

MDX

Non-Cycling Refrigerated Compressed Air Dryers with zero-loss “Intellidrain”

Operation & Maintenance Manual

MODELS MDX 320 – 420 – 515 – 650

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HOW TO USE THIS MANUAL

All features of this machine, all information on safety, machine installation, operation, adjusting and maintenance are described in this manual. This manual is integral part of this machine and should absolutely be read and understood by any person operating and maintaining this machine. Should this machine be sold again, this manual should be given to the new machine owner. Should this manual be lost, please ask for a new copy to your authorized dealer.

SYMBOLS

Symbols included in the below frames refer to safety instructions to be followed during the machine operation and maintenance. The other symbols refer to machine features and are either on the machine or on explanation screens.



Air inlet



Condensate drain



Air outlet



Direction of rotation of fan motor



Electric shock danger!

WARRANTY

This product has been factory tested before shipment. It is guaranteed to be free from defects in material and/or workmanship for a period of 12 months from the date of shipment. This warranty applies provided the machine has been installed and used in accordance with the instructions detailed in this manual. The manufacturer agrees, at its discretion, to repair or replace all defective parts free of charge. Further, the manufacturer agrees to cover charges associated with field labor required to make authorized warranty repairs, provided the Motivair warranty policy is followed and an S.I.R. authorization is issued by Motivair. Labor coverage shall be limited to maximum rates as published in the latest price list. A factory authorized service technician may only perform all field repairs. This warranty is limited to defects associated with operation and manufacture only. All parts subject to wear due to their normal operation are not covered by this warranty. All transportation costs associated with factory repair of equipment are the sole responsibility of the owner.

1.0 GENERAL

1.1 standard equipment

- Instruction and maintenance manual.
- Wiring diagram.
- Condensate drain unit (where not already fitted).

1.2 description – These dryers have been designed to eliminate moisture contained in compressed air by lowering its temperature to 33-39°F. These dryers take advantage of a sealed refrigeration system. The air delivered by this dryer is free of all liquid condensate, which is first accumulated in the separator, then discharged from the dryer by an electronic zero-loss drain (Intellidrain). If the compressed air load (temperature and/or scfm flow) imposed on the dryer is more than the rated capacity, this will result in a higher dew point, but will not cause a safety issue. Make certain the dryer is not connected to a system pressure higher than the rated maximum.

ATTENTION: This dryer is supplied with a power disconnect switch (S1).

The authorized electrical contractor is responsible for the correct power supply, in accordance with local and national electrical codes.

A start/stop switch (ON/OFF) allows the dryer to be turned on and allows normal operation. This dryer is equipped with a refrigeration circuit safety device to prevent damage. A high-pressure switch opens the compressor's contacts at a preset pressure and remains in this position until the reset button is activated. The reset button remains enabled until the line pressure returns to the factory-set safe level. A Klixon protection device on the compressor prevents damage to the compressor from electrical or thermal overload. This is an automatic re-setting device.

1.3 use - The use of a dryer is recommended for the treatment of compressed air when a low moisture level is required for general manufacturing processes.

1.4 general safety instruction - Read this manual carefully before performing any installation, or maintenance operation. This machine has been designed and to be used as described below. Any other use is not advised. Specialized personnel must perform any maintenance or cleaning operation. The Supplier is not responsible for any use other than the intended use, or any use not in compliance with the instructions in this manual.

WHAT SHOULD BE DONE:

- Be familiar with all controls.
- Before performing any maintenance make sure that the dryer is not connected to the compressed air system (inlet & outlet isolation valves closed) and the dryer is fully depressurized.
- Before removing the outer panels unplug the dryer and allow 15 minutes for it to cool down.
- Before removing the cooling fan protection guard make sure the dryer is electrically isolated.
- Make sure that all protection panels are properly fitted while the machine is working and after any maintenance operation.
- Make sure that the intake air is free from flammable fumes or vapors that might cause either explosion or fire risk.

WHAT SHOULD NEVER BE DONE:

- Never place flammable objects near the dryer.
- Never use the dryer if the power cable is faulty or the connection is not safe.
- Never allow anyone to operate the dryer without giving him or her proper instructions.
- Never tamper with safety devices.
- Never hit refrigerant pipes with heavy or sharp objects. They contain refrigerant gas under pressure.
- Never touch any part of the cooling circuit when the machine is running. They are very hot!
- Never drain the condensate directly into the sewer system.

This equipment has been designed to comply with all current safety regulations. All installation, use and maintenance operations should therefore be performed according to the instructions in this manual. Qualified and specialized personnel only, fully familiar with safety precautions to be taken should perform any cleaning/maintenance operation on the dryer.

2.0 MACHINE UNPACKING AND HANDLING

2.1 unpacking and handling – The dryer is supplied in a cardboard crate and should always be handled in an upright position, using a suitable and safe lifting device. (see technical data). After cutting straps (always wear safety gloves & glasses and cut them either with scissors or cutting snips), take the dryer out. Remove the package from the top, remove the wooden pallet and place the dryer in the designated location.

2.2 package disposal - We recommend the package is stored so that it can be used again in case the dryer should ever be moved. Keep it at least for the warranty period. If needed, it will be easier and safer to pack the dryer and send it to a service center. If the package is not stored, it should be disposed of in a responsible manner.

3.0 SET-UP

3.1 Dryer Positioning - The dryer should be placed in a suitable equipment room with the following features:

- Completely level floor;
- protected against weather conditions and direct sunlight;
- Properly ventilated, to maintain the room temperature within 41°F and 104°F even when the dryer is running. Allow at least 3 feet around the dryer for proper air circulation. Note the dryer adds heats to the room when operating.

3.2 Installation - Before installation check that the piping to be connected to the dryer is clean inside and does not contain any dirt or installation debris. Install the machine as follows:

- Connect the dryer to the air compressed line in compliance with one of the diagrams shown in fig. 6 and the instructions on the adhesive labels described on page 1.
- A 3-valve by-pass line is recommended. This will enable the dryer to be isolated from the compressed air system for repairs or maintenance, without interrupting the flow of compressed air to the factory or process.
- Connect the condensate drain tube in compliance with local regulations. The condensate from a lubricated compressor cannot be drained directly into the sewer system since it is a pollutant.
- A water-oil separator of suitable capacity is therefore recommended. Consult your local Motivair distributor for more information.
- Make sure the electrical power supply is in compliance with electrical data on the dryer nameplate, as well as local and national electrical codes.
- Always fit a fused disconnect in the power supply to the dryer. It is the responsibility of the installing electrical contractor to insure the correct wire and fuse sizing.
- A particulate pre-filter is always recommended to avoid the possibility of installation debris, rust, dirt or other particulates from blocking the heat exchangers in the dryer. Consult your local Motivair distributor for details.
- A coalescing oil removing filter is always recommended for lubricated compressors. Used compressor oil is not suitable for other compressed air operated machinery, and can cause product spoilage. Consult your local Motivair distributor for details.
- Position the dryer so that all controls can be easily read and all maintenance operations easily performed.

3.3 Start-Up

- Make sure the inlet & outlet isolation valves are closed.
- Turn the power switch (S1) on position 1, to activate the dryer.
- Push and hold the (ON/OFF) button on the control panel **for 3 seconds**.
- Wait for at least 15 minutes until the dryer has stabilized.
- Open the outlet isolation valve and then open the inlet valve. Finally, **slowly** close the by-pass valve. In this way, the plant is gradually pressurized.
- If the compressed air load to the dryer (temperature, scfm flow or both) exceeds the rated capacity of the dryer, the dew point will be higher, but this will not effect the safety or integrity of the dryer.(see technical data).

3.4 Decommissioning - *In the event there is a need to move the dryer, proceed as follows:*

1. Isolate the unit from the compressed air line in the reverse order described in “start-up” above.
2. **Completely depressurize the dryer’s air circuit by using the condensate drain (TEST button);**
3. Disconnect and lock out the electrical power supply to the dryer.

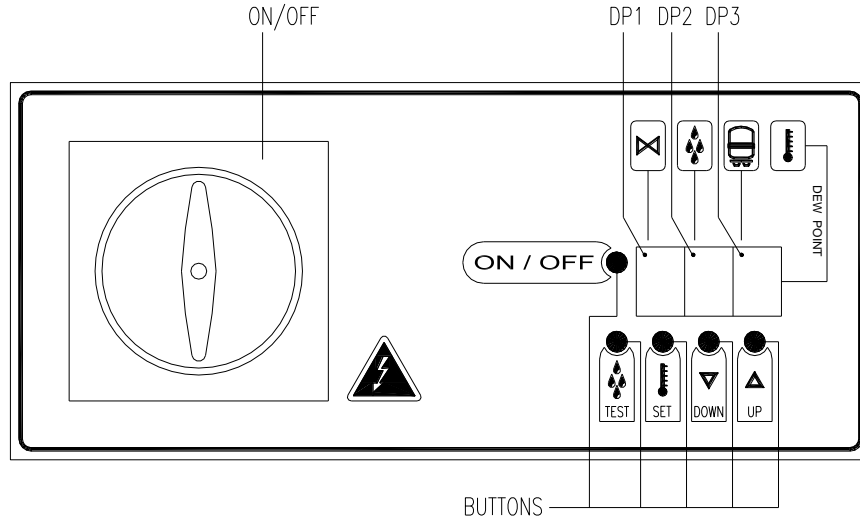
Packing and transport of faulty machines - Repack the dryer in its original box or with a similar one of the same dimensions. The dryer must be kept vertically and packed as supplied from the manufacturer. Make sure the dryer is securely banded to a wood pallet, and marked “FRAGILE”. Do not transport the dryer without the correct packing. It may be damaged irreparably, and this would be the customer’s responsibility.

MATERIALS RETURNED WITHOUT CORRECT PACKAGING AND COMPLETE DOCUMENTATION WILL NOT BE ACCEPTED.

3.5 Control Panel - These dryers are equipped with an electronic controller which controls the basic operating parameters.

WARNING FOR USER:
IT IS FORBIDDEN TO MODIFY THE OTHER SETTING PARAMETERS OF THE ELECTRONIC CONTROLLER WITHOUT THE MANUFACTURER'S AUTHORIZATION. ANY VARIATION TO THE CONFIGURATION PARAMETERS CAN CAUSE FAILURE.

The control panel consists of 5 buttons (ON/OFF, TEST, SET, DOWN and UP) and a three-digit display with three warning LED's shown as DP1, DP2, DP3.



Warning LED

- DP1 On = Refrigerant compressor energized
- DP2 On = Condensate drain valve energized
- DP3 On = Hot-gas solenoid valve energized

Digital display

Message (not flashing)	Description
Numeric Value	Dew - Point

Fault displays

The controller is able to recognize particular types of faults in the drying circuit. When this occurs, the display shows a flashing alarm message alternating with the current dew point's value.

Message (flashing)	Cause
HtA	High temperature alarm
LtA	Low temperature alarm
PF1	Faulty temperature probe

All the alarm messages immediately disappear when the fault which has caused them clears, except for the PF1, which requires the unit to be switched off and then re-started (line sectioning device). PF1 has priority over all other messages.

4.0 INTELLIDRAIN ZERO-LOSS DRAIN TRAP

4.1 Operation

- The Intellidrain is designed to remove condensate from any compressed air application without air loss. It is completely automatic, and requires no external settings or adjustments.
- A two-stage condensate level sensor installed in the trap's internal cavity signals both the beginning and the end of the discharge cycle so the trap discharges only liquid and no air is wasted regardless of load.
- At start-up, purge any air from the trap's inlet connection by pushing the TEST button several times.
- The factory-installed inlet filter should be examined and cleaned daily for the first week of operation, and monthly thereafter.

4.2 Controls

- Green LED: Electrical Power ON
- Red LED: Discharge Solenoid Energized (valve open)
- Pushbutton: Discharge TEST (Open Valve Manually)

4.3 Maintenance

- Close the ball valve located on the filter/stop installed at the drain trap inlet.
- Depressurize the trap by pushing the TEST button.
- Unscrew the plug in the end of the filter/stop to access the filter screen.
- Clean the filter screen with a compressed air jet.
- Reassemble and open filter/stop valve.



5.0 MAINTENANCE

5.1 Weekly - Check visually if the condensate is properly drained.

5.2 Monthly – Check and replace pre-filter element if necessary.

5.3 Every 6 months – Disconnect the dryer and lock out the power supply before performing the following:

Depending on the room temperature, quality of the ambient air, and at the beginning of summer, remove the side panel. Clean the condenser coil with compressed air to remove possible dust or deposits that could impair the condenser performance. Take care not to damage or crush the aluminum fins. Check the compressor power consumption with reference to the nameplate or the data sheet on this manual (see chapter 7.1).

6.0 TROUBLESHOOTING

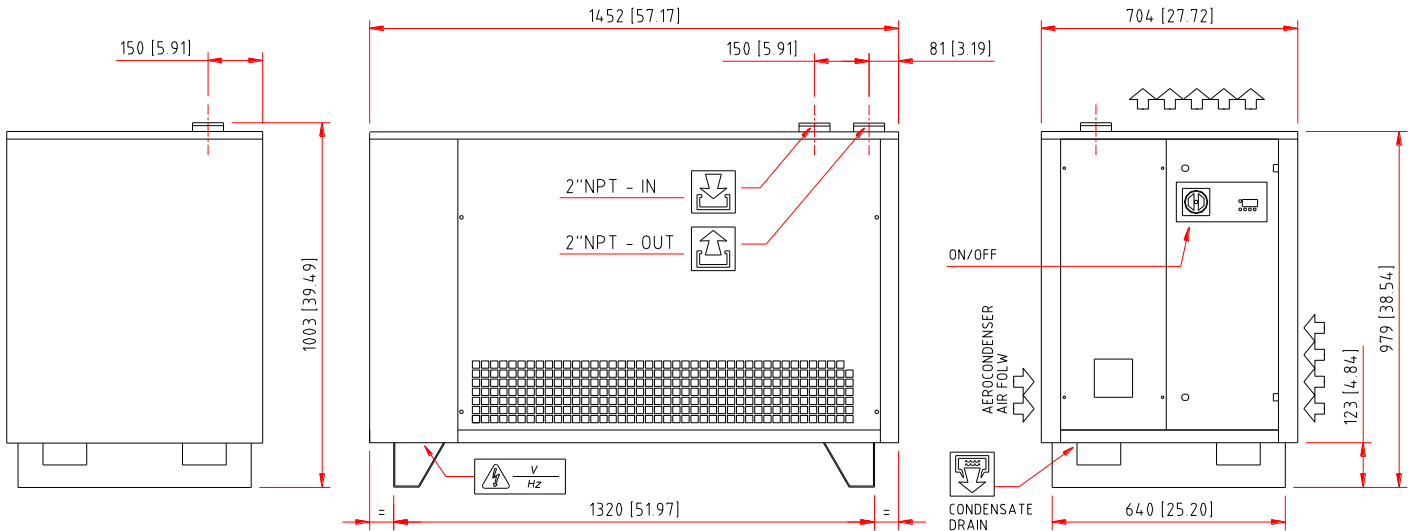
SYMPTOM	POSSIBLE ORIGIN	SOLUTION
Temperature shown in display is higher than preset value	High compressed air inlet temperature High compressed air flow High ambient air temperature Fouled refrigerant condenser Low refrigerant charge Faulty refrigerant compressor Faulty refrigerant solenoid valve Faulty fan thermostat Faulty control relay Refrigerant high pressure switch open	Reduce air temperature to within design limits Reduce air flow to within design limits Increase ventilation rate of installation area Clean condenser Locate & repair leak & re-charge Repair or replace Repair or replace Repair or replace Repair or replace Eliminate cause & reset switch
Air circuit obstructed by condensate freezing.	Inlet/outlet piping reversed Thermostat sensor out of well Faulty thermostat Ambient temperature below freezing Obstruction in air circuit	Connect properly Re-install Repair or replace Install dryer in heated space Locate & remove blockage
Water inside the pipes downstream the dryer.	Air by-pass valve open Condensate drain strainer fouled Faulty condensate drain High dew point temperature	Close valve Clean strainer Repair or replace See Symptom #1 above
Fan doesn't start and/or stop.	Faulty fan pressure switch Low refrigerant charge Low load with low ambient temperature	Repair or replace Locate & repair leak & re-charge Install dryer in heated space

7.0 TECHNICAL FEATURES

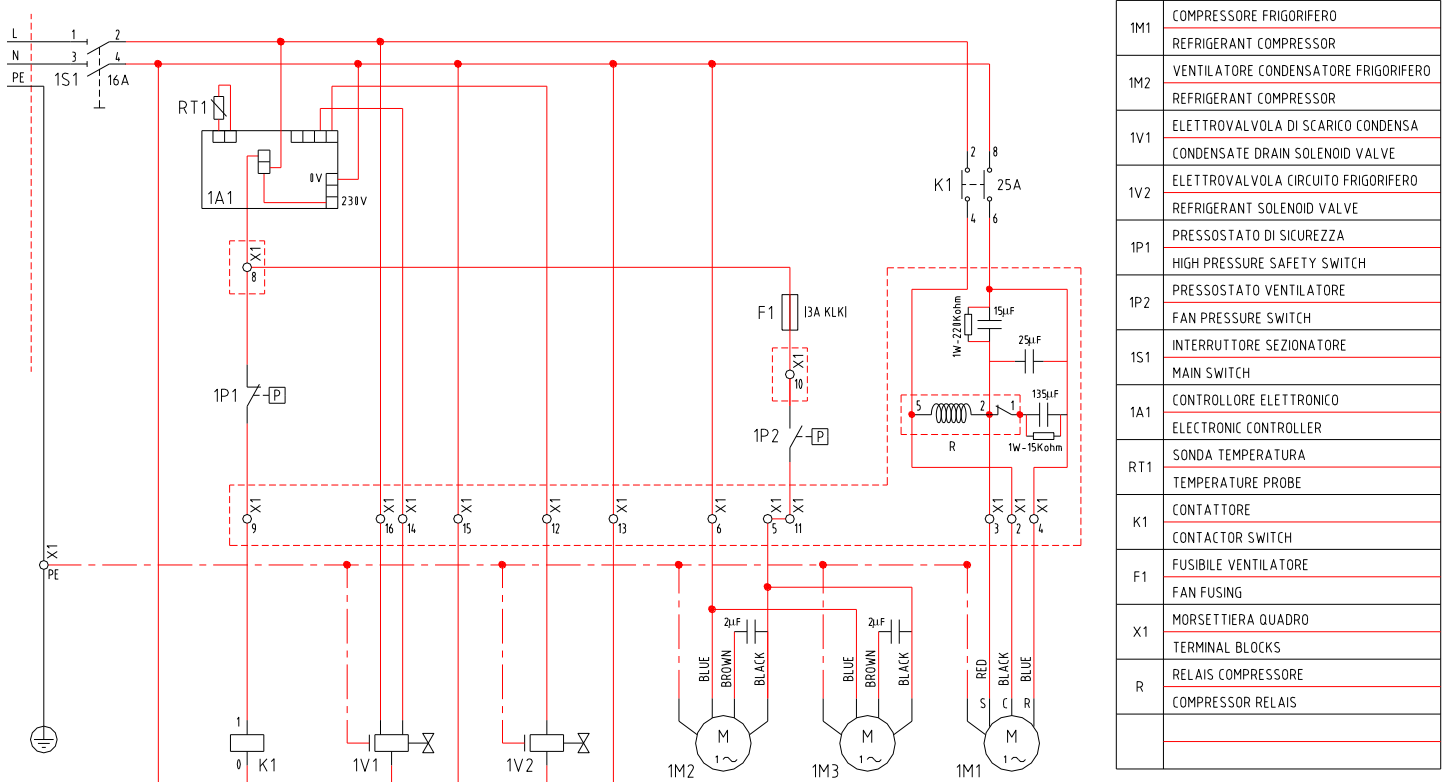
7.1 Data Sheet

Model	UNITS	MDX 320	MDX 320	MDX 420	MDX 515	MDX 650
Air flow rate	SCFM	320	320	400	500	650
Compressor Power	HP	2-1/2	2-1/2	3	3-1/2	4
Nominal Current*	A	18	4.2	6.3	7.0	8.4
Full Load Current	A	26	5.9	9	10	12
Locked Rotor Current	A	74	25	33	47	51
Power supply	V /Ph /Hz	230/1/60	460/3/60	460/3/60	460/3/60	460/3/60
Air connections	NPT	2"	2"	2"	2"	2"
Refrigerant	type	R134a	R134a	R134a	R134a	R134a
Weight	lbs.	419	419	470	640	662
Maximum Air Inlet	°F	113	113	113	113	113
Maximum Ambient	°F	104	104	104	104	104
Maximum Pressure	psig	232	232	232	232	232

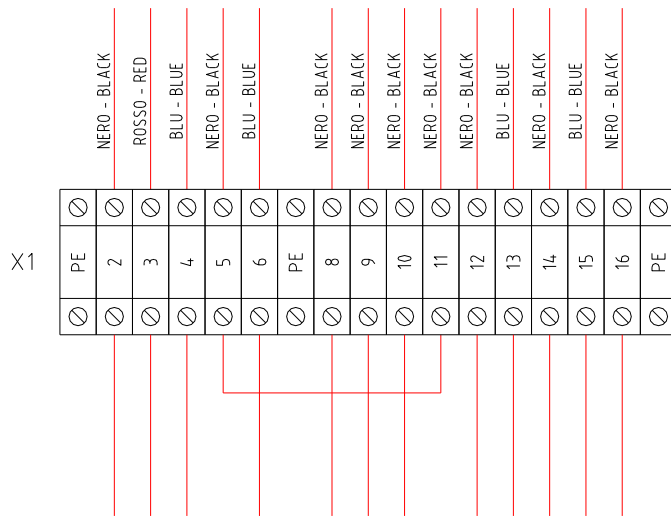
* @ Rating conditions of: 100°F & 100 psig air inlet, 100°F ambient, & 38° leaving dew point



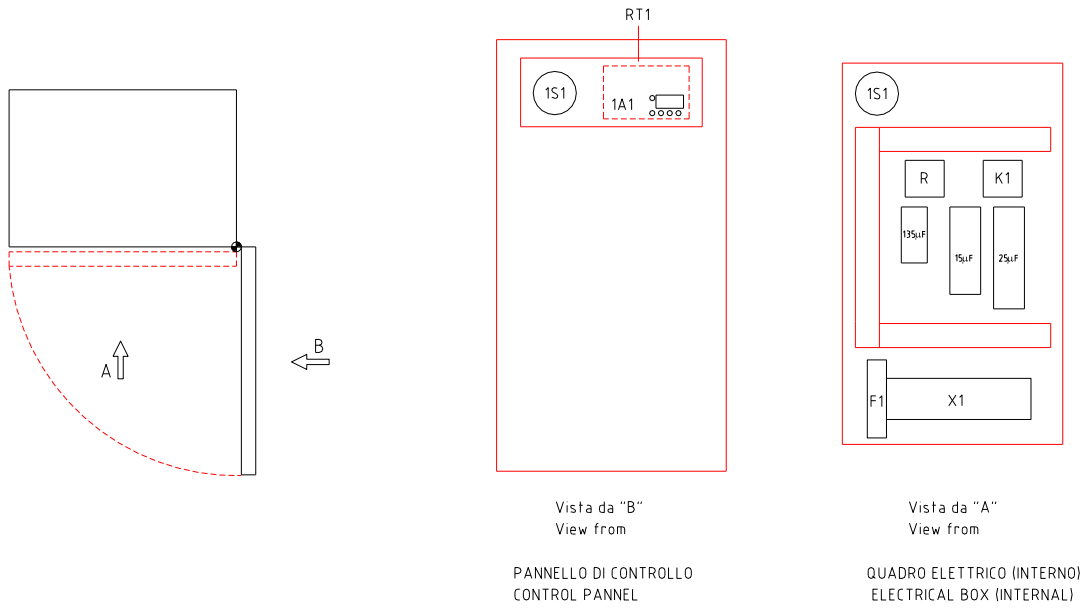
7.2 Wiring Diagrams



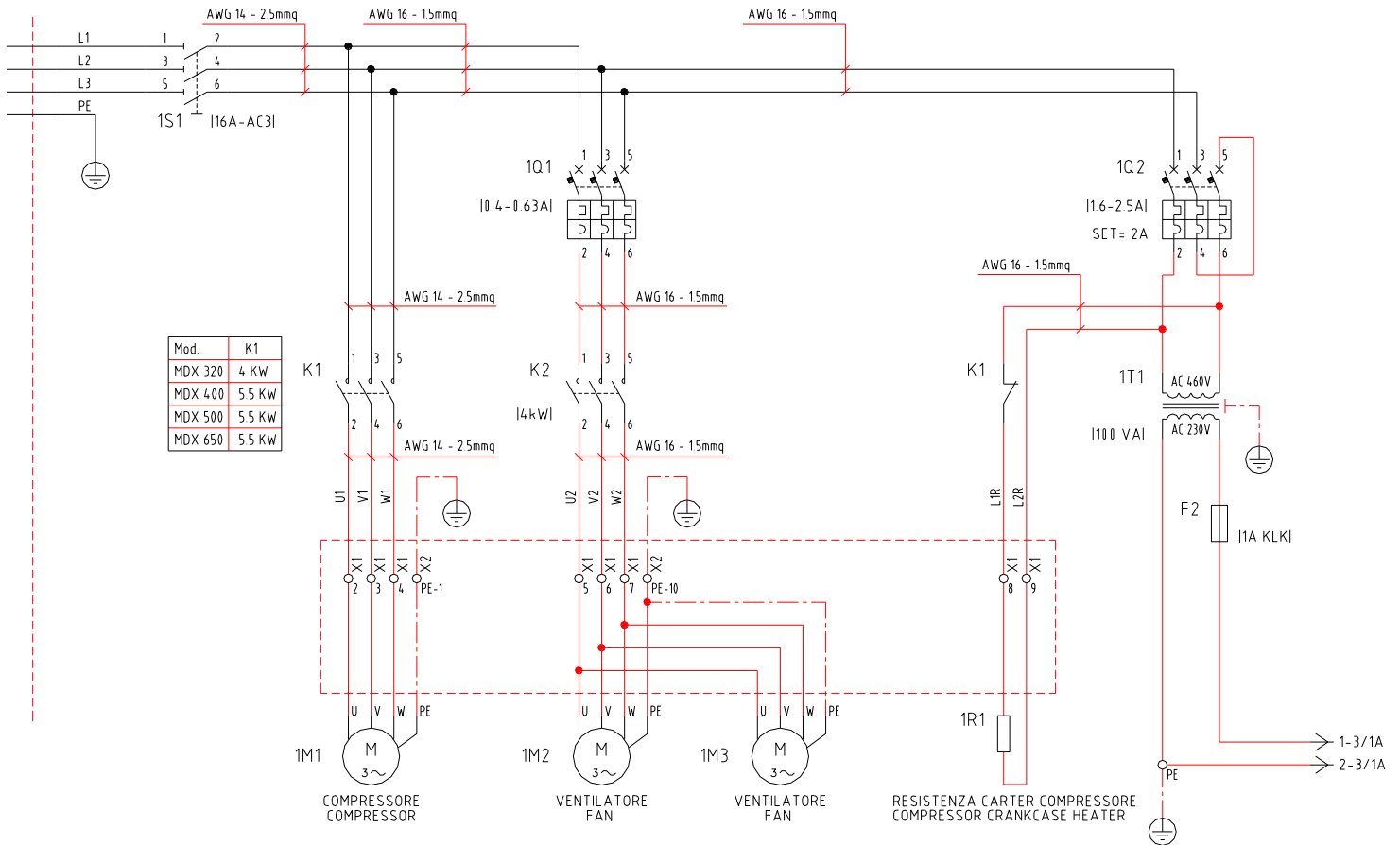
MDX 320 (230/1/60) ELECTRIC WIRING DIAGRAM - Cod. 714.004.03.00 - Rev. 02 - 10.01.01



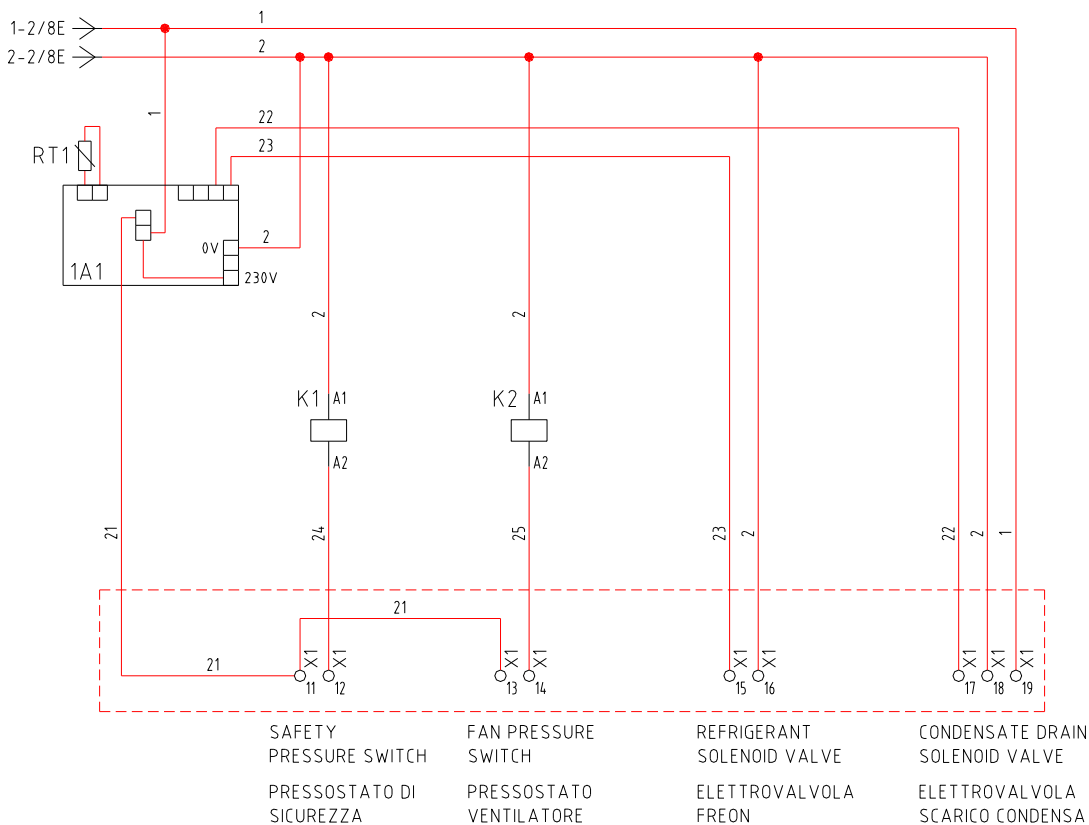
MDX 320 (230/1/60) TERMINAL BLOCK DIAGRAM - Cod. 714.004.03.00 - Rev. 02 - 10.01.01



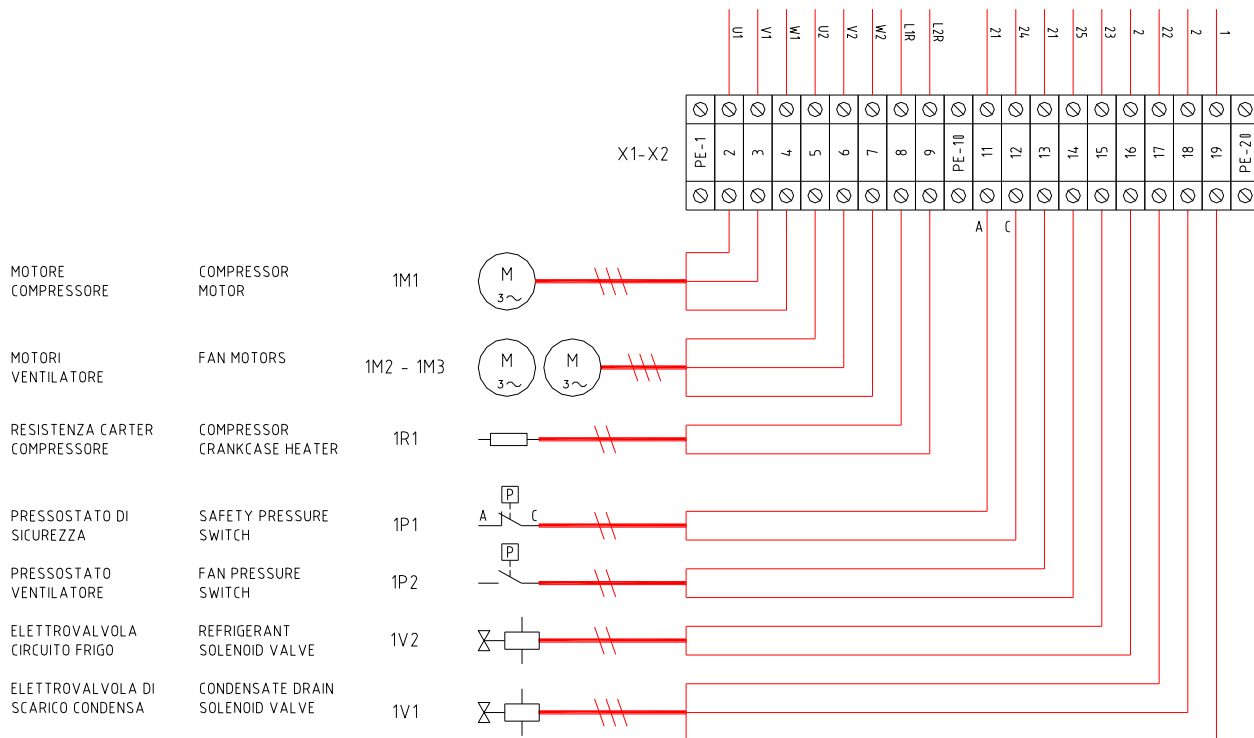
MDX 320 (230/1/60) COMPONENTS LAYOUT - Cod. 714.004.03.00 – Rev. 02 – 10.01.01



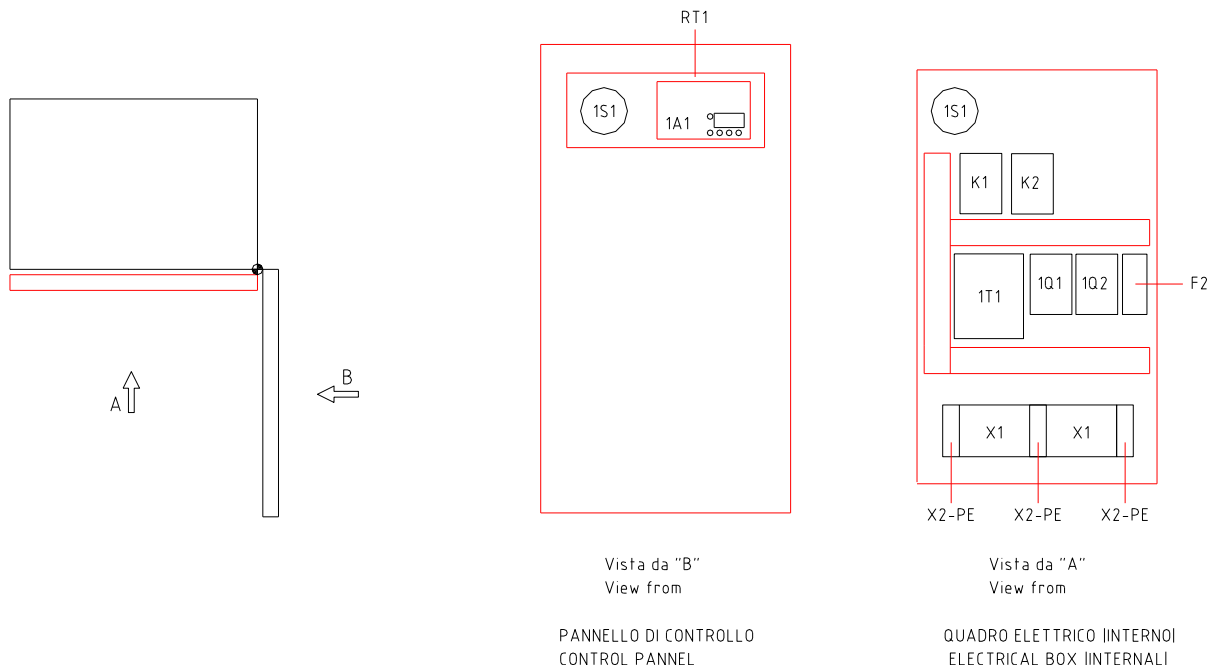
MDX 320 – 420 – 515 – 650 (460/3/60) POWER WIRING DIAGRAM - Cod. 714.023.01.00 – Rev. 02 – 01.03.02



MDX 320 – 420 – 515 – 650 (460/3/60) CONTROL CIRCUIT DIAGRAM - Cod. 714.023.01.00 – Rev. 02 – 01.03.02



MDX 320 – 420 – 515 – 650 (460/3/60) CONTROL CIRCUIT DIAGRAM - Cod. 714.023.01.00 – Rev. 02 – 01.03.02



MDX 320 – 420 – 515 – 650 (460/3/60) COMPONENTS LAYOUT - Cod. 714.023.01.00 – Rev. 02 – 01.03.02

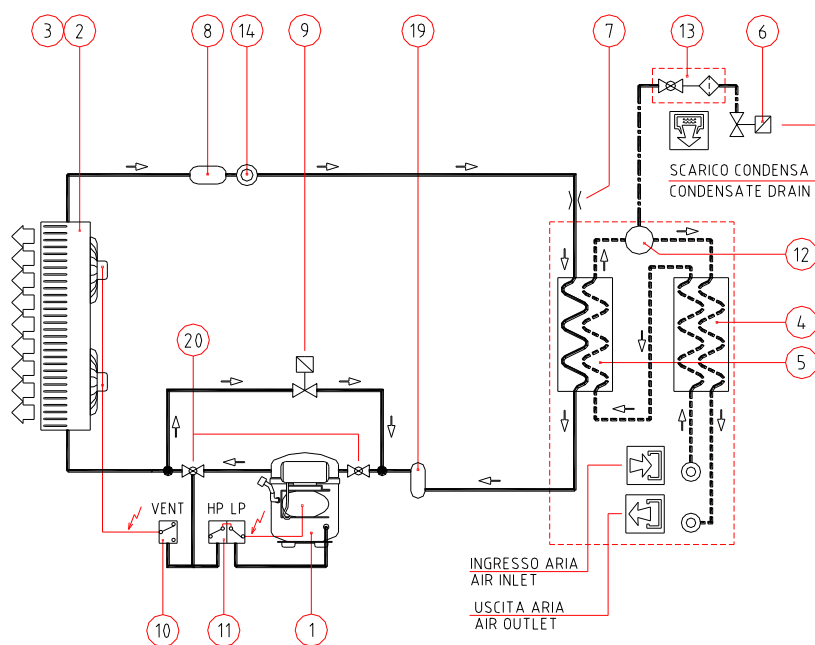
RIF. REF.	COSTRUTTORE MANUFACTURER	MODELLO MODELLO	DENOMINAZIONE DESCRIPTION	DESCRIZIONE DESCRIPTION
1Q1	SIEI	SMP D 0.4-0.63	INTERRUTTORE AUTOMATICO VENTILATORE	FAN CIRCUIT BREAKER
1Q2	SIEI	SMP G 1.6-2.5	INTERRUTTORE AUTOMATICO TRAFORMATORE	TRANSFORMER CIRCUIT BREAKER
F2	OMEGA	1A KLK - 10x38	FUSIBILE CIRCUITO CONTROLLO	CONTROL CIRCUIT FUSE
K1	SIEI	SC03/T 240 1NC - (4KW) - (MDX320)	CONTATTORE COMPRESSORE	COMPRESSOR CONTACTOR SWITCH
		SC-0/T 240 1NC - (5.5KW) - (MDX420-650)		
K2	SIEI	SC03/T 240 1NC	CONTATTORE VENTILATORE	FAN CONTACTOR SWITCH
1S1	BRETER	LA2-20-1753	INTERRUTTORE SEZIONATORE	MAIN SWITCH
1T1	ELFRI	100VA 60Hz - 460/230V	TRASFORMATORE	TRANSFORMER
X1	WEIDMULLER	WDU 2.5	MORSETTIERA	TERMINAL BLOCKS
X2	WEIDMULLER	WDU 4	MORSETTIERA	TERMINAL BLOCKS
1A1	OMI	305.050.02.00	CONTROLLORI ELETTRONICI	ELECTRONIC CONTROLLERS
RT1	OMI	243.025.05.00	SONDE TEMPERATURA	TEMPERATURE PROBES

MDX 320 – 420 – 515 – 650 (460/3/60) PARTS LIST - Cod. 714.023.01.00 – Rev. 02 – 01.03.02

7.3 REFRIGERATION DIAGRAM

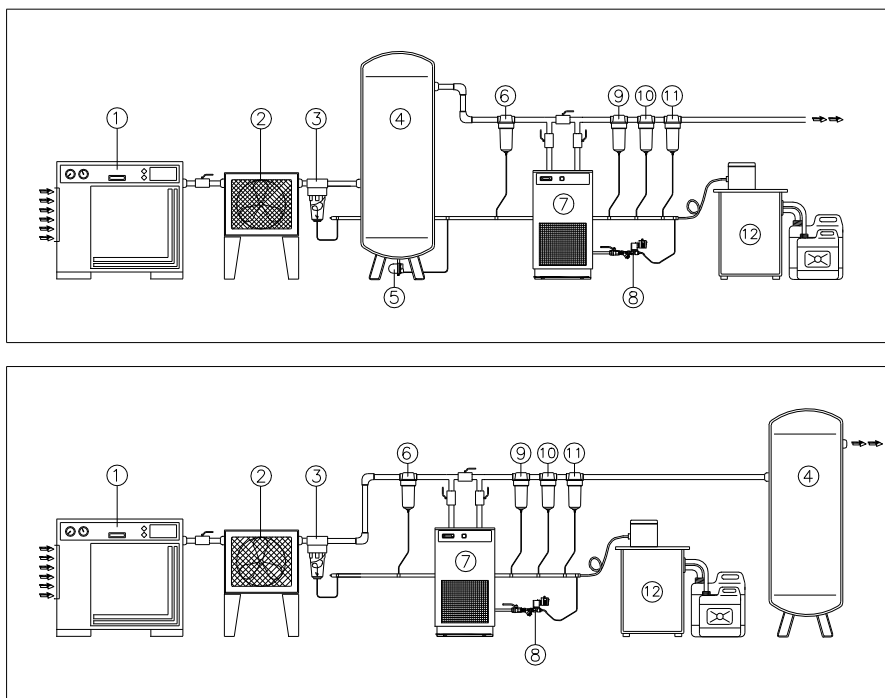
1	Refrigerant compressor	9	Refrigerant solenoid valve
2	Refrigerant condenser	10	Fan pressure switch
3	Condenser fan	11	High pressure safety switch
4	Air to Air economizer	12	Condensate separator
5	Refrigerant evaporator	13	Ball valve with strainer
6	Condensate drain	14	Moisture indicator
7	Capillary tube expansion device	19	Liquid separator
8	Refrigerant filter/dryer	20	Rotalock valve

— = LINEA FREON - REFRIGERANT LINE
 - - - = LINEA ARIA - COMPRESSED AIR LINE
 - - - = LINEA DRENAGGIO - CONDENSATE DRAIN LINE



Cod. 713.024.01.00 - Rev. 01 02.05.02 - MDX 320 - 650

8.0 SYSTEM INSTALLATION & LAYOUT DIAGRAM



1	Air Compressor
2	Aftercooler
3	Condensate Separator
4	Receiver Tank
5	Automatic Drain
6	Particulate Prefilter
7	Dryer
8	IntelliDrain™
9	Filter 0.10 micron
10	Filter 0.01micron
11	Activated Carbon Filter
12	Water/Oil Separator

Fig. 6 INSTALLATION LAYOUT

9. RECOMMENDED SPARE PARTS

Item	Description
1	Heat exchanger / condensate separator assembly
2	Refrigerant compressor
3	Rotalock valve
4	Fan/motor assembly
5	Fan guard
6	Refrigerant condenser
7	Condensate drain
8	Ball valve with strainer
9	Condensate drain bracket
10	Refrigerant filter/dryer
11	Refrigerant solenoid valve body
12	Refrigerant solenoid valve coil
13	Refrigerant solenoid valve bracket
14	Fan pressure switch
15	Refrigerant high pressure switch
16	Electronic controller
17	Temperature Probe with connector
18	Controller mounting pins
19	Lighted ON/OFF switch
20	Control panel cover
21	Cable assembly
22	Electrical box
23	Support base
24	Front panel
25	Rear panel
26	Left side panel
27	Top panel
28	Right side panel