



## TECHNICAL GUIDE

### AFFINITY

### MODELS: PT9

### GAS-FIRED CONDENSING / HIGH EFFICIENCY UPFLOW TWO STAGE FURNACES

### UP TO 94% AFUE

### NATURAL GAS

### 40 - 120 MBH INPUT



Due to continuous product improvement, specifications are subject to change without notice.

Visit us on the web at [www.york.com](http://www.york.com) for the most up-to-date technical information.

Additional rating information can be found at [www.gamanet.org](http://www.gamanet.org).

## DESCRIPTION

These Category IV, highly efficient, compact, condensing type furnaces are designed for residential and commercial installations in a basement, closet, alcove, recreation room or garage where the ambient temperature is above 32°F, or higher. They may be either side wall or thru-roof vented using approved plastic type combustion air and vent piping. All units are factory assembled, wired and tested to assure dependable and economical installation and operation.

## WARRANTY

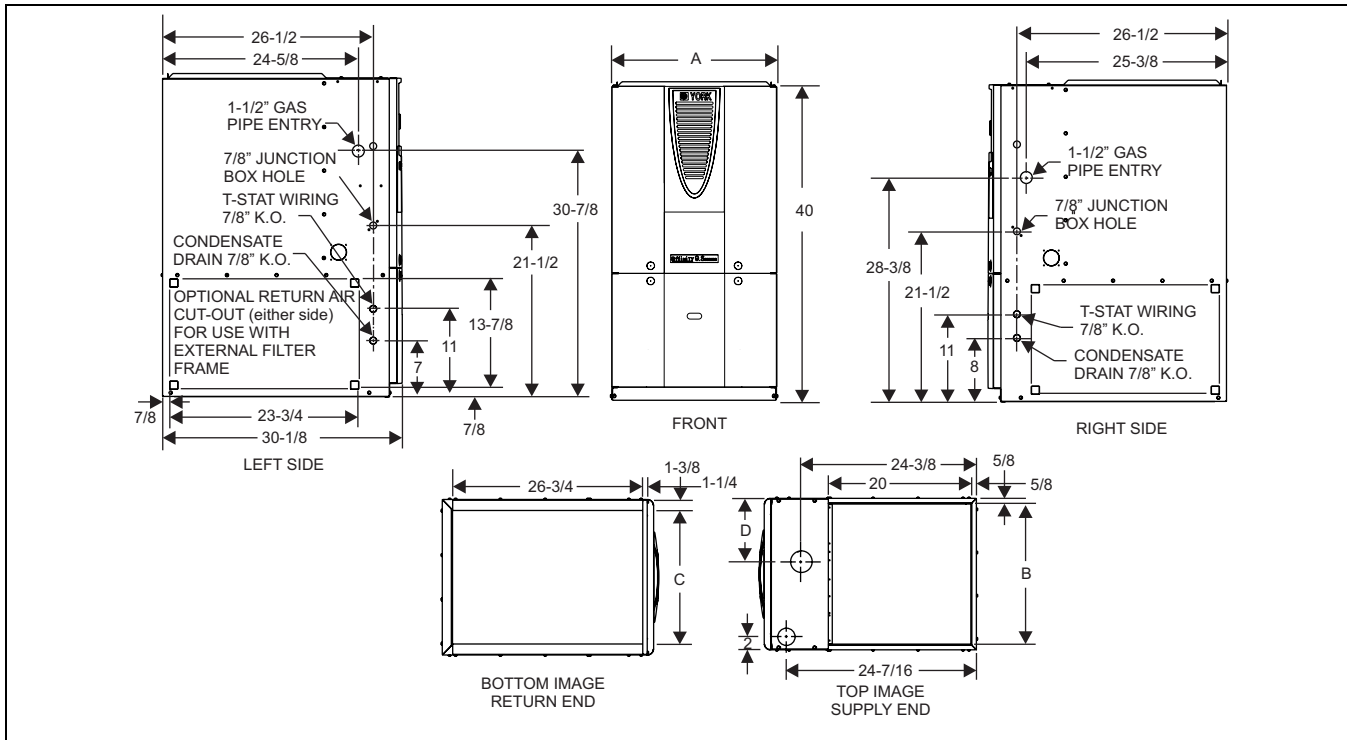
*Lifetime limited warranty on both heat exchangers to the original purchaser; a 20-year limited warranty from original installation date to subsequent purchaser.*

*10-year warranty on the heat exchanger in commercial applications.*

*5-year limited parts warranty.*

## FEATURES

- Two stage heating operation includes:
  - Two stage gas valve
  - Two stage inducer operation
- Provides increased comfort level & very quiet unit operation
- Adjustable delay timer allows two stage operation with single stage thermostat
- Compact, easy to install, ideal height 40" cabinet
- Blower-off delay for cooling SEER improvement.
- Easy to connect power/control wiring.
- Built-in, high level self diagnostics with fault code display.
- Low unit amp requirement for easy replacement application.
- Integrated control module for reliable, economical operation.
- High velocity filter and side -return filter rack provided for easy field installation.
- May be installed as either two-pipe (sealed combustion) or single pipe vent (using indoor combustion air)
- Top intake & vent connection allows installation in narrow locations.
- Electronic Hot Surface Ignition saves fuel cost with increased dependability and reliability.
- Induced combustion system with inshot main burners for quiet, efficient operation.
- No special vent termination kit required.
- 100% shut off main gas valve for extra safety.
- PSC -four speed, direct drive motor with large, quiet blower.
- 24V, 40 VA control transformer and blower relay supplied for add-on cooling.
- Hi-tech tubular aluminized steel primary heat exchanger.
- Secondary (condensing) heat exchanger of 29-4C high-grade stainless steel.
- Timed on, adjustable off blower capability for maximum comfort.
- Solid removable bottom panel allows easy application.
- Easy access from front of unit for cleaning, maintenance or service.
- Protection from intake, exhaust or condensate blockage.
- Insulated blower compartment for quiet operation.



**DIMENSIONS**

Models	Nominal CFM	Cabinet Size	Cabinet Dimension			
			A (in.)	B (in.)	C (in.)	D (in.)
PT9A12N040UP11	1200	A	14-1/2	13-1/4	12-1/8	6-1/4
PT9B12N060UP11	1200	B	17-1/2	16-1/4	15-1/8	8-1/2
PT9B12N080UP11	1200	B	17-1/2	16-1/4	15-1/8	8-1/2
PT9C16N080UP11	1600	C	21	19-3/4	18-1/2	8-7/8
PT9C16N100UP11	1600	C	21	19-3/4	18-1/2	8-7/8
PT9C20N100UP11	2000	C	21	19-3/4	18-1/2	8-7/8
PT9D20N120UP11	2000	D	24-1/2	23-1/4	21-7/8	10-5/8

**COMBUSTION AIR SUPPLY AND VENT PIPING**

MAXIMUM ELBOWS AND VENT LENGTHS										
Models Input BTUH	Pipe Size Inches	Maximum Number of Elbows*								Minimum Length
		1	2	3	4	5	6	7	8	
40,000	1-1/2	30	25	20	10	N/A	N/A	N/A	N/A	5
40,000	2	70	65	60	55	50	45	35	25	5
60,000	1-1/2	30	25	20	10	N/A	N/A	N/A	N/A	5
60,000	2	60	55	50	45	40	30	20	10	5
60,000	3	85	80	75	70	65	60	50	40	20
80,000	1-1/2	20	15	N/A	N/A	N/A	N/A	N/A	N/A	5
80,000	2	60	55	50	45	40	30	20	10	5
80,000	3	85	80	75	70	65	60	50	40	20
100,000	2	25	20	15	N/A	N/A	N/A	N/A	N/A	5
100,000	3	85	80	75	70	65	60	50	40	20
120,000	3	75	70	65	60	55	45	35	25	5

Three elbows (two in vent pipe and one in the air intake pipe) are already accounted for and need not be included in the elbow count from the Table above.  
 NOTE: If installing furnace at altitudes between 2000 - 4500 ft. (609.6 - 1371.6m), intake and vent pipe length must be reduced by 10 ft. (3.05 m). If the installation requires the maximum allowable intake and vent pipe length, the furnace must be converted for high altitude operation. Refer to the proper high altitude application instruction for details.

**ELECTRICAL AND PERFORMANCE DATA**

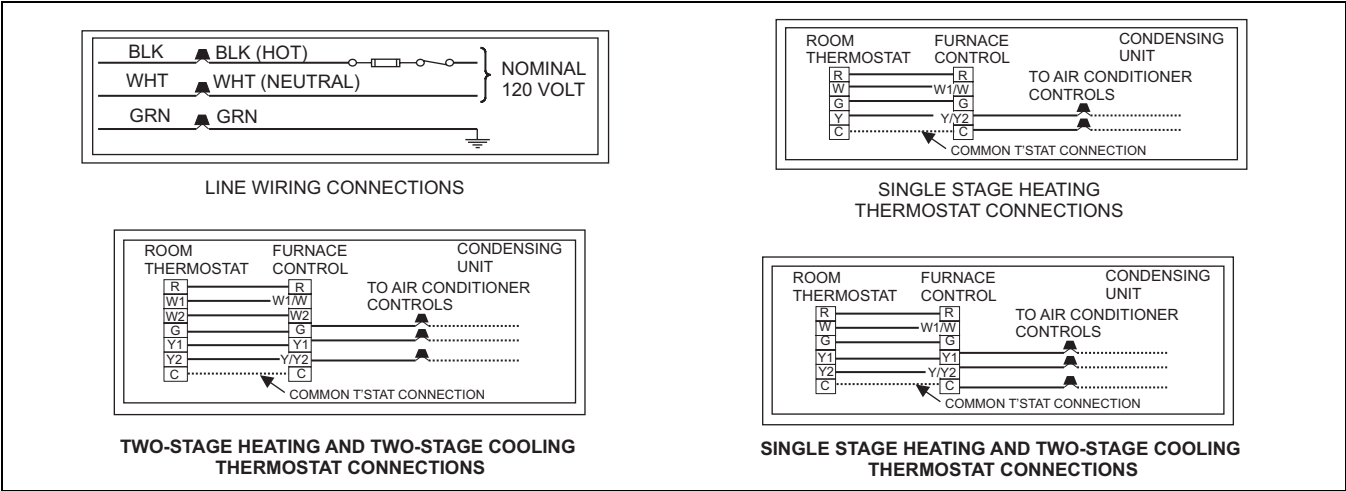
Models	Input High/Low	Output High/Low	Blower Size	Blower		Max. Over-current Protect	Air Temp. Rise °F
	MBH	MBH		HP	Amps		
PT9A12N040UP11	40/26	38/24	11 x 8	1/2	7.7	20	35 - 65
PT9B12N060UP11	60/39	56/36	11 x 8	1/2	7.7	20	40 - 70
PT9B12N080UP11	80/52	75/49	11 x 8	1/2	7.7	20	45 - 75
PT9C16N080UP11	80/52	75/49	11 x 10	3/4	10.2	20	45 - 75
PT9C16N100UP11	100/65	93/60	11 x 10	3/4	10.2	20	45 - 75
PT9C20N100UP11	100/65	93/60	11 x 11	1	12.8	20	45 - 75
PT9D20N120UP11	120/78	112/73	11 x 11	1	12.8	20	40 - 70

Models	Max. Outlet Air Temp.	Nominal Airflow CFM	Cabinet Width In.	Total Unit Amps	AFUE %	Min. Wire Size (awg) @ 75 ft. One Way	Approximate Operating Weight
	°F						
PT9A12N040UP11	165	1200	14-1/2	9	94.0	14	121
PT9B12N060UP11	170	1200	17-1/2	9	93.2	14	135
PT9B12N080UP11	175	1200	17-1/2	9	92.5	14	142
PT9C16N080UP11	175	1600	21	12	92.8	14	157
PT9C16N100UP11	175	1600	21	12	92.5	14	162
PT9C20N100UP11	175	2000	21	14	92.8	12	164
PT9D20N120UP11	170	2000	24-1/2	14	93.2	12	180

\* ESP (External Static Pressure) .5" WG is at furnace outlet ahead of cooling coil.  
 Annual Fuel Utilization Efficiency (AFUE) numbers are determined in accordance with DOE Test procedures.  
 Wire size and over current protection must comply with the National Electrical Code (NFPA-70-latest edition) and all local codes.  
 The furnace shall be installed so that the electrical components are protected from water.

**NOTES:**

1. For altitudes above 2000 ft. reduce capacity 4% for each 1000 ft. above sea level.
2. Wire size based on copper conductors, 60°C, 3% voltage drop.
3. Continuous return air temperature must not be below 55°F.
4. All filters must be high velocity cleanable type.
5. Air flows above 1800 CFM require either return from two sides or one side plus bottom.



**BLOWER PERFORMANCE CFM**

<b>AIRFLOW WITH BOTTOM OR ONE SIDE RETURN</b>											
<b>MODELS</b>	<b>Speed Tap</b>	<b>EXTERNAL STATIC PRESSURE, INCHES W.C.</b>									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
		CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
PT9A12N040UP11	HIGH	1395	1330	1265	1200	1120	1030	940	820	NR	NR
	M-HI	1025	990	960	925	885	825	750	660	NR	NR
	M-LO	785	765	745	715	670	625	545	NR	NR	NR
	LOW	640	605	590	565	530	465	405	NR	NR	NR
PT9B12N060UP11 PT9B12N080UP11	HIGH	1650	1605	1570	1525	1465	1410	1350	1275	1170	1060
	M-HI	1165	1185	1175	1165	1150	1140	1100	1050	970	875
	M-LO	895	915	935	940	940	920	905	860	815	750
	LOW	710	725	725	725	720	700	685	660	625	560
PT9C20N100UP11	HIGH	2300	2210	2120	2020	1930	1830	1715	1595	1480	1350
	M-HI	1950	1900	1830	1755	1680	1595	1500	1390	1270	1155
	M-LO	1610	1545	1490	1440	1390	1315	1230	1155	1050	920
	LOW	1325	1270	1225	1175	1105	1045	990	905	890	790
PT9C16N080UP11 PT9C16N100UP11	HIGH	1960	1955	1925	1890	1830	1765	1695	1615	1600	1485
	M-HI	1565	1560	1560	1575	1545	1530	1475	1425	1365	1260
	M-LO	1230	1275	1285	1300	1310	1300	1280	1245	1190	1070
	LOW	930	945	965	975	975	975	975	950	910	850
PT9D20N120UP11	HIGH	2560	2485	2410	2320	2220	2135	2035	1920	1785	1650
	M-HI	2090	2050	1990	1970	1885	1820	1760	1675	1545	1405
	M-LO	1695	1675	1665	1615	1565	1510	1460	1385	1285	1140
	LOW	1175	1150	1135	1110	1085	1055	1005	980	970	845
<b>AIRFLOW WITH TWO SIDE RETURNS OR WITH BOTTOM AND ONE SIDE RETURN</b>											
<b>MODELS</b>	<b>Speed Tap</b>	<b>EXTERNAL STATIC PRESSURE, INCHES W.C.</b>									
		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
		CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM	CFM
PT9C20N100UP11	HIGH	2465	2380	2295	2195	2095	1995	1875	1760	1620	1470
	M-HI	2085	2035	1960	1880	1800	1705	1605	1485	1360	1235
	M-LO	1725	1625	1595	1540	1485	1405	1315	1235	1125	995
	LOW	1420	1360	1310	1255	1180	1120	1070	970	950	845
PT9D20N120UP11	HIGH	2615	2535	2450	2385	2285	2175	2075	1945	1825	1670
	M-HI	2055	2045	2015	1985	1932	1855	1785	1730	1605	1470
	M-LO	1690	1650	1620	1600	1570	1525	1470	1395	1300	1200
	LOW	1345	1335	1335	1285	1250	1230	1180	1115	1010	850

**NOTES:**

1. Airflow expressed in standard cubic feet per minute (CFM).
2. Return air is through side opposite motor (left side).
3. In order to stay within the velocity rating the filters, airflows above 1800 CFM require either return from two sides or one side plus bottom.
4. Motor voltage at 115 V.
5. NR = Operation at this static pressure is not recommended.

## FILTER PERFORMANCE

The airflow capacity data published in the "Blower Performance" table listed above represents blower performance WITHOUT filters. To determine the approximate blower performance of the system, apply the filter drop value for the filter being used or select an appropriate value from the "Filter Performance" table shown below.

**NOTE:** The filter pressure drop values in the "Filter Performance" table shown below are typical values for the type of filter listed and should only be used as a guideline. Actual pressure drop ratings for each filter type vary between filter manufacturer.

### FILTER PERFORMANCE - PRESSURE DROP INCHES W.C.

Airflow Range	Minimum Opening Size		Filter Type					
			Disposable		Washable Fiber*		Pleated	
	1 Opening Sq. in.	2 Openings Sq. in.	1 Opening In w.c.	2 Opening In w.c.	1 Opening In w.c.	2 Opening In w.c.	1 Opening In w.c.	2 Opening In w.c.
0 - 750	230		0.01		0.01		0.15	
751 - 1000	330		0.04		0.03		0.20	
1001 - 1250	330		0.08		0.07		0.20	
1251 - 1500	330		0.08		0.07		0.25	
1501 - 1750	380	658	0.14	0.08	0.13	0.06	0.30	0.17
1751 - 2000	380	658	0.17	0.09	0.15	0.07	0.30	0.17
2001 & Above	463	658	0.17	0.09	0.15	0.07	0.30	0.17

\* Washable Fiber Filters are the type supplied with furnace

## APPLYING FILTER PRESSURE DROP TO DETERMINE SYSTEM AIRFLOW

To determine the approximate airflow of the unit with a filter in place, follow the steps below:

1. Select the filter type.
2. Select the number of return air openings or calculate the return opening size in square inches to determine the proper filter pressure drop.
3. Determine the External System Static Pressure (ESP) without the filter.
4. Select a filter pressure drop from the table based upon the number of return air openings or return air opening size and add to the ESP from Step 3 to determine the total system static.
5. If total system static matches a ESP value in the airflow table (i.e. 0.20, 0.60, etc.) the system airflow corresponds to the intersection of the ESP column and Model/Blower Speed row.
6. If the total system static falls between ESP values in the table (i.e. 0.58, 0.75, etc.), the static pressure may be rounded to the nearest value in the table determining the airflow using Step 5 or calculate the airflow by using the following example.

**Example:** For a 120,000 Btuh furnace with 2 return openings and operating on high speed blower, it is found that total system static is 0.58" w.c. To determine the system airflow, complete the following steps:

1. Obtain the airflow values at 0.50" & 0.60" ESP.  
Airflow @ 0.50": 2285 CFM  
Airflow @ 0.60": 2175 CFM
2. Subtract the airflow @ 0.50" from the airflow @ 0.60" to obtain airflow difference.  
 $2175 - 2285 = -110$  CFM
3. Subtract the total system static from 0.50" and divide this difference by the difference in ESP values in the table, 0.60" - 0.50", to obtain a percentage.  
 $(0.58 - 0.50) / (0.60 - 0.50) = 0.8$
4. Multiply percentage by airflow difference to obtain airflow reduction.  
 $(0.8) \times (-110) = -88$
5. Subtract airflow reduction value to airflow @ 0.50" to obtain actual airflow @ 0.58" ESP.  
 $2288 - 88 = 2197$

**ACCESSORIES**

**PROPANE (LP) CONVERSION KIT -**

**1NP0580 - All units**

This accessory conversion kit may be used to convert natural gas (N) units for propane (LP) operation. Conversions must be made by qualified distributor or dealer personnel.

**CONCENTRIC VENT TERMINATION -**

1CT0302 (2")

1CT0303 (3")

For use through rooftop, sidewall. Allows combustion air to enter and exhaust to exit through single common hole.

**CONDENSATE NEUTRALIZER KIT - 1NK0301**

Neutralizer cartridge has a 1/2" plastic tube fittings for installation in the drain line. Calcium carbonate refill media is also available from the Source 1 Parts (p/n 026-30228-000).

**SIDEWALL VENT TERMINATION - 1HT0901**

For use on sidewall, two-pipe installations only. Provides a more attractive termination for locations where the terminal is visible on the side of the home.

**EXTERNAL BOTTOM RETURN FILTER RACK W/FILTER -**

Provides a cleanable, high velocity type filter and filter rack. Attaches to the bottom of the furnace.

1BR0314 - For 14-1/2" cabinets

1BR0317 - For 17-1/2" cabinets

1BR0321 - For 21" cabinets

1BR0324 - For 24-1/2" cabinets

**HIGH ALTITUDE PRESSURE SWITCHES -**

These accessory kits may be used to convert units for high altitude operation. Conversion must be made by qualified distributor or dealer personnel.

Pressure Switch Kits	Furnace Models 4,500 Ft to 10,000 Ft.
1PS0501	60 MBH
1PS0502	80/1200 MBH
1PS0503	80/1600, 120 MBH
1PS0504	100/1600 MBH
1PS0505	100/2000 MBH
1PS0506	40 MBH

**NOTE:** For high altitude conversion, an orifice change may also be required. See application instructions.

**ROOM THERMOSTATS -** A wide selection of compatible thermostats are available to provide optimum performance and features for any installation.

1 Heat Stage only, manual, mechanical thermostat. Add sub-base for 1H/1C.

1H/1C, manual change-over electronic non-programmable thermostat.

1H/1C, auto/manual changeover, electronic programmable, deluxe 7-day, thermostat.

1H/1C, auto/manual changeover, electronic programmable.

\* For the most current accessory information, refer to the price book or consult factory.

**NOTES**

# NOTES