



# Compressed Air Dryer and Filtration Unit

## User Manual

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## 1. INTRODUCTION

The Air Dryer and Filtration unit is designed to provide dry clean compressed air at a controlled flow rate and pressure. The unit is intended to run on a compressed air source.

### 1.1. How it works

The Atlas Copco CD1+ adsorption dryer is a twin tower heatless regenerative desiccant dryer.

The general working principle of adsorption dryers is simple. Moist air flows over hygroscopic material (typical materials are silica gel, molecular sieves, activated alumina) and is thereby dried. The exchange of the water vapour in the moist compressed air into the hygroscopic material or “desiccant” causes the hygroscopic medium to be gradually saturated with adsorbed water.

The desiccant needs to be regenerated regularly to regain its drying capacity. Adsorption dryers are typically built with two drying vessels for this reason. Only one tower is operational at a time, while the other is regenerated.

The typical dew point that can be achieved at operational pressure is  $-40^{\circ}\text{C}$ , which makes these dryers suitable for providing very dry air for more critical applications.

The pre-filters are required to prevent contaminants in the air supply from damaging the desiccant media, reducing efficiency and shortening the service life.

The air dryer is designed to be used for both individual or multiple instrument installs. If the intended use is for multiple instruments additional steps should be taken to maintain appropriate purge rates to all instruments. See Appendix 4 for a system diagram.

## 1.2. Components – External

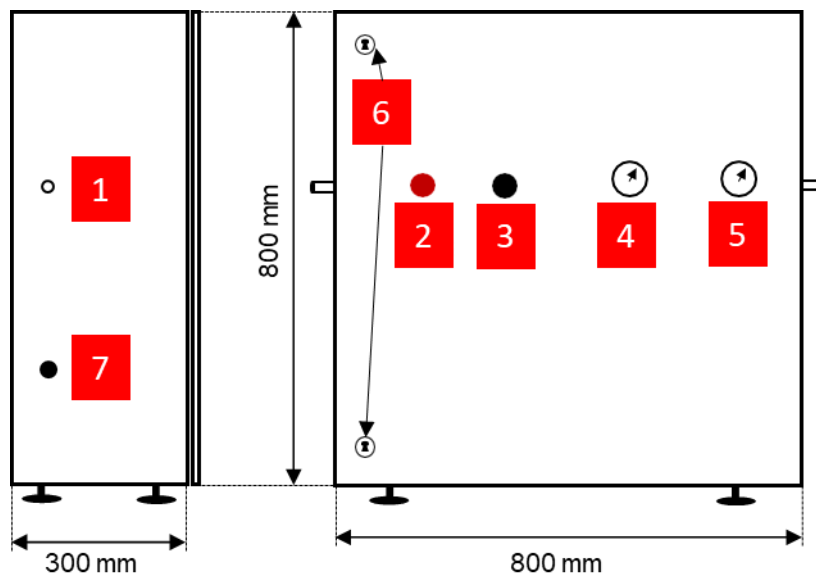


Figure 1: Cabinet Left Side and Front Exterior

### 1. Air inlet

Inlet pressure: 6-10 bar

Flow rate: ≤60 litres/minute

Fitting: ¼" BSP female (¼" NPT adaptors supplied)

Minimum inlet air quality: ISO 8573-1 Class 5.-.4

### 2. Emergency stop button

### 3. Power switch

### 4. Inlet pressure gauge

### 5. Outlet pressure gauge

### 6. Locks

The cabinet must be locked to maintain its IP rating.

### 7. Mains power input gland

Input power: 230 VAC or 110 VAC. Customer must wire power cable.

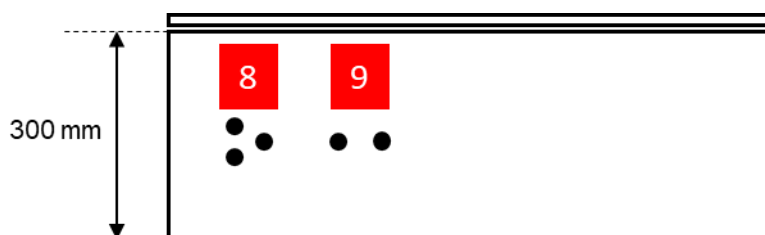


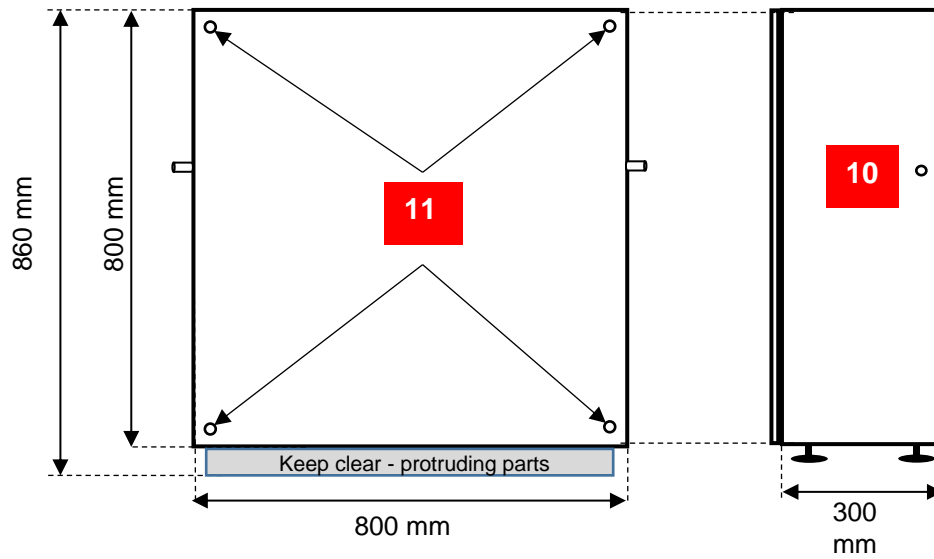
Figure 2: Cabinet Bottom Exterior

### 8. Oil and water drains

Do not obstruct the drains.

### 9. Muffler valves

The unit will vent at timed intervals during normal operation. Do not obstruct the muffler valves.



**Figure 3: Cabinet Back Exterior and Right Side**

**10. Air outlet**

1/4" BSP female fitting. ( 1/4" NPT adaptors supplied)

**11. Rear through holes for wall mounting**

Ø 9 mm. Keit recommends wall-mounting the unit, but it may also be free-standing on the provided feet.

### 1.3. Components – Internal



Figure 4: Internal view

- 12. Mist separator AFD30**
- 13. Shut-off valve**
- 14. Filter (5µm) with inlet pressure regulator AW30**  
The regulator is factory set to 10 bar. Do not adjust.
- 15. Coalescing filter**  
rough filtering of oil aerosol & wet dust
- 16. Coalescing filter PD3**  
fine filtering of oil aerosol & wet dust
- 17. Desiccant Dryer CD1+**  
removal of moisture
- 18. Activated carbon filter**  
removal of oil vapour
- 19. 24 V power supply**  
supplies item 13
- 20. 110 V-230 V transformer**  
(model-dependent)
- 21. Outlet flow regulator**  
0-30 litres/min; factory set to 2 L/min
- 22. Outlet pressure regulator**  
Factory set to 1 bar-g.
- 23. Frost protection**  
Factory-set thermostat. Do not adjust.

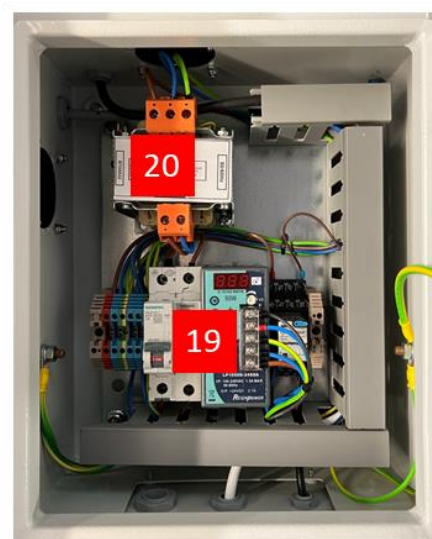


Figure 5: Electrical enclosure

## 2. USING THE DRYER

### 2.1. Starting the unit

1. Close the outlet flow control valve (10).
2. Connect the unit to a single-phase power supply (7) and to your compressed air supply (1).
3. Check that air is not venting through the drain valve (8). If the initial pressure is too low or if the pressure is increased too slowly, the spring valve on the mist separator will not close, so air will be vented through the drain valve. If this is the case, block the drain for a few seconds; this should allow the spring valve to close.
4. Turn the unit on using the front panel switch (3).
5. Ensure that the inlet pressure gauge (4) reads the between 6 and 10 bar. The recommended pressure is 7 bar.
6. Leave the unit running for a minimum of three hours. This will ensure that the desiccant has regenerated, and the air outlet is dry.
7. Open the outlet flow control valve (10). Do not connect your spectrometer to the outlet valve at this point.
8. Set the outlet flow rate such that each spectrometer connected to the unit will receive (2.5 +/- 0.5) L/min, do this by opening the flow regulator (21). Take note of the flow rate set. For example, 6 spectrometers require a flow of 15 L/min.
9. For a single unit installation, connect the spectrometer to the dryer outlet (10) using Ø4 mm stainless steel or PTFE tube.  
For a multi-unit installation, connect your air drier to a manifold with an appropriate number of outlets. Connect to each spectrometer individually with Ø4 mm stainless steel or PTFE tube via a flow controller and balance the flow rate to each system so they each receive the recommended 2 litres/minute. See Appendix 4 for a system diagram.
10. Confirm that the measured flow rate is as set in step 8. If not, adjust the outlet flow control valve (21).
11. Close and lock the panel doors (6).

### 2.2. During regular use

The reservoirs on the mist separator (12) and 5µm filter (14) will gradually fill up as water is condensed out of the air. Periodically, check that the glass bulbs are not full. If the bulbs do fill up, turn the unit off using the front panel switch (3) and disconnect or isolate the air supply. This will open the spring valves on the mist separator and filter and allow the water to drain through the drain valves (8).

The frequency with which the reservoirs need to be emptied will depend on the humidity of your input air.

### 2.3. Stopping the unit

1. Turn off the unit using the front panel switch (3).
2. The compressed air in the unit will vent via the muffler valves on the base of the unit (9).

### 2.4. Long-term storage

The unit may be stored for up to six months at a temperature of 0-30°C in a non-condensing atmosphere. Keit recommends storing the unit in an indoor location. Maintenance should be carried out as per the schedule (see section 3.1).

### 3. MAINTENANCE

Regular maintenance must only be carried out by a suitably qualified and experienced person. Always turn off the unit by following the instructions in section 2.3 and isolate from power and compressed air supplies before conducting any maintenance.

Contact your local Atlas Copco distributor for replacement kits. Contact [support@keit.co.uk](mailto:support@keit.co.uk) if you need help to find a local Atlas Copco distributor.

#### 3.1. Maintenance schedule

Item	Frequency	Activity
Whole unit	Monthly	Visual inspection of: <ul style="list-style-type: none"> <li>• Mist separator and 5µm filter bowls (12 &amp; 14); empty if required, see section 2.2</li> <li>• General condition</li> <li>• Pressure gauges read correct values</li> <li>• Flow regulator set correctly</li> <li>• No internal air or liquid leaks</li> <li>• Internal cables in good condition</li> </ul>
Atlas Copco line filters (15, 16, 18)	4000 hrs operation or 1 year if earlier	Replace filter elements (refer to unit for model number and contact Atlas Copco for part number(s):  Item 15: DD+ series filter kit.  Item 16: PD3 filter kit.  Item 18: QD+ series filter kit.
SMC line filters (12, 14)	4000 hrs operation or 1 year if earlier	Replace filter elements if discoloured or contaminated (refer to unit for model numbers and contact SMC to check part number(s):  Item 12: AFD30 element PN AFD30P-060AS  Item 14: AW30 element PN AF30P-060S
Atlas Copco CD1+ Dryer (17)	6 Months	Inspect; check for damaged wiring or air leaks
	6000 hrs operation or 1 year if earlier	Replace silencers; refer to unit for model number and contact Atlas Copco for part number(s).
	12,000 hrs operation or 2 years if earlier	Replace desiccant cartridges.
	24,000 hrs operation or 4 years if earlier	Replace exhaust valve diaphragm and solenoid valves.  Replace shuttle valve (also called selector valve).

For instructions on how to replace individual components, please refer to the user manuals for the individual components. The manufacturers' part numbers for the components can be found in section 5.

While undertaking maintenance on the compressed air dryer and filtration unit, the accompanying spectrometer measurements may drift due to increased humidity levels. Please see the section on "Purging the IRmadillo" in the relevant spectrometer user manual for more information on purging and stabilisation period.

## 4. TECHNICAL SPECIFICATIONS

Power Supply	Value
Voltage (Standard)	230 VAC
Voltage (Option)	110 VAC
Recommended Supply Type	Single phase, 13 A
Approximate Maximum Load	100 W
Recommended Fuse	5 A

Limits	Units	Min	Recommended	Max
Compressed air inlet pressure	Bar(g)	6	7	10
Ambient temperature	°C	-10	-	55
Inlet compressed air temperature	°C	1.5	35	60
Inlet compressed air humidity	%RH	0	-	100
Inlet compressed air flow	litres/min	-	-	60

Compressed Air Quality to ISO 8573-1	Particulate	Water	Oil
Inlet compressed air quality - minimum requirement	5	-	4
Outlet compressed air quality	1	2	1

Other	Value
Dimensions	H800 x W800 x D300 mm
Panel IP rating (doors shut and locked)	IP54 (Nema 3)
Siting requirements	Avoid direct sunlight

## 5. LIST OF PARTS

Refer to the parts list checklist attached to the inside of the door to confirm the following (expected) part numbers:

DFU01 Parts List	Part No.
Atlas Copco Dryer CD1+ with PD3 (G1/4")	CD1320002
Atlas Copco Filter PD3 (G1/4")	PD3320002
Atlas Copco DD+ series, Coalescing filter (G1/2")	See part
Atlas Copco CD1 Mount Bracket	CDBR261802
Atlas Copco QD+ series, Activated carbon filter (1/2")	See part
SMC Mist Separator G1/4"	SMAFD30
SMC 3/2 Valve G3/8" 24Vdc Modular	SMVP517Y
Flow Controller (1 l/min)	2510A4A40BVBN
Filter/Reg G1/4 (Auto drain) square gauge	SMAW30
Regulator G1/4"	SMAR20
Heater & Thermostat Control - 40W	1FT-TUHE-STAT
Electrical Enclosure H186 x W120 x D126 (230V Small)	EUMC18CD-230
Power Supply - 40v-24VDC 2.5A	OMPS230-24
Relay - 24CDC	RERN2-2012
Breaker -Europa B2 230V	EUBRB2-230
Breaker -Europa C6 230V	EUBRC6-230
Large Internal Enclosure (110/230V Transformer)	EUMC65C-110
Transformer 110V/230V 100W (100VA)*	110-230-BT58711

\*Transformer is fitted to 110 V models only.

## 6. WARRANTY

The manufacturer's warranty lasts 12 months from the date of shipment.

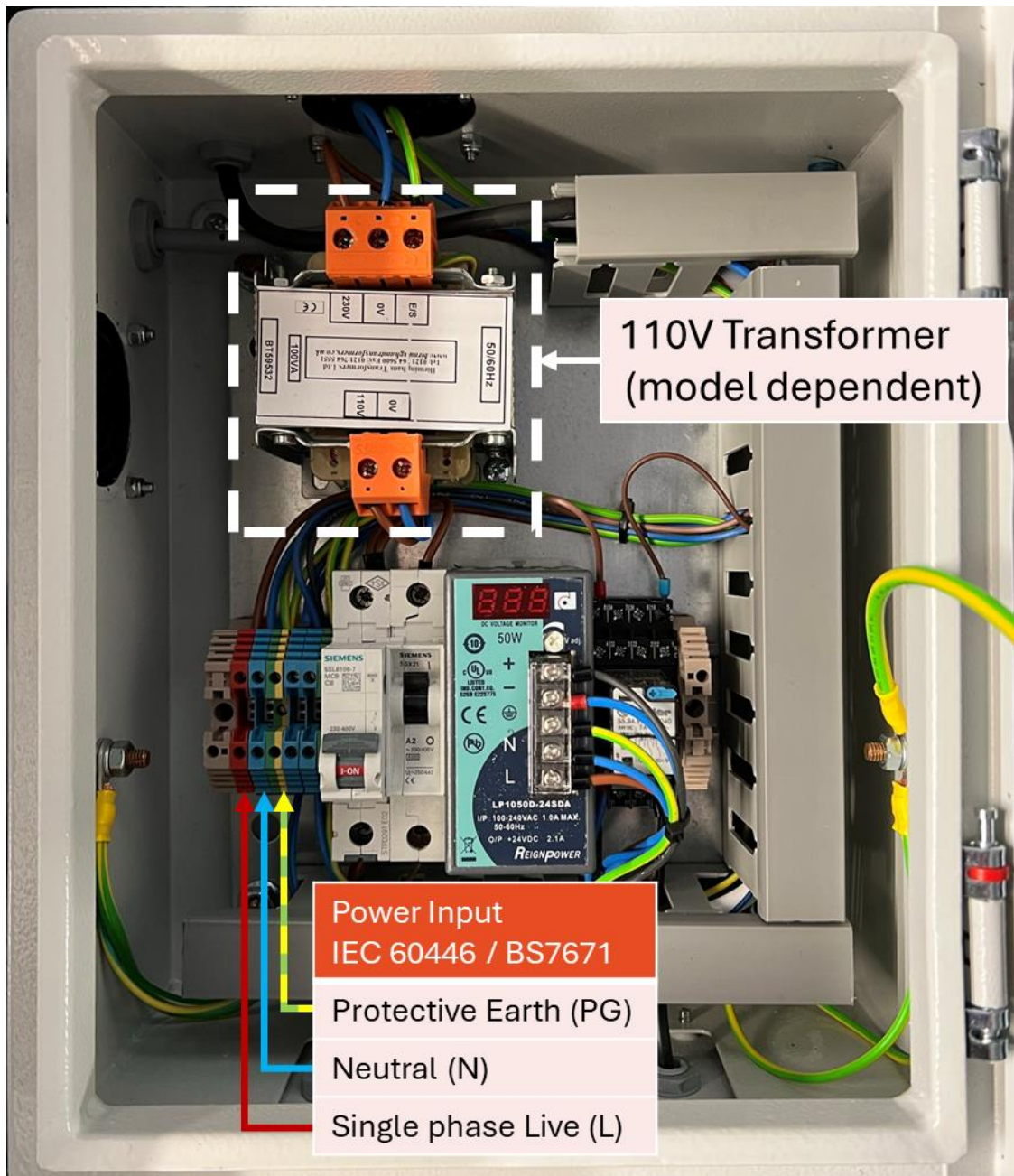
Warranty is on a return to manufacturer basis although the major components are covered globally by the respective manufacturers via local distributor networks.

Find your nearest distributor or service centre via the manufacturers' websites:

Atlas Copco: <https://www.atlascopco.com/en-uk/sys/in-your-country>

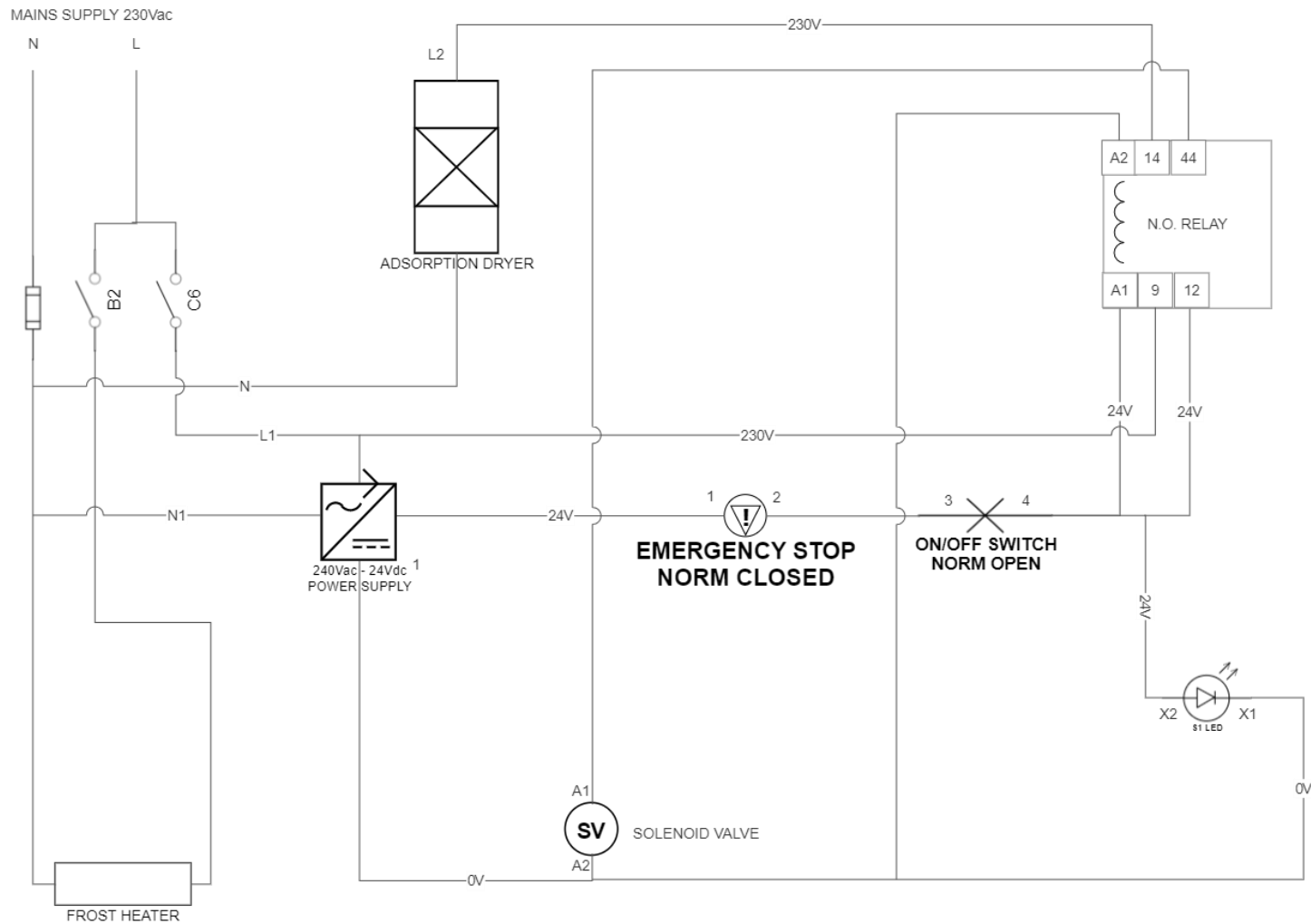
SMC Pneumatics: <https://www.smc.eu/en-gb/worldwide-addresses>

## 7. APPENDIX 1 – ELECTRONICS ENCLOSURE DETAIL VIEW

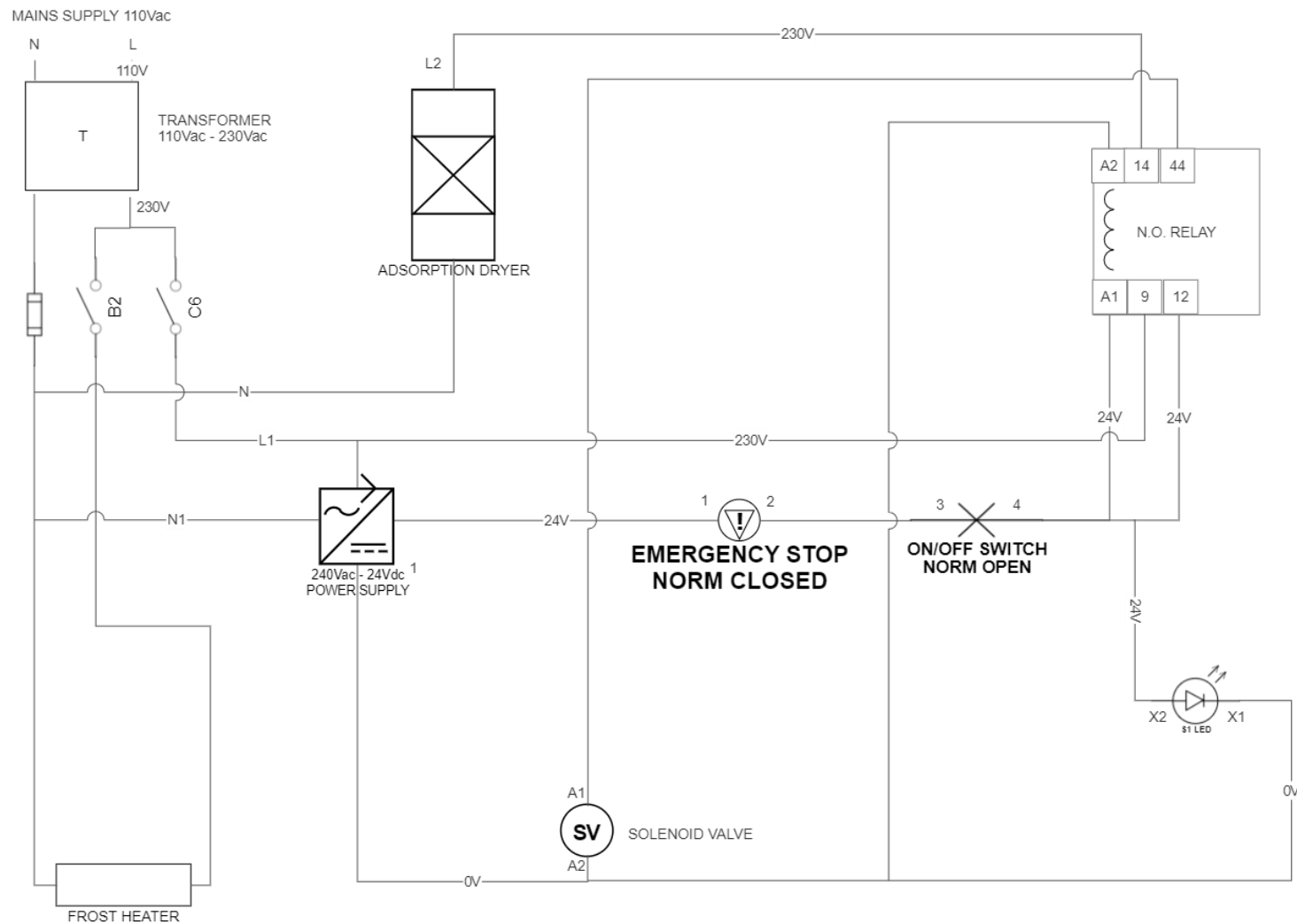


**Figure 6:** single phase power should be connected via the labelled connectors for both 110V and 240V models.

## 8. APPENDIX 2 – CIRCUIT DIAGRAM FOR 230V VERSION



## 9. APPENDIX 3 – CIRCUIT DIAGRAM FOR 110V VERSION



## 10. APPENDIX 4 – PURGE SETUP FOR MULTIPLE INSTRUMENTS

Example using a manifold with X instruments.

