REDDI FACTS

Gas Furnace
Model: TUC120B960A0

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Model	
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B - FURNACES

IMPORTANT — This document is customer property and is to remain with this unit. Please return to service information pack upon completion of work.

PRODUCT SPECIFICATIONS

MODEL	TUC120B960A0
TYPE	UPFLOW, INTERMITTENT ELECTRONIC IGNITION
RATINGS①	
Input, BTUH②	120,000
Temp. Rise (Min. — Max.) °F.	40 — 70
BLOWER DRIVE	DIRECT
Dia. — Width (in.)	12 x 11
No. Used	1
Speeds (No.)	4
CFM vs. in. w.g.	SEE FAN PERFORMANCE TABLE
Motor HP	3/4
R.P.M.	1075
Volts/Ph/Hz	115/1/60
FILTER — Furnished?	YES
Type Recommended	
Lo Vel. (No. - Size - Thk.)	
Hi Vel. (No. - Size - Thk.)	1 - 20 x 25 - 1 in.
VENT — Size (in.)	3.0 ROUND
HEAT EXCHANGER	
Type — Fired	ALUMINIZED STEEL TYPE 1
— Unfired	29-4C
Gauge (Fired)	20
ORIFICES — Main	
Nat. Gas Qty. — Drill Size	3 — 31
L.P. Gas Qty. — Drill Size	3 — 51
GAS VALVE	REDUNDANT — SINGLE STAGE
DIRECT IGNITION DEVICE	
Type	HOT SURFACE
BURNERS — Type	LINEAR
Number	3
POWER CONN. — V/Ph/Hz③	115/1/60
Ampacity (In Amps)	19
Fuse Size — Max. (Amps.)	25
PIPE CONN. SIZE (IN.)	1/2
DIMENSIONS	H x W x D
Crated (in.)	54.75 x 26 x 33½
WEIGHT	
Shipping (lbs.) / Net (lbs.)	235 / 217

① Central furnace heating designs are certified by the American Gas Association Inc. Laboratories.
② Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet; ratings should be reduced at the rate of 4% for each 1000 feet above sea level.
③ The above wiring specifications are in accordance with the National Electrical Code; however installations must comply with local codes.

OPTIONAL EQUIPMENT

ELECTRONIC AIR CLEANER BEF140C100A
AIR CLEANER RELAY KIT BAY24X043
LP CONVERSION KIT BAYLPKT208
HIGH ALTITUDE PRESSURE SWITCH BAYHALT209

EMERGENCY SHUT-OFF INSTRUCTIONS

IF IT IS SUSPECTED THAT A FAILURE OF THE ELECTRICAL, FUEL, OR MECHANICAL SYSTEMS WITHIN THIS FURNACE HAS OCCURRED, THE GAS SUPPLY SHOULD IMMEDIATELY BE TURNED OFF AT THE MANUAL GAS VALVE, LOCATED IN THE BURNER COMPARTMENT AND/OR AT LEVER-HANDLED COCK, AND ELECTRICAL POWER TO THE FURNACE SHOULD BE DISCONNECTED. THE FAILURE MUST BE CORRECTED BY A QUALIFIED SERVICER BEFORE OPERATING THE FURNACE.

WARNING — DO NOT ATTEMPT TO MANUALLY LIGHT THE GAS BURNERS.

Lighting instructions appear on each unit. Each installation must be checked out at the time of initial start up to insure proper operation of all components. Check out should include putting the unit through one complete cycle as outlined below.

Turn on main electrical supply and set thermostat above indicated temperature. The ignitor will automatically heat for approx. 15 seconds, then the gas valve is energized to permit gas flow to burners. After ignition and flame is established, flame control module monitors flame and supplies power to gas valve until thermostat is satisfied. Ignition sequence will cycle 3 times before lockout occurs.

If burner fails to ignite, lower thermostat setting or disconnect electrical supply, wait 5 minutes, raise thermostat setting above indicated temperature, turn electrical supply on. Unit will repeat lighting sequence.

SAFETY NOTICE

THIS INFORMATION IS INTENDED FOR USE BY INDIVIDUALS POSSESSING ADEQUATE BACKGROUNDS OF ELECTRICAL AND MECHANICAL EXPERIENCE. ANY ATTEMPT TO REPAIR A CENTRAL AIR CONDITIONING PRODUCT MAY RESULT IN PERSONAL INJURY AND OR PROPERTY DAMAGE. THE MANUFACTURER OR SELLER CANNOT BE RESPONSIBLE FOR THE INTERPRETATION OF THIS INFORMATION, NOR CAN IT ASSUME ANY LIABILITY IN CONNECTION WITH ITS USE.

RECONNECT ALL GROUNDING DEVICES

ALL PARTS OF THIS PRODUCT CAPABLE OF CONDUCTING ELECTRICAL CURRENT ARE GROUNDED. IF GROUNDING WIRES, SCREWS, STRAPS, CLIPS, NUTS OR WASHERS USED TO COMPLETE A PATH TO GROUND ARE REMOVED FOR SERVICE, THEY MUST BE RETURNED TO THEIR ORIGINAL POSITION AND PROPERLY FASTENED.

DISCONNECT POWER BEFORE SERVICING

REDDI PARTS

COMPONENT	QTY.	DESCRIPTION	CAT. #
Blower Wheel	1	12"D x 11"W, CW, Concave	WG74X0068
Burner Asm.	1	Replacement	WW54X0112
Capacitor	1	15 MFD, 440V	WW20X0126
Fan - Induced Draft	1	Replacement	WW73X0128
Fan & Limit Control (Fan/Limit)	1	Limit 190°F, 8" Probe Honeywell #L4064A2675	WW29X0902
Filter	1	25" x 20"	WG85X0051
Flame Sensor	1	Fenwal #22-100000-6H	WW37X0058
Fusible Link (Flame Roll-Out)	1	333°F./167°C Rating, Micro Devices #404333A	WG09X0033
Gas Valve	1	White Rodgers #36E01-221	WG19X0231
Heat Exchanger Asm.	1	Replacement	WW93X0082
Igniter Asm.	1	Norton #271N	WW37X0057
Igniter Control	1	24 VAC, 60 Hz., 3-Try Board White Rodgers #50E47-160	WW37X0056
Motor - Blower	1	3/4 HP, 1075 RPM, 115V, 60 Hz., 1 Phase, 4 Speed, 8.8 FLA, PSC, Sleeve Bearings	WG94X0169
Motor - Comb. Air/I.D. Blower (Vent)	1	Replacement	WW94X0059
Orifice	3	#31 Drill	WG16X0187
Recup Cell Asm.	1	Replacement	WW93X0096
Relay - Blower	1	DPDT, 16FLA, 48LRA @ 120V, 24V Coil, P & B #KUM1078	WW24X0231
Relay - Combustion Blower	1	SPST, 12FLA, 60LRA @ 125V, 24V Coil, P & B #S87R1A2B1D-24V	WG24X0119
Relay - Time Delay	1	13.8RLA, 82.8LRA @ 120V, 40-80 Sec. Time Delay, ThermO-Disc	WW24X0232
Switch - Aux. Limit	1	Open 155° ± 5°F, Close 125° + 7°F T.I. #1NT01L-0388	WG23X0090
Switch - Blower Door	1	SPST, N.O., 3/4 H.P. @ 125VAC	WG23X0073
Switch - Pressure	1	1.33" ± .08" Neg. W.C., 28VA Pilot Duty @ 24V, Tridelta #FS6399-616	WW26X0111
Transformer	1	115V Pri., 24V Sec., 35VA Jard #TF-351124-B11A	WW32X0092
Wheel - Combustion Blower	1	Vernco #AL-30-101	WG92X0162

*New Part - Set Up Within The Last 18 Months.

SEQUENCE OF OPERATION

With gas and electrical power "OFF"

1. Duct connections properly sealed
2. Filters in place
3. Venting properly assembled
4. Condensate drains properly installed
5. Blower door in place on upflow models

Adjust Heat Anticipator on Thermostat, for Natural or Propane Gas, as follows:
0.85 — White Rodgers Gas Valve
0.75 — Robertshaw Gas Valve
0.65 — Johnson Gas Valve

Turn knob on main gas valve within unit to **"OFF"**. Turn external gas valve to **"ON"**. Purge air from gas lines. After purging, check all gas connections with soapy solution-**DO NOT CHECK WITH AN OPEN FLAME.** Allow 5 minutes for any gas that might have escaped to dissipate. LP Gas being heavier than air may require forced ventilation. Turn knob on gas valve in unit to **"ON"**.

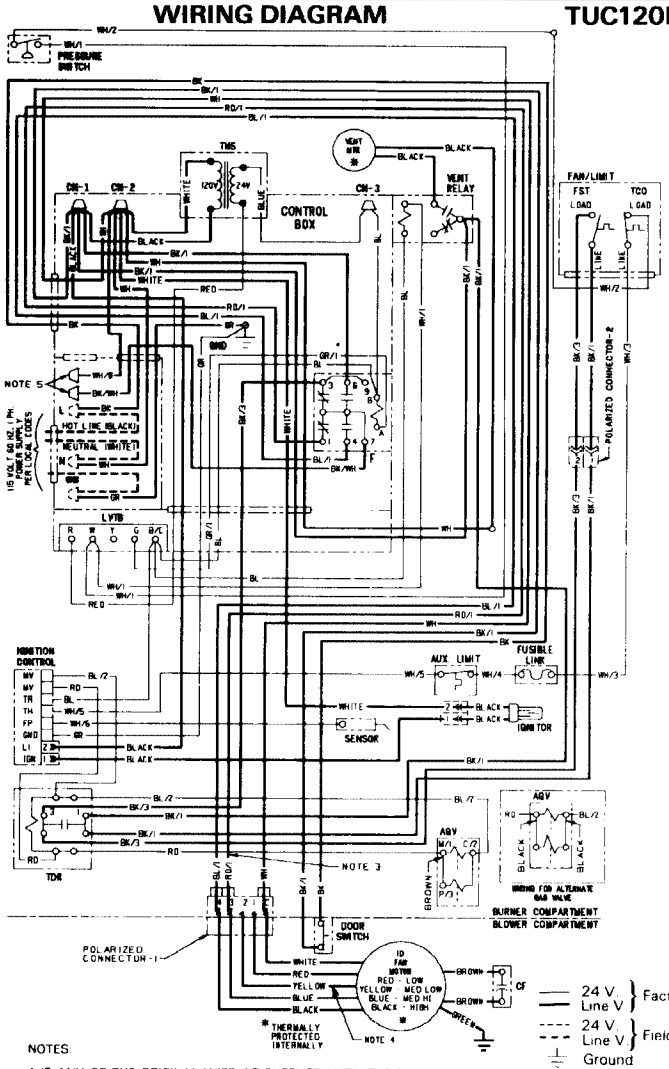
THERMOSTAT CALLS FOR HEAT

R and W Thermostat contacts close to supply power, through safety limit switches, to control circuit which starts the induced draft blower. When the required combustion air is established, the pressure switch allows power to flow through the safety controls to the flame control module and the ignitor.

The ignitor will heat for approx. 15 seconds, then the gas valve is energized to permit gas flow to the burners. The flame sensor confirms that ignition has been achieved within the 7 second ignition trial period. All models utilize a remote sensor.

If the sensor does not confirm ignition in the 7 second time period, the ignition control will go into a re-try mode. During the second trial for ignition there is a 60 second prepurge time for the induced draft motor, then the ignitor will energize for approx. 45 seconds before the gas valve is energized. If the flame sensor does not confirm ignition during this second trial, the ignition control will go into a re-try mode again. The sequence of operation will be repeated. If the ignition has not been confirmed at the end of the 3rd trial, the ignition control will go into lock out mode.

WIRING DIAGRAM TUC120B960A0



NOTES:

1. IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE FURNACE MUST BE REPLACED, IT MUST BE REPLACED WITH WIRING MATERIAL HAVING A TEMPERATURE RATING OF AT LEAST 105 C.
2. THERMOSTAT HEAT ANTICIPATOR SETTING: .85 AMP.
3. SET HEATING SPEED (RD/1) TO SPECIFIED SPEED CALLED FOR IN TABLE A.
4. YELLOW LEAD OMITTED ON TUC-B924A MODELS.
5. THESE LEADS ARE FOR CONNECTION OF THE ELECTRONIC AIR CLEANER. MAXIMUM LOAD 2.5 AMPS.

TABLE A

MODEL	SPEED	HEATING SPEED TERMINAL NO.
TUC120B960A0	MED. HI	3

LEGEND

- 24 V. Line V } Factory Wiring
- 24 V. Line V } Field Wiring
- Ground
- Junction
- Wire Nut or Connector
- Coil
- Capacitor
- Relay Contact (N.O.)
- Relay Contact (N.C.)
- Relay Contact (SPDT)
- Thermistor

COLOR CODES — BK/BL Black Wire

When the ignition and flame is established, the flame control module monitors the flame and supplies power to the gas valve until the thermostat is satisfied. When the thermostat is satisfied, R and W contacts open to de-energize the control circuit.

WARNING

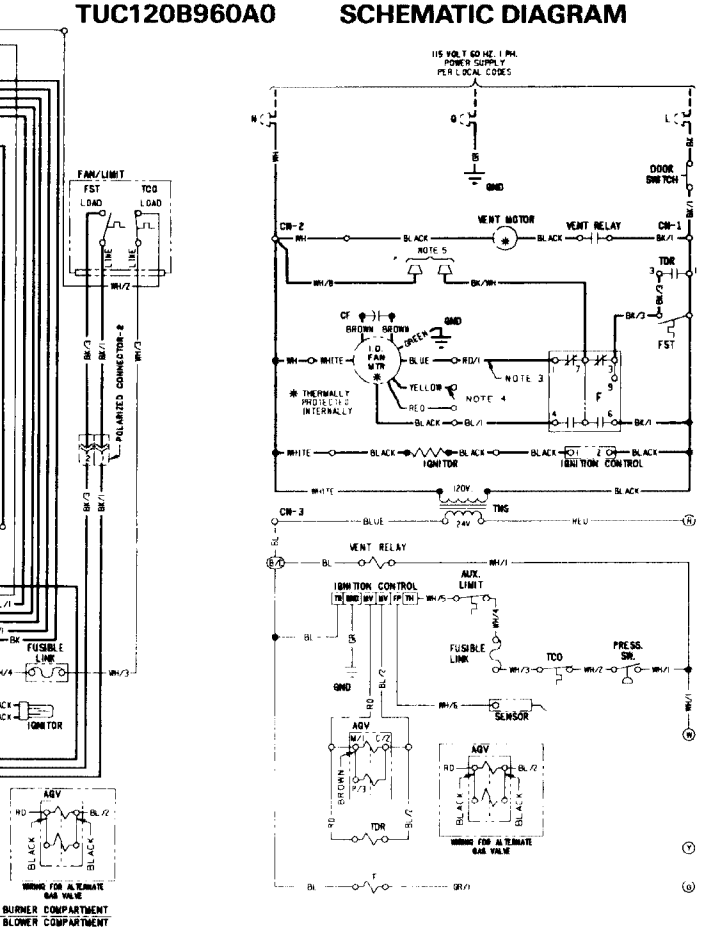
The furnace must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or greater than 1/2 psig.

All gas fittings must be checked for leaks using a soapy solution before lighting furnace. **DO NOT CHECK WITH AN OPEN FLAME.**

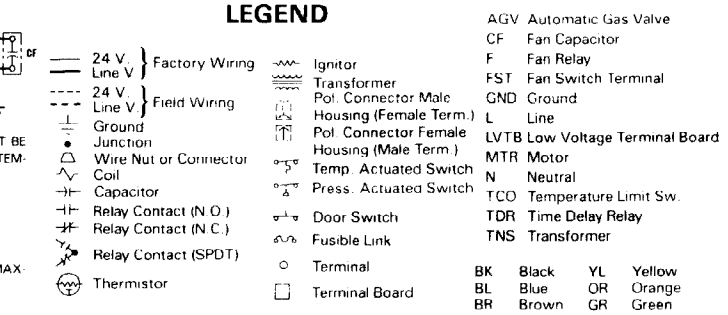
WARNING: DISCONNECT POWER TO UNIT BEFORE REMOVING BLOWER DOOR.

Unit is equipped with a blower door switch which cuts power to blower and gas valve causing shutdown when door is removed. Unit must not be altered to allow operation with the blower door removed. Operation with doors removed or ajar can permit the escape of dangerous fumes. All panels must be securely closed at all times for safe operation of the furnace.

TUC120B960A0 SCHEMATIC DIAGRAM



LEGEND



AGV	Automatic Gas Valve
CF	Fan Capacitor
F	Fan Relay
FST	Fan Switch Terminal
GND	Ground
L	Line
LVTB	Low Voltage Terminal Board
MTR	Motor
N	Neutral
TCO	Temperature Limit Sw.
TDR	Time Delay Relay
TNS	Transformer

BK	Black	YL	Yellow
BL	Blue	OR	Orange
BR	Brown	GR	Green
RD	Red	PR	Purple
WH	White		

COLOR CODES — BK/BL: Black Wire with Blue Marker (BK = COLOR OF WIRE, BL = COLOR OF MARKER)

From Dwg. 21D144692 P04

MAIN BURNER ADJUSTMENT

The regulator on the unit's gas valve is set for a manifold pressure of 3.5" W.C. for natural gas. This can be checked by turning off the gas valve and removing the plug on the gas valve labeled "Outlet Pressure" and installing a water manometer. Turn the gas valve to ON. Put furnace in operation and read the manometer. If it is necessary to adjust the gas consumption, turn the adjustment screw (beneath cap on pressure regulator) clockwise or counterclockwise to 3.5" W.C. After checking pressure, turn gas valve OFF. Remove manometer. Replace plug. Put furnace into operation and leak check plug with soapy solution for leaks.

For LP Models, the regulator is set at 10.5" W.C. If the gas consumption needs to be increased, do not exceed 11.0" W.C.

FLAME CHARACTERISTICS

On LP (propane) units, some light yellow tipping of the outer mantle is normal. Inner mantle should be bright blue. Natural gas units should not have any yellow tipped flames.

Another method for checking input is to clock the gas meter with **all** other gas appliances turned OFF.

HIGH ALTITUDE INSTALLATIONS:

IMPORTANT: The sea level rated input of the furnace installed at elevations above 2,000 feet should be reduced 4% for each 1,000 feet above sea level. For example, for elevations of 4,350 feet, the correct input would be the sea level rated input less 17%.

Check orifice size. The drill size is stamped on the gas manifold or see Table below.

Input Rating BTUH (000)	No. of Burners	Main Burner Orifice Drill Size	
		Nat. Gas	Propane
120	3	31	51

CONTROLS AND SAFETY SWITCH ADJUSTMENT

The fan switch is factory set for the blower to come on at 120°F.* and to shut off at 100°F. These settings are satisfactory in most applications. If necessary to field adjust, disconnect power and proceed as follows:

1. Adjust fan-off pointer to shut blower off when air at the farthest register begins to feel cool, or to setting that will not cause blower to recycle.
2. Fan-on differential is adjustable from 25°F. to 45°F. above fan-off setting.

*NOTE: Do not exceed 125°F. fan-on setting for counterflow units.

BLOWER

All models are factory equipped with a transformer and relay. Additional relay is not required when adding air conditioning.

REMOVAL OF BLOWER:

If the blower should have to be removed for servicing, **TURN OFF ELECTRICITY TO UNIT** and disconnect electrical leads at control box.

AIRFLOW ADJUSTMENT

Check inlet and outlet air temperatures to make sure they are within the ranges specified on the furnace rating plate. If airflow needs to be increased or decreased, see wiring diagram for information on changing the wiring to blower motor. Speed changes can be made at molex plug in blower compartment.

LIMIT SWITCH CHECK OUT

The limit switch is a safety device designed to electrically de-energize the gas valve should the furnace become overheated.

To check for proper operation of the limit switches, set thermostat to temperature higher than room temperature to energize the gas valve. Restrict airflow by blocking the return air or by interrupting power to the blower. When the furnace reaches the maximum outlet temperature as shown on the rating plate, the burners must shut off. If they do not shut off after a reasonable time and over-heating is evident, a faulty limit is probable and the limit switch must be replaced. After checking the operation of the fan and limit control, be sure to remove the paper or cardboard restriction from the filter.

FLAME ROLL-OUT DEVICE

All models are equipped with a fusible link on burner cover. In case of flame roll-out, link will open and close off flow of all gas. See instruction label on front panel of heat exchanger.

FAN PERFORMANCE

FURNACE AIRFLOW (CFM) VS EXTERNAL STATIC PRESSURE (m. w.g.)

MODEL	SPEED TAP	— FILTER IN PLACE —								
		.10	.20	.30	.40	.50	.60	.70	.80	.90
TUC120B960AO	4	—	2086	2050	2016	1979	1926	1868	1808	1729
	3	—	1894	1870	1839	1811	1773	1722	1684	1611
	2	1768	1749	1727	1697	1668	1637	1598	1554	1478
	1	1516	1497	1473	1457	1433	1409	1380	1341	1274

PRINCIPLE OF OPERATION

The system utilizes a silicone carbide element for ignition. The ignitor is an electrically heated resistance element which thermally ignites the gas. The flame detector circuit utilizes flame rectification for monitoring the gas flame.

Upon a call for heat, the element is powered from the 120 VAC line and allowed to heat for 15 seconds (typical). Then the main valve is powered, permitting gas flow to the burner for the trial-for-ignition period. At the end of this period, the flame sensor checks for the presence of flame. If flame is present, the system will monitor it and hold the main valve open. If flame is not established within the trial-for-ignition period, the system will recycle through the complete ignition sequence. If after three cycles combustion has not been established, the system will lockout. If lockout does occur the combustion vent motor will continue to run as long as the thermostat is calling for heat.

THE FOLLOWING FIVE FLOW CHARTS ARE OFFERED TO ASSIST IN TROUBLESHOOTING THE TUC-B & TDC-B MODEL FURNACES, WITH EACH CHART REPRESENTING A UNIQUE SITUATION.