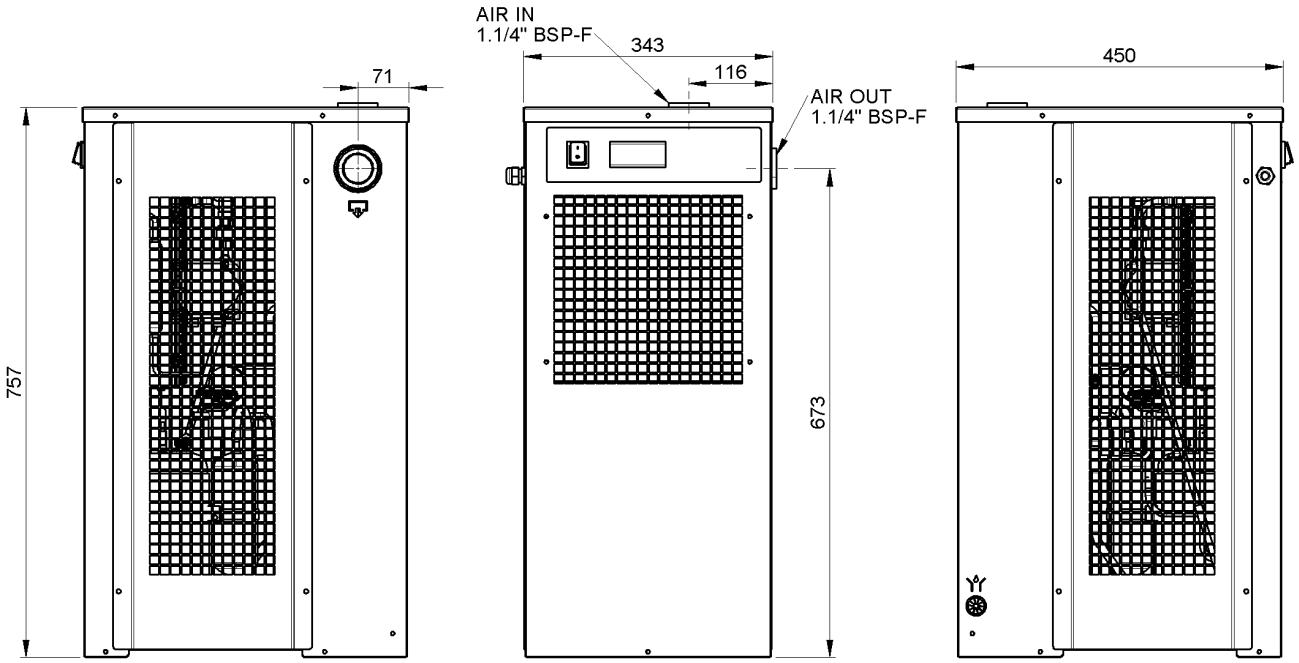


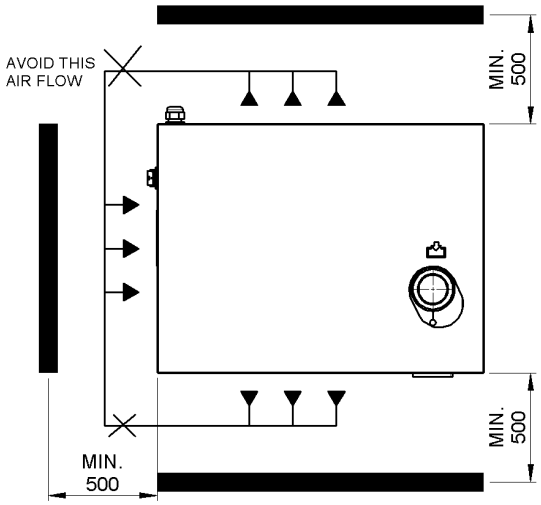




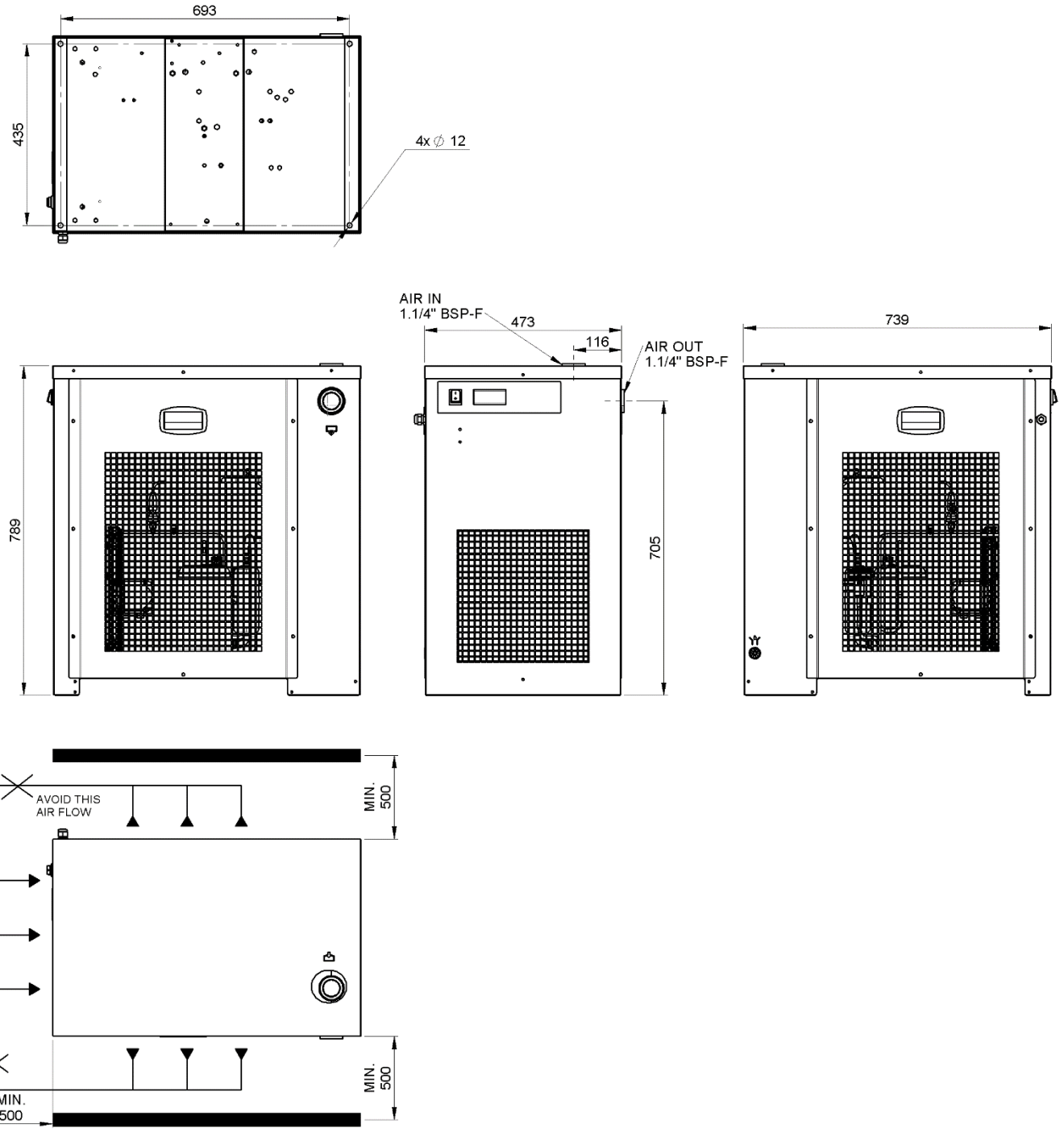
13.1.4 Dryer dimensions DRYPOINT RAc 32 - 43



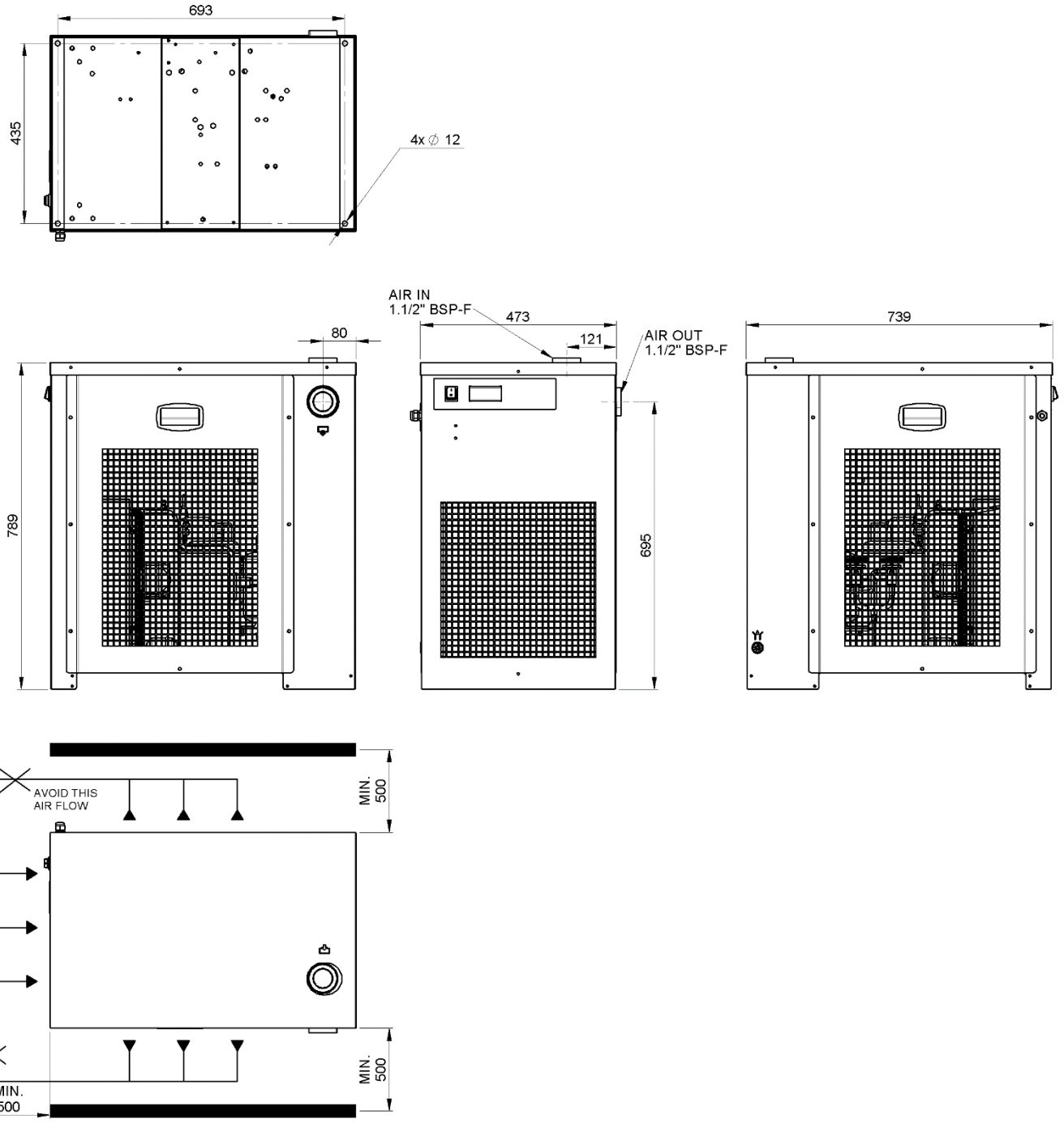




13.1.5 Dryer dimensions DRYPOINT RAc 52



13.1.6 Dryer dimensions DRYPOINT RAc 61 - 75



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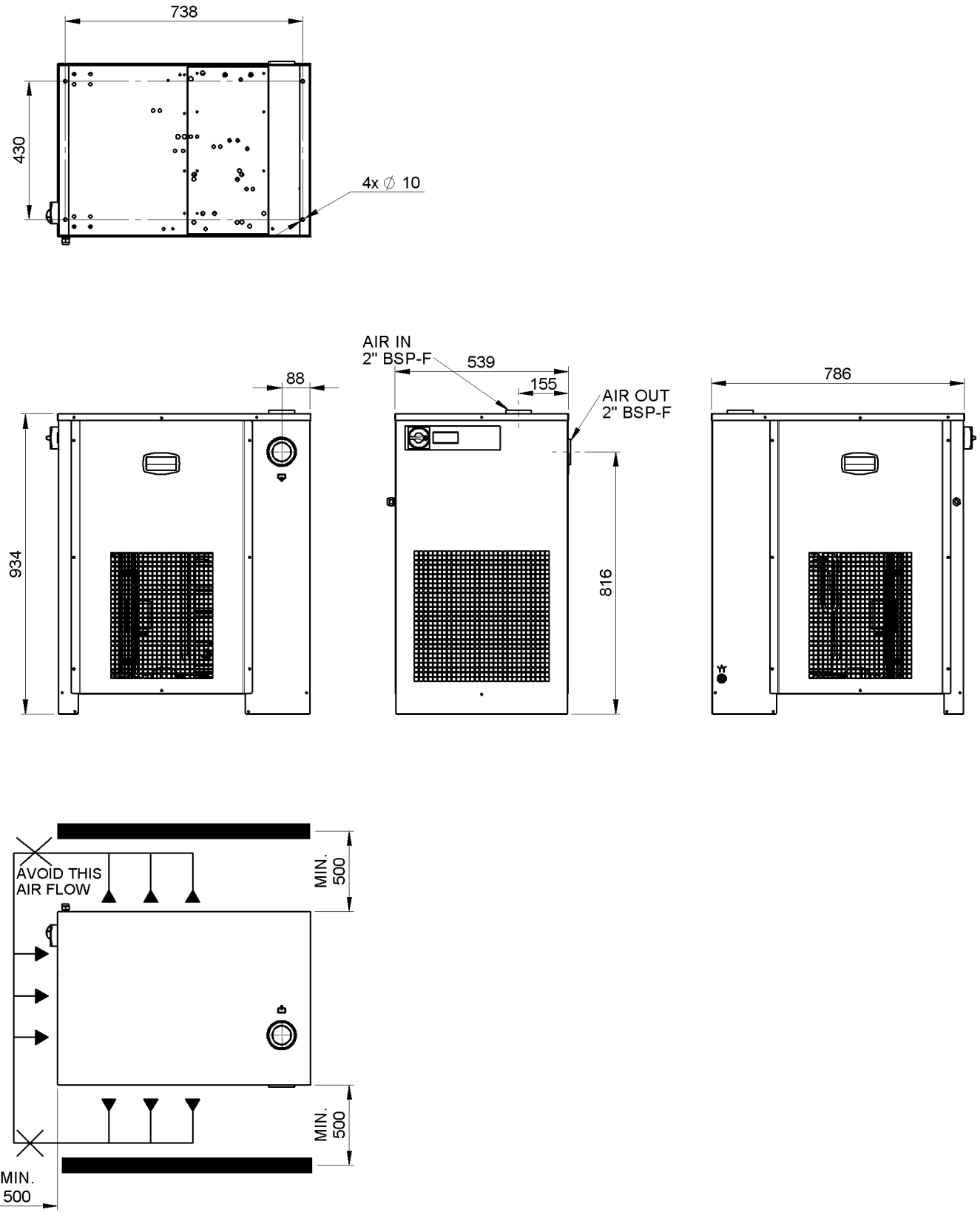

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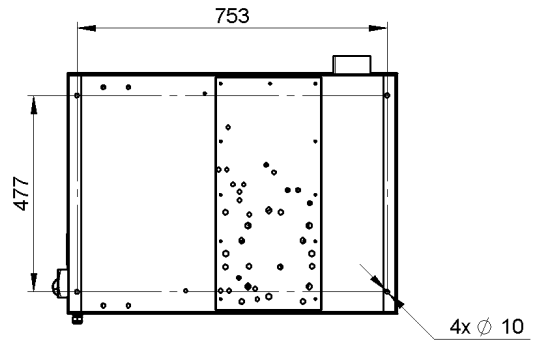

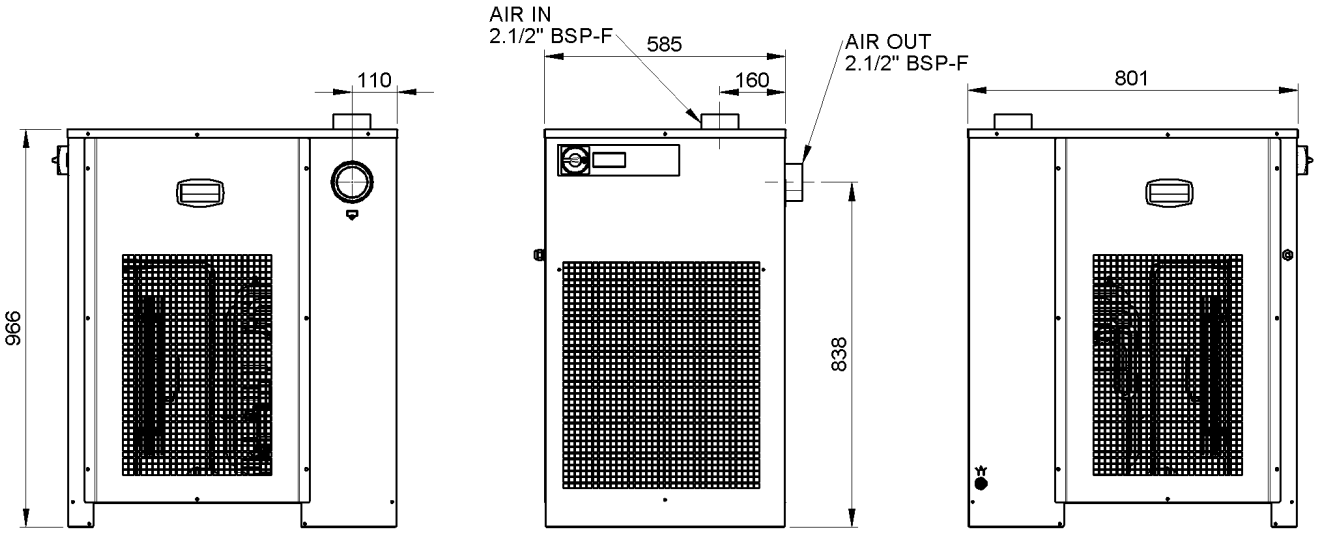

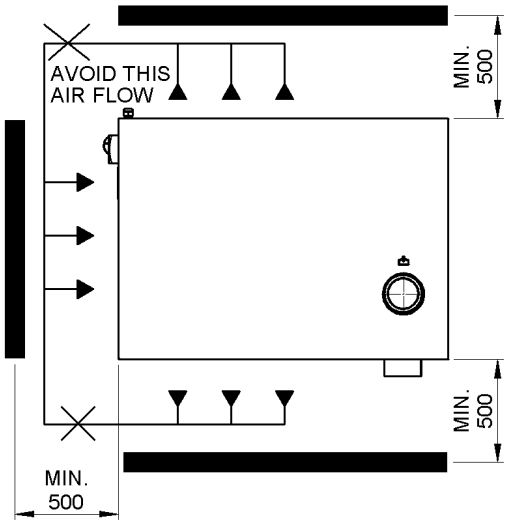

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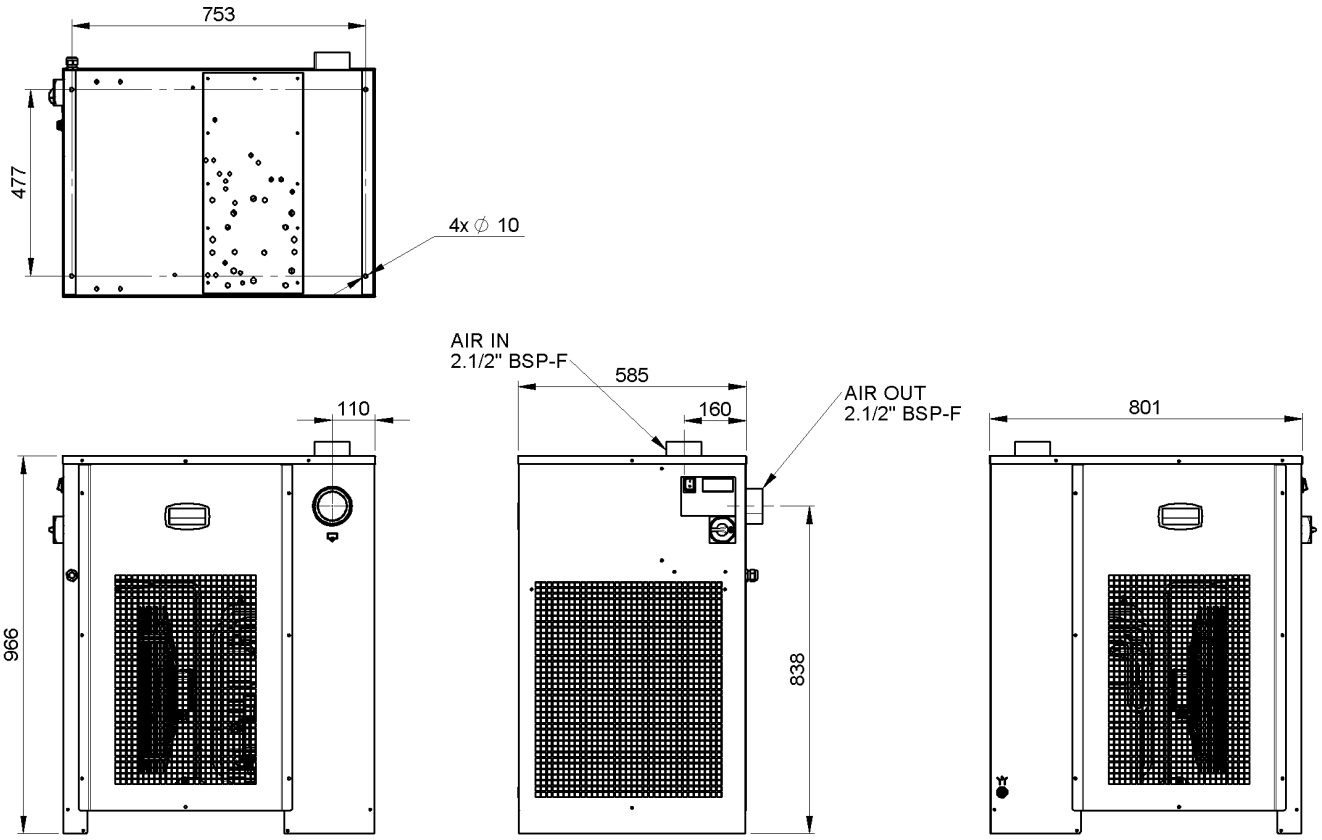
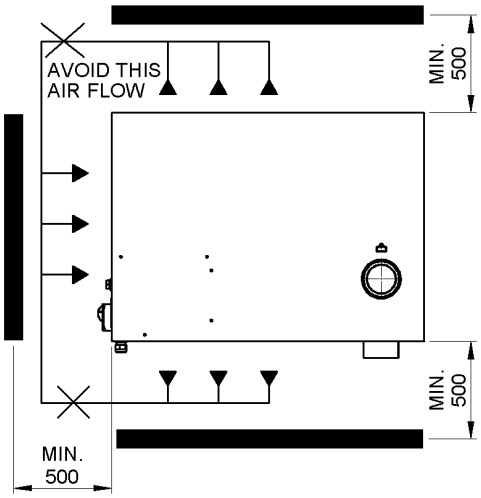


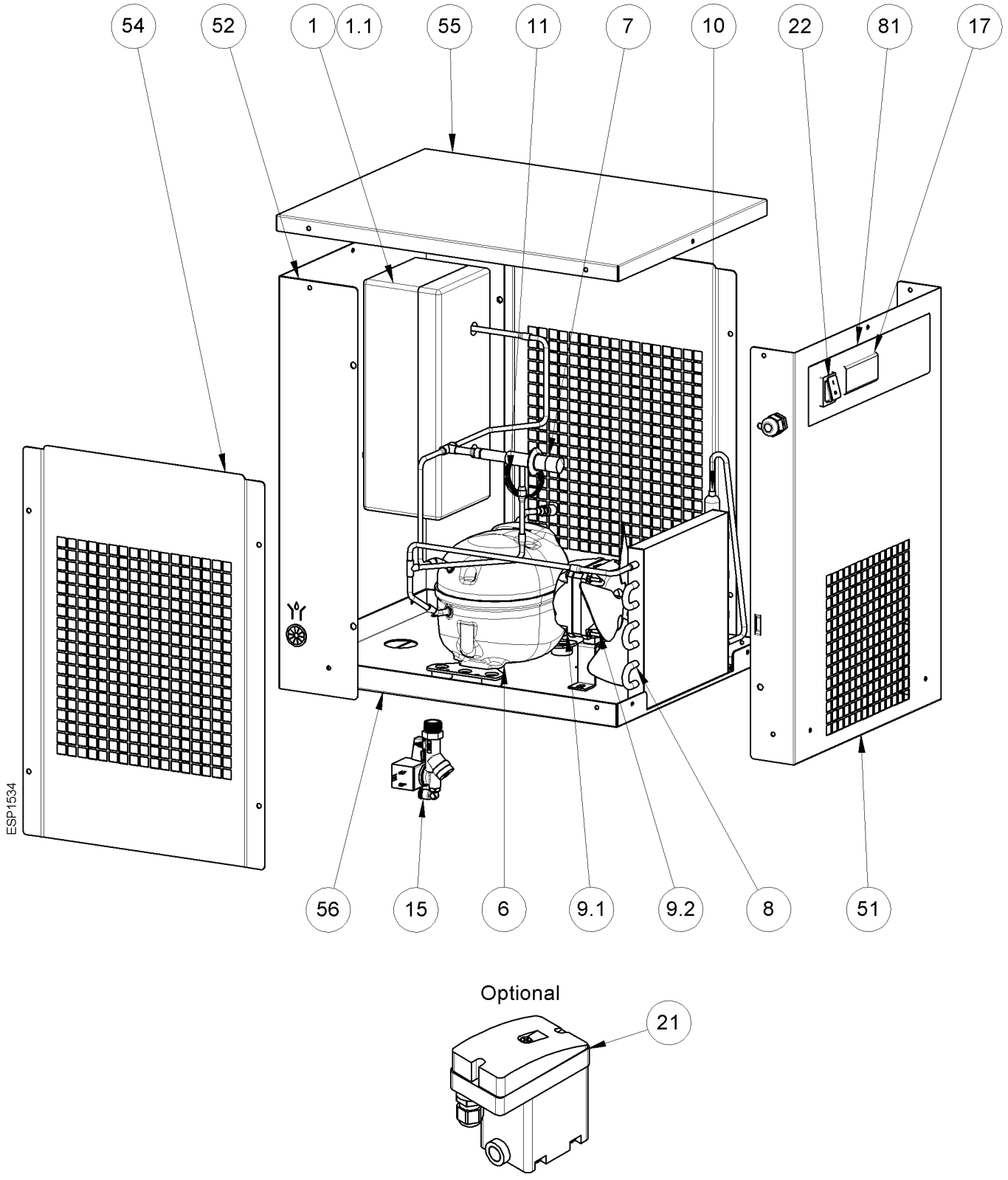


13.2 Exploded diagrams

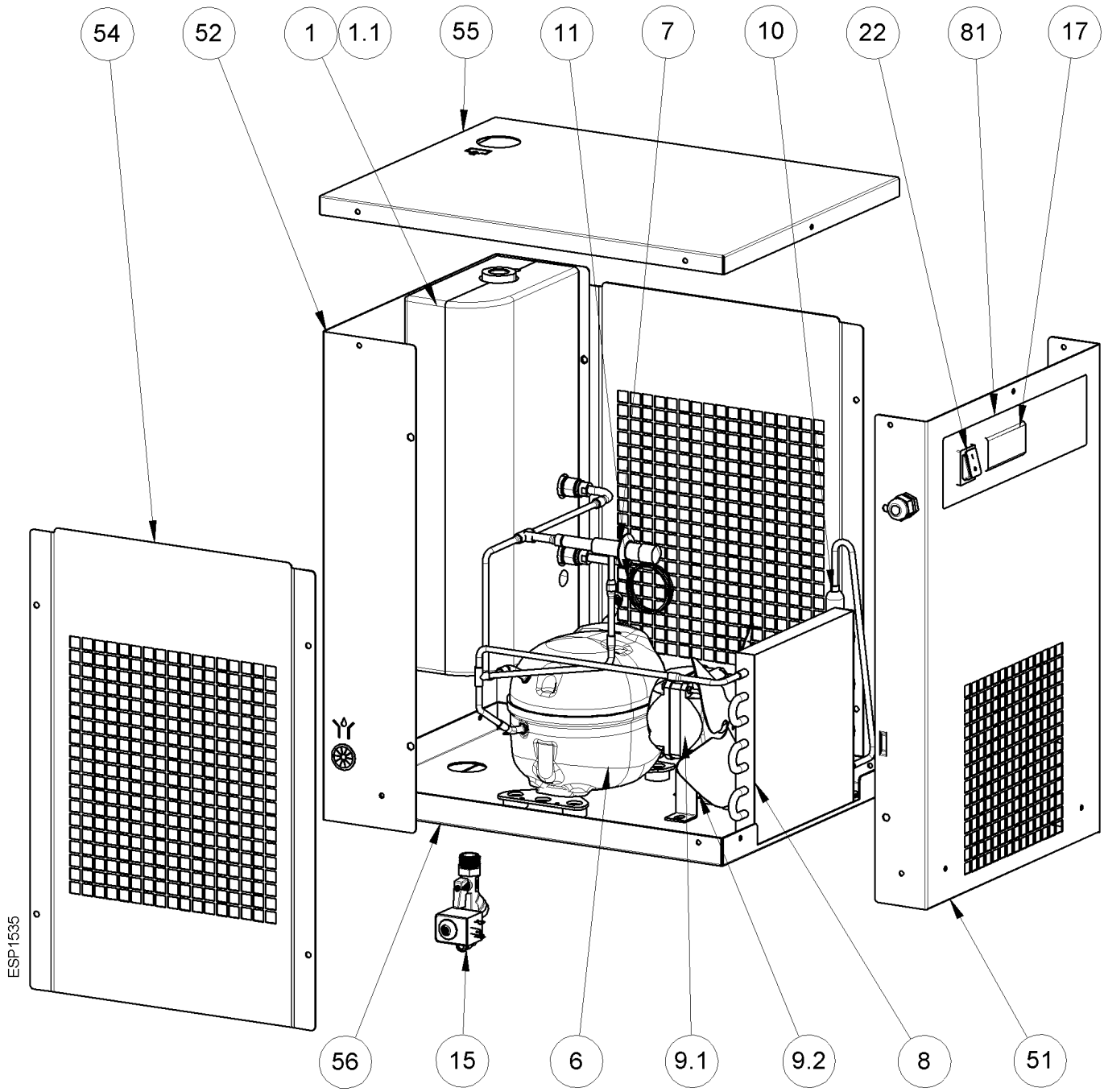
13.2.1 Components of the exploded diagrams

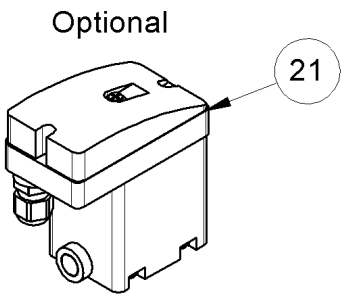
1	Alu drying module
	1.1 Insulation material
2	Refrigerant pressure switch LPS
3	Safety temperature switch TS
4	Refrigerant pressure switch HPS
6	Compressor
7	Hot-gas bypass valve
8	Condenser
9	Condenser fan
	9.1 Motor
	9.2 Blade
	9.3 Grid
10	Filter dryer
11	Capillary tube
12	BT1 temperature probe (dew point)
13	Condensate drain service valve
17	Air dryer control
21	Bekomat drain
22	Main switch
37	Pressure transducer
51	Front panel
52	Back plate
53	Right sidewall
54	Left sidewall
55	Cover
56	Base plate
57	Upper plate
58	Carrier support
59	Support bracket
60	Control panel
61	Electric connecting plug
62	Electric cabinet
65	Condenser filter
66	QE door
81	Adhesive label flow chart

13.2.2 Exploded diagram DRYPOINT RAc 3

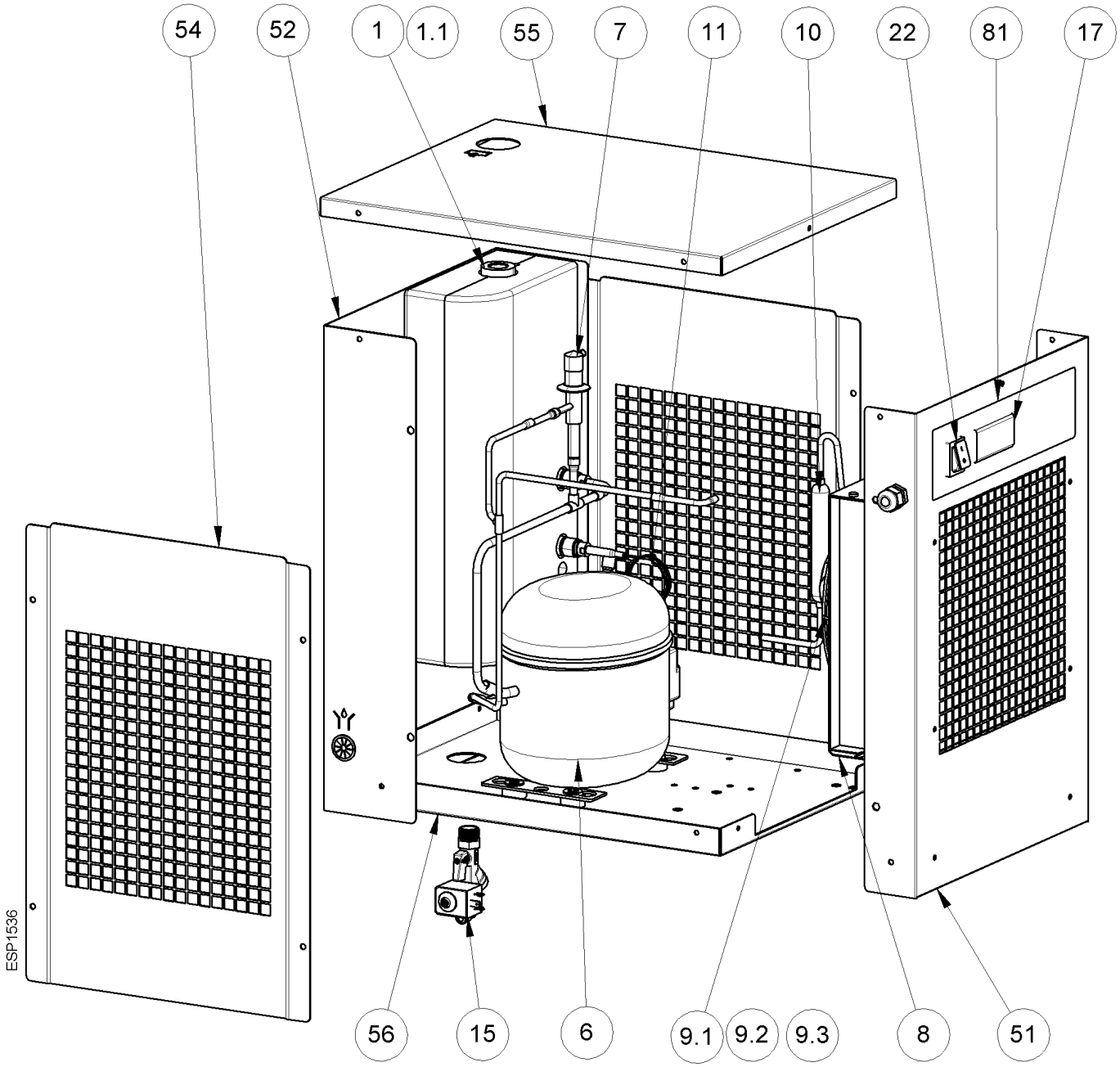


13.2.3 Exploded diagram DRYPOINT RAc 6 - 12





13.2.4 Exploded diagram DRYPOINT RAc 18



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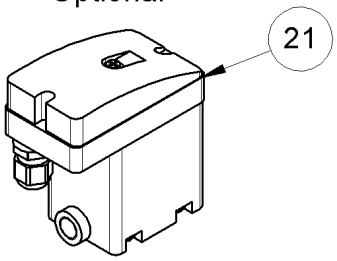

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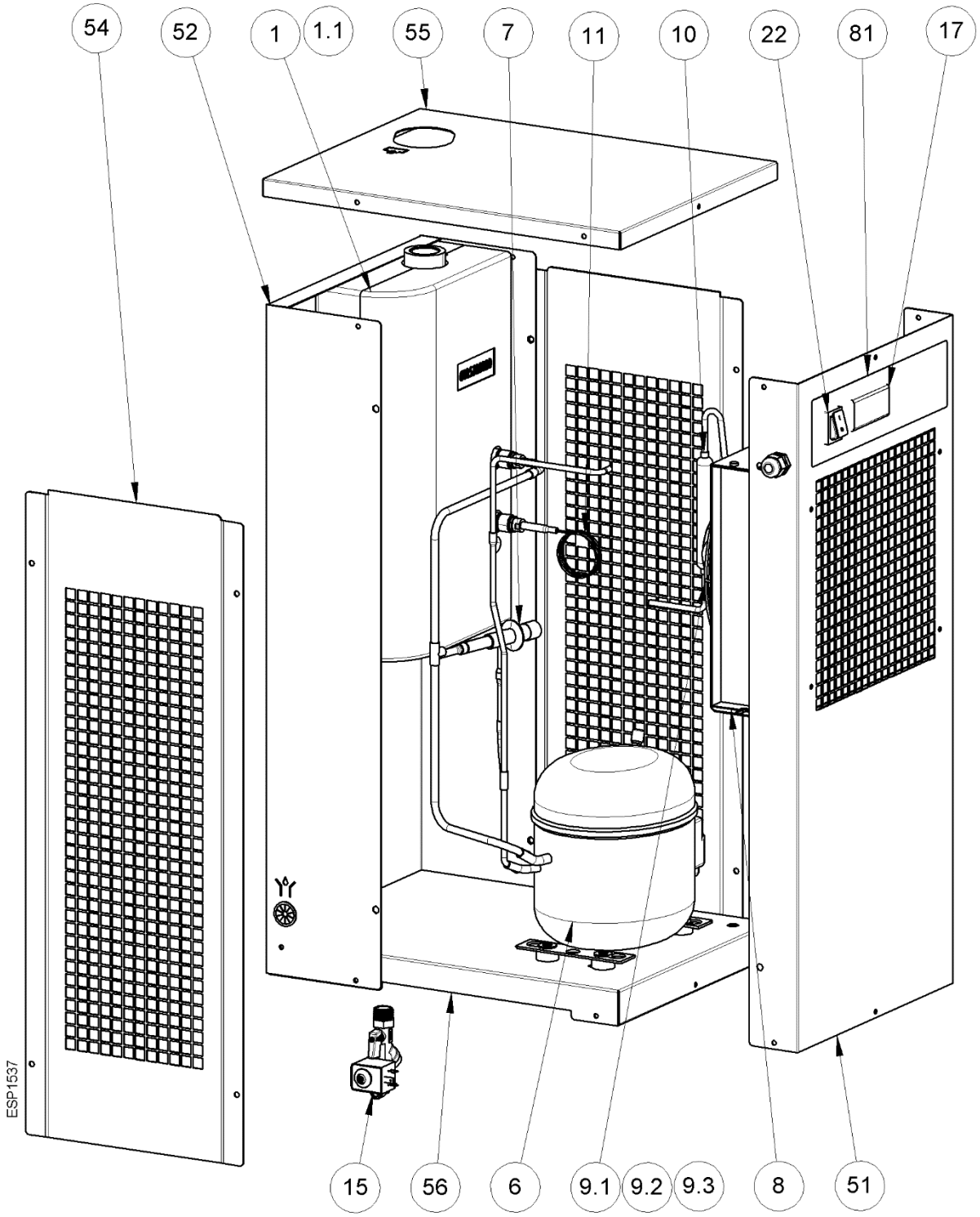

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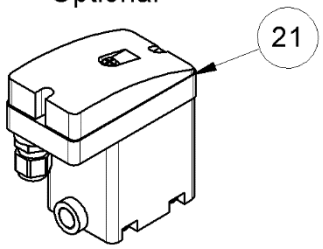
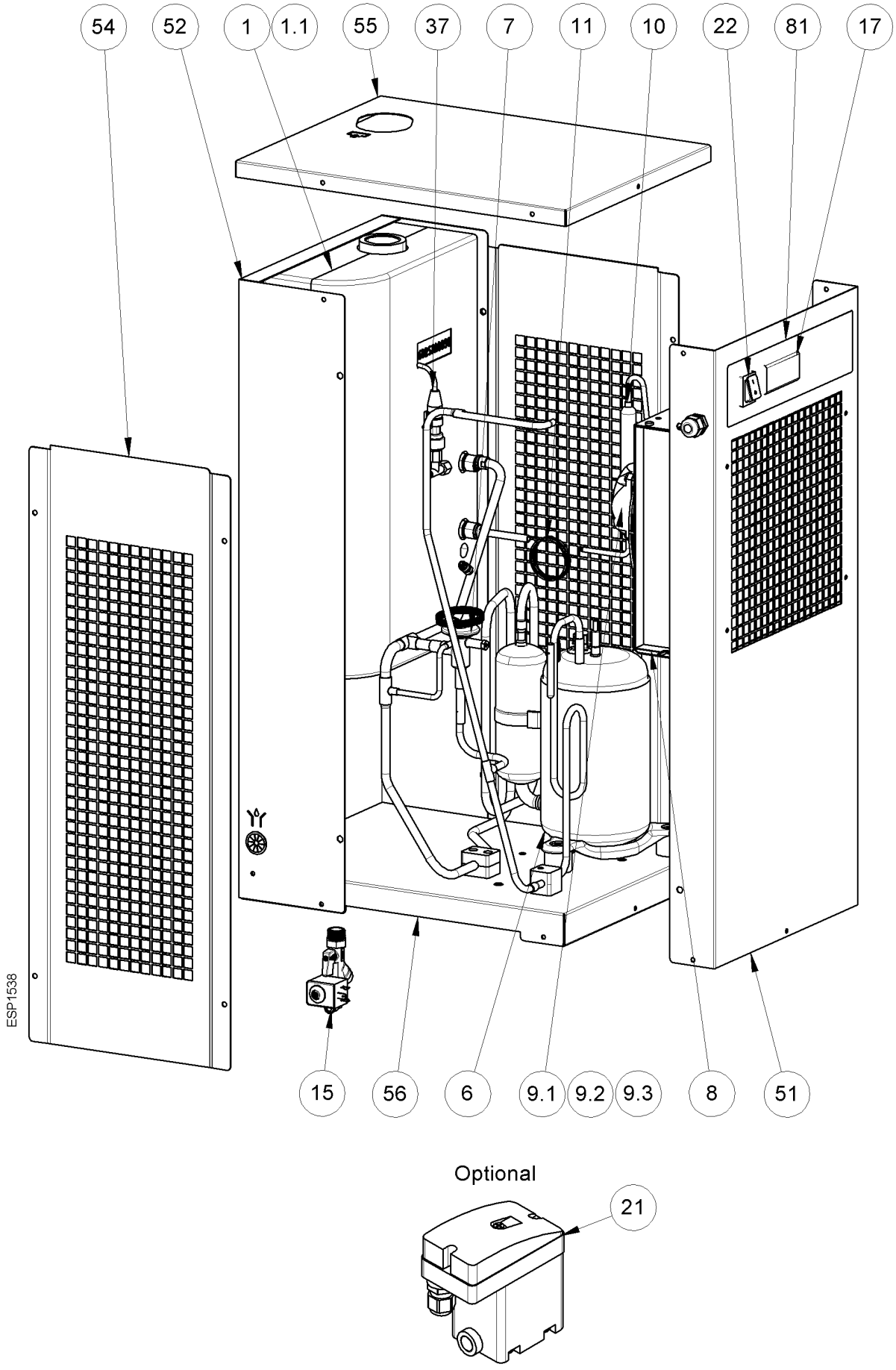
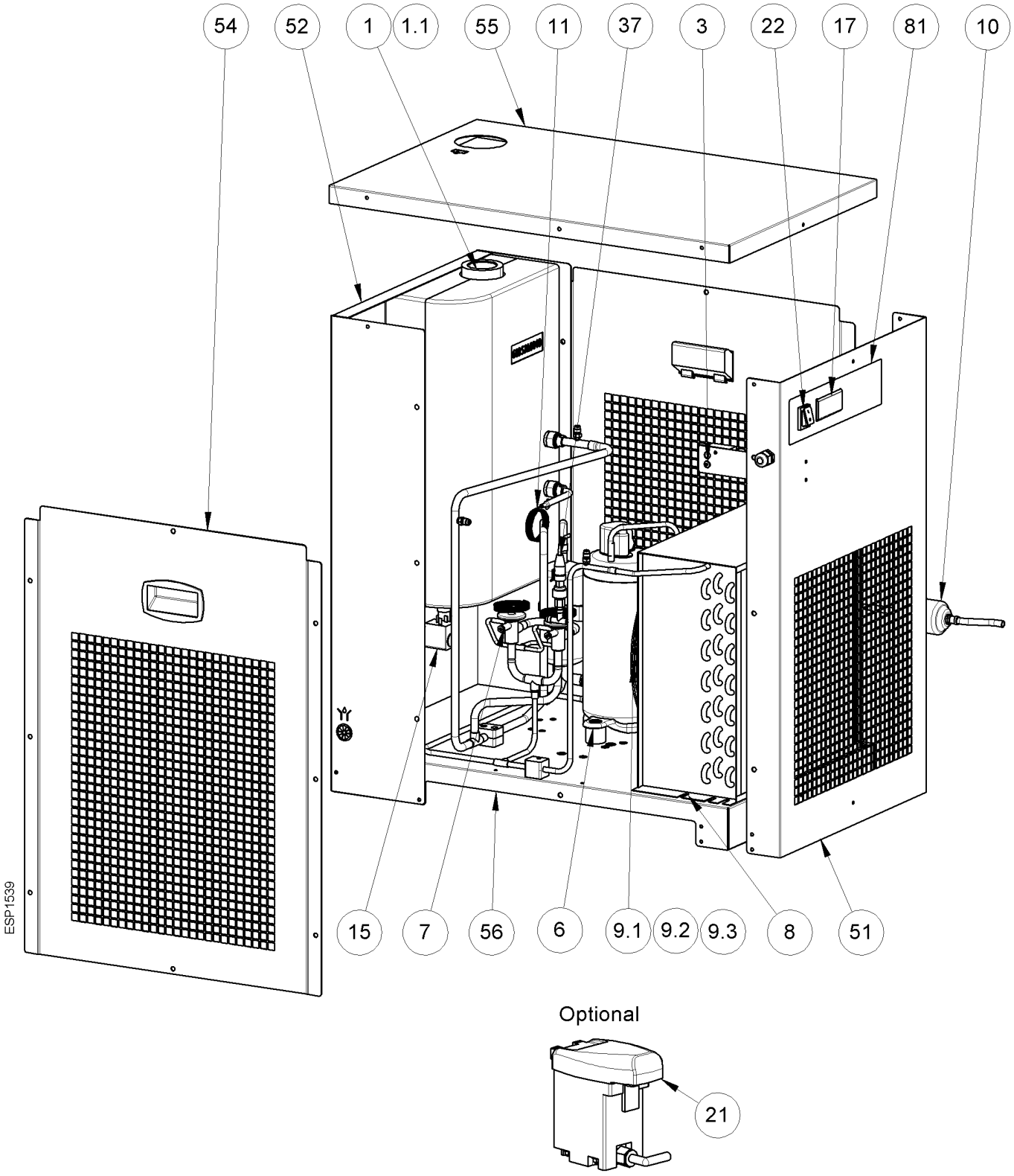


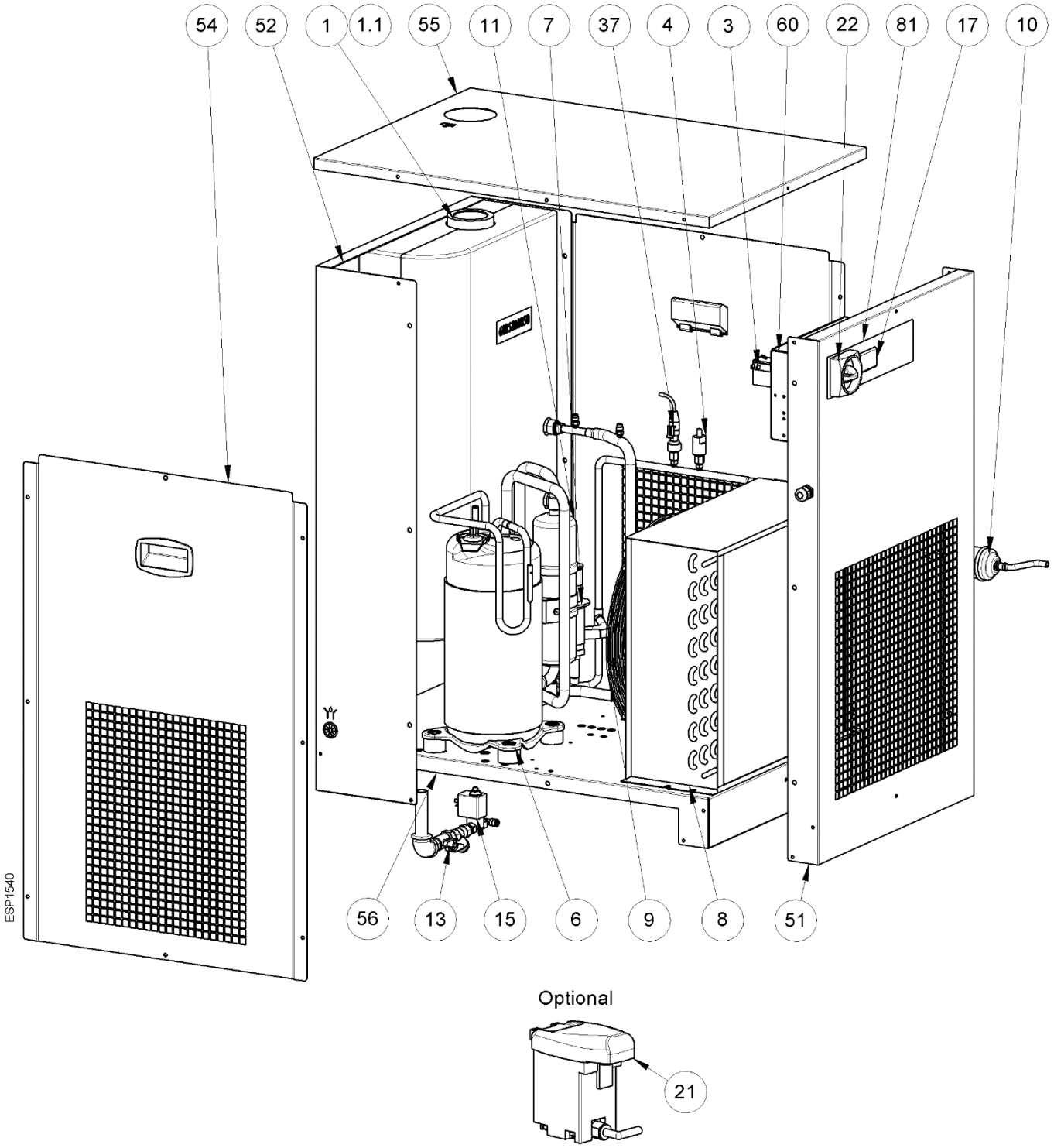
13.2.6 Exploded diagram DRYPOINT RAc 43



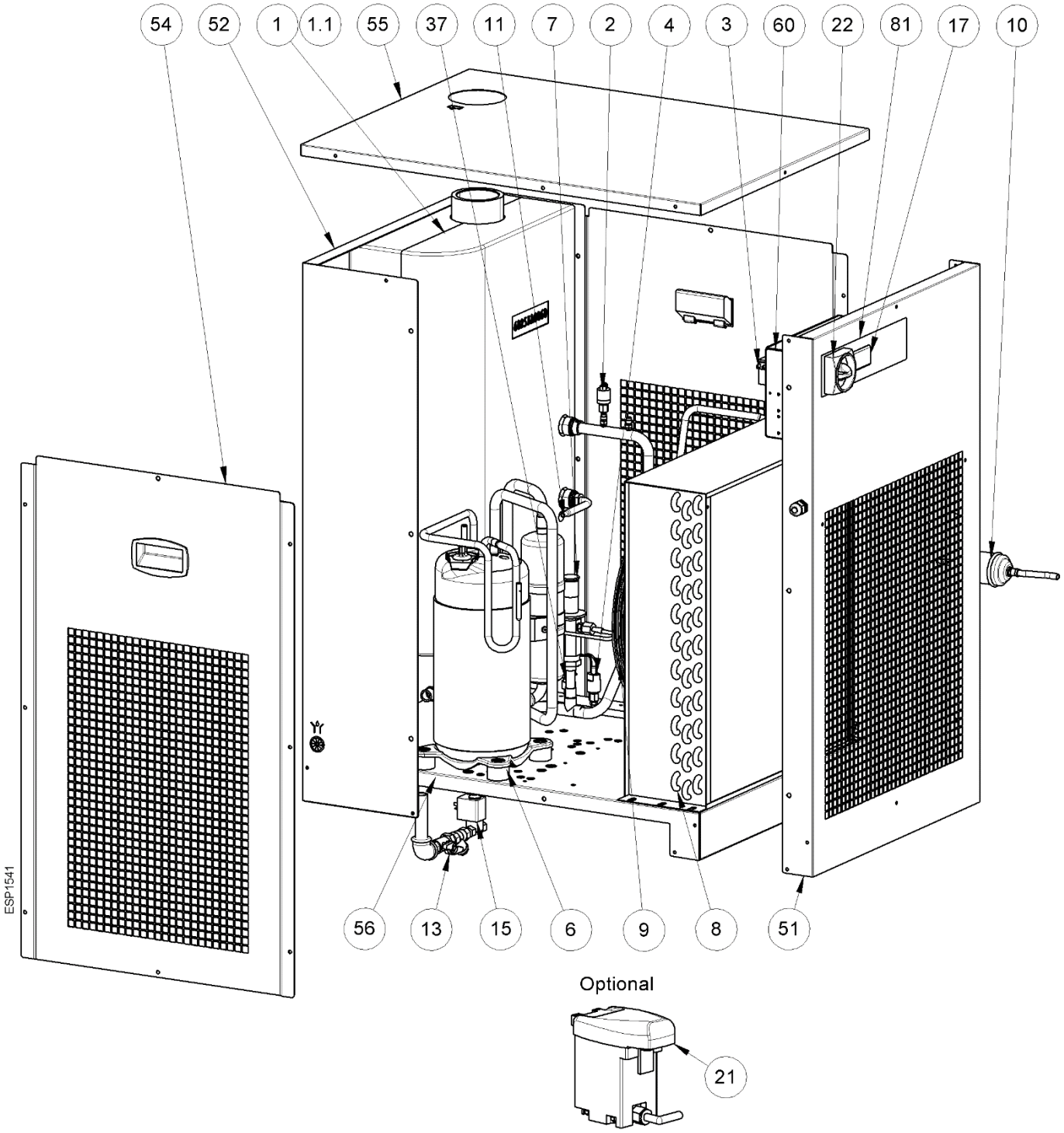
13.2.7 Exploded diagram DRYPOINT RAc 52 – 75



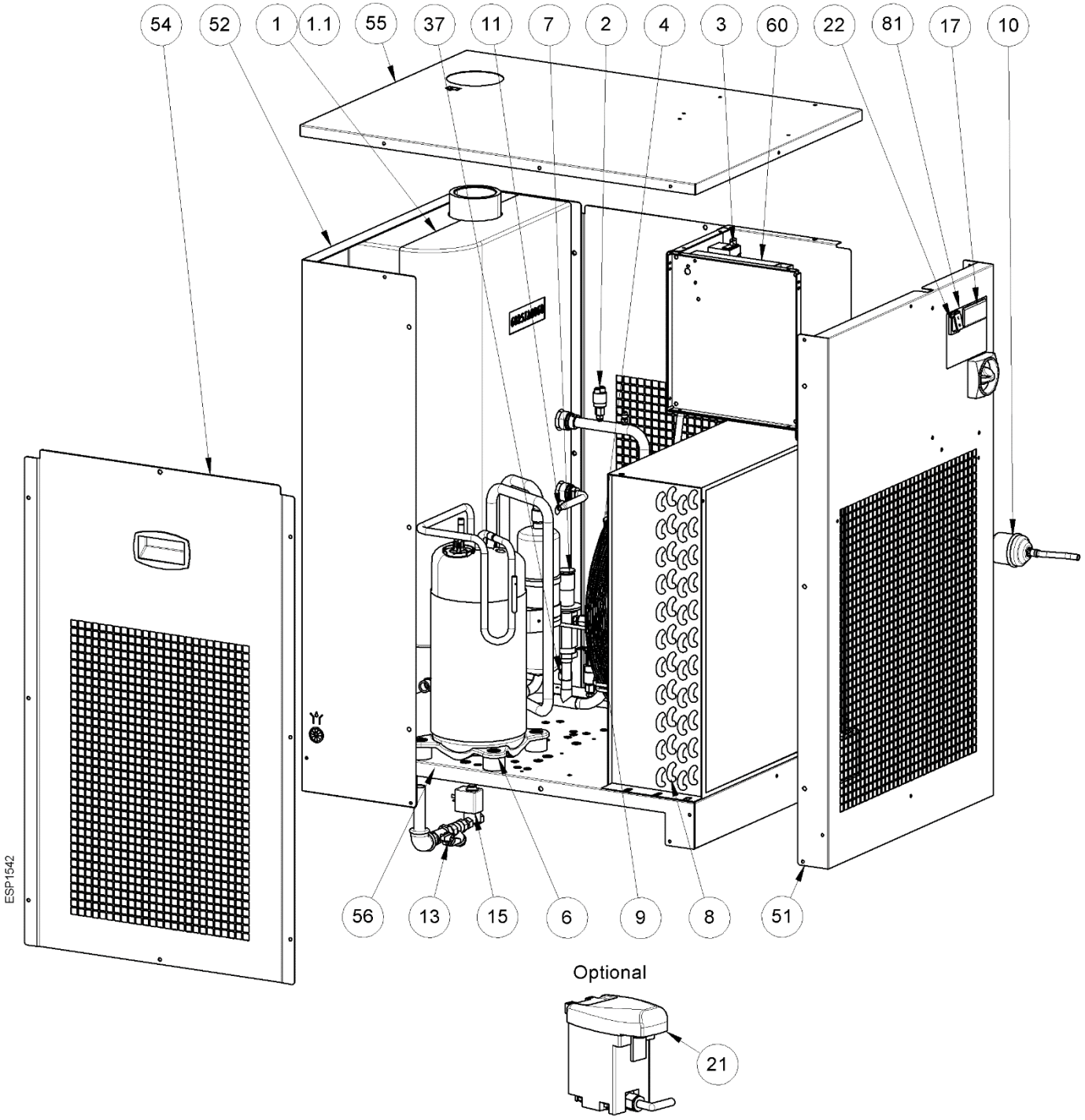
13.2.8 Exploded diagram DRYPOINT RAc 105 – 130



13.2.9 Exploded diagram DRYPOINT RAc 168



13.2.10 Exploded diagram DRYPOINT RAc 190 – 220



13.3 Electric diagrams

13.3.1 Electric diagrams – list of components

MC1 : Compressor
- **KT** : Compressor thermal protection
- **KR** : Compressor starting relay (if installed)
- **CS** : Compressor starting capacitor (if installed)
- **CR** : Compressor operating capacitor (if installed)

MV1 : Condenser fan
- **KV** : Fan thermal protection
- **CV** : Fan starting capacitor (if installed)

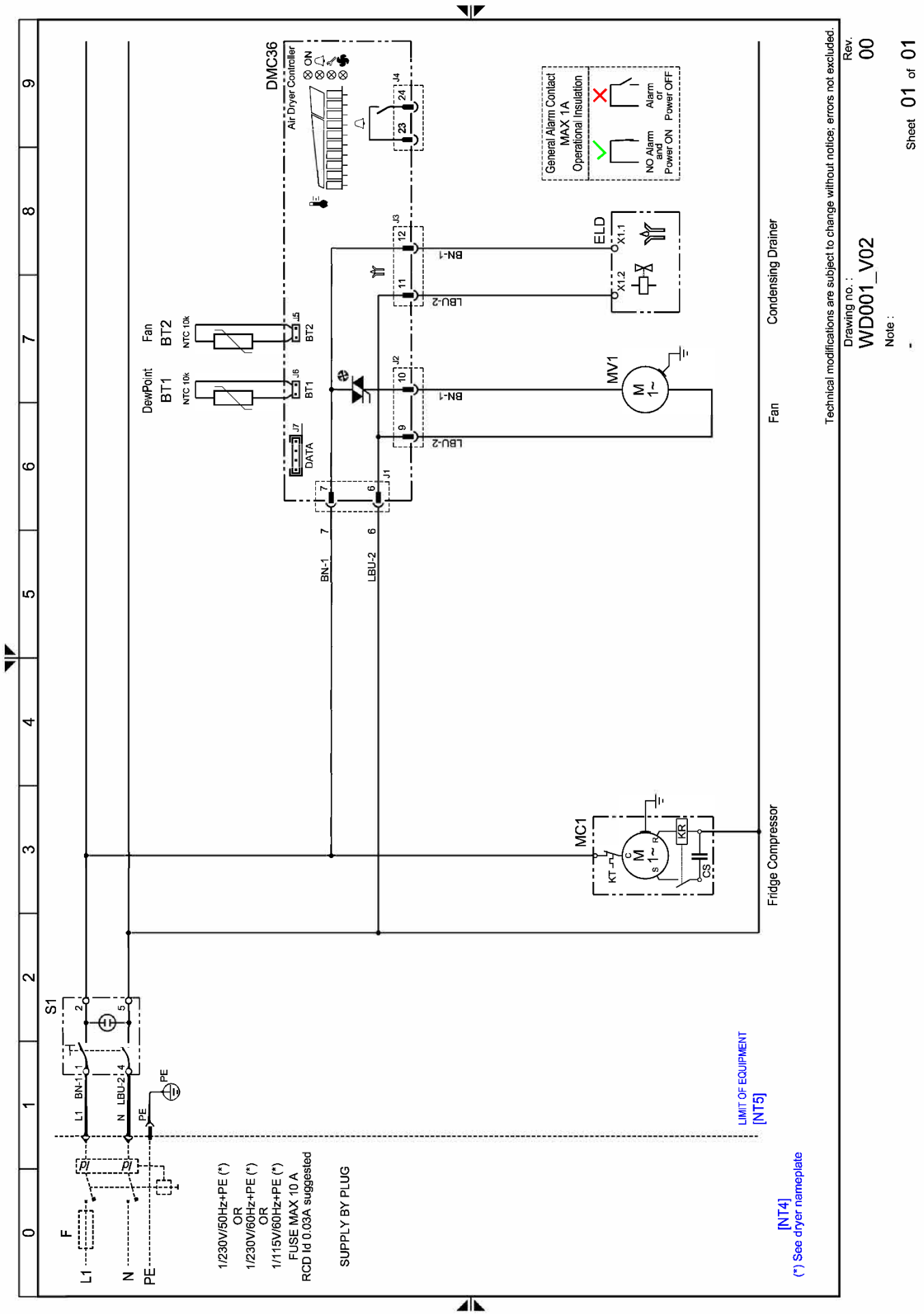
DMC 36 : DMC 36 electronic instrument – air dryer control
- **BT1-2** : Temperature probe – dew point

HPS : Pressure switch – compressor discharge side (HIGH PRESSURE)
LPS : Pressure switch – compressor suction side (LOW PRESSURE)
BP2 : Pressure transducer – fan control
TS : Safety temperature switch
ELD : BEKOMAT drain
S1 : ON/OFF switch
QS : Main switch with locking device
RC : Compressor crankcase heater
BOX : Electrical connection

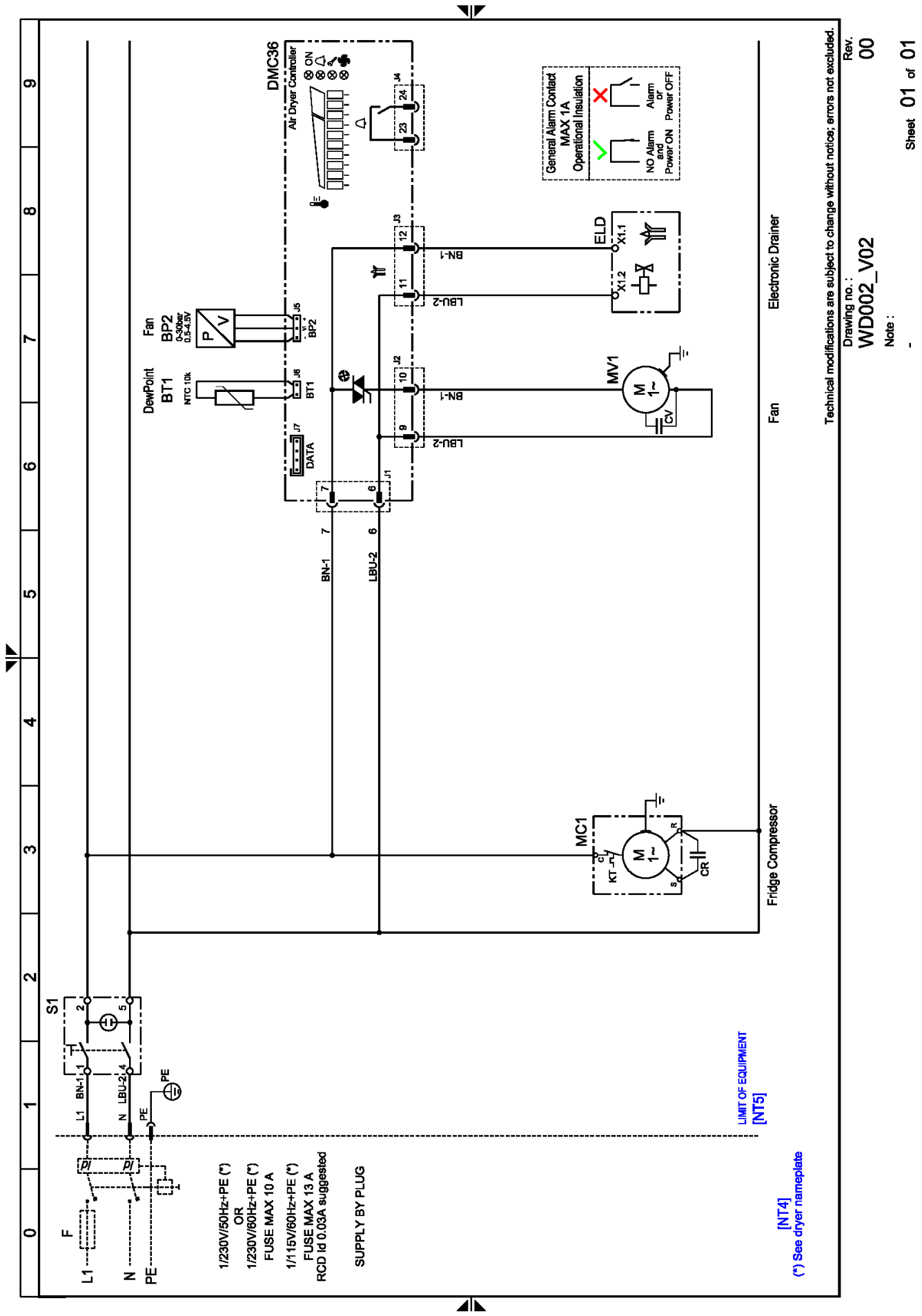
NT1 : Only air-cooled
NT2 : Check the transformer connections with regard to the supply voltage
NT3 : Jump, if not installed
NT4 : Provided and cabled by the customer
NT5 : Internal control
NT6 : Time-controlled drain outlet (not used)
NT7 : Only water-cooled

BN	=	BROWN	**OR**	=	ORANGE
BU	=	BLUE	**RD**	=	RED
BK	=	BLACK	**WH**	=	WHITE
YG	=	YELLOW/GREEN	**WH/BK**	=	WHITE/BLACK

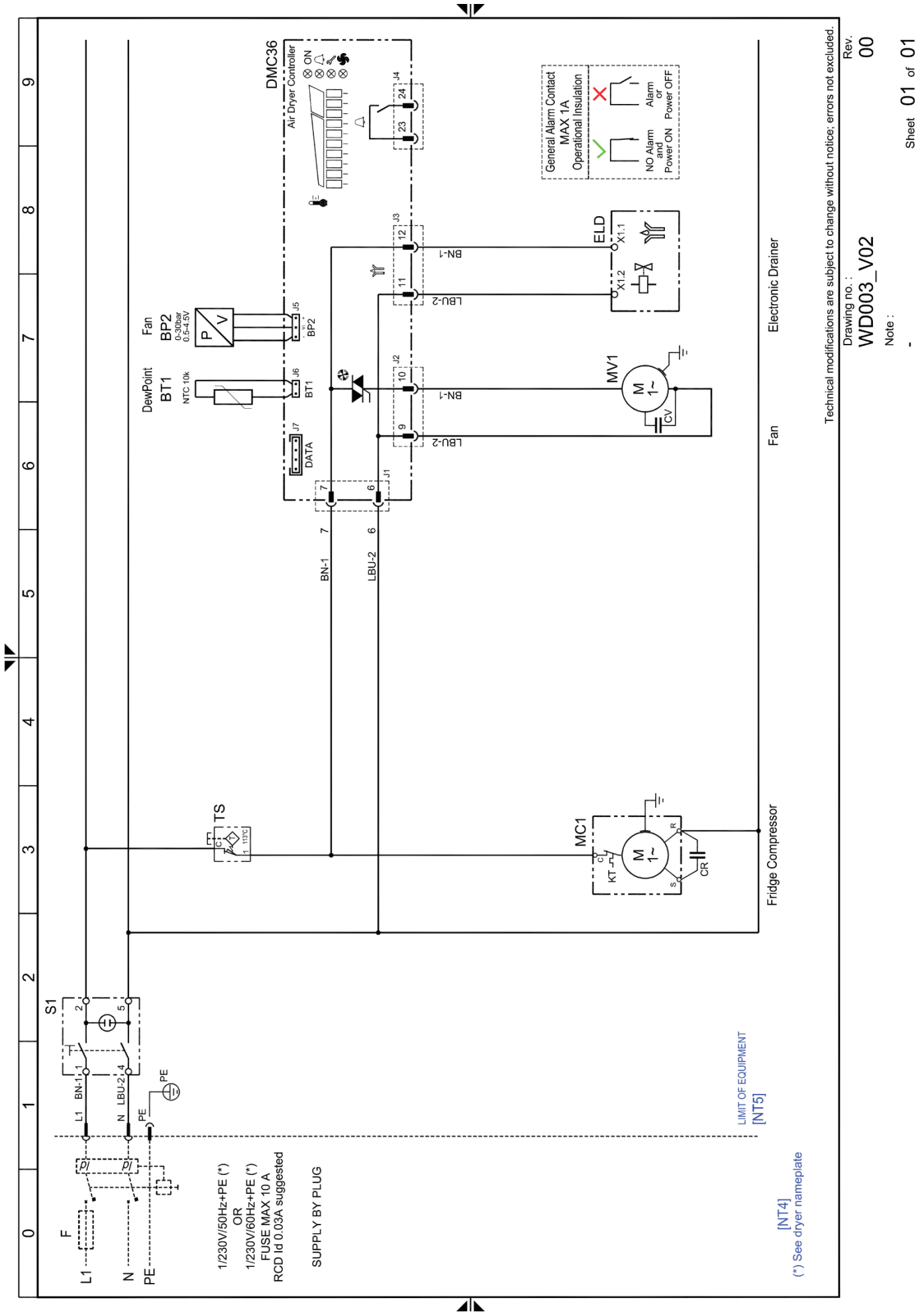
13.3.2 Electric diagram DRYPOINT RAc 3 - 32



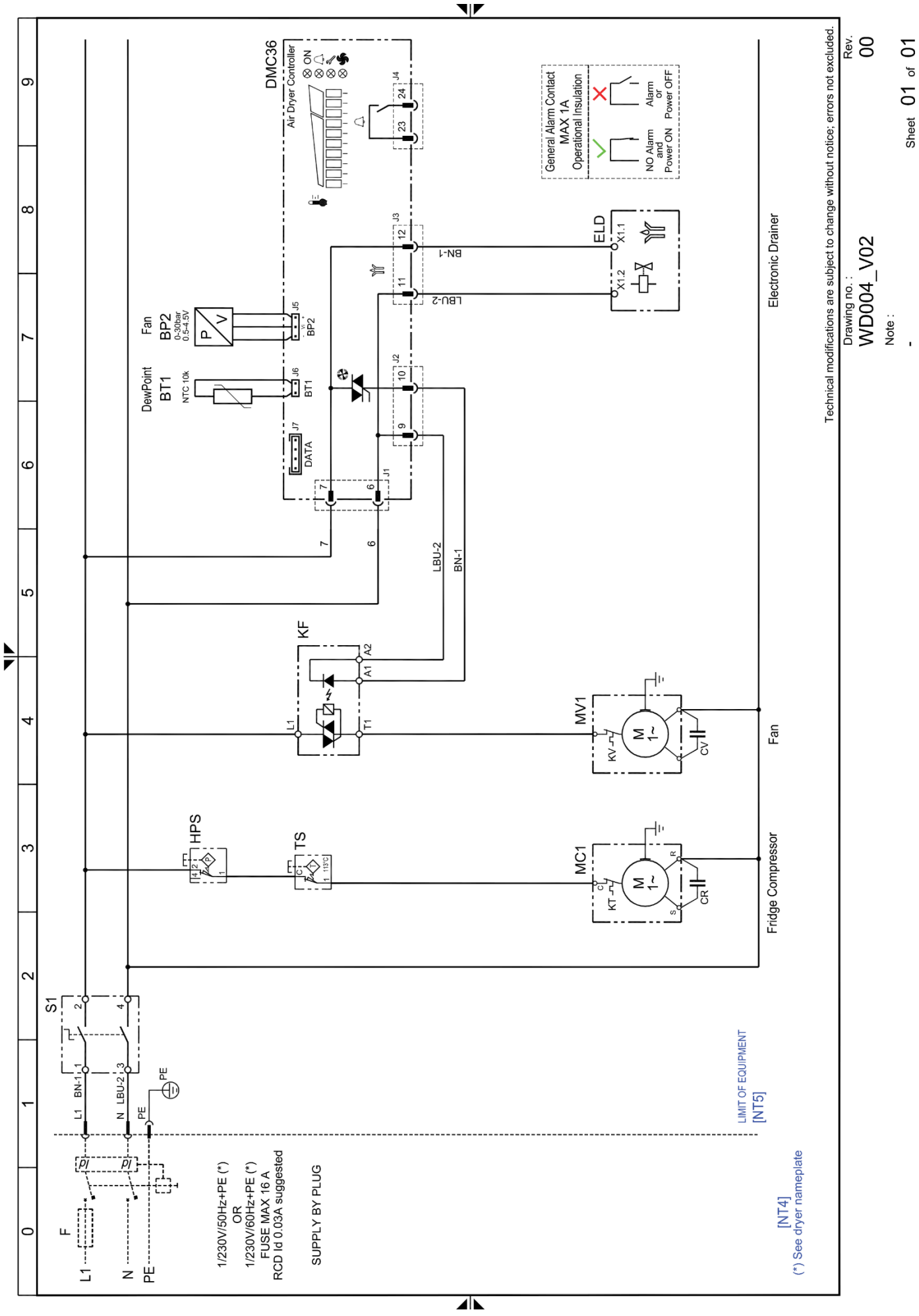
13.3.3 Electric diagram DRYPOINT RAc 43 - 61



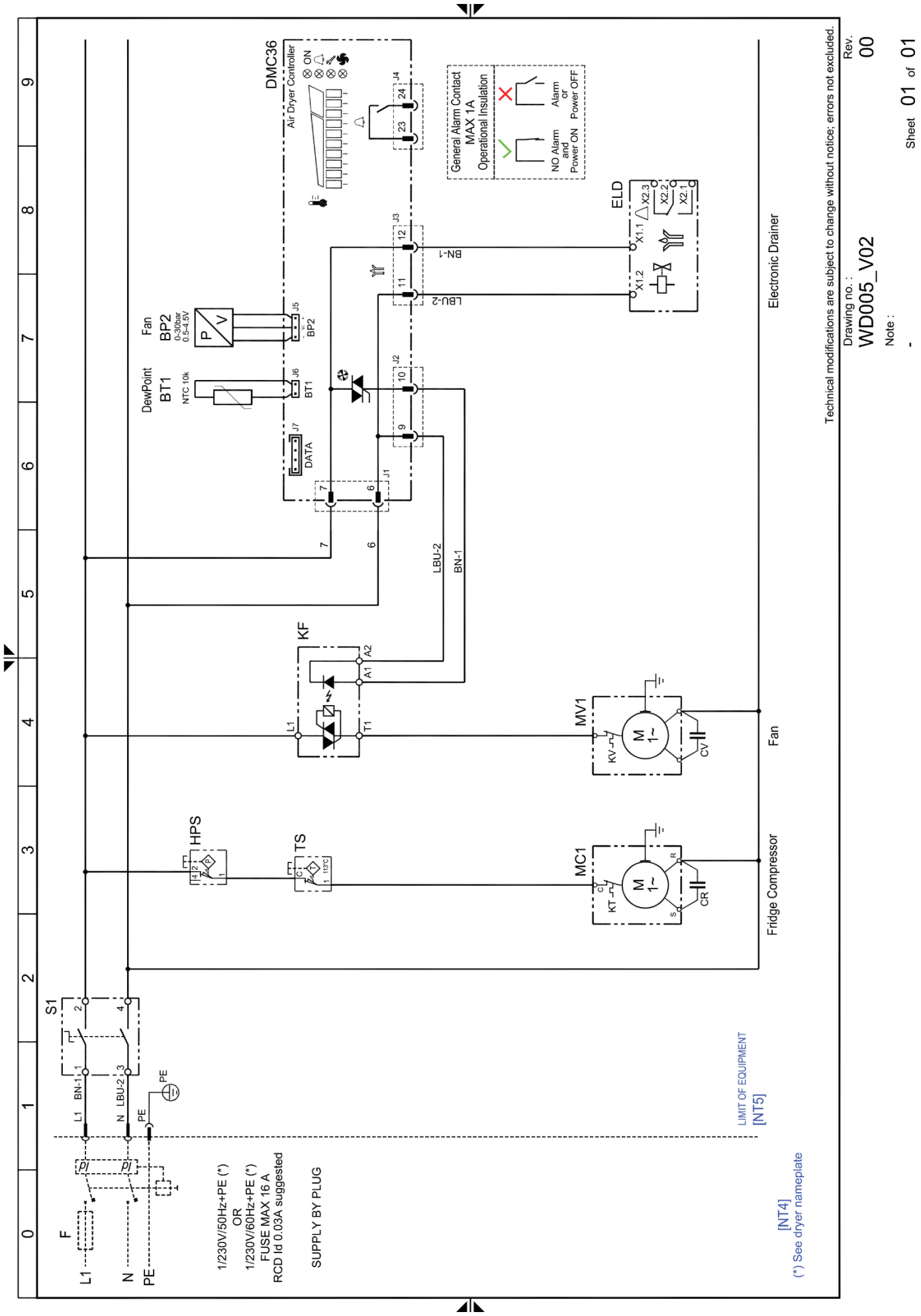
13.3.4 Electric diagram DRYPOINT RAc 75



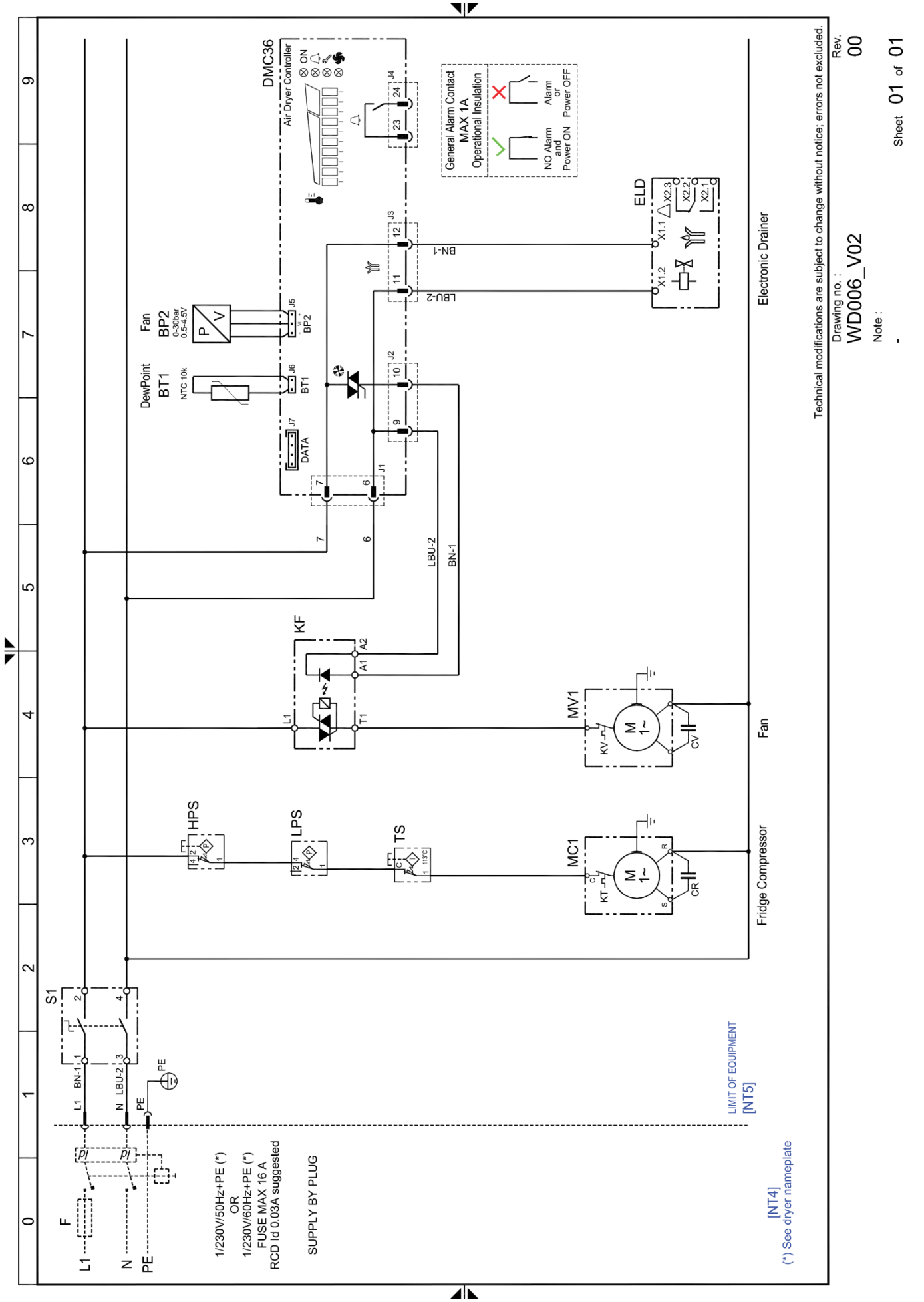
13.3.5 Electric diagram DRYPOINT RAc 105



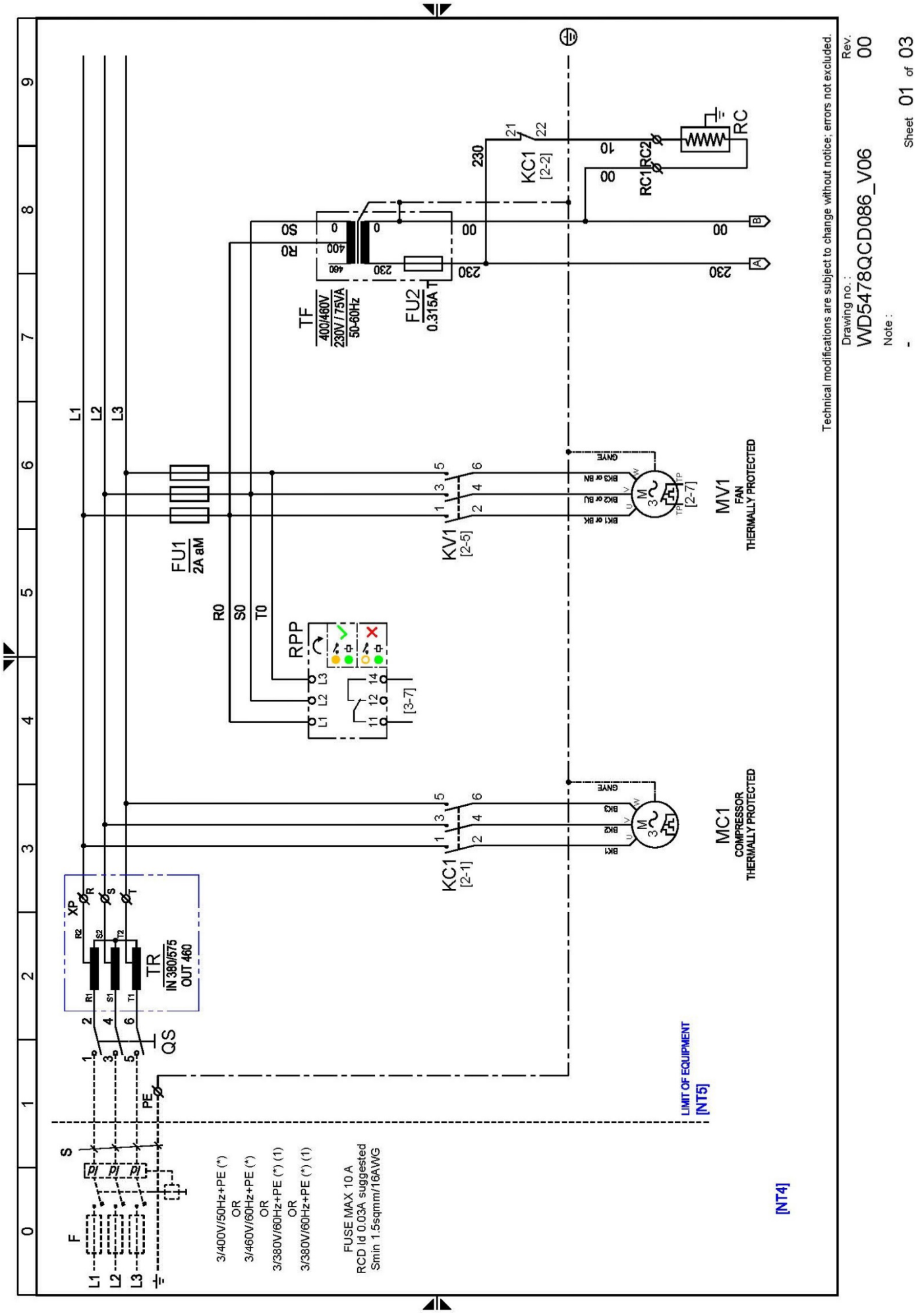
13.3.6 Electric diagram DRYPOINT RAc 130



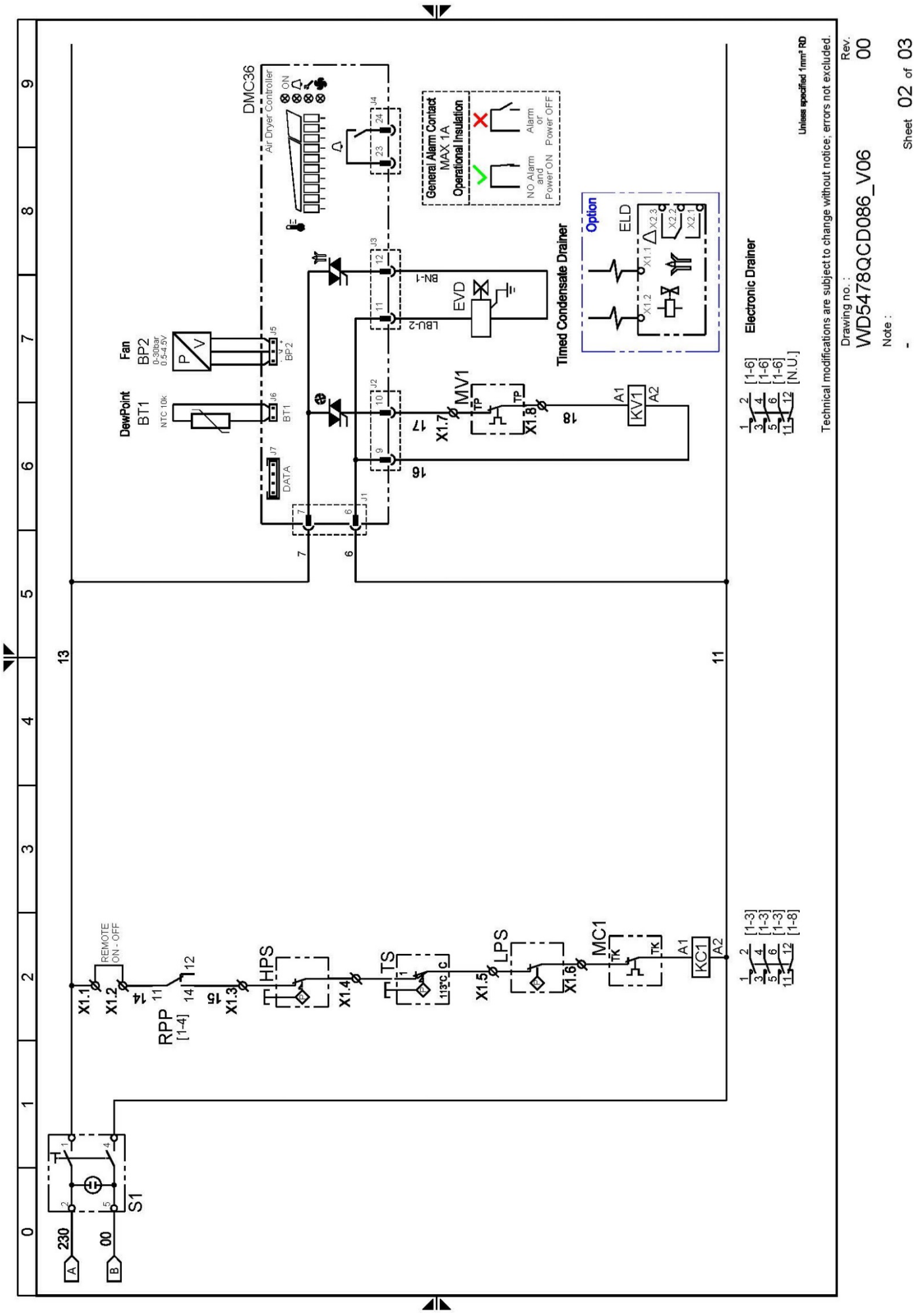
13.3.7 Electric diagram DRYPOINT RAc 168



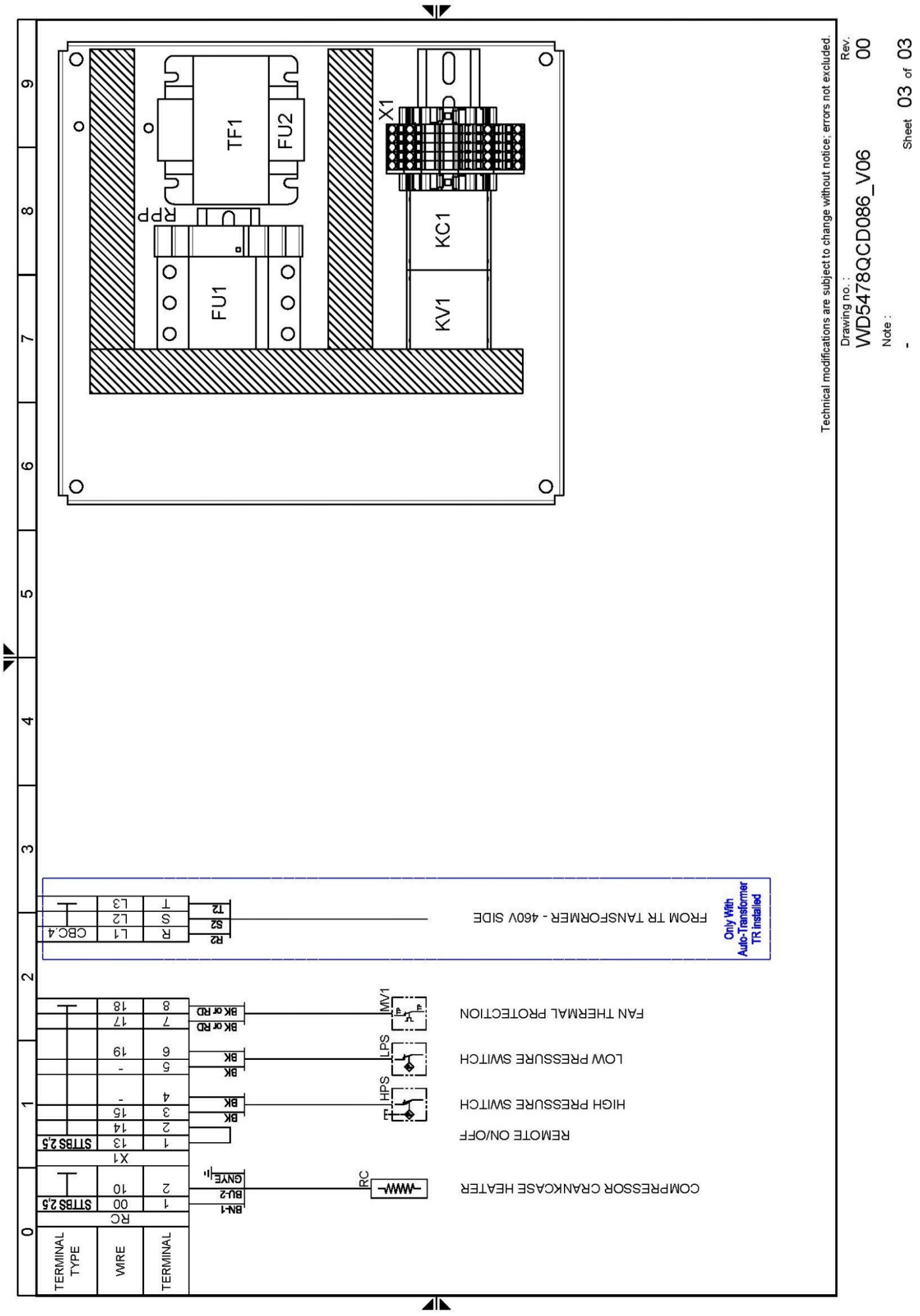
13.3.8 Electric diagram DRYPOINT RAc 190-220 Sheet 1/3



13.3.9 Electric diagram DRYPOINT RAc 190-220 Sheet 2/3



13.3.10 Electric diagram DRYPOINT RAc 190-220 Sheet 3/3



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Original operating instructions in English.
Subject to technical changes / errors excepted.
DRYPOINT_RAc_3 - 220_R513A_manual_en_2023_10