- EN -

CONTENTS

- EN -

INTRODUCTION

This manual is an integral part of the dryer you bought, and must remain with the machine even if this will be resold.

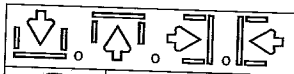
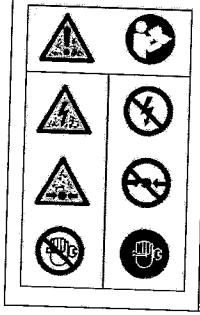
It is highly recommended that the qualified*personnel for installation maintenance and/or control will fully comply with the contents of this manual and the prevention and safety rules in force in the country where the system will be used. In this way, not only the usage of the machine will be rational, but also the service will result cost effective.

In case your dryer will present any kind of problem, please contact your local authorizedHi-Line distributor.

Please note that, when necessary, the use of original spare parts will ensure efficiency and long duration to your dryer.

Due to the continuous technological evolution,Hi-Line reserves the right to modify the specifications contained in this manual without giving previous notice.

SYMBOLS AND LABELS USED IN THE MANUAL AND ON THE DRYER

	Punto ingresso aria.		Punto uscita aria.
	Read the Operators manual before attempt to start up the machine and to perform any service operation on the dryer.		Pay particular attention to components or systems under pressure.
	Pay particular attention to the indications preceded by these symbols.		Pay particular attention to hot surfaces.
	Installation, maintenance, and/or control operations preceded by these symbols must be performed exclusively by qualified personnel*.		Pay particular attention to the risk of electric shock.
	Condensate drain point.		Rotation direction of the fan.
	Pay particular attention to the risk of moving parts		Explosion risk.
	Lifting point.		Don't lift from this point.
	Attention: Before performing any maintenance operation on this machine, do not forget to disconnect the electric supply, to completely discharge air pressure, and to refer to the Operators manual.	CAUTION - RISK OF ELECTRIC SHOCK; DISCONNECT FROM SUPPLY SOURCE BEFORE SERVICING CAUTION - MOVING PART; DO NOT OPERATE WITH PANEL REMOVED CAUTION - HOT PART; DO NOT OPERATE WITH PANEL REMOVED  ATTENZIONE ATTENTION ATENCIÓN ACHTUNG ATENÇÃO OGNI SETTIMANA ONCE A WEEK TOUTES LES SEMAINES CADA SEMANA WOCHENTLICH IL CONDENSATORE VA PULITO CON UN GETTO DI ARIA COMPRESSA. THE CONDENSER MUST BE CLEANED BY BLOWING OUT WITH AIR. NETTOYER LE CONDENSEUR AVEC UN JET D'AIR COMPRIMÉ. LIMPIAR EL CONDENSATOR CON AIRE COMPRIMIDO. DEN KONDENSATOR MIT EINEM DRUCKLUFTSTRAHL REINIGEN. LIMPAR O CONDENSADOR COM AR COMPRIMIDO	

* Qualified personnel must be trained and certified in accordance with local laws and regulations.

WARRANTY

The Company warrants that the equipment manufactured by it and delivered hereunder will be free of defects in material and workmanship for a period of twelve months from the date of placing the Equipment in operation or eighteen months from the date of shipment from the factory, whichever shall first occur. The Purchaser shall be obligated to promptly report any failure to conform to this warranty, in writing to the Company in said period, whereupon the Company shall, at its option, correct such nonconformity, by suitable repair to such equipment or, furnish a replacement part F.O.B. point of shipment, provided the Purchaser has stored, installed, maintained and operated such Equipment in accordance with good industry practices and has complied with specific recommendations of the Company. Accessories or equipment furnished by the Company, but manufactured by others, shall carry whatever warranty the manufacturers have conveyed to the Company and which can be passed on to the Purchaser. The Company shall not be liable for any repairs, replacements, or adjustments to the Equipment or any costs of labor performed by the Purchaser or others without Company's prior written approval.

The effects of corrosion, erosion and normal wear and tear are specifically excluded. Performance warranties are limited to those specifically stated within the Company's proposal. Unless responsibility for meeting such performance warranties are limited to specified tests, the Company's obligation shall be to correct in the manner and for the period of time provided above.

THE COMPANY MAKES NO OTHER WARRANTY OR REPRESENTATION OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HERBY DISCLAIMED.

Correction by the Company of nonconformities whether patent or latent, in the manner and for the period of time provided above, shall constitute fulfillment of all liabilities of the Company for such nonconformities whether based on contract, warranty negligence, indemnity, strict liability or otherwise with respect to or arising out of such Equipment.

The Purchaser shall not operate Equipment which is considered to be defective, without first notifying the Company in writing of its intention to do so. Any such use of Equipment will be at Purchaser's sole risk and liability.

Note that this is Hi-Line standard warranty. Any warranty in force at the time of purchase of the equipment or negotiated as part of the purchase order may take precedence over this warranty.

1. GENERAL INFORMATION

1.1 FUNCTIONAL DESCRIPTION

Hi-Line refrigerated air dryers remove moisture from compressed air. Moisture is detrimental to pneumatically operated appliances, controls, instruments, machinery and tools.

Compressed air enters the patented aluminum heat exchanger where it is cooled down to the dew point temperature in two different stages: In the first air/air sector compressed inlet air is cooled thanks to the colder compressed air coming out counterflow from the condensate separator. In the second refrigerant / air sector, compressed air temperature is further lowered to the dew point temperature. During this two stages almost all the oil and water vapours contained in compressed air are condensed to liquid and successively be separated from the compressed air in the condensate separator and drained out by the automatic drain. At this point the obtained cold air re-enters counterflow the initial air / air exchanger and it is reheated by the inlet hot air with the consequence of energy recovering and also reduction of the relative humidity contained in the outflowing air.

This dryer can be easily installed into various pneumatic systems in which dry air is required or desired. Please refer to Principles of Operation for complete operating details.

The dryer comes provided with all the control, safety and adjustment devices, therefore no auxiliary devices are needed.

A system overload not exceeding the maximum operative limits can worsen the operational performance of the dryer (high dew point), but it will not affect its safety.

The electric diagram (attachment B) shows the minimum protection degree IP 42.

Improper grounding can result in electrical shock and can cause severe injury or death.
This product must be connected to a grounded, metallic, permanent wiring system or an equipment-grounding terminal or lead on the product.
All grounding must be performed by a qualified electrician and comply with national and local electrical codes.

In the event of an electrical short circuit, grounding reduces the risk of electric shock by providing an escape wire for the electric current.
Ground must be established with a bare grounding wire sized according to the voltage and minimum branch circuit requirements.
Ensure good bare metal contact at all grounding connection points, and ensure all connections are clean and tight.
Check grounding connections after initial installation and periodically thereafter to ensure good contact and continuity has been maintained.
Check with a qualified electrician or service technician if the grounding instructions are not completely understood, or if in doubt as to whether the product is properly grounded.

This dryer is designed to work only with compressed air. For a different use, please contact your distributor Hi-Line.

1.2 USE OF THE MACHINE IN SAFE CONDITIONS

This system has been designed and manufactured in compliance with the European safety directive in force, therefore any installation, use and maintenance operations must be performed respecting the instructions contained in this manual.

Because an air dryer is pressurized and contains rotating parts, the same precautions should be observed as with any piece of machinery of this type where carelessness in operation or maintenance could be hazardous to personnel. In addition to obvious safety rules that should be followed with this type of machinery, safety precautions as listed below must be observed.

1. Only qualified personnel shall be permitted to adjust, perform maintenance or repair this air dryer.
2. Read all instructions completely before operating unit.
3. Pull main electrical disconnect switch and disconnect any separate control lines, if used, before attempting to work or perform maintenance on the unit.
4. Do not attempt to service any part while machine is in an operational mode.
5. Do not attempt to remove any parts without first relieving the entire air system of pressure.
6. Do not attempt to remove any part of the refrigeration system without removing and containing refrigerant in accordance with the EPA and local regulations.
7. Do not operate the dryer at pressures in excess of its rating.
8. Do not operate the dryer without guards, shields and screen in place.
9. Inspect unit daily to observe and correct any unsafe operating conditions.

2. INSTALLATION

2.1 ACCEPTANCE AND HANDLING

Upon receiving your Hi-Line air dryer, please inspect the unit closely. If rough handling is detected, please note it on your delivery receipt, especially if the dryer will not be uncrated immediately. Then obtain the freight carrier's signed agreement to any noted damages: this is a precondition for any insurance claims by the customer.

It is mandatory to keep the dryer always in vertical position, as indicated by the symbols present on the packaging. For handling, use devices having sufficient capacity for the weight of the machine.

Remove the packaging after having positioned the dryer in the installation site. For unpacking, refer to section 2.3.

Under no circumstances should any person attempt to lift heavy objects without proper lifting equipment (i.e., crane, hoist, slings or fork truck). Lifting any unit without proper lifting equipment, may cause serious injury. Use fork lift channels where provided.

2.2 STORAGE AND INSTALLATION LOCATION

If not in use, the dryer can be stored in its packaging in a dust free and protected site between 32°F (0°C) and 120 °F (50 °C), and a specific humidity not exceeding 90 %. Should the stocking time exceed 12 months, please contact your local Hi-Line authorized distributor.

If the dryer is not used, it will be placed in a site with the following conditions:

- The machine must be protected from atmospheric agents and not directly exposed to sun light.
- A seating base flat and capable to hold the weight of the machine.
- Ambient temperature complying with the nominal data of the dryer.
- The dryer should be located in a clean area, without forced air draft that can affect the fan control system.
- Make sure to leave sufficient clearance (20 inches, 500 mm) around the dryer in order to allow an adequate cooling of the machine and for maintenance and/or control operations.

The incoming air must be free from smoke or flammable vapours which could lead to explosion or fire risks.

2.3 UNPACKING

The packaging is made of carton or of cellophane. We recommend that you keep the original packaging for the device in case it has to be transported to another location or sent to a service center. Dispose the various packaging materials in compliance with the relevant rules locally in force.

- unpack the device, removing the strapping from the carton. Always wear safety gloves when using scissors or other tools to cut the straps or the cellophane;
- remove the carton or the cellophane;
- in case it's necessary another handling of the device, refer to section 2.1;
- remove the pallet (if present);
- remove the operating manual, accessories and key from the device.

2.4 INSTALLATION

Before attempting any installation operation, make sure that

- **No parts of the air system are under pressure.**
- **No parts of the system are electrically powered.**
- **Tubing to be connected to the dryer are free of impurities.**
- **The pipes to be connected to the dryer does not weigh on the device.**
- **All interconnecting piping has been tightened.**

After having verified the points listed above, you can proceed to the installation of the machine.

1. Connect the dryer to the compressed air lines. If not already existing, we suggest to install a by-pass allowing to isolate the machine from the plant, thus to facilitate eventual maintenance operations.
2. Perform the electrical connection in accordance with any local laws and regulations after reviewing the dryer electrical specifications and wiring diagram. In particular, if the power cord has no plug, install a disconnecting device.
3. Check the condensate drainage assembly, and connect the drain flexible hose to the draining line, keeping in mind that **the condensate separated by the dryer may contain oil, therefore, in order to dispose of it in compliance with the local rules in force, we suggest installing a water-oil separator having adequate capacity.**
4. Power the dryer after having checked that the nominal voltage and line frequency are constant and matching the nominal values of the machine. **The user must provide the installation with an adequate line protection and a ground terminal complying with the electrical rules locally in force.**

In order to optimise the use of the dryer, we suggest to place it in such a way that all the control instruments of the machine will result easily visible.

A suitably sized prefilter must be installed before the dryer. Failure to install and maintain a proper prefilter will void the dryer warranty. The rating for this filter must be at least 10 micron.

It is necessary for the user to install a protective device (a safety accessory) to protect the equipment under pressure from the risk of exceeding the maximum allowable pressure (PS); it is necessary to install a protective device to protect the equipment at high temperature from the risk of exceeding the maximum allowable temperature.

3. START UP

Ensure that the dryer is by–passed, or there is no load on the cooler.
Switch on the main electrical isolation switch (if present). The control panel will show the message OFF, indicating that the line and control voltages are available.

Start sequence
The dryer will initially start by pressing and holding the local ON/OFF button. The start sequence will progress only if there are no active alarms. The compressor motor will start AFTER 120 SECONDS. The fan motor will start simultaneously with the compressor for TUNDRA 175-209 models, after 30 seconds for smaller models.

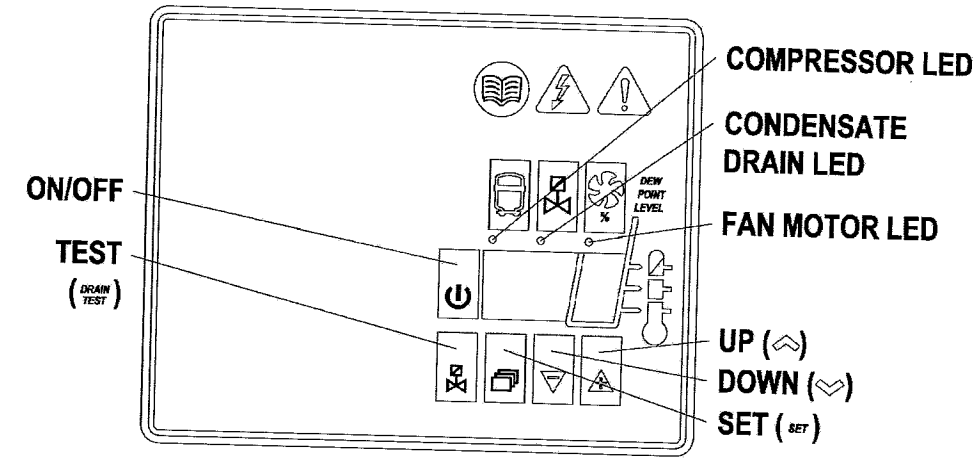
Stop sequence
The dryer can be stopped locally from the control panel. After having pressed the ON/OFF switch for 1 second, the compressor and the fan motor keep on running for further 10 seconds in order to re-balance the internal pressures. The dryer can be also stopped due to an alarm or energy saving condition (ESA or ES2). Any alarm will de–energize the compressor, fan motor can still running, it depends on the type of alarm (see Display indications chapter). If the shutdown is due to an alarm, a message will blink on display indicating the reason for the shutdown. Energy saving condition (ESA or ES2) occurs when the dew point stands below the set value for a long time in order to save energy and avoid heat exchanger freezing. This situation can happen when ambient temperature is low and there is no compressed air load.

Variable speed fan control
A patented microprocessor allows to adjust dryer's cooling capacity by changing the fan motor speed. If the dew point is greater than the set value, the fan speed is increased, if the dew point is smaller than the set value, the fan velocity is decreased. The range can be from 0 to 100% and the higher is the fan speed, the faster the fan LED blinks, you can read the exact value by pressing the UP button. If the velocity is 100% you will read FL (Full Load). Under load standard condition the fan speed is usually at 100%, if there is no load the fan velocity can oscillate between 0 and 20%.
In models TUNDRA 175-209, in order to adjust the greater dryer's cooling capacity, a hot gas by-pass valve cooperates with the variable speed system.

3.1 CONTROL PANEL

The dryers are provided with an electronic control system. All adjustments and resets can be performed by means of the digital panel located on the front of the dryer. The control panel is composed of 5 keys (ON/OFF, TEST, SET, DOWN and UP) and a 3 digit display, with three signalling LEDs indicated by icons (PIC 1)

PIC. 1



DISPLAY VISUALIZATION AND SIGNALLING LEDS

DISPLAY	DESCRIPTION
ESA	the unit is in ENERGY SAVING mode
On	the unit is ON with low load
On_	the unit is ON with normal load
On-	the unit is ON with normal-high load
On=	the unit is ON with high load

LED	STATUS	DESCRIPTION
	ON	Compressor energized
	Blinking	Programming mode activated
	ON	Condensate drain energized
	ON	Speed of the fan = 100%
	Blinking	Speed of the fan < 100%
	OFF	Fan not running

3.1.1 KEYS FUNCTION

TEST: When pushed for 3 sec. during normal operation, it activates the condensate drain.
(Not used on No loss condensate drain)

SET: When pushed and released during normal operation, it displays the parameter C1.
When pushed for 10 seconds, it allows to enter the C8 and C9 condensate drain parameters programming menu (see relevant table).
When pushed after having set new configuration values, it stores the applied modifications.

DOWN: When pushed while setting the drain set point, it decreases the displayed value of one unit per second, during the first 10 seconds, than of one unit every 0,1 sec.
When pushed for 10 seconds during normal operation, it starts an automatic test cycle of the controller.

UP: When pushed while setting the drain set point, it increases the displayed value of one unit per second, during the first 10 seconds, than of one unit every 0,1 sec.

ON / OFF: Pressed, it activates or deactivates the dryer. When the dryer is deactivated, the display shows OFF.

NOTE: when the controller is in the OFF position, some parts of the dryer may still be energized. Therefore, for safety purposes, disconnect the electrical power before performing any operation on the machine.

3.1.2 CONDENSATE DISCHARGE PARAMETERS PROGRAMMING

Push the SET key for 10 seconds to enter the parameters configuration menu: the display will show in sequence the set point value, the code of the first modifiable parameter (C8) and its value).
Only if strictly necessary, use the UP and/or DOWN keys to change the displayed parameter value.
Press the SET key to store the previously changed parameter value or to browse the parameters without changing them.
15 seconds after the last performed operation, the controller will return automatically to the normal operation mode.

PARAMETER	DESCRIPTION	RANGE	DEFAULT SET VALUE	
C8	Delay between condensate discharges	1 ÷ 240 (min)	1	
C9	Time required for condensate discharge	1 ÷ 240 (sec)	TUNDRA 22 - 115 1	TUNDRA 175 - 209 3

NOTE: Changes entered for timing values will be effective only after exiting the programming, while changes to other variables will be immediately effective.
Please remember that eventual changes to the configuration parameters of the machine could negatively affect its efficiency. Thus, changes have to be performed by a person familiar with the operation of the dryer.

WARNING FOR USER:IT'S FORBIDDEN TO ATTEMPT TO MODIFY THE OTHER CONFIGURATION PARAMETERS OF THE ELECTRONIC CONTROLLER WITHOUT AUTHORIZATION AND COLLABORATION OF Hi-Line'S AUTHORIZED DISTRIBUTOR.

3.1.3 DISPLAY INDICATIONS

The controller is capable of recognizing certain types of anomalies in the drying circuit. In such cases, a message will blink on the display, alternated to the current dew point value.

MESSAGE (BLINKING)	CAUSE	OUTPUTS	ACTIONS
HtA	High dew point value (delayed alarm)	Alarm output ON Refrig. Compressor output OFF Fan output ON Drain cycle standard	Resettable by switching off the dryer. If problem persists call your local Hi-Line distributor.
Ht2	Very high dew point value (immediate alarm)		
PF1	Interruption or short circuit on the PTC probe input line	Alarm output ON Refrig. Compressor output OFF Fan output OFF Drain cycle standard	Resettable by switching off the dryer. May require replacing the faulty probe. If problem persists call your local Hi-Line distributor.
ESA	**The automatic Energy saving mode activated due to low load**	Alarm output OFF Refrig. Compressor output OFF Fan output OFF Drain cycle standard	No action necessary. Automatic Reset
ES2			
ASt	Activated after repeated alarms	Alarm output ON Refrig. Compressor output OFF Fan output ON Drain cycle standard	Call your local Hi-Line distributor.

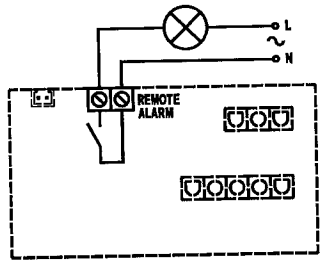
Note: PF1 has priority on all other messages.

3.1.4 REMOTE SIGNALING ALARM (OPTIONAL)

The dryer control board is equipped with a dry contact for a remote alarm signal. This is normally open contact: when an alarm is detected, this contact is closed.
Proceed as follows to activate a remote alarm output:

1. The User must review the diagram below.
2. Disconnect the dryer from electrical power supply, remove cover and left side panel.
3. Connect the alarm circuit to the terminal blocks (See PIC.2).
4. Replace cover, left side panel and reconnect power.

Alarm Output relays electric features:
Max. 250VAC / 3A – AC 15 (Amp. Inductive)



PIC.2

The activation of the above function is at the User's discretion. The User will purchase all necessary installation material. Any operation which needs access to the dryer must be carried out by qualified personnel.

3.2 BEFORE START UP

Before starting the machine, make sure that all operating parameters correspond to the nominal data.
The dryer is supplied already tested and preset for normal operation, and it doesn't require any calibration. Nevertheless, it's necessary to check the operating performances during the first working hours.

3.3 START UP

The operations specified below must be performed after the first start up and at each start up after a prolonged inactive period of time due to maintenance operations, or any other reason.

1. Make sure that all instructions contained in chapters INSTALLATION SITE and INSTALLATION have been observed.
2. Ensure dryer by-pass is open and air inlet/outlet valves closed. (if existing).
3. Activate power supply and press the ON/OFF switch on the control panel for at least 1 second. (note there is a 2 minute delay before the dryer will start after the dryer is turned on).
4. Wait 5 to 10 minutes until machine has achieved its standard operating parameters.
5. Slowly open the air outlet valve and successively open the air inlet valve.
6. If existent, close the air by-pass valve.
7. Check if the condensate drain is working properly.
8. Check if all connecting pipes are properly tightened and fixed.

Before disconnecting the dryer from electrical power supply, use ON/OFF switch to stop the dryer. Otherwise wait 10 minutes before switching the dryer on again, in order to allow freon pressure to rebalance.

4. MAINTENANCE, TROUBLESHOOTING AND DECOMMISSIONING

4.1 MAINTENANCE

Attention! Perform pressure test with inert gases only (helium, nitrogen).

Before attempting any maintenance operation, make sure that:

1. **No parts of the system are under pressure.**
2. **No parts of the system are electrically powered.**

→ **WEEKLY OR EVERY 40 HOURS OF OPERATION**

- Verify the temperature on the control panel display is acceptable.
- Visually check if the condensate is drained regularly.
- Clean the filter mesh of the condensate drain system.

→ **MONTHLY OR EVERY 200 HOURS OF OPERATION**

- Clean the condenser with compressed air, taking care not to damage the condenser fins..
- At the end of the above mentioned operations, check if the dryer is working properly.
- Check the condition of any filters installed with the dryer. Replace elements as needed.

→ **YEARLY OR EVERY 2000 HOURS OF OPERATION**

- Check if the flexible tube used for condensate drainage is damaged and replace it if necessary.
- Check if all connecting pipes are properly tightened and fixed.
- At the end of the above mentioned operations, check if the dryer is working properly.

In case of replacement of one or more components of the device, disposed it along the eventual packaging of the replacement part, as reported in the point 4.3.

4.2 TROUBLESHOOTING

NOTE: FOLLOWING BEHAVIORS ARE NORMAL CHARACTERISTIC OF OPERATION AND NOT TROUBLES

- Variable speed of the fan.
- **Display of message ESA and ES2 in case of operation without load or low load.**
- A 2 minute delay for dryer to start after pressing the on/off switch.

Troubleshooting and eventual control and/or maintenance operations must be performed by qualified personnel.

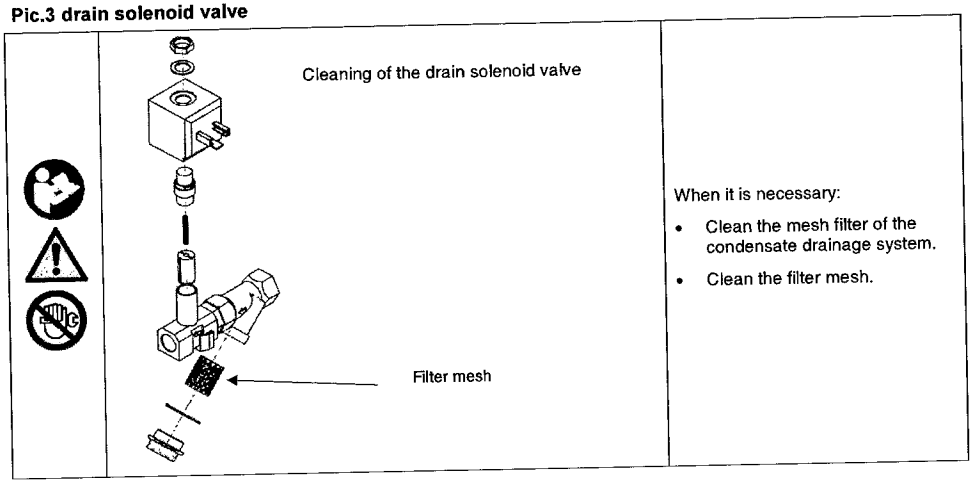
For maintaining the refrigerating circuit of the machine, contact a refrigeration engineer.

TROUBLE	DISPLAY	POSSIBLE CAUSE	REMEDY
WATER IN THE SYSTEM	Control panel display is blank	No power in the line.	Restore the power in the line.
		Problems with cabling.	Check cabling; if the trouble persists, replace it.
		Problems with the electronic control board.	Check the electronic control board; if the trouble persists, replace it.
	OFF	The dryer is off.	Turn it on by pressing the ON/OFF switch for 1 second.
	On	Dryer in stand-by.	Wait 2 minutes after the dryer is switched on.
		Compressed air inlet/outlet inverted.	Check if the compressed air inlet/outlet is connected properly.
		The flow rate and/or temperature of the air entering the dryer are higher than the nominal values.	Restore the nominal conditions.
		The ambient temperature is higher than the nominal values.	Restore the nominal conditions.
		The condenser is dirty.	Clean the condenser.
		Condensate drain is not functioning. Pic.3	Clean the condensate drainage system filter mesh.
			Replace the coil of the drainage solenoid valve if burned.
			Clean or replace the drainage solenoid valve if clogged/jammed.
			Check the C8 and C9 parameters of the electronic control board; if the trouble persists, replace it.
		The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
	HtA Ht2	Problems with cabling or with the electronic control board.	Check the cabling and the electronic control board, if the trouble persists, replace them.
		Activation of compressor's internal thermal protection.	Wait one hour and check again. If the fault persists: stop dryer and call your local Hi-Line distributor.
	HtA Ht2	Problems with the electrical components of the compressor.	Check the electrical components of the compressor.
		Defective compressor.	Replace the compressor.
		The flow rate and/or temperature of the air entering the dryer are higher than the nominal values.	Restore the nominal conditions.
		The ambient temperature is higher than the nominal values.	Restore the nominal conditions.
		The condenser is dirty.	Clean the condenser.
		The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
		Fan pressure switch defective or burned out (if present).	Turn off the dryer and call your local Hi-Line distributor.
		High pressure switch defective or burned out (if present).	Turn off the dryer and call your local Hi-Line distributor.
		Gas leakage in the refrigerating circuit.	Turn off the dryer and call your local Hi-Line distributor.
		Defective fan.	Replace the fan.
		Protection fuse burned out (if present).	Replace the fuse.
	ES2	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
		Gas leakage in the refrigerating circuit without load.	Turn off the dryer and call your local Hi-Line distributor.
	PF1	The temperature control probe is positioned improperly or faulty.	Check the probe; if the trouble persists, replace it.
	ASt	Series of alarms very close to each other.	Call your localHi-Line distributor.

TROUBLE	DISPLAY	POSSIBLE CAUSE	REMEDY
LOW PRESSURE IN THE LINE	ES2 On	Ice formation in the evaporator.	Check the probe; if the trouble persists, replace it.
			Check the electronic control board; if the trouble persists, replace it.
			Contact our Service Centre to check the gas charge.
	On_	Clog.	Check if the compressed air inlet/outlet is connected properly.
			Check if the connecting tubing is clogged; in case proceed accordingly.
			Check if any valves are closed.
			Check the condition of any filter.
	On_	Air flows continuously through the condensate drainage.	Drainage solenoid valve jammed, clean or replace it.
			Verify the condensate drainage times set on the electronic control board (C8 and C9).
			Check the signal from the control board: if it is continuous, replace the control board.

IMPORTANT:
The temperature control probe is extremely delicate. Do not remove the probe from its position. In case of any kind of problem, please contact your local Hi-Line distributor

Pic.3 drain solenoid valve



When it is necessary:

- Clean the mesh filter of the condensate drainage system.
- Clean the filter mesh.

4.3 DECOMMISSIONING

All work on the dryer may only be carried out by specialist personnel!
Follow this procedure if you need to shut down the dryer:

- Stop the device and permanently isolate it from the electricity mains;
- Disconnect the power cable;
- Take pressure off the air circuit;
- Empty the tank and the internal cooling medium circuits;
- If the device has to be dispatched, use the original or similar packaging and keep the device in an up-right position.

Before carrying out any work on the electrical parts, make sure that the main switch interrupts the electricity supply to the dryer and then affix appropriate warning signs to avoid the machine being reconnected to the electricity mains!

Please consult the contents and the safety instructions in the relevant sections of these instructions for details of the correct handling and storage of the chiller. Remove any residual cooling medium from the dryer in a manner appropriate to its properties and in accordance with the legislation in force.

If the device has to be demolished: Never open the sealed cooling assembly (compressor, evaporator and condenser) if there may be any refrigerant or lubricating oil present!

Send the chiller to an approved waste disposal company in accordance with current environmental protection legislation. The other materials/waste constituents must be treated in line with the provisions of the valid legislation.

ATTACHMENTS TO THE MANUAL

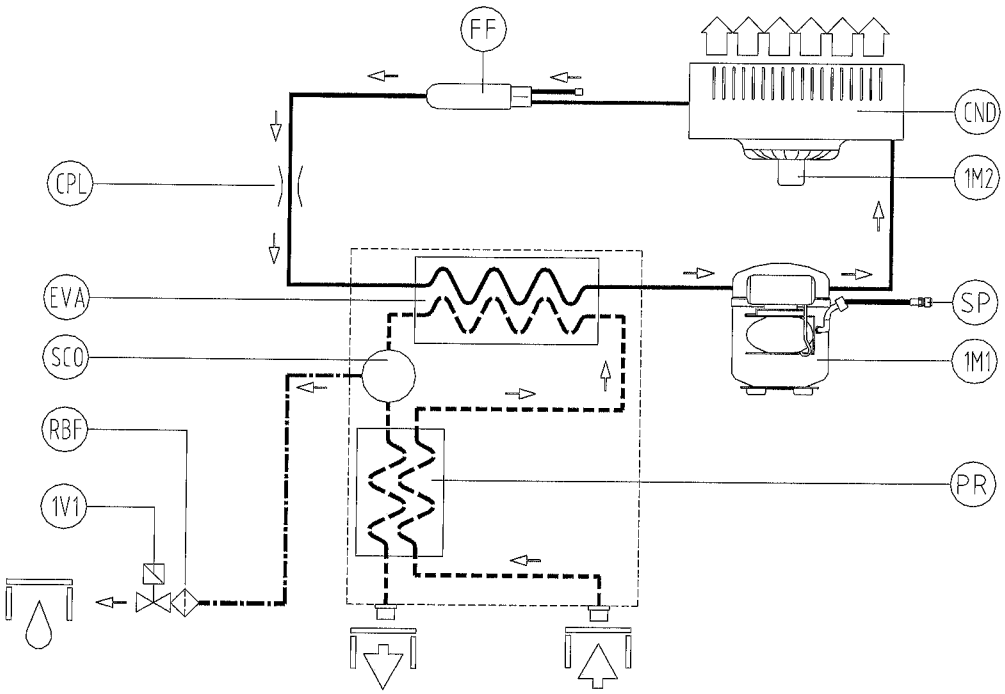
1A1	Electronic Controller
1B1	Drain solenoid valve coil
1B2	Liquid solenoid valve coil
1B3	By-pass solenoid valve coil
1M1	Refrigerant compressor
1M2	Fan Motor
1M3	Glycol circulator
1P1	High pressure Switch
1P2	Fan pressure Switch
1Q1	Compressor circuit breaker
1Q2	Fan circuit breaker
1Q3	Transformer circuit breaker
1R1	Compressor crankcase heater
1R2	Electrical panel heater
1R3	Condensate drain heater
1S1	Main power switch
1S2	Plug
1S3	ZERO DRAIN Terminal blocks
1T1-1T2-1T3	Transformer
1V1	Solenoid drain Valve
1V2	Liquid solenoid valve
1V3	By-pass solenoid valve
ACC	Tank
CB	Compressor box
CBL	Cables
CNA	Sacrificial anode
CND	Condenser
CNV	Fan capacitor
CPL	Capillary tube
EB	Electrical box
ED	10 micron filter element
EH	0.01 micron filter element
EP	1 micron filter element
EQ	5 micron filter element
EVA	Evaporator
F1-F2	Fuses
FD	Air filter 10 micron
FF	Filter dryer
FH	Air filter 0.01 micron
FP	Air filter 1 micron
FQ	Air filter 5 micron
FR	Drain screen
FT	Noise filter
FV	Fan motor fuse

Legend

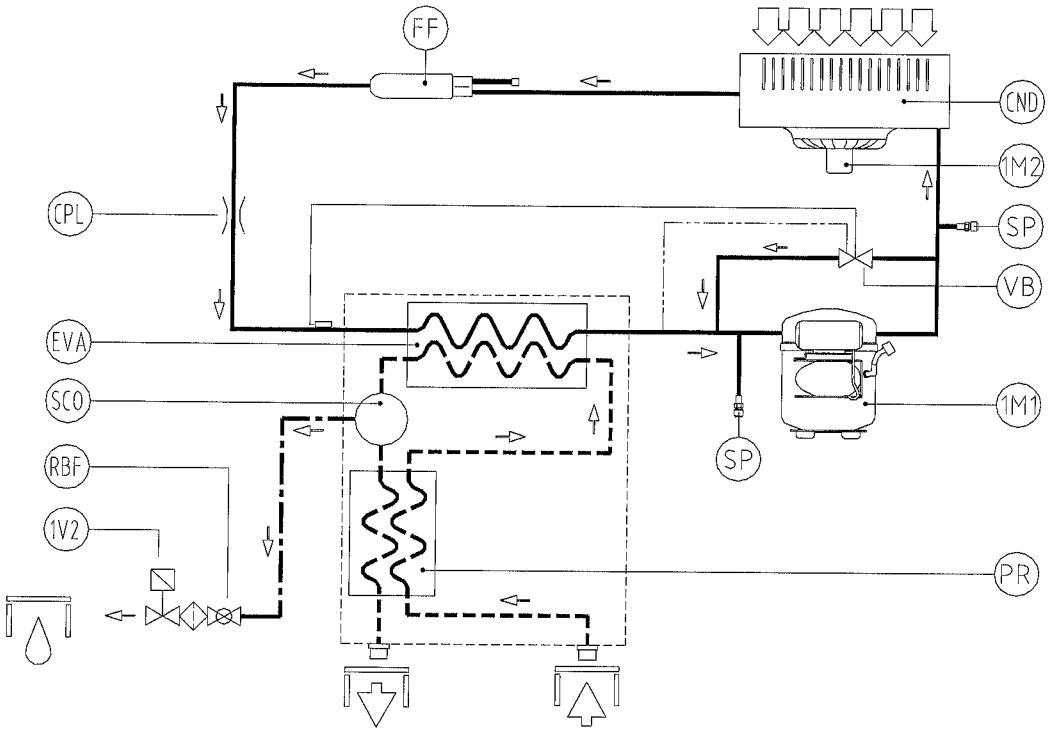
G	Grid
GFCI	Ground fault circuit breaker
IM	Moisture indicator
K1	Contactor switch
K2	Fan contactor switch
KRC1	Protection module
MHP	High pressure manometer
MLP	Low pressure manometer
PCP	Thermal protection
PR	Air-air heat exchanger
PSC	Air-air heat exchanger
R	Compressor relay
RB1	Freon Tap
RBF	Tap with strainer
RBS	Changeover tap
RD1	Reed sensor
REF	Fan speed regulator
RF	Phase control relais
RL	Liquid receiver
RR	Rotalock tap
RS	RS485 Interface
PB / RT	Temperature probes
SC	Heat exchanger base
SCO	Condensate separator
SH	Sensor hose
SLI	Liquid separator
SP	Schrader
SSC	Condensate drain
STC	Control panel cover
TEMP	Time setter
TH1	Thermostat
THR	Electrical box thermostat
TLT	Remote cont. Thermostat
VA	Glycol valve
VB	By-pass hot gas valve
VBA	Air by-pass valve
VE	Expansion valve
VNR	One way valves with strainer
VP	Pressostatic valve
VS	Tap
VSR	Freon safety valve
VT	Fan blade
X1-X2-X3-X4	Terminal blocks

(A) REFRIGERANT CIRCUIT

Cod. 713.0048.03.00 – Rev. 00
Models TUNDRA 22 to TUNDRA 115



Cod. 713.0057.01.00 – Rev. 00
Models TUNDRA 175 to TUNDRA 209

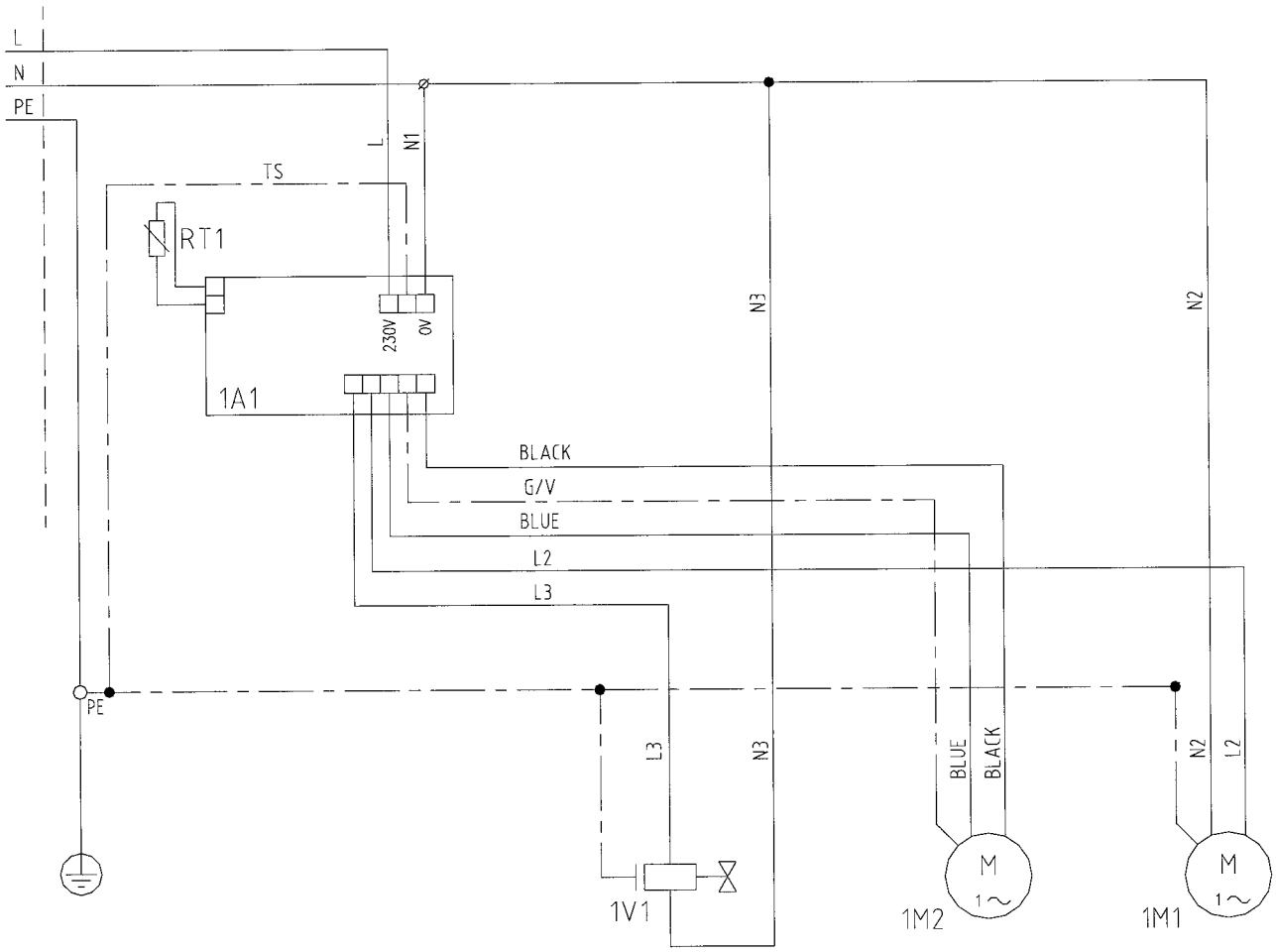


Condensate drain	Air inlet	Air outlet

Refrigerant line	Compressed air line	Condensate drain line	Glycol line

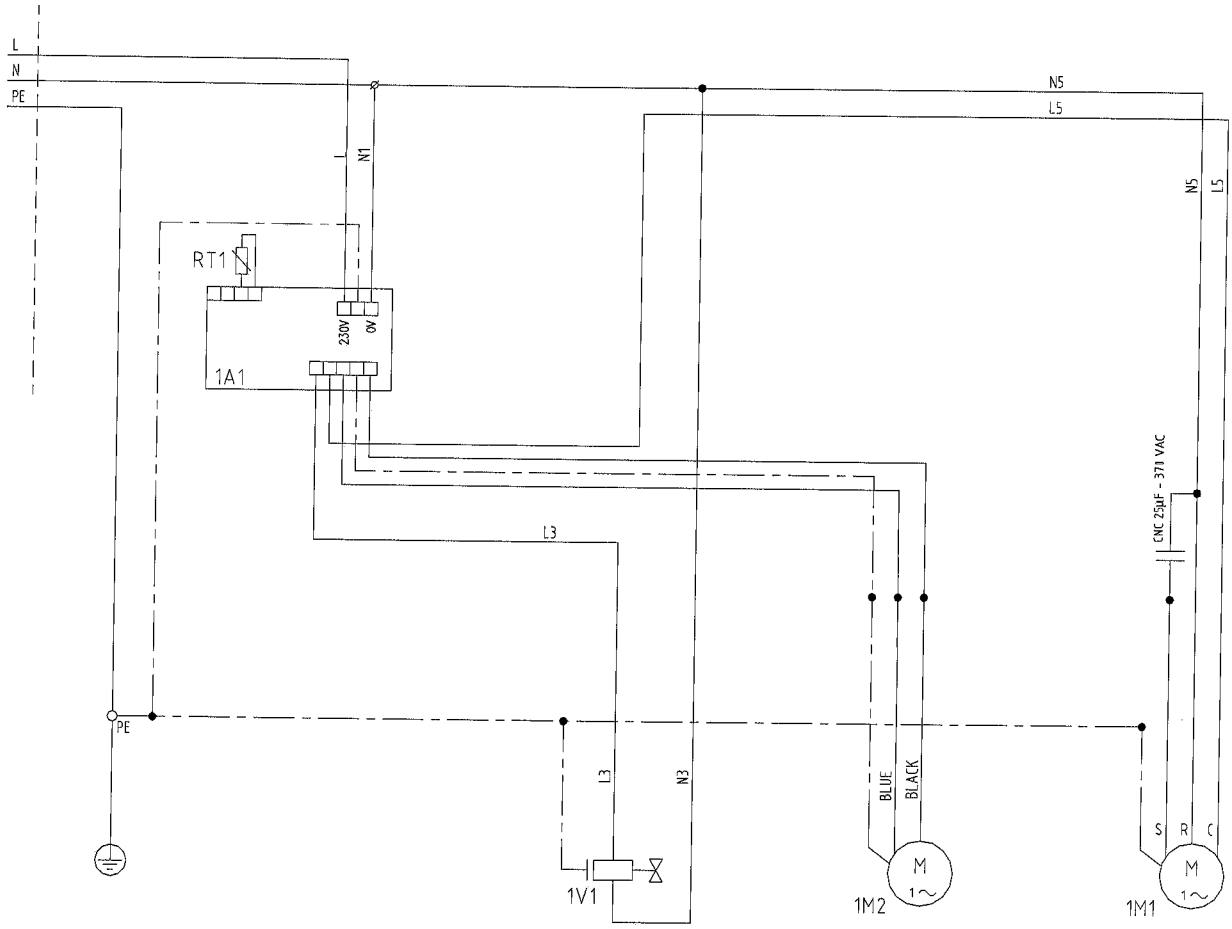
(B) WIRING DIAGRAM

Cod. 714.0104.01.04 – Rev. 00
Models TUNDRA 22 to TUNDRA 115 (230V/1Ph/50-60Hz)



Cod. 714.0170.07.01 – Rev. 00

TUNDRA 175 – TUNDRA 209 (230V/1Ph/50Hz - 230V/1Ph/60Hz)



(C) DATA SHEET

MODEL			TUNDRA 22	TUNDRA 32	TUNDRA 45	TUNDRA 64	TUNDRA 91	TUNDRA 115
AR	Air flow rate	Nl/min Nm³/h	600 36	900 54	1200 72	1800 108	2400 144	3000 180
CONN	Air connections	BSP	1/2"	1/2"	1/2"	3/4"	1"	1"
REF	Refrigerant	Type	R134a					
W	Weight	Kg	17	24	25	26	31	36
AIR T	Air inlet temp.	°C	35 (Max 55)					
AMB T	Ambient temp.	°C	25 (Max 45)					
PRESS W	Working pressure	bar	7 (Max 16)					
DB(A)	Sound pressure level	dB(A)	< 70					
POW SUPPLY	**Power supply**	**V/Ph/Hz**	230/1/50					
kW	Nom. consumption	KW	0,12	0,17		0,29	0,41	0,47
Max kW	Full load consumpt.	KW	0,17	0,24		0,38	0,54	0,61
RLA	Nom. Current	A	0,90	1,13		2,00	2,99	3,20
FLA	Full load current	A	1,04	1,39		2,29	3,50	3,84
LRA	Locked rotor current	A	8,50	15,00		12,00	16,50	18,00
POW SUPPLY	**Power supply**	**V/Ph/Hz**	230/1/60					
kW	Nom. consumption	KW	0,13	0,24		0,35	0,46	0,57
Max kW	Full load consumpt.	KW	0,19	0,37		0,47	0,61	0,73
RLA	Nom. Current	A	0,83	1,46		2,04	2,75	3,12
FLA	Full load current	A	1,07	1,89		2,51	3,36	3,84
LRA	Locked rotor current	A	8,00	16,50		13,50	16,50	20,00

MODEL			TUNDRA 175 230/1/50	TUNDRA 209 230/1/50	TUNDRA 175 230/1/60	TUNDRA 209 230/1/60
AR	Air flow rate	Nl/min Nm³/h	4666 280	5666 340	4666 280	5666 340
CONN	Air connections	BSP	1-1/2"	1-1/2"	1-1/2"	1-1/2"
REF	Refrigerant	Type	R407C			
W	Weight	Kg	62	64	62	64
AIR T	Air inlet temp.	°C	35 (Max 55)			
AMB T	Ambient temp.	°C	25 (Max 45)			
PRESS W	Working pressure	bar	7 (Max 16)			
DB(A)	Sound pressure level	dB(A)	< 70			
POW SUPPLY	**Power supply**	**V/Ph/Hz**	230/1/50		230/1/60	
kW	Nom. consumption	KW	0,60		0,71	
Max kW	Full load consumpt.	KW	0,84		1,00	
RLA	Nom. Current	A	2,70		3,39	
FLA	Full load current	A	3,82		4,77	
LRA	Locked rotor current	A	17,00		20,00	

*Rating conditions of: 35°C (95°F) and 100 psig air Inlet, 25°C (77°F) ambient temperature
Performance and specifications + / - 5%

AIR FLOW RATE	Air flow rate
POW SUPPLY	Power supply
HP	Nominal power
kW	Nominal consumption
Max kW	Full load consumption
RLA	Nominal Current
FLA	Full load current
LRA	Locked rotor current
CONN	Air connections

AIR T	Air inlet temperature
AIR T MAX	Max, air inlet temperature
AMB T	Ambient temperature
AMB T MAX	Max, ambient temperature
PRESS W	Working pressure
PRESS MAX	Max, pressure
DEWP	Pressure dew point
REF	Refrigerant
W	Weight

TOTAL A	Total current
EVAP. TEMP	Evaporation temperature
SUCTION TEMP	Suction temperature
FAN PRESSURE SWITCH SETTING	Fan pressure Switch setting
SAFETY VALVE SETTING	Safety valve setting
DISCH. PRESS.	Discharge pressure
HP SWITCH SETTING	High pressure switch setting
MIN CIRCUIT AMPACITY	Minimum circuit ampacity
DB(A)	Sound pressure level

(D) CORRECTION FACTORS

Correction factor for working pressure

bar	5	6	7	8	9	10	11	12	13	14	15	16
psi	73	87	102	116	131	145	160	174	188,5	203	217	232
FC1	0,85	0,93	1	1,06	1,11	1,15	1,18	1,20	1,22	1,24	1,25	1,26

Correction factor for ambient temperature

°C	25	30	35	40	42	45
°F	77	86	95	104	107,6	113
FC2	1,00	0,96	0,92	0,88	0,85	0,8

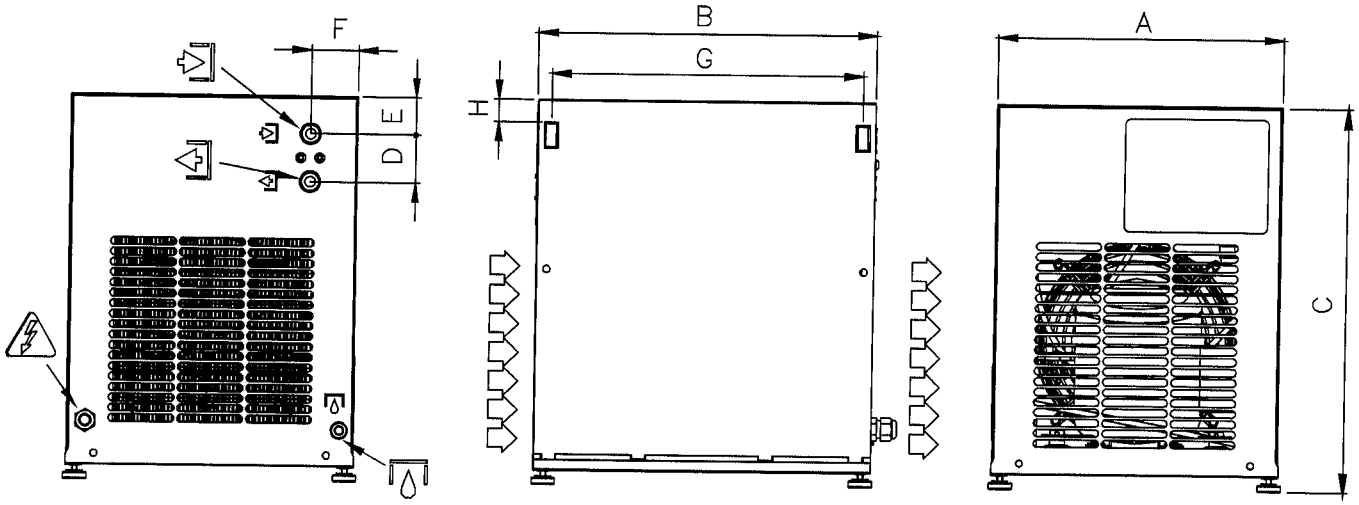
Correction factor for inlet air temperature

°C	30	35	40	45	50	55
°F	86	95	104	113	122	131
FC3	1,20	1,00	0,85	0,71	0,58	0,49

Calculation of the dryer REAL FLOW RATE = nominal dryer flow rate x FC1 x FC2 x FC3
Calculation of the GIVEN FLOW RATE to select a suitable dryer = given flow rate ÷ FC1 ÷ FC2 ÷ FC3

(E) DRYER DIMENSIONS

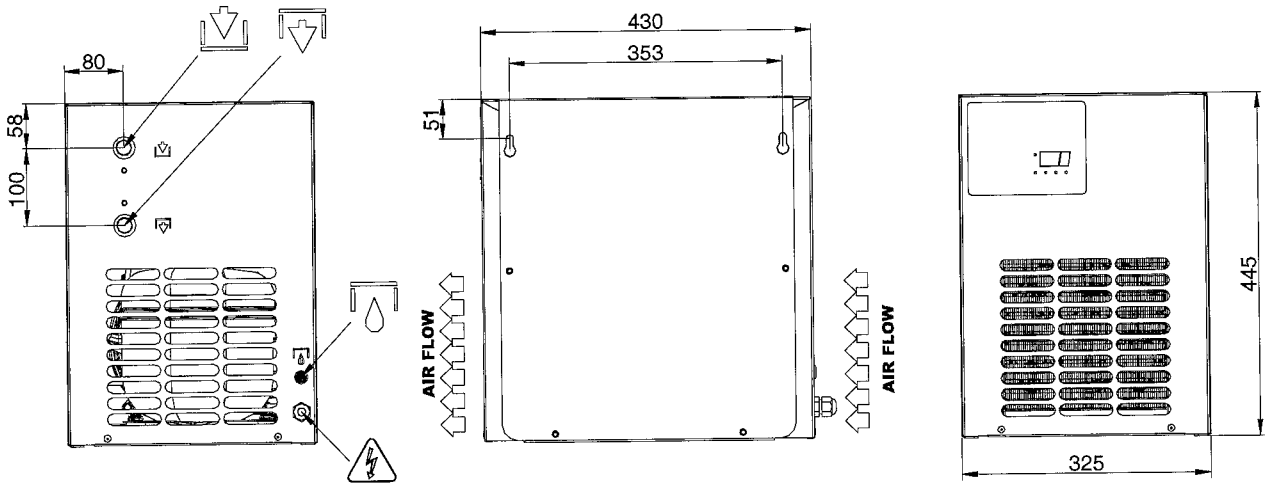
Model TUNDRA 22



	A	B	C	D	E	F	G	H
mm	305	360	408	51	40	50	332	24

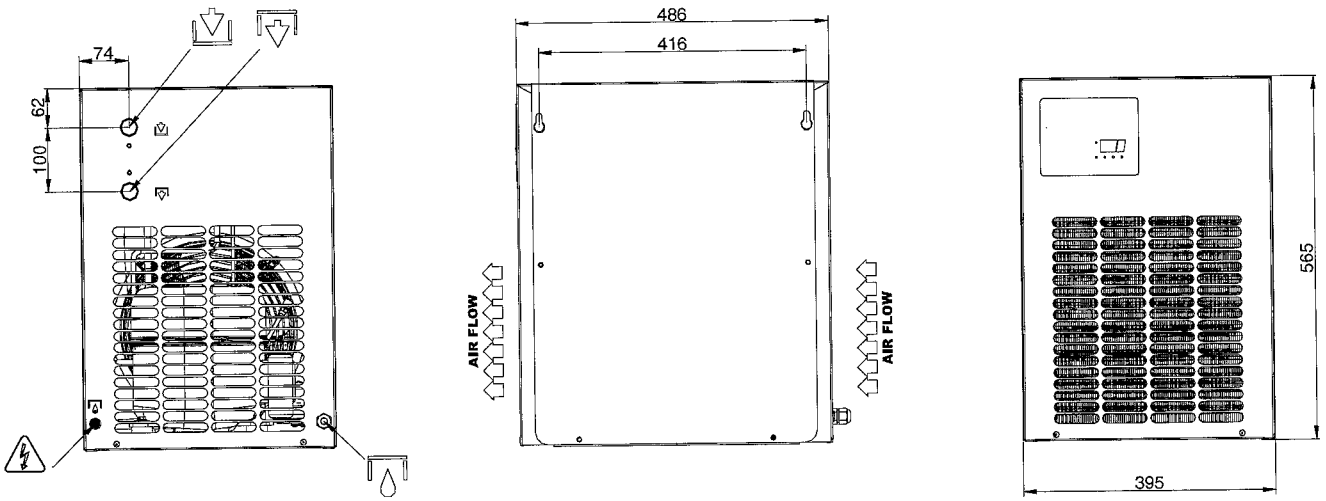
IN	OUT	Ø 6mm	V/ph/Hz

Model TUNDRA 32 TO TUNDRA 64



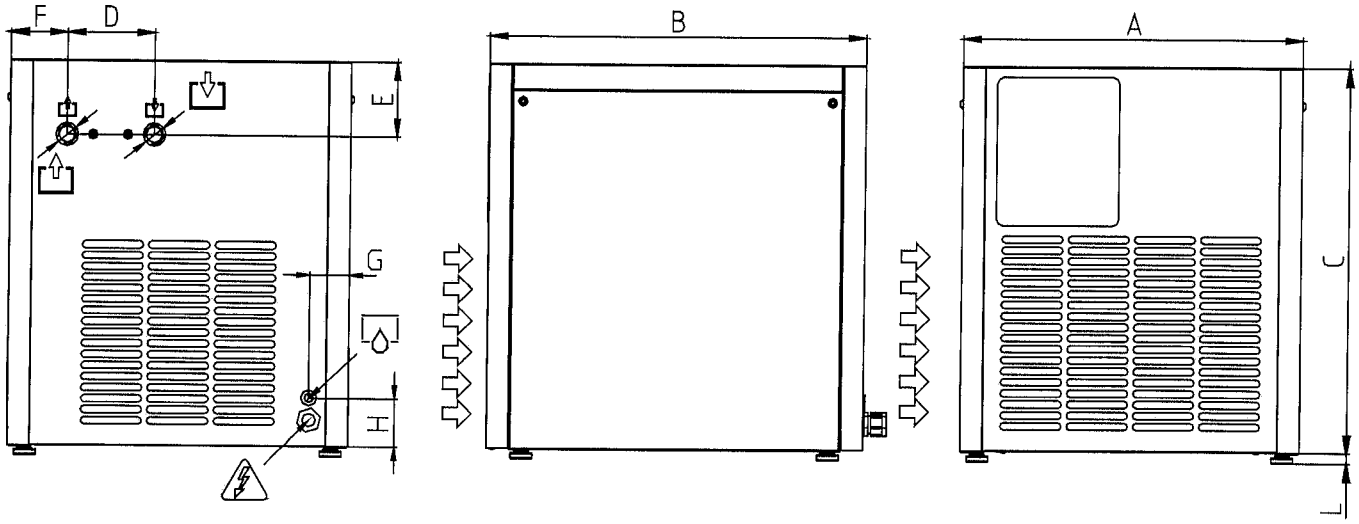
IN	OUT	Ø 6mm	V/ph/Hz

Model TUNDRA 91 TO TUNDRA 115



IN	OUT	Ø 6mm	V/ph/Hz

Models TUNDRA 175 to TUNDRA 209



	A	B	C	D	E	F	G	H	L
mm	485	595	590	125	80	70	50	65	12

IN	OUT	Ø 6mm	V/ph/Hz

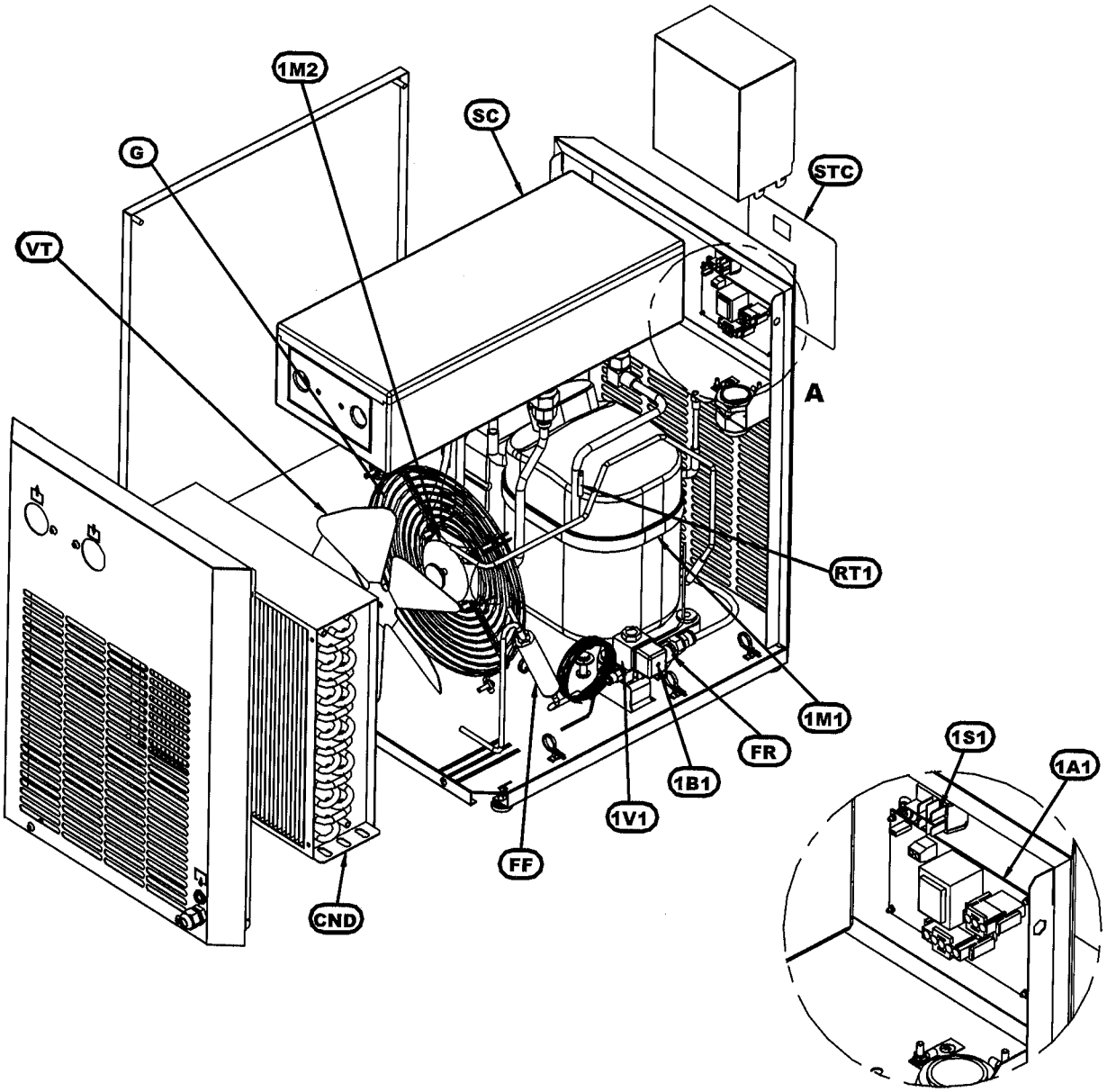
Power supply	Air flow

(F) BASIC SPARE PARTS

Model		SSP	TUNDRA 22	TUNDRA 32	TUNDRA 45	TUNDRA 64	TUNDRA 91	TUNDRA 115
Pos	Element							
1A1	Electronic Controller	A	305.0072.01	305.0072.01	305. 0072.01	305. 0072.01	305.0072.01	305.0072.01
RT1	Temperature probe	A	243.0034.01	243.0034.01	243.0034.01	243.0034.01	243.0034.01	243.0034.01
1M1	Refrigerant compressor	C	201.0079.00	201.0085.00	201.0085.00	201.0143.00	201.0177.00	201.0156.00
1M2	Fan Motor	B	210.0074.00	210.0074.00	210.0074.00	210.0073.00	210.0073.00	210.0114.00
VT	Fan blade	B	213.0020.00	213.0020.00	213.0020.00	213.0020.00	213.0021.00	213.1975.00
G	Grid		213.0044.01	213.0044.01	213.0044.01	213.0044.01	213.0045.01	213.0046.01
1V1	Complete solenoid drain valve	B	240.0148.00	240.0148.00	240.0148.00	240.0148.00	240.0148.00	240.0148.00
1B1	Drain solenoid valve coil	A	240.0152.00	240.0152.00	240.0152.00	240.0152.00	240.0152.00	240.0152.00
CND	Condenser	C	921.0048.01	921.0034.01	921.0035.01	921.0035.01	921.0036.01	921.0037.01
FF	Dehydrator filter	C	630.0049.00	630.0049.00	630.0049.00	630.0049.00	630.0050.00	630.0050.00
FR	Drain screen	B	630.0041.00	630.0041.00	630.0041.00	630.0041.00	140.0100.00	140.0100.00
SC	Heat exchanger base	C	904.0097.01	904.0195.01	904.0195.01	904.0195.01	904.0196.01	904.0197.01
STC	Control panel cover		711.0292.01	711.0292.01	711.0292.01	711.0292.01	711.0292.01	711.0292.01

Model		SSP	TUNDRA 175 230/1/50	TUNDRA 175 230/1/60	TUNDRA 209 230/1/50	TUNDRA 209 230/1/60
Pos	Element					
1A1	Electronic Controller	A	305.0072.01	305. 0072.01	305. 0072.01	305.0072.01
RT1	Temperature probe	A	243.0034.01	243.0034.01	243.0034.01	243.0034.01
1M1	Refrigerant compressor	C	201.0140.00	201.0142.00	201.0140.00	201.0142.00
1M2	Fan Motor	B	210.0114.00	210.0114.00	210.1960.00	210.1960.00
VT	Fan blade	B	213.1975.00	213.1975.00	213.1971.00	213.1971.00
G	Grid		213.0046.01	213.0046.01	210.1949.00	210.1949.00
1V1	Complete solenoid drain valve	B	240.0148.00	240.0148.00	240.0148.00	240.0148.00
1B1	Drain solenoid valve coil	A	240.0152.00	240.0152.00	240.0152.00	240.0152.00
CND	Condenser	C	921.0040.02	921.0040.02	921.0076.01	921.0076.01
FF	Dehydrator filter	C	630.0050.00	630.0050.00	630.0050.00	630.0050.00
FR	Drain screen	B	140.0100.00	140.0100.00	140.0100.00	140.0100.00
SC	Heat exchanger base	C	904.0156.01	904.0156.01	904.0156.01	904.0156.01
STC	Control panel cover		711.0278.02	711.0278.02	711.0278.02	711.0278.02
VB	By-pass hot gas valve	B	142.0120.00	142.0120.00	142.0120.00	142.0120.00

SSP	A	B	C
Suggested spare parts	Very important	Important	Suggested



DETAIL A

710.0167.65.00-03

710.0167.65.00-03