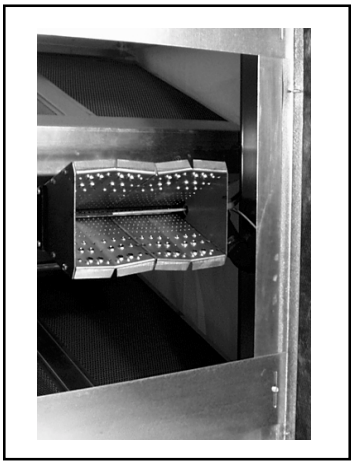
LC SYSTEMS

Installation, Operation, and Maintenance Manual
for Commander Replacement Air Units with Direct Gas-Fired Heater

*Model CMDF



ETL Listed

Listed for compliance with UL 1995 "Heating and Cooling Equipment"
ANSI Z83.4
"Direct Gas Fired Industrial Air Heaters"

WARNING:

Incorrect installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the Installation, Operation, and Maintenance instructions thoroughly before installing or servicing this unit.

When this unit is in a suspended state, the following ANSI standards must be followed. (1) in airplane hangers in accordance with *Aircraft Hangers, ANSI/NFPA 409*, and (2) in public garages the Standard for *Parking Structures, ANSI/NFPA 88A*, or the Standard for *Repair Garages, ANSI/NFPA 88B*.

For Your Safety

If you smell gas:
1. **Open windows**
2. **Don't touch electrical switches**
3. **Extinguish any open flame.**
4. **Immediately call your gas supplier.**

LC SYSTEMS

1675 South High Street
Columbus, Ohio 43207
(Toll Free) 1-800-331-5582
www.lc-systems.com

For Your Safety

The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

September 2002

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Standard Warranty

We warrant to the Person, Firm, Association or Corporation to whom the equipment referred to herein has been delivered , that all equipment manufactured is free from defects in material or factory workmanship. This does not apply to equipment which has been subject to accident, alteration, abuse, misuse or improper installation. Our obligation under this Warranty shall cover repair or replacement, at our option, F.O.B., our factories in London and Columbus, Ohio, any part of said equipment which proves defective within one (1) year from date of original installation, and which our examination shall disclose to be defective. This warranty does not include labor charges for replacement or repair of defective parts and includes no contingent liabilities of any sort. This Warranty is in lieu of all other Warranties, expressed or implied, and all other obligations or liabilities on the part of our company. We neither assume, nor authorize any other person to assume for us, any other obligation of liability in connection with the sale of our equipment. Specifically excluded from this Warranty are accessory items, including but not limited to, air filters, not manufactured by LCSystems . The original equipment manufacturer's Warranty on these products is extended to the Person, Firm, Association, or Corporation purchasing LCSystems products.

Gas Piping Instructions

WARNING:

LEAK TESTING

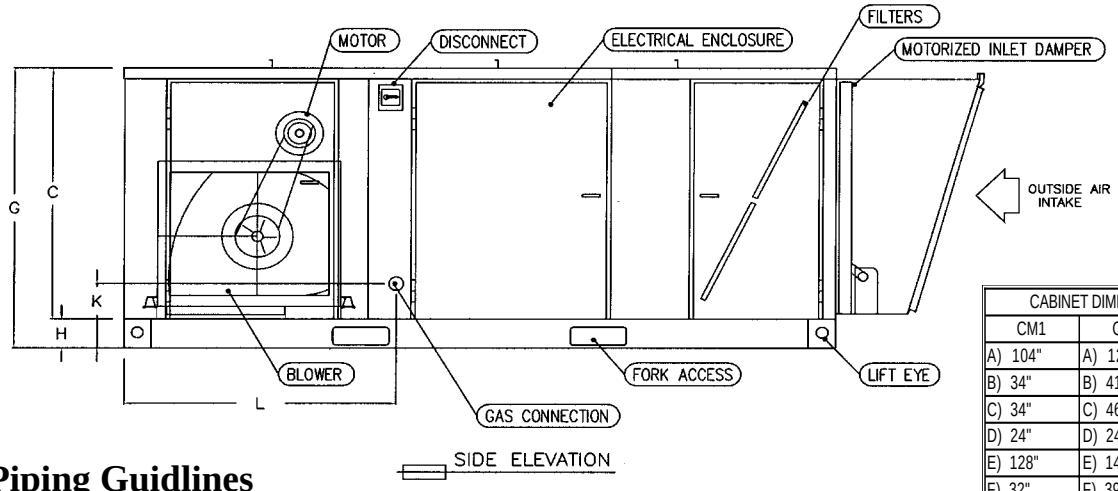
All aspects of this unit, or any other direct fired replacement air heater requires leak testing prior to initial startup. A water/soap solution is the most effective means of performing this test. NEVER test for gas leaks when there are exposed flames.

HIGH PRESSURE TESTING

The heater and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psi (3.5 kPa).

The heater must be isolated form the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at pressures equal to or less than 1/2 psi (3.5 kPa).

Locating Gas Connection



CABINET DIMENSIONAL DATA		
CM1	CM2	CM3
A) 104"	A) 120"	A) 140"
B) 34"	B) 41"	B) 56"
C) 34"	C) 46"	C) 46"
D) 24"	D) 24"	D) 24"
E) 128"	E) 144"	E) 164"
F) 32"	F) 39"	F) 54"
G) 40"	G) 52"	G) 52"
H) 6"	H) 6"	H) 6"
K) 11 7/8"	K) 11 7/8"	K) 11 7/8"
L) 41 1/4"	L) 45 3/4"	L) 73 3/8"

Piping Guidlines

All gas piping should be installed in accordance with local codes. It is required that a ground union be installed adjacent to the manifold for easy servicing. On vertical runs, a drip leg should be provided upstream of the control manifold (see Figure 15). An additional shut-off valve must be located externally of the jacket enclosure where required by local code. The location of this valve must comply with the local codes. An 1/8" N.P.T. plugged tapping, accessible for test guage connection, must be installed immediately upstream of the gas supply connection to the unit.

It is recommended that the gas piping not be installed through the bottom of the furnace bottom panel. If piping must penetrate the furnace bottom panel, it must be sealed to prevent water leakage.

WARNING:

To avoid equipment damage or possible pesonal injury, do not connect gas piping to this unit until a supply line pressure/leak test has been completed. Connecting the unit before completing the pressure/leak test may damage the unit gas valve and result in a fire hazard.

CAUTION:
Do not rely on a shutoff valve to isolate the unit while conducting gas pressure/leak tests. These valves may not be completely shut off, exposing the unit gas valve to excessive pressure and damage. Do not overtighten the inlet gas piping. This may cause stresses that would crack the valve.

DANGER:
Never use an open flame to detect gas leaks. Explosive conditions may exist which would result in personal injury or death.

The gas line should be supported so that no strain is placed on the unit. Pipe compounds which are not soluble to liquid petroleum gases should be used on threaded joints.

The appliance and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressure in excess of 1/2 psig (3.5 kPa)

The appliance must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping at test pressure equal to or less than 1/2 psig (3.5 kPa).

For additional piping information, refer to National Fuel Gas Code ANSI Z233.1 - 1992, or latest edition.

FIELD PIPING INSTALLATION

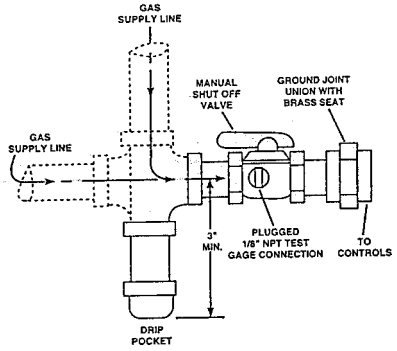


Figure 15
Required piping to unit gas controls

1. Installation of piping must be in accordance with local codes, and ANSI Z233.1 - latest edition, “National Fuel Gas Code”.
2. Piping to units must conform to local and national requirements for type and volume of gas handled, and pressure drop allowed in the line. Refer to the unit rating plate to determine the Btu capacity of the unit and the type of gas the unit is designed to use. Using this information refer to the ASHREA Guide Fundamentals Handbook, or other gas pipe sizing guide to determine the correct supply pipe size. Allow sufficient pipe size based on allowable pressure drop in supply line. Where several units are served by the same main, the total capacity of all units served by the main must be used. Avoid pipe sizes smaller than 1/2”
3. After threading and reaming the ends, inspect piping and remove loose dirt and chips
4. Support piping so that no strains are imposed on the unit controls.
5. Use two wrenches when connecting field piping to units.
6. Provide a drip pocket before each unit and in the line where low spots cannot be avoided (See Figure 15).
7. Take-off to unit should come from top or side of main to avoid trapping condensate.
8. Piping subject to wide temperature variations should be insulated.
9. Pitch piping at least 1/4” per 15 feet of horizontal run.
10. Compounds used on threaded joints of gas piping must be resistant to action of liquified petroleum gases.
11. Purge air from gas piping before lighting unit.
12. After air has been purged, check for gas leaks in the piping system using soap/water solution.
13. Install a ground joint union and gas cock external of the unit for easy servicing of controls, includiing a 1/8” NPT plugged tapping accessible for test guage connections. (See Figure 15.)
14. Allow at least 5 feet of piping between any high pressure regulator and the unit control string.

**Refer to the heater rating plate for determining the minimum gas supply pressure for obtaining the maximum gas capacity for which this heater is specified.

System Startup

For this unit to function properly, follow all of the following steps in this startup checksheet. This is to be done after all the electrical and gas connections have been completed.

WARNING:

Be sure that there is adequate building relief so as to not overpressurize the building when the heating system is operating at its rated capacity. This can be accomplished by taking into account, through standard engineering methods, the structure's designed infiltration rate; by providing properly sized relief openings; or by interlocking a powered exhaust system; or by a combination of these methods.

1. The heater inlet shall be located in accordance with the applicable building code provisions for ventilation air.

2. Field constructed intake accessories should be properly designed to minimize the entry of snow and rain.

3. All air to the heater must be ducted from the outdoors. Recirculation of room air is not permitted.

If the failure or malfunction of this heater creates a hazard to other fuel burning equipment in the building (e.g. when the heater is providing the replacement air to a boiler room), the unit is to be interlocked to open inlet dampers or other such devices.

Special tools required:

- Voltage meter
- Magnehelic gauge or equivalent
- Tachometer
- Temperature probe/thermocouple device
- Amp meter
- Anemometer
- Service Mirror
- Small refrigeration screwdriver
- 5/16" inch nut driver

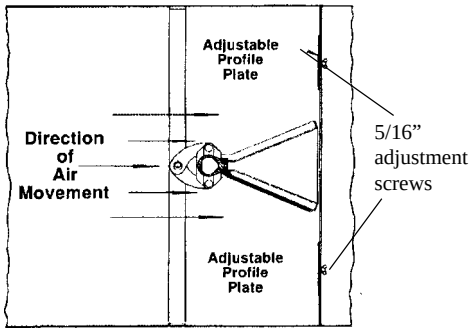


Figure 5 Profile plate adjustment

1. Check Gas Pressure

Check the gas pressure with the heater's nameplate pressure requirements.

** NEVER USE BATTERY POWERED PRESSURE INSTRUMENTS TO CHECK GAS PRESSURE

2. Achieving proper differential pressure across burner.

Achieving the proper pressure drop and air velocity across the burner is essential for the correct operation of a direct fired gas heater. If the velocity is not within given specifications, the heater will not perform effeciently, and can produce an abundance of carbon monoxide (CO) or other harmful gases. This may also cause the system to shutdown if the air is not being proved.

While measuring the differential pressure across the burner, the fan should be running at the designed RPM, while discharging room temperature air (68-70 degrees F.) Using the anemometer, insert one line on the intake side of the burner, and the other line on the downstream side (Refer to Figure 16 on page 6). The proper static pressure reading should be between .500" and .700".

If this reading is higher or lower than the specified ranges, and the volume of air (CFM) delivered from the discharge is correct, then the adjustable baffles will need to be adjusted.

To adjust the baffle plates, turn unit off & open the lift off door on the back side of the unit. Using a 5/16" nut driver loosen the screws that hold the baffles in place(Refer to Figure 5). To increase the differential pressure close the opening between the two baffles, To decrease the differential pressure increase the opening between the two baffles. Be sure to keep the top and bottom baffles an equal distance from the burner. When complete, be sure to tighten the screws holding the adjustable baffles, remove all tooling from inside of cabinet, and close removeable door. Turn unit on and check the differential pressure again. This may need to be repeated to acheive the correct pressure drop.

System Startup Continued

3. Setting the pilot pressure

The pilot pressure is preset at the factory and should not require any adjustment. To check, pilot should display a golf ball size flame.

4. Setting Low Fire

Low fire is set at the factory, but should be checked in the field. For safe and proper operation the burner should have a flame running across the entire length at all times. This flame should be constant and about the size of match sticks when done properly.

To check the setting of low fire on a unit, adjust the temperature dial to its lowest setting and observe the flame through the view port, using the service mirror. For best results, this should be completed when the outdoor air is higher than the lowest setting on the temperature dial. If low fire has been adjusted correctly a constant flame should be seen.

If there are adjustments required, remove wires from the A1014 on terminals 7 and 8. Using the service mirror watch the flame carefully throught the view port. On the front of the Maxitrol modulating gas valve is a needle valve with a red cover. Remove the red cover and adjust using a screwdriver. Turning valve out will increase the size of the flame. Once adequate flame has been achieved replace cover on gas valve and replace wires on terminals 7 and 8 of the A1014.

5. Setting High Fire

This will set the maximum discharge air temperature that can be achieved. The burners high fire needs to be set or the unit could overfire at startup causing shutdowns. This will be done measuring the air inlet and outlet temperatures with the burner at high fire.

a. The first thing that needs to be accounted for is the required temperature rise of an individual unit.

Desired output temperature - winter design temperature = temperature rise.

b. Set the unit to run at high fire. There are two different controls that can be used:

1. Maxitrol Series 14 are used on systems designed on replacement air. On these systems remove wire attached to terminal #4 of the A1014 amplifier.
2. Maxitrol Series 44 are used on systems designed for space heating. On these systems remove wire attached to terminal #3 of the A1044 amplifier.

c. Adjusting the high fire.

Using a temperature probe or thermocouple device, monitor the difference between the ambient air and the discharge temperature. When in the high fire mode remove cap from the RV61 main regulator. There is an adjustment screw that is used to set the point when the required temperature rise is equal to the actual temperature rise. Avoid going too high; this could cause the system to shut down and the High Limit switch will need to be reset. Replace wire to proper terminal when completed.

6. Flame Signal

To ensure proper, trouble free operation, the flame signal should be checked. Readings should be taken during pilot only, low fire, and high fire settings. The readings should remain relatively steady. If there are problems retaining the correct voltage, see the troubleshooting section of this manual.

How to measure the flame signal:

There are two ways that the flame signal could be checked. First is using a standard DC volt meter connected to the flame amplifier test jacks (+) and (-) on the outside of the flame safeguard. Second, if the furnace has the Honeywell 7800 series ignition system the keyboard display module Honeywell #S7800A1001 (not provided) can be used. The signal should read above or at 1.25 volts and remain at that during all flame cycles.

7. High/Low gas pressure switches (Optional)

These switches open (denergize) when the gas pressures are above or below the set limits, thus shutting down the heater. Both switches reset manually.

Settings for the High/Low gas pressure switches are as follows

Low pressure at 3" w.c.

High pressure at 15.5 " w.c.

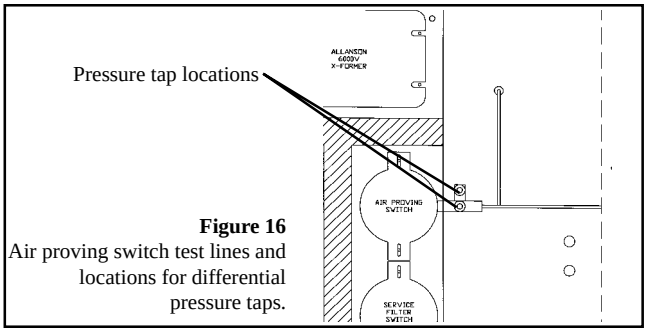
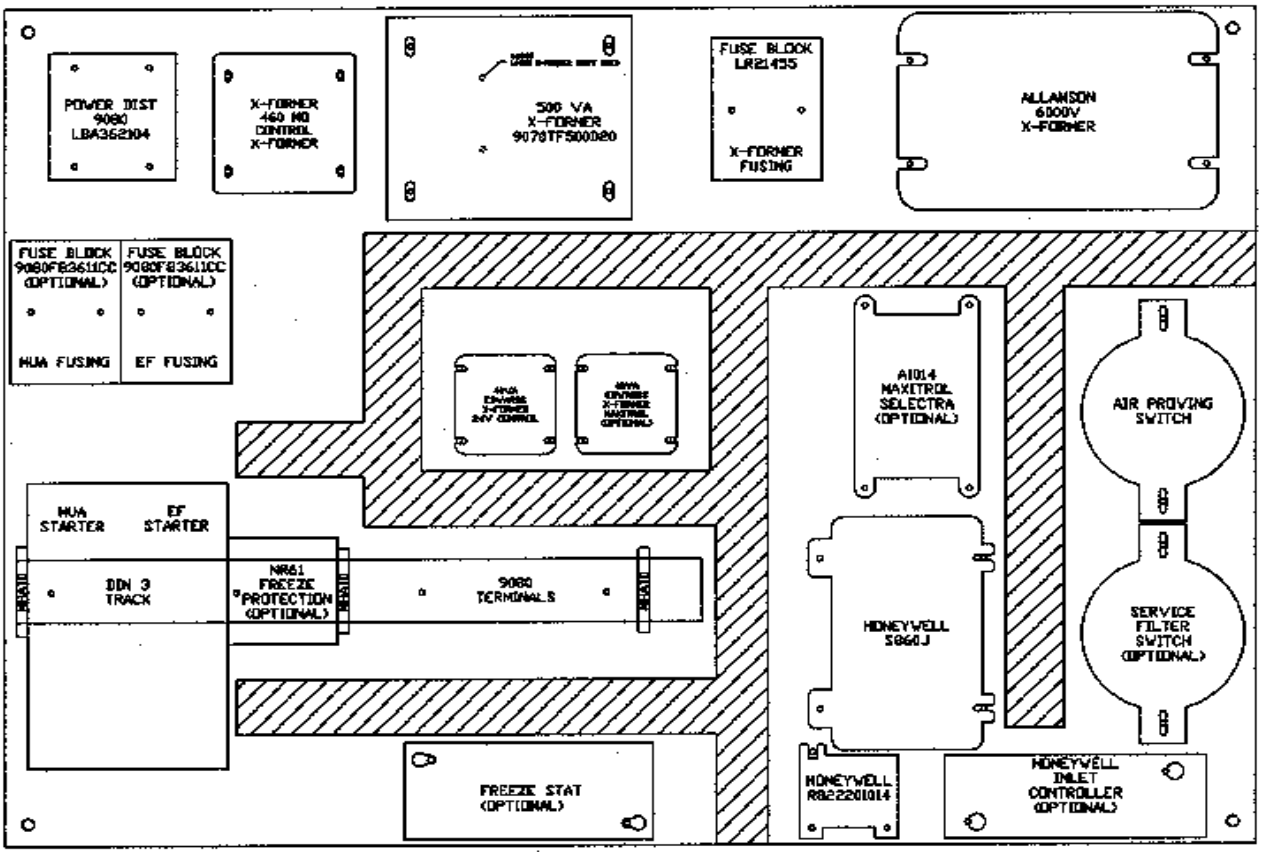


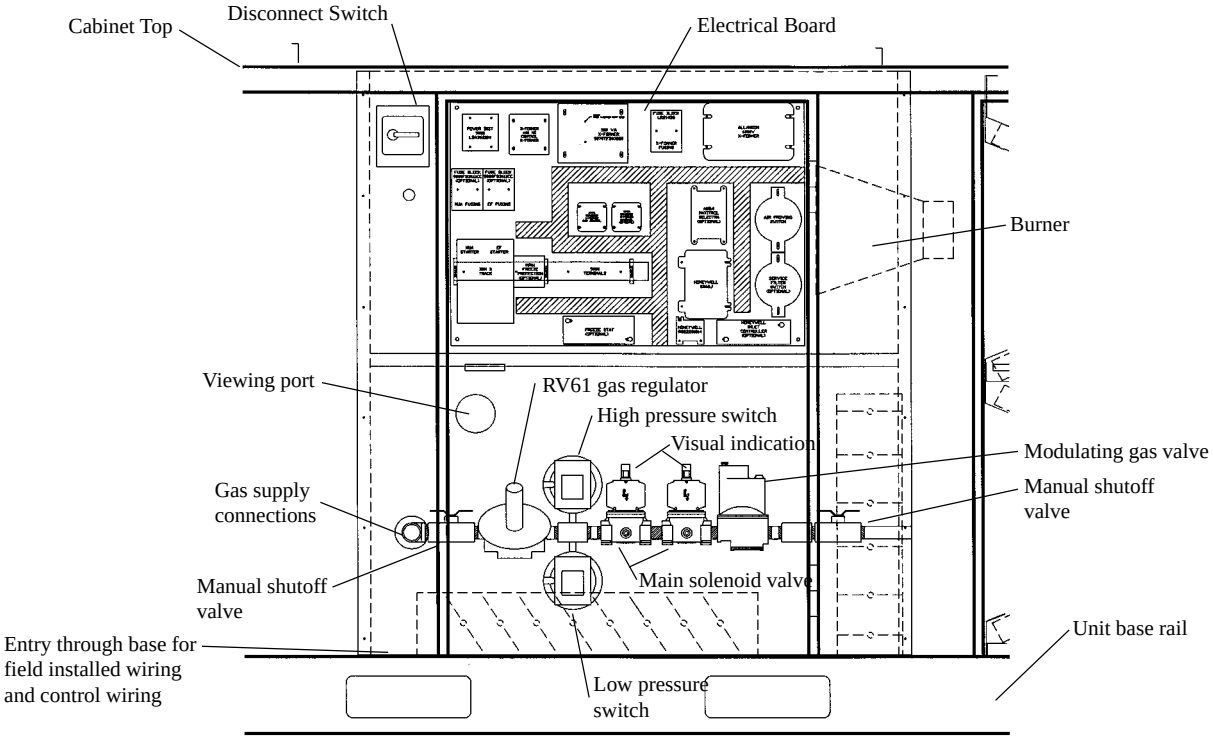
Figure 16
Air proving switch test lines and locations for differential pressure taps.

Electrical Cabinet Layout



Detail view of electrical board and component location

Electrical Cabinet Layout
With Gas Connection



Sequence of Operation for WD-1 Controls

Use this to help in determining if the unit is funtioing properly upon startup.

3 Phase Line Voltage

Safety disconnect on, energizes line voltage control transformer. Energizes line side of blower motor starter.

Optional Features:

Line voltage fuses

Energizes exhaust fan motor starte**r.**

110 Volt Control Circuit

Remote fan switch closed. Make blower motor starter through internal thermal overload contact. Energize ignition transformer and two 110/24 volt low voltage control transformers through blower motor starter auxilary contact and air pressure switch.

Optional Features:

External fire suppression micro-switch controls power from fan switch to unit.

Fire stat de-energizes circuit on temperature rise.

MID (Motorized Inlet Damper) energized.

Service Filter indicator light energized through air pressure switch.

Blower motor starter made through MOD end switch.

Blower motor starter operates on five minute delay off freeze stat.

Remote heat switch closed energizes air pressure switch.

Air inlet controller energize air pressure switch.

High-Low gas pressure switches energize air pressure switch.

24 Volt (low voltage) Control Circuit

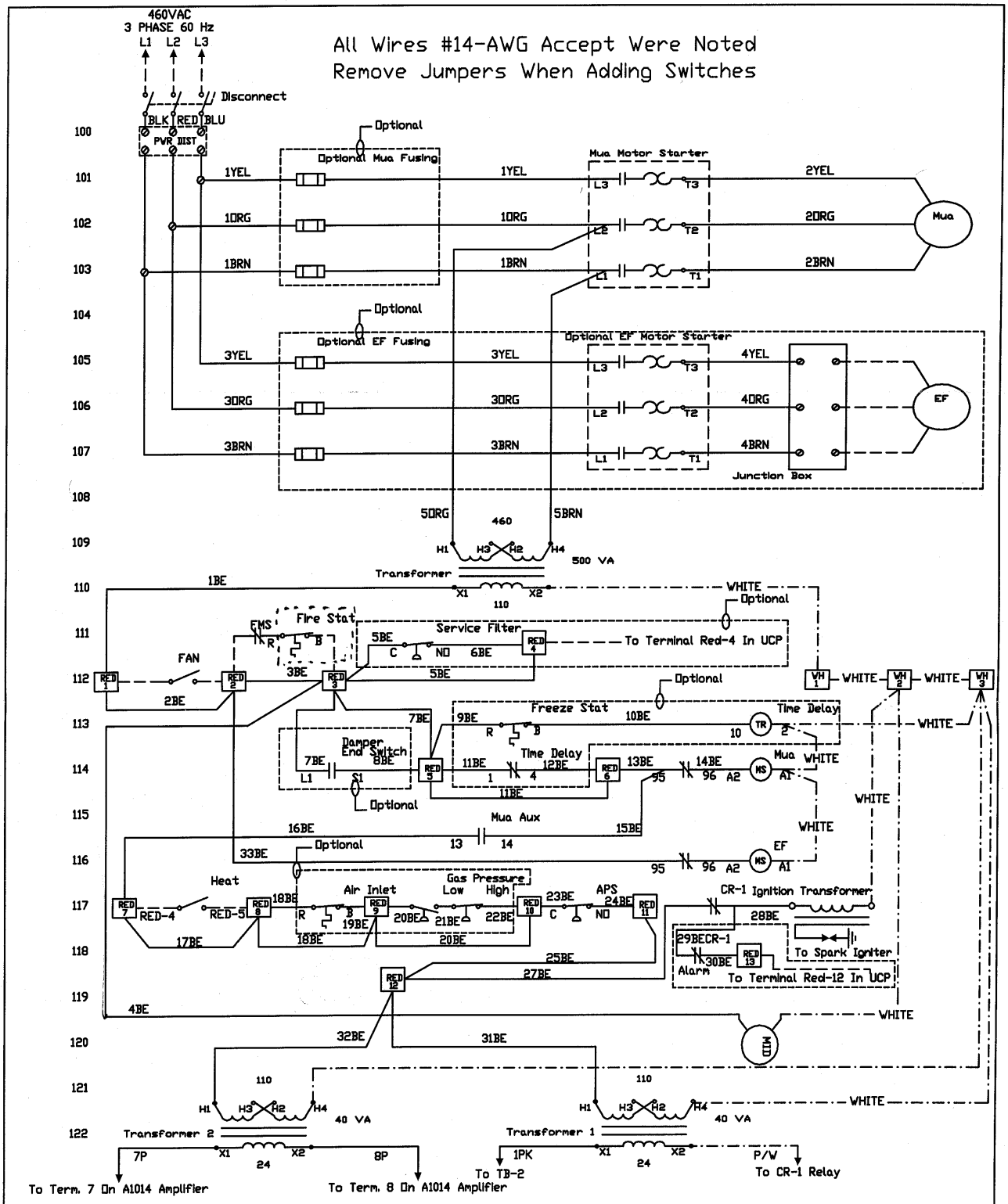
Power from transformer 1 energizes ignition controller through high limit switch. Controller begins 30 second pre-purge. Ignition controller energizes PSSV (Pilot Safety Shut-off Valve). Ignition controller begins 15 second flame proving sequence. If pilot flame not proved, system lockout requires power interruption to re-sequence. Pilot proved controller makes main redundant SSV (Safety Shut-off Valve) and CR-1 coil. CR-1 de-energizes ignition transformer.

Optional Features:

Alarm indicator light energized through CR-1 when ignition sequence begins, de-energized on flame sensing and re-energized on flame failure.

TC-2

Power from Transformer 2 energizes A1014 temperature control amplifier, controlling modulating gas valve. See Maxitrol literature for specific control operation.



OPTIONS LISTING	
	Motor Fusing
	Exhaust Fan / J-Box
	Air Inlet Controller
	High / Low Gas Pressure Switches
	Motorized Control Damper
	T 115 Room Override Stat
	Freeze Stat
	Damper End Switch
	TD114 Shipped Loose

TERMINAL	DESIGNATION
White	Neutral
Green	Ground
Black	AC Power Circuits
Yellow	Externally Fed Circuits
Red	AC Control Circuits
Blue	Low Voltage Circuits
Orange	Analog Inputs & Outputs

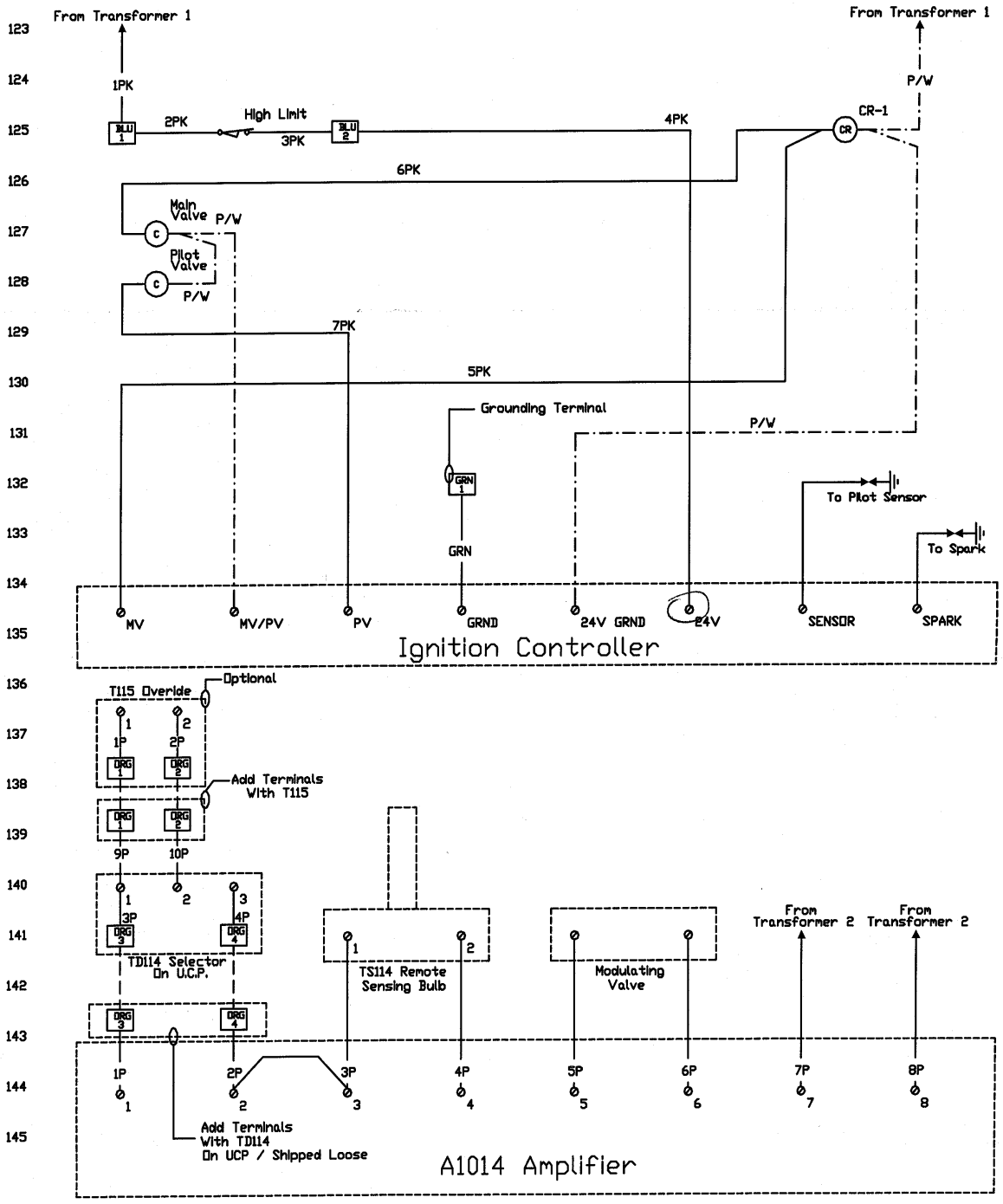
Factory Wiring
Factory Wiring Neutral
Field Wiring

LCSYSTEMS

Drawing Number: WD1-TC2 Standard

Date: 5/24/2001
Revision Date: 5/2/2001
1 of 2
Sales Order Number:

All Wires #14-AWG Accept Were Noted
Remove Jumpers When Adding Switches



OPTIONS LISTING	
X	Service Filter
	Alarm
	Fire Stat

TERMINAL	DESIGNATION
White	Neutral
Green	Ground
Black	AC Power Circuits
Yellow	Externally Fed Circuits
Red	AC Control Circuits
Blue	Low Voltage Circuits
Orange	Analog Inputs & Outputs

Factory Wiring ——————
Factory Wiring Neutral —·—·—·—
Field Wiring – – – – – – –

LCSYSTEMS

Date: 5/24/2001 | 2 of 2
Revision Date: 5/2/2001 | Sales Order Number:

Drawing Number: WD1-TC2 Standard

Sequence of Operation for WD-2 Controls

Use this to help in determining if the unit is functioning properly upon startup.

3 Phase Line Voltage

Safety disconnect on, energizes line voltage control transformer. Energizes line side of blower motor starter.

Optional Features:

Line voltage fuses

Energizes exhaust fan motor starter.

110 Volt Control Circuit

Remote fan switch closed. Make blower motor starter through internal thermal overload contact. Power from transformer 1 energizes iginition controller through high limit switch, energizes air pressure switch. Controller begins 30 second pre-purge. Ignition controller energizes PSSV (Pilot Safety Shut-off Valve). Ignition controller begins 15 second flame proving sequence. If pilot flame not proved system lockout requires power interruption to re-sequence. Pilot proved controller makes main redundant SSV (Safety Shut-off Valve).

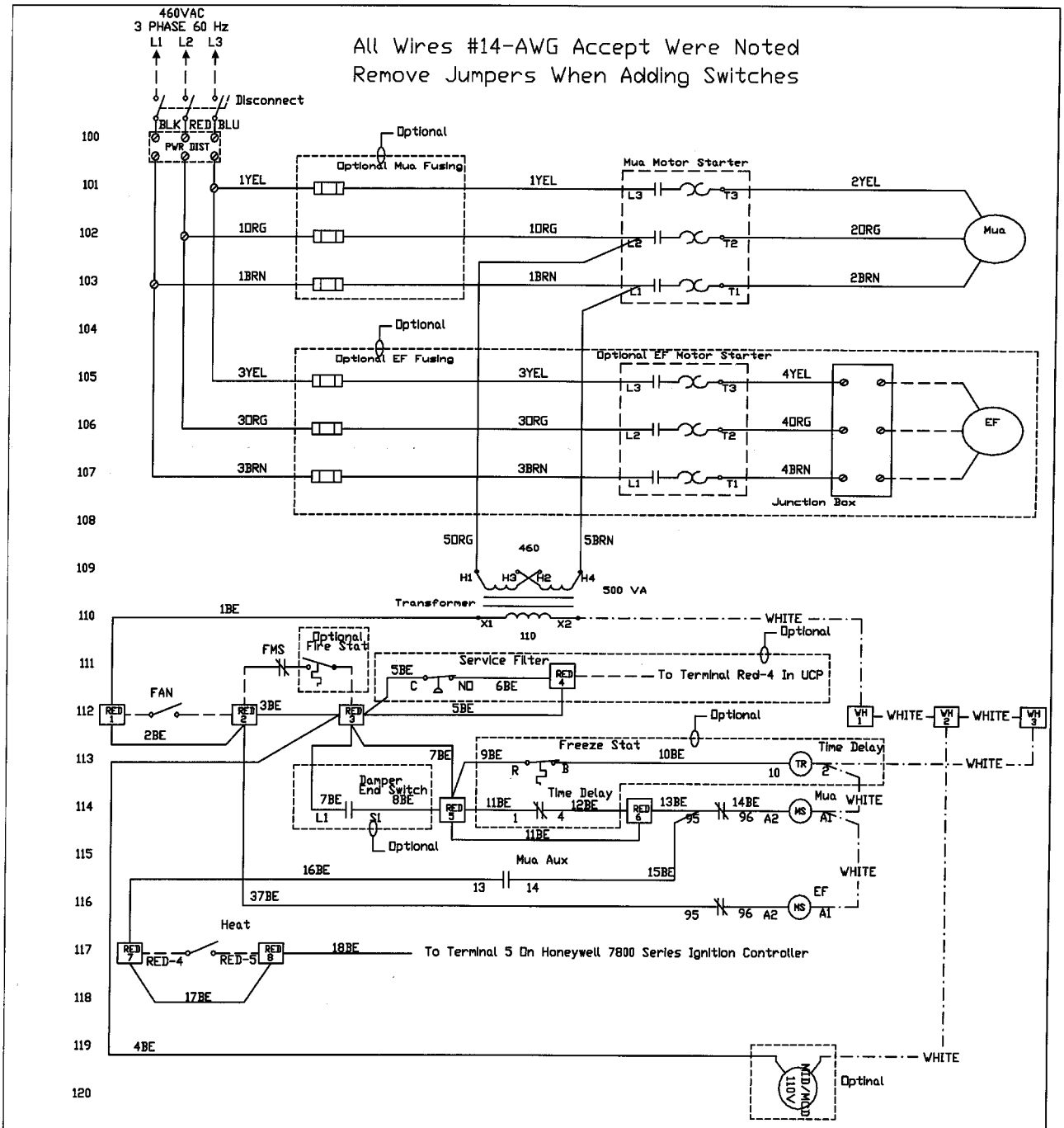
Optional Features:

External fire suppression micro-switch controls power from fan switch to unit.
Fire stat de-energizes circuit on temperature rise.
MID (Motorized Inlet Damper) energized.
Service Filter indicator light energized through air pressure switch.
Blower motor starter made through MOD end switch.
Blower motor starter operates on five minute delay off freeze stat.
Remote heat switch closed energizes air pressure switch.
Air inlet controller energize air pressure switch.
High-Low gas pressure switches energize air pressure switch.

24 Volt (low voltage) Control Circuit

TC-2

Power from 40VA control transformer energizes A1014 temperature control amplifier., controlling modulating gas valve. See Maxitrol literature for specific control operation.



OPTIONS LISTING	
	Motor Fusing
X	Exhaust Fan / J-Box
	Air Inlet Controller
	Fire Stat
X	(MID/MCD) Motorized Inlet Damper
	T 115 Room Override Stat
	Freeze Stat
	Damper End Switch
	TD114 On U.C.P.

TERMINAL	DESIGNATION
White	Neutral
Green	Ground
Black	AC Power Circuits
Yellow	Externally Fed Circuits
Red	AC Control Circuits
Blue	Low Voltage Circuits
Orange	Analog Inputs & Outputs

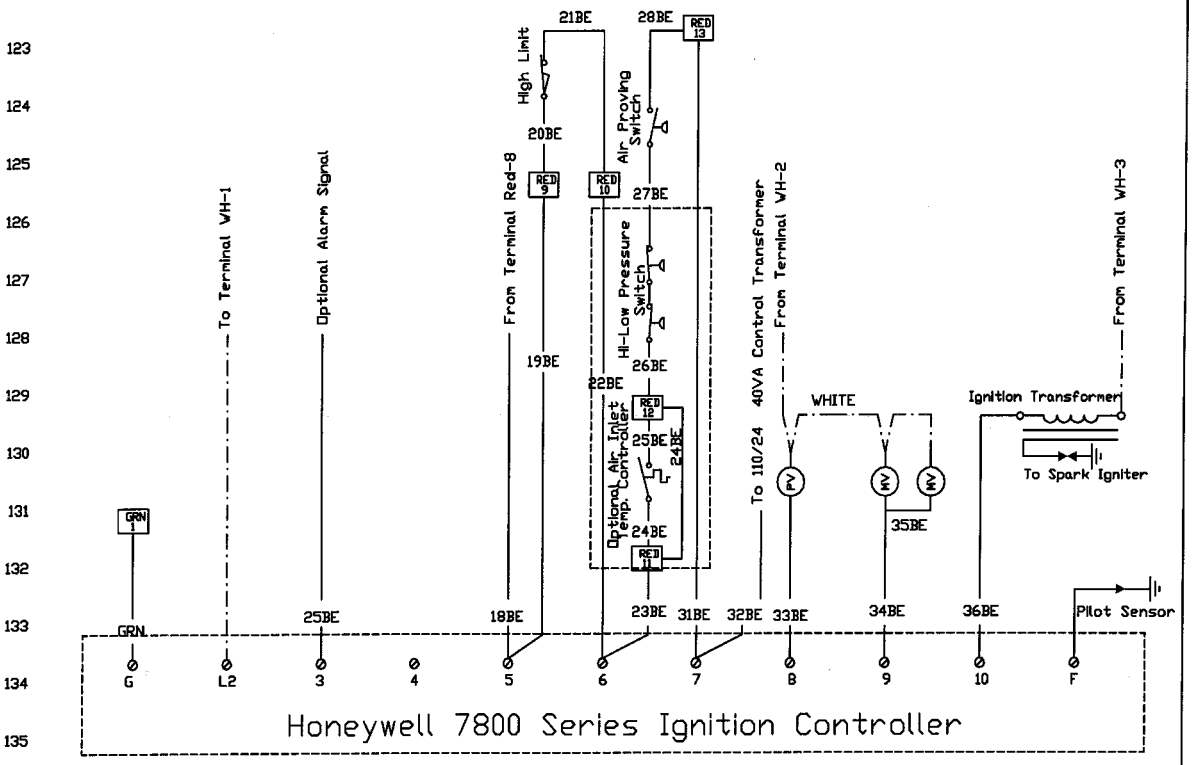
Factory Wiring ——————
Factory Wiring Neutral —·—·—·—
Field Wiring – – – – – –

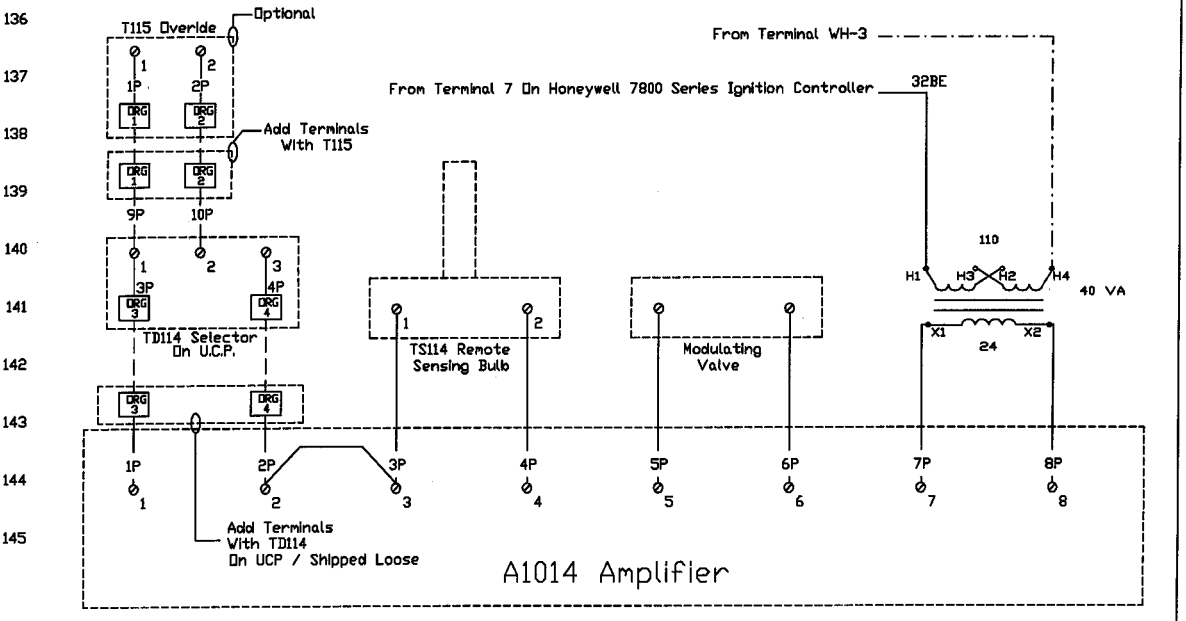
LCSYSTEMS

Date: 4/30/2001 | 1 of 2
Revision Date:
Sales Order Number: 64455

Drawing Number: WD2-TC2 IRI Standard

All Wires #14-AWG Accept Were Noted
Remove Jumpers When Adding Switches





OPTIONS LISTING
Service Filter
Alarm

TERMINAL	DESIGNATION
White	Neutral
Green	Ground
Black	AC Power Circuits
Yellow	Externally Fed Circuits
Red	AC Control Circuits
Blue	Low Voltage Circuits
Orange	Analog Inputs & Outputs

Factory Wiring
Factory Wiring Neutral
Field Wiring

LCSYSTEMS

Date: 4/301/2001 2 of 2
Revision Date:
Sales Order Number: 64455

Drawing Number: WD2-TC2 IRI Standard

Maintenance

LC Systems strongly recommends using these procedures to ensure trouble free operation of our replacement air units. It is very important to maintain the gas heater components of these units to assure the most clean and efficient performance. Most furnace failures occur due to unsatisfactory setup and maintenance.
On the back page of this manual is a table for recording maintenance performed on this unit.

WARNING:
More than one disconnect may be required to disconnect power to this unit. Disconnect all switches before servicing. All disconnects must be locked in the off position.

Yearly maintenance of Burner

1. Shut the system down totally, disconnecting or locking out power supply so there can be no accidental start-up during inspection.

2. Inspect the burners carefully, including upstream and downstream sides of mixing plates as well as burner body face. Any accumulation of scale or foreign material on either side of the mixing plates should be removed with a wire brush. Check visually that no holes in the mixing plates are blocked. If there are holes that are blocked (completely or partially) clear them with a piece of wire.

WARNING:
Do not enlarge burner ports or performance may be drastically affected.

If any mixing plates are loose or missing fasteners, tighten/replace as necessary. Always use zinc plated or stainless fasteners.

3. Put system back into operation and, if possible, view the downstream side while cycling burner through full firing range. This will give a visual check for blocked burner ports.

4. Observe flame pattern and, if necessary, take steps to correct velocity and/or air distribution problems.

Beginning of the Heating Season.

1. Check filters, make sure filters are free of debris.
   Filters should be cleaned when the filter service light is on
2. Check belt to be sure there was no uneven wear, and that the belt still conforms to belt tension standards. Typically when the belt is grasped, a total deflection of 1” should be attained easily.
3. Turn the main gas valve to the “on” position
4. Turn unit on and observe flame through the view port to determine if it is operating properly.

TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	REMEDY
(A) Power Failure	1. Disconnect not turned on	1. Turn disconnect on
	2. Blown fuses	2. Check and replace
	3. Main to unit disconnectnot on	3. Turn on power to main
(B) Dampers will not operate	1. Disconnect not turned on	1. Turn disconnect on
	2. Blown fuses	2. Check and replace
	3. Main to unit disconnectnot on	3. Turn on power to main
	4. Failed damper motor	4. Check and/or replace
	5. Loose wiring to motor	5. Check and tighten
	6. Damper linkage binding	6. Check and clear
(C) Motor Failure	1. Disconnect not turned on	1. Turn disconnect on
	2. Blown fuses	2. Check and replace
	3. Main to unit disconnectnot on	3. Turn on power to main
	4. Failed motor	4. Check and/or replace
	5. Loose wiring to motor	5. Check and tighten
	6. Starter fuses blown	6. Check and/or replace
	7. Motor Overloaded	7. Check for proper speed
	8. Improper supply voltage	8. Check and correct
	9. Motor Overheating	9. Check firing rate of unit
(D) Blower not turning	1. See problem "A" and "C"	1. See "A" and "C"
	2. Broked drive belts	2. Check and replace
	3. Bearings seized	3. Check and replace
	4. Improper supply voltage	4. Check and correct
(E) No Burner Operation	1. See problems "A" thru "D"	1. See problems "A" thru "D"
	2. Damper end switch not functioning	2. Check and/or replace
	3. Failed Air Flow Switch	3. Check and/or replace
	4. Loose wiring connection at air proving switch	4. Check and tighten
	5. No pilot	5. See problem "F"
	6. Pilot not proving	6. See problem "F"
	7. Flame safeguard in lockout	7. Check and reset
	8. High limit tripped	8. Check and/or replace
	9. Too high or low gas pressure	9. Check pressure switches and gas pressure
	10. Failed Control Transformer	10. Check and/or replace
	11. Blown control transformer	11. Check and/or replace
	12. Failed or malfunctioning main gas valves	12. Check and/or replace
	13. Faulty or failed freeze stat or inlet on/off stat	13. Check and/or replace
	14. Failed safeguard control	14. See vendors instructions shipped with unit
(F) No pilot	1. No gas to pilot	1. Check hand valve and pilot solenoid valve
	2. Dampers not functioning	2 See problem "B"
	3. Pilot tube plugged or damaged	3. Check, repair or replace
	4. Freeze stat failure	4. Check and/or replace
	5. Inlet on/off stat failure	5. Check and/or replace
	6. Flame safeguard in lockout	6. Check and reset
	7. Failed flame safeguard	7. See vendor instructions shipped with unit
	8. Failed air flow switch	8. Check and/or replace
	9. Too high or low gas pressure	9. Check pressure switches and gas pressure
	10. See problem "E" no burner operation	10. See problem "E"

TROUBLESHOOTING GUIDE CONTINUED

(G) Pilot will not prove	1. Inadequate signal to safeguard control	1. Check micro-amps. See vendor literature shipped with unit
	2. Insufficient gas pressure to pilot	2. Check and adjust
	3. Loose lead wires	3. Check and correct
	4. Soiled flame rod	4. Check and replace
	5. Moisture on flame rod lead	5. Check and dry leads
	6. UV scanner eye blocked or soiled	6. Check, clear or clean
	7. Defective flame rod or UV scanner	7. Check or replace. See vendor literature shipped with unit
	8. Defective flame safeguard	8. Check or replace. See vendor literature shipped with unit
	9. Short in sensing leads	9. Check and repair
(H) Erratic Temperature	1. Defective temperature selector or sensor air flow or located in drafty area motor	1. See vendor literature shipped with unit 2. Check sensor location and move if required 3. See vendor literature shipped with unit
(I) Unable to Achieve High Fire	1. Low gas supply pressure	1. Check and adjust
	2. Modulating controls improperly set	2. See vendor literature shipped with unit
	3. Faulty temperature sensor	3. Check and/or replace
	4. Faulty amplifier or proportioning motor	4. See vendor literature shipped with unit
(J) Unable to achieve low fire	1. Modulating controls improperly set	1. See vendor literature shipped with unit
	2. Faulty temperature sensor	2. Check and/or replace
	3. Faulty amplifier or proportioning motor	3. See vendor literature shipped with unit
(K) No gas flow	1. Manual gas valve closed	1. Open manual valve
	2. See problem "E", items 2 thru 14	2. See problem "E", items 2 thru 14
(L) Unable to Achieve desired Discharge Air or Space Temperature	1. Temperature sensors improperly or faulty	1. Adjust or replace
	2. Improper gas supply pressure	2. Check and correct
	3. Faulty amplifier or proportioning motor	3. See vendor literature shipped with unit
	4. Air flow too high	4. Check blower speed
	5. Burner capacity undersized	5. Check rating plate for conformance to design specifications

Start Up Data Sheet

Job Information

Job Name:_____
Address:_____
City:_____ State:_____ Zip:_____
Phone:_____ Fax:_____
Contact:_____
Sales Order #_____
Model # _____

Startup Organization:_____
Address:_____
City:_____ State:_____ Zip:_____
Phone:_____ Fax:_____
Service Technician:_____

Field Start-Up Data Documentation

Initial Electrical

Actual High Line Voltage:_____
Hertz: _____
Phase:_____
Actual Amperage:_____

Blower

Blower Rotation: ☐ Correct
Pulley:_____
Belt:_____
Air Volume:
Design _____ CFM
Actual _____ CFM

Mechanical

Burner Baffle Opening:
Length _____ in.
Width _____ in.
Burner Air Pressure:
Differential _____ in. wg
Flame Signal:
Pilot Only _____ Vdc
Low Fire _____ Vdc
High Fire _____ Vdc

** This information must be faxed back to LCSystems within 30 days of start-up or 90 days from delivery for warranty to be effective.

Blower Motor

Motor Voltage:_____
Motor Amperage:_____
Final Run Amps:_____
Pulley: _____
Design RPM:_____
Acual RPM: _____

Heater Options

Fuses:
Quantity:_____
Type: _____
_____
_____

Filters:
Quantity:_____
Type:_____
Size:_____