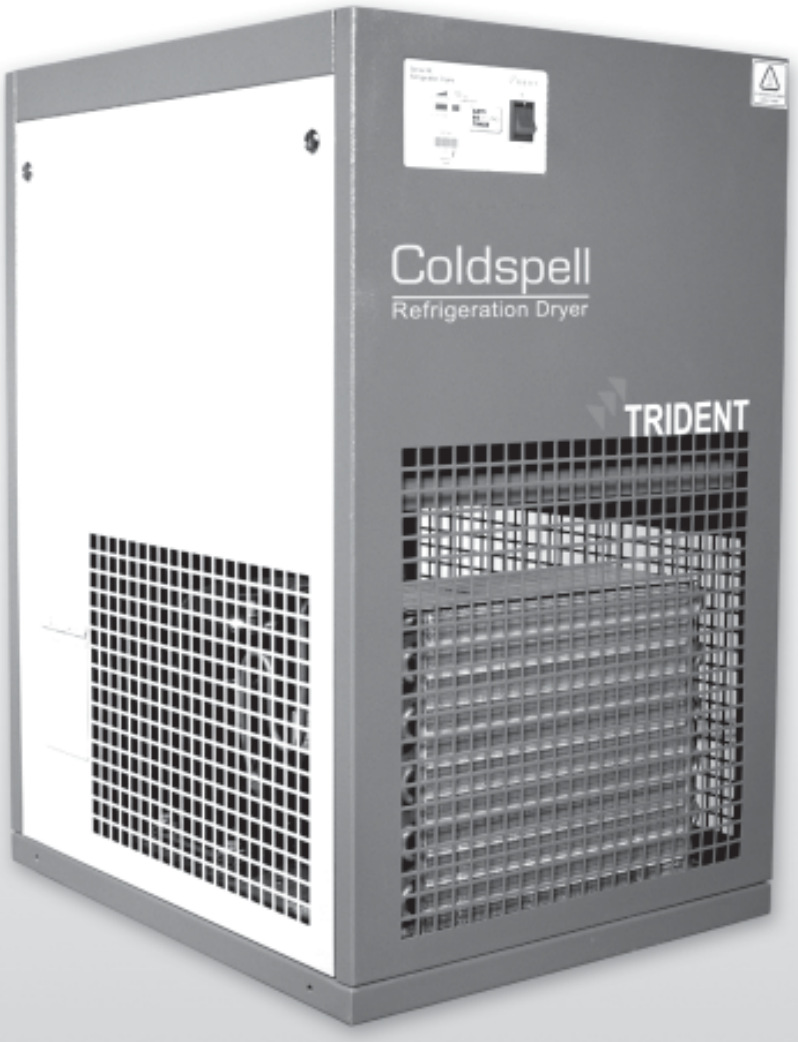
TRIDENT



Installation, Operation, Maintenance

Coldspell

WE REDEFINE COMPRESSED AIR TREATMENT SYSTEMS

Contents

READ THIS MANUAL CAREFULLY BEFORE INSTALLING OR OPERATING THE EQUIPMENT

These symbols warn you of any dangers and the measures to be taken to prevent them.

The most important points for the correct operation of your dryer are printed in bold type.

1. Introduction

1.1 Design

Coldspell refrigeration dryer eliminates any water vapour remaining in the compressed air coming at the outlet of the compressor house. The dryers have been designed for nominal standard inlet conditions as per ISO 7183 in order to obtain a dew point under pressure of + 3°C.

1.2 Description

The dryer consists of :

- Air to Air Heat exchanger
- Air to Freon Evaporator
- Demister
- Refrigerant Compressor
- Electronic controller
- Condenser Assembly
- Expansion Device
- Pressure switch*
- Refrigerant discharge pressure gauge*
- Hot gas bypass valve
- Auto drain valve
- Canopy

** Optional*

2. Specifications

Operational Details

Medium	: Compressed Air
Inlet condition	: Free of dirt, oil, condensate and corrosive substances.
Operating pressure*	: 7 Kg/cm^2
Inlet temperature*	: Max +45^oC
Inlet humidity	: Saturated at specified conditions
Ambient temperature	: Max +38^oC
Pressure dew point	: + 3^oC to 7^oC
Cooling system	: Air cooled / Water cooled
Max. Working pressure	: 16 Kg/cm^2
Refrigerant compressor	: Hermetic sealed

** Optional*

3. Operating Principle

3.1 Pneumatic section

The moist compressed air (dirt, oil and water vapor) enters into the Air/Air Heat Exchanger where it is precooled by the outgoing air and thereby conserving energy.

The compressed air next passes through the evaporator. It is cooled up to +3°C by the Refrigerant. At this sub-cooled temperature, the moisture present in the air is condensed and removed by the Demister.

The cool saturated air passes through the Air to Air Heat Exchanger where it precools incoming air and it gets heated up. Thus this system provides clean dry air at the Outlet. Efficient Filter and Automatic Drain Valve carry out the removal of moisture at Demister. The Heat Exchangers are designed in such a way that they are self-cleaning to maintain the constant heat transfer rate.

3.2 Refrigeration section (Freon)

The Evaporator remove heat from compressed air by means of cold and low pressure freon. The heat removed from the system is dissipated to the atmosphere/water by the condenser. The high pressure refrigerant flows into the expansion valves where it changes into liquid phase at low pressure. The boiling of liquid refrigerant takes place in Evaporator and cold air leaves from the Evaporator. The low pressure, low temperature refrigerant passes into the compressor and the cycle repeats.

The Refrigeration Dryer senses the Refrigerant suction pressure and accordingly varies the flow of Hot Gas Bypass inside the system and maintains constant Dew point at various heat loads.

3.3 Safety

Pressurised equipments may explode if used improperly. It is therefore essential to locate any pressurised equipment, in such a way that the risks relating to incorrect use are reduced to the absolute minimum.

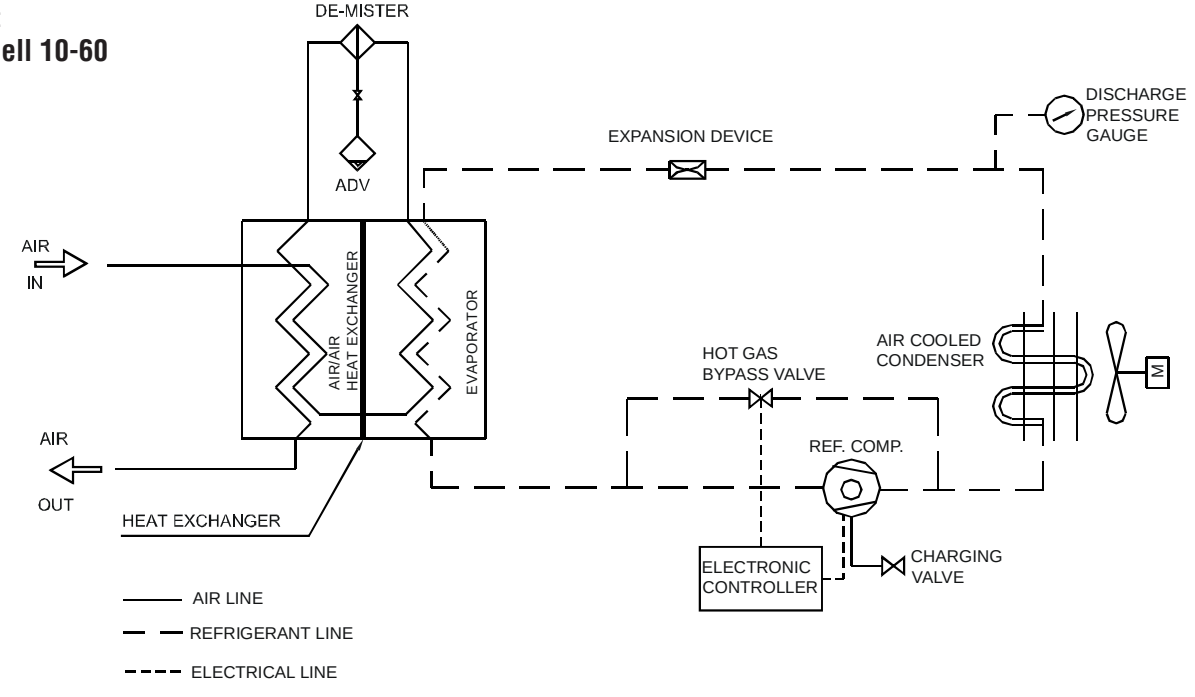
The person responsible for the stuff who is going to install, operate and maintain the machines described in this manual must make sure that they have read and understood these instructions.

In particular we draw your attention to the safety procedures which are described in this manual and which must be scrupulously adhered to. Observing these measures will allow you to install, operate and maintain your dryer without risk.

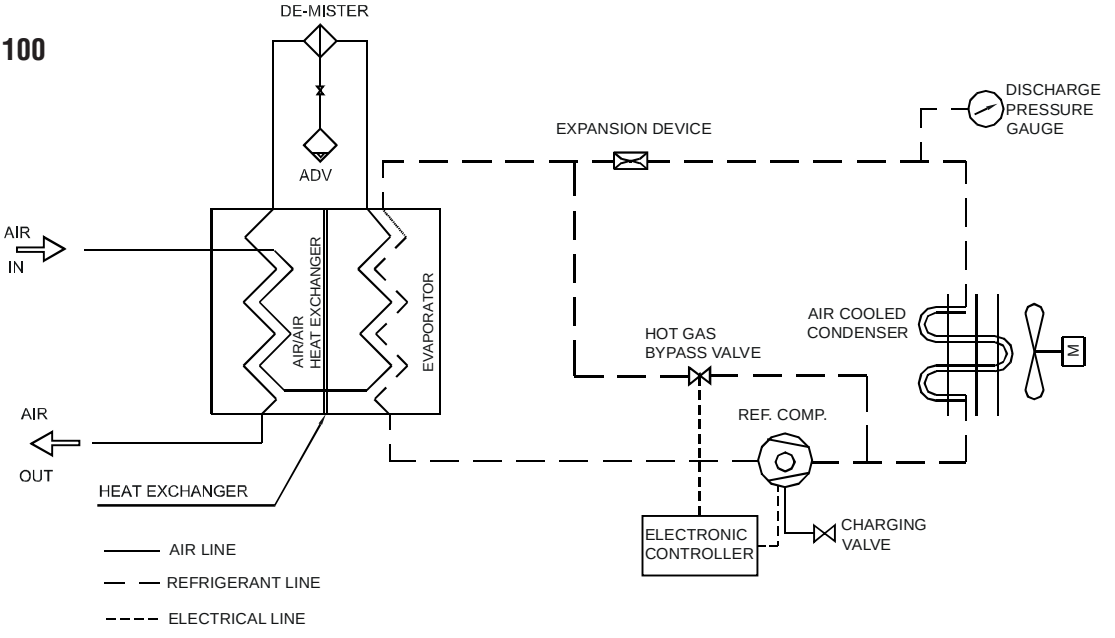
Coldspell dryers are intended for the drying of compressed air. Under no circumstances should they be used to dry other gases before Trident has performed a preliminary study and provided special instructions.

3.4 Schematic Diagrams

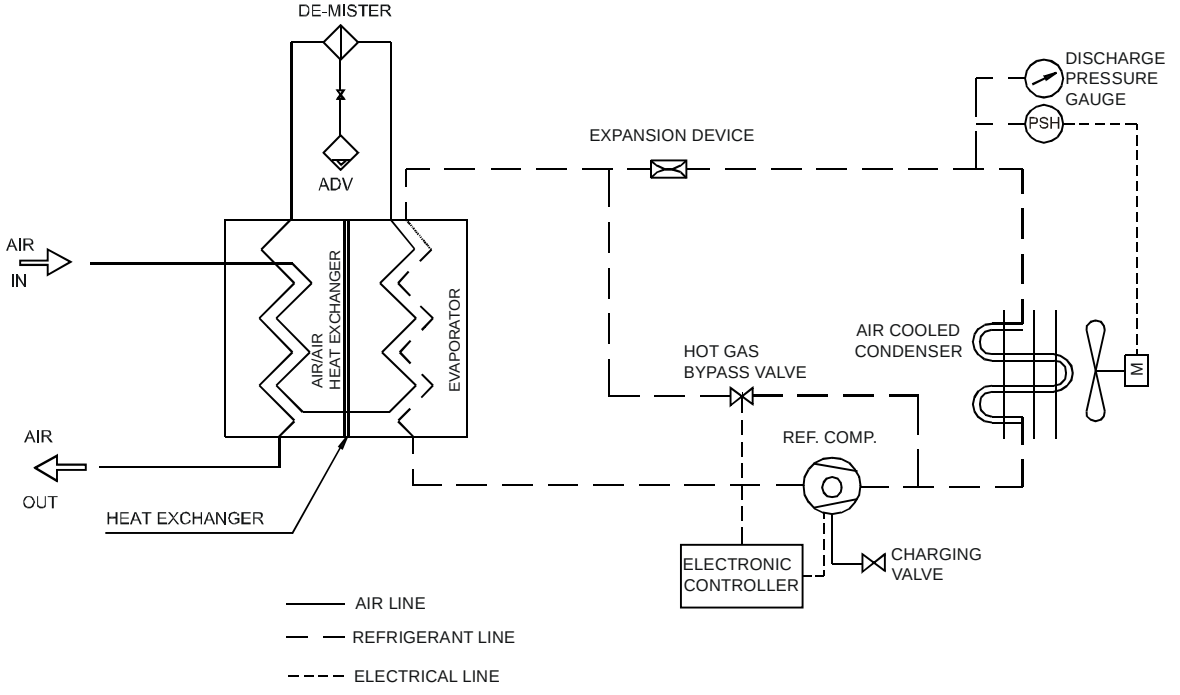
Model :
Coldspell 10-60



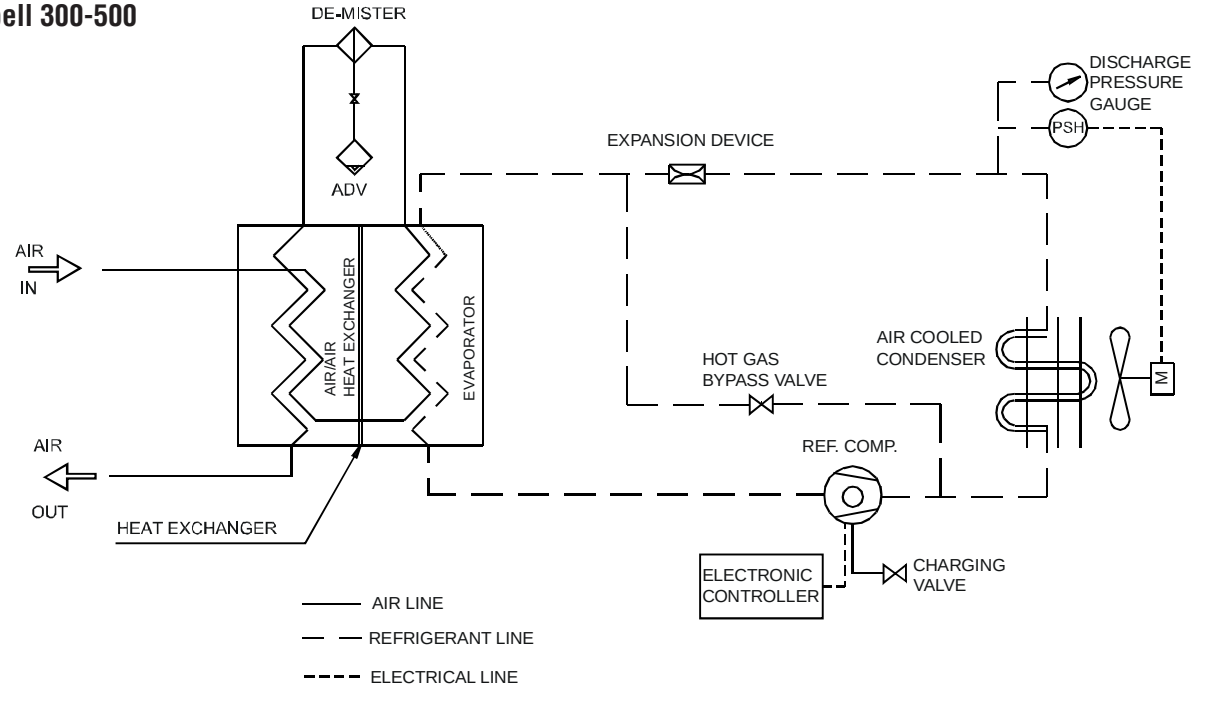
Model :
Coldspell 80 & 100



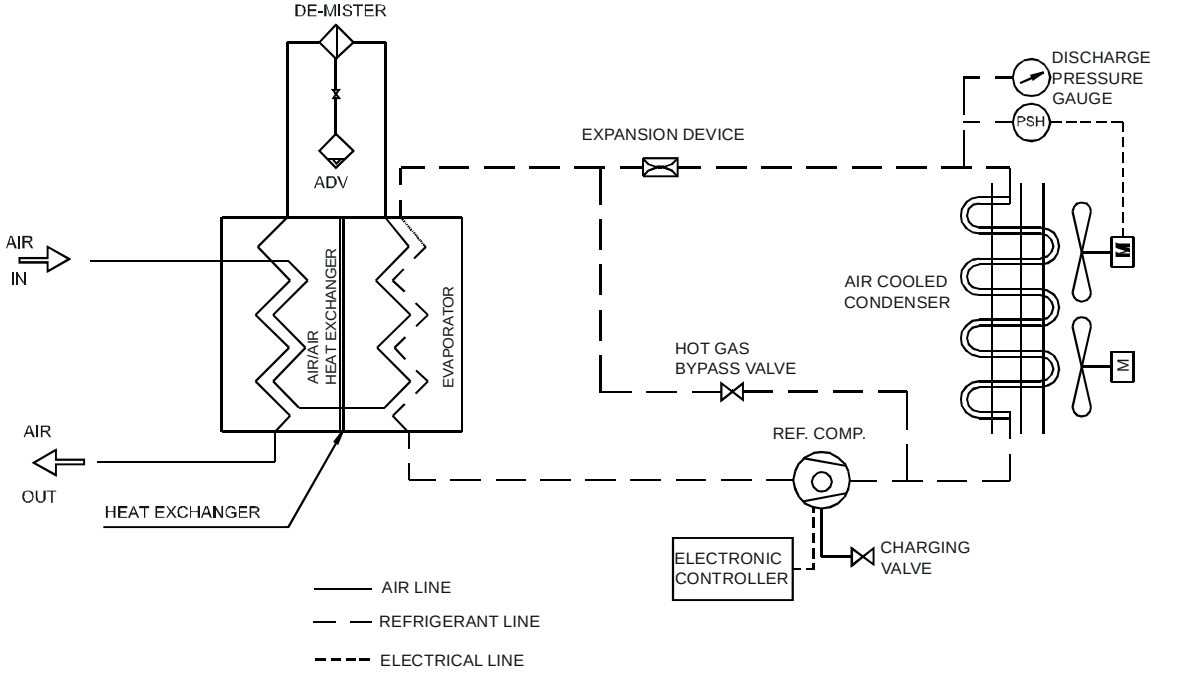
Model :
Coldspell 150-250



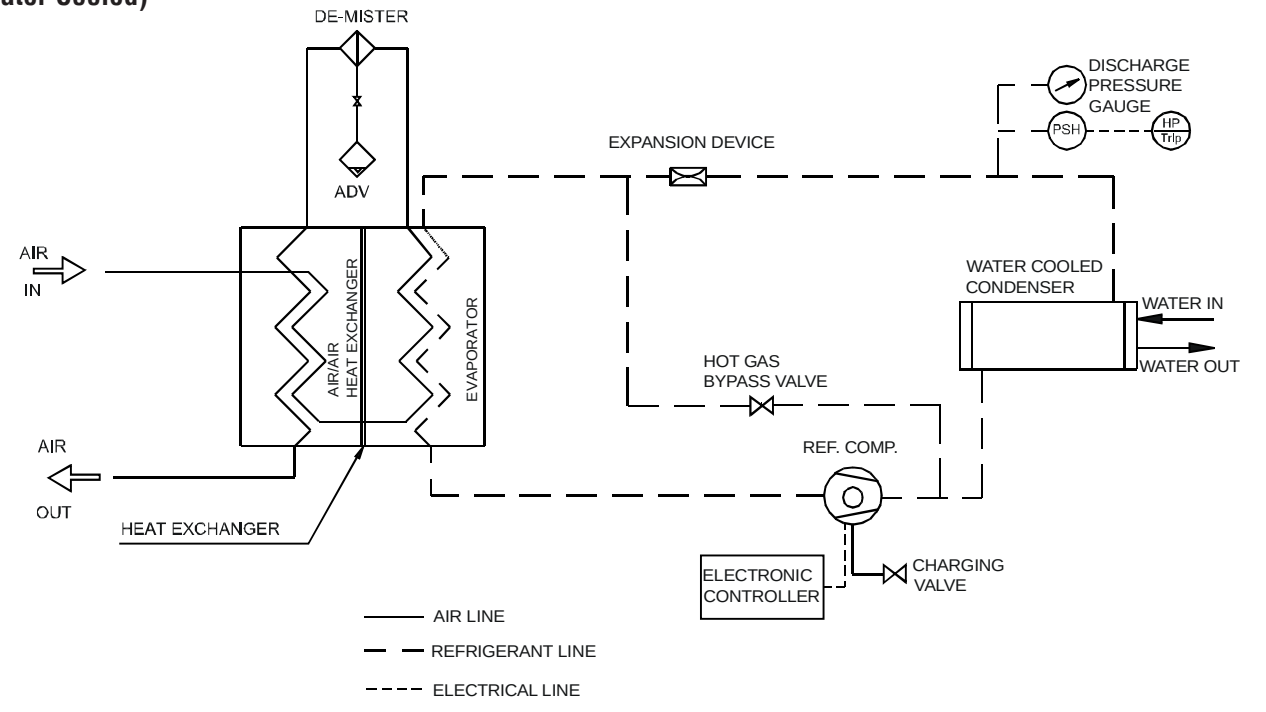
Model :
Coldspell 300-500



Model :
Coldspell 650-1000

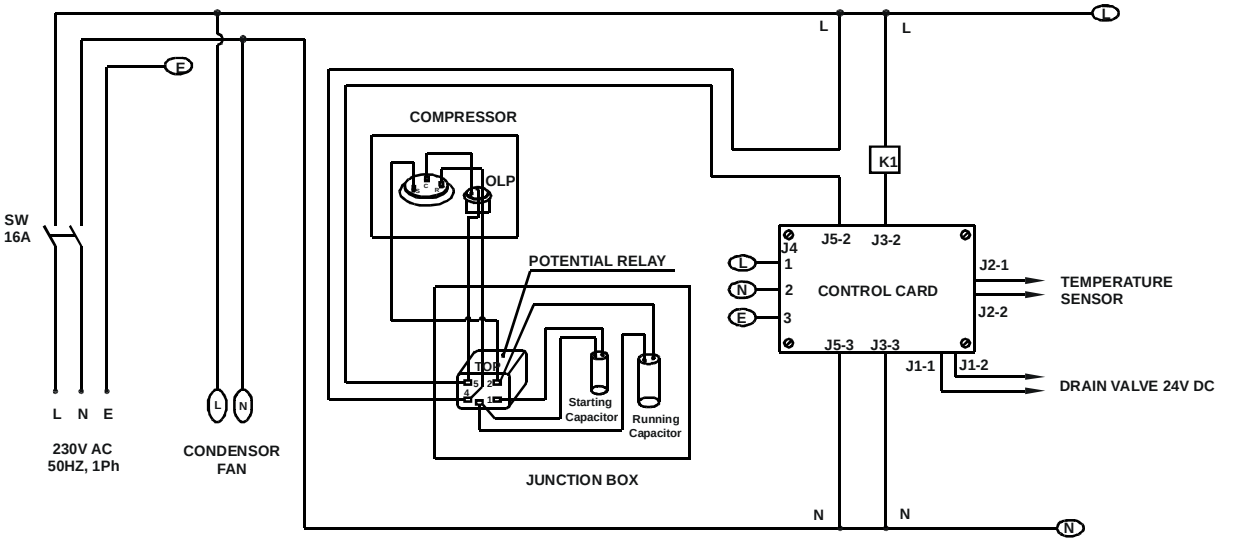


Model :
Coldspell 1200-2000
(Water Cooled)



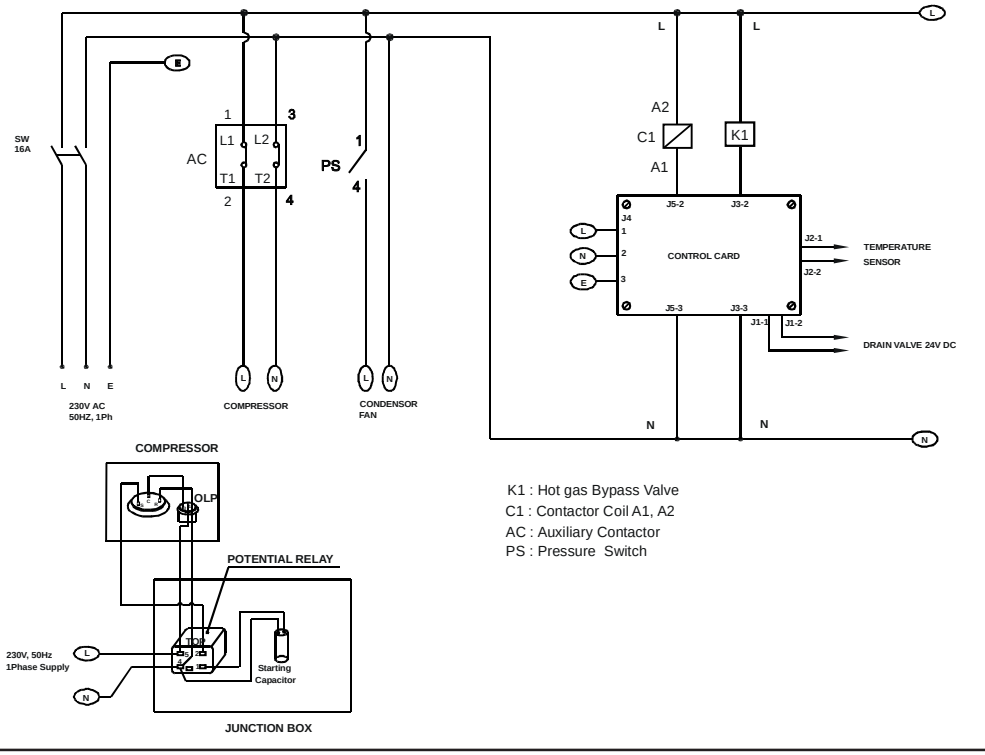
4. Wiring Diagrams

Model :
Coldspell 10 to 100



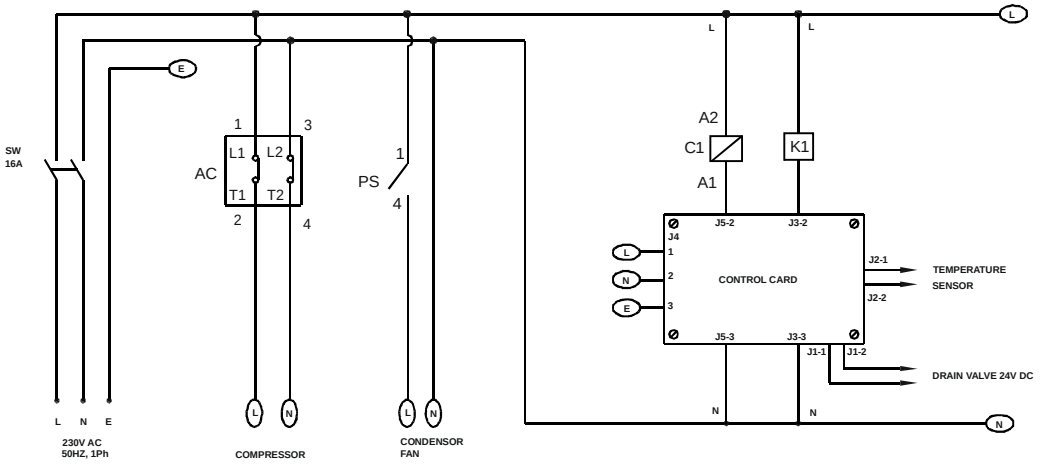
K1 :Hot gas bypass valve

Model :
Coldspell 150

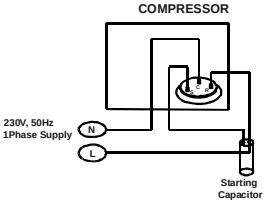


K1 : Hot gas Bypass Valve
C1 : Contactor Coil A1, A2
AC : Auxiliary Contactor
PS : Pressure Switch

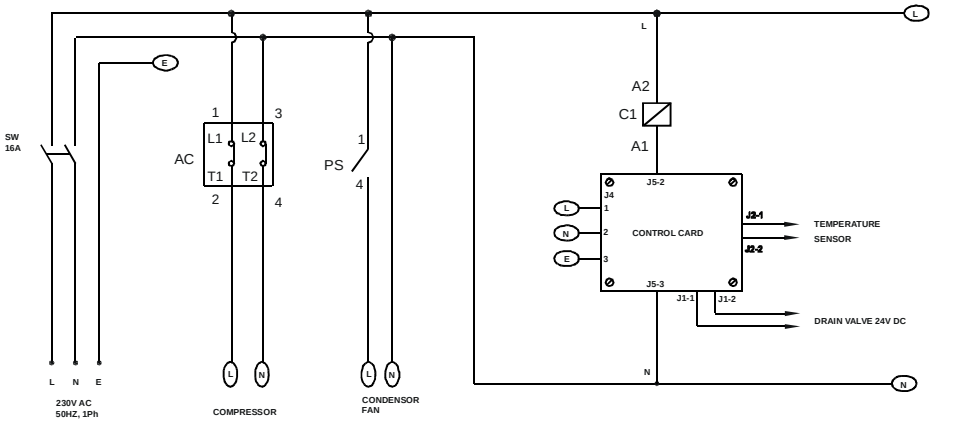
Model :
Coldspell 200 to 250



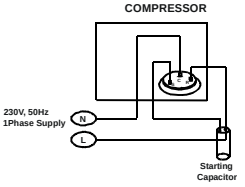
K1 : Hot gas Bypass Valve
C1 : Contactor Coil A1, A2
AC : Auxiliary Contactor
PS : Pressure Switch



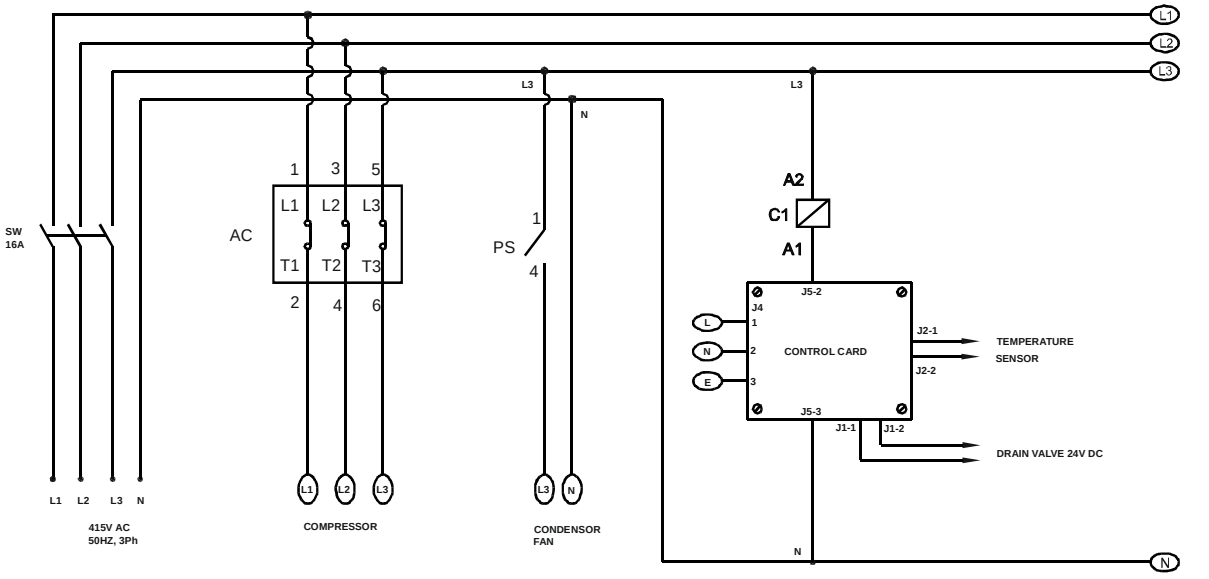
Model :
Coldspell 300



C1 : Contactor Coil A1, A2
AC : Auxiliary Contactor
PS : Pressure Switch

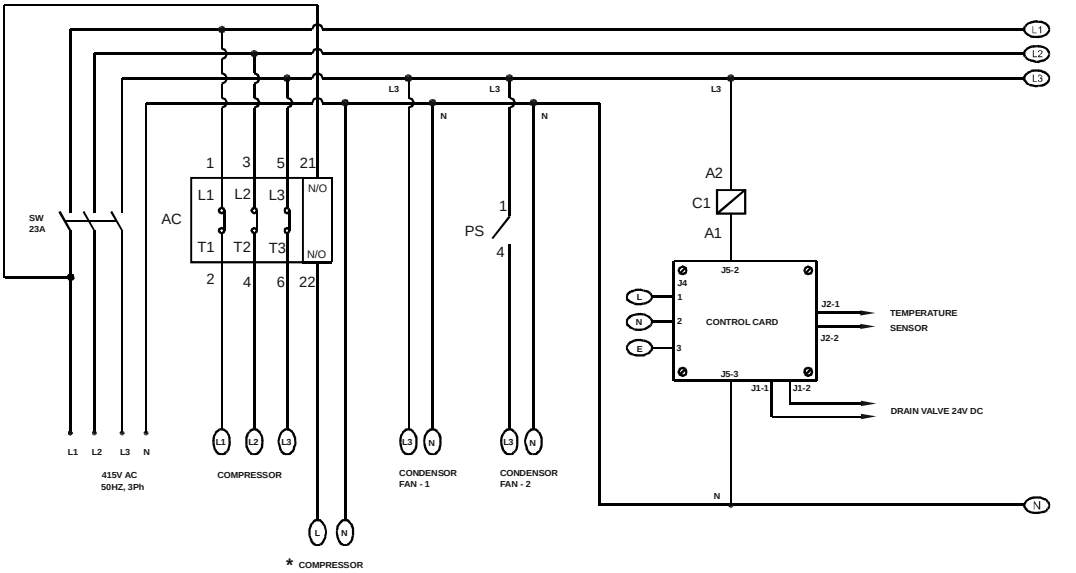


Model :
Coldspell 400 to 500



C1 : Contactor Coil A1, A2
AC : Auxiliary Contactor
PS : Pressure Switch

Model :
Coldspell 650 to 800



C1 : Contactor Coil A1, A2
AC : Auxiliary Contactor
PS : Pressure Switch
* Compressor Heater Optional

5. Installation

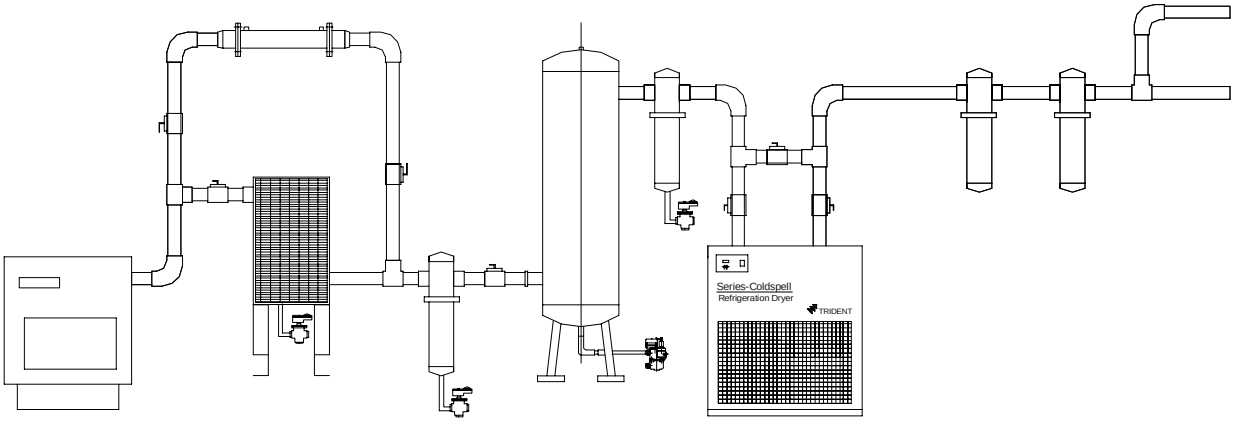
Various risks (crushing, explosion, projection, noise,...): The installation operations described in this chapter should be performed only by personnel qualified in the installation of electro-pneumatic systems. Follow the procedure described below with care in order to prevent exposing personnel to danger.

5.1 Storage

If your dryer is about to be stored during a long time before installation and use, take care to the following instructions:

- If possible, let the dryer in its original packing (In particular products fitted with marine packing with plastic film and dessicant)
- Check that air inlet and outlet are correctly blocked in order to protect the system from foreign materials
- Check that the machine is correctly protected from atmospheric dust or water.
- Check that the store is frost protected
- Make sure to archive correctly the attached documents.

5.2 Installation and site connections



1. Install the dryer in a closed clean, dry room protected from frost. Access to the room should be restricted to personnel not qualified in unit maintenance and operation. The room must be adequately ventilated. The dryer must not be directly exposed to sources of heat. The temperature of the room must not exceed 43°C.

2. Make sure that the dryer is not near any equipment which does not comply with the electromagnetic compatibility directives and which may degrade dryer operation. There must be a minimum distance of 1 m between the dryer and any other equipment, which uses electricity. Yellow lines demarcating the area are preferred.
3. Ensure that the dryer is installed in vertical position and kept level.
4. Fix the anchor points if it's necessary.
5. Install a system of by-pass valves between the dryer inlet and outlet so as to be able to service the installation without having to interrupt the compressed air supply from the network. The upstream and downstream valves must be closed during installation.
6. Connect the compressed air for processing to the dryer inlet with rust-free pipes.
7. Connect a drain pipe to the Drain valve part connection (1/2''F)
8. Connect the processed compressed air to the dryer output with rust-free pipes.
9. Check that all the connectors are airtight and that the fixings are tight.

5.3 Electrical Connections

Connect the electrical power cable to the supply as specified in this manual, ensure the supply is well grounded.

Risk of electrical shock: When connecting the machine, cut off the power at the connecting point.

5.4 Running the installation

Various risks (explosion, projection, noise, ...): Do not pressurise until the installation procedure has been completed.

For water-cooled condenser, ensure that the Water pump is switched on.

Switch ON the system with the ON/OFF switch provided in the front panel of the canopy.

6. Operation

6.1 Operator

Only a minimum level of experience in handling compressed air is necessary to operate a Coldspell refrigeration dryer and he should be familiar in the following terminologies :

- Pressure in Kg/cm^2
- Flow in cfm
- Dew points in ^oC
- Components of a fluid network: compressor, valves, drains, taps, pressure gauges, filters, tanks,...

6.2 How to stop the dryer

Various risks (projection, explosion, noise,...) : Whenever working on the dryer, it I esessential to disconnect it from the network. Follow the procedure below :

1. Open the by-pass valve
2. Close the upstream valve
3. Close the downstream valve
4. Switch off the Dryer
5. Vent the air inside the dryer

7. Maintenance

Various risks (projection, noise, ...) : This operation should be performed by professionals of Refrigeration.

Trident make Refrigeration dryers are robust, reliable machines. To ensure uninterrupted, problem-free operation, regularly perform the inspections below.

Type of inspection	Discharge pressure in refrigerant line	Drain valve	Air Cooled condenser surface cleaning	Water cooled condenser cleaning using dilute HCL	Inlet temper-ature	Dew point temper-ature
Visual	D	D	W	Y	D	D
Spares replacement	-	-	-	-	-	-
Cleaning	-	H/R	M	Y/R	-	-

D - Daily W - Weekly M - monthly H - Half Yearly Y- Yearly R - As required

** Note : For water cooled condenser Clean the condenser by recirculating dilute HCL if discharge pressure exceeds the value specified in Table 7.1.*

Table 7.1

Freon	Discharge pressure in psig
R22	300
R134a	180

8. Condenser cleaning

8.1 Air Cooled

- Stop the dryer
- Open the side doors, so that all dust removed while cleaning can be vent out of dryer through the side doors
- Using compressed air and an air gun clean the dust accumulated on the condenser fins from outside the dryer.
- Ensure that there is no dust inside the dryer and reassemble the doors.

8.2 Water Cooled

- Stop the dryer
- Stop the water supply and close the inlet and outlet valves of the water supply
- Open the door covering the condenser.
- Drain the water completely.
- Pass dilute HCL solution in the tube side at pressure for more than 1 hour
- Reassemble all and start the dryer.

9. Amount of Gas to be charged

Sl. No.	Capacity (cfm)	Gas Used	Amount of gas to be charged (in gm)
1	40	R134a	350
2	60	R134a	400
3	80	R134a	450
4	100	R134a	600
5	150	R134a	700
6	200 / 250 / 300	R22	1500
7	400	R22	2250
8	500	R22	2750
9	650	R22	2850
10	800	R22	3750
11	1000	R22	4100

This is only information. If any doubt contact factory.

10. Repair work

Trouble	Root cause	Solution
1 Dewpoint	• High flow or low pressure of compressed air	• Correct the flow and pressure
	Discharge pressure high or low	Refer point no.05
	Large quantity of hot gas bypassed	Close the hot gas bypass valve
	High return gas entry in to the refrigeration compressor (suction line ice formation)	Open the hot gas bypass valve
	Low gas	Charge gas to maintain the suction pressure
	Expansion device block (Ice formation on the inlet line to heat exchanger)	Service the expansion device / replace
2 Low dewpoint or dew point lesser than 1^0C	Less quantity of hot gas bypassed	Open the hot gas bypass
3 Compressor not running	Thermal over road relay tripped	Allow the compressor to cool and restart, clean the condenser
	Winding broken	Replace the compressor
	Winding short	Replace the compressor
	Pumping failure, compressor is running Freon pressure is not increasing	Replace the compressor
	Wiring problem	Check wiring
4 Controller display not coming	Power supply connection loose or disconnected	Correct the connection
	Controller failure	Replace the controller

Trouble	Root cause	Solution
5 High Discharge pressure		
R22 Gas : Above 280 PSI incase of water cooled.	Water cooled model, water supply or cooling tower not proper	Correct the water supply
	Water cooled model, scale formation in the condenser tubes	Clean the tubes with dil HCl
	Refrigeration line block, after the condenser or Expansion device block	Clean the block
	Condenser dirty	Clean or blow off condenser dust
6 Compressor thermal overload relay trip or compressor getting off and not getting on	Less return gas in the suction line	Close hot gas by pass valve
	Less return gas in the suction line	Charge gas to maintain the suction and discharge pressure
	Winding open	Replace the compressor
	Gas leak in the system	Arrest the leak & charge the gas
	Condenser dirty	Clean condenser dust
7 Compressor head is hot and less return gas in the suction line	Low gas	Charge gas
	High gas	Purge gas to maintain the suction and discharge pressure
	Expansion device block	Clean the block
	Hot gas bypass valve opened more	Close the hot gas by pass valve
	Inlet temperature high	Clean the after cooler
	Inlet flow rate high	Correct the flow rate

Trouble	Root cause	Solution
8 Pressure drop against the dryer or no air at the outlet	Inlet compressed air flow higher than the rated	Correct the flow rate
	Dewpoint less than 1^0C	Increase dewpoint setting
	Demister element choke	Clean or replace the demister element
9 Water at the outlet	Inlet compressed air flow higher than the rated	Correct the flow
	Inlet compressed pressure lower than the rated	Correct the pressure
	Inlet temperature is higher than the rated	Correct the temperature
	Demister drain valve is not working	Service or replace the drain valve
	Air inlet and outlet connected wrongly given	Correct the connection
	Bypass line partially open	Close the bypass valve properly

Contact your authorised service center for any assistance.

11. Recommended spares for 5 years trouble free operation

Sl. No.	Description of Spares	Qty
1	Dew point temperature controller with sensor	1 No.
2	High Pressure Gauge	1 No.
3	High Pressure Switch (Fan Control)	1 No.
4	Gas cylinder (6 Kg)	1 No.
5	Auto drain valve seal kit	1 Set
6	Auto Drain Timer	1 No.
7	Ref. Compressor	1 No.
8	Compressor Electrical Accessories	1 Set
9	Hot gas Bypass Valve	1 No.

TRIDENT

WARRANTY

Products of Trident Pneumatics Pvt Ltd are guaranteed to be free from defects in materials and workmanship when installed and operated in accordance with the instructions outlined in the Instruction Manual.

Trident Pneumatics Pvt. Ltd.'s obligation under this warranty shall be limited to repair or replacement (at the discretion of Trident) of defective goods returned to Trident's plant within one (1) year from the date of commissioning.

Product	:
Model	:
Serial No.	:
	:

_____

Quality Assurance Dept.

Trident Pneumatics Pvt Ltd

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TRIDENT

INSTALLATION & COMMISSIONING REPORT REFRIGERATION DRYER

1. INSTALLATION

Customer :	Model :
	Sl.No :
Contact person :	Phone :
Designation :	Fax :

i) Installed at	Before / After receiver
ii) Inlet air temperature	Normal / High
iii) 1000mm clearance provided around the dryer	Yes / No

2. COMMISSIONING POWER ON STATUS

i) Inlet air temperature	v) Discharge pressure (Freon)
ii) Inlet air pressure	vi) Outlet pressure
iii) Amps	vii) Set pressure
iv) Voltage	viii) Drain valve settings

Installation :	Date of completion :
Commissioning :	Date of completion :

Signature & Name of installing Engineer	Dealers Signature & Seal	Customer's Signature & Seal

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