

# TWP & TWB Series Externally Heated and Blower Purge Desiccant Air Dryers

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Parker Airtek Externally Heated and Blower Purge Desiccant Air Dryers use the adsorption method to remove moisture from compressed air. Nominal pressure dewpoints reach -40°F (-40°C) by directing the flow of saturated compressed air over a bed of desiccant.

The most commonly used desiccant is activated alumina, a spherically shaped, hygroscopic material, selected for its consistent size, shape and extreme surface to mass ratio. This physically tough and chemically inert material is contained in two pressure vessels commonly referred to as “dual” or “twin” towers. As

the saturated compressed air flows through the bed of the “on-line” tower, its moisture content adheres to the surface of the desiccant.

The dry compressed air is then discharged from the vessel into the distribution system.

A master controller cycles the flow of compressed air between the towers. While one tower is “on-line” drying, the other tower is “off-line” regenerating. Regeneration, sometimes referred to as “purging”, is the process of stripping the accumulated moisture from the “off-line” bed.

Both types of Parker Airtek heat reactivated dryers combine heat with either a small portion of the dried compressed air or with force ambient air to affect regeneration. The heated, low pressure purge air flows gently through the regenerating bed, adsorbing the moisture that accumulated on the surface of the desiccant during the drying cycle and exhausting it to the atmosphere.



# Flow Schematic

Parker Airtek's patented Multi-Port Regeneration System (TWP Series) affects superior desiccant bed regeneration and, as a result, provides better and more consistent performance. The Multi-Port Regeneration System injects heated purge air at precise points up and down the towers' length providing a more balanced distribution of heat. This system prevents the desiccant on top from prematurely deteriorating while providing the bottom of the chamber with enough heated purge air to allow complete regeneration on every cycle. The energy saving temperature monitoring system senses the exiting

purge air temperature. When the purge air temperature increases to a pre-set point at which the desiccant bed is fully heated and regenerated, the heater is turned off.

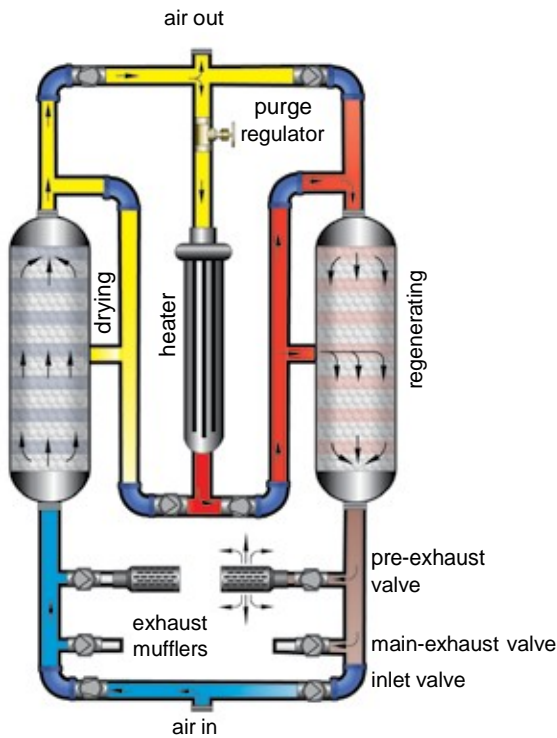
Parker Airtek's Primary Blowdown System is standard on all TWP Series and TWB Series heat reactivated air dryers 1000 scfm and larger. It improves performance and efficiency while increasing desiccant life. The depressurization stage also strips moisture from the bottom of the tank through a purge muffler. Once depressurization is complete, the system switches to the main exhaust where final regeneration is

accomplished with low pressure purge air. By eliminating the main exhaust mufflers, back pressure is also eliminated which allows for more thorough regeneration and less maintenance.

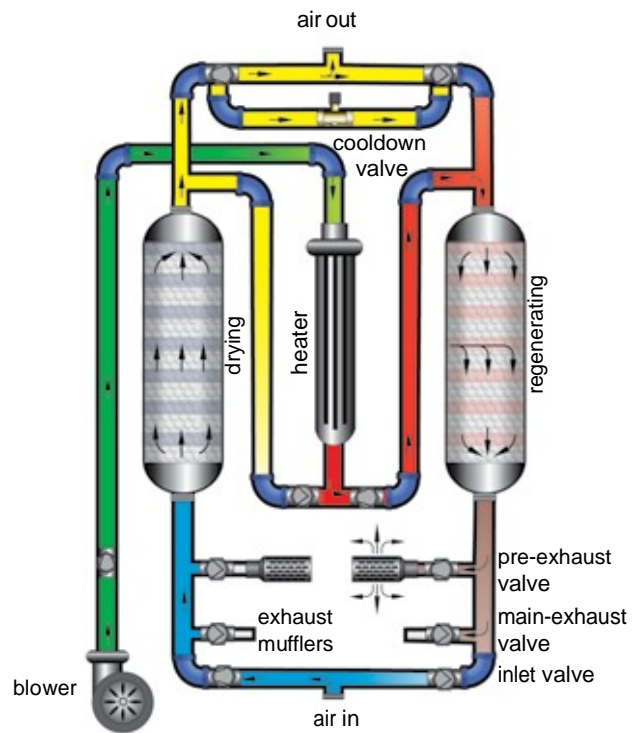
## Up Flow Versus Down Flow Dryin

In the event of prefilter/auto drain failure, up flow drying protects the desiccant bed from contamination of bulk liquids and oil since they stay on the bottom of the tank and get discharged during blowdown. When down flow drying, liquids and oil will gravity drain through the entire bed to the bottom of the tan

**TWP Externally Heated with Patented Multi-Port**



**TWB Series Blower Purge**



# Quick Glance Operational Status

## Digital Readout

The Control Center features a backlit four line character display that monitors operation and status. Regenerating countdowns and time remaining are included.

## Sequence Annunciator

Indicates the status of each tower. LED's indicate which tower is "on-line" drying, "off-line" regenerating as well as the regeneration stages.

## Manual Stepping

Allows the operator to quickly and safely step the dryer through a complete 8 hour cycle, in a matter of minutes.

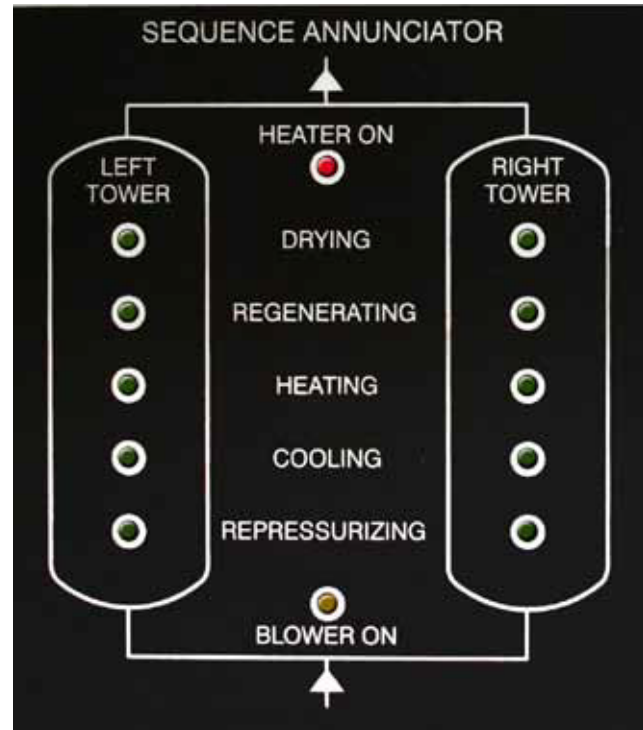
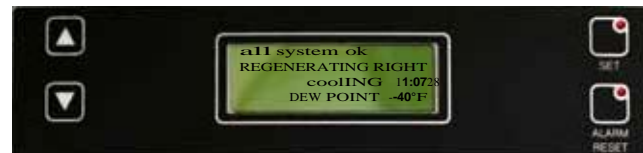
## ThermaLoc™

### (10 Year Extended Warranty on Heater Elements)

The Control Center also controls Airtex's "ThermaLoc™" heater protection system. ThermaLoc™ ensures maximum reliability and eliminates the safety concerns often associated with heat reactivated dryers. Heaters are protected by a totally redundant dual shutdown system that utilizes independent contactors. In addition to the redundant temperature controllers, the system monitors pressure and shuts the heater down in the event of low line pressure. Blower purge dryers have controls to prevent the heater from energizing if the blower is not running.

## Dual Mode Heatless Back Up System

Allows the dryer to function in either the primary heated mode or the auxiliary heatless mode. Should the system experience a temporary overload or a heater failure, the dryer can easily be switched over to operate in the heatless mode. This way the dryer will remain on line until such time as service can be conveniently scheduled. The Dual Mode Back Up System offers unparalleled flexibility, eliminates downtime and prevents business interruptions.



# High Performance Components

**Non-Lubricated Valves** Dryers up to 800 scfm are equipped with our time-proven and dependable non-lubricated switching valves. These independent, air operated valves are specifically designed for compressed air service. They are resistant to desiccant dust and can be maintained without being removed from the dryer.



**Butterfly Actuated Valves** (5 Year Extended Warranty) High Performance Butterfly Actuated Switching Valves are standard on dryers 1000 scfm and larger. These premium, air operated butterfly valves are specifically designed for compressed air. They provide more opening and closing

force compared to other types of valves. An indicator shows the “opened/closed” position of the valve and service can be performed without disturbing dryer piping.



## Design Parameters

Parker Airtek’s Externally Heated and Blower Purge dryers are designed to process a specific volume of compressed air and deliver it to the discharge at a desired pressure dewpoint. Both dryers are rated for a -40°F (-40°C) pressure dewpoint. Dewpoint spikes, inherent on all blower and heat purge dryers, can be reduced by activating Parker Airtek’s standard Supplemental Cool Down Purge feature. Standard

ratings are based on inlet conditions of +100°F (38°C), 100 psi g (7 bar g) and 100% flow. Dryer performance will vary with different inlet conditions.

## Tower insulation

The tower, heater, and purge lines are insulated to increase dryer performance and efficiency by reducing radiant heat loss. It also keeps the unit within the safety parameters set forth by OSHA. Insulation suitable for indoor service is standard on all Parker Airtek Heat Reactivated Dryers (Insulation suitable for outdoor service is an available option).



## Equipment

- Failure to Switch Alarm
- Contacts for Common Alarm
- Systems Sequence Annunciator
- Auxiliary Cooldown
- Heater, Blower Flow Interlock (TWB Models)
- Blower Silencer (TWB Models)
- Compressor Surge Protection
- Control Center
- Redundant Heater Control System (ThermaLoc™)
- Cycle Stepping
- Dual Mode, Heatless Backup
- Fail-Safe Operation
- Control Air Filter
- Long Life and Low Watt Density Heater
- Independent Switching Valves
- Moisture Indicator
- Purge Flow Indicator
- Full Instrumentation
- Indoor Tower Insulation
- Separate Tower Fill/Drain Ports
- Power Saver Exhaust Termination (early regeneration)
- Pressure Equalization
- Stainless Steel Diffuser Screens
- Standby Mode
- Structural Steel Base (1000 scfm & larger)
- Cushioned Seat Check Valves
- High Performance Butterfly Valves (1000 scfm & larger)
- ASME Coded Vessels
- Actuator Valve Limit Switch
- Pre and After Set Filters\*
- Outdoor Insulation\*
- ModBus
- All NEMA Classifications\*
- Non-Yellow Metals\*
- Pressure to 1000 psi g (69 bar g)\*
- Star Watch®\*
- Non-Standard Voltages\*
- PowerLoc™\*
- Ethernet connection\*
- RS485 connection\*

\*Optional Equipment

# Complete Air Treatment

Without proper filtration, desiccant air dryers will not work. Desiccant dryers are designed to adsorb vapor from compressed air; they are not designed for liquid. When liquid, especially oil, is allowed to enter the desiccant chamber, it coats the desiccant material preventing any further adsorption. Oil coated desiccant can not be regenerated, and must be replaced.

The coalescing pre-filter is installed at the dryer inlet. It protects the dryer by removing liquids and reducing the contamination level of the compressed air to .01 PPM by weight. The element is DOP rated at 99.9+% efficient in the 0.3 to 0.6 micron range. An integrated digital indicator is provided to determine element condition. An electronic drain valve is provided on systems 100 through 800 scfm to ensure proper drainage. On systems 1000 scfm and larger a zero air loss demand drain is provided. The drain

controller includes push to test, drain alarm, and common alarm contact.

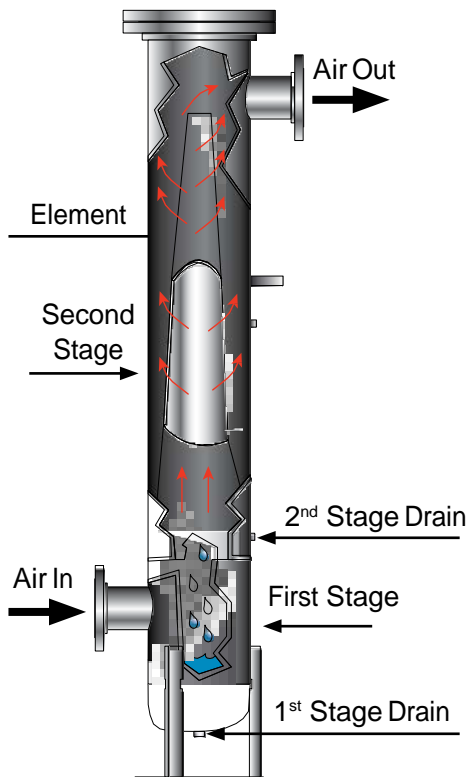
To protect downstream equipment from desiccant dust a particulate after-filter is installed at the dryer discharge. The after-filter element is designed to remove solid particulates from compressed air. The hybrid pleated filter media provides high dirt retention, low pressure drop, and long element life. The element is 99+% effective in removing particles 0.9 micron and larger. An integrated digital element condition indicator is also provided.

Most field problems experienced with desiccant air dryers are the result of improper filter selection, installation, maintenance, and/or draining of condensate. Considering the importance of filtration to dryer performance, Parker Airtek recommends that all desiccant dryers be ordered as a complete,

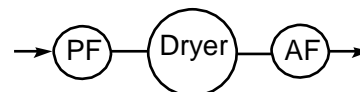
factory assembled Air Treatment System. The Optional Parker Airtek Package "E" includes: properly sized, factory installed coalescing pre-filter and particulate after-filter with electronic drain system (No Loss Demand Drains standard on 1000 scfm and larger), and color change indicators.

Airtek Package "E" systems match our TWP and TWB dryers with Airt high performance filters. In-line filters (JC) are used on systems 100 through 800 scfm and two stage (JLA) severe duty filters are used on systems 1000 scfm and larger. Mist eliminators are available as extra protection.

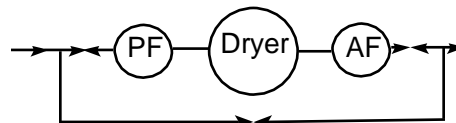
Factory packaging, with matched components and single point connections reduces installation costs, ensures performance and allows Parker Airtek to assume total responsibility for system integrity.



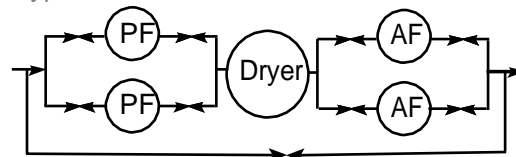
## Package Schematic



Package "E"  
Includes dryer with factory installed pre-filter and after-filter



Package "EB"  
Includes dryer with factory installed pre-filter and after-filter with system bypass



Package "ED"  
Includes dryer with factory installed dual selectable pre and after-filters with system bypass

# PowerLoc™ Energy Management (optional)

The Control Center is designed to accommodate Airtek's optional PowerLoc™ Demand Controller.

PowerLoc™ automatically adjusts energy use to actual moisture load. Moisture loading is affected by inlet temperature, pressure, relative humidity, and flow. These conditions vary throughout the day and rarely combine in such a manner as to produce maximum moisture loads. An inlet temperature reduction of just 20°F (-7°C) will reduce the moisture load by almost 50%. Desiccant dryers are normally sized for "worst case" operation with the cycle fixed to accommodate maximum moisture loads. Because the fixed cycle does not compensate for fluctuating loads, dryers not equipped with PowerLoc™ waste energy by regenerating more often than necessary. PowerLoc™ eliminates this unnecessary use of energy by delaying regeneration until the total design moisture load is achieved. The system monitors actual moisture loading and

limits the number of purge cycles accordingly.

At \$0.08 per KWH, the PowerLoc™ would save \$6,730 annually when used with a 1000 scfm externally heated dryer operating at 75% load for 8,000 hours, at an average inlet temperature of +80°F (27°C). Digital dew point control provides for additional energy savings by allowing the operator to select higher dewpoints when appropriate. The moisture probe is contained in and protected by a rugged, stainless steel housing with a 80 micron sintered metal guard and a pressure rating of 3000 psi g. This housing increases the sensor's ability to withstand reasonable shock and vibration.

The housing also contains an electronics package for continuous self calibration, temperature compensation, and signal stabilization. Due to less frequent cycling, switching valves and desiccant will last longer and require less maintenance.

The PowerLoc™ ceramic sensor is made from state-of-the-art metallized ceramic and replaces traditional materials such as aluminum, silicon and hydroscopic salts. This fast response sensor is made from a ceramic tile that is plasma and vapor deposited to form a surface that is very sensitive to small changes in water vapor pressure.

The proprietary coating processes make the ceramic sensor inherently faster to respond than other impedance or capacitive sensors currently available. The ceramic sensor features the latest digital technology with calibration data stored directly in the sensor's memory, and is equipped with a built-in thermistor for automatic temperature compensation. The PowerLoc™ is traceable to the National Institute of Standards and Technology. A certificate of traceability is available.



# Control Center

Parker Airtek's Control Center for Heat Reactivated Desiccant Air Dryers features a complete complement of data acquisition functions.

These data acquisition functions include the measurement of temperature, pressure, and dewpoint.

## TEMPERATURE (thermocouple)

- Purge Air
- "Special" (fail-safe) Heater Over Temperature
- Left Exhaust
- Right Exhaust
- Dryer Inlet
- Dryer Outlet

## PRESSURE (Transducer signals can be either 4-20ma or 1-5 volt DC)

- Inlet
- Left Tower
- Right Tower
- Purge
- Pre-Filter (psi d)  
(Package "E")
- After-Filter (psi d)  
(Package "E")

## DEWPOINT (Energy Management) - optional

- PowerLoc™ ("Fast Response" Digital Readout with Power Save feature)
- Flow Meter

All Parker Airtek Heated Desiccant Dryers are remotely accessible by RemoteWatch™ software which can be downloaded at <http://divapps.parker.com/divapps/pdf/Starwatch/>.

Star Watch® activated dryers can monitor and analyze every moment of operation, 24-7; it can be done wirelessly. When Star Watch® is active on an installation, it is like having an Airtek factory technician in your plant, advising your process engineer.

The easy to use Control Center affords superior dryer control along with digital telemetry for remote analysis of performance.



# Features

- RemoteWatch™ Software - virtual control, diagrams and graphics
- Star Watch® ready with 68 channels of data and over 60 process values
- Temperature and pressure instrumentation package
- Energy Management PowerLoc™ dewpoint digital readout with Power Save (optional)
- Two extra user defined 4-20 mA or 1-5 Vdc inputs with setpoints and alarms for connection to your flow meter, power meter, etc.
- Intelligent display with operational information
- Full system retentive alarm network (event) log
- Programmable process set points
- Dryer operating “state” annunciation display
- Automatic data logging 24/7, 365 days of all operational information
- 16 Channel “programmable” common alarm
- RS-232 communications port (Optional RS-485)
- Access system via Star Watch® or Modbus protocol
- UL Rated Components
- 160 Fields of operational information
- Dual Mode communication Modbus Protocol, and Star Watch® Protocol
- Connectivity: telco line and cellular wireless modem
- Ethernet (optional)





## TWP Externally Heated Desiccant Air Dryer

Model	Capacity scfm @ 100 psi g (Nm <sup>3</sup> /min @ 7 bar g)	Heater (kW)
TWP100	100 (2.8)	1.5
TWP130	135 (3.8)	1.5
TWP200	200 (5.7)	3
TWP250	250 (7.1)	3
TWP300	300 (8.5)	3
TWP400	400 (11.3)	6
TWP500	500 (14.1)	6
TWP600	600 (17.0)	9
TWP800	800 (22.7)	9
TWP1000	1000 (28.3)	12
TWP1200	1200 (34)	12
TWP1500	1500 (42.5)	18
TWP2000	2000 (62.3)	25
TWP2600	2600 (73.6)	25
TWP3000	3000 (84.9)	30
TWP4000	4000 (113.3)	38
TWP5000	5000 (141.6)	50
TWP6000	6000 (169.9)	60

Model	Dryer with Package "E"				Air In/Out	Power Supply Volts/Phase/ Hz
	Height ins (mm)	Width ins (mm)	Depth ins (mm)	Weight lbs (kg)		
TWP100	83 (2108)	31 (787)	18 (457)	680 (308)	1"	120/1/60
TWP130	83 (2108)	40 (1016)	22 (559)	720 (327)	1"	120/1/60
TWP200	85 (2159)	40 (1016)	22 (559)	920 (417)	1-½"	240/1/60
TWP250	85 (2159)	40 (1016)	22 (558)	1180 (535)	1-½"	240/1/60
TWP300	87 (2209)	43 (1092)	27 (686)	1370 (621)	1-½"	460/3/60
TWP400	88 (2235)	47 (1194)	27 (686)	1400 (635)	2"	460/3/60
TWP500	89 (2261)	50 (1270)	27 (686)	2060 (934)	2"	460/3/60
TWP600	92 (2337)	52 (1321)	28 (711)	2350 (1066)	2"	460/3/60
TWP800	93 (2362)	63 (1600)	35 (889)	3035 (1377)	2"	460/3/60
TWP1000	102 (2591)	78 (1981)	60 (1524)	4195 (1903)	3" Flg	460/3/60
TWP1200	113 (2870)	78 (1981)	60 (1524)	5215 (2365)	3" Flg	460/3/60
TWP1500	113 (2870)	78 (1981)	60 (1524)	6200 (2812)	3" Flg	460/3/60
TWP2000	112 (2845)	108 (2743)	66 (1676)	8565 (3885)	4" Flg	460/3/60
TWP2600	112 (2845)	120 (3048)	66 (1676)	11562 (5244)	4" Flg	460/3/60
TWP3000	112 (2845)	132 (3353)	72 (1829)	12002 (5444)	6" Flg	460/3/60
TWP4000	CF	CF	CF	CF	6" Flg	460/3/60
TWP5000	CF	CF	CF	CF	6" Flg	460/3/60
TWP6000	CF	CF	CF	CF	6" Flg	460/3/60

TWB Externally Heated Air Dryer			
Model	Capacity scfm		
	@ 100 psi g (Nm <sup>3</sup> /min @ 7 bar g)	Blower (HP)	Heater (kW)
TWB100	100 (2.8)	.75	3
TWB200	200 (5.7)	.75	6
TWB300	300 (8.5)	1.5	6
TWB400	400 (11.3)	1.5	9
TWB500	500 (14.1)	3	12
TWB600	600 (17.0)	3	12
TWB800	800 (22.7)	5	15
TWB1000	1000 (28.3)	5	18
TWB1200	1200 (34)	4	25
TWB1500	1500 (42.5)	7.5	30
TWB2000	2000 (62.3)	7.5	38
TWB2600	2600 (73.6)	10	50
TWB3000	3000 (84.9)	10	60
TWB4000	4000 (113.3)	15	85
TWB5000	5000 (141.6)	20	100
TWB6000	6000 (169.9)	20	115
TWB7500	7500 (212.4)	25	135
TWB9000	9000 (254.8)	30	150

## Correction Factors

### Inlet Air Pressure

### Temperature

Inlet Air Pressure			Temperature		
psi g	bar g	CF	°F	°C	CF
50	3.5	.56	90	32	1.35
60	4.1	.65	95	35	1.16
70	4.9	.74	100	38	1.00
80	5.5	.83	105	41	.85
90	6.2	.91	110	43	.74
100	6.9	1.00	115	46	.64
110	7.6	1.09	120	49	.56
120	8.3	1.18			
130	9.0	1.27			
140	9.7	1.37			
150	10.3	1.43			

### Example Calculations

TWP500 corrected for 120 psi (8.3 bar) + 110°F (43°C)

Corrected Capacity = (Rated Capacity) x (psi Correction)  
x (Temperature Correction)

= 500 scfm (13.9 Nm<sup>3</sup>/min) x (1.18) x (.74)

= 437 scfm (12.1 Nm<sup>3</sup>/min)

Model	Dryer with Package "E"				Air In/Out	Power Supply Volts/Phase/ Hz
	Height in (mm)	Width in (mm)	Depth in (mm)	Weight lbs (kg)		
TWB100	83 (2108)	49 (1245)	37 (940)	1050 (476)	1"	120/1/60
TWB200	85 (2159)	56 (1422)	39 (991)	1500 (680)	1-½"	460/3/60
TWB300	87 (2210)	43 (1092)	27 (686)	1900 (862)	1-½"	460/3/60
TWB400	88 (2235)	47 (1194)	27 (686)	2180 (989)	2"	460/3/60
TWB500	89 (2261)	50 (1270)	27 (686)	2840 (1288)	2"	460/3/60
TWB600	92 (2337)	52 (1321)	28 (711)	3420 (1551)	2"	460/3/60
TWB800	93 (2362)	64 (1626)	35 (889)	4490 (2037)	2"	460/3/60
TWB1000	102 (2591)	78 (1981)	60 (1524)	5700 (2585)	3" Flg	460/3/60
TWB1200	113 (2870)	78 (1981)	60 (1524)	6300 (2858)	3" Flg	460/3/60
TWB1500	113 (2870)	78 (1981)	60 (1524)	7165 (3250)	3" Flg	460/3/60
TWB2000	112 (2845)	132 (3353)	72 (1829)	9850 (4468)	4" Flg	460/3/60
TWB2600	112 (2845)	132 (3353)	72 (1829)	12210 (5538)	4" Flg	460/3/60
TWB3000	112 (2845)	144 (3658)	72 (1829)	12650 (5738)	6" Flg	460/3/60
TWB4000	114 (2896)	168 (4267)	84 (2134)	18910 (8577)	6" Flg	460/3/60
TWB5000	114 (2896)	180 (4572)	96 (2438)	21590 (9793)	6" Flg	460/3/60
TWB6000	112 (2845)	180 (4572)	96 (2438)	24890 (11290)	6" Flg	460/3/60
TWB7500	CF	CF	CF	CF	8" Flg	460/3/60
TWB9000	CF	CF	CF	CF	8" Flg	460/3/60