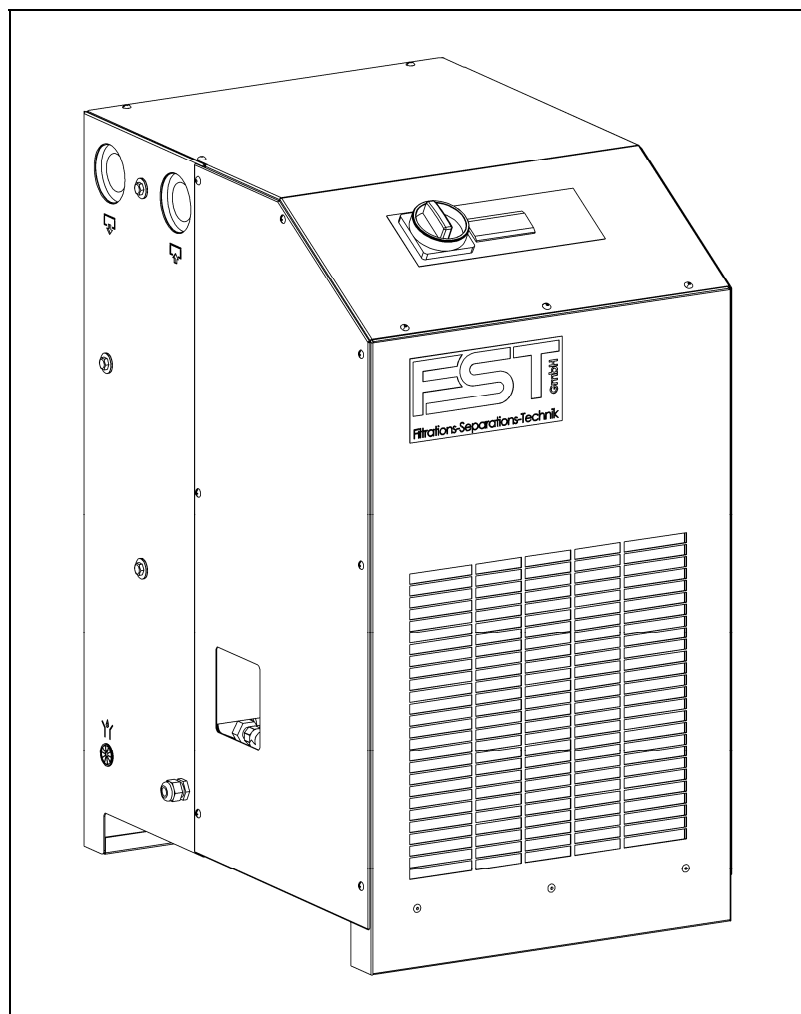




Filtrations-Separations-Technik

OPERATING INSTRUCTION



O11300G00169
07.2010

Compressed Air-Dryer

DFX 2 A – DFX 85 A

Series**DFX****Type Code****Model****Type no.****Version air-cooled**

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.

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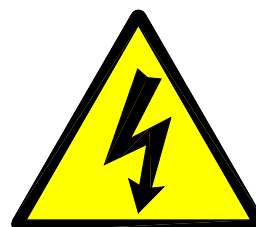
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All safety notes in this operating instruction which may cause harm to personnel or equipment, when ignored, are marked by the following symbols:



General danger symbol



Electrical danger symbol

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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

- | | |
|--|---|
| 1.2.1 Classification EC regulation 97/23 | <ul style="list-style-type: none">• Due to classification into category 2 (type 1146A) according to EC-Pressure Equipment directive, the CA-Dryer are “systems to be monitored”. |
| 1.2.2 Check of working materials | <ul style="list-style-type: none">• Before starting the CA-Dryer, the user has to check the working materials and record this accordingly. |
| 1.2.3 Periodical checks | <ul style="list-style-type: none">• 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. |
| 1.2.4 Instruction EN 378-1 | <ul style="list-style-type: none">• 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. |
| 1.2.5 Short Operating Instruction EN 378-2 | <ul style="list-style-type: none">• A „Short Operating Instruction“ must be prepared by the user and positioned next to the machine. |
| 1.2.6 Documentation EN 378-4.3.1 EC regulation 842/2006 | <ul style="list-style-type: none">• The user is committed to create a unit record of the refrigerating plant when using more than 3 Kg refrigerant. A guideline can be provided by the service. |
| 1.2.7 Maintenance EN 13 313 | <ul style="list-style-type: none">• Maintenance has to be provided by qualified personnel only. |

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 dismantling 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 ₂ FCF ₃	1000 ppm	1300
R407C – HFC	R32/125/134a (23/25/52) CHF ₂ CF ₃ /CH ₂ F ₂ /CH ₂ FCF ₃	1000 ppm	1653

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

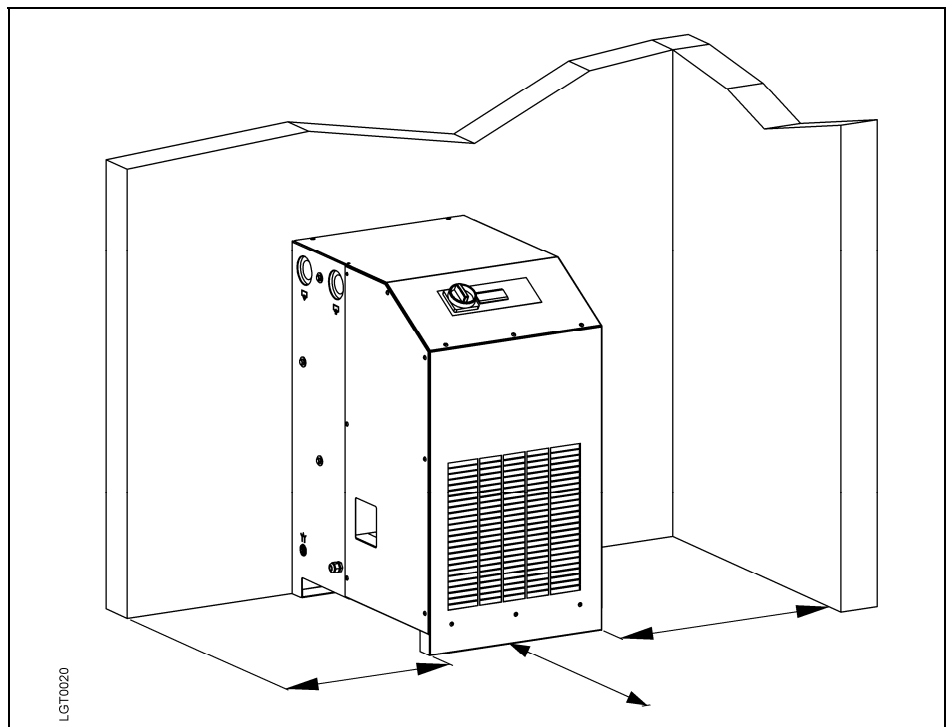
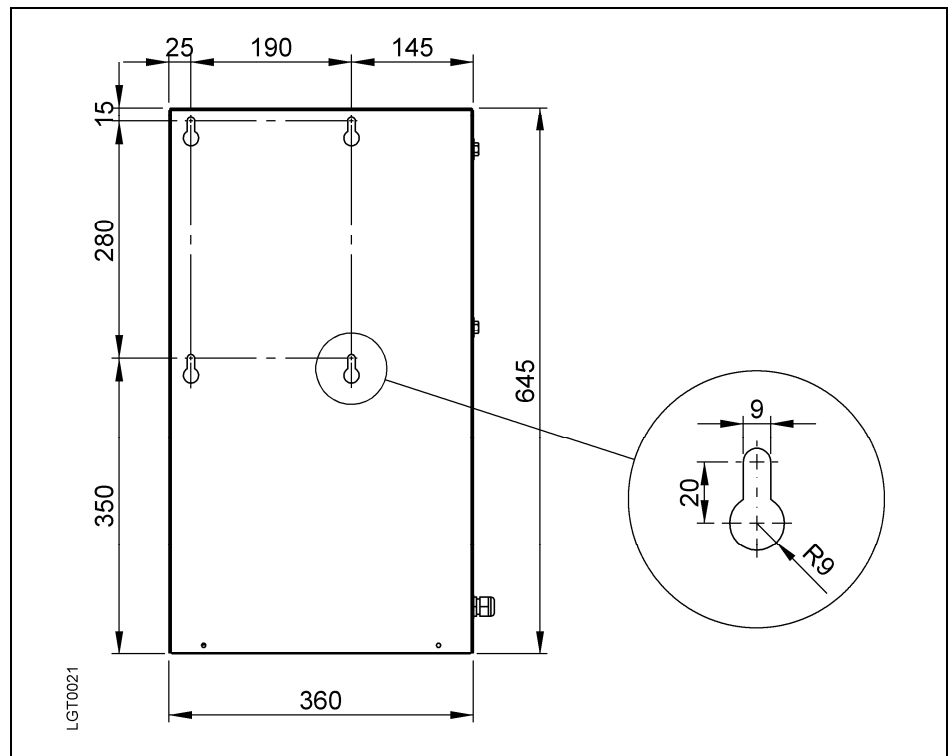


Fig. 2.3b Preparation wall mounting



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.



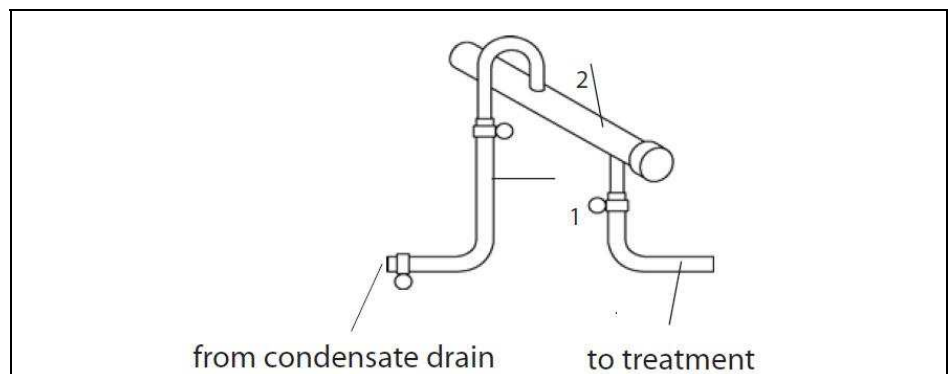
Attention!

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.

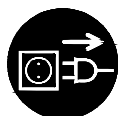
3.3.1 Symbols



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



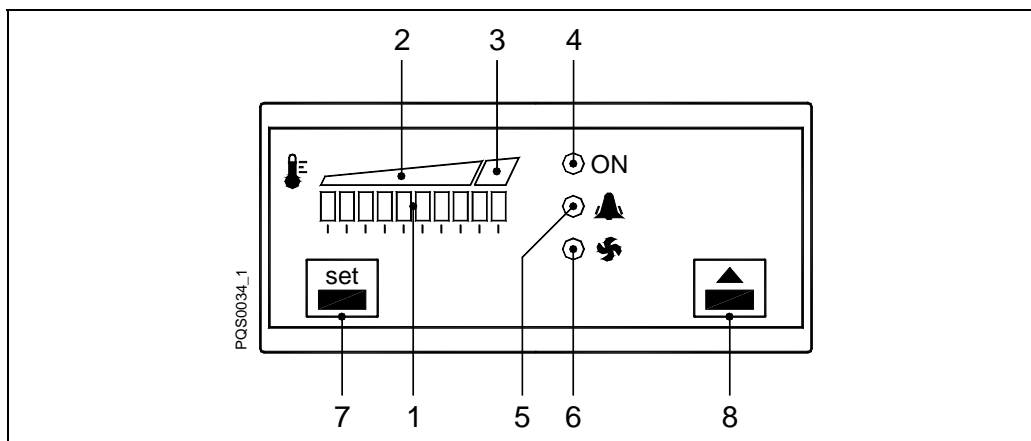
Condensate drain

3.4 Electronic regulator

The electronic regulator DDS5 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 (1130A-1138A)

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 (flashing)
- 6 Led yellow : refrigerant condenser fan on (1130A-1138A)
- 7 Set key
- 8 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

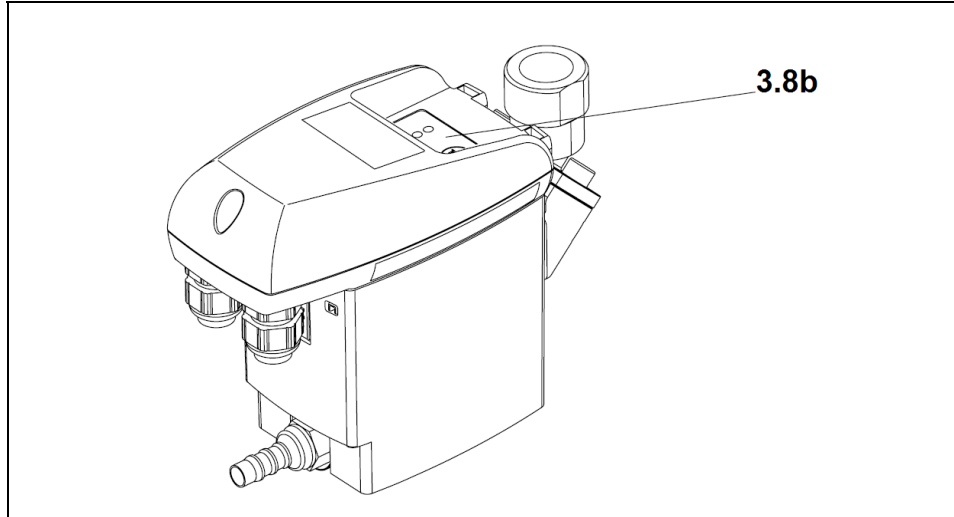
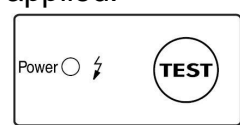


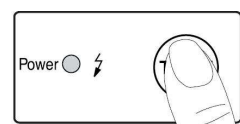
Fig. 3.8b Condensate drain Operation panel

Type 1130A-1144A

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



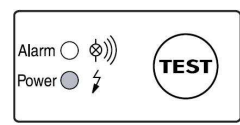
- Ready for operation. Power On
 If the condensate discharge is not functioning properly, the valve will keep opening (about every 2 seconds) so as to clear the fault automatically, if possible.



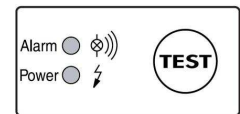
- Test valve function (manual drainage). Press button for approx. 2 seconds. In response to longer pressing, the valve will keep opening. Do not use this function for continuous draining!

Type 1145A-1146A

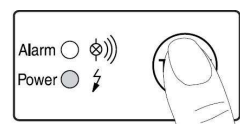
The operating states are indicated by two LED's.



- Ready for operation. Power on.



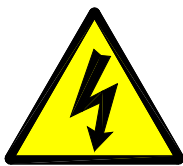
- Malfunction / Alarm.



- 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

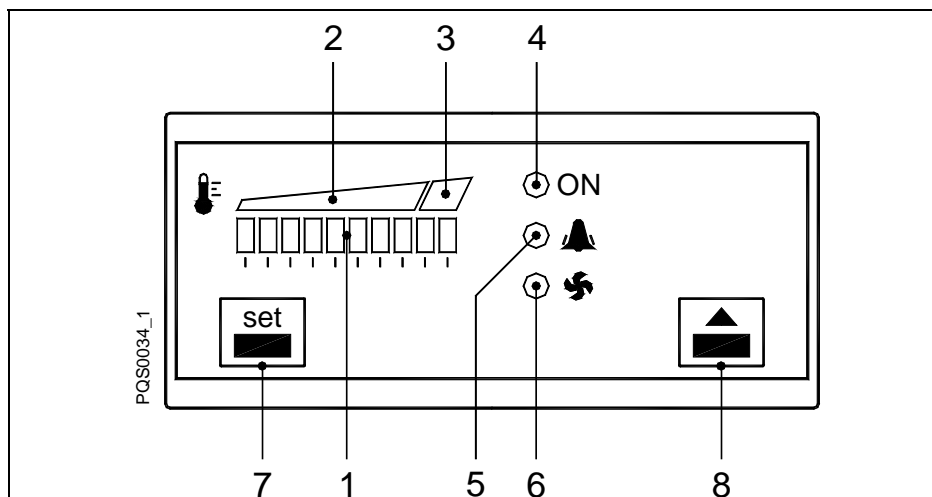
The CA-dryer is switched on via operation switch (Apx 1/6). After approx. 5 minutes the compressed air admission is possible by connecting the compressed air compressor. The CA-dryer is designed for continuous operation and may remain switched on during periods of no load, as it adapts to the required 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. Press SET key (7) for 2 seconds to change from display into setup mode.
2. First data is ALARM_{ON}, shortly press SET key (7) to go to data FAN_{ON}, shortly press SET key (7) to return to data ALARM_{ON}.
3. In order to adjust actual data, keep pressed SET key (7) and press UP key (8).
4. During the setup, led flashing will identify which data is displayed :
 - led ON (4) and ALARM (5) flashing = ALARM_{ON} data
 - led ON (4) and FAN (6) flashing = FAN_{ON} data
5. Setup exit is automatic after 2 minutes or by pressing UP key (8).

- 4.3.2 Electronic regulator**
- Data range
- ALARM_{ON}**
RT1 temperature too high setpoint (ALARM_{ON}) is adjustable in the range +2 ... 20 °C (factory setting 18°C), resolution 2°K, hysteresis -2°K.
(ie : ALARM_{ON} = 18°C; Alarm is active with RT1 temperature ≥18°C for at least 5 minutes; Alarm condition resets immediately with RT1 temperature <16°C).
- FAN_{ON}**
RT2 temperature fan setpoint (FAN_{ON}) is adjustable in the range +31 ... 40 °C (factory setting 35°C), resolution 1 °K, hysteresis -5°K.
(ie : FAN_{ON} = 35°C; Fan start running with RT2 temperature ≥35°C; Fan stop running with RT2 temperature <30°C).
- 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

Condensate drain: replace service unit.
For further information see separate drain instruction.

Leak tightness check : CA-Dryers mentioned in this manual have refrigerant charge ≤ 30 kg (refrigerant quantity as stated in the nameplate) : the maximum allowed leak rate of 2 % must not be exceeded.

5.1.4 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

1. Check and ensure power supply if necessary.
2. If the power supply is ok, contact service or send CA-dryer to the manufacturer.

5.2.2 Pressure dew point too high

1. Temporary overload of the CA-dryer due to non-uniform compressed air consumption ⇒ check CA-dryer's capacity (see 3.4).
2. Ambient temperature too high or the room aeration is insufficient ⇒ reduce temperature and/or provide proper ventilation.
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. RT1 dew point sensor doesn't detect the temperature properly ⇒ ensure the sensor is pushed into the bottom of probe well or RT1 dew point sensor need to be replaced.
5. Refrigerant condenser fan is never running ⇒ see 5.2.6.
6. Refrigerant condenser is polluted ⇒ clean condenser.
7. Hot gas by-pass valve is out of setting ⇒ contact service.
8. Leak in the refrigerating fluid circuit ⇒ contact service.

5.2.3 Pressure dew point too low

1. Ambient temperature is too low ⇒ restore normal condition.
2. **(type 1130A-1138A)** Refrigerant condenser fan is always on and electronic regulator's FAN led is flashing ⇒ see 5.2.11.2.
3. **(type 1139A-1146A)** Refrigerant condenser fan is always on ⇒ Fan control pressure switch SPV is defective ⇒ contact service.
4. 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.

5.2.4 Water in compressed air system

1. Condensate drain is not drained sufficiently ⇒ see 5.2.12.
2. CA-operating pressure too low ⇒ increase operating pressure; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
3. Temporary overload of the CA-dryer due to non-uniform compressed air consumption ⇒ check CA-dryer's capacity (see 3.4).
4. CA-dryer volume flow too high ⇒ reduce volume flow; ⇒ check whether CA-dryer's capacity is properly selected, increase CA-dryer's capacity.
5. CA-inlet temperature too high ⇒ restore normal conditions.
6. **(Only with installed bypass line)** Bypass valve is open ⇒ close bypass valve.
7. **(Only with installed bypass line)** Bypass valve is leaking ⇒ seal or replace bypass valve.

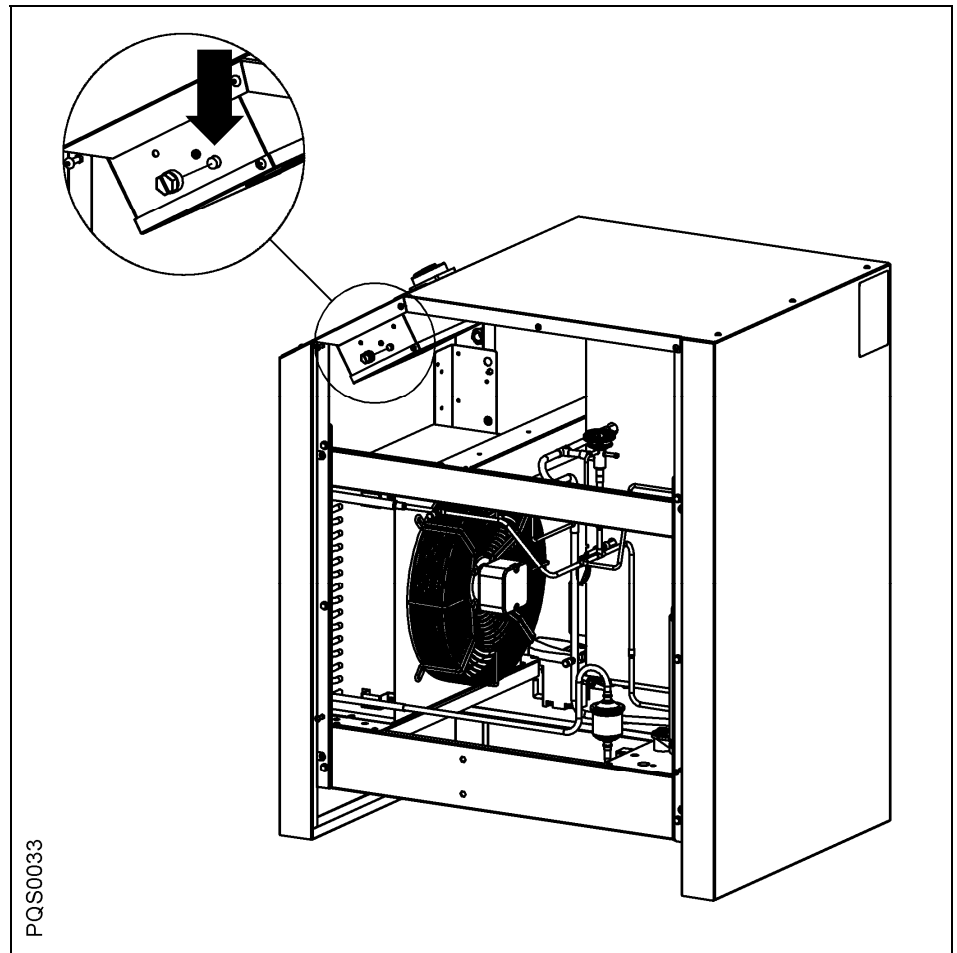
- 5.2.5 Stopping CA-dryer during operation**
1. Compressor's internal overload protection (klixon) is tripped ⇒ eliminate cause of trouble (see 3.4) or contact service. CA-dryer will restart automatically after compressor has cooled down.
Note: the immediate restarting of the unit is not possible because 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-1138A)** Electronic regulator is defective ⇒ contact service.
 4. **(type 1139A-1146A)** Fan control pressure switch SPV 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 5.2.12.
 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

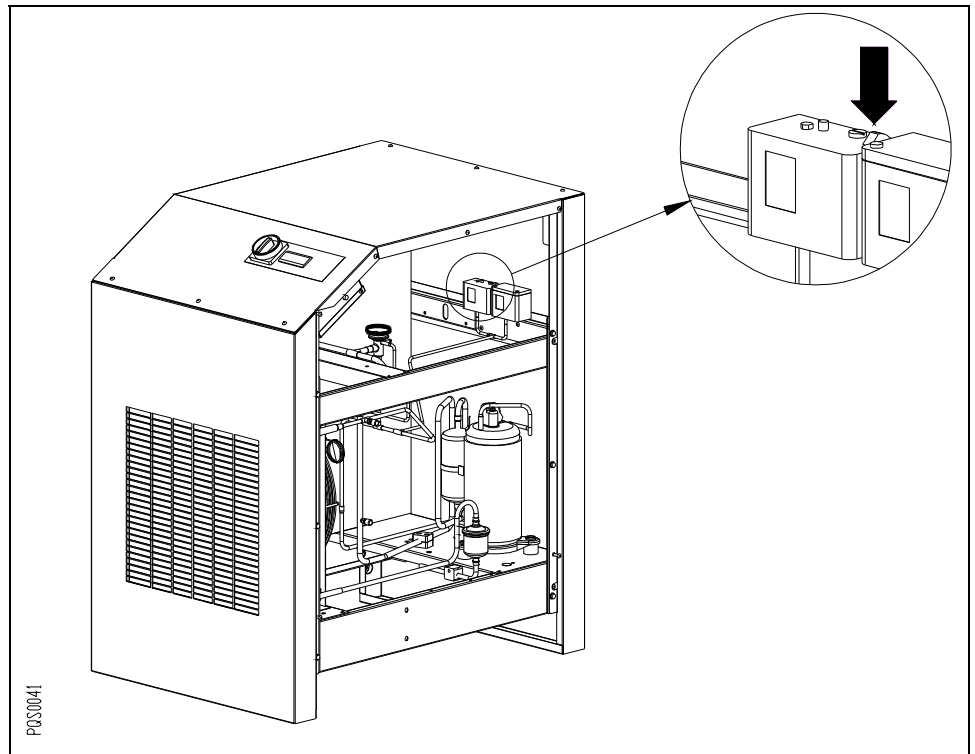


5.2.9 Safety high pressure-switch FPA is tripped (type 1143A-1146A)

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

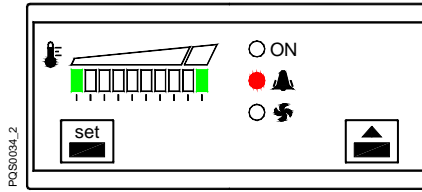


5.2.11 Electronic regulator DDS5

Symptom

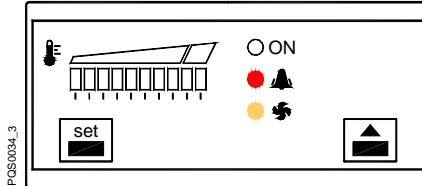
Cause ⇒ Remedy

- 5.2.11.1 Alarm led and display 1st (left) and 10th (right) led are flashing



RT1 dew point sensor is defective ⇒ replace it.

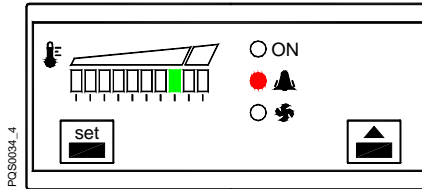
- 5.2.11.2 Alarm led and Fan led are flashing (type 1130A-1138A)



RT2 fan control sensor is defective ⇒ replace it.

Note: refrigerant condenser fan is always running.

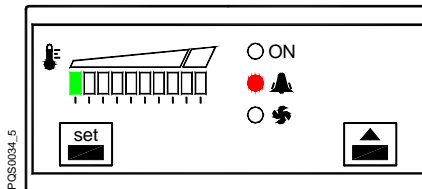
- 5.2.11.3 Alarm led is flashing and display led is lighted



Pressure dew point alarm (higher than $ALARM_{ON}$ setpoint ⇒ see 5.2.2 and 4.3.

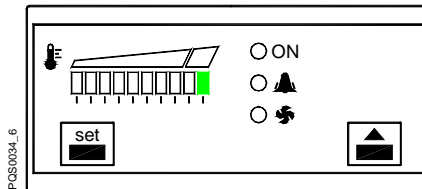
Note: alarm become active 5 minutes later with dewpoint temperature continuously higher than $ALARM_{ON}$ setpoint

- 5.2.11.4 Alarm led and display 1st (left) led are flashing



Pressure dew point too low (lower than $-1^{\circ}C$) ⇒ see 5.2.3.

- 5.2.11.5 Display 10th (right) led is flashing



Pressure dew point too high (higher than $24^{\circ}C$) ⇒ see 5.2.2.

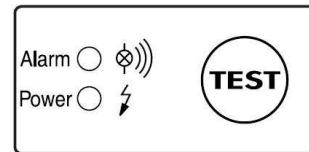
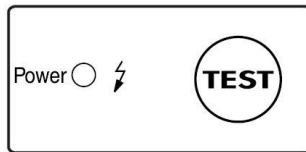
Note: Alarm led could be lighted or not (alarm become active 5 minutes later with dewpoint temperature continuously higher than $ALARM_{ON}$ setpoint)

5.2.12 Condensate drain

Symptom

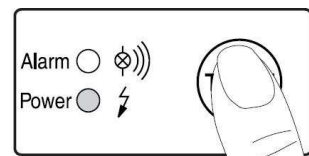
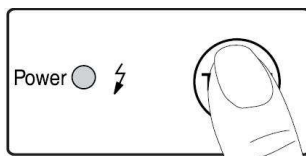
Cause ⇒ Remedy

5.2.12.1 LED not lighting up



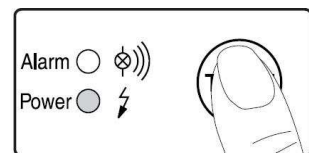
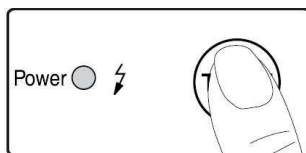
Power supply faulty.
 Power supply board defective.
 - Check voltage on type plate.
 - Check connections.
 - Check of the circuit boards for possible damage to be carried out by qualified personnel only.

5.2.12.2 Pressing of test button, but no condensate discharge



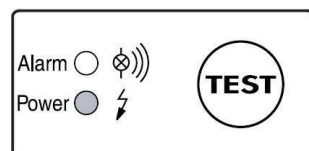
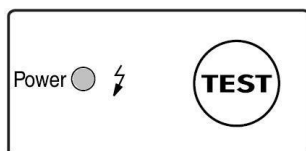
Feed and / or outlet line shut off or blocked.
 Worn parts (seals, valve core, diaphragm).
 Power supply board defective.
 Service unit defective.
 Dropping below necessary minimum pressure.
 Maximum pressure exceeded.
 - Check feed line and outlet line
 - Check if valve opens audibly (press test button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

5.2.12.3 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.

5.2.12.4 Device keeps blowing off air



Service unit defective or dirty.
 - Replace service unit.

Technical Data

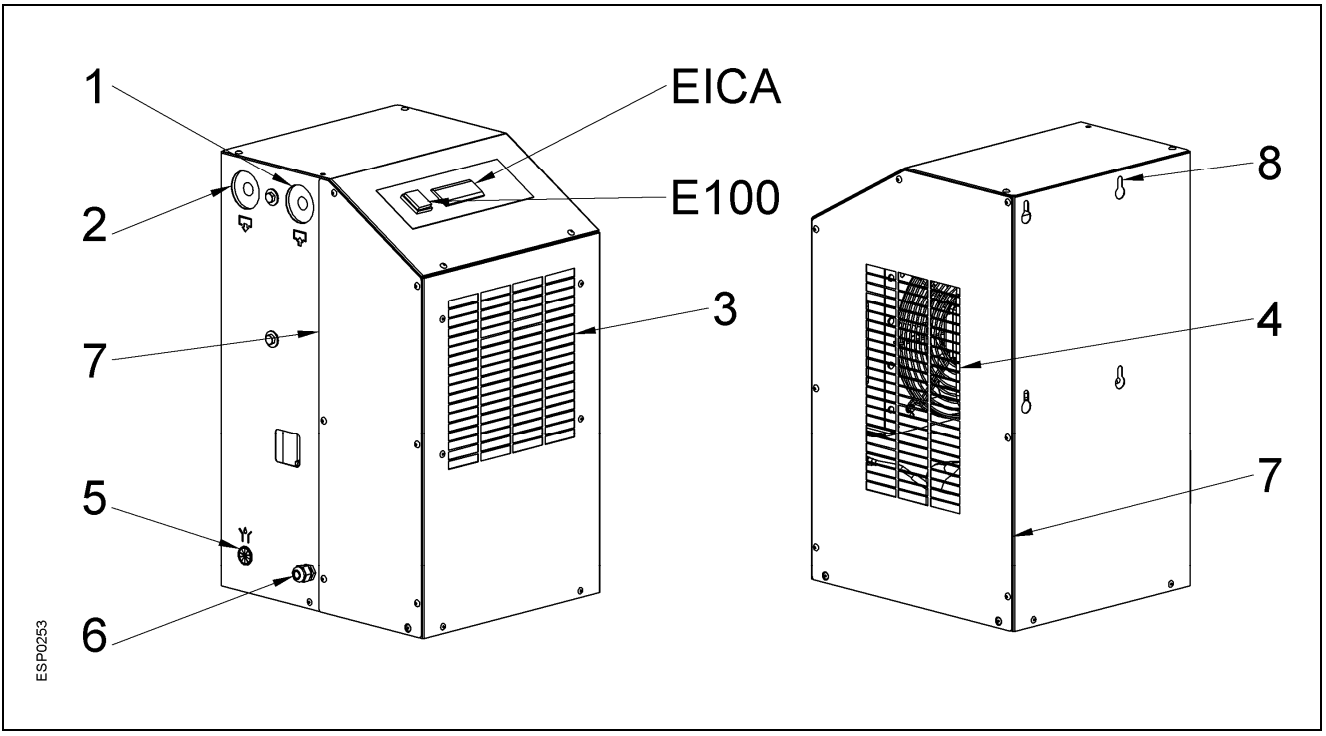
EN	Pos.	Type-No.	1130A	1131A	1132A	1133A	1134A	1135A	1136A	1137A	1138A	1139A	1140A	1141A	1142A	1143A	1144A	1145A	1146A		
						20	35	50	65	85	105	125	150	180	225	300	360	450	550	650	750
	Volume flow	m ³ /h	0.33	0.58	0.83	1.08	1.42	1.75	2.08	2.50	3.00	3.75	5.00	6.00	7.50	9.17	10.83	12.50	14.17		
	Cooling air required	m ³ /h	200																		
	Power consumption (total)	50Hz	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		
		60Hz	0.22	0.23	0.27	0.28	0.39	0.40	0.49	0.50	N.A.										
	Power consumption (fan)	50Hz	33																		
		60Hz	40																		
	Power supply	V / Hz	220-230V 1N~ / 50-60Hz																		
	Allowable pressure (compressed air)	min. max.	2 ... 16																		
		low pressure side	bar	20																	
	high pressure side	bar	30																		
	Compressed air connections	G	3/8"																		
		Weight	kg	24	26	27	29	31	31	31	33	33	33	33	33	33	33	33	33	33	39.2
	Dimensions	height	645																		
		width	360																		
		depth	410																		
	Refrigerant type		R134a																		
	Refrigerant quantity	kg	0.20	0.20	0.22	0.25	0.30	0.30	0.30	0.33	0.33	0.44	0.47	0.48	0.63	0.80	0.95	1.10	1.2	1.70	
	Sound pressure level (at distance of 1m)	dB (A)	< 70																		
	Type of protection	IP	20																		
	Condensate drain	hose	D. 8 / 14																		
Specification:			<p>Pos.1 : Volume flow 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_EN																		
Date:			08.03.2010																		
Page 1 of			1																		

APX 1	1	Compressed air inlet	6	Electric connection
	2	Compressed air outlet	7	Service access
	3	Cooling air inlet	8	Fixing holes
	4	Cooling air outlet	E100	Operation switch
	5	Condensate drain	EICA	Electronic regulator
APX 2 & APX 4	W100	Heat exchanger complete	EIC4	Fan sensor
	W10L	Heat exchanger air/air	V710	Condensate drain service valve
	W10K	Heat exchanger refrigerant/air	EICA	Electronic regulator
	B100	Condensate separator	A100	Condensate drain – complete
	W110	Heat exchanger insulation shell	E100	Main switch
	TSAH	Safety thermo-switch	51	Front panel
	PSAH	Refrigerant high pres.-switch	52	Rear panel
	PS00	Refrigerant pres.-switch Fan	53	Right lateral panel
	V100	Refrigerant compressor	54	Left lateral panel
	V400	Hot gas by-pass regulator	55	Cover panel
	W200	Refrigerant condenser	56	Base plate
	M200	Fan (motor)	58	Support beam
	M201	Fan blade	60	Control panel
	M203	Fan grid	66	Cover control panel
	F100	Filter drier	81	Flow diagram sticker
	X500	Capillary tube	A160	Condensate drain – service unit
	EIC3	DewPoint sensor	X100	Schrader valve
APX 3	S1	Main switch	TSAH	Safety thermo-switch
	K	Refrigerant compressor	PSAH	Refrigerant high pres.-switch
	KT	Compressor thermal protection	PS00	Refrigerant pres.-switch Fan
	KR	Compressor starting relay	A2	DDS Electronic regulator
	CS	Compressor starting capacitor	EIC3	DewPoint sensor
	CR	Compressor run capacitor	EIC4	Fan sensor
	V	Condenser fan	B1	Condensate drainer
	KV	Fan thermal protection		
	CV	Fan starting capacitor		

APPENDIX

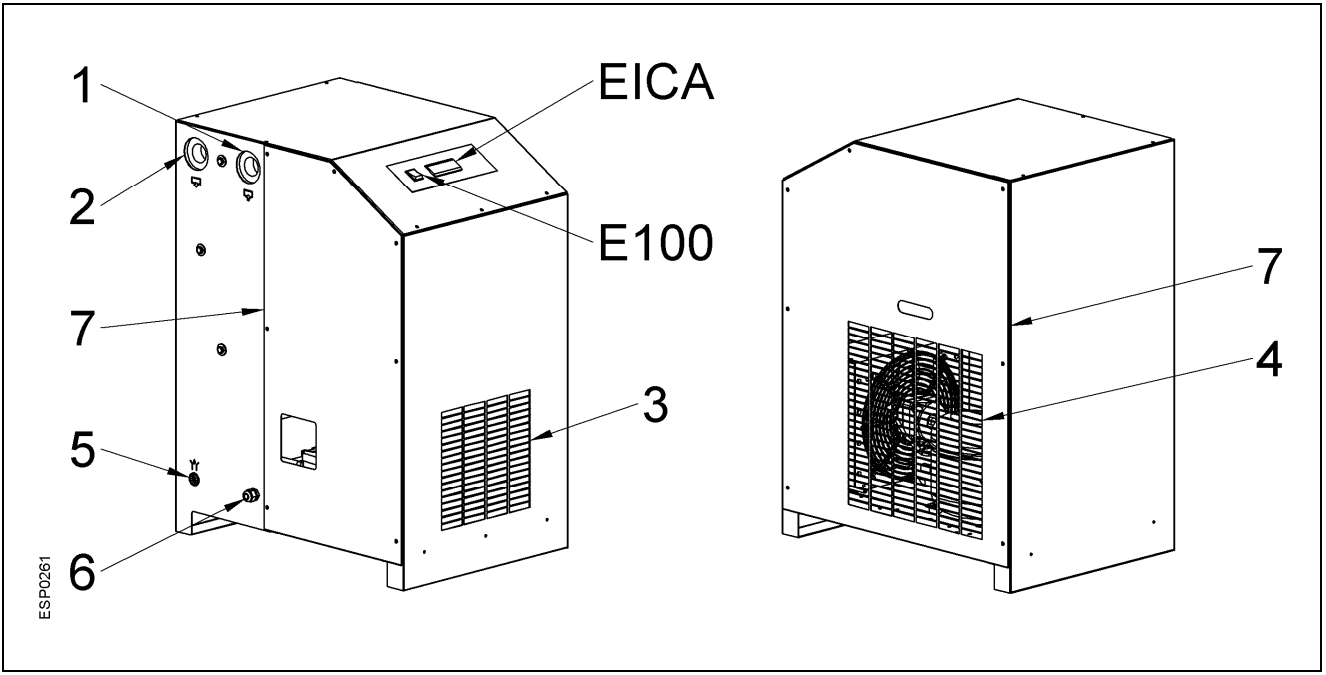
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1130 A – 1137 A



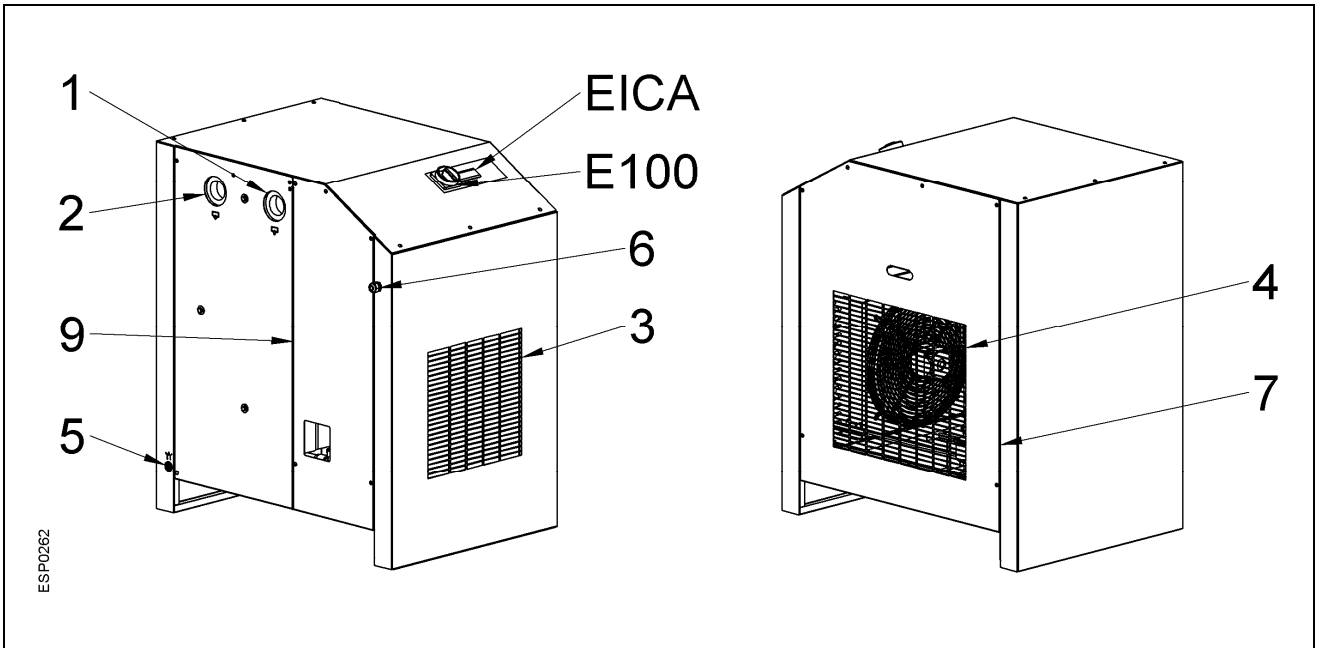
Apx 1.2

1138 A – 1142 A



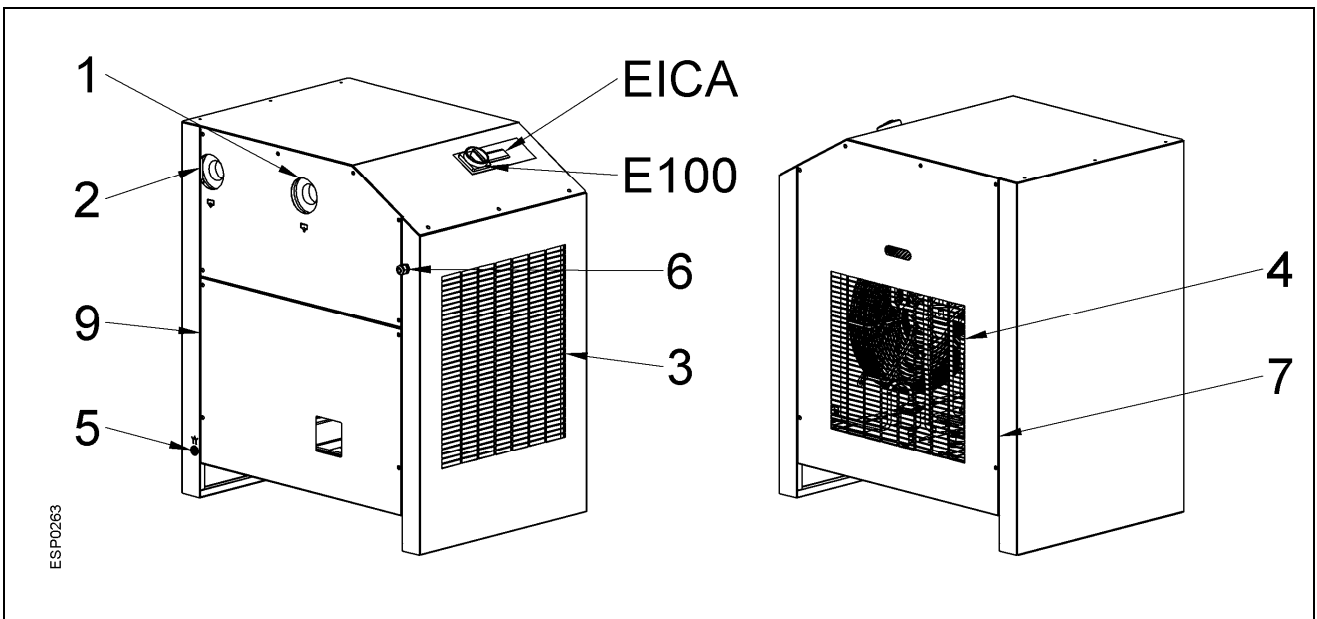
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1143 A – 1145 A



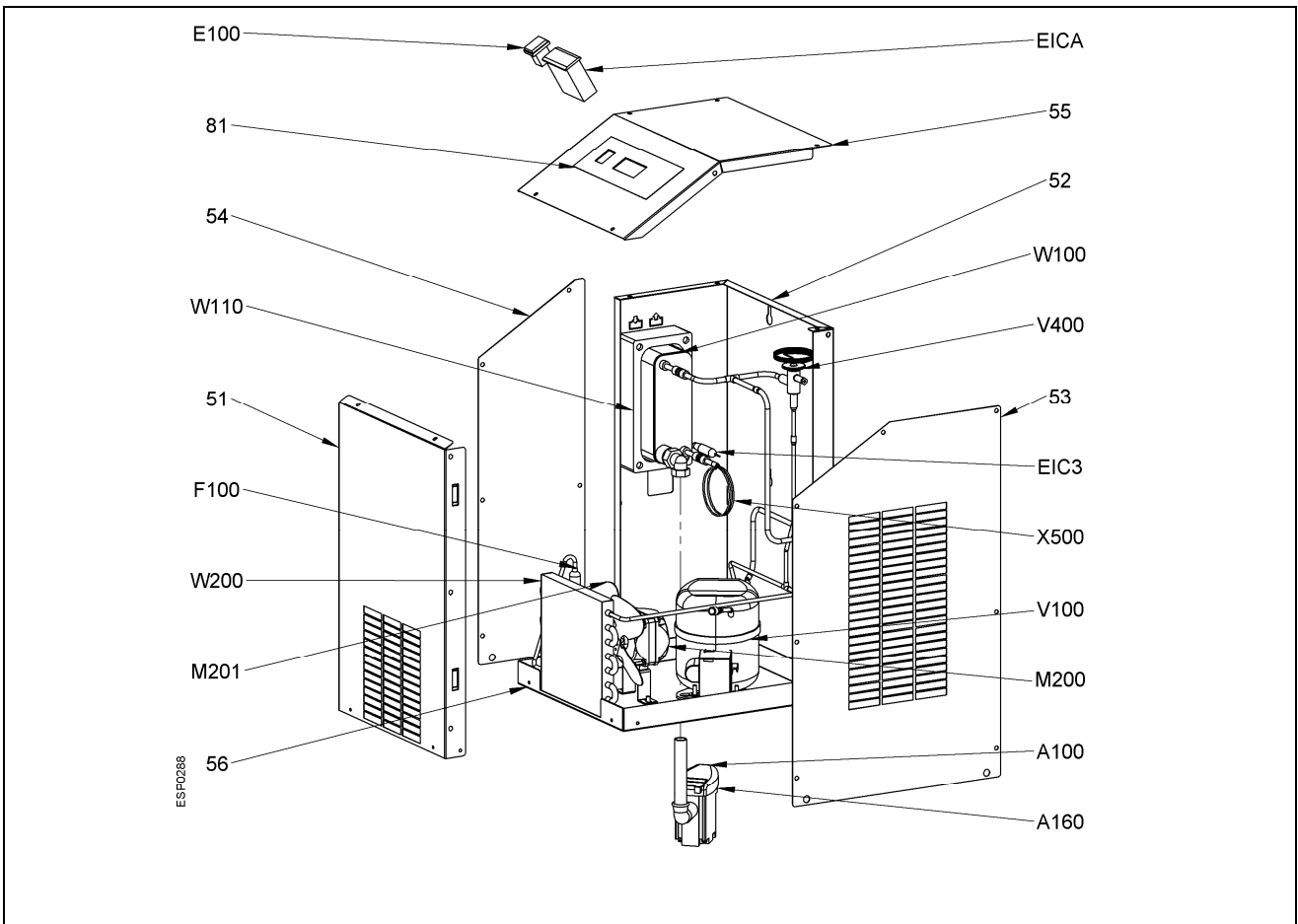
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1146 A



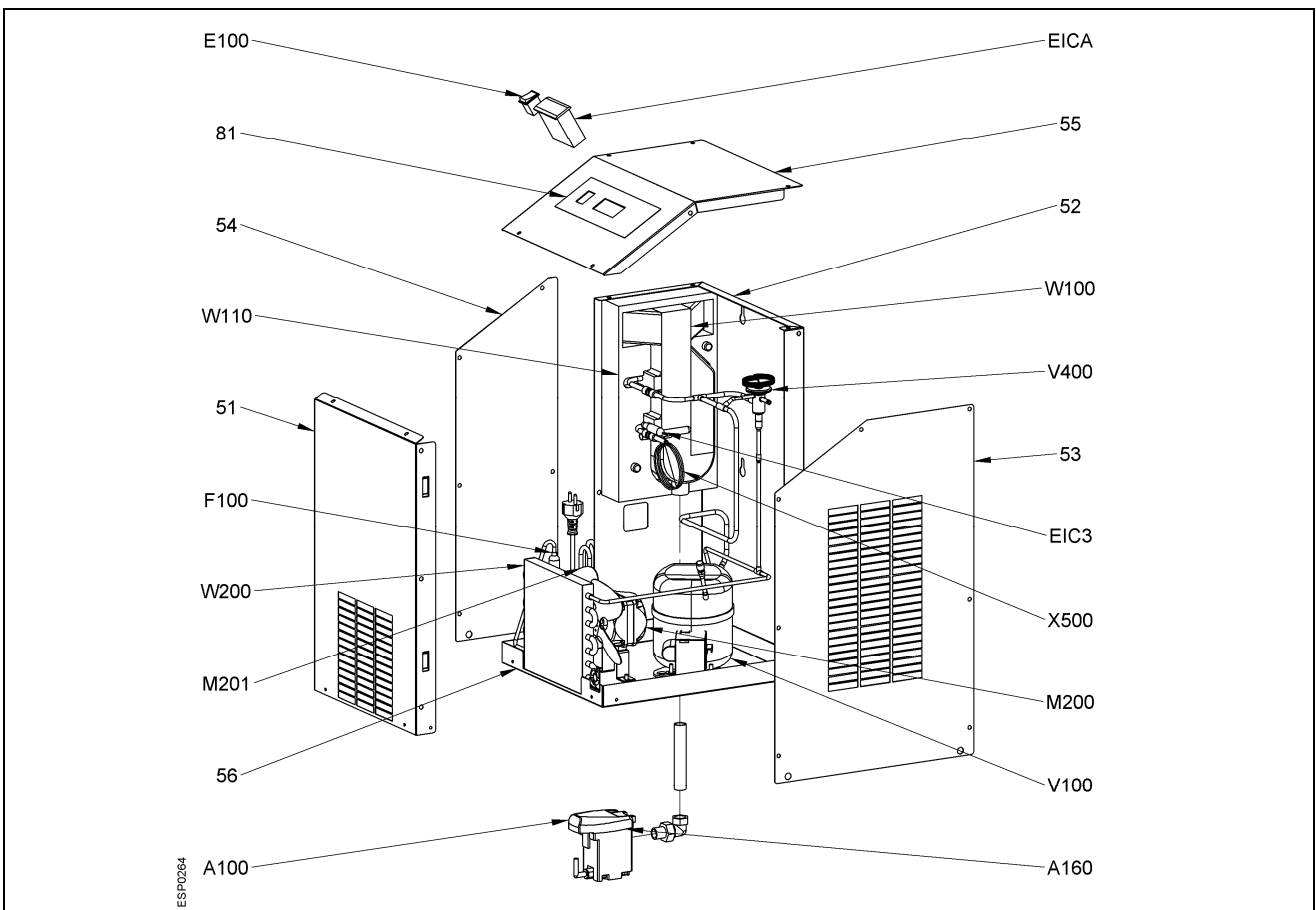
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1130 A



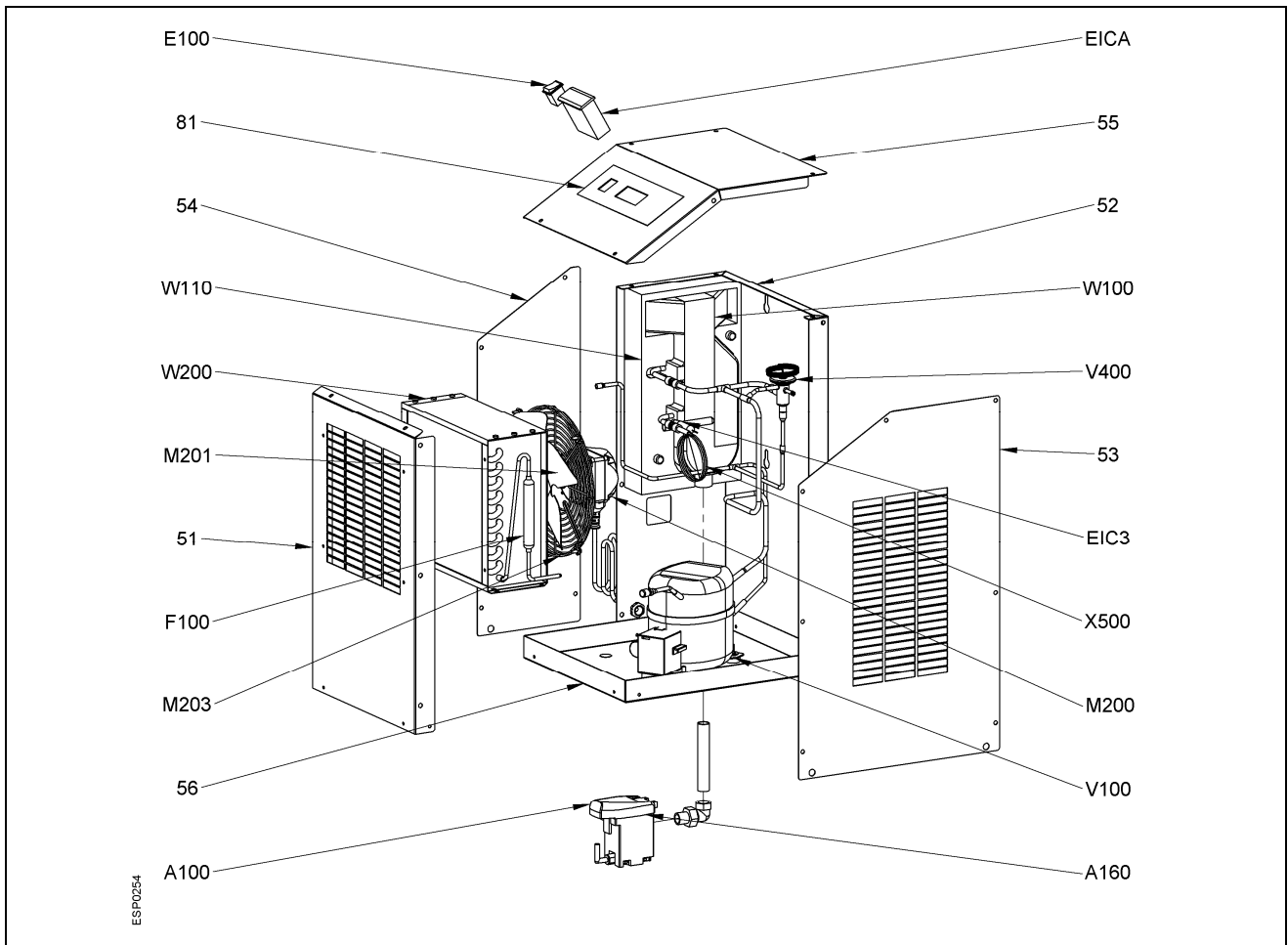
Apx 2.2

1131 A – 1132 A



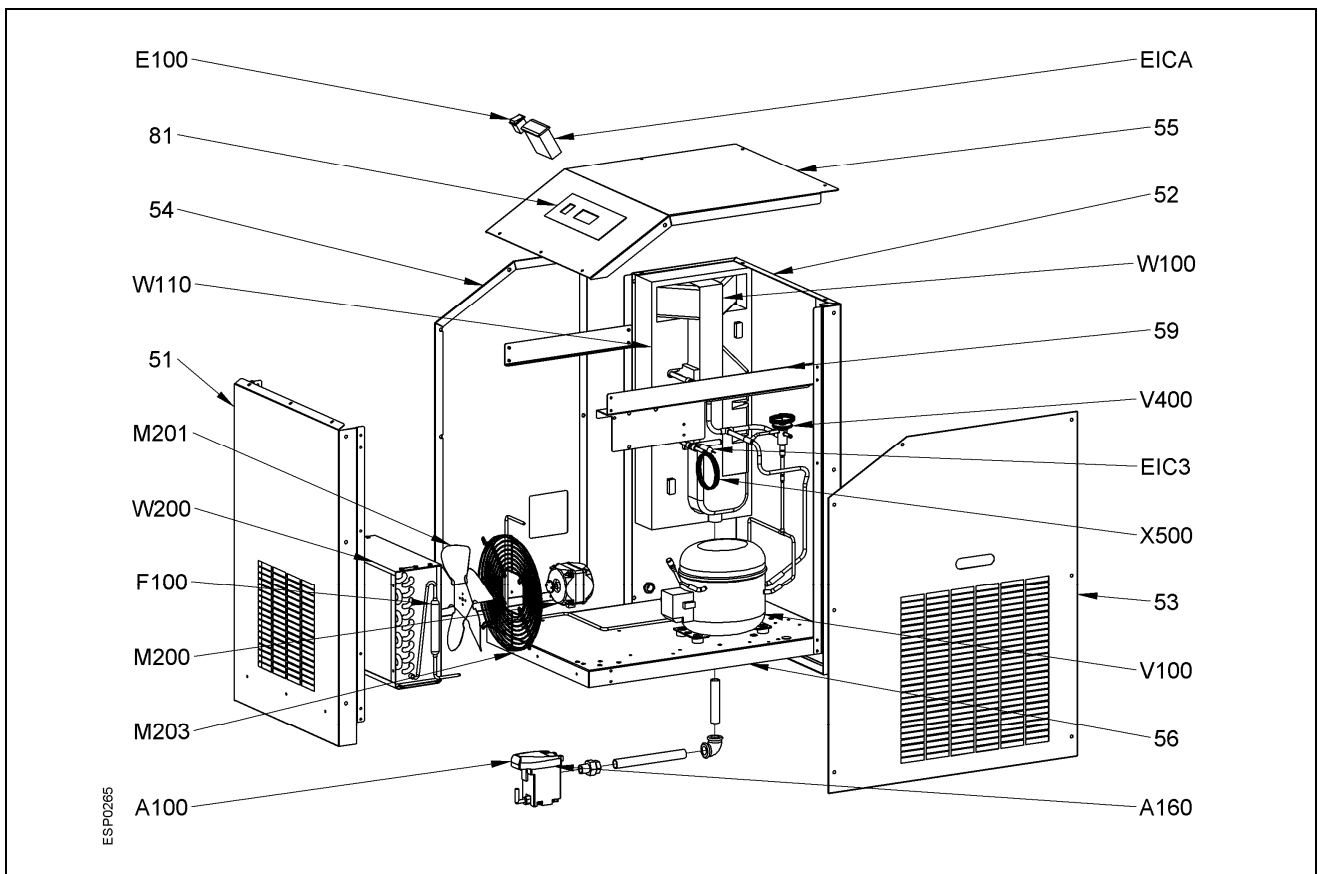
Apx 2.3

1133 A – 1137 A



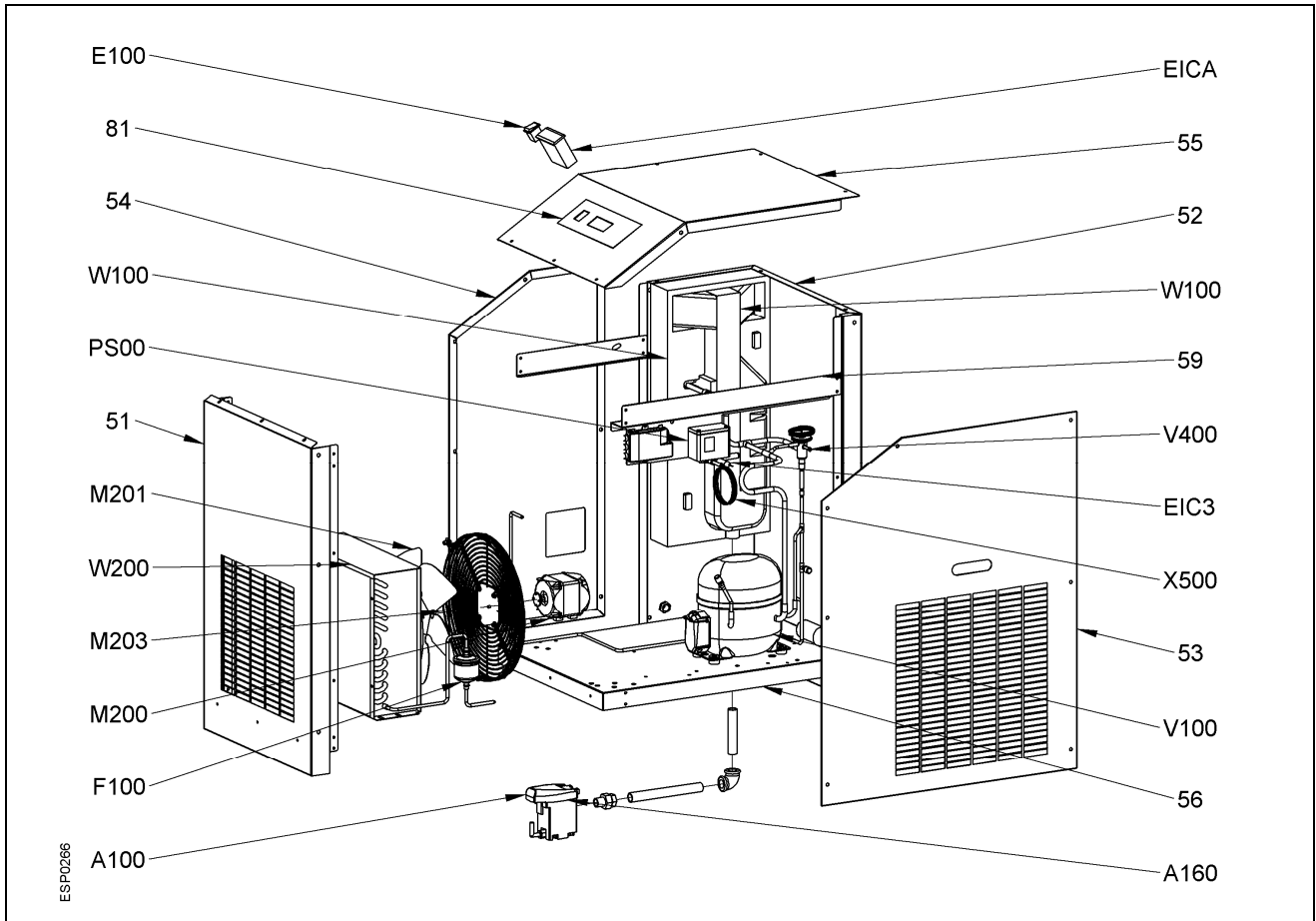
Apx 2.4

1138 A



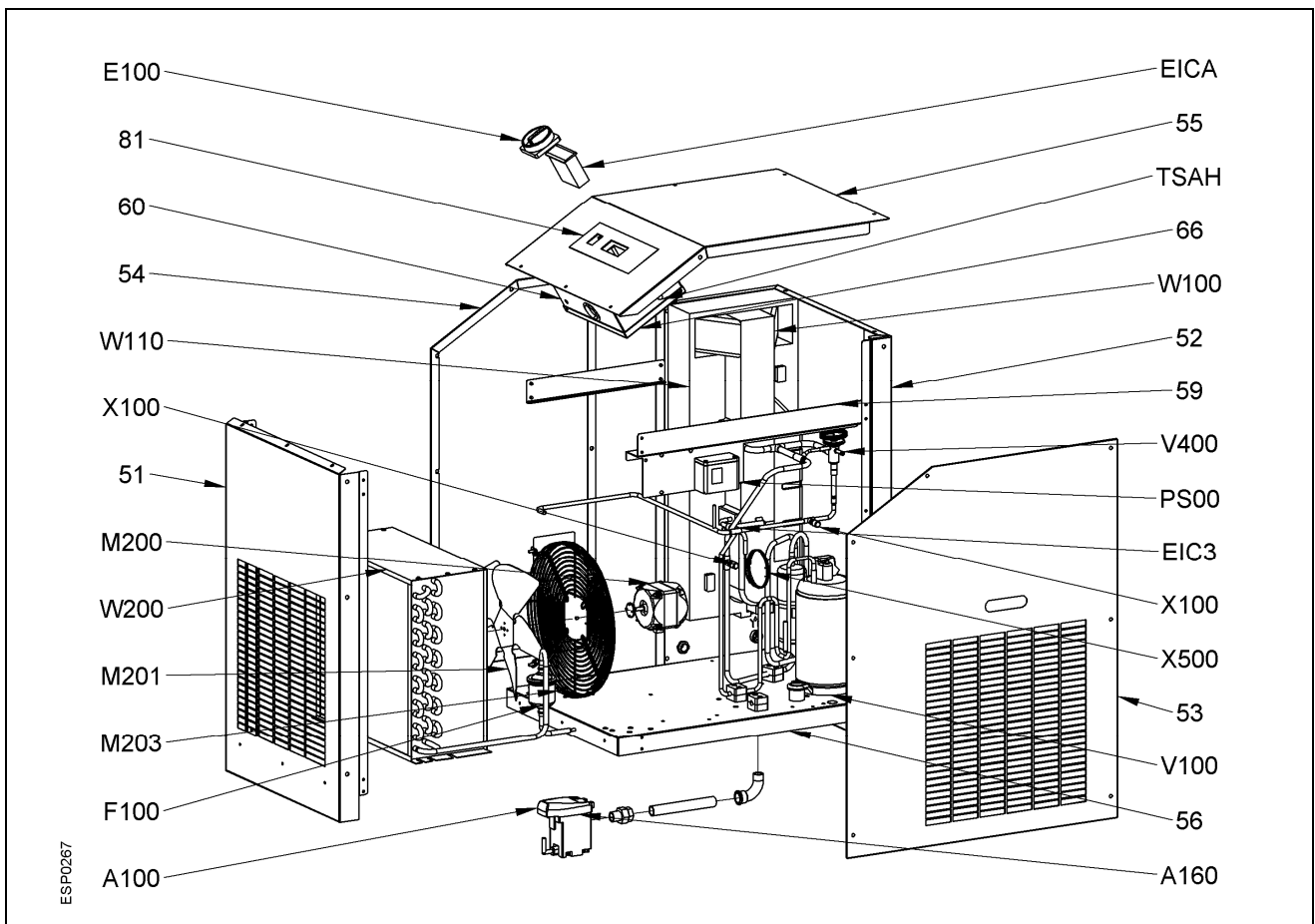
Apx 2.5

1139 A – 1141 A



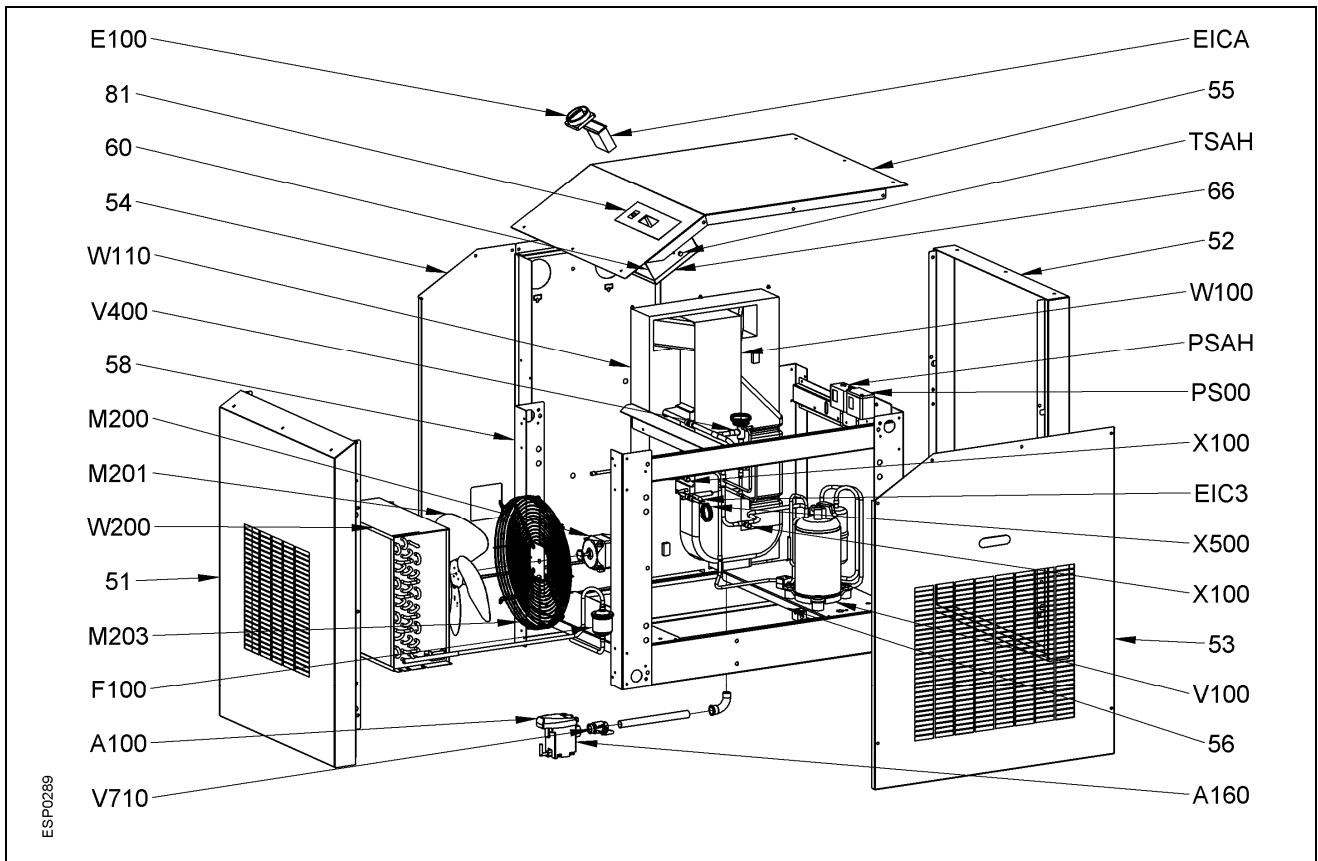
Apx 2.6

1142 A



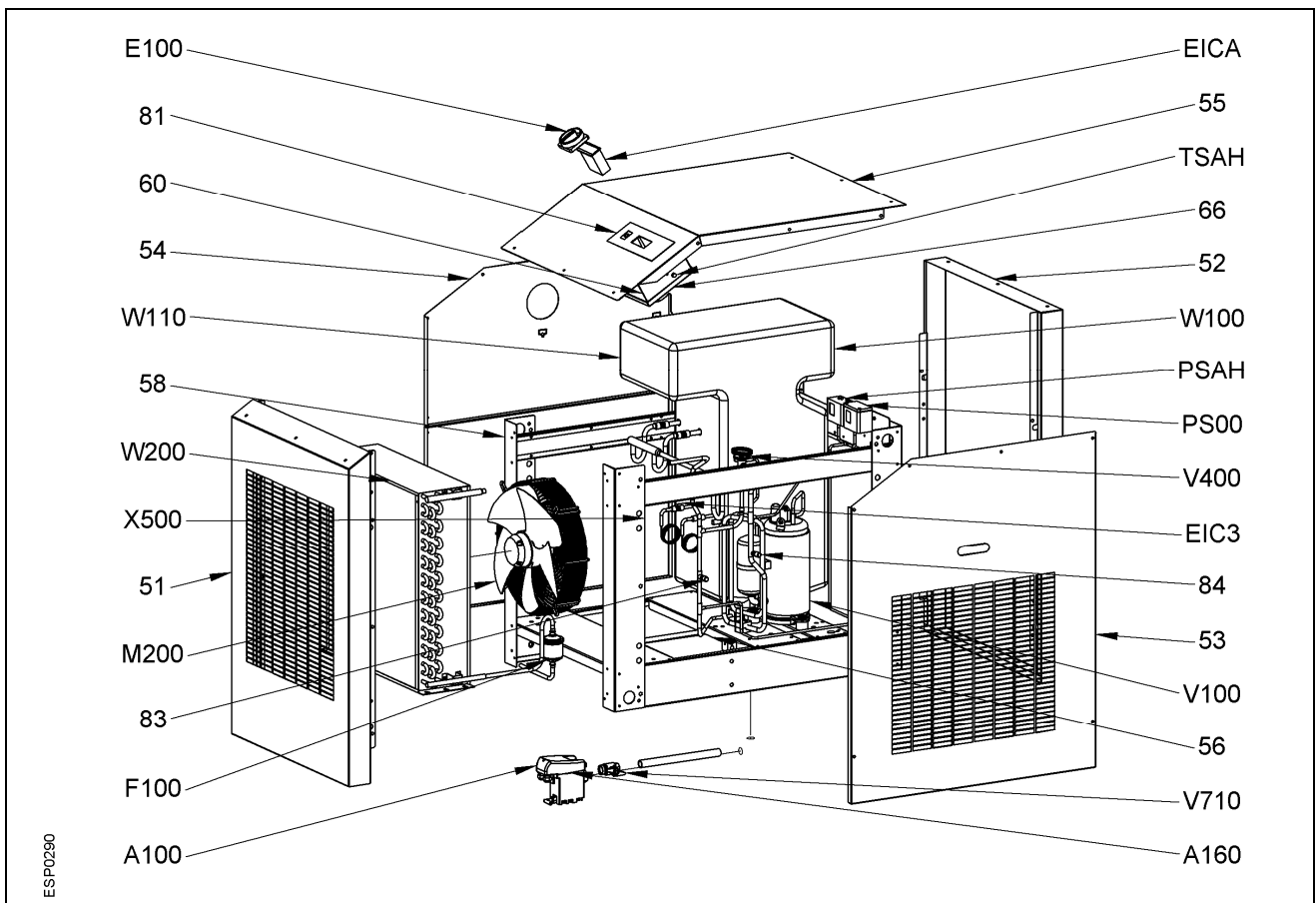
Apx 2.7

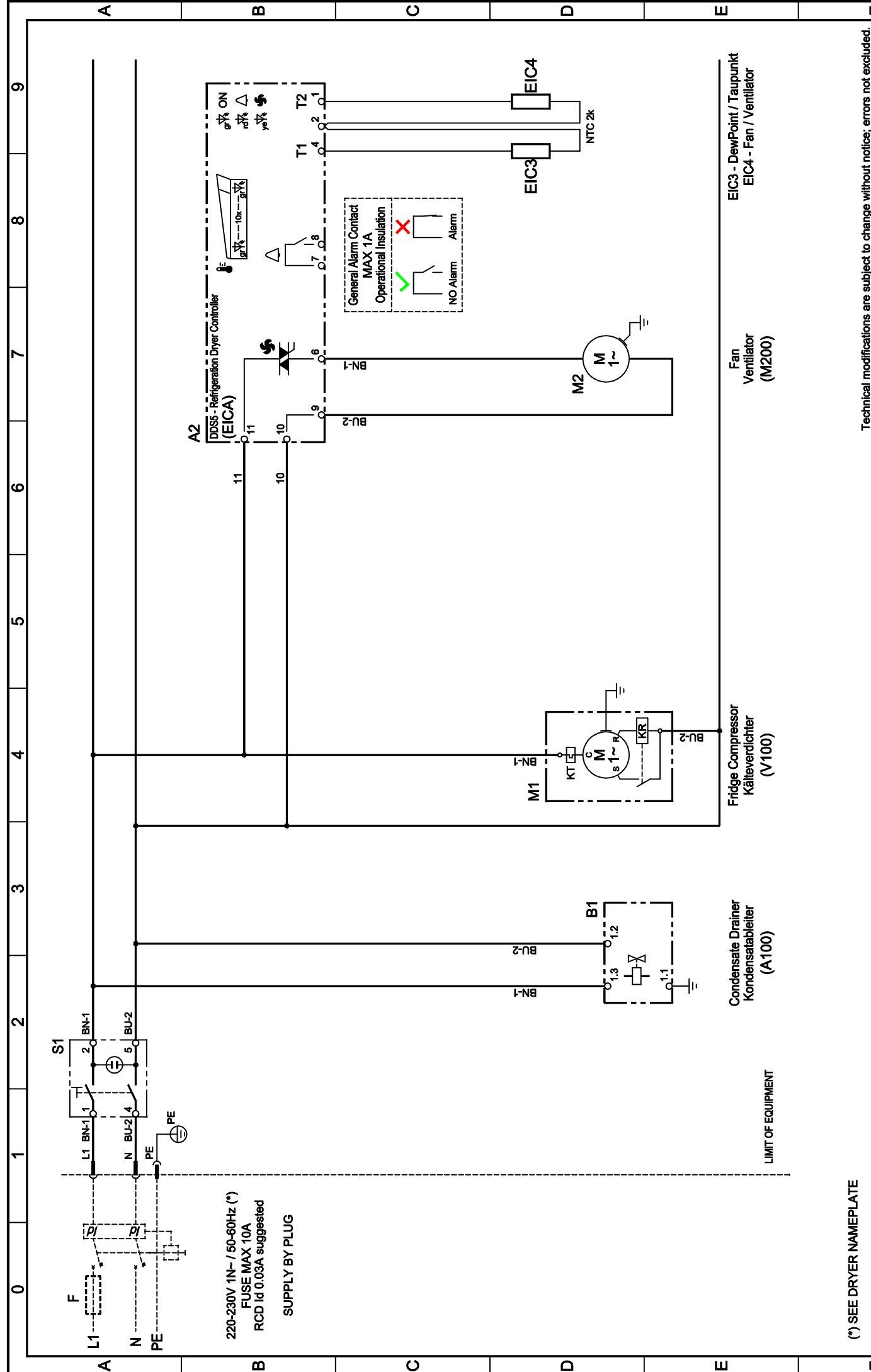
1143 A – 1145 A



Apx 2.8

1146 A

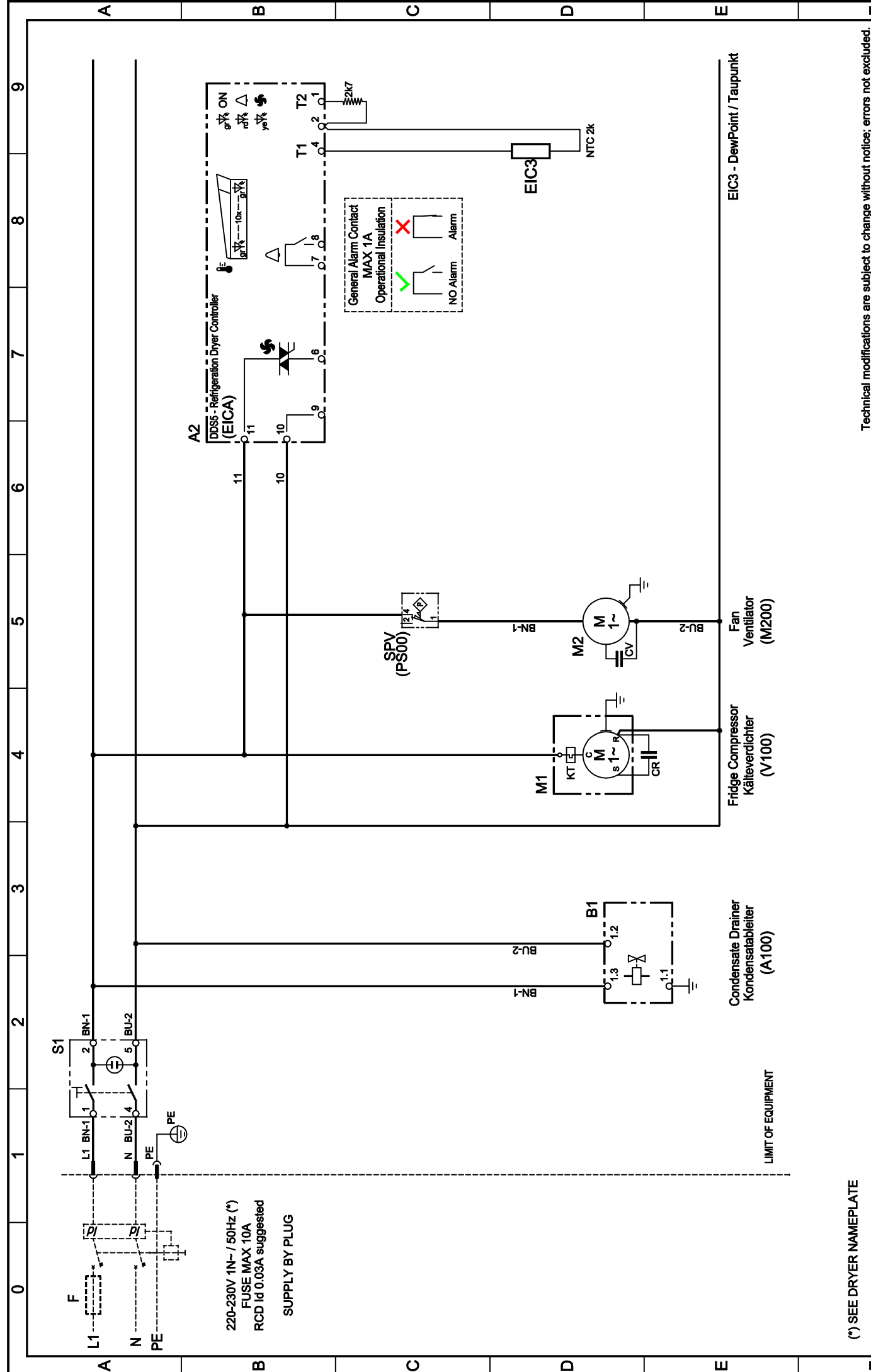




(*) SEE DRYER NAMEPLATE

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

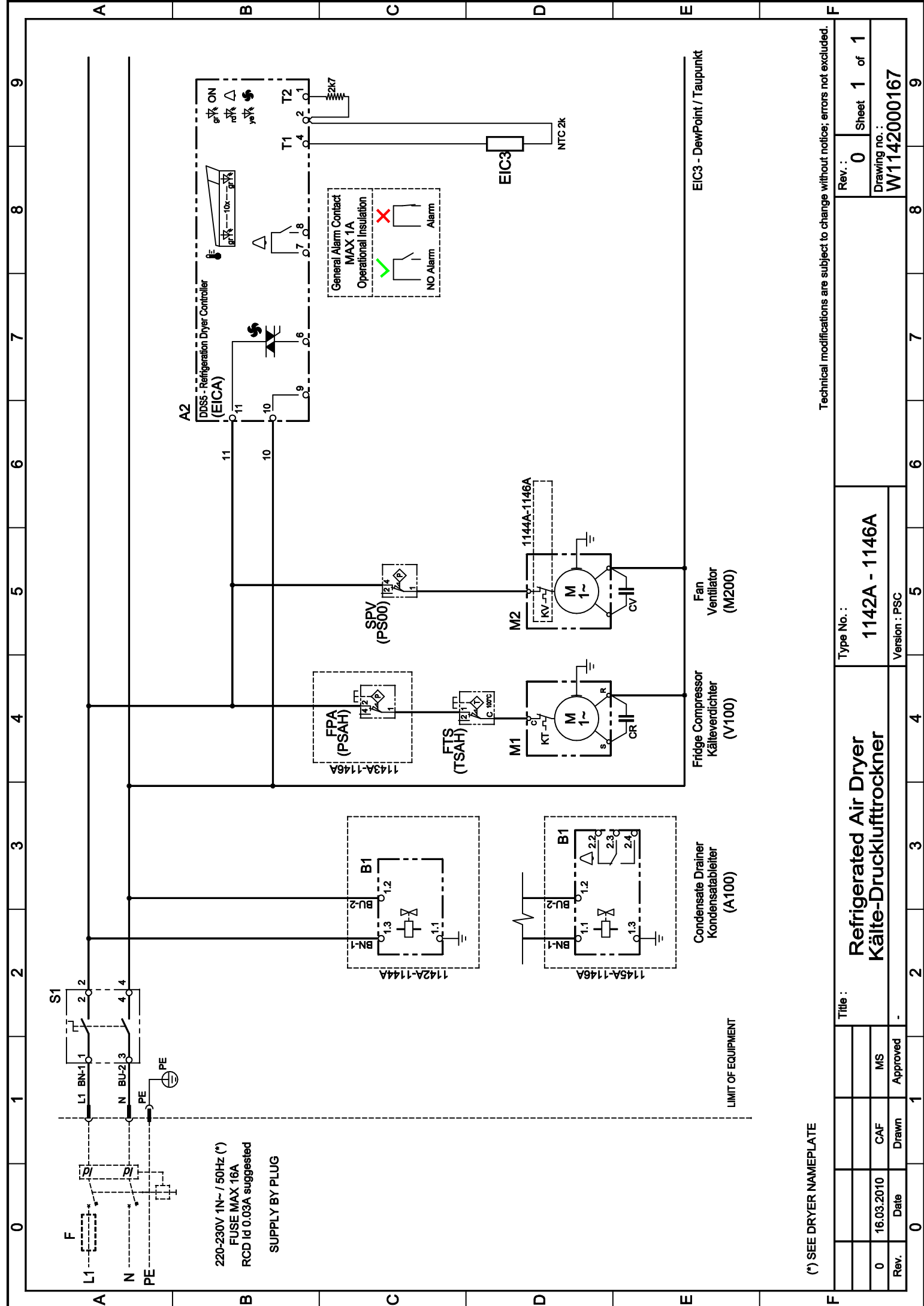
Title :		Type No. :		Rev. :		Sheet 1 of 1	
Refrigerated Air Dryer Kälte-Drucklufttrockner		1130A - 1138A		0		9	
0	16.03.2010	CAF	MS	Drawing no. : W1130000169			
Rev.	Date	Drawn	Approved	Version : RSIR			
0	1	2	3	4	5	6	7



(*) SEE DRYER NAMEPLATE

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

Title :		Type No. :	
Refrigerated Air Dryer Kälte-Drucklufttrockner		1139 - 1141A	
Rev.	Date	Drawn	Approved
0	16.03.2010	CAF	MS
Rev. : 0		Sheet 1 of 1	
Drawing no. :		W1139000167	

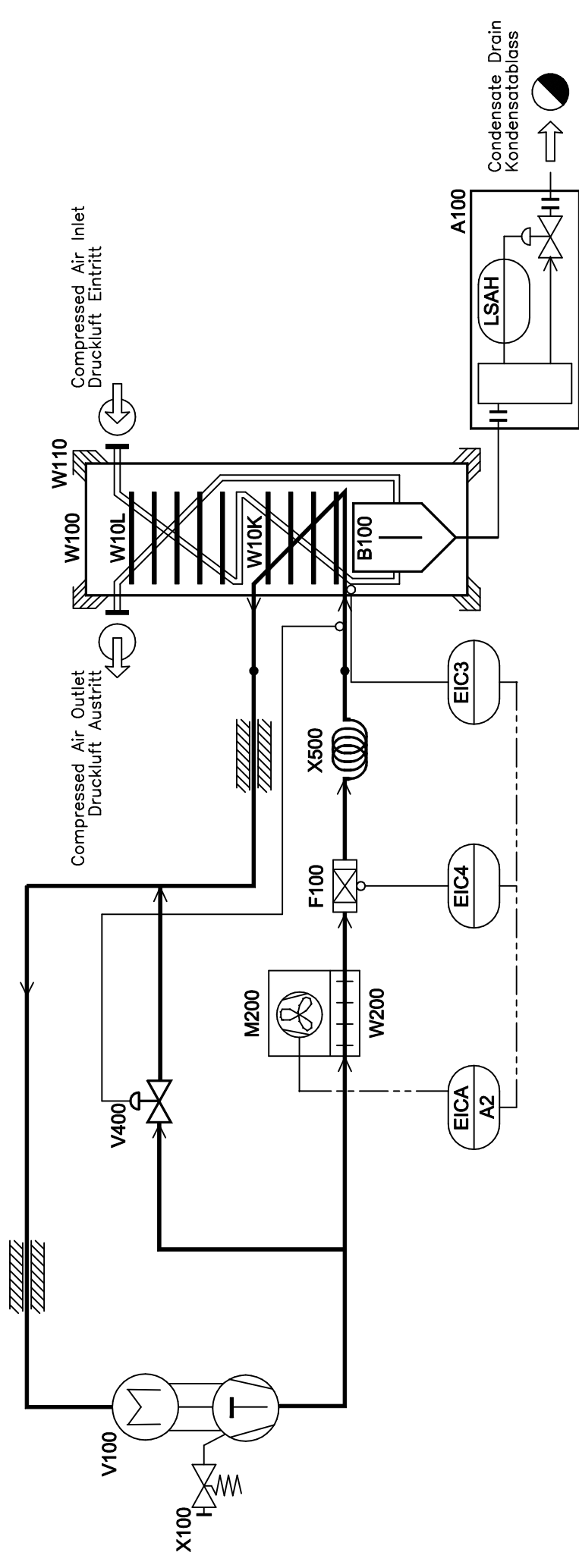


(*) SEE DRYER NAMEPLATE

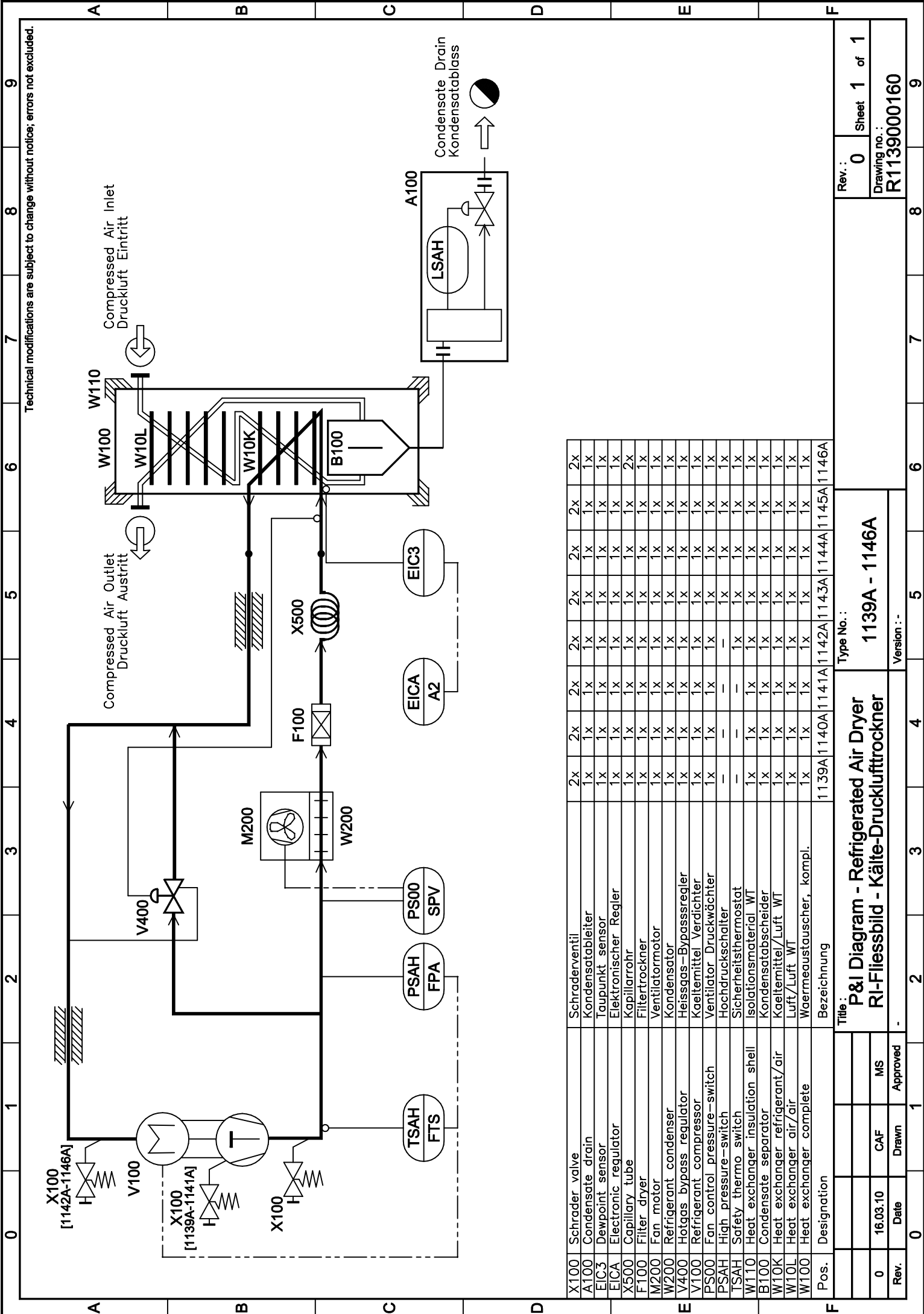
Technical modifications are subject to change without notice; errors not excluded.

Title :		Type No. :	
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Rev.	Date	Drawn	Approved
0	16.03.2010	CAF	MS
Rev. 0		Sheet 1 of 1	
Drawing no. :		W1142000167	

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



X100	Schrader valve	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x												
A100	Condensate drain	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												
EIC3	Dewpoint sensor	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												
X500	Capillary tube	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x	1x												
F100	Filter dryer	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												
W200	Refrigerant condenser	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												
V100	Refrigerant compressor	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												
B100	Condensate separator	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												
W10L	Heat exchanger air/air	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												
Pos.	Designation	1130A			1131A			1132A			1133A			1134A			1135A			1136A			1137A			1138A		
		Title:																										
		Type No.:																										
		1130A - 1138A																										
		Version: -																										
0	16.03.10	CAF	MS																									
Rev.	Date	Drawn	Approved																									
0																												
Rev.:	0	Sheet 1 of 1																										
		Drawing no.:																										
		R1130000160																										



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

Pos.	Designation	1139A	1140A	1141A	1142A	1143A	1144A	1145A	1146A
X100	Schraderventil	2x	2x	2x	2x	2x	2x	2x	2x
A100	Kondensatableiter	1x	1x	1x	1x	1x	1x	1x	1x
EIC3	Dewpoint sensor	1x	1x	1x	1x	1x	1x	1x	1x
EICA	Elektronischer Regler	1x	1x	1x	1x	1x	1x	1x	1x
X500	Kapillarrohr	1x	1x	1x	1x	1x	1x	1x	2x
F100	Filtertrockner	1x	1x	1x	1x	1x	1x	1x	1x
M200	Fan motor	1x	1x	1x	1x	1x	1x	1x	1x
W200	Refrigerant condenser	1x	1x	1x	1x	1x	1x	1x	1x
V400	Hotgas bypass regulator	1x	1x	1x	1x	1x	1x	1x	1x
V100	Refrigerant compressor	1x	1x	1x	1x	1x	1x	1x	1x
PS00	Fan control pressure-switch	1x	1x	1x	1x	1x	1x	1x	1x
PSAH	High pressure-switch	-	-	-	-	-	-	-	-
TSAH	Safety thermo switch	-	-	-	-	-	-	-	-
W110	Heat exchanger insulation shell	1x	1x	1x	1x	1x	1x	1x	1x
B100	Condensate separator	1x	1x	1x	1x	1x	1x	1x	1x
W10K	Heat exchanger refrigerant/air	1x	1x	1x	1x	1x	1x	1x	1x
W10L	Heat exchanger air/air	1x	1x	1x	1x	1x	1x	1x	1x
W100	Heat exchanger complete	1x	1x	1x	1x	1x	1x	1x	1x
Pos.	Designation	1139A	1140A	1141A	1142A	1143A	1144A	1145A	1146A

Rev.: 0 Sheet 1 of 1
 Drawing no.: R1139000160

Type No.: 1139A - 1146A
 Version: -

Title: P&I Diagram - Refrigerated Air Dryer
 RI-Fließbild - Kälte-Drucklufttrockner

16.03.10 Date
 CAF Drawn
 MS Approved



EG-Konformitätserklärung
 EC declaration of conformity
 Déclaration "CE" de conformité
 EG-verklaring van overeenstemming
 EU-konformitetsforklaring

FSN002003 Rev.03

DE - EN - FR
 NL - DA

Hiermit enklären wir, dass die:
 Herewith we declare that:
 Par la présente, nous déclarons, que la type de:
 Hiermede verklaren wij, dat de handel gebrachte machine:
 Hermed erklæres at produkttypen:

Kälte-Drucklufttrockner
 Compressed air refrigeration dryer
 Sécheur par réfrigération
 Perslucht koeldrogers
 Trykluft-køletørrer

Baureihe / Series / Série / Serie Typ / Type Artikel-Nr./Serial-No./
 No Série/Serienummer: 97/23/EG – Kat. / Cat.

DFX2 B10-230-xxx-01	1130A	1C Y 1130 B 0x 00 9	Art. 3 (3)
DFX4 B15-230-xxx-01	1131A	1C Y 1131 B 0x 00 9	Art. 3 (3)
DFX5 B15-230-xxx-01	1132A	1C Y 1132 B 0x 00 9	Art. 3 (3)
DFX7 B15-230-xxx-01	1133A	1C Y 1133 B 0x 00 9	Art. 3 (3)
DFX9 B15-230-xxx-01	1134A	1C Y 1134 B 0x 00 9	Art. 3 (3)
DFX11 B15-230-xxx-01	1135A	1C Y 1135 B 0x 00 9	Art. 3 (3)
DFX13 B25-230-xxx-01	1136A	1C Y 1136 B 0x 00 9	Art. 3 (3)
DFX15 B25-230-xxx-01	1137A	1C Y 1137 B 0x 00 9	Art. 3 (3)
DFX18 B32-230-xxx-01	1138A	1C Y 1138 B 0x 00 7	Art. 3 (3)
DFX23 B32-230-xxx-01	1139A	1C Y 1139 B 0x 00 7	Art. 3 (3)
DFX30 B32-230-xxx-01	1140A	1C Y 1140 B 0x 00 7	Art. 3 (3)
DFX36 B40-230-xxx-01	1141A	1C Y 1141 B 0x 00 7	I
DFX45 B40-230-xxx-01	1142A	1C Y 1142 B 0x 00 7	I
DFX55 B50-230-xxx-01	1143A	1C Y 1143 B 0x 00 7	I
DFX65 B50-230-xxx-01	1144A	1C Y 1144 B 0x 00 7	I
DFX75 B50-230-xxx-01	1145A	1C Y 1145 B 0x 00 7	I
DFX85 B50-230-xxx-01	1146A	1C Y 1146 B 0x 00 7	II

folgenden weiteren Richtlinien entspricht:
 conform with the following directives:
 correspond aux disposition suivantes:
 komt overeen met de volgende verdere richtlijnen:
 videre retningslinier som anvendes:

97/23/EG
 2004/108/EG
 2006/95/EG
 2006/42/EG

Angewendete harmonisierte Normen, insbesondere:
 Applied harmonized standards in particular:
 Normes harmonisée utilisées, notamment:
 Gebruikte geharmoniseerde normen, in het bijzonder:
 Harmoniserade normen som anvendes, i særdeleshed:

ASME VIII Div.1 ; EN378-2 ; EN953 ;
 EN954-1 ; EN1050 EN1088 ;
 EN10028-3 ; EN12100-1 ;
 EN12100-2 ; EN12451 ; EN50081-2 ;
 EN50082-2 ; EN60204-1

Referenz Qualität Dokument:
 Reference quality document:
 Référence Document de qualité:
 Referentie kwaliteit document:
 Referance kvalitet dokument:

Fd – FSN002002 Rev.01

Essen, 15.07.2010

Datum / Date / Datum / Dato

Unterschrift / Signature / Handtekening / Underskrift

(Bevollmächtigter / Authorized person / Fondé de pouvoir / Gevolmagtigede / Fuldmægtig)

FST
 GmbH

Filtrations-Separations-Technik

FST GmbH

Im Teelbruch 106, D-45219 Essen

