HATCO
Compression & Separation

# Regenerative Air Dryer

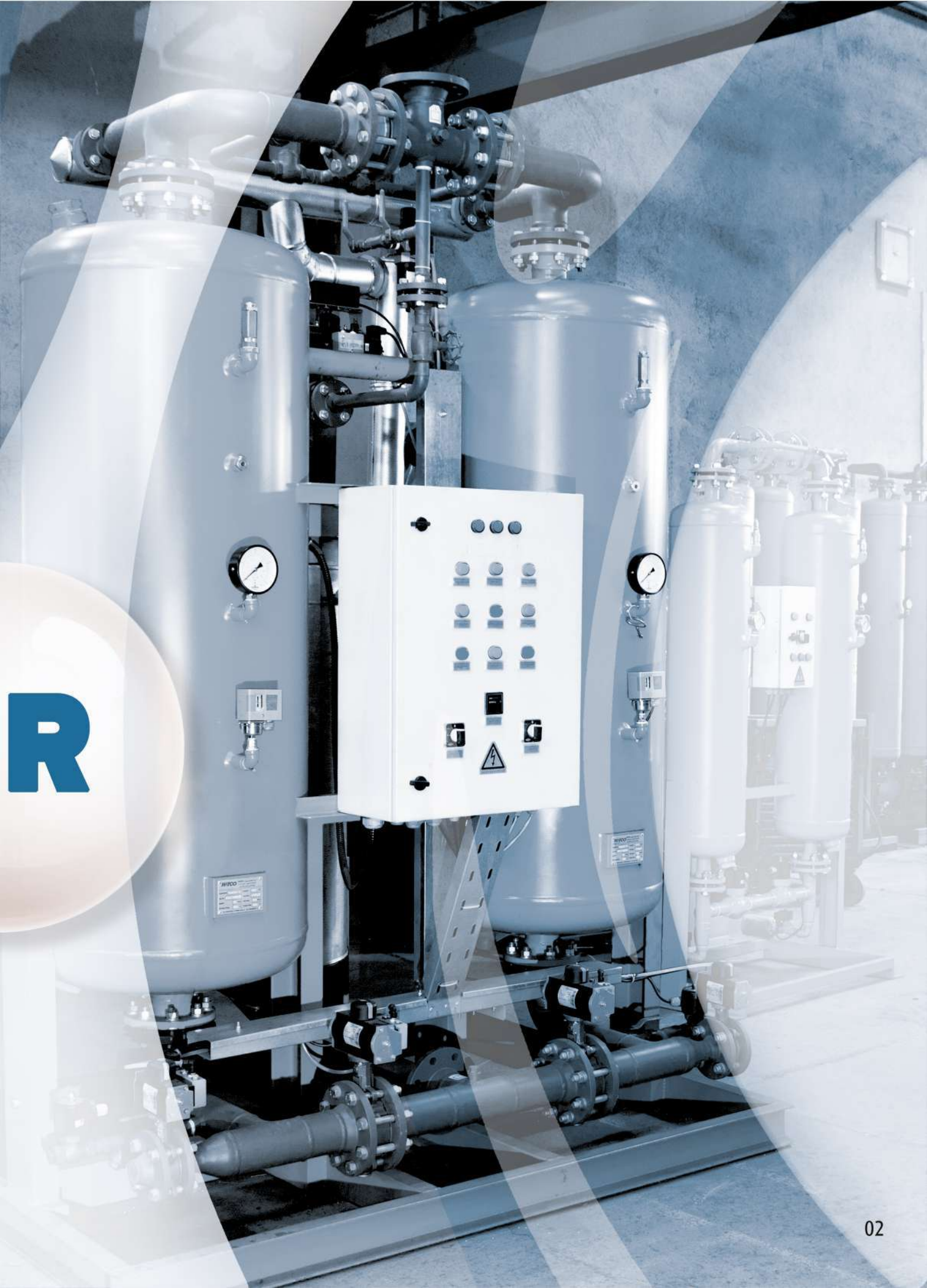
## RDA
## MT-RDA
## RDE
## RDB Series

CA-TE-DR/00 Dec.2021


## DEW POINT REQUIREMENTS

+3 °C ~ +5 °C Refrigeration Air Dryer
up to -70 °C Regenerative Air Dryer

THE BEST WAY TO DRY COMPRESSED AIR



R

Compressed air before treatment

Compressed air after treatment

WE MANUFACTURE Adsorption desiccant dryers (PSA and TSA) FOR EVERY MARKET, and all quality classification.

# Regenerative air dryer
# Purification for every Application

**Adsorption drying involves moving compressed air through an adsorbent thirsty for moisture that becomes saturated which is regenerating regularly. Regeneration involves sweeping expanded dry air in heatless pressure swing adsorption (PSA), internal / external heated air regenerative temperature swing adsorption (TSA).**

**Why desiccant air dryers?**

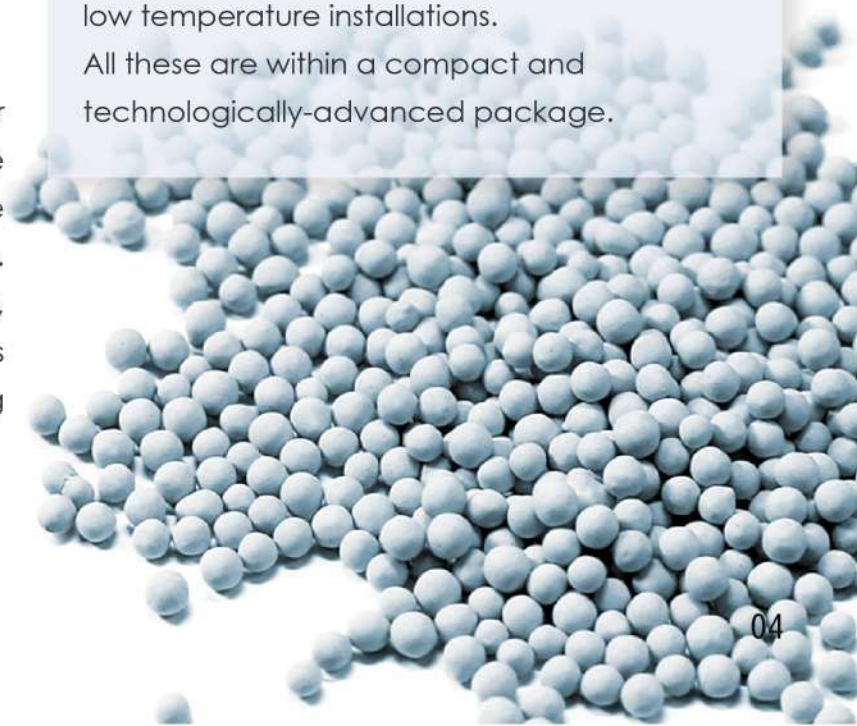
While refrigerated compressed air dryers achieve a pressure dew point of +3 °C to +5 °C sufficient for a broad range of industrial applications, regenerative dryers achieve higher quality of dried compressed air class / pressure dew point which is required by sensitive application and industries, such as pneumatic paint spraying, air motors, pharmaceutical manufacturing, instrumentation, control systems, cryogenic plants and etc.

All types of HATCO regenerative air dryers will optimize the performance and extend the life of all your sensitive pneumatically - operated equipment. Instrumentation, air logic units, cylinders, valves and actuators, which result is reducing maintenance costs and increasing the long life of equipment.

**Technical features on standard models**

Min./Max. operating pressure: 5 ~13 bar g
Input air Max. temperature: + 55 °C
Pressure dew point: -20 to -40 °C
Max available pressure dew point: - 70 °C (optional)

The adsorption dryers offer dew points up to **-70°C,** for efficient operation in many critical applications such as the oil & gas plants, chemical-pharmaceutical, food and beverage, electronic, automotive industries or in external, low temperature installations.
All these are within a compact and technologically-advanced package.



# Advantages:

**Competitive performance**

A dew point down to meet the customer's specification together with simple and easy controls guarantees the dryer operates in the best way possible.

**High reliability**

Removing moisture from compressed air with pressure dew point as low as possible, eliminate system failures, production downtime and costly repairs.

**High efficiency**

Properly design and manufacturing all details ensure a limited pressure drop. Several options are available to increase the efficiency and to reduce the energy consumption.

**Innovation**

HATCO offers the advanced techniques from factory standard such as logic control, parts and other requirements to special types in customized plants to meet the all the

**Energy Savings**

Addressing the energy saving is one of the strategic goals from many of customers which is done via improvement program and solutions in HATCO to reduce the costs.

**Accessibility**

Your time is precious, so we have simplified operations on all types of regenerative dryers by making the key elements easily accessible.

**Modularity**

The solution to your needs: our products are available with modular packs and options to create your ideal dryer.

**Low maintenance**

HATCO desiccant dryers have a small footprint thanks to the all-in one design.
Delivered ready for use, installation is straight forward, minimizing costly production downtime.
All internal components are easily accessible to facilitate maintenance.
The use of high - grade desiccant and high-quality components results in acceptable maintenance intervals.

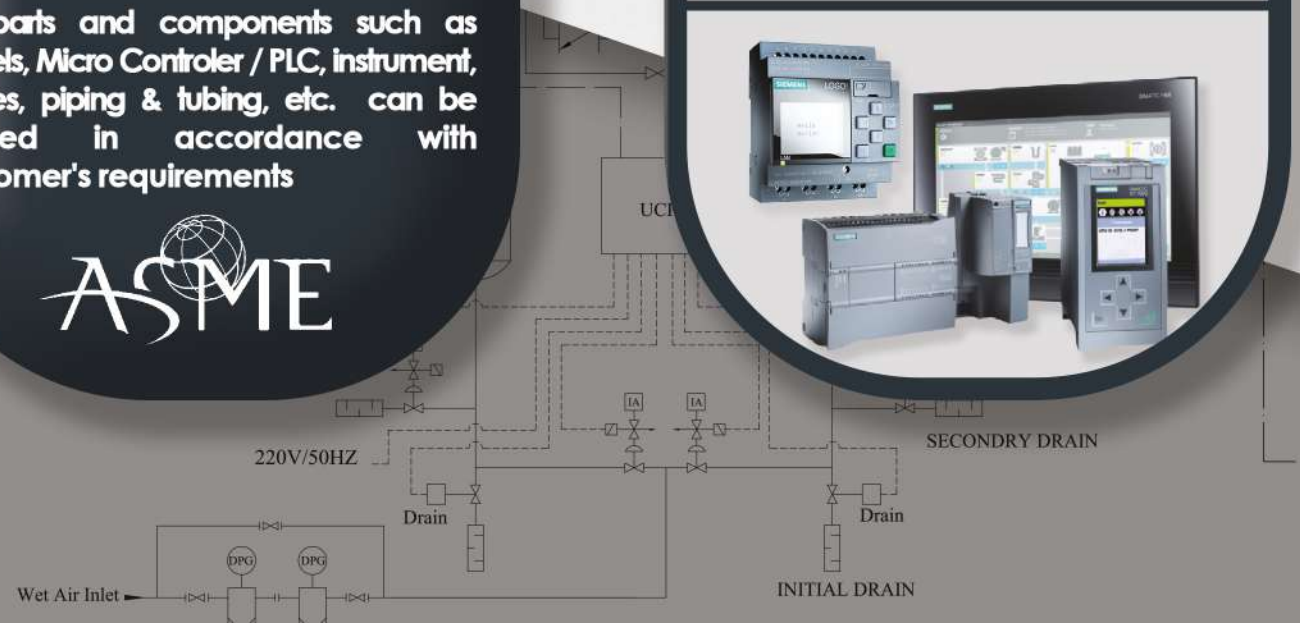
**Defining peace of mind**

Regarding more than 2000 executed success projects by HATCO, you can easily ensure proper functioning of our solution in this respect.

## Benefits:

- Designed according to required dew point and the operating capacity, pressure and temperature
- Advanced electronic control with possibility of connection to DCS
- Standard valves, managed and controlled by Special electric controller
- Extremely compact design
- Ease of operation and maintenance
- Congenial performance at outdoor (Optional)
- Safety valves installed as a standard
- High efficient silencers for depressurization
- Fabrication and installation the manhole at the large towers to ease the inspections and PM
- Stainless steel desiccant bed support screens at the I/O nozzles.
- High performance desiccant

**All parts and components such as panels, Micro Controler / PLC, instrument, valves, piping & tubing, etc. can be offered in accordance with customer's requirements**





## Special Features:

- HATCO's specialty is custom made packages for customers and their projects requirements
- Conformity with all main international Standards
- Stainless steel component like electrical panels, process piping, (e.g. offshore applications)
- Explosion proof equipment, suitable for operation in Zone 1 or Zone 2 environment
- Control by redundant PLC with HMI (Human Machine Interface) for operation via touch screen is available(option).
- Control through of DCS (Distributed Control System) is available

## ENERGY SAVING

**The advanced technologies are ensured the most energy efficient solution.**

### ▷ 5 minutes Fixed Cycle

HATCO 5 minutes cycle operation implies energy saving and less purging
With a cycle of:
5 min. adsorption
3.5 min. regeneration
1.5 min. repressurizing
The machine gives 12 load alterations per hour, in the event that customary 3 minutes of market competitors (3 min. adsorption) gives 20 load alterations in the same duration. In fact drying process necessarily requires more regeneration air that is meaning more energy lost!

### ▷ Demand Cycle

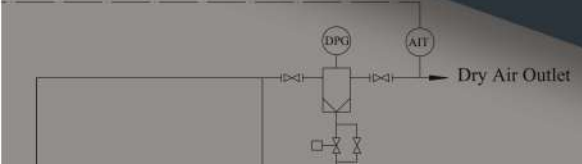
Upon the request, the process can be configured according to:

- Dew point

Air Humidity Management system optimizes dryer operations as a function of dryer's output dew point as an additional option requiring humidity probe.

- Dry air consumption

In cas of stand-by mode configuration, the drying process could be operated and controlled in accordance with the dry air consumption.



# Heatless Desiccant Dryers

## RDA Series;

**For most applications we advise to use the heatless adsorption dryer in order to achieve the required dew point,**

### Principal of Operation:

**The drying process**
**1.** Wet compressed air flows upward through the desiccant which adsorbs the moisture, from bottom to top.

**The regeneration process**
**2.** Dry air from the outlet of the drying tower is expanded nearly atmospheric pressure and sent through the saturated desiccant, forcing the adsorbed moisture out.

**Re-pressurization**
**3.** After desorption, the drain valve is closed and the vessel is re-pressurized.

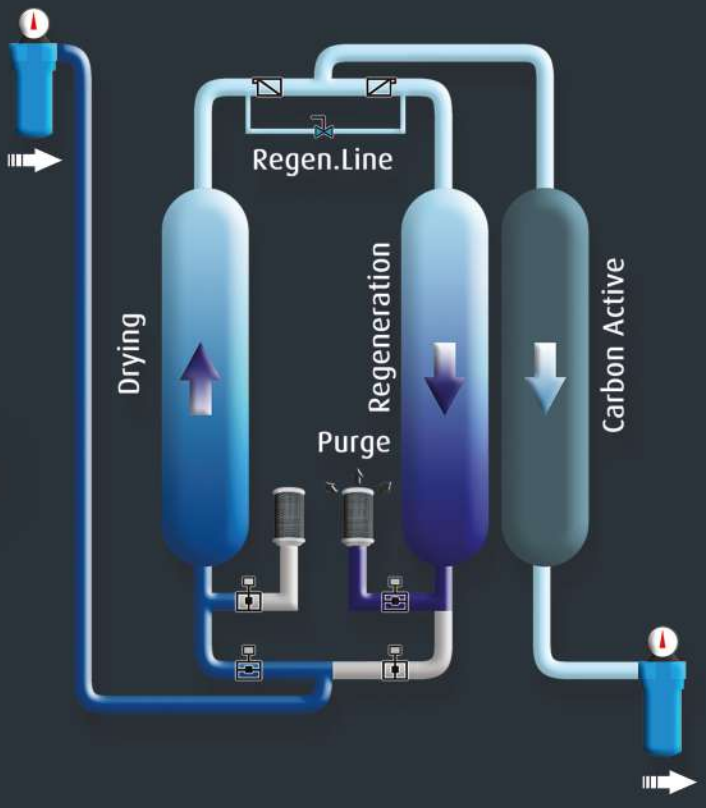
**Switching**
**4.** After regeneration and re-pressurization, the functions of both towers are switched.

HATCO offers a wide range of solutions in adsorption air dryers specificaly heatless types as the options in order to a custom made package.


## MT-RDA Series;

For sensitive applications that is run by oil injected compressors, we advise to use the integrated extra tower on dryer's skid that is charged by activated carbon adsorbent in order to achieve the required high purity with lowest oil vapors. This type could be applied where oil vapor and odor may contaminate end products. The actived carbon bed is designed for long life and services.

The principles of these series are similar to RDA series except dried air at the outlet is flown through of activated carbon tower from top to down to remove oil vapor and odor.



# Heated Purge Desiccant Dryers

Two types of heated regenerative dryers (RDE & RDB) are available:

## RDE Series;

The HATCO RDE Series is an externally heated regenerative air dryer which is offering high reliable design based on fully automated control in order to increase the desiccant long life and services.
The combination of:

1) High moisture capacity, premium grade, high crush strength molecular sieve or activated alumina used in

2) Optimally sized desiccant towers providing low velocity and high contact time through the adsorbent beds delivers long service life and consistent performance.

Externally heated regenerative air dryers, utilizing average of 60-70 % less purge air than a heatless model.
Heated regenerative air dryer packages are the perfect solution for customers who need clean, dry compressed air in a convenient and easy-to-install package.

## Features:

- High temperature solution in preservation all impressive parts
- Specific process parameters such as pressure, dew point are available upon the request
- Automated control sequencing using a highly reliable logic controller or PLC (optional)
- Customized control Philosophy is available on PLC series (optional)
- Operation states viewed on signal lights or text display (optional)
- Local unit electric and control panel could be in conjunction of the project's zone classification (optional)
- Operating as a function of dew point outlet (Optional)
- ASME code or classification approval is available opinion the request (option)
- Hot deep galvanized / stainless steel piping is available (option)
- Coating procedure approvals upon the request (option)

# Super Dry Compressed Air with Maximum Operational Flexibility

This high-value system offer several advantages:

- Complete and ready to install
- No costly separate component or additional piping required
- Completely equipped with all the features you need to produce clean, dry air


- High quality components for reliable performances and long life
- Simplified for optimal maintenance
- System temperature sensor
- Tower pressure gauge
- Tower temperature gauge (Optional)
- Tower safety valve
- All types classified approval filtration and configuration are available
- Stainless steel desiccant bed support screens at the I/O nozzles
- Thermal expansion joint at the regeneration hot line
- Optimized heater with shield elements for long life and corrosion resistance
- Thick insulation with aluminum jacket on hot air lines, and heater for protection, optimum performance and energy saving

# Principal of Operation:

## The drying process

**1.**Wet compressed air flows upward through the desiccant which adsorbs the moisture, from bottom to top.

### The regeneration process

**2.** Dry air from the outlet of the drying tower is expanded nearly atmospheric pressure

**3.** And sent over the heater.

**4.** The heated air is then sent through the saturated desiccant forcing the adsorbed moisture out, from top to bottom.

### Cooling

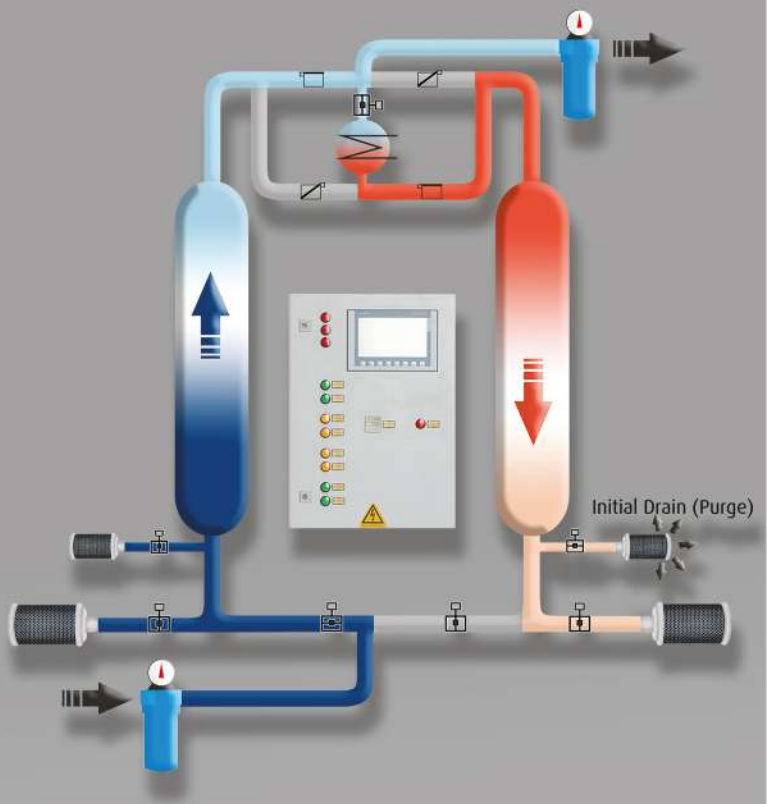
**5.** The cooling cycle at the end of the regeneration cycle shuts down the heater.
A small amount of cool, dry purge air is diverted to cool down the regenerated tower.
By cooling the tower without moisture, temperature of tower will decrease.

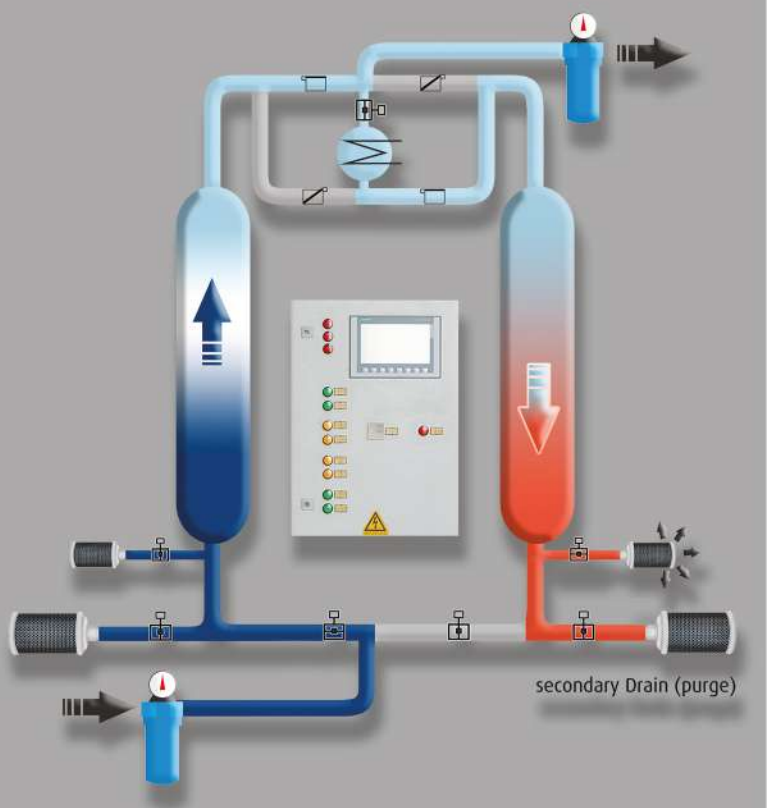
### Repressurization

**6.** After desorption, the drain valve is closed and the towers is re-pressurized.

### Switching

**7.** After regeneration and repressurization, the functions of both towers are switched.

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# ALL RIGHT RESOLUTIONS FOR YOUR APPLICATIONS





## OPTIMIZED DESIGNE FOR DRYING

### RDB series;

**A centrifugal blower and high efficiency heater eliminates the use of valuable compressed air to be used for desiccant regeneration.**

**The completely automatic drying system uses blower to pull ambient air and pass it through the heater. This hot air stream flows opposite to drying flow direction, in order to regenerate the desiccants.**

PLC options:

- Display status
- Display pressure
- Display temperature
- Dew point monitoring & control
- Remote Start/Stop
- Set point & alarm functioning are available
- Data transfer to DCS

# Principal of Operation:

**The drying process**

**1.** Pre-filtered wet compressed air enters the bottom of the drying tower.

**2.** Compressed air passes upward through the desiccant bed; moisture is removed, lowering the dew point.

**3.** Dry compressed air exits the top of the tower and flows downstream to the dust-filter, monitored constantly via dew point sensor (option). To reduce the energy cost, the drying period could be set as the functioning in system control. In this case the drying process is just done until the target dew point occurs (option).

**The regeneration process**

**4.** Prior to regeneration, saturated tower depressurizes to nearly ambient pressure through a drain valve and silencer.

**5.** After that, a blower draws in ambient air for regeneration.

**6.** This air passes through a heater, check valve, and enters top of regenerating tower.

**7.** As the hot ambient air passes downward through the desiccant bed, water molecules are released from the surface of the desiccant.

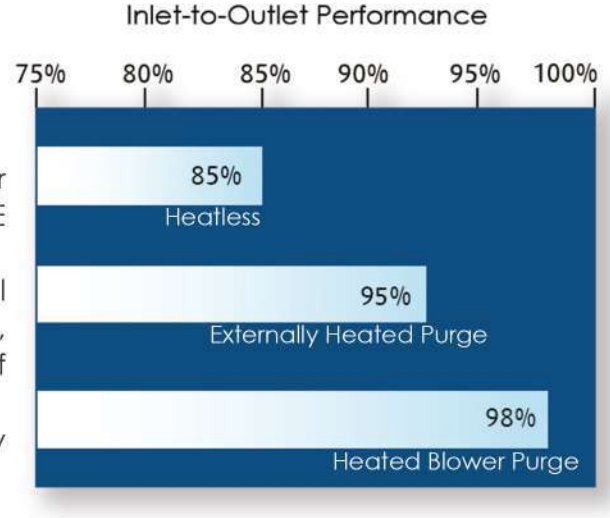
**8.** Hot regenerated air passes through a drain valve and purged to atmosphere.
Proper consumption management and drying process settings are caused terminate heating phase early due to low load conditions. This energy saving solution is automatically passed onto the system and allows for earlier cooling process to begin (Optional).

**Cooling**

**9.** After the heating, the hot tower desiccant is cooled. Cooling is done by expanding dry compressed air from the outlet of the drying tower over the hot regeneted tower, from top to bottom.

## Clever Choice:

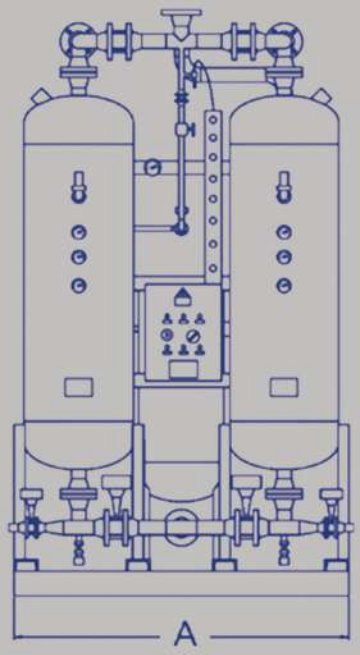
Blower purge externally heated regenerative air dryers (RDB) utilizing even less purge air than RDE Model.
Your compressed air is precious: achieve powerful and cost-effective drying by opting for the RDB, that can be tailored to suit your specific area of application.
With redesigned forms and improved maintainability RDB puts you in control of your process.

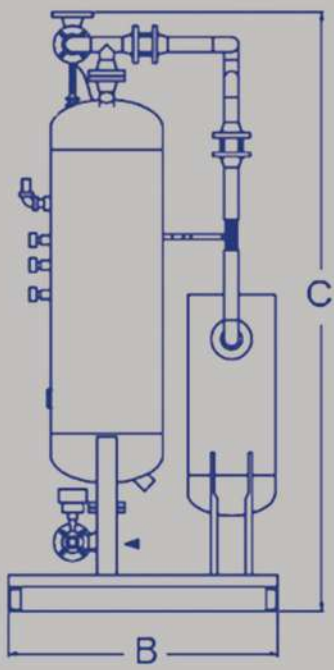


# Technical Specifications

| Model | | Capacity $m^3/min$ | Dimension (mm) A | B | C | Connection DN | Weight Kg | Power Kw |
|---|---|---|---|---|---|---|---|---|
| RDA | 20 | 2.1 | 980 | 550 | 2100 | 25 | 145 | 0.3 |
| RDA | 30 | 3.1 | 1020 | 550 | 1900 | 25 | 225 | 0.3 |
| RDA | 40 | 4.2 | 1050 | 550 | 2220 | 25 | 300 | 0.3 |
| RDA | 50 | 5.1 | 1100 | 550 | 2000 | 40 | 320 | 0.3 |
| RDA | 60 | 6.2 | 1100 | 750 | 2200 | 40 | 360 | 0.3 |
| RDA | 70 | 7.3 | 1100 | 750 | 2350 | 40 | 420 | 0.3 |
| RDA | 100 | 10.2 | 1250 | 800 | 2540 | 50 | 430 | 0.3 |
| RDA | 120 | 12.4 | 1320 | 850 | 2540 | 50 | 510 | 0.3 |
| RDA | 150 | 15.3 | 1500 | 850 | 2570 | 80 | 660 | 0.3 |
| RDA | 170 | 17.2 | 1500 | 850 | 2680 | 80 | 730 | 0.3 |
| RDA | 200 | 20.4 | 1660 | 850 | 2680 | 80 | 780 | 0.3 |
| RDA | 220 | 22.3 | 1660 | 850 | 2800 | 80 | 810 | 0.3 |
| RDA | 250 | 25.4 | 1800 | 1000 | 2830 | 80 | 900 | 0.3 |
| RDA | 300 | 30.3 | 1900 | 1000 | 2870 | 80 | 950 | 0.3 |
| RDA | 350 | 35.5 | 1900 | 1100 | 2870 | 80 | 980 | 0.3 |
| RDA | 400 | 40.7 | 2000 | 1040 | 2830 | 100 | 1150 | 0.3 |
| RDA | 450 | 45.6 | 2000 | 1200 | 2950 | 100 | 1300 | 0.3 |
| RDA | 500 | 50.8 | 2100 | 1230 | 2950 | 100 | 1500 | 0.3 |
| RDA | 550 | 55.3 | 2180 | 1280 | 2980 | 100 | 1790 | 0.3 |
| RDA | 600 | 60.3 | 2240 | 1320 | 3050 | 100 | 1990 | 0.3 |
| RDA | 700 | 70.6 | 2330 | 1360 | 3200 | 100 | 2200 | 0.3 |
| RDA | 800 | 80.8 | 2480 | 1440 | 3300 | 150 | 2400 | 0.3 |
| RDA | 900 | 91.2 | 2540 | 1500 | 3400 | 150 | 2850 | 0.3 |
| RDA | 1000 | 101.3 | 2600 | 1560 | 3500 | 150 | 2850 | 0.3 |
| RDA | 1300 | 132 | 2850 | 1800 | 3800 | 150 | 3500 | 0.3 |
| RDA | 1500 | 153 | 3000 | 1900 | 3900 | 200 | 4040 | 0.3 |
| | | | | | | | | |
| RDE | 100 | 10.1 | 1400 | 1100 | 2450 | 50 | 1250 | 6 |
| RDE | 150 | 15.3 | 1500 | 1150 | 2500 | 80 | 1470 | 12 |
| RDE | 200 | 20.2 | 1600 | 1250 | 2600 | 80 | 1690 | 15 |
| RDE | 250 | 25.4 | 1680 | 1300 | 2600 | 80 | 1850 | 18 |
| RDE | 300 | 30.6 | 1830 | 1330 | 2600 | 80 | 2010 | 18 |
| RDE | 400 | 40.5 | 2000 | 1500 | 2870 | 100 | 2750 | 24 |
| RDE | 500 | 50.5 | 2100 | 1600 | 2950 | 100 | 3450 | 30 |
| RDE | 600 | 60.9 | 2240 | 1700 | 3050 | 100 | 4100 | 33 |
| RDE | 800 | 80.4 | 2480 | 1920 | 3300 | 150 | 4750 | 45 |
| RDE | 1000 | 101.5 | 2600 | 2000 | 3500 | 150 | 5480 | 60 |
| RDE | 1200 | 122.4 | 2850 | 2100 | 3800 | 150 | 6740 | 72 |
| RDE | 1500 | 154.6 | 3000 | 2350 | 3900 | 200 | 8520 | 84 |
| RDE | 1750 | 175.7 | 3200 | 2500 | 4000 | 200 | 10540 | 102 |
| RDE | 2000 | 203.5 | 3200 | 2500 | 4250 | 200 | 12700 | 120 |
| RDE | 2500 | 251.4 | 3400 | 2600 | 4700 | 250 | 15850 | 150 |
| | | | | | | | | |
| RDB | 100 | 10.1 | 1400 | 1400 | 2450 | 50 | 1320 | 10 |
| RDB | 150 | 15.3 | 1500 | 1450 | 2500 | 80 | 1560 | 15 |
| RDB | 200 | 20.2 | 1600 | 1600 | 2600 | 80 | 1780 | 21 |
| RDB | 300 | 30.6 | 1830 | 1780 | 2600 | 80 | 2120 | 24 |
| RDB | 500 | 50.5 | 2100 | 2000 | 2950 | 100 | 3610 | 41 |
| RDB | 600 | 60.9 | 2240 | 2100 | 3050 | 100 | 4280 | 44 |
| RDB | 800 | 80.4 | 2480 | 2400 | 3300 | 150 | 5000 | 61 |
| RDB | 1000 | 101.5 | 2600 | 2520 | 3500 | 150 | 5710 | 83 |
| RDB | 1200 | 122.4 | 2850 | 2600 | 3800 | 150 | 6980 | 95 |
| RDB | 1500 | 154.6 | 3000 | 2950 | 3900 | 200 | 8770 | 114 |
| RDB | 1750 | 175.7 | 3200 | 3100 | 4000 | 200 | 10820 | 135 |
| RDB | 2000 | 203.5 | 3200 | 3150 | 4250 | 200 | 13100 | 160 |
| RDB | 2500 | 251.4 | 3400 | 3250 | 4700 | 250 | 16230 | 195 |
| RDB | 3000 | | On Request | | | | | |
| RDB | 3500 | | On Request | | | | | |
| RDB | 4000 | | On Request | | | | | |
| RDB | 4500 | | On Request | | | | | |
| RDB | 5000 | | On Request | | | | | |

Desiging has done in 20°C and 1 bar (abs)
Special Dryers can be offered on request.




## Corection factors table for RDA series

| Temp. °C | Pressure (bar g) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 35 | 0.75 | 0.88 | 1.00 | 1.12 | 1.25 | 1.35 | 1.45 | 1.50 | 1.60 |
| 40 | 0.67 | 0.79 | 0.90 | 1.00 | 1.12 | 1.21 | 1.30 | 1.35 | 1.44 |
| 45 | 0.56 | 0.66 | 0.75 | 0.84 | 0.93 | 1.00 | 1.10 | 1.12 | 1.20 |
| 50 | 0.41 | 0.48 | 0.55 | 0.61 | 0.68 | 0.74 | 0.79 | 0.82 | 0.88 |
| 55 | 0.30 | 0.35 | 0.40 | 0.45 | 0.50 | 0.54 | 0.58 | 0.60 | 0.64 |

Correction Factor

## Corection factors table for RDE series

| Temp. °C | Pressure (bar g) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 30 | 0.69 | 0.75 | 0.95 | 1.02 | 1.20 | 1.30 | 1.40 |
| 35 | 0.65 | 0.70 | 0.85 | 1.00 | 1.12 | 1.20 | 1.30 |
| 40 | 0.55 | 0.60 | 0.80 | 0.85 | 1.00 | 1.08 | 1.15 |
| 45 | 0.50 | 0.55 | 0.70 | 0.80 | 0.88 | 0.95 | 1.00 |
| 50 | 0.40 | 0.42 | 0.54 | 0.60 | 0.66 | 0.70 | 0.75 |
| 55 | 0.30 | 0.35 | 0.45 | 0.50 | 0.55 | 0.60 | 0.65 |

Correction Factor

ORDERING EXAMPLE FOR HEATLESS TYPE:

- Required dry air capacity: 11 $m^3$/min
- Working press. : 8 bar g
- Inlet temp. : 45°C

Dryer capacity: 11 / 0.84=13.10 $m^3$/min
Selected dryer: RDA 150

All desiccant dryers are designed in accordance with DIN/ISO 7183

## Special Dryers

As the superior manufacturer in domestic market, HATCO offers the a wide range of gas dyers meeting specific constraints, for treating gases $N_2$, $CO_2$, $H_2$, $C_2H_2$, $C_2H_4$, etc.

HATCO offers the large capacity adsorption purifiers systems for cryogenic air separation plants up to 300.000 $m^3$/hr

Our expert sales engineers are available to evaluate your application requirements and help you choose the best desiccant dryer for your needs. Whatever model you select, all HATCO compressed air dryers are built in accordance with our high quality standards, using only superior components to ensure the long-lasting of your investment.

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