



**Refrigerating air dryer**

**BTF 21 – 1320**

**EN - User's maintenance and spare parts manual**

---

Dear Customer,

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

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

Note, these instructions are in addition to the safety rules that apply in the country where the dryer is installed.

Before packing for shipment each **BTF** series refrigerated air dryer undergoes a rigorous test to ensure the absence of any manufacturing faults and to demonstrate that the device can perform all the functions for which it has been designed.

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

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

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

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

---

## Contents

1	Identification plate .....	4
2	Warranty conditions .....	4
3	Safety rules .....	5
3.1	Definition of the conventional signs used in this manual.....	5
3.2	Warnings.....	6
3.3	Proper use of the dryer .....	6
3.4	Instructions for the use of pressure equipment according to PED directive 2014/68/EU.....	7
4	Installation .....	7
4.1	Transport .....	7
4.2	Storage .....	7
4.3	Installation site .....	8
4.4	Installation layout .....	9
4.5	Correction factors.....	10
4.6	Connection to the compressed air system.....	11
4.7	Electrical connections .....	11
4.8	Condensate drain.....	12
5	Start-up .....	12
5.1	Preliminary operation .....	12
5.2	First start-up.....	13
5.3	Start-up and shut down .....	14
6	Technical data .....	15
7	Technical description .....	16
7.1	Control panel.....	16
7.2	Operation .....	17
7.3	Flow diagram .....	17
7.4	Refrigerating compressor.....	18
7.5	Condenser .....	18
7.6	Filter dryer.....	18
7.7	Capillary tube .....	18
7.8	Heat exchanger module .....	18
7.9	Hot gas by-pass valve.....	18
7.10	Refrigerant pressure switches LPS – HPS .....	19
7.11	Safety thermo switch TS .....	19
7.12	Compressor crankcase heater (BTF 1140-1320) .....	19
7.13	Electronic instrument DMC36.....	20
7.13.1	How to switch on the dryer.....	20
7.13.2	How to switch off the dryer .....	20
7.13.3	How a service warning / alarm is displayed.....	20
7.13.4	How is controlled the condenser fan .....	21
7.13.5	How the service reminder timing is displayed.....	21
7.13.6	How to reset the service reminder timer .....	21
7.13.7	How to display the total hours of operation.....	21
7.13.8	Operation of the failure / alarm dry contact.....	22
7.13.9	How to change the operating parameters – SETUP menu .....	22
7.14	Electronic drainer .....	23
8	Maintenance, troubleshooting, spare parts and dismantling .....	24
8.1	Checks and maintenance.....	24
8.2	Troubleshooting .....	25
8.3	Spare parts .....	28
8.4	Maintenance operation on the refrigeration circuit.....	29
8.5	Dismantling of the dryer .....	29
9	Attachments .....	30
	Exploded views – List of components.....	30
	Electric diagrams – List of components .....	30

---

## **1 Identification plate**

The identification plate is located on the back of the dryer and shows all the primary data of the machine. This data should always be referred to when calling the manufacturer or distributor. The removal or alteration of the identification plate will void the warranty rights.

## **2 Warranty conditions**

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

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

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

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

## 3 Safety rules

### 3.1 Definition of the conventional signs used in this manual



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



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



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



Danger hazard. Part or system under pressure.



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



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



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



Danger hazard. Do not operate equipment with panels removed.



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



Compressed air inlet connection point



Compressed air outlet connection point



Condensate drain connection point



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

**NOTE:** Text that specifies items of note to be taken into account does not involve safety precautions.



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

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

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

[1] Experienced and trained personnel familiar with national and local codes, capable to perform the needed activities, identify and avoid possible dangerous situations while handling, installing, using and servicing the machine. Ensuring compliance to all statutory regulations.

### 3.2 Warnings



Compressed air is a highly hazardous energy source.

Never work on the dryer with pressure in the system.

Never point the compressed air or the condensate drain outlet hoses towards anybody.



The user is responsible for the proper installation of the dryer. Failure to follow instructions given in the "Installation" chapter will void the warranty. Improper installation can create dangerous situations for personnel and/or damages to the machine could occur.



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

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



These refrigerating air dryers contains R513A HFC type refrigerant fluid. Refer to the specific paragraph - maintenance operation on the refrigerating circuit.



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



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

### 3.3 Proper use of the dryer

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

The Manufacturer will not be responsible for any problem arising from improper use; the user will bear responsibility for any resulting damage.

Moreover, the correct use requires the adherence to the installation instructions, specifically:

- Voltage and frequency of the main power.
- Pressure, temperature and flow-rate of the inlet air.
- Ambient temperature.

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



The purpose of the machine is the separation of water and eventual oil particles present in compressed air.



The dried air cannot be used for breathing purposes or for operations leading to direct contact with foodstuff.

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

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

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

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



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

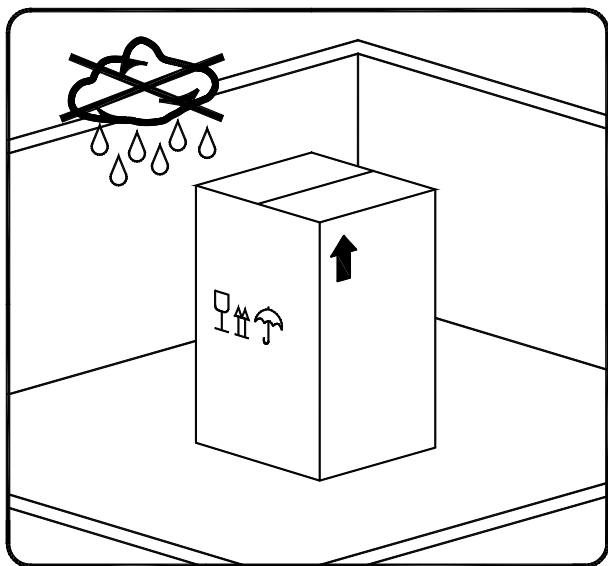
## 4 Installation

### 4.1 Transport

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

- To move the packaged unit we recommend using a suitable trolley or forklift truck. Hand carrying is not recommended.
- Always keep the dryer in the upright vertical position. Damage to components could result if unit is laid on its side or if placed upside down.
- Handle with care. Heavy blows could cause irreparable damage.

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

### 4.3 Installation site



Failure to install dryer in the proper ambient conditions will affect the dryer's ability to condense refrigerant gas. This can cause higher loads on the compressor, loss of dryer efficiency and performance, overheated condenser fan motors, electrical component failure and dryer failure due to the following: compressor loss, fan motor failure and electrical component failure. Failures of this type will affect warranty considerations.

Do not install dryer in an environment of corrosive chemicals, explosive gasses, poisonous gasses; steam heat, areas of high ambient conditions or extreme dust and dirt.



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

#### Minimum installation requirements:

- Select a clean dry area, free from dust, and protected from atmospheric disturbances.
- The supporting area must be smooth, horizontal and able to hold the weight of the dryer.
- Minimum ambient temperature +1°C.
- Maximum ambient temperature +45°C.
- Ensure a proper cooling air replacement.
- Allow a sufficient clearance on each side of the dryer for proper ventilation and to facilitate maintenance operations.

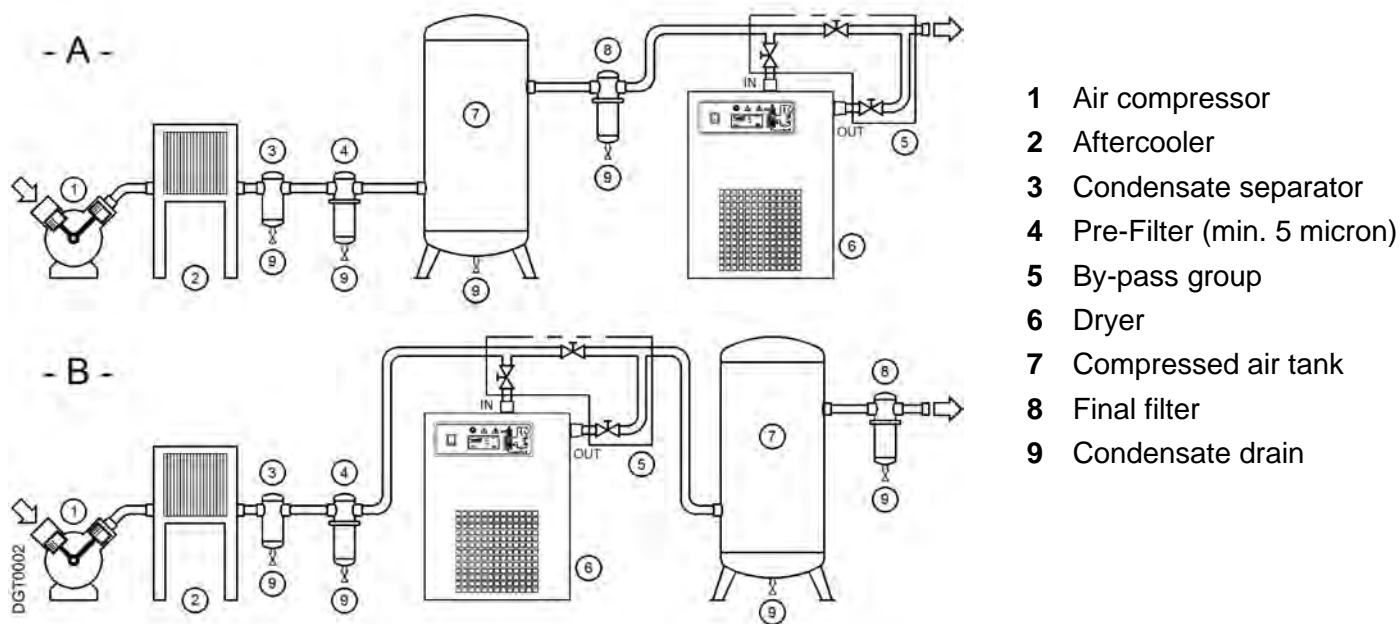
The dryer does not require attachment to the floor surface.



Do not block, even partially, ventilation grid.  
Avoid any possible re-circulation of the exhaust cooling air.  
Protect the dryer from air drafts or forced cooling air conditions.



## 4.4 Installation layout



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

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

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

**4.5 Correction factors**

Correction factor for operating pressure changes:										
Inlet air pressure	barg	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 changes:						
Ambient temperature	°C	≤ 25	30	35	40	45
Factor (F2)		1.00	0.95	0.88	0.79	0.68

Correction factor for inlet air temperature changes:							
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 DewPoint changes:					
DewPoint	°C	3	5	7	10
Factor (F4)		1.00	1.09	1.19	1.37

<b>How to find the air flow capacity:</b>								
<b>Air flow capacity = Nominal duty x Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)</b>								
<p><b>Example:</b>                  An <b>BTF 108</b> has a nominal duty of 108 m<sup>3</sup>/h. What is the maximum allowable flow through the dryer under the following operating conditions:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Inlet air pressure = 8 barg</td> <td style="width: 50%;">Factor (F1) = 1.05</td> </tr> <tr> <td>Ambient temperature = 35°C</td> <td>Factor (F2) = 0.88</td> </tr> <tr> <td>Inlet air temperature = 40°C</td> <td>Factor (F3) = 0.81</td> </tr> <tr> <td>Pressure DewPoint = 5°C</td> <td>Factor (F4) = 1.09</td> </tr> </table> <p>Each item of data has a corresponding numerical factor which multiplied by the design air flow is as follows:</p>	Inlet air pressure = 8 barg	Factor (F1) = 1.05	Ambient temperature = 35°C	Factor (F2) = 0.88	Inlet air temperature = 40°C	Factor (F3) = 0.81	Pressure DewPoint = 5°C	Factor (F4) = 1.09
Inlet air pressure = 8 barg	Factor (F1) = 1.05							
Ambient temperature = 35°C	Factor (F2) = 0.88							
Inlet air temperature = 40°C	Factor (F3) = 0.81							
Pressure DewPoint = 5°C	Factor (F4) = 1.09							
<b>Air flow capacity = 108 x 1.05 x 0.88 x 0.81 x 1.09 = 88 m<sup>3</sup>/h</b>								
<b>88 m<sup>3</sup>/h</b> This is the maximum flow rate that the dryer can accept under these operating conditions.								

<b>How to select a suitable dryer for a given duty:</b>										
<b>Minimum std. air flow rate = <math>\frac{\text{Design air flow}}{\text{Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)}}</math></b>										
<p><b>Example:</b>                  With the following operating parameters:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Design air flow = 100 m<sup>3</sup>/h</td> <td style="width: 50%;">Factor (F1) = 1.05</td> </tr> <tr> <td>Inlet air pressure = 8 barg</td> <td>Factor (F2) = 0.88</td> </tr> <tr> <td>Ambient temperature = 35°C</td> <td>Factor (F3) = 0.81</td> </tr> <tr> <td>Inlet air temperature = 40°C</td> <td>Factor (F4) = 1.09</td> </tr> <tr> <td>Pressure DewPoint = 5°C</td> <td></td> </tr> </table> <p>In order to select the correct dryer model the required flow rate is to be divided by the correction factors relating to above mentioned parameters:</p>	Design air flow = 100 m <sup>3</sup> /h	Factor (F1) = 1.05	Inlet air pressure = 8 barg	Factor (F2) = 0.88	Ambient temperature = 35°C	Factor (F3) = 0.81	Inlet air temperature = 40°C	Factor (F4) = 1.09	Pressure DewPoint = 5°C	
Design air flow = 100 m <sup>3</sup> /h	Factor (F1) = 1.05									
Inlet air pressure = 8 barg	Factor (F2) = 0.88									
Ambient temperature = 35°C	Factor (F3) = 0.81									
Inlet air temperature = 40°C	Factor (F4) = 1.09									
Pressure DewPoint = 5°C										
<b>Minimum std. air flow rate = <math>\frac{100}{1.05 \times 0.88 \times 0.81 \times 1.09} = 122 \text{ m}^3/\text{h}</math></b>										
Therefore the model suitable for the conditions above is <b>BTF 150 (150 m<sup>3</sup>/h - nominal duty)</b> .										

### 4.6 Connection to the compressed air system



Operations to be performed by qualified personnel only.

Never work on system under pressure.



The user is responsible to ensure that the dryer will never be operated with pressure exceeding the maximum pressure rating on the unit data tag.

Over-pressurizing the dryer could be dangerous for both the operator and the unit.

The air temperature and the flow entering the dryer must comply within the limits stated on the data nameplate. The system connecting piping must be kept free from dust, rust, chips and other impurities, and must be consistent with the flow-rate of the dryer. In case of treatment of air at particularly high temperature, the installation of a final refrigerator could result necessary. In order to perform maintenance operations, it is recommended to install a dryer by-pass system.



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

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

### 4.7 Electrical connections



Qualified personnel should carry out connecting unit to the main power.

Be sure to check the local codes in your area.

Before connecting the unit to the electrical supply, verify the data nameplate for the proper electrical information. Voltage tolerance is +/- 10%.

Dryer are supplied with power cord and plug (two poles and ground) or with a junction box.

Be sure to provide the proper fuses or breakers based on the data information located on the nameplate.

A residual-current device (RCD) with  $I_{\Delta n} = 0.03A$  is suggested. The cross section of the power supply cables must comply with the consumption of the dryer, while keeping into account also the ambient temperature, the conditions of the mains installation, the length of the cables, and the requirements enforced by the local Power Provider.



**BTF 1140 – 1320**

**CAUTION:**

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

The rotating direction of the compressor in this machine is checked 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.**



Important: ensure that the dryer is earthed.

Do not use any socket adapters at the mains plug.

If the mains plug needs to be replaced, this must only be done by a qualified electrician.

### 4.8 Condensate drain



The condensate is discharge at the system pressure.  
Drain line should be secured.



Never point the condensate drain line towards anybody.

The dryer comes already fitted with a timed condensate drainer (solenoid valve controlled by electronic instrument) or with an electronic condensate drainer (optional).

Connect and properly fasten the condensate drain to a collecting plant or container.

The drain cannot be connected to pressurized systems.



Don't dispose the condensate in the environment.

The condensate collected in the dryer contains oil particles released in the air by the compressor.

Dispose the condensate in compliance with the local rules.

We recommend to install a water-oil separator where to convey all the condensate drain coming from compressors, dryers, tanks, filters, etc.

## 5 Start-up

### 5.1 Preliminary operation



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

This dryer has been thoroughly tested, packaged and inspected prior to shipment. Nevertheless, the unit could be damaged during transportation, check the integrity of the dryer during first start-up and monitor operation during the first hours of operation.



Qualified personnel must perform the first start-up.

When installing and operating this equipment, comply with all National Electrical Code and any applicable federal, state and local codes.



Who is operating the unit is responsible for the proper and safe operation of the dryer.

Never operate equipment with panels removed.

### 5.2 First start-up



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



#### Sequence of operations (refer to paragraph 7.1 Control Panel).

- Ensure that all the steps of the “Installation” chapter have been observed.
- Ensure that the connection to the compressed air system is correct and that the piping is suitably fixed and supported.
- Ensure that the condensate drain pipe is properly fastened and connected to a collection system or container.
- Ensure that the by-pass system (if installed) is closed and the dryer is isolated.
- Ensure that the manual valve of the condensate drain circuit is open.
- Remove any packaging and other material which could obstruct the area around the dryer.
- Activate the mains switch.
- **BTF 1140 – 1320** - Turn on the main switch - pos. A on the control panel
- **BTF 1140 – 1320** - Wait at least two hours before starting the dryer (compressor crankcase heater must heat the oil of the compressor).
- Turn ON the switch - pos. 1 on the control panel.
- Ensure that electronic instrument is ON.
- **BTF 1140 – 1320** - 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 the consumption matches with the values of the data plate.
- **BTF 1140 – 1320** - Check the rotation direction of the fan – wait for its first interventions.
- Allow the dryer temperature to stabilise at the pre-set value.
- Slowly open the air inlet valve.
- Slowly open the air outlet valve.
- Slowly close the central by-pass valve of the system (if installed).
- Check the piping for air leakage.
- Ensure the drain is regularly cycling - wait for its first interventions.



#### **BTF 1140 – 1320**

#### **CAUTION:**

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

The rotating direction of the compressor in this machine is checked 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.**

### 5.3 Start-up and shut down



**BTF 1140 – 1320 - 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.**



#### **Start-up (refer to paragraph 7.1 Control Panel)**

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



#### **Shut down (refer to paragraph 7.1 Control Panel)**

- Check that the DewPoint temperature indicated on the electronic instrument is within range.
- Shut down the air compressor.
- After a few minutes, turn OFF the switch - pos. 1 on the control panel.



#### **BTF 1140 – 1320 - 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.**

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



**The number of starts must be no more than 6 per hour.**

The dryer must stop running for at least 5 minutes before being started up again.

Frequent starts may cause irreparable damage.

The user is responsible for compliance with these rules.

6 Technical data

MODEL	BTF																	
	21	36	57	72	108	150	192	258	312	366	450	630	780	1008	1140	1320		
Air flow rate at nominal condition (1)	[m <sup>3</sup> /h]	21	36	57	72	108	150	192	258	312	366	450	630	780	1008	1320		
	[l/min]	350	600	950	1200	1800	2500	3200	4300	5200	6100	7500	10500	13000	16800	22000		
	[scfm]	12	21	34	42	64	88	113	152	184	216	265	371	459	594	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 1/4"		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	[m <sup>3</sup> /h]	200	200	200	200	300	300	300	300	400	400	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)	[PhV/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	0.61	0.84	0.93	1.40	1.50	1.80	2.00	2.10	2.20	
Nominal electric consumption @60Hz	[A]	0.8	1.2	1.3	1.3	2.1	2.1	3.3	3.4	6.3	6.5	10.5	10.6	10.7	12.9	4.4	4.5	
Full Load Amperage FLA	[A]	0.12	0.17	0.20	0.21	0.37	0.39	[H]										
Max. noise level at 1 m	[dbA]	0.8	1.1	1.2	1.2	2.1	2.1	[H]										
Weight	[kg]	1.0	1.4	1.5	1.5	2.7	2.7	3.8	4.8	6.6	7.3	12.6	12.7	14.2	16.0	6.5	6.5	
		< 70																
	[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.

7 Technical description

7.1 Control panel

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

BTF 21 – 450



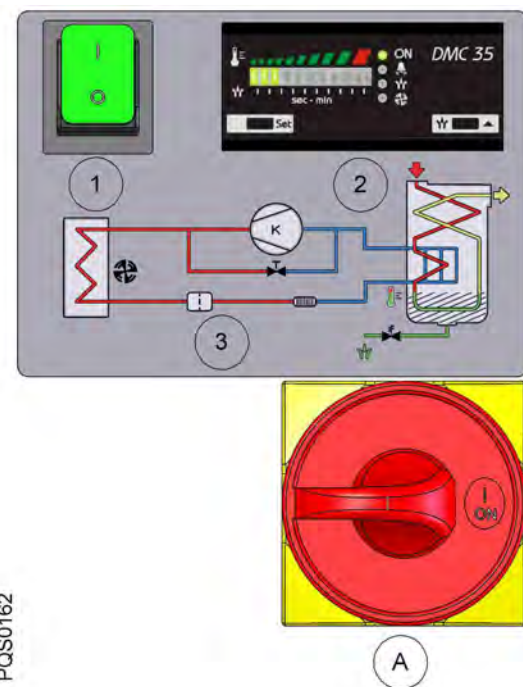
PQS0160

BTF 630 – 1008



PQS0161

BTF 1140 – 1320



PQS0162

- A Main switch
- 1 ON-OFF Switch
- 2 Electronic instrument
- 3 Air and refrigerant flow diagram

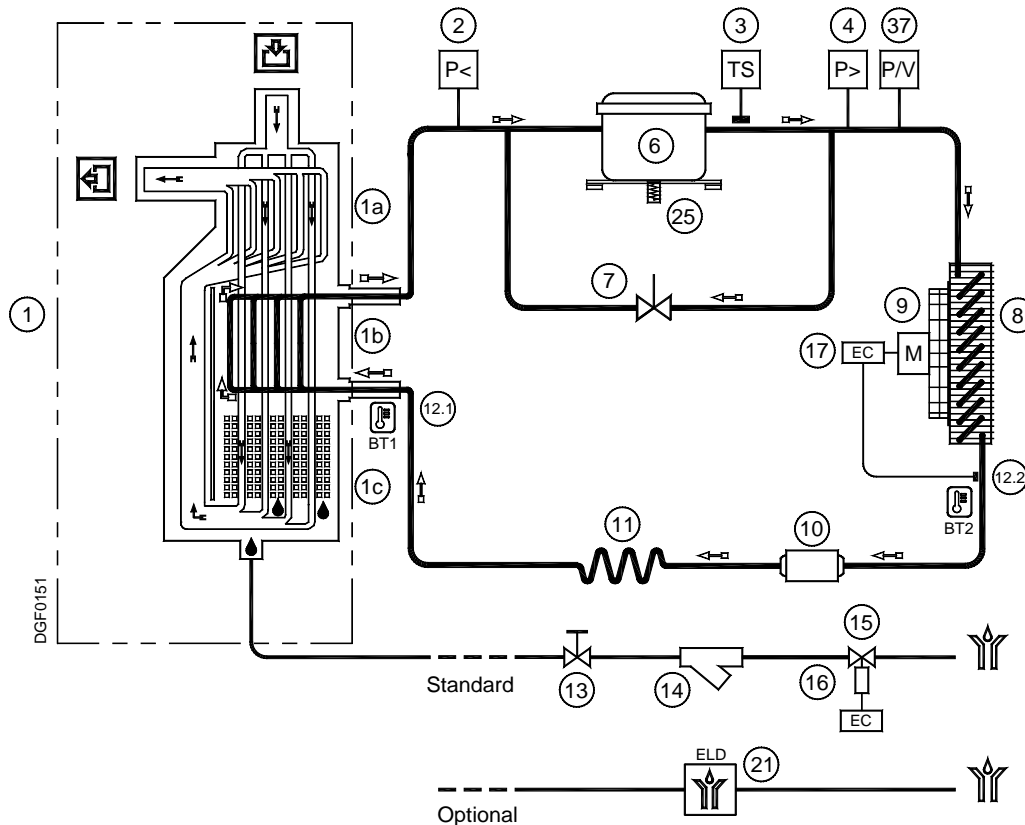


## 7.2 Operation

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

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

## 7.3 Flow diagram



- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>1 Heat exchanger module</li> <li>1a Air-to-air heat exchanger</li> <li>1b Air-to-refrigerant heat exchanger</li> <li>1c Condensate separator</li> <li>2 Refrigerant pressure switch LPS (BTF 1008-1320)</li> <li>3 Safety thermo switch TS (BTF 450-1320)</li> <li>4 Refrigerant pressure switch HPS (BTF 630-1320)</li> <li>6 Compressor</li> <li>7 Hot gas by-pass valve</li> <li>8 Condenser</li> <li>9 Condenser fan</li> <li>10 Filter dryer</li> </ul> | <ul style="list-style-type: none"> <li>11 Capillary tube</li> <li>12.1 Temperature probe BT1 – DewPoint</li> <li>12.2 Temperature probe BT2 – Fan control (BTF 21-192)</li> <li>13 Condensate drain service valve</li> <li>14 Condensate drain strainer</li> <li>15 Condensate drain solenoid valve</li> <li>16 Coil for condensate drain solenoid valve</li> <li>17 Electronic instrument</li> <li>21 Electronic drainer</li> <li>25 Compressor crankcase heater (BTF 1140-1320)</li> <li>37 Pressure Transducer BP2 – Fan control (BTF 258-1320)</li> </ul> |
|---|---|

➔ Compressed air flow direction

➔ Refrigerant gas flow direction

### 7.4 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.

### 7.5 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.

### 7.6 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.

### 7.7 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.

### 7.8 Heat exchanger module

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

### 7.9 Hot gas by-pass valve

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



### ADJUSTMENT

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

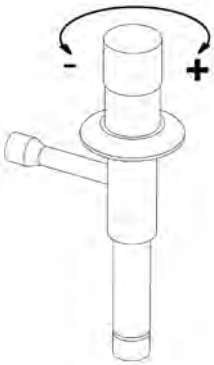
### WARNING

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.

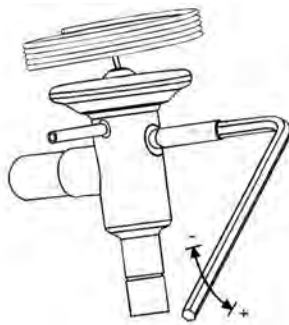
Without compressed air flow through the dryer, rotate the adjusting screw (position A on the drawing) until the following value is reached:

Hot gas setting : R513A pressure 2.3 barg (+0.1 / -0 bar)

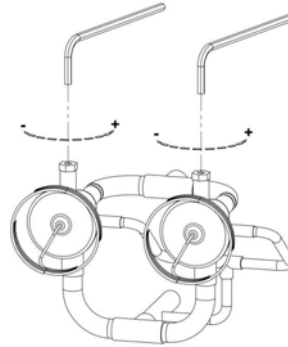
**BTF 31 – 192**



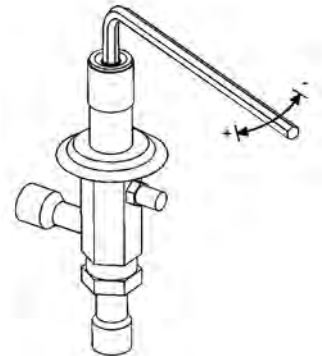
**BTF 258 – 312**



**BTF 366 – 450**



**BTF 630 – 1320**



### 7.10 Refrigerant pressure switches LPS – HPS

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

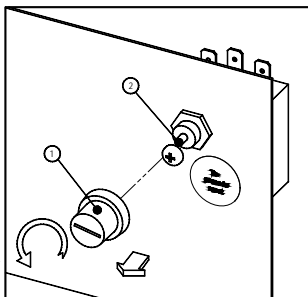
**LPS** : Low-pressure protection device on the suction side of the compressor, trips if the pressure drops below the pre-set value. The values are automatically reset when the nominal conditions are restored.

Calibrated pressure : R513A Stop 0.7 barg - Restart 1.7 barg

**HPS** : This high-pressure controller device, located on the discharge side on the compressor, is activated when the pressure exceeds the pre-set value. It features a manual-resetting button mounted on the controller itself.

Calibrated pressure : R513A Stop 20.8 barg - Manual reset

### 7.11 Safety thermo 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)

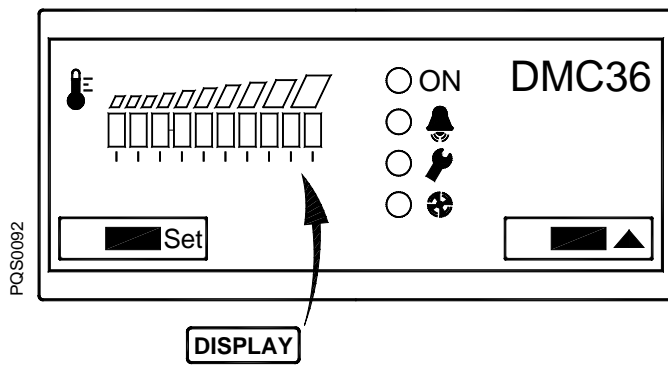
### 7.12 Compressor crankcase heater (BTF 1140-1320)

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.

7.13 Electronic instrument DMC36



- ON Led – Power ON
- Led – Alarm active
- Led – Service reminder
- Led – Condenser fan ON
- 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.

7.13.1 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.

7.13.2 How to switch off the dryer

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

7.13.3 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


**7.13.4 How is controlled the condenser fan**

**BTF 21-192** 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).


**BTF 258-1320** 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).

**7.13.5 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 :

<i>Led</i>	<i>Hours</i>
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



**7.13.6 How to reset the service reminder timer**


With dryer OFF keep pressed buttons  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  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



**7.13.7 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  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  button to exit total hours display (if no button is pressed after 30 seconds the menu is exited automatically).

### 7.13.8 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.

### 7.13.9 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 for at least 2 seconds to enter the setup menu.

Access to the menu is confirmed by led flashing.

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

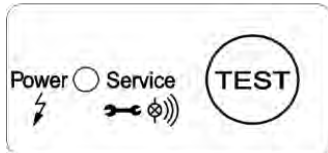
Press to exit setup menu (if no button is pressed after 2 minutes the menu is exited automatically).

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

### 7.14 Electronic drainer

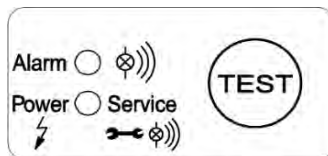
This drainer consists of a condensate accumulator where a capacitive sensor continuously checking liquid level is placed: as soon as the accumulator is filled, the sensor passes a signal to the electronic control and a diaphragm solenoid valve will open to discharge the condensate. For a complete condensate discharge the valve opening time will be adjusted exactly for each single drain operation. No condensate strainers are installed. No adjusting is required. A service valve is installed before the electronic drain in order to make check and maintenance easily. At dryer start-up verify that this valve is open.

Control panel for dryers BTF 192 – 630



Power / Service Led	Green ON - ready to work / supplied Green blinking – maintenance required Orange ON – Circuit board defect
TEST Button	Discharge test (keep pushed for 2 seconds)

Control panel for dryers BTF 780 – 1320



Power / Service Led (green)	ON - ready to work / supplied Blinking – maintenance required
Alarm Led (red)	Blinking – alarm condition
Power+Alarm Led	ON - circuit board defect
TEST Button	Discharge test (keep pushed for 2 seconds)

### Troubleshooting



**Only qualified personnel should perform troubleshooting and or maintenance operations.**

**Prior to performing any maintenance or service, be sure that :**

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

**PLEASE REFER TO INSTRUCTION MANUAL OF ELECTRONIC DRAINER**

## 8 Maintenance, troubleshooting, spare parts and dismantling

### 8.1 Checks and maintenance



Only qualified personnel should perform troubleshooting and or maintenance operations.

Prior to performing any maintenance or service, be sure that :



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



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

#### Daily



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

#### Every 200 hours or monthly



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



- Close the manual condensate drain valve, unscrew the strainer (if installed) and clean it with compressed air and brush. Reinstall the strainer properly tight, and then open the manual valve.
- At the end, check the operation of the machine

#### Every 1000 hours or yearly



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

#### Every 8000 hours



- Replace Electronic drainer service unit



8.2 Troubleshooting



Only qualified personnel should perform troubleshooting and or maintenance operations.

Prior to performing any maintenance or service, be sure that :




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



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

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ The dryer doesn't start.	<ul style="list-style-type: none"> <li>⇒ Verify that the system is powered.</li> <li>⇒ Verify the electric wiring.</li> <li>⇒ <b>BTF 1140-1320</b> - Blow of fuse (FU2 on the electric diagram) of the auxiliary circuit - replace it and check the proper operation of the dryer</li> </ul>
◆ The compressor doesn't work.	<ul style="list-style-type: none"> <li>⇒ Activation of the compressor internal thermal protection - wait for 30 minutes, then retry.</li> <li>⇒ Verify the electric wiring.</li> <li>⇒ <b>If installed</b> - Replace the internal thermal protection and/or the start-up relay and/or the start-up capacitor and/or the working capacitor.</li> <li>⇒ <b>If installed</b> - The pressure switch HPS has been activated - see specific point.</li> <li>⇒ <b>If installed</b> - The pressure switch LPS has been activated - see specific point.</li> <li>⇒ <b>If installed</b> - The safety thermo switch TS has been activated - see specific point</li> <li>⇒ <b>BTF 1140-1320 - during first startup</b> – 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. <b>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</b></li> <li>⇒ <b>BTF 1140-1320</b> – one phase of power supply is missing (see RPP on the electric diagram) – restore the missing phase.</li> <li>⇒ If the compressor still doesn't work, replace it.</li> </ul>
◆ Condenser's fan doesn't work.	<ul style="list-style-type: none"> <li>⇒ Verify the electric wiring.</li> <li>⇒ The electronic instrument is faulty – replace it.</li> <li>⇒ <b>BTF 1140-1320</b> - Blow of fuse (FU1 on the electric diagram) - replace it and check the proper operation of the dryer</li> <li>⇒ There is a leak in the refrigerant circuit - contact a refrigeration engineer.</li> <li>⇒ If the fan still doesn't work, replace it.</li> </ul>

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ DewPoint too high.	<ul style="list-style-type: none"> <li>⇒ The dryer doesn't start - see specific point.</li> <li>⇒ The DewPoint probe BT1 doesn't correctly detect the temperature - ensure the sensor is pushed into the bottom of probe well.</li> <li>⇒ The Compressor doesn't work - see specific point.</li> <li>⇒ The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation.</li> <li>⇒ The inlet air is too hot - restore nominal conditions.</li> <li>⇒ The inlet air pressure is too low - restore nominal conditions.</li> <li>⇒ The inlet air flow rate is higher than the rate of the dryer - reduce the flow rate - restore nominal conditions.</li> <li>⇒ The condenser is dirty - clean it.</li> <li>⇒ The condenser fan doesn't work - see specific point.</li> <li>⇒ The dryer doesn't drain the condensate - see specific point.</li> <li>⇒ The hot gas by-pass valve is out of setting - contact a refrigeration engineer to restore nominal setting.</li> <li>⇒ There is a leak in the refrigerant circuit - contact a refrigeration engineer.</li> </ul>
◆ Dew Point too low	<ul style="list-style-type: none"> <li>⇒ The fan is always ON - the  yellow LED of electronic instrument is flashing - see specific point.</li> <li>⇒ Ambient temperature is too low - restore nominal conditions.</li> <li>⇒ The hot gas by-pass valve is out of setting - contact a refrigeration engineer to restore nominal setting.</li> </ul>
◆ Excessive pressure drop within the dryer.	<ul style="list-style-type: none"> <li>⇒ The dryer doesn't drain the condensate - see specific point.</li> <li>⇒ The DewPoint is too low - the condensate is frost and blocks the air - see specific point.</li> <li>⇒ Check for throttling the flexible connection hoses.</li> </ul>
◆ The dryer doesn't drain the condensate	<ul style="list-style-type: none"> <li>⇒ The condensate drain service valve is closed - open it.</li> <li>⇒ Verify the electric wiring.</li> <li>⇒ The DewPoint is too low - the condensate is frost and blocks the air - see specific point.</li> <li>⇒ Inlet compressed air pressure is too low and condensate is not drained – restore nominal conditions.</li> <li>⇒ Electronic drainer is not operating correctly (see paragraph 7.14).</li> </ul>
◆ The dryer continuously drains condensate.	<ul style="list-style-type: none"> <li>⇒ Electronic drainer is dirty (see paragraph 7.14).</li> </ul>
◆ Water within the line.	<ul style="list-style-type: none"> <li>⇒ The dryer doesn't start - see specific point.</li> <li>⇒ <b>If installed</b> - Untreated air flows through the by-pass unit - close the by-pass.</li> <li>⇒ The dryer doesn't drain the condensate - see specific point.</li> <li>⇒ DewPoint too high - see specific point.</li> </ul>

<b>SYMPTOM</b>	<b>POSSIBLE CAUSE - SUGGESTED ACTION</b>
<p>◆ <b>If installed</b> –HPS high pressure switch has been activated.</p>	<p>⇒ Check which of the following has caused the activation :</p> <ol style="list-style-type: none"> <li>1. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation.</li> <li>2. The condenser is dirty - clean it.</li> <li>3. The condenser fan doesn't work - see specific point.</li> </ol> <p>⇒ Reset the pressure switch pressing the button on the controller itself - verify the dryer for correct operation.</p> <p>⇒ HPS pressure switch is faulty - contact a refrigeration engineer to replace it.</p>
<p>◆ <b>If installed</b> – LPS low pressure switch has been activated.</p>	<p>⇒ There is a leak in the refrigerating fluid circuit - contact a refrigeration engineer.</p> <p>⇒ The pressure switch reset automatically when normal conditions are restored - check the proper operation of the dryer.</p>
<p>◆ <b>If installed</b> – TS safety thermo switch has been activated.</p>	<p>⇒ Check which of the following has caused the activation :</p> <ol style="list-style-type: none"> <li>1. Excessive thermal load – restore the standard operating conditions.</li> <li>2. The inlet air is too hot - restore the nominal conditions.</li> <li>3. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation.</li> <li>4. The condenser unit is dirty - clean it.</li> <li>5. The fan doesn't work - see specific point.</li> <li>6. The hot gas by-pass valve requires re-adjusting – contact a specialized technician to restore nominal setting.</li> <li>7. Refrigerant gas leak - contact a refrigeration engineer.</li> </ol> <p>⇒ Reset the thermo switch by pressing the button on the thermo switch itself – verify the correct operation of the dryer.</p> <p>⇒ TS thermo switch is faulty - replace it.</p>
<p>◆ DMC36 - Led   and display 1st (left) and 10th (right) led are flashing.</p>	<p>⇒ Verify the electric wiring of BT1 DewPoint probe.</p> <p>⇒ The BT1 DewPoint probe is faulty - replace it.</p> <p>⇒ The electronic instrument is faulty - replace it.</p>
<p>◆ DMC36 Led   and led   are flashing</p>	<p>⇒ Verify the electric wiring of BT2/BP2 fan control probe.</p> <p>⇒ The BT2/BP2 fan control probe is faulty - replace it.</p> <p>⇒ The electronic instrument is faulty - replace it.</p>
<p>◆ DMC36 Led   and display 1st (left) led are flashing</p>	<p>⇒ DewPoint too low - see specific point.</p> <p>⇒ The BT1 DewPoint probe is faulty - replace it.</p> <p>⇒ The electronic instrument is faulty - replace it.</p>
<p>◆ DMC36 Led   and is flashing</p>	<p>⇒ DewPoint too high - see specific point.</p> <p>⇒ The BT1 DewPoint probe is faulty - replace it.</p> <p>⇒ The electronic instrument is faulty - replace it.</p>
<p>◆ DMC36 Led   and  are flashing</p>	<p>⇒ Service reminder timer has expired – dryer requires service.</p> <p>⇒ Perform the proper service to the dryer.</p> <p>⇒ Reset the service reminder timer.</p>

8.3 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	BTF															
		21	36	57	72	108	150	192	258	312	366	450	630	780	1008	1140	1320
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																
3	TS Safety thermo switch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
4	HPS Pressure switch																
37	Pressure transducer																
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	2	2	1	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																
9.1	MV Fan motor	1	1	1	1	1	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	1	1	1	1	1
9.3	Fan grid																
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	2	1	1	1	1	1	1	1	1
13-14	Condensate drain valve/strainer	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14	Y strainer																
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	1	1	1
	QS Main switch																
	KC-KV Contactor																
60	TF Transformer																
	RPP Reverse phase protector																
	KF Solid state relay																

#### 8.4 Maintenance operation on the refrigeration circuit



Maintenance and service on refrigerating systems must be carried out only by certified refrigerating engineers only, according to local rules.

All the refrigerant of the system must be recovered for its recycling, reclamation or destruction.

**Do not dispose the refrigerant fluid in the environment.**

This dryer comes ready to operate and filled with R513A type refrigerant fluid.



In case of refrigerant leak contact a certified refrigerating engineer. Room is to be aired before any intervention.

If is required to re-fill the refrigerating circuit, contact a certified refrigerating engineers.

Refer to the dryer nameplate for refrigerant type and quantity.

Characteristics of refrigerants used:

Refrigerant	Chemical formula	TLV	GWP
R513A - HFC	56% C <sub>3</sub> H <sub>2</sub> F <sub>4</sub> · 44% C <sub>2</sub> H <sub>2</sub> F <sub>2</sub>	1000 ppm	631

#### 8.5 Dismantling of the dryer

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



Part	Material
Refrigerant fluid	R513A, Oil
Canopy and Supports	Carbon steel, Epoxy paint
Refrigerating compressor	Steel, Copper, Aluminium, Oil
Alu-Dry Module	Aluminium
Condenser Unit	Aluminium, Copper, Carbon steel
Pipe	Copper
Fan	Aluminium, Copper, Steel
Valve	Brass, Steel
Electronic Level Drain	PVC, Aluminium, Steel
Insulation Material	Synthetic rubber without CFC, Polystyrene, Polyurethane
Electric cable	Copper, PVC
Electric Parts	PVC, Copper, Brass



We recommend to comply with the safety rules in force for the disposal of each type of material.

Refrigerant contains droplets of lubrication oil released by the refrigerating compressor.

Do not dispose this fluid in the environment. It has to be discharged from the dryer with a suitable device and then delivered to a collection centre where it will be processed to make it reusable.

**9 Attachments**

**Exploded views – List of components**

- |  |                                    |
|--|------------------------------------|
| <b>1</b> Heat exchanger module                     | <b>21</b> Electronic drainer       |
| <b>1.1</b> Insulation material                     | <b>22</b> Main switch              |
| <b>2</b> Refrigerant pressure switch LPS           | <b>37</b> Pressure transducer      |
| <b>3</b> Safety thermo switch TS                   | <b>51</b> Front panel              |
| <b>4</b> Refrigerant pressure switch HPS           | <b>52</b> Back panel               |
| <b>6</b> Compressor                                | <b>53</b> Right lateral panel      |
| <b>7</b> Hot-gas bypass valve                      | <b>54</b> Left lateral panel       |
| <b>8</b> Condenser                                 | <b>55</b> Cover                    |
| <b>9</b> Condenser fan                             | <b>56</b> Base plate               |
| <b>9.1</b> Motor                                   | <b>57</b> Upper plate              |
| <b>9.2</b> Blade                                   | <b>58</b> Support beam             |
| <b>9.3</b> Grid                                    | <b>59</b> Support bracket          |
| <b>10</b> Filter dryer                             | <b>60</b> Control panel            |
| <b>11</b> Capillary tube                           | <b>61</b> Electric connecting plug |
| <b>12</b> Temperature probe                        | <b>62</b> Electric box             |
| <b>13</b> Condensate drain service valve           | <b>66</b> QE door                  |
| <b>14</b> Condensate drain strainer                | <b>81</b> Flow diagram sticker     |
| <b>15</b> Condensate drain solenoid valve          | <b>83</b> HP Service valve         |
| <b>16</b> Coil for condensate drain solenoid valve | <b>84</b> LP Service valve         |
| <b>17</b> Electronic instrument                    |                                    |

**Electric diagrams – List of components**

- |  |  |
|--|--|
| <b>MC1</b> Compressor  | <b>LPS</b> Low pressure switch                   |
| <b>KT</b> Compressor thermal protection                                    | <b>HPS</b> High pressure switch                  |
| <b>KR</b> Compressor starting relay  | <b>TS</b> Safety thermo switch                   |
| <b>CS</b> Compressor starting capacitor                                    | <b>EVD</b> Timed condensate drain solenoid valve |
| <b>CR</b> Compressor operating capacitor                                   | <b>ELD</b> Electronic drainer                    |
| <b>MV1</b> Condenser fan   | <b>S1</b> ON-OFF switch                          |
| <b>KV</b> Fan thermal protection   | <b>QS</b> Main switch with door block            |
| <b>CV</b> Fan starting capacitor   | <b>RC</b> Compressor crankcase heater            |
| <b>DMC36</b> Electronic instrument   | <b>BOX</b> Electrical box                        |
| <b>BT1-2</b> Temperature probes  | <b>RPP</b> Reverse phase protector               |
| <b>BP2</b> Pressure Transducer   |  |
| <br>   |  |
| <b>NT1</b> Air-Cooled only   | <b>NT5</b> Limit of equipment                    |
| <b>NT2</b> Verify transformer connection according to power supply voltage | <b>NT6</b> Timed drain output                    |
| <b>NT3</b> Jump if not installed   | <b>NT7</b> Water Cooled only                     |
| <b>NT4</b> Provided and wired by customer                                  |  |
| <br>   |  |
| <b>BN</b> Brown  | <b>OR</b> Orange                                 |
| <b>BU</b> Blue   | <b>RD</b> Red                                    |
| <b>BK</b> Black  | <b>WH</b> White                                  |
| <b>YG</b> Yellow / Green   | <b>WH/BK</b> White / Black                       |





A **DOVER**™ COMPANY

**BlitzRotary GmbH**

Hüfinger Straße 55  
D-78199 Bräunlingen  
Phone/Telefon +49.771.9233.0  
Fax/Telefax +49.771.9233.99  
info@blitzrotary.com  
www.blitzrotary.com

Original instructions are in **ITALIAN** - Subject to technical changes without prior notice; errors not excluded

**EN** - Subject to technical changes without prior notice; errors not excluded / Translation of original instructions





**Refrigerating air dryer**

**BTF 21 – 1320**

**User's maintenance and spare parts manual**

**Attachments / Anhänge**

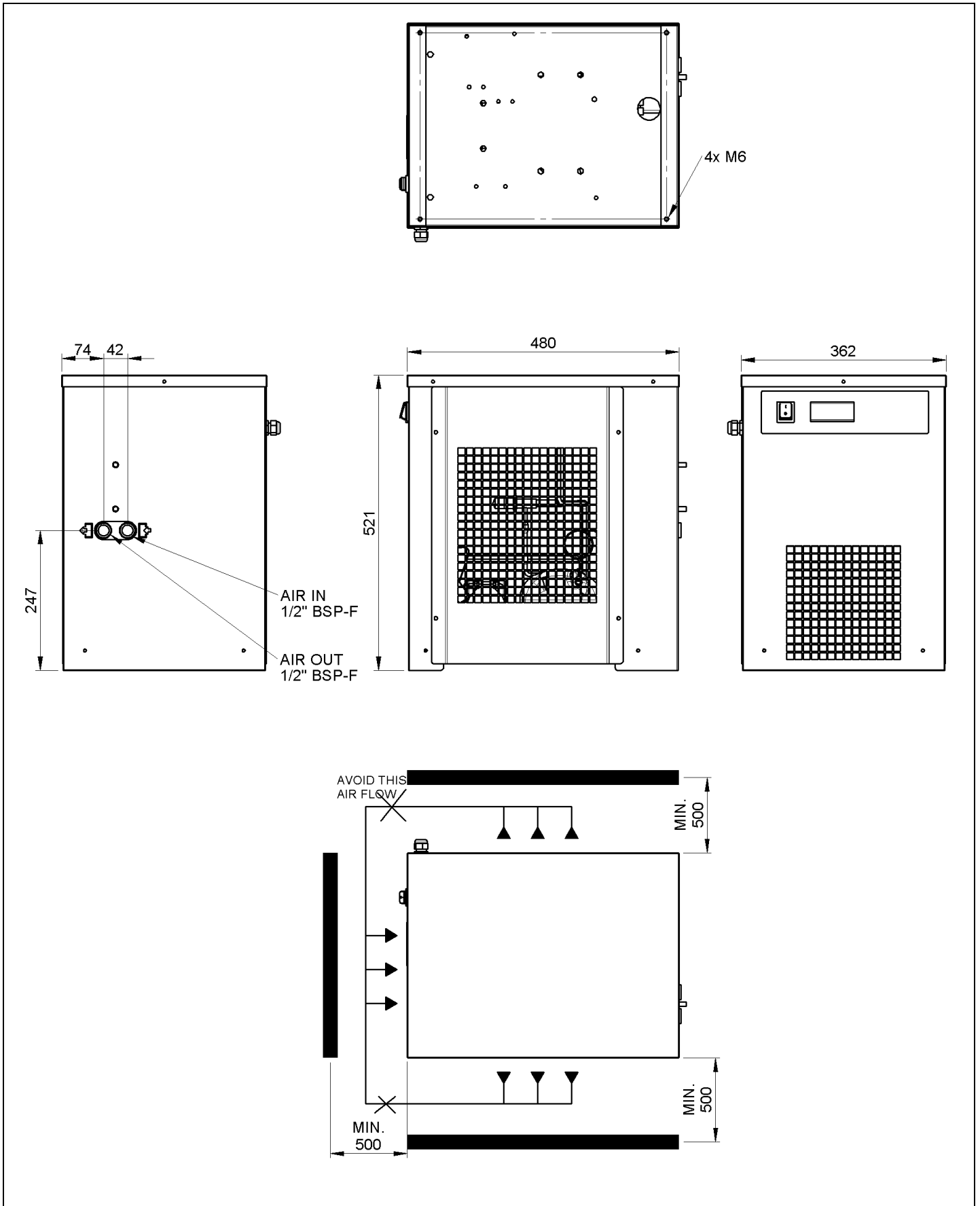
**Contents**

<b>9 Attachments.....</b>	<b>3</b>
9.1 Dryers dimensions.....	3
9.1.1 BTF 21.....	3
9.1.2 BTF 36 – 108.....	4
9.1.3 BTF 150.....	5
9.1.4 BTF 192 – 258.....	6
9.1.5 BTF 312.....	7
9.1.6 BTF 366 – 450.....	8
9.1.7 BTF 630 – 780.....	9
9.1.8 BTF 1008.....	10
9.1.9 BTF 1140 – 1320.....	11
9.2 Exploded views.....	12
9.2.1 BTF 21.....	12
9.2.2 BTF 36 – 72.....	13
9.2.3 BTF 108.....	14
9.2.4 BTF 150 – 192.....	15
9.2.5 BTF 258.....	16
9.2.6 BTF 312 – 450.....	17
9.2.7 BTF 630 – 780.....	18
9.2.8 BTF 1008.....	19
9.2.9 BTF 1140 – 1320.....	20
9.3 Electric diagrams.....	21
9.3.1 BTF 21 - 192.....	21
9.3.2 BTF 258 – 366.....	22
9.3.3 BTF 450.....	23
9.3.4 BTF 630.....	24
9.3.5 BTF 780.....	25
9.3.6 BTF 1008.....	26
9.3.7 BTF 1140 – 1320 1/3.....	27
9.3.8 BTF 1140 – 1320 2/3.....	28
9.3.9 BTF 1140 – 1320 3/3.....	29

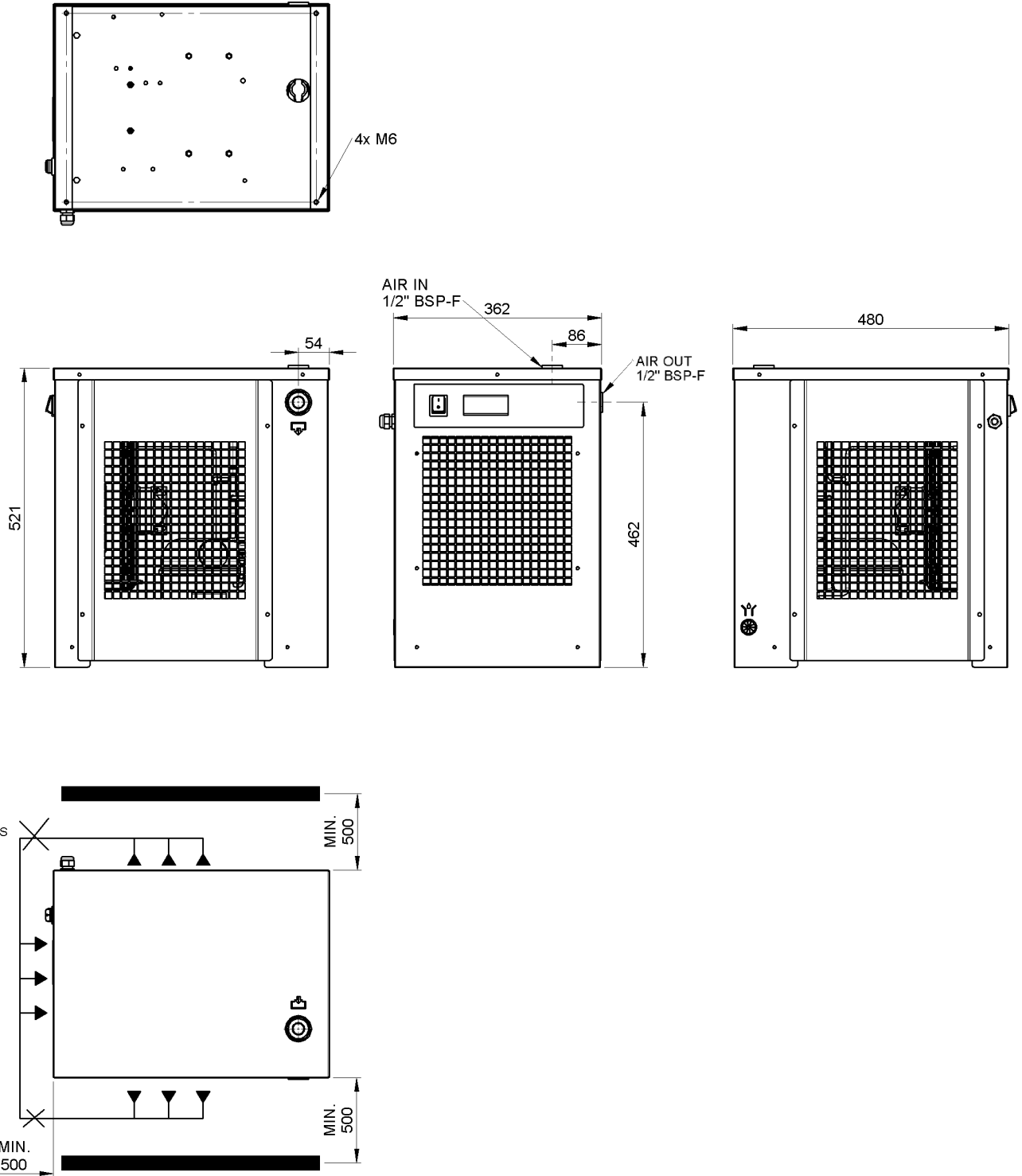
9 Attachments

9.1 Dryers dimensions

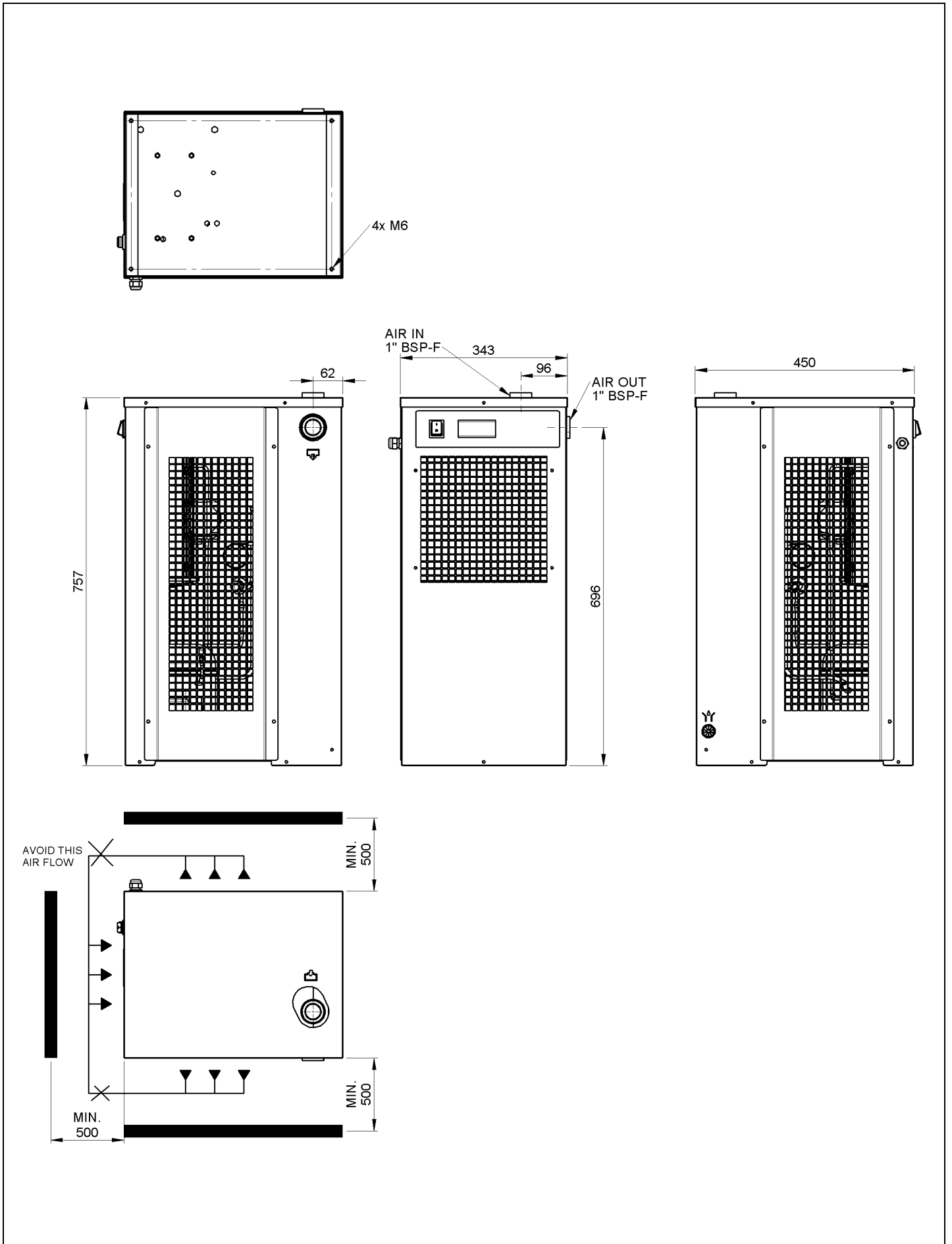
9.1.1 BTF 21



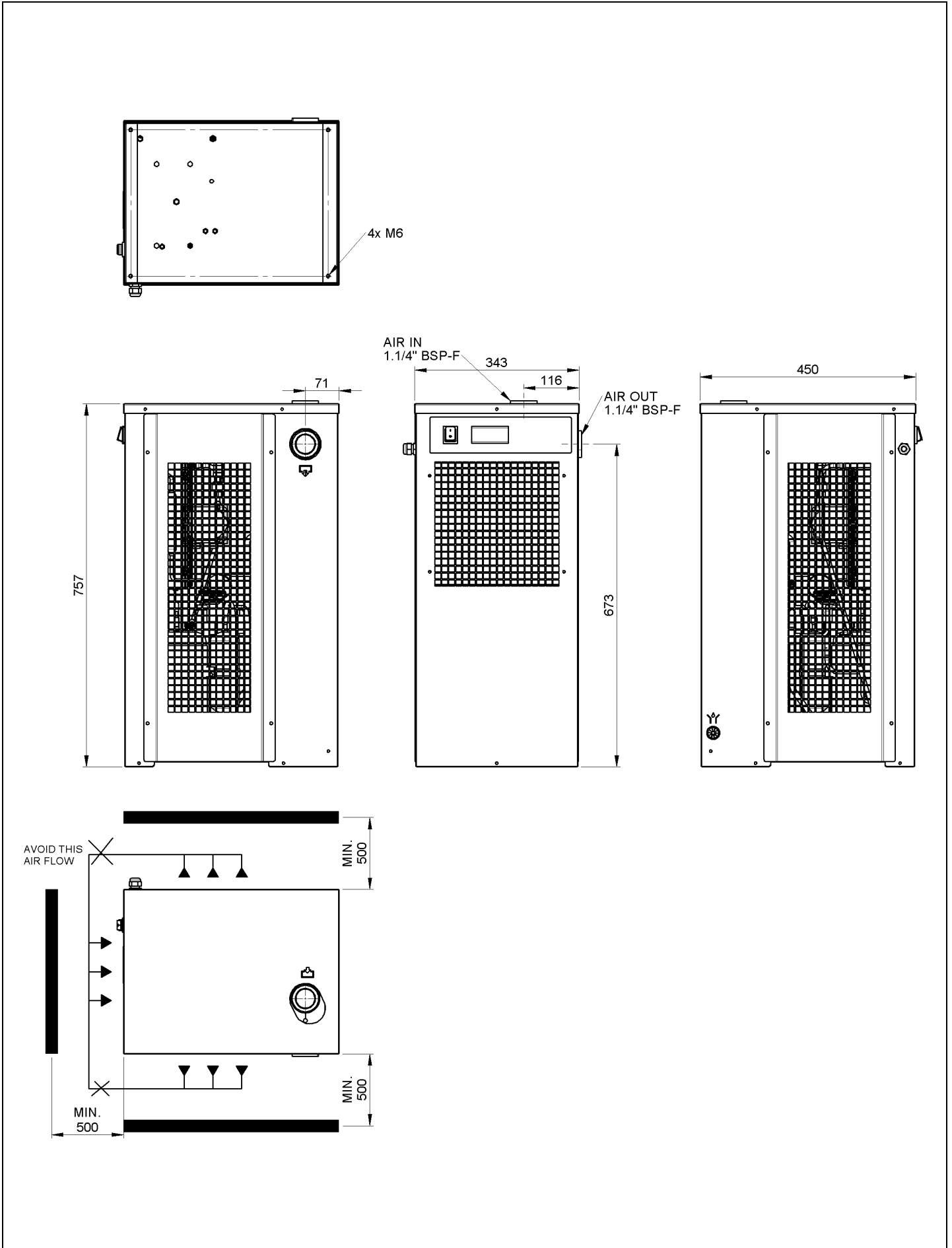
9.1.2 BTF 36 – 108



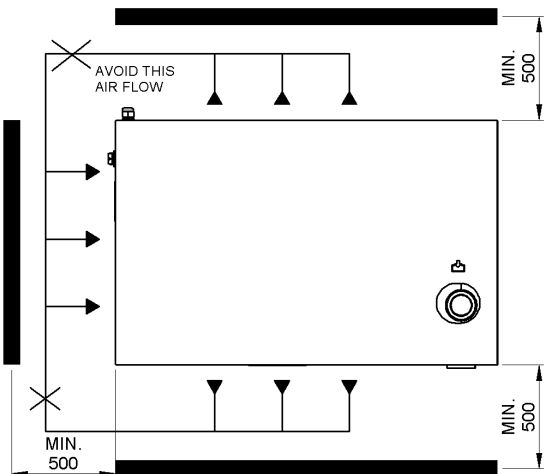
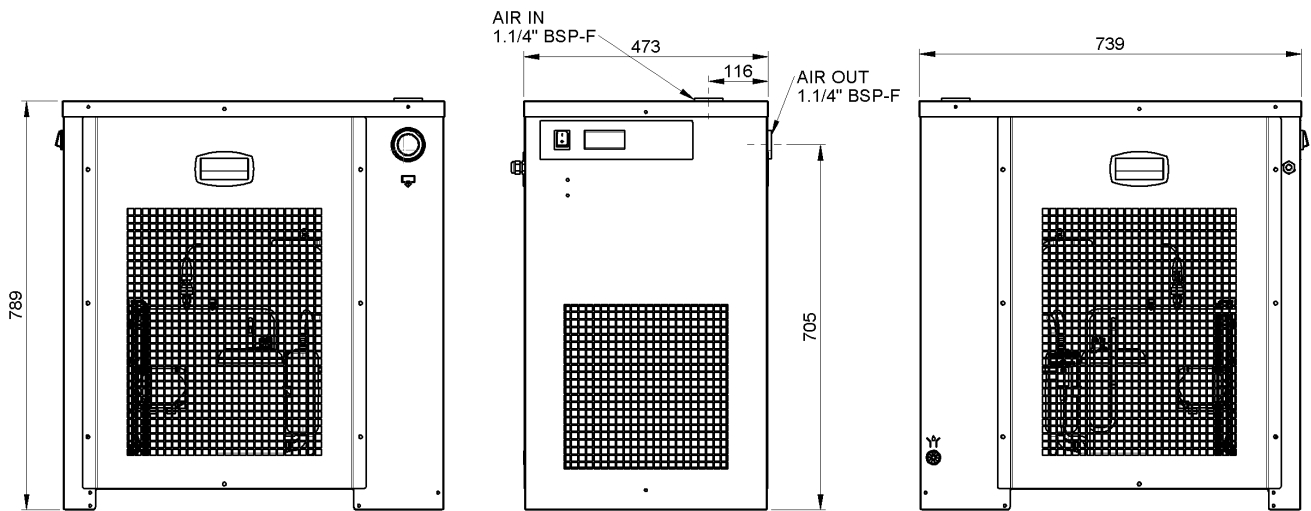
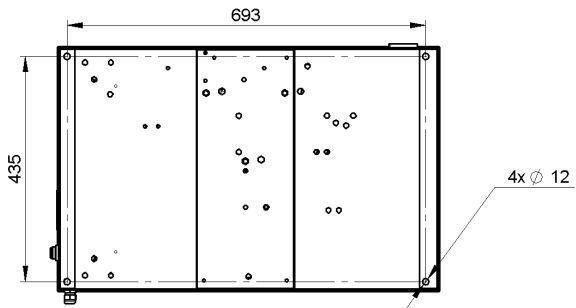
9.1.3 BTF 150



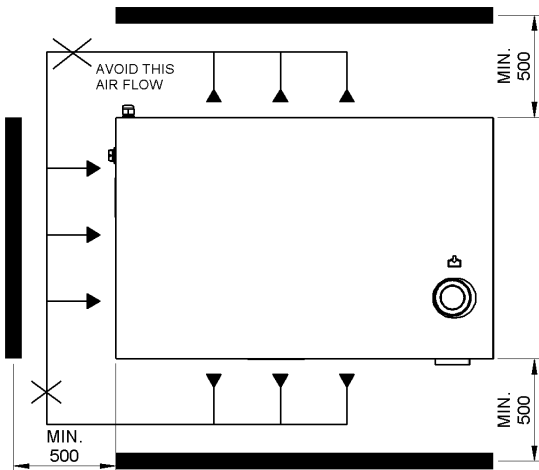
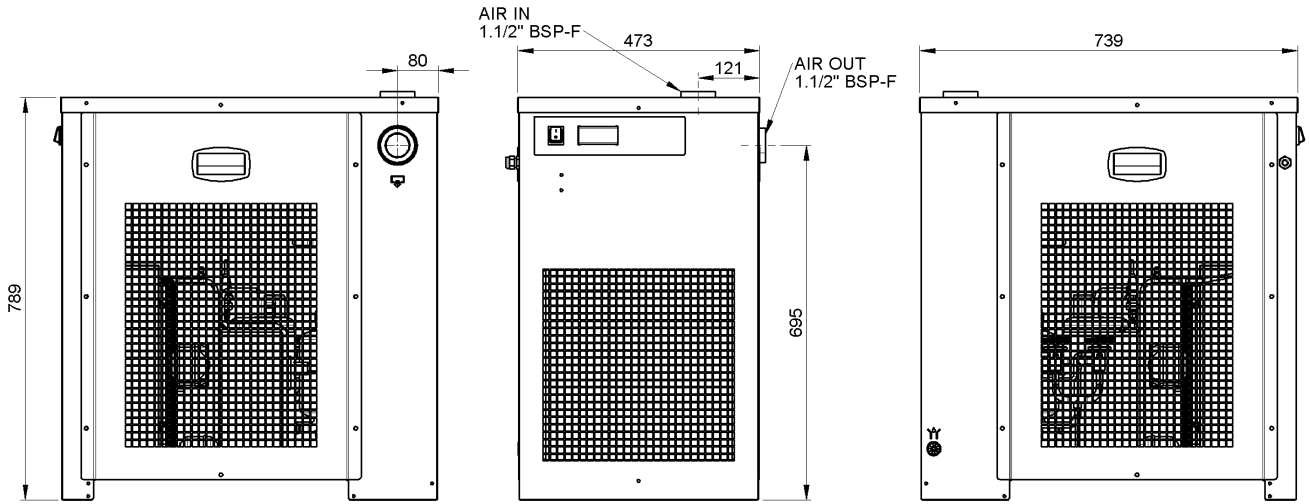
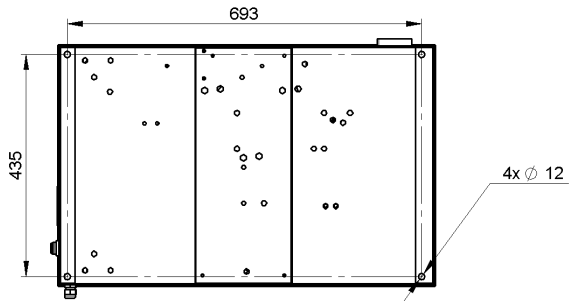
9.1.4 BTF 192 – 258



9.1.5 BTF 312

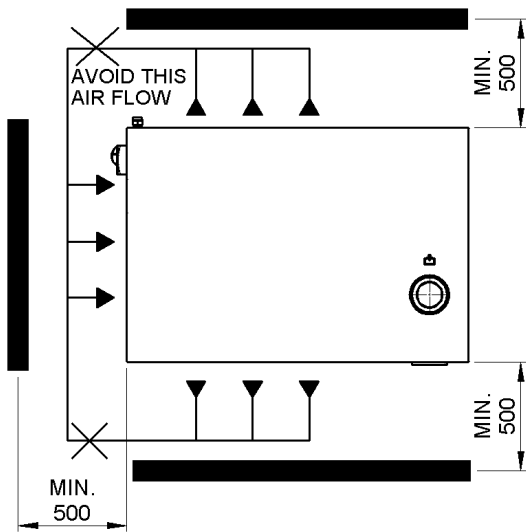
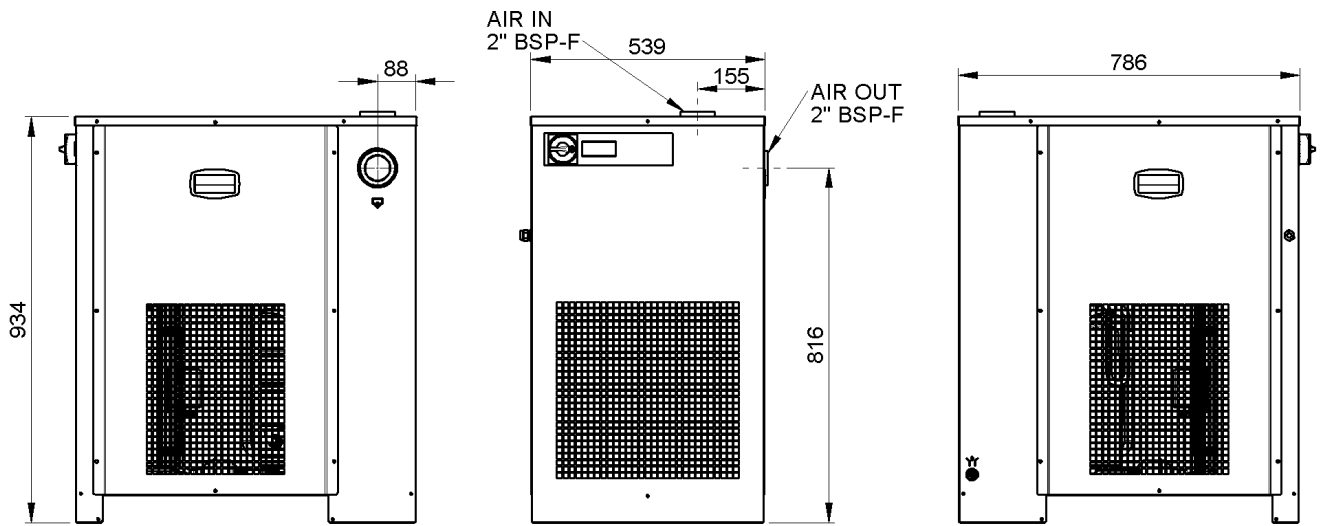
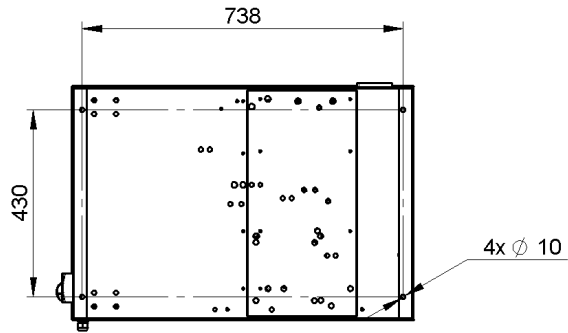


9.1.6 BTF 366 – 450

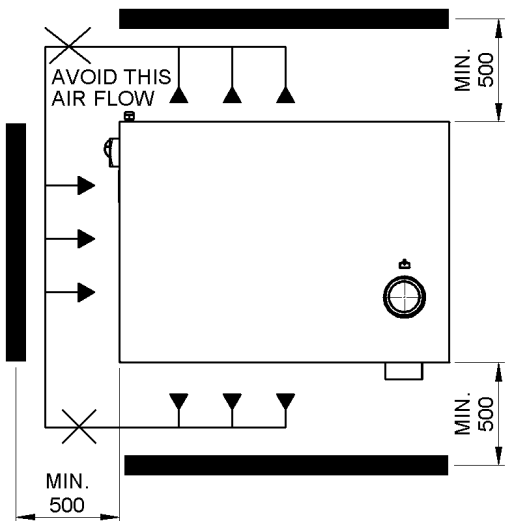
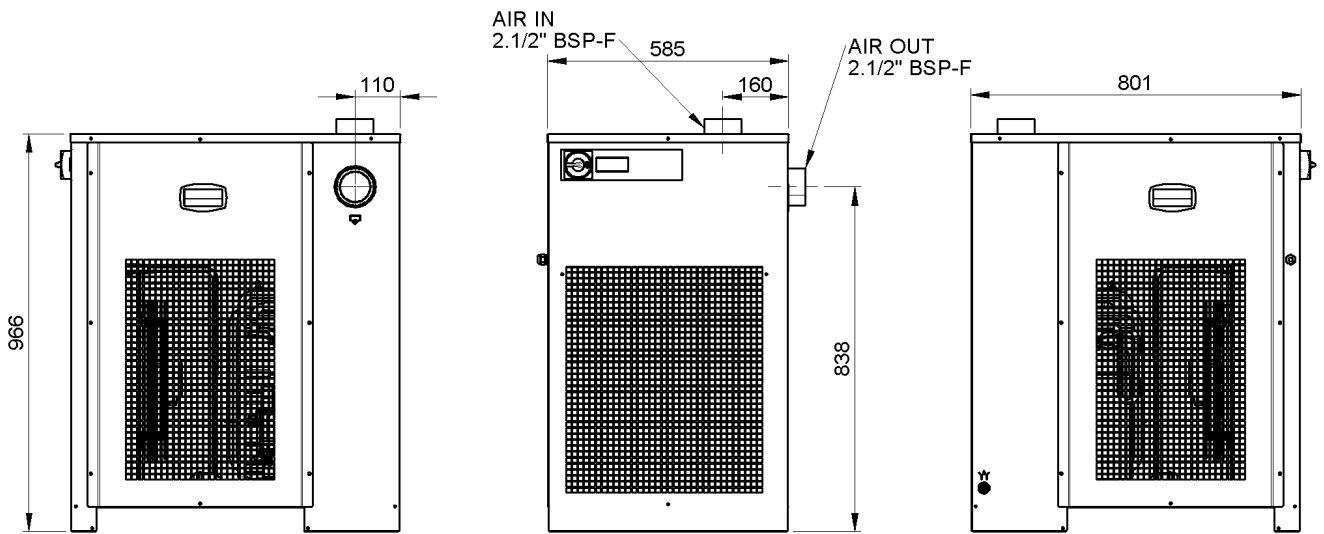
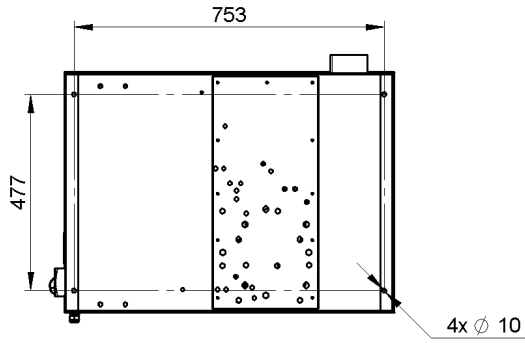




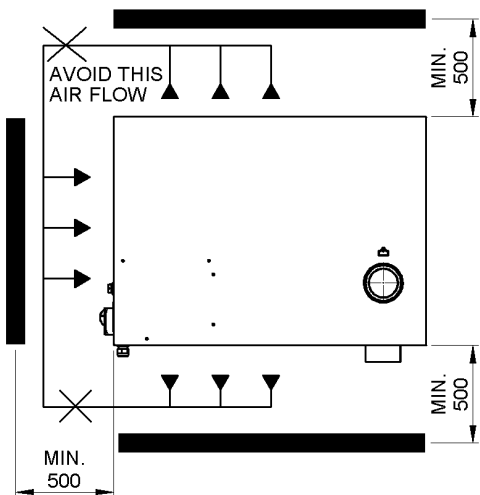
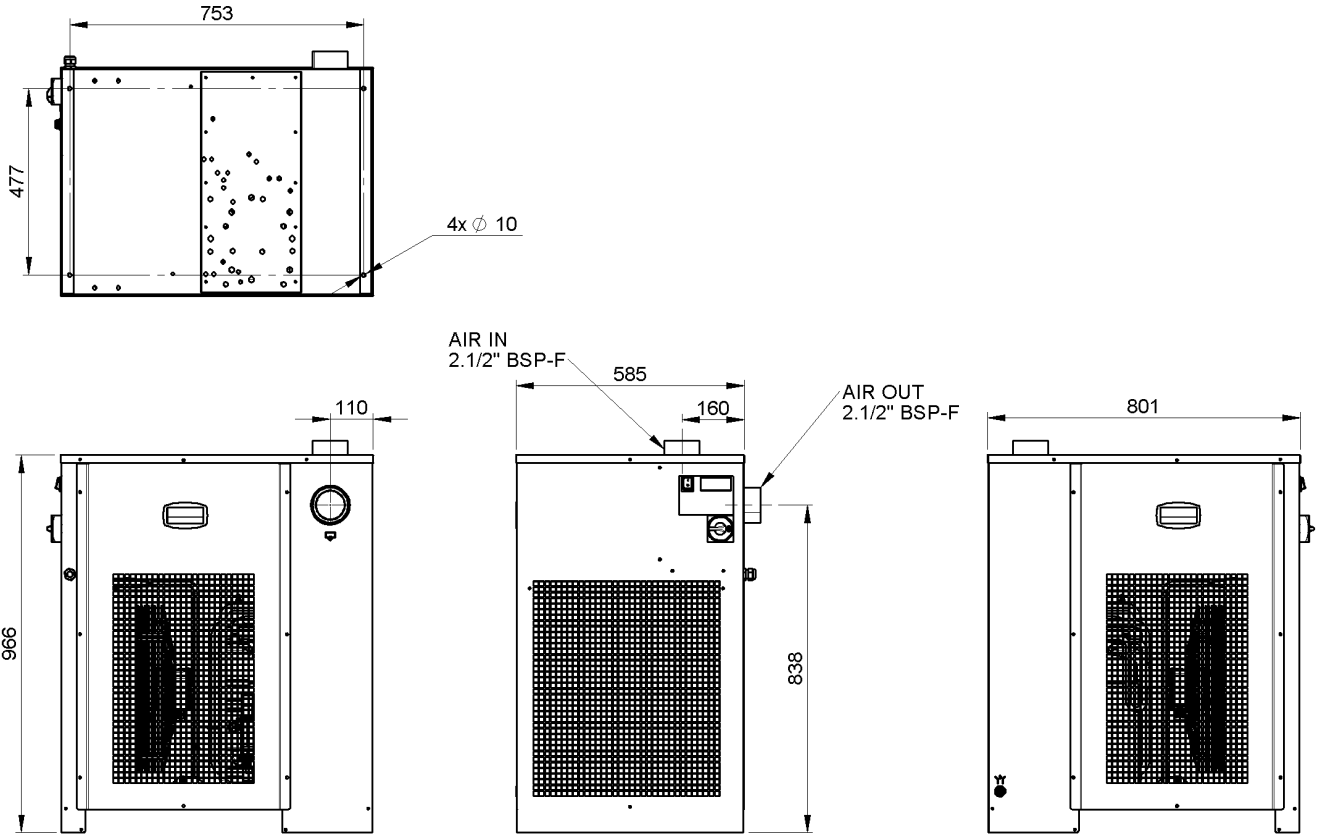
9.1.7 BTF 630 – 780



9.1.8 BTF 1008

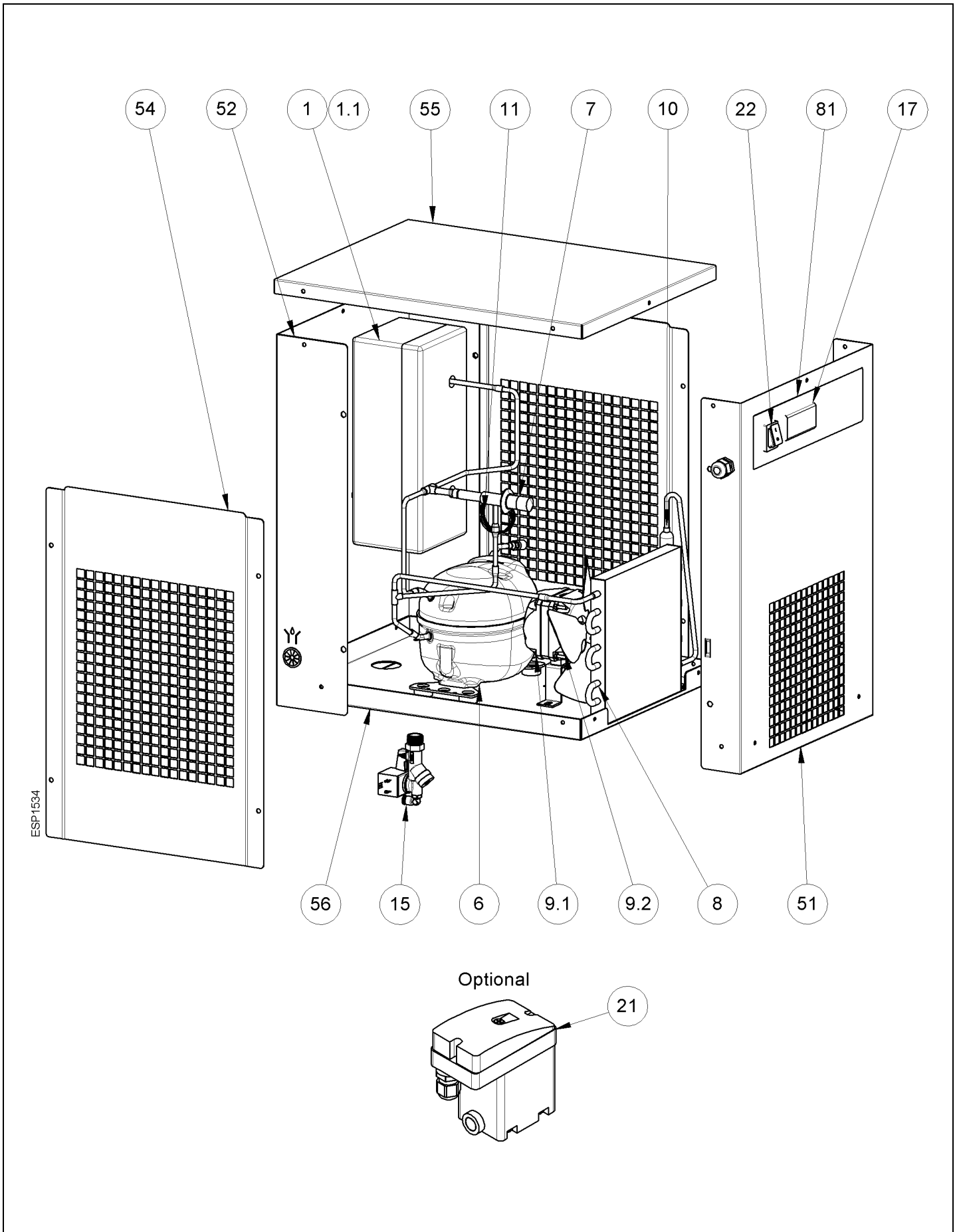


9.1.9 BTF 1140 – 1320

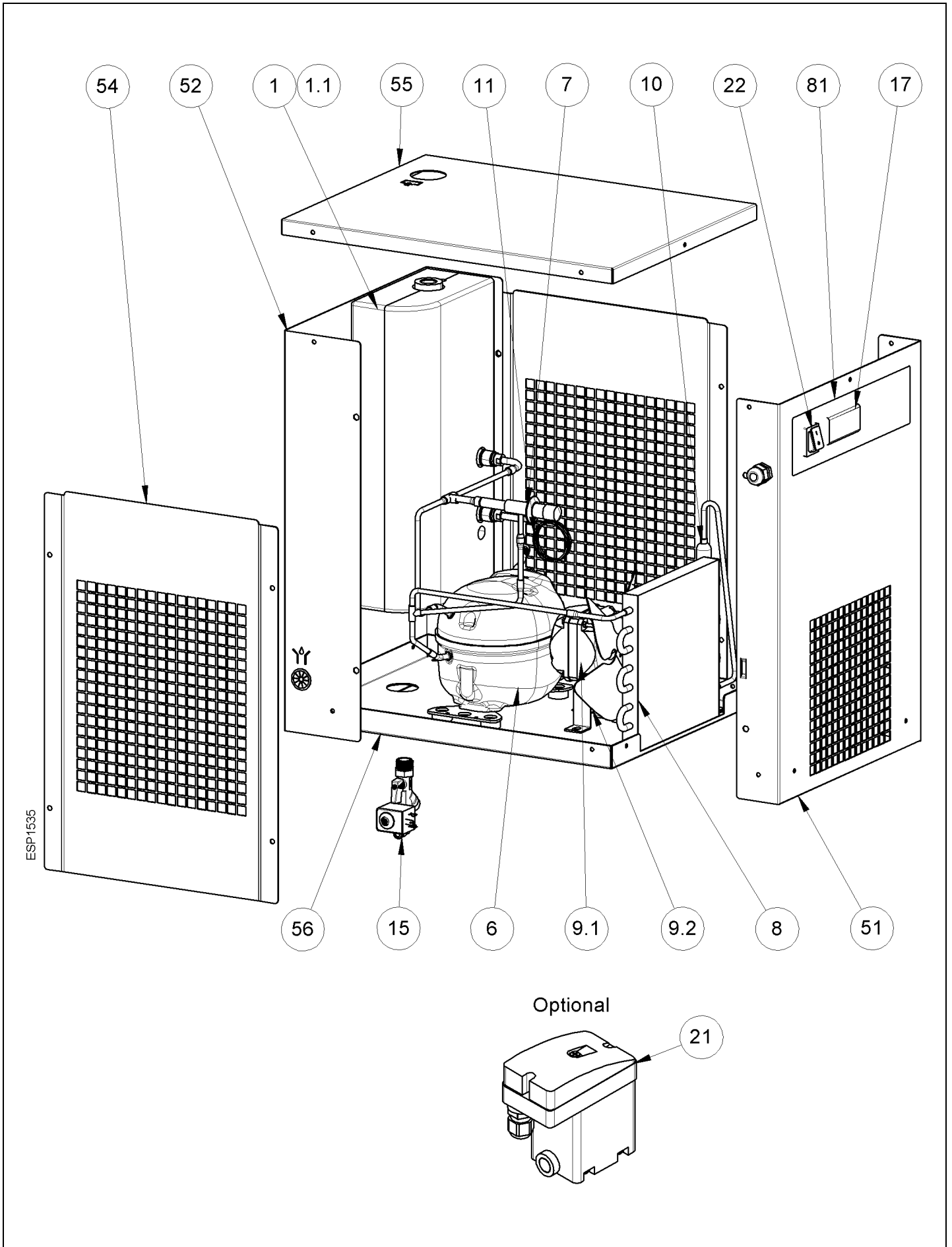


9.2 Exploded views

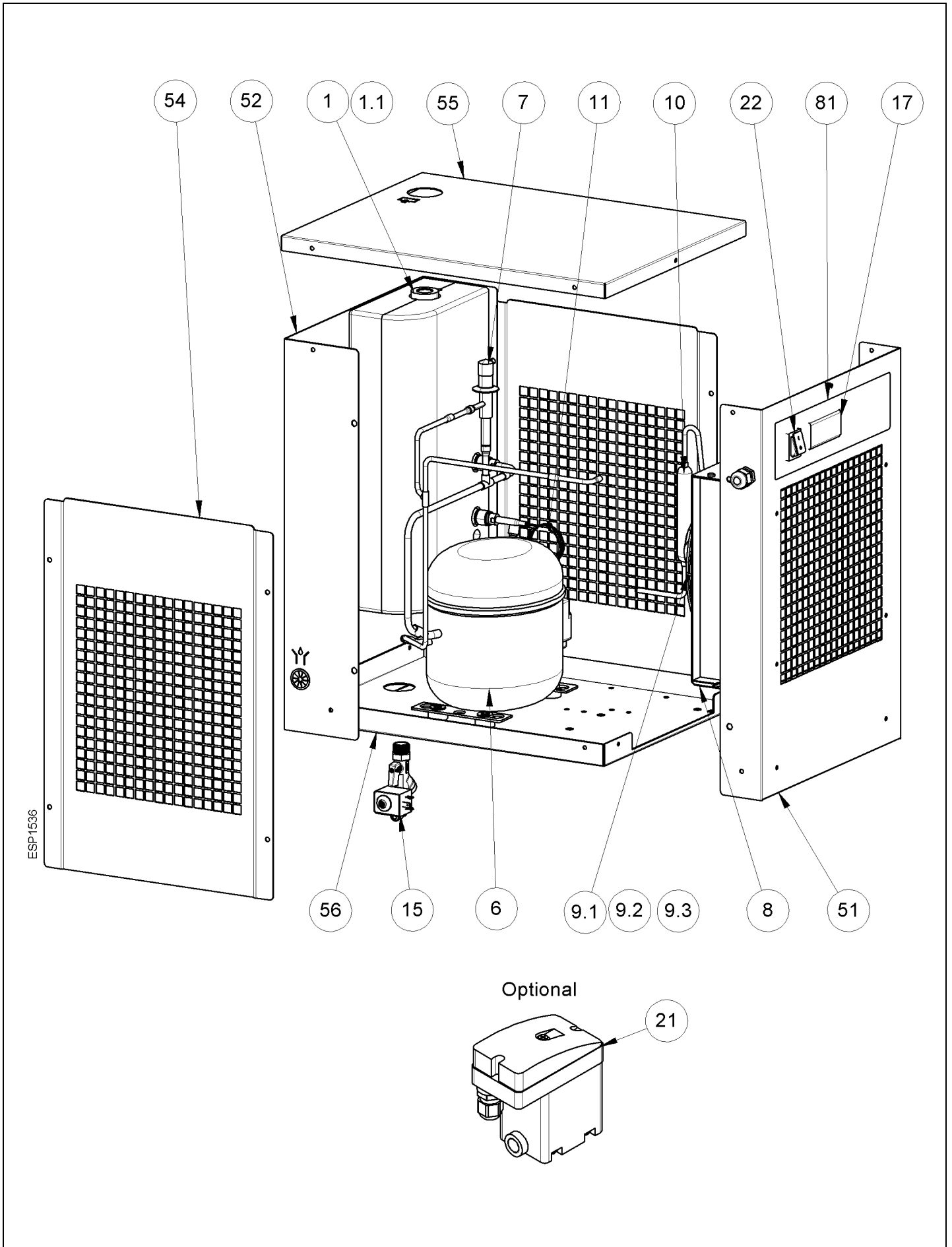
9.2.1 BTF 21



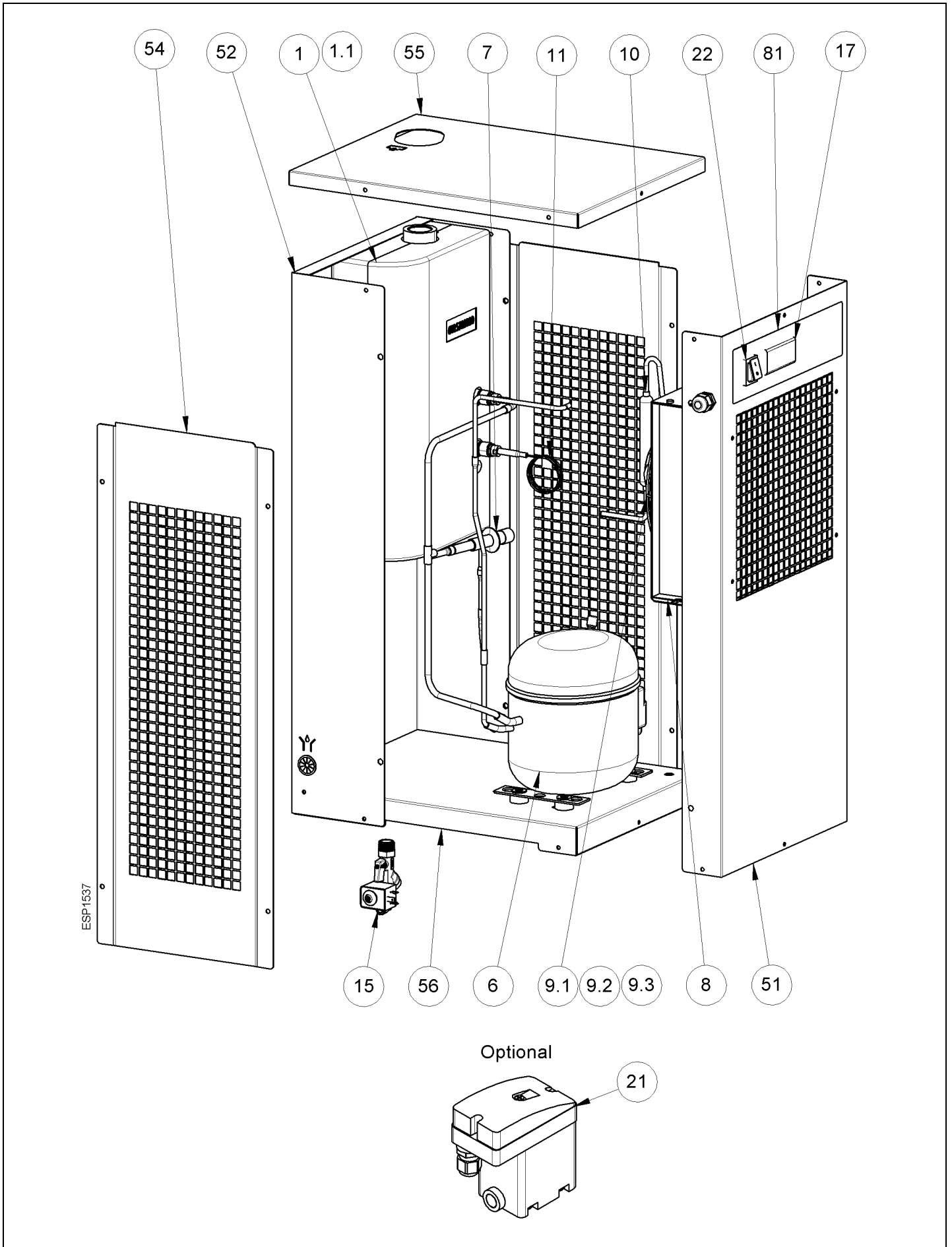
9.2.2 BTF 36 – 72



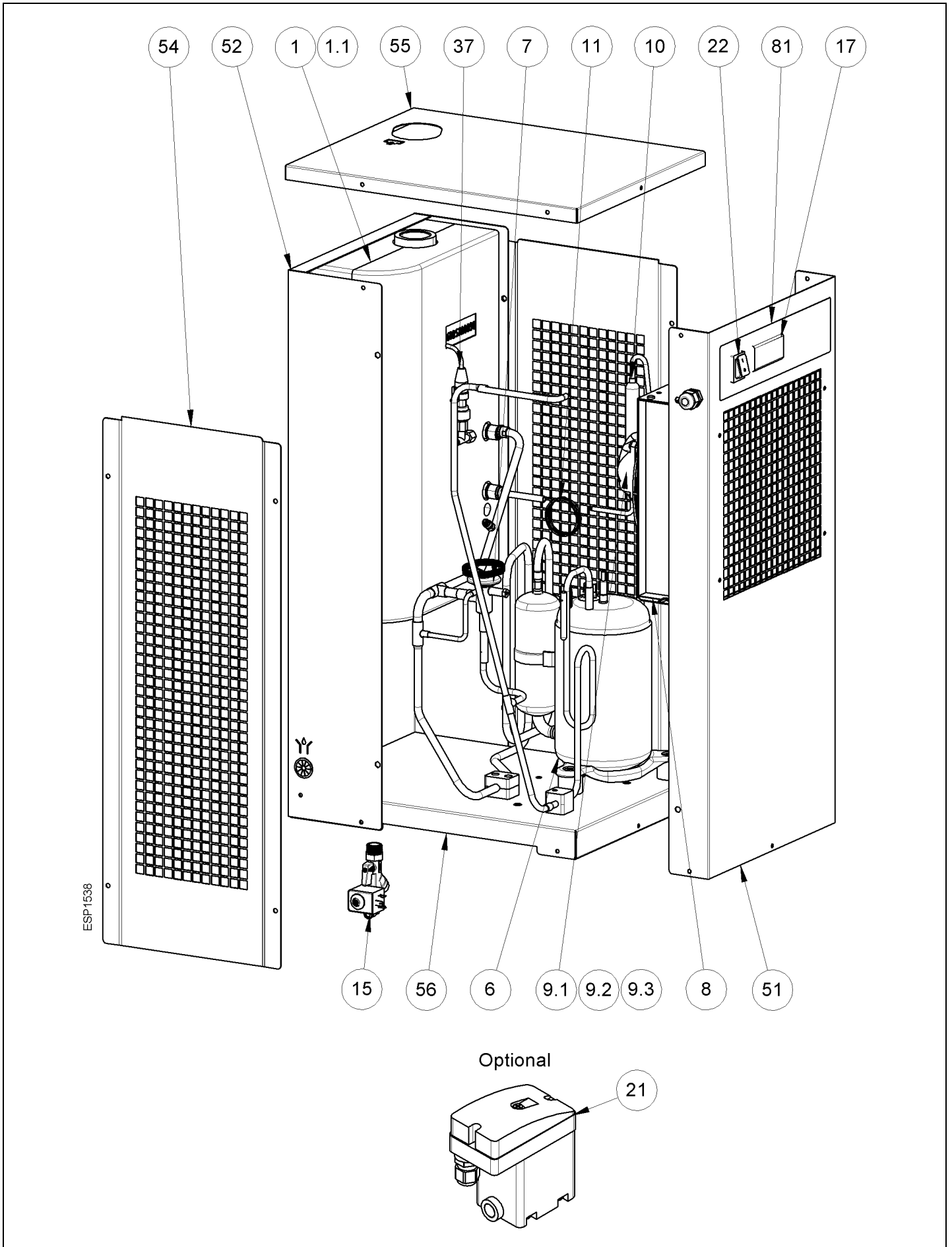
9.2.3 BTF 108



9.2.4 BTF 150 – 192

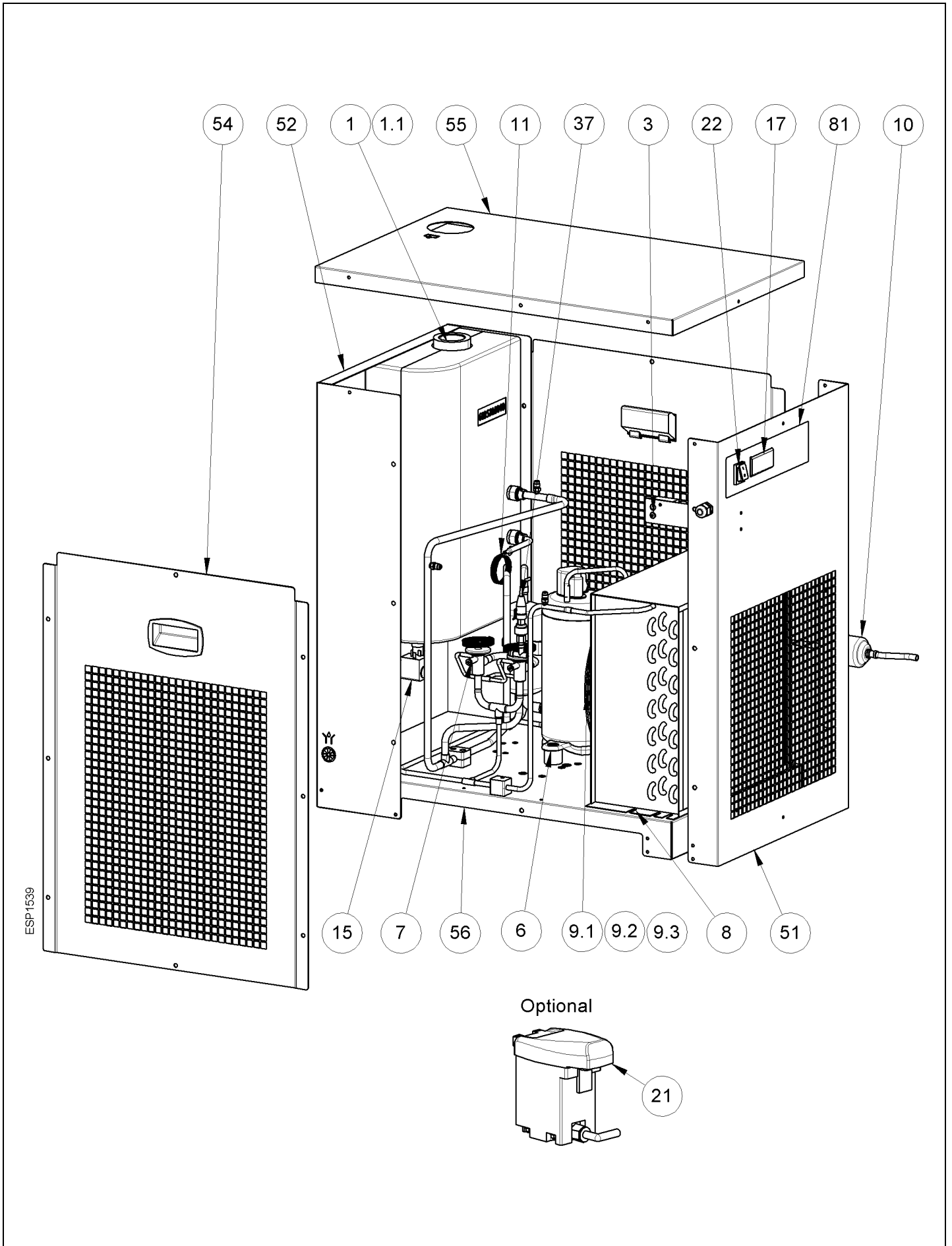


9.2.5 BTF 258

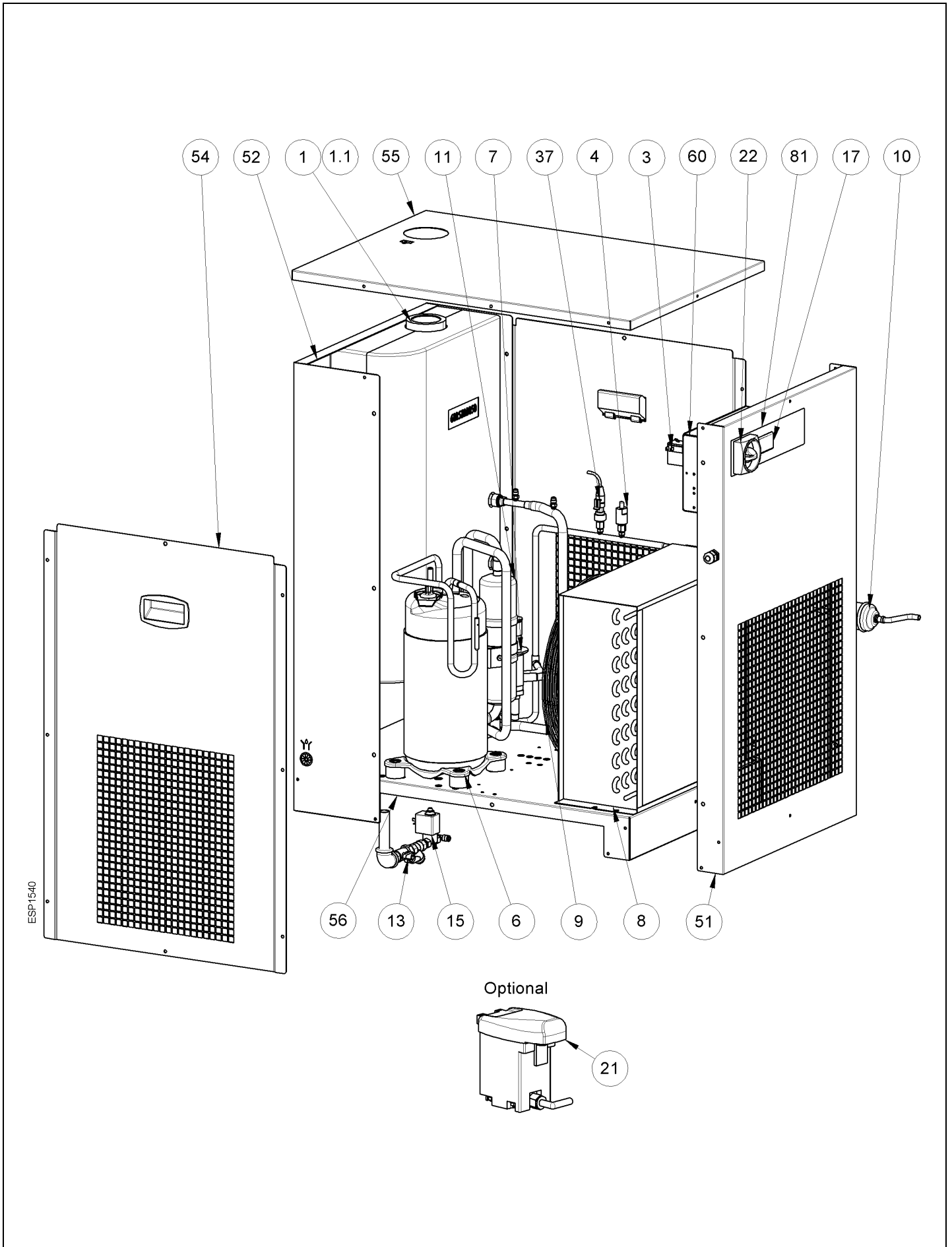




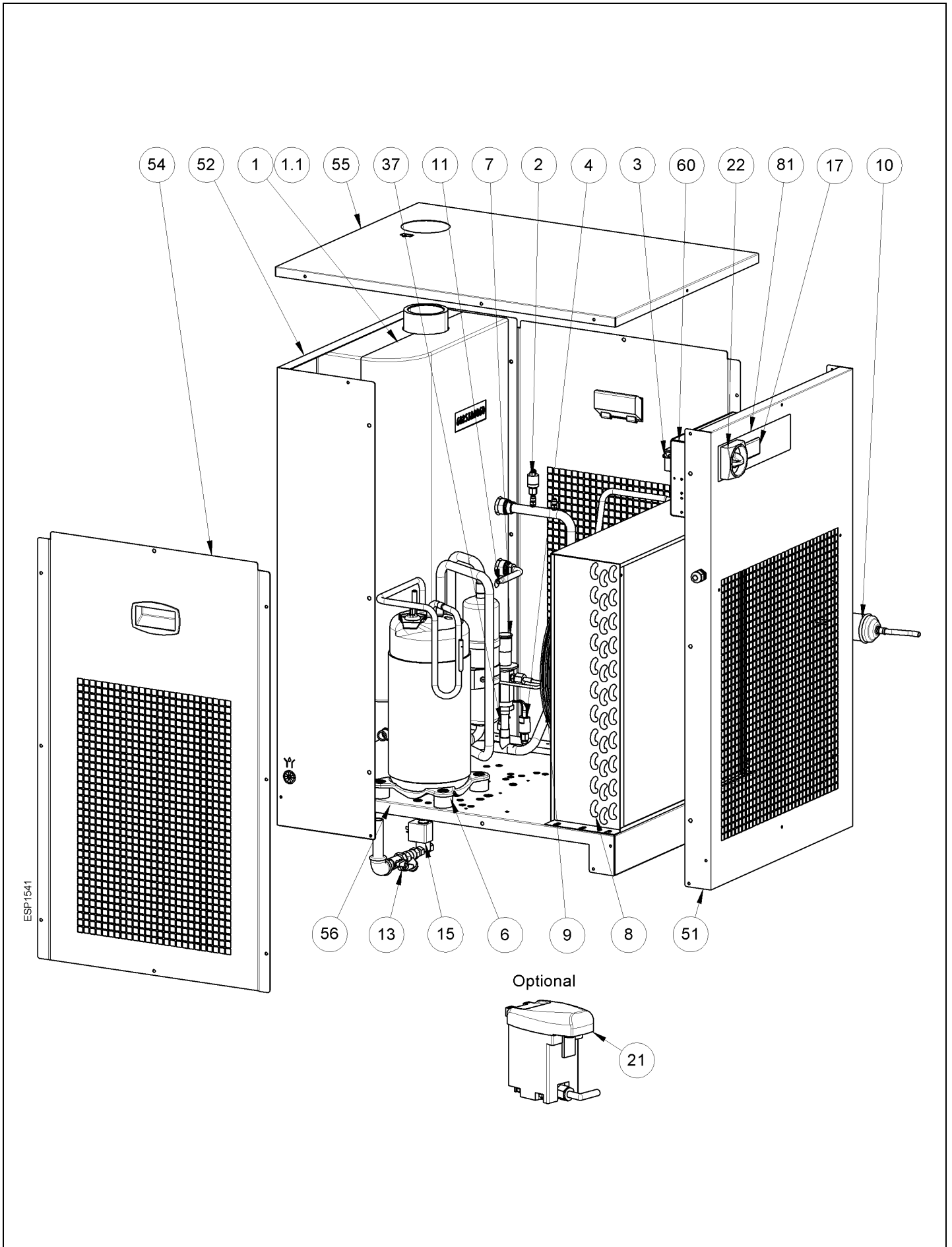
9.2.6 BTF 312 – 450



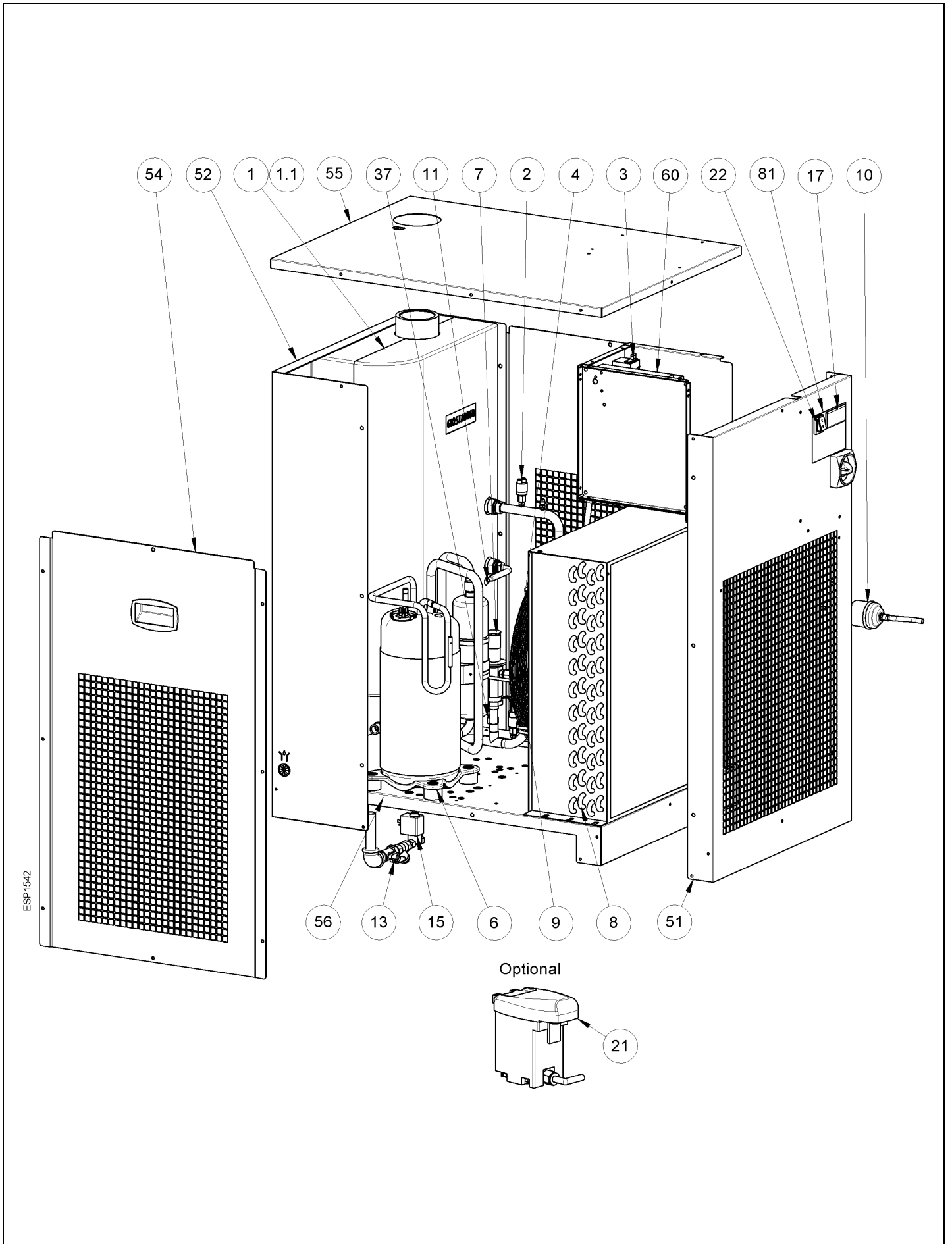
9.2.7 BTF 630 – 780



9.2.8 BTF 1008



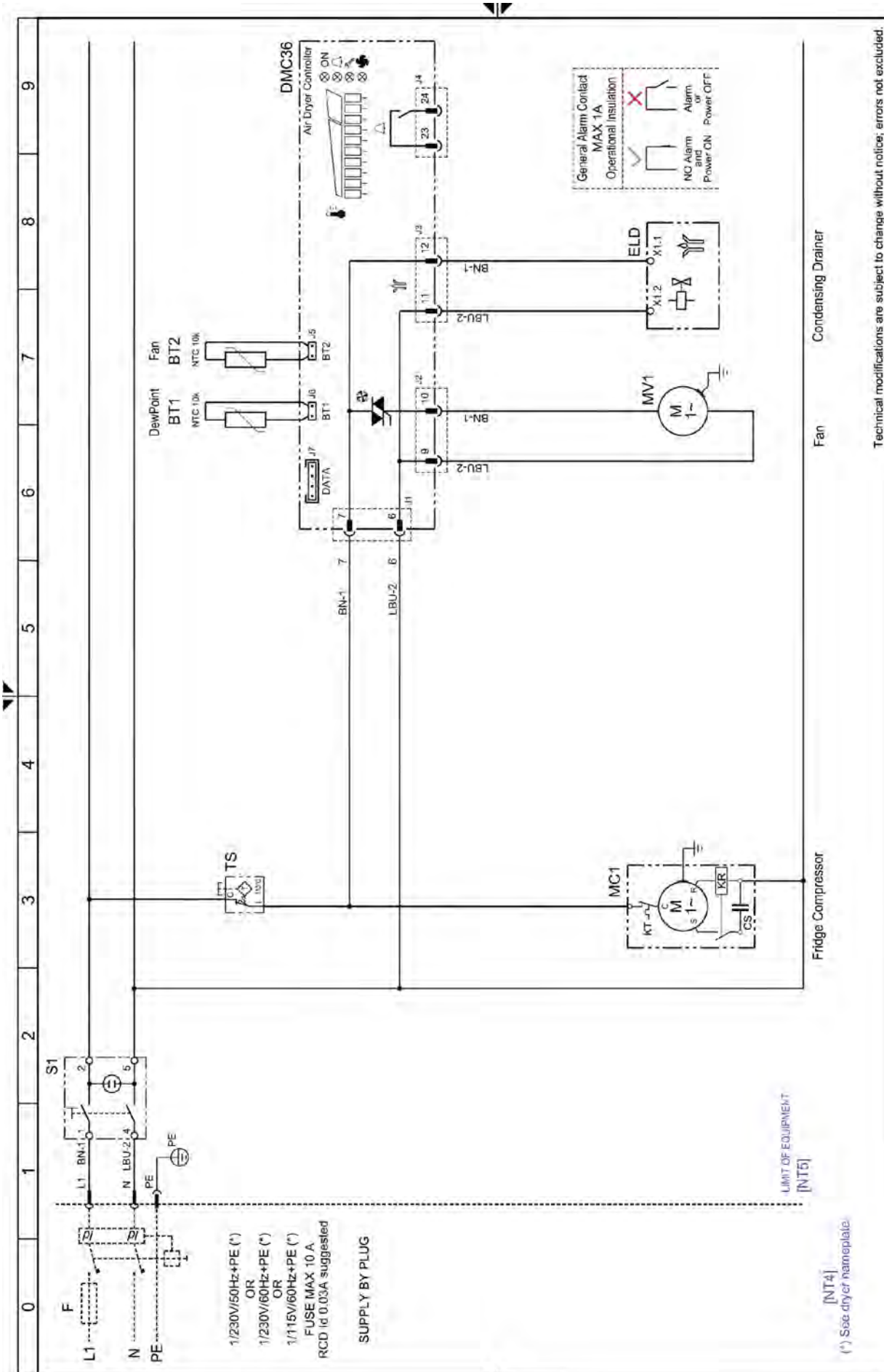
9.2.9 BTF 1140 – 1320



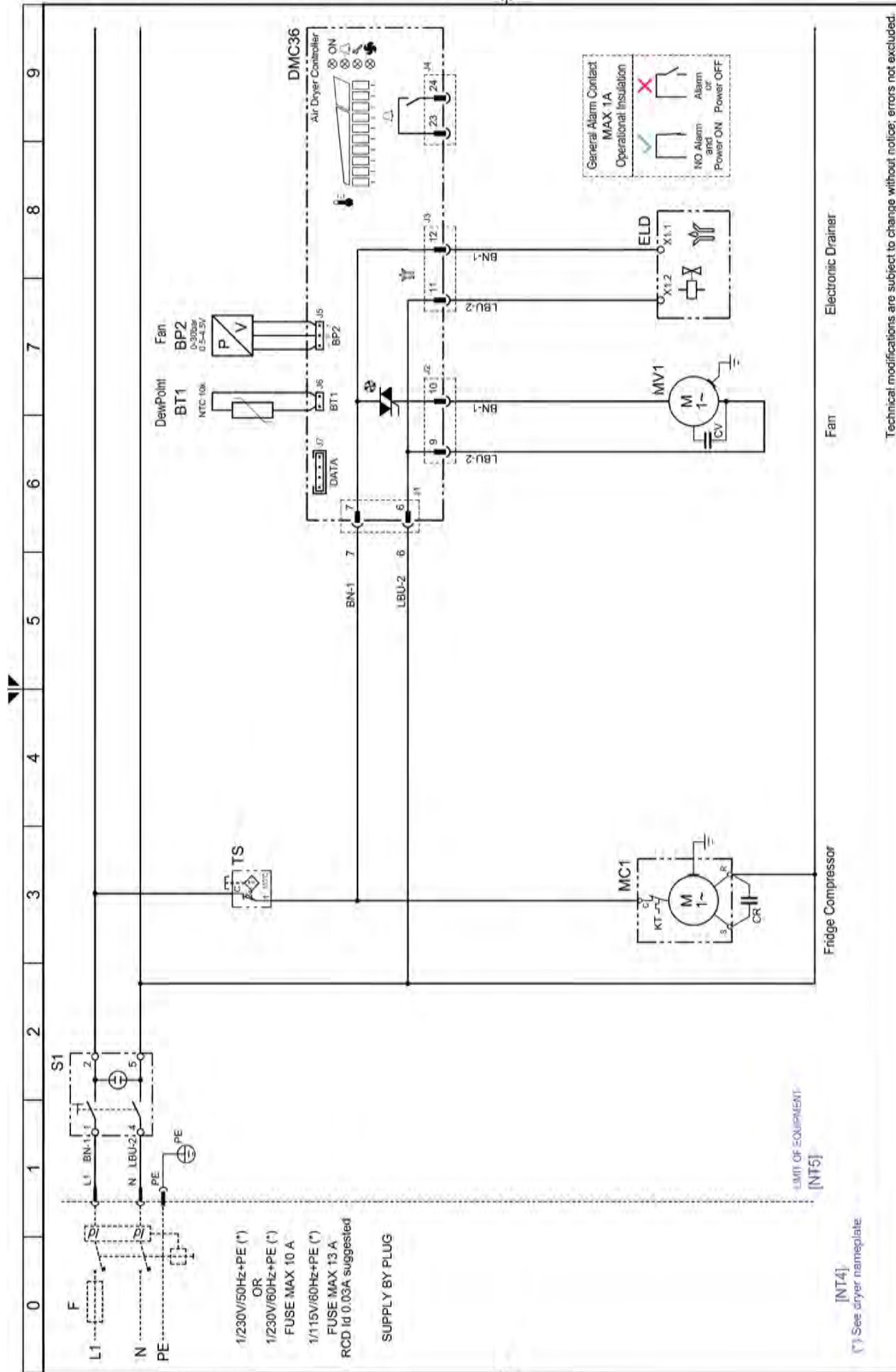
ESP1542

9.3 Electric diagrams

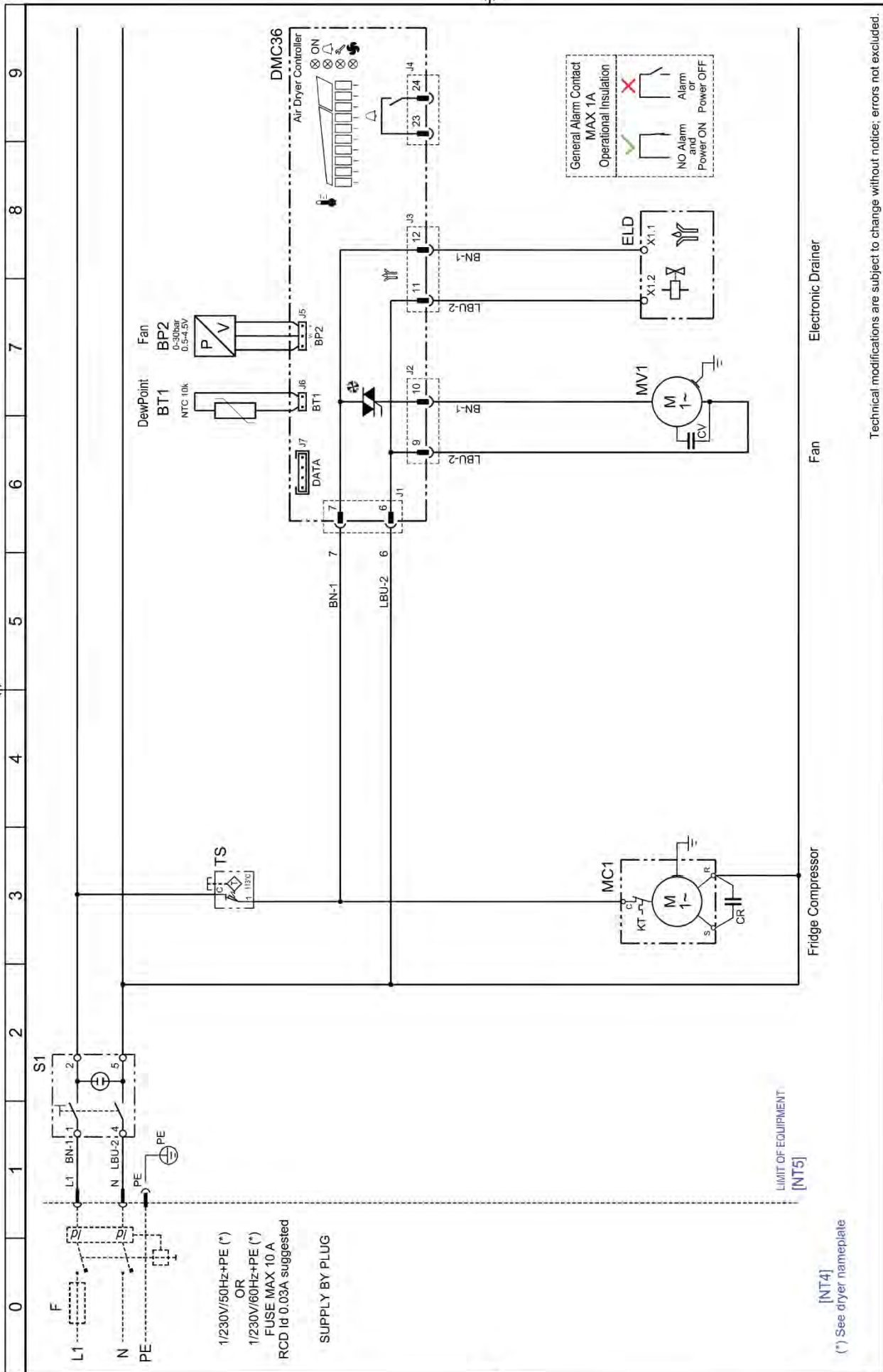
9.3.1 BTF 21 - 192



9.3.2 BTF 258 – 366



9.3.3 BTF 450



Technical modifications are subject to change without notice; errors not excluded.

Rev.

00

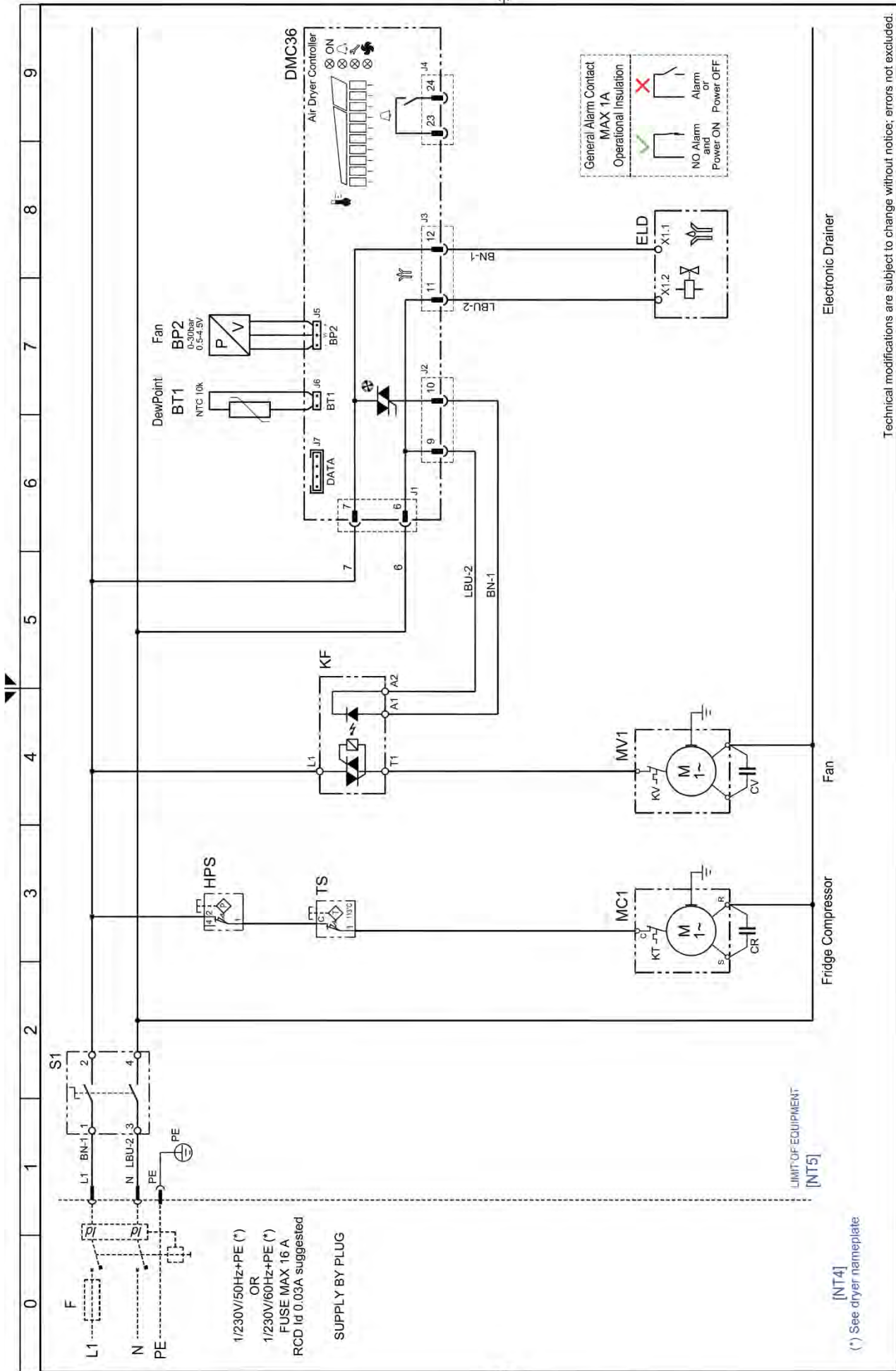
Drawing no. :

WD003\_V02

Note :

Sheet 01 of 01

9.3.4 BTF 630

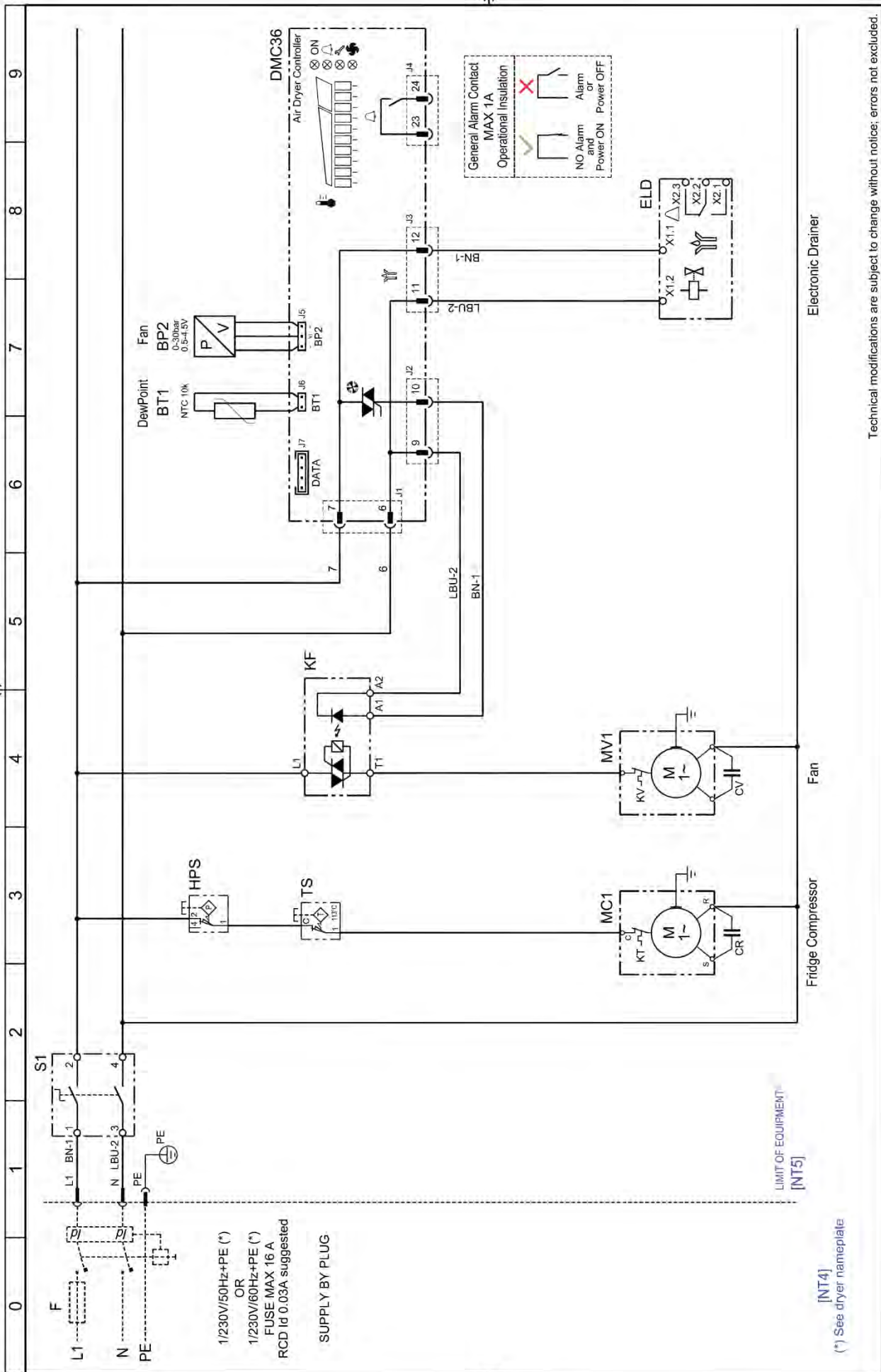


Technical modifications are subject to change without notice; errors not excluded.

Drawing no.: **WD004\_V02**  
 Rev.: **00**  
 Note: -  
 Sheet **01** of **01**



9.3.5 BTF 780



Technical modifications are subject to change without notice; errors not excluded.

Rev.

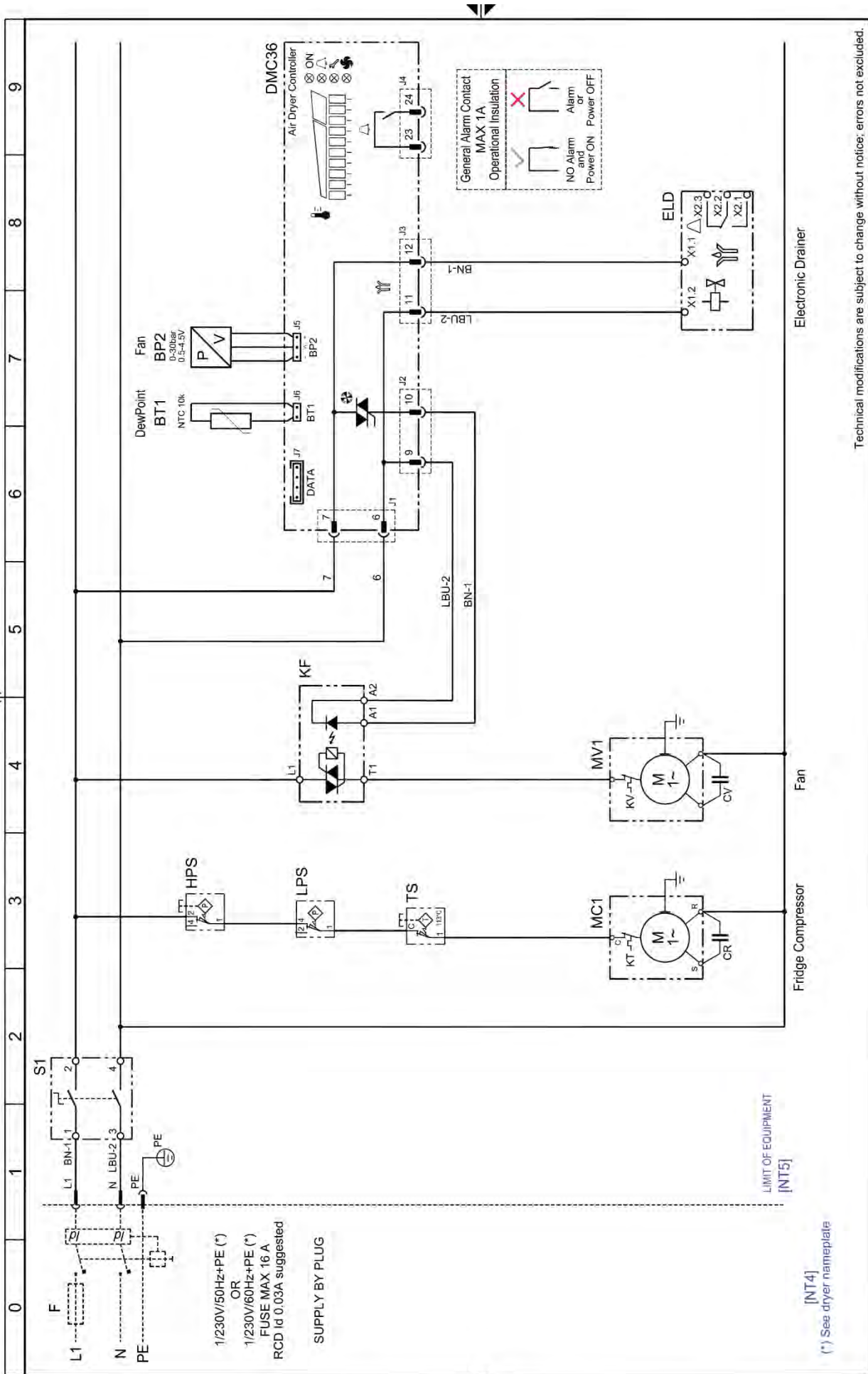
WD005\_V02

00

Note :

Sheet 01 of 01

9.3.6 BTF 1008



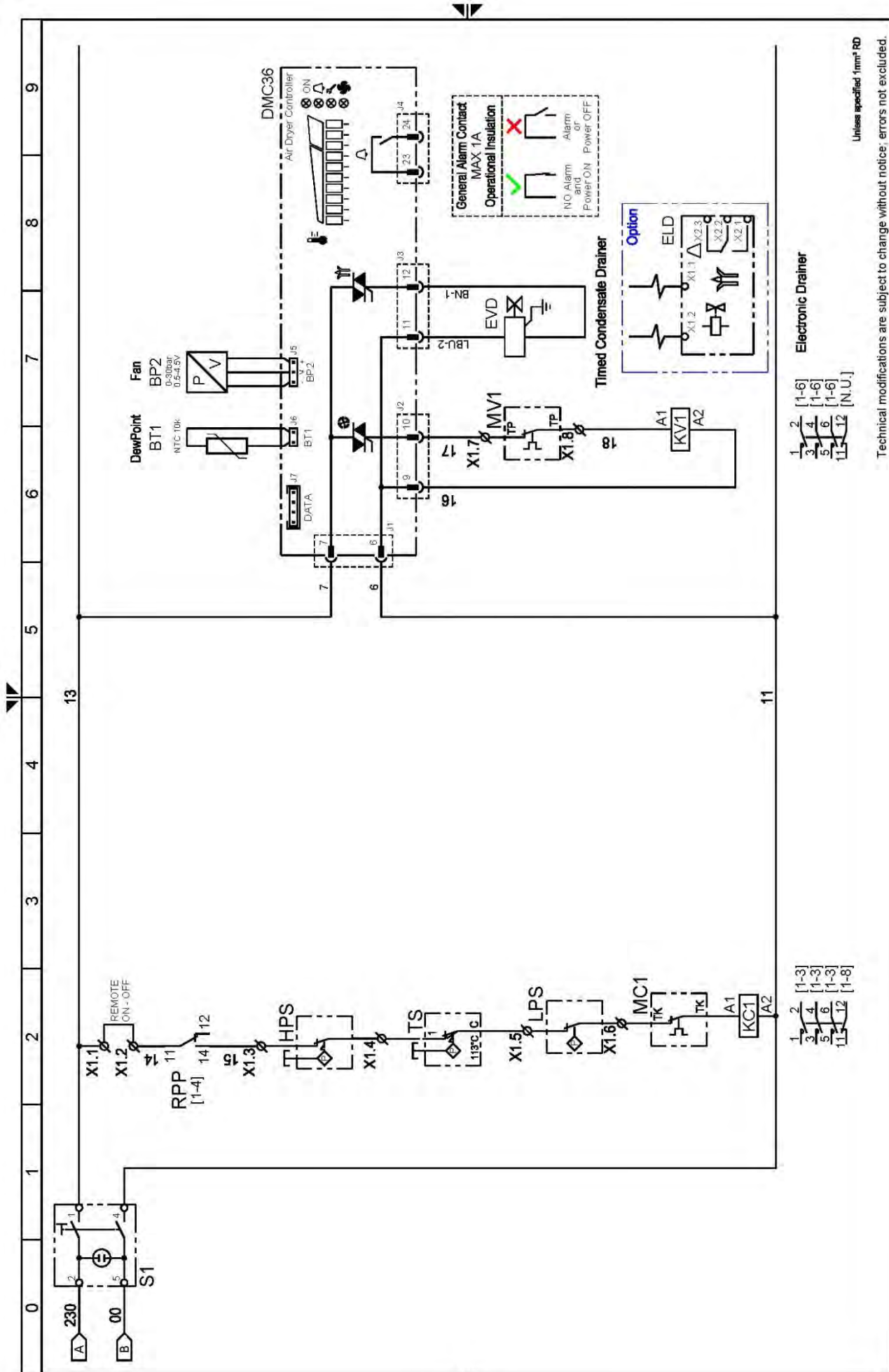
Technical modifications are subject to change without notice; errors not excluded.

Drawing no. : **WD006\_V02**  
 Rev. **00**

Note :  
 Sheet **01** of **01**



9.3.8 BTF 1140 – 1320 2/3









# **Blitz**<sup>®</sup>

**A DOVER<sup>™</sup> COMPANY**

## **BlitzRotary GmbH**

Hüfinger Straße 55  
D-78199 Bräunlingen  
Phone/Telefon +49.771.9233.0  
Fax/Telefax +49.771.9233.99  
info@blitzrotary.com  
www.blitzrotary.com