EN - english

Instructions for installation and operation

Compressed air refrigeration dryer

DRYPOINT® RA 20T-960T

05-012

Dear customer,

Thank you for deciding in favour of the DRYPOINT® RA 20T-960T compressed-air refrigeration dryer. Please read these installation and operating instructions carefully before mounting and starting up the DRYPOINT® RA 20T-960T and follow our directions. Perfect functioning of the DRYPOINT® RA 20T-960T and thus reliable compressed-air drying can only be guaranteed when the provisions and notes stipulated here are strictly adhered to.

Contents

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® RA 20T-960T 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® RA 20T-960T 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] 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.

2.2 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

2.3 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® RA 20T-960T 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® RA 20T-960T 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:

- **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.
- **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.
- Prior to carrying out works on refrigerant-carrying parts, remove the refrigerant to such an extent that safe working is possible.
- Do not eat, drink or smoke during work. Keep out of the reach of children.
- **Breathing protection:** ambient-air-independent respirator (at high concentrations).
- **Eye protection:** sealing goggles.
- **Hand protection:** protective gloves (e.g. made of leather).
- **Personal protection:** protective clothing.
- **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 Operating instructions in accordance with the 2014/68/EU Pressure Equipment Directive

The DRYPOINT® RA 20T-960T compressed-air refrigeration dryer contains pressure equipment in the sense of the 97/23/EC 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® RA 20T-960T 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® RA 20T-960T 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® RA 20T-960T 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® RA 20T-960T 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® RA 20T-960T 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

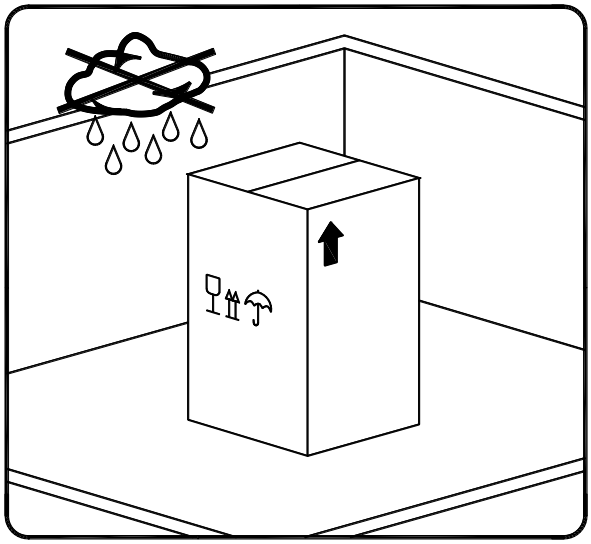
Check the packaging for visible loss or damage. If no visible damage can be ascertained, place the unit in close proximity to the place of installation and unpack the device.

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



Keep the device away from extreme weather conditions even when packaged.

Keep the dryer in an upright position, also while it is stored. Tilting the device or turning it upside down can cause irreparable damage to some components.

When the dryer is not in use, it can be stored in its packaging in a dust-free and protected place at a temperature +1°C…+50°C and at a specific humidity of max. 90%. If the storage period exceeds 12 months, you should 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 +50°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).

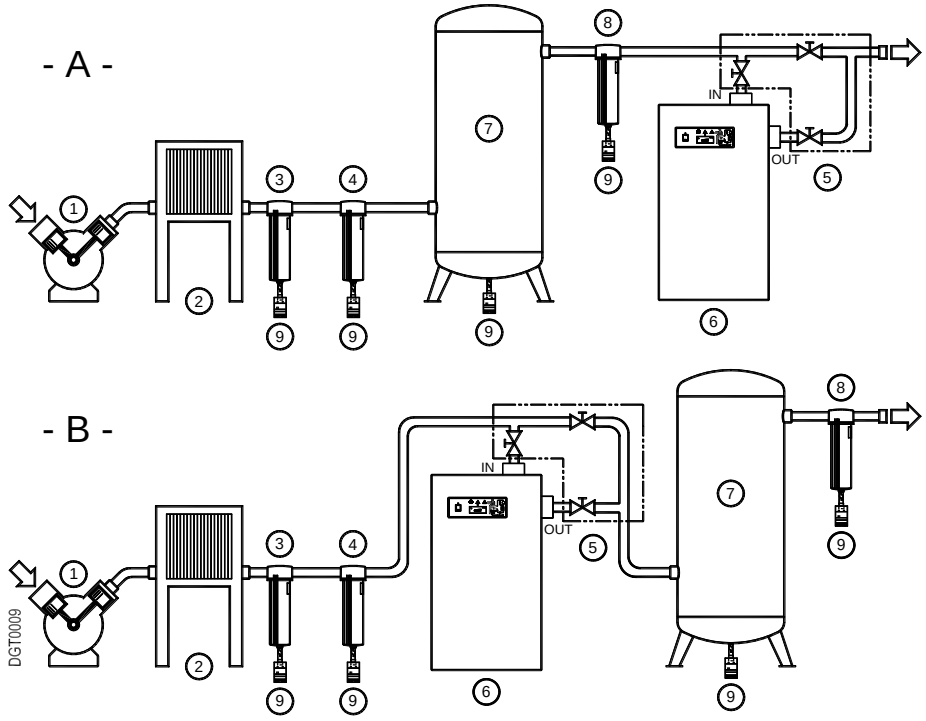
Prevent any recirculation of the outgoing cooling air.

Protect the dryer against draughts.

Note!

Dryers models RA 20T – 70T can be wall-mounted. See fixing dimensions on dimensional drawings in the appendices section.
The hanging mounting inevitably causes the obstruction of the ventilation grid positioned on the panel facing the wall fixing. This obstruction, in any case, does not prejudge the efficiency of the ventilation inside the dryer which is guaranteed by other grids on the other panels.

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
Factor (F1)	0.77	0.86	0.93	1.00	1.05	1.14	1.21	1.27

Correction factor for ambient temperature modifications :						
Ambient temperature °C	≤ 25	30	35	40	45	50
Factor (F2)	1.00	0.96	0.91	0.85	0.76	0.64

Correction factor for air inlet temperature modifications:								
Air temperature °C	≤ 25	30	35	40	45	50	55	60
Factor (F3)	1.27	1.21	1.00	0.84	0.70	0.57	0.48	0.42

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 RA 240T** has a planned nominal capacity of **246 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 = 30°C ⇨ Factor (F2) = 0.96
- Air inlet temperature = 40°C ⇨ Factor (F3) = 0.84
- 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 = 246 x 1.05 x 0.96 x 0.84 x 1.09 = 227 m³/h

227 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 = 180 m³/h
- Air inlet pressure = 8 bar(g) ⇨ Factor (F1) = 1.05
- Ambient temperature = 30°C ⇨ Factor (F2) = 0.96
- Air inlet temperature = 40°C ⇨ Factor (F3) = 0.84
- 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:

$$\textbf{Air throughput acc. to planning} = \frac{\textbf{180}}{\textbf{1.05 x 0.96 x 0.84 x 1.09}} = \textbf{195 m³/h}$$

The suitable model for these requirements is **DRYPOINT RA 190T** (with a spec. nominal capacity of 204 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.

During the piping of the dryer, the inlet and outlet connections need to be supported as is shown in the illustration.
Non-observance will cause damage.

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%.
DRYPOINT RA 20T-960T dryers are supplied with a VDE 16A standard power cord and safety plug (two-pole and earth connection) or with a junction box on the back plate.
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 IΔn =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.

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).
- Start the dryer by switching on the main switch on the control panel (pos. 1).
- Make sure that the DMC 34 electronic control unit is switched on.
- Ensure that the power consumption complies with the values on the name plate.
- Ensure that the fan runs properly **–** wait for the 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 dew point between 0°C and +10°C displayed on the DMC 34 control unit is considered to be correct according to the possible operating conditions (flow rate, air inlet temperature, 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.

9.3 Shut down and restart

Shut down (see Section 11.1 "Control panel")

- Ensure that the dew point temperature indicated on the DMC 34 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 34 electronic control unit is switched on.
- Wait a few minutes and then check, whether or not the dew point temperature indicated on the DMC 34 electronic control unit is stable and whether or not the condensate is drained off at regular intervals.
- Establish the compressed-air supply.

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 dew point between 0°C and +10°C displayed on the DMC 34 control unit is considered to be correct according to the possible operating conditions (flow rate, air inlet temperature, 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 DRYPOINT RA		20T	35T	50T	70T	110T	135T	190T	240T	330T	370T	490T	630T	750T	870T	960T
Air flow rate at nominal condition (1)	[m3/h]	21	33	51	72	108	150	204	246	366	408	540	648	750	870	960
	[l/min]	350	550	850	1200	1800	2500	3400	4100	6100	6800	9000	10800	12500	14500	16000
	[scfm]	12	19	30	42	64	88	120	145	215	240	318	382	441	512	565
Pressure DewPoint at nominal condition (1)	[°C]	3														
Nominal ambient temperature	[°C]	25														
Min...Max ambient temperature	[°C]	1 … 50														
Nominal inlet air temperature (max.)	[°C]	35 (70)														
Nominal inlet air pressure	[barg]	7														
Max. inlet air pressure	[barg]	16				14										
Air pressure drop - Δp	[bar]	0,01	0,02	0,04	0,06	0,07	0,10		0,19	0,13	0,16	0,08	0,13	0,08	0,11	0,15
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		R134.a				R407C										
Refrigerant quantity (2)	[kg]	0,19	0,19	0,22	0,20	0,25	0,28	0,59		0,82		1,10		2,30		2,40
Cooling air fan flow	[m3/h]	200		300		300		450		2400		2500		3300		
Heat Rejection	[kW]	0,45	0,57	0,68	0,87	1,00	1,70	2,90	3,15	4,70	4,90	6,10	6,60	6,90	7,25	7,93
Standard Power Supply (2)	[Ph/V/Hz]	1/230/50-60				1/230/50										
Nominal electric consumption @50Hz	[kW]	0,17	0,20	0,27	0,35	0,44	0,49	0,79	0,83	1,10	1,25	1,55	1,65	1,80	1,90	2,10
	[A]	1,2	1,4	1,7	1,9	2,4	2,9	3,6	3,9	5,2	6,0	7,4	8,0	8,1	8,7	9,7
Nominal electric consumption @60Hz	[kW]	0,20	0,22	0,29	0,37	[-]										
	[A]	1,4	1,5	1,8	2,2	[-]										
Full Load Amperage FLA	[A]	1,5	1,5	1,7	2,4	3,1	3,5	5,9	5,9	8,9	8,9	9,0	9,0	14,3	14,3	14,3
Max. noise level at 1 m	[dbA]	< 70														
Weight	[kg]	28	29	31	32	39	41	46	53	55	63	92	94	141	150	158

(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.

MODEL DRYPOINT RA		110T-E	135T-E	190T-E	240T-E	330T-E	370T-E	490T-E	630T-E	750T-E	870T-E	960T-E
Air flow rate at nominal condition (1)	[m3/h]	108	150	204	246	366	408	540	648	750	870	960
	[l/min]	1800	2500	3400	4100	6100	6800	9000	10800	12500	14500	16000
	[scfm]	64	88	120	145	215	240	318	382	441	512	565
Pressure DewPoint at nominal condition (1)	[°C]	3										
Nominal ambient temperature	[°C]	25										
Min...Max ambient temperature	[°C]	1 … 50										
Nominal inlet air temperature (max.)	[°C]	35 (70)										
Nominal inlet air pressure	[barg]	7										
Max. inlet air pressure	[barg]	14										
Air pressure drop - Δp	[bar]	0,07	0,10		0,19	0,13	0,16	0,08	0,13	0,08	0,11	0,15
Inlet - Outlet connections	[BSP-F]	G 1”		G 1.1/4”		G 1.1/2”		G 2”		G 2.1/2”		
Refrigerant type		R134.a		R407C								
Refrigerant quantity (2)	[kg]	0,35	0,40	0,55		1,00		1,20		1,95		2,00
Cooling air fan flow	[m3/h]	350		530		2800		2950		3900		
Heat Rejection	[kW]	1,18	2,01	3,40	3,70	5,60	5,80	7,20	7,80	8,15	8,60	9,40
Standard Power Supply (2)	[Ph/V/Hz]	1/230/60										
Nominal electric consumption	[kW]	0,47	0,58	0,93	0,98	1,30	1,48	1,83	1,95	2,15	2,25	2,50
	[A]	2,8	3,4	4,3	4,6	6,1	7,0	8,7	9,4	9,6	10,3	11,4
Full Load Amperage FLA	[A]	5,1	5,1	7,3	7,3	10,3	10,3	14,0	14,0	15,0	15,0	15,1
Max. noise level at 1 m	[dbA]	< 70										
Weight	[kg]	39	41	46	53	55	63	92	94	141	150	158

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

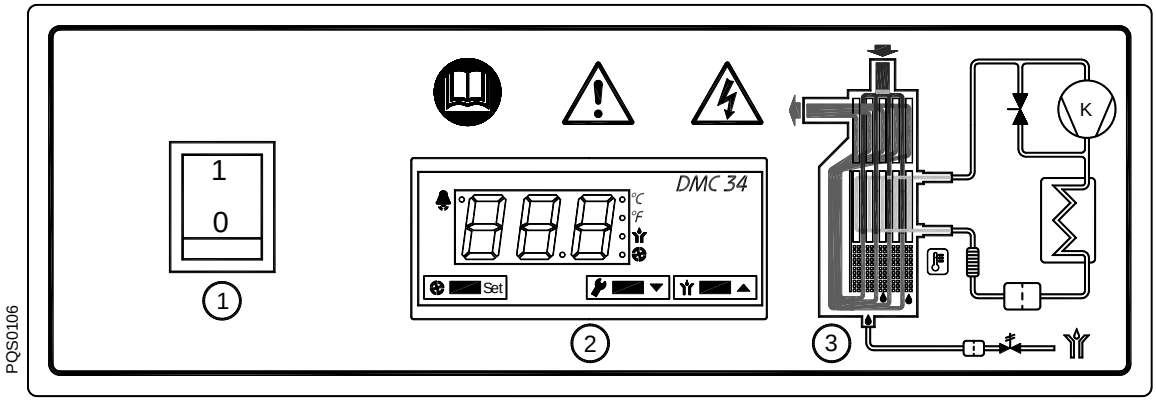
(2) Check the data shown on the identification plate.

11 Technical description

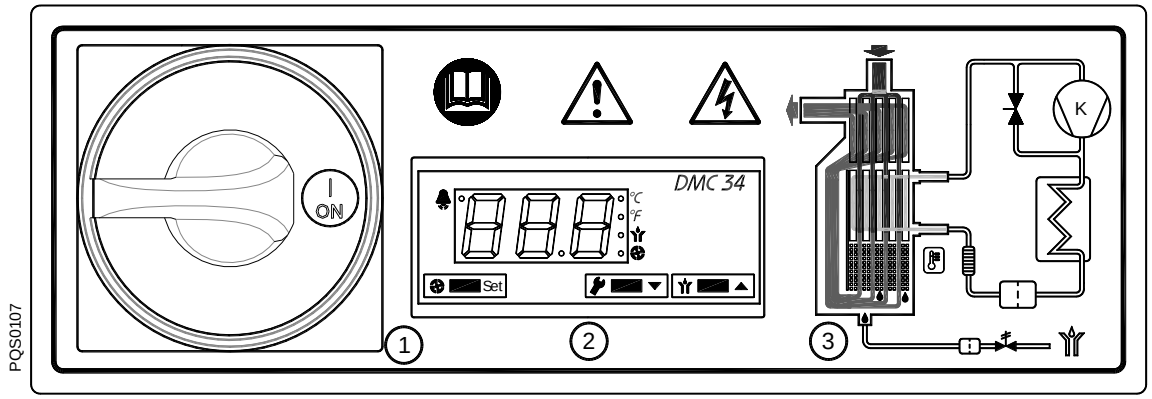
11.1 Control panel

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

RA 20T – 370T



RA 490T – 960T



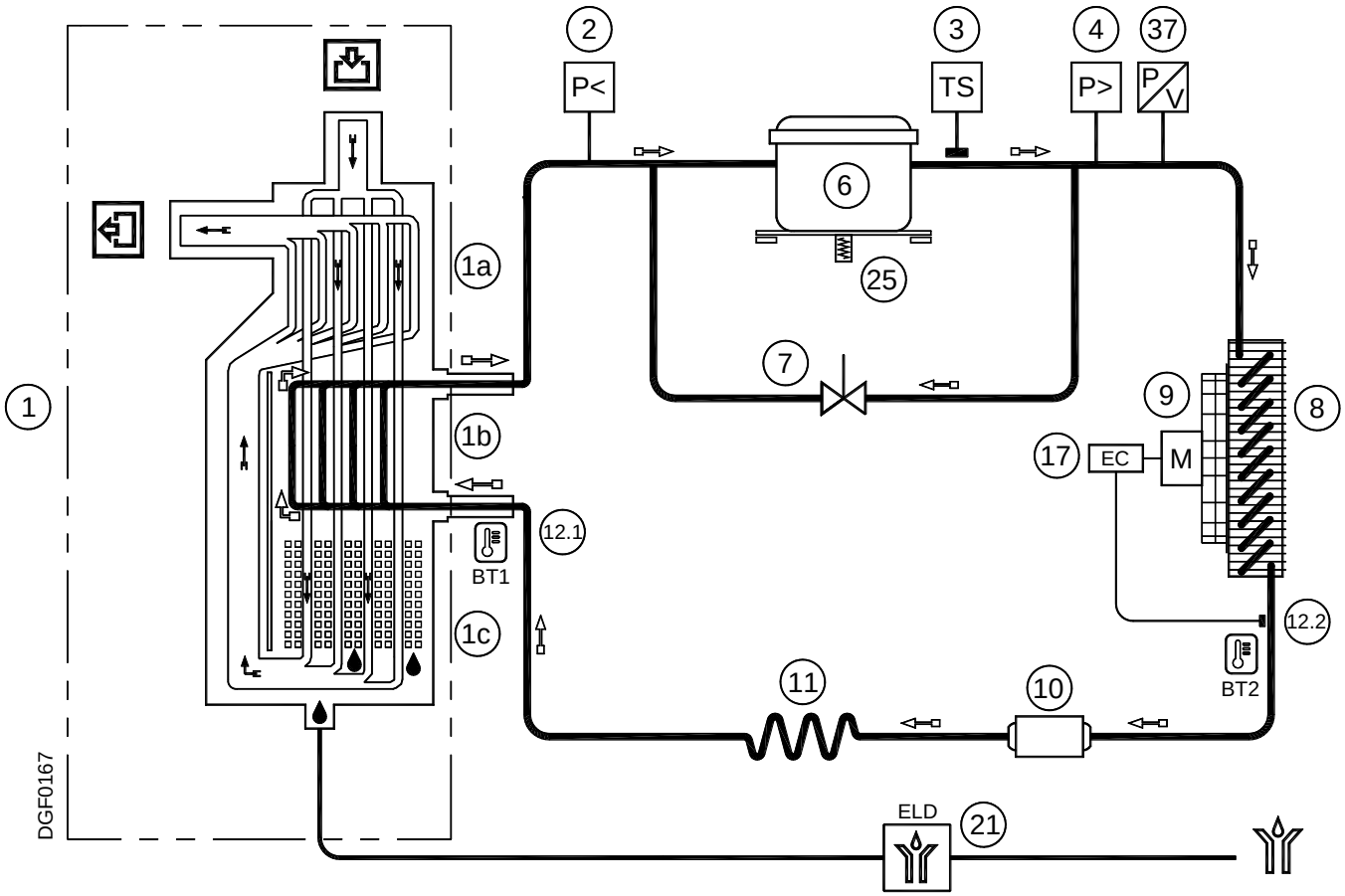
1 Main switch
2 Electronic control unit DMC 34
3 Air and refrigerant gas flow chart

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
1a Air-to-air heat exchanger
1b Air-to-refrigerant heat exchanger
1c Condensate separator
2 Refrigerant pressure switch LPS (RA 490T – 960T)
3 Safety thermo switch TS (RA 330T – 960T)
4 Refrigerant pressure switch HPS (RA 490T – 960T)
6 Compressor
7 Hot gas by-pass valve
7 Hot gas by-pass valve
8 Condenser
9 Condenser fan
10 Filter dryer
11 Capillary tube
12 Temperature probe BT1 – DewPoint
13 Condensate drain service valve
17 Bekomat
21 Electronic drainer
25 Compressor crankcase heater (Not installed)
37 Pressure Transducer BP2 – Fan control

Compressed air flow direction

Refrigerant gas flow direction

11.4 Refrigerating compressor

The refrigerating compressor is the pump in the system, gas coming from the evaporator (low pressure side) is compressed up to the condensation pressure (high pressure side). The compressors utilized are manufactured by leading manufacturers and are designed for applications where high compression ratios and wide temperature changes are present.
The hermetically sealed construction is perfectly gas tight, ensuring high-energy efficiency and long, useful life. Dumping springs support the pumping unit in order to reduce the acoustic emission and the vibration diffusion. The aspirated refrigerant gas, flowing through the coils before reaching the compression cylinders cools the electric motor. The thermal protection protects the compressor from over heating and over currents. The protection is automatically restored as soon as the nominal temperature conditions are reached..

11.5 Condenser

The condenser is the component in which the gas coming from the compressor is cooled down and condensed becoming a liquid. Mechanically, a serpentine copper tubing circuit (with the gas flowing inside) is encapsulated in an aluminum fin package.
The cooling operation occurs via a high efficiency fan, creating airflow within the dryer, moving air through the fin package. It's mandatory that the ambient air temperature does not exceed the nominal values. It is also important to keep the condenser unit free from dust and other impurities.

11.6 Filter dryer

Traces of humidity and slag can accumulate inside the refrigerant 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.

11.7 Capillary tube

It consists of a piece of reduced cross section copper tubing located between the condenser and the evaporator, acting as a metering device to reduce the pressure of the refrigerant. Reduction of pressure is a design function to achieve optimum temperature reached within the evaporator: the smaller the capillary tube outlet pressure, the lower the evaporation temperature.
The length and interior diameter of the capillary tubing is accurately sized to establish the performance of the dryer; no maintenance or adjustment is necessary.

11.8 Aluminium heat exchanger

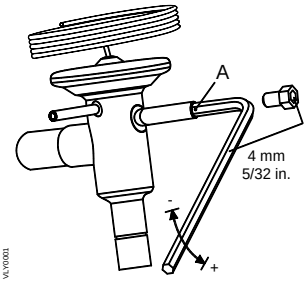
The heat exchanger module houses the air-to-air, the air-to-refrigerant heat exchangers and the demister type condensate separator. The counter flow of compressed air in the air-to-air heat exchanger ensures maximum heat transfer. The generous cross section of flow channel within the heat exchanger module 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.

11.9 Hot-gas bypass 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 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 : R134.a pressure 2.0 barg (+0.1 / -0 bar)
R407C pressure 4.5 barg (+0.1 / -0 bar)

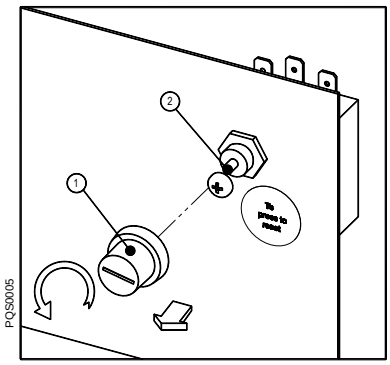
11.10 Refrigerant pressure switches LPS – HPS

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.

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.

11.11 Safety temperature switch TS

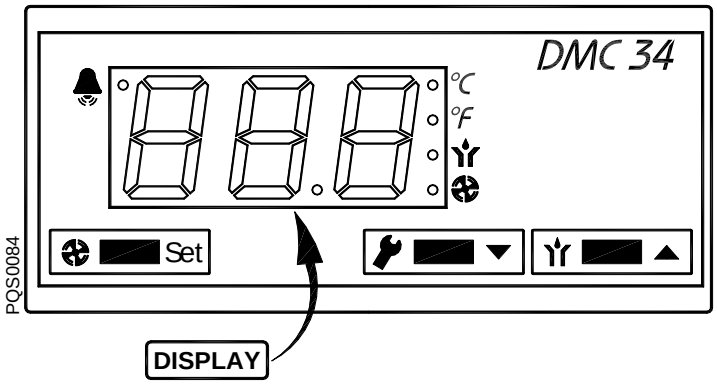


To protect the operating safety and the integrity of the dryer, a thermo switch (TS) is installed on the refrigerant gas circuit. The thermo switch sensor, in case of unusual discharge temperatures, stops the refrigerating compressor before it is permanently damaged.

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 113 °C (+0 / -6 °K)

11.12 Electronic instrument DMC34



Led - Temperature in °C

Led - Temperature in °F

Led – Drain ON

Led – Fan ON

Led – Alarm/Service

Button – Setup menu access / Condensing

Button – Decrease / Service

Button – Increase / Drain test

The DMC34 displays DewPoint temperature, controls the condenser fan activation, handles a service reminder and keep record of the total hours of operation of the dryer.

11.12.1 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 the display shows the DewPoint temperature.

The condensate drain test is always active using the button .

11.12.2 How to switch off the dryer

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

11.12.3 How to display the operating parameters

During normal operation, the display shows the DewPoint temperature (in °C or °F).

Press and hold Set button to display condensing pressure.

Press and hold button to display hours until the next service.

Press and hold Set + buttons to display total hours of operation of the dryer (cannot be reset).

NOTE : with led °C on temperatures are in °C and pressure in barg; with led °F on temperatures are in °F and pressure in psig.
The total hours of operation and the hours until the next service are shown in the field 0…999 hours and in thousands of hours from 01.0 hours on (example : if the display shows number 35 it means 35 hours; if the display shows number 3.5 it means 3500 hours).

11.12.4 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.

When a service warning / alarm is active, the led is flashing.

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
flashing + PF 1 on display	PF1 - Probe 1 Failure : failure temperature probe BT1
flashing + PF2 on display	PF2 - Probe 2 Failure : failure pressure probe BP2
flashing + HdP on display	HdP - High DewPoint: DewPoint too high Set BT1>HdS, delay Hdd / Reset BT1<HdS-1°C (HdS-2°F)
flashing + LdP on display	LdP - Low DewPoint : DewPoint too low Set BT1< -1°C (30°F), delay 5 minutes / Reset T1> 1°C (34°F)
flashing + SrU on display	SrV - Service : maintenance service time expired SrV

11.12.5 How is controlled the condenser FAN

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 (R134a approx. 11 barg/160 psig – R407C approx. 18 barg/260 psig) and led is ON. Condenser fan stops when BP2 pressure is lower than FANoff setting (R134a approx. 8 barg/115 psig – R407C approx. 14 barg/203 psig).

11.12.6 How is controlled the drain solenoid valve

Drain solenoid valve is activated (ON) for ton seconds (standard 2 seconds) every toF minutes (standard 1 minute). Led shows that condensate drain solenoid valve is ON.

The condensate drain test is always active using the button .

NOTE : if an electronic drainer is installed, DMC34 is set to keep always powered the drain output (ton =ON).

11.12.7 How to reset the service reminder timer

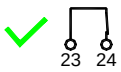
With dryer OFF keep pressed buttons Set + , power the dryer and switch it on using the ON-OFF switch (pos.1 paragraph 7.1).

After 5 seconds display shows SrU, release buttons Set + , keep pressed button for 5 seconds. Timer has been reset and controller start to operate regularly.

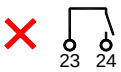
Service reminder timing can be reset at any time, even before the timing has expired

11.12.8 Operation of the failure / alarm dry contact

The DMC34 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.

11.12.9 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 simultaneously press buttons Set + ▲ for at least 5 seconds to enter the setup menu.
Access to the menu is confirmed by message ton on the display (first parameter of menu).
Keep Set pressed to display the value of the selected parameter and use arrows ▼ and ▲ to change the value. Release the button Set to confirm the value and skip to following parameter.
Press ▼ + ▲ to exit setup menu (if no button is pressed after 2 minutes the menu is exited automatically).

ID	Description	Limits	Resolution	Standard setup
ton	Ton – drain time ON : time ON condensate drain valve **ON = Electronic drainer installed**	ON-00 … 20 sec	1 sec	ON
toF	ToF - drain time OFF : pause time for condensate drain valve	1 … 20 min	1 min	1
HdS	HdS – High DewPoint Setting : Alarm threshold for a high DewPoint (the alarm disappears when the temperature drop 1°C / 2°F below alarm point)	0.0…25.0 °C or 32 … 77 °F	0.5 °C or 1 °F	20 or 68
Hdd	Hdd - High DewPoint Delay : high DewPoint alarm enable delay	01 … 20 minutes	1 min	15
SrV	SrV - Service Setting: setting of service warning timer. 00 = service warning timer disabled.	00.0 … 20.0 (x 1000) hours	0.5 (x1000) hours	08.0
SrC	SrC – Service Contact : configuration of the alarm dry contact for the service warning timer. YES = activate the contact / NO = NOT activate the contact	YES / NO	-	YES
SCL	SCL - Scale: display scale of temperatures and pressure (°C = temperatures in °C and pressure in barg; °F = temperatures in °F and pressure in psig)	°C … °F	-	°C

11.13 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 RA 20T-960T** 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® RA 20T-960T 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 Electronic drainer service unit
- Replace compressed air filters.

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® RA 20T-960T 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.

FAULT	POSSIBLE REASON – SUGGESTED MEASURE
◆ The dryer does not start.	⇨ Check whether or not the dryer is connected with the electric mains. ⇨ Check the electric cabling.
◆ The refrigerating compressor does not work.	⇨ The internal heat protection of the compressor was activated – wait 30 minutes and then retry. ⇨ Check the electric cabling. ⇨ If installed – replace the internal heat protection and/or the start-up relay and/or the starting capacitor and/or the operating capacitor. ⇨ If installed – the HPS pressure switch was activated – see the corresponding point. ⇨ If installed – the LPS pressure switch was activated – see the corresponding point. ⇨ If installed – the TS safety temperature switch was activated – see the corresponding point. ⇨ In the event that the compressor still does not work, replace it.
◆ Condenser's fan doesn't work.	⇨ Verify the electric wiring. ⇨ The electronic instrument is faulty – replace it. ⇨ **If installed** - Fan relay / power contactor (see KF/KV1 on the electric diagram) is faulty - replace it. ⇨ There is a leak in the refrigerant circuit - contact a BEKO service technician. ⇨ If the fan still doesn't work, replace it.
◆ Dew point 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 BEKO service technician to restore nominal setting. ⇨ There is a leak in the refrigerant circuit - contact a BEKO service technician.
◆ Dew Point too low	⇨ The fan is always ON - Led  is flashing + display PF2 - see specific point. ⇨ Ambient temperature is too low - restore nominal conditions. ⇨ The hot gas by-pass valve is out of setting - contact a BEKO service technician 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. ⇨ Condensate 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 drain solenoid valve is failed – replace it. ⇨ Electronic instrument is faulty – repace it.

	⇨ 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.
◆ 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 ⇨ Electronic drainer is dirty.
◆ 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 BEKO service technician 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.
◆ **If installed –** 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.
◆ DMC34 – Led is flashing + display PF 1 .	⇨ Verify the electric wiring of BT1 DewPoint probe. ⇨ The BT1 DewPoint probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC34 – Led is flashing + display PF2.	⇨ Verify the electric wiring of BP2 fan pressure probe. ⇨ The BP2 fan pressure probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC34 – Led is flashing + display HdP .	⇨ DewPoint too high - see specific point. ⇨ The BT1 DewPoint probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC34 – Led is flashing + display LdP .	⇨ DewPoint too low - see specific point. ⇨ The BT1 DewPoint probe is faulty - replace it. ⇨ The electronic instrument is faulty - replace it.
◆ DMC34 – Led is flashing + display SrU .	⇨ 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

NOTE: To order the recommended spare parts or other elements, the data on the name plate must be indicated.

ID N.		DESCRIPTION	PART NUMBER	DRYPOINT RA														
				20T	35T	50T	70T	110T	135T	190T	240T	330T	370T	490T	630T	750T	870T	960T
2	LPS	Pressure switch	5655NNN085											1	1	1	1	1
3	TS	Safety thermo switch	56141NN000							1	1	1	1	1	1	1	1	1
4	HPS	Pressure switch	5655NNN087											1	1	1	1	1
6	MC	Compressor	5015110104	1	1													
			5015110107			1												
			5015110116				1											
			5015110016					1	1									
			5030116005							1	1							
			5030116020									1	1					
			5030116025											1	1			
			5030116035													1	1	
			5030116040															1
7		Hot gas by-pass valve	64140SS150	1	1	1	1	1	1									
			64140SS151							1	1	1	1	1	1	1	1	1
8		Condenser	5810005005A	1	1													
			5810018004A			1	1											
			5810023004A					1										
			5810020005A						1									
			5810060000A							1	1							
			5810098006A									1	1					
			5810080005A											1	1			
			5810160000													1	1	1
9	MV	Complete fan	5250110004									1	1	1	1			
			5250110003													1	1	1
9,1	MV	Fan motor	5210110011A	1	1	1	1											
			5210110018A					1	1									
			5210110022A							1	1							
9.2		Fan blade	5215000010	1	1													
			5215000019			1	1											
			5215000022					1										
			5215000025						1									
			5215000034							1	1							
9.3		Fan grid	5225000010			1	1	1										
			5225000027						1									
			5225000030							1	1							
10		Filter drier	6650SSS007	1	1	1	1	1	1									
			6650SSN002							1	1	1	1	1	1	1	1	1
12	BT1	Temperature probe	5625NNN046	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17	DMC34	Electronic instrument	5620150012	1	1	1	1	1	1									
			5620150011							1	1	1	1	1	1	1	1	1
21	ELD	Bekomat	2210BEK001J	1	1	1	1	1	1	1	1	1	1	1	1			
			2210BEK002J													1	1	1
		Bekomat service unit	2210BEK055	1	1	1	1	1	1	1	1	1	1	1	1			
			2210BEK056													1	1	1
22	S1	Lighted switch	5450SZN011	1	1	1	1	1	1	1	1	1	1					
		Main switch	5450SZN140											1	1	1	1	1
37	BP2	Pressure transducer	5622NNN010	1	1	1	1	1	1	1	1	1	1	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 R134a or R407C 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
R134a - HFC	CH_2FCF_3	1000 ppm	1430
R407C - HFC	R32/125/134a (23/25/52) $CHF_2CF_3/CH_2F_2/CH_2FCF_3$	1000 ppm	1773.85

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	R407C, R134a, 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

Exploded views – List of components

1	Alu-Dry module
1.1	Insulation material
2	Refrigerant pressure switch LPS
3	Safety thermo 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	Temperature probe
13	Condensate drain service valve
17	Electronic instrument
20	Refrigerant accumulator
21	Bekomat
22	Main switch
37	Pressure transducer
51	Front panel
52	Back panel
53	Right lateral panel
54	Left lateral panel
55	Cover
56	Base plate
57	Upper plate
58	Support beam
59	Support bracket
60	Control panel
61	Electric connecting plug
62	Electric box
66	QE door
81	Flow diagram sticker

Electric diagrams – List of components

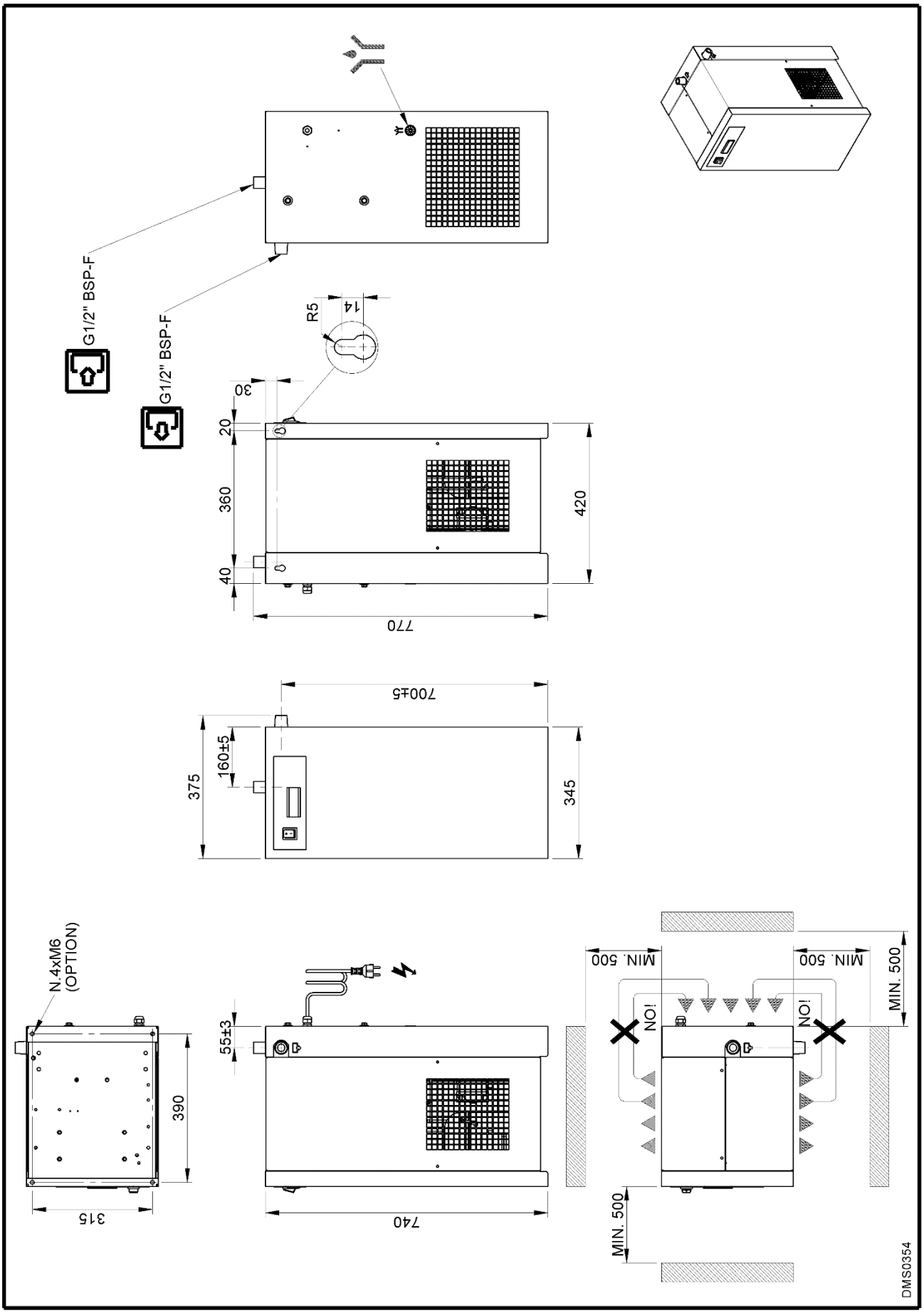
MC1	Compressor
KT	Compressor thermal protection
KR	Compressor starting relay
CS	Compressor starting capacitor
CR	Compressor operating capacitor
MV1	Condenser fan
KV	Fan thermal protection
CV	Fan starting capacitor
DMC34	Electronic instrument
BT1	Temperature probe
BP2	Pressure Transducer
LPS	Low pressure switch
HPS	High pressure switch
TS	Safety thermo switch
ELD	Bekomat
S1	ON-OFF switch

NT1	Air-Cooled only
NT2	Verify transformer connection according to power supply voltage
NT3	Jump if not installed
NT4	Provided and wired by customer
NT5	Limit of equipment
NT6	Timed drain output
NT7	Water Cooled only

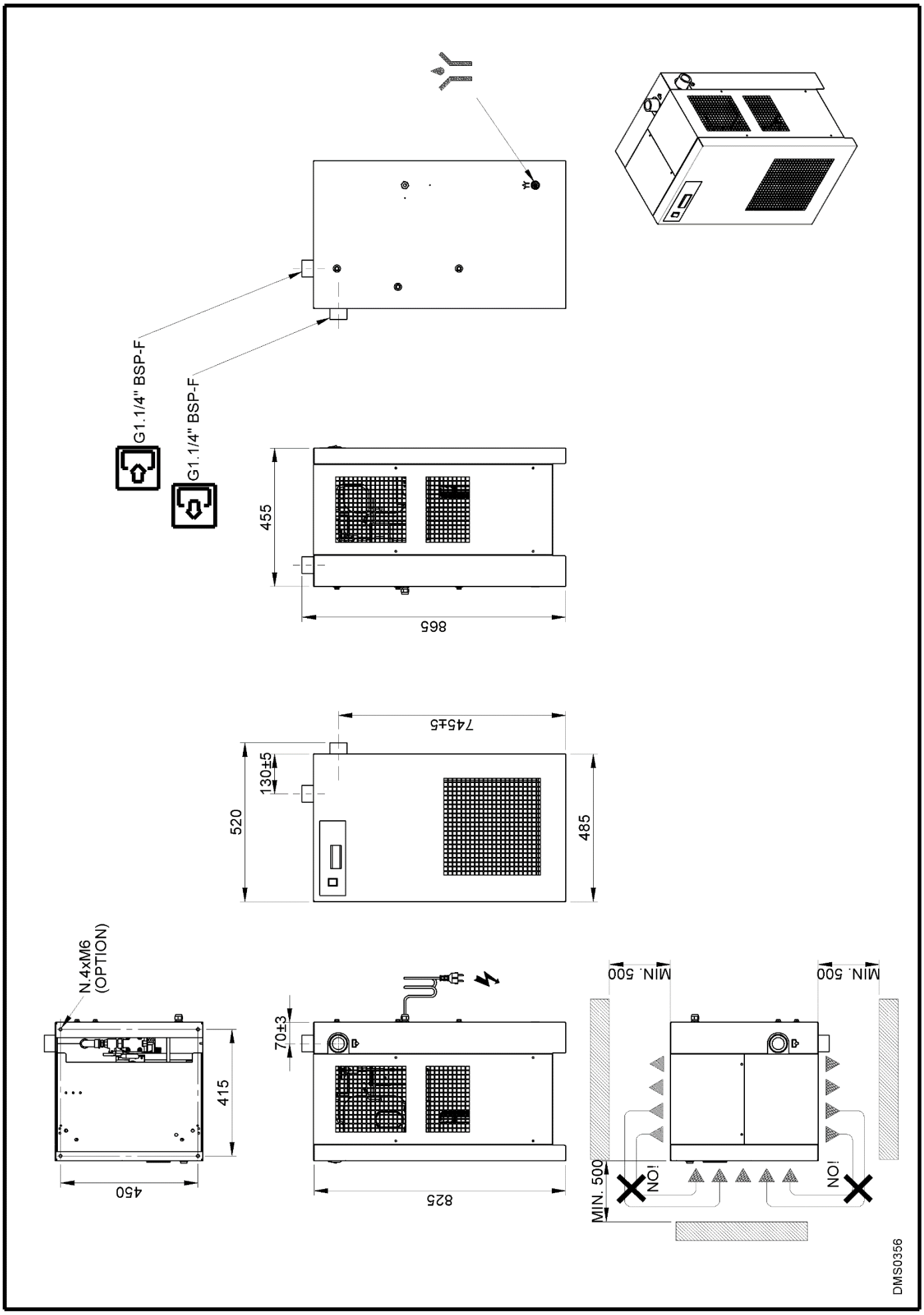
BN	Brown
BU	Blue
BK	Black
YG	Yellow / Green
OR	Orange
RD	Red
WH	White
WH/BK	White / Black

13.1 Dryer dimensions

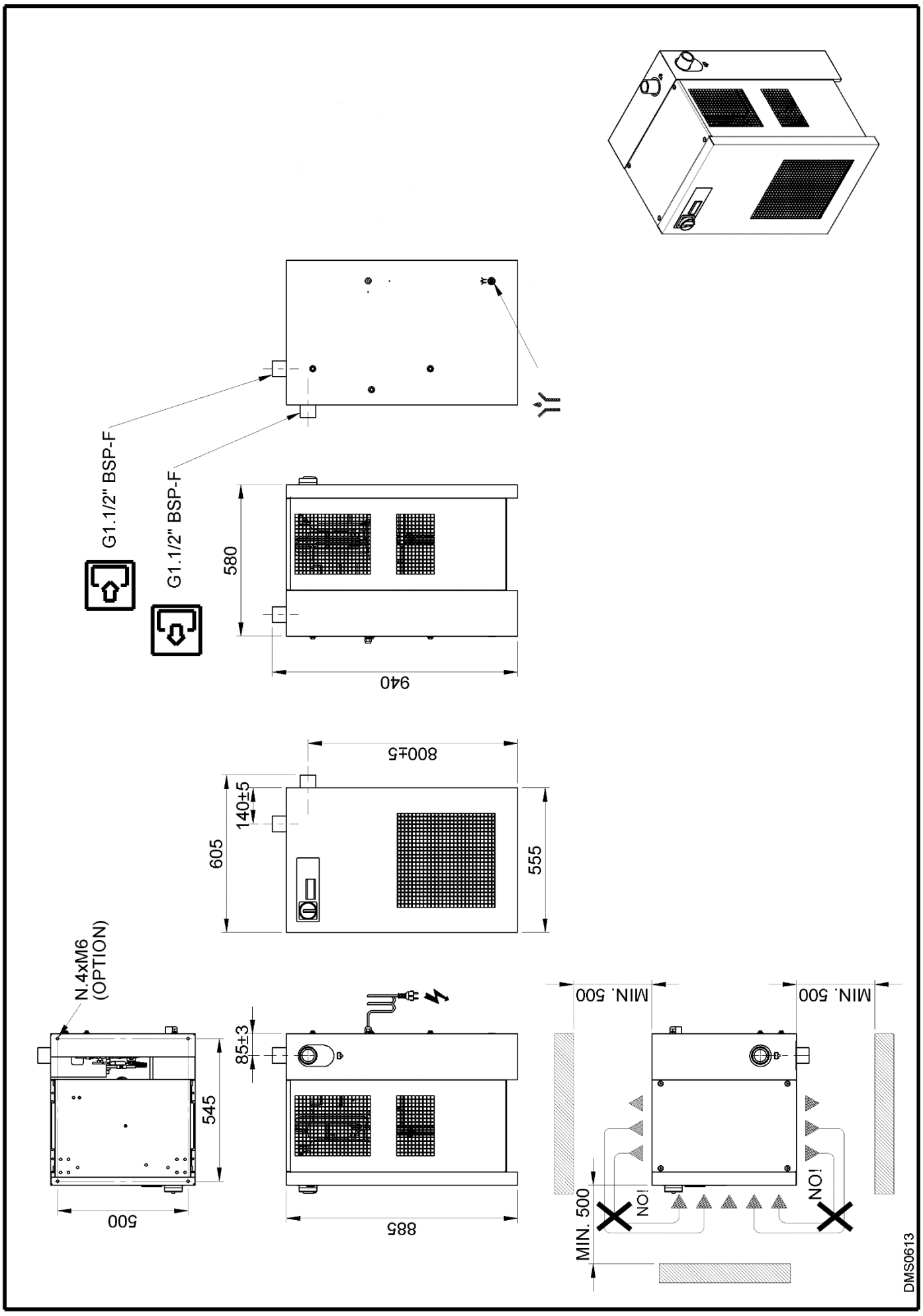
13.1.1 Dryer dimensions DRYPOINT RA 20T – 70T



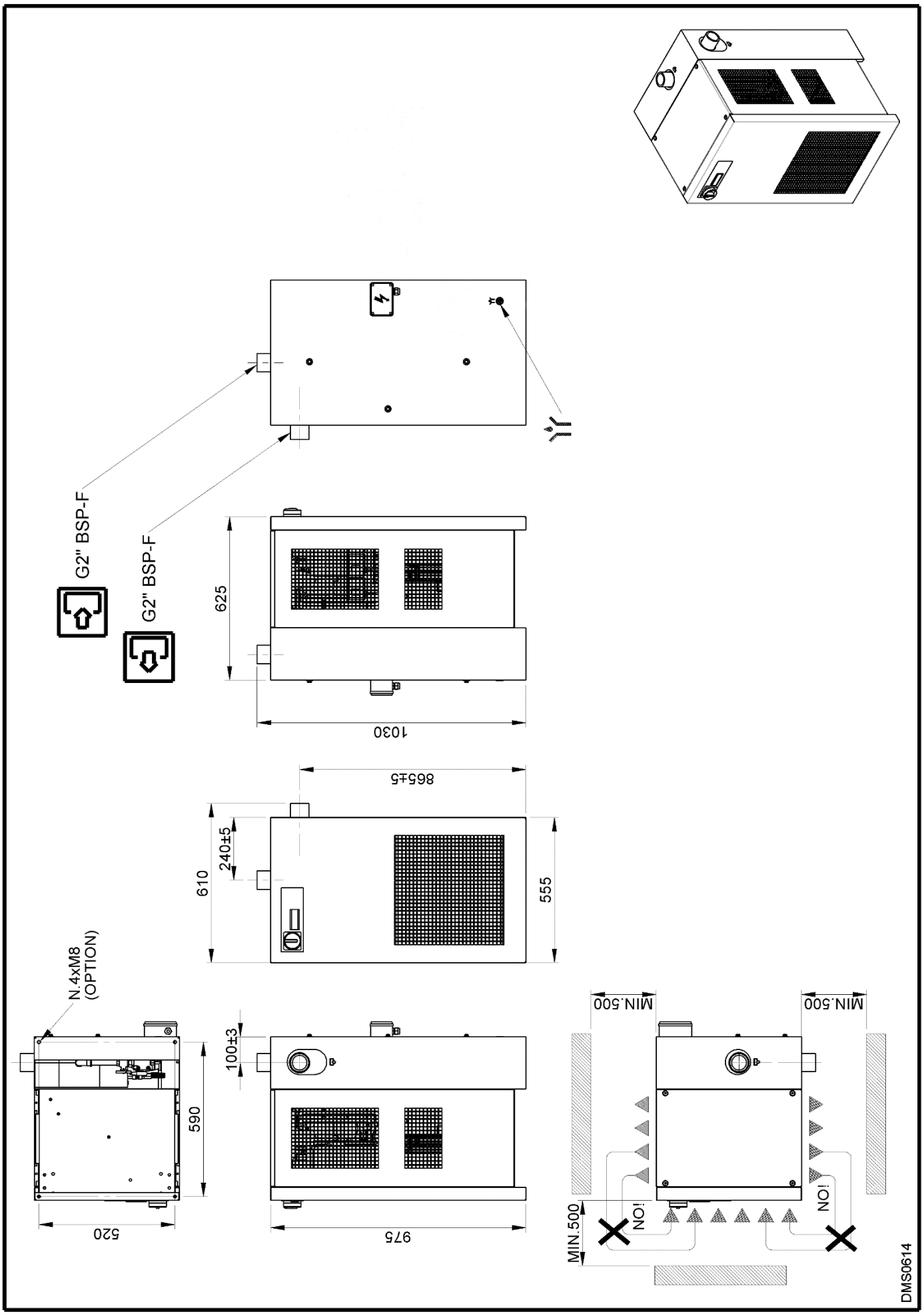
13.1.2 Dryer dimensions DRYPOINT RA 110T – 240T



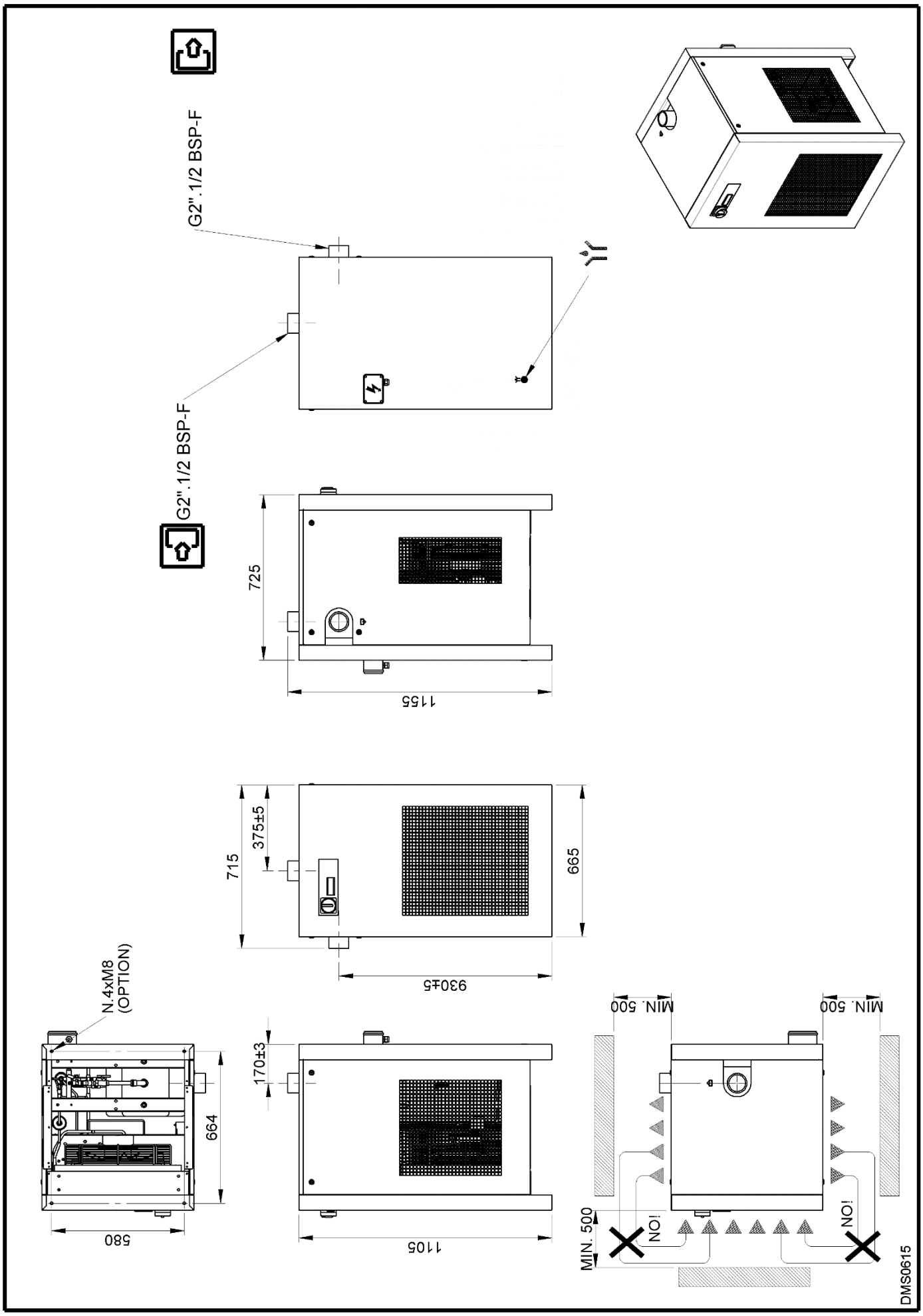
13.1.3 Dryer dimensions DRYPOINT RA 330T – 370T



13.1.4 Dryer dimensions DRYPOINT RA 490T – 630T

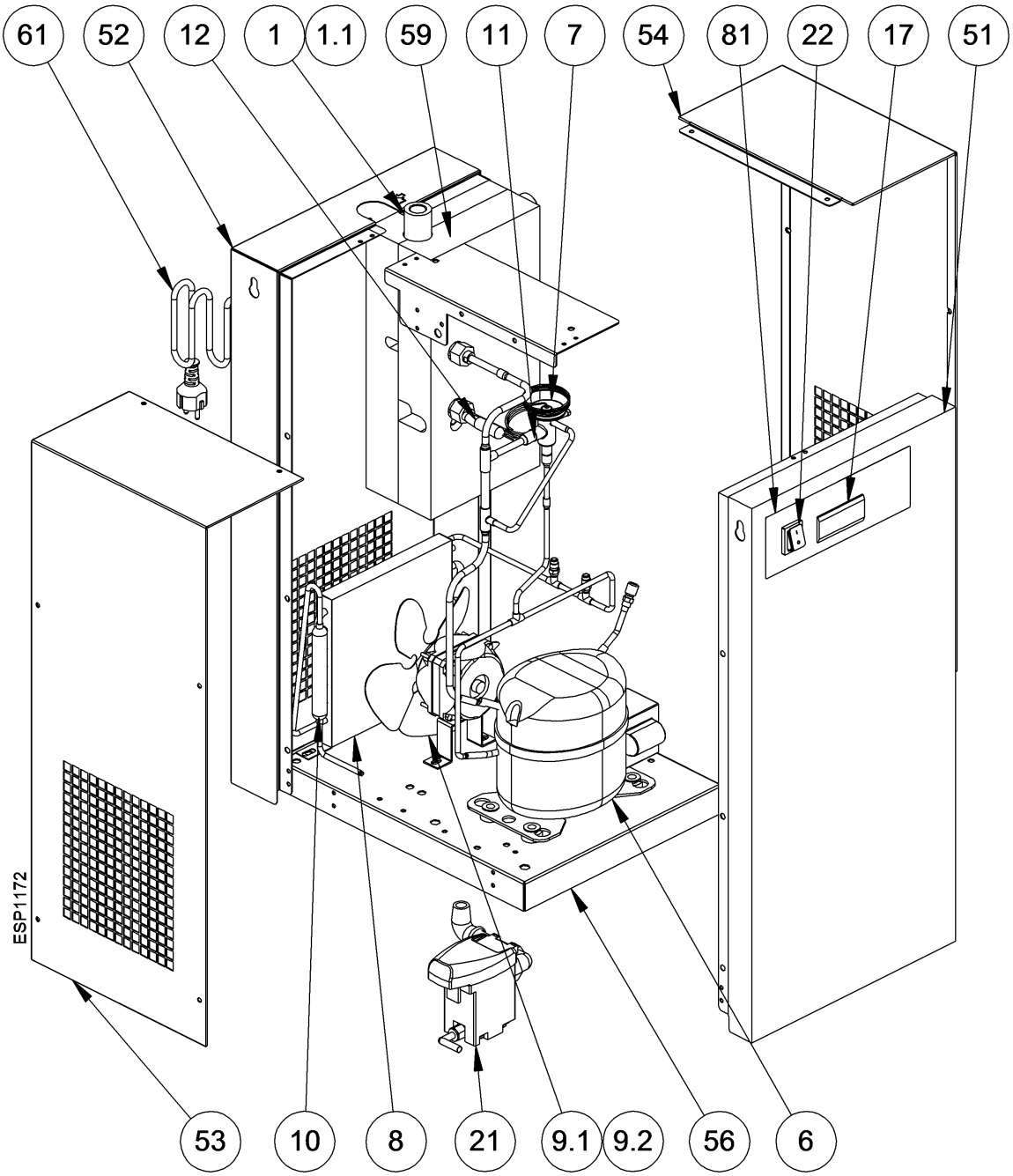


13.1.5 Dryer dimensions DRYPOINT RA 750T – 960T

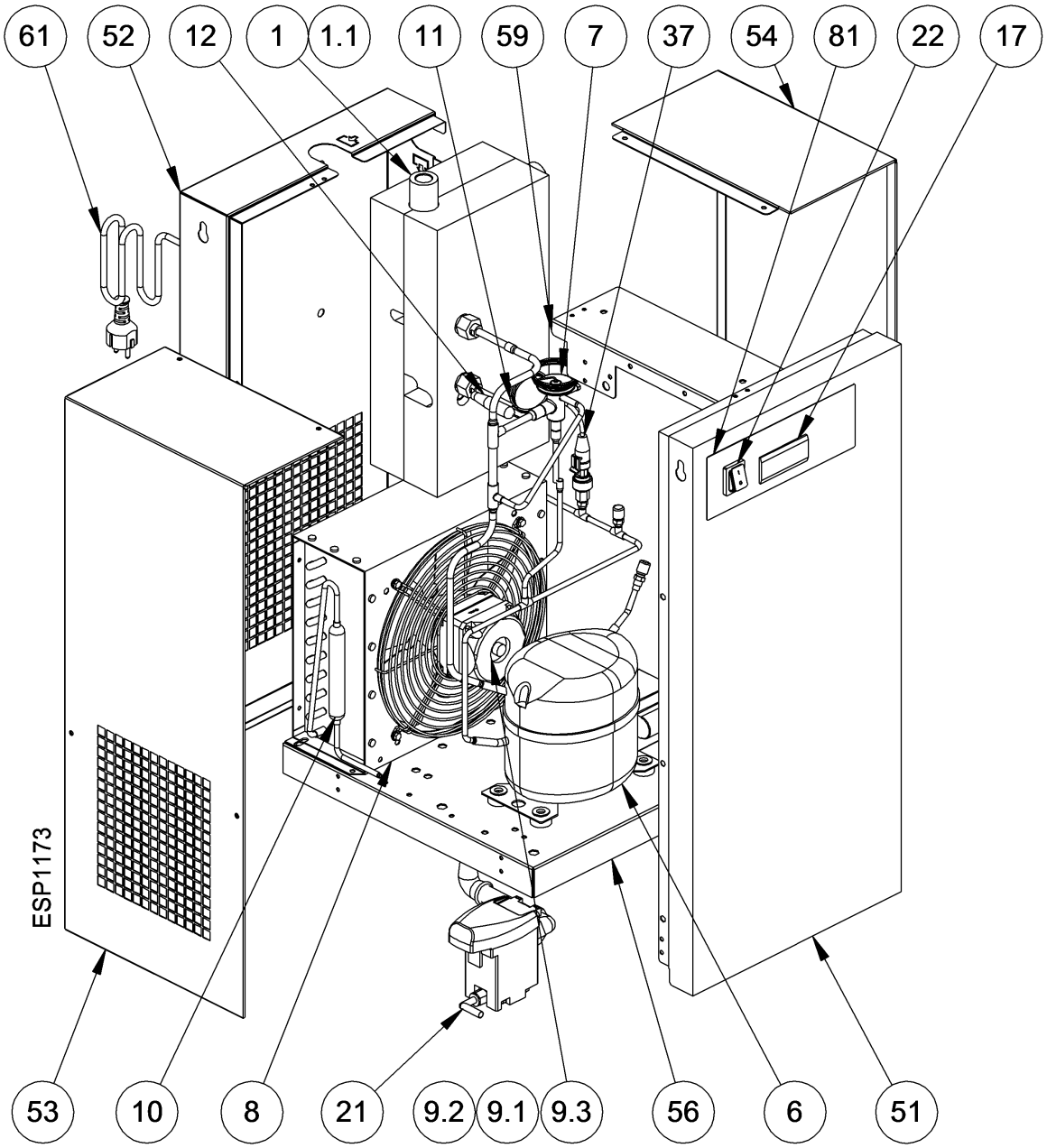


13.2 Exploded diagram

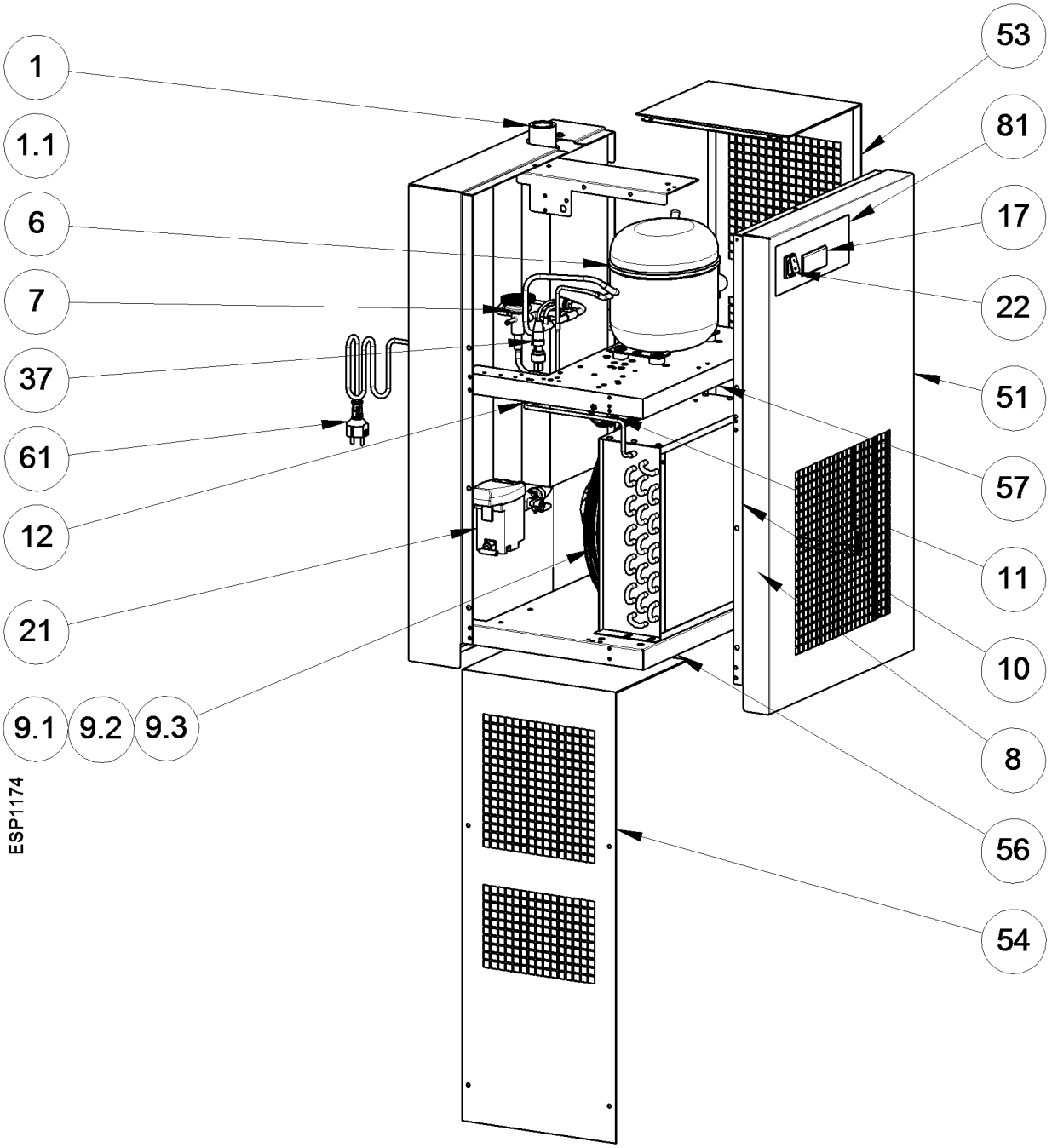
13.2.1 Exploded diagram DRYPOINT RA 20T – 35T



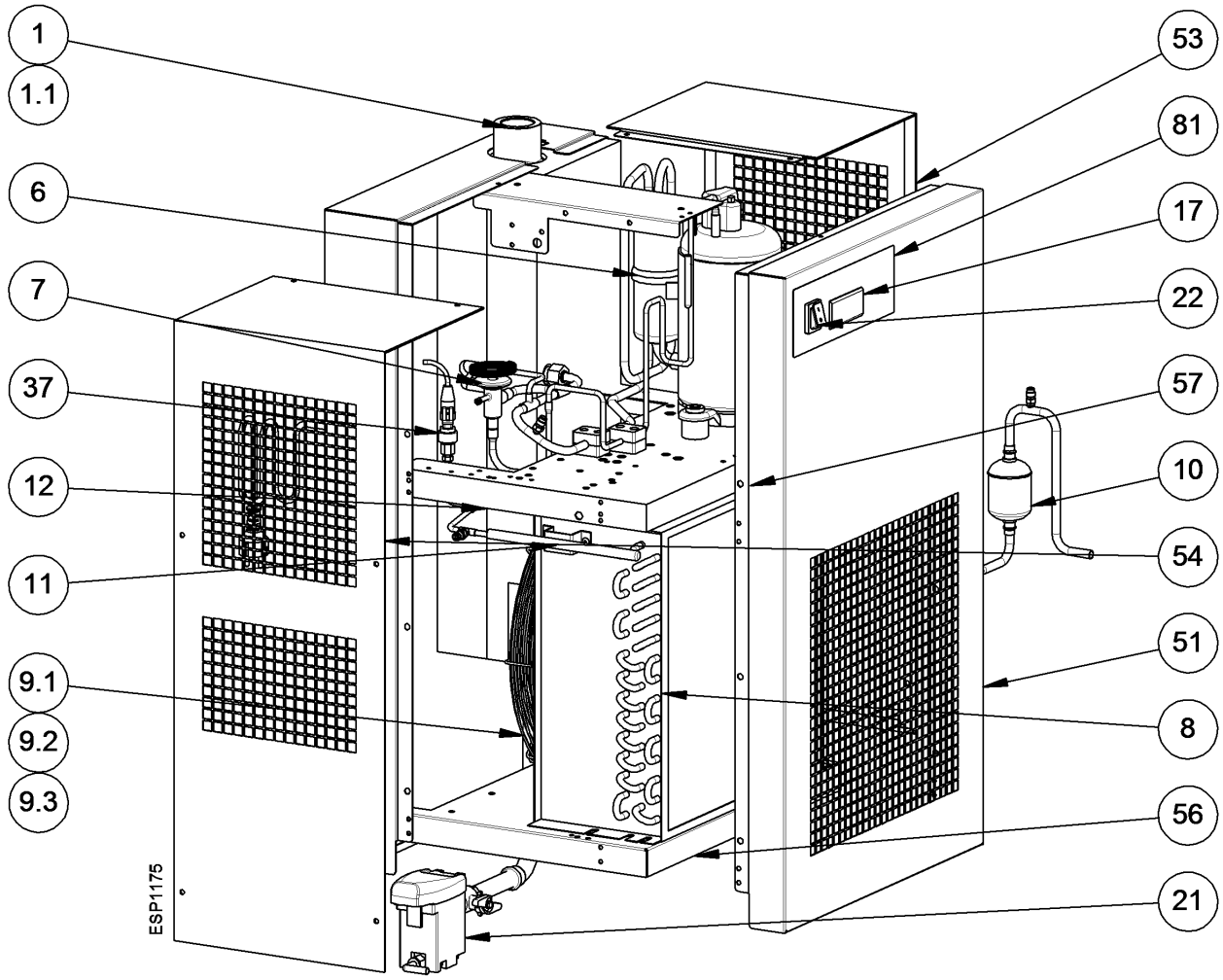
13.2.2 Exploded diagram DRYPOINT RA 50T – 70T



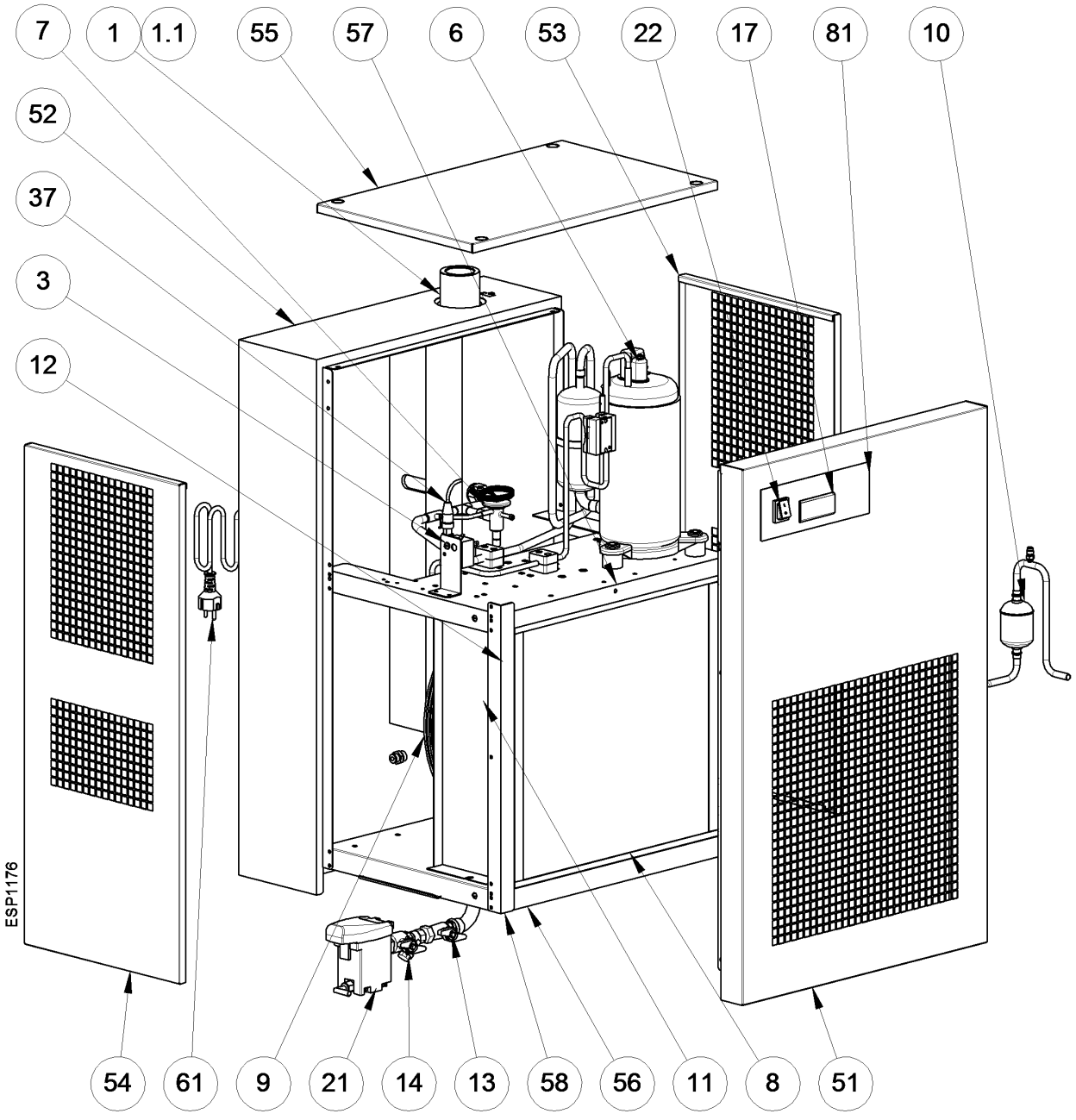
13.2.3 Exploded diagram DRYPOINT RA 110T – 135T



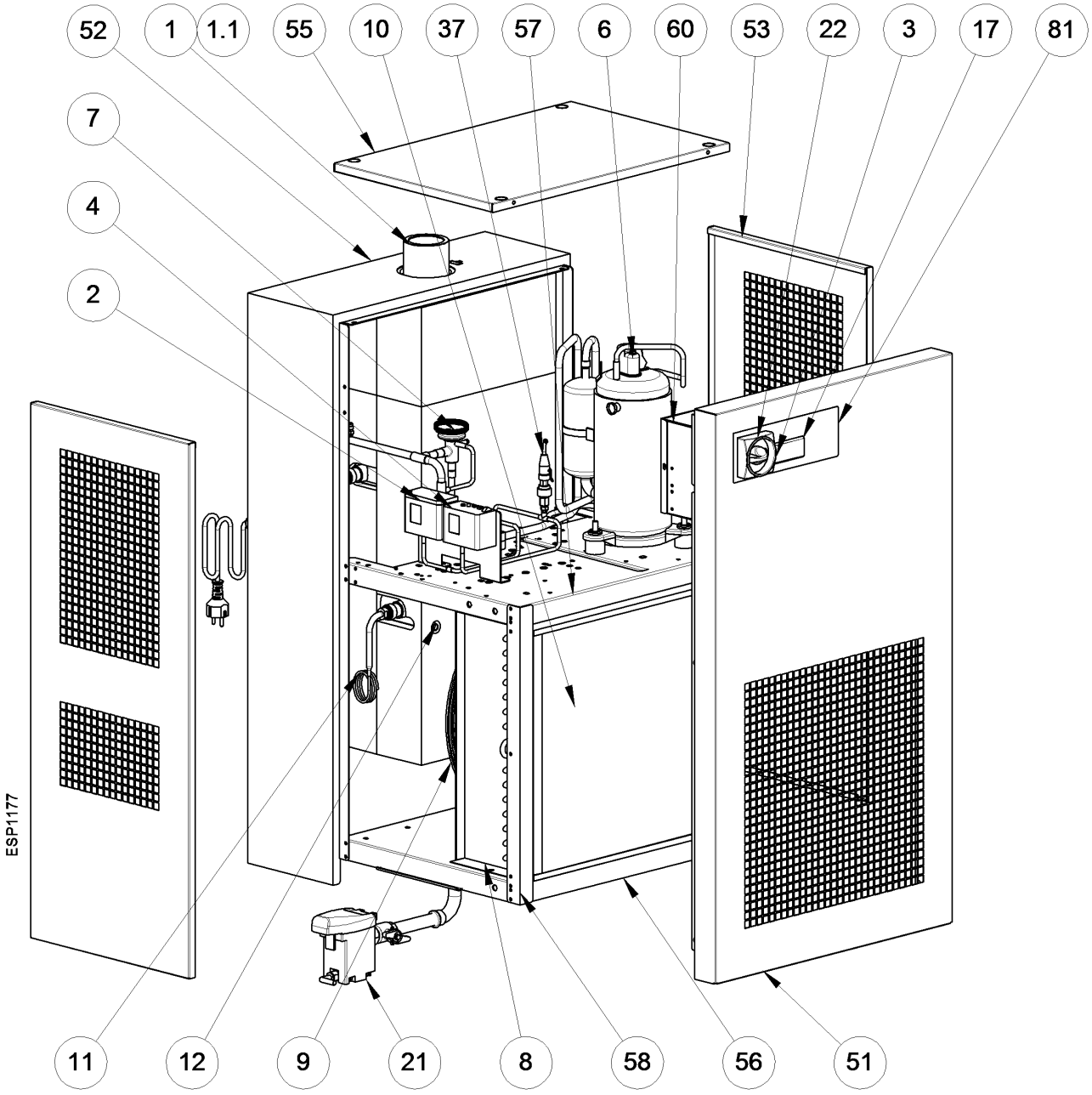
13.2.4 Exploded diagram DRYPOINT RA 190T – 240T



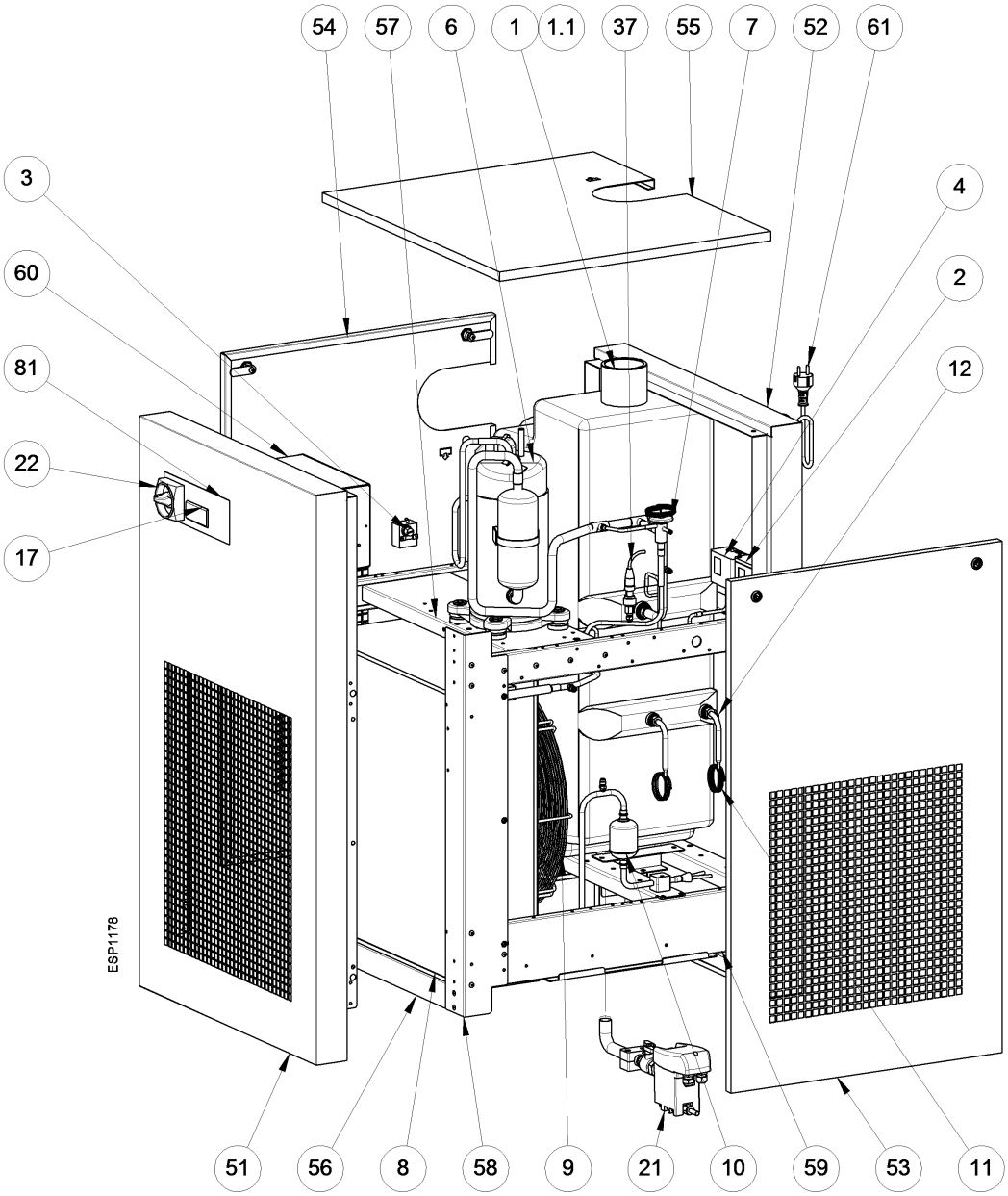
13.2.5 Exploded diagram DRYPOINT RA 330T – 370T



13.2.6 Exploded diagram DRYPOINT RA 490T – 630T

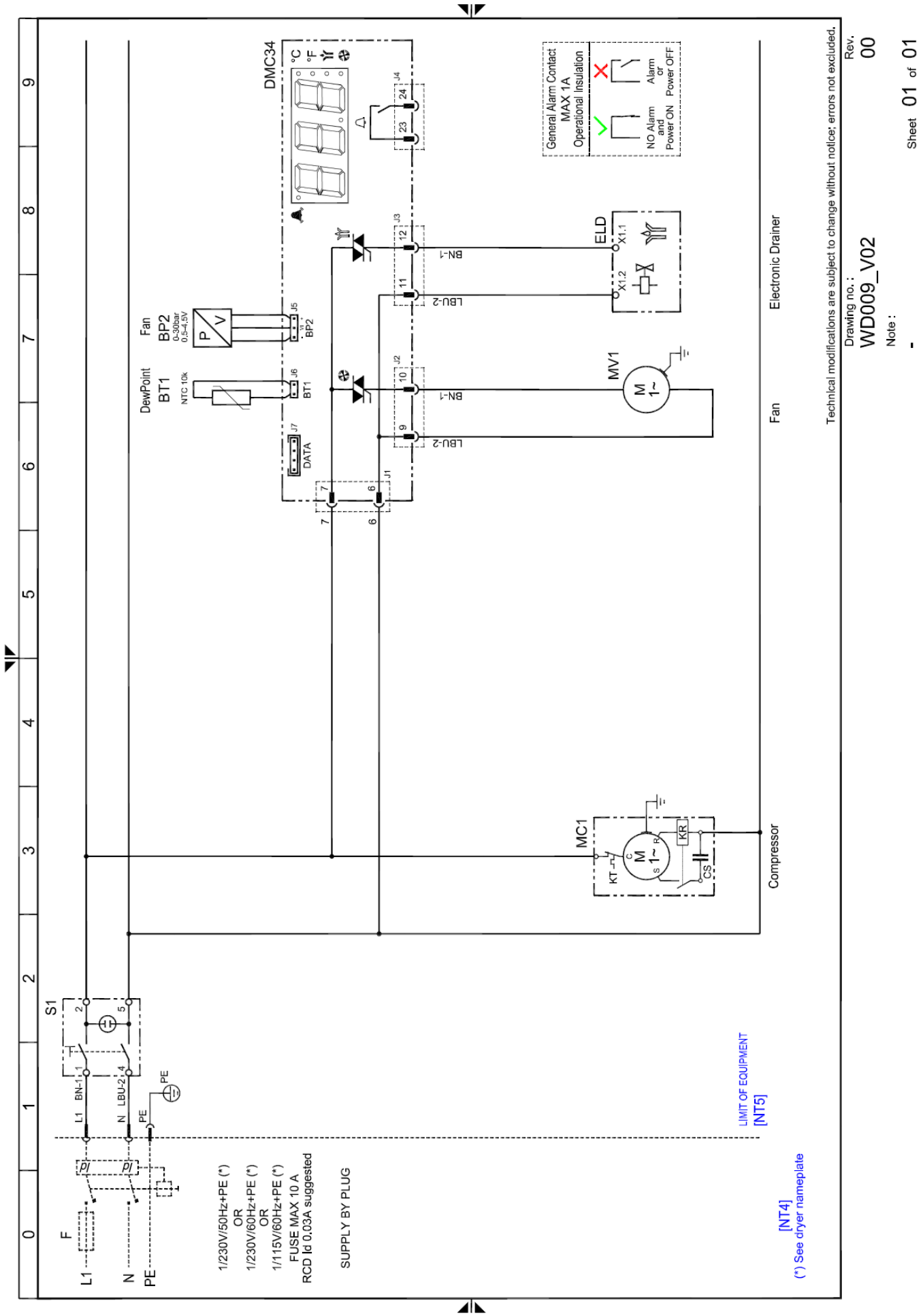


13.2.7 Exploded diagram DRYPOINT RA 750T – 960T

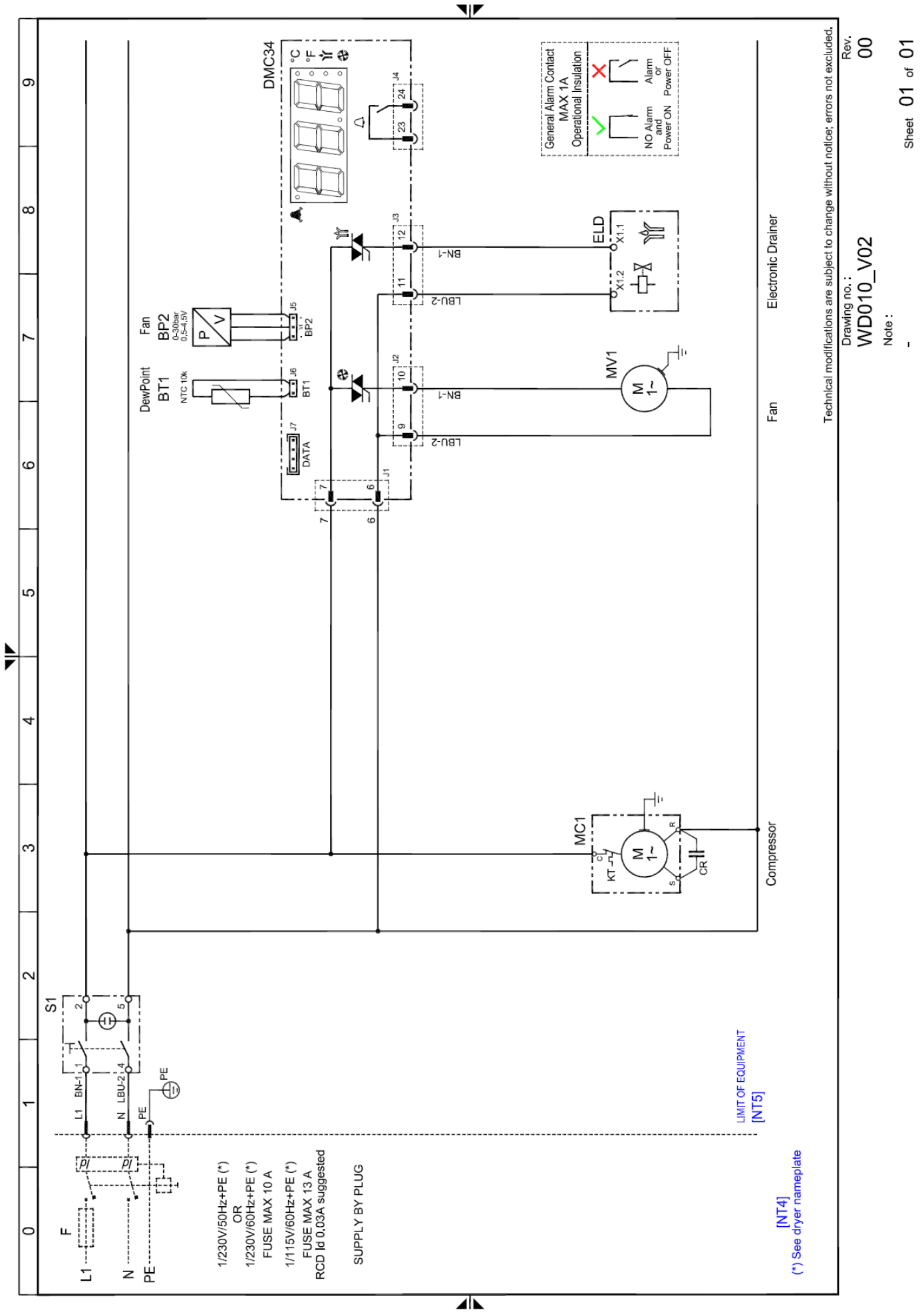


13.3 Electric diagrams

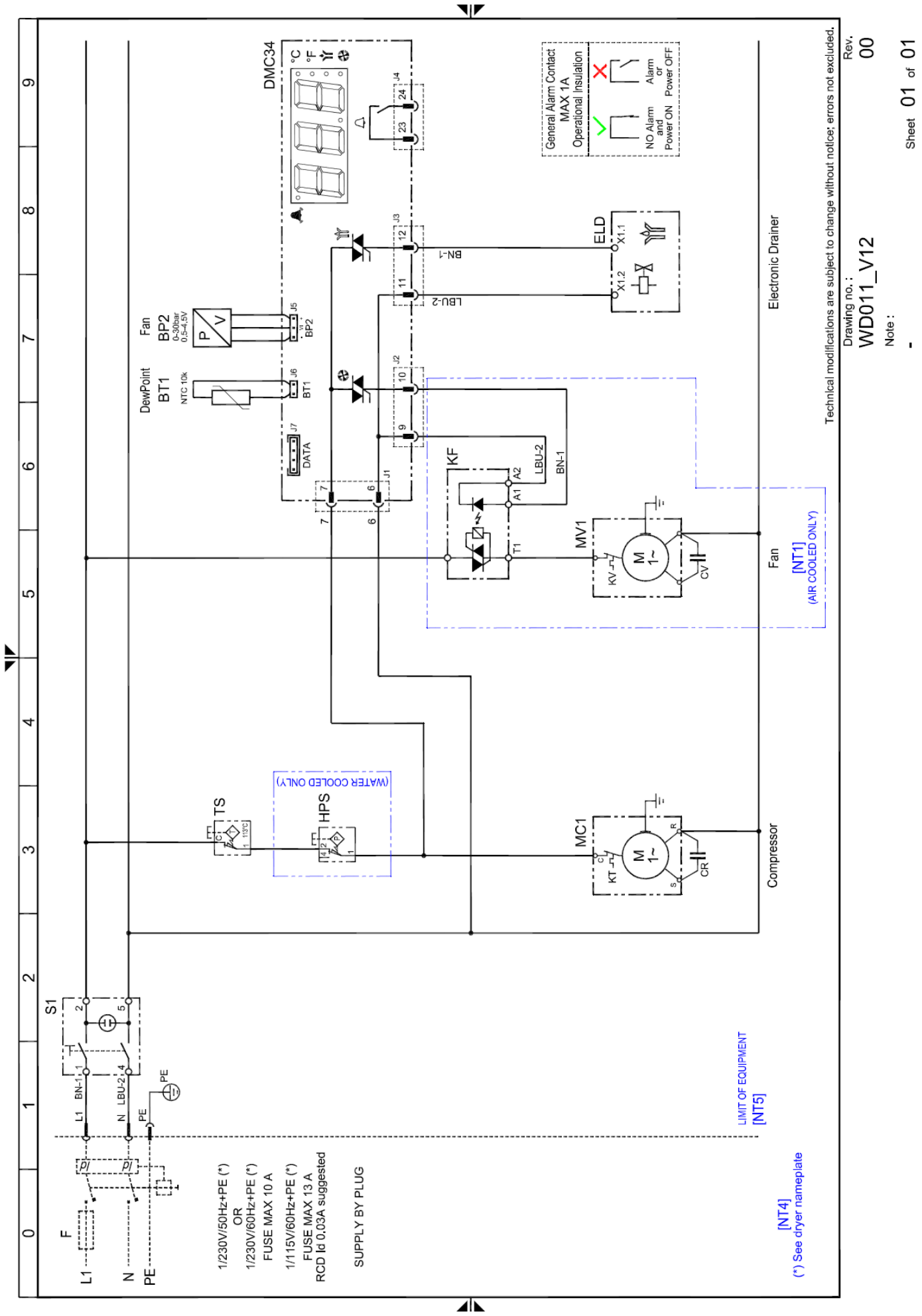
13.3.1 Electric diagram DRYPOINT RA 20T – 135T



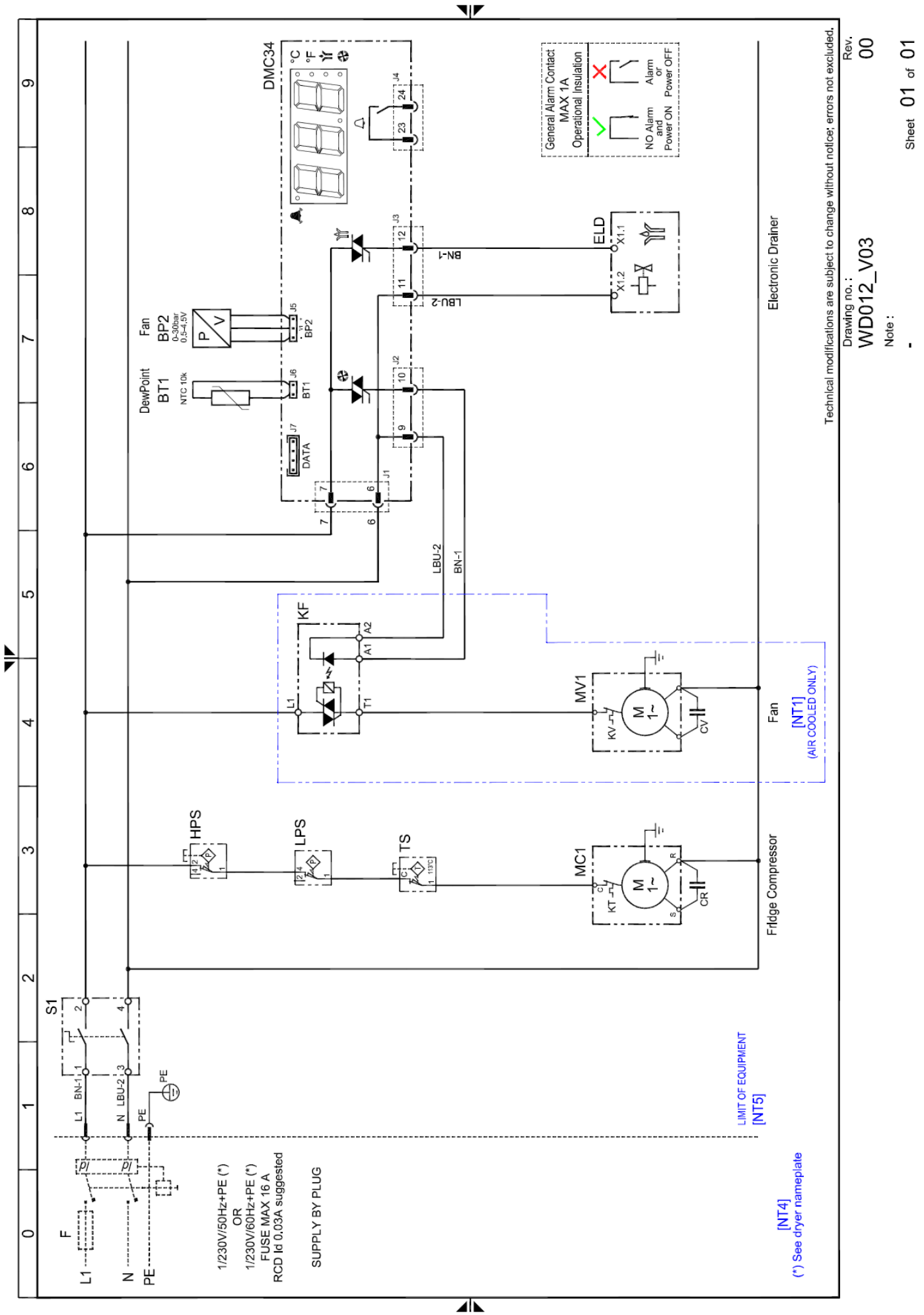
13.3.2 Electric diagram DRYPOINT RA 190T – 240T



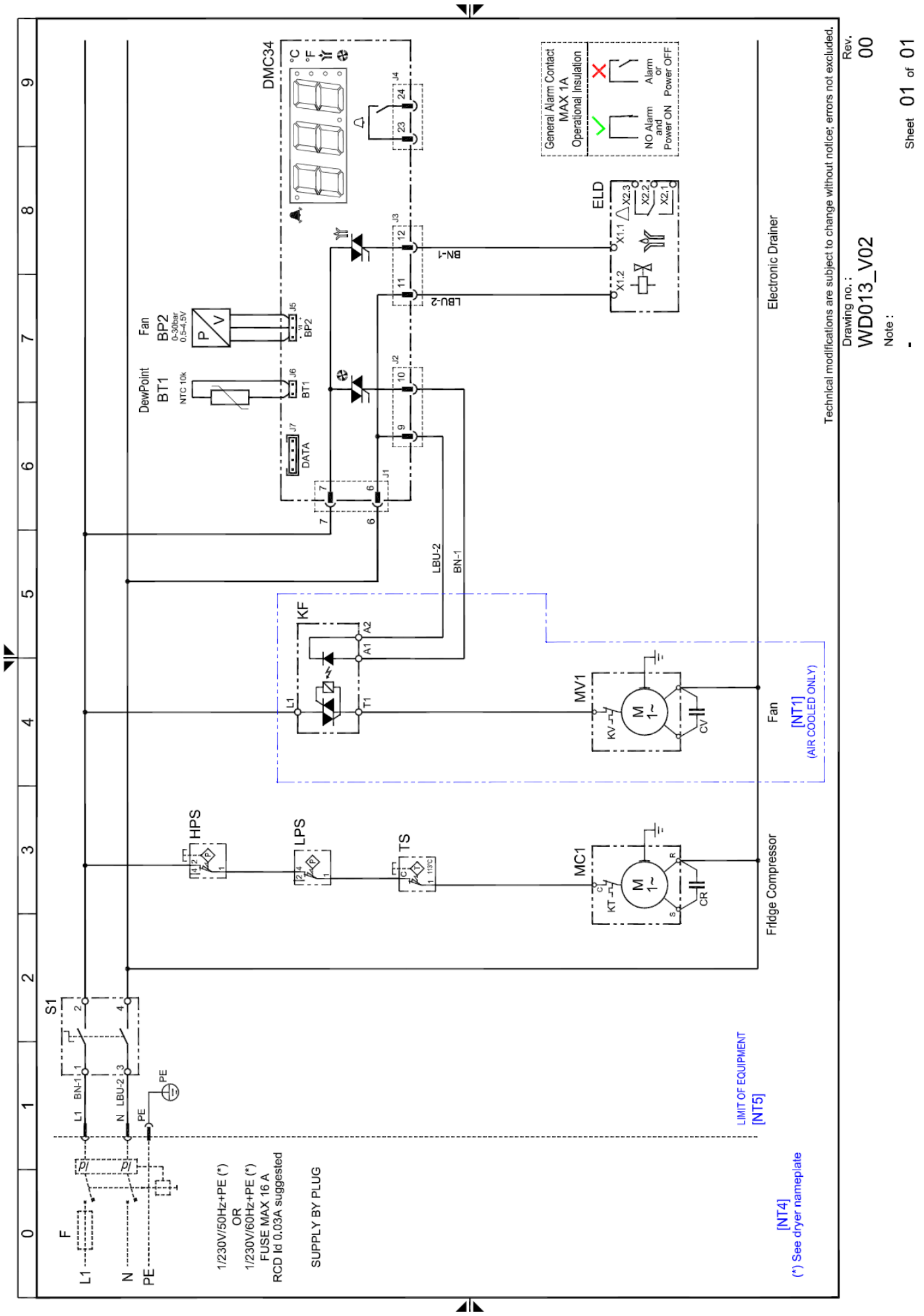
13.3.3 Electric diagram DRYPOINT RA 330T - 370T



13.3.4 Electric diagram DRYPOINT RA 490T – 630T



13.3.5 Electric diagram DRYPOINT RA 750T – 960T



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EU-Konformitätserklärung

Wir erklären hiermit, dass die nachfolgend bezeichneten Produkte den Anforderungen der einschlägigen Richtlinien und technischen Normen entsprechen. Diese Erklärung bezieht sich nur auf die Produkte in dem Zustand, in dem sie von uns in Verkehr gebracht wurden. Nicht vom Hersteller angebrachte Teile und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt.

Produktbezeichnung:	DRYPOINT® RA …
Modelle:	20T, 35T, 50T, 70T, 110T, 135T, 190T, 240T, 330T, 370T, 490T, 630T
Spannungsvarianten:	≥ 110 VAC
Max. Betriebsdruck:	20T … 70T: 16 bar (g) 110T … 630T: 14 bar (g)
Produktbeschreibung und Funktion:	Kältetrockner zur Herabsetzung des Drucktaupunkts in Druckluft

Maschinen-Richtlinie 2006/42/EG

Angewandte harmonisierte Normen:	EN 14119, EN 14120, EN 12100, EN 13849-1, EN 60204-1
Name des Dokumentationsbevollmächtigten:	Jürgen Hütter Im Taubental 7 41468 Neuss, Deutschland

Druckgeräte-Richtlinie 2014/68/EU

Angewandte harmonisierte Normen:	ASME VIII Div. 1, EN 378-2, EN 10028-3, EN 12451
Angewandtes Konformitätsbewertungsverfahren:	330T ... 630T: Modul A

Die Produkte 20T … 240T fallen in keine Druckgerätekategorie und sind gemäß Artikel 4 Absatz 3 in Übereinstimmung mit der in den Mitgliedstaaten geltenden guten Ingenieurspraxis ausgelegt und werden dieser entsprechend hergestellt.

Niederspannungs-Richtlinie 2014/35/EU

Angewandte harmonisierte Normen:	EN 60204-1

EMV-Richtlinie 2014/30/EU

Angewandte harmonisierte Normen:	EN 61000-6-2:2016, EN 61000-6-4:2018

ROHS II-Richtlinie 2011/65/EU

Die Vorschriften der Richtlinie 2011/65/EU zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten werden erfüllt.

Der Hersteller trägt die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung.

Unterzeichnet für und im Namen von:

Neuss,11.06.2018

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Original operating instructions in English.
Subject to technical changes / errors excepted.

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