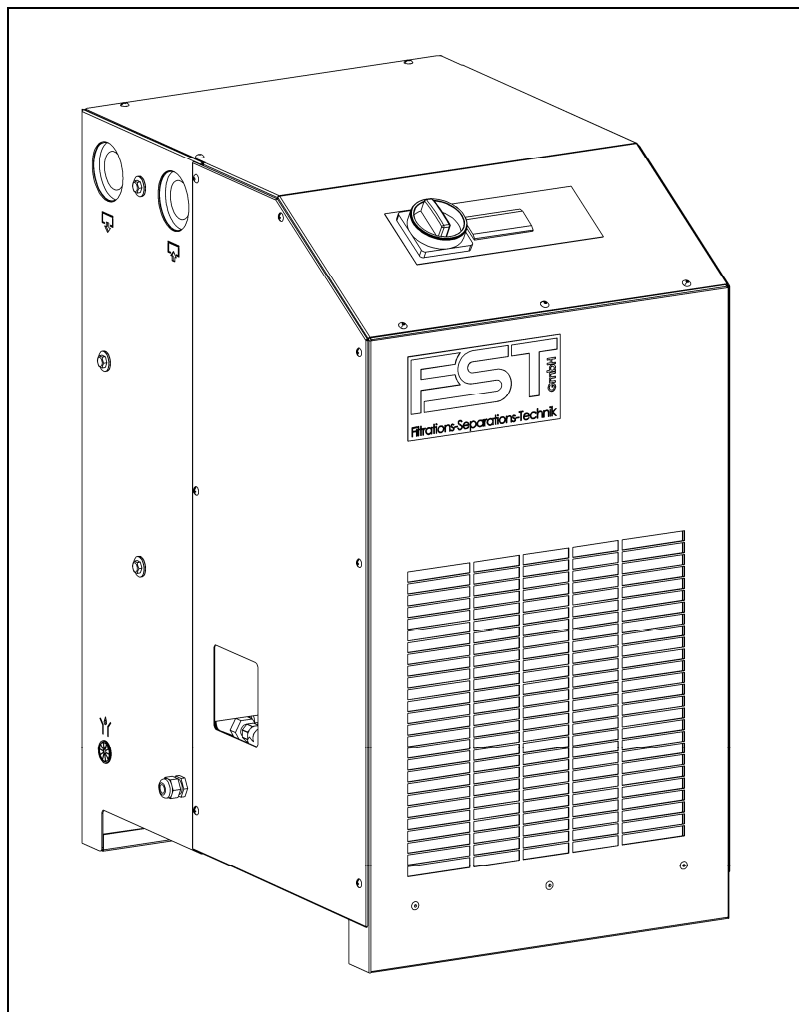




Filtrations-Separations-Technik

## OPERATING INSTRUCTION



O11300G00169  
06.0\_09.2017

**Compressed Air-Dryer**

# DFX 2 A – DFX 85 A

**Series DFX**

Type Code	Model	Type no.	
<b>Version air-cooled</b>	DFX 2	B10-230-xxx-01	1130 A
	DFX 4	B15-230-xxx-01	1131 A
	DFX 5	B15-230-xxx-01	1132 A
	DFX 7	B15-230-xxx-01	1133 A
	DFX 9	B15-230-xxx-01	1134 A
	DFX 11	B15-230-xxx-01	1135 A
	DFX 13	B25-230-xxx-01	1136 A
	DFX 15	B25-230-xxx-01	1137 A
	DFX 18	B32-230-xxx-01	1138 A
	DFX 23	B32-230-xxx-01	1139 A
	DFX 30	B32-230-xxx-01	1140 A
	DFX 36	B40-230-xxx-01	1141 A
	DFX 45	B40-230-xxx-01	1142 A
	DFX 55	B50-230-xxx-01	1143 A
	DFX 65	B50-230-xxx-01	1144 A
	DFX 75	B50-230-xxx-01	1145 A
DFX 85	B50-230-xxx-01	1146 A	



**Original instructions are in ENGLISH!**

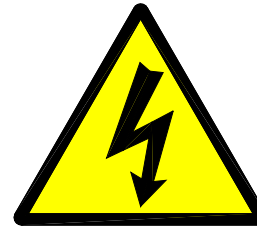
Technical modifications are subject to change without notice; errors not excluded.

Type code		Page
<b>Part 1</b>	<b>Important user information</b>	
	1.1 General Notes	EN_4
	1.2 Legal requirements for the user	EN_5
	1.3 Safety regulations	EN_6
	1.4 Refrigerant handling	EN_7

All safety notes in this operating instruction which may cause harm to personnel or equipment, when ignored, are marked by the following symbols:



General danger symbol



Electrical danger symbol

	1.5 First Aid	EN_8
	1.6 Disposal	EN_8
<b>Part 2</b>	<b>Installation</b>	
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	2.2 Requirements on the place of installation	EN_9
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<b>Part 6</b>	<b>Technical data</b>	
	6.1 Technical data	EN_26
<b>Part 7</b>	<b>Appendix legend</b>	
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<b>Appendix</b>		
	Apx 1 Units layout	
	Apx 2 Spare parts view	
	Apx 3 Wiring diagrams	
	Apx 4 PI diagram	

**1.1 General notes**

- This compressed air-dryer is called CA-dryer in the following.
- The Company does not accept responsibility if safety regulations are not met during handling, operation, maintenance and repair, even though these are not strictly stated in these operating instructions.
- We recommend the notice of these operating instructions verified by the operating personnel in writing (personnel file).
- We recommend translation of these operating instruction into native language of foreign workers.
- The usability and the life cycle of the compressed air-dryer as well as the avoidance of premature repairs depends on proper operation, maintenance, care and competent repair under consideration of these operating instructions.
- Hints to figures and locations are in brackets, e.g. **(Fig.3/7)**.
- Due to our position as suppliers of components we do not always know the final usage and total range of products' application. We constantly improve our products to the latest state of science and technology and therefore, we assume that our product are free from defects in sense of product liability. However, it cannot be excluded that during faulty operation in critical areas of application especially at danger to life and limb of persons involved, additionally safety measures may be necessary. Therefore, we request the user of our components / units, to ensure in his own interest, to inform us about the application of our products in order to initiate additional safety measures, if necessary.
- Keep this manual for future reference.

## 1.2 Legal requirements for the user

- |  |  |
|--|--|
| <b>1.2.1 Classification EC regulation 2014/68</b>              | <ul style="list-style-type: none"><li>• Due to classification into category 2 (type 1146A) according to EC-Pressure Equipment directive, the CA-Dryer are “systems to be monitored”.</li></ul>               |
| <b>1.2.2 Check of working materials</b>                        | <ul style="list-style-type: none"><li>• Before starting the CA-Dryer, the user has to check the working materials and record this accordingly.</li></ul>   |
| <b>1.2.3 Periodical checks</b>                                 | <ul style="list-style-type: none"><li>• The user of the CA-Dryer has to find out the test periods of the complete unit and the unit parts on base of a safety related technical evaluation.</li></ul>        |
| <b>1.2.4 Instruction EN 378-1</b>                              | <ul style="list-style-type: none"><li>• The user has to provide the instructions for the operators as well as their information of the used working media. A yearly instruction is mandatory.</li></ul>      |
| <b>1.2.5 Short Operating Instruction EN 378-2</b>              | <ul style="list-style-type: none"><li>• A „Short Operating Instruction“ must be prepared by the user and positioned next to the machine.</li></ul>   |
| <b>1.2.6 Documentation EN 378-4.3.1 EC regulation 842/2006</b> | <ul style="list-style-type: none"><li>• The user is committed to create a unit record of the refrigerating plant when required by regulation 517/2014. A guideline can be provided by the service.</li></ul> |
| <b>1.2.7 Maintenance EN 13 313</b>                             | <ul style="list-style-type: none"><li>• Maintenance has to be provided by qualified personnel only.</li></ul>  |

### 1.3 Safety Regulations

**Attention!**

The operator has to observe the national working-, operating- and safety regulations. Also existing internal factory regulations must be met.

Maintenance and repair work must only be carried out by specially trained personnel and, if necessary, under supervision of a person qualified for this work.

- Protective or safety devices must not be removed, modified or readjusted temporarily or permanently.
- User proper tools for maintenance and repair work only.
- Use original spare parts only.

**Attention!**

All maintenance and repair works must only be executed at stopped machine, disconnected power supply and pulled mains plug. Ensure that the CA-dryer cannot be switched on by mistake.

- Prior to dismounting a part under pressure disconnect the CA-dryer from all pressure sources and depressurize the CA-dryer.
- Do not use inflammable solvents for cleanings.
- Keep the environment absolutely clean during maintenance and repair works. Keep free of dirt by covering the parts and free openings with clean cloth, paper or adhesive tape.
- Never weld at the pressure vessel or modify it in any way.
- Ensure that no tools, loose parts or similar are left in the system.
- The casing of the CA-Dryer must not be stepped on.
- The CA-Dryer must not be used as deposit station.
- CA-Dryer must only be operated within the limits stated in the nameplate.
- Condensate drain system access opening is intended to manage the drain only (display visibility and test button) : a deeper access inside the CA-Dryer may cause injuries due to refrigerant hot piping.

#### 1.4 Refrigerant handling

- Wear eye protection and protective gloves.
- Avoid contact of liquid refrigerants with your skin (frostbite).
- Do not inhale refrigerant vapours.
- To avoid higher concentrations, all work rooms must be ventilated very well. The opening of windows and doors may not be sufficient, so an exhausting system must be used directly at the supply point or near the floor.
- Do not smoke, because fire might decompose the refrigerant. The resulting substances are toxic and must not be inhaled.
- Do not have refrigerants escaped during filling or repair work. Cover with tape.
- Leave the room immediately and only enter after the room has been sufficiently ventilated when refrigerant concentrations (e.g. pipe line leakages) appear suddenly.
- Execute welding and soldering works on refrigerating systems in well ventilated rooms only. Refrigerants will be decomposed in flames as well as in electrical arcs.
- The resulting decomposition products are toxic.
- Before welding and soldering at refrigerating systems, the refrigerant must be removed.
- A stinking smell points to decomposition of refrigerant due to overheating:
  - leave room immediately;
  - ventilate room very well.

##### 1.4.1 Refrigerant charging and discharging

- refrigerant charging and discharging operations shall be made by qualified personnel only.
- Do not throw out refrigerant in the environment during discharge operation. Use proper refrigerant recovery system.
- In case of refrigerant charging requirement, use only refrigerant type and quantity as indicated in the CA-Dryer nameplate.

##### 1.4.2 Refrigerant characteristics

Refrigerant	Chemical formula	TLV	GWP
R134a – HFC	CH <sub>2</sub> FCF <sub>3</sub>	1000 ppm	1430
R407C – HFC	R32/125/134a (23/25/52) CHF <sub>2</sub> CF <sub>3</sub> /CH <sub>2</sub> F <sub>2</sub> /CH <sub>2</sub> FCF <sub>3</sub>	1000 ppm	1773.85

**1.5 First aid**

- 1.5.1 General notes:**
- Immediately bring casualty into the fresh air or into a well ventilated room.
  - Assistants must pay attention to self-protection!
  - Take off contaminated clothes.
  - Never leave the casualty unattended!
  - **CALL THE DOCTOR and inform him that accident has been caused by refrigerants, as to be read on the name plate!**
- 1.5.2 After inhaling:**
- Bring casualty into the fresh air, keep him warm, and let him relax.
  - At breathlessness: Oxygene therapie
  - At apnoea: Resuscitation
  - Mouth-to-nose resuscitation, mouth-to-mouth resuscitation or with equipment.
  - Medical treatment necessary
- 1.5.3 After skin contact:**
- At skin contact, clean with water and soap immediately.
  - After contact with the fluid, undercooled skin areas must be cooled with warm (not hot) water.
- 1.5.4 After eye contact:**
- Flush well opened eye with running water for at least 10 minutes.
  - Contact doctor.
- 1.5.5 Notes for the doctor:**
- Inform doctor about the used refrigerant.
  - After inhalation, deep breathing of a corticoid emulsive dosing aerosol (e.g. Ventolair) as soon as possible.
  - Prohibition of using adrenergic drugs.
  - Prophylactic pulmonary edema after inhalation of decomposition products / fire gases
- 1.6 Disposal**
- When disposing of used devices, pay attention to oil and refrigerant in the hermetical sealed refrigerating circuit of CA-dryers. Therefore, before dismounting, these operation media must be disposed by a special company.
  - The used materials are listed on the recycling label inside the CA-dryer.

**Attention!**

Do not dispose waste oil into the environment. Do not mix with household rubbish and do not burn it unauthorised plants.

- The escape of refrigerant into the atmosphere must be prevented by appropriate measures.



- 2.1 Transportation** Transportation has to be carried out in the normal operating position of the CA-dryer.  
For a short time an inclined position of 45° is allowed.  
Handle with care. Heavy blows could cause irreparable damage.
- 2.2 Requirements on the place of installation** At the site of installation, the CA-dryer can be installed without anchorage or special foundation at the location desired.  
The CA-dryer is provided for an ambient temperature of 25 °C.

**Attention!**

To avoid corrosion on components of the CA-dryer the compressed and ambient air must be free of aggressive parts.  
The CA-dryer are provided for inside mounting.  
Deviating conditions require the consultation of the manufacturer.

To prevent the condensate from freezing the room temperature must not drop below +2 °C.

**Attention!**

At different ambient conditions pay attention to the layout data!

**2.3 Installation (mounting)**

The CA-dryer must be installed that accessibility to the front panel is ensured. Furthermore leave space for service purposes on both sides of the CA-dryer (fig.2.3a).

Wall mounting is possible with types 1130A-1137A (fig.2.3b).

Fig. 2.3a *Installation of CA-dryer*

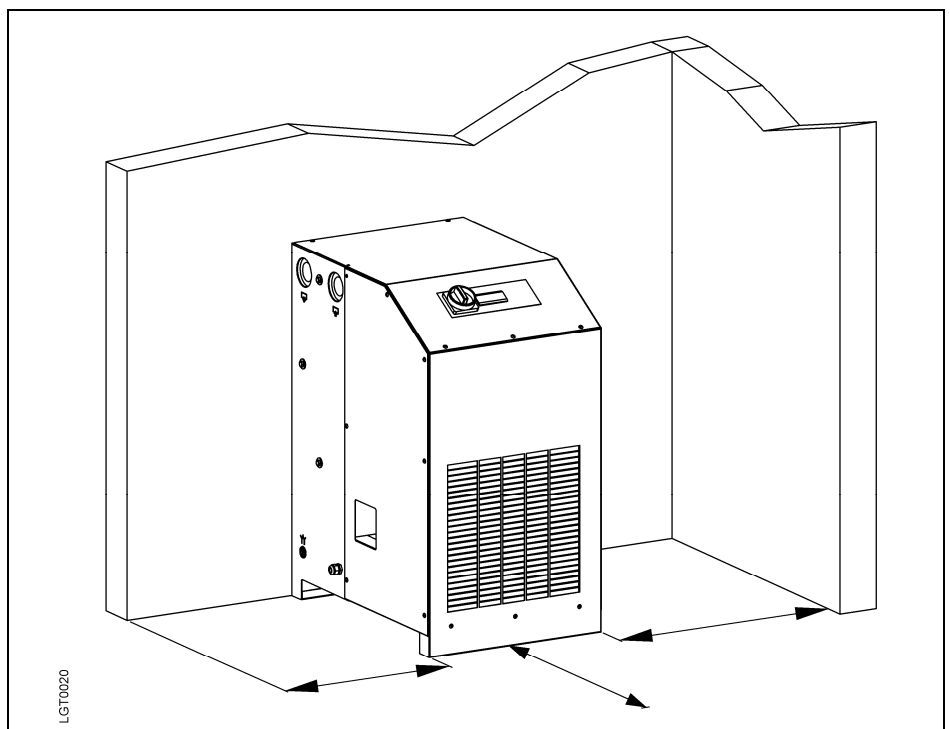
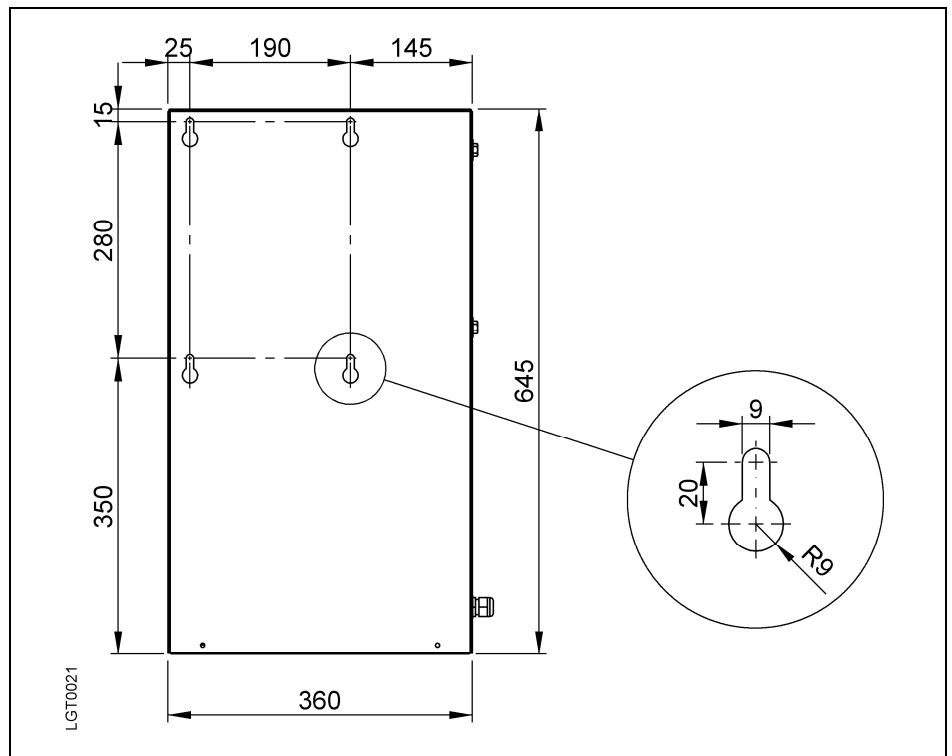


Fig. 2.3b Preparation wall mounting



### 2.3.1 Version air cooled

The cooling air is sucked in by the refrigerant condenser (Apx 1/3) and discharged at the right side (Apx 1/4). Both areas must be kept free and must not be obstructed.

### 2.4 Compressed air connection

The connection must be executed acc. to marking at the CA-dryer (Apx 1/1 + 1/2). For service purposes the installation of a bypass line is recommended (additional equipment).



#### Attention!

Before mounting the CA-dryer, welding residual, rust or other pollution must be removed from the pipelines to be connected. If pollution cannot be excluded, proper filter system must be installed.

The compressed air pipes must be installed stress-free.

Expansion joints are recommended in case of vibrations and pulsations.

CA-dryer must only be operated within the temperature and pressure limits stated on the nameplate.

Prior to use, the user must fit safety / pressure relief devices on the CA-system.

### 2.5 Electric connection

The CA-dryers are completely equipped and wired. They merely have to be connected to a power supply. The CA-dryer are to be protected by slow-blow fuses as defined in the wiring diagram.

**Operating voltage:** according to name plate data.

## 2.6 Connection condensate drain

A hose already pre-mounted at the condensate drain leads the condensate out of the CA-dryer (Apx 1/5). A connection by the costumer has to be carried out corresponding to the local conditions.



The CA-dryers separates water as well as oil from the compressed air. The water/oil mixture must not be led into the sewage. Water and oil must be separated by suitable separators (additional equipment).

A minimum operating pressure of 2 bar is required for safe operation.



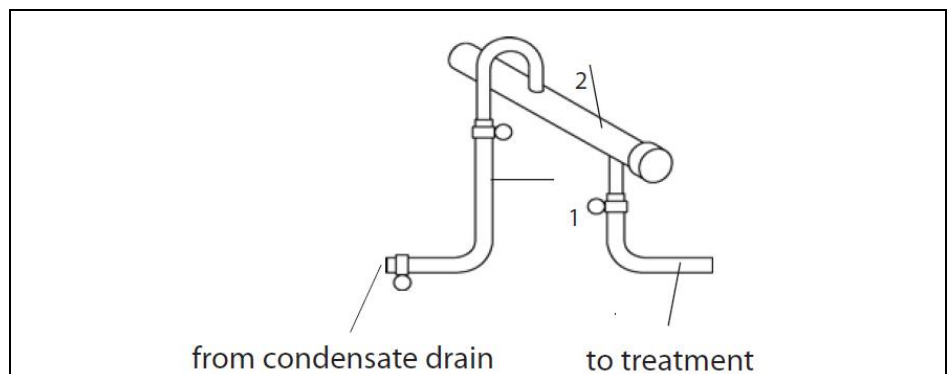
### Attention!

Route outflow so that persons or objects will not be struck by condensate (condensate outlet at operating pressure)!

### 2.6.1 Connection condensate draining

The condensate drain pipe (fig.2.6/1) may be fixed to the wall with a rising slope of maximum 5m. thereby the minimum operating pressure increases for 0,1 bar per meter. The collecting pipe (fig.2.6/2) has to have at least the cross-section of the condensate outlet.

Fig. 2.6 Connection condensate draining



- 3.1 **Designation** Refrigerating compressed air-dryer (CA-dryer).  
Version see type code (page 2).
- 3.2 **Intended use** Only compressed air will be dehumidified by the CA-dryer.
- 3.3 **Unit Layout** See Appendix Apx 1 for CA-dryer components which are accessible from outside.

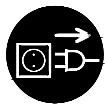
3.3.1 **Symbols**



Compressed air inlet



Compressed air outlet



Before maintenance works are to be executed at the CA-dryer, the unit must be disconnected from the power supply.



Risk of injury if the CA-dryer is not disconnected from the power supply because of a freely rotating fan blade.



The refrigerant compressor of the refrigeration system heats up during operation, so a risk of burn injuries is given at maintenance works

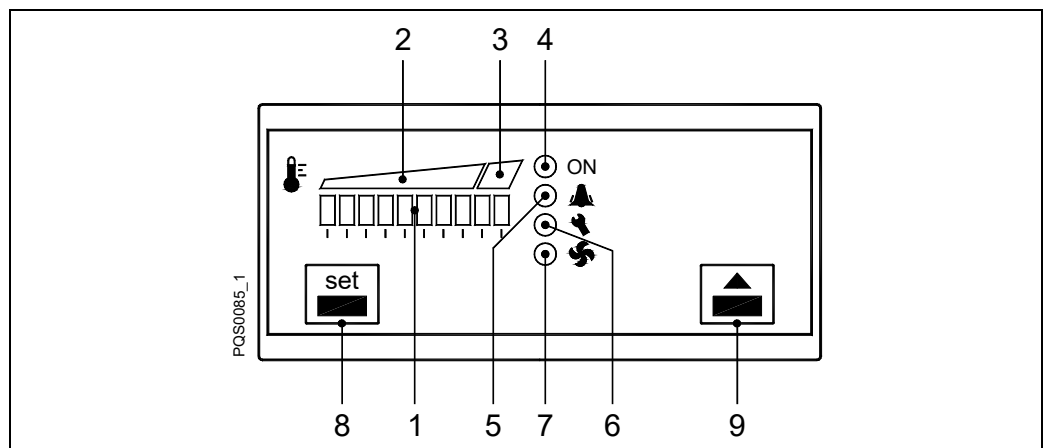


Condensate drain

3.4 **Electronic regulator**

The electronic regulator DDS7 is a controller specially designed for CA-dryers. It operates on the basis of the micro processors and performs three functions:  
 - Pressure dew point display  
 - Pressure dew point alarm  
 - Refrigerant condenser fan control

Fig. 3.4 Symbols electronic regulator



- 1 10x Led green : Pressure dew point indication
- 2 Green area : Pressure dew point normal
- 3 Red area : Pressure dew point high
- 4 Led green : CA-dryer on
- 5 Led red : ALARM active
- 6 Led yellow : DRAIN MAINTENANCE required
- 7 Led yellow : FAN - refrigerant condenser fan ON
- 8 Set key
- 9 Up key

- 3.5 Nominal power of CA-dryer** The nominal power of the CA-dryer mentioned in the technical data is related to a working pressure of 7 bar, a compressed air inlet temperature of 35 °C as well as an ambient temperature of 25 °C acc. to ISO 7183.  
Lower working pressure, higher compressed air inlet temperature and/or higher ambient temperatures overload the compressor which causes to an increased pressure dewpoint and the compressor can be stopped by internal safety devices. At essentially deviating operating conditions, contact the deliverer of the CA-dryer for support.
- 3.6 Principle of operation** The CA-dryer includes a refrigerant system cooling the compressed air flow. The steam saturation limit is lowered causing condensate to fall out, which is removed by the condensate drain.  
The higher the cooling temperature difference of the compressed air, the higher the amount of condensate.  
The lower the cooling temperature of compressed air, the lower the moisture content.  
The lower limit of the compressed air cooling results from the working principle of the CA-dryer, which is based on the moisture separation in liquid form.
- 3.7 Mode of operation**
- 3.7.1 Compressed air side** The compressed air precooled in the Aftercooler and saturated with moisture enters into the CA-dryer and is precooled in the first cooling stage, the air-to-air heat exchanger without additional energy. Cooling is carried out in counter flow to the already cooled air heated during this process.  
The cooling to the pressure dew point is performed in the second cooling stage, the refrigerant-to-air heat exchanger cooled by the refrigerant system installed. Subsequently, the cooled compressed air is reheated in the air-to-air heat exchanger as already described.
- 3.7.2 Refrigerant side** The refrigerant is injected into the refrigerant-to-air heat exchanger where it evaporates, thereby the compressed air is cooled. The hot gas by-pass valve regulates the cooling temperature and keeps the pressure dew point constant in nearly all capacity stages. The refrigerant compressed by the motor compressor is condensed within the condenser and is available for the evaporation again.
- 3.7.3 Pressure dew point control** Any compressed air dryer can be operated under partial load due to lower compressed air flow or lower compressed air inlet temperature in the range of 0 to 100% load in permanent operation.

### 3.8 Condensate draining

The condensate drain (fig.3.8a) automatically drains the condensate. A minimum pressure of 2 bar is required for safe operation.

#### 3.8.1 Condensate drain sensor-controlled

Once the container has filled with condensate, so that the capacitive level sensor emits a signal, the internal solenoid valve opens and the condensate is forced by the working pressure into the discharge pipe.

The condensate drain electronic system ensures the closing of the outlet opening before any compressed air can escape.

Fig. 3.8a Condensate drain General

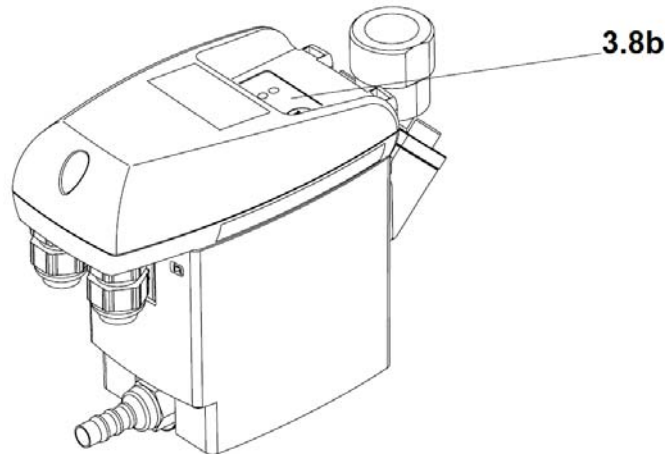
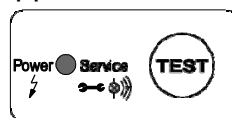


Fig. 3.8b Condensate drain Operation panel

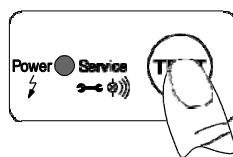
#### Type 1130A-1144A

The power LED is lit up green when operating voltage is being applied.



- Ready for operation. Power On

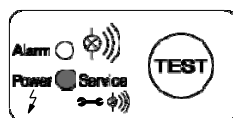
If the condensate discharge is not functioning properly, the valve will keep opening (about every 2 seconds) so as to clear the fault automatically, if possible.



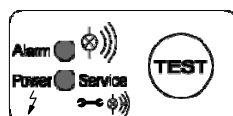
- Test valve function (manual drainage). Press button for approx. 2 seconds. In response to longer pressing, the valve will keep opening. Do not use this function for continuous draining!

#### Type 1145A-1146A

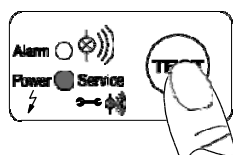
The operating states are indicated by two LED's.



- Ready for operation. Power on.



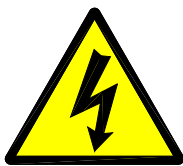
- Malfunction / Alarm.



- Test of valve function and manual drainage: briefly press button.  
- Press button for >1 minute to test the alarm function.

## 4.1 Commissioning

After installation the CA-dryer is supplied with power via the power cable or by operating the main switch (Apx 1/6).



### Attention!

Before operating the operation switch (Apx 1/6), a waiting period of at least 6 hours is absolutely necessary.

## 4.2 Starting

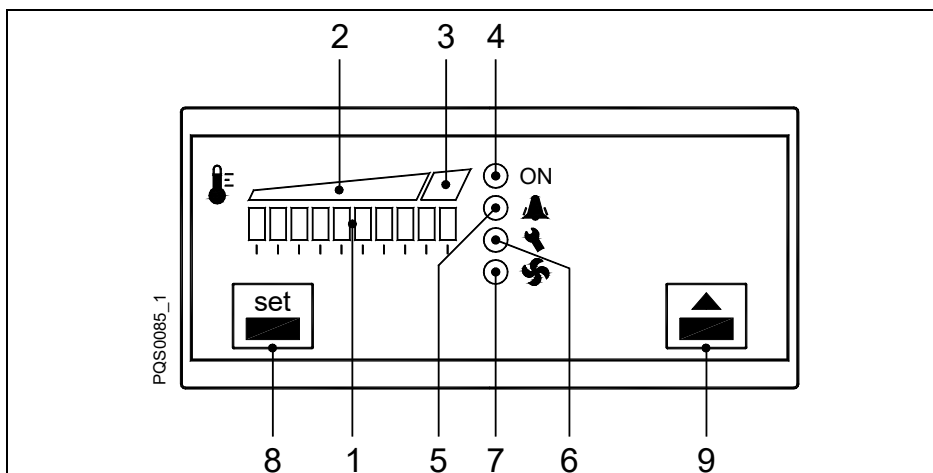
The CA-dryer is switched on via operation switch (Apx 1/6). After approx. 5 minutes the compressed air admission is possible by connecting the compressed air compressor. The CA-dryer is designed for continuous operation and may remain switched on during periods of no load, as it adapts to the required performance automatically.

## 4.3 Operation

Operation is indicated by the led "ON" of the electronic regulator (fig.4.3/4)

The pressure dew point indication (fig.4.3/1) is showing the pressure dew point reached by the CA-dryer.

### 4.3.1 Electronic regulator - Changing factory setting Fig.4.3



1. Keep pressed SET key (8) for 2 seconds to change from display into setup mode, then release it.
2. First data is ALARM<sub>ON</sub>, shortly press SET key (8) to go to data DRAIN<sub>MAINTENANCE</sub>, shortly press SET key (8) to return to data ALARM<sub>ON</sub>.
3. In order to adjust actual data, keep pressed SET key (8) and press UP key (9).
4. During the setup, led flashing will identify which data is displayed :
  - led ON (4) and ALARM (5) flashing = ALARM<sub>ON</sub> data
  - led ON (4) and DRAIN MAINTENANCE(6) flashing = DRAIN<sub>MAINTENANCE</sub> data
5. Setup exit is automatic after 2 minutes or by pressing UP key (9).

- 4.3.2 Electronic regulator**  
**- Data range**
- ALARM<sub>ON</sub>**  
 EIC3 temperature too high setpoint (ALARM<sub>ON</sub>) is adjustable in the range +2 ... 20 °C (factory setting 18°C), resolution 2°K, hysteresis -2°K.  
 (ie : ALARM<sub>ON</sub> = 18°C; Alarm is active with EIC3 temperature ≥18°C for at least 5 minutes; Alarm condition resets immediately with EIC3 temperature <16°C).
- DRAIN<sub>MAINTENANCE</sub>**  
 It defines the action of alarm contact when drain maintenance time is expired (factory setting 8000 hours).
- 1st led of dew point indication bar ON = alarm contact switches at expiring of maintenance time (factory setting).
  - 2nd led of dew point indication bar ON = alarm contact does not switch at expiring of maintenance time.
- 4.3.3 Electronic regulator**  
**- Hour counter**
- This function shows the total operating hours of the dryer through the dew point indication bar (max displayable value 99900 hours).
- Keep pressed both SET key (8) and UP key (9) for 5 seconds, then release them.
  - Led ON (4) 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 : n.0 leds lit → 1st digit =0)
  - Press UP key (9)
  - Led ALARM (5) 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 UP key (9)
  - Led DRAIN MAINTENANCE (6) 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 UP key (9) repeatedly to scroll the displaying of 3 digits again.
  - The exit of hour counter is automatic after 30 seconds or by pressing SET key (8).



- 4.3.4 Electronic regulator - Drain maintenance timer** This function shows the elapsed time from last reset of timer dedicated to drain maintenance (factory setting 8000 hours). The elapsed time is shown through the dew point indication bar.
- Keep pressed UP key (9)
  - Led DRAIN MAINTENANCE (6) is lit and a certain numbers of leds of dew point indication bar are light up. Each led define a range of elapsed hours from last reset.
  - 1st led = 0...800 hours
  - 2nd led = 801...1600 hours
  - 3rd led = 1601...2400 hours
  - 4th led = 2401...3200 hours
  - 5th led = 3201...4000 hours
  - 6th led = 4001...4800 hours
  - 7th led = 4801...5600 hours
  - 8th led = 5601...6400 hours
  - 9th led = 6401...7200 hours
  - 10th led = 7201...8000 hours
  - 10th led flashing = >8001 hours
- ie : 5500 hours are passed from last reset of timer, leds 1...7 are lit.
- Release UP key (9) to return to dew point displaying.
- After expiring time (8000 hours) leds 1...10 are lit and DRAIN MAINTENANCE is triggered. Contact the SERVICE CENTER for reset.
- 4.4 Stopping** At standstill periods, the CA-dryer is switched off with the operation switch (Apx 1/6). For longer standstill periods or service works, the CA-dryer is switched off by pulling the power plug (Apx 1/8).

## 5.1 Maintenance

**Attention!**

Prior to any maintenance works all safety regulations for electrical systems and units must be observed (see also part 1).

Maintenance intervals highly depend on the model of operation and the ambient conditions on site, the intervals below are only to be understood as general recommendations.

## 5.1.1 Daily maintenance

- a) Check function of condensate drain.  
Check, if water is drained.  
Test valve function (manual drainage):  
Press button for approx. 2 seconds.  
In response to longer pressing, the valve will keep opening.  
Do not use this function for continuous draining!
- b) Monitor pressure dew point (fig.3.4/1). In case of differences to normal operation (see 5.2.2, 5.2.3).
- c) Verify the refrigerant condenser for cleanliness.

## 5.1.2 Weekly maintenance

Inspection and cleaning of condensate draining system if necessary.

## 5.1.3 Yearly maintenance or every 8000 hours (which comes first)

The led "DRAIN MAINTENANCE" is lit (fig.4.3/6) : replace drain service kit, then contact the SERVICE CENTER to reset this warning.

If the service kit replacement occurs before led signalling (fig.4.3/6), contact the SERVICE CENTER to reset the timer of drain maintenance.

For further information see separate instruction in the service kit.

## 5.1.4 Periodic checks at refrigerant system

Circuits with refrigerant charge exceeding 5 Tons of CO<sub>2</sub> equivalent (as stated in the nameplate) are subject to periodic leak tightness check as provided by EU regulation 517/2014.

## 5.1.5 Periodic checks at pressure vessels

CA-Dryer type 1146A is included into the pressure vessel guideline category II, fluid group 2 and has a maximum pressure of 14 bar.

Periodic checks must be done according to National legislations and the determinations of the user.

**Attention!**

Maintenance work must be performed at the depressurized condensate drain only. For this purpose, the installation of a bypass line is recommended.

## 5.2 Trouble shooting

	Symptom	Cause ⇒ Remedy
5.2.1	No Function	<ol style="list-style-type: none"> <li>1. Check and ensure power supply if necessary.</li> <li>2. If the power supply is ok, contact service or send CA-dryer to the manufacturer.</li> </ol>
5.2.2	Pressure dew point too high	<ol style="list-style-type: none"> <li>1. Temporary overload of the CA-dryer due to non-uniform compressed air consumption ⇒ check CA-dryer's capacity (see 3.4).</li> <li>2. Ambient temperature too high or the room aeration is insufficient ⇒ reduce temperature and/or provide proper ventilation.</li> <li>3. CA-dryer volume flow too high ⇒ reduce volume flow; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.</li> <li>4. EIC3 dew point sensor doesn't detect the temperature properly ⇒ ensure the sensor is pushed into the bottom of probe well or EIC3 dew point sensor need to be replaced.</li> <li>5. Refrigerant condenser fan is never running ⇒ see 5.2.6.</li> <li>6. Refrigerant condenser is polluted ⇒ clean condenser.</li> <li>7. Hot gas by-pass valve is out of setting ⇒ contact service.</li> <li>8. Leak in the refrigerating fluid circuit ⇒ contact service.</li> </ol>
5.2.3	Pressure dew point too low	<ol style="list-style-type: none"> <li>1. Ambient temperature is too low ⇒ restore normal condition.</li> <li>2. Refrigerant condenser fan is always on and electronic regulator's FAN led is flashing ⇒ see 5.2.10.2.</li> <li>3. Switch off CA-dryer and maintain compressed air flow. After approx. half an hour, the pressure dew point will return to normal value. Restart the unit. If the pressure dew point decrease again contact service.</li> </ol>
5.2.4	Water in compressed air system	<ol style="list-style-type: none"> <li>1. Condensate drain is not drained sufficiently ⇒ see 5.2.11.</li> <li>2. CA-operating pressure too low ⇒ increase operating pressure; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.</li> <li>3. Temporary overload of the CA-dryer due to non-uniform compressed air consumption ⇒ check CA-dryer's capacity (see 3.4).</li> <li>4. CA-dryer volume flow too high ⇒ reduce volume flow; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.</li> <li>5. CA-inlet temperature too high ⇒ restore normal conditions.</li> <li>6. <b>(Only with installed bypass line)</b> Bypass valve is open ⇒ close bypass valve.</li> <li>7. <b>(Only with installed bypass line)</b> Bypass valve is leaking ⇒ seal or replace bypass valve.</li> </ol>

**5.2.5 Stopping CA-dryer during operation**

1. Compressor's internal overload protection (klixon) is tripped ⇒ eliminate cause of trouble (see 3.4) or contact service. CA-dryer will restart automatically after compressor has cooled down.

**Note:** the immediate restarting of the unit is not possible because the compressor's overload protection requires a minimum time to cool down to an acceptable operating temperature.

2. Compressor or starting device is defective ⇒ contact service.
3. CA-dryer volume flow too high ⇒ reduce volume flow; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
4. CA-inlet temperature too high ⇒ restore normal conditions.
5. Ambient temperature too high or the room aeration is insufficient ⇒ Reduce temperature or provide proper ventilation.
6. Refrigerant condenser fan is never running ⇒ see 5.2.6.
7. Refrigerant condenser is polluted ⇒ clean condenser.
8. CA-operating pressure too low ⇒ increase operating pressure; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
9. **(type 1142A-1146A)** Safety thermo-switch FTS is tripped ⇒ see 5.2.8.
10. **(type 1143A-1146A)** Safety high pressure-switch FPA is tripped ⇒ see 5.2.9.

**5.2.6 Refrigerant condenser fan is never running**

1. Check and ensure electric wiring.
2. Fan's internal overload protection is tripped ⇒ eliminate cause of trouble (see 3.4) or contact service. Fan will restart automatically after it has cooled down.
3. **(type 1130A-1142A)** Electronic regulator is defective ⇒ contact service.
4. **(type 1143A-1146A)** Electronic regulator and / or relay KF is defective ⇒ contact service.
5. Leak in the refrigerating fluid circuit ⇒ contact service.

**5.2.7 High differential pressure at CA-side**

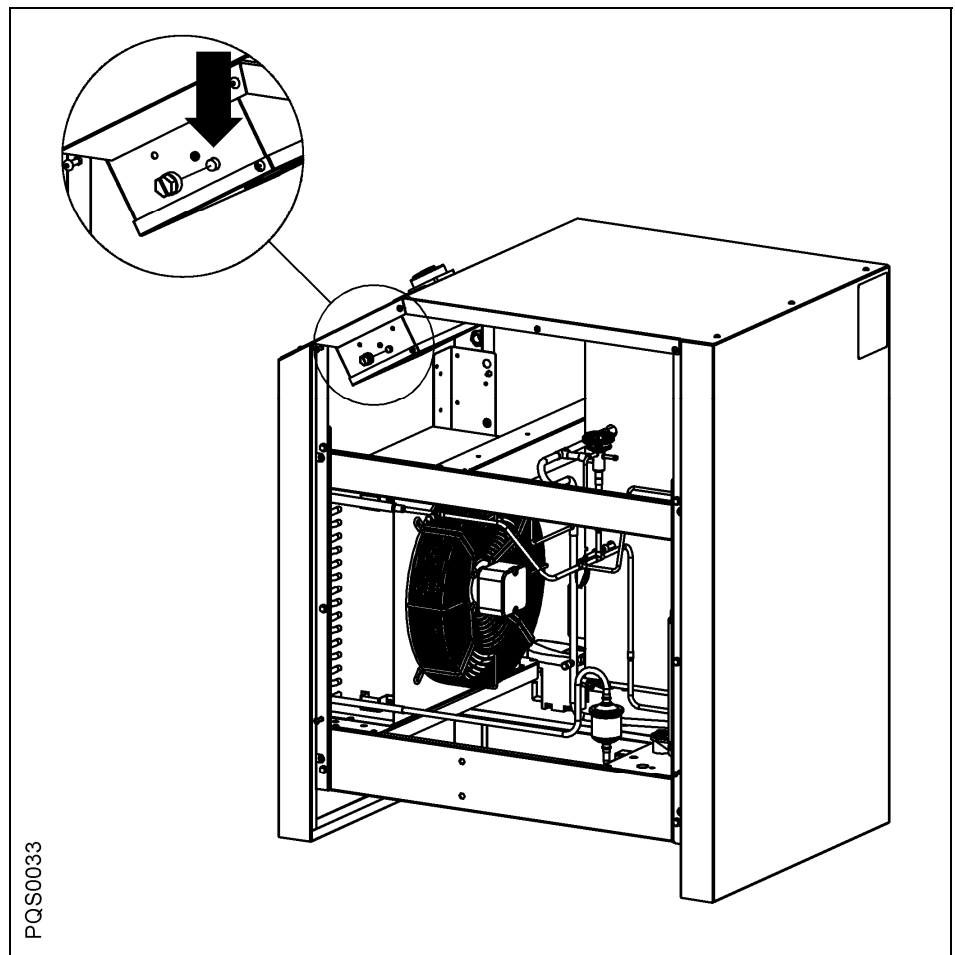
1. CA-dryer volume flow too high ⇒ reduce volume flow; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
2. CA-operating pressure too low ⇒ increase operating pressure; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
3. Pressure dew point too low ⇒ see 5.2.3.
4. Condensate drain is not drained sufficiently ⇒ see 5.2.11.
5. Heat exchanger polluted ⇒ contact service.

**5.2.8 Safety thermo-switch FTS is tripped (type 1142A-1146A)**

1. CA-dryer volume flow too high  $\Rightarrow$  reduce volume flow;  $\Rightarrow$  check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
2. CA-inlet temperature too high  $\Rightarrow$  restore normal conditions.
3. Ambient temperature too high or the room aeration is insufficient  $\Rightarrow$  reduce temperature and/or provide proper ventilation.
4. Refrigerant condenser fan is never running  $\Rightarrow$  see 5.2.6.
5. Refrigerant condenser is polluted  $\Rightarrow$  clean condenser.
6. CA-operating pressure too low  $\Rightarrow$  increase operating pressure;  $\Rightarrow$  check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
7. Leak in the refrigerating fluid circuit  $\Rightarrow$  contact service.
8. Safety thermo-switch FTS is defective  $\Rightarrow$  contact service.

**Note:** Safety thermo-switch FTS require a reset : press reset button (fig.5.2.8).

Fig. 5.2.8 Safety thermo-switch FTS reset button

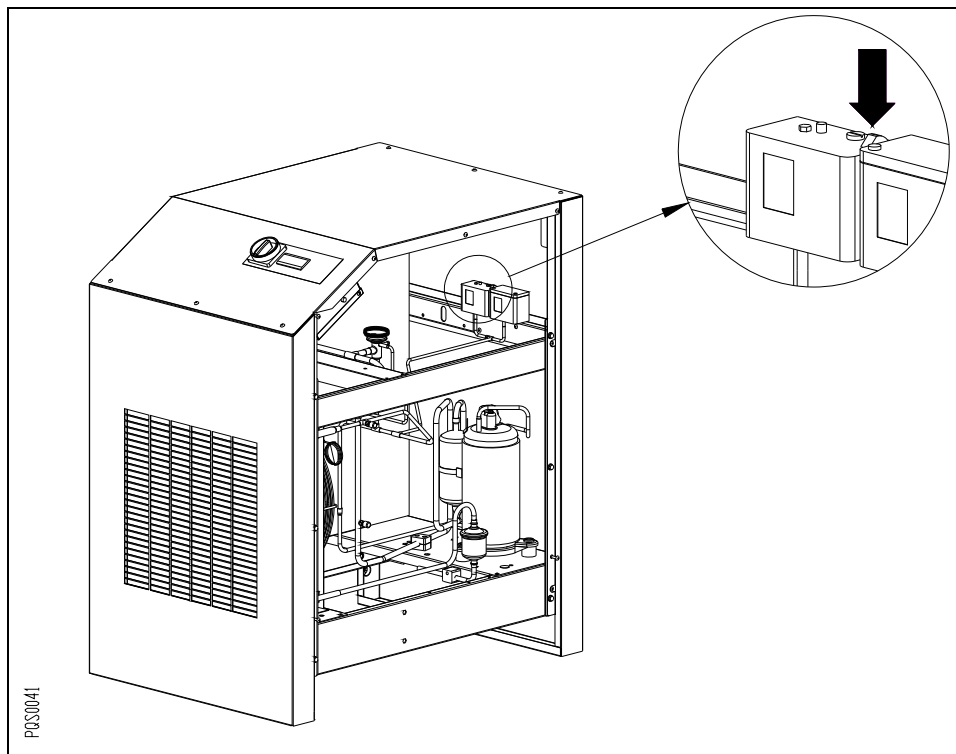


**5.2.9 Safety high pressure-switch FPA is tripped (type 1143A-1146A)**

1. Ambient temperature too high or the room aeration is insufficient  $\Rightarrow$  reduce temperature and/or provide proper ventilation.
2. Refrigerant condenser fan is never running  $\Rightarrow$  see 5.2.6.
3. Refrigerant condenser is polluted  $\Rightarrow$  clean condenser.

**Note:** Safety high pressure-switch FPA require a reset : press reset button (fig.5.2.9).

*Fig. 5.2.9 Safety high pressure-switch FPA reset button*

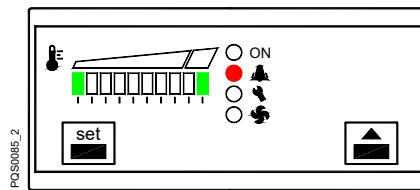


## 5.2.10 Electronic regulator DDS7

### Symptom

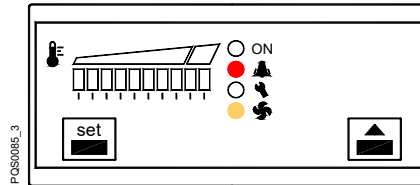
### Cause ⇒ Remedy

- 5.2.10.1 Alarm led and display 1<sup>st</sup> (left) and 10<sup>th</sup> (right) led are flashing



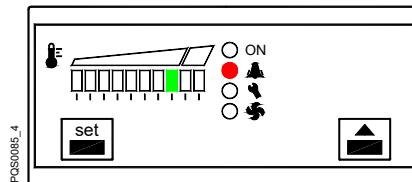
EIC3 dew point sensor is defective ⇒ replace it.

- 5.2.10.2 Alarm led and Fan led are flashing



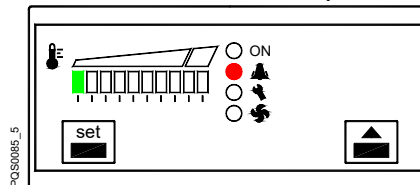
EIC4 or EIC5 fan control sensor is defective ⇒ replace it. **Note:** refrigerant condenser fan is always running and led FAN (7) flashes.

- 5.2.10.3 Alarm led is flashing and display led is lighted



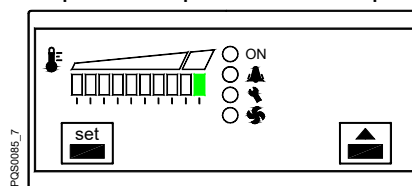
Pressure dew point alarm (higher than ALARM<sub>ON</sub> setpoint) ⇒ see 5.2.2 and 4.3 **Note:** alarm becomes active 5 minutes later with dewpoint temperature continuously higher than ALARM<sub>ON</sub> setpoint. Alarm automatically reset when dewpoint temperature decrease of 2°K below ALARM<sub>ON</sub> setpoint.

- 5.2.10.4 Alarm led and display 1<sup>st</sup> (left) led are flashing



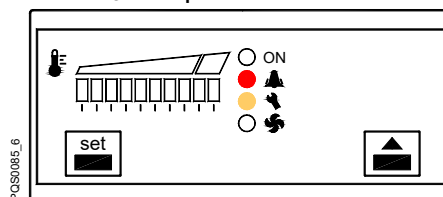
Pressure dew point too low (lower than -1°C) ⇒ see 5.2.3 **Note:** alarm becomes active 5 minutes later with dewpoint temperature continuously lower than -1°C. Alarm automatically reset when dewpoint temperature rise up to >+1°C

- 5.2.10.5 Display 10<sup>th</sup> (right) led is flashing



Pressure dew point over range (higher than 24°C) ⇒ see 5.2.2 **Note:** Dew point alarm could occur or not. Alarm becomes active 5 minutes later with dewpoint temperature continuously higher than ALARM<sub>ON</sub> setpoint.

- 5.2.10.6 Alarm led and drain maintenance led are flashing



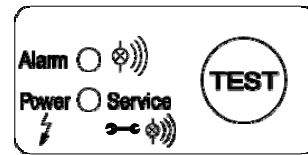
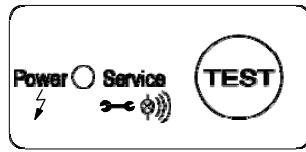
The time of drain maintenance timer is expired ⇒ contact SERVICE CENTER for drain replacement and reset the timer.

## 5.2.11 Condensate drain

## Symptom

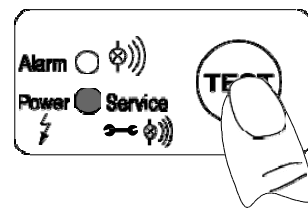
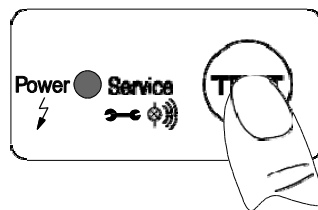
## Cause ⇒ Remedy

## 5.2.11.1 LED not lighting up



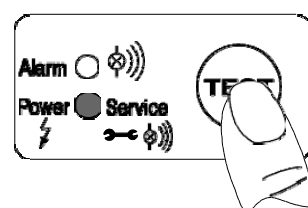
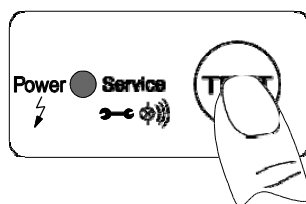
Power supply faulty.  
 Power supply board defective.  
 - Check voltage on type plate.  
 - Check connections.  
 - Check of the circuit boards for possible damage to be carried out by qualified personnel only.

## 5.2.11.2 Pressing of test button, but no condensate discharge



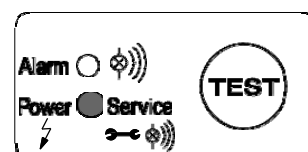
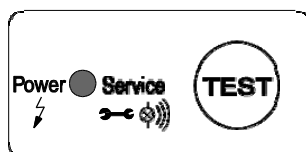
Feed and / or outlet line shut off or blocked.  
 Worn parts (seals, valve core, diaphragm).  
 Power supply board defective.  
 Service unit defective.  
 Dropping below necessary minimum pressure.  
 Maximum pressure exceeded.  
 - Check feed line and outlet line  
 - Check if valve opens audibly (press test button several times).  
 - Check of the circuit board for possible damage to be carried out by qualified personnel only.  
 - Check operating pressure.

## 5.2.11.3 Condensate discharge only when test button is being pressed



Feed line with insufficient slope; cross-section too small.  
 Excessive condensate quantities.  
 Service unit extremely dirty.  
 - Lay feed line with adequate slope  
 - Replace service unit.

## 5.2.11.4 Device keeps blowing off air



Service unit defective or dirty.  
 - Replace service unit.



5.3

Spare parts list

Spare parts list is printed on a dedicated sticker applied on the internal side of the rear panel of 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 inside dryers.

ID	Ref.	Description	Dryer type																
			1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146
			1/230V±10%/50-60Hz																
1	W100	Complete heat exchanger	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
3	TSAH	Safety thermo-switch																	
4	PSAH	High pressure switch																	
6	V100	Refrigerant compressor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	V400	Hot gas by-pass regulator	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
8	W200	Refrigerant condenser	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	M200	Complete fan																	
9,1	M200	Fan motor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9,2	M201	Fan blade	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9,3	M203	Fan grid																	
10	F100	Filter drier	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
12	EIC3-EIC4	Temperature probe	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
37	EIC5	Pressure transducer																	
17	EICA	Electronic regulator	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	A100	Condensate drain - complete	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21S	A160	Condensate drain - service unit	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
22	E100	Main switch	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
KF	KF	Solid state relay																	

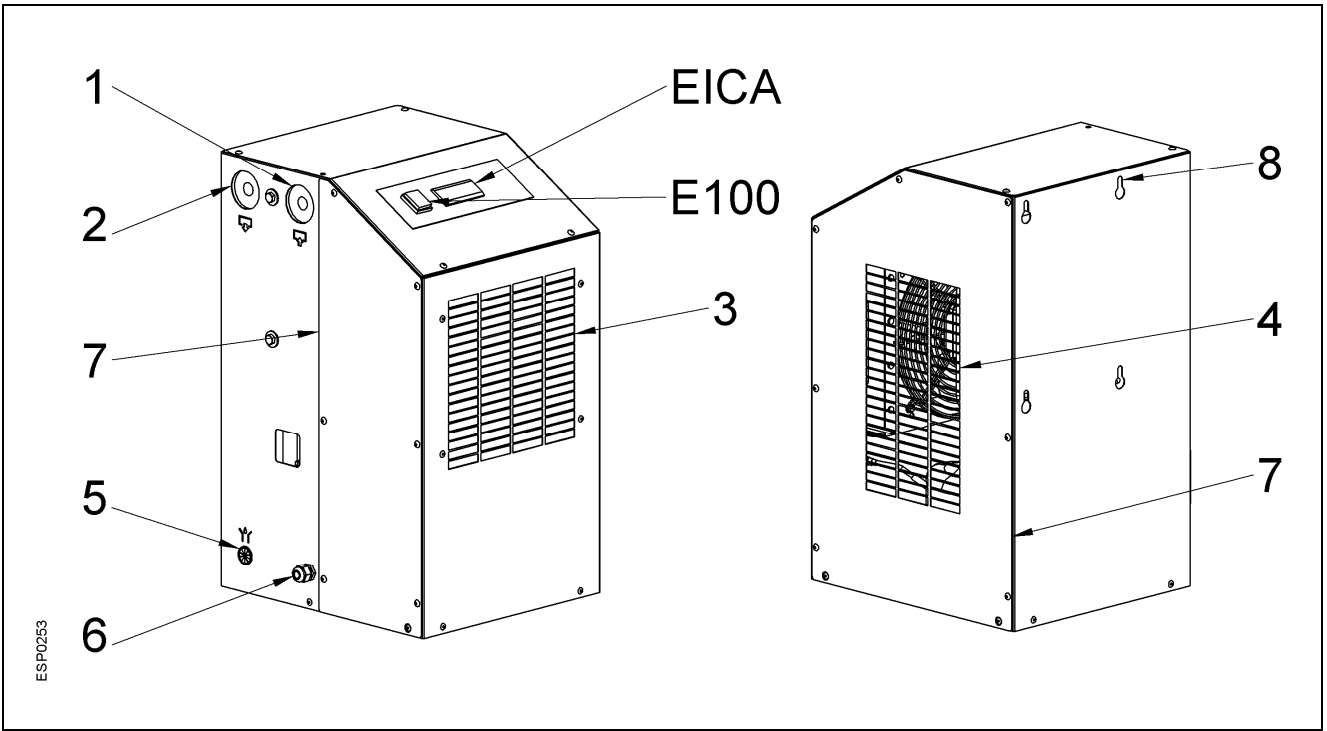
Technical Data																							
EN	Pos.	Type-No.:	1130A	1131A	1132A	1133A	1134A	1135A	1136A	1137A	1138A	1139A	1140A	1141A	1142A	1143A	1144A	1145A	1146A				
	1	Air flow rate	m <sup>3</sup> /h	20	35	50	65	85	105	125	150	180	225	300	360	450	550	650	750	850			
			m <sup>3</sup> /min	0,33	0,58	0,83	1,08	1,42	1,75	2,08	2,50	3,00	3,75	5,00	6,00	7,50	9,17	10,83	12,50	14,17			
	2	Cooling air required	m <sup>3</sup> /h	200				300				340	350	380		430	450	1900	2200				
	3	Power consumption (total)	kW	0,16	0,18	0,19	0,22	0,29	0,31	0,39	0,40	0,53	0,71	0,80	0,81	0,76	0,79	0,88	1,35	1,38			
			kW	0,22	0,23	0,27	0,28	0,39	0,40	0,49	0,50												
	4	Power consumption (fan)	W	33				55				95		85		76		130					
			W	40				65															
	5	Power supply	V / Hz	1 / 230V / 50-60Hz																			
	6	Allowable pressure (compressed air)	bar	2 ... 16																			
	7	Allowable pressure (refrigerant)	bar	20																			
	8	Compressed air connections	bar	30																			
	9	Weight	G	3/8"	24	26	27	29	31	31	33	33	33	33	33	33	33	33	33	33			
			kg	24	26	27	29	31	31	31	31	31	31	31	31	31	31	31	31	31			
	10	Dimensions	mm	645																			
			height	360																			
			width	410																			
			depth	R134a																			
	11	Refrigerant type		R134a																			
	12	Refrigerant quantity	kg	0,18	0,18	0,22	0,25	0,30	0,30	0,30	0,30	0,25	0,25	0,25	0,42	0,37	0,37	0,62	0,65	0,95	1,10	1,10	1,70
	13	Sound pressure level (at distance of 1m)	dB (A)	< 70																			
	14	Type of protection	IP	22																			
		Condensate drain	mm	D. 8 / 14																			
Specification:			<p>Pos.1 : Air flow rate referred to the suction status of the air compressor                      at compressed air inlet temperature                      operating pressure                      ambient temperature                      pressure dew point at CA-dryer outlet</p> <p>Pos.3,4 : Power consumption at ambient temperature                      Compressed air inlet temperature                      Allowed ambient temperature</p> <p>Technical modifications are subject to change without notice, error not excluded.</p>																				
Designation:			1130 A - 1146 A																				
Type-No.:			T11300000169																				
Date:			09.06.2017																				
Page 1 of			1																				

<b>APX 1</b>	<b>1</b>	Compressed air inlet	<b>6</b>	Electric connection	
	<b>2</b>	Compressed air outlet	<b>7</b>	Service access	
	<b>3</b>	Cooling air inlet	<b>8</b>	Fixing holes	
	<b>4</b>	Cooling air outlet	<b>E100</b>	Operation switch	
	<b>5</b>	Condensate drain	<b>EICA</b>	Electronic regulator	
<b>APX 2 &amp; APX 4</b>	<b>W100</b>	Heat exchanger complete	<b>EIC4</b>	Fan sensor	
	<b>W10L</b>	Heat exchanger air/air	<b>EIC5</b>	Fan transducer	
	<b>W10K</b>	Heat exchanger refrigerant/air	<b>V710</b>	Condensate drain service valve	
	<b>B100</b>	Condensate separator	<b>EICA</b>	Electronic regulator	
	<b>W110</b>	Heat exchanger insulation shell	<b>A100</b>	Condensate drain – complete	
	<b>TSAH</b>	Safety thermo-switch	<b>E100</b>	Main switch	
	<b>PSAH</b>	Refrigerant high pres.-switch	<b>51</b>	Front panel	
	<b>V100</b>	Refrigerant compressor	<b>52</b>	Rear panel	
	<b>V400</b>	Hot gas by-pass regulator	<b>53</b>	Right lateral panel	
	<b>W200</b>	Refrigerant condenser	<b>54</b>	Left lateral panel	
	<b>M200</b>	Fan (motor)	<b>55</b>	Cover panel	
	<b>M201</b>	Fan blade	<b>56</b>	Base plate	
	<b>M203</b>	Fan grid	<b>58</b>	Support beam	
	<b>F100</b>	Filter drier	<b>60</b>	Control panel	
	<b>X500</b>	Capillary tube	<b>66</b>	Cover control panel	
	<b>EIC3</b>	DewPoint sensor	<b>81</b>	Flow diagram sticker	
			<b>A160</b>	Condensate drain – service unit	
			<b>X100</b>	Schrader valve	
	<b>APX 3</b>	<b>S1</b>	Main switch	<b>TSAH</b>	Safety thermo-switch
		<b>K</b>	Refrigerant compressor	<b>PSAH</b>	Refrigerant high pres.-switch
<b>KT</b>		Compressor thermal protection	<b>A2</b>	DDS Electronic regulator	
<b>KR</b>		Compressor starting relay	<b>EIC3</b>	DewPoint sensor	
<b>CS</b>		Compressor starting capacitor	<b>EIC4</b>	Fan sensor	
<b>CR</b>		Compressor run capacitor	<b>EIC5</b>	Fan transducer	
<b>V</b>		Condenser fan	<b>B1</b>	Condensate drainer	
<b>KV</b>		Fan thermal protection			
<b>CV</b>		Fan starting capacitor			

<b>Type 1130A-1138A</b>	WD001_V04
<b>Type 1139A-1141A</b>	WD002_V04
<b>Type 1142A</b>	WD003_V04
<b>Type 1143A-1144A</b>	WD004_V04
<b>Type 1145A-1146A</b>	WD005_V04

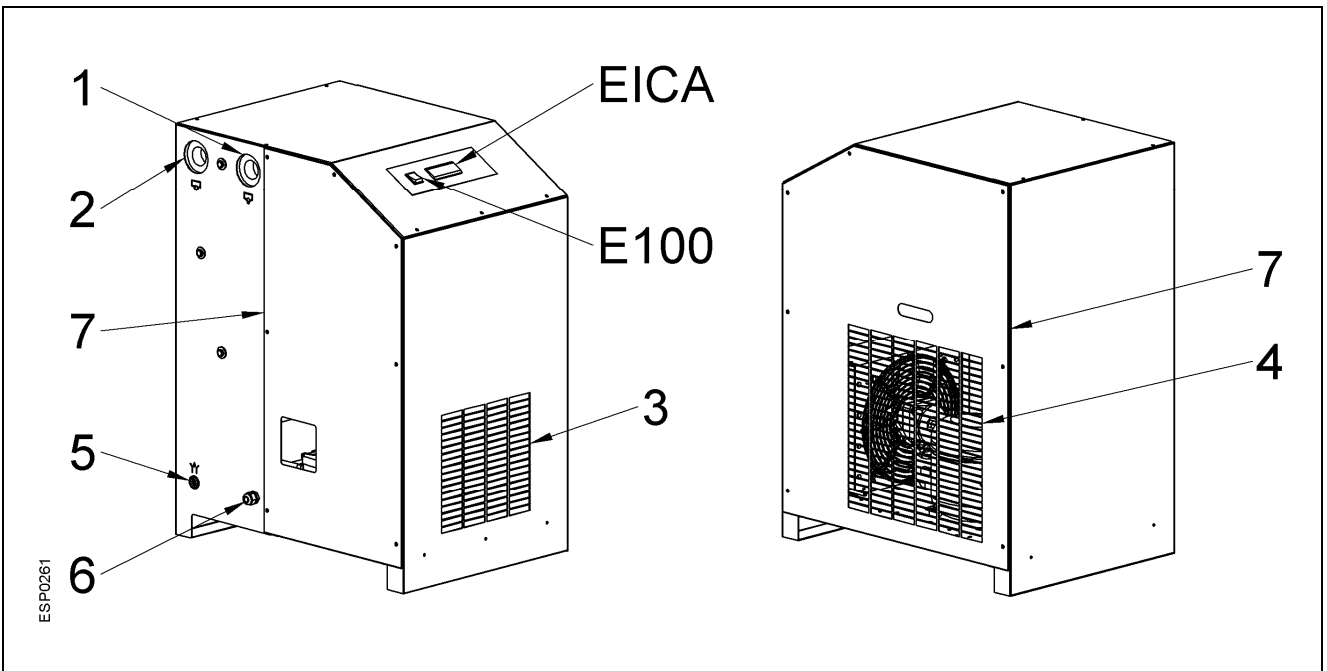
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# 1130 A – 1137 A



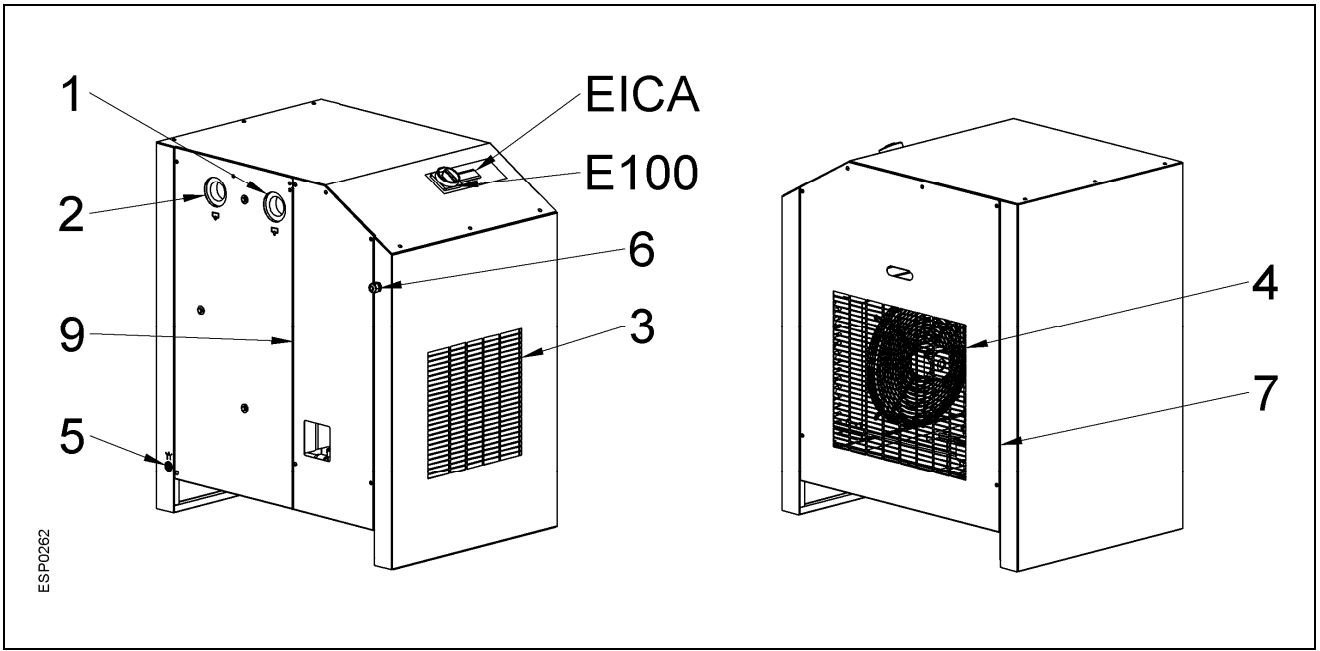
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# 1138 A – 1142 A



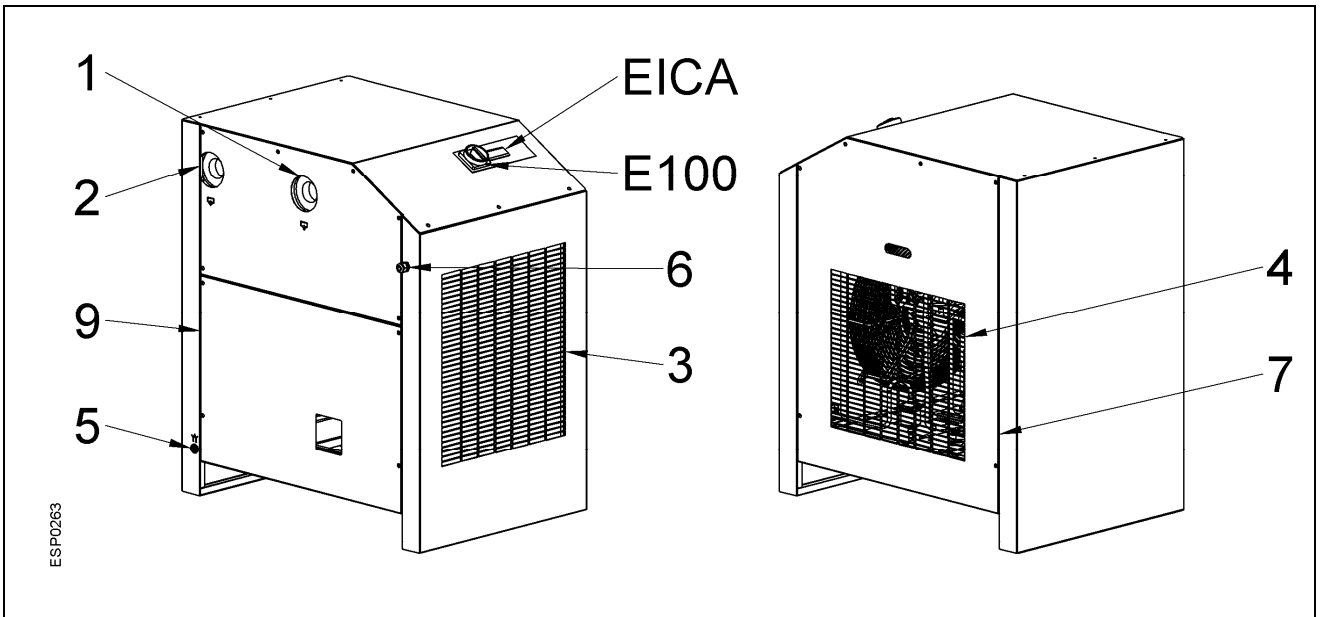
### Apx 1.3

### 1143 A – 1145 A



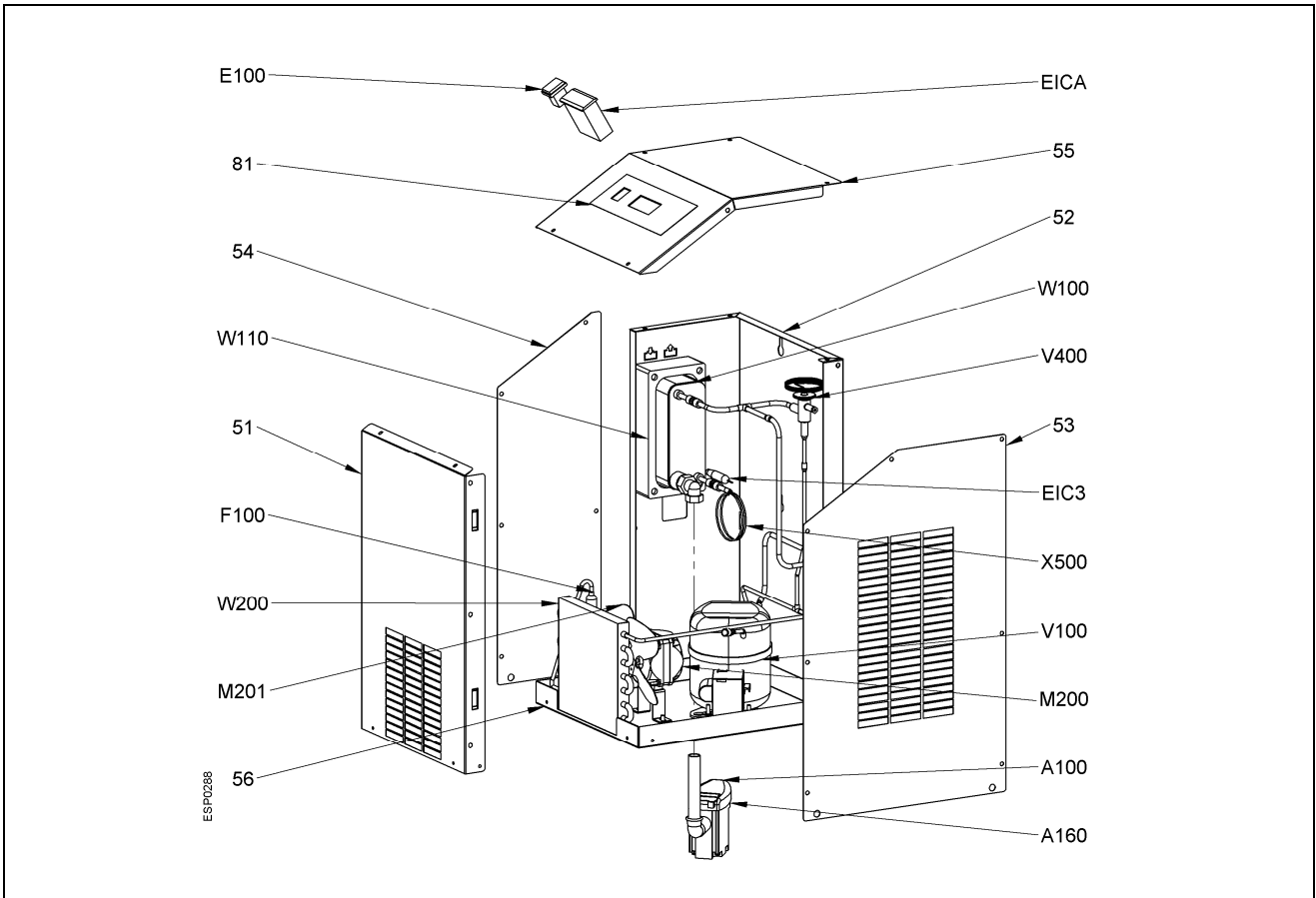
### Apx 1.4

### 1146 A



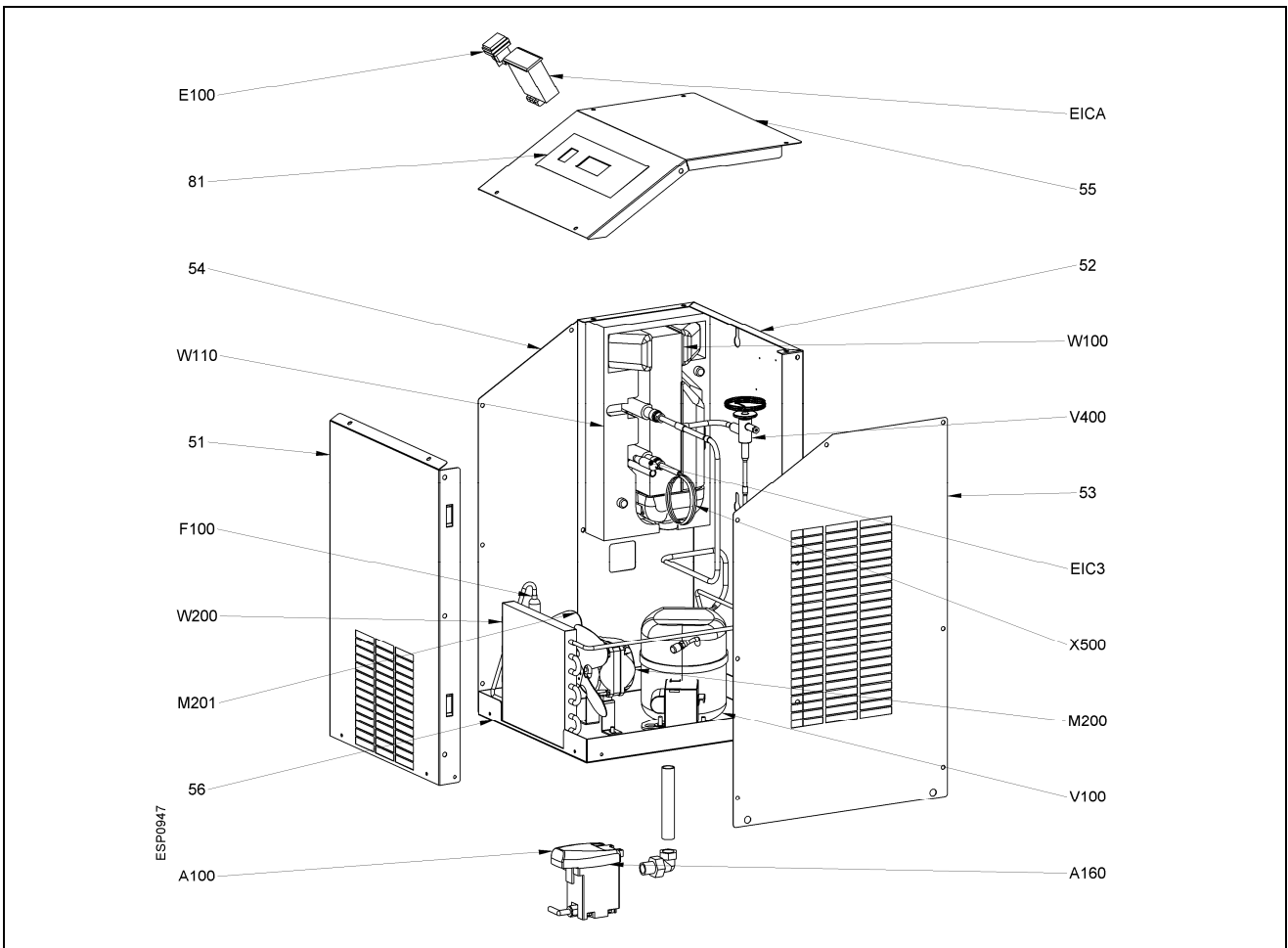
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# 1130 A



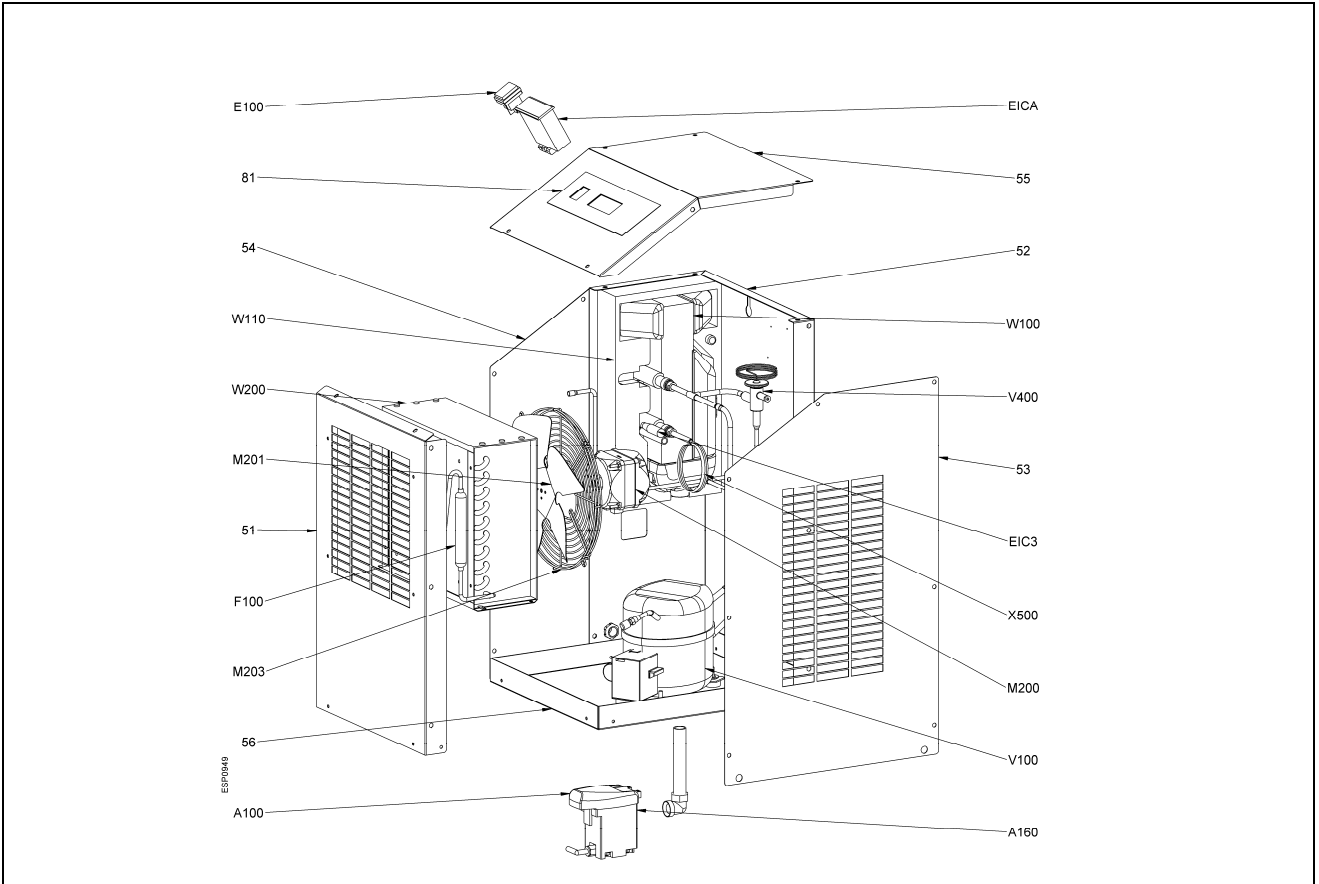
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# 1131 A – 1132 A



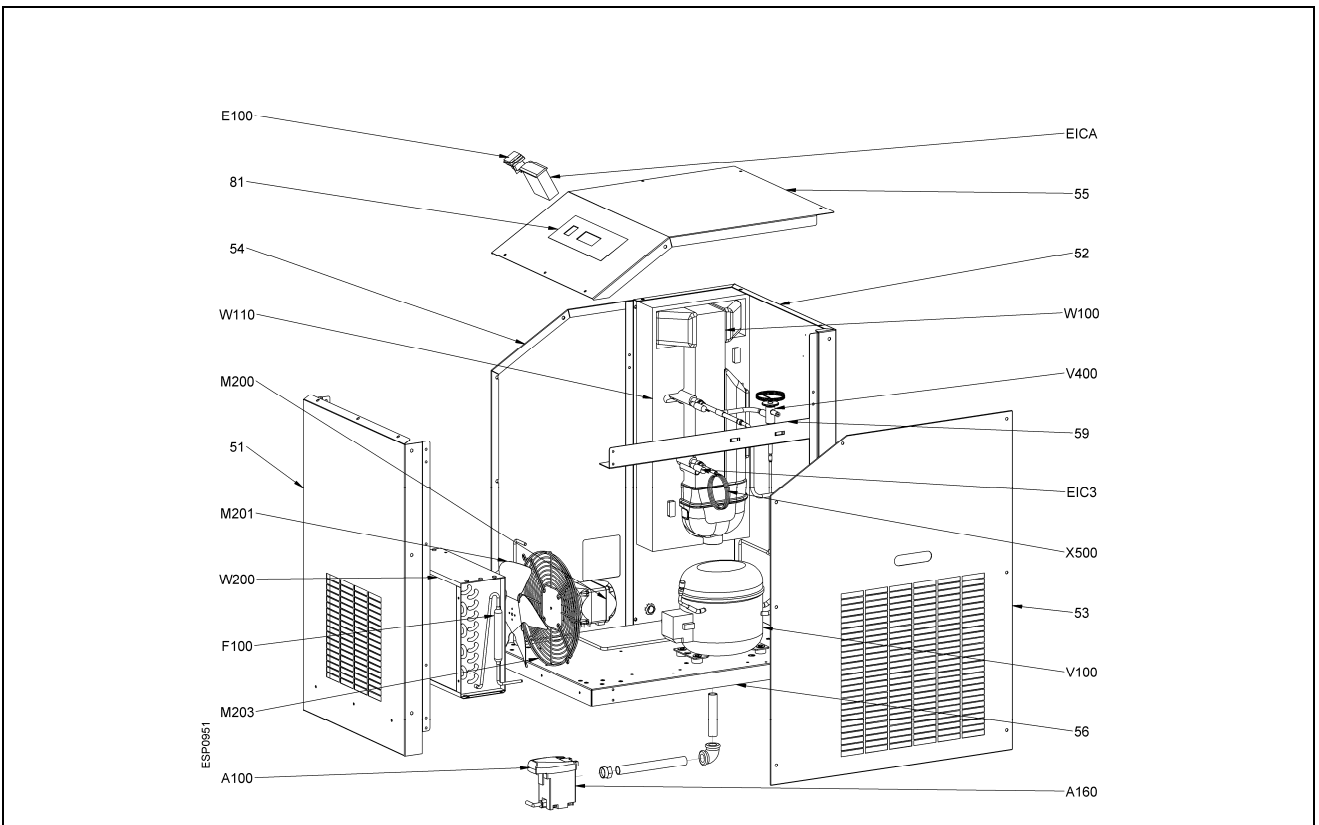
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# 1133 A – 1137 A



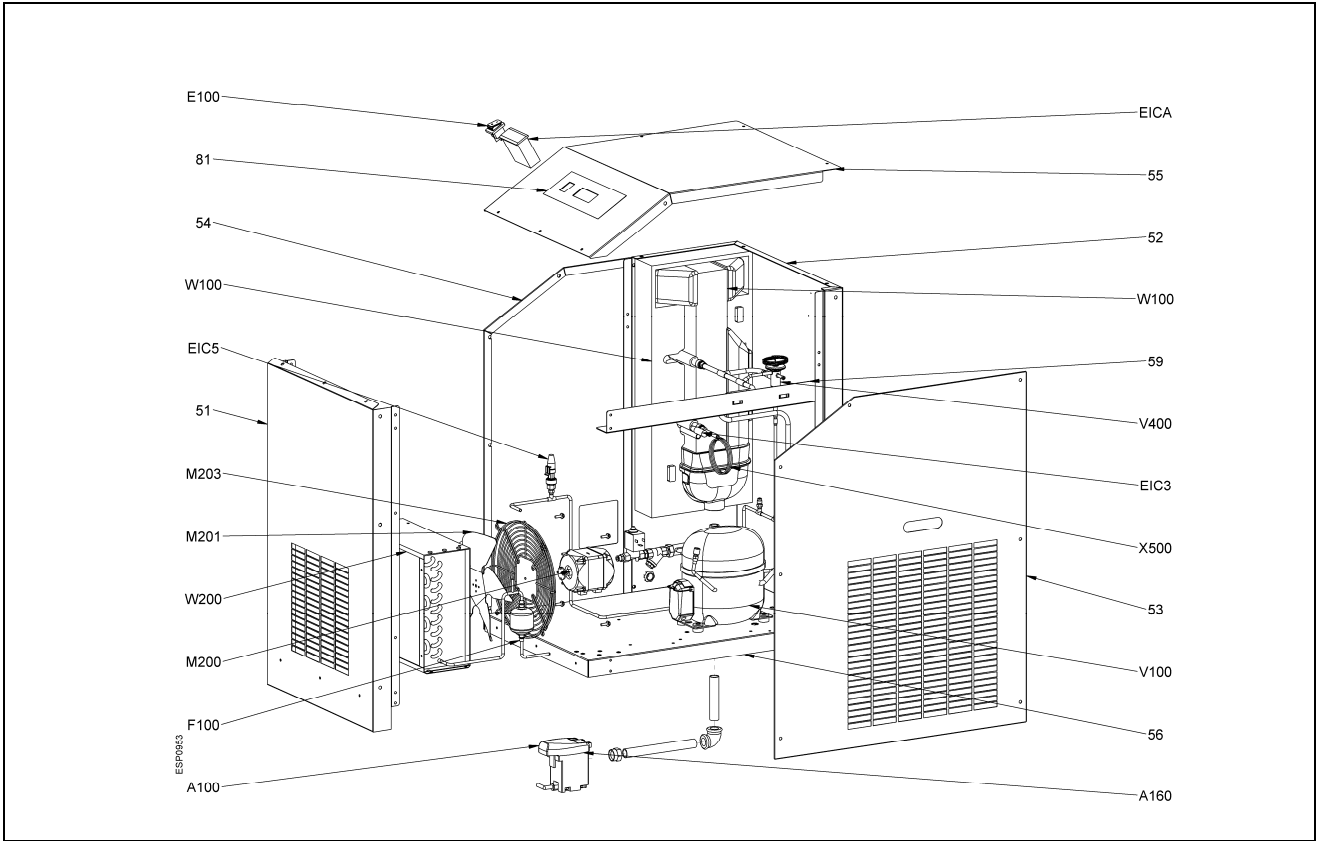
# Apx 2.4

# 1138 A



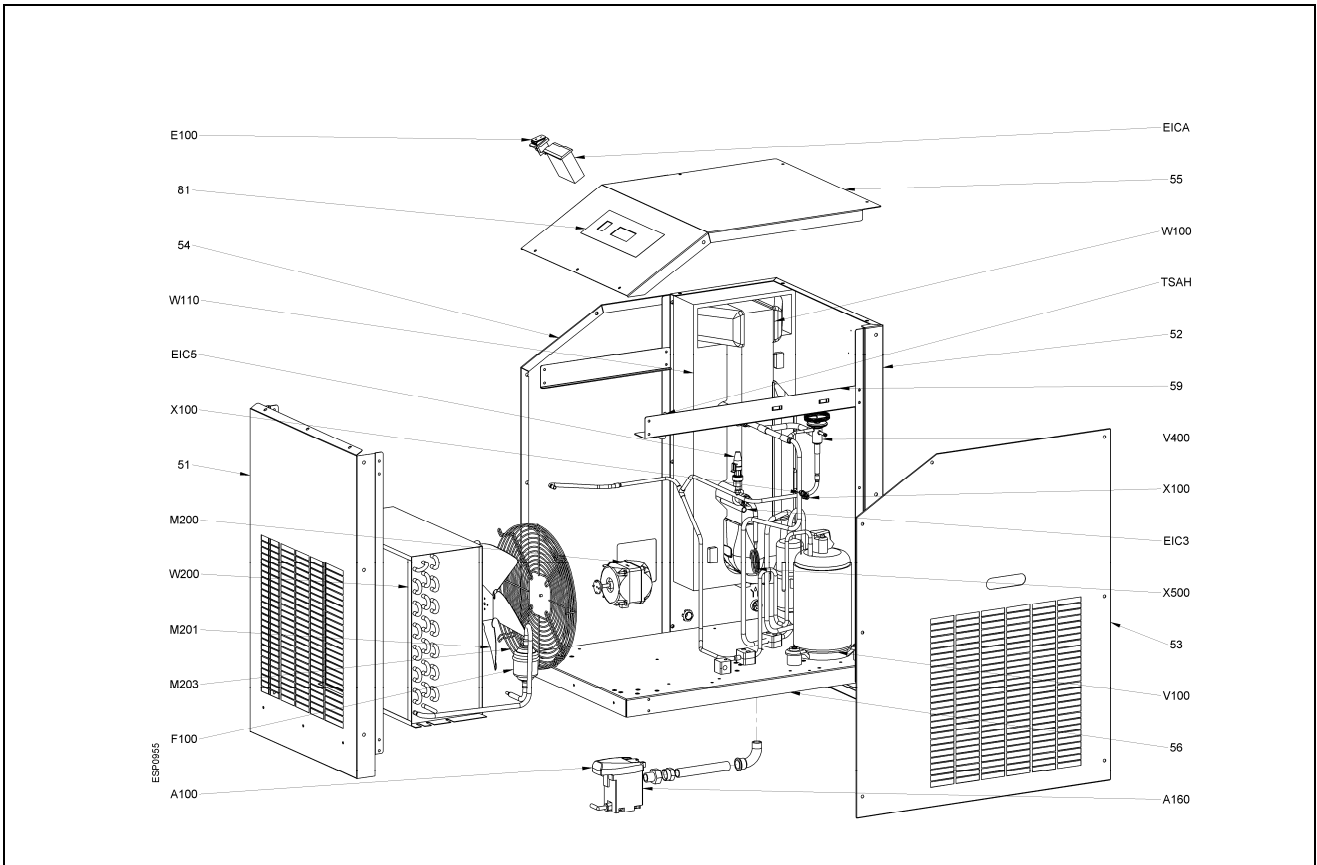
# Apx 2.5

# 1139 A – 1141 A



# Apx 2.6

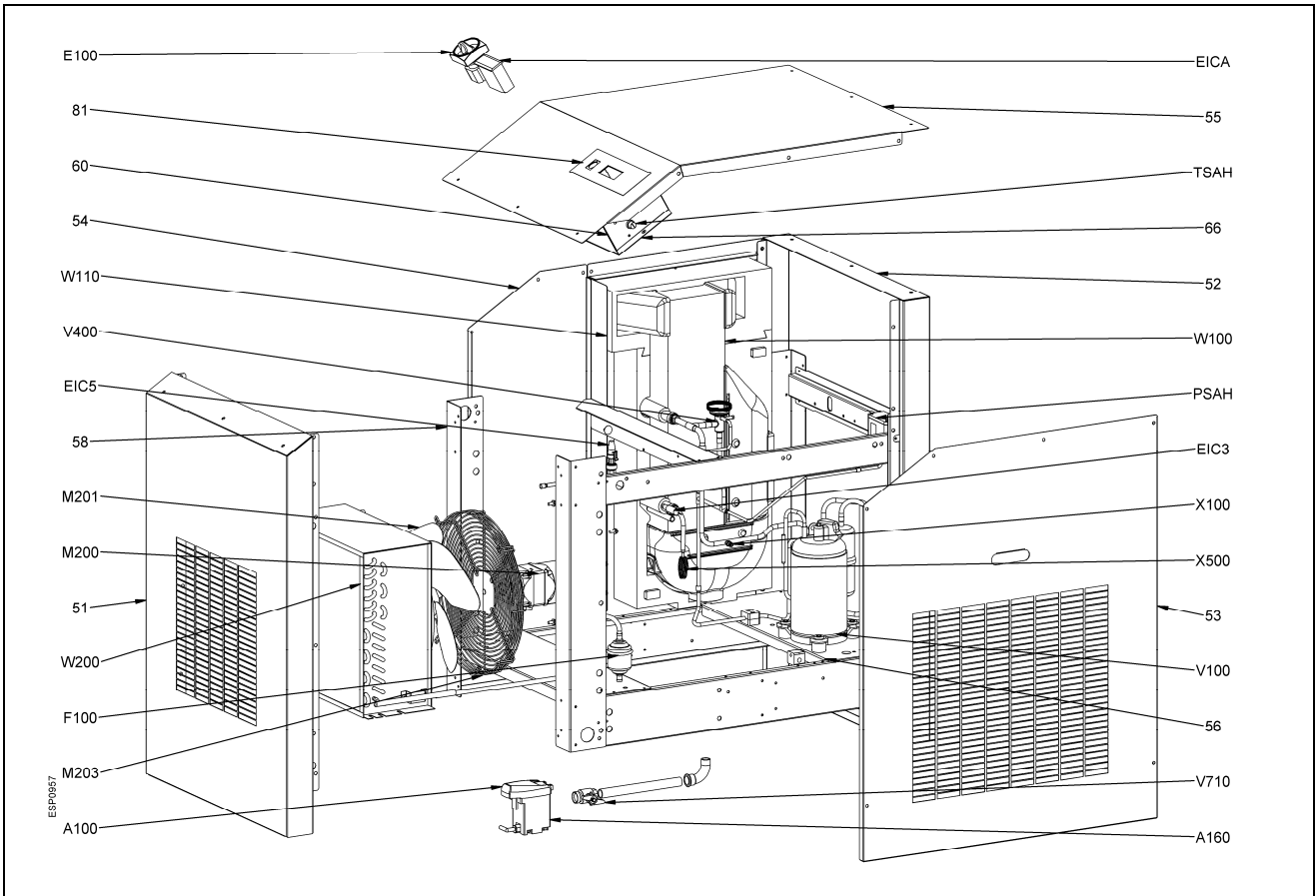
# 1142 A





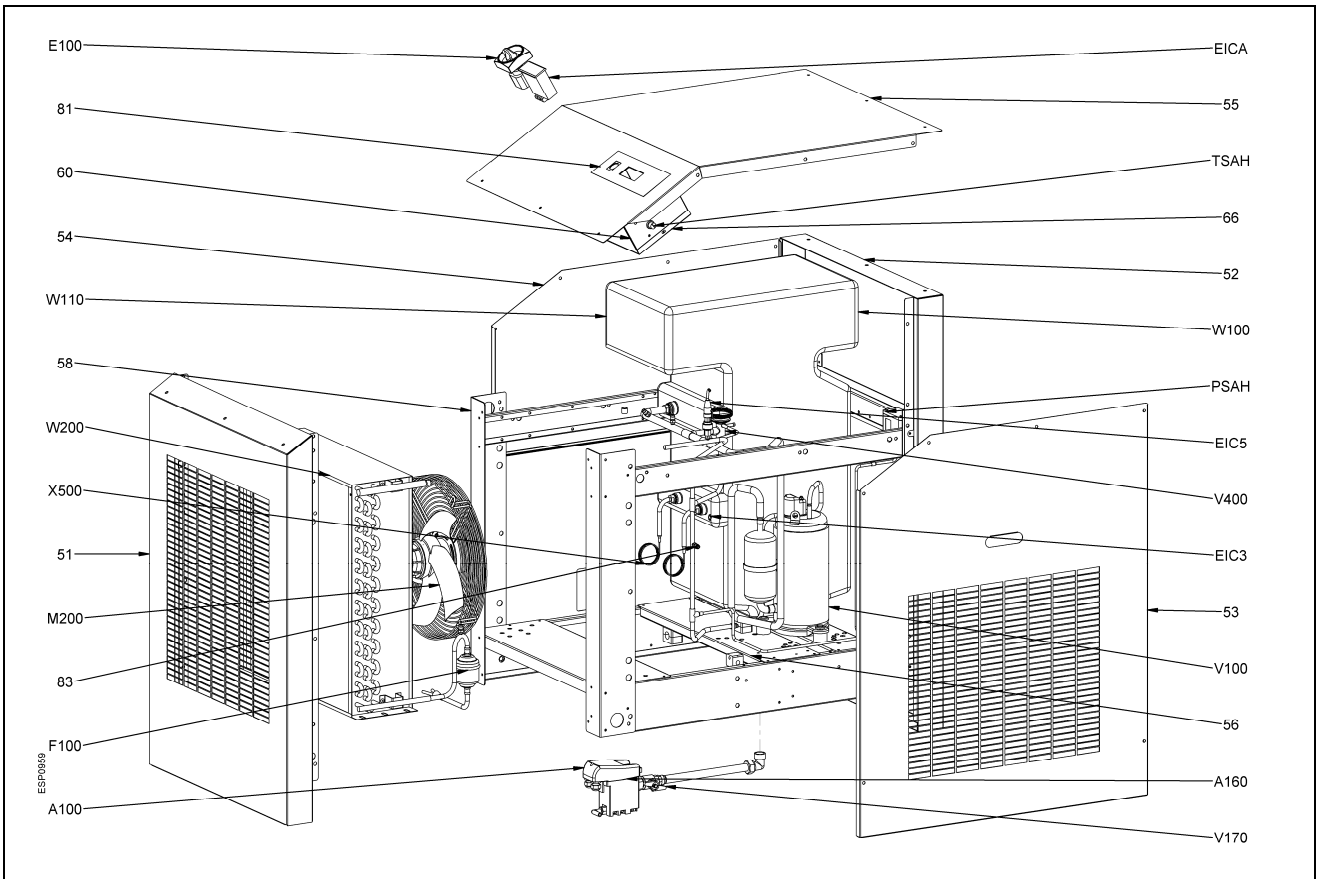
# Apx 2.7

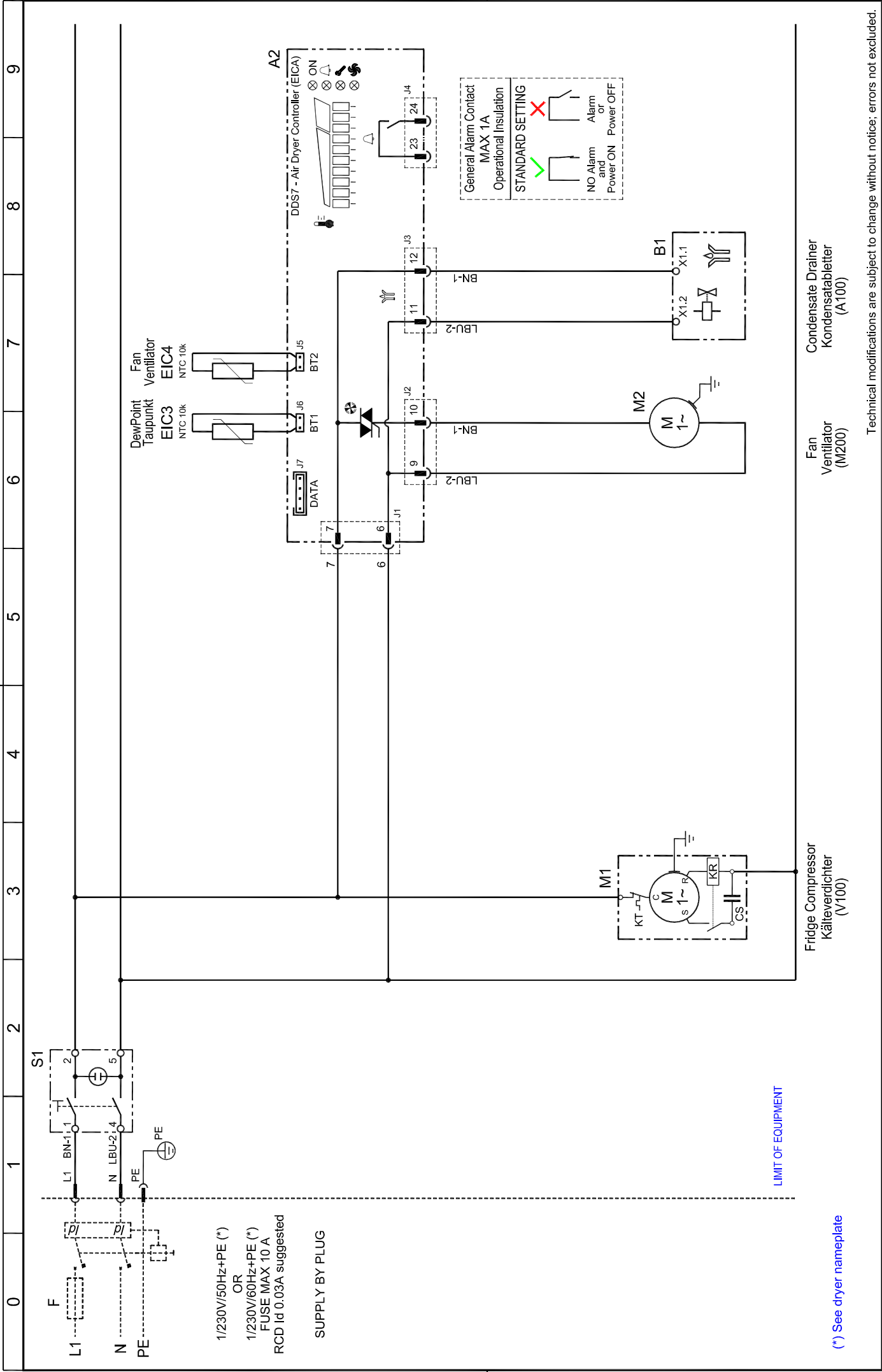
# 1143 A – 1145 A



# Apx 2.8

# 1146 A





0

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9

(\*) See dryer nameplate

Fridge Compressor  
Kälteverdichter  
(V100)

Fan Ventilator  
(M200)

Condensate Drainer  
Kondensatablätter  
(A100)

LIMIT OF EQUIPMENT

1/230V/50Hz+PE (\*)  
OR  
1/230V/60Hz+PE (\*)  
FUSE MAX 10 A  
RCD Id 0.03A suggested

SUPPLY BY PLUG

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

Drawing no. :

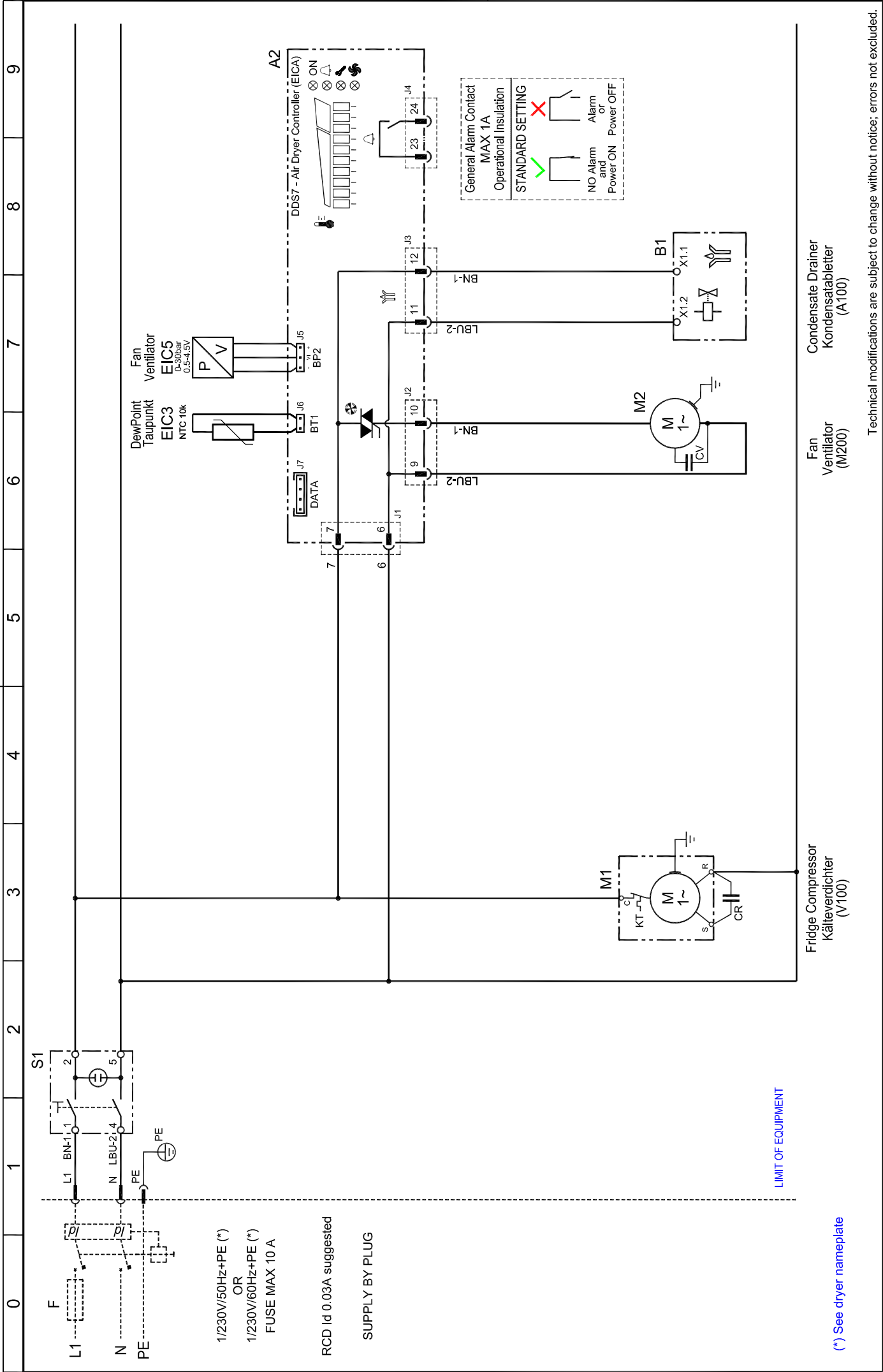
WD001\_V04

Note :

Rev.

00

Sheet 01 of 01



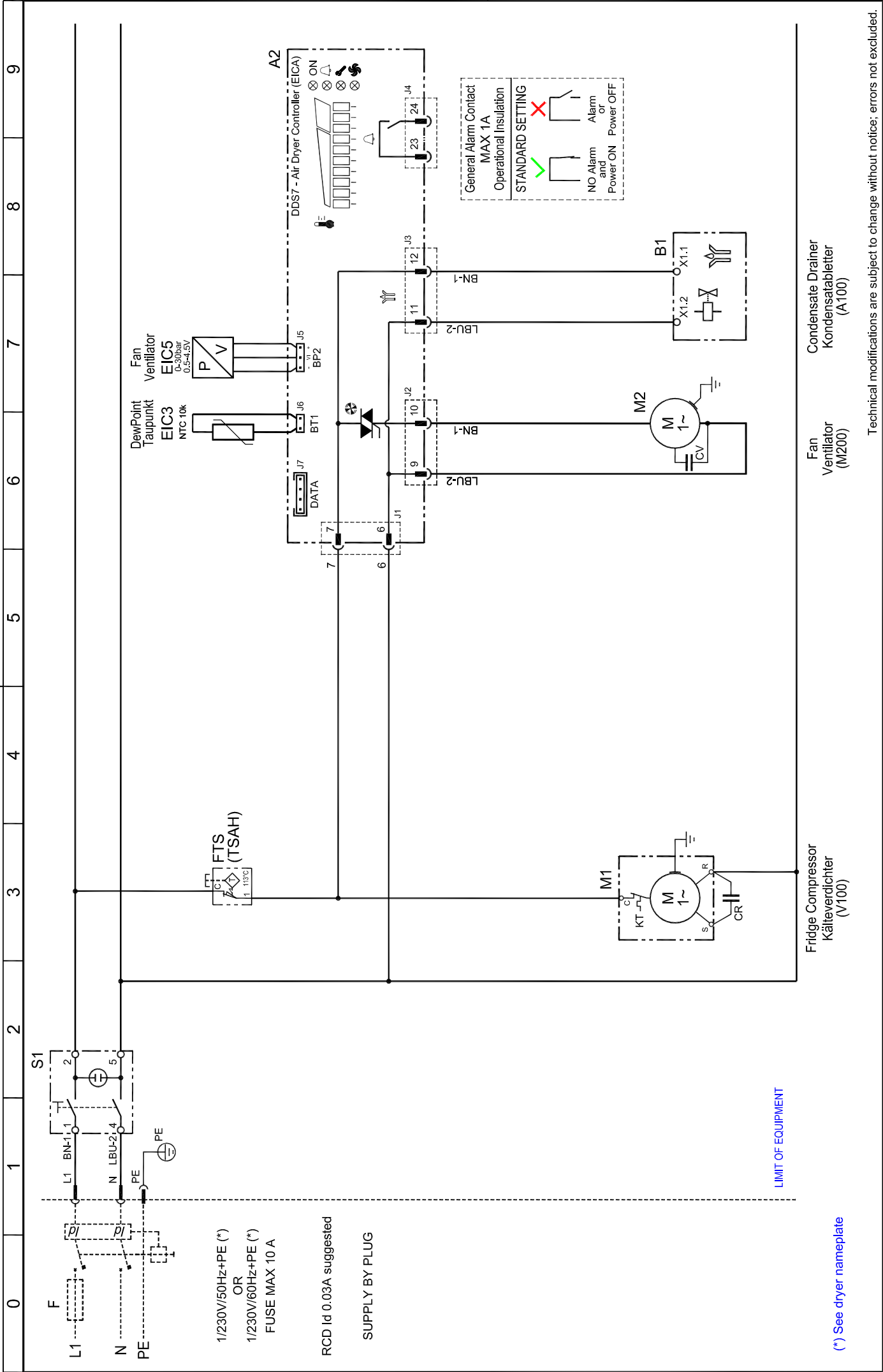
(\*) See dryer nameplate

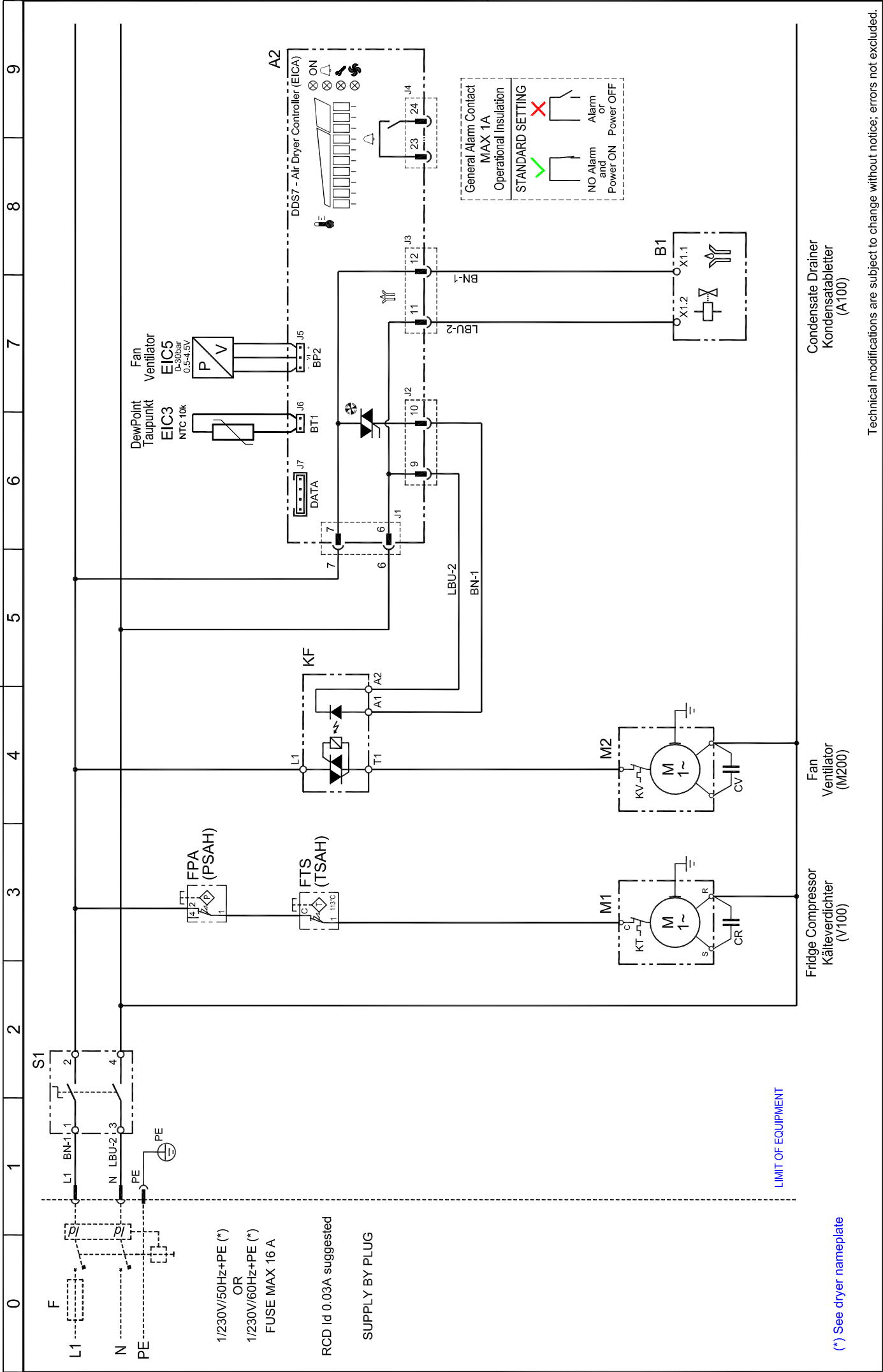
Technical modifications are subject to change without notice; errors not excluded.

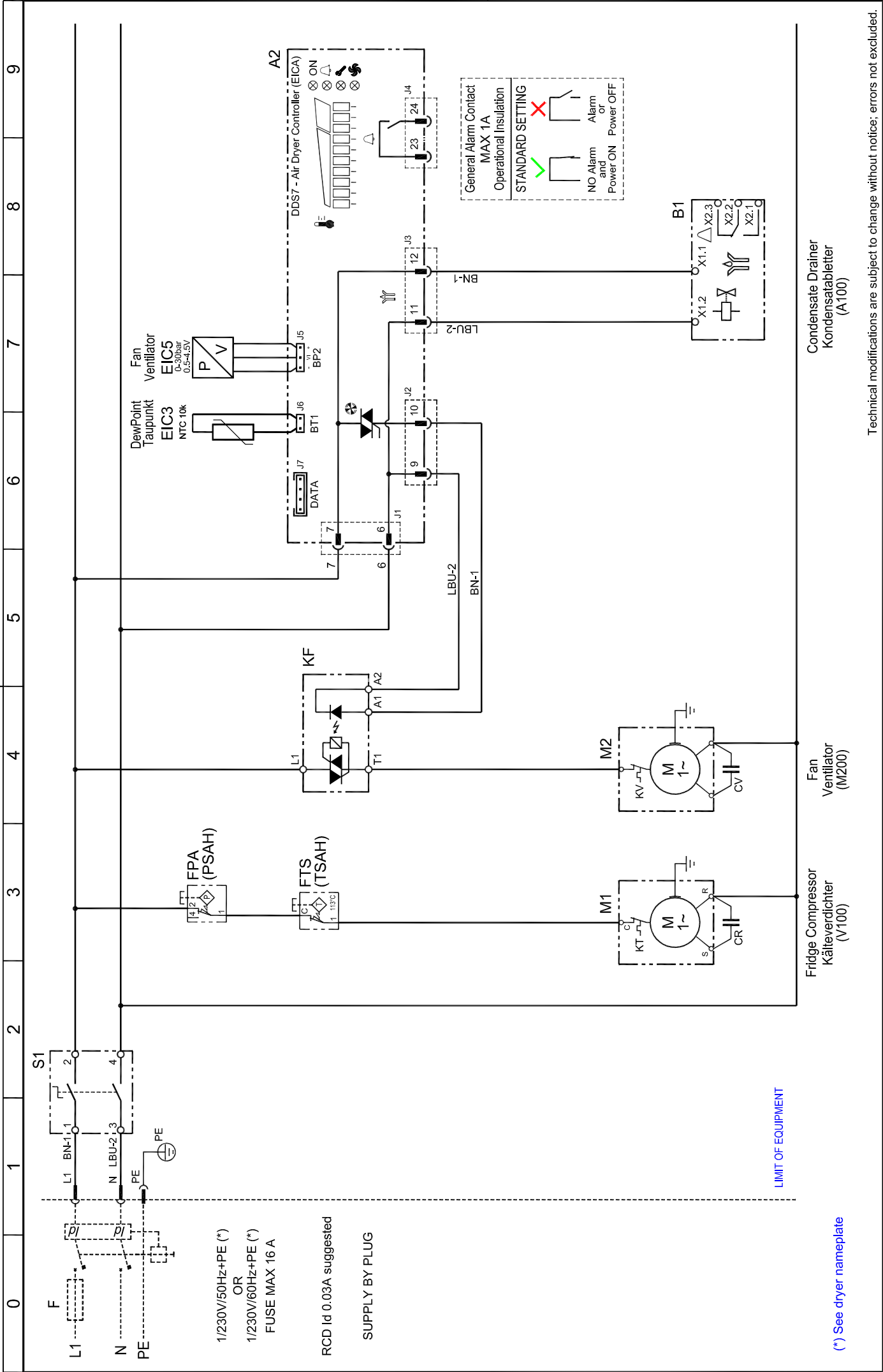
Rev. 00

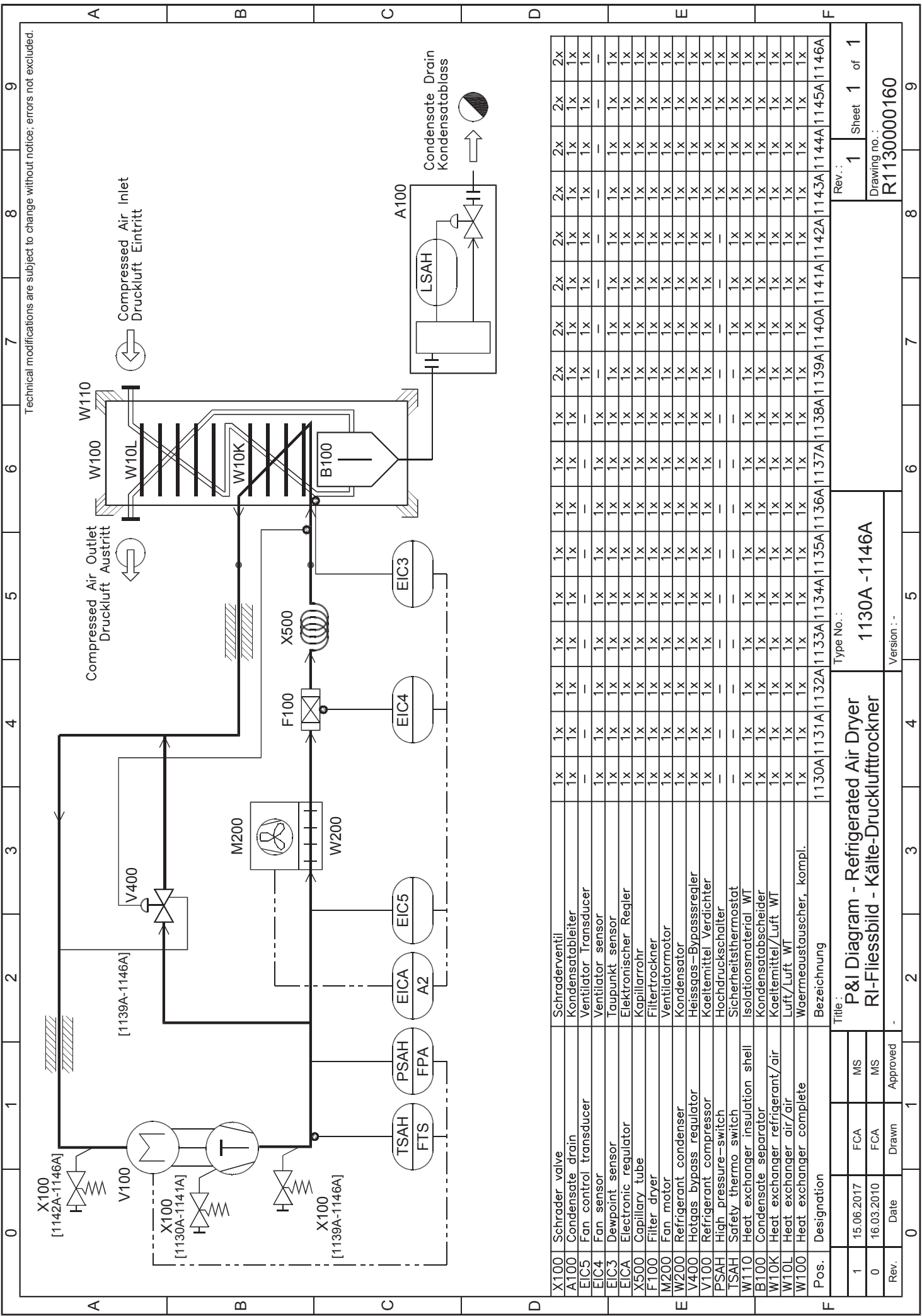
Drawing no.: WD002\_V04

Note: -









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

Pos.	Designation	1130A	1131A	1132A	1133A	1134A	1135A	1136A	1137A	1138A	1139A	1140A	1141A	1142A	1143A	1144A	1145A	1146A
X100	Schrader ventil	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
A100	Kondensatableiter	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
EIC5	Fan control transducer	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
EIC4	Fan sensor	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
EIC3	Dewpoint sensor	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
EICA	Electronic regulator	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
X500	Capillary tube	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
F100	Filtertrockner	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
M200	Fan motor	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
W200	Refrigerant condenser	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
V400	Hotgas bypass regulator	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
V100	Refrigerant compressor	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
PSAH	High pressure switch	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
TSAH	Safety thermo-switch	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
W110	Heat exchanger insulation shell	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
B100	Condensate separator	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
W10K	Heat exchanger refrigerant/air	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
W10L	Heat exchanger air/air	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
W100	Heat exchanger complete	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x
F	Designation	1130A	1131A	1132A	1133A	1134A	1135A	1136A	1137A	1138A	1139A	1140A	1141A	1142A	1143A	1144A	1145A	1146A

Title :		Type No. :		Rev. :		Sheet 1 of 1	
P&I Diagram - Refrigerated Air Dryer		1130A -1146A		1		1	
RI-Fließbild - Kälte-Drucklufttrockner		Version : -		8		9	
Rev.	Date	Drawn	Approved				
0		1	2	3	4	5	6
Drawing no. :		R1130000160					

