40”
FAN ASSISTED COMBUSTION GAS FURNACES

Service Manual

NUG3	NTC5	NCC5
NUG5	NTC7	NCG5
NUH5	NTN5	NDC7
NNAU	NNAG	NDN5
NNAT	NNAC	

This manual supports fan assisted combustion gas furnaces manufactured after 1992

Manufactured by:

Inter-City Products Corporation
Lavergne, TN USA 37086

Part Number
441 082001 00

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INTRODUCTION

This service manual is designed to be used in conjunction with the installation manual and/ or technical support manual provided with each furnace.

This furnace represents the very latest in high efficiency gas furnace technology. Consequently, certain controls within the furnace consist of highly sophisticated electronic components which are **not user serviceable**. Therefore, it is essential that only competent, qualified, service personnel attempt to install, service, or maintain this product.

This Service manual was written to assist the professional HVAC service technician to quickly and accurately diagnose and repair any malfunctions of this product.

This service manual covers a variety of different models; Upflow (ONLY) models, Upflow/Horizontal models, Counterflow (ONLY) models, Counterflow/Horizontal models, Dual Certified models, and Non-Direct vent models. The overall operation of all of these models is essentially the same, with the exception of the differences of certain controls which may be unique to particular model and/or family.

This manual, therefore, will deal with all subjects in a general nature (I.E. all text will pertain to all models) unless that subject is unique to a particular model or family, in which case it will be so indicated.

Throughout the manual references are made to "EARLIER MODELS" as well as "MORE RECENT MODELS". GENERALLY, the distinction between these two groups is based on a difference in fan controls and/or ignition systems used. These may not be the only differences, however, and the differences may vary from model to model within a particular family or series.

It will be necessary then for you to accurately identify the unit you are servicing, so you may be certain of a proper diagnosis and repair. (See Unit Identification, pg.2)

WARNING

The information contained in this manual is intended for use by a qualified service technician who is familiar with the safety procedures required in installation and repair and who is equipped with the proper tools and test instruments.

Installation or repairs made by unqualified persons can result in hazards subjecting the unqualified person making such repairs to the risk of injury or electrical shock which can be serious, or even fatal not only to them, but also to persons being served by the equipment.

If you install or perform service on equipment, you must assume responsibility for any bodily injury or property damage which may result to you or others. We will not be responsible for any injury or property damage arising from improper installation, service, and/or service procedures.

UNIT IDENTIFICATION

The unit's rating plate contains important information for the service technician. It also lists the complete Model, Manufacturing, and Serial numbers. These complete numbers are required to obtain correct replacement parts as well as accurate service information.

Before attempting any adjustments, or replacing any components, be certain to check the unit's rating plate (located on the left or right inside side panel) to obtain these complete numbers. The illustrations below will help you know more about the unit you are servicing.

Model Numbers Beginning with "NC", "ND", "NT", or "NU"

MODEL NUMBER	N	T	N	5	050	B	F	A

MARKETING REVISION

PRODUCT FAMILY

NOMINAL AIR FLOW (Tons)

A = Heat Only	G = 3.5
B = 1	H = 4
C = 2	J = 4.5
D = 2	K = 5
E = 2.5	L = 5.5 - 7.0
F = 3	M = 7.5 - 10.0

PRODUCT GROUP

U = Upflow	T = Upflow / Horizontal
H = Horizontal	C = Downflow / Horizontal
D = Downflow	L = Lowboy
F = Floor Furnace	M = Multi-position

FUEL

G = Natural Gas	C = Natural Gas†
N = Natural Gas California NOx‡	O = Oil
L = L.P. Gas	H = High Altitude Natural Gas

AFUE

A = 78%
B = 80% IID
E = 90% IID Standard Vent
F = 90% Sealed Combustion
G = 90% TAS

SERIES

5 = 5000
7 = 7000
9 = 9000

NOMINAL INPUT MBTUH

† "C"used to designate Natural Gas California NOx on units manufactured prior to date code L9515
‡ Units manufactured after date code L9515

Model Numbers Beginning With "NN"

MODEL NUMBER	N	N	A	U	100	B	K	B

MARKETING CODE

PRODUCT FAMILY

N = NEUTER PRODUCT

NOMINAL AIR FLOW (Tons)

A = HEAT ONLY	G = 3.5
B = 1.0	H = 4.0
C = 1.5	J = 4.5
D = 2.0	K = 5
E = 2.5	L = 5.5 - 7.0
F = 3.0	M = 7.5 - 10

PRODUCT GROUP

N = NATURAL GAS FURNACES
L = LP GAS FURNACES
O = OIL FURNACES

SALES CODE

EFFICIENCY

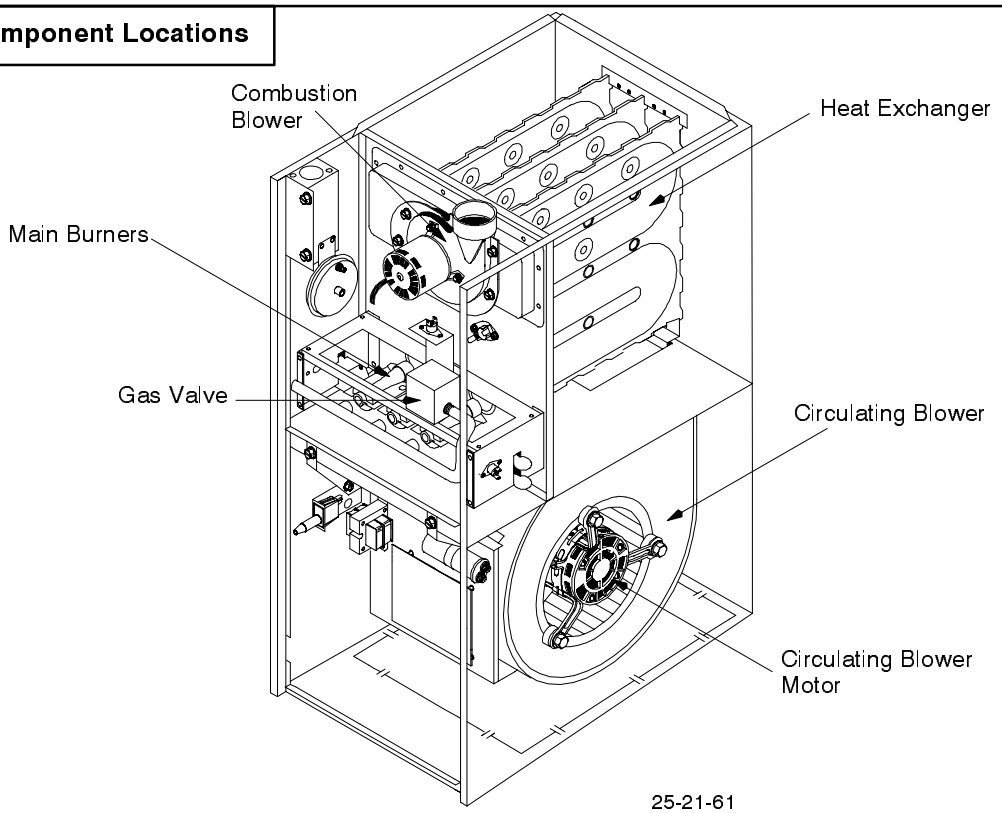
A = 80% INDUCED COMBUSTION	
B = 90% INDUCED COMBUSTION	D = 79% OIL
C = 90% INDUCED COMBUSTION DIRECT VENT	E = 80% OIL

UNIT IDENTIFIER

U = UPFLOW	H = HORIZONTAL
C = DOWNFLOW/HORIZONTAL	L = LOWBOY
T = UPFLOW/HORIZONTAL	D = DOWNFLOW

HEATING CAPACITY - MBTUH

Figure 1 **Component Locations**



FURNACE THEORY OF OPERATION

The high efficiencies and lower profile (compared to previous series) of this furnace have been obtained using design techniques not typical of traditional furnace designs. A brief description of these new design techniques and the purpose they serve follows.

1. Reducing the height of the furnace while maintaining the high efficiency of previous models required maintaining the **surface area** of the heat exchanger, and yet minimizing the overall size.

   The design required to achieve these results is the "SERPENTINE" design, wherein the flue gasses must follow a serpent shaped passage through the heat exchanger, rather than simply rise to the top of the heat exchanger via convection.

   This "Serpentine" path is resistive to normal convective flow, and requires that a partial vacuum be created at the outlet of the heat exchanger to maintain the flow of flue products through the heat exchanger.

2. The serpentine heat exchanger design does not lend itself well to the ribbon type, or slotted port type burner found in more traditional design furnaces for the following reasons:

   A. The secondary combustion air flows at right angles to the burner flame, making it likely to "pull" the flame off a ribbon or slotted port type burner.

   B. The flame "height" of a ribbon or slotted port type burner would make it difficult (if not impossible) to prevent impingement of the flame on the heat exchanger surfaces while maintaining the low profile heat exchanger.

   For these reasons, an "INSHOT" type burner is used in this series. The inshot burner (also called a "jet" burner) fires a flame straight out its end. This burner is designed to fire into a tube style heat exchanger, making it an ideal application in the tube-like passages of the serpentine heat exchanger.

3. To overcome the resistance to convective flow of the serpentine heat exchangers requires the use of an Induced Draft Combustion Blower Assembly.

4. The Combustion Blower Assembly is mounted on the outlet side of the heat exchanger. This blower creates a partial vacuum (negative pressure) within the heat exchanger drawing the flue products out of the furnace.

5. A pressure switch (Air Proving Switch) is used as a safety device that prevents the ignition system from firing the furnace until it senses that a proper draft has been established through the furnace.

SEQUENCE OF OPERATION - HEATING

Refer to the appropriate Ignition control section for unit you are servicing

ELECTRICAL SUPPLY

SUPPLY CIRCUIT

The furnace cannot be expected to operate correctly unless it is properly connected (wired) to an adequately sized (15 amp) single branch circuit.

WARNING

Electrical shock hazard.

Turn OFF electric power at fuse box or service panel before making any electrical connections and ensure a proper ground connection is made before connecting line voltage.

Failure to do so can result in property damage, personal injury and/or death.

SUPPLY VOLTAGE

Supply voltage to the furnace should be a nominal 115 volts. It MUST be between 97 volts and 132 volts. Supply voltage to the furnace should be checked WITH THE FURNACE IN OPERATION. Voltage readings outside the specified range can be expected to cause operating problems. Their cause MUST be investigated and corrected.

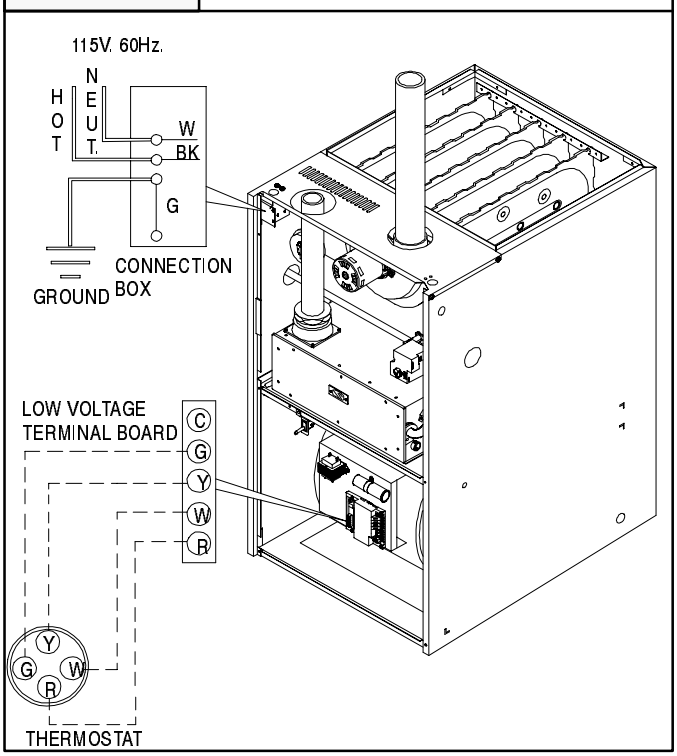
ELECTRICAL GROUND

Grounding of the electrical supply to ALL FURNACES IS REQUIRED for safety reasons.

POLARITY

CORRECT POLARITY of the line voltage supply to all furnaces is also required for safety reasons.

Figure 2 Electrical Connections



CHECKING GROUNDING AND POLARITY

Grounding may be verified as follows:

1. Turn the power supply **"OFF"**

2. Using an **Ohmmeter** check for continuity between the Neutral (white) wire and Ground wire of the supply circuit.

3. With the Ohmmeter set on the R x1 scale, the reading should be **zero Ohms**.

4. A zero Ohm reading indicates that the neutral is grounded back to the main panel.

5. An alternate check would be to check for continuity from the Neutral to a cold water pipe, (Pipe must be metal, and must have a continuous, uninterrupted connection to ground) or to a driven ground rod.

6. Any **readings other than zero Ohms** would indicate a poor ground, or no ground.

Polarity may be verified as follows:

1. Turn power supply **"ON"**

2. Using a **Voltmeter** check for voltage between the **Hot** (Black) and **Neutral** (White) wire of supply circuit.

3. Reading should be **Line** (Supply) **Voltage**.

4. Check for Voltage between the **Neutral** (White) wire and **Ground** wire of the supply circuit.

5. Reading should be **zero Volts**. (if line voltage is read, polarity is reversed)

6. A zero Volt reading indicates there is no voltage potential on Neutral wire.

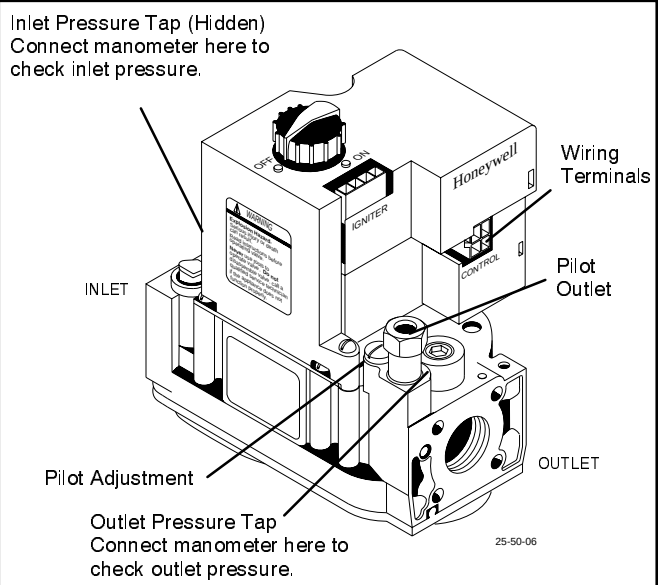
7. Double check by checking for voltage between the **Hot** (Black) wire and **Ground** wire of the supply circuit.

8. Reading should be **Line** (supply) **Voltage**. (if zero volts is read, there is no ground, or polarity is reversed.)

GAS SUPPLY

An adequately sized gas supply to the furnace is required for proper operation. Gas piping which is undersized will not provide sufficient capacity for proper operation. Piping should be sized in accordance with accepted industry standards.

Figure 3 **Typical Gas Valve**



NATURAL GAS

Inlet pressure to the furnace should be checked (at the gas valve) with ALL OTHER GAS FIRED APPLIANCES OPERATING. Inlet pressure to the furnace under these conditions MUST be a minimum of 4.5 in. W.C. If the inlet pressure is less, it may be an indication of undersized piping or regulator problems.

L.P. GAS

Inlet pressure to the furnace should be checked in the same manner as for Natural gas, however, with L.P. Gas, the inlet pressure MUST be a minimum of 11 in. W.C. If this cannot be obtained, problems are indicated in either the regulator or pipe sizing.

CHECKING INPUT (FIRING) RATE

Once it has been determined that the gas supply (inlet) pressure is correct to the furnace, it is necessary to check the input (firing) rate. This can be done in two (2) ways. First (the preferred method) by checking and adjusting (as necessary) the manifold pressure. The second way is to "Clock" the gas meter.

WARNING

Fire or explosion hazard.

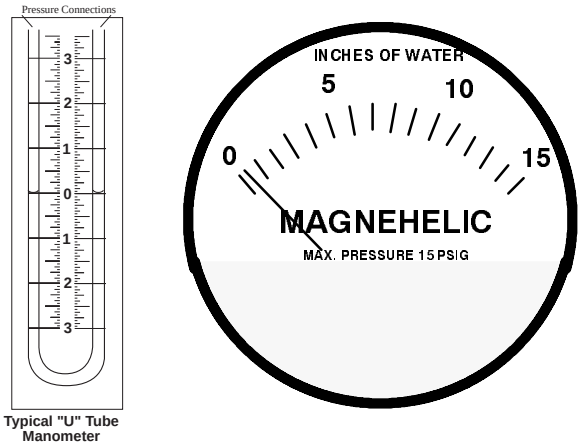
Turn OFF gas at shut off before connecting U-tube manometer.

Failure to turn OFF gas at shut off before connecting U-tube manometer can result in personal injury and/or death.

CHECKING MANIFOLD PRESSURE

1. Connect a U-tube manometer or Magnehelic gauge (0-12 in. W.C. range) to the pressure tap on the "OUTLET" side of the gas valve.

Figure 4 **Gas Pressure Testing Devices**



2. Turn gas "ON" . fire the furnace, and remove adjustment cover (screw-cap).

Note: Dual certified models that have been installed as a direct-vent furnace (i.e. with combustion air piped directly to the furnace from outside the structure) Must have the combustion box cover OFF (removed) to accurately adjust manifold pressure.

3. Turn adjustment screw clockwise (IN) to INCREASE pressure, and counterclockwise (OUT) to DECREASE pressure.

4. Set manifold pressure to 3.5 in. W.C. for Natural Gas, and to 10 in. W.C. for L.P. Gas.

5. For units above 2,000 Ft., insure that orifice size has been changed (per National Fuel Gas Code - Appendix "F") if gas supply has not already been de-rated for altitude by the gas supplier.

"CLOCKING" GAS METER (NATURAL GAS)

1. Check with gas supplier to obtain ACTUAL BTU content of gas.

2. Turn "OFF" gas supply to ALL other gas appliances.

3. Time how many seconds it takes the smallest (normally 1 cfh) dial on the gas meter to make one complete revolution.

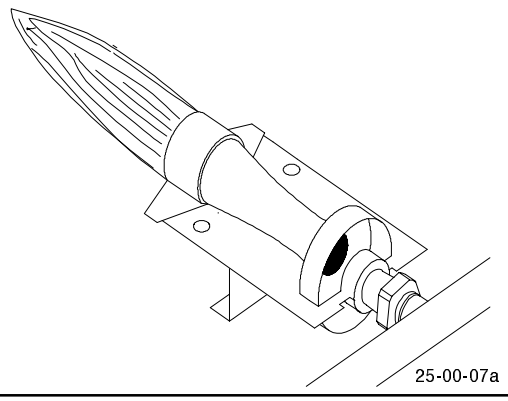
Example			
Natural Gas BTU Content	**No. of Seconds Per Hour**	**Time Per Cubic Foot in Seconds**	**BTU Per Hour**
1,000	3,600	48	75,000
1,000 X 3,600 ÷ 48 = 75,000 BTUH			

4. Calculate input rate by using ACTUAL BTU content of gas in formula shown in example.

Note: Dual certified models that have been installed as a direct-vent furnace (i.e. with combustion air piped directly to the furnace from outside the structure) Must have the combustion box cover ON (installed) to accurately calculate input rate by "clocking" the gas meter .

BURNERS

Figure 5 **Main Burner**



Burners used in this series of furnace are of the "INSHOT" type. Their operation can be compared to that of a torch in that produce a hard, sharp, somewhat noisy flame. Noise should not be an issue on Dual-Certified because of the closed burner box design. Due to the open burner box design of other models noise can be an issue, especially when the furnace is installed within a living space. In order to insure that the burners are operating properly, and at their design noise level, proper adjustment of the gas (manifold) pressure is essential.

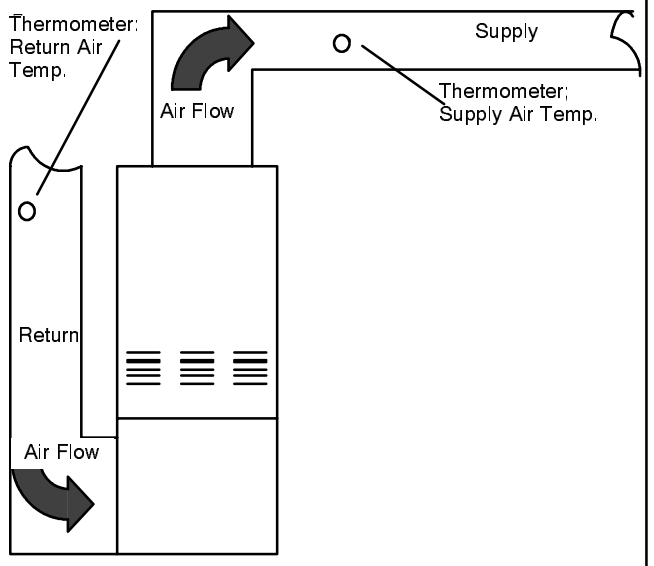
The burners used in this series ARE NOT EQUIPPED WITH AIR SHUTTERS, as none are required. Proper operation (flame characteristics) is obtained by insuring that the orifice size, and manifold pressure are correct for the fuel being used and the altitude of the installation.

CHECKING TEMPERATURE RISE

The furnace is designed to operate within a certain specified range of temperature rise.

Operating the furnace outside the specified range may result in lower efficiency and/or comfort levels, as well as premature combustion component failures.

Figure 6 **Checking Temperature Rise**



Simply stated, the temperature rise through the furnace is the difference in temperature between the return air, and the supply air.

NOTE: BEFORE CHECKING TEMPERATURE RISE BE CERTAIN THAT MANIFOLD PRESSURE IS PROPERLY ADJUSTED

Temperature Rise can be checked by placing a thermometer in the return air duct as close to the furnace as possible. Place a second thermometer in the supply duct at least two (2) feet away from the furnace. (This will prevent any false readings caused by radiation from the furnace heat exchanger) Make sure that the FILTER IS CLEAN and that ALL REGISTERS AND/OR DAMPERS ARE OPEN.

Operate the furnace for 15 minutes before taking temperature readings. Subtract the return air temperature from the supply air temperature. The result is the temperature rise. Compare with the allowable rise listed for the model (size) you are checking.

If the rise is not within the specified range, it will be necessary to change the heating blower speed. **If the rise is too high**, it will be necessary to **increase the blower speed**. **If the rise is too low**, it will be necessary to **reduce the blower speed**.

HIGH ALTITUDE OPERATION

This series of furnace is designed to operate in the majority of the country without any modifications. Beginning at altitudes of 2,000 Ft. above sea level, however, certain measures need to be taken to insure continued, safe, reliable operation. For example, most units (except "NU**H**" models) must be de-rated for altitude (by changing orifice size) based upon the Btu content of the gas being supplied, and installed altitude.

Also, all Non-direct vent units (except "NU**H**" models) must have a high altitude inlet air restrictor installed at altitudes above 4,000 Ft. above sea level. Dual Certified units require the installation of a high altitude pressure switch at altitudes above 6,000 Ft. above sea level.

If you are servicing a unit installed at altitudes above 2,000 Ft., insure that it has been properly modified to operate at that altitude. See the sections on Gas pressure, inlet air restrictors and pressure switches to obtain specific information for your particular installation altitude.

ROOM THERMOSTATS

Room thermostats are available from several different manufacturers in a wide variety of styles. They range from the very simple and inexpensive Bi-metallic type to the complex and costly electronic set-back type. In all cases, no matter how simple or complex, they are simply a switch (or series of switches) designed to turn equipment (or components) "ON" or "OFF" at the desired conditions.

An improperly operating, or poorly located room thermostat can be the source of perceived equipment problems. A careful check of the thermostat and wiring must be made then to insure that it is not the source of problems.

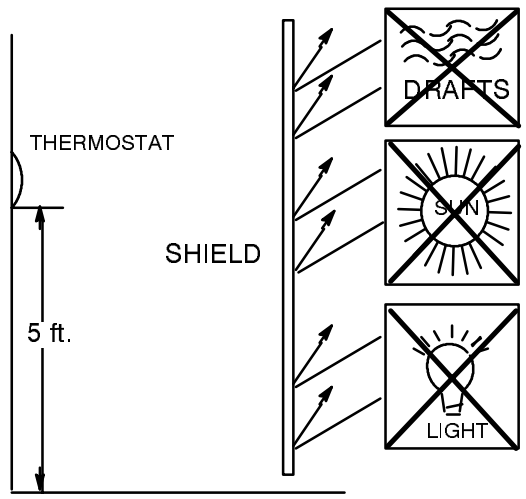
LOCATION

The thermostat should not be mounted where it may be affected by drafts, discharge air from registers (hot or cold), or heat radiated from the sun or appliances.

The thermostat should be located about 5 Ft. above the floor in an area of average temperature, with good air circulation. Normally, an area in close proximity to the return air grille is the best choice.

Mercury bulb type thermostats **MUST** be level to control temperature accurately to the desired set-point. Electronic digital type thermostats SHOULD be level for aesthetics.

Figure 7 **Thermostat Location**



HEAT ANTICIPATORS

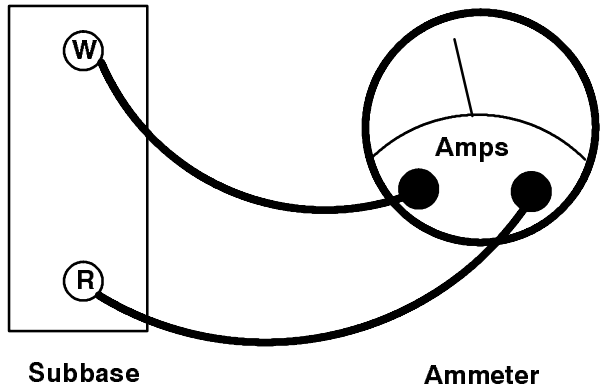
Heat anticipators are small resistance heaters built into most electro-mechanical thermostats. Their purpose is to prevent wide swings in room temperature during furnace operation.

In order to accomplish this, the heat output from the anticipator must be the same regardless of the current flowing through it. Consequently, most thermostats have an adjustment to compensate for varying current draw in the thermostat circuit.

The proper setting of heat anticipators then is important to insure proper temperature control and customer satisfaction.

The best method to obtain the required setting for the heat anticipator, is to measure the actual current draw in the control circuit ("W")using a low range (0-2.0 Amps) Ammeter. (See Illustration) After measuring the current draw, simply set the heat anticipator to match that value.

Figure 8 **Measuring Current Draw**



If a low range ammeter is not available, a "Clamp-on" type ammeter may be used as follows:

1. Wrap EXACTLY ten (10) turns of wire around the jaws of a clamp-on type ammeter.

2. Connect one end of the wire to the "W" terminal of the thermostat sub-base, and the other to the "R" terminal.

3. Turn power on, and wait approximately 1 minute, then read meter.

4. Divide meter reading by 10 to obtain correct anticipator setting.

If an ammeter is not available, a setting of 0.75 amps can be used (for models equipped with the HONEYWELL S8600 ignition module) and a setting of 0.30 amps can be used (for Standing Pilot models, and for models equipped with the HONEYWELL SV9500 Gas Valve/Ignition Control) which should provide satisfactory operation in most cases.

Electronic thermostats do not use a resistance type anticipator. These thermostats use a microprocessor (computer) that determines a cycle rate based on a program loaded into it at the factory.

These cycle rates are normally field adjustable for different types of equipment. The method of adjustment, however, varies from one thermostat manufacturer to another. Check with the thermostat manufacturer to find out the proper way of adjusting the cycle rate.

CONTROL WIRING

Control wiring is an important part of the total equipment installation, since it provides the vital communications link between the thermostat, and the equipment. It is often overlooked as the source of equipment malfunctions. Control wiring that is either too long, undersized, or improperly connected (be it simply loose, or on the wrong terminal) can in fact be the source of many equipment problems.

ALWAYS check to make sure that the control wiring is connected to the proper terminal(s) of the equipment and thermostat you are using. Remember, also, that thermostat terminals are not always identified alike by different thermostat manufacturers. Connections MUST be clean and tight to insure trouble-free operation.

ELECTRONIC CONTROLS used on certain models of this series of furnace RESPOND DIFFERENTLY to certain control wiring practices which have been generally accepted in the HVAC industry for many years.

For Example: For years, installers have run a wire from the "Y" terminal of the room thermostat and connected it directly to the contactor coil of a condensing unit. (not making any connection to the furnace with this wire) Then, run the low voltage "Common" wire from the condensing unit back to the "C" terminal of the furnace.

On earlier models of this series equipped with a HEATCRAFT or WATSCO fan timer(which used a separate blower relay) this practice did not present a problem, since the "Y" terminal was simply a binding post with no internal connection to other furnace components. The blower relay was energized via the "G" terminal to bring on the cooling speed.

With the HONEYWELL ST9120 electronic Fan Timer/Furnace Control used in more recent models of this series, however, the "Y" terminal of the furnace does in fact serve a particular purpose. Failure to connect it will result in certain improper operation as follows:

The COOLING fan speed is energized via the "Y" terminal. **Failure to connect** the thermostat **"Y" terminal** to the "Y" terminal on the control will result in the **failure to energize** the **COOLING speed** on a call for cooling from the thermostat. (The HEATING speed will be energized instead via the "G" terminal)

For more detailed information about this control, see the appropriate section on the ST9120 control, found elsewhere in this manual.

INTERLOCK SWITCH

The blower compartment door of all models is equipped with an interlock switch. This switch is "Normally Open" (closes when door is on furnace) and will interrupt furnace operation when the blower door is open. This interlock switch is a safety device, and SHOULD NEVER BE BY-PASSED.

Since this is a single pole switch, (breaking only one side of the line) proper line voltage polarity is essential to insure that furnace components are not "HOT" when switch is open. (See Checking Grounding and Polarity)

LIMIT SWITCHES

Three (3) different kinds of limit switches are used on this series of furnace. They are the main limit, rollout limit, and auxiliary limit switches. The main limit, and rollout limit switches are used on ALL models. The auxiliary limit is used only on models approved for counterflow and/or horizontal installation.

It must be remembered, that a **limit switch** is a **safety device** and other than for testing purposes, **limit switches should never be jumped out**. Limit switches are "normally closed" electrical switches that are designed to open when their pre-determined "limit setting" has been reached. It should also be remembered, that when a limit switch opens, it more than likely is not due to a bad switch!

The cause of the opening limit must be found and corrected, before the furnace can resume proper operation.

WARNING

Fire hazard.

Limit controls are factory preset and MUST NOT be adjusted. Use ONLY manufacturer's authorized replacement parts.

Failure to do so can result in personal injury and/or death.

The specific functions of the three (3) limit switches used in this series of furnaces is as follows.

MAIN LIMIT SWITCH

A "Normally Closed" switch located on the front partition of the furnace. Its purpose is to monitor supply air temperature, and to interrupt furnace (burner) operation when a supply air temperature is sensed which would result in the furnace exceeding Maximum allowable outlet air temperature. While the main limit is open, (depending upon the model) the combustion blower, and/or the circulating blower will be energized continuously. This control is an "Automatic" re-set control, which will re-set itself when the temperature sensed drops to a safe level.

If furnace (burner) cycles on this limit switch, (I.E. switch opens and closes during furnace operation) it is more than likely due to a high temperature rise through the furnace. (See checking temperature rise found elsewhere in this manual)

High temperature rise can be caused by either OVERFIRING (high manifold pressure, incorrect orifices, etc.) or LOW AIR FLOW (dirty filter, blower speed too low, excessive static in duct system, etc.)

To verify this, the cut-out (opening) point of the switch should be checked (using a thermocouple type thermometer connected to the switch) as follows:

1. Operate furnace for several minutes.
2. Block return air grille(s) to furnace.
3. Observe temperature at which switch opens (burner operation ceases).
4. Remove blockage from return grille(s).
5. Observe temperature at which switch closes (burner operation resumes).
6. Compare readings with the limit setting listed in the Tech. Service Data section for the model you are servicing.

If switch is opening within the specified range, then it is simply doing its job, and the cause of the over-temperature must be determined and corrected.

If, however, the switch is found to be opening prematurely, then it should be replaced. When replacing ANY limit switch, use ONLY a switch of EXACTLY the same temperature setting. Use of a different temperature limit switch can create a dangerous situation. Some of the main limit switches used in this series are SIMILAR IN APPEARANCE, however, DIFFERENT TEMPERATURE SETTINGS ARE USED for different models. Be certain you have the correct control for the model you are servicing.

ROLLOUT LIMIT

A "Normally Closed" switch mounted on the top of the burner box. Units approved for horizontal installation will be equipped with two additional switches (one each on the left and right sides of the burner box) wired in series to provide rollout protection when the furnace is installed horizontally.

The purpose of the rollout switch(es) is to monitor the temperature inside the burner box, and to interrupt furnace (burner) operation when a temperature is sensed that indicates flame rollout has taken place.

MANUAL RE-SET ROLLOUT SWITCH

All models are equipped with a manual re-set rollout switch. Once the rollout switch has opened, burner

operation will be prevented until the rollout switch is "Manually Re-set" by pressing the red button located on the switch. While the rollout switch is open, (Depending upon the particular model) the combustion blower and/or circulating blower will be energized continuously.

NEVER USE AN AUTOMATIC RE-SET ROLLOUT SWITCH TO REPLACE A MANUAL RE-SET TYPE ROLLOUT SWITCH.

If the rollout switch has opened, the cause must be determined. A restricted heat exchanger or overfired furnace are some possible reasons for flame rollout.

AUXILIARY LIMIT SWITCHES

(Counterflow and/or Horizontal Models Only)

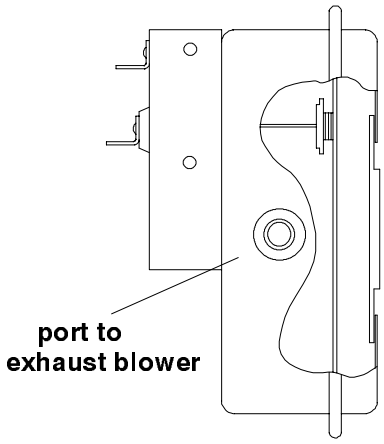
All Counterflow and/or Horizontal models are equipped with one (1) or two (2) additional (AUXILIARY) limit switches mounted on the blower housing. Their purpose is to monitor return air temperature, and interrupt burner operation when a temperature is sensed which could result in the filter surface(s) exceeding allowable temperatures. Depending upon the particular model, the combustion blower, and/or circulating blower may be energized continuously (as long as there is a call for heat from the thermostat) While auxiliary limit switch remains open.

This control is an "Automatic" re-set control which will re-set itself when it senses that the temperature has dropped to a safe level.

PRESSURE SWITCHES

An air proving switch (pressure switch) is used on all models to insure that a draft has been established through the heat exchanger before allowing burner operation.

Figure 9 **Single Port Pressure Switch**

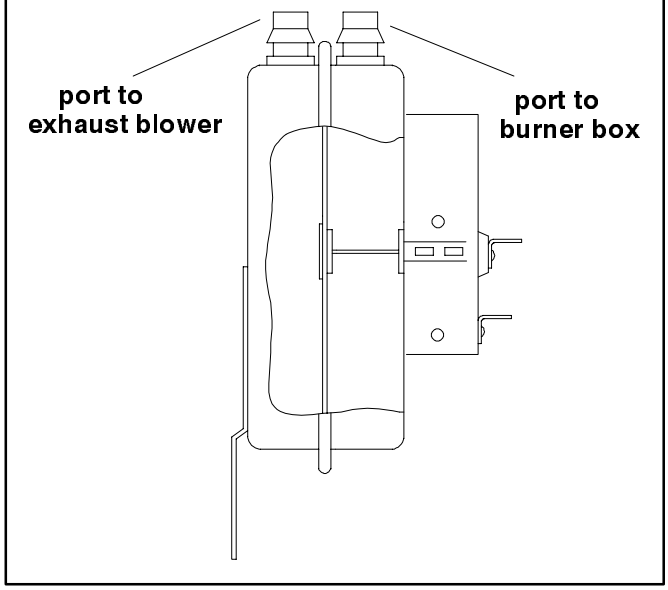


Non-Direct Vent models use a single tap (port) switch which senses the negative pressure that is created by (at) the combustion blower, and is present inside the heat exchanger of the furnace.

Dual Certified models use a dual tap (port) "Differential" type switch. This switch senses the differential in negative pressure between that created by (at) the combustion blower, and that which is present inside the burner box of the furnace.

Different models use different (setting) pressure switches. The different settings are required to insure continued SAFE, RELIABLE, operation. NEVER SUBSTITUTE a pressure switch with one that is similar in appearance. ONLY FACTORY PROVIDED or AUTHORIZED SUBSTITUTES ARE ACCEPTABLE.

Figure 10 **Differential Pressure Switch**



Non-Direct Vent models installed at altitudes above 4,000 Ft. above sea level require replacing the standard

inlet air restrictor (mounted on the collector box behind the combustion blower) with a high altitude inlet air restrictor orifice. The different diameter restrictor orifices are matched to each particular model's pressure switch settings to allow continued SAFE, RELIABLE, high altitude operation.

Dual Certified models installed at altitudes above 6,000 Ft. above sea level require replacing the standard differential pressure switch with a high altitude pressure switch to insure continued SAFE, RELIABLE, high altitude operation.

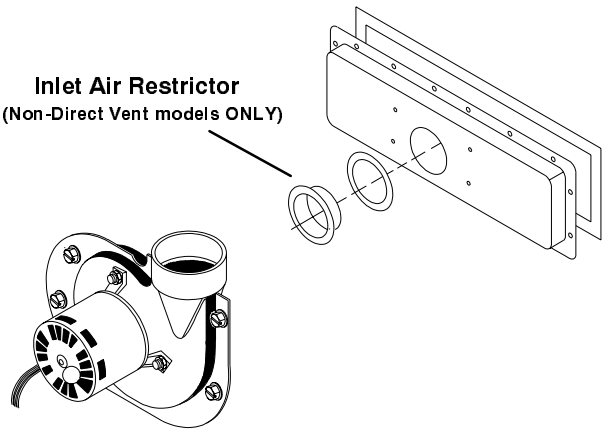
Under normal operating conditions, sufficient negative pressure will be created to close the pressure switch, and keep it closed to keep furnace operating. Under abnormal conditions, however, such as a restricted vent pipe, or a leak in the heat exchanger, sufficient negative pressure will not be created. This will result in the switch failing to close or failing to remain closed during furnace operation.

If you are servicing a unit whose pressure switch will not close, or remain closed during operation, the operating pressures of that furnace should be checked and compared to the appropriate chart for the series you are servicing.

EXHAUST BLOWER

All models use one of three different induced draft combustion blowers mounted on the outlet side of the heat exchanger. The purpose of the combustion blower is to establish a draft (flow) through the heat exchanger, to insure that all flue products are carried outside the structure via the vent pipe. The blower is made of metal, and is driven by a shaded pole motor.

Figure 11 **Exhaust Blower**



Non-Direct Vent models use two (2) different combustion blowers. All Standing Pilot models share a common combustion blower, and all electronic ignition models share another common combustion blower. Although similar in appearance, they have different performance characteristics, and consequently, are NOT INTERCHANGEABLE.

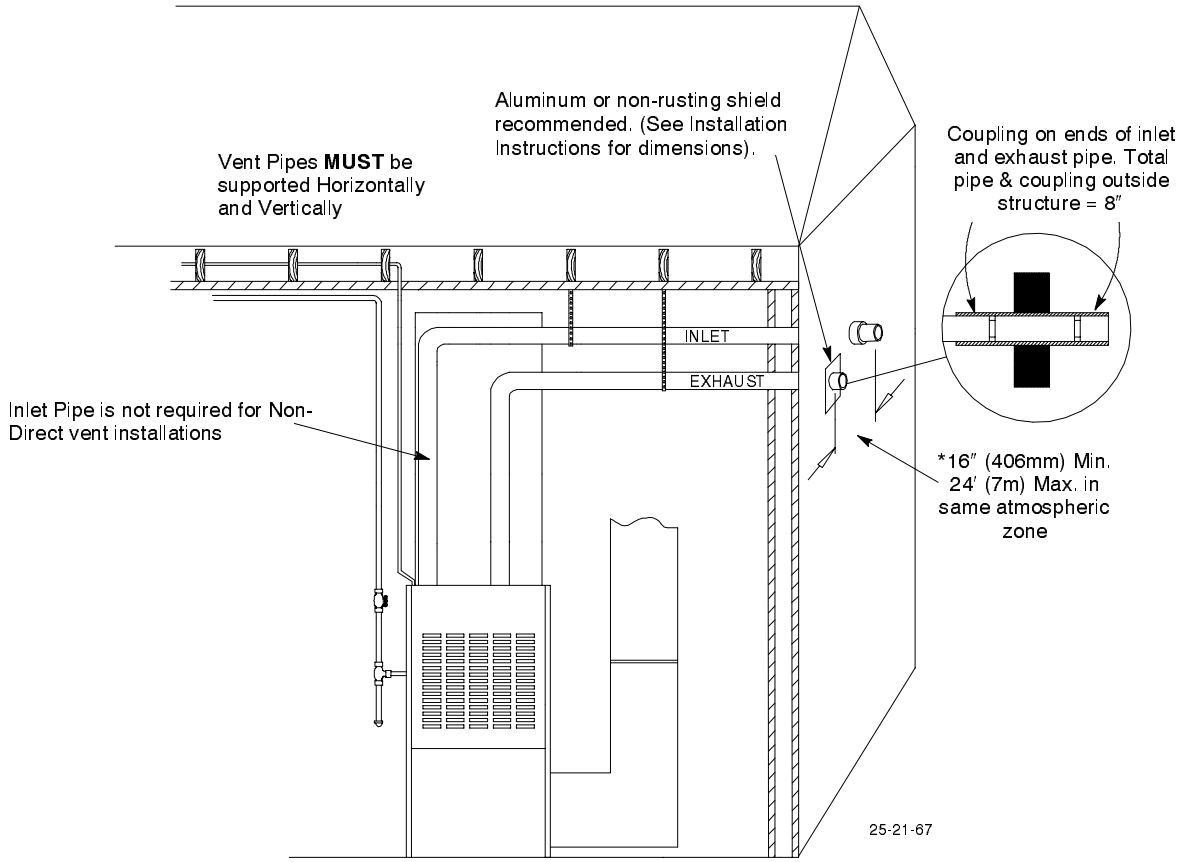
All Non-Direct Vent models use an inlet air restrictor mounted to the collector box on the inlet (back) side of the blower. A different (size) inlet air restrictor orifice is used for the different non-direct vent models. When replacing a combustion blower on a non-direct vent model, it is essential that the orifice be re-installed on the collector box before blower is mounted to the furnace.

All **Dual Certified** models also share a common combustion blower, which although similar in appearance to those of the non-direct vent models is different, and consequently NOT INTERCHANGEABLE.

Dual Certified models DO NOT USE an inlet air restrictor mounted to the collector box on the inlet (back) side of the combustion blower. Proper restriction for these models is provided through a slightly different heat exchanger design.

VENT/COMBUSTION AIR PIPING

Figure 12 **Typical Direct Vent Installation (Category III horizontal venting)**



* Increase minimum from 16″ (406mm) to 18″ (457mm) for cold climates (sustained temperatures below 0° F).

Vent and combustion air piping are an extremely important part of the total furnace installation. Improperly installed or inadequately sized vent and/or combustion air piping can be the source of many perceived furnace problems. For example, most problems associated with pressure switch operation can normally be traced to shortcomings in the vent and/or combustion air piping. Anytime these type problems arise, a thorough inspection of the vent and/or combustion air piping should be conducted.

ALL MODELS require a vent (exhaust) pipe to carry flue products to the outside of the structure.

Dual Certified MODELS (ONLY) require a combustion air inlet pipe to bring in all air for combustion from outside the structure (when installed as a Direct Vent Furnace)

Consult the appropriate Venting tables and/or piping chart for the model (series) you are servicing.

CAPACITORS

A capacitor is used for the circulating (conditioned air) blower motor. Before replacing one of these motors (assumed to be bad) the condition of the capacitor should be verified, since **it**, and not the motor, may be the source of the problem.

Before checking ***any*** capacitor, the supply power to the unit should be turned "OFF".

The capacitor should then be discharged (through a resistor) before testing. A 20,000 Ohm 2 Watt resistor can be used for this purpose.

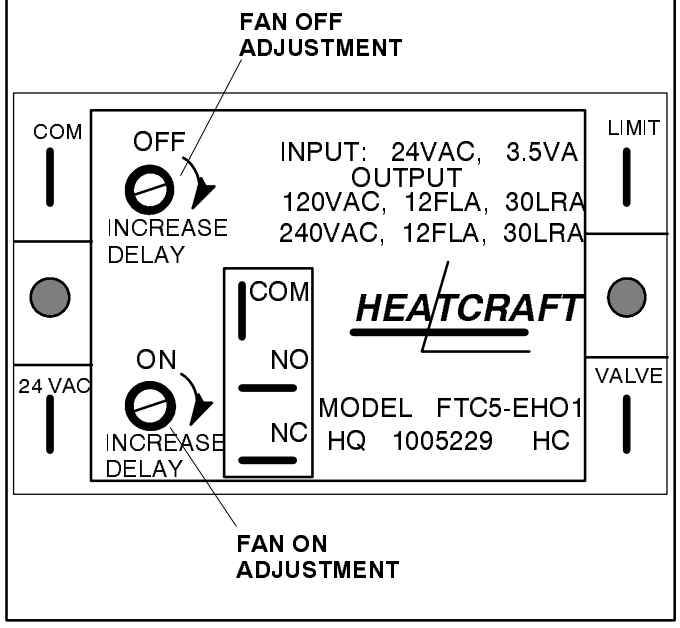
The condition of the capacitor should be verified with a capacitor analyzer (one that indicates the capacitor's value in microfarads) rather than with an Ohmmeter. The reason for this, is that an Ohmmeter test can only indicate if a capacitor is "OPEN, or "SHORTED", it cannot verify if its value (microfarads) is within an acceptable range.

Capacitor should test to within 10% of its rated value. Capacitors testing outside this range should be replaced. A Weak capacitor can be the cause of a motor failing to start.

HEATCRAFT & WATSCO (CAM-STAT) ELECTRONIC FAN TIMERS

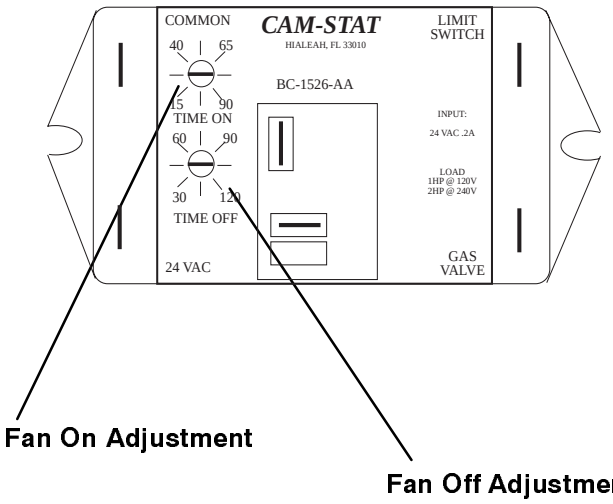
One of two (2) different electronic fan timers may be found in most earlier models. Although different in physical appearance, they both function identically. They provide an adjustable "ON" delay in HEATING of 15-90 seconds, and an adjustable "OFF" delay in HEATING of 30-120 seconds. Due to the manner in which they are wired into the circuit, they will also provide a continuous blower operation whenever one of the safeties (limit switches) is open with the furnace powered.

Figure 13 Heatcraft Fan Timer



Although the controls operate identically, some replacement controls may have terminals located and/or identified differently. Always be certain when replacing a control to wire according to terminal identification, NOT according according to terminal location.

Figure 14 Watsco (Cam-Stat) Fan Timer



CONTROL OPERATION

In order for this control to function properly, it MUST be wired into the circuit correctly. The first step then in checking this control is to insure that it is wired according the unit's wiring diagram.

There are four (4) low voltage terminals located around the outside perimeter of the control. The "COM" terminal is always connected to the Common side of the 24 Volt power supply. The "24 VAC" terminal and "LIMIT" terminal (all limit switches are in series with the "LIMIT" terminal) are always connected to the "HOT" ("R") side of the low voltage transformer. The "VALVE" terminal is always connected to the gas valve terminal that is energized on a call for heat.

There are two (2) line voltage terminals in the center of the control marked "COM and "NO" (some controls may have a third terminal marked "NC", however it is not used in this application of the control) The "COM" line volt

terminal is connected to the blower relay (or speed tap of the blower motor) whereas the "NO" terminal is connected to the "HOT" side of the line voltage power supply.

When wired as indicated, (and with the furnace connected to line voltage) the control will function as follows:

If the power (lead) is removed from the "LIMIT" terminal, The "Normally Open" fan contacts will close and immediately bring on the blower. (This is what happens when one of the limit switches opens) The blower will continue to run as long as this circuit remains open. Once the the circuit is closed, and 24 volt power is reapplied to the "LIMIT" terminal the "OFF" delay will be initiated, and when complete, the blower will turn off.

Normal fan timing ("ON and "OFF" delays) is initiated whenever the "VALVE" terminal is energized (or de-energized in the case of "OFF" delays) with 24 volts, as is the case when the gas valve opens and closes.

CHECKING HEATCRAFT AND /OR WATSCO (CAM-STAT) CONTROLS

The control may be checked while it is in the furnace as follows.:

Turn Electrical and Gas supply off to furnace.

WARNING

Electrical shock hazard.

Turn OFF electric power at fuse box or service panel before making any electrical connections and ensure a proper ground connection is made before connecting line voltage.

Failure to do so can result in property damage, personal injury and/or death.

To check the "ON" delay place a jumper wire between the "24VAC" and "VALVE" terminals. Restore ELECTRICAL power. After "ON" delay (15-90 seconds) expires, "NORMALLY OPEN" fan contacts should close, and blower should run.

To check "OFF" delay, CAREFULLY remove jumper wire from between "24VAC" and "VALVE" terminals (remembering that FURNACE IS STILL POWERED). After "OFF" delay (30-120 seconds) expires, "NORMALLY OPEN" contacts should reopen, and blower should stop.

To check the "LIMIT" function carefully (with the unit still powered) disconnect the wire to the "LIMIT" terminal (or a wire to ANY of the limit switches in furnace). The blower should start immediately, and continue to run as long as wire is disconnected. Upon reconnecting the wire, the control will go through a normal "OFF" delay (30-120 seconds) after which time, the blower should stop.

If the control passes these tests it is operating normally. Restore Gas and Electrical supply, and resume operation.

HONEYWELL ST9120 Series FAN TIMER/FURNACE CONTROL

The HONEYWELL ST9120 Electronic Fan Timer/Furnace Control is an integrated electronic control, which contains NO USER SERVICEABLE COMPONENTS. It is, as its name implies, a fan timer and a furnace control of sorts. In addition to controlling the fan operation for heating, it also takes the place of the blower relay, the combustion air relay and/or the system relay.

Two (2) different series of the control (ST9120"C" & ST9120"G") have been, and/or currently are being used in the production of this series of product. The operation of both versions is nearly identical. The major difference being that the ST9120C has fixed ON and OFF fan delays for heating. The ST9120G, however, provides for field adjustment of the OFF delay on all models of this control, and adjustment of the ON delay as well in more recent models. Additionally,there are two different versions of the ST9120G. The basic difference between these versions is that one has a black plastic enclosure, whereas the other does not. For replacement parts purposes, only the ST9120G (with black plastic enclosure) is supplied.

Figure 15 Honeywell ST9120C

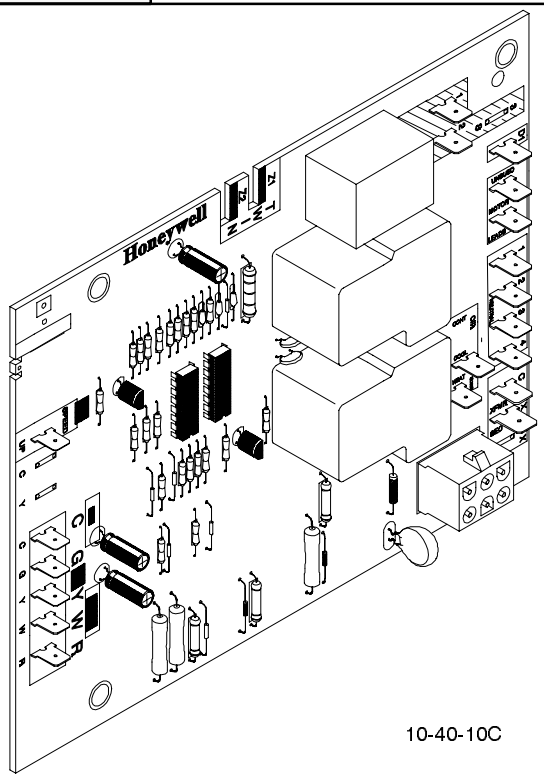
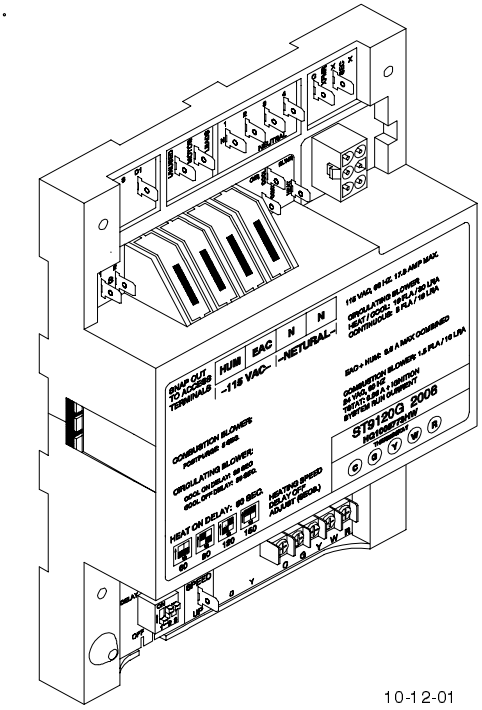


Figure 16 Honeywell ST9120G (with enclosure)

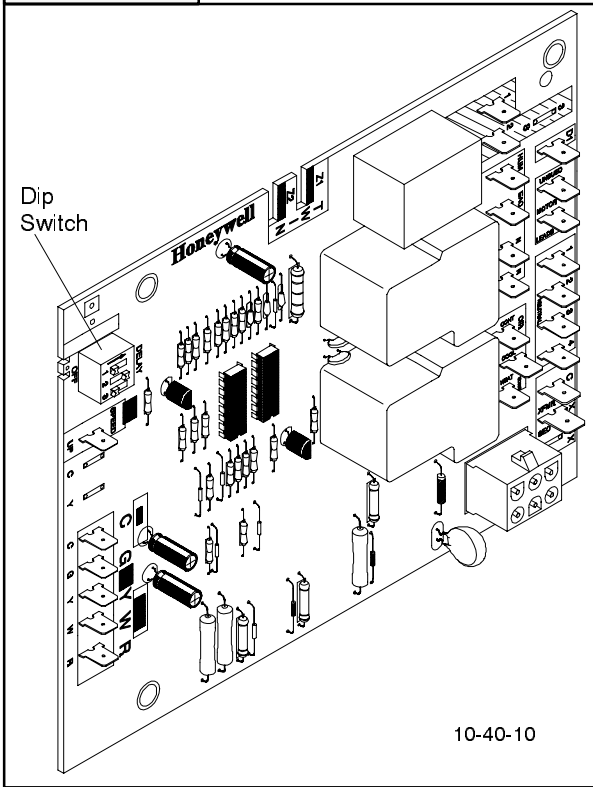


The ST9120 is used in both (earlier) models in conjunction with the HONEYWELL S8600 Ignition Module and VR8204A Gas Valve as well as more recent models in conjunction with either the SV9500 GAS VALVE/IGNITION CONTROL or the VR8200 Standing Pilot gas valve. It provides the power source to begin the ignition sequence through a monitored safety circuit. It also serves as a low voltage terminal strip., In the ST9120"G" series control certain accessory terminals are also provided as well as a Continuous fan terminal which allows for continuous fan operation at a speed other than either the heating or cooling speed.

The control provides a fixed (non-adjustable) 30 second "ON and "OFF" delay for the circulating blower in COOLING and (depending on the model and/or vintage of the control) either a fixed 60 second or an adjustable 30 or 60 second "ON" delay for the circulating blower in HEATING. (Newer ST9120"G" controls have adjustable "ON" delays in HEATING)

The ST9120"G" control also provides an adjustable HEATING "OFF" delay for the circulating blower which can be field adjusted to 60, 90, 120, or 150 seconds (60,100,140,or 180 on newer controls).

Figure 17 Honeywell ST9120G (without enclosure)



HONEYWELL ST9120 "C" & ST9120"G" UNIQUE CONTROL FUNCTIONS/RESPONSES

There are some unique responses from these controls that differ from what one would normally expect, and may be somewhat confusing. Specifically, these are as follows:

Energizing the "G" terminal of this control will cause the blower to run on the HEATING speed. (With most other furnaces, the blower relay is energized via the "G" terminal normally causing the blower to run on the cooling speed.)

Energizing the "G" & "Y" terminals (together) will cause the blower to run on the COOLING speed. It is important that you take note of this, since control wiring improperly connected can cause perceived as well as real equipment problems.

For example,in the past, the "Y" terminal in nearly all furnaces was simply a binding post. There was no electrical connection between this terminal and the rest of the furnace. Consequently, many installers would not use this terminal to connect the "Y" signal from the thermostat, but would run it directly from the thermostat to the condensing unit, then run the "Common" signal back to the furnace "C" terminal.

This method of wiring will result in improper operation from this control. The control MUST receive a "Y" signal in order for it to energize the "COOL" terminal, bringing on the blower in the cooling speed. If it is wired as above, the condensing unit will come on, but the blower will run on the HEATING speed.

"NO TERMINALS" ENERGIZED (on low voltage terminal strip) - If a speed tap wire has been connected to the "CONT" (continuous) terminal, (optional terminal provided on the ST9120"G" series controls only) the blower will runs on this speed. Maximum allowable connected load for this terminal is 8.0 FLA

This feature requires some explanation as to how it differs from "FAN ON" selected from the thermostat sub-base.

The "CONTINUOUS" terminal of the ST9120"G" control is energized ***ONLY*** when there is NO OTHER CALL FOR OPERATION of any kind. If there is a call for HEAT, COOL, or "FAN ON", this terminal is DE-ENERGIZED. The purpose of this terminal is to provide a means of air circulation during "OFF CYCLES" at a different speed than either heating or cooling. **The use of this terminal is optional, and there will be no speed tap wires connected to this terminal when the furnace is shipped.**

"CONTINUOUS" fan should not be confused with "FAN ON" which is obtained by switching the fan selector switch on the thermostat sub-base to **"FAN ON"** (energizing the **"G"** terminal) which causes the blower to run on the **"HEATING" speed**.

The **ST9120"G" Electronic Air Cleaner** terminal **(EAC)** IS ***ONLY*** energized in conjunction with the HEATING and COOLING speed terminals. It IS NOT ENERGIZED in conjunction with the "CONTINUOUS" fan speed terminal. **The maximum allowable connected load to the EAC terminal is 0.8 (eight tenths) Amp.***

The **ST9120"G" HUMIDIFIER** terminal **(HUM)** is energized in conjunction with terminal "D1" (I.E. it is energized whenever the combustion blower is running) **The maximum allowable connected load to the HUM terminal is 0.8 (eight tenths) Amp.***

The combined connected loads of the EAC and HUM terminals cannot exceed a total of 0.8 (eight tenths) amp.

Setting The ST9120"G" Heating Fan "OFF" Delay is accomplished by the positioning of "DIP" switches. The illustration below, as well as a label on the control itself indicates how to position these switches to obtain the desired setting.

Figure 18 **Heating OFF Delay DIP switch Settings (Earlier Controls)**

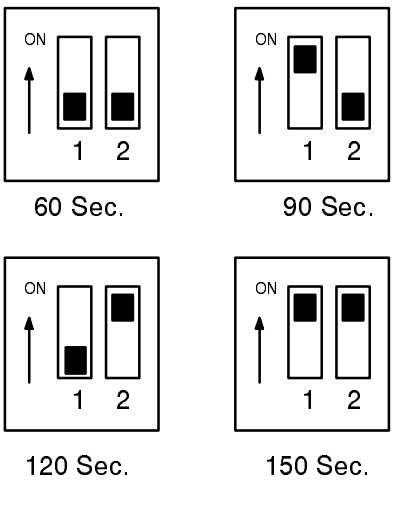
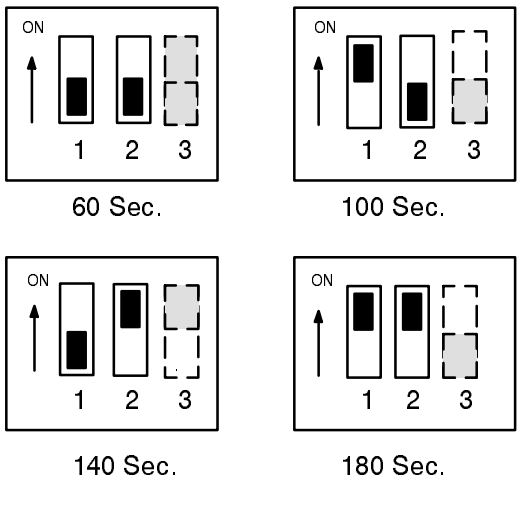


Figure 19 Heating OFF Delay DIP switch Settings (Newer controls)

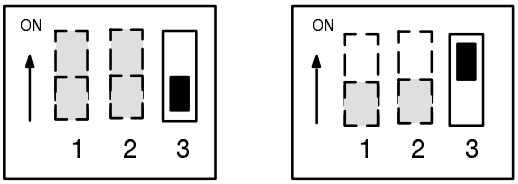


The **ST9120"G" Heating "OFF" delay** can be set to either 60, 90, 120, or 150 seconds (60,100,140, or 180 for newer controls). The control was shipped out in the 120 second position (140 for newer controls). This may be satisfactory for some installations, but not for others.

The "OFF" delay should be set as long as possible without creating "COLD AIR" complaints at the end of the cycle.

The **Heating "ON" delay is fixed at 60 seconds on the ST9120"C" control,(and on earlier ST9120"G" controls) and is not adjustable**. On newer ST9120"G" controls it may be set to either 30 or 60 seconds. The control is shipped out at 30 seconds. As with the "OFF" delay, this may be satisfactory for some installations, but not for others.

Figure 20 Heating ON Delay DIP switch Settings (Newer controls)



The "ON" delay should be set as short as possible without creating "COLD AIR" complaints at the beginning of the cycle.

The **COOLING "ON and "OFF" delays of both the ST9120"C" and ST9120"G" are fixed at 30 seconds, and are not adjustable.**

The operation of the HONEYWELL ST9120 series FAN TIMER/FURNACE CONTROL (as well as the operation of the furnace in general) can be verified in a few minutes by using two (2) jumper wires (to jumper terminals of the low voltage terminal strip) and the "TEST SEQUENCE" below.

ST9120 TESTING SEQUENCE

If furnace successfully passes this testing sequence, it can be assumed that there are no problems with the ST9120 FAN TIMER/FURNACE CONTROL. If it does not, however, it does not necessarily mean that there are problems with the control. Any malfunctions should be thoroughly investigated before replacing any components.

CHECKING **COOLING** FUNCTIONS

1. JUMPER "Y" & "G" TO "R"
2. CHECK COOLING FAN DELAY "ON"
3. CHECK COOLING SPEED FAN OPERATION
4. REMOVE JUMPER
5. CHECK COOLING FAN "OFF" DELAY

CHECKING **HEATING** FUNCTIONS

1. JUMPER "W" TO "R"
2. CHECK COMBUSTION BLOWER START-UP
3. CHECK IGNITION SYSTEM ACTIVATION
4. WHEN MAIN BURNER LIGHTS, CHECK HEATING FAN "ON" DELAY
5. CHECK HEATING SPEED FAN OPERATION
6. REMOVE JUMPER
7. CHECK POST PURGE DELAY
8. CHECK HEATING FAN "OFF" DELAY

GAS VALVE/IGNITION CONTROL (HONEYWELL SV9500)

The system consists basically of only two (2) components. The Ignition System Control and the Pilot Hardware. They operate on Two (2) 24 volt power circuits received from the ST9120G Fan Timer/Furnace Control. One is the power supply for the ignitor, the second is to activate the ignition sequence.

The Ignition System Control manages the Ignition Sequence, and the flow of gas to the pilot and main burners. It is in essence a combination Gas Valve and Ignition control. It contains sophisticated electronic components (internally) and has NO USER SERVICEABLE COMPONENTS. Should a problem be verified internally within the device, IT IS NOT FIELD REPAIRABLE, and must be replaced.

The Pilot Hardware includes the pilot burner, the hot surface element that lights the pilot burner, the flame rod that senses pilot flame, and the cable that attaches to the system control. The hot surface element is made of a tough *break resistant* ceramic composite material. It operates on 24 Volts A.C. The Igniter/Flame Rod assembly can be replaced independently from the pilot burner assembly.

The system operation is quite simple, and forgiving. (I.E. nuisance lockouts are eliminated)

SV9500 SYSTEM OPERATION

Connecting the furnace to the line voltage supply with the blower door interlock switch closed provides 24 volts to power the system. (this is accomplished by the connections from terminals [pins] #4 & #2 from the ST9120 fan timer to terminals #1 & #3 of the SV9500 gas valve)

When the thermostat calls for heat, (the combustion blower starts, causing the pressure switch to close completing the circuit to the ignition system control) there will be approximately a two (2) second delay, while the ignition system control runs a self check

Part of that self check is to see if a flame signal is detected. If a flame signal is detected upon a call for heat (and naturally there shouldn't be), the ignition system control will energize the electronic fan timer output (causing the conditioned air blower to start after the fixed 60 second "ON" delay)and will keep the valve and ignitor circuits off.

Assuming that no flame signal is detected upon the call for heat, (Normal operation), the ignition system control will power the ignitor circuit (24 Volts) causing the ignitor to heat up.

If the ignitor circuit is not proven (I.E. the ignitor is missing, broken, or the connections are loose) there will be no response from the ignition system control. (Lockout)

Once the ignitor circuit has been proven, and the ignitor begins to heat up, the pilot valve will be energized allowing gas to flow to the pilot burner.

With the ignitor now hot, and gas flowing to the pilot, the pilot should light, and the sensor should sense flame.

If no flame is sensed, (I.E. no gas, pilot not lit, flame not enveloping sensor, etc.) the ignitor will stay on, and the pilot valve will remain open until it does sense flame, or until the call for heat is satisfied. THE SYSTEM WILL NOT LOCK OUT under this condition.

Assuming that the pilot does light, and flame is sensed, (normal operation) the ignition system control will turn the ignitor off, while energizing the main valve. This will allow the pilot to light the main burner. It will also energize the electronic fan timer output (causing the conditioned air blower to start after the fixed 60 second "ON" delay).

If a flame outage (I.E. loss of gas supply, blown out, etc.) should occur during a run cycle (Main burner operation), the ignition system will immediately de-energize the main valve and re-power the ignitor circuit placing the system back in to the "Trial For Ignition" mode.

As previously, it will remain in this "Trial For Ignition" mode (Ignitor powered and pilot valve open) either until the pilot lights and flame is sensed, or until the call for heat ends.

If, during main burner operation, the ignitor circuit opens, (I.E. ignitor breaks, or wiring becomes disconnected or loose from control) the pilot and main valve will close and the system will shut down. (Lockout)

Consequently, as you can see, the only condition that will cause a lockout in this system is an unproven ignitor circuit.

With any other type of condition, (loss of gas, loss of power, etc.) the system will reset itself, and revert to a "Trial For Ignition" mode until it either lights and resumes main burner operation, or the call for heat ends.

The SV9500 system **is not sensitive** to furnace grounding or line voltage polarity. Accordingly, you cannot experience a lockout due to those reasons.

Assuming that the main burner did not experience any problems during the run cycle (normal operation) it would continue to operate as long as the call for heat remained.

Once the call for heat ended, the ignition system control would immediately close the main and pilot valves, and de-energize the electronic fan timer output.

De-energizing the electronic fan timer output causes the "OFF" delay timing to begin, and when the pre-selected time (60,90,120, or 150 seconds) expires, the blower will turn off.

TROUBLESHOOTING

Malfunctions of the HONEYWELL SV9500 "Smart Pilot" system may be easily diagnosed using a voltmeter and a spare igniter/flame rod assembly. The igniter itself can also be checked using an Ohmmeter. Resistance of a "Good" igniter should be 10 Ohms or less. See the troubleshooting flow chart and the sequence of operation flow chart in the back pages of this manual for additional information on operation and troubleshooting.

HONEYWELL S8600M (SPARK -to- PILOT) IGNITION SYSTEM

Earlier models used a HONEYWELL S8600M spark to pilot ignition system in conjunction with a VR8204 gas valve,

OPERATION

On a call for HEAT, the S8600M is energized (once the pressure switch closes) and provides a 90 second "Trial For Ignition". This "Trial for Ignition" provides a high voltage spark (approximately 20,000 Volts) to the ignitor, and energizes the pilot circuit of the gas valve.

With spark and gas now available at the pilot burner, the pilot should light and prove flame by flame rectification on the flame sensor.

When the S8600M detects the flame rectification of the proven pilot flame, it will simultaneously turn off the spark, and energize the main valve. This will allow the pilot light to light the main burner.

If for some reason the pilot does not light, (I.E. no gas or no spark) or if it lights but does not prove flame (rectification) within the 90 second "Trial for Ignition", the pilot circuit and spark will be de-energized for a "Wait Cycle" of approximately five (5) minutes.

The purpose of the "Wait Cycle is to allow any unburned gasses to be vented out the flue before once again providing a "Trial for Ignition". During this five (5) minute "Wait Cycle", apparently nothing will be happening. The combustion blower, however, will be running, and (assuming the pressure switch is closed), the the S8600M will remain energized. The gas valve and/or spark, however, will not be energized during this "Wait Cycle" period.

Once the "Wait Cycle" is complete, the S8600M will provide another 90 seconds "Trial for Ignition". The S8600M will continually repeat this sequence (I.E. 90 second "Trial for Ignition" followed by a Five (5) minute "Wait Cycle") until the pilot and main burner light, or the call for HEAT ends.

During troubleshooting, the "long" five (5) minute "Wait Cycle" can be eliminated by simply satisfying the call for HEAT, and recalling, or by breaking and remaking the line voltage power to the unit. This will reset the S8600M, and immediately provide another 90 second "Trial for Ignition". Simply removing and reinstalling the blower door of the furnace will accomplish this reset.

TROUBLESHOOTING

Malfunctions of the HONEYWELL S8600M "Spark to Pilot" may be easily diagnosed using a Volt-Ohmmeter. See the troubleshooting flow chart in the back pages of this manual.

HONEYWELL VR8200 (STANDING PILOT) IGNITION SYSTEM

Standing Pilot models use a Honeywell VR8200A gas valve in conjunction with a Q350 pilot burner assembly. The VR8200A provides a 3-position (OFF-PILOT-ON) manual control of gas flow. The OFF position prevents gas flow to both the pilot and main burner. The PILOT position allows gas flow to the pilot burner only. The ON

position allows gas to flow to the pilot and main burners through the two (2) automatic valves which in turn are controlled by the room thermostat.

OPERATION

Lighting and establishing a pilot flame on the thermocouple, (while the manual control knob is in the pilot position) generates a millivolt signal in the thermocouple. If a sufficiently strong enough millivolt signal is generated it will energize the power unit within the gas valve causing the safety shutoff valve to remain open, allowing gas to be available to the first automatic valve. When the thermostat calls for HEAT, the first and second valve operator solenoids are energized. This opens the first automatic valve, and lifts the second automatic operator valve disc off its seal. This diverts gas flow from the second automatic diaphragm causing a pressure drop on the underside of the diaphragm. The reduced pressure on the underside of the diaphragm allows the diaphragm to move downward, away from its seat. Gas can now flow through the first valve to the upper side of the diaphragm of the second automatic valve, and to the valve outlet.

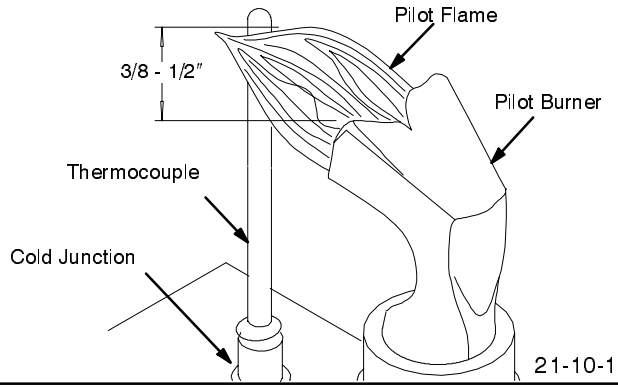
TROUBLESHOOTING

Pilot difficulties (either inability to light, or failure to remain lit) are the most common type of problems experienced with any standing pilot system. Consequently, proper pilot adjustment is essential if pilot difficulties are to be prevented.

PILOT ADJUSTMENT

To adjust the pilot, remove the cap screw cover from the pilot adjustment screw on gas valve. Turn the adjustment screw counterclockwise to increase pilot flame, and clockwise to decrease the pilot flame.

Figure 21 **Pilot Flame Adjustment**



TESTING THERMOCOUPLE

If a millivolt meter is available, performance of the thermocouple can be checked. With a properly adjusted pilot(as described above), thermocouple should produce at least 20 millivolts when checked under a "NO LOAD" or "Open Circuit" condition (i.e. disconnected from power unit of gas valve).

The thermocouple can also be tested under a "LOAD" or "Closed Circuit" condition (i.e. connected to power unit of gas valve) if an adapter is available in addition to the millivolt meter. With a properly adjusted pilot flame, thermocouple should produce at least 10 millivolts.

If thermocouple output is not within range specified, (and pilot flame is properly adjusted), thermocouple should be replaced.

If millivolt reading is satisfactory when tested under a "NO LOAD" condition, but unsatisfactory when tested under a "LOAD" condition, the thermocouple is not at fault. This situation is indicative of excessive heat at the cold junction (base) of the thermocouple.

BLOWER ASSEMBLY

All models use a multi-speed, permanent split capacitor motor, direct-drive, blower assembly. Different size (HP) motors and/or different diameter blower wheels are used in each model to obtain the required air flow. The entire blower assembly slides out on rails for servicing after removing the two screws at the front and disconnecting the harness connectors at the front of the blower deck.

SELECTING BLOWER SPEEDS

The wide variety of applications and installations of furnaces throughout the country makes it impossible to "Factory Select" blower speeds that will provide proper operation for all installations. This means then, that the blower speeds for both heating and cooling must be "Field Selected" for each particular installation to insure proper operation.

The criteria for selecting the proper blower speeds ***IS NOT*** "High for Cooling, Low for Heating". Although that may be how it works out SOMETIMES, It can (in many cases) be exactly the opposite. (I.E. a Lower speed for Cooling, and a Higher speed for Heating)

The PROPER CRITERIA FOR SELECTING BLOWER SPEEDS is as follows:

HEATING

A blower speed must be selected that will provide proper temperature rise through the furnace. (See "checking temperature rise" found elsewhere in this manual). The required CFM for a particular temperature rise can also be calculated by using the following formula:

$$\text{Temp. Rise} \times 1.08 = \frac{\text{Output BTU}}{\text{CFM}}$$

EXAMPLE: Using a model NTC075BFC (75 Mbtu) furnace of this series with an output of 59,000 Btuh and a desired temperature rise of 50°F (range of 35-65°F allowable) and a **measured** external static pressure of 0.2" W.C. with a dry coil.

$$\frac{59{,}000}{50 \times 1.08} \text{ or } \frac{59{,}000}{54} = 1093 \text{ CFM}$$

Checking the blower performance data for this model, (see chart on this page) indicates that @ 0.2" W.C. E.S.P. medium speed will deliver 1100 CFM. Accordingly, medium speed should be used in this example for the HEATING speed.

COOLING

A blower speed must be selected that will provide proper air flow (Nominal 400 CFM per ton) for the size (capacity) air conditioning coil being used at the external static pressure of the Duct system (installation). This requires CHECKING THE EXTERNAL STATIC PRESSURE, and then consulting the BLOWER PERFORMANCE DATA to determine the required speed tap.

EXAMPLE: A 24,000 BTU (2 ton) air conditioning system, using the same 75,000 BTU furnace as in the previous example. The external static pressure is measured and found to be 0.4" W.C.

400 CFM (nominal) per ton required

400 X 2 = 800 CFM required

Checking the blower performance data (see chart below) for this model indicates that @ 0.4" W.C. ESP low speed will deliver 730 CFM. Accordingly, low speed should be used in this example for the COOLING speed.

BLOWER PERFORMANCE DATA NTC075BFC

		Model Number		
		NTC5		
		050BFC	**075BFC**	100BKC
ESP (Inches)	**SPEED TAP**	**CFM**		
.10	LOW	645	733	1417
	MED. LOW	-	-	1611
	MEDIUM	1000	1116	
	MED. HIGH	-	-	1830
	HIGH	1305	1418	2219
.20	LOW	660	740	1405
	MED. LOW	-	-	1595
	MEDIUM	990	**1100**	
	MED. HIGH	-	-	1810
	HIGH	1250	1370	2185
.30	LOW	665	742	1388
	MED. LOW	-	-	1570
	MEDIUM	975	1085	
	MED. HIGH	-	-	1798
	HIGH	1205	1323	2163
.40	**LOW**	650	**730**	1360
	MED. LOW	-	-	1545
	MEDIUM	950	1050	
	MED. HIGH	-	-	1765
	HIGH	1150	1270	2125

CHANGING BLOWER SPEEDS

The procedure for changing blower speeds (if needed) differs slightly, based on the type of fan control the particular model is equipped with. See the appropriate section for the model you are servicing.

Figure 22	**Blower Speed Chart**
Wire Color	**Motor Speed**
Black	High
Orange*	Med-High
Blue	Medium
Red	Low
* Med-High speed may not be provided on all models.	

WARNING

Electrical shock hazard.

Turn OFF power to furnace before changing speed taps.

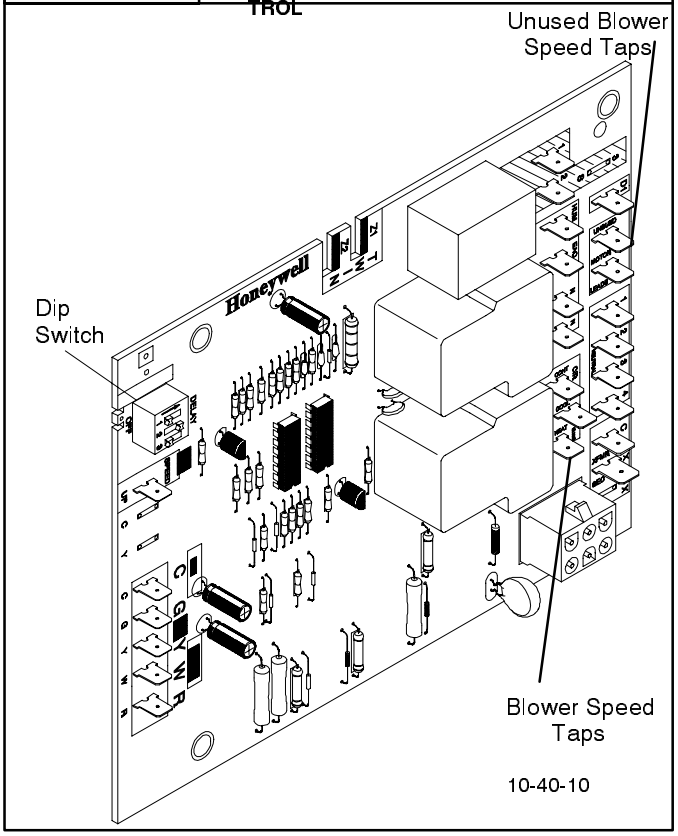
Failure to do so can result in personal injury and/or death.

HONEYWELL ST9120 EQUIPPED MODELS

HEATING SPEED

Should it be necessary to change blower speeds to obtain proper temperature rise, Simply take the appropriate speed tap wire, and plug it on to the terminal marked "HEAT".

Figure 23 HONEYWELL ST9120 FAN TIMER/FURNACE CONTROL



COOLING SPEED

When the proper speed has been determined, it is then simply plugged on to the terminal of the control marked "COOL".

"UNUSED" TERMINALS

There are two (2) terminals (marked "UNUSED MOTOR LEADS" on the HONEYWELL ST9120G) which have no internal connection to the control. Their purpose is to provide a place to connect, or "PARK" any "UNUSED" speed tap wires to keep them out of the way and prevent them from shorting out against the furnace casing, or each other.

HEATCRAFT OR WATSCO(CAM-STAT) EQUIPPED MODELS

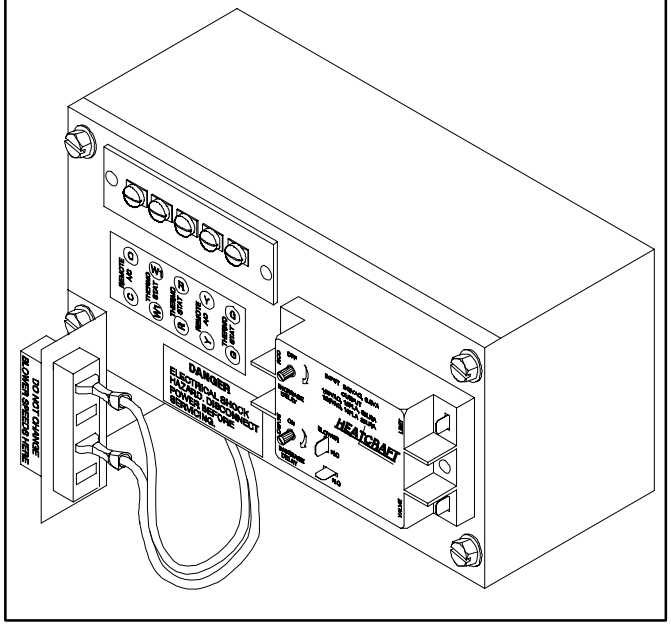
HEATING SPEED

Should it be necessary to change blower speeds to obtain proper temperature rise, Simply take the YELLOW WIRE, and plug it on to the appropriate speed tap wire terminal of the junction block.

COOLING SPEED

When the proper speed has been determined, simply take the VIOLET WIRE and plug it on to the appropriate speed tap wire terminal of the junction block.

Figure 24 Changing Blower Speeds



HEAT EXCHANGER REMOVAL/REPLACEMENT (UPFLOW MODELS)

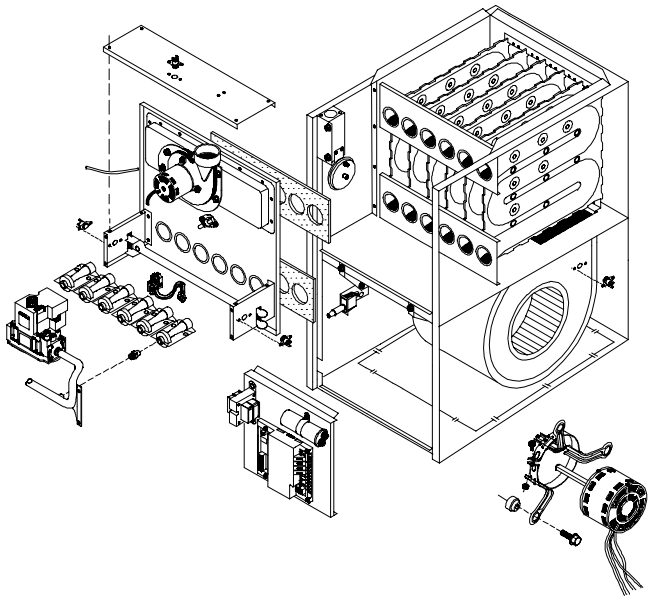


Figure 25

1. Turn "OFF" electrical power and gas supply to furnace.
2. Disconnect vent pipe to furnace at exhaust blower.
3. Disconnect intake pipe (Dual Certified models only) at combustion air box.
4. Disconnect gas piping to gas valve.
5. Remove cover from junction box in furnace, and disconnect electrical supply wiring inside junction box.

Note: Before performing next step, insure that the wiring diagram is available and readable, or tag all wires first.

6. Disconnect wiring to pressure switch, limit switch, roll-out switch(es), combustion blower, and gas valve.
7. On models with ignition module mounted to furnace side panel, remove screws securing ignition module to side panel, and carefully lower module, and allow to hang by wiring in front of blower door.
8. Remove junction box, pressure switch and limit switch.
9. Remove combustion blower
10. Remove the collector box
11. On Dual Certified models (only) remove screws securing cover to combustion box .
12. Remove screws securing burner box (Dual Certified models) or manifold support brackets (Non-Direct Vent models) to front partition
13. Remove top panel
14. Remove screws around perimeter of front partition
15. Heat exchanger can now be removed from furnace.
16. Reverse procedure to re-install, making sure that any gaskets that have been torn during disassembly are replaced with new ones.
17. After re-assembly, turn the gas supply on, and check for leaks. All leaks must be repaired immediately.
18. Perform an operational check of the furnace.

HEAT EXCHANGER REMOVAL/REPLACEMENT (COUNTERFLOW MODELS)

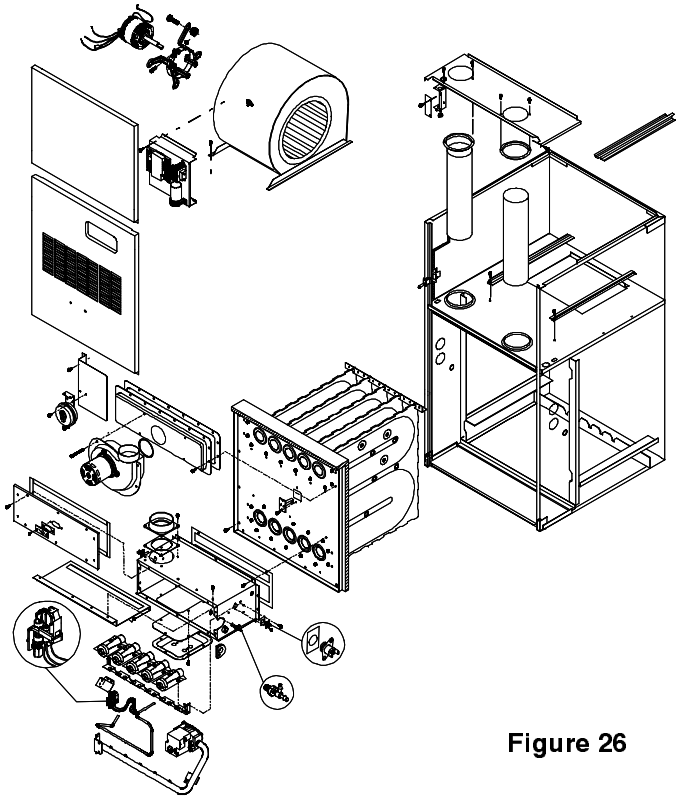


Figure 26

1. Turn "OFF" electrical power and gas supply to furnace.
2. Disconnect vent pipe to furnace at exhaust blower.
3. Disconnect intake pipe (Dual Certified models only) at combustion air box.
4. Disconnect gas piping to gas valve.
5. Remove cover from junction box in furnace, and disconnect electrical supply wiring inside junction box.

Note: Before performing next step, insure that the wiring diagram is available and readable, or tag all wires first.

6. Disconnect wiring to pressure switch, limit switch, roll-out switch(es), combustion blower, and gas valve.
7. On models with ignition module mounted to furnace side panel, remove screws securing ignition module to side panel, and carefully raise module, and place in blower compartment.
8. Remove junction box, pressure switch and limit switch.
9. Remove combustion blower
10. Remove the collector box
11. On Dual Certified models (only) remove screws securing cover to combustion box .
12. Remove screws securing burner box (Dual Certified models) or manifold support brackets (Non-Direct Vent models) to front partition
13. Remove screws around perimeter of front partition
14. Heat exchanger can now be removed from furnace.
15. Reverse procedure to re-install, making sure that any gaskets that have been torn during disassembly are replaced with new ones.
16. After re-assembly, turn the gas supply on, and check for leaks. All leaks must be repaired immediately.
17. Perform an operational check of the furnace.

TECHNICAL SERVICE DATA INDEX

TECHNICAL SERVICE DATA INDEX

TECHNICAL SERVICE DATA INDEX

MODEL NUMBER	TECH. SVC. DATA	MODEL NUMBER	TECH. SVC. DATA
NUH5			
NUH5050BCB1	Sheet 18		
NUH5050BCB2	Sheet 19		
NUH5050BFB1	Sheet 18		
NUH5050BFB2	Sheet 19		
NUH5075BFB1	Sheet 18		
NUH5075BFB2	Sheet 19		
NUH5100BFB1	Sheet 18		
NUH5100BFB2	Sheet 19		
NUH5125BHB1	Sheet 18		
NUH5125BHB2	Sheet 19		
NUH5150BKB1	Sheet 18		
NUH5150BKB2	Sheet 19		

Technical Service Data Sheet 1. (NCC5, NCG5, NNAC, NNAG MODELS)

Equipped with Honeywell S8600M Ignition Module & Heatcraft (or Watsco) Fan Timer

Figure 27 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BFA	10 X 6	1/3PSC	3	30-60	115/6.9	210
075BFA	10 X 8	1/3PSC	3	40-70	115/6.9	240
075BHA	11 X 10	1/2PSC	3	25-55	115/10.3	210
100BHA	11X 10	1/2PSC	3	35-65	115/10.3	195
125BKA	12 X 12	3/4PSC	4	45-75	115/14	160
150BKA	12 X 12	3/4PSC	4	50-80	115/14	150

Figure 28 Specifications

	050BF	075BF/BH	100BH	125BK	150BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	38,000	57,000	80,000	100,000	118,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50	.20/.50
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.75	.75	.75	.75	.75
TimerSetting (sec.) DELAY ON	15 - 90	15 - 90	15 - 90	15 - 90	15 - 90
DELAY OFF	30 - 120	30 - 120	30 - 120	30 - 120	30 - 120
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42	6/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.020	.020	.020	.020	.020
Spark Gap	1/8	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.50	-0.65

Technical Service Data Sheet 2. (NCC5, NCG5, NNAC, NNAG MODELS)

Equipped with Honeywell S8600M Ignition Module & Honeywell ST9120 Fan Timer

Figure 29 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BFB	10 X 6	1/3PSC	3	30-60	115/8.3	180
075BFB	10 X 8	1/3PSC	3	40-70	115/8.3	250
075BHB	11 X 10	1/2PSC	3	25-55	115/11.3	200
100BHB	11X 10	1/2PSC	3	35-65	115/11.3	180
125BKB	12 X 12	3/4PSC	4	45-75	115/14.7	150
150BKB	12 X 12	3/4PSC	4	50-80	115/14.7	150

Figure 30 Specifications

	050BF	075BF/BH	100BH	125BK	150BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	39,500	59,000	79,000	98,750	118,500
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50	.20/.50
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.75	.75	.75	.75	.75
TimerSetting DELAY ON	60	60	60	60	60
(sec.) DELAY OFF	60-150	60-150	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42	6/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.018	.018	.018	.018	.018
Spark Gap	1/8	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.50	-0.65

Technical Service Data Sheet 3. (NCC5, NCG5, NNAC, NNAG MODELS)

Equipped with Honeywell SV9500M "Smart Valve" & Honeywell ST9120 Fan Timer

Figure 31 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BFB	10 X 6	1/3PSC	3	30-60	115/8.3	180
075BFB	10 X 8	1/3PSC	3	40-70	115/8.3	250
075BHB	11 X 10	1/2PSC	3	25-55	115/11.3	200
100BHB	11X 10	1/2PSC	3	35-65	115/11.3	180
125BKB	12 X 12	3/4PSC	4	45-75	115/14.7	150
150BKB	12 X 12	3/4PSC	4	50-80	115/14.7	150

Figure 32 Specifications

	050BF	075BF/BH	100BH	125BK	150BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	39,500	59,000	79,000	98,750	118,500
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50	.20/.50
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.30	.30	.30	.30	.30
Timer Setting DELAY ON	30	30	30	30	30
(sec.) DELAY OFF	60-150	60-150	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/SV9500M	MHSV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42	6/#42
Ignition Type	MH/HSP	MH/HSP	MH/HSP	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018	.018	.018	.018
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.50	-0.65

Technical Service Data Sheet 4. (NDN5 MODELS)

Figure 33 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
NDN5050BF	10 X 6	1/3PSC	3	30-60	115/9.0	210
NDN5075BF	10 X 8	1/3PSC	3	40-70	115/9.0	240
NDN5100BF	11 X 10	1/2PSC	3	50-80	115/7.0	260
NDN5100BH	11X 10	1/2PSC	3	35-65	115/12.0	195
NDN5125BK	12 X 12	3/4PSC	4	45-75	115/15.0	160

Figure 34 Specifications

	NDN5050BF	NDN5075BF	NDN5100BF	NDN5100BH	NDN5125BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	100,000	125,000
Output	40,000	61,000	81,000	81,000	102,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.15/.50	.20/.50
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.30	.30	.30	.30	.30
Timer Setting DELAY ON	30/60	30/60	30/60	30/60	30/60
(sec.) DELAY OFF	60/100/140/180	60/100/140/180	60/100/140/180	60/100/140/180	60/100/140/180
Gas Valve Mfg/Type	MH/SV9500M	MH/ SV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	4/#42	5/#42
Ignition Type	MH/HSP	MH/HSP	MH/HSP	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018	.018	.018	.018
Pressure Switch (Opens)	-0.40	-0.40	-0.65	-0.65	-0.65

Technical Service Data Sheet 5. (NTC5, MODELS)

Equipped with Honeywell S8600M Ignition Module & Heatcraft (or Watsco) Fan Timer

Figure 35 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
NTC5050BEA1	10 X 6	1/3PSC	3	35-65	115/6.9	230
NTC5050BHA1	10 X 10	1/2PSC	3	15-45	115/10.3	215
NTC5075BFA1	10 X 8	1/3PSC	3	35-65	115/6.9	230
NTC5075BHA1	10 X 10	1/2PSC	3	25-55	115/10.3	270
NTC5100BHA1	10 X 10	1/2PSC	3	35-65	115/10.3	195
NTC5100BKA1	12 X 12	3/4PSC	4	35-65	115/14	140
NTC5125BKA1	12 X 12	3/4PSC	4	40-70	115/14	175

Figure 36 Specifications

	NTC5050BE/BH	NTC5075BF/BH	NTC5100BH/BK	NTC5125BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000
Output	38,000	57,000	80,000	100,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50
Transformer Size(VA)	40	40	40	40
Anticipator Setting	.75	.75	.75	.75
TimerSetting (sec.) DELAY ON	15 - 90	15 - 90	15 - 90	15 - 90
DELAY OFF	30 - 120	30 - 120	30 - 120	30 - 120
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.020	.020	.020	.020
Spark Gap	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45

Technical Service Data Sheet 6. (NTC5, MODELS)

Equipped with Honeywell S8600M Ignition Module & Heatcraft (or Watsco) Fan Timer

Figure 37 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
NTC5050BEA1	10 X 6	1/3PSC	3	35-65	115/6.9	230
NTC5050BHA1	10 X 10	1/2PSC	3	15-45	115/10.3	215
NTC5075BFA2	10 X 8	1/3PSC	3	35-65	115/6.9	300
NTC5075BHA2	10 X 10	1/2PSC	3	25-55	115/10.3	240
NTC5100BHA2	10 X 10	1/2PSC	3	35-65	115/10.3	195
NTC5100BKA1	12 X 12	3/4PSC	4	35-65	115/14	140
NTC5125BKA1	12 X 12	3/4PSC	4	40-70	115/14	175

Figure 38 Specifications

	NTC5050BE/BH	NTC5075BF/BH	NTC5100BH/BK	NTC5125BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000
Output	38,000	57,000	80,000	100,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50
Transformer Size(VA)	40	40	40	40
Anticipator Setting	.75	.75	.75	.75
TimerSetting DELAY ON (sec.)	15 - 90	15 - 90	15 - 90	15 - 90
DELAY OFF	30 - 120	30 - 120	30 - 120	30 - 120
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.020	.020	.020	.020
Spark Gap	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45

Technical Service Data Sheet 7. (NTC5, NNAT MODELS)

Equipped with Honeywell S8600M Ignition Module & Heatcraft (or Watsco) Fan Timer

Figure 39 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BEA2	10 X 6	1/3PSC	3	35-65	115/6.9	270
050BHA1	10 X 10	1/2PSC	3	15-45	115/10.3	215
075BFA2	10 X 8	1/3PSC	3	35-65	115/6.9	300
075BHA2	10 X 10	1/2PSC	3	25-55	115/10.3	240
100BHA2	10 X 10	1/2PSC	3	35-65	115/10.3	195
100BKA2	12 X 12	3/4PSC	4	35-65	115/14	130
125BKA2	12 X 12	3/4PSC	4	40-70	115/14	170

Figure 40 Specifications

	050BE/BH	075BF/BH	100BH/BK	125BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000
Output	38,000	57,000	80,000	100,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50
Transformer Size(VA)	40	40	40	40
Anticipator Setting	.75	.75	.75	.75
TimerSetting (sec.) DELAY ON	15 - 90	15 - 90	15 - 90	15 - 90
DELAY OFF	30 - 120	30 - 120	30 - 120	30 - 120
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.020	.020	.020	.020
Spark Gap	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45

Technical Service Data Sheet 8. (NTC5, NNAT MODELS)

Equipped with Honeywell S8600M Ignition Module & Honeywell ST9120 Fan Timer

Figure 41 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BFB1	10 X 6	1/3PSC	3	35-65	115/8.3	270
050BHB1	10 X 10	1/2PSC	3	15-45	115/11.3	270
075BFB1	10 X 8	1/3PSC	3	35-65	115/8.3	300
075BHB1	10 X 10	1/2PSC	3	25-55	115/11.3	240
100BHB1	10 X 10	1/2PSC	3	35-65	115/11.3	195
100BKB1	12 X 12	3/4PSC	4	35-65	115/14.7	130
125BKB1	12 X 12	3/4PSC	4	40-70	115/14.7	170

Figure 42 Specifications

	050BF/BH	075BF/BH	100BH/BK	125BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000
Output	39,500	59,000	79,000	98,750
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50
Transformer Size(VA)	40	40	40	40
Anticipator Setting	.75	.75	.75	.75
TimerSetting (sec.) DELAY ON	60	60	60	60
DELAY OFF	60-150	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.018	.018	.018	.018
Spark Gap	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.65	-0.65

Technical Service Data Sheet 9. (NTC5, MODELS)

Equipped with Honeywell SV9500M "Smart Valve" & Honeywell ST9120 Fan Timer

Figure 43 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
NTC5050BFB2	10 X 6	1/3 PSC	3	35-65	115/8.3	270
NTC5050BHB	10 X 10	1/2 PSC	3	15-45	115/11.3	270
NTC5075BFB2	10 X 8	1/3 PSC	3	35-65	115/8.3	300
NTC5075BHB2	10 X 10	1/2 PSC	3	25-55	115/11.3	240
NTC5100BHB2	12 X 10	1/2 PSC	3	35-65	115/11.3	195
NTC5100BKB2	12 X 12	3/4 PSC	4	35-65	115/14.7	130
NTC5125BKB2	12 X 12	3/4 PSC	4	40-70	115/14.7	170

Figure 44 Specifications

	NTC5050BF/BH	NTC5075BF/BH	NTC5100BH/BK	NTC5125BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000
Output	39,500	59,000	79,000	
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50
Transformer Size (VA)	40	40	40	40
Anticipator Setting	.30	.30	.30	.30
TimerSetting DELAY ON	60	60	60	60
(sec.) DELAY OFF	60-150	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/SV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42
Ignition Type	MH/HSP	MH/HSP	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018	.018	.018
Pressure Switch (Opens)	-0.40	-0.40	-0.65	-0.65

Technical Service Data Sheet 10. (NTC5, MODELS)

Equipped with Honeywell SV9500M "Smart Valve" & Honeywell ST9120 Fan Timer

Figure 45 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
NTC5050BFC	DD10-6	1/3PSC	3	35F - 65F	115/9	270
NTC5075BFC	DD10-8	1/3PSC	3	35F - 65F	115/9	300
NTC5075BHC	DD10-10	1/2PSC	3	25F - 55F	115/12	300
NTC5100BFC	DD11-10	1/3PSC	3	45F - 75F	115/7	270
NTC5100BJC	DD11-10	3/4PSC	4	35F - 65F	115/16	195
NTC5100BKC	DD12-12	3/4PSC	4	35F - 65F	115/15	130
NTC5100BKD	DD11-10	3/4PSC	4	35F - 65F	115/15	130
NTC5125BKC	DD12-12	3/4PSC	4	40F - 70F	115/15	170
NTC5125BKD	DD11-10	3/4PSC	4	40F - 70F	115/15	150
NTC5150BKC	DD12-12	3/4PSC	4	45F - 75F	115/15	150

Figure 46 Specifications

	NTC5050BFC	NTC5075BFC NTC5075BHC	NTC5100BFC NTC5100BJC NTC5100BKC NTC5100BKD	NTC5125BKC NTC5125BKD	NTC5150BKC
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	40,000	59,000	79,000	99,000	120,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/0.5	.20/0.5	.20/0.5
Transformer Size (VA)	40	40	40	40	40
Anticipator Setting	.30	.30	.30	.30	.30
TimerSetting DELAY ON	30-60	30-60	30-60	30-60	30-60
(sec.) DELAY OFF	60-180	60-180	60-180	60-180	60-180
Gas Valve Mfg/Type	MH/SV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	2/#42	4/#42	5/#42	6/#42
Ignition Type	MH/HSP	MH/HSP	MH/HSP	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018	.018	.018	.018
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.65	-0.65

Technical Service Data Sheet 11. (NUG5, NNAU MODELS)

Equipped with Honeywell S8600M Ignition Module & Heatcraft (or Watsco) Fan Timer

Figure 47 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BCA1	DD10-6A	1/6PSC	3	40 - 70	115/2.7	230
050BEA1	DD10-6A	1/3PSC	3	35 - 65	115/6.9	230
050BHA1	DD10-10A	1/2PSC	3	15 - 45	115/10.3	215
075BHA1	DD10-10	1/2PSC	3	25 - 55	115/10.3	240
075BFA1	DD10-8	1/3PSC	3	35 - 65	115/6.9	300
100BFA1	10X10	1/3PSC	3	45 - 75	115/5.3	215
100BHA1	10X10	1/2PSC	3	35 - 65	115/10.3	195
100BKA1	12X12	3/4PSC	4	35 - 65	115/14	140
125BHA1	12X12	1/2PSC	3	45 - 75	115/5.2	175
125BKA1	12X12	3/4PSC	4	40 - 70	115/14	175
150BKA1	12X12	3/4PSC	4	45 - 75	115/14	150

Figure 48 Specifications

	050BC/BE/BH	075BF/BH	100BF/BH/BK	125BH/BK	150BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	38,000	57,000	80,000	100,000	125,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/0.5	.20/0.5	.20/0.5
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.75	.75	.75	.75	.75
TimerSetting DELAY ON	15 - 90	15 - 90	15 - 90	15 - 90	15 - 90
(sec.) DELAY OFF	30 -120	30 - 120	30 -120	30 - 120	30 - 120
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42	5/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.020	.020	.020	.020	.020
Spark Gap	1/8	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45	-0.65

Technical Service Data Sheet 12. (NUG5, NNAU MODELS)

Equipped with Honeywell S8600M Ignition Module & Heatcraft (or Watsco) Fan Timer

Figure 49 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BEA2	DD10-6A	1/3PSC	3	35 - 65	115/6.9	270
050BHA2	DD10-10A	1/2PSC	3	15 - 45	115/10.3	215
075BHA2	DD10-10	1/2PSC	3	25 - 55	115/10.3	240
075BFA2	DD10-8	1/3PSC	3	35 - 65	115/6.9	300
100BFA2	10X10	1/3PSC	3	45 - 75	115/5.3	215
100BHA2	10X10	1/2PSC	3	35 - 65	115/10.3	195
100BKA2	12X12	3/4PSC	4	35 - 65	115/14	130
125BHA2	12X12	1/2PSC	3	45 - 75	115/5.2	175
125BKA2	12X12	3/4PSC	4	40 - 70	115/14	170
150BKA2	12X12	3/4PSC	4	45 - 75	115/14	140

Figure 50 Specifications

	050/BE/BH	075BF/BH	100BF/BH/BK	125BH/BK	150BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	38,000	57,000	80,000	100,000	125,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/0.5	.20/0.5	.20/0.5
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.75	.75	.75	.75	.75
TimerSetting DELAY ON	15 - 90	15 - 90	15 - 90	15 - 90	15 - 90
(sec.) DELAY OFF	30 -120	30 - 120	30 -120	30 - 120	30 - 120
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42	5/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.020	.020	.020	.020	.020
Spark Gap	1/8	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45	-0.65

Technical Service Data Sheet 13. (NUG5, NNAU MODELS)

Equipped with Honeywell S8600M Ignition Module & Honeywell ST9120 Fan Timer

Figure 51 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BCB1	DD10-6A	1/6PSC	3	40 - 70	115/3.8	230
050BFB1	DD10-6A	1/3PSC	3	35 - 65	115/8.3	270
050BHB1	DD10-10A	1/2PSC	3	15 - 45	115/11.3	270
075BFB1	DD10-8	1/3PSC	3	35 - 65	115/8.3	300
075BHB1	DD10-10	1/2PSC	3	25 - 55	115/11.3	240
100BFB1	DD10-10	1/3PSC	3	45-75	115/6.4	180
100BHB1	DD10-10	1/2PSC	3	35-65	115/11.3	195
100BKB1	DD12-12	3/4PSC	4	35-65	115/14.7	130
125BHB1	DD12-12	1/2PSC	3	45-75	115/6.2	170
125BKB1	DD12-12	3/4PSC	4	40-70	115/14.7	170
150BKB1	DD12-12	3/4PSC	4	45-75	115/14.7	140

Figure 52 Specifications

	050BC/BF/BH/	075BF/BH	100BF/BH/BK	125BH/BK	150BK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	39,500	59,000	80,000	100,000	125,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/0.5	.20/0.5	.20/0.5
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.75	.75	.75	.75	.75
TimerSetting DELAY ON	60	60	60	60	60
(sec.) DELAY OFF	60-150	60-150	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42	6/#42
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.018	.018	.018	.018	.018
Spark Gap	1/8	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45	-0.65

Technical Service Data Sheet 14. (NUG5, MODELS)

Equipped with Honeywell SV9500M "Smart Valve" & Honeywell ST9120 Fan Timer

Figure 53 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BCB2	DD10-6A	1/6PSC	3	40 - 70	115/3.8	230
050BFB2	DD10-6A	1/3PSC	3	35 - 65	115/8.3	270
050BHB2	DD10-10A	1/2PSC	3	15 - 45	115/11.3	270
075BFB2	DD10-8	1/3PSC	3	35 - 65	115/8.3	300
075BHB2	DD10-10	1/2PSC	3	25 - 55	115/11.3	240

Figure 54 Specifications

	050BC/BF/BH	075BF/BH
Gas Type	NATURAL	NATURAL
Input (Btuh)	50,000	75,000
Output	39,500	59,000
Rated Ext. Static Press.	.10/0.5	.12/0.5
Transformer Size (VA)	40	40
Anticipator Setting	.30	.30
TimerSetting DELAY ON	60	60
(sec.) DELAY OFF	60-150	60-150
Gas Valve Mfg/Type	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP
Manifold Pressure	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42
Ignition Type	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018
Pressure Switch (Opens)	-0.40	-0.40

Technical Service Data Sheet 15. (NUG5, MODELS)

Equipped with Honeywell SV9500M "Smart Valve" & Honeywell ST9120 Fan Timer

Figure 55 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
100BFB2	DD10 X 10	1/3 PSC	3	45-75	115/6.4	270
100BHB2	DD10 X 10	1/2 PSC	3	35-65	115/11.3	195
100BKB2	DD12 X 12	3/4 PSC	4	35-65	115/14.7	130
125BHB2	DD12 X 12	1/2 PSC	3	45-75	115/6.2	170
125BKB2	DD12 X 12	3/4 PSC	4	40-70	115/14.7	170
150BKB2	DD12 X 12	3/4 PSC	4	45-75	115/14.7	140

Figure 56 Specifications

	100BF/BH/BK	125BH/BK	150BK
Gas Type	NATURAL	NATURAL	NATURAL
Input (Btuh)	100,000	125,000	150,000
Output	80,000	100,000	125,000
Rated Ext. Static Press.	.15/0.5	.20/0.5	.20/0.5
Transformer Size (VA)	40	40	40
Anticipator Setting	.30	.30	.30
TimerSetting DELAY ON	60	60	60
(sec.) DELAY OFF	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/SV9500M	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5
Orifice Quantity/Size	4/#42	5/#42	6/#42
Ignition Type	MH/HSP	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018	.018
Pressure Switch (Opens)	-0.50	-0.45	-0.65

Technical Service Data Sheet 16. (NTN5 MODELS)

Figure 57 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
NTN5050BFA	DD10-6	1/3PSC	3	35F - 65F	115/9	270
NTN5075BFA	DD10-8	1/3PSC	3	35F - 65F	115/9	300
NTN5075BHA	DD10-10	1/2PSC	3	25F - 55F	115/12	300
NTN5100BKA	DD12-12	3/4PSC	4	35F - 65F	115/15	130
NTN5100BKB	DD11-10	3/4PSC	4	35F - 65F	115/15	130
NTN5125BKA	DD12-12	3/4PSC	4	40F - 70F	115/15	170
NTN5125BKB	DD11-10	3/4PSC	4	40F - 70F	115/15	150

Figure 58 Specifications

	NTN5050BFA	NTN5075BFA NTN5075BHA	NTN5100BKA NTN5100BKB	NTN5125BKA NTN5125BKB
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000
Output	40,000	59,000	79,000	99,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/0.5	.20/0.5
Transformer Size (VA)	40	40	40	40
Anticipator Setting	.30	.30	.30	.30
TimerSetting DELAY ON	30-60	30-60	30-60	30-60
(sec.) DELAY OFF	60-180	60-180	60-180	60-180
Gas Valve Mfg/Type	MH/SV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	2/#42	4/#42	5/#42
Ignition Type	MH/HSP	MH/HSP	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018	.018	.018
Pressure Switch (Opens)	-0.40	-0.40	-0.65	-0.65

Technical Service Data Sheet 17. (NUG3 MODELS)

Figure 59	Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050AFA1	DD10-6	1/3PSC	3	25F - 55F	115/8	230F
075AFA1	DD10-8	1/3PSC	3	25F - 55F	115/8	300F
0100AHA1	DD10-10	1/2PSC	3	35F - 65F	115/11	240F
0125AKA1	DD12-12	3/4PSC	4	35F - 65F	115/15	150F

Figure 60	Specifications			
	050AF	075AF	100AH	125AK
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000
Output	40,000	59,000	80,000	99,000
Rated Ext. Static Press.	0.10/0.50	0.12/0.50	0.15/0.50	0.20/0.50
Transformer Size (VA)	40	40	40	40
Anticipator Setting	.30	.30	.30	.30
TimerSetting DELAY ON	30	30	30	30
(sec.) DELAY OFF	140	140	140	140
Gas Valve Mfg/Type	MH/VR8200A	MH/VR8200A	MH/VR8200A	MH/VR8200A
Regulation Type	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#42	3/#42	4/#42	5/#42
Ignition Type	STANDING PILOT	STANDING PILOT	STANDING PILOT	STANDING PILOT
Pilot Orifice Size	.012	.012	.012	.012
Pressure Switch (Closes)	-.33	-.33	-.33	-.33

Technical Service Data Sheet 18. (NUH5, MODELS)

Equipped with Honeywell S8600M Ignition Module & Honeywell ST9120 Fan Timer

Figure 61 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BCB1	10 X 6	1/6PSC	3	40-70	115/3.8	230
050BFB1	10 X 6	1/3PSC	3	35-65	115/8.3	270
075BFB1	10 X 8	1/3PSC	3	35-65	115/8.3	300
100BFB1	10 X 10	1/3PSC	3	45-75	115/6.4	180
125BHB1	12 X 12	1/2PSC	3	45-75	115/6.2	170
150BKB1	12 X 12	3/4PSC	4	45-75	115/14.7	140

Figure 62 Specifications

	050BCB1/BFB1	075BFB1	100BFB1	125BHB1	150BKB1
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	40,000	59,000	79,000	100,000	120,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50	.20/.50
Transformer Size(VA)	40	40	40	40	40
Anticipator Setting	.75	.75	.75	.75	.75
TimerSetting (sec.) DELAY ON	60	60	60	60	60
DELAY OFF	60-150	60-150	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A	MH/VR8204A
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#43	3/#43	4/#43	5/#43	6/#43
Ignition Type	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M	MH/S8600M
Pilot Orifice Size	.018	.018	.018	.018	.018
Spark Gap	1/8	1/8	1/8	1/8	1/8
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45	-0.65

Technical Service Data Sheet 19. (NUH5, MODELS)

Equipped with Honeywell SV9500M "Smart Valve" & Honeywell ST9120 Fan Timer

Figure 63 Blower and Motor Data

Model Number	Blower Type & Size	Motor & Type	Motor Speeds	Temperature Rise	Volts/Amps	Limit Setting
050BCB2	10 X 6	1/6 PSC	3	40-70	115/8.3	230
050BFB2	10 X 6	1/3 PSC	3	35-65	115/8.3	270
075BFB2	10 X 8	1/3 PSC	3	35-65	115/8.3	300
100BFB2	10 X 10	1/3 PSC	3	45-75	115/6.4	180
125BHB2	12 X 12	1/2 PSC	3	45-75	115/6.2	170
150BKB2	12 X 12	3/4 PSC	4	45-75	115/14.7	140

Figure 64 Specifications

	050BCB2/BFB2	075BFB2	100BFB2	125BHB2	150BKB2
Gas Type	NATURAL	NATURAL	NATURAL	NATURAL	NATURAL
Input (Btuh)	50,000	75,000	100,000	125,000	150,000
Output	40,000	59,000	79,000	100,000	12,000
Rated Ext. Static Press.	.10/0.5	.12/0.5	.15/.50	.20/.50	.20/.50
Transformer Size (VA)	40	40	40	40	40
Anticipator Setting	.30	.30	.30	.30	.30
TimerSetting DELAY ON	60	60	60	60	60
(sec.) DELAY OFF	60-150	60-150	60-150	60-150	60-150
Gas Valve Mfg/Type	MH/SV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M	MH/SV9500M
Regulation Type	SNAP	SNAP	SNAP	SNAP	SNAP
Manifold Pressure	3.5	3.5	3.5	3.5	3.5
Orifice Quantity/Size	2/#43	3/#42	4/#43	5/#43	6/#43
Ignition Type	MH/HSP	MH/HSP	MH/HSP	MH/HSP	MH/HSP
Pilot Orifice Size	.018	.018	.018	.018	.018
Pressure Switch (Opens)	-0.40	-0.40	-0.50	-0.45	-0.65

Technical Service Data Sheet 20.

Figure 65

Manufacturers Number (Mfr No -See Rating Plate) **NDC7050BFA1**

Specifications

GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	50,000	50,000	
	Output (Btuh) Std/Alt.	40,000	40,000	
	Temp. Rise (^{0}F)	35-65	35-65	
	Electrical (Volts/Hz/FLA)	115/60/5.3	115/60/5.3	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	2/#42	2/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HW HSP	HW HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	3	3	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.90	0.02	0.92
	40'+5-90^0 Elbows	0.85	0.17	0.65
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	250	250	
	Limit Control Setting (^{0}F)	160	160	
	Auxiliary Limit (°F)	110	110	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010644	1010644	
	Press Differential (Close)	0.39	0.39	
	Press Differential (Open)	0.29	0.29	
	High Alt. Press. Sw (Part No)	--	--	
	Press Differential (Close)	--	--	
	Press Differential (Open)	--	--	

Circulation Air Blower Data

Type & Size	10-8	Filt Type	Washable
Motor Amps/RPM	4.6/1050	Filt Size (")	16x18x2
Motor Type/ H.P.	PSC/1/3	Min. Cool Cap. (Tons)	1.5
Cap. MFD/Volts	5/370	Max. Cool Cap. (Tons)	3

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	718	840	1109	1473
.20	719	838	1094	1431
.30	714	837	1086	1396
.40	692	819	1063	1349
.50	660	791	1027	1291
.60	615	752	986	1222
.70	563	683	934	1141

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	339	396	523	695
.20	339	395	516	675
.30	337	395	513	659
.40	327	387	502	637
.50	311	373	485	609
.60	290	355	465	577
.70	266	322	441	538

Gas Conversion Kits

Nat to LP NAHF002LP

LP to Nat NAHF002NG

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Technical Service Data Sheet 21.

THIS DATA IS SUBJECT TO CHANGE WITHOUT NOTICE

Figure 66

Manufacturers Number (Mfr No -See Rating Plate) NDC7075BFA1

Specifications

GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	75,000	75,000	
	Output (Btuh) Std/Alt.	60,000	60,000	
	Temp. Rise (^{0}F)	35-65	35-65	
	Electrical (Volts/Hz/FLA)	115/60/7.5	115/60/7.5	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	3/#42	3/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HW HSP	HW HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	3	3	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.87	0.14	0.73
	40'+5-90^0 Elbows	0.75	0.16	0.59
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	200	200	
	Limit Control Setting (^{0}F)	150	150	
	Auxiliary	110	110	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010645	1010645	
	Press Differential (Close)	0.47	0.47	
	Press Differential (Open)	0.37	0.37	
	High Alt. Press. Sw (Part No)	1010644	1010644	
	Press Differential (Close)	0.39	0.39	
	Press Differential (Open)	0.29	0.29	

Circulation Air Blower Data

Type & Size	10-8	Filt Type	Washable
Motor Amps/RPM	6.8/1050	Filt Size (")	16x18x2
Motor Type/ H.P.	PSC/1/2	Min. Cool Cap. (Tons)	2
Cap. MFD/Volts	7.5/370	Max. Cool Cap. (Tons)	3.5

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	778	984	1263	1576
.20	786	1003	1249	1532
.30	790	1003	1244	1489
.40	788	1001	1215	1432
.50	781	982	1186	1371
.60	765	962	1146	1308
.70	743	923	1094	1229

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	367	464	596	744
.20	371	473	589	723
.30	373	473	587	703
.40	372	472	573	676
.50	369	463	560	647
.60	361	454	541	617
.70	351	436	516	580

Gas Conversion Kits

Nat to LP NAHF002LP

LP to Nat NAHF002NG

Technical Service Data Sheet 22.

Figure 67

Manufacturers Number (Mfr No -See Rating Plate) **NDC7100BHA1**

Specifications

GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	100,000	100,000	
	Output (Btuh) Std/Alt.	80,000	80,000	
	Temp. Rise (^{0}F)	35-65	35-65	
	Electrical (Volts/Hz/FLA)	115/60/9.2	115/60/9.2	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	4/#42	4/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HW HSP	HW HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	4	4	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.95	0.19	0.76
	40'+5-90^0 Elbows)	0.94	0.27	0.67
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	200	200	
	Limit Control Setting (^{0}F)	190	190	
	Auxiliary Limit (^{0}F)	110	110	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010645	1010645	
	Press Differential (Close)	0.47	0.47	
	Press Differential (Open)	0.37	0.37	
	High Alt. Press. Sw (Part No)	1010644	1010644	
	Press Differential (Close)	0.39	0.39	
	Press Differential (Open)	0.29	0.29	

Circulation Air Blower Data

Type & Size	10-10	Filt Type	Washable
		Filt Size (")	16x18x2
Motor Amps/RPM	8.5/1050	Min. Cool	
Motor Type/ H.P.	PSC/1/2	Cap. (Tons)	2
		Max. Cool	
Cap. MFD/Volts	10/370	Cap. (Tons)	4

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	954	1312	1698	1925
.20	950	1292	1645	1853
.30	946	1265	1596	1780
.40	915	1231	1530	1708
.50	878	1175	1455	1638
.60	830	1118	1362	1546
.70	778	1020	1241	1435

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	450	619	801	908
.20	448	610	776	874
.30	446	597	753	840
.40	432	581	722	806
.50	414	555	687	773
.60	392	528	643	730
.70	367	481	586	677

Gas Conversion Kits

Nat to LP NAHF002LP
LP to Nat NAHF002NG

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Technical Service Data Sheet 23.

Figure 68

Manufacturers Number (Mfr No -See Rating Plate) NDC7125BKA1

	Specifications			
GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	125,000	125,000	
	Output (Btuh) Std/Alt.	100,000	100,000	
	Temp. Rise (^{0}F)	45-75	45-75	
	Electrical (Volts/Hz/FLA)	115/60/10.5	115/60/10.5	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	5/#42	5/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HSP	HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	4	4	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.96	0.14	0.82
	40' + 5-90^0 Elbows)	0.90	0.24	0.66
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	250	250	
	Limit Control Setting (^{0}F)	170	170	
	Auxiliary Limit (^{0}F)	130	130	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010646	1010646	
	Press Differential (Close)	0.55	0.55	
	Press Differential (Open)	0.45	0.45	
	High Alt. Press. Sw (Part No)	1010645	1010645	
	Press Differential (Close)	0.47	0.47	
	Press Differential (Open)	0.37	0.37	

Circulation Air Blower Data

Type & Size	11.8-10.6	Filt Type	Washable
Motor Amps/RPM	9.8/900	Filt Size (")	16x18x2
Motor Type/ H.P.	PSC/3/4	Min. Cool Cap. (Tons)	3.5
Cap. MFD/Volts	10/370	Max. Cool Cap. (Tons)	5

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5(" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	1463	1650	1879	2214
.20	1429	1635	1859	2154
.30	1417	1614	1838	2152
.40	1389	1579	1806	2106
.50	1364	1556	1773	2049
.60	1339	1513	1725	1981
.70	1299	1470	1668	1903

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	690	779	887	1045
.20	674	772	877	1017
.30	669	762	867	1016
.40	656	745	852	994
.50	644	734	837	967
.60	632	714	814	935
.70	613	694	787	898

Gas Conversion Kits

Nat to LP NAHF002LP

LP to Nat NAHF002NG

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Technical Service Data Sheet 24.

Figure 69

Manufacturers Number (Mfr No -See Rating Plate) **NTC7050BFA1**

Specifications

GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	50,000	50,000	
	Output (Btuh) Std/Alt.	40,000	40,000	
	Temp. Rise (^{0}F)	35-65	35-65	
	Electrical (Volts/Hz/FLA)	115/60/5.3	115/60/5.3	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	2/#42	2/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HW HSP	HW HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	3	3	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.78	0.06	0.72
	40'+5-90^0 Elbows	0.74	0.12	0.62
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	250	250	
	Limit Control Setting (^{0}F)	160	160	
	Auxiliary Limit (°F)	130	130	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010644	1010644	
	Press Differential (Close)	0.39	0.39	
	Press Differential (Open)	0.29	0.29	
	High Alt. Press. Sw (Part No)	--	--	
	Press Differential (Close)	--	--	
	Press Differential (Open)	--	--	

Circulation Air Blower Data

Type & Size	10-8	Filt Type	Washable
Motor Amps/RPM	4.6/1050	Filt Size (")	16x25x1
Motor Type/ H.P.	PSC/1/3	Min. Cool Cap. (Tons)	1.5
Cap. MFD/Volts	5/370	Max. Cool Cap. (Tons)	3

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	718	840	1109	1473
.20	719	838	1094	1431
.30	714	837	1086	1396
.40	692	819	1063	1349
.50	660	791	1027	1291
.60	615	752	986	1222
.70	563	683	934	1141

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	339	396	523	695
.20	339	395	516	675
.30	337	395	513	659
.40	327	387	502	637
.50	311	373	485	609
.60	290	355	465	577
.70	266	322	441	538

Gas Conversion Kits

Nat to LP NAHF002LP

LP to Nat NAHF002NG

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Technical Service Data Sheet 25.

Figure 70

Manufacturers Number (Mfr No -See Rating Plate) **NTC7075BFA1**

Specifications

GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	75,000	75,000	
	Output (Btuh) Std/Alt.	60,000	60,000	
	Temp. Rise (^{0}F)	35-65	35-65	
	Electrical (Volts/Hz/FLA)	115/60/7.5	115/60/7.5	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	3/#42	3/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HW HSP	HW HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	3	3	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.88	0.10	0.78
	40'+5-90^0 Elbows	0.76	0.14	0.62
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	200	200	
	Limit Control Setting (^{0}F)	180	180	
	Auxiliary	130	130	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010645	1010645	
	Press Differential (Close)	0.47	0.47	
	Press Differential (Open)	0.37	0.37	
	High Alt. Press. Sw (Part No)	1010644	1010644	
	Press Differential (Close)	0.39	0.39	
	Press Differential (Open)	0.29	0.29	

Circulation Air Blower Data

Type & Size	10-8	Filt Type	Washable
Motor Amps/RPM	6.8/1050	Filt Size (")	16x25x1
Motor Type/ H.P.	PSC/1/2	Min. Cool Cap. (Tons)	2
Cap. MFD/Volts	7.5/370	Max. Cool Cap. (Tons)	3.5

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	778	984	1263	1576
.20	786	1003	1249	1532
.30	790	1003	1244	1489
.40	788	1001	1215	1432
.50	781	982	1186	1371
.60	765	962	1146	1308
.70	743	923	1094	1229

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	367	464	596	744
.20	371	473	589	723
.30	373	473	587	703
.40	372	472	573	676
.50	369	463	560	647
.60	361	454	541	617
.70	351	436	516	580

Gas Conversion Kits

Nat to LP NAHF002LP
LP to Nat NAHF002NG

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Technical Service Data Sheet 26.

Figure 71

Manufacturers Number (Mfr No -See Rating Plate) **NTC7100BHA1**

Specifications

GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	100,000	100,000	
	Output (Btuh) Std/Alt.	80,000	80,000	
	Temp. Rise (^{0}F)	35-65	35-65	
	Electrical (Volts/Hz/FLA)	115/60/9.2	115/60/9.2	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	4/#42	4/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HW HSP	HW HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	4	4	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.92	0.20	0.72
	40'+5-90^0 Elbows)	0.88	0.24	0.64
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	200	200	
	Limit Control Setting (^{0}F)	180	180	
	Auxiliary Limit (^{0}F)	130	130	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010645	1010645	
	Press Differential (Close)	0.47	0.47	
	Press Differential (Open)	0.37	0.37	
	High Alt. Press. Sw (Part No)	1010644	1010644	
	Press Differential (Close)	0.39	0.39	
	Press Differential (Open)	0.29	0.29	

Circulation Air Blower Data

Type & Size	10-10	Filt Type	Washable
Motor Amps/RPM	8.5/1050	Filt Size (")	16x25x1
Motor Type/ H.P.	PSC/1/2	Min. Cool Cap. (Tons)	2
Cap. MFD/Volts	10/370	Max. Cool Cap. (Tons)	4

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	954	1312	1698	1925
.20	950	1292	1645	1853
.30	946	1265	1596	1780
.40	915	1231	1530	1708
.50	878	1175	1455	1638
.60	830	1118	1362	1546
.70	778	1020	1241	1435

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	450	619	801	908
.20	448	610	776	874
.30	446	597	753	840
.40	432	581	722	806
.50	414	555	687	773
.60	392	528	643	730
.70	367	481	586	677

Gas Conversion Kits

Nat to LP NAHF002LP
LP to Nat NAHF002NG

THIS DATA IS SUBJECT TO CHANGE WITHOUT NOTICE

Technical Service Data Sheet 27.

Figure 72

Manufacturers Number (Mfr No -See Rating Plate) **NTC7125BKA1**

		Specifications		
GENERAL	Gas Type	Nat	LP	
	Input (Btuh) Std/Alt.	125,000	125,000	
	Output (Btuh) Std/Alt.	100,000	100,000	
	Temp. Rise (^{0}F)	45-75	45-75	
	Electrical (Volts/Hz/FLA)	115/60/10.5	115/60/10.5	
	Transformer Size (VA)	40	40	
	T'stat Heat Anticipator	.30	.30	
GAS & IGNITION	Gas Valve	HW SV9500	HW SV9500	
	Regulation Type	SNAP	SNAP	
	Manifold Press. (Inch's WC)	3.5	10.0	
	Std. Main Orifices (No/Size)	5/#42	5/#54	
	Pilot Orifice Size	.018	.011	
	Ignition Type/Series	HSP	HSP	
	Lock-Out Time	---	---	
COMBUSTION	Flue Outlet Size (Inches)	4	4	
	Std. Outlet Temp (^{0}F)	<480	<480	
	Comb.Blower (MFD/Volts)	---	---	
	Std. Pressures (Inch's of WC)	**@Blower**	**@Burner Box**	**Differential**
	5' No Elbows	0.99	0.16	0.88
	40' + 5-90^0 Elbows)	0.89	0.22	0.66
LIMITS & CONTROLS	Thermal Sensor (^{0}F)	250	250	
	Limit Control Setting (^{0}F)	165	165	
	Auxiliary Limit (^{0}F)	130	130	
	Fan Control (Type)	HW ST9120	HW ST9120	
	Fan Control On	30/60	30/60	
	(Timed-Secs) Off	60,100,140,180	60,100,140,180	
	Std. Pressure Sw. (Part No)	1010646	1010646	
	Press Differential (Close)	0.55	0.55	
	Press Differential (Open)	0.45	0.45	
	High Alt. Press. Sw (Part No)	1010645	1010645	
	Press Differential (Close)	0.47	0.47	
	Press Differential (Open)	0.37	0.37	

Circulation Air Blower Data

Type & Size	11.8-10.6	Filt Type	Washable
Motor Amps/RPM	9.8/900	Filt Size (")	16x25x2
Motor Type/ H.P.	PSC/3/4	Min. Cool Cap. (Tons)	3.5
Cap. MFD/Volts	10/370	Max. Cool Cap. (Tons)	5

Air Delivery in Cubic Feet per Minute (C.F.M.)

(Furnace Rated @0.5(" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	1463	1650	1879	2214
.20	1429	1635	1859	2154
.30	1417	1614	1838	2152
.40	1389	1579	1806	2106
.50	1364	1556	1773	2049
.60	1339	1513	1725	1981
.70	1299	1470	1668	1903

Air Delivery in Liters Per Second (L/S)

(Furnace Rated @0.5" WC ESP)

External Static Pressure Inches of W.C.

TAP	LOW	MED L	MED H	HIGH
.10	690	779	887	1045
.20	674	772	877	1017
.30	669	762	867	1016
.40	656	745	852	994
.50	644	734	837	967
.60	632	714	814	935
.70	613	694	787	898

Gas Conversion Kits

Nat to LP NAHF002LP

LP to Nat NAHF002NG

THIS DATA IS SUBJECT TO CHANGE WITHOUT NOTICE

WIRING DIAGRAM INDEX

MODEL NUMBER	WIRING DIAGRAM
NCC5	
NCC5050BFA1	#2 (Part # 1008061)
NCC5050BFB1	#5 (Part # 1009280)
NCC5050BFB2	#7 (Part # 1009721)
NCC5075BFA1	#2 (Part # 1008061)
NCC5075BFB1	#5 (Part # 1009280)
NCC5075BFB2	#7 (Part # 1009721)
NCC5075BHA1	#2 (Part # 1008061)
NCC5075BHB1	#5 (Part # 1009280)
NCC5075BHB2	#7 (Part # 1009721)
NCC5100BHA1	#2 (Part # 1008061)
NCC5100BHB1	#5 (Part # 1009280)
NCC5100BHB2	#7 (Part # 1009721)
NCC5125BKA1	#2 (Part # 1008061)
NCC5125BKB1	#5 (Part # 1009280)
NCC5125BKB2	#7 (Part # 1009721)
NCG5	
NCG5150BKA1	#2 (Part # 1008061)
NCG5150BKB1	#5 (Part # 1009280)
NCG5150BKB2	#7 (Part # 1009721)
NDC7	
NDC7050BFA1	#11 (Part # 1010513)
NDC7075BFA1	#11 (Part # 1010513)
NDC7100BHA1	#11 (Part # 1010513)
NDC7125BKA1	#11 (Part # 1010513)
NDN5	
NDN5050BFA1	#12 (Part # 1010587)
NDN5075BFA1	#12 (Part # 1010587)
NDN5100BFA1	#12 (Part # 1010587)
NDN5100BHA1	#12 (Part # 1010587)
NDN5125BKA1	#12 (Part # 1010587)
NNAC	
NNAC050BFA1	#2 (Part # 1008061)
NNAC050BFB1	#5 (Part # 1009280)
NNAC075BFA1	#2 (Part # 1008061)
NNAC075BFB1	#5 (Part # 1009280)
NNAC075BHA1	#2 (Part # 1008061)
NNAC075BHB1	#5 (Part # 1009280)
NNAC100BHA1	#2 (Part # 1008061)
NNAC100BHB1	#5 (Part # 1009280)
NNAC125BKA1	#2 (Part # 1008061)
NNAC125BKB1	#5 (Part # 1009280)

MODEL NUMBER	WIRING DIAGRAM
NNAG	
NNAG150BKA1	#2 (Part # 1008061)
NNAG150BKB1	#5 (Part # 1009280)
NNAT	
NNAT050BEA2	#2 (Part # 1008061)
NNAT050BFB1	#5 (Part # 1009280)
NNAT050BHB1	#5 (Part # 1009280)
NNAT075BFB1	#5 (Part # 1009280)
NNAT075BHB1	#5 (Part # 1009280)
NNAT100BHB1	#5 (Part # 1009280)
NNAT100BKA2	#2 (Part # 1008061)
NNAT100BKB1	#5 (Part # 1009280)
NNAT125BKA2	#2 (Part # 1008061)
NNAT125BKB1	#5 (Part # 1009280)
NNAU	
NNAU050BCA1	#3 (Part # 1008244)
NNAU050BCB1	#4 (Part # 1009279)
NNAU050BEA1	#3 (Part # 1008244)
NNAU050BEA2	#3 (Part # 1008244)
NNAU050BFB1	#4 (Part # 1009279)
NNAU050BHA1	#3 (Part # 1008244)
NNAU050BHB1	#4 (Part # 1009279)
NNAU075BFA1	#3 (Part # 1008244)
NNAU075BFB1	#4 (Part # 1009279)
NNAU075BHA1	#3 (Part # 1008244)
NNAU075BHB1	#4 (Part # 1009279)
NNAU100BFA1	#3 (Part # 1008244)
NNAU100BFB1	#4 (Part # 1009279)
NNAU100BHA1	#3 (Part # 1008244)
NNAU100BHB1	#4 (Part # 1009279)
NNAU100BKA2	#3 (Part # 1008244)
NNAU100BKB1	#4 (Part # 1009279)
NNAU125BHA1	#3 (Part # 1008244)
NNAU125BHB1	#4 (Part # 1009279)
NNAU125BKA2	#3 (Part # 1008244)
NNAU125BKB1	#4 (Part # 1009279)
NNAU150BKA2	#3 (Part # 1008244)
NNAU150BKB1	#4 (Part # 1009279)
NTC5	
NTC5050BEA1	#1 (Part # 1007878)
NTC5050BEA2	#2 (Part # 1008061)
NTC5050BFB1	#5 (Part # 1009280)
NTC5050BFB2	#6 (Part # 1009720)
NTC5050BFC	#9 (Part # 1010258)
NTC5050BHA1	#1 (Part # 1007878)

WIRING DIAGRAM INDEX

MODEL NUMBER	WIRING DIAGRAM
NTC5050BHB1	#5 (Part # 1009280)
NTC5050BHB2	#6 (Part # 1009720)
NTC5075BFA1	#1 (Part # 1007878)
NTC5075BFA2	#2 (Part # 1008061)
NTC5075BFB1	#5 (Part # 1009280)
NTC5075BFB2	#6 (Part # 1009720)
NTC5075BFC	#9 (Part # 1010258)
NTC5075BHA1	#1 (Part # 1007878)
NTC5075BHA2	#2 (Part # 1008061)
NTC5075BHB1	#5 (Part # 1009280)
NTC5075BHB2	#6 (Part # 1009720)
NTC5075BHC	#9 (Part # 1010258)
NTC5100BFC	#9 (Part # 1010258)
NTC5100BHA1	#1 (Part # 1007878)
NTC5100BHA2	#2 (Part # 1008061)
NTC5100BHB1	#5 (Part # 1009280)
NTC5100BHB2	#6 (Part # 1009720)
NTC5100BJC	#9 (Part # 1010258)
NTC5100BKA1	#1 (Part # 1007878)
NTC5100BKA2	#2 (Part # 1008061)
NTC5100BKB1	#5 (Part # 1009280)
NTC5100BKB2	#6 (Part # 1009720)
NTC5100BKC	#9 (Part # 1010258)
NTC5125BKA1	#1 (Part # 1007878)
NTC5125BKA2	#2 (Part # 1008061)
NTC5125BKB1	#5 (Part # 1009280)
NTC5125BKB2	#6 (Part # 1009720)
NTC5125BKC	#9 (Part # 1010258)
NTC5150BKC	#9 (Part # 1010258)

NTC7

NTC7050BFA1	#10 (Part # 1010511)
NTC7075BFA1	#10 (Part # 1010511)
NTC7100BHA1	#10 (Part # 1010511)
NTC7125BKA1	#10 (Part # 1010511)

NTN5

NTN5050BFA1	#9 (Part # 1010258)
NTN5075BFA1	#9 (Part # 1010258)
NTN5075BHA1	#9 (Part # 1010258)
NTN5100BHA1	#9 (Part # 1010258)
NTN5100BKA1	#9 (Part # 1010258)
NTN5100BKB1	#9 (Part # 1010258)
NTN5125BKA1	#9 (Part # 1010258)
NTN5125BKB1	#9 (Part # 1010258)

MODEL NUMBER	WIRING DIAGRAM

NUG3

NUG3050AFA1	#8 (Part # 1010009)
NUG3075AFA1	#8 (Part # 1010009)
NUG3100AHA1	#8 (Part # 1010009)
NUG3125AKA1	#8 (Part # 1010009)

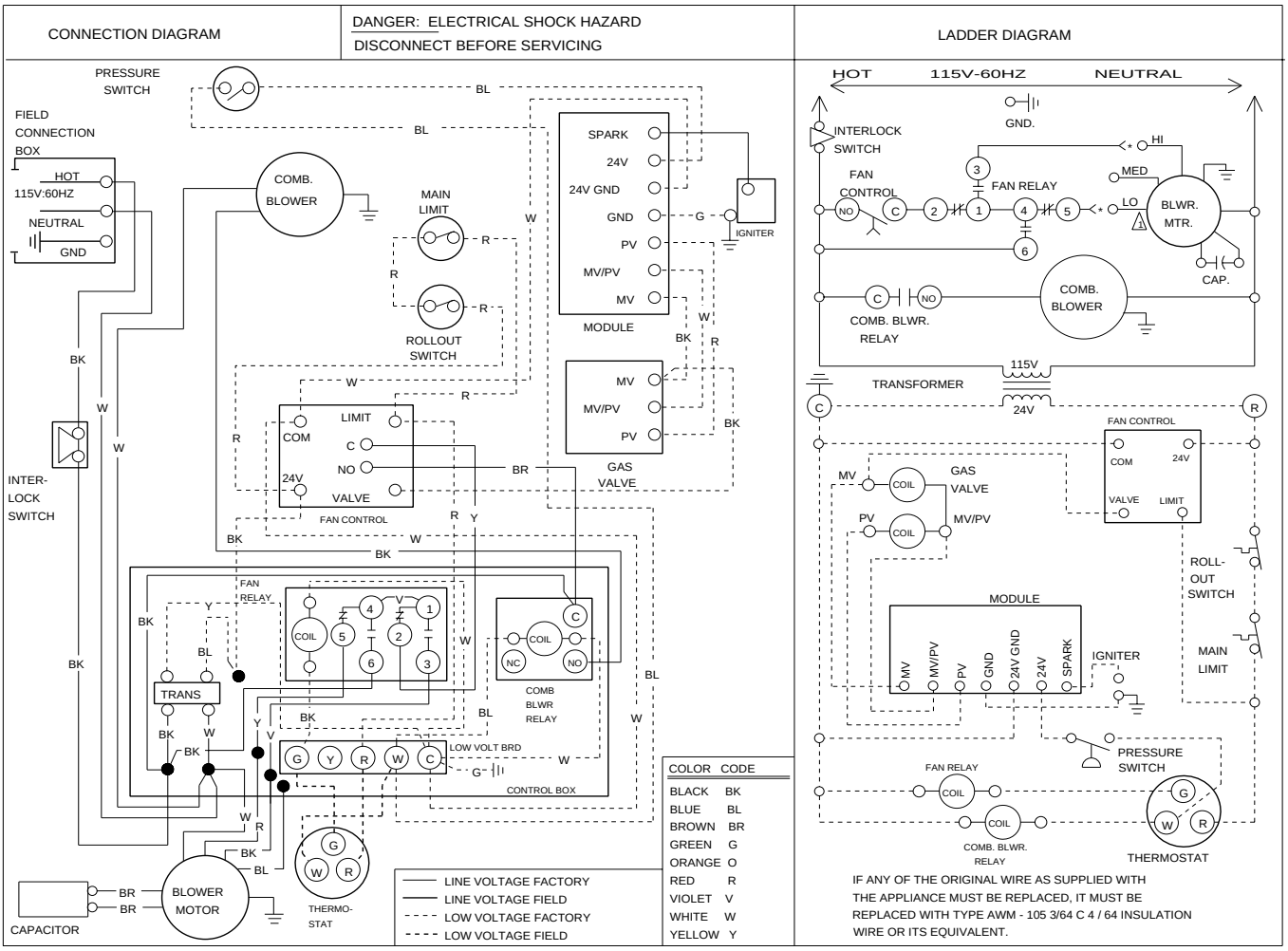
NUG5

NUG5050BCA1	#1 (Part # 1007878)
NUG5050BCB1	#4 (Part # 1009279)
NUG5050BCB2	#6 (Part # 1009720)
NUG5050BEA1	#1 (Part # 1007878)
NUG5050BEA2	#1 (Part # 1007878)
NUG5050BFB1	#4 (Part # 1009279)
NUG5050BFB2	#6 (Part # 1009720)
NUG5050BHA1	#1 (Part # 1007878)
NUG5050BHB1	#4 (Part # 1009279)
NUG5050BHB2	#6 (Part # 1009720)
NUG5075BFA1	#1 (Part # 1007878)
NUG5075BFA2	#1 (Part # 1007878)
NUG5075BFB1	#4 (Part # 1009279)
NUG5075BFB2	#6 (Part # 1009720)
NUG5075BHA1	#1 (Part # 1007878)
NUG5075BHA2	#1 (Part # 1007878)
NUG5075BHB1	#4 (Part # 1009279)
NUG5075BHB2	#6 (Part # 1009720)
NUG5100BFA1	#1 (Part # 1007878)
NUG5100BFA2	#1 (Part # 1007878)
NUG5100BFB1	#4 (Part # 1009279)
NUG5100BFB2	#6 (Part # 1009720)
NUG5100BHA1	#1 (Part # 1007878)
NUG5100BHA2	#1 (Part # 1007878)
NUG5100BHB1	#4 (Part # 1009279)
NUG5100BHB2	#6 (Part # 1009720)
NUG5100BKA1	#1 (Part # 1007878)
NUG5100BKA2	#1 (Part # 1007878)
NUG5100BKB1	#4 (Part # 1009279)
NUG5100BKB2	#6 (Part # 1009720)
NUG5125BHA1	#1 (Part # 1007878)
NUG5125BHB1	#4 (Part # 1009279)
NUG5125BHB2	#6 (Part # 1009720)
NUG5125BKA1	#1 (Part # 1007878)
NUG5125BKA2	#1 (Part # 1007878)
NUG5125BKB1	#4 (Part # 1009279)
NUG5125BKB2	#6 (Part # 1009720)
NUG5150BKA1	#1 (Part # 1007878)
NUG5150BKA2	#1 (Part # 1007878)
NUG5150BKB1	#4 (Part # 1009279)
NUG5150BKB2	#6 (Part # 1009720)

WIRING DIAGRAM INDEX

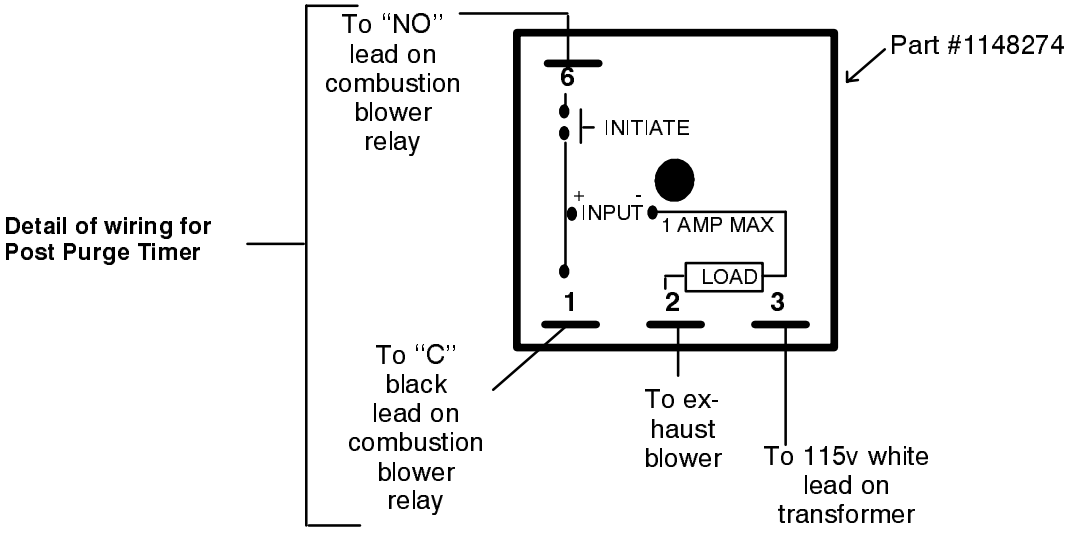
MODEL NUMBER	WIRING DIAGRAM	MODEL NUMBER	WIRING DIAGRAM
NUH5			
NUH5050BCB1	#4 (Part # 1009279)		
NUH5050BCB2	#6 (Part # 1009720)		
NUH5050BFB1	#4 (Part # 1009279)		
NUH5050BFB2	#6 (Part # 1009720)		
NUH5075BFB1	#4 (Part # 1009279)		
NUH5075BFB2	#6 (Part # 1009720)		
NUH5100BFB1	#4 (Part # 1009279)		
NUH5100BFB2	#6 (Part # 1009720)		
NUH5125BHB1	#4 (Part # 1009279)		
NUH5125BHB2	#6 (Part # 1009720)		
NUH5150BKB1	#4 (Part # 1009279)		
NUH5150BKB2	#6 (Part # 1009720)		

Wiring Diagram # 1. (Part # 1007878)

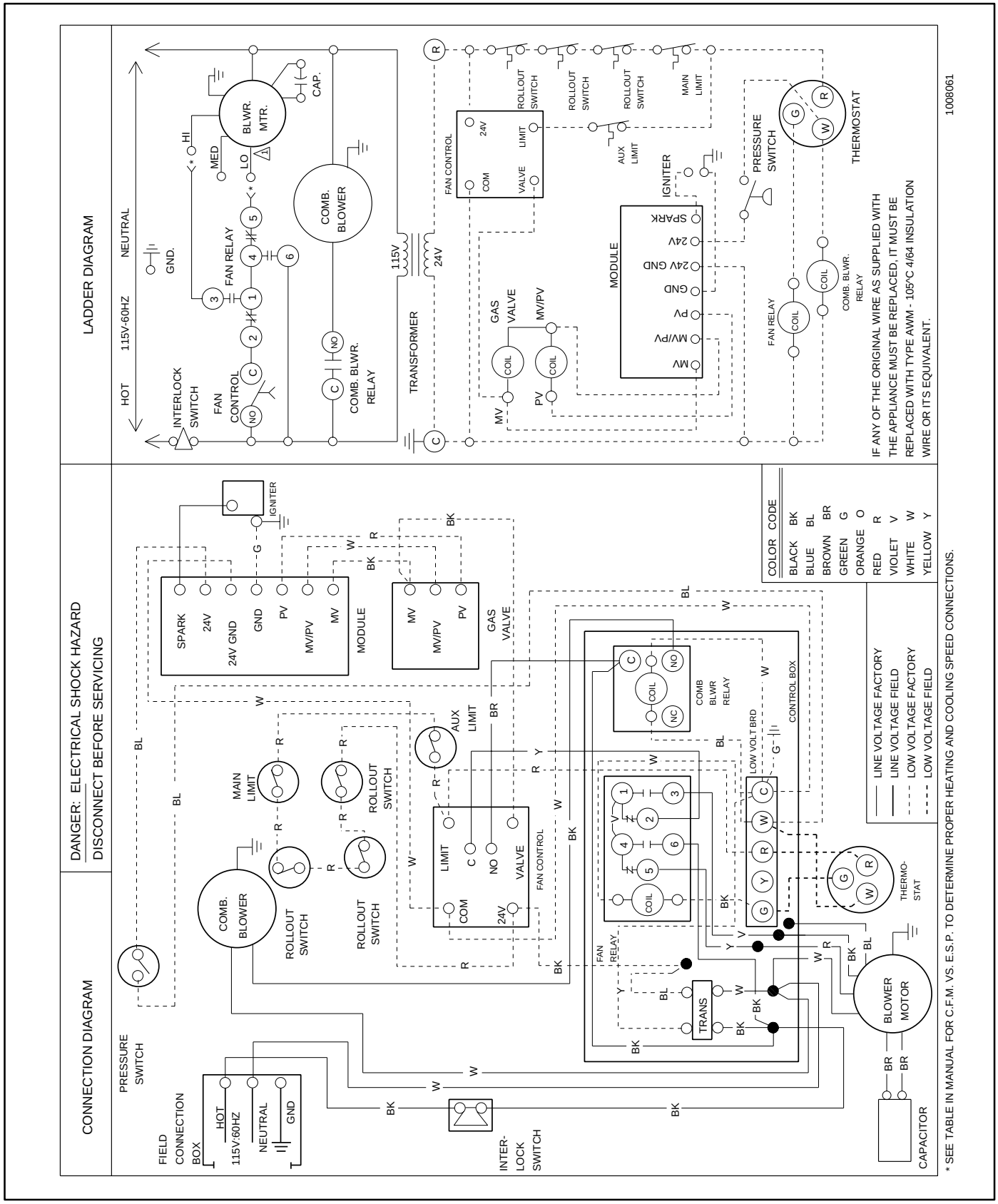


* SEE TABLE IN MANUAL FOR C.F.M. VS. E.S.P. TO DETERMINE PROPER HEATING AND COOLING SPEED CONNECTIONS.

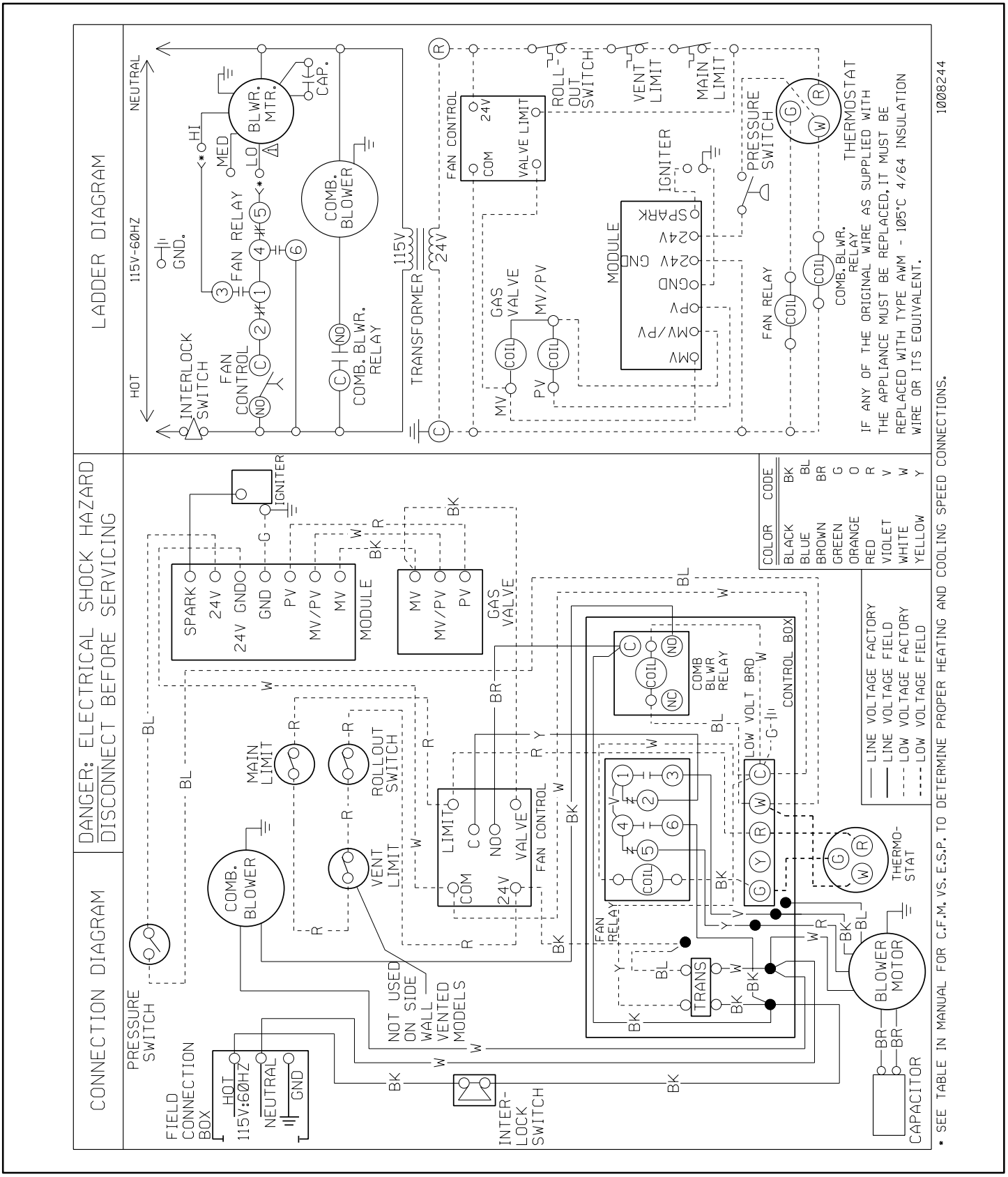
1007878



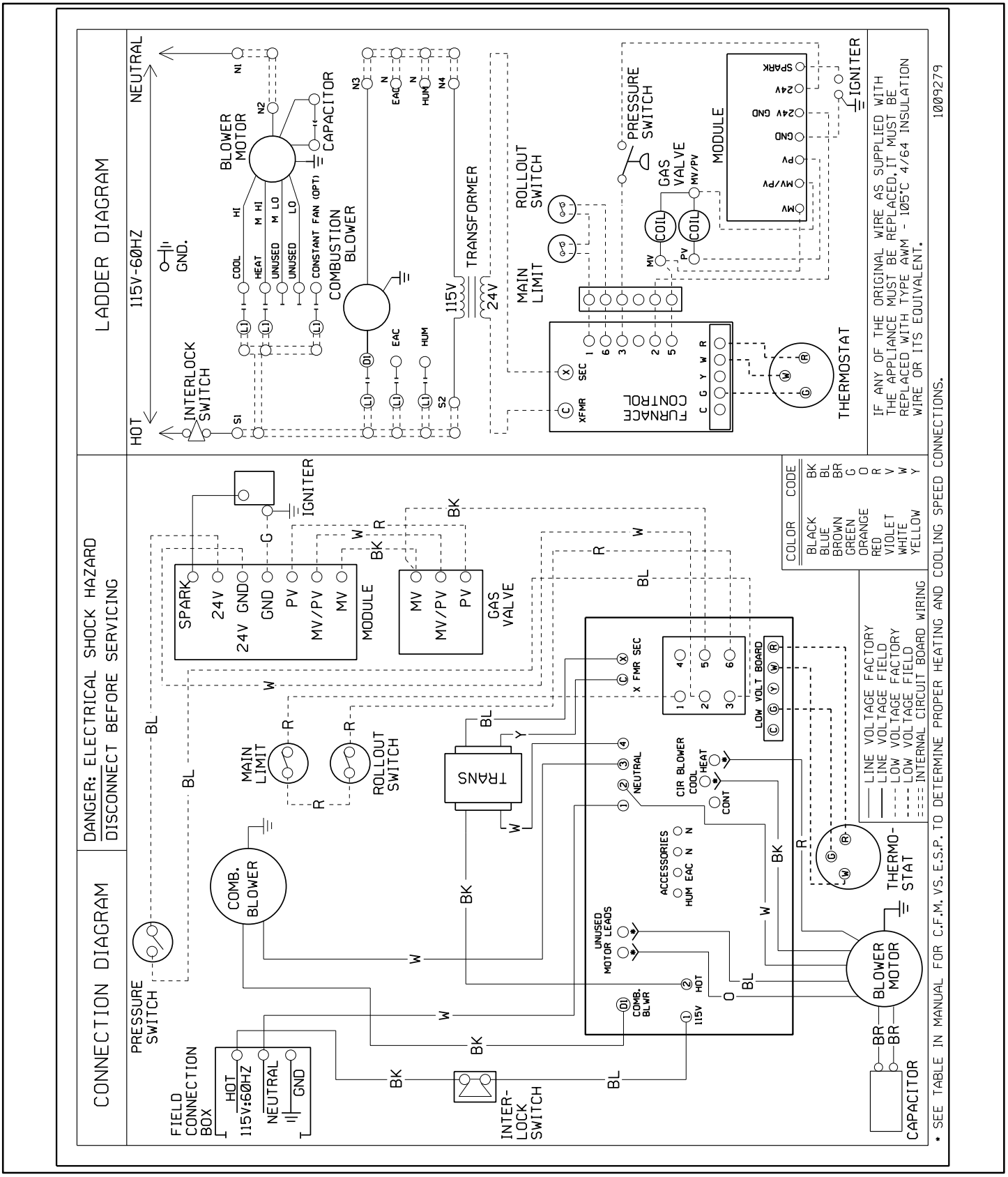
Wiring Diagram # 2. (Part # 1008061)



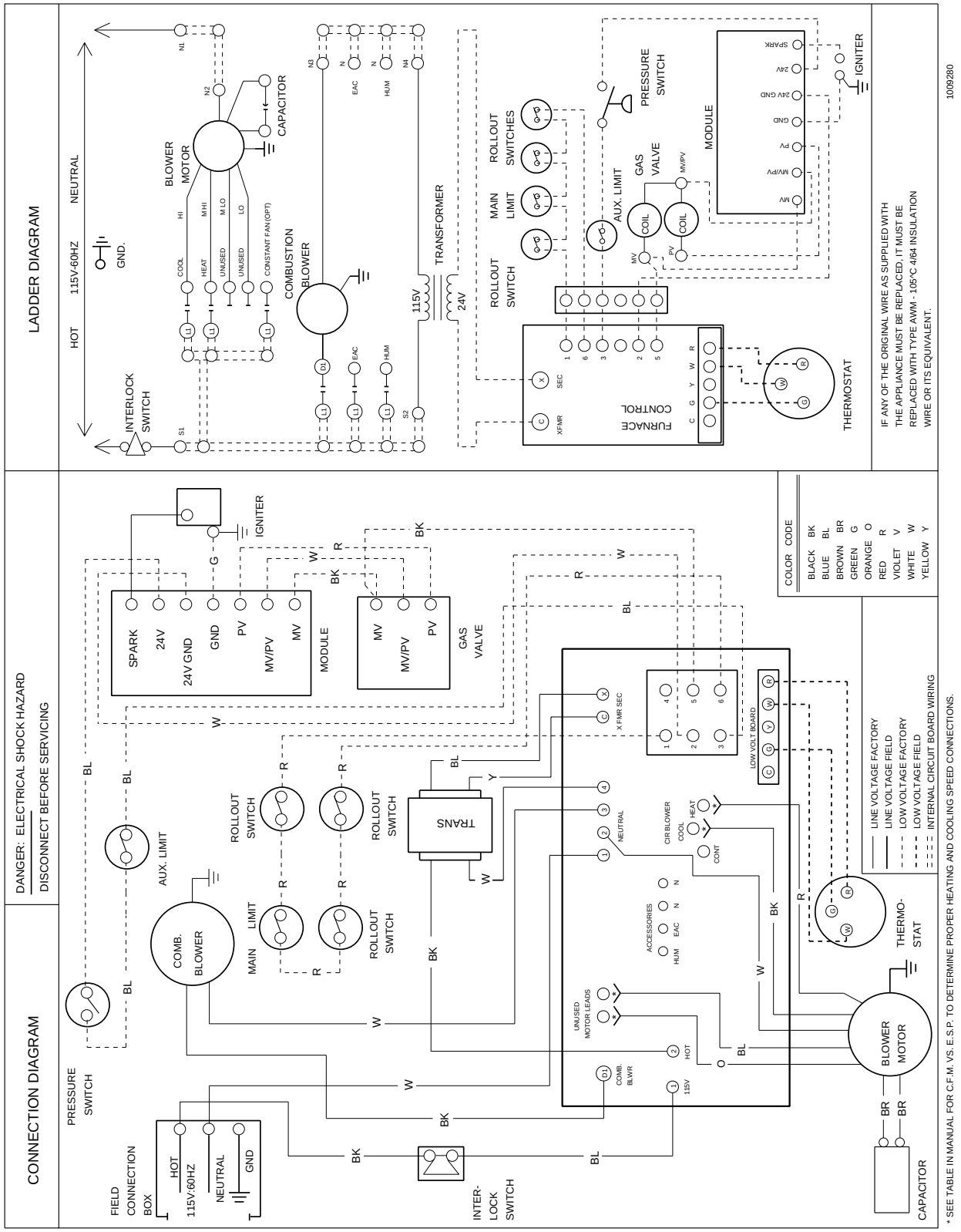
Wiring Diagram # 3. (Part # 1008244)



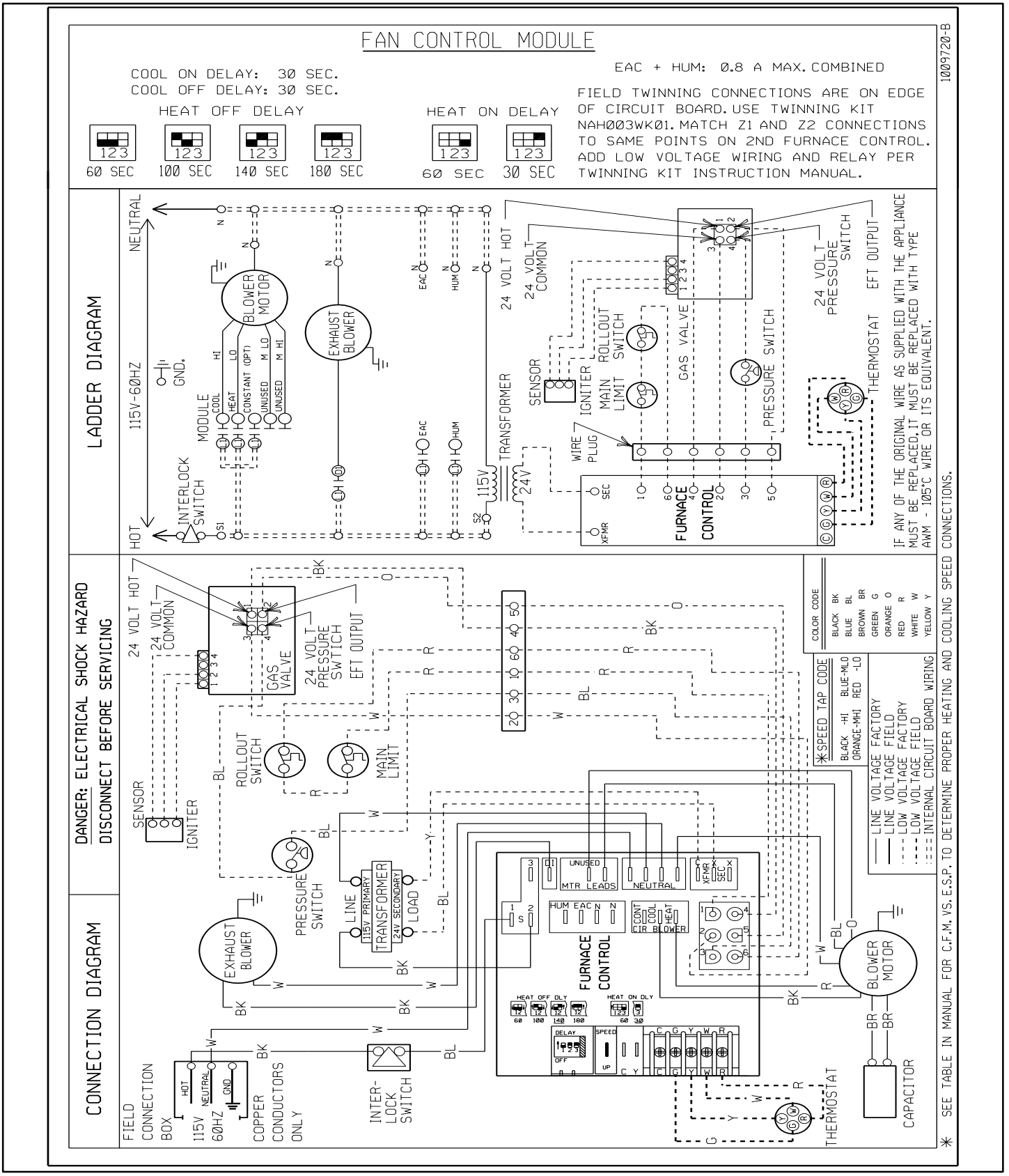
Wiring Diagram # 4. (Part # 1009279)



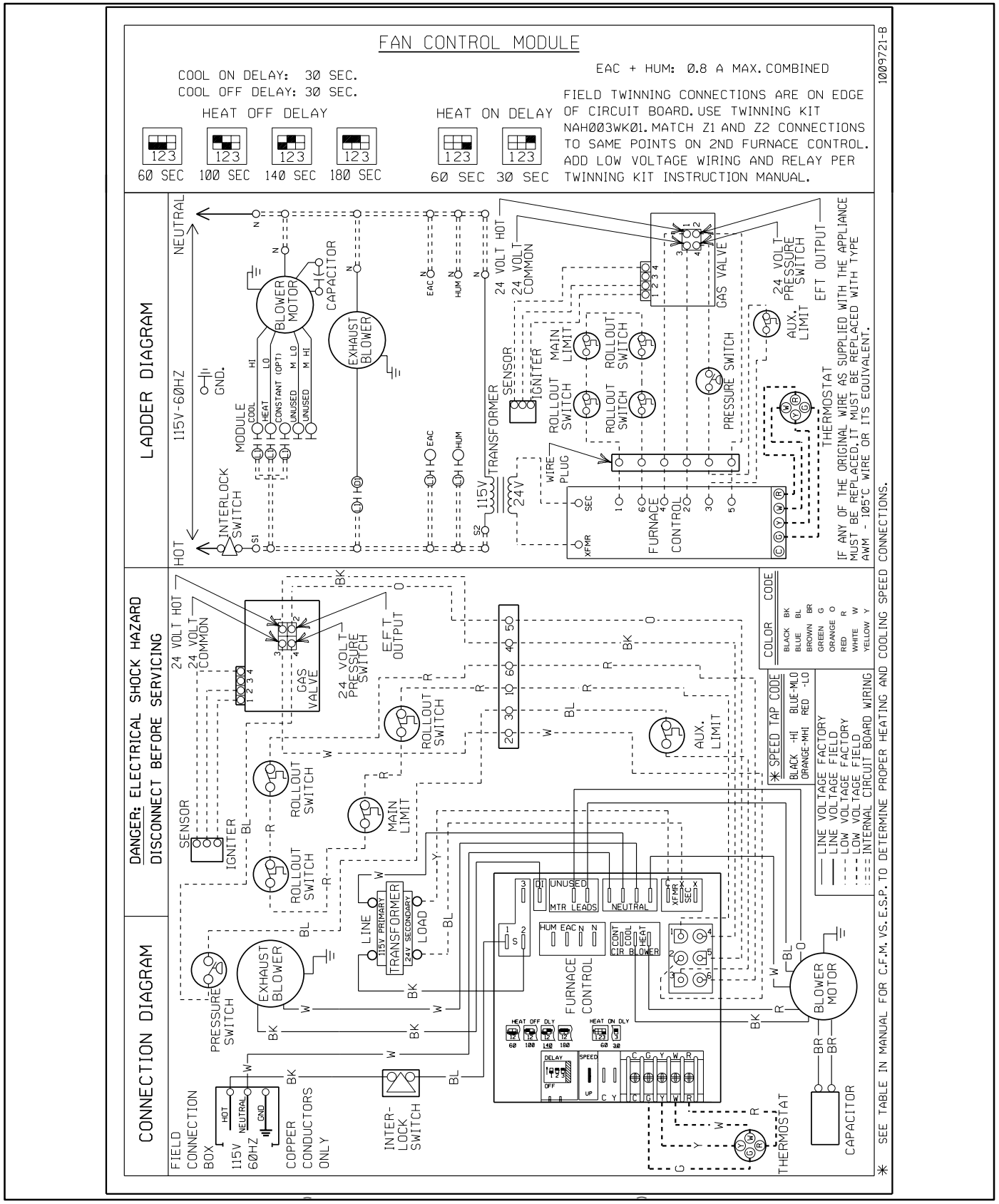
Wiring Diagram # 5. (Part# 1009280)



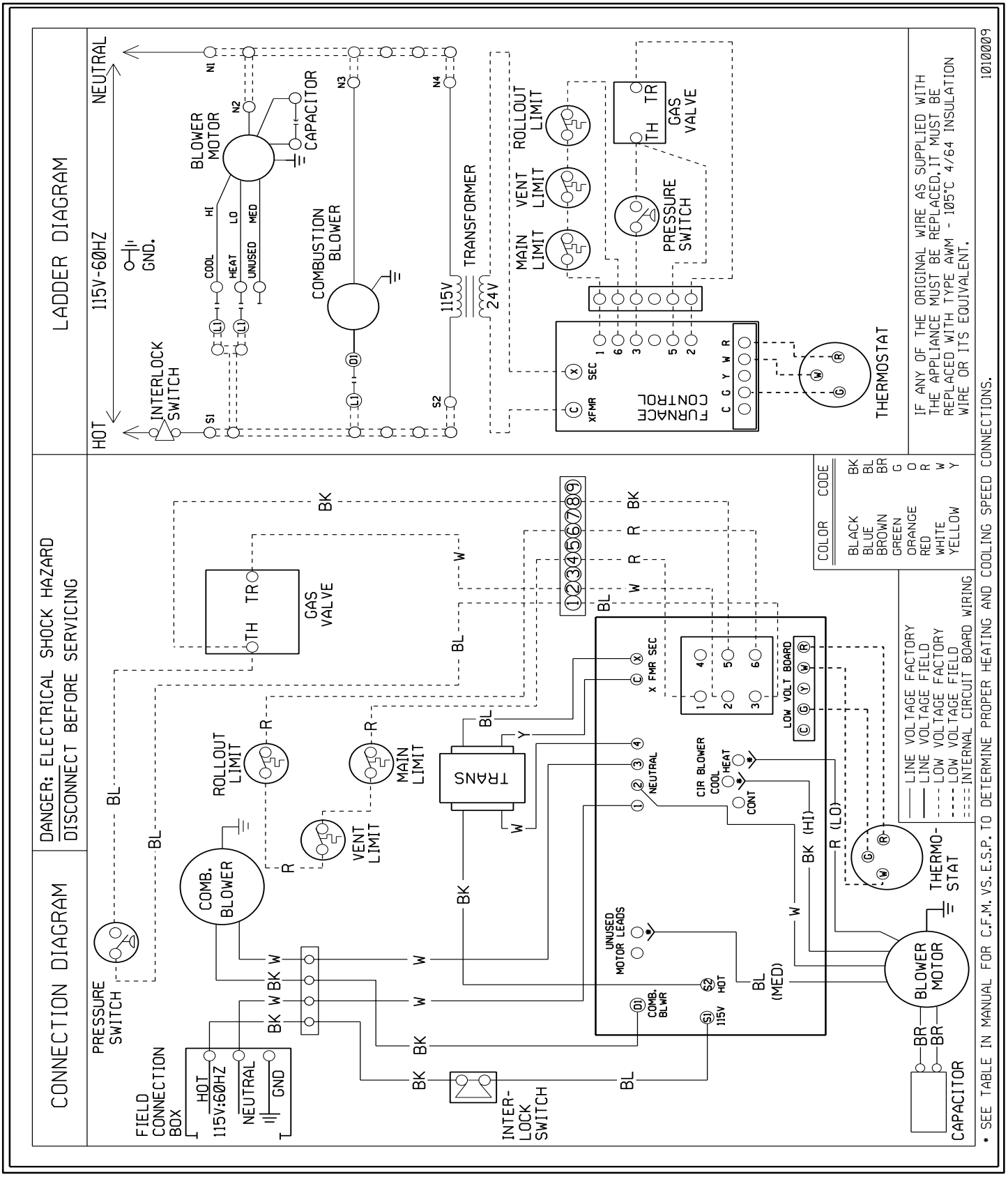
Wiring Diagram # 6. (Part # 1009720)



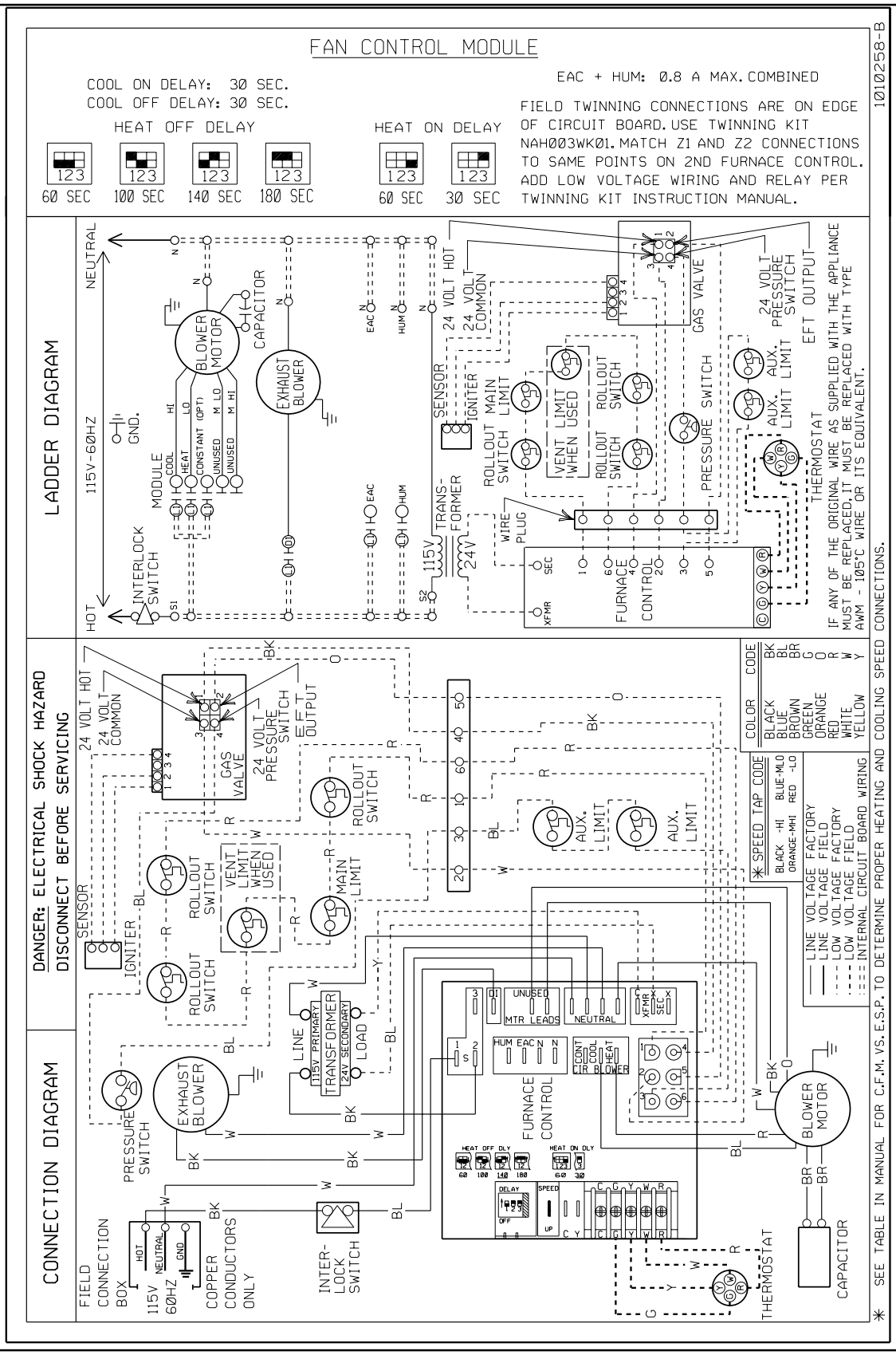
Wiring Diagram # 7. (Part # 1009721)



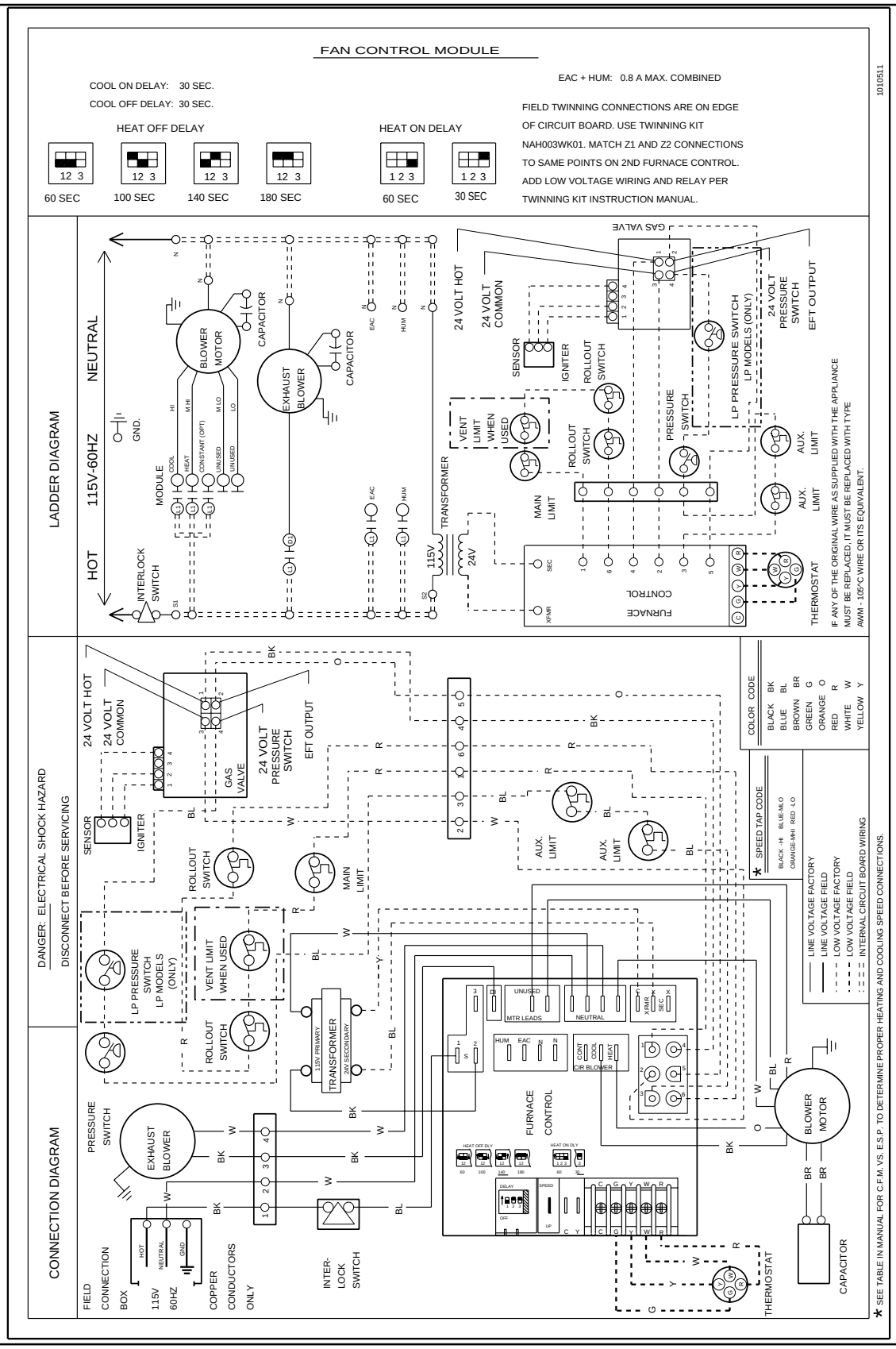
Wiring Diagram # 8. (Part # 1010009)



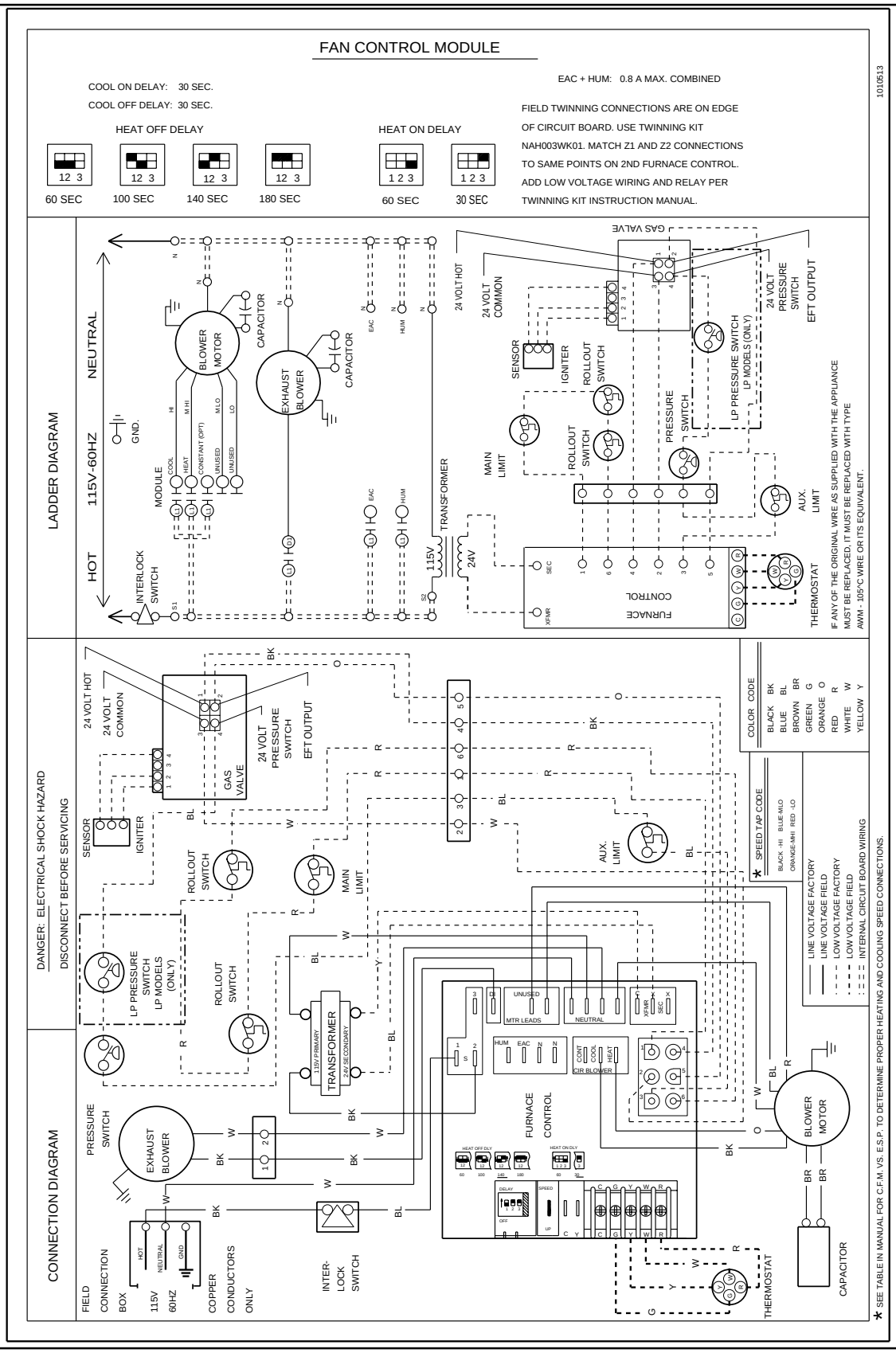
Wiring Diagram # 9. (Part # 1010258)



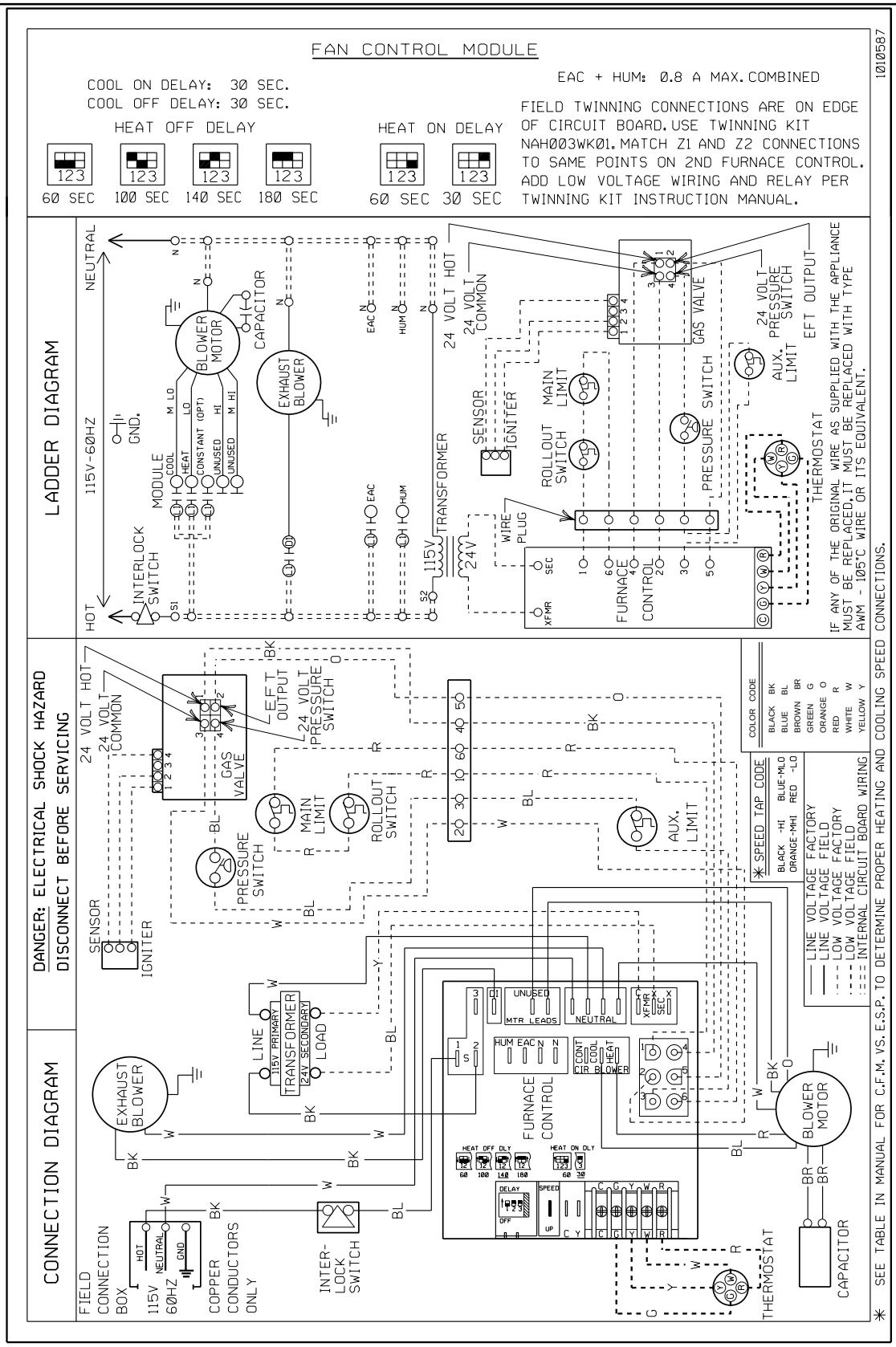
Wiring Diagram # 10. (Part # 1010511)



Wiring Diagram # 11. (Part # 1010513)



Wiring Diagram # 12. (Part # 1010587)



BLOWER PERFORMANCE DATA INDEX

MODEL NUMBER	CHART NUMBER
NCC5	
NCC5050BFA1	Chart # 1
NCC5050BFB1	Chart # 1
NCC5050BFB2	Chart # 1
NCC5075BFA1	Chart # 1
NCC5075BFB1	Chart # 1
NCC5075BFB2	Chart # 1
NCC5075BHA1	Chart # 1
NCC5075BHB1	Chart # 1
NCC5075BHB2	Chart # 1
NCC5100BHA1	Chart # 1
NCC5100BHB1	Chart # 1
NCC5100BHB2	Chart # 1
NCC5125BKA1	Chart # 1
NCC5125BKB1	Chart # 1
NCC5125BKB2	Chart # 1
NCG5	
NCG5150BKA1	Chart # 1
NCG5150BKB1	Chart # 1
NCG5150BKB2	Chart # 1
NDC7	
NDC7050BFA1	Chart # 2
NDC7075BFA1	Chart # 2
NDC7100BHA1	Chart # 2
NDC7125BKA1	Chart # 2
NDN5	
NDN5050BFA1	Chart # 3
NDN5075BFA1	Chart # 3
NDN5100BFA1	Chart # 3
NDN5100BHA1	Chart # 3
NDN5125BKA1	Chart # 3
NNAC	
NNAC050BFA1	Chart # 4
NNAC050BFB1	Chart # 4
NNAC075BFA1	Chart # 4
NNAC075BFB1	Chart # 4
NNAC075BHA1	Chart # 4
NNAC075BHB1	Chart # 4
NNAC100BHA1	Chart # 4
NNAC100BHB1	Chart # 4
NNAC125BKA1	Chart # 4
NNAC125BKB1	Chart # 4

MODEL NUMBER	CHART NUMBER
NNAG	
NNAG150BKA1	Chart # 4
NNAG150BKB1	Chart # 4
NNAT	
NNAT050BEA2	Chart # 5
NNAT050BFB1	Chart # 5
NNAT050BHB1	Chart # 5
NNAT075BFB1	Chart # 5
NNAT075BHB1	Chart # 5
NNAT100BHB1	Chart # 5
NNAT100BKA2	Chart # 5
NNAT100BKB1	Chart # 5
NNAT125BKA2	Chart # 5
NNAT125BKB1	Chart # 5
NNAU	
NNAU050BCA1	Chart # 6
NNAU050BCB1	Chart # 6
NNAU050BEA1	Chart # 6
NNAU050BEA2	Chart # 6
NNAU050BFB1	Chart # 6
NNAU050BHA1	Chart # 6
NNAU050BHB1	Chart # 6
NNAU075BFA1	Chart # 6
NNAU075BFB1	Chart # 6
NNAU075BHA1	Chart # 6
NNAU075BHB1	Chart # 6
NNAU100BFA1	Chart # 6
NNAU100BFB1	Chart # 6
NNAU100BHA1	Chart # 6
NNAU100BHB1	Chart # 6
NNAU100BKA2	Chart # 6
NNAU100BKB1	Chart # 6
NNAU125BHA1	Chart # 6
NNAU125BHB1	Chart # 6
NNAU125BKA2	Chart # 6
NNAU125BKB1	Chart # 6
NNAU150BKA2	Chart # 6
NNAU150BKB1	Chart # 6
NTC5	
NTC5050BEA1	Chart # 7
NTC5050BEA2	Chart # 7
NTC5050BFB1	Chart # 7
NTC5050BFB2	Chart # 7
NTC5050BFC	Chart # 8
NTC5050BHA1	Chart # 7

BLOWER PERFORMANCE DATA INDEX

MODEL NUMBER	CHART NUMBER
NTC5050BHB1	Chart # 7
NTC5050BHB2	Chart # 7
NTC5075BFA1	Chart # 7
NTC5075BFA2	Chart # 7
NTC5075BFB1	Chart # 7
NTC5075BFB2	Chart # 7
NTC5075BFC	Chart # 8
NTC5075BHA1	Chart # 7
NTC5075BHA2	Chart # 7
NTC5075BHB1	Chart # 7
NTC5075BHB2	Chart # 7
NTC5075BHC	Chart # 8
NTC5100BFC	Chart # 8
NTC5100BHA1	Chart # 7
NTC5100BHA2	Chart # 7
NTC5100BHB1	Chart # 7
NTC5100BHB2	Chart # 7
NTC5100BJC	Chart # 8
NTC5100BKA1	Chart # 7
NTC5100BKA2	Chart # 7
NTC5100BKB1	Chart # 7
NTC5100BKB2	Chart # 7
NTC5100BKC	Chart # 8
NTC5125BKA1	Chart # 7
NTC5125BKA2	Chart # 7
NTC5125BKB1	Chart # 7
NTC5125BKB2	Chart # 7
NTC5125BKC	Chart # 8
NTC5150BKC	Chart # 8

NTC7

NTC7050BFA1	Chart # 2
NTC7075BFA1	Chart # 2
NTC7100BHA1	Chart # 2
NTC7125BKA1	Chart # 2

NTN5

NTN5050BFA1	Chart # 9
NTN5075BFA1	Chart # 9
NTN5075BHA1	Chart # 9
NTN5100BHA1	Chart # 9
NTN5100BKA1	Chart # 9
NTN5100BKB1	Chart # 9
NTN5125BKA1	Chart # 9
NTN5125BKB1	Chart # 9

MODEL NUMBER	CHART NUMBER

NUG3

NUG3050AFA1	Chart # 10
NUG3075AFA1	Chart # 10
NUG3100AHA1	Chart # 10
NUG3125AKA1	Chart # 10

NUG5

NUG5050BCA1	Chart # 11
NUG5050BCB1	Chart # 11
NUG5050BCB2	Chart # 11
NUG5050BEA1	Chart # 11
NUG5050BEA2	Chart # 11
NUG5050BFB1	Chart # 11
NUG5050BFB2	Chart # 11
NUG5050BHA1	Chart # 11
NUG5050BHB1	Chart # 11
NUG5050BHB2	Chart # 11
NUG5075BFA1	Chart # 11
NUG5075BFA2	Chart # 11
NUG5075BFB1	Chart # 11
NUG5075BFB2	Chart # 11
NUG5075BHA1	Chart # 11
NUG5075BHA2	Chart # 11
NUG5075BHB1	Chart # 11
NUG5075BHB2	Chart # 11
NUG5100BFA1	Chart # 12
NUG5100BFA2	Chart # 12
NUG5100BFB1	Chart # 12
NUG5100BFB2	Chart # 12
NUG5100BHA1	Chart # 12
NUG5100BHA2	Chart # 12
NUG5100BHB1	Chart # 12
NUG5100BHB2	Chart # 12
NUG5100BKA1	Chart # 12
NUG5100BKA2	Chart # 12
NUG5100BKB1	Chart # 12
NUG5100BKB2	Chart # 12
NUG5125BHA1	Chart # 12
NUG5125BHB1	Chart # 12
NUG5125BHB2	Chart # 12
NUG5125BKA1	Chart # 12
NUG5125BKA2	Chart # 12
NUG5125BKB1	Chart # 12
NUG5125BKB2	Chart # 12
NUG5150BKA1	Chart # 12
NUG5150BKA2	Chart # 12
NUG5150BKB1	Chart # 12
NUG5150BKB2	Chart # 12

BLOWER PERFORMANCE DATA INDEX

MODEL NUMBER	CHART NUMBER	MODEL NUMBER	CHART NUMBER
NUH5			
NUH5050BCB1	Chart # 13		
NUH5050BCB2	Chart # 13		
NUH5050BFB1	Chart # 13		
NUH5050BFB2	Chart # 13		
NUH5075BFB1	Chart # 13		
NUH5075BFB2	Chart # 13		
NUH5100BFB1	Chart # 13		
NUH5100BFB2	Chart # 13		
NUH5125BHB1	Chart # 13		
NUH5125BHB2	Chart # 13		
NUH5150BKB1	Chart # 13		
NUH5150BKB2	Chart # 13		

Blower Performance Data - Chart 1

Figure 73 Blower Performance Data

		Model Number					
		NCC5					NCG5
		050BF	075BF	075BH	100BH	125BK	150BK
ESP (Inches)	SPEED TAP	CFM					
.10	LOW	781	657	1512	1289	1762	1756
	MED. LOW	--	--	--	--	1947	1951
	MEDIUM	1173	1032	1669	1558	--	--
	MED. HIGH	--	--	--	--	2150	2127
	HIGH	1373	1479	1840	1818	2344	2286
.20	LOW	770	650	1460	1260	1700	1710
	MED. LOW	--	--	--	--	1905	1900
	MEDIUM	1140	1015	1610	1520	--	--
	MED. HIGH	--	--	--	--	2090	2063
	HIGH	1330	1420	1780	1760	2278	2210
.30	LOW	767	646	1402	1246	1632	1664
	MED. LOW	--	--	--	--	1879	1839
	MEDIUM	1121	1000	1559	1486	--	--
	MED. HIGH	--	--	--	--	2021	2003
	HIGH	1294	1378	1711	1710	2208	2145
.40	LOW	750	632	1360	1210	1590	1600
	MED. LOW	--	--	--	--	1809	1770
	MEDIUM	1130	980	1499	1445	--	--
	MED. HIGH	--	--	--	--	1950	1920
	HIGH	1240	1295	1640	1660	2120	2070
.50	LOW	744	624	1291	1177	1550	1556
	MED. LOW	--	--	--	--	1750	1714
	MEDIUM	1032	960	1439	1397	--	--
	MED. HIGH	--	--	--	--	1893	1848
	HIGH	1173	1247	1572	1597	2051	2001
.60	LOW	710	592	1230	1130	1480	1495
	MED. LOW	--	--	--	--	1680	1650
	MEDIUM	968	899	1360	1330	--	--
	MED. HIGH	--	--	--	--	1813	1770
	HIGH	1090	1160	1480	1510	1960	1930
.70	LOW	686	574	1171	1096	1433	1433
	MED. LOW	--	--	--	--	1611	1580
	MEDIUM	915	870	1277	1273	--	--
	MED. HIGH	--	--	--	--	1738	1696
	HIGH	1007	1087	1391	1483	1869	1827

Blower Performance Data - Chart 2

Figure 74 Blower Performance Data

		Model Number			
		NDC7 / NTC7			
		050BF	075BF	100BH	125BK
ESP	SPEED TAP	CFM			
.10 ESP IN. W.C.	LOW	718	778	954	1463
	MEDIUM LOW	840	984	1312	1650
	MEDIUM HIGH	1109	1263	1698	1879
	HIGH	1473	1576	1925	2214
.20 ESP IN. W.C.	LOW	719	786	950	1429
	MEDIUM LOW	838	1003	1292	1635
	MEDIUM HIGH	1094	1249	1645	1859
	HIGH	1431	1532	1853	2154
.30 ESP IN. W.C.	LOW	714	790	946	1417
	MEDIUM LOW	837	1003	1265	1614
	MEDIUM HIGH	1086	1244	1596	1838
	HIGH	1396	1489	1780	2152
.40 ESP IN. W.C.	LOW	692	788	915	1389
	MEDIUM LOW	819	1001	1231	1579
	MEDIUM HIGH	1063	1215	1530	1806
	HIGH	1349	1432	1708	2106
.50 ESP IN. W.C.	LOW	660	781	878	1364
	MEDIUM LOW	791	982	1175	1556
	MEDIUM HIGH	1027	1186	1455	1773
	HIGH	1291	1371	1638	2049
.60 ESP IN. W.C.	LOW	615	765	830	1339
	MEDIUM LOW	752	962	1118	1515
	MEDIUM HIGH	986	1146	1362	1725
	HIGH	1222	1308	1546	1981
.70 ESP IN. W.C.	LOW	563	743	778	1299
	MEDIUM LOW	683	923	1020	1470
	MEDIUM HIGH	934	1094	1241	1668
	HIGH	1141	1229	1435	1903

Blower Performance Data - Chart 3

Figure 75 Blower Performance Data

		Model Number				
		NDN5				
		050BF	075BF	100BF	100BH	125BK
ESP (Inches)	**SPEED TAP**	**CFM**				
.10	LOW	781	657	724	1289	1333
	MED. LOW	--	--	--	--	1573
	MEDIUM	1173	1032	1110	1558	--
	MED. HIGH	--	--	--	--	1840
	HIGH	1373	1479	1720	1818	2148
.20	LOW	770	650	685	1260	1294
	MED. LOW	--	--	--	--	1544
	MEDIUM	1140	1015	1099	1520	--
	MED. HIGH	--	--	--	--	1816
	HIGH	1330	1420	1650	1760	2093
.30	LOW	767	646	649	1246	1266
	MED. LOW	--	--	--	--	1500
	MEDIUM	1121	1000	1092	1486	--
	MED. HIGH	--	--	--	--	1776
	HIGH	1294	1378	1571	1710	2041
.40	LOW	750	632	625	1210	1240
	MED. LOW	--	--	--	--	1467
	MEDIUM	1130	980	1030	1445	--
	MED. HIGH	--	--	--	--	1726
	HIGH	1240	1295	1450	1660	1981
.50	LOW	744	624	607	1177	1175
	MED. LOW	--	--	--	--	1419
	MEDIUM	1032	960	987	1397	--
	MED. HIGH	--	--	--	--	1665
	HIGH	1173	1247	1331	1597	1906
.60	LOW	710	592	605	1130	1141
	MED. LOW	--	--	--	--	1357
	MEDIUM	968	899	920	1330	--
	MED. HIGH	--	--	--	--	1607
	HIGH	1090	1160	1210	1510	1828
.70	LOW	686	574	600	1096	1054
	MED. LOW	--	--	--	--	1308
	MEDIUM	915	870	873	1273	--
	MED. HIGH	--	--	--	--	1538
	HIGH	1007	1087	1100	1434	1751

Blower Performance Data - Chart 4

Figure 76 Blower Performance Data

		Model Number					
		NNAC					NNAG
		050BF	075BF	075BH	100BH	125BK	150BK
ESP (Inches)	SPEED TAP	CFM					
.10	LOW	781	657	1512	1289	1762	1756
	MED. LOW	--	--	--	--	1947	1951
	MEDIUM	1173	1032	1669	1558	--	--
	MED. HIGH	--	--	--	--	2150	2127
	HIGH	1373	1479	1840	1818	2344	2286
.20	LOW	770	650	1460	1260	1700	1710
	MED. LOW	--	--	--	--	1905	1900
	MEDIUM	1140	1015	1610	1520	--	--
	MED. HIGH	--	--	--	--	2090	2063
	HIGH	1330	1420	1780	1760	2278	2210
.30	LOW	767	646	1402	1246	1632	1664
	MED. LOW	--	--	--	--	1879	1839
	MEDIUM	1121	1000	1559	1486	--	--
	MED. HIGH	--	--	--	--	2021	2003
	HIGH	1294	1378	1711	1710	2208	2145
.40	LOW	750	632	1360	1210	1590	1600
	MED. LOW	--	--	--	--	1809	1770
	MEDIUM	1130	980	1499	1445	--	--
	MED. HIGH	--	--	--	--	1950	1920
	HIGH	1240	1295	1640	1660	2120	2070
.50	LOW	744	624	1291	1177	1550	1556
	MED. LOW	--	--	--	--	1750	1714
	MEDIUM	1032	960	1439	1397	--	--
	MED. HIGH	--	--	--	--	1893	1848
	HIGH	1173	1247	1572	1597	2051	2001
.60	LOW	710	592	1230	1130	1480	1495
	MED. LOW	--	--	--	--	1680	1650
	MEDIUM	968	899	1360	1330	--	--
	MED. HIGH	--	--	--	--	1813	1770
	HIGH	1090	1160	1480	1510	1960	1930
.70	LOW	686	574	1171	1096	1433	1433
	MED. LOW	--	--	--	--	1611	1580
	MEDIUM	915	870	1277	1273	--	--
	MED. HIGH	--	--	--	--	1738	1696
	HIGH	1007	1087	1391	1483	1869	1827

Blower Performance Data - Chart 5

Figure 77 Blower Performance Data

ESP (In. W.C)	SPEED TAP	CFM						
		NNAT050BE/BF	NNAT050BH	NNAT075BF	NNAT075BH	NNAT100BH	NNAT100BK	NNAT125BK
.10	LOW	645	1503	733	1503	1333	1417	1611
	MED. LOW						1611	1816
	MEDIUM	1000	1722	1116	1722	1545		
	MED. HIGH						1830	2005
	HIGH	1305	1887	1418	1887	1835	2219	2250
.20	LOW	660	1460	740	1460	1305	1405	1575
	MED. LOW						1595	1765
	MEDIUM	990	1660	1100	1660	1520		
	MED. HIGH						1810	1960
	HIGH	1250	1810	1370	1810	1790	2185	2205
.30	LOW	665	1420	742	1420	1284	1388	1532
	MED. LOW						1570	1733
	MEDIUM	975	1608	1085	1608	1496		
	MED. HIGH						1798	1923
	HIGH	1205	1752	1323	1752	1754	2163	2158
.40	LOW	650	1370	730	1370	1250	1360	1480
	MED. LOW						1545	1670
	MEDIUM	950	1540	1050	1540	1460		
	MED. HIGH						1765	1860
	HIGH	1150	1670	1270	1670	1700	2125	2110
.50	LOW	655	1318	711	1318	1218	1336	1457
	MED. LOW						1527	1619
	MEDIUM	925	1484	1016	1484	1420		
	MED. HIGH						1726	1805
	HIGH	1100	1599	1209	1599	1655	2095	2065
.60	LOW	640	1250	700	1250	1160	1300	1395
	MED. LOW						1480	1560
	MEDIUM	890	1400	970	1400	1380		
	MED. HIGH						1700	1750
	HIGH	1040	1520	1100	1520	1585	2050	1995
.70	LOW	615	1182	670	1182	1088	1259	1327
	MED. LOW						1430	1488
	MEDIUM	840	1322	910	1322	1325		
	MED. HIGH						1653	1681
	HIGH	980	1425	1061	1425	1497	2001	1922

Blower Performance Data - Chart 6

Figure 78 | **Blower Performance Data**

ESP (Inches)	SPEED TAP	CFM										
		NNAU050BC	NNAU050BE	NNAU050BH	NNAU075BF	NNAU075BH	NNAU100BF	NNAU100BH	NNAU100BK	NNAU125BH	NNAU125BK	NNAU150BK
.10	LOW	600	645	1503	733	1503	1067	1333	1417	1300	1611	1357
	MED. LOW								1611		1816	1542
	MEDIUM	735	1000	1722	1116	1722	1231	1545		1570		
	MED. HIGH								1830		2005	1709
	HIGH	840	1305	1887	1418	1887	1432	1835	2219	1900	2250	2073
.20	LOW	575	660	1460	740	1460	1020	1305	1405	1270	1575	1325
	MED. LOW								1595		1765	1525
	MEDIUM	690	990	1660	1100	1660	1180	1520		1550		
	MED. HIGH								1810		1960	1750
	HIGH	790	1250	1810	1370	1810	1390	1790	2185	1820	2205	2040
.30	LOW	545	665	1420	742	1420	984	1284	1388	1250	1532	1260
	MED. LOW								1570		1733	1503
	MEDIUM	625	975	1608	1085	1608	1125	1496		1510		
	MED. HIGH								1798		1923	1761
	HIGH	720	1205	1752	1323	1752	1335	1754	2163	1780	2158	2014
.40	LOW	500	650	1370	730	1370	921	1250	1360	1200	1480	1270
	MED. LOW								1545		1670	1480
	MEDIUM	590	950	1540	1050	1540	1080	1460		1470		
	MED. HIGH								1765		1860	1740
	HIGH	670	1150	1670	1270	1670	1266	1700	2125	1710	2110	1975
.50	LOW	455	655	1318	711	1318	858	1217	1336	1150	1457	1243
	MED. LOW								1527		1619	1464
	MEDIUM	545	925	1484	1016	1484	1027	1420		1370		
	MED. HIGH								1726		1805	1710
	HIGH	605	1150	1599	1209	1599	1191	1655	2095	1605	2065	1953
.60	LOW	410	640	1250	700	1250	780	1160	1300	1050	1395	1225
	MED. LOW								1480		1560	1430
	MEDIUM	485	890	1400	970	1400	938	1380		1290		
	MED. HIGH								1700		1750	1650
	HIGH	560	1040	1520	1100	1520	1092	1585	2050	1445	1995	1885
.70	LOW	335	615	1182	670	1182	701	1088	1259	935	1327	1195
	MED. LOW								1430		1488	1401
	MEDIUM	410	840	1322	910	1322	850	1325		1140		
	MED. HIGH								1653		1681	1602
	HIGH	480	980	1425	1061	1425	1028	1497	2001	1275	1922	1827

Blower Performance Data - Chart 7

Figure 79 Blower Performance Data

		Model Number						
		NTC5						
		050BE 050BF	050BH	075BF	075BH	100BH	100BK	125BK
ESP (Inches)	**SPEED TAP**	**CFM**						
.10	LOW	645	1503	733	1503	1333	1417	1611
	MED. LOW	-	-	-	-	-	1611	1816
	MEDIUM	1000	1722	1116	1722	1545	-	-
	MED. HIGH	-	-	-	-	-	1830	2005
	HIGH	1305	1887	1418	1887	1835	2219	2250
.20	LOW	660	1460	740	1460	1305	1405	1575
	MED. LOW	-	-	-	-	-	1595	1765
	MEDIUM	990	1660	1100	1660	1520	-	-
	MED. HIGH	-	-	-	-	-	1810	1960
	HIGH	1250	1810	1370	1810	1790	2185	2205
.30	LOW	665	1420	742	1420	1284	1388	1532
	MED. LOW	-	-	-	-	-	1570	1733
	MEDIUM	975	1608	1085	1608	1496	-	-
	MED. HIGH	-	-	-	-	-	1798	1923
	HIGH	1205	1752	1323	1752	1754	2163	2158
.40	LOW	650	1370	730	1370	1250	1360	1480
	MED. LOW	-	-	-	-	-	1545	1670
	MEDIUM	950	1540	1050	1540	1460	-	-
	MED. HIGH	-	-	-	-	-	1765	1860
	HIGH	1150	1670	1270	1670	1700	2125	2110
.50	LOW	655	1318	711	1318	1218	1336	1457
	MED. LOW	-	-	-	-	-	1527	1619
	MEDIUM	925	1484	1016	1484	1420	-	-
	MED. HIGH	-	-	-	-	-	1726	1805
	HIGH	1100	1599	1209	1599	1655	2095	2065
.60	LOW	640	1250	700	1250	1160	1300	1395
	MED. LOW	-	-	-	-	-	1480	1560
	MEDIUM	890	1400	970	1400	1380	-	-
	MED. HIGH	-	-	-	-	-	1700	1750
	HIGH	1040	1520	1100	1520	1585	2050	1995
.70	LOW	615	1182	670	1182	1088	1259	1327
	MED. LOW	-	-	-	-	-	1430	1488
	MEDIUM	840	1322	910	1322	1325	-	-
	MED. HIGH	-	-	-	-	-	1653	1681
	HIGH	980	1425	1061	1425	1497	2001	1922

Blower Performance Data - Chart 8

Figure 80 Blower Performance Data

		Model Number									
		NTC5									
		050 BFC	075 BFC	075 BHC	100 BFC	100 BJC	100 BKC	100 BKD	125 BKC	125 BKD	150 BKC
ESP (Inches)	SPEED TAP	CFM									
.10	LOW	645	733	1503	1067	1278	1417	1210	1611	1264	1357
	MED. LOW	-	-	-	-	1546	1611	1441	1816	1520	1542
	MEDIUM	1000	1116	1722	1231	-	-	-	-	-	-
	MED. HIGH	-	-	-	-	1822	1830	1773	2005	1841	1709
	HIGH	1305	1418	1887	1432	2302	2219	2104	2250	2161	2073
.20	LOW	660	740	1460	1020	1264	1405	1201	1575	1251	1325
	MED. LOW	-	-	-	-	1543	1595	1430	1765	1506	1525
	MEDIUM	990	1100	1660	1180	-	-	-	-	-	-
	MED. HIGH	-	-	-	-	1784	1810	1740	1960	1803	1750
	HIGH	1250	1370	1810	1390	2731	2185	2078	2205	2132	2040
.30	LOW	665	742	1420	984	1244	1388	1197	1532	1249	1290
	MED. LOW	-	-	-	-	1499	1570	1453	1733	1486	1503
	MEDIUM	975	1085	1608	1125	-	-	-	-	-	-
	MED. HIGH	-	-	-	-	1737	1798	1740	1923	1772	1761
	HIGH	1205	1323	1752	1335	2171	2163	2061	2158	2079	2014
.40	LOW	650	730	1370	921	1212	1360	1191	1480	1219	1270
	MED. LOW	-	-	-	-	1471	1545	1441	1670	1456	1480
	MEDIUM	950	1050	1540	1080	-	-	-	-	-	-
	MED. HIGH	-	-	-	-	1683	1765	1718	1860	1736	1740
	HIGH	1150	1270	1670	1266	2098	2125	2020	2110	2042	1975
.50	LOW	655	711	1318	858	1185	1336	1167	1457	1168	1243
	MED. LOW	-	-	-	-	1417	1527	1425	1619	1427	1464
	MEDIUM	925	1016	1484	1027	-	-	-	-	-	-
	MED. HIGH	-	-	-	-	1641	1726	1707	1805	1702	1740
	HIGH	1100	1209	1599	1191	2012	2095	2005	2065	1991	1953
.60	LOW	640	700	1250	780	1178	1300	1160	1395	1178	1225
	MED. LOW	-	-	-	-	1367	1480	1390	1560	1415	1430
	MEDIUM	890	970	1400	938	-	-	-	-	-	-
	MED. HIGH	-	-	-	-	1574	1700	1676	1750	1672	1650
	HIGH	1040	1100	1520	1092	1921	2050	1953	1995	1914	1885
.70	LOW	615	670	1182	701	1119	1259	1130	1327	1143	1195
	MED. LOW	-	-	-	-	1304	1430	1365	1488	1358	1401
	MEDIUM	840	910	1322	850	-	-	-	-	-	-
	MED. HIGH	-	-	-	-	1495	1653	1654	1681	1614	1602
	HIGH	980	1061	1425	1028	1826	2001	1917	1922	1838	1827

Blower Performance Data - Chart 9

Figure 81 Blower Performance Data

		Model Number						
		NTN5						
		050BFA	075BFA	075BHA	100BKA	100BKB	125BKA	125BKB
ESP (Inches)	**SPEED TAP**	**CFM**						
.10	LOW	645	733	1503	1417	1210	1611	1264
	MED. LOW	-	-	-	1611	1441	1816	1520
	MEDIUM	1000	1116	1722	-	-	-	-
	MED. HIGH	-	-	-	1830	1773	2005	1841
	HIGH	1305	1418	1887	2219	2104	2250	2161
.20	LOW	660	740	1460	1405	1201	1575	1251
	MED. LOW	-	-	-	1595	1430	1765	1506
	MEDIUM	990	1100	1660	-	-	-	-
	MED. HIGH	-	-	-	1810	1740	1960	1803
	HIGH	1250	1370	1810	2185	2078	2205	2132
.30	LOW	665	742	1420	1388	1197	1532	1249
	MED. LOW	-	-	-	1570	1453	1733	1486
	MEDIUM	975	1085	1608	-	-	-	-
	MED. HIGH	-	-	-	1798	1740	1923	1772
	HIGH	1205	1323	1752	2163	2061	2158	2079
.40	LOW	650	730	1370	1360	1191	1480	1219
	MED. LOW	-	-	-	1545	1441	1670	1456
	MEDIUM	950	1050	1540	-	-	-	-
	MED. HIGH	-	-	-	1765	1718	1860	1736
	HIGH	1150	1270	1670	2125	2020	2110	2042
.50	LOW	655	711	1318	1336	1167	1457	1168
	MED. LOW	-	-	-	1527	1425	1619	1427
	MEDIUM	925	1016	1484	-	-	-	-
	MED. HIGH	-	-	-	1726	1707	1805	1702
	HIGH	1100	1209	1599	2095	2005	2065	1991
.60	LOW	640	700	1250	1300	1160	1395	1178
	MED. LOW	-	-	-	1480	1390	1560	1415
	MEDIUM	890	970	1400	-	-	-	-
	MED. HIGH	-	-	-	1700	1676	1750	1672
	HIGH	1040	1100	1520	2050	1953	1995	1914
.70	LOW	615	670	1182	1259	1130	1327	1143
	MED. LOW	-	-	-	1430	1365	1488	1358
	MEDIUM	840	910	1322	-	-	-	-
	MED. HIGH	-	-	-	1653	1654	1681	1614
	HIGH	980	1061	1425	2001	1917	1922	1838

Blower Performance Data - Chart 10

Figure 82 Blower Performance Data

		Model Number			
		NUG3			
		050AF	075AF	100AH	125AK
ESP (Inches)	SPEED TAP	CFM			
.10	LOW	645	733	1333	1611
	MED. LOW	-	-	-	1816
	MEDIUM	1000	1116	1545	-
	MED. HIGH	-	-	-	2005
	HIGH	1305	1418	1835	2250
.20	LOW	660	740	1305	1575
	MED. LOW	-	-	-	1765
	MEDIUM	990	1100	1520	-
	MED. HIGH	-	-	-	1960
	HIGH	1250	1370	1790	2205
.30	LOW	665	742	1284	1532
	MED. LOW	-	-	-	1733
	MEDIUM	975	1085	1496	-
	MED. HIGH	-	-	-	1923
	HIGH	1205	1323	1754	2158
.40	LOW	650	730	1250	1480
	MED. LOW	-	-	-	1670
	MEDIUM	950	1050	1460	-
	HIGH	-	-	-	1860
		1150	1270	1700	2110
.50	LOW	655	711	1218	1457
	MED. LOW	-	-	-	1619
	MEDIUM	925	1016	1470	-
	MED. HIGH	-	-	-	1805
	HIGH	1150	1209	1655	2065
.60	LOW	640	700	1160	1395
	MED. LOW	-	-	-	1560
	MEDIUM	890	970	1380	-
	MED. HIGH	-	-	-	1750
	HIGH	1040	1100	1585	1995
.70	LOW	615	670	1088	1327
	MED. LOW	-	-	-	1488
	MEDIUM	840	910	1325	-
	MED. HIGH	-	-	-	1681
	HIGH	980	1061	1497	1922

Blower Performance Data - Chart 11

Figure 83 Blower Performance Data

		Model Number				
		NUG5				
		050BC	050BE 050BF	050BH	075BF	075BH
ESP (Inches)	**SPEED TAP**	**CFM**				
.10	LOW	600	645	1503	733	1503
	MEDIUM	735	1000	1722	1116	1722
	HIGH	840	1305	1887	1418	1887
.20	LOW	575	660	1460	740	1460
	MEDIUM	690	990	1660	1100	1660
	HIGH	790	1250	1810	1370	1810
.30	LOW	545	665	1420	742	1420
	MEDIUM	625	975	1608	1085	1608
	HIGH	720	1205	1752	1323	1752
.40	LOW	500	650	1370	730	1370
	MEDIUM	590	950	1540	1050	1540
	HIGH	670	1150	1670	1270	1670
.50	LOW	455	655	1318	711	1318
	MEDIUM	545	925	1484	1016	1484
	HIGH	605	1150	1599	1209	1599
.60	LOW	410	640	1250	700	1250
	MEDIUM	485	890	1400	970	1400
	HIGH	560	1040	1520	1100	1520
.70	LOW	335	615	1182	670	1182
	MEDIUM	410	840	1322	910	1322
	HIGH	480	980	1425	1061	1425

Blower Performance Data - Chart 12

Figure 84 Blower Performance Data

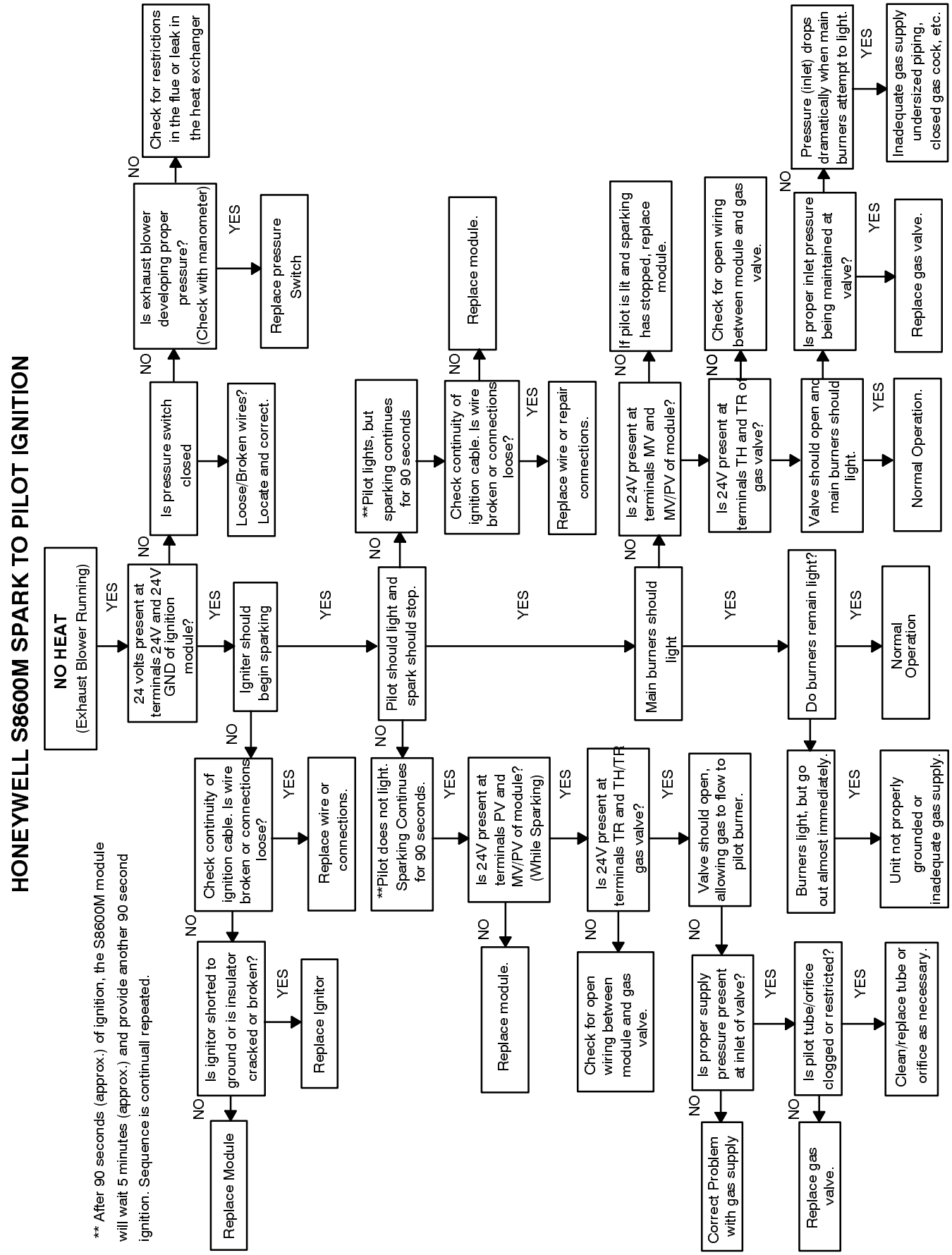
		Model Number					
		NUG5					
		100BF	100BH	100BK	125BH	125BK	150BK
ESP (Inches)	**SPEED TAP**	**CFM**					
.10	LOW	1067	1333	1417	1300	1611	1357
	MED. LOW	--	--	1611	--	1816	1542
	MEDIUM	1231	1545	--	1570	--	--
	MED. HIGH	--	--	1830	--	2005	1709
	HIGH	1432	1835	2219	1900	2250	2073
.20	LOW	1020	1305	1405	1270	1575	1325
	MED. LOW	--	--	1595	--	1765	1525
	MEDIUM	1180	1520	--	1550	--	--
	MED. HIGH	--	--	1810	--	1960	1750
	HIGH	1390	1790	2185	1820	2205	2040
.30	LOW	984	1284	1388	1250	1532	1290
	MED. LOW	--	--	1570	--	1733	1503
	MEDIUM	1125	1496	--	1510	--	--
	MED. HIGH	--	--	1798	--	1923	1761
	HIGH	1335	1754	2163	1780	2158	2014
.40	LOW	921	1250	1360	1200	1480	1270
	MED. LOW	--	--	1545	--	1670	1480
	MEDIUM	1080	1460	--	1470	--	--
	MED. HIGH	--	--	1765	--	1860	1740
	HIGH	1266	1700	2125	1710	2110	1975
.50	LOW	858	1218	1336	1150	1457	1243
	MED. LOW	--	--	1527	--	1619	1464
	MEDIUM	1027	1420	--	1370	--	--
	MED. HIGH	--	--	1726	--	1805	1710
	HIGH	1191	1655	2095	1605	2065	1953
.60	LOW	780	1160	1300	1050	1395	1225
	MED. LOW	--	--	1480	--	1560	1430
	MEDIUM	938	1380	--	1290	--	--
	MED. HIGH	--	--	1700	--	1750	1650
	HIGH	1092	1585	2050	1445	1995	1885
.70	LOW	701	1088	1259	935	1327	1195
	MED. LOW	--	--	1430	--	1488	1401
	MEDIUM	850	1325	--	1140	--	--
	MED. HIGH	--	--	1653	--	1681	1602
	HIGH	1028	1497	2001	1275	1922	1827

Blower Performance Data - Chart 13

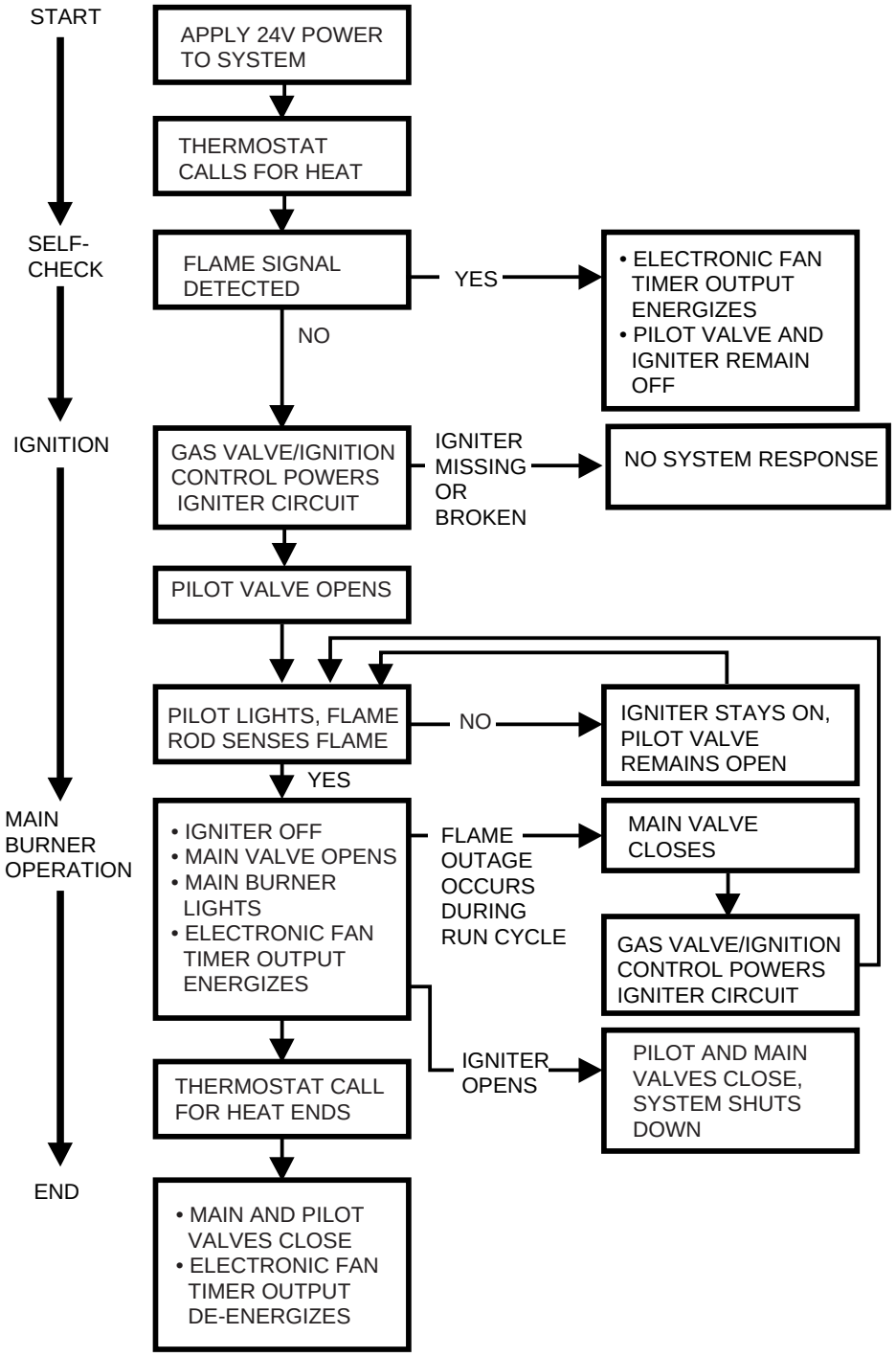
Figure 85 Blower Performance Data

		Model Number						
		NUH5						
		050BC	050BF	075BF	100BF	125BH	150BK	
ESP (In. W.C)	SPEED TAP	CFM						
.10	LOW	600	645	733	1067	1300	1357	
	MED. LOW	-	-	-	-	-	1542	
	MEDIUM	735	1000	1116	1231	1570	-	
	MED. HIGH	-	-	-	-	-	1709	
	HIGH	840	1305	1418	1432	1900	2073	
.20	LOW	575	660	740	1020	1270	1325	
	MED. LOW	-	-	-	-	-	1525	
	MEDIUM	690	990	1100	1180	1550	-	
	MED. HIGH	-	-	-	-	-	1750	
	HIGH	790	1250	1370	1390	1820	2040	
.30	LOW	545	665	742	984	1250	1290	
	MED. LOW	-	-	-	-	-	1503	
	MEDIUM	625	975	1085	1125	1510	-	
	MED. HIGH	-	-	-	-	-	1761	
	HIGH	720	1205	1323	1335	1780	2014	
.40	LOW	500	650	730	921	1200	1270	
	MED. LOW	-	-	-	-	-	1480	
	MEDIUM	590	950	1050	1080	1470	-	
	MED. HIGH	-	-	-	-	-	1740	
	HIGH	670	1150	1270	1266	1710	1975	
.50	LOW	455	655	711	858	1150	1243	
	MED. LOW	-	-	-	-	-	1464	
	MEDIUM	545	925	1016	1027	1370	-	
	MED. HIGH	-	-	-	-	-	1710	
	HIGH	605	1100	1209	1191	1605	1953	
.60	LOW	410	640	700	780	1050	1225	
	MED. LOW	-	-	-	-	-	1430	
	MEDIUM	485	890	970	938	1290	-	
	MED. HIGH	-	-	-	-	-	1650	
	HIGH	560	1040	1100	1092	1445	1885	
.70	LOW	335	615	670	701	935	1195	
	MED. LOW	-	-	-	-	-	1401	
	MEDIUM	410	840	910	850	1140	-	
	MED. HIGH	-	-	-	-	-	1602	
	HIGH	480	980	1061	1028	1275	1827	

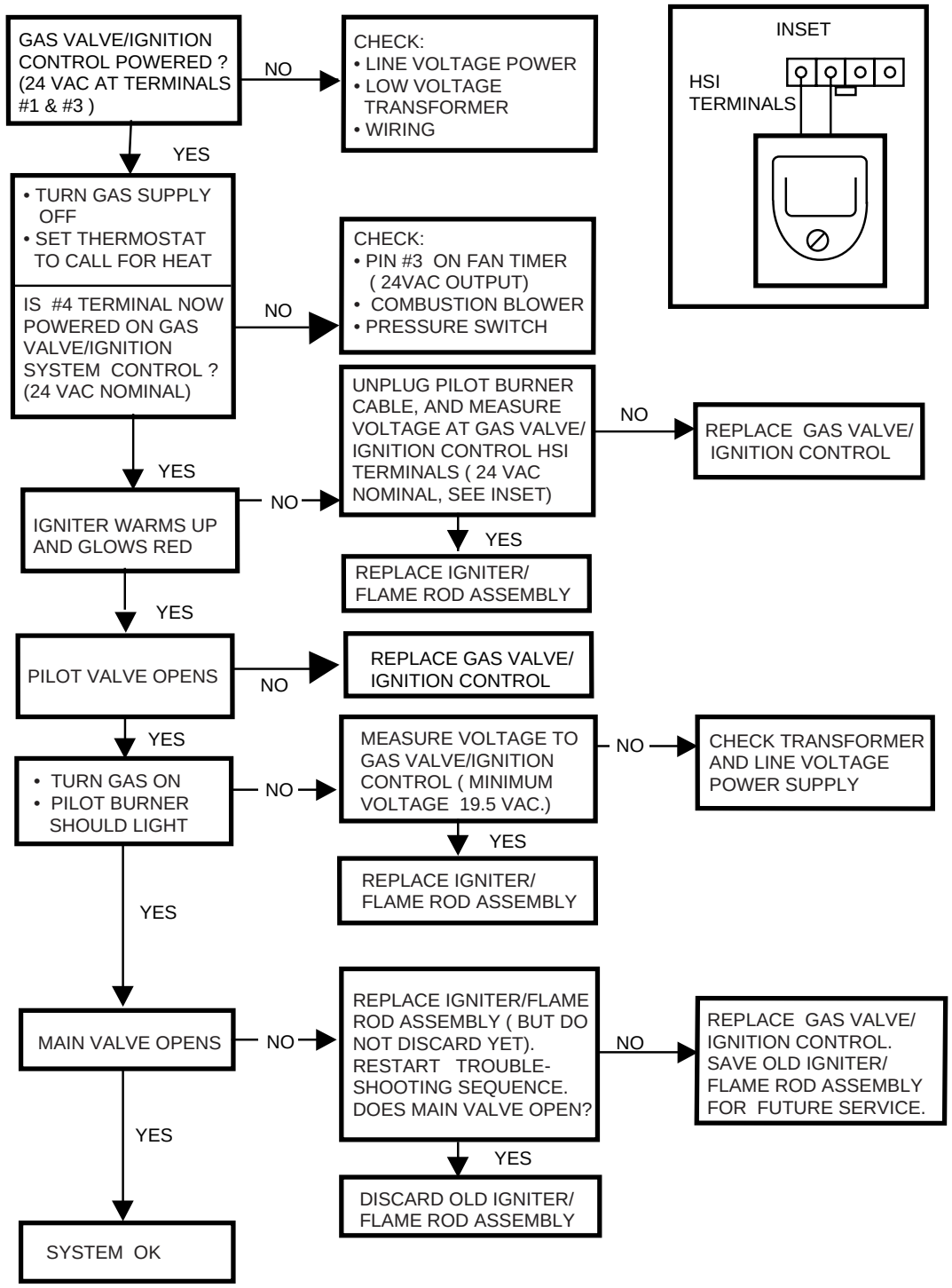
Honeywell S8600M Ignition System Troubleshooting Chart



Honeywell SV9500M "SMART VALVE" Sequence of Operation



Honeywell SV9500M "SMART VALVE" Troubleshooting Chart



Appendix of Helpful Information

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United States Codes

Applicable Natural Gas and Propane Codes

National Fuel Gas Code, ANSI Z223.1-1992 (or current edition).

Applicable Electrical Codes

National Electrical Code
ANSI/NFPA No. 70-1990 (or current edition)

For a nominal charge, these code books can be ordered from:

American National Standards Institute
1430 Broadway
New York, NY 10018

Canadian Codes

Applicable Natural Gas and Propane Codes

Natural Gas Installation Code. CAN/CGA - B149.1-M91 (or current edition).

Propane Installation Code. CAN/CGA - B149.2-M91 (or current edition).

Applicable Electrical Codes

Canadian Electrical Code Part 1. CSA Standard C22.1 - 1990 (or current edition).

For a nominal charge, these code books can be ordered from:

Canadian Gas Association
55 Scarsdale Road
Don Mills, Ontario M3B ZR3

Canadian Standards Association
178 Rexdale Boulevard
Rexdale, Ontario M9W IR3

Glossary of Terms

Category I
As defined by ANSI Standard Z21.47 "A central furnace which operates with a non-positive vent pressure and with a vent gas temperature at least 140°F (78° C) above its dew point." As used with this furnace, Category I venting generally uses metal pipe venting vertically or nearly vertical. If venting horizontally with metal pipe, an approved device attached near the termination point **MUST** be used to maintain a non-positive pressure inside vent pipe. This assures that no combustion products will remain inside pipe and infiltrate into the structure.

Category III
As defined by ANSI Standard Z21.47 "A central furnace which operates with a positive vent pressure and with a vent gas temperature at least 140°F (78° C) above its dew point." As used with this furnace, Category III venting uses a combination of single wall metal and high temperature **SEALED** plastic pipe. This method does not require a power venting device, but does require special high temperature plastic pipe, sealants, and limits on number of elbows used. These can be determined from the section in the installation manual titled *Horizontal Venting*.

Gas Connector
The flexible gas hose which connects the gas supply to the furnace. Gas connector can **NOT** be used inside furnace or be secured or supported by the furnace or ductwork.

Direct Vent
An installation of an approved (Dual Certified) model wherein ALL air for combustion is obtained from outside the structure, and piped directly to the furnace in accordance witn published instructions.

Dual Certified
A furnace model, which has been agency approved for installation as either a Direct Vent furnace, or a Non-Direct Vent Furnace.

Heat anticipator
A variable resistor inside a thermostat which generates a small amount of heat. The purpose of the anticipator is to reduce temperature swings. The anticipator must be set to match the current output by the low voltage transformer.

Horizontal venting
Vent of a gas appliance where vent exists or terminates through a side wall of a structure.

Manometer
A test gauge for measuring gas pressure. Calibrated to read in inches of water column. ("w.c.).

Non-Direct Vent
A "Typical" furnace installation, wherein air for combustion is obtained from the area in which the furnace is installed, or via ducts, or grilles which communicate with the area in which the furnace is installed.

Single wall vent pipe
Galvanized single wall vent pipe. Only used in applications which allow single wall venting according to local codes, GAMA vent tables, and codes of countries having jurisdiction. See Appendix for listing of applicable codes.

Sweep elbows
Elbows used in venting which have a larger turning radius than standard elbows. Can be 45° or 90° radii. Allow more latitude in venting because vent runs can be turned without the restrictions normally found in 90 degree elbows.