Refrigerating air dryer

ACT VS
800 - 2500

Air – water cooled

EN - User's maintenance and spare parts manual

7425MUM321_EN_04.0

CE

Dear Customer,

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

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

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

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

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

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

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

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

Contents

1 Identification plate

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

2 Warranty conditions

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

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

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

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

3 Safety rules

3.1 Definition of the conventional signs used in this manual

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

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

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

Danger hazard. Part or system under pressure.

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

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

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

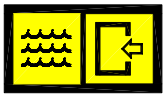
Danger hazard. Do not operate equipment with panels removed.

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

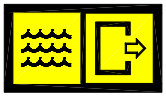
Compressed air inlet connection point

Compressed air outlet connection point

Condensate drain connection point



Cooling water inlet connection point (Water-Cooled)



Cooling water outlet connection point (Water-Cooled)

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

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

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

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

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

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

3.2 Warnings

Compressed air is a highly hazardous energy source.
Never work on the dryer with pressure in the system.
Never point the compressed air or the condensate drain outlet hoses towards anybody.

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

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

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

These refrigerating air dryers contain R134a or R407C HFC type refrigerant fluid. Refer to the specific paragraph - maintenance operation on the refrigerating circuit.

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

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

3.3 Proper use of the dryer

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

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

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

- Voltage and frequency of the main power.
- Pressure, temperature and flow-rate of the inlet air.
- Pressure, temperature and cooling water capacity (Water-Cooled).
- Ambient temperature.

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

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

The dried air cannot be used for breathing purposes or for operations leading to direct contact with foodstuff.
This dryer is not suitable for the treatment of dirty air or of air containing solid particles.

3.4 Instructions for the use of pressure equipment according to PED directive 97/23/EC

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

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

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

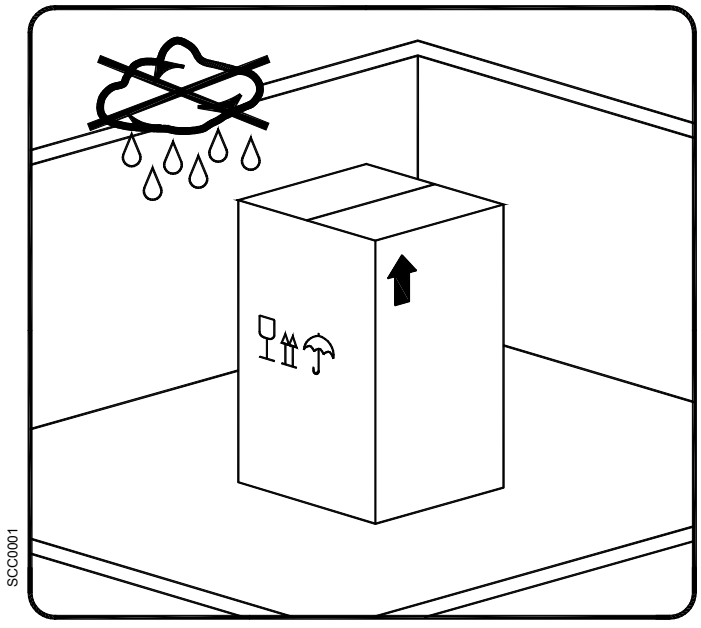
4 Installation

4.1 Transport

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

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

4.2 Storage



Even when packaged, keep the machine protected from severity of the weather.
Keep the dryer in vertical position, also when stored. Turning it upside down some parts could be irreparably damaged.
If not in use, the dryer can be stored in its packaging in a dust free and protected site at a temperature of +34°F (+1°C) … +122°F (+50°C), and a specific humidity not exceeding 90%. Should the stocking time exceed 12 months, please contact the manufacturer.

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

4.3 Installation site

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

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

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

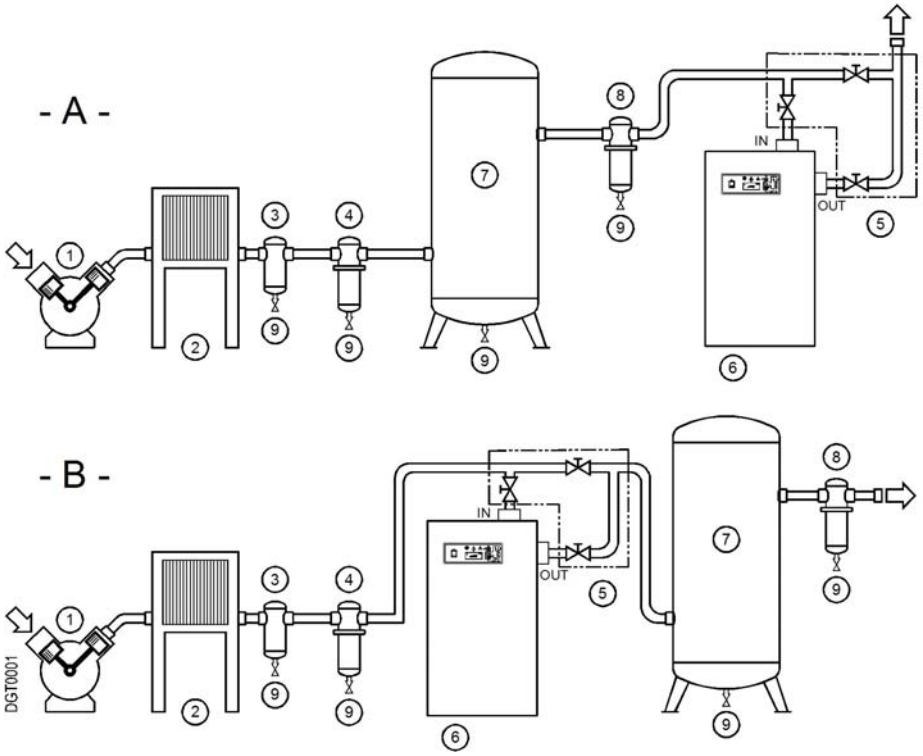
Minimum installation requirements:

- Select a clean dry area, free from dust, and protected from atmospheric disturbances.
- The supporting area must be smooth, horizontal and able to hold the weight of the dryer.
- Minimum ambient temperature +34°F (+1°C).
- Maximum ambient temperature +113°F (+45°C).
- Ensure a proper cooling air replacement.
- Allow a sufficient clearance on each side of the dryer for proper ventilation and to facilitate maintenance operations.

The dryer does not require attachment to the floor surface.

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

4.4 Installation layout



1 Air compressor
2 Aftercooler
3 Condensate separator
4 Pre-Filter (min. 5 micron)
5 By-pass group
6 Dryer
7 Compressed air tank
8 Final filter
9 Condensate drain

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

Type A installation is suggested when the compressor operates at reduced intermittence and the total consumption equals the compressor flow rate.
Type B installation is suggested when the air consumption can consistently change with peak values highly exceeding the flow rate of the compressors. The capacity of the tank must be sized in order to compensate eventual instantaneous demanding conditions (peak air consumption).

4.5 Correction factors

Correction factor for operating pressure changes:									
Inlet air pressure	psig	60	80	100	120	140	160	180	203
	barg	4	5.5	7	8	10	11	12	14
Factor (F1)		0.79	0.91	1.00	1.07	1.13	1.18	1.23	1.27

Correction factor for ambient temperature changes (Air-Cooled):								
Ambient temperature	ºF	≤ 80	90	95	100	105	110	115
	ºC	≤ 27	32	35	38	40	43	45
Factor (F2)		1.11	1.09	1.06	1.00	0.94	0.87	0.78

Correction factor for inlet air temperature changes:									
Air temperature	ºF	≤ 90	100	110	122	130	140	150	158
	ºC	≤ 32	38	43	50	55	60	65	70
Factor (F3)		1.16	1.00	0.82	0.68	0.61	0.52	0.45	0.40

Correction factor for DewPoint changes:					
DewPoint	ºF	38	41	45	50
	ºC	3	5	7	10
Factor (F4)		1.00	1.08	1.20	1.36

How to find the air flow capacity:

Air flow capacity = Nominal duty x Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)

Example:
An **ACT VS 800** has a nominal duty of 800 scfm (1358 m³/h). What is the maximum allowable flow through the dryer under the following operating conditions:

Inlet air pressure = 120 psig (8 barg) — Factor (F1) = 1.07
Ambient temperature = 115°F (45°C) — Factor (F2) = 0.78
Inlet air temperature = 122°F (50°C) — Factor (F3) = 0.68
Pressure DewPoint = 50°F (10°C) — Factor (F4) = 1.36

Each item of data has a corresponding numerical factor which multiplied by the design air flow is as follows:

Air flow capacity = 800 x 1.07 x 0.78 x 0.68 x 1.36 = 617 scfm (1048 m³/h)

617 scfm (1048 m³/h) This is the maximum flow rate that the dryer can accept under these operating conditions.

How to select a suitable dryer for a given duty:

$$\textbf{Minimum std. air flow rate} = \frac{\textbf{Design air flow}}{\textbf{Factor (F1) x Factor (F2) x Factor (F3) x Factor (F4)}}$$

Example:
With the following operating parameters:

Design air flow = 750 scfm (1274 m^3/h)
Inlet air pressure = 120 psig (8 barg) — Factor (F1) = 1.07
Ambient temperature = 115°F (45°C) — Factor (F2) = 0.78
Inlet air temperature = 122°F (50°C) — Factor (F3) = 0.68
Pressure DewPoint = 50°F (10°C) — Factor (F4) = 1.36

In order to select the correct dryer model the required flow rate is to be divided by the correction factors relating to above mentioned parameters:

$$\textbf{Minimum std. air flow rate} = \frac{\textbf{750}}{\textbf{1.07 x 0.78 x 0.68 x 1.36}} = \textbf{972 scfm (1652 m³/h)}$$

Therefore the model suitable for the conditions above is **ACT VS 1000** (**1000 scfm [1698 m³/h]** - nominal duty).

4.6 Connection to the compressed air system

Operations to be performed by qualified personnel only.
Never work on system under pressure.
The user is responsible to ensure that the dryer will never be operated with pressure exceeding the maximum pressure rating on the unit data tag.
Over-pressurizing the dryer could be dangerous for both the operator and the unit.

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

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

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

4.6.1 Inlet / outlet flanged air connections (only ACT VS 800 – 1250)

Inlet / oulet flanged air connections and Victaulic ® joints are located inside the box under the dryer (see Fig.1).

Assembly flange (B) and Victaulic ® joint (A) as shown in Fig.2
Pay particular attention in not damaging the gasket of Victaulic ® joint (A).
Fully tighten the two bolts of Victaulic ® joint (see Fig.3)

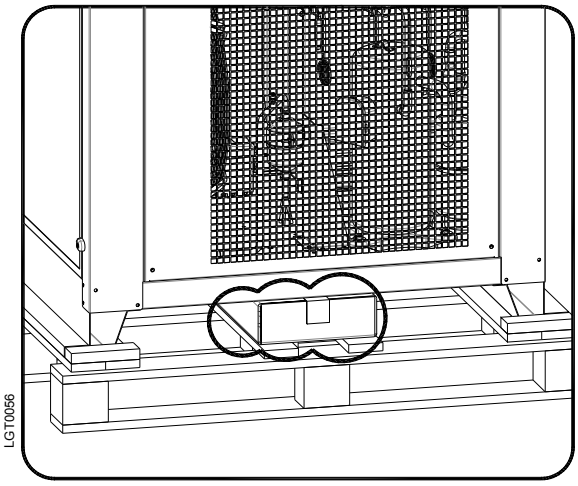


Fig.1

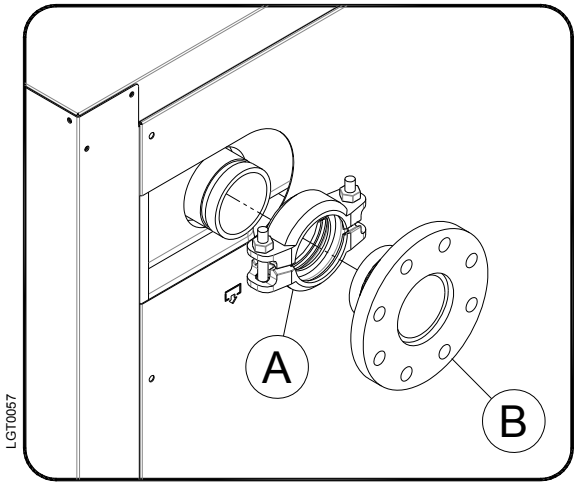


Fig.2

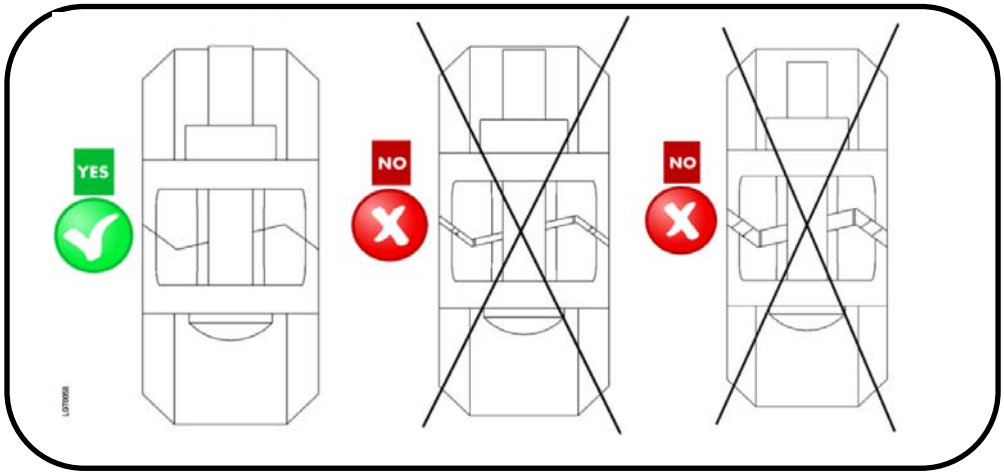


Fig.3

4.7 Connection to the cooling water network (Water-Cooled)

Operations to be performed by qualified personnel only.
Never work on system under pressure.
The user is responsible to ensure that the dryer will never be operated with pressure exceeding the maximum pressure rating on the unit data tag.
Over-pressurizing the dryer could be dangerous for both the operator and the unit.

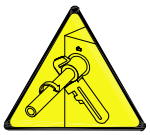
The temperature and the amount of cooling water must comply with the limits indicated on the technical characteristics chart. The cross section of the connection pipes, preferably flexible, must be free from rust, chips and other impurities. We recommend to use connecting pipes able to insulate the dryer from possible vibrations originating from the line (flexible hoses, vibration damping fittings, etc.).

We recommend the installation of a 500 micron filter to prevent a clogging of the heat exchanger.

Minimum cooling water requirements:

Temperature	59…86°F (15…30°C) (1)	HCO_3 / SO_4	>1.0 mg/l or ppm
Pressure	44...145 psig (3…10 barg) (2)	NH_3	<2 mg/l or ppm
Head pressure	> 44 psig (3 bar) (2) (3)	Cl^-	50 mg/l or ppm
Total hardness	6.0…15 dH°	Cl_2	0.5 mg/l or ppm
PH	7.5…9.0	H_2S	<0.05 mg/l or ppm
Conductivity	10…500 µS/cm	CO_2	<5 mg/l or ppm
Residual solid particles	<30 mg/l or ppm	NO_3	<100 mg/l or ppm
Saturation Index SI	-0.2 < 0 < 0.2	Fe	<0.2 mg/l or ppm
HCO_3	70…300 mg/l or ppm	Al	<0.2 mg/l or ppm
SO_4^{2-}	<70 mg/l or ppm	Mn	<0.1 mg/l or ppm

Note : (1) – Other temperature on request - Check the data shown on the identification plate.
(2) – Other pressure on request - Check the data shown on the identification plate.
(3) – Pressure difference at dryer water connection points at maximum water flow - Other head pressure on request

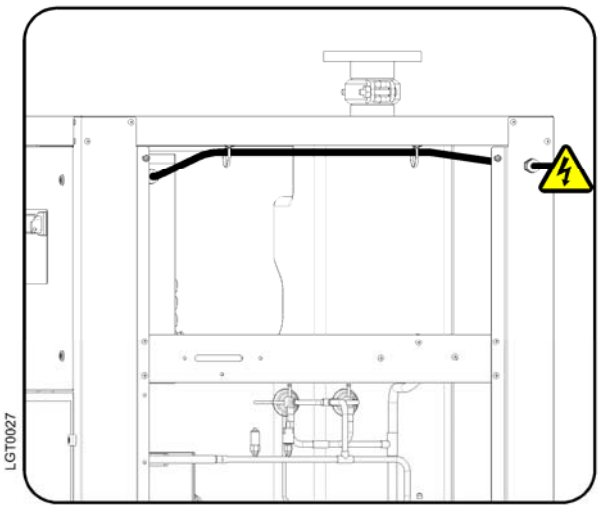


CAUTION :
PIPING THE DRYER, INLET/OUTLET CONNECTIONS MUST BE SUPPORTED AS SHOWN IN THE DIAGRAM.
FAILING WILL RESULT IN DAMAGE.

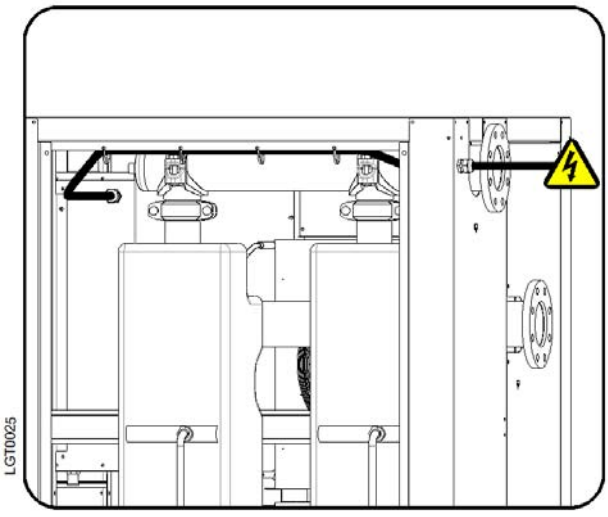
4.8 Electrical connections

Qualified personnel should carry out connecting unit to the main power.
Be sure to check the local codes in your area.

Before connecting the unit to the electrical supply, verify the data nameplate for the proper electrical information. Voltage tolerance is +/- 10%. The installer is responsible for supplying and installing the power cable. Be sure to provide the proper fuses or breakers based on the data information located on the nameplate.



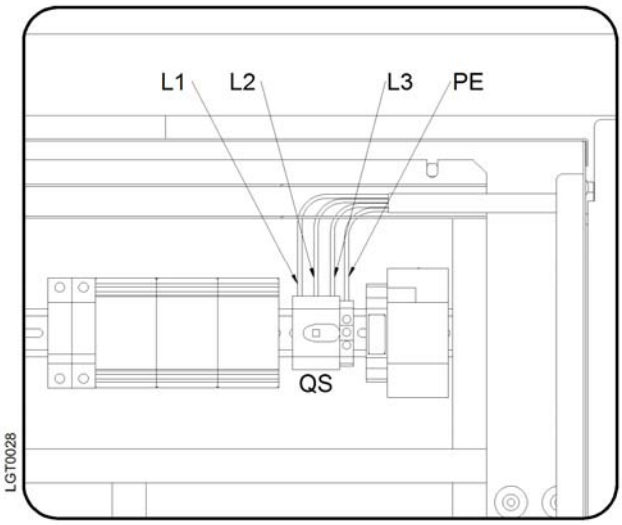
ACT VS 800 – 1250



ACT VS 1500 – 2500

A residual-current device (RCD) with IΔn =0.3A Class B is suggested. The cross section of the power supply cables must comply with the consumption of the dryer, while keeping into account also the ambient temperature, the conditions of the mains installation, the length of the cables, and the requirements enforced by the local Power Provider.

Compressor and fan(s) proper rotation direction are managed automatically by the inverters.
It is not necessary to observe the phases sequence when connecting the power cable to the main switch.



Important: ensure that the dryer is earthed.
Do not use any socket adapters at the mains plug.
If the mains plug needs to be replaced, this must only be done by a qualified electrician.

4.9 Condensate drain

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

Never point the condensate drain line towards anybody.

The dryer comes already fitted with an electronic condensate drainer.
Connect and properly fasten the condensate drain to a collecting plant or container.
The drain cannot be connected to pressurized systems.

Don’t dispose the condensate in the environment.
The condensate collected in the dryer contains oil particles released in the air by the compressor.
Dispose the condensate in compliance with the local rules.
We recommend to install a water-oil separator where to convey all the condensate drain coming from compressors, dryers, tanks, filters, etc.

5 Start-up

5.1 Preliminary operation

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

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

Qualified personnel must perform the first start-up.
When installing and operating this equipment, comply with all National Electrical Code and any applicable federal, state and local codes.

Who is operating the unit is responsible for the proper and safe operation of the dryer.
Never operate equipment with panels removed.

5.2 First start-up

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

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

- Ensure that all the steps of the “Installation” chapter have been observed.
- Ensure that the connection to the compressed air system is correct and that the piping is suitably fixed and supported.
- Ensure that the condensate drain pipe is properly fastened and connected to a collection system or container.
- Ensure that the by-pass system (if installed) is closed and the dryer is isolated.
- Ensure that the manual valve of the condensate drain circuit is open.
- Remove any packaging and other material which could obstruct the area around the dryer.
- Activate the mains switch.
- Turn on the main switch - pos. 1 on the control panel.
- Wait about 45 seconds the initialization of the electronic controller DMC50.
- Select the desired language and the current date and time.
- Wait at least two hours before starting the dryer (compressor crankcase heater must heat the oil of the compressor).
- Keep pressed the button  at least 3 seconds, the dryer starts and the display shows ON.
  If the temperature shown on the display is sufficiently high, verify that the refrigerating compressor starts within a few minutes.
  NOTE! – With low temperatures, the refrigerating compressor will remain OFF.
- Ensure the consumption matches with the values of the data plate.
- Ensure the cooling water flow and temperature is adequate (Water-Cooled).
- Ensure the effective operation of the fan, watching its speed percentage on the display (Air-Cooled).
- Allow the dryer temperature to stabilise at the pre-set value.
- Slowly open the air inlet valve.
- Slowly open the air outlet valve.
- Slowly close the central by-pass valve of the system (if installed).
- Check the piping for air leakage.
- Ensure the drain is regularly cycling - wait for its first interventions.

5.3 Start-up and shut down

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

Start-up (refer to paragraph 7.1 Control Panel)

- Check the condenser for cleanliness (Air-Cooled).
- Ensure the cooling water flow and temperature is adequate (Water-Cooled).
- The display of electronic controller shows STANDBY.
- Keep pressed the button at least 3 seconds, the dryer starts and the display shows ON.
  If the temperature shown on the display is sufficiently high, verify that the refrigerating compressor starts within a few minutes.
  NOTE! – With low temperatures, the refrigerating compressor will remain OFF.
- Wait few minutes; verify that the DewPoint temperature displayed on electronic controller is correct and that the condensate is regularly drained.
- Switch on the air compressor.

Shut down (refer to paragraph 7.1 Control Panel)

- Check that the DewPoint temperature displayed on electronic controller is within range.
- Shut down the air compressor.
- Keep pressed the button at least 3 seconds, the dryer stops and the display shows STANDBY.

Dryer remote control ON-OFF

- See instructions on paragraph 7.14.11

NOTE : A DewPoint within 32°F (0°C) and +50°F (+10°C) displayed on electronic controller is correct according to the possible working conditions (flow-rate, temperature of the incoming air, ambient temperature, etc.).

The electronic controller DMC50 adjusts compressor and fan(s) speed according to thermal load applied to the dryer. At very low or no load conditions, compressor is switched ON and OFF by the DMC50 to keep the temperature of the heat exchanger cold, allowing a consistent additional energy saving.

The dryer must remain ON during the full usage period of the compressed air, even if the air compressor works intermittently.

The number of starts/stops by pressing the button must be limited to six per hour.
Frequent starts may cause irreparable damage.

MODEL ACT VS		800-UR	1000-UR	1250-UR	1500-UR	1750-UR	2000-UR	2500-UR
Air flow rate at nominal condition (1)	[scfm]	800	1000	1250	1500	1750	2000	2500
	[m3/h]	1358	1698	2123	2547	2972	3396	4245
	[l/min]	22640	28300	35375	42450	49525	56600	70750
Pressure DewPoint at nominal condition (1)	[°F (°C)]	38 (3)						
Nominal ambient temperature	[°F (°C)]	100 (38)						
Min...Max ambient temperature	[°F (°C)]	34...115 (1...45)						
Nominal inlet air temperature	[°F (°C)]	100 (38) max.158 (70)						
Nominal inlet air pressure	[psig (barg)]	100 (7)						
Max. inlet air pressure	[psig (barg)]	203 (14)						
Air pressure drop - Δp	[psi (bar)]	2.9 (0.20)	2.8 (0.19)	3.6 (0.25)	2.8 (0.19)	1.9 (0.13)	2.6 (0.18)	3.6 (0.25)
Inlet - Outlet connections	[FL ANSI]	3" # 150			4" # 150			

Air-Cooled	Refrigerant type		R134.a	R407C				
	Refrigerant quantity (2)	[oz (kg)]	124 (3.50)	141 (4.00)	162 (4.60)	212 (6.00)	229 (6.50)	265 (7.50)	335 (9.50)
	Cooling air fan flow	[cfm (m3/h)]	3200 (5400)	4300 (7200)	4400 (7400)	8600 (14400)		8800 (14800)	
	Heat Rejection	[btu/hr (kW)]	36800 (10.8)	55600 (16.3)	69600 (20.4)	73300 (21.5)	80200 (23.5)	109000 (32.0)	136100 (39.9)
	Standard Power Supply (2)	[Ph/V/Hz]	3/460/60						
	Nominal electric consumption	[kW]	3.50	4.90	5.90	6.90	7.90	9.00	10.40
		[A]	4.6	6.3	7.7	9.0	10.3	11.7	13.7
	Full Load Amperage FLA	[A]	6.9	8.9	10.7	13.2	14.3	17.6	21.3
	Max. noise level at 1 m	[dbA]	< 75			< 80			
	Weight	[lb (kg)]	547 (248)	622 (282)	699 (317)	1036 (470)	1202 (545)	1211 (549)	1369 (621)

Water-Cooled	Refrigerant type		R134.a	R407C				
	Refrigerant quantity (2)	[oz (kg)]	99 (2.80)	113 (3.20)	131 (3.70)	169 (4.80)	194 (5.50)	212 (6.00)	268 (7.60)
	Max. cooling water inlet temp (3)	[°F (°C)]	86 (30)						
	Min...Max. cooling water inlet pressure	[psig (barg)]	45...145 (3...10)						
	Cooling water flow at 15°C	[US gpm (m3/h)]	1.01 (0.23)	1.45 (0.33)	1.76 (0.40)	1.85 (0.42)	2.03 (0.46)	2.91 (0.66)	3.61 (0.82)
	Cooling water flow at 30°C	[US gpm (m3/h)]	3.35 (0.76)	4.80 (1.09)	5.46 (1.24)	5.72 (1.30)	5.99 (1.36)	9.33 (2.12)	11.62 (2.64)
	Heat Rejection	[btu/hr (kW)]	36800 (10.8)	55600 (16.3)	69600 (20.4)	73300 (21.5)	80200 (23.5)	109000 (32.0)	136100 (39.9)
	Control of cooling water flow		Automatic by valve						
	Cooling water connection	[NPT-F]	3/4"			1"			
	Standard Power Supply (2)	[Ph/V/Hz]	3/460/60						
	Nominal electric consumption	[kW]	3.10	4.10	5.10	5.40	6.40	7.50	8.90
		[A]	4.0	5.4	6.8	7.1	8.3	9.7	11.6
	Full Load Amperage FLA	[A]	5.7	7.1	8.8	9.4	10.5	13.8	17.5
	Max. noise level at 1 m	[dbA]	< 70			< 75			
	Weight	[lb (kg)]	508 (231)	574 (261)	642 (292)	957 (435)	1104 (502)	1113 (506)	1250 (568)

(1) The nominal condition refers to an ambient temperature of 100°F (38°C) with inlet air at 100 psig (7 barg) and 100°F (38°C).
(2) Check the data shown on the identification plate.
(3) Other temperature on request.

MODEL ACT VS		800-UQ	1000-UQ	1250-UQ	1500-UQ	1750-UQ	2000-UQ	2500-UQ
Air flow rate at nominal condition (1)	[scfm]	800	1000	1250	1500	1750	2000	2500
	[m3/h]	1358	1698	2123	2547	2972	3396	4245
	[l/min]	22640	28300	35375	42450	49525	56600	70750
Pressure DewPoint at nominal condition (1)	[°F (°C)]	38 (3)						
Nominal ambient temperature	[°F (°C)]	100 (38)						
Min...Max ambient temperature	[°F (°C)]	34...115 (1...45)						
Nominal inlet air temperature	[°F (°C)]	100 (38) max.158 (70)						
Nominal inlet air pressure	[psig (barg)]	100 (7)						
Max. inlet air pressure	[psig (barg)]	203 (14)						
Air pressure drop - Δp	[psi (bar)]	2.9 (0.20)	2.8 (0.19)	3.6 (0.25)	2.8 (0.19)	1.9 (0.13)	2.6 (0.18)	3.6 (0.25)
Inlet - Outlet connections	[FL ANSI]	3" # 150			4" # 150			

Air-Cooled	Refrigerant type	R134.a	R407C					
	Refrigerant quantity (2) [oz (kg)]	124 (3.50)	141 (4.00)	162 (4.60)	212 (6.00)	229 (6.50)	265 (7.50)	335 (9.50)
	Cooling air fan flow [cfm (m3/h)]	3200 (5400)	4300 (7200)	4400 (7400)	8600 (14400)		8800 (14800)	
	Heat Rejection [btu/hr (kW)]	36800 (10.8)	55600 (16.3)	69600 (20.4)	73300 (21.5)	80200 (23.5)	109000 (32.0)	136100 (39.9)
	Standard Power Supply (2) [Ph/V/Hz]	3/575/60						
	Nominal electric consumption [kW]	3.50	4.90	5.90	6.90	7.90	9.00	10.40
	Nominal electric consumption [A]	3.7	5.1	6.2	7.2	8.2	9.3	10.9
	Full Load Amperage FLA [A]	5.5	7.1	8.6	10.6	11.4	14.1	17.0
	Max. noise level at 1 m [dbA]	< 75			< 80			
	Weight [lb (kg)]	558 (253)	633 (287)	710 (322)	1054 (478)	1219 (553)	1228 (557)	1387 (629)

Water-Cooled	Refrigerant type	R134.a	R407C					
	Refrigerant quantity (2) [oz (kg)]	99 (2.80)	113 (3.20)	131 (3.70)	169 (4.80)	194 (5.50)	212 (6.00)	268 (7.60)
	Max. cooling water inlet temp (3) [°F (°C)]	86 (30)						
	Min...Max. cooling water inlet pressure [psig (barg)]	45...145 (3...10)						
	Cooling water flow at 15°C [US gpm (m3/h)]	1.01 (0.23)	1.45 (0.33)	1.76 (0.40)	1.85 (0.42)	2.03 (0.46)	2.91 (0.66)	3.61 (0.82)
	Cooling water flow at 30°C [US gpm (m3/h)]	3.35 (0.76)	4.80 (1.09)	5.46 (1.24)	5.72 (1.30)	5.99 (1.36)	9.33 (2.12)	11.62 (2.64)
	Heat Rejection [btu/hr (kW)]	36800 (10.8)	55600 (16.3)	69600 (20.4)	73300 (21.5)	80200 (23.5)	109000 (32.0)	136100 (39.9)
	Control of cooling water flow	Automatic by valve						
	Cooling water connection [NPT-F]	3/4"			1"			
	Standard Power Supply (2) [Ph/V/Hz]	3/575/60						
	Nominal electric consumption [kW]	3.10	4.10	5.10	5.40	6.40	7.50	8.90
	Nominal electric consumption [A]	3.2	4.3	5.4	5.6	6.7	7.8	9.3
	Full Load Amperage FLA [A]	4.3	5.4	6.5	6.8	8.5	15.4	16.2
	Max. noise level at 1 m [dbA]	< 70			< 75			
	Weight [lb (kg)]	520 (236)	587 (266)	645 (297)	957 (443)	1125 (510)	1133 (514)	1270 (576)

(1) The nominal condition refers to an ambient temperature of 100°F (38°C) with inlet air at 100 psig (7 barg) and 100°F (38°C).

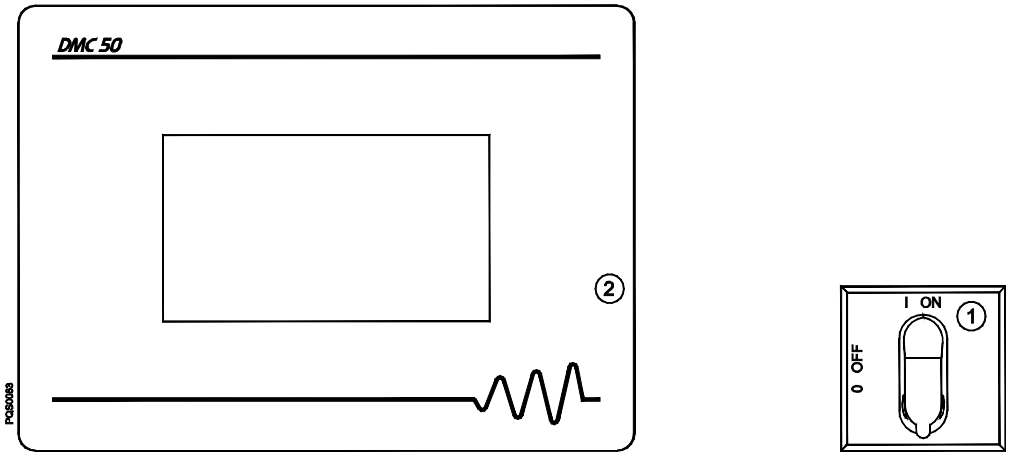
(2) Check the data shown on the identification plate.

(3) Other temperature on request.

7 Technical description

7.1 Control panel

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



1 Main switch

2 Electronic instrument DMC50

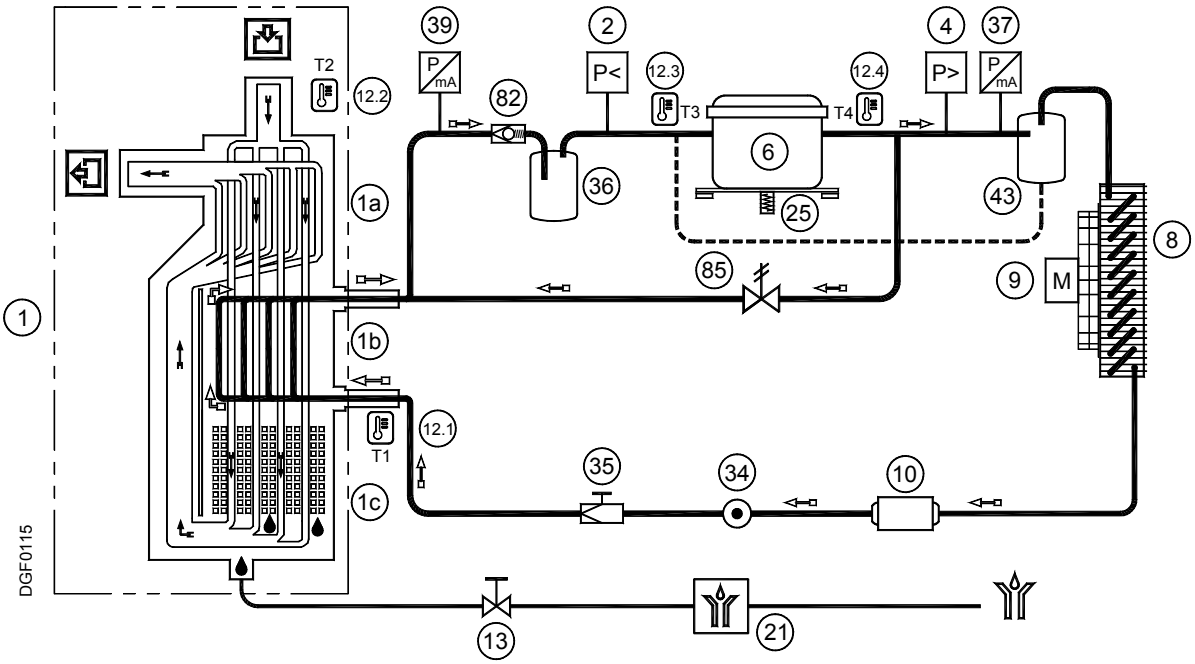
7.2 Operation

Operating principle - The dryer models described in this manual operate all on the same principle. The hot moisture laden air enters an air to air heat exchanger. The air then goes through the evaporator, also known as the air to refrigerant heat exchanger. The temperature of the air is reduced to approximately 36°F (2°C), causing water vapor to condense to liquid. The liquid is continuously coalesced and collected in the separator for removal by the condensate drain. The cool moisture free air then passes back through the air to air heat exchanger to be reheated to within 14.4°F (8°C) [Δ temperature] of the incoming air temperature as it exits the dryer.

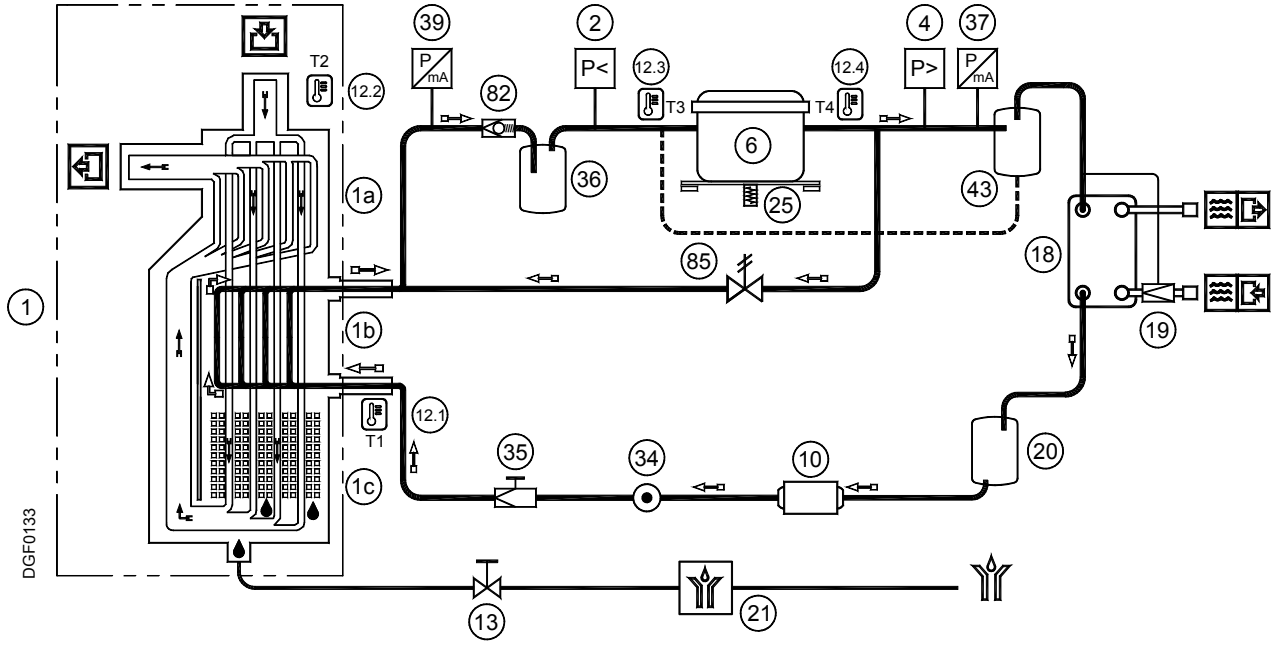
Refrigerant circuit - Refrigerant gas is cycled through the compressor and exits at high pressure to a condenser where heat is removed causing the refrigerant to condense to a high-pressure liquid state. The liquid is forced through a capillary tube where the resulting pressure drop allows the refrigerant to boil off at a predetermined temperature. Low-pressure liquid refrigerant enters the heat exchanger where heat from the incoming air is transferred causing the refrigerant to boil; the resulting phase change produces a low pressure, low temperature gas. The low-pressure gas is returned to the compressor, where it is re-compressed and begins the cycle again.

Operation in eco mode (Variable Speed) – The DMC50 electronic controller constantly monitors the evaporating pressure (BLP), the condensing pressure (BHP) and the temperature of the DewPoint (BT1).
At each compressor start-up compressor's speed is forced to a fixed speed (approx. 40-50% of its maximum speed) for approx. 3 minutes to allow a proper oil circulation in the refrigerant circuit. During this period, if the evaporating pressure (BLP) falls too low, DMC50 will activate a solenoid valve EVB that will increase the evaporating pressure above the freezing point. Expired the first 3 minutes, DMC50 will adjust compressor's speed in order to keep the evaporating pressure almost constant, allowing a constant dewpoint even with dryer thermal load variation. In low load conditions, compressor will run at its lowest allowable speed. Even if that speed is larger than load demand, the evaporating pressure will decrease from its setting point and when the temperature of the DewPoint tends to fall close to the freezing point, the DMC50 controls the switching off of the compressor. The compressor will be started again when the DewPoint temperature and evaporating pressure rises above a target value. The check valve CHV in combination with the thermo expansion valve TEXV help to extend the off time of the compressor and avoid the immediate balancing of high and low pressures of the refrigerant circuit. The solenoid valve EVB is activated before the compressor start as long as refrigerant pressures (low and high) get balanced. Fan(s) speed will be controlled by the DMC50 in order to keep the condensing pressure measured by BHP almost constant (Air-Cooled).
With these dryers, the energy consumption will be adjusted closely proportional to the thermal load applied to the dryer itself, allowing considerable energy savings in the majority of applications.

7.3 Flow diagram (Air-Cooled)



7.4 Flow diagram (Water-Cooled)



1 Alu-Dry module
1a Air-to-air heat exchanger
1b Air-to-refrigerant heat exchanger
1c Condensate separator
2 Refrigerant pressure switch LPS
4 Refrigerant pressure switch HPS
6 Compressor
8 Condenser (Air-Cooled)
9 Condenser fan (Air-Cooled)
10 Filter dryer
12.1 T1 Temperature probe – DewPoint
12.2 T2 Temperature probe – Air IN
12.3 T3 Temperature probe – Compressor suction
12.4 T4 Temperature probe – Compressor discharge
13 Condensate drain service valve
18 Condenser (Water-Cooled)
19 Condenser water regulating valve (Water-Cooled)
20 Refrigerant accumulator (Water-Cooled)
21 Electronic drainer
25 Compressor crankcase heater
34 Liquid sight glass
35 Thermostatic expansion valve TEXV
36 Liquid separator
37 Refrigerant pressure transducer BHP
39 Refrigerant pressure transducer BLP
43 Oil separator (ACT VS 2000-2500)
82 Check valve CHV
85 Pressure balancing solenoid valve EVB

Compressed air flow direction

Refrigerant gas flow direction

7.5 Refrigerating compressor

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

7.6 Condenser (Air-Cooled)

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

7.7 Condenser (Water-Cooled)

The condenser is the component in which the gas coming from the compressor is cooled down and condensed becoming a liquid. Basically it is a water/refrigerating gas exchanger where the cooling water lowers the temperature of the refrigerating gas.
The temperature of the inlet water must not exceed the nominal values. It must also guarantee an adequate flow and that the water entering the exchanger is free from dust and other impurities.

7.8 Condenser water regulating valve (Water-Cooled)

The condenser water regulating valve is used to keep the condensing pressure/temperature constant when the Water-Cooled is being used. Thanks to the capillary tube, the valve detects the pressure in the condenser and consequently adjusts the water flow. When the dryer stops the valve automatically closes the cooling water flow.

The condenser water regulating valve is an operating control device.
The closure of the water circuit from the pressure condenser water regulating valve cannot be used as a safety closure during service operations on the system.

ADJUSTMENT
The condenser water regulating valve is adjusted during the testing phase to a pre-set value that covers 90% of the applications. However, sometimes the extreme operating conditions of the dryer may require a more accurate calibration.
During start-up, a qualified technician should check the condensing pressure/temperature and if necessary adjust the valve by using the screws on the valve itself.
To increase the condensing temperature, turn the adjusting screws counter-clockwise; to lower it turn the screws clock-wise.

Water valve setting :
R134.a pressure 145 psig (± 7.3 psi) [10 barg (± 0.5 bar)]
R407C pressure 232 psig (± 7.3 psi) [16 barg (± 0.5 bar)]

7.9 Filter dryer

Traces of humidity and slag can accumulate inside the refrigerant circuit. Long periods of use can also produce sludge. This can limit the lubrication efficiency of the compressor and clog the expansion valve or capillary tube. The function of the filter drier, located before the capillary tubing, is to eliminate any impurities from circulating through the system.

7.10 Thermostatic expansion valve

The purpose of this valve is to regulate the refrigerant flow across the dryer relative to the heat load. It's operation is to maintain a constant condition in the evaporator, regardless of load variations, to provide the correct dew point and prevent liquid refrigerant returning to the compressor.

7.11 Alu-Dry module

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

7.12 Refrigerant pressure switches LPS – HPS

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

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

Calibrated pressure :	R134.a	Stop 10.2 psig (0.7 barg) - Restart 24.7 psig (1.7 barg)
	R407C	Stop 24.7 psig (1.7 barg) - Restart 39.2 psig (2.7 barg)

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

Calibrated pressure :	R134.a	Stop 290 psig (20 barg) - Manual reset P<203 psi (P<14 bar)
	R407C	Stop 435 psig (30 barg) - Manual reset P<334 psi (P<23 bar)

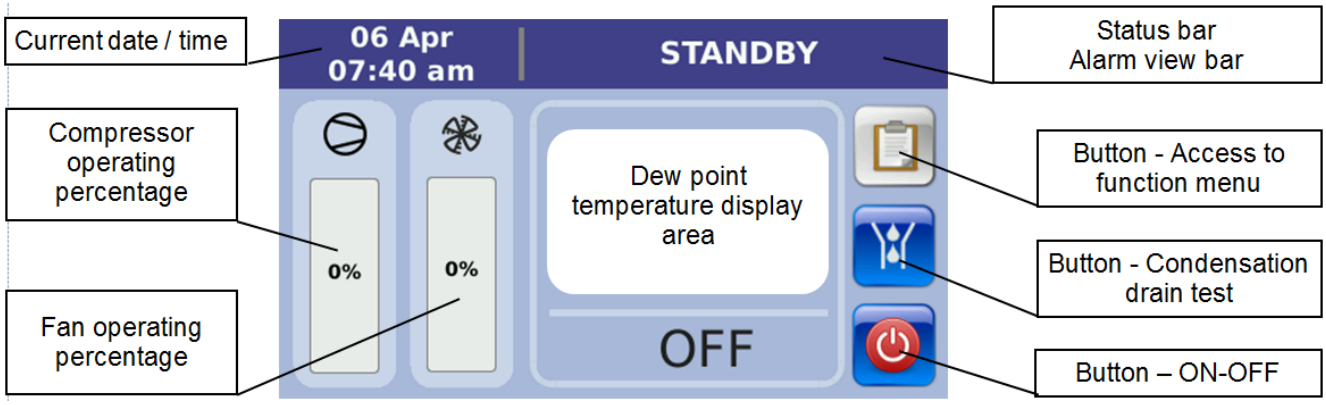
7.13 Compressor crankcase heater

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

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

7.14 DMC50 electronic control unit

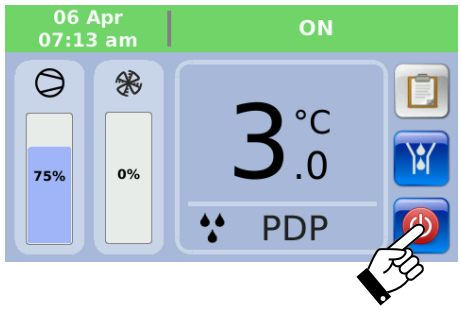
The DMC50 electronic control unit is a device which controls the dryer's functional processes, provides a dialogue interface for the operator, and consists of a main module within the control panel and a touch screen module positioned on the front panel of the dryer. Both modules are connected together via data communication and power supply cables. The operator can use the touch screen display to manage operating functions, view alerts/faults (service), and set dryer process parameters.
Switch ON the dryer by means of the main switch (pos.1 of control panel - see section **7.1**) and wait for the DMC50 control unit initialisation process. After about 45 seconds the display will show the main screen :



0.25

7.14.1 Starting the dryer (“ON” mode)

Hold the button for 3 seconds to start the dryer.
The dryer will start up and the status bar will turn green and display ON.

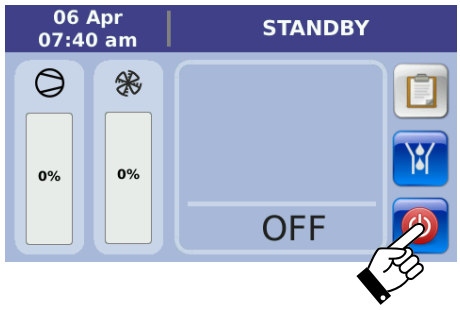


NOTE! During the warm-up phase, which lasts about 3 minutes, the compressor works at a set speed equivalent to approximately 40-50% of its maximum speed, to enable the lubricating oil to circulate correctly in the compressor at the beginning. This phase is illustrated with a bar symbol under the compressor icon, which gradually becomes blue and shows the time that has lapsed since the dryer started. Once the dryer has warmed up the bar symbol disappears and the dryer commences standard operation.
The display will show:

- ⇨ Compressor operating percentage (0-100%)
- ⇨ Fan operating percentage (0-100%)
- ⇨ Dew point temperature

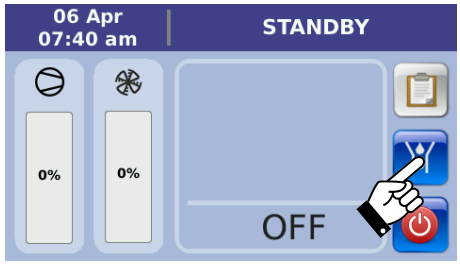
7.14.2 Stopping the dryer (“STANDBY” mode)

Hold the button for 3 seconds to stop the dryer. The dryer will stop (STANDBY) and the status bar will turn blue and display STANDBY.



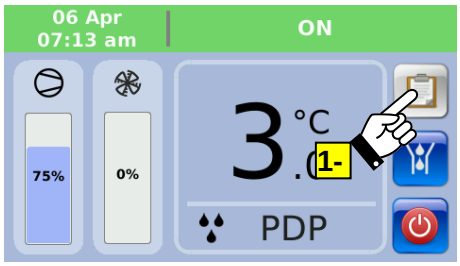
7.14.3 Performing the condensation drain test

Hold the button to perform the condensation drain test.
Release the button to finish the condensation drain test.



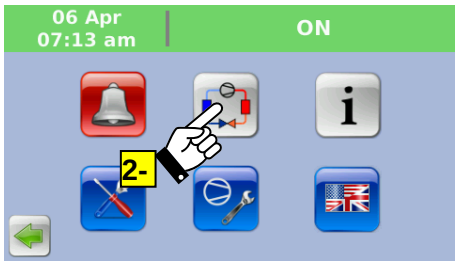
NOTE! The condensation drain test can be performed at any time, regardless of the dryer status displayed on the status bar (ON, STANDBY, ALARM, SERVICE WARNING).

7.14.4 Displaying process values T1, T2, T3, T4, HP, LP, %, %

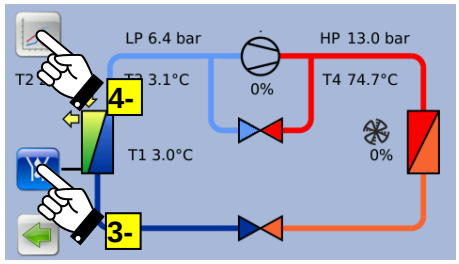


1- With the dryer operating (ON mode) press the button to access the dryer's menu of functions.

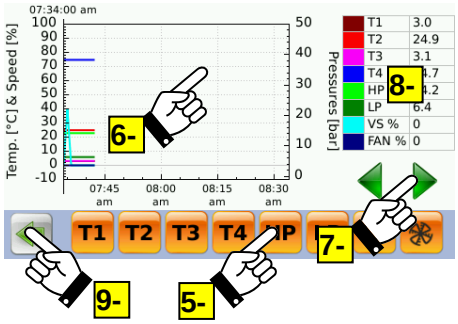
2- Press the button to display the refrigeration circuit diagram and the dryer's instantaneous process values:



- **T1** - Value measured by the BT1 probe in °C or °F (Dew Point temperature)
- **T2** - Value measured by the BT2 probe in °C or °F (Air temperature at exchanger inlet)
- **T3** - Value measured by the BT3 probe in °C or °F (Temperature of refrigerant gas on compressor suction side)
- **T4** - Value measured by the BT4 probe in °C or °F (Temperature of refrigerant gas on compressor discharge side)
- **HP** - Value measured by the BHP probe in bar or psi (Pressure of refrigerant gas on compressor discharge side)
- **LP** - Value measured by the BLP probe in bar or psi (Pressure of refrigerant gas on compressor suction side)



- **%** - Percentage value of compressor operation
- **%** - Percentage value of fan operation
- - Pressure balancing solenoid valve active (open)
- - Pressure balancing solenoid valve not active (closed)



3- Hold the button to perform the condensation drain test. Release the button to finish the condensation drain test.

4- Press the button to display the log file process values expressed graphically or numerically for the last 60 minutes of dryer operation. The default graph includes traces for all 8 process values.

5- Use the T1 T2 T3 T4 HP LP buttons to display/hide the corresponding coloured traces.

6- Touch the graph on the screen to position the cursor roughly near the required time.

7- Use the buttons to fine tune the position of the graph cursor on the required time. Positioning accuracy is +/- 1 minute.

8- The table on the right of the screen displays the process values stored in the time period selected by the graph cursor in numerical format.

9- Press the button to return to the previous screen.

NOTE! The stored process values, which are available in numerical or graph format, relate to the last 60 minutes of dryer operation. Stored process values that are not within this time frame are permanently deleted automatically.

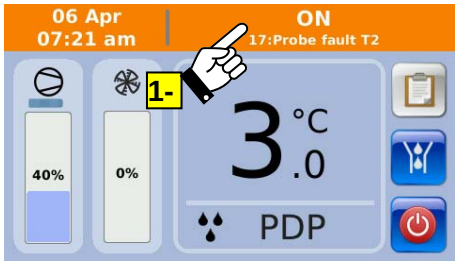
7.14.5 How the DMC50 control unit displays and processes a service warning

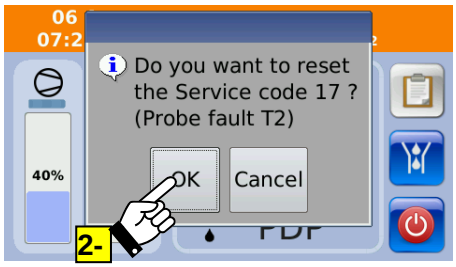
The service warning is an irregular event that must be flagged to operators/maintenance technicians. It does not jeopardise the safety of the machine/operators and it does not stop the dryer, with the exception of the HdS parameter (STOP dryer due to high dew point), which can be set to stop the dryer.
In the presence of a service warning, the status bar shows a description of the event and turns flashing orange. In this condition it is not possible to reset the service warning as the cause is still present.
When a service warning is no longer active but has not been reset, the status bar shows a description of the event and is permanently lit (orange). In this condition the service warning can be reset as the cause has been removed.

With dryer operating (ON): the presence of one or more service warnings is flagged on the display with the status bar changing from green to orange.

With the dryer stopped (STANDBY): the presence of one or more service warnings is not flagged at all on the display.

It is only when the operator wants to start the dryer with the button that the DMC50 control unit still enables the dryer to be started in the presence of a service warning, and displays the warning status by changing the colour of the status bar (orange).





Resetting a service warning:
1- Touch the screen on the status bar where the service warning is shown.
2- Confirm the service warning is to be reset with OK, or exit without resetting with Cancel.

NOTE! After resetting service warnings, the operator/maintenance technician must verify/solve the problem that caused the service warning.
Service warnings never reset automatically, with the exception of service warning no. 19 (malfunction of electronic condensation drainer), which is factory-set to enable automatic resetting (Ard parameter → Yes setting).

Service ID	Description	Set	Delay	Reset
15	- Low Dew Point - Dew point temperature T1 too low	T1 < -1°C (30.2°F)	5 minutes	T1 > 0°C (32°F)
16	- High Dew Point - Dew point temperature T1 too high	T1 > HdA parameter	Parameter Hdd	Parameter HdA-1°K
17	- Probe Fault T2 - T2 temperature probe fault	-	Flag immediately	Restore probe
18	- Probe Fault T3 - T3 temperature probe fault	-	Flag immediately	Restore probe
19	- Drainer - Malfunction of ELD electronic condensate drain	Contact open	20 minutes	Restore contact
20	- Programmed service - Scheduled service time expired	Parameter SrV	Flag immediately	-
21	- High Discharge Temperature - Temp. T4 compressor discharge over normal limits but within safe limits	T4>100°C (212°F)	60 seconds	T4<95°C (203°F)
22	- High Evaporating Pressure -	R134.a 4.0 barg R407C 6.8 barg	60 seconds	R134.a 4.0 barg R407C 6.8 barg
23	- Low Condensing Pressure -	Variable	180 seconds	Variable
24	- High Condensing Pressure -	Variable	180 seconds	Variable

NOTE! Service warning no. 19 (drainer) could transpire if the compressor operates without compressed air flow.

7.14.6 How the DMC50 control unit displays and processes an alarm

The alarm is an irregular event that always causes the dryer to stop to ensure the safety of operators and the machine.

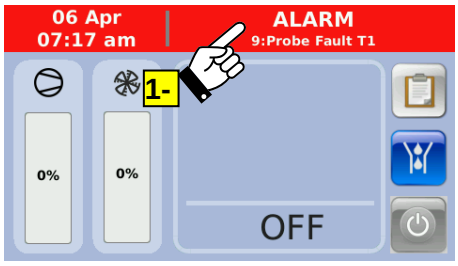
In the presence of an alarm the status bar shows a description of the event and turns flashing red. In this condition it is not possible to reset the alarm as the cause is still present.

When an alarm is no longer active but has not been reset, the status bar shows a description of the event and is permanently lit (red). In this condition the alarm can be reset as the cause has been removed.

With dryer operating (ON): the presence of one or more alarms is flagged on the display with the status bar changing from green to red.

With the dryer stopped (STANDBY): the presence of one or more alarms is not flagged at all on the display, with the exception of alarm no. 6 (ICE) which is the only alarm which is displayed and automatically resets with the dryer stopped (STANDBY).

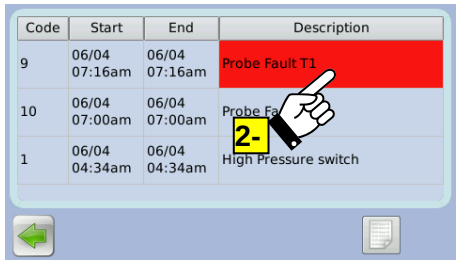
It is only when the operator wants to start the dryer with the button that the DMC50 control unit prevents the dryer starting up in the presence of an alarm and displays the alarm status by changing the colour of the status bar (red).



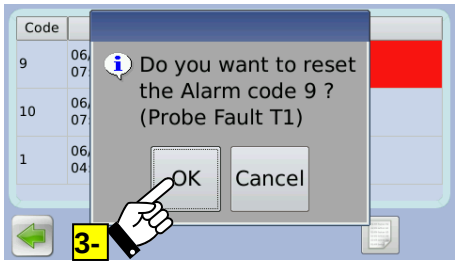
Resetting an alarm:

1- Touch the screen on the status bar where the alarm is shown to display the list of stored alarms.

2- Touch the screen on the alarm to be reset.



3- Confirm the alarm is to be reset with OK, or exit without resetting with Cancel.

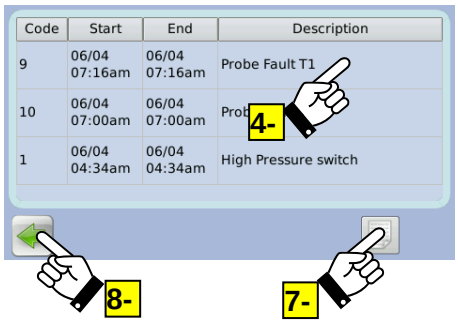


4- Touch the screen on the alarm just reset to display the dryer process values for the 60 minutes of operation immediately preceding the occurrence of the event.

5- Scroll through the stored process values using the buttons.

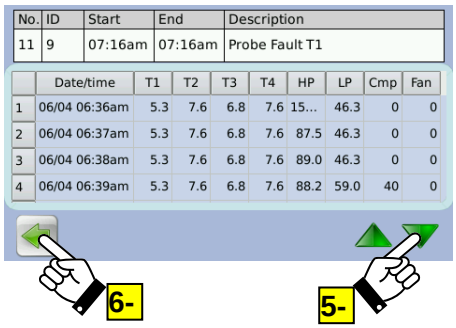
6- Press the button to return to the previous screen.

7- Use the button to download process values in .txt format for possible analysis/diagnostics. See the detailed procedure for downloading values in the section **7.14.8**.



8- Press the button to return to the previous screen at any time.

NOTE! The dryer must be restarted manually by the operator/maintenance technician after alarms are reset. Automatic restart is not available after an alarm has been reset. Before restarting, the operator/maintenance technician must verify/solve the problem that caused the alarm on the dryer. Alarms are never reset automatically (with the exception of alarm no. 6 ICE with the dryer stopped (STANDBY).



Alarm ID	Description	Set	Delay	Reset
1	- High Pressure Switch - Pressure switch HPS has triggered Refrigerant pressure high	Contact open	Flag immediately	Restore contact
2	- Low Pressure Switch - Pressure switch LPS has triggered Refrigerant pressure low	Contact open	Flag immediately	Restore contact
3	- Fan Protection - Fan electrical protection has triggered Fan motor overload	Contact open	Flag immediately	Restore contact
4	- High Discharge Temperature - Temperature T4 compressor discharge over safety limits	T4>110°C (230°F)	60 seconds	T4<100°C (212°F)
5	- Compressor Protection - QC1 circuit breaker has tripped Compressor overload	C. breaker tripped	Flag immediately	Restore C. breaker
6	- ICE - Temperature T1 exchanger too low. Condensation frozen	T1 < -3°C (26.6°F)	60 seconds	T1 > 0°C (32°F)
7	- Probe Fault LP - LP pressure transducer fault	-	Flag immediately	Restore transducer
8	- Probe Fault HP HP pressure transducer fault	-	Flag immediately	Restore transducer
9	- Probe Fault T1 - T1 temperature probe fault	-	Flag immediately	Restore probe
10	- Probe Fault T4 - T4 temperature probe fault	-	Flag immediately	Restore probe
11	- Low Differential Pressure - Low differential pressure between the values measured by BHP and BLP	HP-LP < 2.5 bar	60 seconds	HP-LP > 2.5 bar
12	- High Evaporating Pressure -	R134.a 4.5 barg R407C 7.3 barg	60…300 seconds	-
13	- Low Condensing Pressure -	Variable	180…300 seconds	-
1001	- Power Unit Communication Lost - Communication fault between the main DMC50 control unit module and the display module			
1002	- Inverter Communication Lost - Communication fault between the DMC50 control unit and the compressor inverter			
1400 1479	Specific compressor inverter alarms Consult the inverter manual			

7.14.7 Displaying the log file of stored alarms

1- Press the button to access the dryer's menu of functions.

2- Press the button to display the log file for the last 50 alarms stored.

3- Scroll through the list of alarms using the buttons.
Alarms are stored chronologically.
The most recent event is added to the top of the list and replaces the oldest which is removed from the bottom of the list.

4- Touch the screen on the alarm just reset to display the dryer process values for the 60 minutes of operation immediately preceding the occurrence of the alarm in question.

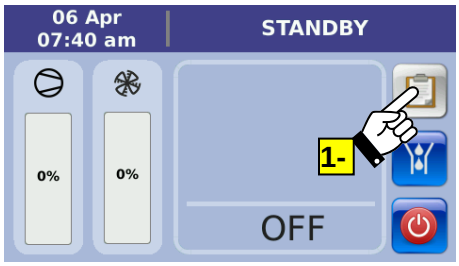
5- Scroll through the stored process values using the buttons.

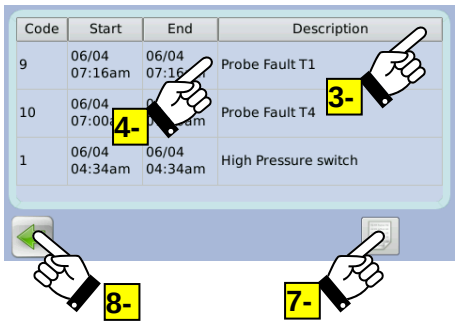
6- Press the button to return to the previous screen.

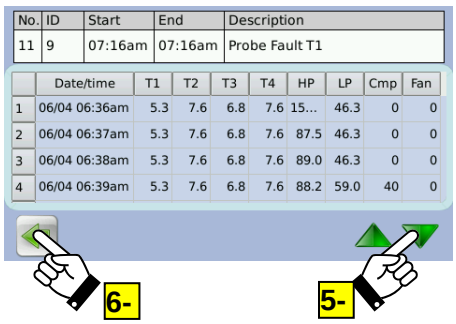
7- Use the button to download process values in .txt format for possible analysis/diagnostics. See the detailed procedure for downloading values in the section **7.14.8**.

8- Press the button to return to the previous screen at any time.

NOTE!
Only alarms are stored in the log file. Service warnings are not stored. If power is cut off from the dryer, the log file with the stored alarms will NOT be deleted.

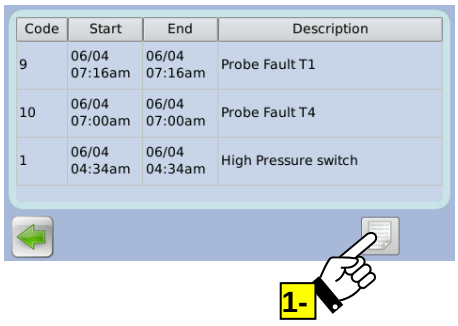






7.14.8 Downloading the process values stored following an alarm

Process values for stored alarms can be downloaded in .txt format onto a USB stick after resetting an alarm (see section **7.14.6**, step **7-**), or from the screen for consulting the alarms log file (see section **7.14.7**, step **7-**).



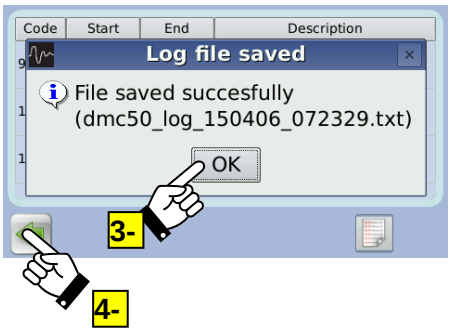
Preliminary steps
- Switch OFF the dryer by means of the main switch (pos.1 of control panel - see section **7.1**)
- Open the hatch on the control panel with the special key provided with the dryer.
- Insert a formatted USB stick in the relevant port on the back of the touch screen display module.
- Close the hatch on the control panel carefully.
- Switch ON the dryer.

1- Press the  button to access the process value download function.

2- Confirm that the process values are to be downloaded with OK, or exit the operation with Cancel.

3- Confirm the download operation was successful with OK.

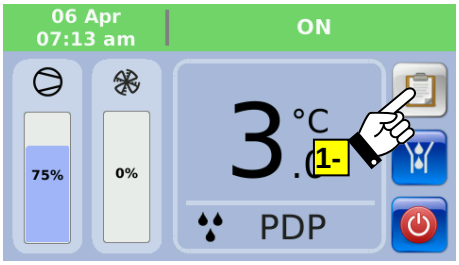
4- Press the  button to return to the previous screens



Final steps
- Switch OFF the dryer by means of the main switch (pos.1 of control panel - see section **7.1**)
- Open the hatch on the control panel with the special key provided with the dryer.
- Remove the USB stick.
- Close the hatch on the control panel carefully.
- Switch ON the dryer.

7.14.9 Displaying instantaneous process values for the compressor inverter

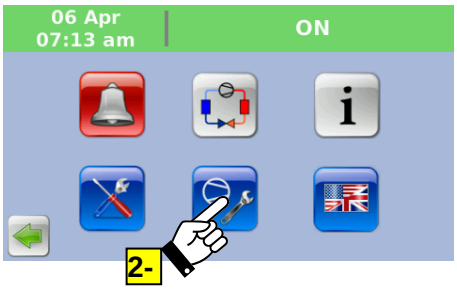
1- With the dryer operating (ON mode), press the  button to access the dryer's menu of functions.



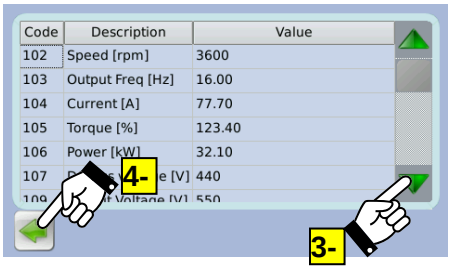
2- Press the  button to display the list of instantaneous process values for the compressor inverter.

3- Scroll through the list of values using the  buttons.

4- Press the  button to return to the previous screen at any time.



NOTE!
The dryer must be started and the compressor running to show the current inverter process values.
With dryer stopped (STANDBY) all values shown are “0“

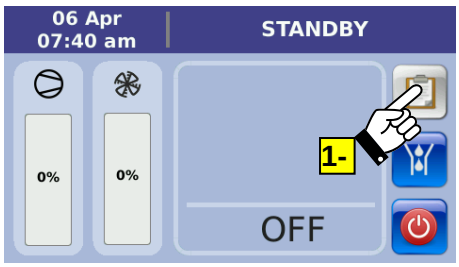


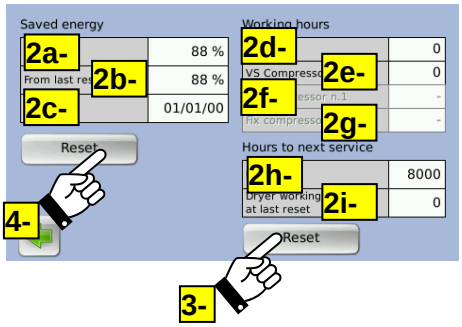
7.14.10 Displaying technical maintenance and energy savings data

1- With the dryer stopped (STANDBY) or operating (ON mode), press the button to access the dryer's menu of functions.

2- Press the button to display:

- **2a-** The total percentage of energy savings for the variable speed compressor, with respect to its continuous operation at 100%.
- **2b-** The partial percentage (starting from the last time the counter was zeroed) of energy savings for the variable speed compressor, with respect to its continuous operation at 100%.
- **2c-** The date the partial energy savings counter was last zeroed.
- **2d-** The total hours of dryer operation.
- **2e-** The total hours of variable speed compressor operation.
- **2f-** The total hours of 1st fixed speed compressor operation (not installed).
- **2g-** The total hours of 2nd fixed speed compressor operation (not installed).
- **2h-** The hours remaining till the next service.
- **2i-** The partial hours of dryer operation, starting from the last time the counter was zeroed.



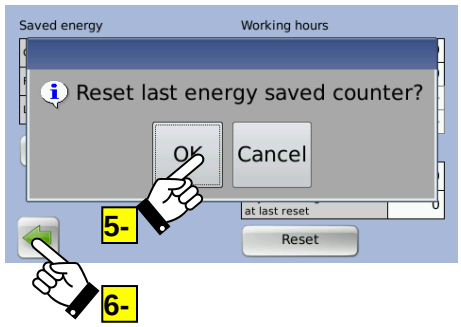


3- With dryer stopped (STANDBY mode), press the Reset button to reset the count of the hours remaining before the next service (parameter SrV → default 8000 hours). This function is useful in the case of maintenance carried out on the dryer before the hours remaining till the next service have lapsed. This is a password-protected function to prevent the counter being reset accidentally.

4- Press the Reset button to zero the partial energy savings counter.

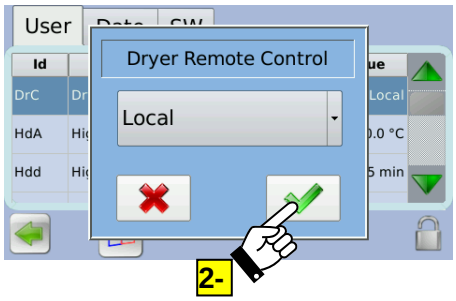
5- Confirm the counter is to be zeroed with OK, or exit without zeroing with Cancel.

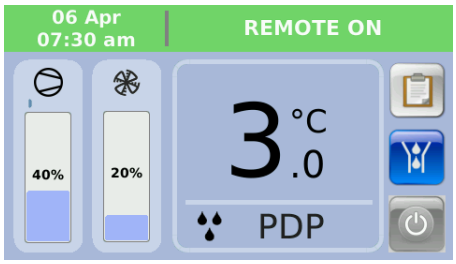
6- Press the button to return to the previous screen at any time.



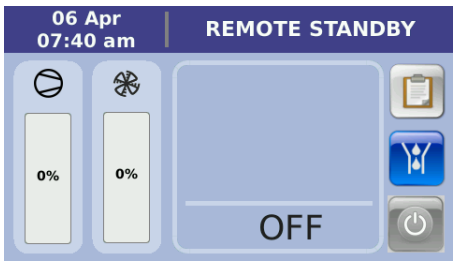
7.14.11 Controlling the dryer from a remote workstation

The main module on the DMC50 control unit is provided with a digital input set up for dryer start up (ON) - stop (STANDBY) mode from a remote workstation.
1- Wire a clean contact, free from electric potential, to terminals 17 and 18 on the DCM50 control unit's main module.
2- Set the DrC parameter to REMOTE mode.
3- Close the contact. The dryer will start up and the status bar will turn green and display REMOTE ON.
4- Open the contact. The dryer will stop and the status bar will turn blue and display REMOTE STANDBY.





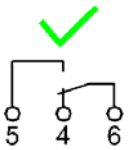
NOTE!
The dryer cannot be started up and stopped from the touch screen display when in REMOTE mode. However it is possible to carry out all other operations, such as the condensation drain test, the management of alarms/service warnings, and access functions menus.



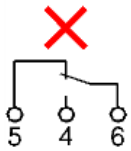
Only a clean contact free from electric potential and suitable for low voltage must be used. Ensure there is adequate insulation on potentially hazardous live parts.

7.14.12 How the alarm / service warning flagging contact operates

The main module on the DMC50 control unit is provided with a clean contact, free from electric potential, for remotely flagging dryer alarm/warning conditions.
1- Set the ACM (Alarm Contact Management) parameter to the required mode (see section **7.14.14**).



Dryer powered and absence of the conditions checked with the ACM parameter settings



Dryer not powered or presence of at least one of the conditions checked with the ACM parameter settings

7.14.13 How the RS485 serial communication port operates

The main module on the DMC50 control unit is provided with a data communication connection for remote dryer monitoring operations.
Contact the manufacturer for further information on using this application.

7.14.14 Displaying / changing process user parameters

1- With the dryer stopped (STANDBY) or operating (ON mode), press the button to access the dryer's menu of functions.

2- Press the button to display the list of process user parameters and respective current settings.

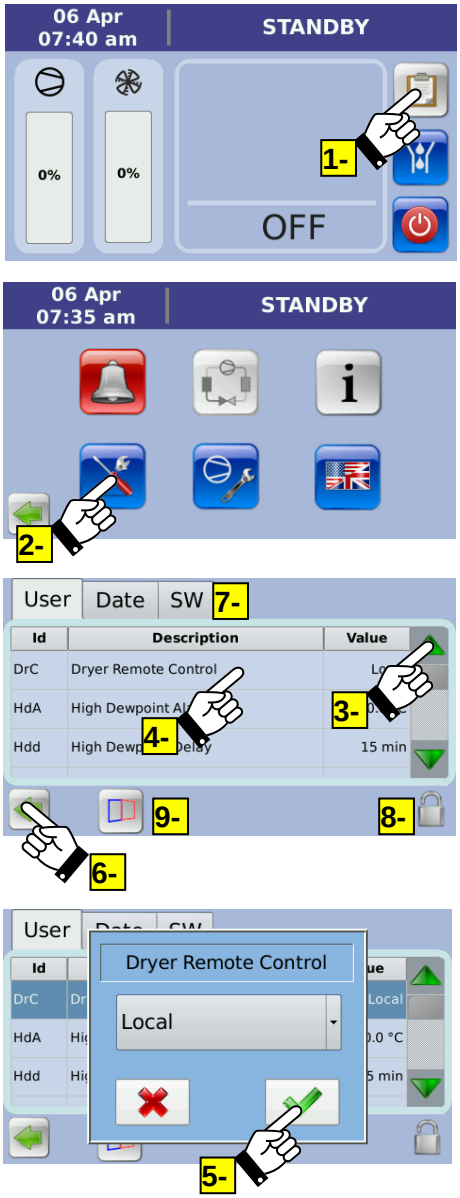
3- Scroll through the list of parameters using the buttons.

4- Touch the screen on the parameter to be changed to display the possible settings (see user parameter table), then select one of the settings. If the parameter to be changed requires a numerical value, set the new value using the numerical keypad within the max and min limits shown.

5- Confirm the setting or numerical value entered using the button or press the button to return to the parameter list without making any changes. Repeat operations **3- 4- 5-** for all parameters to be changed.

6- Press the button to return to the previous screen at any time.

7-, 8-, 9- NOTE! The SW tab and buttons are reserved for technical/diagnostic password-protected operations. They do not contain user functions.



ID	Description	Limits	Scale	Factory setting
DrC	- Dryer Remote Control - Enables/disables dryer remote control	Local / Remote	-	Local
HdA	- High Dewpoint Alarm - Sets the service warning intervention threshold high dew point	0…25.0°C or 32…77°F	0.5°C or 1°F	20.0°C or 68°F
Hdd	- High Dewpoint Delay - Sets the service warning delay time high dew point	1…20 minutes	1 minute	15 minutes
HdS	- High Dewpoint Alarm Stop - Select if high dew point service warning - Stops the dryer (Yes) - Does not stop the dryer (No)	Yes / No	-	No
SrV	- Service Setting - Sets the hours remaining till the next service **NOTA :** 00.0 = counter disabled	12.0 (x1000) hours	0.5 (x1000) hours	8.0 (x1000) hours
SCL	Sets the temperature/pressure units of measurement °C = Temperature in °C and pressure in bar °F = Temperature in °F and pressure in psi	°C / °F	-	°C
AS	- Auto Restart - Enables/disables automatic dryer restart after restoring the electricity supply. Yes = the dryer restarts automatically after restoring the electricity supply (if it had been started) No = The dryer must be restarted using the  button.	Yes / No	-	No
Ard	- Auto Reset Service Drain - Enables/disables the electronic condensation drain fault to be reset automatically. Yes = reset automatically No = reset manually	Yes / No	-	Yes
ACM	- Alarm Contact Management - Selects the switching logic for the alarm contact on the DCM50 control unit's main module: 1 = any alarm and high dew point 2 = any alarm and any service warning 3 = any alarm	1…3	1	1
IPA	- IP Address - Selects the IP address to use in the serial connection line	1…255	1	1

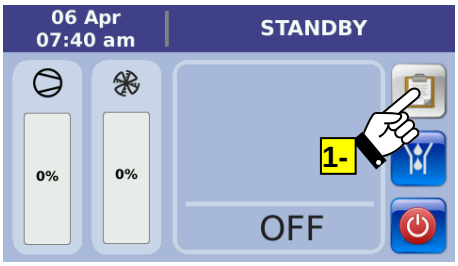
7.14.15 Changing the system date / time

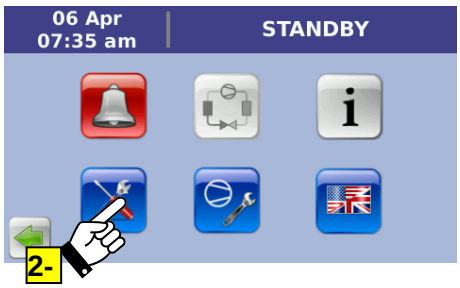
1- With the dryer stopped (STANDBY) or operating (ON mode), press the button to access the dryer's menu of functions.

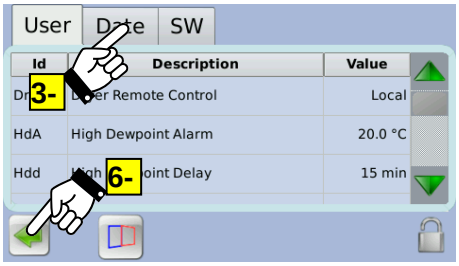
2- Press the button to display the list of process user parameters and respective current settings.
3- Touch the Date tab on the screen.
4- Set the current date and time.

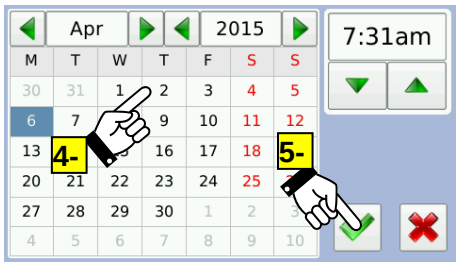
5- Confirm using the button or press the button to return to the parameter list without making any changes.

6- Press the button to return to the previous screen at any time.







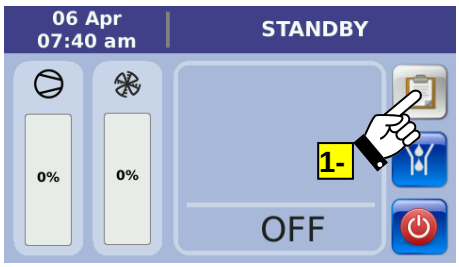


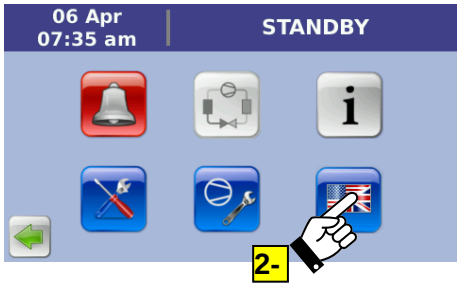
7.14.16 Changing the user interface language

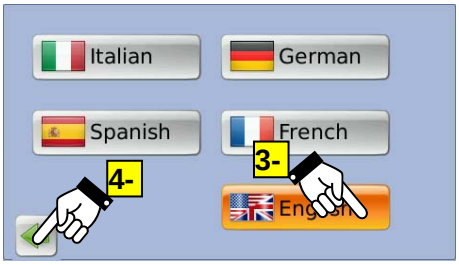
1- With the dryer stopped (STANDBY) or operating (ON mode), press the button to access the dryer's menu of functions.

2- Press the button to display the list of available languages.
3- Choose the required language.

4- Press the button to return to the previous screen at any time.



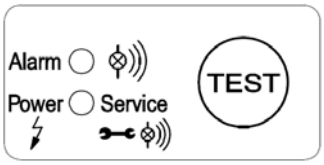




7.15 Electronic drainer

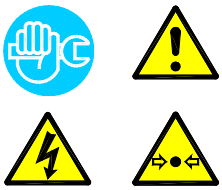
This drain consists of a condensate accumulator where a capacitive sensor continuously checking liquid level is placed: as soon as the accumulator is filled, the sensor passes a signal to the electronic control and a diaphragm solenoid valve will open to discharge the condensate. For a complete condensate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

Control panel



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

Troubleshooting



Only qualified personnel should perform troubleshooting and or maintenance operations.
Prior to performing any maintenance or service, be sure that :

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

PLEASE REFER TO INSTRUCTION MANUAL OF ELECTRONIC DRAINER

8 Maintenance, troubleshooting, spare parts and dismantling

8.1 Checks and maintenance


Only qualified personnel should perform troubleshooting and or maintenance operations.
Prior to performing any maintenance or service, be sure that :


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


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

Daily

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

Every 200 hours or monthly


- With an air jet (max. 2 bar / 30 psig) blowing from inside towards outside clean the condenser; repeat this operation blowing in the opposite way; be careful not to damage the aluminum fins of the cooling package (Air-Cooled)
- Remove the filter of the electrical panel and clean the filter material with a jet of compressed air. If necessary replace the filter material.

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

Every 1000 hours or yearly

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

Every 8000 hours

- Replace Electronic drainer service unit

8.2 Troubleshooting




Only qualified personnel should perform troubleshooting and or maintenance operations.
Prior to performing any maintenance or service, be sure that :

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


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

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ The dryer doesn't start.	⇨ Verify that the system is powered. ⇨ Verify the electric wiring. ⇨ Blow of fuse (see FU1/FU2/FU3 on the electric diagram) of the auxiliary circuit - replace it and check the proper operation of the dryer. ⇨ Electronic controller DMC50 in alarm condition – see the corresponding point.
◆ The compressor doesn't work.	⇨ Verify the electric wiring. ⇨ Electronic controller DMC50 in alarm condition – see the corresponding point. ⇨ If the compressor still doesn't work, replace it.
◆ Condenser's fan doesn't work (Air-Cooled).	⇨ Verify the electric wiring. ⇨ Electronic controller DMC50 in alarm condition – see the corresponding point. ⇨ If the fan still doesn't work, replace it.
◆ DewPoint too high.	⇨ The dryer doesn't start - see specific point. ⇨ The DewPoint probe doesn't correctly detect the temperature - ensure the sensor is pushed into the bottom of probe well. ⇨ The Compressor doesn't work - see specific point. ⇨ The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled). ⇨ The inlet air is too hot - restore nominal conditions. ⇨ The inlet air pressure is too low - restore nominal conditions. ⇨ The inlet air flow rate is higher than the rate of the dryer - reduce the flow rate - restore nominal conditions. ⇨ The condenser is dirty - clean it (Air-Cooled) ⇨ The condenser fan doesn't work - see specific point (Air-Cooled). ⇨ The cooling water is too hot - restore nominal conditions (Water-Cooled). ⇨ The cooling water flow is insufficient - restore nominal conditions (Water-Cooled). ⇨ The dryer doesn't drain the condensate - see specific point. ⇨ The hot gas by-pass valve is out of setting - contact a refrigeration engineer to restore nominal setting. ⇨ There is a leak in the refrigerant circuit - contact a refrigeration engineer.
◆ Dew Point too low	⇨ The fan is always on – verify the correct operation pressure transducer (see BHP on the electric diagram) – (Air-Cooled). ⇨ Ambient temperature is too low - restore nominal conditions (Air-Cooled).

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ Excessive pressure drop within the dryer.	⇨ The dryer doesn't drain the condensate - see specific point. ⇨ The DewPoint is too low - the condensate is frost and blocks the air - see specific point. ⇨ Check for throttling the flexible connection hoses.
◆ The dryer doesn't drain the condensate	⇨ The condensate drain service valve is closed - open it. ⇨ Verify the electric wiring. ⇨ The DewPoint is too low - the condensate is frost and blocks the air - see specific point. ⇨ Inlet compressed air pressure is too low and condensate is not drained – restore nominal conditions. ⇨ Electronic drainer is not operating correctly (see paragraph 7.15).
◆ The dryer continuously drains condensate.	⇨ Electronic drainer is dirty (see paragraph 7.15).
◆ Water within the line.	⇨ The dryer doesn't start - see specific point. ⇨ **If installed** - Untreated air flows through the by-pass unit - close the by-pass. ⇨ The dryer doesn't drain the condensate - see specific point. ⇨ DewPoint too high - see specific point.
◆ HPS high pressure switch has been activated.	⇨ Check which of the following has caused the activation : 1. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled). 2. The condenser is dirty - clean it (Air-Cooled). 3. The condenser fan doesn't work - see specific point (Air-Cooled). 4. The cooling water is too hot - restore nominal conditions (Water-Cooled). 5. The cooling water flow is insufficient - restore nominal conditions (Water-Cooled). ⇨ Reset the pressure switch pressing the button on the controller itself - verify the dryer for correct operation. ⇨ HPS pressure switch is faulty - contact a refrigeration engineer to replace it.
◆ LPS low pressure switch has been activated.	⇨ There is a leak in the refrigerating fluid circuit - contact a refrigeration engineer. ⇨ The pressure switch reset automatically when normal conditions are restored - check the proper operation of the dryer.
◆ Compressor discharge temperature too high.	⇨ Check which of the following has caused the failure : 1. Eccessive thermal load – restore nominal conditions. 2. The inlet air is too hot - restore nominal conditions. 3. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled). 4. The condenser unit is dirty - clean it (Air-Cooled). 5. The fan doesn't work - see specific point (Air-Cooled). 6. The fan is always on – verify proper operation of pressure transducer (see BHP on electric diagram) – (Air-Cooled). 7. The temperature of the cooling water is too low – restore nominal conditions (Water-Cooled). 8. The cooling water flow adjusting valve requires re-adjusting - contact a specialized technician to restore nominal setting (Water-Cooled). 9. Refrigerant gas leak - contact a refrigeration engineer.

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ Condensing pressure too high	⇨ Check which of the following has caused the failure : 1. The ambient temperature is too high or the room aeration is insufficient - provide proper ventilation (Air-Cooled). 2. The condenser unit is dirty - clean it (Air-Cooled). 3. The fan doesn't work - see specific point (Air-Cooled). 4. The temperature of the cooling water is too hot – restore nominal conditions (Water-Cooled). 5. Cooling water flow is not sufficient – restore nominal conditions (Water-Cooled).
◆ Condensing pressure too low	⇨ Check which of the following has caused the failure : 1. The fan is always on – verify proper operation of pressure transducer (see BHP on electric diagram) – (Air-Cooled). 2. Ambient temperature is too low - restore nominal conditions (Air-Cooled). 3. Air flows through the condenser even with fan off – protect dryer against wind or external air flows (not caused by dryer's fan) (Air-Cooled). 4. The temperature of the cooling water is too low – restore nominal conditions (Water-Cooled). 5. The cooling water flow adjusting valve requires re-adjusting - contact a specialized technician to restore nominal setting (Water-Cooled). 6. Refrigerant gas leak - contact a refrigeration engineer. 7. Compressor does not work – see specific point.
◆ Evaporating pressure too high	⇨ Find out the reason for the fault: 1. Excessive thermal load – re-establish the nominal conditions. 2. The inlet air is too hot – re-establish the nominal conditions. 3. The ambient air temperature is too high or the room ventilation insufficient – ensure sufficient ventilation. 4. The condenser is dirty – please clean it (air-cooled). 5. The fan does not work – see the corresponding section (air-cooled). 6. The adjusting valve for the cooling-water flow needs to be re-adjusted - contact a specialist to have the nominal calibration re-established (water-cooled). 7. Compressor does not work – see specific point.
◆ Low differential pressure between HP-LP values	⇨ Find out the reason for the fault: 1. The fan runs continuously – ensure perfect functioning of the pressure transducer (see BHP on the electric diagram) - (air-cooled). 2. The ambient temperature is too low – re-establish the nominal conditions. 3. Air flows through the condenser although the fan is switched off – protect the dryer against wind or external air flows (not caused by the fan of the dryer) - (air-cooled). 4. The cooling-water temperature is too low – re-establish the nominal conditions (water-cooled). 5. The adjusting valve for the cooling-water flow needs to be re-adjusted - contact a technician for refrigeration plants to have the nominal calibration re-established (water-cooled). 6. Refrigerant gas leak – contact a technician for refrigeration plants. 7. Compressor does not work – see specific point.

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ Electronic controller DMC50 in alarm condition (status area red colour) - See section **7.14.6**	⇨ Status area blinking red : one or more alarms are active. The display shows the ID code and the description of the active alarm. ⇨ Status area steady red : one or more alarms need to be reset. The display shows the ID code and the description of alarm which is no longer active but which still need to be reset. ⇨ Alarms are shown by following codes and descriptions : 1. **High Pressure Switch -** HPS pressure switch triggered (refrigerant high pressure) because the refrigerant pressure is too high – see the corresponding paragraph. 2. **Low Pressure Switch -** LPS pressure switch triggered (low pressure) because the refrigerant pressure is too low – see the corresponding paragraph. 3. **Fan protection** (air-cooled) - At least one of electrical protections of the fan has triggered or the inverter is in alarm condition or fault - see electric diagram. Circuit breaker QV1 has tripped - reset circuit breaker, restart and check the perfect functioning of the dryer. Internal thermal protection MF1 (and/or MF2 if installed) has tripped - wait 30 minutes, restart and check the perfect functioning of the dryer. Inverter INV2 in alarm condition - Refer to the manual of inverter, reset the alarm condition by acting on the inverter control panel, restart and check the perfect functioning of the dryer. Fault Inverter INV2 - Replace the inverter. 4. **High Discharge Temperature -** The outlet temperature protection of the compressor has triggered as a result of a very high temperature, over safety limits (probe T4) – see the corresponding paragraph. 5. **Compressor protection -** The electrical protection of the compressor has tripped (see QC1 on the electric diagram) – reset, restart and check the perfect functioning of the dryer. 6. **Ice** : The temperature inside the exchanger (probe BT1) is too low – the dew point is too low – see the corresponding paragraph. 7. **Probe Fault LP -** Failure pressure transducer BLP - see electric diagram - check the electric cabling and/or replace the transducer. 8. **Probe Fault HP** - Failure pressure transducer BHP - see electric diagram - check the electric cabling and/or replace the transducer. 9. **Probe Fault T1** - Failure temperature probe BT1 - see electric diagram - check the electric cabling and/or replace the probe. 10. **Probe Fault T4** - Failure temperature probe BT4 - see electric diagram - check the electric cabling and/or replace the probe. 11. **Low Differential Pressure** - Low differential pressure between HP-LP values - see the corresponding paragraph. 12. **High Evaporating Pressure** - The evaporating pressure is too high – see the corresponding paragraph. 13. **Low Condensing Pressure** - The condensing pressure is too low - see the corresponding paragraph 1001. **Power Unit Communication Fault** - Data communication between display and main module of the controller DMC50 is lost - Check the cable connection between two modules and / or replace the cable. 1002. **Inverter Communication Fault** - Data communication between main module of the controller DMC50 and inverter of the compressor is lost. Cable data connection broken - Check the cable connection between the two modules and / or replace the cable. Fault inverter INV1 - Replace the inverter 1400. → 1479 **Specific alarms of inverter of the compressor** - Refer to the manual of inverter, reset the alarm condition by acting on the inverter control panel, restart and check the perfect functioning of the dryer.

SYMPTOM	POSSIBLE CAUSE - SUGGESTED ACTION
◆ Electronic controller DMC50 in service warning condition (status area orange colour) - See section **7.14.5**	⇨ Status area blinking orange : one or more service warnings are active. The display shows the ID code and the description of the active warning. ⇨ Status area steady orange : one or more service warnings need to be reset. The display shows the ID code and the description of warning which is no longer active but which still need to be reset ⇨ Service warnings are shown by following codes and descriptions : 15. **Low Dew Point** - Dew point too low – see the corresponding paragraph. 16. **High Dew Point** - Dew point too high (higher than adjusted value on HdA parameter) – see the corresponding paragraph. 17. **Probe Fault T2** - Failure temperature probe BT2 - see electric diagram - check the electric cabling and/or replace the probe. 18. **Probe Fault T3** - Failure temperature probe BT3 - see electric diagram - check the electric cabling and/or replace the probe. 19. **Drainer** - The condensate drain ELD (and/or ELD2 if installed) does not work properly (ALARM contact is open) – see electric diagram and corresponding paragraph. 20. **Programmed service** - Maintenance notification time is expired (over than adjusted value on SrV parameter) – carry out the scheduled maintenance and reset the hour meter. 21. **High discharge temperature** - The outlet temperature protection of the compressor has triggered as a result of a very high temperature but within safety limits (probe T4) – see the corresponding paragraph. 22. **High Evaporating Pressure** - The evaporating pressure is too high – see the corresponding paragraph. 23. **Low Condensing Pressure** - The condensing pressure is too low - see the corresponding paragraph. 24. **High Condensing Pressure** - The condensing pressure is too high - see the corresponding paragraph.

8.3 Spare parts

The suggested spare parts list will enable you to promptly intervene in case of abnormal operation, so avoiding to wait for the spares delivery. In case of failure of other parts, for example inside the refrigerating circuit, the replacement must be worked out by a refrigerating systems specialist or in our factory.
NOTE: To order the suggested spare parts or any other part, it's necessary to quote the data reported on the identification plate.

8.4 Maintenance operation on the refrigeration circuit

Maintenance and service on refrigerating systems must be carried out only by certified refrigerating engineers only, according to local rules.
All the refrigerant of the system must be recovered for its recycling, reclamation or destruction.
Do not dispose the refrigerant fluid in the environment.

This dryer comes ready to operate and filled with R134a or R407C type refrigerant fluid.

In case of refrigerant leak contact a certified refrigerating engineer. Room is to be aired before any intervention.
If is required to re-fill the refrigerating circuit, contact a certified refrigerating engineers.
Refer to the dryer nameplate for refrigerant type and quantity.

Characteristics of refrigerants used:

Refrigerant	Chemical formula	TLV	GWP
R134a - HFC	CH_2FCF_3	1000 ppm	1300
R407C - HFC	R32/125/134a (23/25/52) CHF2CF3/CH2F2/CH2FCF3	1000 ppm	1653

8.5 Dismantling of the dryer

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

Part	Material
Refrigerant fluid	R134a, R407C, Oil
Canopy and Supports	Carbon steel, Epoxy paint
Refrigerating compressor	Steel, Copper, Aluminium, Oil
Alu-Dry Module	Aluminium
Condenser Unit	Aluminium, Copper, Carbon steel
Pipe	Copper
Fan	Aluminium, Copper, Steel
Valve	Brass, Steel
Electronic Level Drain	PVC, Aluminium, Steel
Insulation Material	Synthetic rubber without CFC, Polystyrene, Polyurethane
Electric cable	Copper, PVC
Electric Parts	PVC, Copper, Brass

We recommend to comply with the safety rules in force for the disposal of each type of material.
Refrigerant contains droplets of lubrication oil released by the refrigerating compressor.
Do not dispose this fluid in the environment. Is has to be discharged from the dryer with a suitable device and then delivered to a collection centre where it will be processed to make it reusable.

9 Attachments

Exploded views – List of components

1	Alu-Dry module
1.1	Insulation material
2	Refrigerant pressure switch LPS
4	Refrigerant pressure switch HPS
6	Compressor
8	Condenser (Air-Cooled)
9	Condenser fan (Air-Cooled)
10	Filter dryer
12	BT1 temperature probe (dew point)
13	Condensate drain service valve
17	Electronic instrument
18	Condenser (Water-Cooled)
19	Condenser water-regulating valve (Water-Cooled)
20	Refrigerant accumulator
21	Electronic drainer
22	Main switch
34	Liquid sight glass
35	Thermostatic expansion valve TEXV
36	Liquid separator
37	Refrigerant pressure transducer BHP
39	Refrigerant pressure transducer BLP
40	Compressor inverter INV1
41	Condenser fan inverter INV2
42	Electrical panel fan
43	Oil separator
51	Front panel
52	Back panel
53	Right lateral panel
54	Left lateral panel
55	Cover
56	Base plate
57	Upper plate
58	Support beam
59	Support bracket
60	Control panel
65	Condenser filter
66	QE door
82	Check valve CHV
83	Refrigerant service valve – H.P. side
84	Refrigerant service valve – L.P. side
85	Pressure balancing solenoid valve EVB

Electric diagrams – List of components

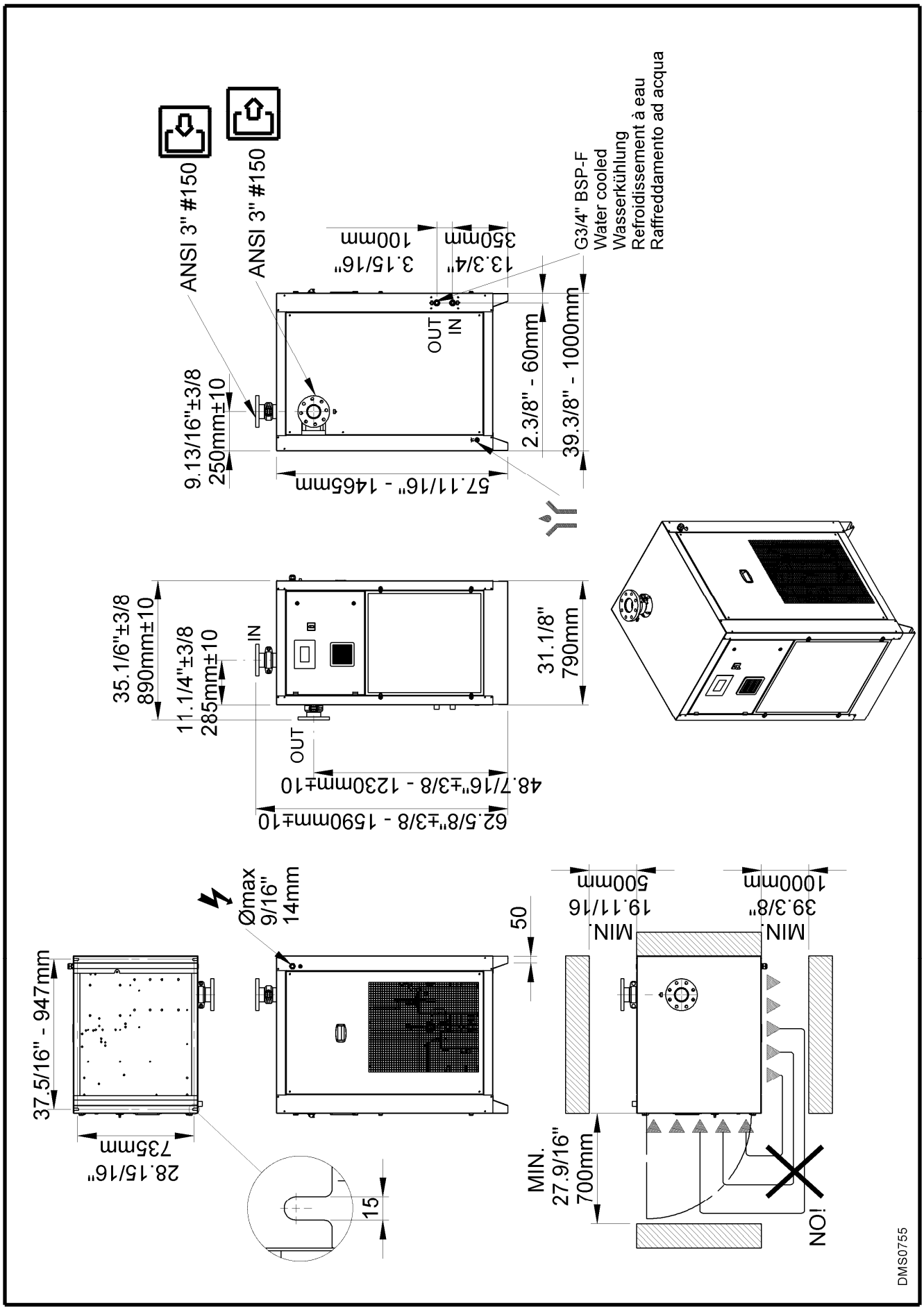
MC1	Compressor
MF1 - 2	Condensers fans
DMC50MA	Electronic cont. DMC50 – Main module
DMC50-DU1	Electronic cont. DMC50 – Display module
INV1	Compressor inverter
INV2	Condenser fan inverter
BT1 - 4	Temperature probes
BHP - BLP	Refrigerant pressure transducer
LPS	Low pressure switch
HPS	High pressure switch
ELD	Electronic drainer
EVB	Pressure balancing solenoid valve
QS	Main switch with door block
RC	Compressor crankcase heater
MCP	Electrical panel fan

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

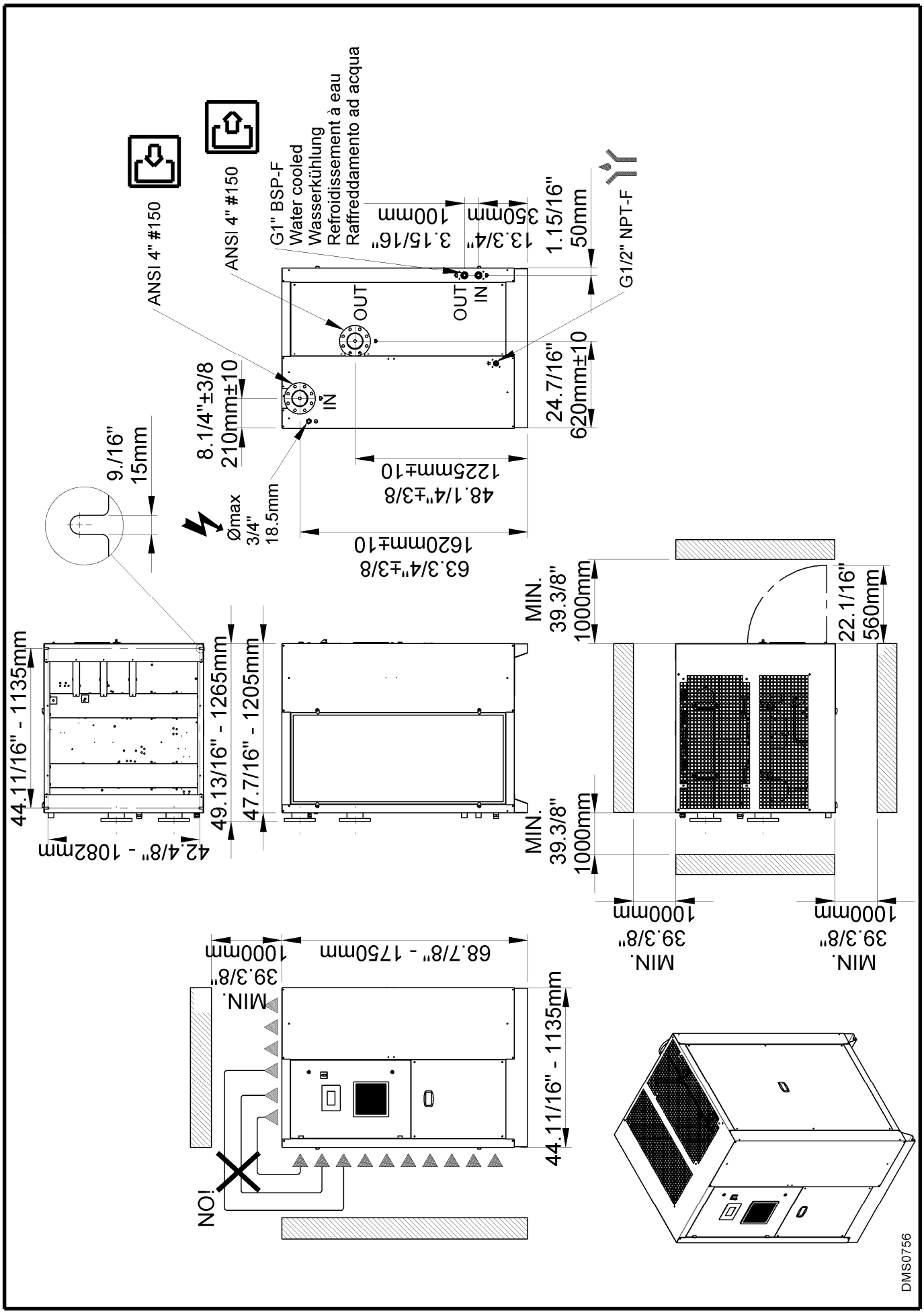
BN	Brown
BU	Blue
BK	Black
YG	Yellow / Green
OR	Orange
RD	Red
WH	White
WH / BK	White / Black

9.1 Dryers dimensions

9.1.1 ACT VS 800 – 1250

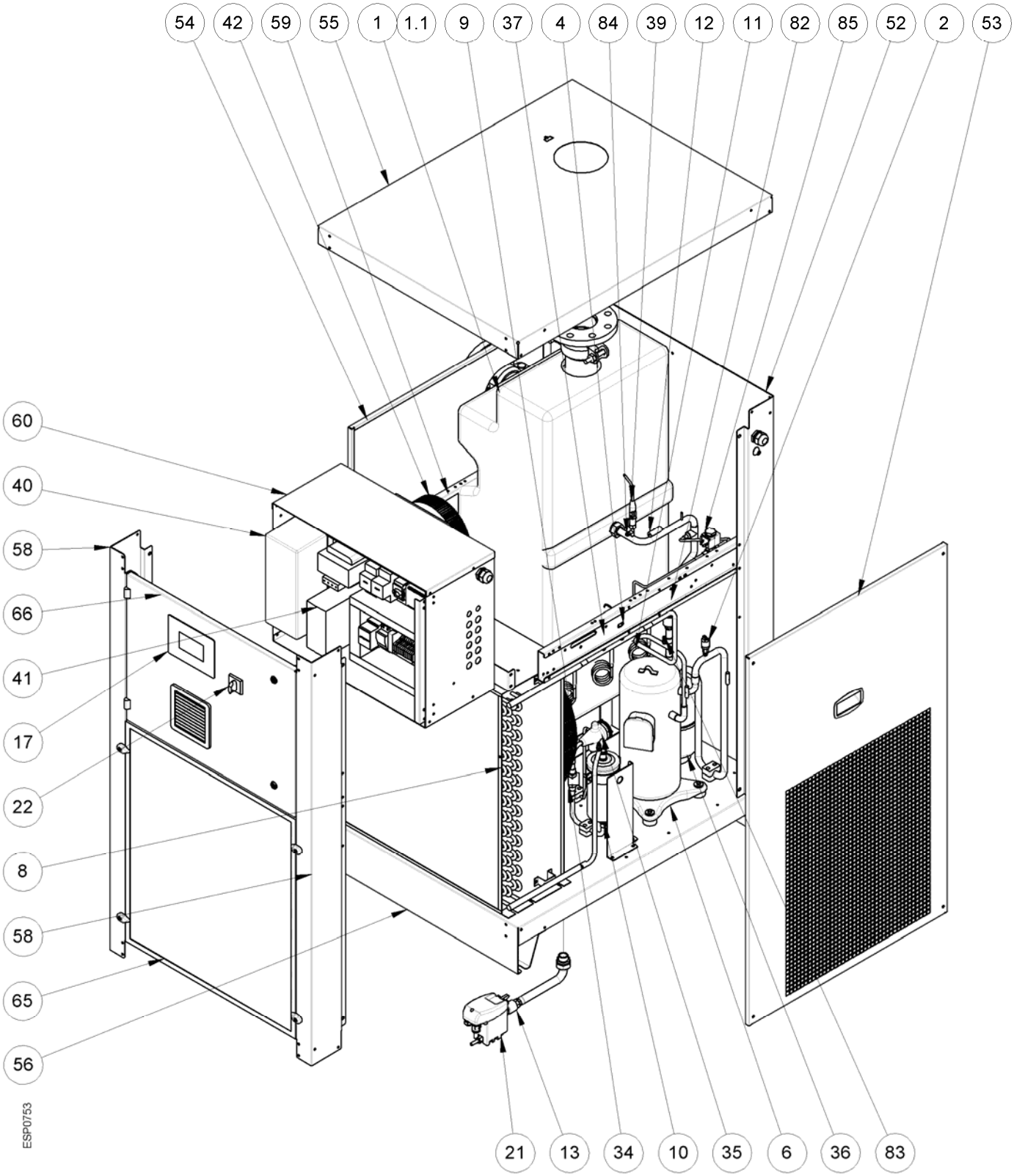


9.1.2 ACT VS 1500 – 2500



9.2 Exploded views

9.2.1 ACT VS 800 – 1250 Air Cooled



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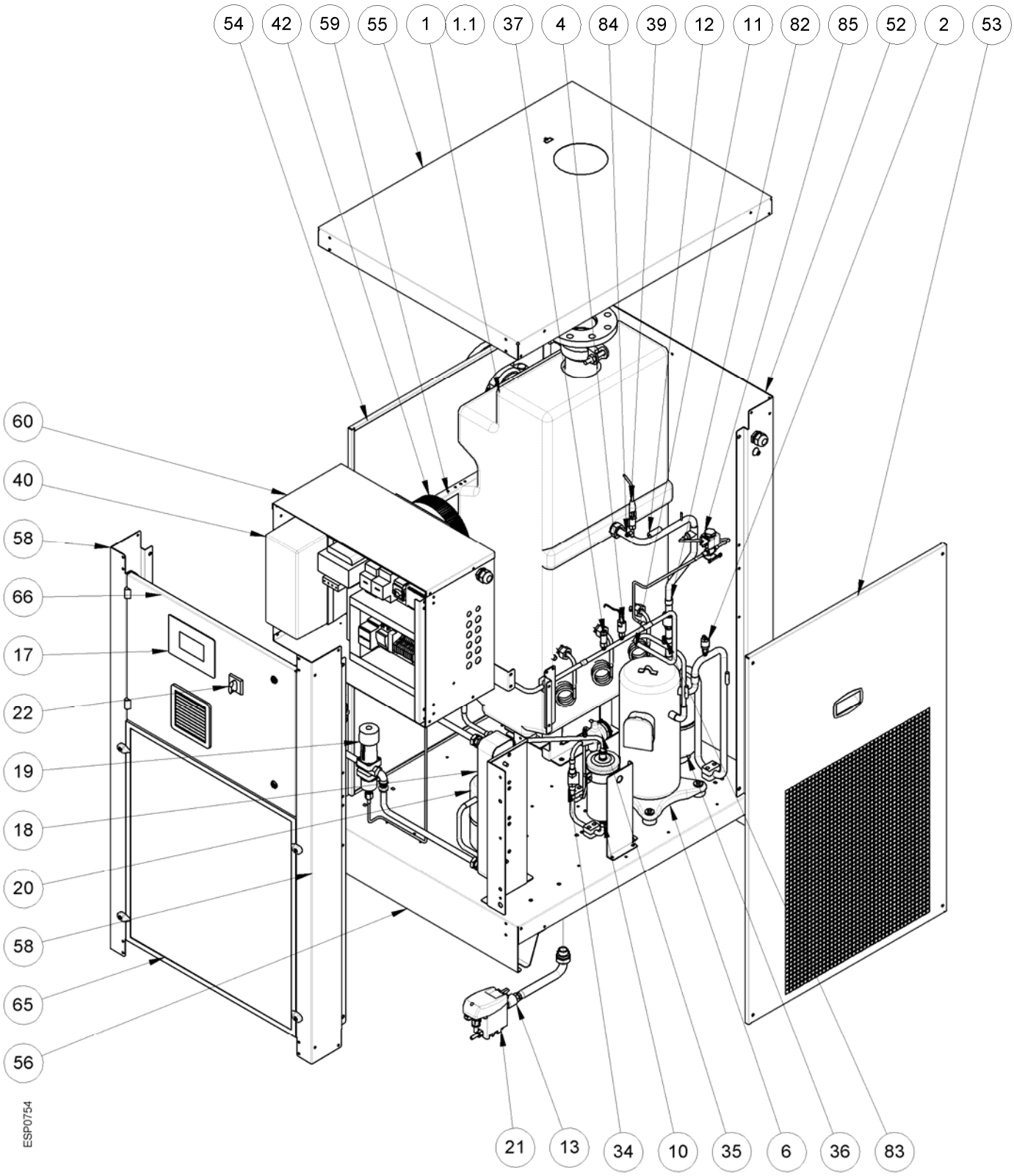

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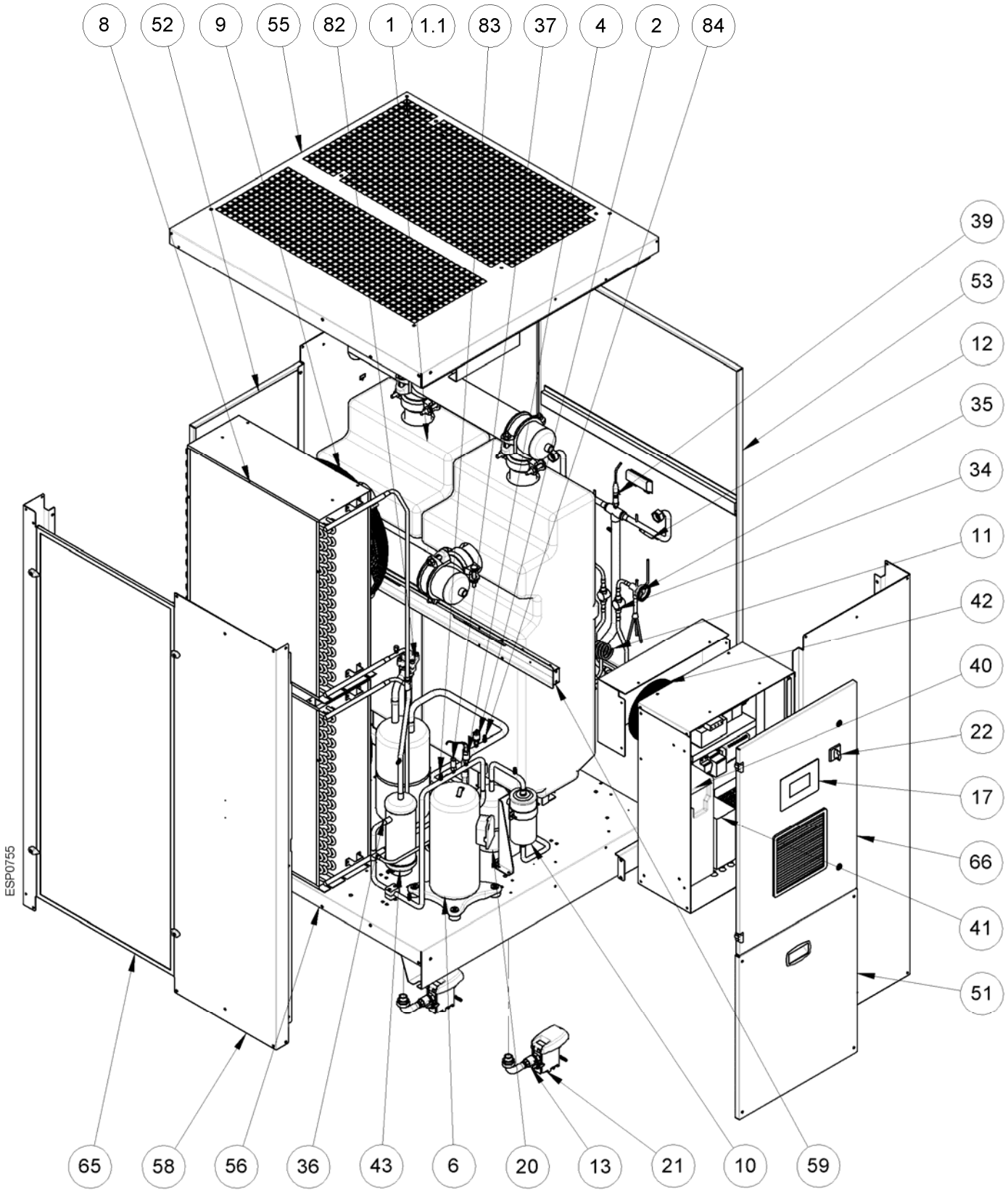

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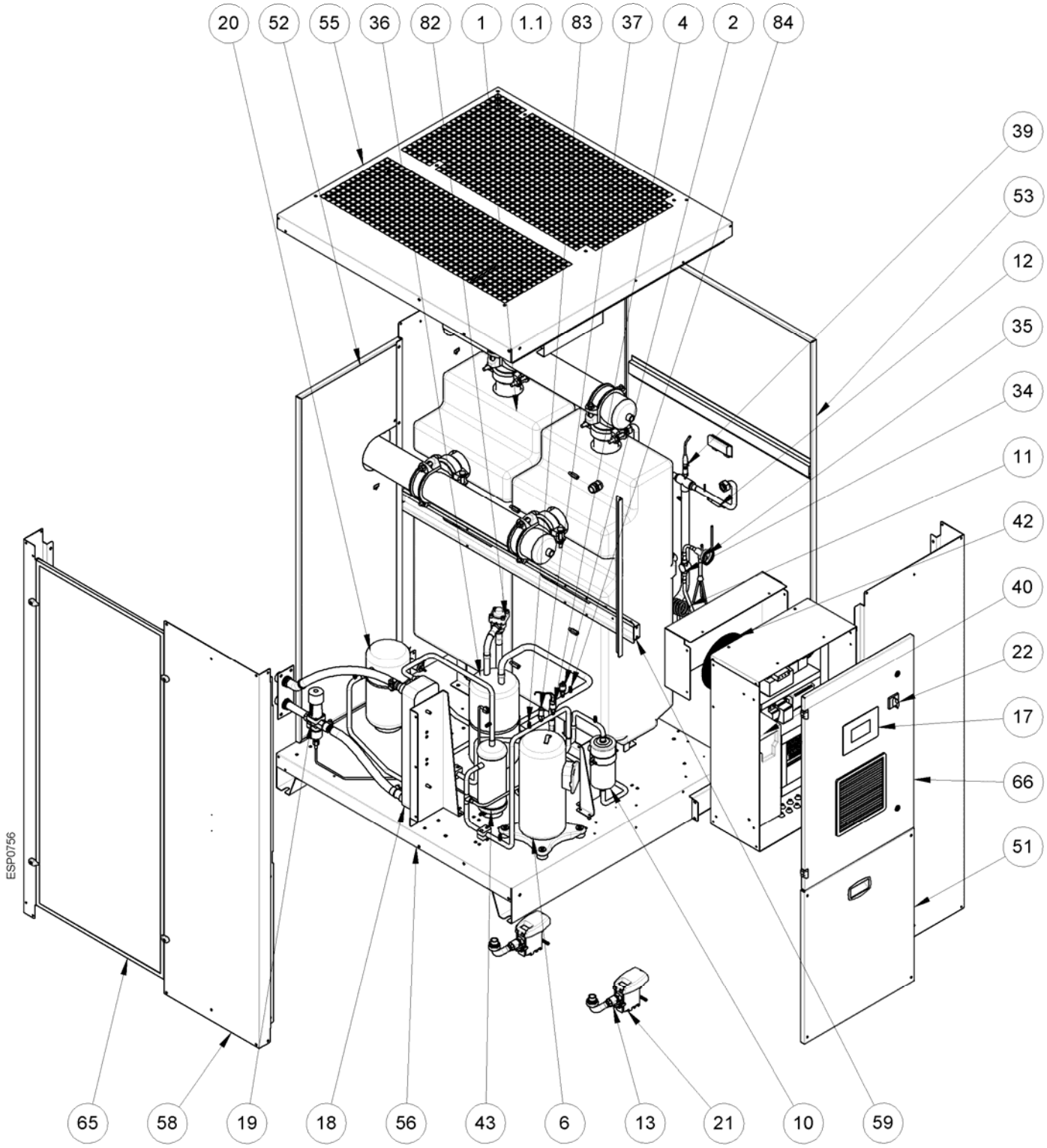
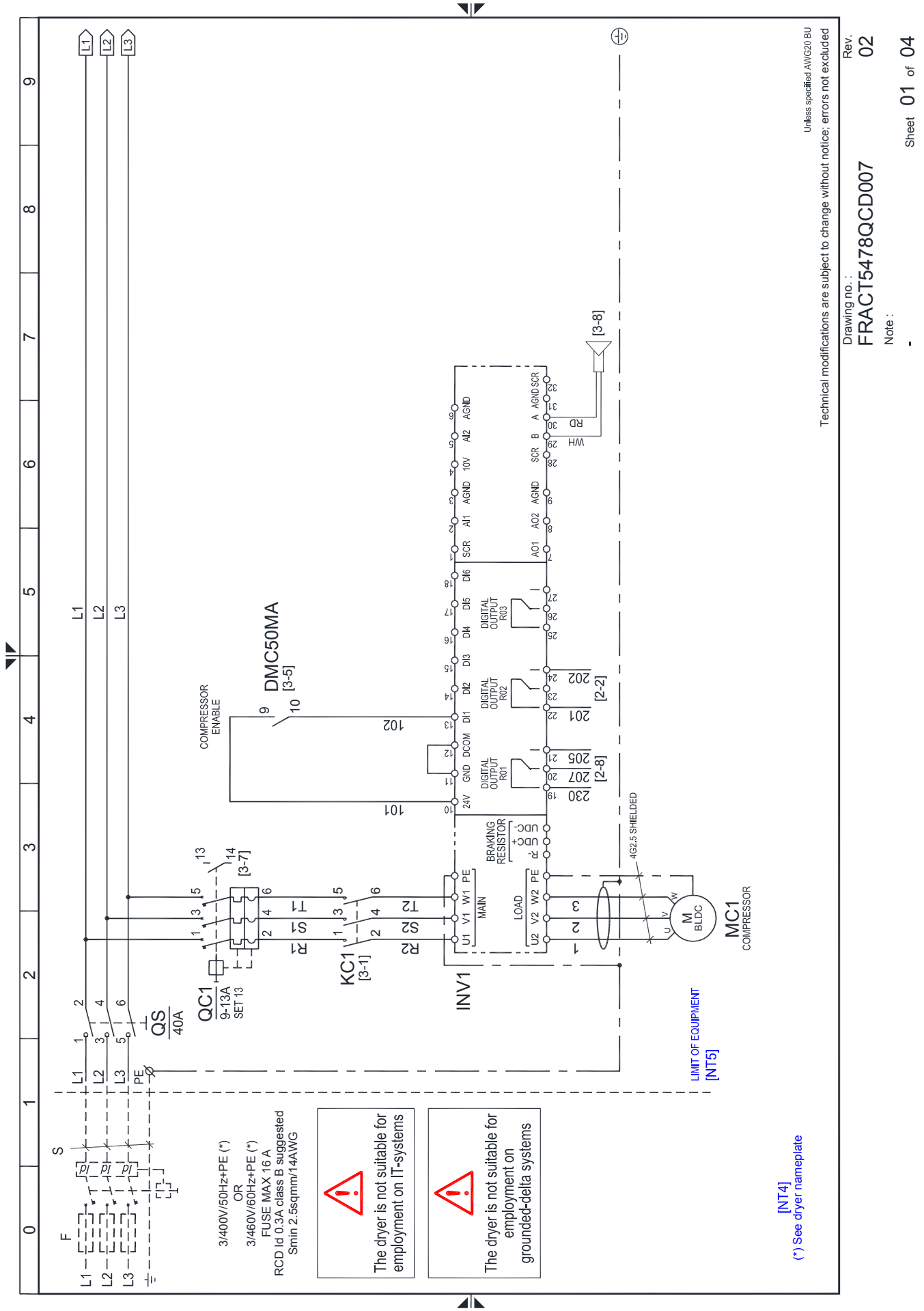
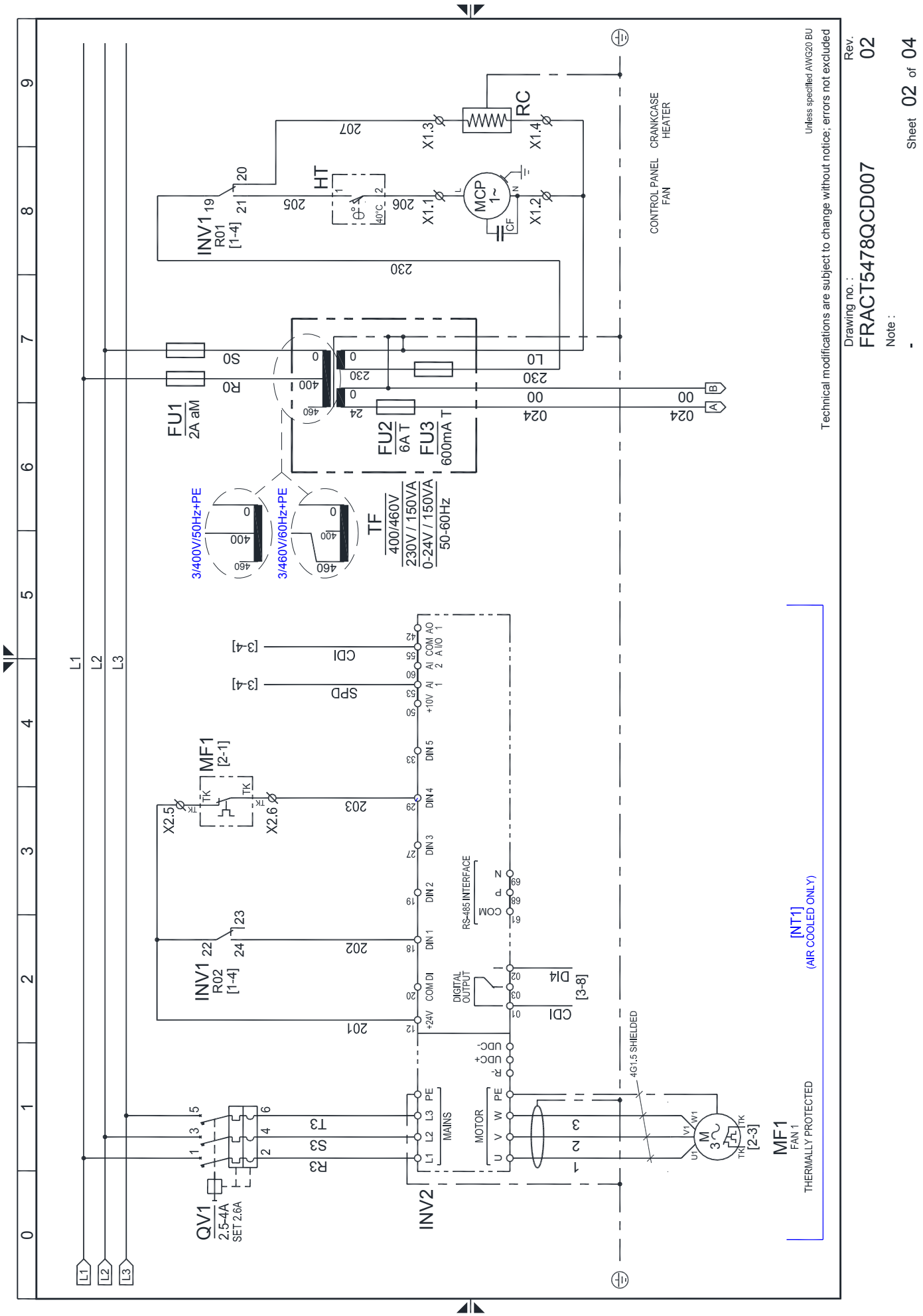


9.3 Electric diagrams

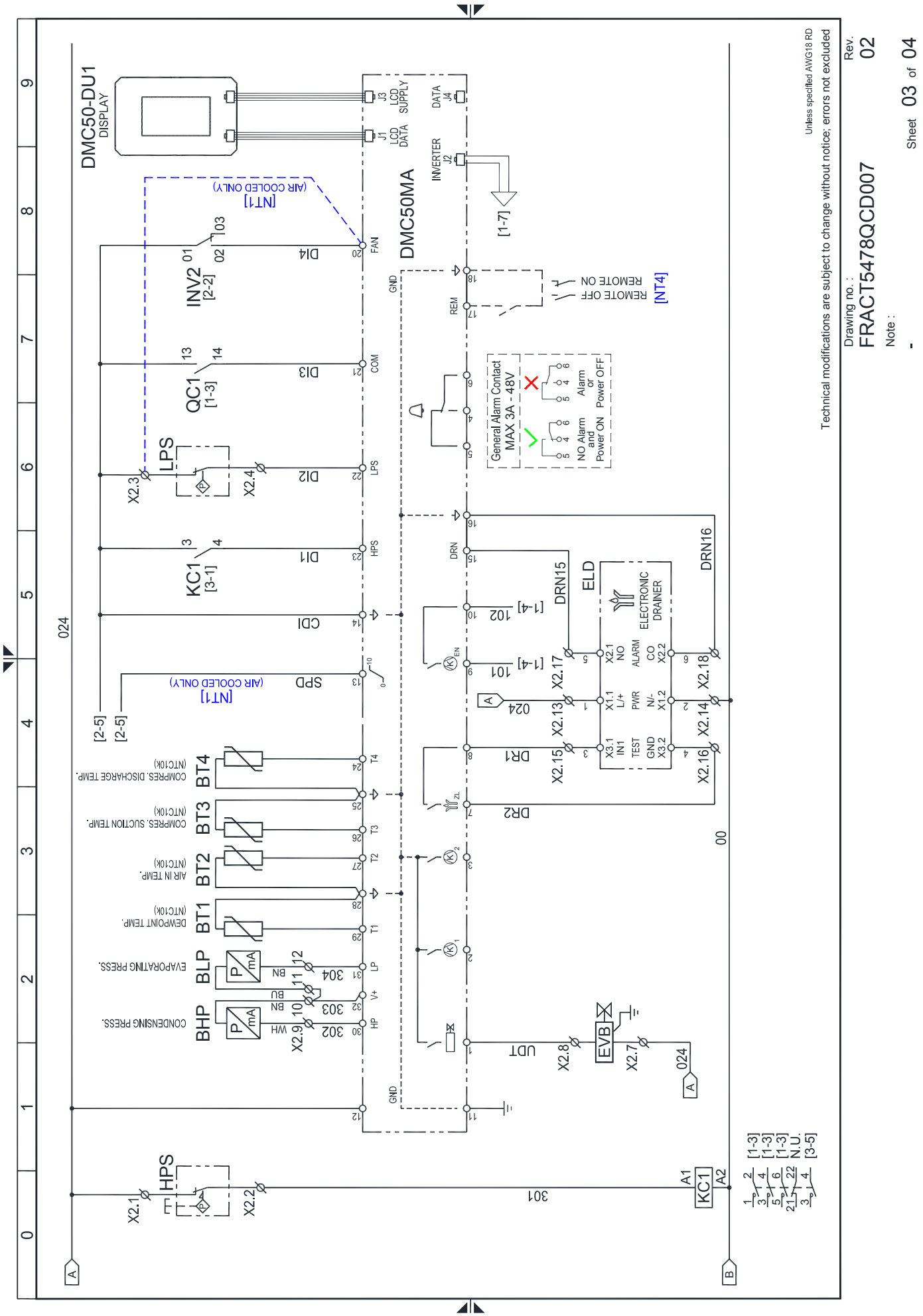
9.3.1 ACT VS 800 – 1250 Sheet 1 of 4



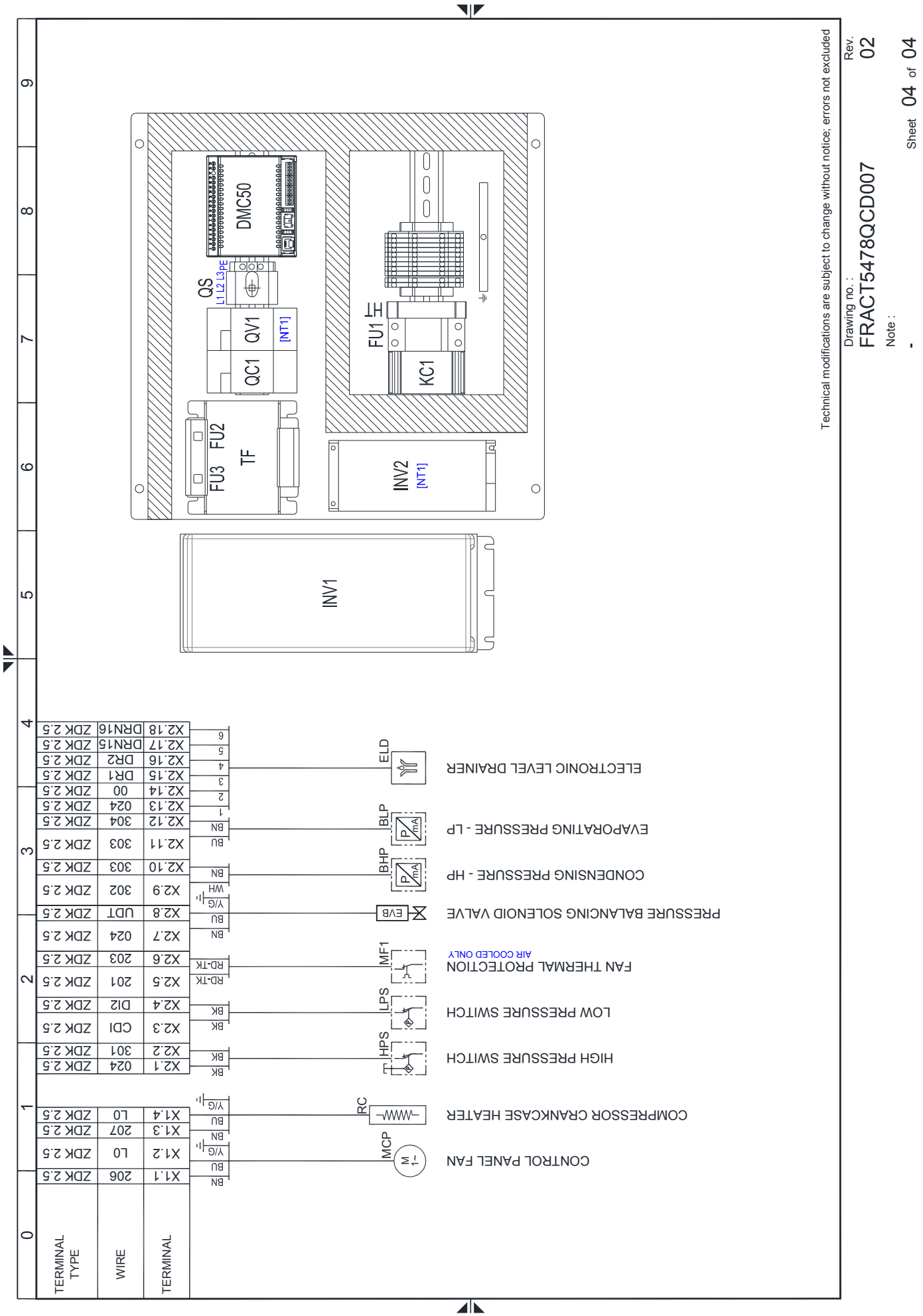
9.3.2 ACT VS 800 – 1250 Sheet 2 of 4



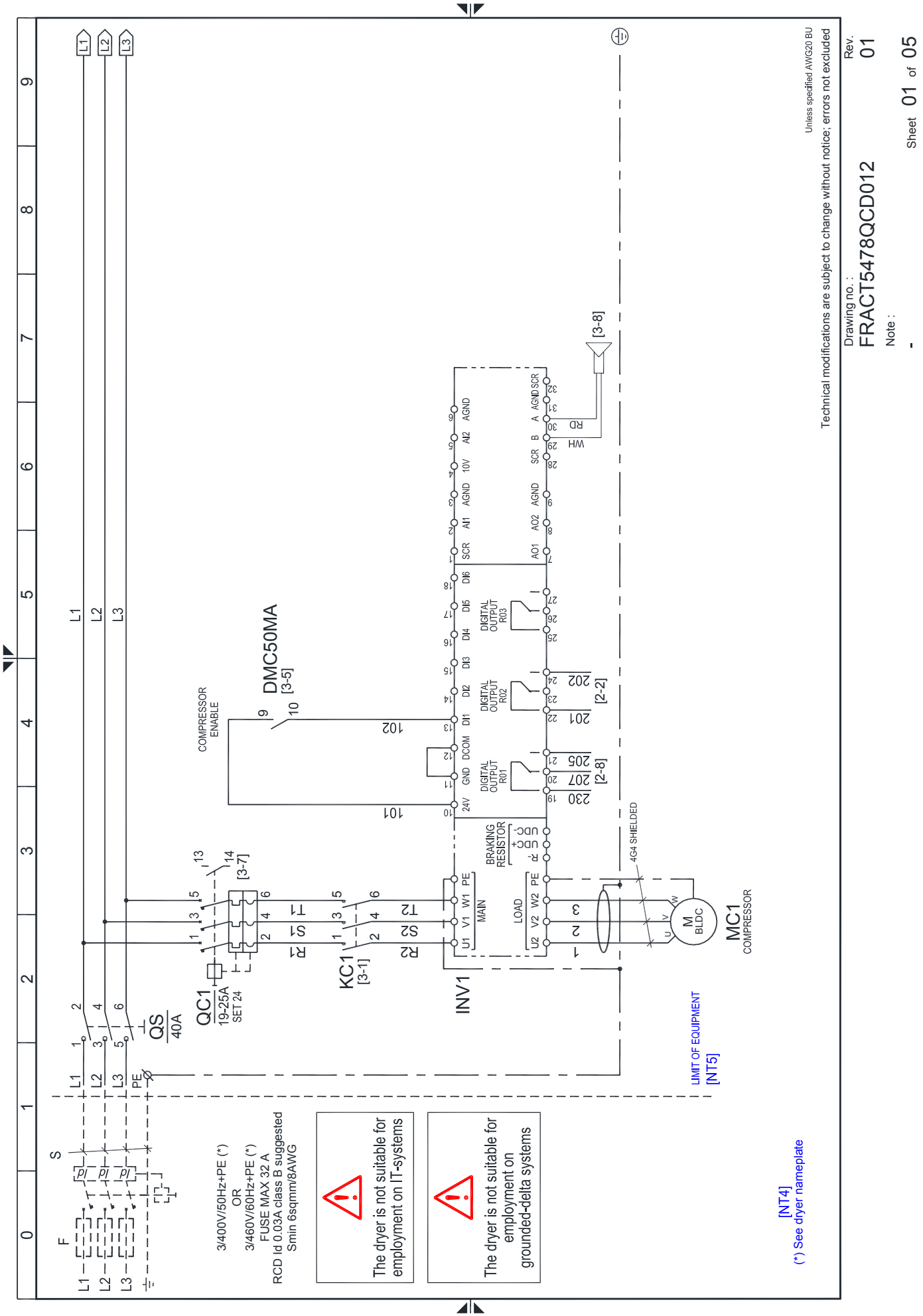
9.3.3 ACT VS 800 – 1250 Sheet 3 of 4



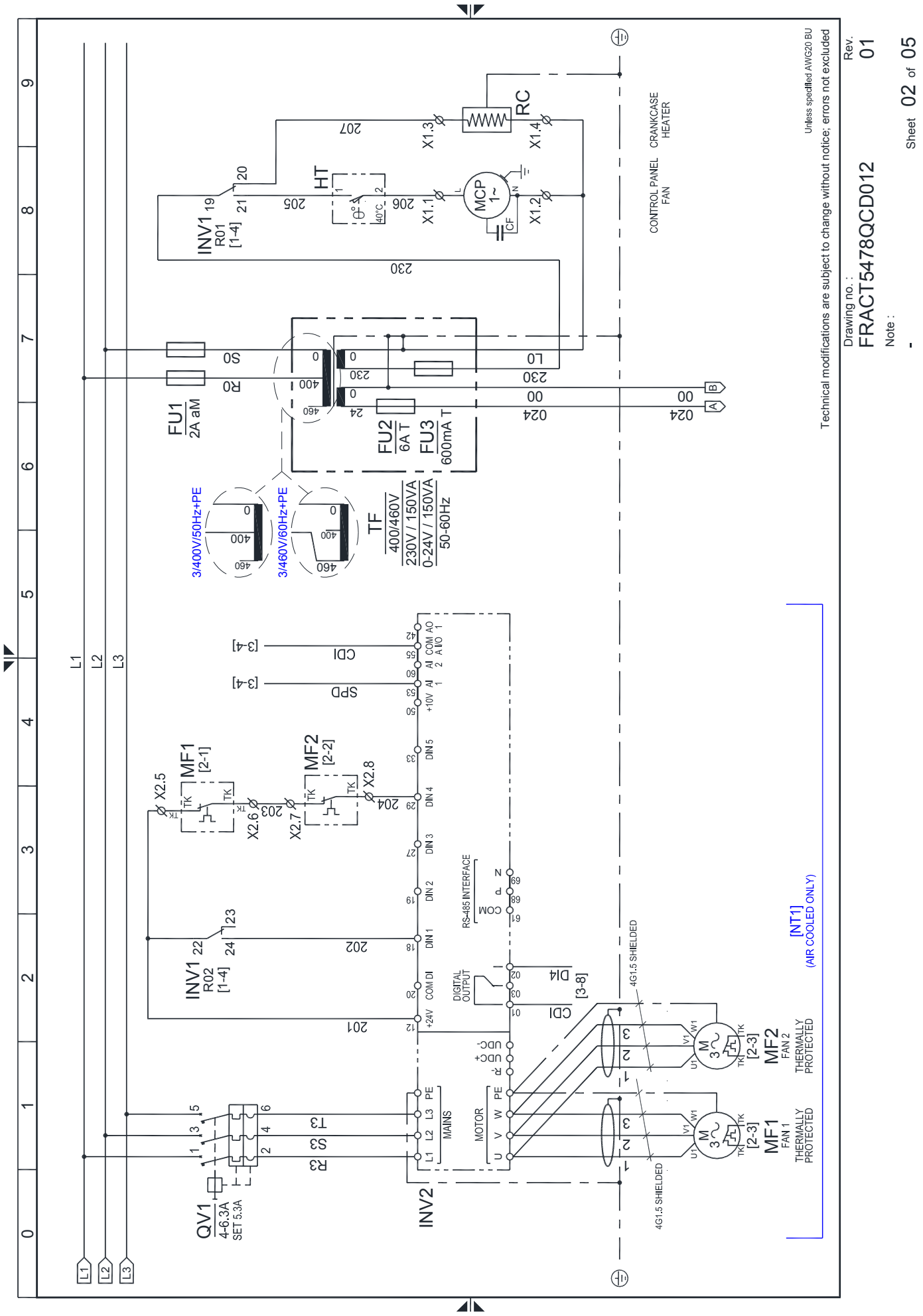
9.3.4 ACT VS 800 – 1250 Sheet 4 of 4



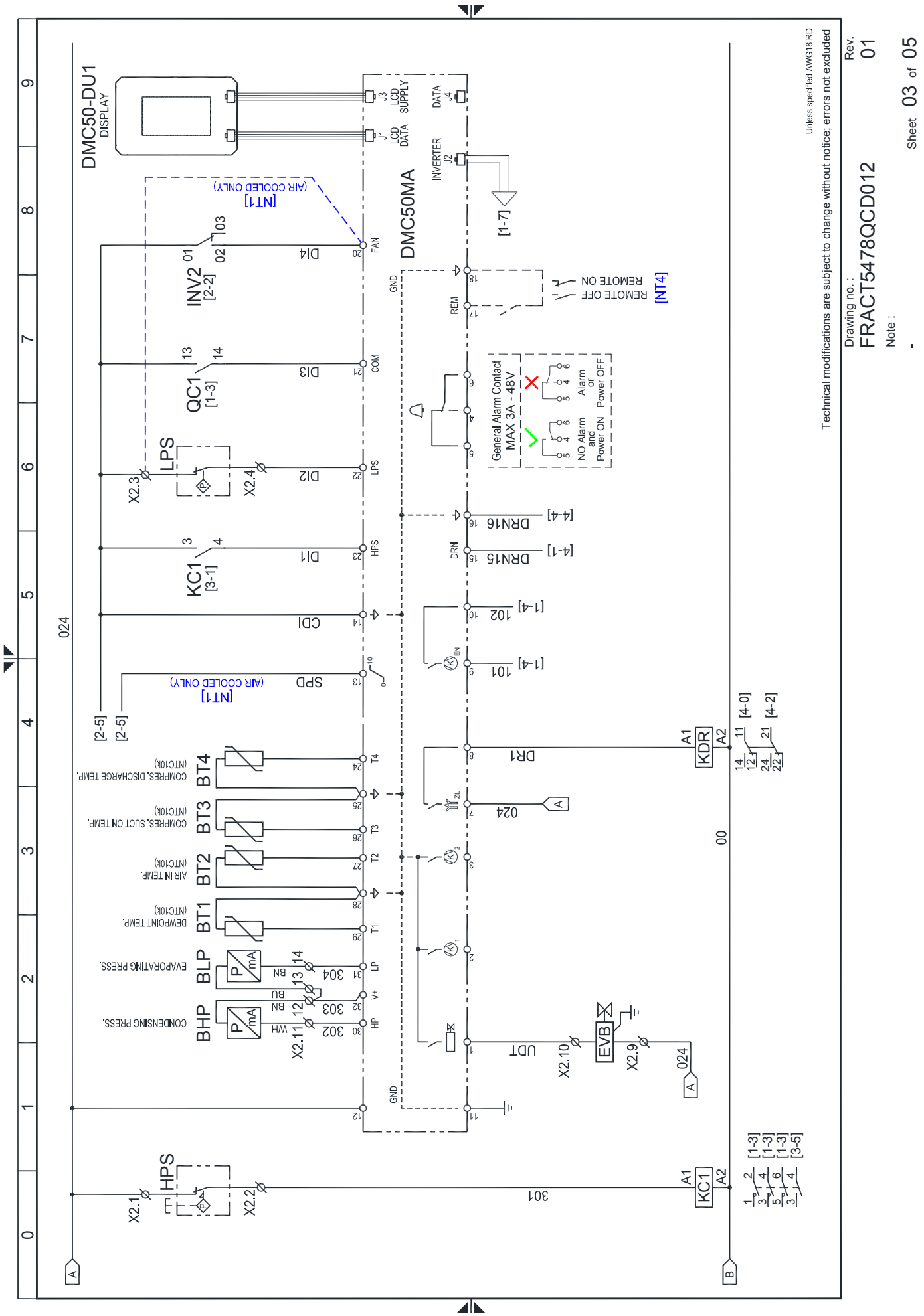
9.3.5 ACT VS 1500 – 2500 Sheet 1 of 5



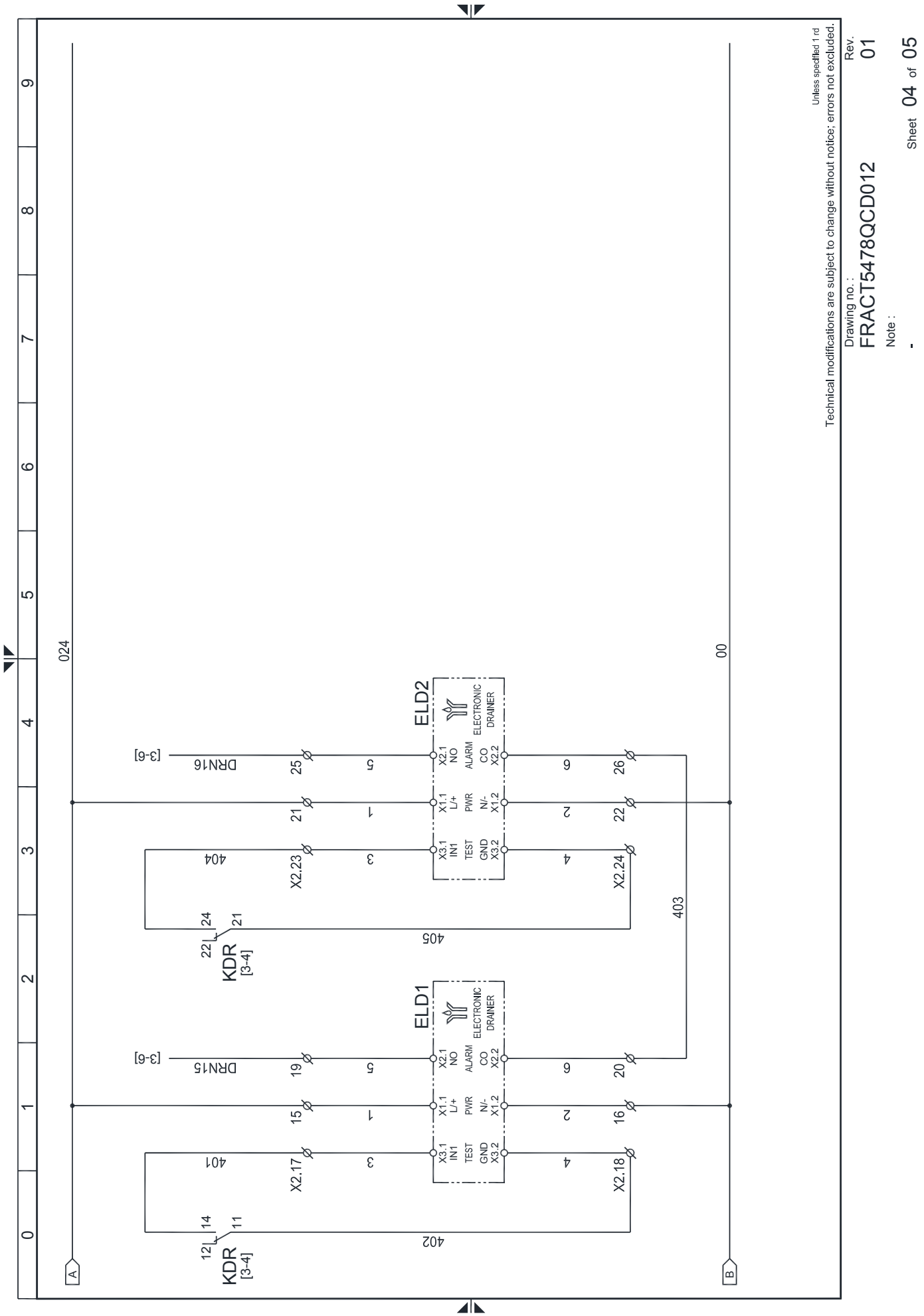
9.3.6 ACT VS 1500 – 2500 Sheet 2 of 5



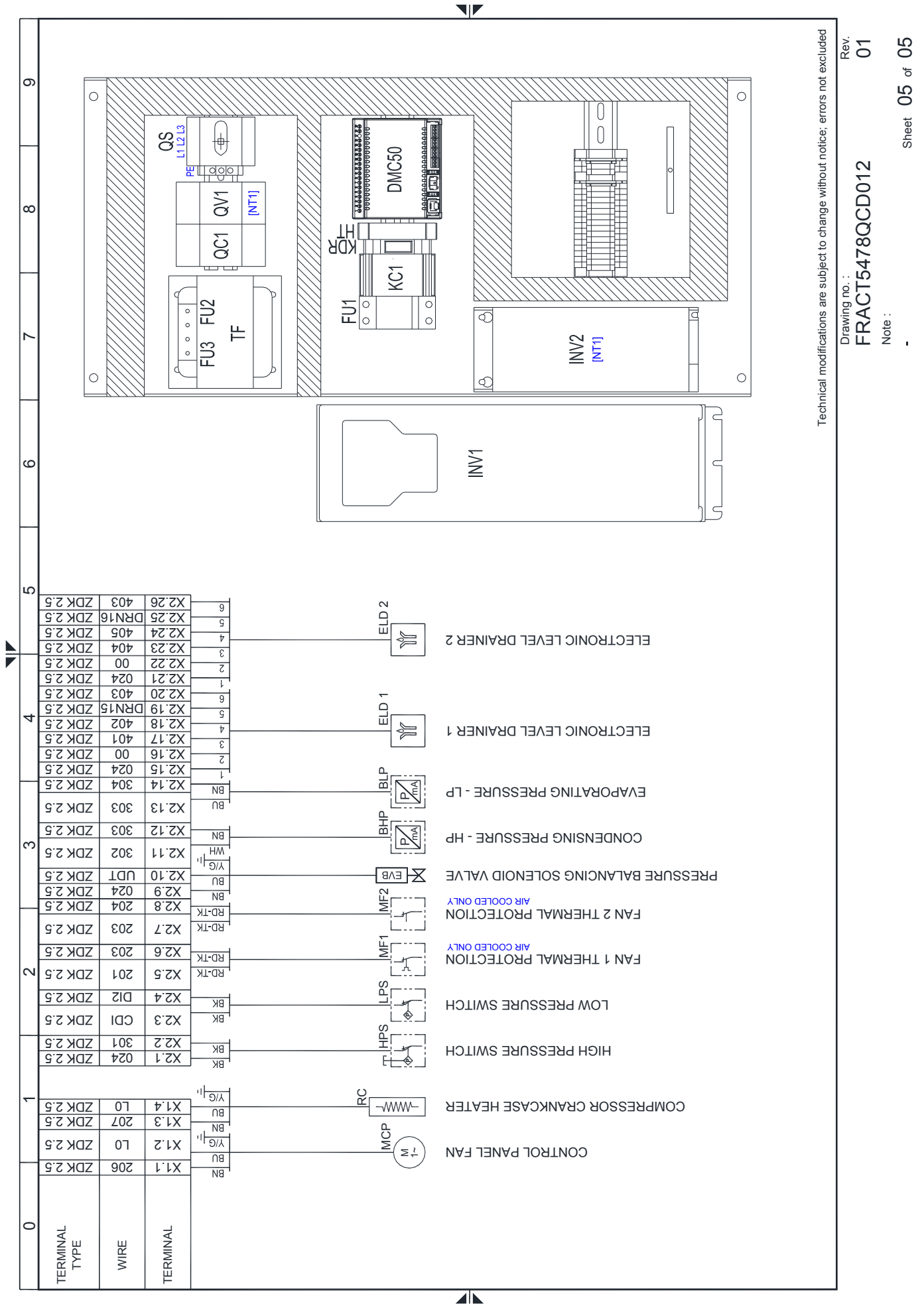
9.3.7 ACT VS 1500 – 2500 Sheet 3 of 5



9.3.8 ACT VS 1500 – 2500 Sheet 4 of 5



9.3.9 ACT VS 1500 – 2500 Sheet 5 of 5



COSTRUTTORE / *MANUFACTURER :*

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Sede Legale:

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COD.ID.CEE IT 00430110312
R.E.A.GO n.51691
Cod.Fisc.e Reg.Impr. 00430110312

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