

Desiccant Compressed Air Dryer Dryspell Series

INSTALLATION, OPERATION, MAINTENANCE Regenerative Type Heatless Desiccant Dryer



GENERAL

Compressed air is a vital energy medium used in almost all areas of industrial production. The atmospheric air taken in by the compressor contains contaminants, dirt particles and humidity, i.e. water vapor which condenses in compressed air pipes. The condensation can lead to considerable costs (corrosion, freezing, etc.). These costs can be avoided by the application of a Dryspell Series dryer. This complete purification system includes an optional prefilter with automatic condensate drain, heatless adsorption dryer and in built afterfilter. The Dryspell series with *optional Prefilter*(*Recommended*) is specially made for small compressed air flows, is compact, easy to maintain, and comes standard with

- ➤ Electronic controller with manual purge economizer and compatible with dew point sensor for automatic purge control
- > Electronic drain valve on the inlet filter
- A inbuilt 3-micron particulate after-filter (within the diffuser screen or Compactor plate) to protect downstream equipment from desiccant fines.

Design

The air enters the coalescing prefilter where solids and condensates (oil/water mixture) are retained up to a residual oil content of 0.01mg/cu.m. The heatless regenerative dryer then adsorbs moisture from the compressed air stream down to an atmospheric dew point (ADP) of -40°F at standard inlet conditions (100°F, 100% saturated, 100psig). Finally the in built after filter removes any desiccant fines before they can travel downstream.

Models

| Dryspell Models | Nominal Inlet Flow SCFM | | | | |
|-----------------|-------------------------|--|--|--|--|
| 10 | 10 | | | | |
| 20 | 20 | | | | |
| 30 | 30 | | | | |
| 45 | 45 | | | | |
| 60 A | 60 | | | | |
| 100 | 100 | | | | |
| 125 | 125 | | | | |
| 200 | 200 | | | | |
| 250 | 250 | | | | |
| 300 | 300 | | | | |
| 375 | 375 | | | | |



Statement of conformity

> 97/23/CE : Pressurised Equipments

> 89/392/CEE : Machine Safety

> 89/336/CEE : Electromagnetic Compatibility

> 73/23/CEE : Low Voltage

Specification

Maximum Pressure : 225 PSIG (16 bar) Minimum Pressure : 29 PSIG (2 bar)

Maximum Temperature : 158 F

Voltage : 115/1/60, 208-230/1/60, 220-240/1/50

Power Consumption : 12 Watt Max

Recommended

Pre-filter rating : 0.01 Micron (Coalescer)

After-filter Rating (Inbuilt) : 3.0 Micron (within the diffuser screen or Compactor plate)

Cycle Time : 4 min Purge Loss : 12%

Air Outlet Conditions : Dry air down to -40degF ADP

Power Cord : 7 ft

Contents

The dryer consists of:

- 2 aluminum towers filled with desiccant
- 2 aluminum blocks including air seals and check valve
- ➤ 1 Pre filter
- 2 solenoid pilot valves
- Built in after filters
- ➤ 1 electronic control
- 1 pressure gauge
- 2 Mufflers
- Electronic auto drain

Adsorbent Material

The desiccant used in the dryspell series is a smooth sphere of activated alumina produced by a unique manufacturing process. The benefits of using this high performance desiccant include:

- Uniform ball size
 - ✓ Reduces pressure drop and channeling
- High crush strength
 - ✓ Allows rapid pneumatic loading of towers



- Low abrasion
 - ✓ The low abrasion ensures less dusting during transport, loading, and service life which reduces pressure drop and minimizes downstream valve and filter plugging, common with dustier products.
- High adsorptive capacity.
 - ✓ The desiccant's high surface area and tailored pore distribution provide a high dynamic H2O adsorption capacity. It also has excellent cyclical stability which leads to a long desiccant life.

DESCRIPTION OF OPERATION

Operating Principles

Wet air enters the inlet prefilter and flows from the top block to the lower block via the air transfer tubes. Air then flows to the shuttle inlet valve and is diverted to tower 1. The compressed air flowing through tower 1 is dried to a -40°F ADP and exits via the outlet filter. A small portion (12%) of the compressed air is expanded to near atmospheric pressure by passing through the purge orifice. Expansion of this already-dry gas to near-atmospheric pressure increases the ability of the purge air to strip the previously adsorbed water vapor from the partially saturated desiccant bed in tower 2. The air exhausts through the opened two-way purge valve. This cycle continues for 1.5 minutes then the purge valve closes and tank 2 begins re- pressurization. After 30 seconds purge valve 1 opens and the process repeats for tower 2.

- the online tower dries for 2 minutes
- > the offline tower regenerates for 1 minute and 30 seconds
- > the offline tower re-pressurizes for 30 seconds

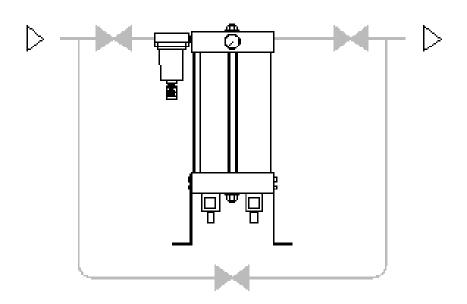
Warning

Failure to follow these instructions can lead to serious injury or death. This dryer should be only be used for drying filtered, compressed air. Ensure inlet air to this air dryer is filtered.

Only experienced and licensed electricians that are properly trained in compressed air systems should service or repair Trident products. Before start-up or performing any maintenance on any Trident air dryer, filter, drain system, or other equipment, you must first turn off and disconnect all electrical power and service to the equipment at the main disconnect switch. Also, be sure to bypass and depressurize the dryer to 0 PSIG. Do not start or operate the dryer if there is a leak. Make sure the dryer's protection rating is applicable to the installation conditions. Do not operate the dryer at pressures and/or temperatures above the maximum allowable marked on the data label. Likewise, verify that incoming voltage matches the voltage marked on the data label. Do not lift the dryer by its piping or control box or drop the dryer. Doing so may damage the dryer.



INSTALLATION AND MAINTENANCE



Safety

Dryspell dryers are intended for the drying of compressed air. Under no circumstance should they be used to dry other gases.

The desiccants used are not toxic. However, they may cause respiratory problems if they are inhaled in dust form. The use of a dust mask is sufficient to protect personnel.

Installation Site and Connections

- Install the dryer in a closed clean, dry room protected from freezing. Access to the room should be restricted to personnel qualified in 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 ℃/109 ℉.
- 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 3 feet between the dryer and any other equipment which uses electricity.
- Ensure that the dryer is installed in the vertical position.
- Dryer should be secured by bolting it down.



- ➤ Install a system of by-pass valves between the dryer inlet and outlet so the dryer can be serviced without having to interrupt the compressed air supply from the circuit (see diagram above). The upstream and downstream valves must be closed during installation.
- Connect a drain line to the Pre-filter auto drain outlet.
- Check for leaks after all connections have been made.
- Always pressurize dryer before power up.

Electrical Connections

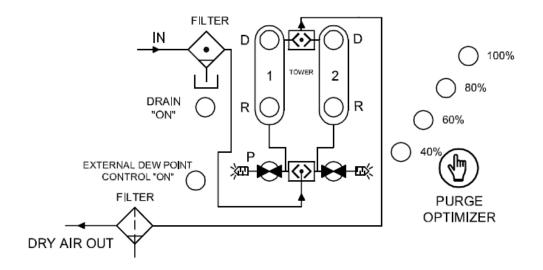
Connect the electrical power cable to an 85-260 V, single phase, 60 Hz grounded power supply.

Running The Installation and Turning On The Dryer

The valves upstream and downstream of the dryer must be closed and the by-pass valve open before the compressor is started.

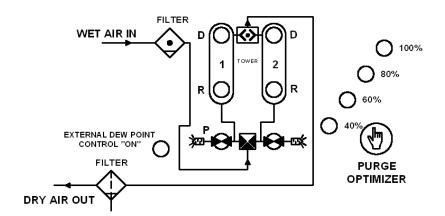
- Make sure power to dryer is off.
- Open bypass valve, close outlet valve.
- Open inlet valve until dryer is pressurized.
- Open outlet, close bypass valve.
- Turn on power to the dryer.
- Check if the LED on the tower is in the drying operation, and that the automatic drain valve at the bottom of the prefilter drains every 4 minutes

Control Panel DS 31-90





Control Panel DS 31-200



The control panel presents all the instruments necessary to control and regulate the dryer:

- a machine diagram
- > two LEDs indicating the tower in drying operation (Tower 1 and Tower 2).
- ➤ a LED indicating the prefilter drain operation (Drain) (for models equipped with electronic auto drain.).
- Press 8 sec Purge Optimizer button continuously, then set the value (40% to 100%) if needed to control the purge flow

Operating Cycles Time

Drying time : 2 min

Regeneration time : 1 min 30 seconds

Pressurization time: 30 seconds

| First Cycle | | Second Cycle | | |
|-------------|-------------------|-------------------|---------|--|
| Tower 1 | Tower 2 | Tower 1 | Tower 2 | |
| Drying | Regeneration | Regeneration | Drying | |
| Drying | Re-pressurization | Re-pressurization | Drying | |

When 1 is lighted, tower 1 is in drying operation and tower 2 is in regeneration mode. After tower 2 regeneration is finished, tower 2 LED will blink to show that the tank is now in the pressurization stage. After 30 seconds of pressurization, tower 1 will depressurize, the operating cycle is reversed with tower 1 is in the regeneration stage and tower 2 in the drying mode. (Caution: At the end of the pressurization the regeneration tower will depressurize producing a loud noise.) The cycle occurs every 2 minutes. (For models equipped with prefilter and electronic auto drain, the prefilter condensate drain discharge is programmed every 4 minutes for 4 seconds.) All these cycle times are fixed and not adjustable by user.



Shutting Down the Dryer

Follow the procedure below:

- Open the by-pass valve.
- Close the inlet valve.
- Close the outlet valve.
- > Turn off power to the dryer.

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

Monthly Inspections

During the monthly routine inspection, check that:

- the drying and regeneration cycles function normally,
- the silencers are not clogged.

Semi Annual Inspections

During the semi-annual routine inspection, check that:

- that the drying and regeneration cycles function normally
- > the silencers are not clogged
- > replace filter elements

Annual Inspections

During the annual routine inspection, check that:

- the drying and regeneration cycles function normally
- > the silencers are not cloqued
- replace filter elements.
- the state of the desiccant: if the desiccant is brown (oil pollution) or if there is a lot of dust (disintegration), then change the desiccant (see next section).
- the state of block 'O' rings.

During the entire operation, the compressor and the dryer must be shut down. It is recommended for all personnel who are in the presence of the desiccant to wear dust masks

Quantity of Desiccant in the Dryer

The replacement desiccant in your dryer must be absolutely identical to the initial desiccant. Contact the factory for desiccant kit part number.



The total quantities required for each model are as follows (weight in kgs):

| Dryspell Models | Quantity (Kgs) | | | | | | |
|-----------------|----------------|--|--|--|---|--|--|
| 10 | 2 | | | | | | |
| 20 | 6 | | | | | | |
| 30 | 8 | | | | 8 | | |
| 45 | 10 | | | | | | |
| 60 A | 14 | | | | | | |
| 100 | 8 Bag* | | | | | | |
| 125 | 10 Bag | | | | | | |
| 200 | 16 Bag | | | | | | |
| 250 | 20 Bag | | | | | | |
| 300 | 24 Bag | | | | | | |
| 375 | 30 Bag | | | | | | |

^{*}Bag is a special custom made desiccant cartridge. It is accurately packed and sealed with a required quantity and quality of desiccant.

Changing the Desiccant

1. Dryspell 10 to Dryspell 60A

- Bypass dryer.
- Disconnect dryer from airlines.
- > Loosen the Tie rod and remove it
- Replace the old desiccant
- ➤ Make sure O-rings or gaskets are in place
- Install and screw the Tie rod

2. Dryspell 100 to Dryspell 375

- Bypass the dryer.
- Disconnect dryer from air lines.
- Loosen the M8 Allen Bolt and remove the top block and top compactor plate.
- Remove the saturated desiccant bag by pulling the bag handle in upward direction and replace the new desiccant bag. If there is no desiccant bag, just tilt the dryer remove the old desiccant and replace new desiccant bag.
- ➤ Make sure O-rings or gaskets are in place
- Install the top compactor plate continues by top block and screw the M8 Allen Bolt.



LEDS not Glowing

A – Check the power supply connection and tension

Tower Status LED not Changing

A – Change the controller

LEDS Status Change but Tower not Switching

- A Check coil connection at DIN and terminal connector in the controller
- B Check the solenoid valve

No Purging

- A Check the solenoid valve
- B Check the exhaust valve
- C Clean the silencer (muffler)

Continuous Purging at Tower 1

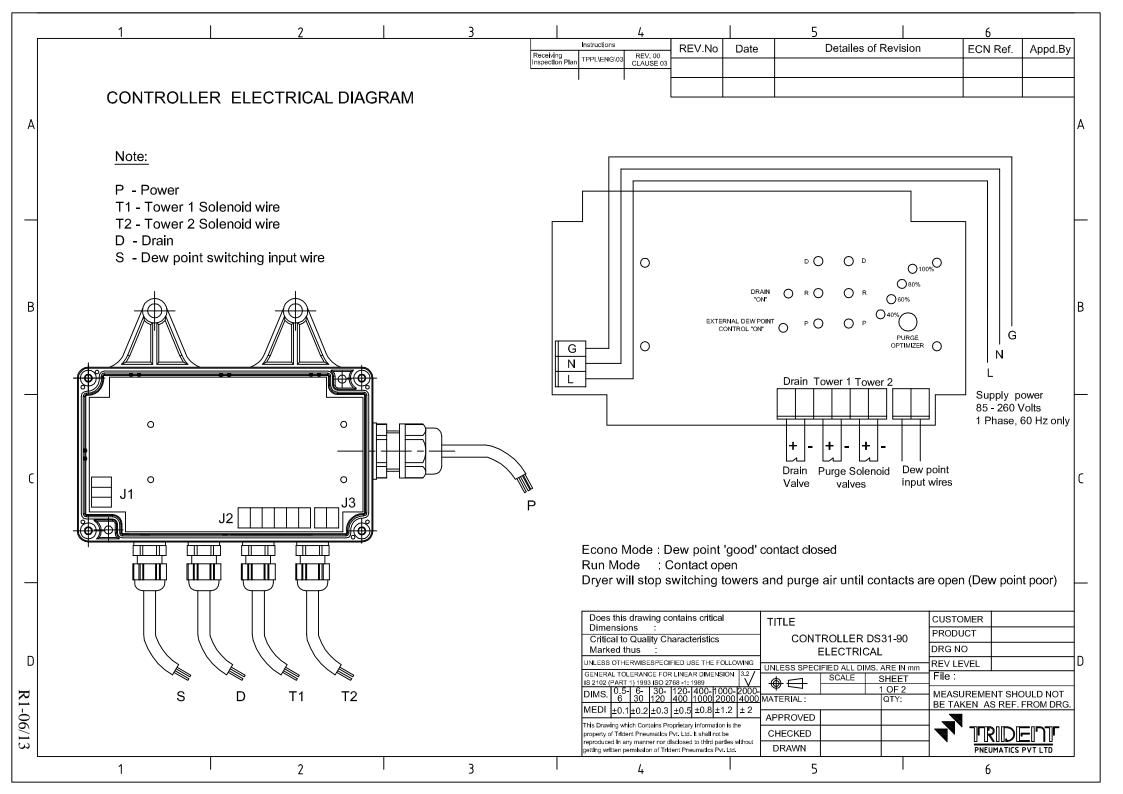
- A Shuttle not closing
- B Check pilot air for exhaust valve
- C Check exhaust valve piston stuck

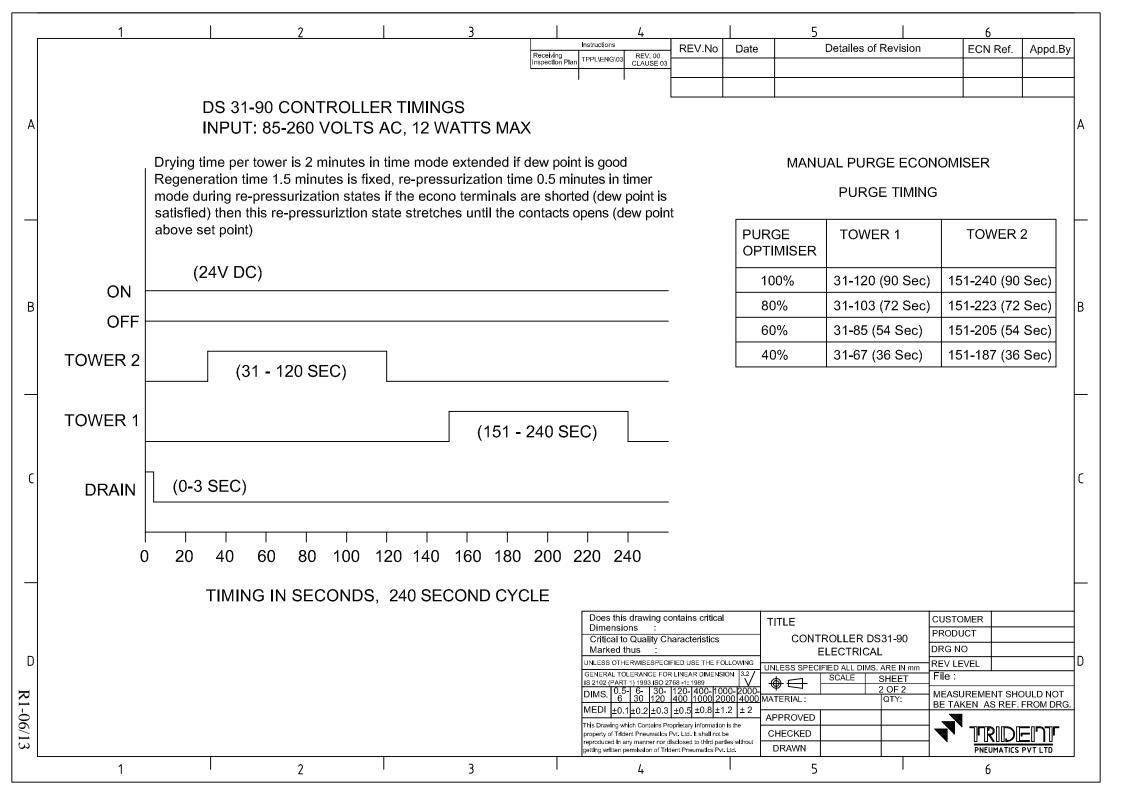
High Purge Loss

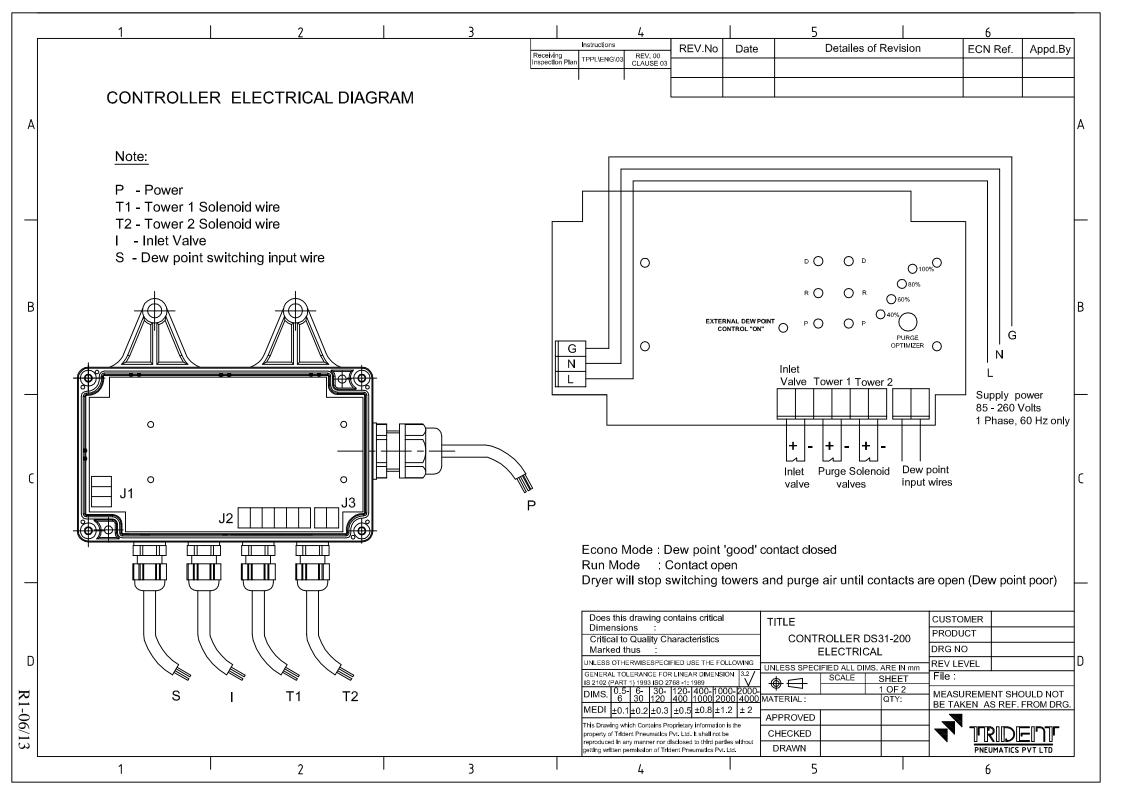
- A Check outlet shuttle closing
- B Check for silencer choke

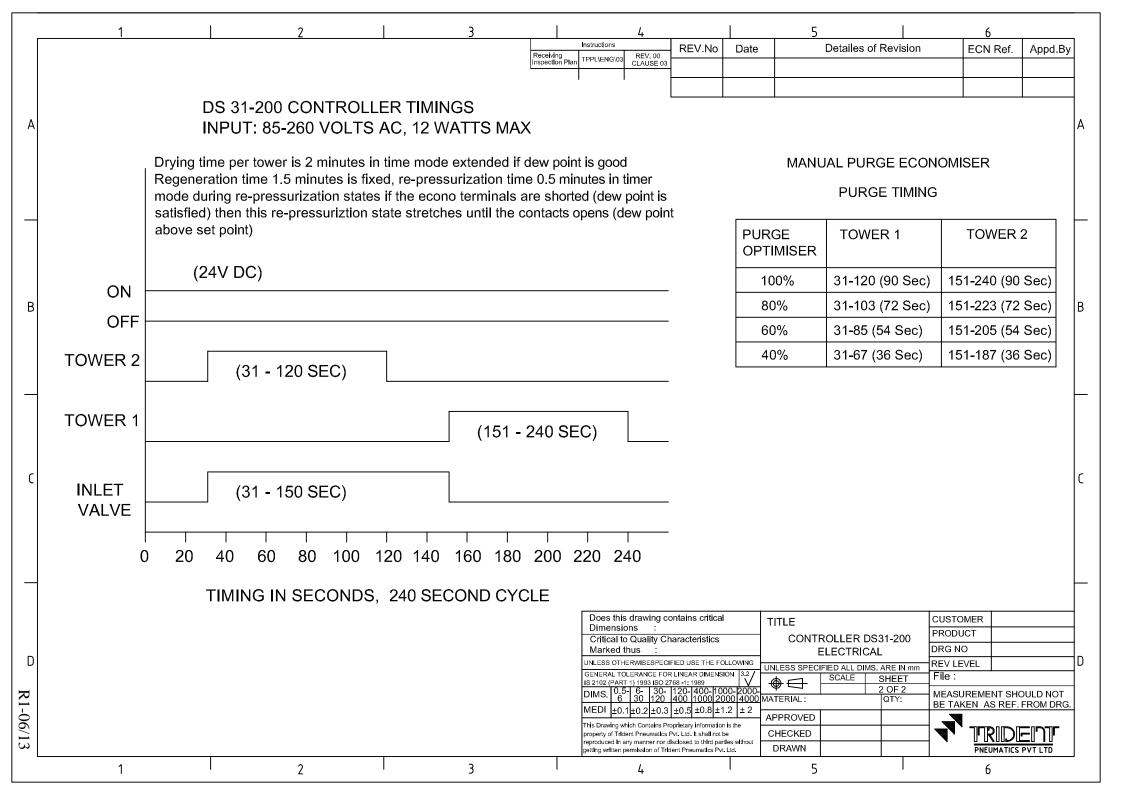
High Pressure Drop across Dryer

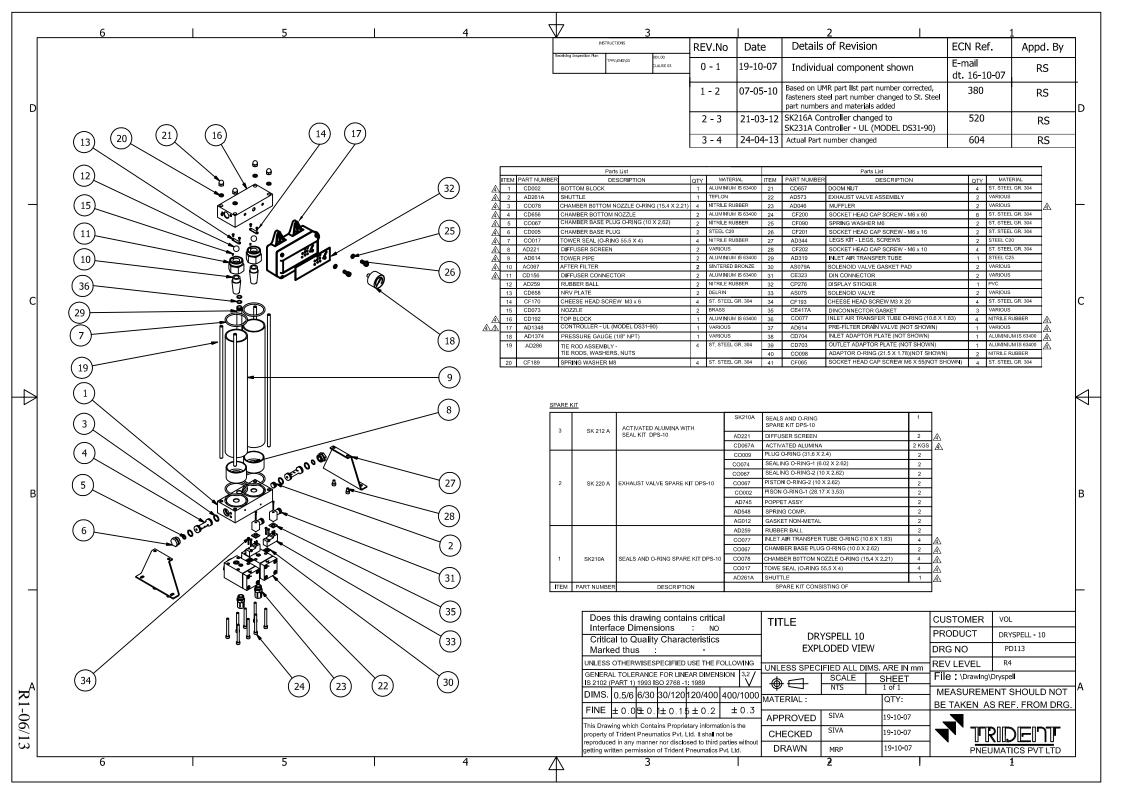
- A Prefilter may be clogged. Check and replace filter elements.
- B Check whether the dryer is being overflowed.

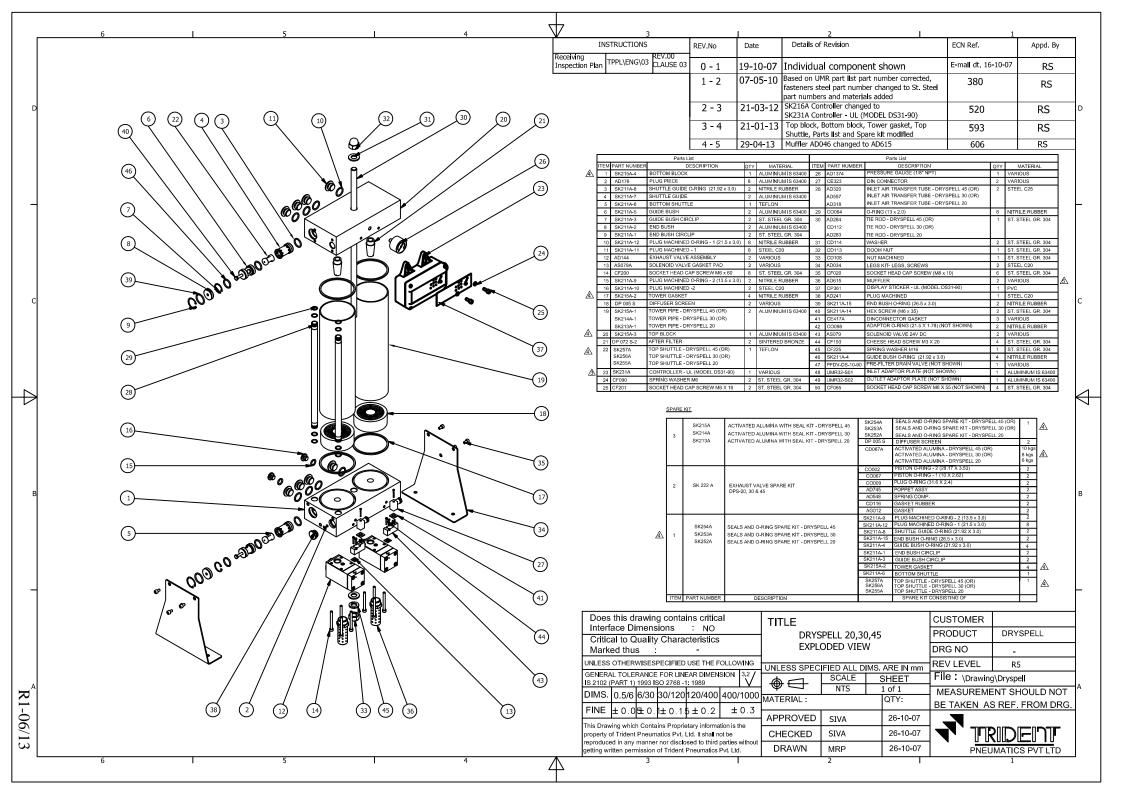


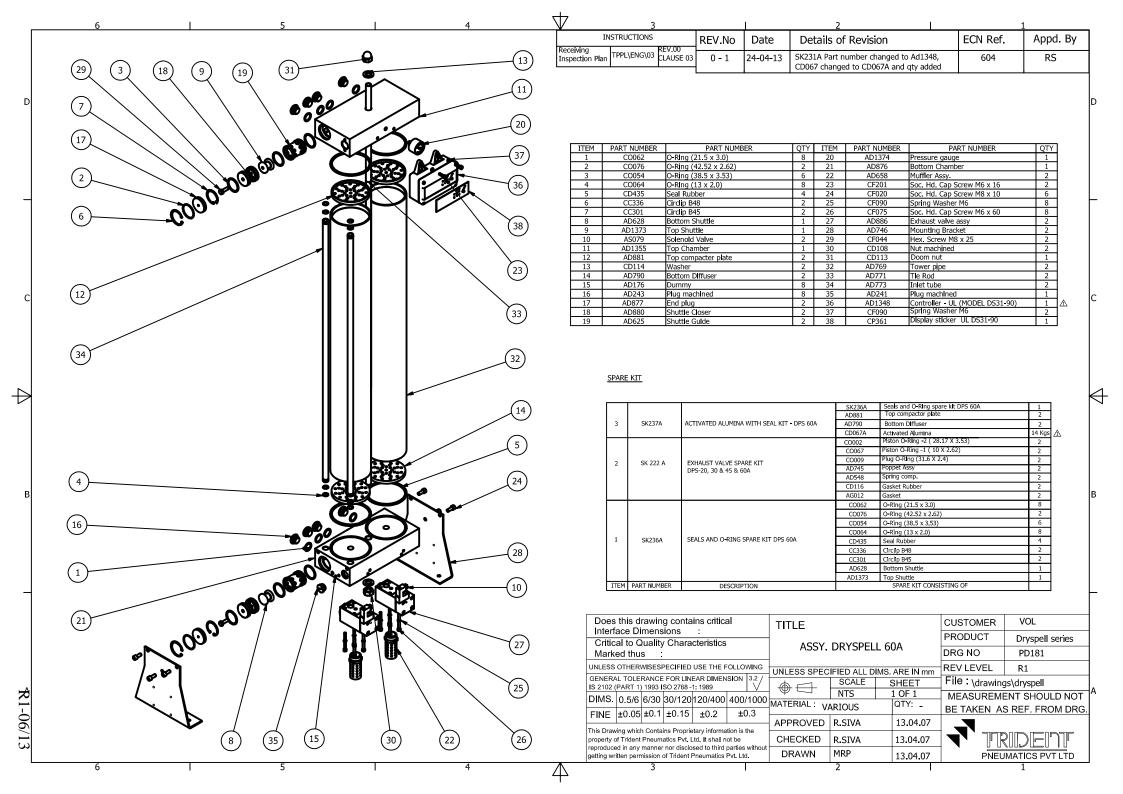


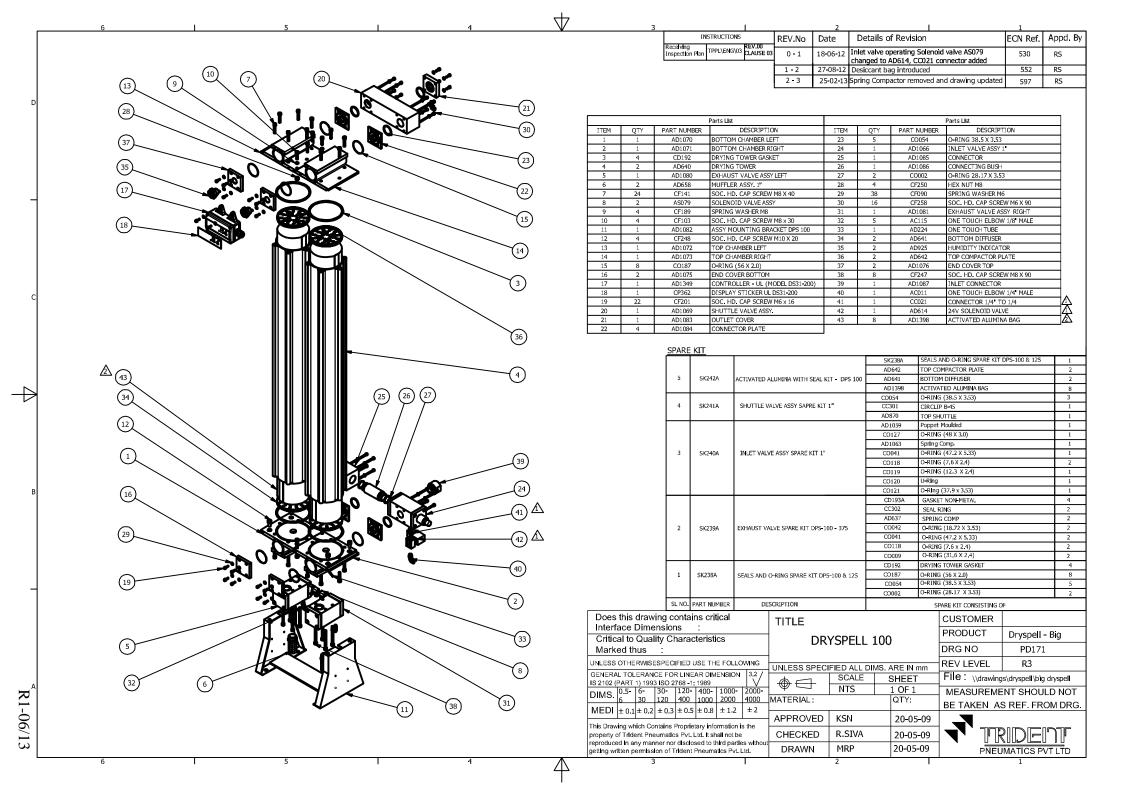


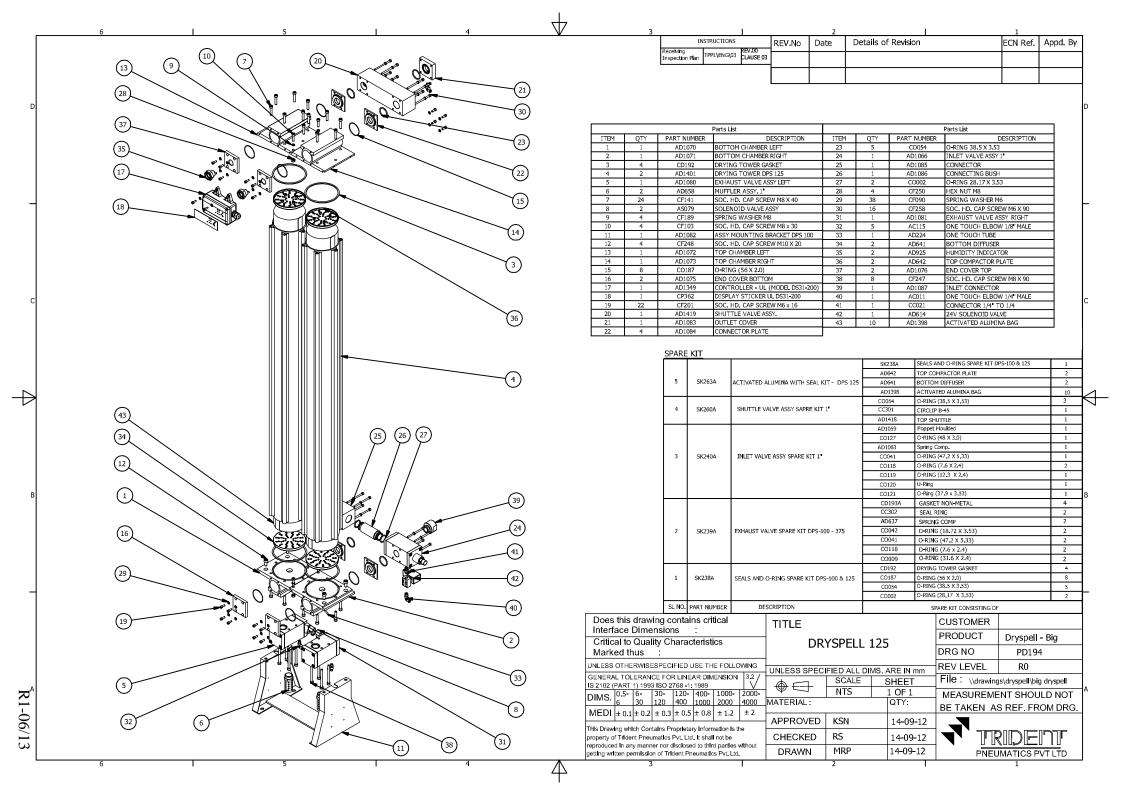


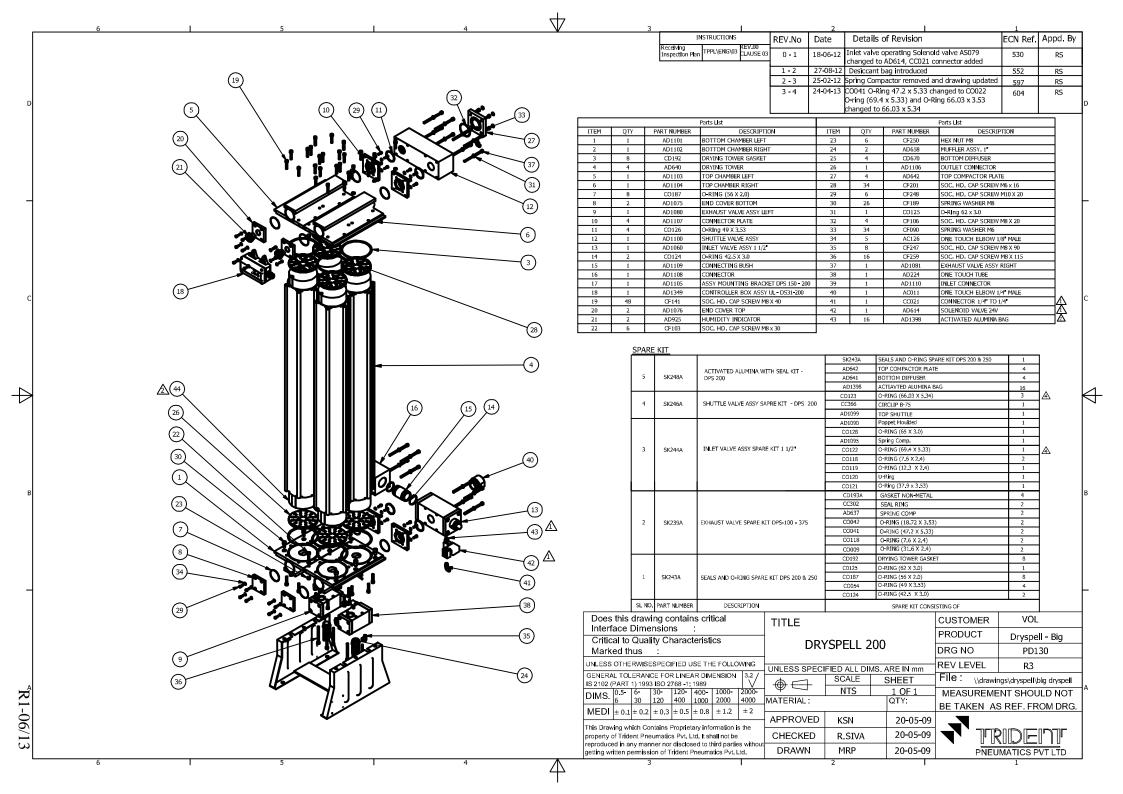


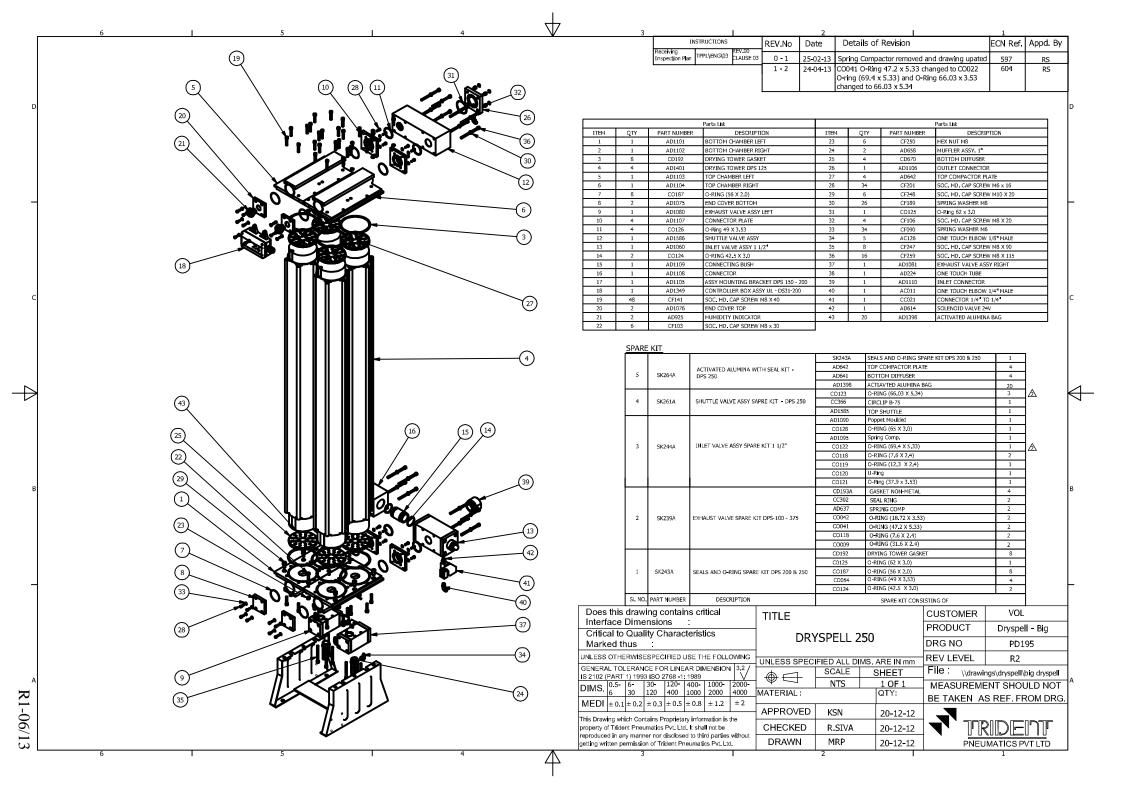


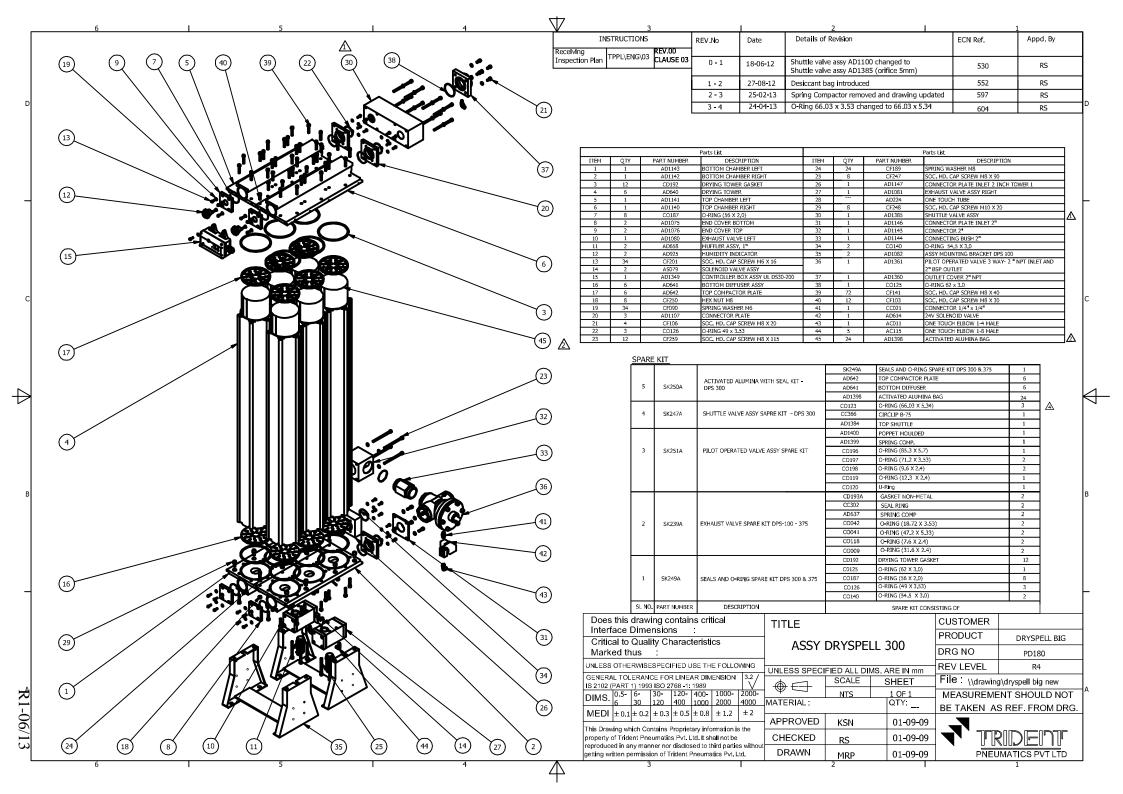


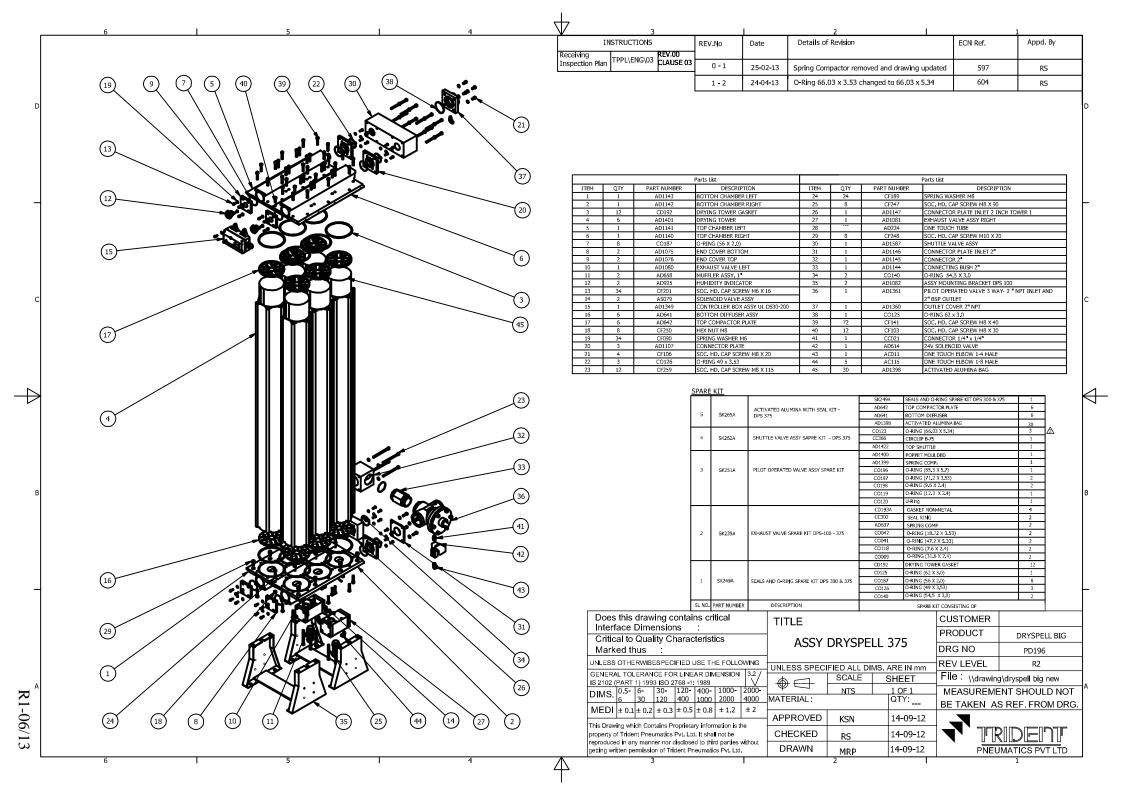






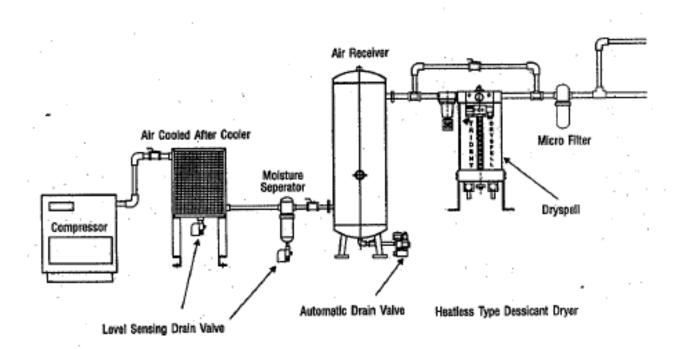








COMPRESSED AIR LAYOUT





INSTALLATION & COMMISIONING REPORT MINI REGENERATIVE AIR DRYER

| Customer : | | Model : | | | | | |
|-------------------------------|-----------------------------|-----------------------|--------------------|-------------------|---------------|----------|--|
| | | | SI. No. | : | | | |
| Contact person : | | | Phone | : | | | |
| | | | | | | | |
| Designation : | | | Fax : | | | | |
| (Please add any comn | nents or | remarks here fo | ound while | e unpac | king) | | |
| 1. INSTALLATION | | | | | | | |
| I. INSTALLATION | | | | | | | |
| a) Installation at : | Before / After Air Receiver | | iver L | LED Glo | owing | Yes / No | |
| b) Inlet air Temperature : | Normal / High | | | Tower 1 Drying | and 2 | Yes / No | |
| c) Side clearance provided : | Yes / No | | | Depress | surizing | Yes / No | |
| d) Power Grounded : | Yes / No | | | Regene | ration | Yes / No | |
| e) Air Flow Outlet : | Normal / Faulty | | | | | | |
| f) Change over sequence: | Normal / Faulty | | | | | | |
| 2. COMMISSIONING | -1 | | | | | | |
| Installation | | | Date of Completion | | | | |
| Commissioning | | | Date of Completion | | | | |
| Comments: | | | | | | | |
| Customer | | Installation Engineer | | | | | |
| | | | | | | | |
| | | I | 1 | | | | |
| | | | | | | | |
| | | | | | | | |
| digitation di trainio di | | alers re & Seal | | Customer's | | | |
| Installing Engineer Signatu | | C G Ocal | | Sig | nature & Seal | | |