

Dry-Tank Technology

Operation Manual



Model: DTT-01

ASSEMBLY, OPERATION & MAINTENANCE

CE

INSTRUCTIONS

1026IM01rev0

Initial issue: August 2020

Introduction

Thank you for purchasing the Dry-Tank Technology (DTT) compressed air dryer.

Read this manual fully before use and follow the instructions carefully. This will ensure the safety of yourself and those around you, and you can look forward to your purchase giving you long and satisfactory service.

For safety operation of DTT dryer, read thoroughly and follow stated safety instructions, as well as regulations stated within ISO 4414*¹ & JIS B 8370*².

*¹) ISO 4414: Pneumatic fluid power – Recommendations for the application of equipment to transmission and control systems.

*²) JIS B 8370: Pneumatic fluid power – General rules relating to systems

Guarantee

This product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt which will be required as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission. This guarantee does not affect your statutory rights.

Environmental Recycling Policy



Through purchase of this product, the customer is taking on the obligation to deal with the WEEE in accordance with the WEEE regulations in relation to the treatment, recycling & recovery and environmentally sound disposal of the WEEE.

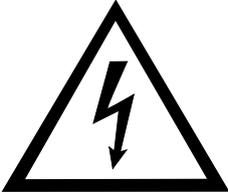
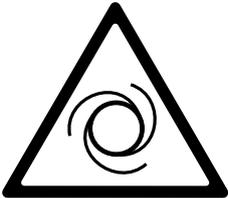
In effect, this means that this product must not be disposed of with general household waste. It must be disposed of according to the laws governing Waste Electrical and Electronic Equipment (WEEE) at a recognised disposal facility.

Safety Precautions

Before using your DTT dryer, it is in your own interest to read and pay attention to the following safety rules.

1. Compressed air is dangerous. Do not point a jet of air at a person or animal and do not discharge compressed air against the skin or eye.
2. Wear appropriate PPE when using compressed air tools, machines or processes.
3. DO NOT operate your DTT system with the fan guards removed.
4. Repairs must be carried out by a qualified engineer. If problems occur contact AGISEN Ltd.
5. Before carrying out maintenance, make sure that the pressure is released and that the DTT system is disconnected from the electrical supply.
6. DO NOT adjust or tamper with the safety valves. The maximum pressure of operation is clearly marked on the DTT system.
7. DO NOT operate in wet or damp conditions. Keep the DTT system dry at all times. Do not use in dusty or otherwise dirty locations.
8. Some of the metal parts can become quite hot during operation. Do not touch these until the DTT system has cooled down.
9. Read the operational instructions and set the pressure control valve (PCV) appropriately for your application/use.
10. When spraying flammable materials e.g. cellulose paint, ensure that there is sufficient airflow and keep clear of any sources of ignition.
11. DO NOT apply strain to electrical cables and make sure that the air connections between the compressor and the DTT, and the DTT and the receiver are not kinked or the flow obstructed.
12. When disconnecting the DTT from the compressor and receiver, ensure that the air supply is turned off at the outlet and vent all pressurised air from the DTT system, the receiver and any connected equipment.
13. Make sure that children and animals are kept well away from the compressor and DTT system combination.
14. Make sure that all individuals using the compressor and DTT system have had the necessary training, have read and understood the operation of the equipment and have the proper PPE.
15. Make sure that any equipment or tool used in conjunction with the compressor and DTT system, has a safe working pressure exceeding that of the maximum working pressure of the installation.
16. Be careful when assembling, operating and maintaining the DTT system that all the appropriate safety procedures have been followed.
17. Be careful when assembling the DTT as some panel edges may be sharp.
18. The DTT system has a low noise fan. However, as it is used in conjunction with a compressor, suitable noise protection should be worn.

Safety Symbols

	<p>Read this instruction booklet carefully before assembling, positioning, operating or maintaining the DTT system.</p>	
	<p>Risk of electric shock. The DTT system must be disconnected from the mains supply before removing any covers. Do not use in a wet environment.</p>	
	<p>Risk of accidental start-up. The DTT system could start automatically in the event of a power cut and subsequent reset. Do not move the DTT system while it is connected to the power or air source.</p>	
	<p>This DTT system contains surfaces which may reach a high temperature during operation. Never operate with the fan housing removed.</p>	
		<p>Wear safety goggles and ear protectors when using the DTT system in close proximity to the compressor.</p>
	<p>This DTT system, in conjunction with a compressor, produces a high sound level during operation. Ear protection should be worn.</p>	
	<p>Danger of compressed air circuit. Before replacing or cleaning parts, be sure to bleed compressed air remain inside of the product until the gauge indicates "0". If you do not do this air-bleeding, there would be the great danger of unexpected accident, such as shooting out of parts when they are being unscrewed.</p>	

Electrical Connections



WARNING: READ THESE ELECTRICAL SAFETY INSTRUCTIONS THOROUGHLY BEFORE CONNECTING THE PRODUCT TO THE MAINS SUPPLY.

Connect the mains lead to a standard, 230 Volt a.c. (50Hz) electrical supply through an approved 13-amp BS 1363 plug, or a suitably fused isolator switch. If the plug has to be changed because it is not suitable for your socket, or because of damage, it must be removed and a replacement fitted, following the wiring instructions shown below. The old plug must be discarded safely, as insertion into a power socket could cause an electrical hazard.



WARNING: THE WIRES IN THE POWER CABLE OF THIS PRODUCT ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE: BLUE = NEUTRAL, BROWN = LIVE & YELLOW AND GREEN = EARTH

Plug to BS1363/A
always fit a 3amp fuse



If the colours of the wires in the power cable do not agree with the markings on the plug.

- The BLUE wire must be connected to the terminal which is marked N or coloured black.
- The BROWN wire must be connected to the terminal which is marked L or coloured red.
- The YELLOW AND GREEN wire must be connected to the terminal which is marked E or coloured green.

We strongly recommend that this machine is connected to the mains supply through a Residual Current Device (RCD)

General Description

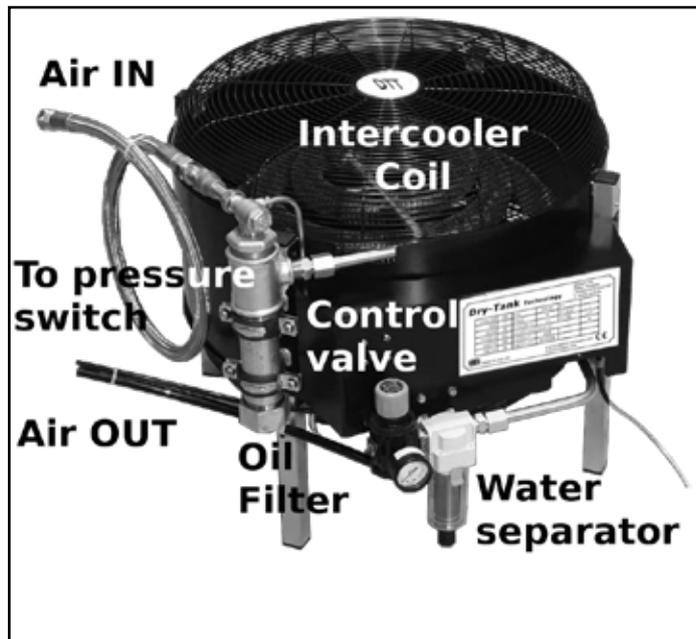


Fig.1

The DTT system is a new method of removing water from compressed air. Unlike current technology it completely isolates the compressed air while the water is removed before passing the dried air into the receiver. This means that when the system pressure drops, under high or sustained usage, that the amount of water in the compressed air does not increase. The DTT system provides a consistent level of water-free compressed air.

When compressed air is generated it is fed directly into the top of the DTT drier

through a high temperature oil filter. The air passes through a fan-cooled, high-efficiency intercooler where the water vapour in the compressed air is condensed. This liquid water flows under gravity through the intercooler and is collected in the water separator. The control valve is used to vary the amount of water removed. This enables the operator to set the most appropriate, energy-efficient level for their process or use.

The fan is controlled via a pressure switch connected to the main receiver pressure via a push-fit tee-piece. This enables partial system venting when the receiver reaches its maximum pressure and turns the fan on and off in line with the compressor pump. The system, unlike refrigerant dryers, is only operational when the compressor is on and does not need to be continually powered.

Since the DTT system does not contain any refrigerant gases it is good for the environment and its simple design makes it easy to operate and maintain. In almost all situations the unit can be cleaned and repaired by the user. The build quality and energy efficiency benefits of the system will ensure that the user has many years of liquid water-free compressed air.

More technical information regarding the operation and expected levels of water removal can be found on our website at www.dryairsupply.com

Installation: location

The product should not be used or stored in the circumstances as follows.

Those circumstances will cause not only malfunction but also failures.

- Environments where the product is exposed to rain or salt water, oil etc.
- Explosive or inflammable environments.
- Very dusty environments.
- Locations where the ambient temperature is beyond the following range:
 - On-stream: 2 to 50°C
 - In storage: 0 to 50°C (assuming there is no water in the separator)
- Location which contain high levels of electromagnetic noise.
- Circumstances where static electricity is produced can be discharged through the product.
- Circumstances where strong vibrations or impact are transmitted.
- Circumstances where the body and fan guards are subject to deformative mechanical loading.
- Locations where the grilles can be obstructed or blocked
- Locations containing strong localised high temperature areas, especially at ground level e.g. heating vents
- Locations where the contaminated water cannot be handled safely.

Installation: Siting

This section, details product specific siting instructions for the DTT system. General considerations such as power supply location, piping routing, health and safety issues and disposal issue will need to be addressed by the user in conjunction with these instructions.

Since the DTT system cools the compressed air in the heat exchanger to ambient temperature the cooler the siting environment the better the levels of water removal. Care must be taken to ensure that at no time does the temperature drop below freezing as any water in the system may freeze, potentially causing blockage and/or damage to other system parts. In all situations, the siting location should be the same or cooler than the location in which the compressed air is used. The presence of floor mounted heating vents should be avoided as this has a significant negative affect upon the performance of the system.

Since the majority of the total water content of the compressed air (78 to ~85%) is removed by the water separator suitable disposal arrangements are required.

Installation: Air piping

- The DTT unit is connected between the compressor head and the receiver.
 - The input flexible pipe is rated up to 260°C at 100 Bar. If other connection methods are utilised then the user must ensure that they have been rated for the output temperature and pressure of the compressor.
 - The output pipe from the DTT unit is a standard 12mm OD pneumatic pipe. The length of this pipe should be kept as short as possible to mitigate any whipping risk should a connector or pipe fail.
 - Bypassing the DTT is simply a matter of refitting the direct pipe connection between the head and the receiver and blocking the DTT pressure control line at the interface Tee-connector.
-

Installation: Water drain

- The DTT system is fitted with a water filter that contains an auto-drain function. When the water has reached a specific volume, a float mechanism operates the drain and the water is expelled.
- A suitable container is required to collect this contaminated water. This fluid must be disposed of in accordance with local, state and or country laws and regulations.

Installation

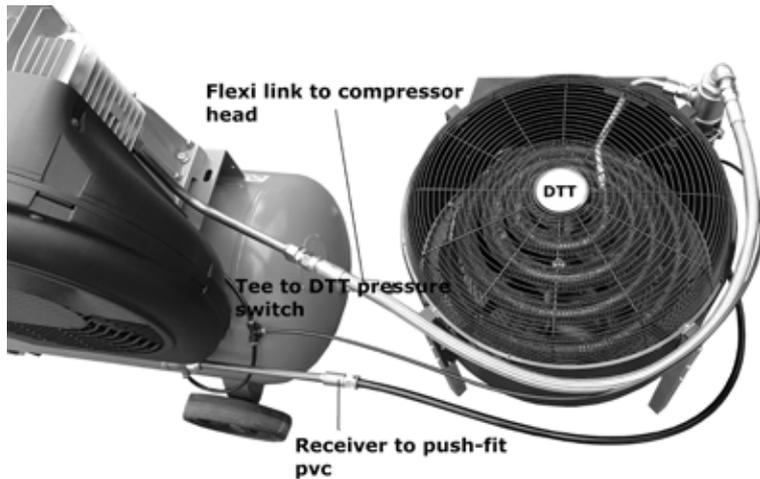


Fig.2

The complete installation can be seen in the Fig.2. The metal flexible input pipe is connected to the compressor head output via a short copper pipe. The output of the DTT is a 12mm PVC tube which is connected via a push fit connector and another short length of copper tube to the one-way valve on the receiver. The PVC tube between the receiver

valve and the compressor pressure switch is cut and a push-fit tee connector inserted. The DTT system pressure switch is connected to the other port on the tee-piece. The DTT unit can then be plugged in to the mains. The DTT is operational. The full installation sequence can be seen below.



Step 1

Identify connection between the compressor head and the non-return valve on the receiver.



Step 2

Disconnect the pipe at the receiver and the compressor head.

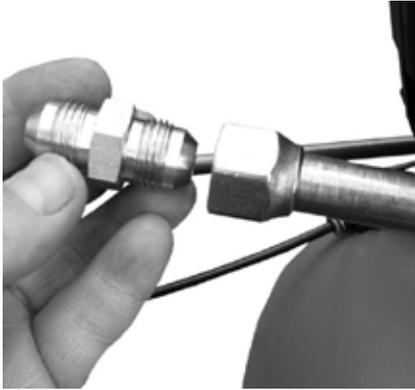


Step 3

Attach the compressor head to the intermediate pipe.

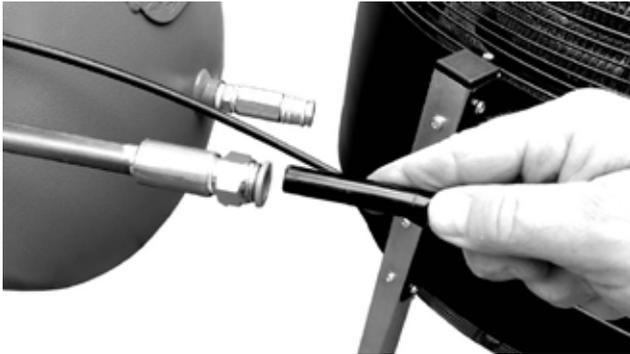


Step 4 Attach the receiver intermediate pipe (one with the push fit connector at one end).



Steps 5 & 6

Fit Male to male stud between the intermediate pipe from the head and the flexi input pipe into the DTT system.



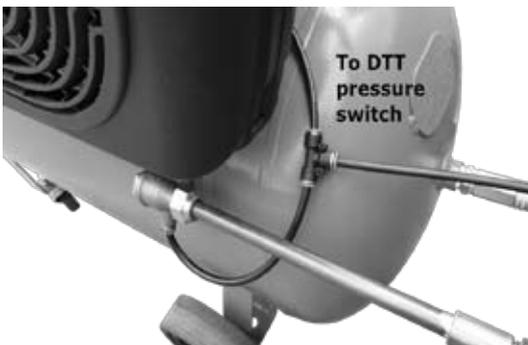
Fit the 12mm PVC pipe from the output of the DTT into the intermediate pipe connected to the receiver.

Step 7



Step 8

Cut the PVC tube connection between the receiver connection and the compressor pressure switch.



Step 9

Insert a push-fit tee and connect the pressure switch connection on the DTT.

Operation / Shutdown



Caution

No one but someone who has enough knowledge and experience about the product and incidental devices should operate or shut down the product.

Check points before operation:

- Check that all the connectors have been tightened sufficiently.
- Visual inspection of the condition of the input and output pipes.
- Visual inspection of the integrity and condition of the mains power cable and connector.
- Ensure the fan guards are in place and that the fan inlet is unobstructed.

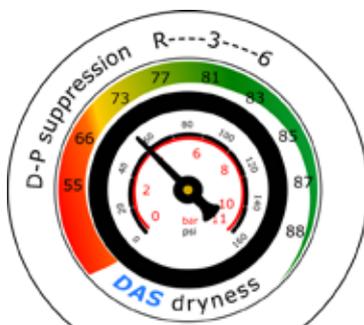
Operation & Shutdown

- Insert the power plug and turn on the main circuit.
- Switch on the unit, the power light will illuminate; the fan may start depending upon the pressure presented to the pressure switch.
- When the compressor is energised set the maximum output pressure of the system using the output pressure regulator attached to the output of the receiver.
- Set the pressure control valve on the DTT unit to a pressure equal to or greater than that set on the output regulator.
- The DTT fan will be energised and de-energised at approximately the same pressure settings as the compressor.
- After some time the water removed from the gas will be enough to trip the auto-drain and the excess water will be expelled from the system.
- The DTT system is turned off at the mains when fan-assisted drying is no longer required.
- Even with the fan switched off the DTT system is still an effective water removal device so long as the intercooler coil does not heat up significantly.
- The system is completely de-energised by removal of the power and turning the compressor off.

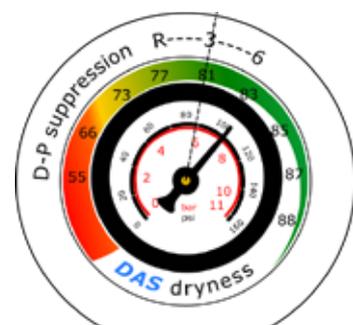
Operation: Pressure control valve

The pressure control valve arrangement consists of a central pressure gauge, reading in bar and psi, and an outer rotating bezel arrangement. When the bezel is set as described below, the pressure gauge needle indicates the percentage of water removed from the compressed air using the inner scale on the bezel (55 to 88%). The outer scale on the bezel (D-P suppression) gives a reading of the pressure dew point temperature suppression of the compressed air being produced.

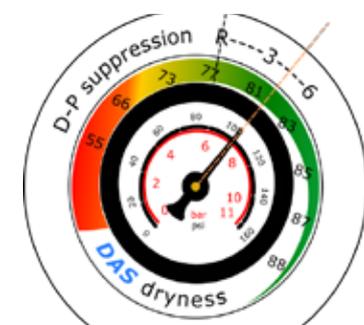
The pressure gauge will either indicate the pressure set point or, if the receiver is already at a pressure higher than the set point pressure, this value. **In order to correctly set the pressure control valve either the receiver needs to be depressurised or the push fit pipe to the receiver momentarily disconnected to vent to atmosphere.**



Since the system has a very small internal volume, a few seconds after the compressor comes on the pressure control valve will indicate its current setting. This setting is adjusted using the knob on top of the pressure control valve.



The pressure control valve adjust knob can then be turned and set to an appropriate value for the current use application. It is important that the valve is set at a higher pressure than the main receiver regulator pressure setting as this ensures complete liquid water removal and the storage of unsaturated compressed air in the receiver. Appropriate pressure setting values can be found in the following table.



The inner fixed dial surrounding the pressure gauge gives an indication of the percentage of total water removed from the compressed air, in this case ~81.5%. Turning the outer dial so that the letter "R" is opposite the pressure value set on the receiver pressure regulator will give an indication of the dew point temperature suppression. In the figure to the left, this indicates about 4.5°C, in other words the temperature in any part of the system must be 4.5°C lower than the ambient temperature before any liquid water would be condensed out from the remaining water vapor.

Operation: System Performance

When the DTT dryer cools the compressed air to ambient temperature a large quantity of liquid water is removed. The precise amount of water removed depends upon the ambient temperature and relative humidity and the pressure differential between the pressure control valve and the receiver's output pressure regulator setting. The larger the differential the greater the percentage of water removal and the greater the dew point difference (DPD). The DPD is a temperature differential BELOW the ambient temperature where liquid water will start to form. So long as no part of the air system is below this temperature (ambient - DPD) then no liquid water will be present within the system. The pressure control valve allows the user to control and DPD, depending upon the air processes used and the local environment, to obtain liquid water-free air in the most efficient and environmentally friendly manner.

% R.H.		75				50			
Ambient Temp(°C)		20		30		20		30	
%R and Dew Point Difference		%R	DPD	%R	DPD	%R	DPD	%R	DPD
Control Valve Pressure setting / (Bar(g))	7	83	4.5	83	4.9	74.7	4.5	74.7	4.9
	8	85	6.3	85	6.9	77.5	6.3	77.5	6.9
	9	86.5	7.9	86.5	8.6	79.8	7.9	79.8	8.6
	10	87.7	9.4	87.7	10.2	81.6	9.4	81.6	10.2
	11	88.8	10.7	88.8	11.5	83.1	10.7	83.1	11.5
Main receiver output pressure regulator is set at 5 Bar(g).									

% R.H.		75				50			
Ambient Temp(°C)		5		10		5		10	
%R and Dew Point Difference		%R	DPD	%R	DPD	%R	DPD	%R	DPD
Control Valve Pressure setting / (Bar(g))	7	83	4.1	83	4.2	74.7	4.1	74.7	4.2
	8	85	5.7	85	5.9	77.5	5.7	77.5	5.9
	9	86.5	7.1	86.5	7.4	79.8	7.1	79.8	7.4
	10	87.7	8.4	87.7	8.7	81.6	8.4	81.6	8.7
	11	88.8	9.6	88.8	9.9	83.1	9.6	83.1	9.9
Main receiver output pressure regulator is set at 5 Bar(g).									

Temperature at which water starts to form in the air system is given by:

Ambient temperature (°C) - DPD (°C)

Operation: Typical setting by application

The DTT dryer is designed to provide water-free compressed air. It does this by cooling the compressed air to the ambient temperature under controlled pressure. This produces unsaturated air that is pumped directly into the receiver. Setting the control pressure to a value greater than the receiver's output regulator pressure setting will guarantee liquid water-free compressed air. The greater the difference between these settings the greater the drying effect.

Since the dryer cools to ambient temperature, even if this changes, the drying effect automatically adjusts with this change to provide a consistent level of dryness.

Since the user can control the pressure control setting an optimum choice of settings can be determined for each application for which the compressed air is used. The table below gives some guidance that can be used.

Application	PCV Setting	Regulator Setting	Notes
HVLP spray guns (3 Bar max)	5 - 7	3	higher PCV setting for higher flow rate guns
Shot and grit blasting (90psi)	7.5 - 8.5	6.5	
Air riveter	7.5	6.2	
Drills and screwdrivers	7.5	6.2	
Die grinding	7.5 - 8.5	6.2	
Impact wrench	7.5 - 8	6.2	relatively low air consumption
Orbital sander	7.5 - 8	6.2	
Pneumatic actuators			Op pressure plus 1 Bar

All pressure values are referenced to 1Bar(a) i.e. are gauge pressures

Maintenance: Daily inspection

Please check the following during usual operations. If you find some problems, immediately stop the operation of the dryer and refer to the Troubleshooting section.

- There is no air leakage into, out of and through the dryer. Particularly check the connections, joints and unions.
- The ON light is operational.
- The autodrain on the water separator is functioning correctly with no air leakage when sealed.
- There is no abnormal sound or vibration from the dryer and that the fan guards have not become deformed.
- That the air passage through the bottom of the dryer is unobstructed.
- That the fan comes on when the compressor is powered.

Maintenance: Periodic maintenance

- Clean dust and other foreign particles from the fan covers with a vacuum and blow any dust off the intercooler coils.
- Check the condition of the power lead and ensure that the insulation has not been compromised or the cable clamps over stressed.

Maintenance: Service parts

There is no hard and fast service schedule for the dryer. Replacement regimes are left to the user and should be based on the frequency of operation. As an indication, the electrical components have expected lifetimes of:

- The pressure switch - One million times.
- Fan motor - 40,000 hours

	Warning
<ul style="list-style-type: none"> • Maintenance of the dryer should only be carried out by someone with sufficient knowledge and experience of air dryers and related equipment. • Before carrying out maintenance, the important warnings in this manual must be thoroughly read and understood. 	

	Danger
<ul style="list-style-type: none"> • When replacing or cleaning parts of the air dryer, be sure to remove the compressed air pressure inside the dryer. Never remove any components of the system when the dryer is operational or air pressure remains inside. It is extremely dangerous as parts may come flying off at speed or whip around or other unexpected events. • This dryer has parts that become hot during operation, especially the inlet pipework. There is a risk of burns. Ensure that before maintenance all the parts of the dryer have cooled. • The product contains mains electricity. There is a danger of electrocution. Ensure that the mains electricity has been turned off and that the mains connector has been removed. Before re-energising the system ensure that the mains switch on the DTT dryer has been turned off. Turn this switch on only after the mains has been connected and the dryer is set for operation. • When carrying out work on the auto-drain, there is a risk of coming into contact with the drain fluid. This fluid can contain skin and eye irritants, wear the appropriate PPE (gloves and eye protection). Follow the appropriate waste disposal regulations for your country. • Although all the panel edges have been deburred, there is a slight chance of being cut. Wear the appropriate hand protection. • Never use solvent based cleaners to clean the auto drain and water separator parts. 	

Maintenance: Cleaning the filters

Remove contaminants deposited in the auto-drain every month. Use a neutral detergent for cleaning. If the degree of dirt is heavy and difficult to remove replace the filter after identifying and correcting the source of contamination, reduce cleaning cycle period. The filter is cleaned in the following manner.

Step 1

- Turn the mains switch on the dryer OFF, remove mains plug from outlet.
- If a bypass valve arrangement is fitted, close the input and output valves and open the bypass valve.
- Depressurise the dryer by loosening the input coupling nut between the heat exchanger and the water separator.



Step 2

- The pressure control valve gauge indicates the pressure in the DTT heat exchanger and water filter.
- The system will depressurise naturally although this can also be accomplished by loosening the input coupling nut between the heat exchanger and the water separator.
- This nut must be retightened before the system can be pressurised.

Step 3

- The water separator body cover and bowl can be removed by sliding the locking switch upwards and twisting the body cover. The body cover is attached using a bayonet mount.
- The bowl and the bowl can now be carefully pulled downwards.
- Care must be taken to ensure that the sealing o-ring is not damaged and is replaced following cleaning.
- The cover and bowl can now be separated.



Step 4

- The water separator bowl can now be cleaned using a neutral detergent. No solvent should be used during any portion of the cleaning process as this can damage the sealing o-ring and other plastic components.
- The bowl is dried and the function of the auto-drain checked.

Step 5

- The oil filter can be drained by unscrewing the drain plug at the base of the unit. The waste oil emulsion should be disposed of properly.
- The oil filter scrubbers can be cleaned by unscrewing the bottom coupling, removing the oil scrubbing pads, cleaning them with a neutral detergent.
- Reassembly is the reverse process.



Before turning the dryer on ensure that all connectors and pipe work has been tightened sufficiently

Troubleshooting

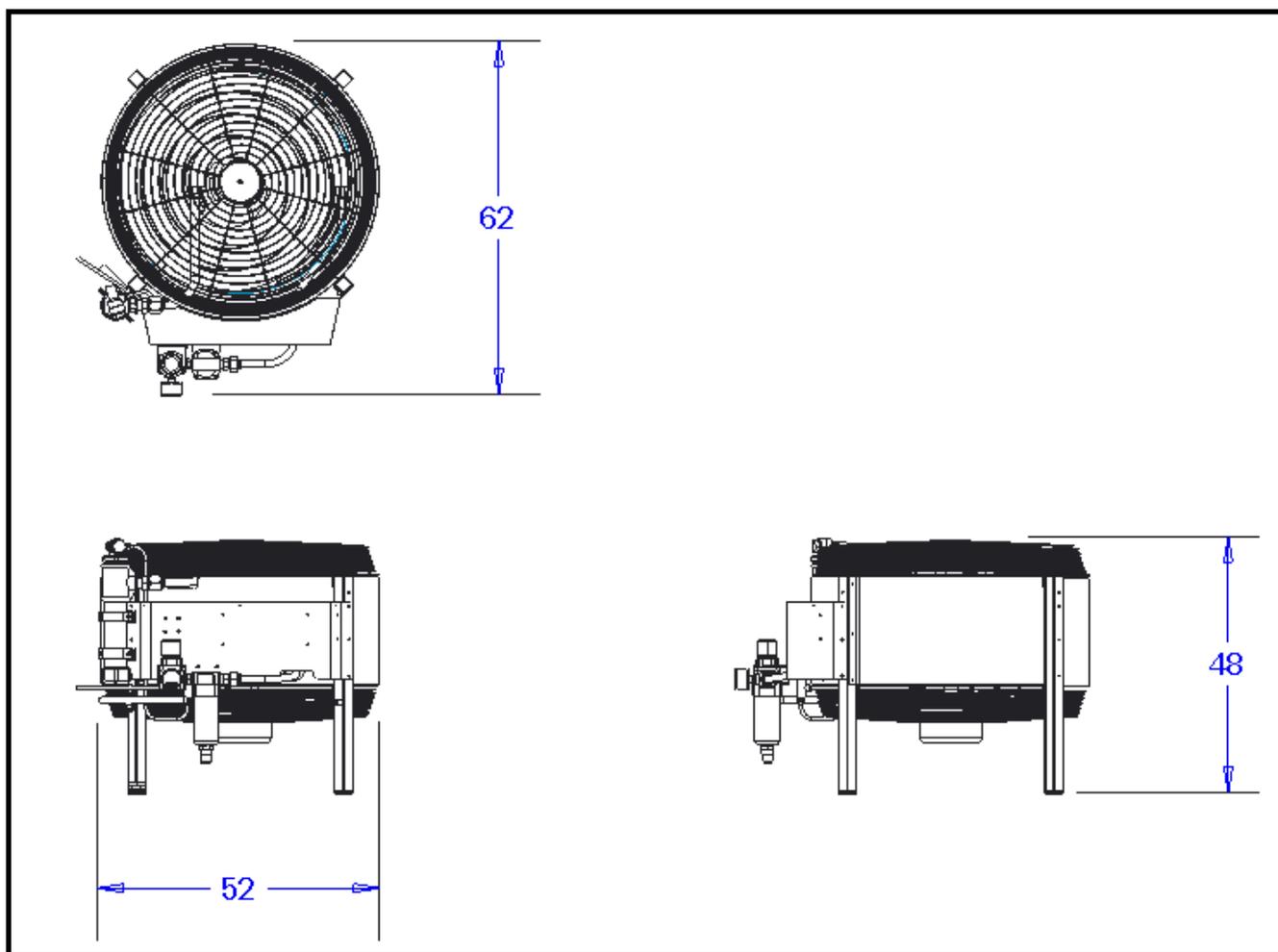
Should any problem occur, inspect the following table, and if the problem cannot be solved, shut off the power supply and then contact our Parts & Service line.

Problem	Probable Causes	Remedy
The dryer does not operate and the power lamp does not light.	Power cord or plug is not properly connected	Inspect power cord, connector and connector fuse condition (UK).
	mains power is not available.	Confirm mains power is available. If suitably qualified to do so, reset breaker or other switchgear.
The dryer fan does not energise when the compressor is running.	The fan has failed.	Replace the fan.
	The pressure switch connections are loose.	Inspect the pressure switch connections.
	The pressure switch has failed.	Run the compressor and monitor the control pressure. The fan should switch on above 2 Bar(g). If not replace the pressure switch.
The pressure control gauge indicates no or a very low reading.	There is an air leak in the dryer.	Use standard techniques to identify the source of the leak and fix. Failure of the intercooler will require a replacement.
Water can be seen at the user workstation.	The pressure control valve has not been set properly.	Re-read the section on how to set up the dryer.
	The water separator is not working correctly.	Review the water level in the water separator and ensure that the auto-drain function is working correctly. If required clean the water separator or replace.

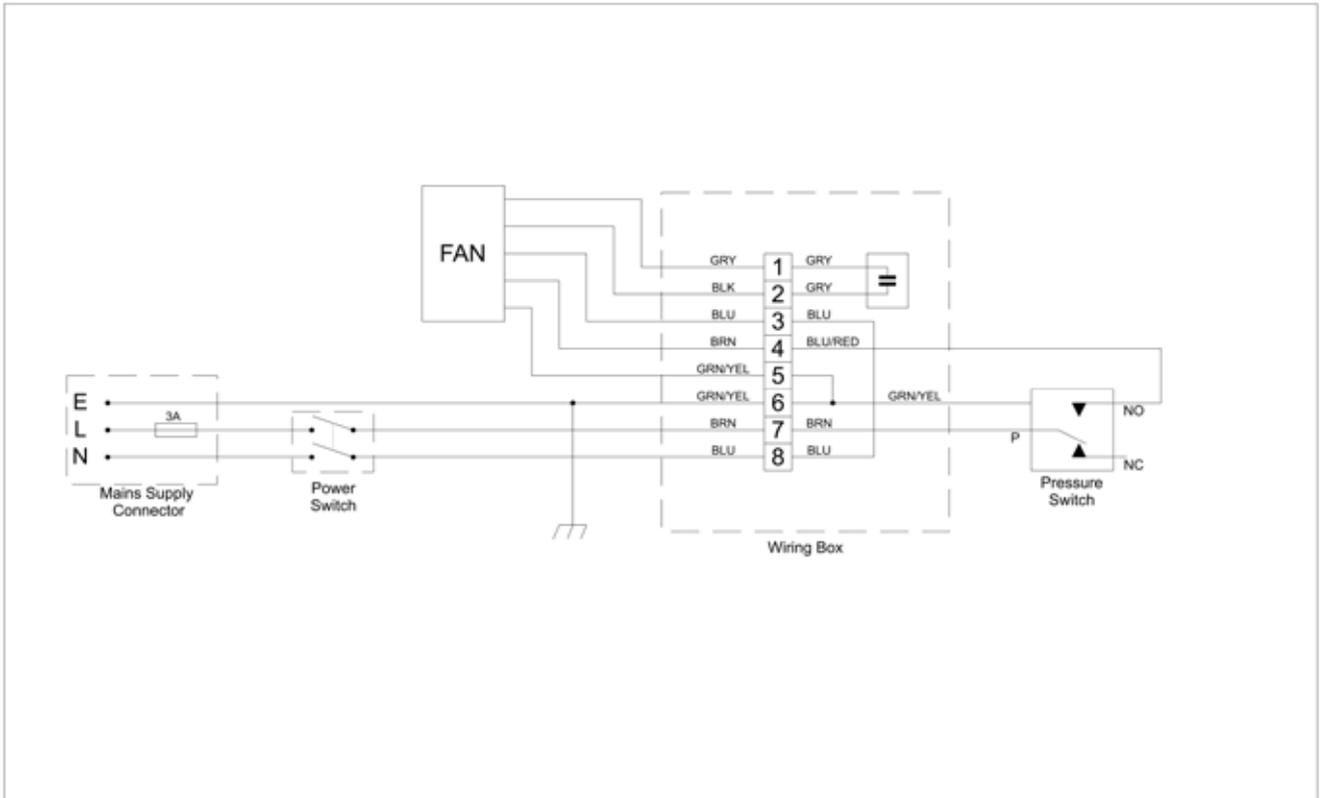
Specification

Specification: Model DTT-01		
Inlet air max temperature	120°C	*inlet flexi specified to 260°C
Inlet air maximum pressure	12 Bar(g)	
Operational environment temperature range	1 to 40°C	
Drying capability (10cfm FAD, 6 Bar(g))	2.5kW	*continuous operation
Pressure dew point suppression	0 - 6°C	*Temperature below ambient at which condensation may begin to be formed in the receiver & pressurised airlines.
Power consumption	140 W @ 230Vac	*Only consumes power when the compressor is pumping air
Dimensions (LxWxH), Mass (kg)	62 cm x 52 cm x 48 cm, 16kg	

Dimensions



Electrical circuit



Declaration of Conformity



AGISEN Limited

Worcester Drive, Melton Mowbray
Leicestershire LE13 0AT

DECLARATION OF CONFORMITY

This is an important document and should be retained

We, AGISEN limited declare that the following product(s) comply with the directive(s) and standard(s) listed below.

Product Description:	Compressed Air Dryer
Model name:	Dry-Tank Technology (Compressed air dryer)
Model number(s)	DTT-01
Serial/batch number:	N/A
Notified Body	N/A

Technical Document Holder	S.C. Murray AGISEN Limited Worcester Drive Melton Mowbray Leicestershire LE13 0AT England
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Conformity Assessment Procedure:	to 2000/14/EC Annex VI
Manufacturer:	AGISEN Limited
Noise related value:	N/A
Measured sound power level:	N/A
Guaranteed sound pressure level:	N/A

Declaration of Conformity



AGISEN Limited

Worcester Drive, Melton Mowbray
Leicestershire LE13 0AT

DECLARATION OF CONFORMITY

This is an important document and should be retained

Directive(s):

- 2006/42/EC Machinery Directive
- 2014/30/EU Electromagnetic Compatibility Directive
- 2011/65/EU Restriction of Hazardous substances

Standard(s):

EN60204-1, EN61000-6-3, EN61000-6-4

The technical documentation required to demonstrate that the product meets the requirements of the aforementioned directives has been compiled and is available for inspection by the relevant enforcement authorities.

The CE mark was first applied in: 2020

Signed:

.....
T. J. Litt
Director

Date of issue:

27/08/2020

Place of issue:

AGISEN Limited
Worcester Drive
Melton Mowbray
Leicestershire
LE13 0AT
England

