MANUAL

DRYSPELL PLUS
Desiccant compressed air dryers

Models 10, 20, 30, 45, 60, 100, 125, 200, 250, 300, 375

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Statement of conformity

- 97/23/EC - Pressurised equipment
- 89/392/CEE-Machine safety
- 89/336/CEE-Electromagnetic compatibility
- 73/23/CEE-Low voltage
- OH6629.5C-CRN
- UL-Listed, RoHS-compliance
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Section 1

Intended use

Dryspell Plus dryers are compressed air drying devices manufactured for industrial & other uses.

Water is invariably found in compressed air in the form of vapour and condensed droplets. Dryspell Plus dryers remove this water.
Section 3

Using this manual

This manual has been specially designed so that you can use your Trident Dryspell Plus dryer optimally and safely. Before you start using the filter, go through this manual thoroughly. It contains vital information regarding the installation, operation and maintenance of the dryer.

All the information, illustrations and specifications in this manual are based on the latest product information at the time of preparation of the manual. Trident reserves the right to make changes in the product at any time without notice.

Ensure that this manual is available at all times to the personnel operating your compressed air system.
Section 4

Functional description

Figure 1. View of Dryspell Plus dryer with canopy and Trident Cleansweep pre-filter. The control panel may be seen in the front, at the top. The pre-filter is fitted on the side.

The following are among the major components of your Dryspell Plus:

- Two desiccant towers
- Top and bottom blocks, including air seals and check valves
- Two solenoid valves
- Two inbuilt after-filters
- One electronic control unit and control panel
- One pressure gauge (optional)
- Two silencers
Your Dryspell Plus dryer may have an optional canopy. There may be an optional pre-filter also. If present, the pre-filter is fitted outside the dryer assembly.

![Figure 2. View of Dryspell Plus dryer without canopy](image)

The function of each of the major components is outlined in the following description of the operation of the dryer.
4.1 Description of operation

Figure 3. Schematic of Dryspell Plus dryer

Compressed air containing moisture and oil droplets enters the pre-filter. Bulk liquids are removed from the air by the pre-filter. The air then flows through the inlet shuttle valve, which diverts it to tower 1. The desiccant in tower 1 dries the compressed air to -40°F PDP as it flows through. The dried air leaves tower 1 via the after-filter. A small part (15%) of the compressed air is passed through the purge orifice by means of opening a two-way purge valve and thereby expanded till its pressure is near-atmospheric. This expansion of the already-dry gas (purge air) to near-atmospheric pressure increases its capacity to strip adsorbed water vapour from the desiccant bed in tower 2. The purge-air stream passes through tower 2, removing water vapour from the desiccant. This purge operation is carried out for 1 minute and 30 seconds. Then the purge valve is closed, and the pressure in tower 2 begins to rise again. The repressurisation is carried out for 30 seconds. The purge valve is opened, and purge air passes through tower 1.

During the first 2 minutes of each 4-minute cycle of operation, the following processes take place:

- The online tower (tower 1) dries compressed air for 2 minutes.
- The offline tower (tower 2) regenerates (adsorbed moisture is removed from the desiccant in it) for 1 minute and 30 seconds.
- The offline tower is re-pressurised for 30 seconds.

During the next half of the cycle, these processes are repeated with tower 2 being the online tower and tower 1 the offline tower.
4.2 External dewpoint control

The dryer can be optionally operated under external dewpoint control. In this optional system, a dewpoint meter is fitted at the outlet of the dryer. The dewpoint meter (1) provides an indication of the dewpoint of the dried air and (2) when the dewpoint of the dried air increases (this happens when the water vapour content of the dried air increases because the desiccant is saturated and water vapour cannot be adsorbed any more), it provides a signal to end the cycle. The air is then diverted to the other tower, which contains dry desiccant. Thus the dewpoint meter allows the moisture loading time of each desiccant bed to stretch as long as the desiccant absorbs moisture. In general, there is no fixed cycle time of 4 minutes' duration when external dew point control is used. The operating cycle with external dew point control is referred to as a stretch cycle.

4.3 Purge economiser

In practical situations, the airflow through the dryer is not maintained at the maximum flow value that the equipment is designed for. The moisture load may also vary. At such times, less purge-air may be required to remove the moisture from the desiccant in a tower. The amount of purge-air used can be reduced by reducing the regeneration time. Dryspell dryers feature a purge economising feature that can reduce the amount of purge air used by changing the regeneration time from the maximum value of 90 seconds. The purge is stopped by the purge economiser after a preprogrammed duration. However, the cycle time is maintained at 4 minutes.

The regeneration flow can be reduced in steps of 20% from 100% to 40% according to the flow through the dryer or the moisture load. The purge optimisation option may be selected from the control panel.

Control panel. The control panel is used to adjust the purge optimiser and external dewpoint control settings. The control panel in models 10, 20, 30, 45 and 60 is different from the panel in models 100, 125, 200, 250, 300 and 375.

![Control Panel DS 31-90](image)

Figure 4. Control panel of Dryspell Plus (models 10, 20, 30, 45 and 60)
Figure 5. Control panel of Dryspell Plus (models 100, 125, 200, 250, 300 and 375)
The following are found on the control panel:

- A schematic of the dryer
- Two LED indicators for each drying tower—these indicate whether the tower is drying (D) or regenerating/re-pressurising (R).
- One LED indicating the operation of the pre-filter drain (only in models 10, 20, 30, 45 and 60)

To adjust the purge flow, press the button marked 'PURGE OPTIMIZER' continuously for 8 seconds, and then set the purge flow to the required value (40%, 60%, 80% or 100%).

**Setting the Purge economizer**

Through front panel - Steady conditions

To set the purge economizer please refer the tables below:

**Inlet Pressure Correction Factor**

<table>
<thead>
<tr>
<th>psi (g)</th>
<th>60</th>
<th>80</th>
<th>100</th>
<th>120</th>
<th>140</th>
<th>160</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar (g)</td>
<td>4.1</td>
<td>5.5</td>
<td>6.9</td>
<td>8.3</td>
<td>9.7</td>
<td>11</td>
<td>12.4</td>
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<tr>
<td>Factor</td>
<td>0.65</td>
<td>0.83</td>
<td>1</td>
<td>1.18</td>
<td>1.37</td>
<td>1.52</td>
<td>1.7</td>
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</table>

**Temperature Correction Factor**

<table>
<thead>
<tr>
<th>°F</th>
<th>90</th>
<th>95</th>
<th>100</th>
<th>105</th>
<th>110</th>
<th>115</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C</td>
<td>32</td>
<td>35</td>
<td>38</td>
<td>41</td>
<td>43</td>
<td>46</td>
<td>49</td>
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<tr>
<td>Factor</td>
<td>1.35</td>
<td>1.16</td>
<td>1</td>
<td>0.85</td>
<td>0.74</td>
<td>0.64</td>
<td>0.56</td>
</tr>
</tbody>
</table>

**Dewpoint Correction**

![Dewpoint Correction Graph]
Principle

Pressure swing adsorption dryers purge 15% compressed air at 100 PSI pressure and 1000F inlet compressed air temperature. This is required to regenerate the bed of adsorbent. The requirement of purge is from basic physical laws and cannot be altered substantially. Purge loss is a function of Dew point required, Inlet air temperature, Operating pressure and rated flow. These parameters have certain values as per standards and Dryers are designed for same. The common standards are ISO 7183 or CAGI which specifies the standard inlet conditions for the dryer as air temperature 38 deg (1000F) C and pressure of 7 bar (g) (100 PSI). In practice this is very different. Further a dryer will never be used at its rated flow. When a dryer is not used at its rated capacity the purge still happens at 15% of the rated capacity. For e.g a Dryspell Plus 100 would purge 15 scfm at 7 bar irrespective of the flow through the dryer. Hence the above dryer with a 80% flow ie 60 scfm would still be purging 15 scfm making the actual purge loss to 25%. This is a common problem with all dryers. Dryspell plus series dryers come with a front panel purge economizer. Select the Purge economiser switch and the purge flow is correspondingly reduced. This is done changing the purge time. The purge flow requirement is governed by the Flow rate, Inlet air temperature, Air pressure and dew point.

Purge optimizer setting = Percentage of rated flow/ (Pressure correction factor * temperature correction factor * Dew point correction factor) e.g In a given system the Pressure is 120 PSI, Temperature is 1000F, Dew point requirement is -400F and flow is 80% of rated flow.

Purge optimizer setting = 80/(1.18 x 1 x 1.15) = 58.9 =60%. This saves 40% of purge air. When conditions are not known or stable set purge optimizer at 100% to ensure dew point.

Through Dewpoint controller - Dynamic Conditions The second method of saving purge is to interface the Dryspell controller with a dew point switch. A potential free contact of the dew point switch is connected to the controller terminals. The controller purges correct quantity of air and stops purging. It remains at this state till the dew point at the outlet of the dryer falls below the set value. At this point the controller changes over to the fresh desiccant tower and starts purge to regenerate the saturated tower. With this interface highly fluctuating load, varying temperature and pressure can also factored to save purge air. Please refer user manual for terminal details. This interface also guarantees dew point.
Section 5

Technical specifications

5.1 Recommended ratings

Pre-filter rating : 0.01 micron (coalescer)

After-filter rating (built-in) : 25 microns (within the diffuser screen or compactor plate)

5.2 Physical description

<table>
<thead>
<tr>
<th>Model</th>
<th>Height (mm)</th>
<th>Width (mm)</th>
<th>Depth (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryspell Plus 10</td>
<td>1038</td>
<td>330</td>
<td>150</td>
<td>21</td>
</tr>
<tr>
<td>Dryspell Plus 20</td>
<td>963</td>
<td>371</td>
<td>213</td>
<td>29</td>
</tr>
<tr>
<td>Dryspell Plus 30</td>
<td>1227</td>
<td>371</td>
<td>213</td>
<td>39</td>
</tr>
<tr>
<td>Dryspell Plus 45</td>
<td>999</td>
<td>497</td>
<td>313</td>
<td>49</td>
</tr>
<tr>
<td>Dryspell Plus 60</td>
<td>1192</td>
<td>523</td>
<td>313</td>
<td>61</td>
</tr>
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<td>Dryspell Plus 100</td>
<td>1603</td>
<td>439</td>
<td>372</td>
<td>106</td>
</tr>
<tr>
<td>Dryspell Plus 125</td>
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<td>439</td>
<td>372</td>
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<td>214</td>
</tr>
<tr>
<td>Dryspell Plus 250</td>
<td>1925</td>
<td>449</td>
<td>582</td>
<td>238</td>
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<tr>
<td>Dryspell Plus 300</td>
<td>1615</td>
<td>457</td>
<td>764</td>
<td>256</td>
</tr>
<tr>
<td>Dryspell Plus 375</td>
<td>1925</td>
<td>457</td>
<td>764</td>
<td>286</td>
</tr>
</tbody>
</table>

5.3 Operating conditions

Maximum pressure : 16 bar g (225 psi g)
Rated operating pressure : 7 bar g (100 psi g)
Rated operating temperature : 38°C (100°F)
Cycle time : 4 minutes
Purge loss : 15%

5.4 Power

Voltage : 100-240 V AC, 50/60 Hz, 1 phase
Maximum power consumption : 20 W
Length of power cord : 10 feet * (Optional for US suppliers only)
5.5 Capacity

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal inlet flow (cfm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryspell Plus 10</td>
<td>10</td>
</tr>
<tr>
<td>Dryspell Plus 20</td>
<td>20</td>
</tr>
<tr>
<td>Dryspell Plus 30</td>
<td>30</td>
</tr>
<tr>
<td>Dryspell Plus 45</td>
<td>45</td>
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<tr>
<td>Dryspell Plus 60</td>
<td>60</td>
</tr>
<tr>
<td>Dryspell Plus 100</td>
<td>100</td>
</tr>
<tr>
<td>Dryspell Plus 125</td>
<td>125</td>
</tr>
<tr>
<td>Dryspell Plus 200</td>
<td>200</td>
</tr>
<tr>
<td>Dryspell Plus 250</td>
<td>250</td>
</tr>
<tr>
<td>Dryspell Plus 300</td>
<td>300</td>
</tr>
<tr>
<td>Dryspell Plus 375</td>
<td>375</td>
</tr>
</tbody>
</table>

5.6 Air inlet conditions

Rated operating temperature : 38°C (100°F)
Rated operating pressure : 7 bar g (100 psi g)
Oil should be less than 2 ppm
** As per ISO 7183 option B rated condition

5.7 Air outlet conditions

-40°C (-40°F) PDP (ISO 8573-1:2010 (E) Class 2)
Section 6

Installation

6.1 General
- Make sure that the dryer is not close to any equipment that does not comply with EU directive 2004/108/EC (relating to electromagnetic compatibility) and that may affect the operation of the dryer.
- Do not drop the dryer or lift it by the piping or control panel. Doing so may damage the dryer.
- Ensure that the dryer is installed in the vertical position.

6.2 Location
- Install the dryer in a closed, clean, dry room protected from freezing.
- Access to the room should be restricted to personnel qualified in the maintenance and operation of Dryspell Plus dryers.
- 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 (109°F).

6.3 Layout
- There must be a minimum distance of 3 feet between the dryer and any other equipment around it that uses electricity.

6.4 Air line

![Bypass arrangement to be provided on air line](image)

- Install a system of bypass valves between the dryer inlet and outlet as shown in Figure 6 so that the dryer can be serviced without having to interrupt the compressed air supply from the circuit.
- If the dryer has been bought without a pre-filter, install a suitable filter ahead of the dryer.
- The upstream and downstream valves must be closed during installation.

6.5 Manpower required
- One skilled technician.

6.6 Tools required
- Standard tool set.

6.7 Procedure
- Secure the dryer by bolting it down.
- Connect a drain line to the pre-filter.
- Check for leaks after all connections have been made.
Section 7

Operation

⚠️ Warning: Dryspell Plus dryers are designed and manufactured for drying compressed air. Under no circumstances should they be used to dry any other gases.

⚠️ Warning: The adsorbents used in the dryer are non-toxic. However, they may cause respiratory problems if they are inhaled as dust. The use of dust masks is sufficient to protect personnel.

⚠️ Warning: This dryer should be used for drying only filtered compressed air. Ensure that the air supplied to the inlet of this air dryer is filtered. Failure to follow this instruction can lead to serious injury or death.

7.1 Do's and don'ts
- Do not turn on or operate the dryer if there is a leak.
- Make sure that the dryer's protection rating matches the conditions at your installation
- Verify that the voltage of the power supply matches the voltage marked on the data label
- Do not operate the dryer at pressures above the maximum allowable limits marked on the data label. This label is found on the leg of the dryer

![Figure 7. Name plate of Dryspell Plus dryer](image)

7.2 Turning the dryer on
Always pressurise the dryer before powering it up:
- Make sure that the power supply to the dryer is turned off
- Open the bypass valve and close the outlet valve
- Open the inlet valve and pressurise the dryer
- Open the outlet and close the bypass valve
- Turn on the power to the dryer
7.3 Running
The LEDs on the control panel light up as shown in the accompanying table.

<table>
<thead>
<tr>
<th>Lighting sequence of LEDs on control panel during a 4-minute cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage of cycle</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>D R D R</td>
</tr>
<tr>
<td>I (90 seconds)</td>
</tr>
<tr>
<td>II (30 seconds)</td>
</tr>
<tr>
<td>III (90 seconds)</td>
</tr>
<tr>
<td>IV (30 seconds)</td>
</tr>
</tbody>
</table>

Caution: Each time that a regeneration tower depressurises, a loud noise is produced. This occurs every 2 minutes.

In dryer models with pre-filters and electronic auto-drains, every 4 minutes, the valve at the bottom of the pre-filter opens automatically and discharges condensate for 4 seconds.

The cycle times are fixed and cannot be adjusted by the user.

7.4 Shutting down
Follow this procedure when shutting the dryer down:

- Open the bypass valve.
- Close the inlet valve.
- Close the outlet valve.
- Turn off power to the dryer.
Section 8

Maintenance

⚠️ **Warning:** Only experienced and licensed electricians who are trained to handle compressed air systems should service or repair Trident products.

Adsorption dryers are robust, reliable machines. To ensure uninterrupted, problem-free operation, perform the inspections described in the following sections at the specified intervals.

In this section, the item codes of the various parts of the dryer are marked on the respective illustrations. Refer to the list of spares (Section 11. Recommended parts and consumables) in this manual for details. Cite the item codes when obtaining spares.

Before starting up or performing any maintenance on any Trident air dryer, filter, drain system or other equipment, you must first turn off and disconnect the electrical power supply to the equipment at the main switch. Also, be sure to bypass and depressurise the dryer to 0 psi g.

8.1 Monthly inspections

- Verify that the drying-and-regeneration cycle is normal (as described in the section 'Running' in the chapter 'Operation'). If it is found that the operating cycle is not normal, use the troubleshooting section of this manual (Section 10. Troubleshooting) to address the problem.
- Verify that the silencers are not clogged. There will be no air flow through a silencer that is clogged. A clogged silencer must be replaced with a new silencer. The silencer may be removed by unscrewing it. Fit the new silencer on the exhaust valve and tighten it.

8.2 Semi-annual inspections

- Verify that the dryer is cycling normally.
- Verify that the silencers are not clogged.
- Replace clogged silencers with new silencers as described under 'Monthly inspections'. Replace the filter elements of the filters.

8.3 Annual inspections

- Verify that the dryer is cycling normally as described in this manual.
- Verify that the silencers are not clogged. If any silencer is clogged, replace it with a new silencer.
- Replace the filter elements of the filters.
- Inspect and determine the state of the desiccant. If the desiccant is brown (this indicates oil pollution) or if there is a lot of dust in the desiccant (this condition is caused by disintegration of the desiccant), then change the desiccant (see following section).
- Replace the O-rings of the top and bottom blocks.

Note: The compressor and the dryer must be shut down when the state of the desiccant and the state of the O-rings are inspected. It is recommended that all personnel present wear dust masks when desiccant is replaced.
8.4 Replacing the desiccant
In models 10, 20 and 30, the towers must be filled directly with desiccant. In all other models, desiccant bags must be used. The graphic here explains which procedure applies to your model, the item code to be cited when ordering the desiccant and the quantity required.

![Figure 8. Changing the desiccant in the Dryspell Plus range of models-types of filling, item codes and quantities of desiccant required](image)

8.5 Service procedures
The procedures to be followed for servicing/replacement of sub-assemblies in Dryspell Plus dryers are described in this section. Servicing/replacement must be carried out when there is failure of the respective parts and if found necessary during the monthly, semi-annual and annual inspections.
8.5.1 Dryspell Plus model 10

Reference: Manual Version
8.5.1.1 Changing the desiccant

Figure 9. Changing desiccant-Dryspell Plus model 10

- Using a screwdriver, disconnect the controller wire from the exhaust solenoid valve and prefilter solenoid valve
- Remove the dome nuts and M8 washers
- Remove the top chamber with the filter and controller
- Discard the O-ring (55.4 mm * 4 mm)
- Discard the top diffuser screens (two)
- Remove the tower assembly. (The bottom screen fits tightly in the bottom assembly)
- Discard the O-ring (55.4 mm * 4 mm).
- Detach the bottom diffusers by pushing them using the rod passing through the tower. Discard the bottom diffusers.
- Empty the desiccant in the tower.
- Fill the desiccant tower with Activated alumina CD067A and then Molecular sieves CC447
- Replace the discarded parts with corresponding new components. Reassemble all the parts. Tighten the screws and dome nuts
8.5.1.2 Servicing the bottom shuttle

- Remove the chamber base plug (use spanner no. 21)
- Remove the chamber base plug O-ring (10 mm * 2.62 mm). Discard the ring
- Replace it with a new O-ring (10 mm * 2.62 mm)
- Pull out the chamber base nozzle using an M6 * 25 bolt
- Remove the nozzle O-rings (15.4 mm * 2.21 mm, two) and discard them
- Clean the chamber base nozzle and replace the two O-rings (15.4 mm * 2.21 mm, two)
- Remove the shuttle and discard it
- Replace it with a new shuttle
- Coat the nozzle and all the O-rings with food-grade grease
- Fasten an M6 * 25 bolt in the chamber base nozzle and draw the bolt out
- Secure the chamber base plug with O-rings (15.4 mm * 2.21 mm and 10 mm * 2.62 mm)
8.5.1.3 Servicing the exhaust valve

- Using a no. 38 spanner, remove the plug at the bottom of the assembly. Clean the plug
- Discard the O-ring (31.6 mm * 2.4 mm)
- Discard the spring and poppet assembly
- Using a 5 mm Allen key, remove the four socket head cap screws
- Remove the top cover
- Discard the gasket
- Push the piston assembly from below
- Discard the piston O-ring (28.17 mm * 2.62 mm)
- Clean the piston and install a new O-ring (28.17 mm * 2.62 mm)
- Discard the O-ring (10 mm * 2.62 mm) inside the valve body
- Coat the piston and O-ring with food-grade grease
- Reassemble the parts, replacing the discarded components with new spares
- The vent hole in the cover should be aligned with the vent hole in the housing

Figure 11. Exploded view of exhaust valve of Dryspell Plus model 10
8.5.1.4 Servicing the non-return valve

- Using a no. 38 spanner, remove the two M3 * 6.0 cheese head screws
- Clean the NRV plate
- Replace the rubber ball with a new one
- Clean the diffuser connector and re-install it
- Re-install the NRV plate and fasten the cheese head screws
8.5.1.5 Changing the inlet tube

- Using a screwdriver, disconnect the controller wire from the exhaust solenoid valve and prefilter solenoid valve
- Remove the dome nuts and spring washers
- Remove the top block
- Discard the inlet air transfer tube
- Discard the O-rings (10.6 mm * 1.83 mm)
- Replace the inlet transfer tube with a new one
- Fix the inlet tube on the bottom block with new O-rings
- Replace the top block
- Complete the reassembly with the spring washers and dome nuts
8.5.2 Dryspell Plus models 20 and 30
8.5.2.1 Changing the desiccant

- Remove the dome nut and washer
- Remove the top chamber with the filter and controller
- Discard the tower gaskets (top)
- Remove the top diffuser screens
- Remove the tower pipe assembly (The bottom screen fits tightly in the bottom.)
- Discard the tower gaskets (bottom)
- Remove the old desiccant from the tower
- Using the rods passing through the towers, push the bottom diffusers to detach them from the towers
- Fill the desiccant tower with Activated alumina CD067A and then Molecular sieves CC447. Fix new top diffusers
- Reassemble the towers in the bottom chamber. Replace the discarded components with corresponding new parts. Reassemble the top chamber and fasten with the dome nut
8.5.2.2 Servicing the bottom shuttle

- Unscrew the socket head cap screw (M8) and remove the mounting bracket of the dryer
- Remove the circlip on the end bush and discard it
- Remove the O-ring (26.5 mm * 3 mm) and discard it
- Remove the end bush
- Discard the circlip on the guide bush
- Remove the hex screw assembly
- Remove the guide bush. Discard the O-ring (21.92 mm * 3 mm)
- Remove the shuttle and discard it
- Remove the shuttle guide and clean it. Discard the O-ring (21.92 mm * 3 mm)
- Apply grease on the various parts
- Reassemble the parts of the assembly, replacing the discarded parts with new components
8.5.2.3 Servicing the exhaust valve

- Using a no. 38 spanner, remove the plug. Clean the plug
- Discard the O-ring (31.6 mm * 2.4 mm)
- Discard the spring and poppet assembly
- Using a 5 mm Allen key, unscrew the four socket head cap screws holding the valve assembly together
- Remove the top cover
- Discard the gaskets (AG012 and CD116)
- Push the piston assembly from below
- Clean the piston. Apply food-grade grease on the piston
- Discard the piston O-ring (28.17 mm * 2.62 mm)
- Discard the O-ring (10 mm * 2.62 mm) inside the valve body
- Replace the discarded components with new spares. Coat the piston O-ring with food-grade grease
- Reassemble the exhaust valve

Figure 16. Exploded view of exhaust valve- Dryspell Plus models 20 and 30
8.5.2.4 Servicing the top shuttle

- Using circlip pliers, remove the end bus circlip. Discard the circlip
- Discard the end bush O-ring
- Remove the end bush using an M6 screw
- Discard the guide bush circlip
- Draw the hex screw assembly using an M6 * 25 bolt
- Remove the guide bush and guide bush O-ring (21.92 mm * 3 mm). Discard the O-ring
- Remove the shuttle guide O-ring
- Discard the top shuttle
- Clean and replace the shuttle guide with a new O-ring (21.92 mm * 3 mm)
- Reassemble the parts. Use new parts in place of the discarded components
8.5.2.5 Changing the inlet tube

- Unfasten the dome nuts, and remove the washers
- Remove the top block with the filter and controller
- Discard the inlet air transfer tube
- Discard the O-rings (10.6 * 1.83)
- Fix a new inlet air transfer tube on the bottom block with new O-rings
- Fix the top block
- Fasten the dome nuts with the washers
8.5.3.1 Changing the desiccant

Figure 19. Changing desiccant-Dryspell Plus model 45

Figure 20. Changing desiccant-Dryspell Plus model 60
• Remove the socket head cap screws
• Remove the top chamber with the filter and controller
• Remove the top compactor plates (two)
• Remove the old desiccant bags
• Replace the drying tower gaskets and the bottom diffuser assemblies with new ones
• Fasten the towers in the bottom by tightening the screws
• Filling the Desiccant bag assembly:

**Dryspell Plus model 45:**
Fill the desiccant bag assembly firstly with a bag of Activated Alumina AD1398 followed by a bag of mixed Activated alumina and molecular sieves AD1624 as shown in the figure 19.

**Dryspell Plus model 60:**
Fill the desiccant bag assembly firstly with 2 bags of Activated Alumina AD1398, AD1622, lastly with a bag of Molecular sieves AD1623 as shown in the figure 20
• Reassemble the top compactor plates and the drying tower gaskets
• Fix the top chamber
• Fasten it by tightening the screws

### 8.5.3.2 Servicing the bottom shuttle

![Figure 21. Exploded view of bottom shuttle-Dryspell Plus models 45 and 60](image-url)
• Remove the socket head cap screws using a 5 mm Allen key
• Remove the spring washer and the end cover
• Discard the three O-rings (51.6 mm * 2.4 mm)
• Draw the shuttle guide out using a 6 mm bolt
• Clean the shuttle guide
• Discard the O-ring (51.6 mm * 2.4 mm)
• Remove the shuttle closer and O-ring (39.34 * 2.62) and discard it Replace it with new one
• Remove the shuttle inlet and the shuttle closer
• Discard the circlip and replace it with a new circlip
• Reassemble the parts. Replace the discarded parts with new components

8.5.3.3 Servicing the exhaust valve

Figure 22. Exploded view of exhaust valve- Dryspell Plus models 45 and 60
Using a no. 38 spanner, remove the plug. Clean the plug. Discard the O-ring. Discard the spring and poppet assembly. Using a 5 mm Allen key, remove the four socket head cap screws on the top cover. Remove the top cover from the body. Discard the gasket. Push the piston assembly from below. Discard the piston O-ring. Clean the piston. Coat the piston with food-grade grease. Reassemble the piston assembly with a new O-ring. Coat the piston O-ring food-grade grease before assembly. Discard the O-ring (10 mm * 2.62 mm) inside the valve body. Reassemble the exhaust valve with new components in place of the discarded ones. Replace the plug.

8.5.3.4 Servicing the non-return valve plate

Figure 23. Exploded view to illustrate servicing of non-return valve plate-
Dryspell Plus models 20 and 30
Using a 6 mm Allen key, remove the socket head cap screws.
- Remove the top block assembly.
- Discard the spring washer and cap screw.
- Using a 4 mm Allen key, remove the NRV assembly. Discard the NRV assembly.
- Push the purge orifice from below. Discard the purge orifice.
- Clean the NRV housing.
- Discard the O-ring (56 mm × 2 mm).
- Reassemble the NRV housing with new components.
- Fix the NRV housing in the top block and reassemble the parts.

8.5.3.5 Changing the inlet tube

- Using a 6 mm Allen key, remove the socket head cap screws.
- Remove the top block with the filter and set them aside.
- Discard the inlet tube and two O-rings.
- Fix a new inlet tube in the bottom block with new O-rings.
- Reassemble the top block.
- Fasten the socket head cap screws using a 6 mm Allen key.
8.5.4 Drypell Plus models 100 & 125

DRYSPELL PLUS 100 EXPLODED VIEW

Dw. No. PD242
8.5.4.1 Changing the desiccant

Figure 25. Changing desiccant-Dryspell Plus model 100
- Disconnect the solenoid coil and inlet valve wire connection
- Remove the pilot air connection from the top block assembly
- Remove the socket head cap screws M8 * 40
- Remove the top chamber with the controller
- Remove the drying tower gasket and replace with new ones
- Remove the top compactor plates (two)
- Remove the old desiccant bags
- Clean the drying towers
- Filling the Desiccant bag assembly:

**Dryspell Plus model 100:**

Fill the desiccant bag assembly firstly with 3 bags of Activated Alumina AD1398 followed by a bag of molecular sieves AD1424 as shown in the figure 25
Dryspell Plus model 125:
Fill the desiccant bag assembly firstly with 3 bags of Activated Alumina AD1398 followed by a bag of mixed Activated alumina and Molecular Sieves AD1425, lastly with a bag of molecular sieves AD1424 as shown in the figure 26
- Replace the top compactor plate with new one
- Fix the top block assembly and tighten the cap screws
- Connect the solenoid coil, inlet valve and pilot air connections

8.5.4.2 Changing the top shuttle

- Using circlip pliers, remove the circlip B 45
- Using an M12 bolt, push the shuttle closer assembly out.
- Discard and replace the O-ring (38.5 mm * 3.53 mm) in the shuttle closure
- Clean the shuttle closer
- Take the shuttle guide out of the shuttle housing.
- Clean the shuttle guide
- Discard and replace the O-ring (38.5 mm * 3.53 mm) in the shuttle guide
- Replace with new shuttle
- Reassemble the parts in the shuttle housing

Figure 27. Exploded view of top shuttle-Dryspell Plus 100 & 125
8.5.4.3 Changing the inlet valve assembly in Dryspell Plus model

- Using an Allen key, remove the screws M8 ×20 at the bottom cover assembly
- Remove the bottom cover and clean it.
- Discard the O-ring (48 mm × 3.0 mm)
- Remove the M8 hex nut and take out the spacer machined. Clean the spacer machined
- Remove and discard the poppet moulded AD1059
- Discard the O-ring (7.6 mm × 2.4 mm).
- Remove the spacer machined and clean it.
- Using an Allen key, remove the screws at the top of the assembly.

Reference: Manual Version
• Remove the top cover and clean it.
• Remove the spring.
• Take the piston assembly out by pushing the stem machined AD1113 from bottom side
• Remove and clean the stem indicator AD1057, hex nut M8 and piston machined
• Discard the O-rings (47.2 mm × 3.53 mm and 7.6 mm × 2.4 mm) and remove the spacer machined
• Take out the stem machined AD1113
• Rotate and remove the guide bush using the two holes.
• Discard the O-ring (12.3 mm × 2.4 mm) that is exposed.
• Discard the O-rings (37.9 mm × 3.53 mm) and U-ring.
• Reassemble the guide bush assembly with new components and place it in the valve housing.
• Grease the stem machined AD1113 and fit it inside the Housing valve AD1535
• Reassemble the stem indicator AD1057 and spacer machined with new O-rings and a new poppet moulded
• Replace the spring and reassemble the top cover
• Reassemble the spacer machined AD1055
• Fix the new poppet moulded in the stem machined AD1113
• Tighten the nut and reassemble the bottom cover
8.5.4.4 Servicing the exhaust valve 100 & above

- Remove M8 * 20 cap screw
- Remove the bottom cover and discard & replace the gasket non metal
- Remove the spring compression
- Remove the cap screw M8 * 20 and spring washer
- Remove seal ring washer and holder
- Replace the seal ring
- Remove the o -ring 7.6 *2.4 from the valve housing
- Remove M * 20 cap screw to remove the adapter cover

- Remove the adapter cover and discard the gasket non metal and replace with new one
- Push the poppet assembly outside
- Replace the O- ring 47.2 * 5.33 andO - ring 18.72 *3.53
- Reassemble the piston assembly into housing valve
- Fix the top adaptor cover
- Reassemble the O- ring 7.6*2.4 into the housing valve
- Reassemble the Seal ring assembly and fix the new spring
- Fit the Gasket non-metal
- Reassemble the bottom cover and tighten the screws

Figure 29. Exploded view of exhaust valve- Dryspell Plus models 100 & above
8.5.5.1 Changing the desiccant

Figure 30. Changing desiccant-Dryspell Plus model 200

Figure 31. Changing desiccant-Dryspell Plus model 250
INSTRUCTION MANUAL - Dryspell Plus

- Disconnect the solenoid coil and inlet valve wire connection
- Remove the pilot air connection from the top block assembly
- Remove the socket head cap screws M8 * 40
- Remove the top chamber with the controller
- Remove the drying tower gasket from the top block and replace with new ones
- Remove the top compactor plates (FOUR)
- Remove the old desiccant bags
- Clean the drying towers
- Filling the Desiccant bag assembly:

**Dryspell Plus model 200:**

Fill the desiccant bag assembly firstly with 3 bags of Activated Alumina AD1398 followed by a bag of molecular sieves AD1424 as shown in the figure 30

**Dryspell Plus model 250:**

Fill the desiccant bag assembly firstly with 3 bags of Activated Alumina AD1398 followed by a bag of mixed Activated alumina and Molecular Sieves AD1425, lastly with a bag of molecular sieves AD1424 as shown in the figure 31
- Replace the top compactor plate with new one
- Fix the top block assembly and tighten the cap screws
- Connect the solenoid coil, inlet valve and pilot air connections

**8.5.5.2 Changing the top shuttle 200-375**

Figure 32. Exploded view of top shuttle-Dryspell Plus 200-375
• Using circlip pliers, remove the circlip B 75
• Using an M12 bolt, push the shuttle closer assembly out
• Discard and replace the O-ring (66.03 mm × 3.54 mm) in the shuttle closure
• Clean the shuttle closer
• Take the shuttle guide out of the shuttle housing.
• Clean the shuttle guide
• Discard and replace the O-ring (66.03 mm × 3.54 mm) in the shuttle guide
• Replace with new shuttle
• Reassemble the parts in the shuttle housing
8.5.5.3 Changing the inlet valve assembly

Figure 33. Exploded view of inlet valve assembly-Dryspell Plus model 200 & 250
- Using an Allen key, remove the screws M10 *20 at the bottom cover assembly
- Remove the bottom cover and clean it
- Discard the O-ring (65 mm * 3.0 mm)
- Remove the M8 hex nut and take out the spacer machined. Clean the spacer machined
- Remove and discard the poppet moulded AD1090
- Discard the O-ring (7.6 mm * 2.4 mm)
- Remove the spacer machined and clean it
- Using an Allen key, remove the screws at the top of the assembly.
- Remove the top cover and clean it
- Remove the spring
- Take the piston assembly out by pushing the stem machined AD1089 from bottom side
- Remove and clean the stem indicator AD1092, hex nut M8 and piston machined
- Discard the O-rings (69.4 mm * 5.33 mm and 7.6 mm * 2.4 mm) and remove the spacer machined
- Take out the stem machined AD1089
- Rotate and remove the guide bush using the two holes
- Discard the O-ring (12.3 mm * 2.4 mm) that is exposed
- Discard the O-ring (37.9 mm × 3.53 mm) and U-ring
- Reassemble the guide bush assembly with new components and place it in the valve housing
- Grease the stem machined AD1089 and fit it inside the Inlet Housing valve AD1559
- Reassemble the stem indicator AD1092 and spacer machined with new O-rings and a new poppet moulded
- Replace the spring and reassemble the top cover
- Reassemble the spacer machined AD1055
- Fix the new poppet moulded in the stem machined AD1089
- Tighten the nut and reassemble the bottom cover

For servicing the Exhaust valve in dryspell plus models 200 & 250 refer section 8.5.4.4
8.5.6 Dryspell Plus models 300 & 375
8.5.6.1 Changing the desiccant

Figure 34. Changing desiccant-Dryspell Plus model 300
• Disconnect the solenoid coil and inlet valve wire connection
• Remove the pilot air connection from the top block assembly
• Remove the socket head cap screws M8 * 40
• Remove the top chamber with the controller.
• Remove the drying tower gasket and replace with new ones
• Remove the top compactor plates (Six)
• Remove the old desiccant bags.
• Clean the drying towers
• Filling the desiccant bag assembly:
Dryspell plus model 300:
Fill the desiccant bag assembly firstly with 3 bags of Activated Alumina AD1398 followed by a bag of molecular sieves AD1424 as shown in the figure 34.

Dryspell plus model 375:
Fill the desiccant bag assembly firstly with 3 bags of Activated Alumina AD1398 followed by a bag of mixed Activated alumina and Molecular Sieves AD1425, lastly with a bag of molecular sieves AD1424 as shown in the figure 35.

- Replace the top compactor plate with new one
- Fix the top block assembly and tighten the cap screws
- Connect the solenoid coil, inlet valve and pilot air connections
- Fasten the towers in the bottom by tightening the screws.

For changing the top shuttle in dryspell plus models 300 & 375 refer section 8.5.5.2
8.5.6.2 Changing the inlet valve assembly

Figure 36. Exploded view of inlet valve assembly-Dryspell Plus model 300 & 375
- Using an Allen key, remove the screws M10 *40 at the top cover
- Remove the top cover and clean it
- Remove the spring comp
- Remove and clean the stem indicator
- Remove M10 hex nut
- Remove Spacer machined and piston machined
- Discard and replace the o-ring 85.3 * 5.7 & 9.6 * 2.4
- Remove the spacer machined
- Remove bottom plug by using spanner
- Discard and replace the o-ring 71.2 * 3.53
- Remove M10 Nylock nut
- Remove spacer machined and poppet moulded
- Discard and replace the o-ring 12.3 * 2.4
- Remove spacer machined
- Remove stem machined AD1861
- Remove guide bush
- Discard and replace the o-ring 71.2 * 3.53 and 12.3 * 2.4
- Discard and replace the u-ring
- Reassemble all the parts

For servicing the Exhaust valve in dryspell plus models 300 & 375 refer section 8.5.4.4
Section 9

Disposal of consumables and replaced parts

Disposal of the condensate, desiccant, filter elements and other spare parts of the dryer is to be done in accordance with the pollution control norms prevailing at the time of dryer installation or use.

Dryer parts that are replaced have metal and rubber components. These may be disposed in accordance with the pollution control regulations.
## Section 10

### Troubleshooting

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<th>Solution</th>
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<td>Loose connections or incorrect voltage</td>
<td>Attend to the power supply.</td>
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<tr>
<td>Tower-status LED not changing</td>
<td>1) Controller faulty</td>
<td>1) Change the controller</td>
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<tr>
<td></td>
<td>2) Solenoid valve faulty</td>
<td>2) Replace the solenoid valve.*</td>
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<tr>
<td>Status LEDs change but towers</td>
<td>1) Faulty coil connection at DIN and terminal connector in the controller</td>
<td>1) Change the controller.*</td>
</tr>
<tr>
<td>not switching</td>
<td></td>
<td>2) Replace the solenoid valve.*</td>
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<tr>
<td>No purging</td>
<td>1) Faulty solenoid valve</td>
<td>1) Replace the solenoid valve.*</td>
</tr>
<tr>
<td></td>
<td>2) Faulty exhaust valve</td>
<td>2) Clean the exhaust valve.</td>
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<tr>
<td></td>
<td>2) Exhaust valve not closing</td>
<td>2) Call Trident for service support.</td>
</tr>
<tr>
<td>Purge loss excessive</td>
<td>1) Outlet shuttle not closing</td>
<td>1) Clean the shuttle.</td>
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<td></td>
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<tr>
<td>High pressure drop across dryer</td>
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<td></td>
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<td>1) Set the economiser mode at the correct value</td>
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<tr>
<td>dewpoint</td>
<td>2) Valves not functioning properly or dryer not cycling as in normal operation</td>
<td>2) Call Trident for service support.</td>
</tr>
<tr>
<td></td>
<td>3) Pre-filtering of air not adequate</td>
<td>3) Replace the filter element.</td>
</tr>
<tr>
<td></td>
<td>4) Desiccant degraded</td>
<td>4) Replace the desiccant.</td>
</tr>
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</table>

* Call Trident for this action.
## Section 11

### Recommended parts and consumables

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<td>Dryspell Plus 10</td>
<td>Filter element assembly T 100 Y</td>
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<td>2</td>
<td>SK278A</td>
<td>Seal kit with desiccant-Dryspell Plus 10</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SK220A</td>
<td>Exhaust valve spare kit Dryspell Plus 10</td>
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</tr>
<tr>
<td>4</td>
<td>SK210A</td>
<td>Seals and O-ring spare kit-Dryspell Plus 10</td>
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<tr>
<td>5</td>
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<td>Dryspell Plus 20, 30</td>
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<td></td>
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<td>SK282A</td>
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Section 12

Sales and Services

PneumaticPlus

1300 E. 223rd st #505
Carson, CA 90745
Tel: 800-658-3579
Email: Sales@Pneumaticplus.com
## Appendix

### Conversion tables

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<th>Flow Multiplying Factors</th>
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Reference: Manual Version