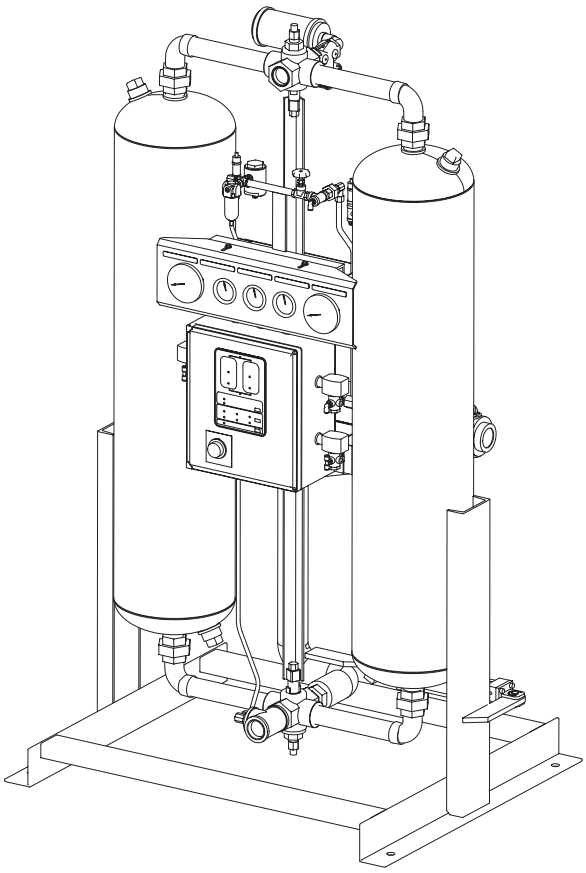
Heated Desiccant Air Dryer

HEATED DESICCANT AIR DRYER



MODELS RE231-RE250

Arrow Pneumatics

ARROW PNEUMATICS

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READ CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR MAINTAIN YOUR DRYER. PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO DO SO COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE. KEEP OWNER'S MANUAL FOR FUTURE REFERENCE.

UNPACKING

ARROW REGENERATIVE AIR DRYERS ARE SHIPPED AS COMPLETELY ASSEMBLED PACKAGES FILLED WITH DESICCANT READY TO INSTALL.

VISUALLY CHECK THE DRYER FOR DAMAGE THAT MAY HAVE OCCURRED IN TRANSIT. IF THERE IS EVIDENCE OF DAMAGE, IMMEDIATELY ENTER A CLAIM WITH THE CARRIER, AND NOTIFY YOUR ARROW REPRESENTATIVE.

APPLICATION CHECK AND ANALYSIS

TO ACHIEVE THE BEST DRYER PERFORMANCE, YOU SHOULD CAREFULLY CHECK THAT THE DESIGN AND INSTALLATION REQUIREMENTS OUTLINED BELOW ARE SATISFIED.

1. Standard operating pressure of your Arrow Dryer can range from 75 minimum to 150 maximum PSIG. Check dryer label to verify maximum service pressure. Air available for your air usage will vary with operating pressure.

2. The dryer should not be installed where compressed air and/or ambient temperature exceeds 120°F or drops below 32°F. Locate dryer to avoid extremes of heat and cold from other conditions. Best results occur when dryer is located as close to point of use as practical. Where applicable, dryer towers should be insulated to reduce heat loss. Avoid locating dryer outside or where it is exposed to the elements.

3. Arrow dryers are sized according to air flow not pipe size. The dryer requires 6% to 8% of inlet airflow (SCFM) for regeneration. The difference between the inlet and outlet flow is the amount of purge air required. This air is purged to atmosphere and is not available for use downstream. Make certain air supply to dryer meets your air demand plus purge air requirements.

Note: Dryers must be sized for usable air required plus purge air which equals required air inlet air flow to dryer.

INTRODUCTION TO HEATED REGENERATIVE DRYING

The Arrow Pneumatics externally heated twin tower regenerative dryers combine the high reliability of our "RH" series desiccant dryer and adds an external heater to form the "RE" series dryer. Dew points, normally –40°F, can optionally be as low as –100°F. Purge air is approximately 7% of rated flow, thus reducing the operating costs of the heated twin tower regenerative dryers compared to heatless regenerative dryers. Purge air in the "RE" series is heated by a 100% efficient incoloy sheath electric heater housed in an externally mounted shell. A thermostat controls the temperature of the heater allowing long life and energy savings. The heater and purge piping are insulated for safety and further energy savings. Arrow "RE" series heated dryers have microprocessor controls housed in a NEMA4 rated enclosure. Pneumatically actuated valves have been chosen for long life and high air flow.

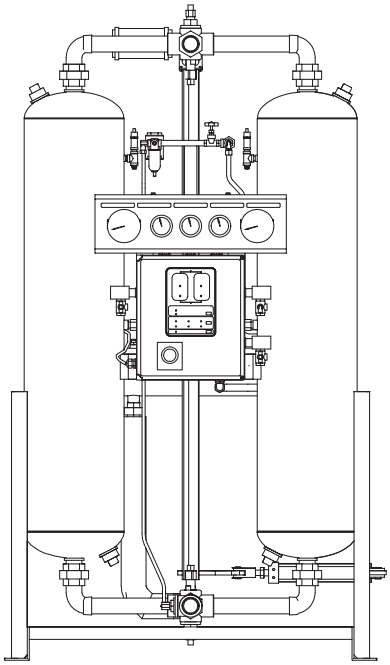
SPECIFICATIONS

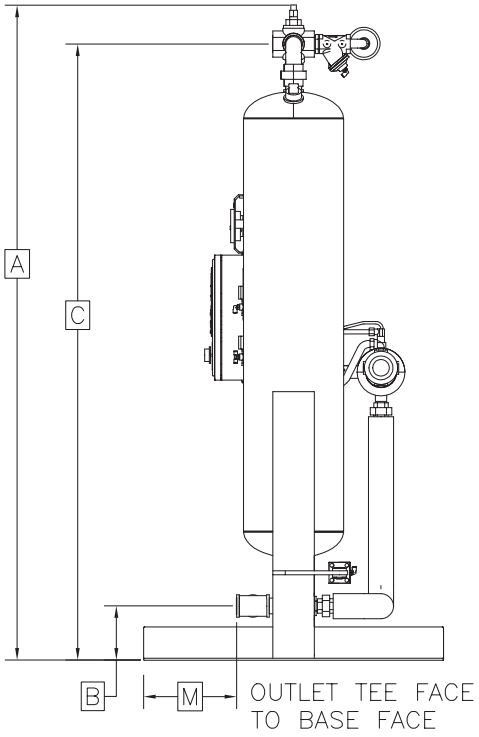
Model No.	Capacity SCFM	Heater Power (KW)	Amps	Purge Flow SCFM	Purge Pressure Setting
RE231	50	.75	6.3	4.5	40 PSIG
RE232	75	1.25	8.5	5.3	35 PSIG
RE233	100	1.50	12.5	6.7	45 PSIG
RE234	150	2.00	2.4	12.0	50 PSIG
RE235	200	2.50	3.0	13.6	45 PSIG
RE236	250	3.00	3.6	20.0	45 PSIG
RE237	300	4.00	4.8	21.0	50 PSIG
RE238	350	4.00	4.8	24.7	40 PSIG
RE239	400	5.00	6.0	27.0	45 PSIG
RE240	500	6.00	7.2	29.0	50 PSIG
RE241	650	6.50	7.2	44.0	45 PSIG
RE242	750	7.50	9.0	50.0	40 PSIG
RE243	900	9.00	10.8	65.0	35 PSIG
RE244	1,100	12.00	14.5	73.0	40 PSIG
RE245	1,300	15.00	18.0	98.6	35 PSIG
RE246	1,500	15.00	18.0	114.2	45 PSIG
RE247	1,800	20.00	21.7	136.9	40 PSIG
RE248	2,100	20.00	24.1	159.5	50 PSIG
RE249	2,500	24.00	30.1	190.2	45 PSIG
RE250	3,000	30.00	36.1	227.0	45 PSIG

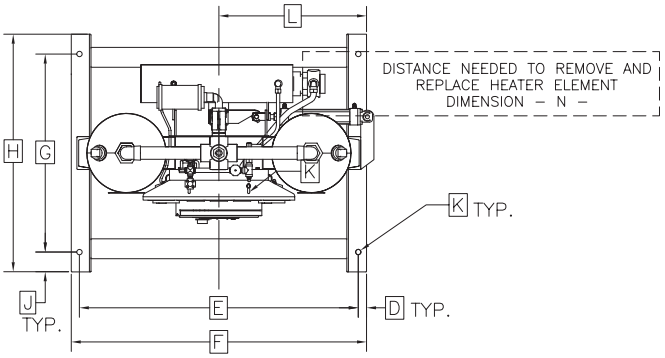
ADDITIONAL SPECIFICATIONS

- **Specifications and dimensions** are subject to change without notice.
- **Standard design conditions** are 100°F inlet temperature, 100 psig and 100˚F ambient temperature. For other than standard design conditions or capacities up to 12,000 scfm, consult your factory representative.
- **Maximum pressure drop** of 2 PSIG
- **Maximum Working Pressure:** 150 PSIG
- **Minimum Working Pressure:** 75 PSIG
- **Maximum Inlet Temperature:** 120ºF
- **Minimum Inlet Temperature:** 32ºF
- **Standard Pressure Dew Point:** -40ºF
- **Electrical Construction:** NEMA 4X

Model No.	Height Inches	Width Inches	Depth Inches	Weight Lbs.
RE231	63	39	24	440
RE232	63	39	24	600
RE233	71	39	24	760
RE234	79	45	36	930
RE235	79	45	36	1,050
RE236	79	45	36	1,330
RE237	76	52	36	1,525
RE238	76	52	36	1,700
RE239	93	52	36	1,940
RE240	93	52	36	2,275
RE241	103	61	36	2,650
RE242	103	61	36	3,170
RE243	103	61	36	3,750
RE244	105	70	48	4,175
RE245	105	70	48	4,580
RE246	114	81	60	5,020
RE247	114	81	60	5,410
RE248	114	81	60	6,040
RE249	111	94	60	8,720
RE250	111	94	60	9,880



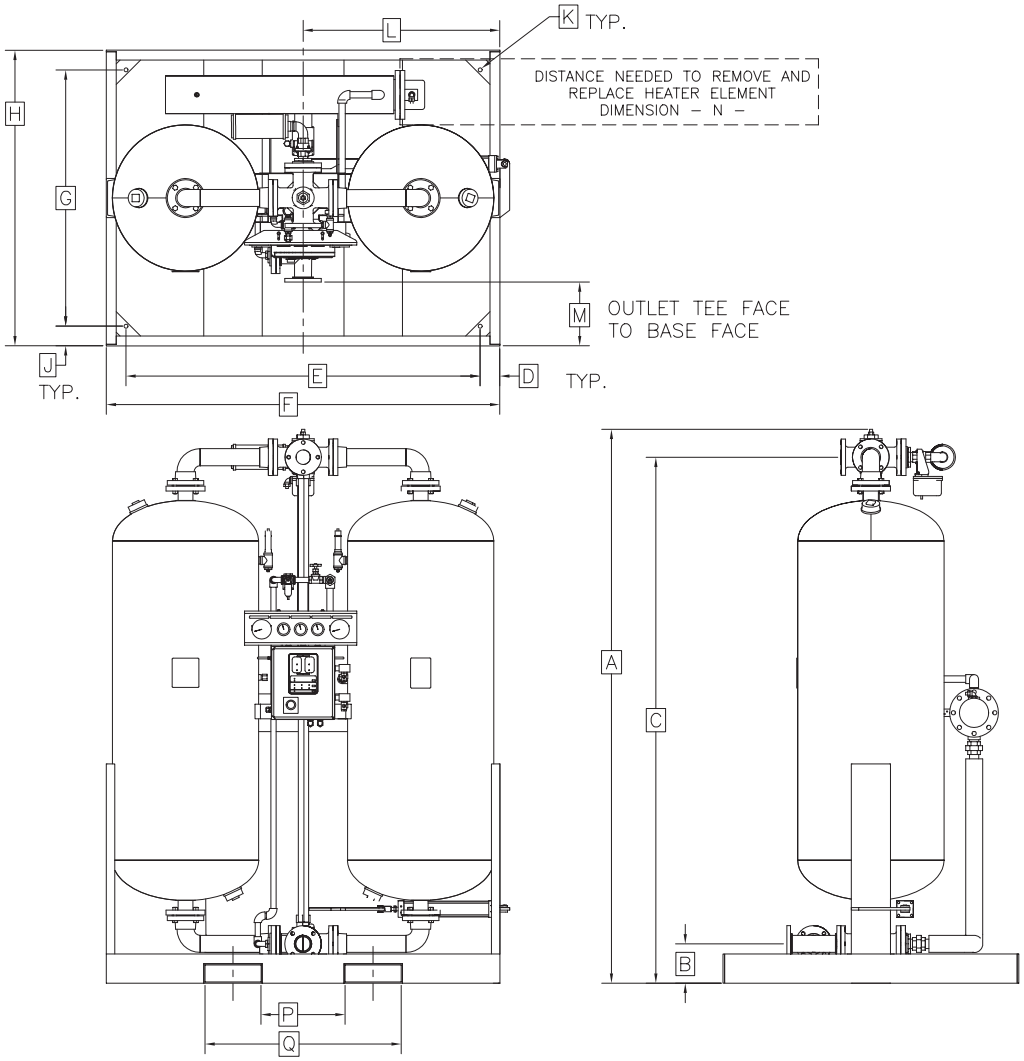




DIMENSIONED IN INCHES	MODEL NO.				
	RE231	**RE232**	**RE233**	**RE234**	**RE235**
A	62.28	62.28	70.28	78.68	78.68
B	6.10	6.10	6.10	6.51	6.51
C	58.40	58.40	66.40	73.99	73.99
D	1.25	1.25	1.25	1.25	1.25
E	35.75	35.75	35.75	42.25	42.25
F	38.25	38.25	39.00	44.75	44.75
G	21.00	21.00	21.00	30.00	30.00
H	24.00	24.00	24.00	36.00	36.00
J	1.50	1.50	1.50	3.00	3.00
K	0.5625	0.5625	0.5625	0.8125	0.8125
L	19.125	19.125	19.50	22.375	22.375
M	7.23	7.23	7.23	11.18	11.18
N	30.00	30.00	30.00	30.00	30.00

DIMENSIONED IN INCHES	MODEL NO.				
	RE236	**RE237**	**RE238**	**RE239**	**RE240**
A	78.68	76.03	76.03	92.82	92.82
B	6.51	6.46	6.46	6.46	6.46
C	73.99	71.04	71.04	89.54	89.54
D	1.25	1.25	1.25	1.25	1.25
E	42.25	48.75	48.75	49.00	49.00
F	44.75	51.25	51.25	51.50	51.50
G	30.00	30.00	30.00	30.00	30.00
H	36.00	36.00	36.00	36.00	36.00
J	3.00	3.00	3.00	3.00	3.00
K	0.8125	0.8125	0.8125	0.8125	0.8125
L	22.375	22.125	22.125	25.75	25.75
M	11.18	9.97	9.97	9.97	9.97
N	30.00	40.00	40.00	45.00	45.00

DIMENSIONED IN INCHES	MODEL NO.		
	RE241	**RH242**	**RE243**
A	102.70	102.70	102.70
B	7.63	7.63	7.63
C	96.93	96.93	96.93
D	1.25	1.25	1.25
E	58.40	58.40	58.40
F	60.90	60.90	60.90
G	30.00	30.00	30.00
H	36.00	36.00	36.00
J	3.00	3.00	3.00
K	0.8125	0.8125	0.8125
L	30.45	30.45	30.45
M	7.97	7.97	7.97
N	45.00	50.00	50.00



DIMENSIONED IN INCHES	MODEL NO.			
	RE244	**RE245**	**RE246**	**RE247**
A	104.16	104.16	113.65	113.65
B	7.58	7.58	8.07	8.07
C	98.44	98.44	107.93	107.93
D	3.40	3.40	3.71	3.71
E	62.70	62.70	73.32	73.32
F	69.50	69.50	80.75	80.75
G	41.83	41.83	53.20	53.20
H	48.63	48.63	60.63	60.63
J	3.40	3.40	3.71	3.71
K	0.8125	0.8125	0.8125	0.8125
L	34.75	34.75	40.375	40.375
M	7.07	7.07	13.07	13.07
N	50.00	50.00	50.00	60.00
P	22.00	22.00	23.25	23.25
Q	41.00	41.00	46.25	46.25

DIMENSIONED IN INCHES	MODEL NO.		
	RE248	**RE249**	**RE250**
A	113.65	110.53	110.53
B	8.07	7.69	7.69
C	107.93	104.30	104.30
D	3.71	3.71	3.71
E	73.32	88.64	88.64
F	80.75	96.08	96.08
G	53.20	53.20	53.20
H	60.63	60.63	60.63
J	3.71	3.71	3.71
K	0.8125	0.8125	0.8125
L	40.375	48.04	48.04
M	13.07	12.36	12.36
N	60.00	50.00	50.00
P	25.25	24.83	24.83
Q	48.25	47.33	47.33

MOUNTING SPECIFICATIONS AND DRYER LOCATION

1. Electrical connection must be hard piped with an external fused disconnect switch and proper overload protection. See electrical connection section for connection location.

WARNING
ARROW DRYERS ARE WIRED FOR HIGH VOLTAGE. ONLY QUALIFIED ELECTRICIANS ARE AUTHORIZED TO SERVICE THIS ELECTRICAL EQUIPMENT

2. Frame must be suitably grounded.

3. Generally locate your dryer downstream from the air receiver. The only exception would be on applications with a fluctuating demand. Then the dryer should be located upstream of the receiver to avoid air surges through the dryer's desiccant beds.

4. Provide adequate space around the dryer for servicing.
   Bolt dryer skid to foundation where possible.

PIPING ARRANGEMENT & FILTER INSTALLATION

1. Remove all pipe plugs from the dryer. Take care to insure that pipe dope, pipe tape, scale or metal chips are not trapped before the inlet port.

Note: Pre & after filters must be used on all Regenerative Air Dryers.

Note: In situations where air supply is required 24 hours a day (it is undesirable to interrupt the airflow), a three valve bypass system is recommended to bypass the dryer and filters. Use the fewest elbows and taper connections necessary to keep pressure drop at a minimum.

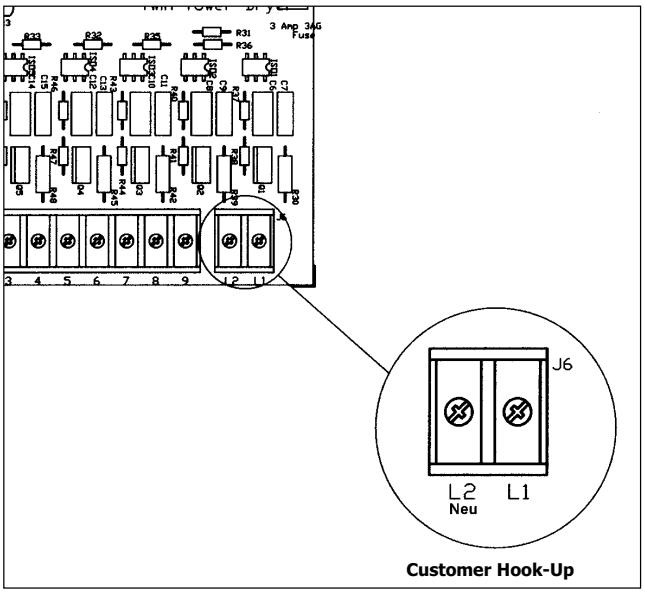
2. Wet air inlet is at the dryer's top piping assembly. Dry air outlet is from the dryer's bottom piping assembly (see flow diagram on page 10).

3. Install **Pre-Filters** to "Inlet Air" connection on the top piping assembly.
   - Wet, compressed air should be connected to **pre-filter.**
   - Compressed air entering the dryer must be cooled to at least 120ºF.
   - Pre-filters, located before the dryer, protect desiccant beds from contamination by oil, entrained water, pipe scale, etc., thereby extending dryer desiccant life. Locate pre-filters as close to the dryer as possible. An automatic drain must be installed on all prefilters.
   - It is recommended that a mechanical separator be installed immediately preceding the pre-filter to remove the bulk liquid oil and entrained water.

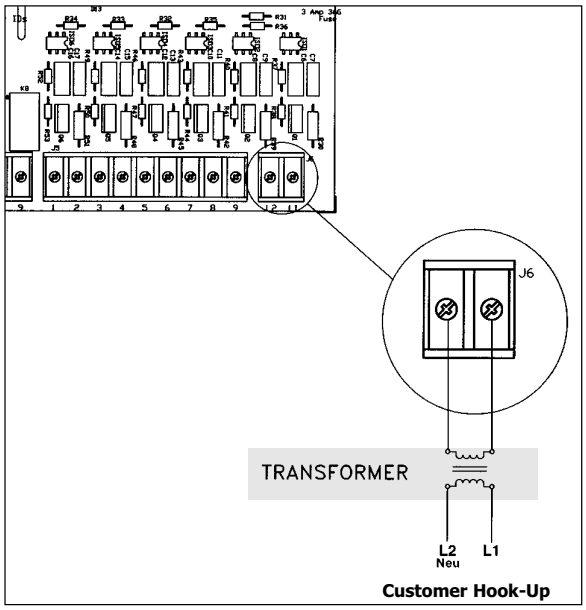
4. Install **After Filter** to "Outlet Air" connection on the bottom piping assembly.
   - Dry, service air should be connected to **after-filter.**
   - After filters, located after the dryer, help eliminate the possibility of desiccant dusting and carry over into the air system.
   - Install afterfilters as far downstream as practical to minimize exposure to elevated compressed air temperatures (160ºF to 180ºF normally) common at dryer tower switch over. High temperature filters are recommended to prevent rupture possibility in the event dryer failure should occur. Consult your Arrow representative for appropriate filter selection and sizing. Plastic bowl type filters are not recommended.

ELECTRICAL CONNECTION

RE231 THRU RE233 - 120V/1ph/60Hz



RE234 THRU RE250 480V/3ph/60Hz

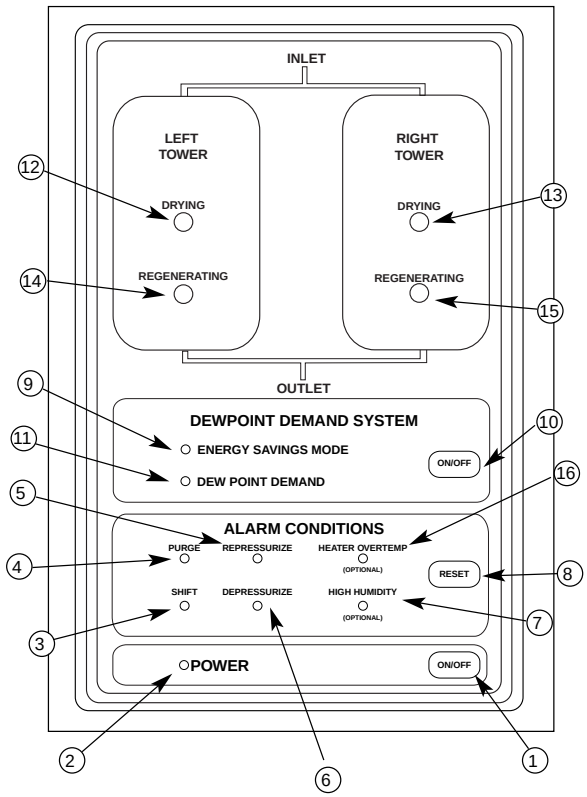


Note: Circuit Board Timer is rated for 120V/1ph/60Hz ONLY

START-UP OPERATIONS

1. **Power On/Off Push Button** - Energizes circuit board timer, initiating dryer operation.
2. **Power ON LED** - Illuminates when dryer is in operation.
3. **Failure to Shift Alarm LED** - Illuminates when dryer has failed to shift.
4. **Failure to Purge Alarm LED** - Illuminates when dryer has failed to purge.
5. **Failure to Repressurize Alarm LED** - Illuminates when dryer has failed to repressurize.
6. **Failure to Depressurize Alarm LED** - Illuminates when dryer has failed to depressurize.
7. **High Humidity Alarm LED (Optional)** - Illuminates when an elevated dew point has occurred.
8. **Alarm Condition Reset Button** - Clears all alarms conditions
9. **Energy Savings Mode LED (Optional)** - Illuminates when dryer has reached the desired dew point and initiates Energy Savings Mode.
10. **Dew Point Demand On/Off Button** - Energizes Dewpoint Demand Logic.
11. **Dew Point Demand LED (Optional) -** Illuminates when Dewpoint Demand Logic is in operation.
12. **Left Tower Drying LED** - Illuminates when left tower is drying service air.
13. **Right Tower Drying LED** - Illuminates when right tower is drying service air.
14. **Left Tower Regenerating LED** - Illuminates when left tower is regenerating.
15. **Right Tower Regenerating LED** - Illuminates when right tower is regenerating.
16. **Heater Overtemp Alarm (Optional)** - Illuminates when a heater over temperature condition exists.

Touch Pad Control Panel



AFTER ALL PIPING AND ELECTRICAL CONNECTIONS ARE MADE, PROCEED AS FOLLOWS:

1. *SLOWLY PRESSURIZE THE DRYER!*
2. When the dryer reaches full operating pressure, check the system for air leaks. Soap test all joints and fittings. To maintain desired dew point, any leaks detected must be fixed, especially those on the outlet side of the dryer.
3. Energize electrical circuit by simply pressing the power on/off button.
4. The Power On LED will be illuminated when the dryer is in operation. When the electrical circuit has been energized, the control circuit board will start to operate and automatically initiate dryer operation. The timer is factory set, so that no field adjustment is necessary. See cycle timing section for dryer operation.

Note: Cycle will begin with left tower drying, right tower regenerating.

5. Adjust purge adjustment valve so that the center purge pressure gauge reads appropriate pressure (see specifications chart for purge pressure on page 4).
6. Insure that thermostat is set @425ºF.

Dryer Operation

Regeneration of the "RE" series dryers is similar to the twin tower regenerative dryers in that the airflow is reversed between operation and regeneration. Compressed air saturated with water vapor passes through the inlet valve and flows downward through the desiccant in tower "A." Tower "A" is said to be "on-line." The activated alumina desiccant adsorbs water vapor in the compressed air and the pressure dew point is lowered to a minimum of –40˚F. The dried air then passes through the outlet valve to the factory tools and/or equipment.

While the air is being dried in tower "A," the desiccant in tower "B" that absorbed moisture in the previous cycle is simultaneously regenerated. Tower "B" is "off line." At the start of the regeneration cycle, tower "B" is depressurized from the operating pressure to atmospheric pressure with an upward air flow which passes through the purge valve and out the purge muffler. Regeneration continues with dried purge air from tower "A" that is expanded to atmospheric pressure to lower its vapor pressure. This purge air is heated and passes through an orifice assembly and upward through tower "B" out to atmosphere. The temperature of the heater can be adjusted for better efficiencies. The combination of heated and lowered vapor pressure air allows for efficient and cost effective desiccant regeneration.

The entire process therefore consists of two cycles, one for drying and the other for regeneration. This process takes 8 hours to complete, with the drying cycle using 4 hours to provide the desired dew point, and regeneration cycle taking 4 hours;3 hours for heating and 1 hour for cooling. As pressure is a direct function of purge air, the higher the pressure, the lower the purge. All Arrow Pneumatics externally heated regenerative dryers have a 2 psi maximum pressure drop at standard conditions.

Dryer Operation cont'd

The dryer is fully automatic in operation and will now operate with a minimum of maintenance and care. Each sequence of operations is programmed by an automatic circuit board timer.

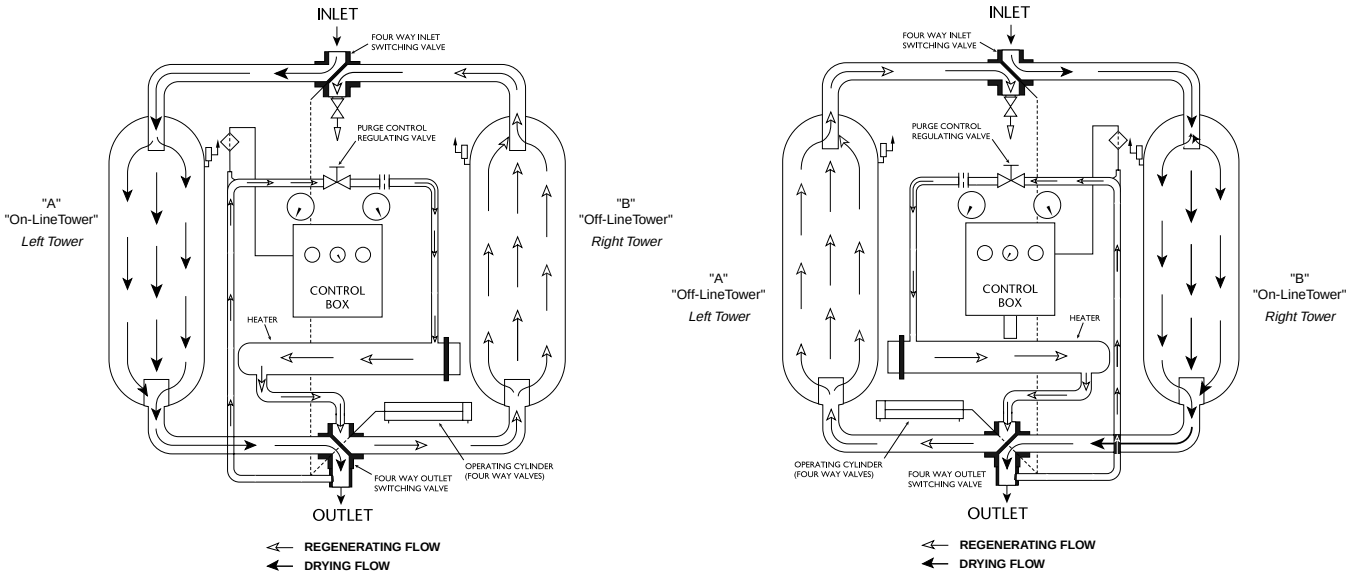
Standard dryers operate on an 8 hour NEMA cycle with hours drying and 4 hours regenerating (3 hours heating and 1 hour cool down).

Prior to tower switch over, a 10 minute time interval is allowed to bring both towers to full line pressure before switch over (right and left tower switch drying/regenerating functions). This accomplished by closing the purge valve, and allowing the purge air flow to bring the off-line tower to full line pressure. After the pressure in the regenerated tower reaches line pressure, the 4-way plug valves shift. This shift should always occur at full line pressure to prevent rapid pressurization which would agitate, and cause attrition to the desiccant bed.

Approximately 5 minutes after the towers shift the purge valve will open, depressurizing the tower that had been in drying service for the previous 4 hours. At this time the heater will initiate the regenerating cycle.

At this point the heater is energized for the three hour heating period. The purge air flow begins to carry heat into and through the wet desiccant bed. During the 4th hour of the regeneration cycle, the heater is turned off and the purge air is allowed to continue flowing through the bed.

The now cool purge air, cools the desiccant, carrying the heat out of the regenerating tower. This cool down period is important in reducing desiccant thermal shock (pulverization of desiccant caused by excessive temperature differential).



NOTE: At Initial Start-Up, check the dryer operation for one or two cycles, especially at the time of the tower shift. Verify that all systems are operating in their proper order and sequence. If the dryer is not functioning properly, contact your Arrow Representative.

Shut Down Procedure

WARNING
IF DRYER IS SHUT DOWN DURING A HEATED CYCLE, BOTH TOWERS MUST COOL TO 200ºF OR BELOW, BEFORE STARTUP, TO PREVENT DAMAGE TO DRYER AND FILTERS.

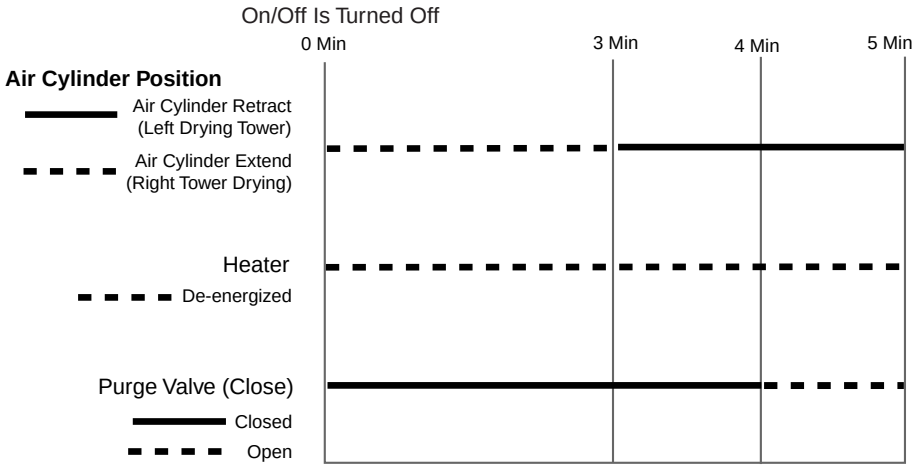
Note: After any shutdown in either 1st or 2nd 4-hour cycle, the dryer will always start a new cycle, drying the left tower and regenerating the right tower

Shutdown #1

- **Condition:** Dryer must be de-energized during the first 4-hour cycle (left tower drying condition).
- **Response**: Press the ON/OFF button; the dryer will be de-energized immediately.

Shutdown #2

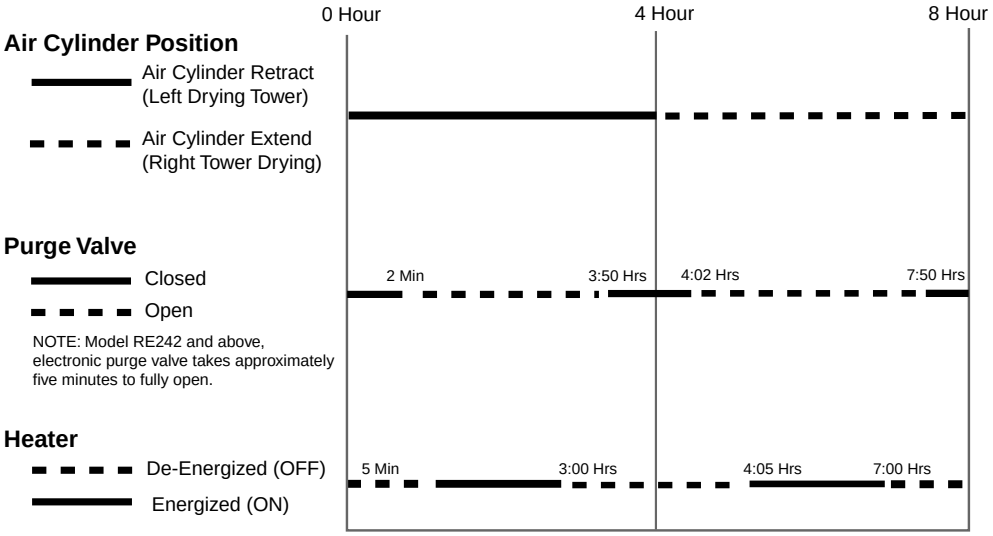
- **Condition**: Dryer must be de-energized during the second 4-hour cycle. (right tower drying condition.)
- **Response:** Press the ON/OFF button; the following 5-minute timing sequence will occur. During this 5 minute shut-down period the status LED's will flash. After 5 minutes the dryer will be de-energized.



Shutdown #3

- **Condition:** Dryer must be de-energized *immediately* during the second 4-hour cycle (right tower drying.)
- **Response:** Press and hold ON/OFF button for 5 seconds; dryer will be de-energized immediately.

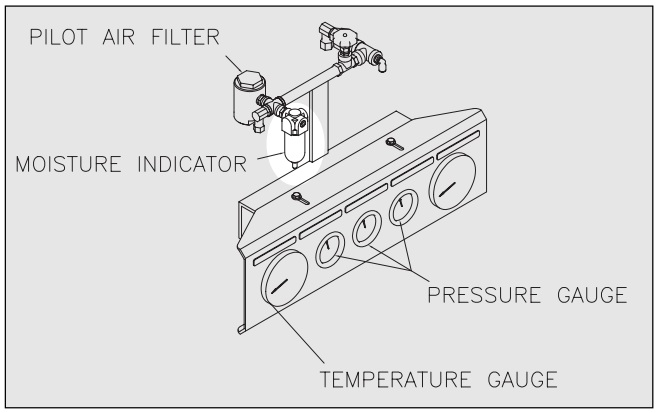
Cycle Timing



Moisture Indicator

The Moisture indicator is provided to warn operating personnel of dryer malfunction. If the dryer is functioning properly, the desiccant in the Moisture Indicator will be blue. Should the blue color fade or turn pink, discontinue dryer use and refer to elevated dew point section in Troubleshooting Guide.

Note: A small portion of air should flow through the moisture indicator



Pressure Alarm Package

The pressure alarm package is designed to monitor the following: depressurization and repressurization of towers, purge pressure and tower shifting.

Failure to Depressurize – Senses for pressure on the offline tower after tank shift-over. Should the tower fail to depressurize do to a malfunctioning system component (i.e. purge valve, solenoid valve, purge check valve or circuit board timer) the Failure to Depressurize LED will be illuminated. The Failure to Shift LED will also be illuminated to show a shift failure. Should the alarm LED be observed, refer to Troubleshooting Guide.

Failure to Repressurize – Senses for pressure on the offline tower before tank shift-over. Should the tower fail to repressurize do to a malfunctioning system component (i.e. purge valve, solenoid valve, or circuit board timer) the Failure to Repressurize LED will be illuminated. The Failure to Shift LED will also be illuminated to show a shift failure. Should alarm LED be observed, refer to Troubleshooting Guide.

Failure to Purge – Senses for pressure on the center purge piping at all times during dryer operation. Should a low purge pressure condition occur (i.e. purge flow regulator turned down or debris in the purge pressure piping) the Failure to Purge LED will be illuminated, and the heater will be de-energized. Should alarm LED be observed, refer to Troubleshooting Guide.

Failure to Shift – The Failure to Shift LED will be illuminated when a dryer shift failure has occurred. The shift failure was due to a Failure to Depressurize or Failure to Repressurize. Observe dryer operation to determine which failure caused the Failure to Shift and refer to Troubleshooting Guide.

Heater Operation

Set heater thermostat @ 425 deg F.
For long and efficient heater life, Arrow externally mounted heaters are operated at a low watt density. When supplied with proper purge flow, heaters are rated and sized not to overheat.

CAUTION
HEAT REACTIVATED DRYERS MUST ALWAYS BE PRESSURIZED WHEN ENERGIZED. HEATERS CAN OVERHEAT AND PREMATURELY AGE IF PURGE AIRFLOW IS INTERRUPTED OR DISCONTINUED DURING HEATER OPERATION.

Note: If purge pressure falls below 20 psi the heater will automatically cut out.

Heater Operation cont'd

During dryer operation, you will note that the heater will cycle on and off during the 3 hour heating period. The heater supplies enough heat that when combined with purge airflow, it will fully regenerate (dry out) the wet desiccant bed in the off-line tower.

WARNING
DURING THE REGENERATION CYCLE THE OFF-LINE REGENERATION TOWER GETS HOT. CARE SHOULD BE TAKEN WHENEVER YOU ARE WORKING ON OR NEAR THE DRYER

You will note that the tower temperature gauges (located on the panel) will indicate when desiccant regeneration is nearing completion.

Near the end of the 3 hour regeneration period, a temperature reading of 250ºF to 275ºF normally indicates the desiccant bed has been regenerated.

Note: At the end of 3 hour heating period observe temperature gauge for 30 minutes. Temperature gauge readings will vary with moisture loading of desiccant.

Should moisture content of inlet compressed air be low (i.e. during dry winter months) regeneration temperatures may reach as high as 325ºF.

Should moisture content of the compressed air exceed dryer's design capacity, (overloading, too much SCFM, elevated inlet temperature, low pressure) temperature readings will range below 220ºF. Note: The standard -40 deg F pressure dewpoint will not be achieved if this condition occurs.

Purge Flow System

RE-Series Exhaust Purge Dryers feature a purge flow system.
The purge flow system consists of:

① Purge Flow Adjustment Valve
② Purge Flow Meter (Gauge)
③ Purge Orifice (Located in pipe union)

The purge flow system is located between the twin towers of the dryer and/or above the control box. The function of the purge flow system is to regulate the amount of purge air allowed to flow into and subsequently regenerate the off-line (0 PSIG) tower.

The purge flow is controlled by adjusting the purge flow valve to a specific setting as indicated on the purge flow meter (gauge). Once set, the purge flow adjusting valve in conjunction with the purge orifice plate will allow a certain fixed purge air flow.

Combined with the heat provided by the heater, the purge air has sufficient moisture holding capacity (low vapor pressure) to dry out the wet desiccant in the regenerating tower.

The required purge flow setting is affected by changes in the flow, temperature and pressure of the compressed air stream. Should your operating conditions vary, consult your Arrow representative.

CAUTION
TO MAINTAIN THE PROPER OUTLET DEWPOINT, THE DRYER MUST RECEIVE THE PROPER AMOUNT OF PURGE AIR. IF THERE IS EXCESSIVE BACK PRESSURE IN THE TOWER BEING REGENERATED, CHECK THE PURGE MUFFLER AND PURGE PIPING. BACK PRESSURE IS INDICATED WHEN OFF-LINE TOWER PRESSURE GAUGE READS HIGHER THAN 5 PSIG. THE PIPING AND PURGE MUFFLERS MUST BE KEPT CLEAN TO MAINTAIN THE PROPER PURGE RATE

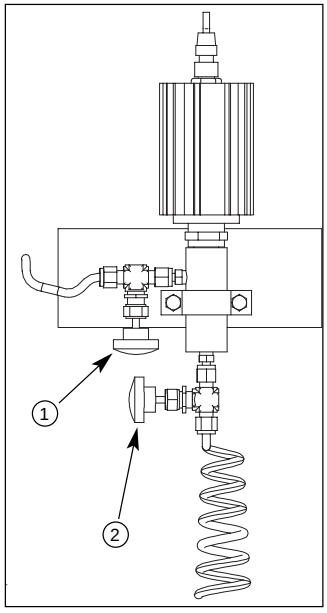
Dewpoint Demand Plus

NOTE: At initial startup and during the first six months of continuous dryer operation, the Dew Point Demand Plus logic SHOULD NOT BE ACTIVATED. A conditioning process must occur in new desiccant, this will allow the desiccant to remove its precise water vapor capacity from the airflow.

The function of DDP is to conserve energy by eliminating unnecessary dryer cycling, purge air consumption, and compressor power consumption.

The DDP works by utilizing a moisture sensitive probe to measure the water vapor content of the outlet air flow. The moisture content of the sample air stream indicates the wetness of the drying tower's desiccant bed.

The purpose of the probe and its associated electronics is to first measure the "wetness" of the air within the desiccant beds and then regenerate the desiccant beds only when the moisture loading reaches a pre-set maximum, desired dewpoint.



NOTE: Factory Shipped With Dew Point Demand Logic Turned Off and DDP Sample Valve [1] and [2] closed.

The Dew Point Demand Plus is packaged with a digital dew point controller and High Humidity Alarm option. The digital dew point controller allows the end user to pre-set a desired dew point at which the dryer will start the Energy Savings Mode. This controller also allows the end-user to pre-set a dew point at which a high humidity alarm condition would occur. See High Humidity Alarm option for full description. See the digital dew point controller Owners Manual enclosed for changing desired dew points.

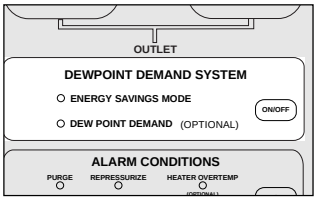
NOTE: Digital dew point controller UNLOCKING CODE 430.

NOTE: Energy Savings Mode is factory preset to activate at -30º F dew point. High Humidity alarm is factory preset to +10º F dew point.

AFTER APPROXIMATELY SIX MONTHS

Dew Point Demand System Startup and Operation

NOTE: Allow the dryer to operate for a number of cycles to ensure that the probe will not be exposed to high humidity and damaging liquid water. This is especially important when the dryer has been stored or sitting idle for several months.



1. Press the Dew Point Demand ON/OFF button to energize Dew Point Demand Logic.
2. **Slowly** open the DDP sample valve[1]. This valve should be fully opened.
3. **Slowly** open the DDP sample valve[2] so that a small flow of air passes across the probe (approximately 2 to 3 SCFH). This valve should be open at all times when dryer is in operation.
4. When the desired dew point is reached, the energy savings mode LED will be energized to indicate the dryer is in energy savings mode; eliminating unnecessary dryer cycling, purge air flow and compressor power consumption.

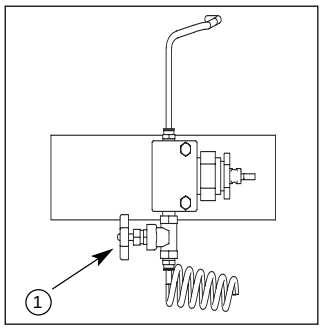
Dew Point Demand

Dew Point Demand is a cost effective alternative to Dew Point Demand Plus. This system operates similar to the Dew Point Demand Plus, but does not have the digital display, high humidity alarm or an adjustable dew point "tank switchover". The "tank switchover" occurs at a fixed –40˚F dew point.

Dew Point Demand System Startup and Operation

NOTE: Allowing the dryer to operate for a number of cycles ensures that the probe will not be exposed to high humidity and damaging liquid water. This is especially important when the dryer has been stored or sitting idle for several months.

Dew Point Demand System Startup and Operation cont'd



NOTE: Factory Shipped With Dew Point Demand Logic Turned Off and DDS Sample Valve [1] closed.

1. Press the Dew point ON/OFF button to energize Dew Point Demand Logic
2. **Slowly** open the DDP sample valve[1] so that a small flow of air passes across the probe (approximately 2 to 3 SCFH). This valve should be open at all times when dryer is in operation.
3. When "fixed" -40ºF dewpoint is reached, the energy savings mode LED will be energized to indicate the dryer is in energy savings mode; eliminating unnecessary dryer cycling, purge air flow and compressor power consumption.

High Humidity Alarm: This option continuously monitors the outlet air stream for dew point performance. Should the dryer dew point elevate because of malfunctioning system component, overflow condition, oil contamination or desiccant attrition, the High Humidity Alarm LED will be illuminated. Should the light be observed, refer to Troubleshooting Guide. High Humidity set point is +10ºF.

–100˚F Pressure Dew Point: This option lowers the dew point from the standard –40˚F to –100˚ F
On the heated dryers, a split bed of activated alumina and molecular sieve is added.

Remote Alarm Contacts: Contacts will be supplied for: Heater Overtemp Alarm, Energy Saving Mode, High Humidity Alarm, Failure to Depressurize alarm, Failure to Repressurize, Failure to Purge and Failure to Shift, allowing an easy connection method for energizing remote visual or audible alarms. A 120-volt signal is sent when a failure occurs. (Refer to attached diagram for connection location.)

Remote Alarm Dry Contacts: Contacts will be supplied for: Heater Overtemp Alarm, Energy Saving Mode, High Humidity Alarm, Failure to Repressurize,Failure to Depressurize alarm, Failure to Purge and Failure to Shift, allowing for Customer supplied alarm circuits to be easily connected. Maximum voltage and current is 120V, 3 amperes.(Refer to attached diagram for connection location.)

Low Ambient Package: Low ambient temperature protection is accomplished by encasing both towers with a rugged insulation. This insulation along with heat trace cables eliminates "freeze-ups" from low ambient conditions such as cold outdoor or unheated indoor installations.

1. Check to see that the power supply to the heat trace cable is 120V.
2. Install the power cord plug into receptacle.

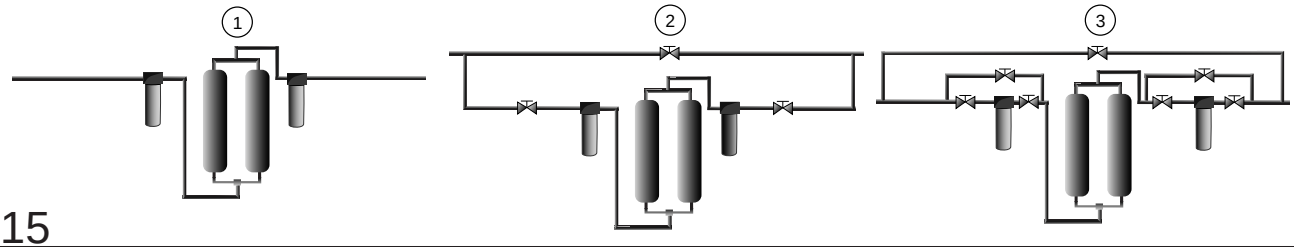
RS-232 Serial Communications Interface: Allows serial port connections for computer monitoring of dryer functions and operating statuses. (Refer to attached diagram for connection and protocol.)

Heater Over Temperature Alarm: The Heater Over Temperature Alarm option monitors operation of the electric heater. The over temperature is factory set at 375ºF. Should an over temperature condition occur, the integrated over temperature sensor automatically de-energizes the heater and provides a visual alarm. Dryer operation should be discontinued until the condition can be corrected.

Pre-piped Connection With Pre and After Filters [1]
Prefilter and afterfilter mounted to dryer with integral piping ready to install in system.

3-Valve Bypass w/Pre-piped Connection[2]
Prefilter and afterfilter mounted to dryer with integral piping and 3 bypass valves for bypassing filters and dryer. Ready to install in system.

7-Valve Bypass w/Pre-piped Connection[3]
Prefilter and afterfilter mounted to dryer with integral piping and 7 bypass valves for individually bypassing either filter and/or dryer. Ready to install in system.



WARNING:
BEFORE MAINTENANCE OF DRYER ALWAYS SHUT DRYER OFF, DISCONNECT THE ELECTRICAL SUPPLY, AND DEPRESSURIZE THE PNEUMATIC SYSTEM TO AVOID PERSONAL INJURY

Prefilters and Afterfilters

1. **Prefilters** - The cartridges of the prefilters must be changed as often as required to prevent contamination of the regenerative dryer's bed.

   The prefilter **MUST BE DRAINED DAILY**. To prolong filter cartridge life, it is recommended that a mechanical air/moisture separator be placed immediately before the prefilter. If an automatic drain trap is used, check its operation every 48 hours.

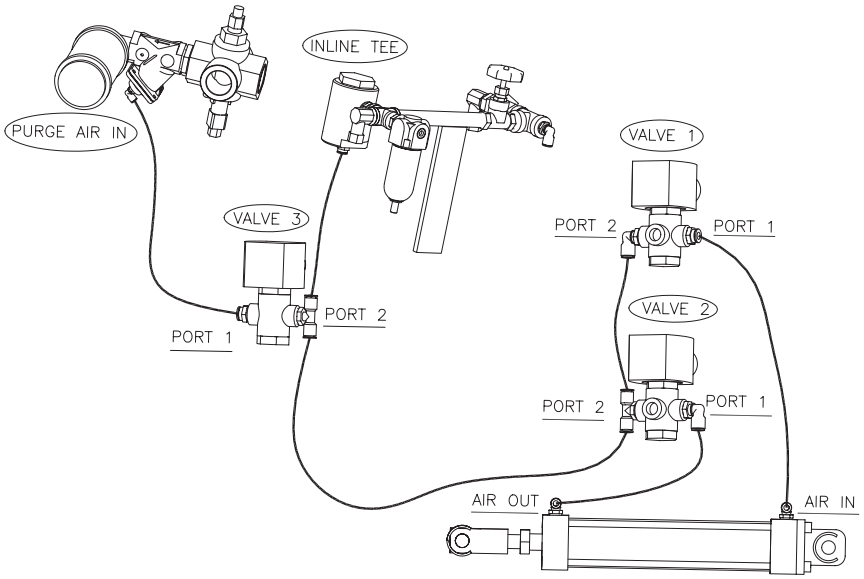
2. **Afterfilters** - The purpose of the afterfilter is to remove residual desiccant dust.

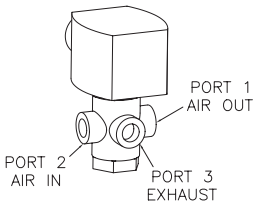
Note: For maximum filtration efficiency service elements and drains according to manufacturer's recommended schedule.

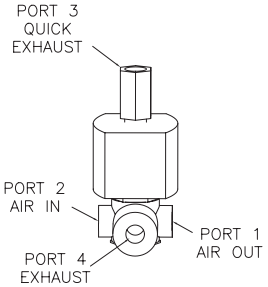
Solenoid Valves

Periodically clean each solenoid valve. If any of the normally closed solenoid valves fail to operate, use the air flow diagram below and voltage sequence chart (pp17) to check following:

1. Control Voltage - Check the outlet voltage sequence from the circuit board to verify that the solenoid is receiving electric voltage.
2. Burned out solenoid cell
3. High/low voltage - Voltage should be plus or minus 10% of nameplate reading.
4. Solenoid valve leaking - Disassemble, clean and repack or replace.





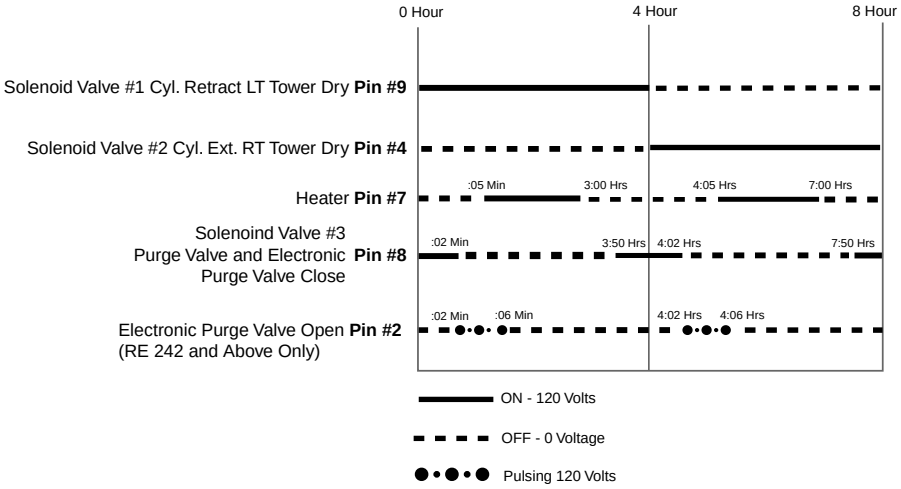


Timer

Should the sequencing of towers fail, first check the red light marked "Status" located on the timer circuit board. When blinking, the timer board is energized. If the light is not blinking, check the voltage across the 3 Amp 3 AG fuse located on the board. Replace fuse if "blown". If fuse is not "blown" check voltage sequence to the appropriate solenoid valve.

Timer Voltage Sequence

Note: See contact strip marked J5 on timer circuit board.



Air Cylinder

Should the air cylinder fail to extend or retract, check the following:

① Disconnect the pilot line to check if the cylinder is receiving pilot pressure.

- If the cylinder is receiving pressure, disassemble, clean and replace cylinder seals as required.
- If the cylinder is not receiving pressure, see solenoid valve information in Maintenance Section. (pp16)

Purge Muffler

At high pressures a clogged muffler could result in a high back pressure and could result in mechanical failure or personal injury. For this reason the purge muffler must be periodically checked for any restrictive debris. If pressure is observed on the offline tower replace muffler immediately.

WARNING

WHEN REPLACING THE PURGE MUFFLERS IT IS RECOMMENDED THE DRYER BE TURNED OFF AND FULLY DEPRESSURIZED. BACK PRESSURE CAUSED BY CLOGGED MUFFLER CAN CAUSE INJURY SHOULD YOU ATTEMPT TO DISASSEMBLE WHILE PRESSURIZED.

Purge Valve (Air Operated)

Should the normally open purge valve fail to operate check the following:

① Check air signal to valve.

- If air signal is present; disassemble, clean and replace diaphragm and seals.
- If no air signal is present; see solenoid valve information in Maintenance Section. (pp 16)

Purge Valve (Electrically Operated)

Should the electrically operated purge valve fail to open or close check the following:

① Check voltage to valve.

- If voltage is present; disassemble and clean.
- If no voltage is present; see timer circuit board, and timer voltage sequence maintenance section. (pp 117)

4-Way Valves

1. Valves should be disassembled, cleaned and re-lubricated once every year as part of a regular maintenance schedule.

Note: All Plug valves are shipped from stock assembled and filled with proper vale lubricant.

CAUTION
A LUBRICANT WITH A SUITABLE TEMPERATURE RANGE MUST BE USED.
REFER TO PARTS LIST FOR RECOMMENDED TYPE. DO NOT USE GREASE!

2. In order to keep the internals of 4-way valve in excellent condition and free from corrosion, it is recommended to turn the sealant screw or apply a single shot from a sealant gun to provide sufficient lubrication to the internals to prevent rusting. To lubricate the 4-way valve, give the lubricant screw, (located on top of the 4-way valve) one complete clockwise turn once a year. Re-lubricate valve when lubricant screw threads are no longer visible.

Use steps provided to lubricate the 4-way plug valve:

1. Remove lubricant screw from plug valve. For larger valves, a lubricant gun is recommended.
2. Insert sealant and add as much as necessary to fill the port completely
3. Insert lubricant screw back into plug valve. Turn down lubricant screw until increased resistance is evident. Sealant will ooze out of the bottom stem.
4. Shift 4-way and repeat steps 2 and 3.

PREVENTATIVE MAINTENANCE SCHEDULE

Daily

① Check and record inlet pressure, temperature and flow. Verify that it is within specifications.

② Check tower pressure gauge readings within operating tolerance.

③ Check tower pressure gauges for proper dryer cycling.

④ Verify that pressure in purging tower is 5 PSIG or less.

⑤ Verify that prefilters and off-line differential pressure is within operating limits.

⑥ Check that there is no condense discharge from prefilters.

Monthly

① Check your operating conditions: inlet flow, inlet pressure, and inlet temperature.

② Check prefilters and after filters.

③ Check dryer cycle and sequence of operations, (i.e. drying, regenerating, heating, cooling, depressurization, and repressurization).

④ Check tower temperature gauges during 3rd and 4th hour of regeneration cycle.

PREVENTATIVE MAINTENANCE SCHEDULE cont'd

Every Three Months

① Check pilot air filter element and clean.

② Replace prefilter and afterfilter elements.

Semi-Annually

① Check outlet dew point.

② Blow down relief valves.

Annually

① Check desiccant and replace if necessary.

② Inspect and clean purge valves and internal components as necessary.

③ Inspect and clean solenoid valves, replace internal components as necessary.

④ Test electrical components, replace as necessary.

⑤Inspect all tubing to all valves - check for leaks or damage.

⑥ Turn lubrication screw on both 4-way valves

⑦ Inspect and clean 4-way valves and replace internal components as necessary

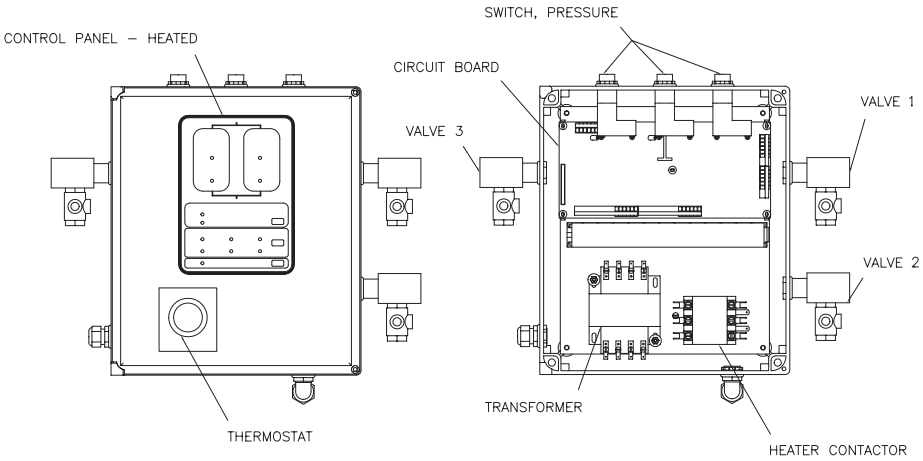
Every Three Years

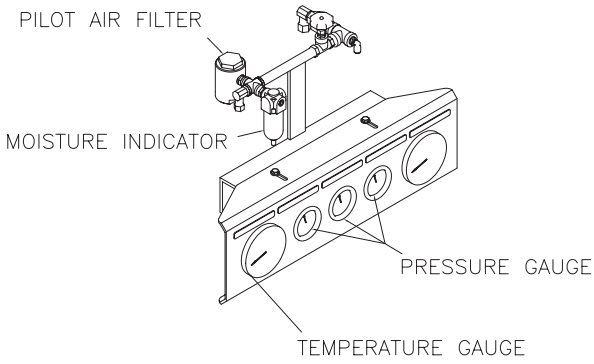
① Replace desiccant if necessary.

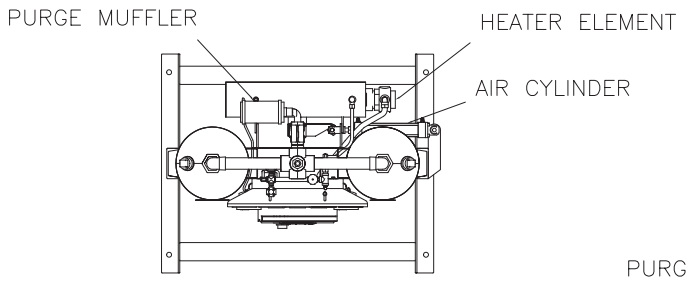
TROUBLE SHOOTING GUIDE

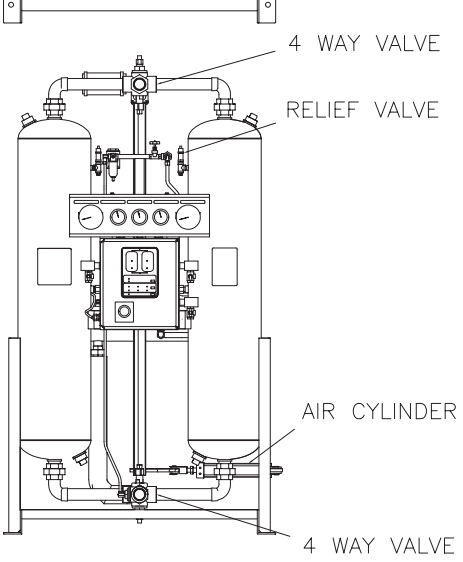
PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Dryer fails to depressurize	Purge valve does not open	Check purge valve, air signal to valve, and its associated solenoid valve. Refer to maintenance section to troubleshoot each component.
	Purge muffler is clogged	Replace Purge Muffler.
	4-Way Valve fails to shift	Check air signals to air cylinder, and the associated solenoid valve. Refer to maintenance section to troubleshoot each component.
	Air is leaking past 4-way valve	Clean and repack both valves with lubricate.
Excessive back pressure in regenerating tower (above 5PSIG)	Purge muffler is clogged	Replace purge muffler.
	Air is leaking past 4-way valve	Check lubricant in bottom 4-way valve. Relube if necessary.

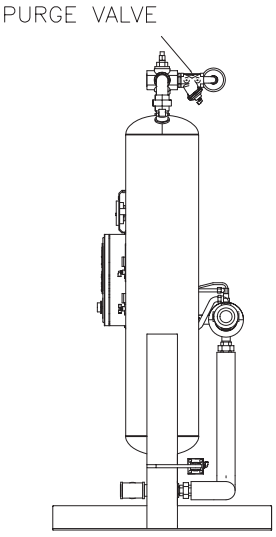
PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Elevated Dewpoint	Insufficient purge rate	Check purge flow settings. Check purge piping for obstruction.
	Clogged Purge Muffler	Replace Purge Muffler.
	Inlet air/gas pressure below design condition	Check pressure source.
	Flow rate higher than design condition	Check flow rate and causes for increased demand.
	Inlet temperature above design condition	Check aftercooler, clean and service as necessary.
	Entrained water entering desiccant bed	Check air/moisture separator, elements and prefilter. Replace dryer desiccant if necessary.
	Desiccant contaminated by oil	Install suitable prefilter and replace dryer desiccant.
Excessive pressure drop in dryer	Excessive flow rate	Check flow rate. Locate cause for increased air demand.
	Inlet pressure below design condition	Check pressure source.
Failure to shift towers from drying to regenerating cycle	No input power	Check input voltage. See 'status" light on circuit board.
	Dryer not turned on	Check power on LED.
	Defective timer	Check input and output voltages.
	Defective solenoid valve	Check input voltage to air cylinder solenoid valves. Check outlet air flow from air cylinder solenoid valves.
	No lubricant in 4-way valve	Check and repack bottom valve with lubricant.
Elevated Regerating tower temp. (above 325 deg F)	Low moisture loading (i.e. winter months) Low flow conditions	Reset thermostat to 350 - 375 deg F and observe tower temps. at tower switchover. Adjust temperature below 350 deg F if needed.
Dryer fails to pressurize	Purge Valve does not close	Check purge valve,air signal to purge valve and its associated valve. Check timer sequencing.
Dryer depressurizes too rapidly	Purge valve does not close; dryer depressurizing through purge valve	Check purge valve, air signal to purge valve, and its associated solenoid valve. Check purge valve open circuit on timer circuit board.
Failure to Purge LED illuminates	Purge pressure (below 20 psi)	See purge pressure settings on page 4. Set to proper setting and press re-set.


CONTROL PANEL – HEATED
SWITCH, PRESSURE
CIRCUIT BOARD
VALVE 1
VALVE 3
VALVE 2
THERMOSTAT
TRANSFORMER
HEATER CONTACTOR


PILOT AIR FILTER
MOISTURE INDICATOR
PRESSURE GAUGE
TEMPERATURE GAUGE


PURGE MUFFLER
HEATER ELEMENT
AIR CYLINDER


4 WAY VALVE
RELIEF VALVE
AIR CYLINDER
4 WAY VALVE


PURGE VALVE

Part Description	MODEL			
	RE231	**RE232**	**RE233**	**RE234**
4 Way Valve	122365	122365	122083	122004PR
Repair Kit (4 Way Valve)	122365-RK	122365-RK	122083-RK	122004PR-RK
Purge Valve	126150	126150	126150	126150
Repair Kit (Purge Valve)	126150-RK	126150-RK	126150-RK	126150-RK
Air Cylinder	126900	126900	126900	122006
Repair Kit (Air Cylinder)	122016	122016	122016	122016
Heater Element NEMA 4	123029	123051	123032	123034
Thermostat	123011	123011	123011	123011
Heater Over Temp. Thermostat (Opt.)	123015	123015	123015	123015
Heater Contactor	122189	122189	122189	122189
Circuit Board Timer	126719	126719	126719	126719
Panel Overlay	126540	126540	126540	126540
Solenoid Valve 1	122128	122128	122128	122128
Solenoid Valve 2	122128	122128	122128	122128
Solenoid Valve 3	122128	122128	122128	122128
Purge Muffler	126060	126060	126060	126061
Pressure Gauge	122150	122150	122150	122150
Temperature Gauge	126724	126724	126724	126724
Pressure Relief Valve	122050	122050	122050	122050
Moisture Indicator Assembly	126502	126502	126502	126502
Pilot Air Filter	9052T	9052T	9052T	9052T
(Element Kit) Pilot Air Filter	EK9052	EK9052	EK9052	EK9052
Replacement Desiccant (Total)	**70 LBS**	**104 LBS**	**140 LBS**	**210 LBS**
Activated Alumina 400 Lbs Fiber Drum 1/8" Beads	34010	34010	34010	34010
Activated Alumina 50 Lbs. Fiber Drum 1/8" Beads	34011	34011	34011	34011
Molecular Sieve 50 lbs. Fiber Drum 1/8" Beads (Opt.)	34015	34015	34015	34015
Pressure Switch	122245	122245	122245	122245
Dewpoint Demand Plus Sensor (Opt.)	126048	126048	126048	126048
Dewpoint Demand Plus Controller (Opt.)	126536	126536	126536	126536
Circuit board: Dewpoint Demand & High Humidity (Opt.)	122717	122717	122717	122717
High Humidity Sensor (Opt.)	123079	123079	123079	123079
Dewpoint Demand Sensor (Opt.)	122158	122158	122158	122158
Transformer 230V & 480V	122297	122297	122297	122297
Lube Sticks	122062	122062	122062	122062

RE235	RE236	RE237	RE238	RE239	RE240
122004PR	122004PR	122304	122304	122304	122304
122004PR-RK	122004PR-RK	122304-RK	122304-RK	122304-RK	122304-RK
126150	126150	126150	126150	126150	126155
126150-RK	126150-RK	126150-RK	126150-RK	126150-RK	126155-RK
122006	122006	122070	122070	122070	122070
122016	122016	122017	122017	122017	122017
123036	123038	123039	123039	123060	123005
123011	123011	123011	123011	123011	123011
123015	123015	123015	123015	123015	123015
122189	122189	122189	122189	122189	122189
126719	126719	126719	126719	126719	126719
126540	126540	126540	126540	126540	126540
122128	122128	122128	122128	122128	122128
122128	122128	122128	122128	122128	122128
122128	122128	122128	122128	122128	122128
126061	126061	126061	126061	126061	126039
122150	122150	122150	122150	122150	122150
126724	126724	126724	126724	126724	126724
122050	122050	122050	122050	122051	126026
126502	126502	126502	126502	126502	126502
9052T	9052T	9052T	9052T	9052T	9052T
EK9052	EK9052	EK9052	EK9052	EK9052	EK9052
280 LBS	**350 LBS**	**420 LBS**	**490 LBS**	**560 LBS**	**700 LBS**
34010	34010	34010	34010	34010	34010
34011	34011	34011	34011	34011	34011
34015	34015	34015	34015	34015	34015
122245	122245	122245	122245	122245	122245
126048	126048	126048	126048	126048	126048
126536	126536	126536	126536	126536	126536
122717	122717	122717	122717	122717	122717
123079	123079	123079	123079	123079	123079
122158	122158	122158	122158	122158	122158
122297	122297	122297	122297	122297	122297
122062	122062	122062	122061	122061	122061

Part Description	MODEL				
	RE241	**RE242**	**RE243**	**RE244**	**RE245**
4 Way Valve	122079	122079	126862	126862	126862
Repair Kit (4 Way Valve)	122079-RK	122079-RK	126862-RK	126862-RK	126862-RK
Purge Valve	126155	122116	122116	122116	122116
Repair Kit (Purge Valve)	126155-RK	N/A	N/A	N/A	N/A
Air Cylinder	122013	122013	122013	122014	122014
Repair Kit (Air Cylinder)	122017	122017	122017	122018	122018
Heater Element NEMA 4	123005	123006	123092	123046	123025
Thermostat	123011	123011	123011	123011	123011
Heater Over Temp Thermostat (Opt.)	123015	123015	123015	123015	123015
Heater Contactor	122189	122155	122155	122155	122155
Circuit Board Timer	126719	126719	126719	126719	126719
Panel Overlay	126540	126540	126540	126540	126540
Solenoid Valve 1	122128	122247	122247	122247	122247
Solenoid Valve 2	122128	122247	122247	122247	122247
Solenoid Valve 3	122128	N/A	N/A	N/A	N/A
Purge Muffler	126039	126039	126039	126039	126039
Pressure Gauge	122150	122150	122150	122150	122150
Temperature Gauge	126724	126724	126724	126724	126724
Pressure Relief Valve	126026	126026	122076	122076	122076
Moisture Indicator Assembly	126502	126502	126502	126502	126502
Pilot Air Filter	9052T	9052T	9052T	9052T	9052T
(Element Kit)Pilot Air Filter	EK9052	EK9052	EK9052	EK9052	EK9052
Replacement Desiccant Total	**840 LBS**	**1050 LBS**	**1260 LBS**	**1540 LBS**	**1820 LBS**
Activated Alumina 400 Lbs. Fiber Drum 1/8" Beads	34010	34010	34010	34010	34010
Activated Alumina 50 Lbs. Fiber Drum 1/8" Beads	34011	34011	34011	34011	34011
Molecular Sieve 50 Lbs. Fiber Drum 1/8" Beads (Opt.)	34015	34015	34015	34015	34015
Pressure Switch	122245	122245	122245	122245	122245
Dewpoint Demand Plus Sensor (Opt.)	126048	126048	126048	126048	126048
Dewpoint Demand Plus Controller (Opt.)	126536	126536	126536	126536	126536
Circuit Board Dewpoint Demand High Humidity (Opt.)	122717	122717	122717	122717	122717
High Humidity Sensor (Opt.)	123079	123079	123079	123079	123079
Dewpoint Demand Sensor (Opt.)	122158	122158	122158	122158	122158
Transformer 230V & 480V	122297	122297	122297	122297	122297
Lube Sticks	122061	122061	122061	122061	122061

RE246	RE247	RE248	RE249	RE250
126227	126227	126227	122381	122381
126227-RK	126227-RK	126227-RK	122381-RK	122381-RK
123022	123022	123022	123022	123022
N/A	N/A	N/A	N/A	N/A
122014	122014	122014	122274	122274
122018	122018	122018	122145	122145
123025	122330	122330	123042	126786
123011	123011	123011	123011	123011
123015	123015	123015	123015	123015
122155	122155	122155	122155	122155
126719	126719	126719	126719	126719
126540	126540	126540	126540	126540
122247	122247	122247	122247	122247
122247	122247	122247	122247	122247
N/A	N/A	N/A	N/A	N/A
126039	126039	126039	126039	126039
122150	122150	122150	122150	122150
126724	126724	126724	126724	126724
122053	122053	122053	122053	122053
126502	126502	126502	126502	126502
9052T	9052T	9052T	9052T	9052T
EK9052	EK9052	EK9052	EK9052	EK9052
2100 LBS	**2520 LBS**	**2940 LBS**	**3500 LBS**	**4200 LBS**
34010	34010	34010	34010	34010
34011	34011	34011	34011	34011
34015	34015	34015	34015	34015
122245	122245	122245	122245	122245
126048	126048	126048	126048	126048
126536	126536	126536	126536	126536
122717	122717	122717	122717	122717
123079	123079	123079	123079	123079
122158	122158	122158	122158	122158
122297	122297	122297	122297	122297
122061	122061	122061	122061	122061

The Arrow Regenerative type compressed air dryer is warranted to be free from defects in material and workmanship, when used under conditions recommended by the manufacturer, for a period of 12 (twelve) months from date of shipment from factory to job site of original owner. Products purchased from warehouse stock are warranted for a period of 12 (twelve) months from date of shipment from that warehouse provided Arrow is furnished full name, address and date of shipment information.

This warranty is limited to parts and labor F.O.B. factory, and is subject to the same restrictions as outlined below concerning misuse, abuse or accident.

This warranty will apply to equipment installed, operated, and maintained in accordance with the procedures and recommendations as outlined in the owners manual published by Arrow Pneumatics.

During the life of this warranty, Arrow Pneumatics will repair or replace (at Arrow's option) free of charge, F.O.B. its plant, any defective part of assembly, if such defect occurred in normal service and was not due to apparent misuse, abuse, or accident.

Any warranty service performed in the field must be authorized by Arrow Pneumatics. Unauthorized service voids the warranty and resulting charge will not be paid by Arrow Pneumatics.

Arrow Pneumatics makes no other warranties or guarantees, expressed or implied. The merchantability of the components is expressly excluded. The manufacturer assumes no liability for indirect or consequential damage.

(This warranty good only in the continental boundary of the United States. For export, contact the factory)

For Your Records

Record the serial number, found on the front of your dryer and inside the electrical enclosure, in the spaces designated on the warranty card, and in the spaces provided below. Refer to the model and serial number whenever you call your distributor for information or service on this product.

Model _____ Serial Number _____

Arrow Pneumatics

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