UNIT INFORMATION

LDT
6.5 to 12.5

100148
09/2026

Service Literature

LDT078H THROUGH 152H DUAL FUEL SERIES WITH R-454B

The LDT commercial combination heat pump and gas heat unit is available in 6.5 / 7.5 / 8.5 / 10 / 12.5 ton cooling capacities. The LDT078, 092, 102, 120 and 152 refrigerant systems utilize two compressors, two reversing valves, two accumulators (152 only), and other parts common to a heat pump. Units are available in 130,000, 180,000 or 240,000Btuh (38.1, 52.7 or 70.3 kW) heating inputs. Gas heat sections are designed with stainless steel tube heat exchangers.

LDT078-152 units are equipped with variable-volume, direct drive blowers. These units will provide supply air at lower speeds when cooling demand is low and increase to higher speeds when cooling demand is high. Refer to Supply Air Start-Up sections.

LDT units are designed to accept any of several different energy management thermostat control systems with minimum field wiring.

Units are also designed for R-454B refrigerant. Service equipment must be rated for R-454B.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes.

Units are available with an optional hot gas reheat coil which provides a dehumidifying mode of operation. Refer to Reheat Operation section.

If the unit must be lifted for service, rig unit by attaching four cables to the holes located in the unit base rail (two holes at each corner). Refer to the installation instructions for the proper rigging technique.

False ceilings or drop ceiling may be used as a return air plenum only if the unit being installed has a Refrigerant Detection System installed.

⚠ WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

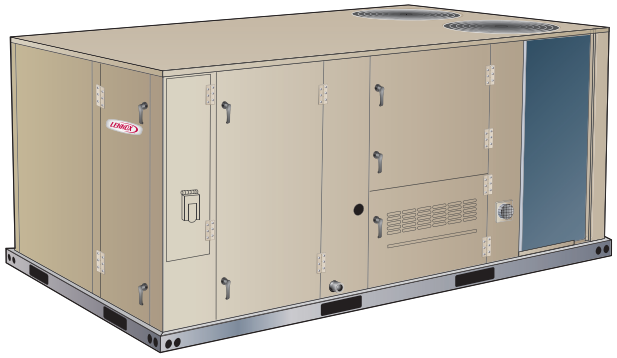
The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odor.

⚠ WARNING

If this appliance is conditioning a space with an area smaller than TA min or stored in a space with an area smaller than A min as defined by this instruction, then that space must be without continuously operating open flames (e.g. an operating gas appliance) or other potential ignition sources (e.g. an operating electric heater or similar hot surface). A flame-producing device may be installed in the same space if the device is provided with an effective flame arrest system.



⚠ WARNING

Auxiliary devices which may be potential ignition sources shall not be installed in the duct work. Examples of potential ignition sources are hot surfaces with a temperature exceeding 700°C and electric switching components.

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out with work in confined spaces being avoided.

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

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⚠ WARNING

To prevent serious injury or death:

1- Lock-out/tag-out before performing maintenance.

2- If system power is required (e.g., smoke detector maintenance), disable power to blower, remove fan belt where applicable, and ensure all controllers and thermostats are set to the "OFF" position before performing maintenance.

3- Always keep hands, hair, clothing, jewelry, tools, etc., away from moving parts.

⚠ CAUTION

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional HVAC installer or equivalent, service agency, or the gas supplier.

⚠ CAUTION

As with any mechanical equipment, contact with sharp sheet metal edges can result in personal injury. Take care while handling this equipment and wear gloves and protective clothing.

⚠ IMPORTANT

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC's and HCFC's) as of July 1, 1992. Approved methods of recovery, recycling or reclaiming must be followed. Fines and/or incarceration may be levied for non-compliance.

⚠ WARNING

Only manufacturer approved auxiliary devices are permitted to be installed in this unit.

⚠ CAUTION

Leak Detection System installed. Unit must be powered except for service.

⚠ CAUTION

Servicing shall be performed only as recommended by the manufacturer.

⚠ WARNING

•This appliance must be installed in accordance with local and national wiring regulations.

•If the appliance is not fitted with an option for full disconnection from power, a means of disconnection must be incorporated in the fixed wiring in accordance with national and local wiring regulations.

⚠ WARNING

Ducts connected to an appliance shall not contain a potential ignition source.

⚠ IMPORTANT

Pipe work, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

⚠ IMPORTANT

Refrigerant sensors for refrigerant detection systems shall only be replaced with sensors specified by the appliance manufacture.

⚠ CAUTION

This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

OPTIONS / ACCESSORIES

Item Description		Order Number	Unit Model No 078	092	102	120	152
COOLING SYSTEM							
Condensate Drain Trap	PVC	**22H54**	X	X	X	X	X
	Copper	**76W27**	X	X	X	X	X
Drain Pan Overflow Switch		**21Z07**	OX	OX	OX	OX	OX
GAS HEATING SYSTEM							
Bottom Gas Piping Kit		**54W95**	X	X	X	X	X
Combustion Air Intake Extensions		**19W51**	X	X	X	X	X
[1] Modulating Gas Heat		Factory	O	O	O	O	O
Gas Heat Input	Standard - 85,000-130,000 Btuh	Factory	O	O	O	O	O
	Medium - 117,000-180,000 Btuh	Factory	O	O	O	O	O
	High - 156,000-240,000 Btuh	Factory		O	O	O	O
LPG/Propane Conversion Kit	Two-Stage Standard Heat	**14N22**	X	X	X	X	X
	Two-Stage Medium Heat	**14N23**	X	X	X	X	X
	Two-Stage High Heat	**14N25**	X	X	X	X	X
NOTE - Combination Two-Stage and Modulating Kits will not be available until 11/16/2026	Two-Stage and Modulating All Heat Sizes	**39J46**	X	X	X	X	X
Low Temperature Vestibule Heater	208/230V-3ph	**22A51**	X	X	X	X	X
	460V	**22A55**	X	X	X	X	X
	575V	**13X65**	X	X	X	X	X
Vertical Vent Extension		**42W16**	X	X	X	X	X
BLOWER - SUPPLY AIR							
Blower Option	DirectPlus™ Blower System with MSAV®	Factory	O	O	O	O	O
CABINET							
Burglar Bars		**Y3355**	X	X	X	X	X
Combination Coil/Hail Guards		**24C86**	OX	OX	OX	OX	
		37A56					OX
Corrosion Protection		Factory	O	O	O	O	O
Horizontal Discharge Kit		**51W25**	X	X	X	X	X
Return Air Adaptor Plate (for same size LCA/LGA/LHA, LCC/LGC/LHC and TCA/TGA/THA unit replacement)		**54W96**	OX	OX	OX	OX	OX
CONTROLS							
Blower Proving Switch		**21Z10**	OX	OX	OX	OX	OX
Commercial Controls	CPC Einstein Integration	Factory	O	O	O	O	O
	LonTalk® Module	**54W27**	OX	OX	OX	OX	OX
	Novar® LSE	Factory	O	O	O	O	O
Dirty Filter Switch		**53W67**	OX	OX	OX	OX	OX
[1] Remote Discharge Air Temperature Sensor		**21Z08**	OX	OX	OX	OX	OX
Fresh Air Tempering		**21Z08**	OX	OX	OX	OX	OX
Smoke Detector - Supply or Return (Power board and one sensor)		**31A68**	OX	OX	OX	OX	OX
Smoke Detector - Supply and Return (Power board and two sensors)		**31A69**	OX	OX	OX	OX	OX

[1] Modulating Gas Heat for Horizontal Applications requires a Remote Discharge Air Temperature Sensor (21Z08). Sensor is shipped with the unit for field installation if unit is configured at the factory. Sensor must be ordered separately for field installation if unit is not factory configured.

NOTE - Order numbers shown are for ordering field installed accessories.
OX = Configure To Order (Factory Installed) or Field Installed.
O = Configure To Order (Factory Installed).
X = Field Installed.

OPTIONS / ACCESSORIES

Item Description		Order Number	Unit Model No 078	092	102	120	152
INDOOR AIR QUALITY							
Air Filters							
Healthy Climate® High Efficiency Air Filters 20 x 25 x 2 in. (Order 4 per unit)	MERV 8	**50W61**	OX	OX	OX	OX	OX
	MERV 13	**52W41**	OX	OX	OX	OX	OX
	MERV 16	**21U41**	X	X	X	X	X
Replacement Media Filter With Metal Mesh Frame (includes non-pleated filter media)		**Y3063**	X	X	X	X	X
Indoor Air Quality (CO_2) Sensors							
Sensor - Wall-mount, off-white plastic cover with LCD display		**77N39**	X	X	X	X	X
Sensor - Wall-mount, off-white plastic cover, no display		**87N53**	X	X	X	X	X
Sensor - Black plastic case, LCD display, rated for plenum mounting		**87N52**	X	X	X	X	X
Sensor - Black plastic case, no display, rated for plenum mounting		**87N54**	X	X	X	X	X
CO_2 Sensor Duct Mounting Kit - for downflow applications		**23Y47**	X	X	X	X	X
Aspiration Box - for duct mounting non-plenum rated CO_2 sensors (**77N39**)		**90N43**	X	X	X	X	X
Needlepoint Bipolar Ionization (NPBI)							
Needlepoint Bipolar Ionization (NPBI) Kit		**21U36**	X	X	X	X	X
UVC Germicidal Lamps							
[2] Healthy Climate® UVC Light Kit (110/230v-1ph)		**21A93**	X	X	X	X	X
Step-Down Transformers	460V primary, 230V secondary	**10H20**	X	X	X	X	X
	575V primary, 230V secondary	**10H21**	X	X	X	X	X
ELECTRICAL							
Voltage 60 Hz	208/230V - 3 phase	Factory	O	O	O	O	O
	460V - 3 phase	Factory	O	O	O	O	O
	575V - 3 phase	Factory	O	O	O	O	O
HACR Circuit Breakers		Factory	O	O	O	O	O
Disconnect Switch	80 amp	**54W56**	OX	OX	OX	OX	OX
[3] Short-Circuit Current Rating (SCCR) of 100kA (includes Phase/Voltage Detection)		Factory	O	O	O	O	O
GFI Service Outlets	15 amp non-powered, field-wired (208/230V, 460V only)	**74M70**	OX	OX	OX	OX	OX
	15 amp factory-wired and powered (208/230V, 460V)	Factory	O	O	O	O	O
	[4] 20 amp non-powered, field-wired (208/230V, 460V, 575V)	**67E01**	X	X	X	X	X
	[4] 20 amp non-powered, field-wired (575V only)	Factory	O	O	O	O	O
Weatherproof Cover for GFI		**10C89**	X	X	X	X	X

[2] Lamps operate on 110-230V single-phase power supply. Step-down transformer may be ordered separately for 460V and 575V units. Alternately, 110V power supply may be used to directly power the UVC ballast(s).

[3] Disconnect Switch not available with higher SCCR option. Short-Circuit Current Rating option not available on field installed electric heat.

[4] Canada requires a minimum 20 amp circuit. Select 20 amp, non-powered, field wired GFI.

NOTE - Order numbers shown are for ordering field installed accessories.
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OPTIONS / ACCESSORIES

Item Description		Order Number	Unit Model No 078	092	102	120	152
ECONOMIZER							
High Performance Economizer (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)							
High Performance Economizer (Downflow or Horizontal)		**20U80**	OX	OX	OX	OX	OX
Includes Economizer Dampers with Outdoor Air Hood and Barometric Relief Dampers with Exhaust Hood							
Downflow Applications - Use furnished Outdoor Air Hood and Barometric Relief Dampers with Exhaust Hood							
Horizontal Applications - Use furnished Outdoor Air Hood and Barometric Relief Dampers with Exhaust Hood - Order Horizontal Discharge Kit separately							
Horizontal Applications (reduced height) - Order Horizontal Low Profile Barometric Relief Dampers with Exhaust Hood and Horizontal Discharge Kit (**51W25**) separately							
Horizontal Low Profile Barometric Relief Dampers							
Horizontal Low Profile Barometric Relief Dampers (Exhaust hood furnished)		**53K04**	X	X	X	X	X
CANFAB ECONOMIZER							
Horizontal Economizer With Outdoor Air Hood (Approved for California Title 24 Building Standards / AMCA Class 1A Certified)							
Includes Outdoor Air Hood		**39Q16**	X	X	X	X	X
Economizer Controls							
Differential Enthalpy (Not for Title 24)	Order 2	**21Z09**	OX	OX	OX	OX	OX
Sensible Control	Sensor is Furnished	Factory	O	O	O	O	O
Single Enthalpy (Not for Title 24)		**21Z09**	OX	OX	OX	OX	OX
Building Pressure Control		**13J77**	X	X	X	X	X
Outdoor Air CFM Control		**13J76**	X	X	X	X	X
Global Control	Sensor Field Provided	Factory	O	O	O	O	O
OUTDOOR AIR							
Outdoor Air Dampers With Outdoor Air Hood							
Motorized		**14G28**	OX	OX	OX	OX	OX
Manual		**14G29**	X	X	X	X	X
POWER EXHAUST							
Standard Static	208/230V-3ph	**53W44**	OX	OX	OX	OX	OX
	460V-3ph	**53W45**	OX	OX	OX	OX	OX
	575V-3ph	**53W46**	OX	OX	OX	OX	OX
HUMIDITROL® CONDENSER REHEAT OPTION							
Humiditrol Dehumidification Option		Factory	O	O	O	O	O
Humidity Sensor Kit, Remote mounted (required)		**17M50**	X	X	X	X	X
ROOF CURBS							
Hybrid Roof Curbs, Downflow							
8 in. height		**11F54**	X	X	X	X	X
14 in. height		**11F55**	X	X	X	X	X
18 in. height		**11F56**	X	X	X	X	X
24 in. height		**11F57**	X	X	X	X	X
Adjustable Pitch Curb							
14 in. height		**54W50**	X	X	X	X	X
CEILING DIFFUSERS							
Step-Down - Order one	RTD11-95S	**13K61**	X	X			
	RTD11-135S	**13K62**			X	X	X
Flush - Order one	FD11-95S	**13K56**	X	X			
	FD11-135S	**13K57**			X	X	X
Transitions (Supply and Return) - Order one	C1DIFF30B-1	**12X65**	X	X			
	C1DIFF31B-1	**12X66**			X	X	X

NOTE - Order numbers shown are for ordering field installed accessories.
OX = Configure To Order (Factory Installed) or Field Installed.
O = Configure To Order (Factory Installed).
X = Field Installed.

SPECIFICATIONS — 6.5 TON | 7.5 TON | 8.5 TON

Model			LDT078H5E	LDT092H5E	LDT102H5E
Nominal Tonnage			6.5 Ton	7.5 Ton	8.5 Ton
Efficiency Type			High	High	High
Blower Type			DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®
Cooling Performance	Gross Cooling Capacity (Btuh)		79,000	92,000	101,000
	[1] Net Cooling Capacity (Btuh)		78,000	90,000	98,000
	[1] AHRI Rated Air Flow (cfm)		2400	2600	2800
	[1] IEER (Btuh/Watt)		17.0	16.8	16.8
	[1] EER (Btuh/Watt)		12.5	12.1	11.9
	Total Unit Power (kW)		6.5	7.4	8.4
Heating Performance	[1] Total High Heat Capacity (Btuh)		73,000	86,000	96,000
	[1] AHRI Rated Air Flow (cfm)		2600	3200	3400
	[1] COP		3.5	3.5	3.5
	Total Unit Power (kW)		6.1	7.3	8.0
	[1] Total Low Heat Capacity (Btuh)		40,000	46,000	53,000
	[1] COP		2.25	2.25	2.25
	Total Unit Power (kW)		5.2	6.7	7.3
Sound Rating Number		dBA	88	88	88
Refrigerant Charge		Refrigerant Type	R-454B	R-454B	R-454B
	Without Reheat Option	Circuit 1	11 lbs. 8 oz.	11 lbs. 0 oz.	10 lbs. 12 oz.
		Circuit 2	11 lbs. 0 oz.	11 lbs. 4 oz.	11 lbs. 4 oz.
	With Reheat Option	Circuit 1	13 lbs. 0 oz.	13 lbs. 12 oz.	15 lbs. 8 oz.
		Circuit 2	11 lbs. 0 oz.	11 lbs. 4 oz.	11 lbs. 4 oz.
Gas Heat Available			See page 8		
Compressor Type (number)			Two-Stage Scroll (1) Single-Stage Scroll (1)		
Outdoor Coil	Net face area - ft.² (total)		25.9	25.9	25.9
	Tube diameter - in.		3/8	3/8	3/8
	Rows		3	3	3
	Fins - in.		20	20	20
Outdoor Coil Fans	Motor HP (number and type)		1/3 (2 ECM)	1/3 (2 ECM)	1/3 (2 ECM)
	Rpm		300-1100	300-1100	300-1100
	Watts (total)		100-820	100-820	100-820
	Diameter (Number) - in.		(2) 24	(2) 24	(2) 24
	Blades		3	3	3
	Total Air volume - cfm		2000-7500	2000-7500	2000-7500
Indoor Coil	Net face area - ft.² (total)		13.5	13.5	13.5
	Tube diameter - in.		3/8	3/8	3/8
	Rows		4	4	4
	Fins - in.		14	14	14
	Condensate drain size (NPT) - in.		(1) 1		
	Expansion device type		Balanced Port Thermostatic Expansion Valve		
Indoor Blower	Nominal motor HP		3.75 HP (ECM)	3.75 HP (ECM)	3.75 HP (ECM)
	Wheel (Number) diameter x width - in.		(1) 22 x 19	(1) 22 x 19	(1) 22 x 19
Filters	Type of filter		MERV 4, Disposable		
	Number and size - in.		(4) 20 x 25 x 2		
Line voltage data (Volts-Phase-Hz)			208/230-3-60, 460-3-60, 575-3-60		

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] AHRI Certified to AHRI Standard 340/360:
Cooling Ratings - 95°F outdoor air temperature and 80°F db/67°F wb entering indoor coil air.
High Temperature Heating Ratings - 47°F db/43°F wb outdoor air temperature and 70°F entering indoor coil air.
Low Temperature Heating Ratings - 17°F db/15°F wb outdoor air temperature and 70°F entering indoor coil air.

SPECIFICATIONS — 10 TON | 12.5 TON

Model			LDT120H5E	LDT152H5E
Nominal Tonnage			10 Ton	12.5 Ton
Efficiency Type			High	High
Blower Type			DirectPlus™ ECM Direct Drive with MSAV®	DirectPlus™ ECM Direct Drive with MSAV®
Cooling Performance		Gross Cooling Capacity (Btuh)	119,000	140,000
		[1] Net Cooling Capacity (Btuh)	116,000	136,000
		[1] AHRI Rated Air Flow (cfm)	3500	4200
		[1] IEER (Btuh/Watt)	16.6	15.0
		[1] EER (Btuh/Watt)	11.8	10.9
		Total Unit Power (kW)	10.1	12.7
		[1] Total High Heat Capacity (Btuh)	112,000	128,000
		[1] AHRI Rated Air Flow (cfm)	3600	4200
		[1] COP	3.5	3.4
		Total Unit Power (kW)	9.3	11.4
		[1] Total Low Heat Capacity (Btuh)	63,000	70,000
		[1] COP	2.25	2.1
		Total Unit Power (kW)	8.3	10.4
Sound Rating Number		dBA	88	87
Refrigerant Charge		Refrigerant Type	R-454B	R-454B
	Without Reheat Option	Circuit 1	10 lbs. 11 oz.	15 lbs. 0 oz.
		Circuit 2	10 lbs. 10 oz.	12 lbs. 12 oz.
	With Reheat Option	Circuit 1	13 lbs. 8 oz.	16 lbs. 0 oz.
		Circuit 2	10 lbs. 10 oz.	12 lbs. 12 oz.
Gas Heat Available			See page 8	
Compressor Type (number)			Two-Stage Scroll (1) Single-Stage Scroll (1)	
Outdoor Coil		Net face area - ft.² (total)	25.9	29.4
			3/8	3/8
		Number of rows	3	3
		Fins - in.	20	20
Outdoor Coil Fans		Motor HP (number and type)	1/3 (2 ECM)	1/3 (4 ECM)
		Rpm	300-1100	300-1100
		Watts (total)	100-820	200-1400
		Diameter (Number) - in.	(2) 24	(4) 24
		Blades	3	3
		Total Air volume - cfm	2000-7500	3000-9000
Indoor Coil		Net face area - ft.² (total)	13.54	13.54
		Tube diameter - in.	3/8	3/8
		Rows	4	4
		Fins - in.	14	14
		Condensate drain size (NPT) - in.	(1) 1	
		Expansion device type	Balanced Port Thermostatic Expansion Valve	
Indoor Blower		Nominal motor output	3.75 HP (ECM)	3.75 HP (ECM)
		Wheel (Number) diameter x width - in.	(1) 22 x 9	(1) 22 x 9
Filters		Type of filter	MERV 4, Disposable	
		Number and size - in.	(4) 20 x 25 x 2	
Line voltage data (Volts-Phase-Hz)			208/230-3-60, 460-3-60, 575-3-60	

NOTE - Net capacity includes evaporator blower motor heat deduction. Gross capacity does not include evaporator blower motor heat deduction.

[1] AHRI Certified to AHRI Standard 340/360:
Cooling Ratings - 95°F outdoor air temperature and 80°F db/67°F wb entering indoor coil air.
High Temperature Heating Ratings - 47°F db/43°F wb outdoor air temperature and 70°F entering indoor coil air.
Low Temperature Heating Ratings - 17°F db/15°F wb outdoor air temperature and 70°F entering indoor coil air.

SPECIFICATIONS — GAS HEAT

Model			LDT078 LDT092 LDT102 LDT120 LDT152	LDT078 LDT092 LDT102 LDT120 LDT152	LDT092 LDT102 LDT120 LDT152
Heat Input Type			**Standard**	**Medium**	**High**
Gas Heat Type			Two-Stage or Modulating		
Gas Heating Performance	Input - Btuh	Minimum	85,000	117,000	156,000
		Maximum	130,000	180,000	240,000
	Output - Btuh	Maximum	105,000	146,000	194,000
Temperature Rise Range - °F			15 - 45	30 - 60	40 - 70
Minimum Air Volume - cfm			2150	2250	2600
Thermal Efficiency			81%	81%	81%
Gas Supply Connections			3/4 in. NPT		
Recommended Gas Supply Pressure - Nat. / LPG			7 in. w.g. / 11 in. w.g.		
Gas Supply Pressure Range		Min./Max. (Natural)	4.7 - 10.5 in. w.g.		
		Min./Max. (LPG)	10.8 - 13.5 in. w.g.		

NOTE - Modulating Gas Heat operates between the minimum and maximum gas heat inputs shown.
NOTE - Air volume may modulate below minimum volume if heat input is below maximum.

HIGH ALTITUDE DERATE

NOTE - Units may be installed at altitudes up to 2000 feet above sea level without any modifications.
At altitudes above 2000 feet units must be derated to match gas manifold pressures shown in table below.
At altitudes above 4500 feet unit must be derated 4% for each 1000 feet above sea level.

NOTE - This is the only permissible derate for these units.

Refer to the Installation Instructions for more detailed information.

Heat Input Type	Altitude Feet	Gas Manifold Pressure in. w.g.		Input Rate (Btuh)
		Natural Gas	LPG/ Propane	
Standard	2001 - 4500	1.6 / 3.1	4.4 / 8.9	85,000 - 120,000
Medium	2001 - 4500	1.6 / 3.1	4.4 / 8.9	117,000 - 166,000
High	2001 - 4500	1.6 / 3.1	4.4 / 8.9	156,000 - 221,000

BLOWER DATA

BLOWER TABLE INCLUDES RESISTANCE FOR BASE UNIT ONLY (NO HEAT SECTION) WITH DRY INDOOR COIL AND AIR FILTERS IN PLACE.

FOR ALL UNITS ADD:

1 − Wet indoor coil air resistance of selected unit.
2 − Any factory installed options air resistance (heat section, Economizer, etc.)
3 − Any field installed accessories air resistance (duct resistance, diffuser, etc.)
See page 10 for wet coil and option/accessory air resistance data.

Maximum Static Pressure With Gas Heat - 2.0 in. w.g.
Minimum Air Volume Required For Different Gas Heat Sizes:
Standard - 2150 cfm; Medium - 2250 cfm; High - 2600 cfm

Total Air Volume cfm	Total Static Pressure - in. w.g.													
	0.2		0.4		0.6		0.8		1.0		1.2		1.4	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	644	137	740	235	796	302	833	343	873	373	996	558	1065	664
2000	675	165	768	260	821	330	861	386	960	507	1026	629	1094	753
2250	711	195	803	290	856	375	901	497	991	564	1058	703	1128	840
2500	764	241	852	335	904	439	951	568	1025	641	1097	789	1170	934
2750	847	316	901	399	946	543	1004	674	1074	746	1146	895	1220	1041
3000	944	426	980	511	1021	671	1074	803	1136	874	1205	1021	1276	1167
3250	1022	544	1057	640	1099	810	1149	942	1207	1012	1272	1156	1338	1304
3500	1092	666	1131	770	1174	948	1225	1081	1281	1151	1342	1297	1402	1451
3750	1161	780	1202	892	1248	1079	1298	1217	1353	1291	1409	1445	1463	1609
4000	1230	888	1273	1010	1319	1212	1369	1362	1421	1441	1471	1608	1518	1784
4250	1299	1006	1342	1140	1388	1362	1436	1526	1483	1612	1528	1790	1571	1975
4500	1366	1142	1409	1289	1454	1532	1498	1708	1542	1798	1583	1984	1623	2172
4750	1432	1295	1474	1457	1516	1719	1558	1903	1598	1997	1637	2187	1674	2377
5000	1496	1471	1537	1645	1577	1921	1616	2110	1654	2205	1690	2396	1726	2586
5250	1560	1667	1598	1849	1636	2132	1673	2324	1709	2419	1744	2609	1779	2796
5500	1623	1878	1659	2064	1695	2349	1731	2539	1765	2634	- - -	- - -	- - -	- - -
5750	1686	2097	1720	2284	1755	2567	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
6000	1748	2316	1781	2502	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

Total Air Volume cfm	Total Static Pressure - in. w.g.											
	1.6		1.8		2.0		2.2		2.4		2.6	
	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts	RPM	Watts
1750	1134	775	1203	896	1275	1025	1356	1149	1422	1287	1470	1439
2000	1162	878	1231	1007	1302	1139	1379	1268	1440	1411	1486	1570
2250	1198	975	1268	1111	1338	1250	1409	1388	1464	1542	1507	1711
2500	1243	1075	1313	1217	1380	1365	1442	1517	1491	1685	1533	1860
2750	1293	1186	1361	1336	1423	1494	1477	1661	1520	1839	1561	2016
3000	1346	1317	1410	1474	1466	1642	1514	1818	1554	2000	1594	2180
3250	1402	1460	1460	1627	1511	1803	1553	1986	1591	2172	1631	2352
3500	1459	1616	1509	1793	1555	1976	1594	2165	1631	2352	1671	2531
3750	1512	1785	1557	1970	1599	2159	1636	2350	1673	2536	1713	2714
4000	1562	1969	1604	2157	1643	2347	1680	2538	1717	2722	1756	2896
4250	1611	2163	1650	2352	1688	2541	1724	2729	1762	2908	- - -	- - -
4500	1661	2362	1698	2552	1734	2739	1770	2922	- - -	- - -	- - -	- - -
4750	1710	2567	1746	2754	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
5000	1761	2774	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -

BLOWER DATA

FACTORY INSTALLED OPTIONS/FIELD INSTALLED ACCESSORY AIR RESISTANCE - in. w.g.

Air Volume cfm	Wet Indoor Coil		Reheat Coil	Gas Heat Exchanger			Economizer	CanFab Horizontal Economizer	Filters			Return Air Adaptor Plate
	078, 092	102, 120, 152		Standard Heat	Medium Heat	High Heat			MERV 8	MERV 13	MERV 16	
1750	0.04	0.04	0.02	0.06	0.02	0.02	0.05	0.04	0.01	0.03	0.06	0.00
2000	0.05	0.05	0.02	0.07	0.05	0.06	0.06	0.05	0.01	0.03	0.08	0.00
2250	0.06	0.06	0.02	0.07	0.07	0.08	0.08	0.07	0.01	0.04	0.09	0.00
2500	0.07	0.07	0.03	0.09	0.10	0.11	0.11	0.08	0.01	0.05	0.10	0.00
2750	0.08	0.08	0.03	0.09	0.11	0.12	0.12	0.10	0.02	0.05	0.11	0.00
3000	0.10	0.09	0.03	0.11	0.12	0.13	0.13	0.12	0.02	0.06	0.12	0.02
3250	0.11	0.10	0.04	0.12	0.15	0.16	0.15	0.14	0.02	0.06	0.13	0.02
3500	0.12	0.11	0.04	0.12	0.16	0.17	0.15	0.16	0.03	0.07	0.15	0.04
3750	0.14	0.13	0.05	0.14	0.19	0.20	0.15	0.18	0.03	0.08	0.16	0.07
4000	0.15	0.14	0.05	0.14	0.21	0.22	0.19	0.20	0.04	0.08	0.17	0.09
4250	0.17	0.15	0.06	0.14	0.24	0.28	0.19	0.23	0.04	0.09	0.19	0.11
4500	0.19	0.17	0.07	0.15	0.26	0.32	0.22	0.26	0.04	0.09	0.20	0.12
4750	0.20	0.18	0.07	0.16	0.29	0.37	0.25	0.29	0.05	0.10	0.21	0.16
5000	0.22	0.20	0.08	0.16	0.34	0.43	0.29	0.32	0.06	0.10	0.23	0.18
5250	0.24	0.22	0.08	0.16	0.37	0.47	0.32	0.35	0.06	0.11	0.24	0.19
5500	0.25	0.23	0.09	0.18	0.44	0.54	0.34	0.38	0.07	0.12	0.25	0.22
5750	0.27	0.25	0.10	0.19	0.49	0.59	0.45	0.42	0.07	0.12	0.27	0.25
6000	0.29	0.27	0.10	0.20	0.54	0.64	0.52	0.45	0.08	0.13	0.28	0.27

POWER EXHAUST FAN PERFORMANCE

Return Air System Static Pressure	Air Volume Exhausted
in. w.g.	cfm
0	3175
0.05	2955
0.10	2685
0.15	2410
0.20	2165
0.25	1920
0.30	1420
0.35	1200

BLOWER DATA

CEILING DIFFUSERS AIR RESISTANCE - in. w.g.

Unit	RTD11 Step-Down Diffuser				FD11 Flush Diffuser
	Air Volume cfm	2 Ends Open	1 Side, 2 Ends Open	All Ends & Sides Open	
078 & 092	2400	0.21	0.18	0.15	0.14
	2600	0.24	0.21	0.18	0.17
	2800	0.27	0.24	0.21	0.20
	3000	0.32	0.29	0.25	0.25
	3200	0.41	0.37	0.32	0.31
	3400	0.50	0.45	0.39	0.37
	3600	0.61	0.54	0.48	0.44
	3800	0.73	0.63	0.57	0.51
102 & 120	3600	0.36	0.28	0.23	0.15
	3800	0.40	0.32	0.26	0.18
	4000	0.44	0.36	0.29	0.21
	4200	0.49	0.40	0.33	0.24
	4400	0.54	0.44	0.37	0.27
	4600	0.60	0.49	0.42	0.31
	4800	0.65	0.53	0.46	0.35
	5000	0.69	0.58	0.50	0.39
	5200	0.75	0.62	0.54	0.43
152	4200	0.22	0.19	0.16	0.10
	4400	0.28	0.24	0.20	0.12
	4600	0.34	0.29	0.24	0.15
	4800	0.40	0.34	0.29	0.19
	5000	0.46	0.39	0.34	0.23
	5200	0.52	0.44	0.39	0.27
	5400	0.58	0.49	0.43	0.31
	5600	0.64	0.54	0.47	0.35
	5800	0.70	0.59	0.51	0.39

CEILING DIFFUSER AIR THROW DATA

Size	Air Volume	[1] Effective Throw Range	
		RTD11 Step-Down	FD11 Flush
	cfm	ft.	ft.
078, 092	2600	24 - 29	19 - 24
	2800	25 - 30	20 - 28
	3000	27 - 33	21 - 29
	3200	28 - 35	22 - 29
	3400	30 - 37	22 - 30
102, 120	3600	25 - 33	22 - 29
	3800	27 - 35	22 - 30
	4000	29- 37	24 - 33
	4200	32 - 40	26 - 35
	4400	34 - 42	28 - 37
152	5600	39 - 49	28 - 37
	5800	42 - 51	29 - 38
	6000	44 - 54	40 - 50
	6200	45 - 55	42 - 51
	6400	46 - 55	43 - 52
	6600	47 - 56	45 - 56

[1] Throw is the horizontal or vertical distance an air stream travels on leaving the outlet or diffuser before the maximum velocity is reduced to 50 ft. per minute. Four sides open.

ELECTRICAL DATA — 6.5 TON

Model		LDT078H5E		
[1] Voltage - 60Hz		208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)	Rated Load Amps	11.9	6.8	4.8
	Locked Rotor Amps	112	61.8	39
Compressor 2 (Non-Inverter)	Rated Load Amps	9	4.1	3.3
	Locked Rotor Amps	70	39	29
Outdoor Fan Motors (2)	Full Load Amps (2 ECM)	2.8	1.4	1.1
	Total	5.6	2.8	2.2
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	20
Indoor Blower Motor	HP	3.75	3.75	3.75
	Full Load Amps	8	4.2	3.6
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	45	25	20
	With (1) 0.33 HP Power Exhaust	50	25	20
[3] Minimum Circuit Ampacity (MCA)	Unit Only	38	20	16
	With (1) 0.33 HP Power Exhaust	40	21	17

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] 1 Extremes of operating range are plus and minus 10% of line voltage.

[2] 2 HACR type breaker or fuse.

[3] 3 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — 7.5 TON

Model		LDT092H5E		
[1] Voltage - 60Hz		208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)	Rated Load Amps	11.9	6.8	4.8
	Locked Rotor Amps	112	61.8	39
Compressor 2 (Non-Inverter)	Rated Load Amps	12.8	6	5.8
	Locked Rotor Amps	120.4	49.4	41
Outdoor Fan Motors (2)	Full Load Amps (2 ECM)	2.8	1.4	1.1
	Total	5.6	2.8	2.2
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	20
Indoor Blower Motor	HP	3.75	3.75	3.75
	Full Load Amps	8	4.2	3.6
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	50	25	20
	With (1) 0.33 HP Power Exhaust	50	25	20
[3] Minimum Circuit Ampacity (MCA)	Unit Only	42	22	18
	With (1) 0.33 HP Power Exhaust	44	23	19

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] 1 Extremes of operating range are plus and minus 10% of line voltage.

[2] 2 HACR type breaker or fuse.

[3] 3 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — 8.5 TON

Model		LDT102H5E		
[1] Voltage - 60Hz		208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)	Rated Load Amps	11.9	6.8	4.8
	Locked Rotor Amps	112	61.8	39
Compressor 2 (Non-Inverter)	Rated Load Amps	16	7.1	6.4
	Locked Rotor Amps	156.4	69	47.8
Outdoor Fan Motors (2)	Full Load Amps (2 ECM)	2.8	1.4	1.1
	Total	5.6	2.8	2.2
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	20
Indoor Blower Motor	HP	3.75	3.75	3.75
	Full Load Amps	8	4.2	3.6
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	60	25	25
	With (1) 0.33 HP Power Exhaust	60	30	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only	46	23	19
	With (1) 0.33 HP Power Exhaust	48	24	20

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] 1 Extremes of operating range are plus and minus 10% of line voltage.

[2] 2 HACR type breaker or fuse.

[3] 3 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — 10 TON

Model		LDT120H5E		
[1] Voltage - 60Hz		208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)	Rated Load Amps	13.8	6.9	5.8
	Locked Rotor Amps	150	58	47.8
Compressor 2 (Non-Inverter)	Rated Load Amps	18.6	8.3	7.7
	Locked Rotor Amps	155	58.1	47.8
Outdoor Fan Motors (2)	Full Load Amps (2 ECM)	2.8	1.4	1.1
	Total	5.6	2.8	2.2
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	20
Indoor Blower Motor	HP	3.75	3.75	3.75
	Full Load Amps	8	4.2	3.6
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	60	30	25
	With (1) 0.33 HP Power Exhaust	70	30	25
[3] Minimum Circuit Ampacity (MCA)	Unit Only	51	25	22
	With (1) 0.33 HP Power Exhaust	54	26	23

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] 1 Extremes of operating range are plus and minus 10% of line voltage.

[2] 2 HACR type breaker or fuse.

[3] 3 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

ELECTRICAL DATA — 12.5 TON

Model		LDT152H5E		
[1] Voltage - 60Hz		208/230V-3ph	460V-3ph	575V-3ph
Compressor 1 (Non-Inverter)	Rated Load Amps	19.2	9.1	6.2
	Locked Rotor Amps	162.3	70.8	58.2
Compressor 2 (Non-Inverter)	Rated Load Amps	22.4	9.1	7.2
	Locked Rotor Amps	166.2	74.6	54
Outdoor Fan Motors (4)	Full Load Amps (4 ECM)	2.8	1.4	1.1
	Total	11.2	5.6	4.4
Power Exhaust (1) 0.33 HP	Full Load Amps	2.4	1.3	1
Service Outlet 115V GFI (amps)		15	15	20
Indoor Blower Motor	HP	3.75	3.75	3.75
	Full Load Amps	8	4.2	3.6
[2] Maximum Overcurrent Protection (MOCP)	Unit Only	80	35	30
	With (1) 0.33 HP Power Exhaust	90	40	30
[3] Minimum Circuit Ampacity (MCA)	Unit Only	67	31	24
	With (1) 0.33 HP Power Exhaust	69	32	25

NOTE - All units have a minimum Short Circuit Current Rating (SCCR) of 5000 amps.

[1] 1 Extremes of operating range are plus and minus 10% of line voltage.

[2] 2 HACR type breaker or fuse.

[3] 3 Refer to National or Canadian Electrical Code manual to determine wire, fuse and disconnect size requirements.

FIELD WIRING NOTES

- For use with copper wiring only
- Field wiring not furnished
- All wiring must conform to NEC or CEC and local electrical codes
- For specific wiring information, please refer to the installation instructions

Minimum R454B Space and CFM Requirements

Minimum Airflow[1]		
Unit	**Q_{min}(CFM)**	**Q_{min}(m^3h)**
LDT078	304	516
LDT092	297	505
LDT102	297	505
LDT120	283	480
LDT152	396	674
LDT078 w/ Humiditrol	344	584
LDT092 w/ Humiditrol	363	618
LDT102 w/ Humiditrol	410	696
LDT120 w/ Humiditrol	357	606
LDT152 w/ Humiditrol	423	719

Minimum Room Area of Conditioned Space[2]		
Unit	**TA_{min}(ft^2)**	**TA_{min}(m^2)**
LDT078	169	15.7
LDT092	165	15.3
LDT102	165	15.3
LDT120	157	14.5
LDT152	220	20.4
LDT078 w/ Humiditrol	191	17.7
LDT092 w/ Humiditrol	202	18.7
LDT102 w/ Humiditrol	228	21.1
LDT120 w/ Humiditrol	198	18.4
LDT152 w/ Humiditrol	235	21.8

Refrigerant Charge R-454B			
Unit	Stage	M_c(lbs)	M_c(kg)
LDT 078	Stage 1	11.50	5.22
	Stage 2	11.00	4.99
LDT 092	Stage 1	11.00	4.99
	Stage 2	11.25	5.10
LDT 102	Stage 1	10.85	4.92
	Stage 2	11.25	5.10
LDT 120	Stage 1	10.69	4.85
	Stage 2	10.63	4.82
LDT 152	Stage 1	15.00	6.80
	Stage 2	12.75	5.78
LDT078 w/ Humiditrol	Stage 1	13.00	5.90
	Stage 2	11.00	4.99
LDT092 w/ Humiditrol	Stage 1	13.75	6.24
	Stage 2	11.25	5.10
LDT102 w/ Humiditrol	Stage 1	15.50	7.03
	Stage 2	11.25	5.10
LDT120 w/ Humiditrol	Stage 1	13.50	6.12
	Stage 2	10.63	4.82
LDT152 w/ Humiditrol	Stage 1	16.00	7.26
	Stage 2	12.75	5.78

Altitude Adjustment Factor[3]									
Halt	0	200	400	600	800	1000	1200	1400	1600
AF	1	1	1	1	1.02	1.05	1.04	1.1	1.12
Halt	1600	1800	2000	2200	2400	2600	2800	3000	3200
AF	1.12	1.15	1.18	1.21	1.25	1.28	1.32	1.36	1.4

[1] ***NOTE -*** *The minimum airflow is the lowest CFM allowed during venting operation (leak mitigation).*

[2] ***NOTE -*** *The minimum room area of conditioned space is the smallest area the unit can service.*

[3] ***NOTE -*** *Use the Altitude Adjustment Factor to adjust the values in the tables above to different altitudes. Find the relevant altitude above sea level in the two "Halt" rows and then multiply the value needed from the tables above by the altitude factor number. Example: For the minimum airflow in CFM for an LDT078 at 1000 ft. above see level, multiply 304 by 1.05 to get 319.2 CFM as the new Q_{min}.*

PARTS ARRANGEMENT

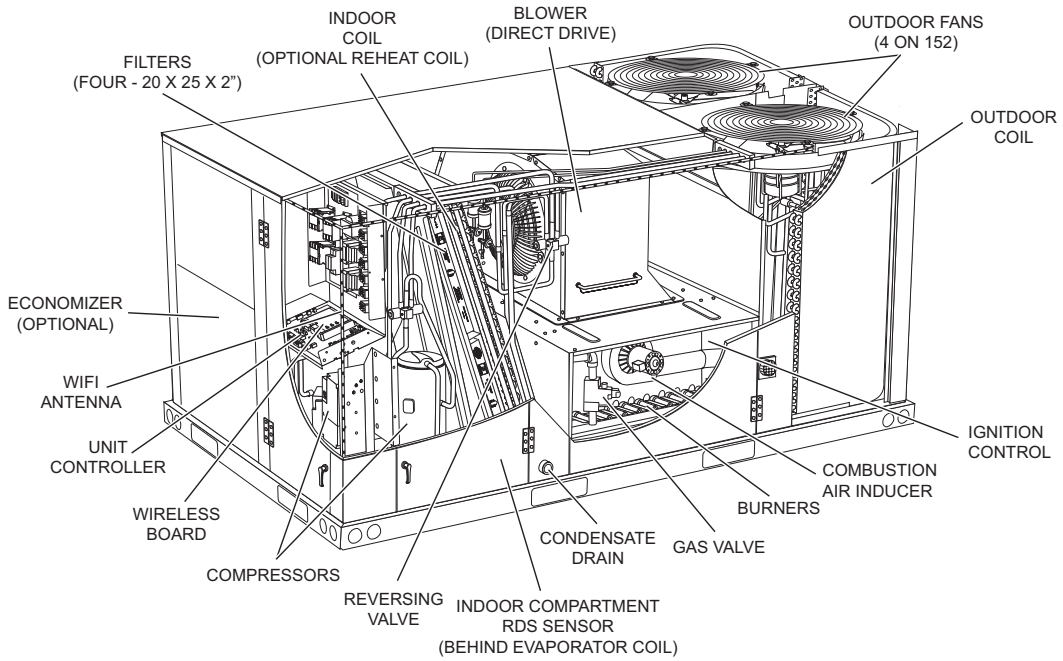


Figure 1

LDT078-152 CONTROL BOX

SHADED AREA IS A HINGED PANEL IN FRONT OF
CONTROLS AREA (OPTIONAL A173 LOCATION)

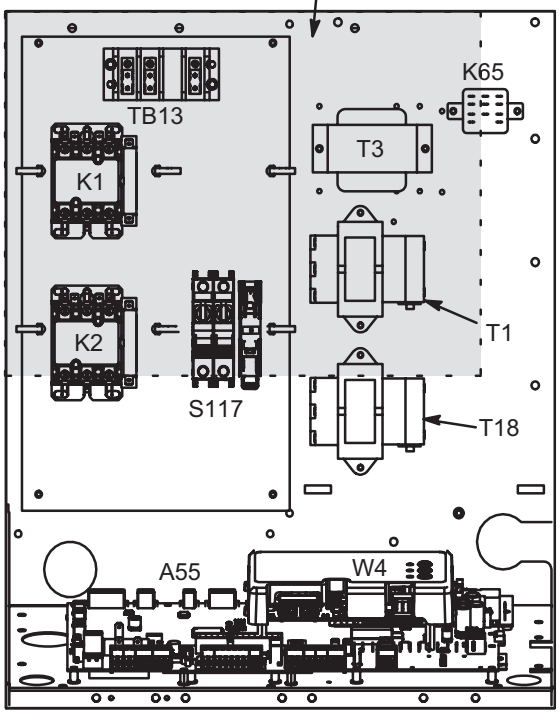


Figure 2

LDT078-152 CONTROL BOX
ON/OFF REHEAT

SHADED AREA IS A HINGED PANEL IN FRONT OF CONTROLS AREA (OPTIONAL A173 LOCATION)

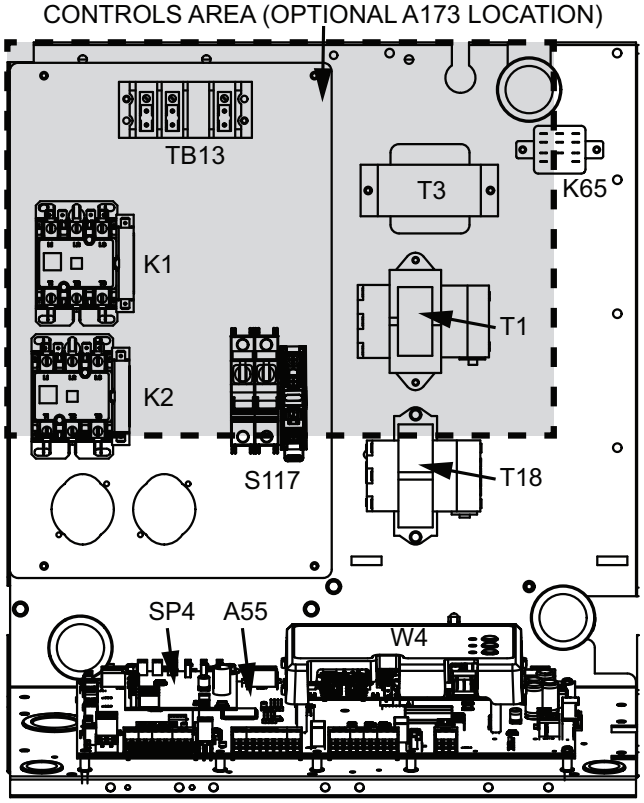


Figure 3

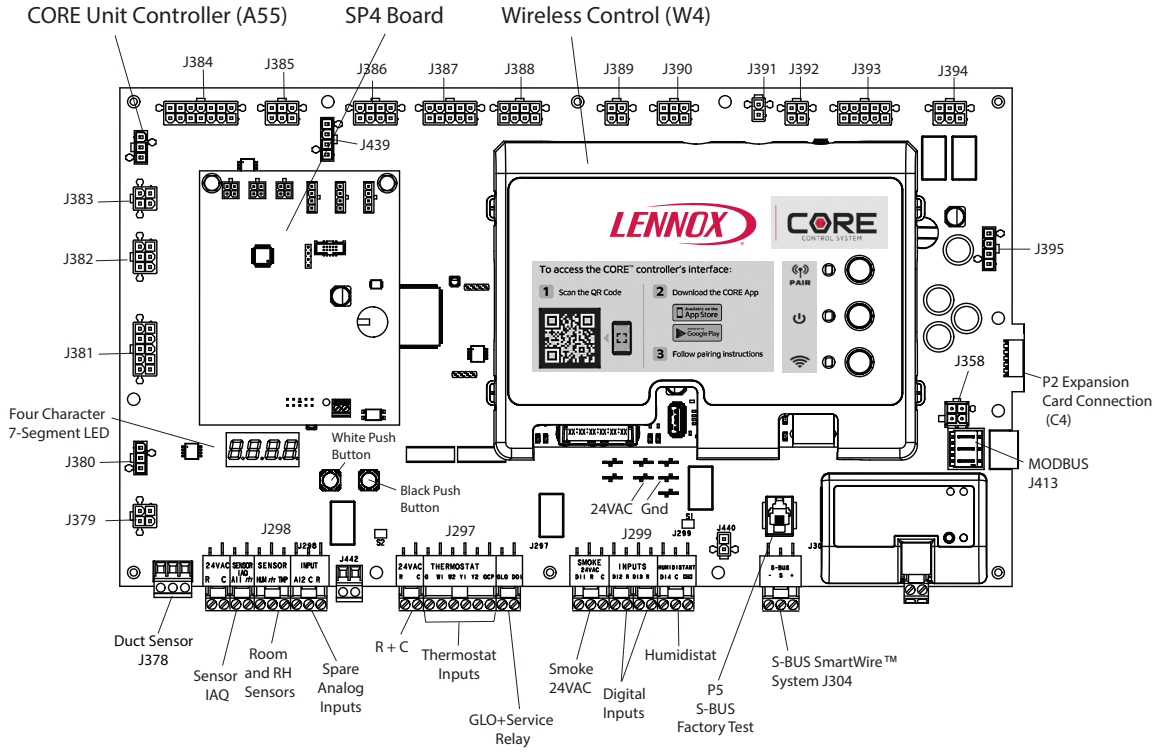


Figure 4

SP4 CONTROLLER

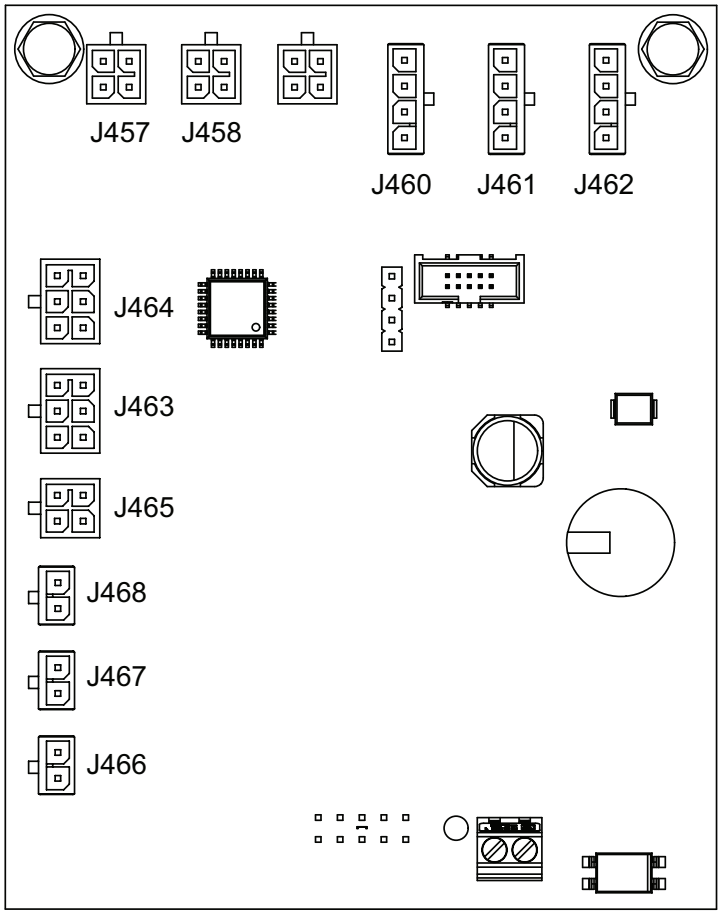


Figure 5

CONTROL BOX ARRANGEMENT
MODULATING GAS HEAT UNITS

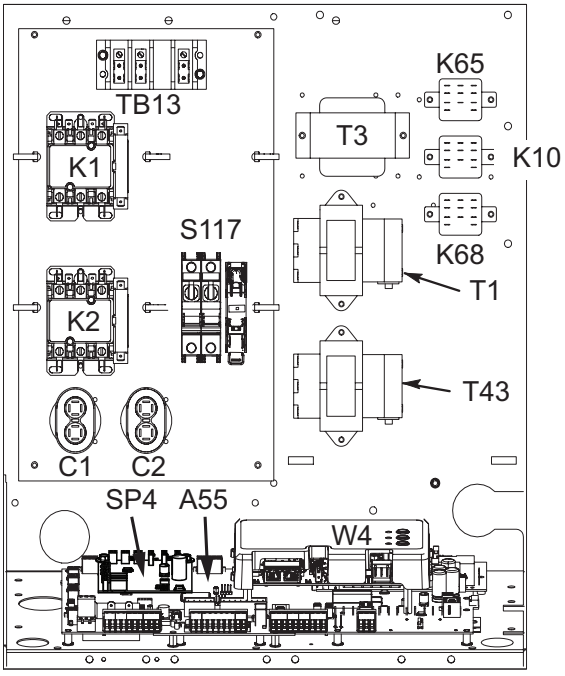


Figure 6

I–UNIT COMPONENTS

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control.

The LDT unit parts arrangement are shown in Figure 1. All L1, L2, and L3 wiring is color coded; L1 is red, L2 is yellow, and L3 is blue. See wiring diagrams in the back of this manual for complete call out of components per LDT unit. All 6.5 through 12.5 ton units are configure to order units (CTO).

A–CONTROL BOX COMPONENTS

LDT control box components are shown in Figure 2. The control box is located in the upper portion of the compressor compartment.

1–Disconnect Switch S48 (Optional)

All units may be equipped with an optional disconnect switch S48. Other factory or field installed optional circuit breakers may be used, such as CB10. S48 and CB10 are toggle switches, which can be used by the service technician to disconnect power to the unit.

2–Control Transformer T1

All use a single line voltage to 24VAC transformer mounted in the control box. Transformer supplies power to control circuits in the unit. The transformer is rated at 92VA and is protected by a 6 amp circuit breaker (CB8). The 208/230 (Y) voltage transformers use primary voltage taps as shown in Figure 3, while 460 (G) and 575 (J) voltage transformers use a single primary voltage tap.

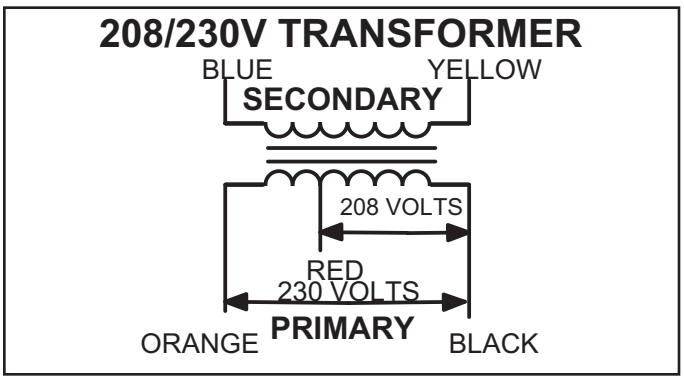


Figure 7

3–C. A. I. Transformers T3 575V Units

All LDT 575 (J) voltage units use transformer T3. The auto voltage to 230VAC transformer is mounted in the control box. The transformer has an output rating of 0.5A. T3 transformer supplies 230 VAC power to combustion air blower motor (B6).

4–Transformer T18

T18 is a single line voltage to 24VAC transformer used in all LDT units. T18 is rated at 70VAC and is protected by a 3.5 amp circuit breaker (CB18).

5–Compressor Contactor K1, K2

All compressor contactors are three-pole, double-break contactors with 24VAC coils. K1 and K2 (both energized by A55) energize compressors B1 and B2.

6–Power Exhaust Relay K65 (PED units)

Power exhaust relay K65 is a N.O. DPDT relay with a 24VAC coil. K65 is used in all LDT units equipped with the optional power exhaust dampers. K65 is energized by the economizer control panel (A56), after the economizer dampers reach 50% open (adjustable in CORE). When K65 closes, the exhaust fan B10 is are energized.

7–Terminal Block (TB13)

TB13 terminal block distributes line voltage power to the line voltage items in the unit.

8–Unit Controller A55 (Figure 4)

The Unit Controller provides all unit control functions, unit status information, unit diagnostics, programmable parameters and USB verification and profile sharing. The unit controller can only be interfaced with via the CORE Service mobile app. Refer to the Unit controller instructions provided for additional details on pairing and app functions.

Attention!

Use this QR code to download the mobile service app. Follow the prompts to pair the app with the unit control system and configure the unit. Refer to the "Download Mobile App" section in this manual and the Setup Guide provided with this unit. The QR code is also available in the unit control area.

The app can be downloaded from the appropriate iOS or Android store. Look for the following

The Unit Controller uses input from a zone/room sensor cooling, a thermostat, or a third-party controller to operate the unit. Zone/room sensor, thermostat, and third-party controller wires are connected to J297 on the Unit Controller.

Many default Unit Controller settings are adjustable. Refer to the unit installation instruction or the Unit Controller manual provided with the unit.

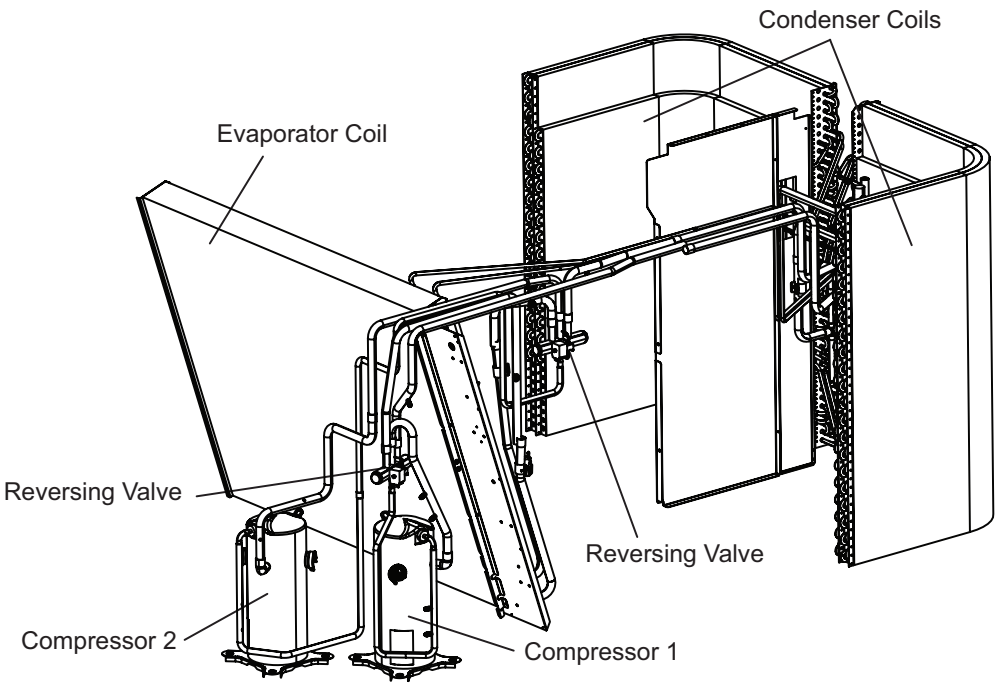
The Unit Controller is configured to identify optional kits and accessories for proper function. Each character in the configuration ID represents a different option. Refer to the unit installation instruction or the Unit Controller manual provided with the unit.

9–SP4 Board A133

This boards provides connections for the Mixed Air Temperature Sensor (RT15) and Modulating Gas Valve (GV4) in Modulating Gas Heat unit.

PLUMBING COMPONENTS

LDT078-120



LDT152

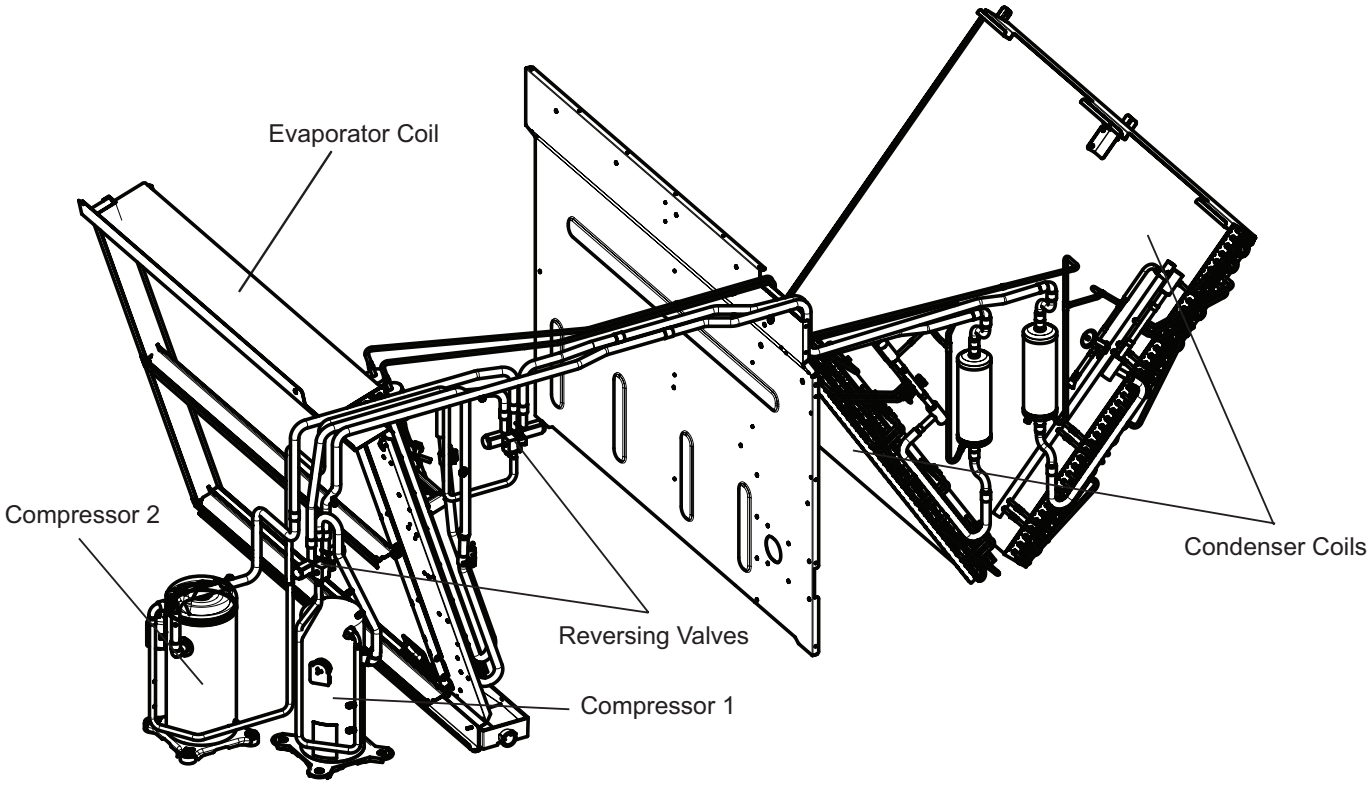


Figure 8

B–COOLING COMPONENTS

All units use independent cooling circuits consisting of separate compressors, outdoor coils and indoor coil (with 2 separate stages). See Figure 8. Units are equipped with two or three draw-through type condenser fans. and direct drive blowers. The blower draws air across the indoor coil during unit operation.

Cooling may be supplemented by a factory-or-field-installed economizer. The indoor coils are slab type and are stacked. Each indoor coil uses a thermostatic expansion valve as the primary expansion device. Each indoor coil is also equipped with enhanced fins and rifled tubing. In all units, each compressor is protected by a crankcase heater, high pressure switch and low pressure switch. Additional protection is provided by by thermistors for low ambient control and freezing prevention.

1–Compressors B1 and B2

Units use two scroll compressors and two independent cooling circuits. Compressor capacity may vary from stage to stage. In all cases, the capacity of each compressor is added to reach the total capacity of the unit. See “SPECIFICATIONS” and “ELECTRICAL DATA” (table of contents) or compressor nameplate for compressor specifications.

⚠ WARNING

Electrical shock hazard. Compressor must be grounded. Do not operate without protective coverover terminals. Disconnect power before removing protective cover. Discharge capacitors before servicing unit. Failure to follow these precautions could cause electrical shock resulting in injury or death.

Each compressor is energized by a corresponding compressor contactor.

NOTE-Refer to the wiring diagram section for specific unit operation.

⚠ IMPORTANT

Some scroll compressors have an internal vacuum protector that will unload scrolls when suction pressure goes below 20 psig. A hissing sound will be heard when the compressor is running unloaded. Protector will reset when low pressure in system rises above 40 psig. DO NOT REPLACE COMPRESSOR.

2–High Pressure Switches S4 and S7

The high pressure switch is an auto-reset SPST N.C. switch which opens on a pressure rise. All units are equipped with this switch. On fin/tube outdoor coils, the switch is located in the compressor discharge line. On all -aluminum outdoor coils, the switch is located on the liquid line in the blower section. Switches are wired in series with the compressor contactor coil.

On standard and high efficiency units, S4 (first circuit) and S7 (second circuit) are wired in series with the respective compressor contactor coils. On ultra high efficiency units, only S4 is used. S4 is located on the common compressor discharge line and is wired to both compressor-contactors via the A55 Unit Controller.

When discharge pressure rises to 640 ± 20 psig (4413 ± 138 kPa) (indicating a problem in the system) the switch opens and the respective compressor is de-energized (the economizer can continue to operate). When discharge pressure drops to 475 ± 20 psig (3275 ± 138 kPa) the pressure switch will close.

The A55 Unit Controller has a three-strike counter before locking out. This means the control allows three high pressure trips per one thermostat demand. The control can be reset by breaking and remaking the thermostat demand or manually resetting the control.

3–Reversing Valve L1 and L2

A refrigerant reversing valve with a 24 volt solenoid coil is used to reverse refrigerant flow during unit operation in all LDT units. The reversing valve is connected in the vapor line of the refrigerant circuit. The reversing valve coil is energized during cooling demand and during defrost.

Reversing valve L1 and L2 are controlled by the M4 controller in response to cooling demand or by defrost.

4–Low Pressure Switches S87, S88

The low pressure switch is an auto-reset SPST N.O. switch (held N.C. by refrigerant pressure) which opens on a pressure drop. All units are equipped with this switch. The switch is located in the compressor suction line.

S87 (compressor one) and S88 (compressor two) are wired to A55 Unit Controller. A55 governs the low pressure switches by shunting the switches during start up until pressure is stabilized. After the shunt period, the control has a three-strike counter, during first thermostat demand, before the compressor is locked out. The control is reset by breaking and remaking the thermostat demand or manually resetting the control.

When suction pressure drops to 25 $\pm$ 5 psig, (indicating low pressure), the switch opens and the compressor(s) is(are) de-energized. The switch automatically resets when pressure in the suction line rises to 40 $\pm$ 5 psig due to many causes such as refrigerant being added.

5–Defrost Control

The defrost control ensures that the heat pump outdoor coil does not ice excessively during the heating mode. The defrost control uses input from the coil and ambient sensors to initiate demand defrost cycles from the CORE Controller. If the system fails to calibrate or obtain readings for demand defrost,it will run timed defrost at customer setting. Gas heat is energized during defrost

6–Filter Drier (all units)

All units have a filter drier located in the liquid line of each refrigerant circuit at the exit of each condenser coil (outdoor coil in LDT units). The drier removes contaminants and moisture from the system.

7–Condenser Fan Motors B4, B5, B21, B22

See specifications section of this manual for specifications of condenser fans B4 , B5, B21, and B22 (B21 and B22 on 152 units only). All LDT motors are electrically commutated condenser fan motors (ECM). The ECM motors are wired directly to 230VAC power but do not operate until a pulse width modulated (PWM) control signal is sent from the CORE controller. All outdoor fans will run at the same speed when the appropriate PWM signal is received. The fans may be removed for servicing and cleaning by removing the fan grilles.

Transformer T5 and Fuse F57
460VAC & 575VAC Only:

460VAC and 575VAC units will use a Transformer T5 to step-down the line voltage to the correct 230VAC. There are two fuses F57 located next to the T5 transformer. The location of the T5 transformer is behind the disconnect box just above the bottom power entry cover.

8–Crankcase Heaters HR1, HR2

Heater HR1 is installed around compressor B1 and heater HR2 is installed around compressor B2. Crankcase heater wattage varies by compressor manufacturer.

9–L14 Reheat Coil Solenoid Valve

When Unit Controller input (Unit Controller J298-5 or J299-8) indicates room conditions require dehumidification, L14 reheat valve is energized (Unit Controller P269-3) and refrigerant is routed to the reheat coil.

10–Temperature Sensors RT46, RT47, RT48 & RT49

Units are equipped with four factory-installed thermistors (RT46-RT49) located on different points on the refrigerant circuit.

The thermistors provide the CORE Controller with constant temperature readings of four specific locations on the refrigeration circuit. These temperatures are used as feedback in certain modes of unit operation.

Each thermistor must be specifically placed for proper unit operation and to initiate valid alarms. See Figure 9 and Figure 10 proper locations.

LDT078, 092, 102, 120, 152
INDOOR COIL
RT46, RT47

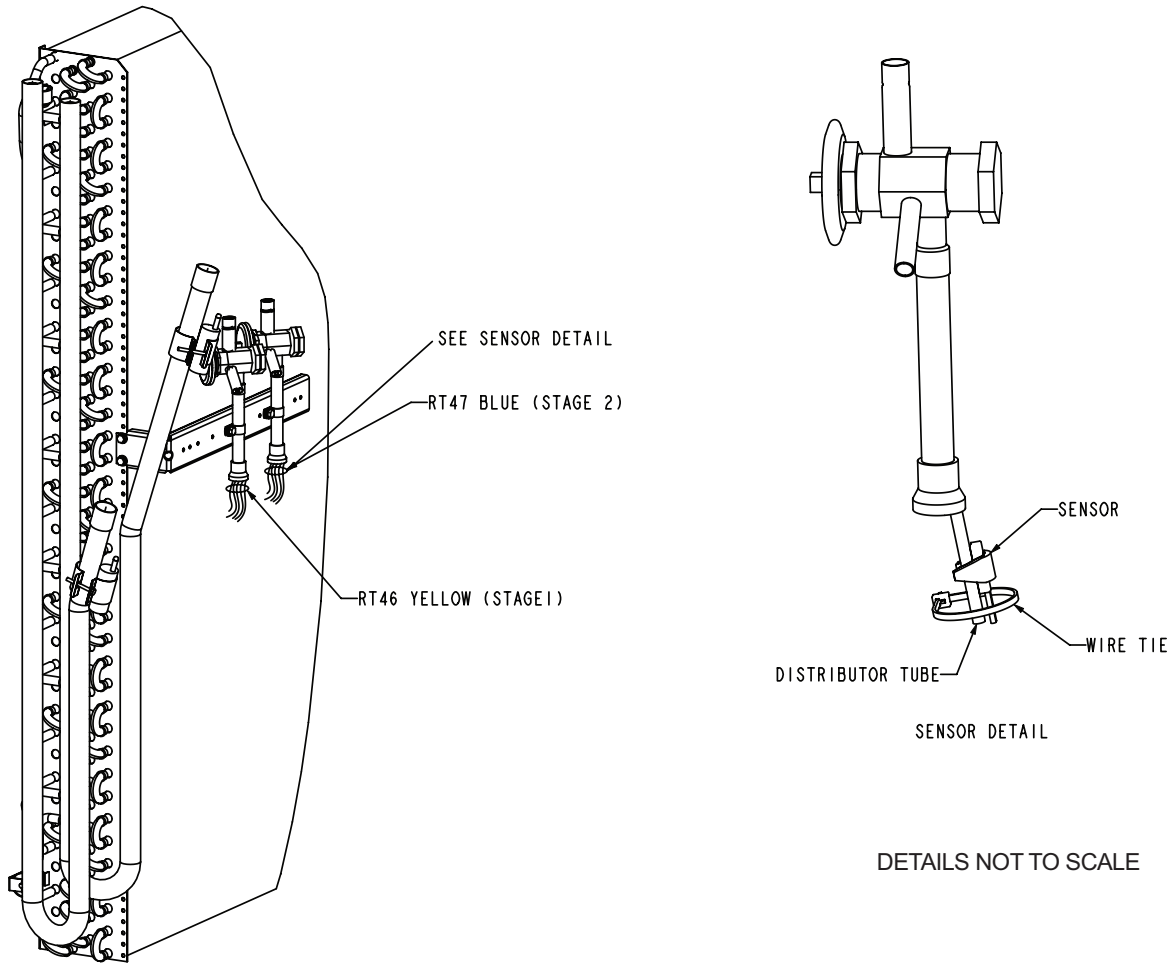
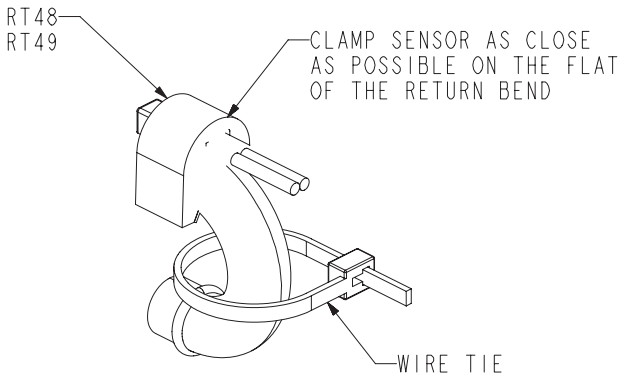
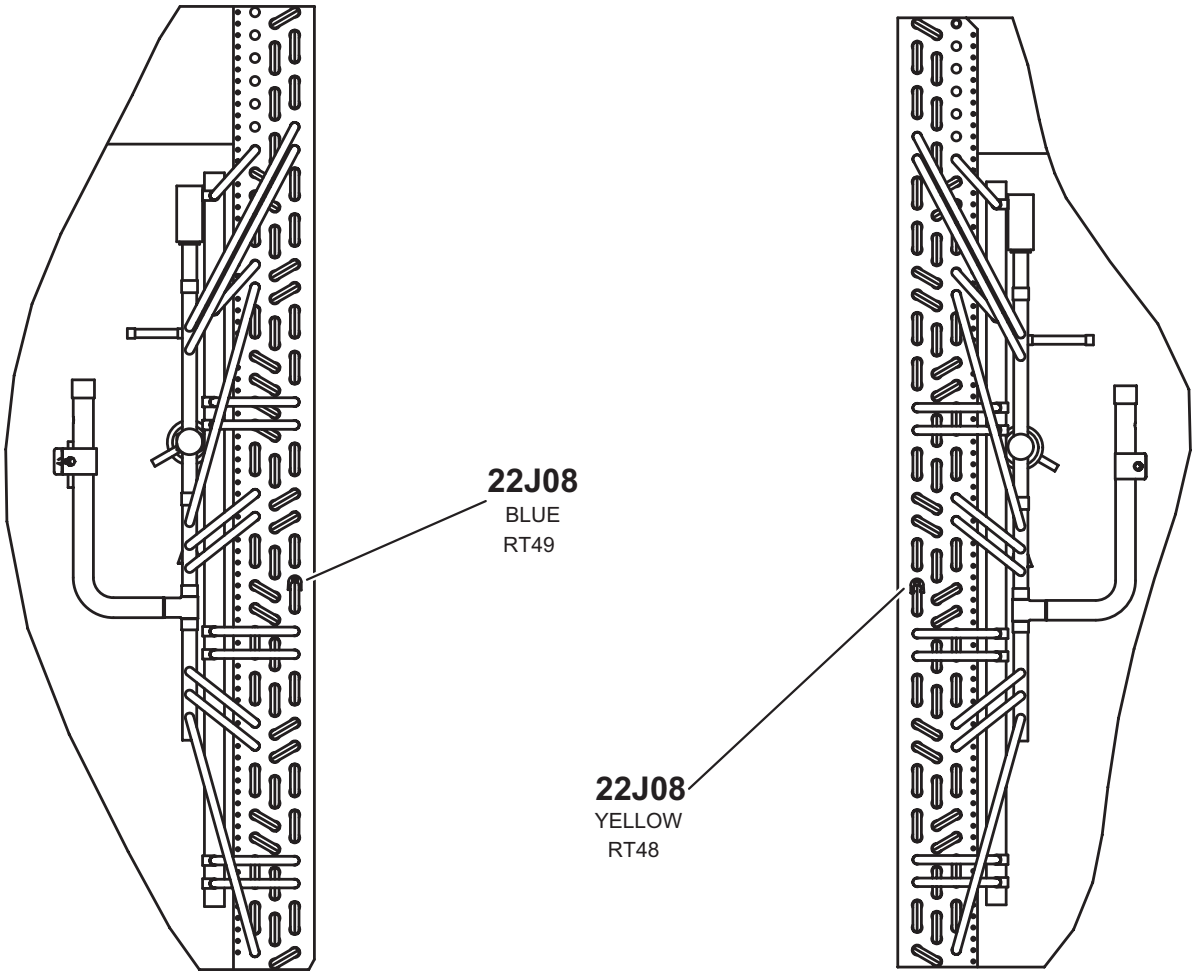


Figure 9

LDT078, 092, 102, 120, 152
OUTDOOR COIL
RT48, RT49



SENSOR DETAIL



STAGE 2

DETAILS NOT TO SCALE

Figure 10

LH/LD 078-152
INDOOR COMPARTMENT RDS SENSOR

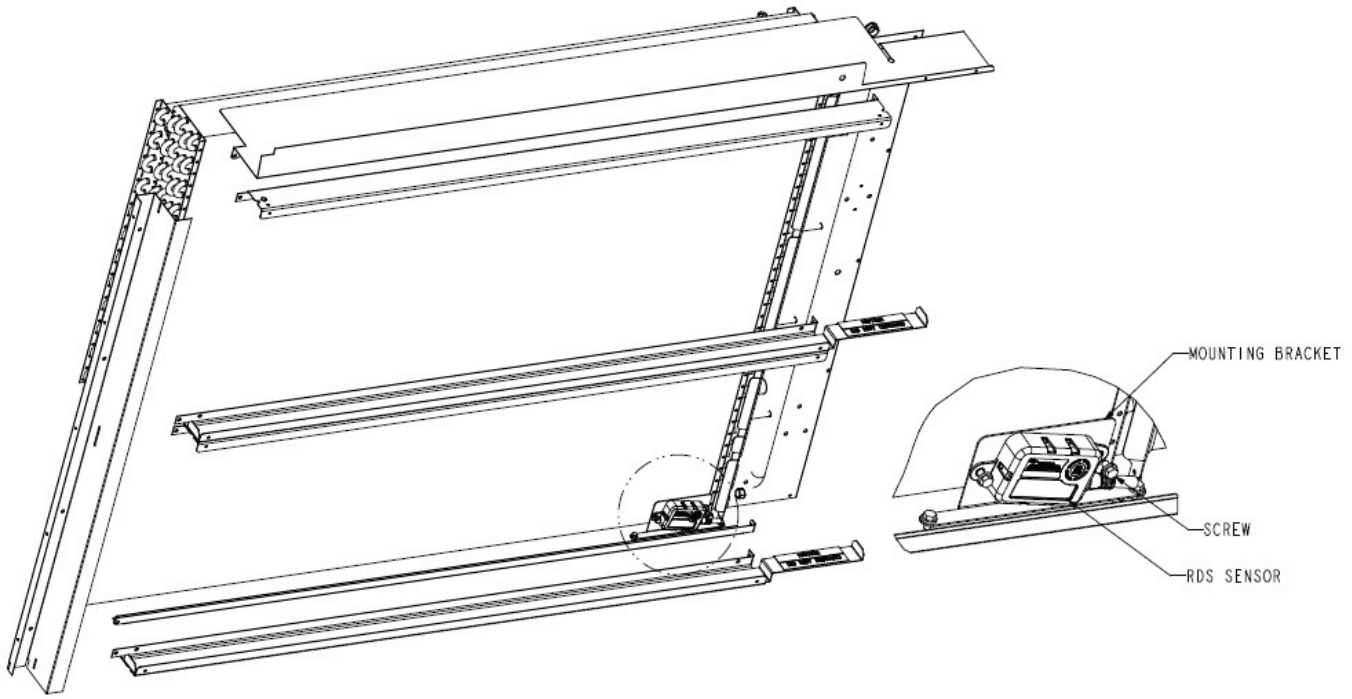


Figure 11

11–RDS Sensors

Units are equipped with factory-installed RDS Sensors located on different points on the unit. The RDS sensors provide the Unit Controller with continuous readings for leaked refrigerant concentration levels and sensor health status (Good or Fault). These readings are used to modify unit operation to disperse the leaked refrigerant and to remove possible ignition sources. In addition, the Unit Controller uses these readings to initiate alarms to alert the operator of a refrigerant leak or faulty sensor(s).

Each sensor must be specifically placed for proper unit operation and to initiate valid alarms. To identify sensor locations see Figure 11.

C–BLOWER COMPARTMENT

The blower compartment is located between the evaporator coil and the condenser coil section. The blower assembly is secured to a sliding frame which allows the blower motor assembly to be pulled out of the unit.

Units are equipped with variable speed, direct drive blowers. The supply CFM can be adjusted by changing the percentage of motor output using the Unit Controller settings. Measure the intake air CFM and adjust the RPM% to get design-specified supply air CFM.

1–Blower Wheels

Units are be equipped with a backward inclined blower wheel. See “SPECIFICATIONS” at the front this manual for more detail.

2–Indoor Blower Motor B3

Units are equipped with a direct drive blower assembly with a three-phase, variable speed, direct drive blower motor.

All motor specifications are listed in the SPECIFICATIONS (table of contents) in the front of this manual. Units may be equipped with motors manufactured by various manufacturers, therefore electrical FLA and LRA specifications will vary. See unit name plate for information specific to your unit.

The Unit Controller checks the incoming power during start-up. If the voltage or phase is incorrect, the Unit Controller will display an alarm and the unit will not start.

Blower Operation

Refer to the Unit Controller Setup Guide to energize blower. Use the mobile service app menu; see SERVICE > TEST.

In both thermostat and zone control mode, the Unit Controller will stage the blower between low and high speed. In zone sensor control mode, the Unit Controller will vary (VAV) the blower between low and high speed.

⚠ WARNING

1-Make sure that unit is installed in accordance with the installation instructions and applicable codes.

2-Inspect all electrical wiring, both field- and factory-installed, for loose connections. Tighten as required.

3-Check to ensure that refrigerant lines do not rub against the cabinet or against other refrigerant lines.

4-Check voltage at disconnect switch. Voltage must be within range listed on nameplate. If not, consult power company and have voltage condition corrected before starting unit.

5-Make sure filters are new and in place before start-up.

Initiate blower only (G) demand at thermostat according to instructions provided with thermostat. Unit will cycle on thermostat demand. The following steps apply to applications using a typical electro-mechanical thermostat.

1 - Blower operation is manually set at the thermostat subbase fan switch. With fan switch in **ON** position, blowers will operate continuously.

2 - With fan switch in **AUTO** position, the blowers will cycle with demand. Blowers and entire unit will be off when system switch is in **OFF** position.

NOTE - *Blower operation mode can also be initiated by the mobile service app.*

Direct-drive motor may not immediately stop when power is interrupted to the Unit Controller. Disconnect unit power before opening the blower compartment. The Controller's digital inputs must be used to shut down the blower. See Unit Controller manual for operation sequences.

3–Blower Access

The blower assembly is secured to a sliding frame which allows the blower assembly to be pulled out of the unit. See Figure 13.

1 - Loosen the reusable wire tie which secures the controls and high voltage blower wiring to the blower housing. Disconnect the pressure sensor low voltage wire harness.

2 - Remove and retain screws on either side (and on the front for direct drive) of sliding frame. Use the metal handle to pull frame toward outside of unit.

3 - Slide frame back into original position when finished servicing. Reattach the blower wiring in the previous location using the wire tie. Reconnect pressure sensor low voltage wire harness.

4 - Replace retained screws.

The supply CFM can be adjusted by changing the percentage of motor output using the Unit Controller settings Refer to Table 1 for menu paths and default settings.. Record any RPM% changes on the parameter settings label located on the inside of the compressor access panel.

⚠ CAUTION

The BLOWER CALIBRATION process starts the indoor blower at operational speeds and moves the economizer damper blades. Before starting this process, replace any access panels and close all unit doors except compressor compartment door.

Blower calibration is required only on units that are newly installed or if there is a change in the duct work or air filters after installation. Use the mobile service app to navigate to the SETUP>TEST & BALANCE>BLOWER menu. After the new RPM% values are entered, select START CALIBRATION. The blower calibration status is displayed as a % complete. Upon successful completion, the mobile service app will display CALIBRATION SUCCESS and go back to the blower calibration screen.

IMPORTANT - *The default value for Cooling Low motor speed is lower than a traditional singe- or two-speed unit. If operating the unit with a 2- or 3-stage controller (2- or 3-stage thermostat, DDC controller, etc.), it is recommended to increase the Cooling Low CFM default value to a suitable level for part load cooling (typically 60% of full load CFM).*

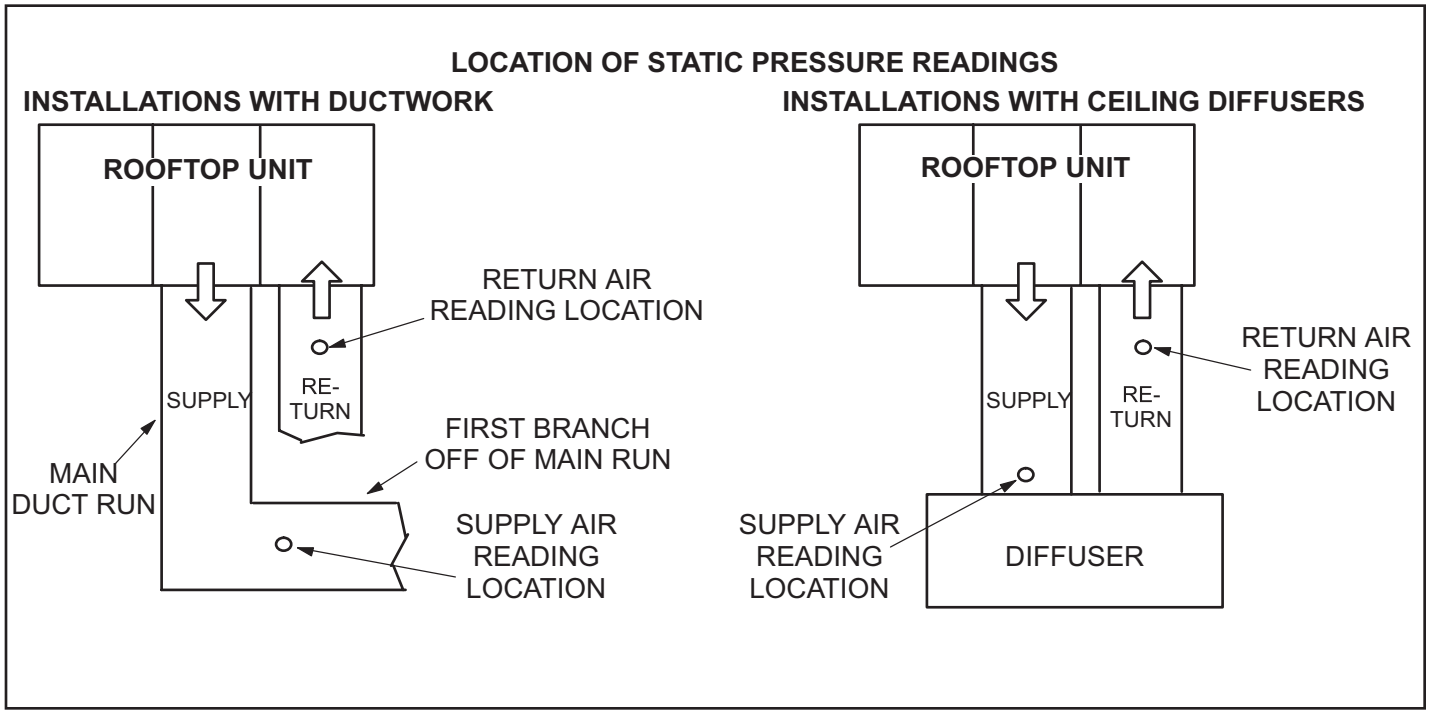


Figure 12

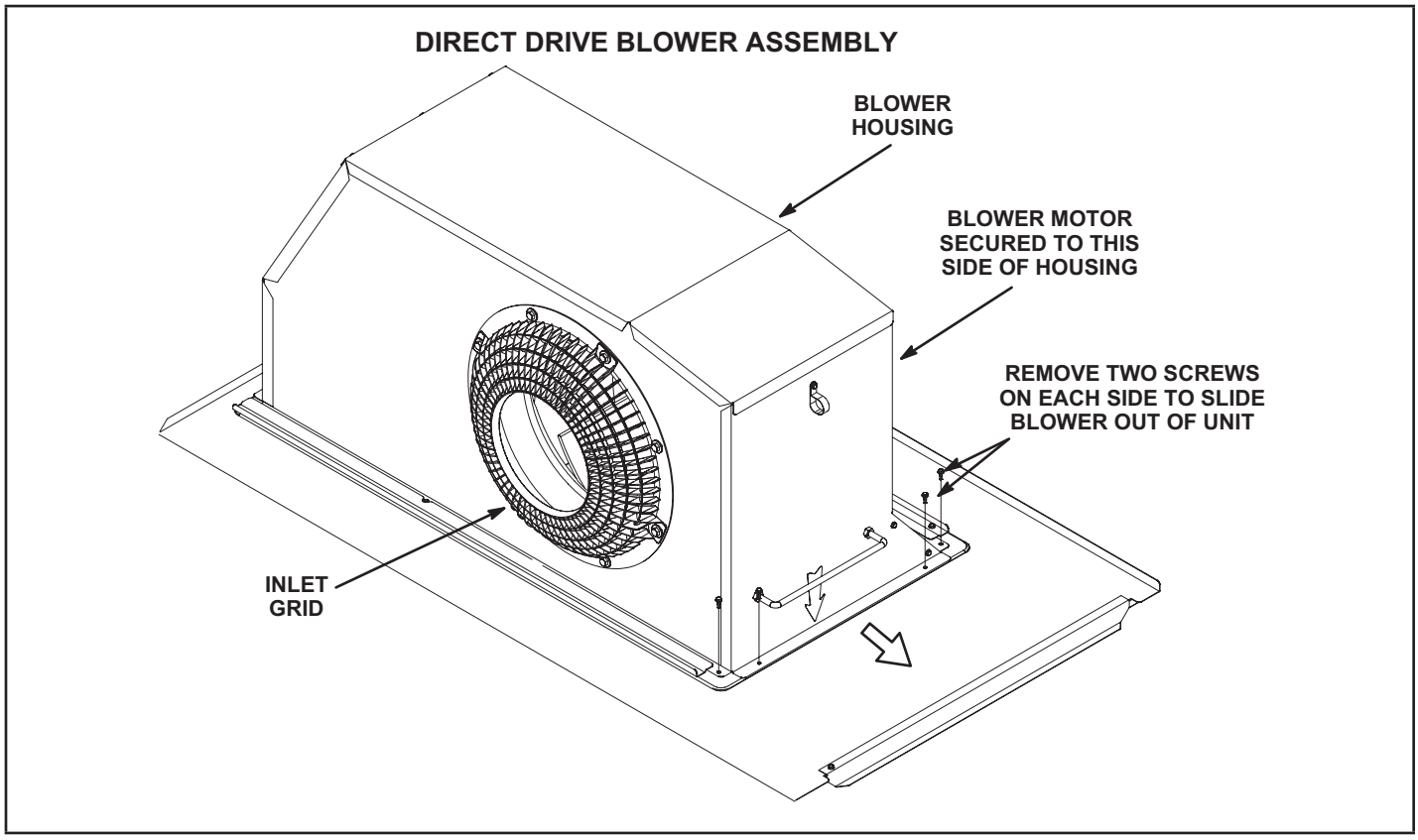


Figure 13

Table 1

DIRECT DRIVE PARAMETER SETTINGS - 581102-01

Parameter	Field Setting	Description
Note: Any changes to Smoke CFM setting must be adjusted before the other CFM settings. Use SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 12 for EBM, 6 for ECM		
BLOWER SMOKE CFM	%	Percentage of RPM for blower smoke speed.
SETUP > TEST & BALANCE > BLOWER		
BLOWER HEATING HIGH CFM	%	Percentage of RPM for blower heating high speed.
BLOWER HEATING LOWCFM	%	Percentage of RPM for blower heating low speed (P volt gas heat only).
BLOWER COOLING HIGH CFM	%	Percentage of RPM for blower cooling high speed.
BLOWER COOLING LOW CFM	%	Percentage of RPM for blower cooling low speed and vent speed for standard static blowers.
BLOWER VENTILATION CFM	%	Percentage of RPM for high static blower ventilation speed.
SETUP > TEST & BALANCE > DAMPER		
BLOWER HIGH CFM DAMPER POS %	%	Minimum damper position for high speed blower operation. Default 0%.
BLOWER LOW CFM DAMPER POS %	%	Minimum damper position for low speed blower operation. Default 0%.
POWER EXHAUST DAMPER POS %	%	Minimum damper position for low power exhaust operation. Default 50%.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 216		
POWER EXHAUST DEADBAND %	%	Deadband % for power exhaust operation. Default 10%.
SETTINGS > RTU OPTIONS > EDIT PARAMETERS = 10 (Applies to Thermostat Mode ONLY)		
FREE COOLING STAGE-UP DELAY	sec	Number of seconds to hold blower at low speed before switching to blower at high speed. Default 300 seconds.

Installer: Record any parameter changes under “Field Setting” column. Settings need to be recorded by installer for use when Unit Controller is replaced or reprogrammed.

D–GAS HEAT COMPONENTS

1–Heat Exchanger (Figure 14)

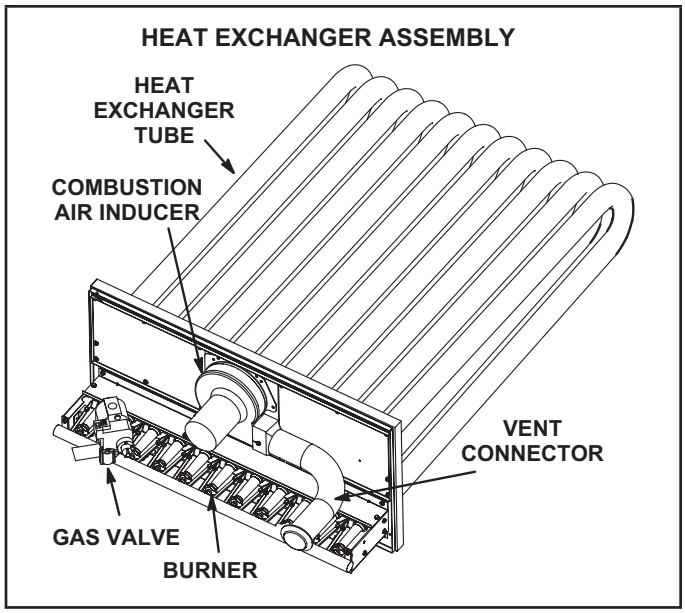


Figure 14

LDT units use cluster type inshot burners with tubular stainless steel heat exchangers and two-stage redundant gas valves. LDT092, 102, 120 and 152 units use one eleven tube/burner for high heat, one nine tube/burner for medium heat and one six tube/burner for standard heat. Burners use a burner venturi to mix gas and air for proper combustion.

LDT078 units use one nine tube/burner for medium heat and one six tube/burner for standard heat. Burners in all units use a burner venturi to mix gas and air for proper combustion.

Combustion takes place at each tube entrance. As hot combustion gases are drawn upward through each tube by the combustion air blower, exhaust gases are drawn out the top and fresh air/gas mixture is drawn in at the bottom. Heat is transferred to the air stream from all surfaces of the heat exchanger tubes. The supply air blowers, controlled by the A55 Unit Controller, force air across all surfaces of the tubes to extract the heat of combustion. The shape of the tubes ensures maximum heat exchange

2–Burner Box Assembly (Figure 16)

The burner box assembly contains the following components: Burners, manifolds, orifices, E1 igniter, FS1 flame sensor, S47 roll-out switch, and surrounding sheet metal enclosure. For E1, FS1, and S47 details, see separate sections for each component.

Burners

All units use cluster type inshot burners. See Figure 15. Burners are factory set and do not require adjustment. A peep hole with cover is furnished in the heating access panel for flame viewing. Always operate the unit with the access panel in place.

Burners can be removed for service as an assembly. Burner maintenance and service is detailed in the SERVICE CHECKS section of this manual.

TYPICAL GAS BURNER ASSEMBLY

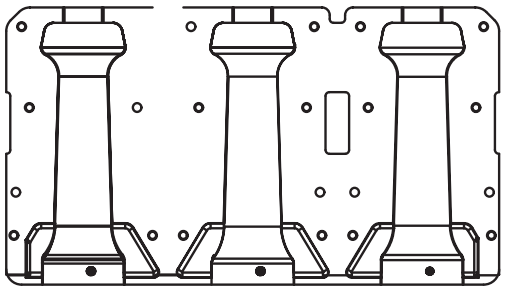


Figure 15

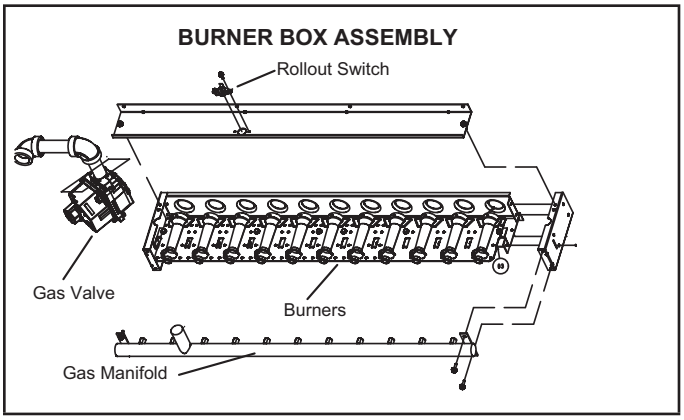


Figure 16

Manifold and Orifices

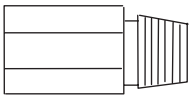
For each burner assembly, the unit has a corresponding manifold assembly. The manifold assembly is a formed, painted, 3/4" diameter, black iron pipe with 6, 9, or 11 brass orifices installed. The manifold assembly secures to the burner box (See Figure 16) using sheet metal screws. A manifold is correctly installed when the each orifice falls inside the small inlet ring at each burner's inlet.

Orifices are machined from 7/16" Hex Brass Stock with male 1/8-27 NPT on one end, a small hole (orifice) on opposite end-face, and orifice size permanently stamped into brass. When installing orifices into the manifold, tighten to spec outlined in Figure 17.

NOTE - Do not use thread sealing compound on the orifices. Using thread sealing compound may plug the orifices.

Each orifice and burner are sized specifically to the unit. Refer to ProductZone@www.davenet.com for correct sizing information.

ORIFICE WITH PIPE THREADS



Tighten to 6.25 ± .5 ft.lbs.
Do not over-tighten.

Figure 17

3–Primary High Temperature Limits S10

S10 is a SPST N.C., auto-reset, high temperature primary limit for gas heat. S10 limit contact Actuation (change from closed to open) occurs when the switch temperature rises to the setting. Limit contacts will Auto-Reset (automatically re-close) when temperature falls to switch temperature setting. Refer to Table 2 for Actuation and Auto-Reset temperatures.

S10 Limits are wired directly to the A3 Direct Spark Ignition control. Limit contact open signals the DSI control when excessive temperature is reached in the heat exchanger compartment. Refer to Table 7 for DSI response to open contacts.

The S10 limit location for the Direct Plus Blowers are located on the front right side of the indoor blower deck (Figure 18). This S10 limit style is an open-faced button switch mounted though a 1" diameter hole.

4–Flame Roll-out Limit S47

Flame roll-out limit S47 is a SPST N.C., manually reset, high temperature limit located as shown in Figure 18. S47 is wired to the A3 ignition controller. When S47 senses flame roll-out (indicating a blockage in the combustion air passages), the flame rollout limit trips and the ignition control immediately closes the gas valve.

Limit S47 is factory preset to open at 290F ± 12F (143.3C ± 6.7C) on a temperature rise. All flame roll-out limits are manual reset. The flame roll-out switch (S47) is not manually resettable until it cools down below 150F. Once cooled down, reset by carefully depress button on top of the switch until a distinct "click" is heard. If distinct "click" is not heard, verify contact closure by a continuity check between switch's 1/4" electrical connections after unplugging unit wiring from switch. If continuity is confirmed, switch contacts have closed.

Table 2
S10 LIMIT TEMPERATURE VALUES

Indoor Blower Type	Heating Imput (BTU)	Limit Actuation (Open on Temp. Rise)	Limit Auto-Reset (Close on Temp. Fall)
DirectPlus™ Direct Drive ECM Blower System	130,000	150°F ± 3°F	110°F ± 7°F
	180,000	190°F ± 5°F	150°F ± 7°F
	240,000	185°F ± 3°F	145°F ± 7°F

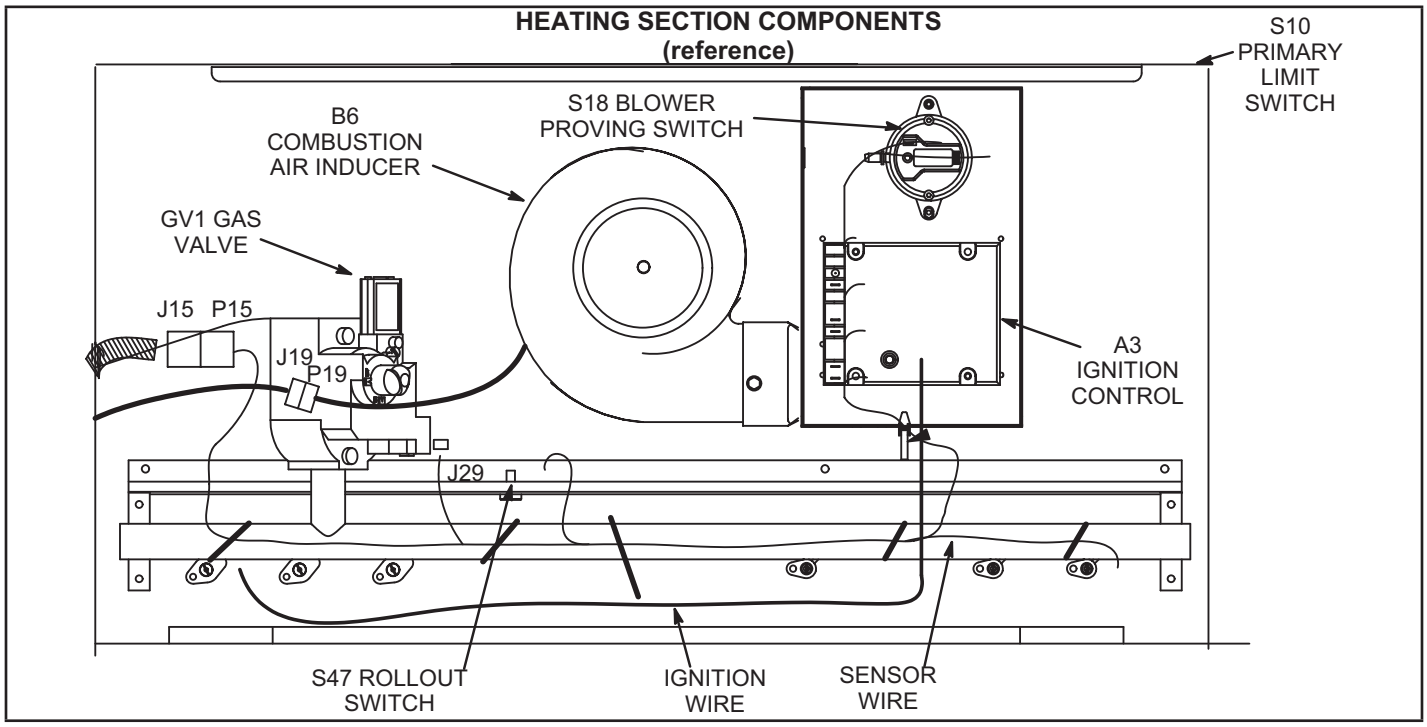


Figure 18

5–Combustion Air Prove Switch S18

The S18 Pressure switch is a SPST N.O. switch located to the right of the B6 Combustion Air Inducer in the heating compartment (See Figure 18). S18 Pressure switch is wired directly to the A3 DSI control enabling switch contact position comparison to CAI operating status. Pressure switch is designed for the contacts to change from open when CAI off to closed when the CAI is activated proving that the CAI is operating. A 3/16" I.D. silicone rubber tubing connects pressure switch port to the barb fitting located on the CAI housing.

The S18 switch closes at negative 0.10" w.c. +/- 0.05" w.c. on pressure fall (larger negative number). This pressure switch is factory set and not adjustable. Verify pressure switch operation by performing a continuity test between the switch's 1/4" electrical connections after unplugging unit wiring from switch. When CAI is OFF (not running), no continuity (open contacts) should be measured. When the CAI is ON (running), continuity (closed contacts) should be measured.

NOTE - *An obstruction or leak in silicone tubing can prevent the pressure switch contacts from changing upon CAI activation (turned ON). DO NOT Exhale (blow) into the pressure switch port as any pressure above 3" w. c. (0.1 psi) can damage the switch diaphragm.*

Table 3

S18 Prove Switch Settings

Close" w.c. (Pa)	Open " w.c. (Pa)
0.25 ± 5 (62.3 ± 12.4)	0.10 ± 5 (24.8 ± 12.4)

6–Combustion Air Inducer B6

The combustion air inducer provides fresh air to the burner while clearing the combustion chamber of exhaust gases. See Figure 18 for the inducer location. The inducer is energized by the A3 Ignition Control via K13 relay.

The inducer uses a 208/230V single-phase PSC motor and a 4.81in. x 1.25in. (122mm x 32mm) blower wheel. The motor operates at 3450 RPM and is equipped with auto-reset overload protection. Blower is supplied by various manufacturers. Ratings may vary by manufacturer. Specific blower electrical ratings can be found on the unit rating plate.

All combustion air blower motors are sealed and cannot be oiled. The blower cannot be adjusted but can be disassembled for cleaning.

7–Combustion Air Motor Capacitor C3

Combustion air inducer B6 requires a run capacitor. The C3 Capacitor is supplied as an integrated part of the B6 Combustion Air Inducer Assembly. The C3 capacitor is mounted and wired to the B6 assembly by the motor manufacturer. Ratings will be on side of capacitor or combustion air motor plate.

8–Gas Valves GV1

Units are equipped with one of 2 types of gas valves based upon the unit configuration. The unit will have either a Copeland 36H54 series two-stage gas valve GV1 or a Copeland 36H27 modulating gas valve GV4.

8a–Two-Stage Gas Valve GV1

The Copeland 36H54 series two stage gas valve features are indicated in Figure 24. When a W1 heating demand is present as input to DSI control, the valve is energized in low fire by the ignition control at the same time as the spark electrode. If the heating demand increases (W1 and W2 demands inputs to DSI control), high fire signal is provided by the ignition controller. Both the low fire and high fire signals are required for the gas valve GV1 to operate in high fire.

A shut-off switch is provided on the valve for manual shut-off. The shut-off switch will immediately close both stages without delay.

Both low fire and high fire (if applicable) valve outputs are adjustable. The gas manifold pressure should be adjusted when the unit is installed at altitudes higher than 2000 feet. Refer to section, V- SYSTEMS SERVICE CHECKS, A-Heating System Service Checks, for procedure to adjust manifold.

8b–Modulating Gas Valve GV4

The Copeland 36H27 series modulating gas valve has 7 features highlighted in Table 4. Refer to Figure 19 and Figure 20 for the location of each feature.

Table 4
MGV PHYSICAL FEATURES

Figure #	Description	Features
1	Inlet Side Wrenching Surface	Outside dimension across hex flats = 1.375"; wrenching surface depth = 0.5" minimum.
2 [1]	Outlet Pressure Port	To open port, rotate 1/8"-27 NPT hex screw counterclockwise to remove. To close port, rotate 1/8"-27 NPT hex screw clockwise until securely closed. **Tools required:** 3/16" hex wrench (Allen), 1/8" barb fitting, 1/4" ID tubing.
3	Outlet Pressure Adjustment Cap	Manifold pressure adjustment screw under removable, translucent cap. Turn to increase (+) or decrease (-) manifold pressure. Adjustment range about ±1.0" w.c. (at min. & max.) **Tool required:** 1/8" flat blade screwdriver
4	Fuel Label	Label, "NAT. GAS", will be removed for LP conversion. See kit for details.
5	Main Solenoid Power Switch	On/Off switch for main valve open/close solenoid.
6	Electrical Connection	Valve has one 5 pin electrical plug. See section, Electrical Connections, for details.
7 [1]	Inlet Pressure Post	To open port, rotate 1/8"-27 NPT hex screw counterclockwise to remove. To close port, rotate 1/8"-27 NPT hex screw clockwise until securely closed. **Tools required:** 3/16" hex wrench (Allen), 1/8" barb fitting, 1/4" ID tubing.

[1] Extremes of operating range are plus and minus 10% of line voltage.

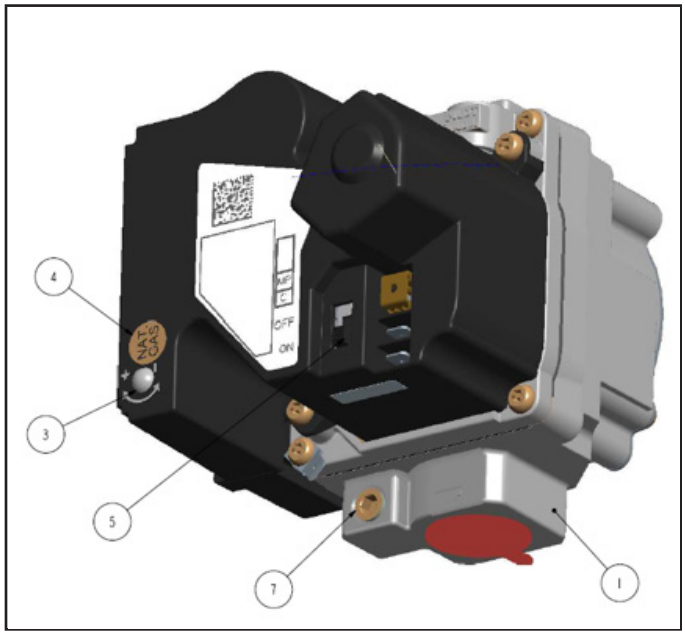


Figure 19

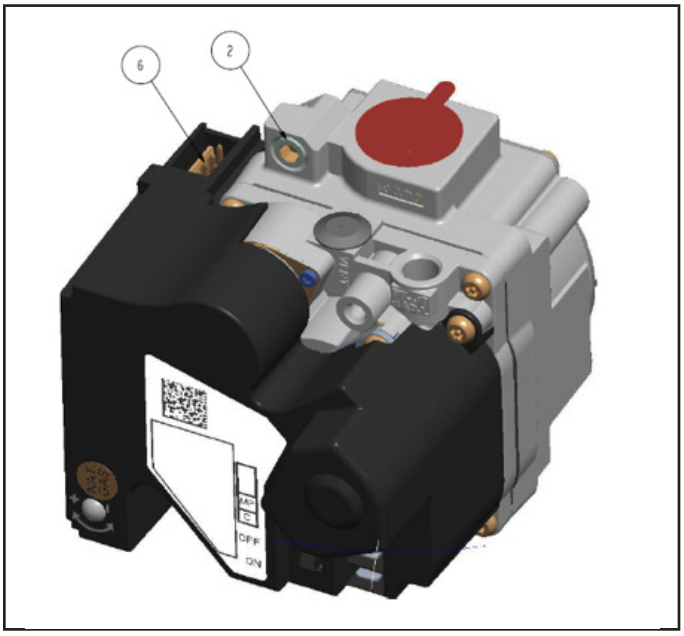


Figure 20

Table 5
MGV CONNECTOR FUNCTION BY PIN NUMBER

Pin #	Control Board Stenciling [1]	Description
1	TH	Constant 24VAC input power; supplies control board and stepper motor; Pin 1 is on bottom or farthest pin from On/Off switch.
2	VOL/RXD	Communication, Input. Stepper motor position signal; 0VDC - 10VDC.
3	TXD	Communication, Feedback. NOT USED.
4	TR	Ground, reference.
5	MV TH	Main Valve 24VAC; power applied to Pin 5 opens main valve. Pin 5 is on top or closest pin to On/Off switch.

[1] White stencil lettering on green PCB at 5-pin jack connection; visible when unit harness plug disconnected.

Modulating Gas Valve (MGV) Electrical Connections

The 36H27 modulating gas valve electrical connections are all contained in one JST style 5-pin connector (S5P-VH). Table 5 details the 5 Pins.

Modulating Gas Valve – Turn Power On, Home Function initiates

MGV control board does not save the stepper motor position when powered off. When 24VAC power is applied to Pin #1, MGV initiates a stepper motor "Home" function that can take 10 - 15 seconds to complete. After the Home function is complete, MGV sends the stepper motor to the position per VDC signal on Pin #2.

***NOTE** - 24VAC power to MGV (Pin #1) is supplied from the DSI (Direct spark ignition) control.*

MGV Manifold Pressure Adjustments – Use CORE Component Test Mode

During heating operation, the CORE is continually recalculating and adjusting the signal to the MGV (0 - 10 VDC to Pin #2) changing the manifold pressure. CORE Component Test mode is the only means of adjusting the manifold pressure settings (minimum or maximum). In Component Test mode, the CORE does not vary the signal to the MGV. The CORE sends a preset VDC signal of either 0 VDC (minimum) or 10 VDC (maximum) depending upon the user's selection.

The 36H27 valve has software that must recognize a user is making a change to a setpoint and then respond. When adjusting either minimum or maximum setpoints (in CORE Component Test mode), rotate the adjustment screw slowly until the software recognizes a change and starts adjusting the manifold pressure. The recommended rotation rate is 1/4 turn (90°) in 4 - 5 seconds.

***NOTE** - starting a setpoint change by rapidly rotating the adjustment screw may result in the software not detecting the request.*

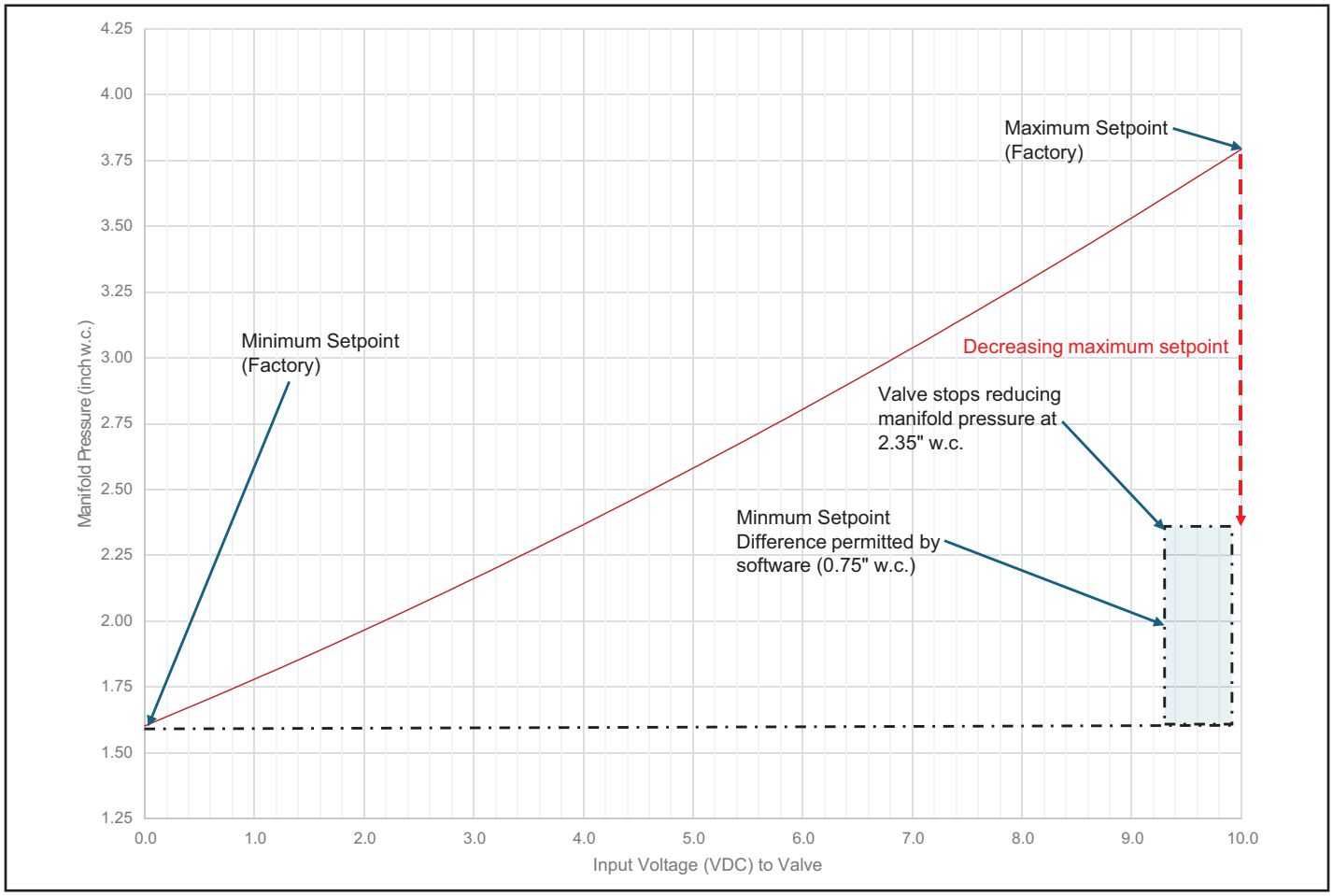


Figure 21
Separation Between Minimum and Maximum Setpoints

MGV Manifold Pressure Adjustments – Valve Software Restrictions

The valve's software requires no less than certain number of motor steps between the minimum setting (input = 0 VDC) and maximum setting (input = 10 VDC). When decreasing the maximum or increasing the minimum setpoints, the valve will stop adjusting the manifold pressure when the setpoints are closer than 0.75" w.c. (Natural Gas) or 3.0" w.c. (LP/Propane). In Figure 21, the 0.75" w.c. separation concept is illustrated so valve software behavior can be understood. To avoid this software restriction when making large adjustments (i.e., high altitude derate), decrease the minimum first, then adjust the maximum.

Input Voltage (VDC) vs. MGV Manifold Pressure – What happens when manifold pressure is changed?

The Modulating Gas Valve's minimum and maximum manifold pressure setpoints are adjusted individually. The manifold pressure adjustment options are minimum only, maximum only, and both minimum and maximum. When an adjustment is made, the manifold pressure output for each input VDC is recalculated accordingly. To illustrate, two graphs have been provided. Both graphs have a red line showing the factory settings.

The first graph (Figure 22) illustrates how the intermediate manifold pressures change (for same input VDC) when the maximum manifold setpoint is increased or decreased. The manifold pressure for each input VDC either increased or decreased versus the original setpoint. A similar change occurs when adjusting only the minimum manifold setpoint.

The second graph (Figure 23) illustrates how the intermediate manifold pressure settings change when both the minimum and maximum manifold pressure settings are increased or decreased the same amount.

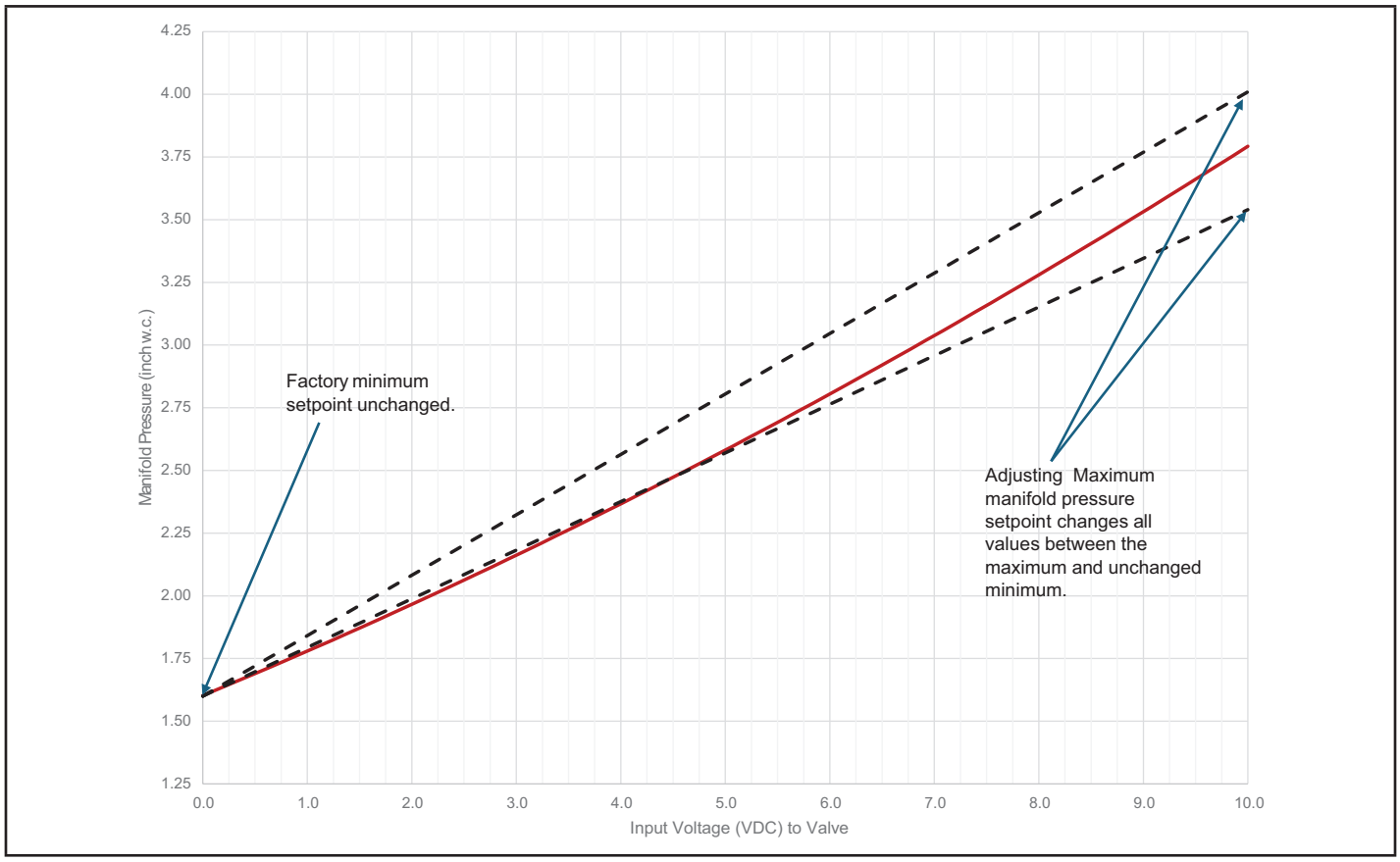


Figure 22
Input VDC vs. Max Manifold Pressure Setting Change

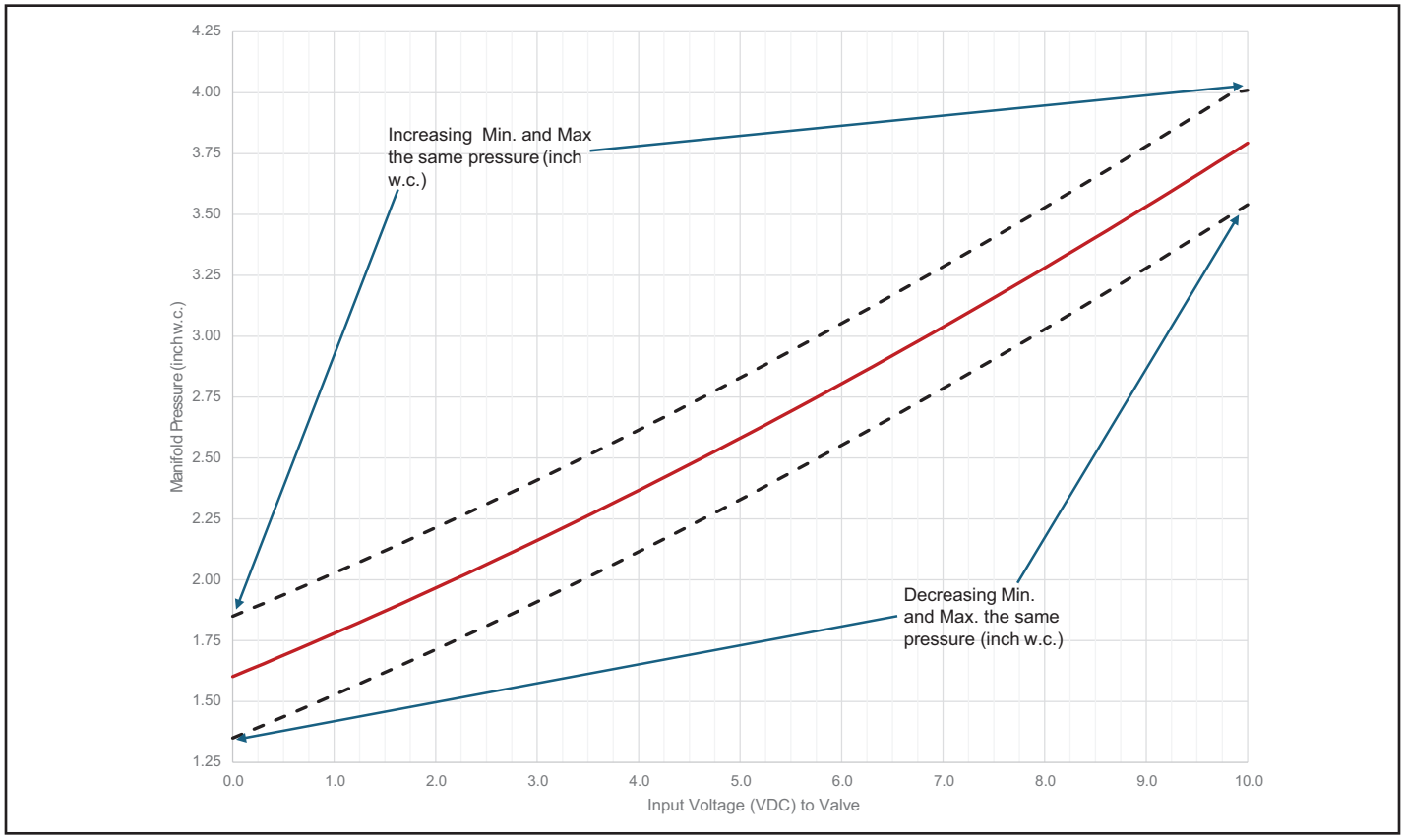


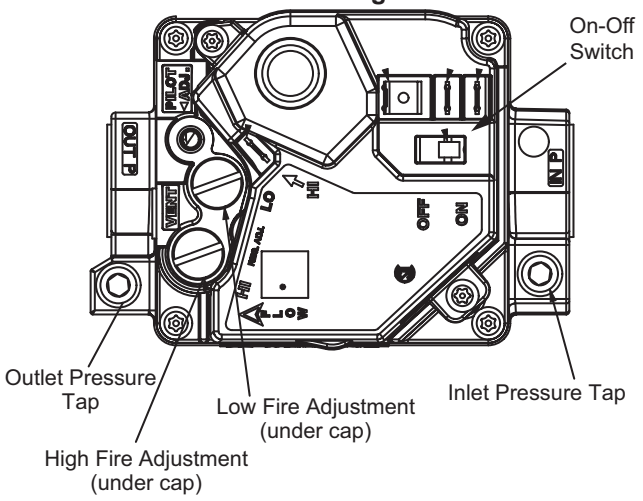
Figure 23
Input VCD vs. Both Min/Max Manifold Pressure Change

Table 6

GAS VALVE REGULATION FOR LDT UNITS

Max Inlet Pressure "W.C.	Operating Pressure "W.C. (outlet) Factory Setting			
	Natural		L.P. Propane	
	Low	High	Low	High
13.0	1.6±0.2.	3.7±0.3	5.5±0.3	10.5±0.5

WHITE RODGERS 36H54 GAS VALVE
Two-Stage



GAS VALVE SWITCH SHOWN IN **ON** POSITION.

Figure 24

WHITE RODGERS 36H27 GAS VALVE
MODULATING

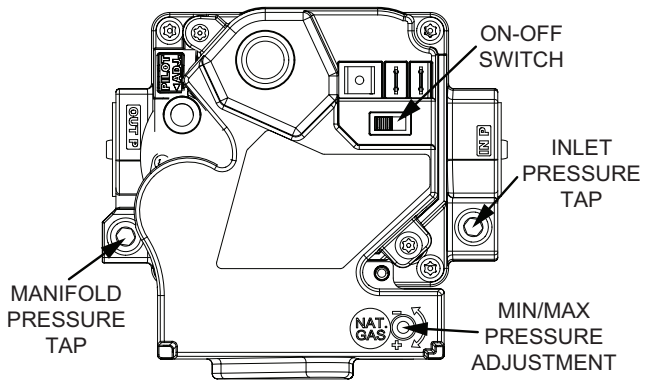


Figure 25

9–Spark Electrode E1 (Ignitor)

An electrode assembly is used for ignition spark. The electrode is mounted through holes on the left-most end of the burner support. The electrode tip protrudes into the flame envelope of the adjacent burner. The electrode assembly is fastened to burner supports and can be removed for service without removing any part of the burners.

During ignition, DSI control generates spark energy which is transmitted through an insulated noise suppression cable into E1 electrode assembly (Figure 26) at male 1/4" quick connect. Spark energy continues through electrode's center rod, arcs (sparks) across gap between rods at opposite electrode end, then ignites the fuel-air mixture at the burner. Flame travels from burner to burner until all are lit.

NOTE - *If electrode wire must be replaced, wire and suppression must be same type cable.*

The spark electrode assembly can be removed for inspection by removing the screw securing the electrode assembly and sliding it out of unit.

For proper unit operation, electrodes must be positioned and gapped correctly. Spark gap may be checked with appropriately sized twist drills or feeler gauges. Disconnect power to the unit and remove electrode assembly. The gap should be between 0.125" + 0.015" (3.2 mm + .4 mm). See Figure 26.

The noise suppression cable is a 8 mm silicone-insulated stranded high voltage wire. The wire uses 1/4" (6.35 mm) female quick connect on the electrode end and female spark plug-type terminal on the ignition control end

⚠ IMPORTANT

In order to maximize spark energy to electrode, high voltage wire should touch unit cabinet as little as possible.

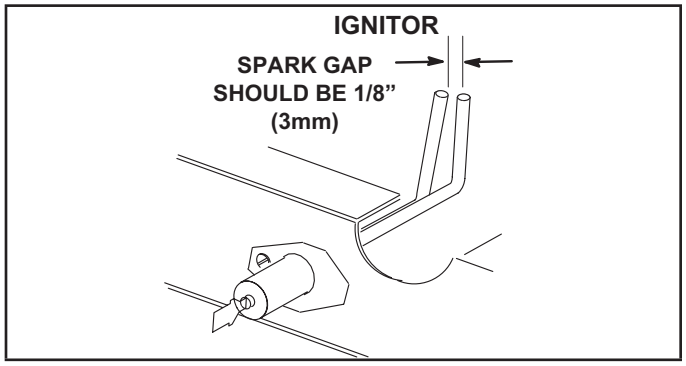


Figure 26

10–Flame Sensors

Flame rectification sensing is used on all LGT units. When a flame is present, a small electric current (micro amps) flows out of the DSI control's FS terminal through the flame to ground. Conversely, when the flame is not present, current should not flow. The designed electrical pathway for current flow is DSI control to wire harness to FS1 electrode to FLAME to ground (via either burner assembly or E1 ground rod).

The flame sensor electrode is mounted through a hole in the burner support, electrode tip protrudes into the flame envelope of the appropriate burner, and the electrode assembly is secured with a screw to burner support. The electrode assembly can be removed for service without removing any part of the burners. A side view of the FS electrode can be seen in Figure 27. The FS electrode is designed so the tips are at least 1/2" (12.7 mm) inside the flame envelope. FS electrode is not field adjustable. Do not bend or alter the electrode as this may create a hazardous condition that can cause property damage or personal injury.

To measure flame current, follow the procedure:

1. Disconnect power to unit.
2. Remove lead from sensing electrode and install a 0-50DC microamp meter in series between the sensing electrode and the sensing lead.
3. Reconnect power and adjust thermostat for heating demand.
4. When flame is established, microamp reading should be 0.5 to 1.0. Drop out signal is .09 or less.
5. Remove heating demand and disconnect power to unit before disconnecting meter.
6. Make sure sensor wire is securely reconnected before reconnecting power to unit.

NOTE - *If the meter scale reads 0, the leads are reversed. Adjust thermostat to remove heating demand, disconnect power, and reconnect leads for proper polarity.*

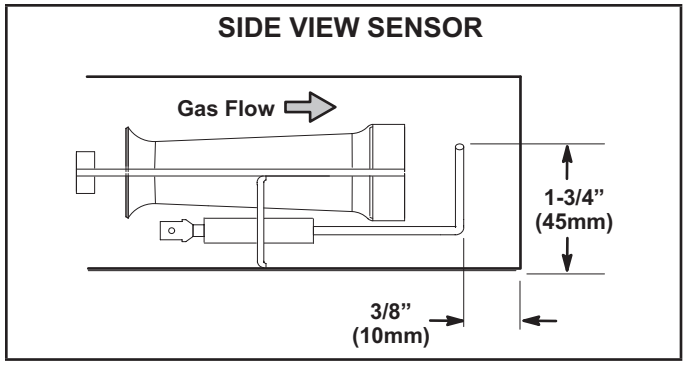


Figure 27

11–Mixed Air Temperature Sensor RT15

On units with the modulating gas heat option, an additional indoor air temperature sensor, Mixed Air Temperature RT15, is installed in the blower compartment. The sensor measures the temperature of indoor air downstream of the indoor coil and prior to entering the blower intake. The Mixed Air Temperature Sensor is a 2-wire, 10k thermistor that snaps into a 9/16" diameter hole. Refer to Figure 28 for installed location.

12–Discharge Air Temperature RT6

All units are equipped with a Discharge Air Temperature Sensor RT6 (DAT). The RT6 Sensor is a 2-wire 10K thermistor whose length varies based upon unit options. The DAT (RT6) sensor has 3 possible factory locations. The most common, or standard non-modulating gas heat, location is illustrated in Figure 29. The DAT (RT6) location changes with either of the following options: Remote RT6 or Modulating Gas Heat.

For units with the Remote RT6 option, DAT (RT6) is a field installed option shipped as a Bag Assembly with instructions. Refer to Figure 30 for the Bag Assembly shipping location.

For the units with the Modulating Gas Heat option, the DAT (RT6) is a multi-part assembly. The assembly consists of the RT6 sensor, a sensor positioning bracket, a short tube, and long tube. The assembly is designed for air to be drawn into the long tube air holes (in the heating compartment) and exits at the short tube's open end (in the blower compartment). RT6 sensor has been factory positioned near the short tube's open end and along the tube's centerline (not touching the tube sides). Refer to Figure 31 for the details regarding the installed location DAT (RT6) assembly.

NOTE - *For units with Modulating Gas Option AND configured for Horizontal Ductwork (Side Discharge and Return air flow), the Remote RT6 Option MUST be used.*

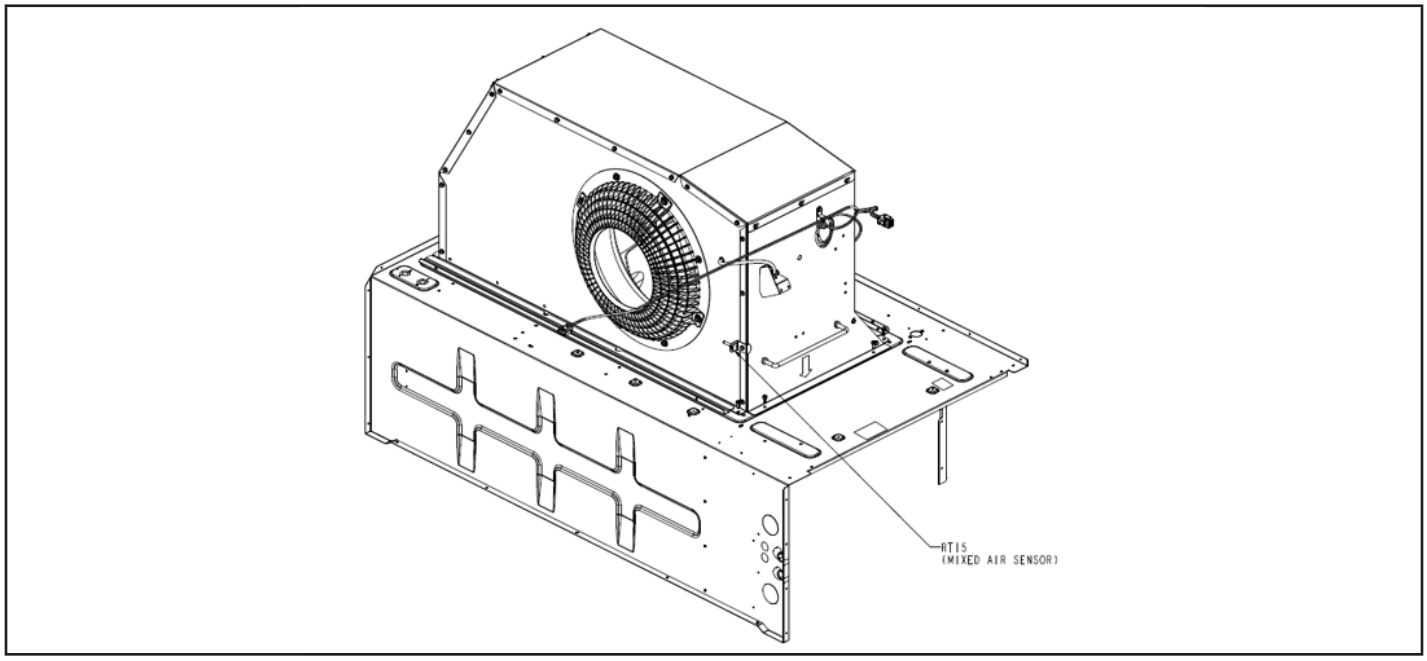


Figure 28
RT15 Mixed Ar Temperature (Direct Plus ECM Blower)

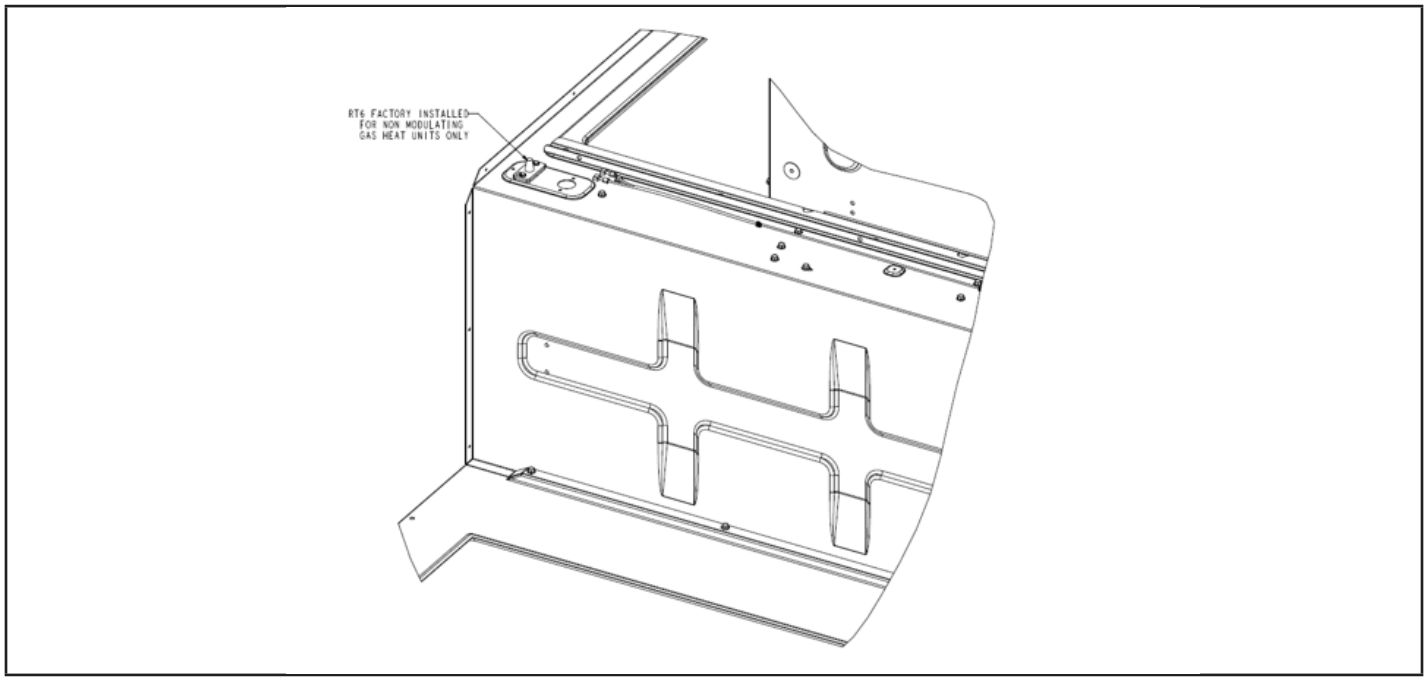


Figure 29
Standard RT6 Location (Non-Modulating Gas Heat) - Blower Compartment Left Rear Blower Deck

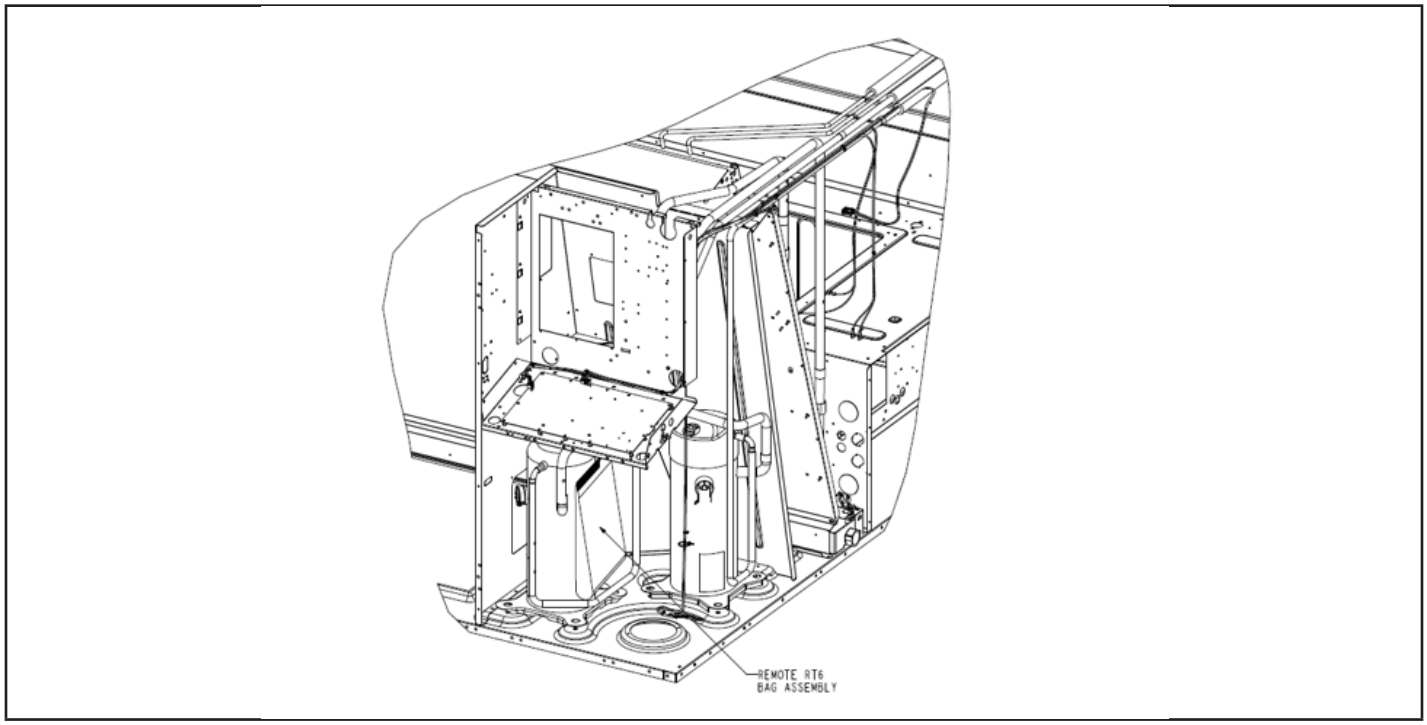


Figure 30
Remote RT6 - Control Compartment

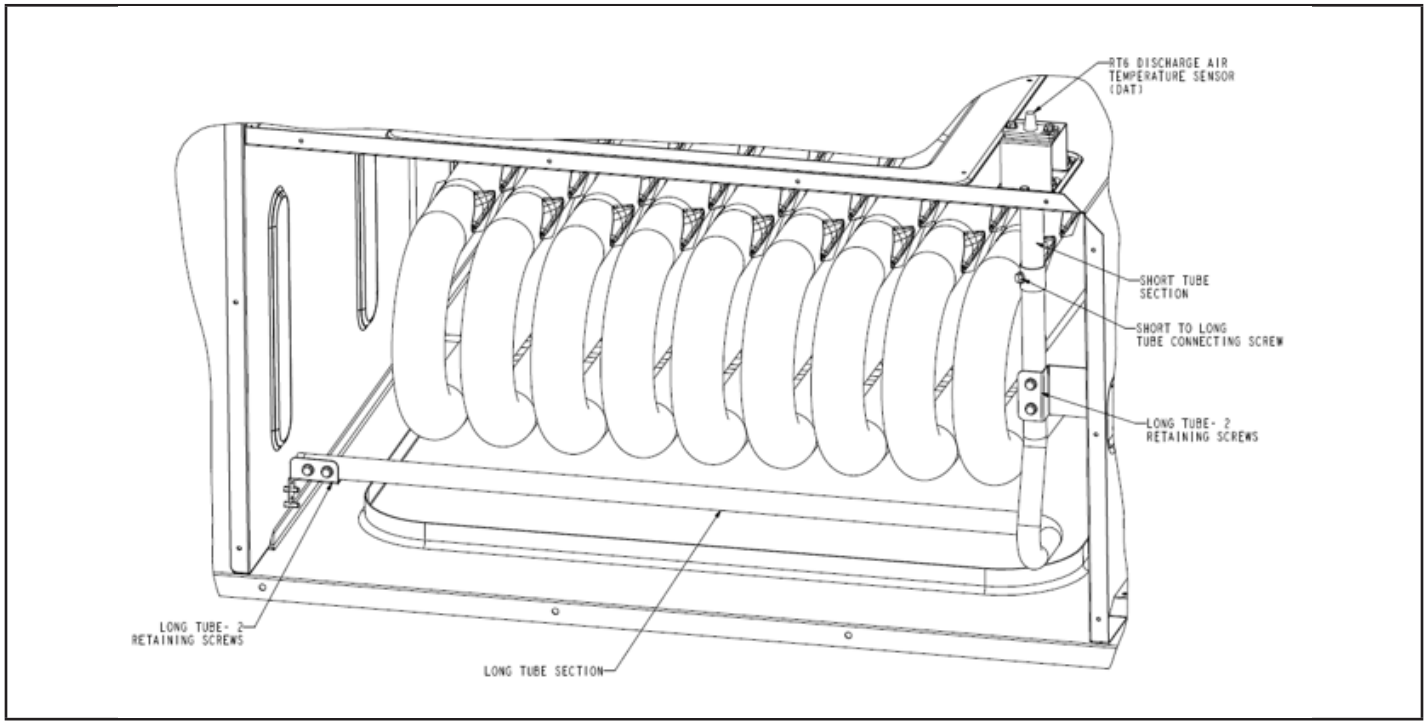


Figure 31
Modulating Gas Option - Back of Unit with Rear Panels Removed

TO REPLACE SHORT TUBE

(refer to Figure 31)

1. Remove Horizontal discharge cover (at rear of unit).
2. Remove and retain screw connecting short tube to long tube.
3. Open Blower Access Panel and remove blower assembly to gain access to DAT (RT6) Assembly.
4. Remove and retain 3 screws securing the RT6 positioning bracket to blower deck. If preferred, RT6 sensor can be removed from positioning bracket by removing 2 of the screws (see note).
5. Slip Sensor & positioning bracket (assembled) from inside short tube and set aside.
6. Remove and retain 2 screws securing short mounting tube plate to blower deck.
7. Lift short tube up and into blower compartment.
8. Reverse steps to install new short tube using retained parts.

NOTE - *When the RT6 Sensor has been removed from its positioning bracket. To re-install the sensor, first, resecure positioning bracket to blower deck. Second, slip sensor through bracket into short tube opening and torque each screw to 15 - 17 IN-LBS). Visually check sensor does nto touch sides of short tube.*

TO REPLACE LONG TUBE

(refer to Figure 31)

1. Remove Horizontal discharge cover (at rear of unit).
2. Remove and retain 5 screws securing long tube into unit (2 screws on the right bracket, 1 screw connecting short to long tube, and 2 on left bracket attached to the wall).
3. Slide right end of long tube downward and off short tube.
4. Rotate the left end of tube toward the inside of the unit while moving whole tube toward inside of unit to clear right support bracket.
5. Slip tube out the side discharge opening.
6. Reverse steps to install new tube using retained screws.

13–Direct Spark Ignition Control (A3)

⚠ WARNING

Shock hazard. Spark related components contain high voltage which can cause personal injury or death. Disconnect power before servicing. Control is not field repairable. Unsafe operation will result. If control is inoperable, simply replace the entire control.

The Direct Spark Ignition (DSI) control performs or manages several key functions during gas heating demand cycle. Several of the key functions are ignition sequence, gas valve operation (GV1, GV4), Combustion Air Inducer operation (B6), monitoring and responding to safety switches (S10, S18, S47), and heating sequence extinguishment.

The DSI control's red light (LED) is provided as a visual communication of the current operational status or active errors (refer to Table 7 for LED Codes).

Additionally, the DSI control communicates information to main CORE control using MODBUS.

Operation - Normal

On activation of W1 heating demand to A3 Direct Spark Ignition (DSI) control, a check for proper switch contact positions: S10 Limit (closed); S47 Rollout (closed); S18 Pressure switch (open) is performed. Once this check is complete and conditions are correct, the DSI control activates B6 Combustion Air Inducer and waits for the S18 Pressure switch contacts to change from open to closed. After S18 contact have closed (CAI operation proven), DSI control starts a 30 second Pre-Purge Period. The **Pre-Purge** period enables the combustion air inducer to vent exhaust gases present in the burners, heat exchanger tubes, and collector box. With S18 Pressure switch contacts closed and expiration of Pre-Purge period, the DSI control starts the Trial for Ignition sequence.

A **Trial for Ignition** starts with DSI control simultaneously activating 2-stage gas valve GV1 (Low Fire) OR modulating gas valve GV4 (min. position) and the E1 Spark Electrode. DSI control deactivates the E1 Spark Electrode immediately when EITHER a flame is sensed at FS1 Flame Sense Electrode OR expiration of the 10 second Trial for Ignition Period.

NOTE - *The blower operation is managed by the CORE Controller. At the start of the Trial for Ignition Period, the CORE Controller initiates the Blower On Delay timer.*

Once the flame is established (sensed), the ignition control then proceeds to "steady state" mode where all inputs are monitored to ensure the S10 limit switch, S47 roll-out switch and S18 prove switch are closed as well as flame remains present (sensed via FS1). Refer to Table 7 for A3 DSI control status codes and definitions.

NOTE - *For units equipped with modulating gas valve GV4 option, after flame establishment, GV4 gas valve starts modulating based upon the CORE provided position signal.*

If additional heating demand W2 is applied to the DSI control, the DSI control switches the 2-stage gas valve GV1 from Low to High Fire.

When heating demand is removed from the DSI control, gas valve (GV1, GV4) is de-energized. DSI control continues Combustion Air Inducer operation for a 45 second Post-Purge Period, then deactivates the Combustion Air Inducer.

NOTE - *CORE controller starts Blower Off Delay timer when heating demand is removed (satisfied).*

Operation - Abnormal

If flame is not sensed during the **Trial for Ignition***,* A3 DSI control will deactivate the gas valve and operate B6 CAI operating for a 30 second **Inter-Purge Period**. The Inter-Purge period enables combustion air inducer to vent built-up gas, such as unburned fuel-air mixture or exhaust products, from the burners, heat exchanger tubes, and collector box. After expiration of the Inter-Purge Period, DSI control simultaneously activates 2-stage gas valve GV1 (Low Fire) OR modulating gas valve GV4 (min. position) and the E1 Spark Electrode. DSI control deactivates the E1 Spark Electrode immediately when EITHER a flame is sensed at FS1 Flame Sense Electrode OR expiration of the 10 second Trial for Ignition Period. The DSI will attempt, up to 2 more times, a Trial for Ignition, to establish a flame during the same heating demand. Refer to Table 7 for A3 DSI control status codes and definitions.

If flame is established, then lost during "steady state" mode, A3 DSI control will deactivate the gas valve and operate B6 CAI operating for a 30 second **Inter-Purge Period**. The Inter-Purge period enables combustion air inducer to vent exhaust gases from the burners, heat exchanger tubes, and collector box. After expiration of the Inter-Purge Period, DSI control simultaneously activates 2-stage gas valve GV1 (Low Fire) OR modulating gas valve GV4 (min. position) and the E1 Spark Electrode. DSI control deactivates the E1 Spark Electrode immediately when EITHER a flame is sensed at FS1 Flame Sense Electrode OR expiration of the 10 second Trial for Ignition Period. The DSI will attempt, up to 4 more times, an Ignition Recycle to re-establish a flame during the same heating demand. Refer to Table 7 for A3 DSI control status codes and definitions.

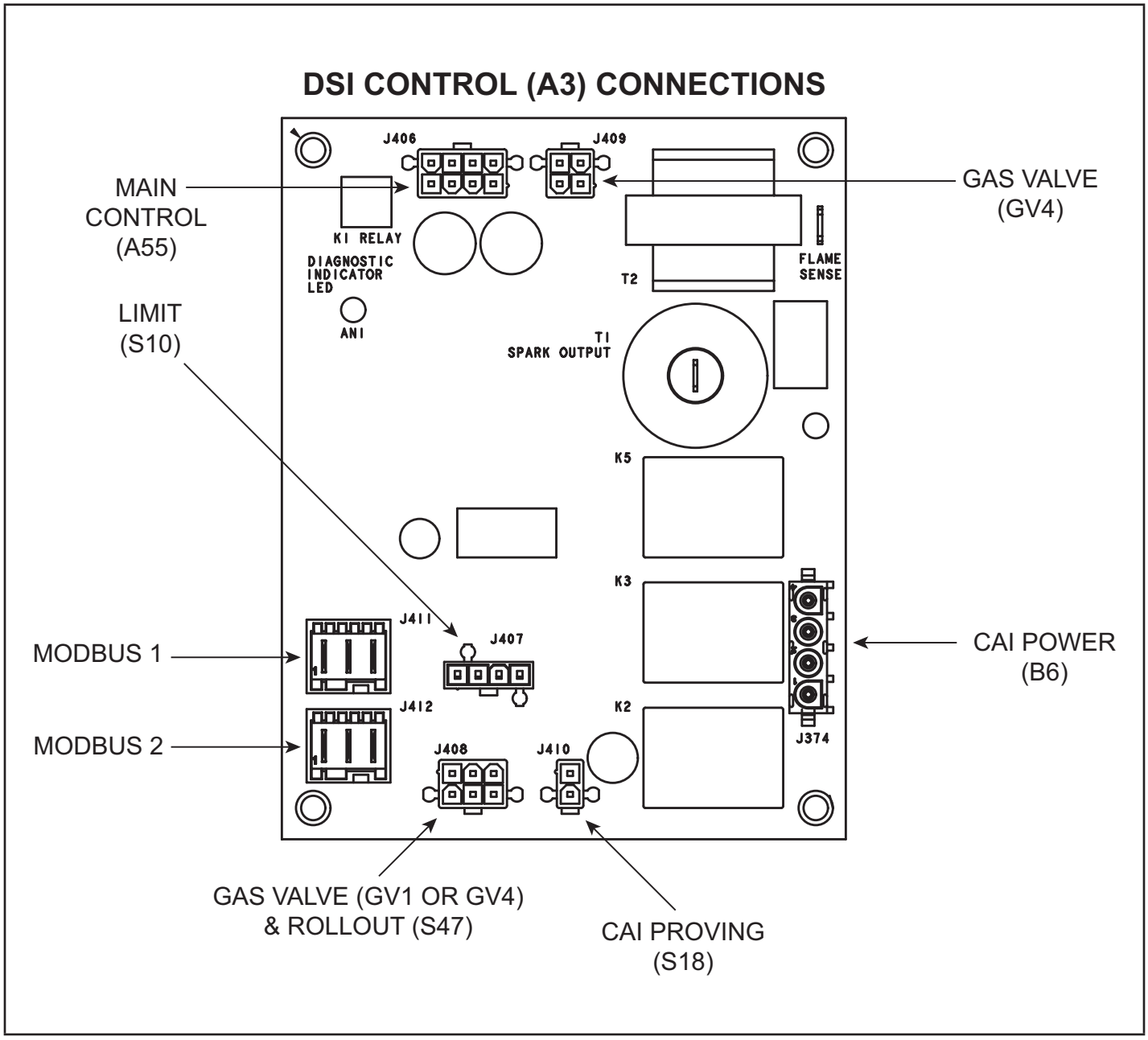


Figure 32

Table 7
A3 DIRECT SPARK IGNITION CONTROL (DSI) – DIAGNOSTIC CODES AND DETAILS

Diagnostic Indicator	Status	Description	Potential Remedy Actions
Slow Flash	Normal Operation	No Heating demand at DSI control.	None
Fast Flash	Normal Operation	Heating demand at DSI control	None
Steady Off	Internal Control Fault OR No Power	DSI control is OFF (no 24VAC power) or has an internal fault.	Determine status of 24VAC power supplied to DSI (refer to Unit Wiring Diagram). • If DSI control is ON (24VAC present), replace DSI control. • If DSI control is OFF (no 24VAC present), correct issues and restore 24VAC to DSI control.
Steady On	Control Internal Failure	**Internal DSI control board hardware fault.** • DSI internal hardware fault detected, indicator activated, DSI function locked out. • DSI automatically removes lockout if hardware fault clears.	• Power cycle DSI control to clear fault. • If fault remains, replace DSI control.
1 Flash	S47 Rollout Open	**DSI detects open Rollout contacts (N.C.) during W1 demand.** • When contacts open, DSI closes Gas Valve, runs Combustion Air Inducer (CAI) high speed, activates indicator flash. DSI function locked out. • If Rollout manually reset (contacts close), DSI continues CAI operation for post purge period, then turns CAI off, indicator flash continues. DSI remains locked out.	• DSI Lockout cleared by a manual reset of Rollout switch before power cycling DSI. • Investigate / correct possible issues leading to Rollout contacts opening (e.g., CAI off or failed, blocked tubes, blocked flue, etc.). • Verify correct Rollout operation (see section, *5. Flame Roll-out Limit Switch S47*).
2 Flashes	S10 Limit Open or Opened multiple times during one heating demand	**DSI detects open Limit contacts (N.C.) during W1 demand.** • When contacts open, DSI closes Gas Valve, runs CAI high speed, activates indicator flashes. • When contacts re-close & W1 demand present, DSI restarts ignition sequence, deactivates indicator flashes. • When contacts re-close & no W1 demand present, DSI runs CAI for post purge period, then turns CAI off, deactivates LED flashes. ***NOTE** - for 3rd occurrence of open contacts during same W1 demand, DSI activates indicator flashes, DSI function is locked out.*	• DSI Lockout cleared by Limit contacts re-close AND 1 of the following occurs: expiration of a 1-hour timer; removing W1 demand for 5 - 10 seconds from DSI; or power cycling DSI. • Investigate / correct possible issues leading to Limit contacts opening (e.g., low blower airflow, duct restrictions, high gas pressure, etc.). • Verify correct Limit operation (see section, *2. Primary High Temperature Limits S10*).
3 Flashes	S18 Pressure Switch open with CAI ON	**DSI detects Pressure switch contacts (N.O.) did not close when CAI activated.** • DSI activates CAI, if Pressure switch contact closure is not detected in 300 seconds, DSI turns off CAI for 300 seconds, then repeats sequence until Pressure switch contacts close or W1 demand removed.	• Confirm CAI is ON. • Verify Pressure switch tubing integrity (e.g., no obstructions, kinks, cracks, or splits). • Verify Pressure switch proper contact operation (see section, 7-Combustion Air Prove Switch S18).

4 Flashes	Control lockout – failed to detect or sustain flame	**DSI does not sense flame during initial trial for ignition.** When flame not sensed during ignition period, DSI closes Gas Valve, deenergizes ignitor, runs CAI for inter-purge period, activates LED Flashes. After CAI inter-purge period, DSI reenergizes ignitor, opens Gas Valve, deactivates indicator flashes. ***NOTE -*** *on the 3rd failure to detect flame during the same W1 demand, DSI runs CAI for inter-purge period, turns off CAI, and activates indictor flashes. DSI function locked out.* **Flame established during initial trial for ignition, then lost afterwards.** When flame is lost, DSI closes Gas Valve, runs CAI for inter purge period, activates indicator flashes. After inter purge period, DSI maintains CAI operation, opens Gas Valve, energizes spark and attempts to re-establish flame. ***NOTE -*** *on the 5th loss of established flame during the same W1 demand, DSI closes Gas Valve, runs CAI for post purge period, turns off CAI, activates indicator flash. DSI function locked out.*	• DSI Lockout cleared when one of the following occurs: expiration of a 1-hour timer; removing W1 demand for 5 - 10 seconds from DSI; or power cycling DSI. • Confirm FS1 flame sensor operation (see section, 11-Flame Sensor). • Confirm E1 ignitor operation (see section, 10-Spark Electrode (Ignitor)). • Confirm adequate Gas Valve flow during trial for ignition.
5 Flashes	Flame present with gas off	**DSI detects flame signal for more than 4 seconds when Gas Valve is closed.** • While flame is sensed, DSI turns on and runs CAI, activates indicator flashes. • When flame is no longer sensed, DSI runs CAI for post purge period, then turns CAI off, LED remains Flashing, DSI function locked out.	• DSI Lockout cleared when one of the following occurs: expiration of a 1-hour timer; removing W1 demand for 5 - 10 seconds from DSI; or power cycling DSI. • Confirm FS1 flame sensor operation (see section, 11-Flame Sensor).
6 Flashes	Pressure Switch closed with CAI OFF	**DSI detects closed Pressure Switch contacts (N.O.) when CAI is off.** • DSI control finds Pressure Switch contacts closed prior to pre-purge ignition step. DSI activates indicator flashes and waits indefinitely for contacts to open before turning on CAI.	• Confirm CAI is OFF. • Verify Pressure Switch proper operation (see section, 7-Combustion Air Prove Switch S18).
7 Flashes	Not used	Not Applicable	Not Applicable
8 Flashes	Pressure switch opened repeatedly during heating demand	**DSI detects Pressure Switch contacts (N.O.) change from Closed to Open 3 times during same W1 demand.** ***NOTE -*** *On 3rd contact opening during same W1 demand, DSI closes Gas Valve, runs CAI for post purge period, then turns CAI off, activates indicator flashes, DSI function locked out.*	• DSI Lockout cleared when one of the following occurs: expiration of a 1-hour timer; removing W1 demand for 5 - 10 seconds from DSI; or power cycling DSI. • Verify Pressure switch tubing integrity (e.g., no obstructions, kinks, cracks, or splits). • Verify Pressure Switch proper contact operation (see section, 7-Combustion Air Prove Switch S18).

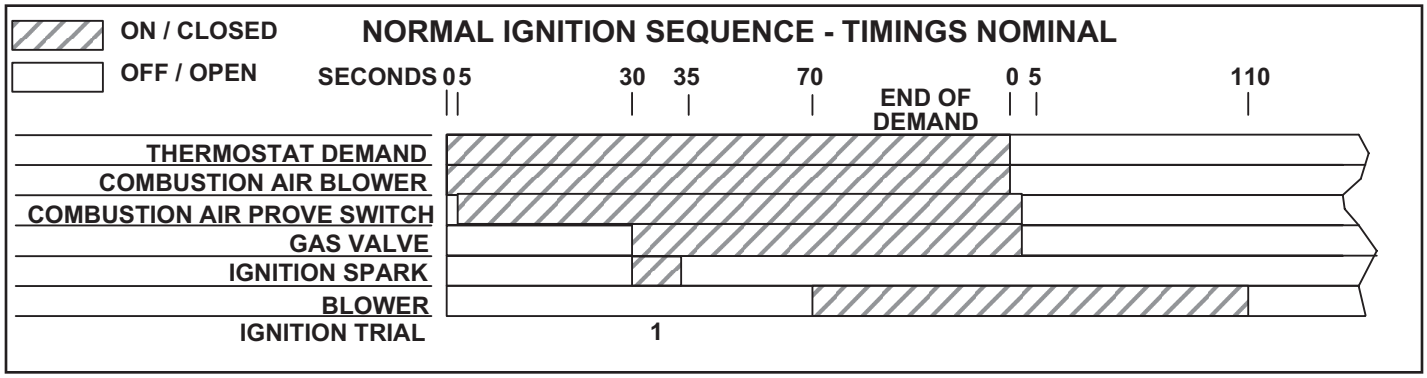


Figure 33

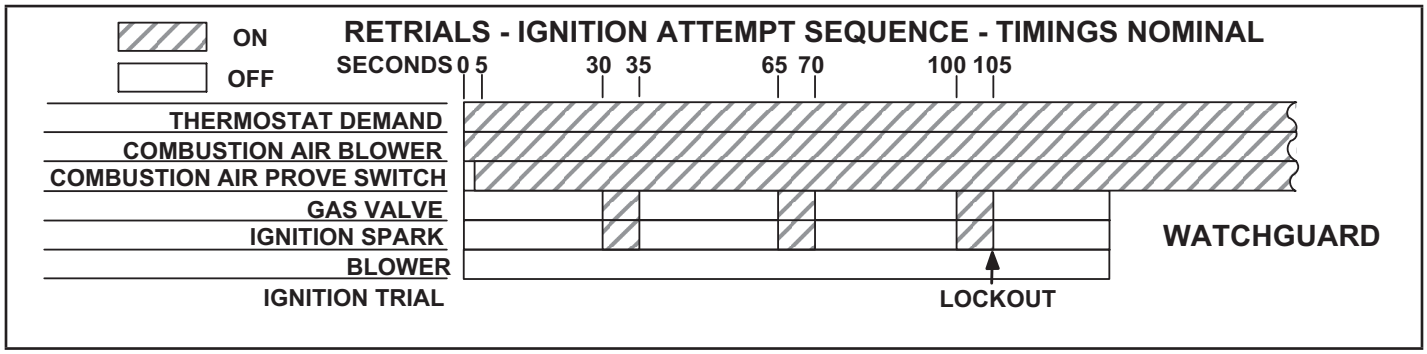


Figure 34

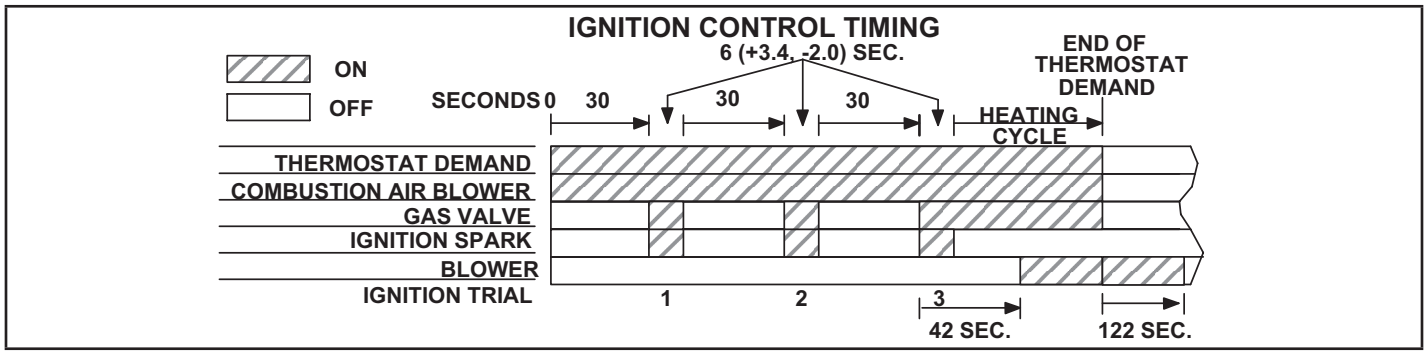


Figure 35

14–Balance Point Parameter 526

When outdoor air temperature is above setpoint (35°F ± 5F° default), the unit will operate in heat pump mode. When outdoor air temperature falls below setpoint, the unit will operate in gas heat mode. The balance point setpoint can be adjusted using the following mobile service app menu path:

Go to RTU MENU > SETTINGS > RTU OPTIONS > EDIT PARAMETER = 526 (HP DF BALANCE POINT)

NOTE - *Only stage one is used; stage 2 is not used.*

Although the recommended balance point setpoint is 35F, the setpoint can be adjusted. Weigh the comfort / cost benefit when increasing the setpoint.

II–PLACEMENT AND INSTALLATION

Make sure the unit is installed in accordance with the installation instructions and all applicable codes. See accessories section for conditions requiring use of the optional roof mounting frame (LARMF).

III–START-UP – OPERATION

Refer to start-up directions and refer closely to the unit wiring diagram when servicing. See unit nameplate for minimum circuit ampacity and maximum fuse size.

A–Preliminary and Seasonal Checks

1 - Make sure the unit is installed in accordance with the installation instructions and applicable codes.

2 - Inspect all electrical wiring, both field and factory installed for loose connections. Tighten as required. Refer to unit diagram located on inside of unit control box cover.

3 - Check to ensure that refrigerant lines are in good condition and do not rub against the cabinet or other refrigerant lines.

4 - Check voltage at the disconnect switch. Voltage must be within the range listed on the nameplate. If not, consult the power company and have the voltage corrected before starting the unit.

5 - Recheck voltage and amp draw with unit running. If voltage is not within range listed on unit nameplate, stop unit and consult power company. Refer to unit nameplate for maximum rated load amps.

6 - Inspect and adjust blower belt (see section on Blower Compartment - Blower Belt Adjustment).

B–Mechanical Heating Start Up

NOTE - The outdoor air ambient temperature must be above the heat pump balance point setpoint (35_F default) to enable heat pump operation. The balance point setpoint can be adjusted using the following mobile service app menu path:

Go to RTU MENU > SETTINGS > RTU OPTIONS > EDIT PARAMETER = 526 (HP DF BALANCE POINT)

Set thermostat or temperature control device to initiate a first-stage heating demand.

A first-stage heating demand (W1) will energize compressors 1 and 2. All outdoor fans are energized with a W1 demand.

NOTE - L1 and L2 reversing valves are de-energized in the heating mode.

7 - An increased heating demand (W2) will energize high gas heat and de-energize heat pump operation.

C–Gas Heating Start Up

FOR YOUR SAFETY READ BEFORE LIGHTING

⚠ WARNING

Danger of explosion. Can cause injury or death. Do not attempt to light manually. Unit has direct spark ignition system.

⚠ WARNING

Danger of explosion. Can cause injury or product or property damage. If overheating occurs or if gas supply fails to shut off, shut off the manual gas valve to the appliance before shutting off electrical supply.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Do not use this unit if any part has been under water. Immediately call a qualified service technician to inspect the unit and to replace any part of the control system and any gas control which has been under water.

⚠ WARNING

The heat exchanger in this unit could be a source of smoke on initial firing. Take precautions with respect to building occupants and property. Vent initial supply air outside when possible.

BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

The gas valve may be equipped with either a gas control lever or gas control knob. Use only your hand to push the lever or turn the gas control knob. Never use tools. If the lever will not move or the knob will not push in or turn by hand, do not try to repair it. Call a qualified service technician. Force or attempted repair may result in a fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed

In case of a safety shutdown, move thermostat switch to OFF and return the thermostat switch to HEAT to reset ignition control. Placing Furnace In Operation

Turning on Gas to Unit

1. Set thermostat to lowest setting.
2. Turn off all electrical power to appliance.
3. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
4. Open or remove the heat section access panel.
5. Move gas valve switch to **"OFF"**. Do not force. See Figure 36 and Figure 37.
6. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP**! Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you do not smell gas, go to the next step.
7. Move gas valve switch to "**ON**". Do not force. See Figure 36 and Figure 37.
8. Close or replace the heat section access panel.
9. Turn on all electrical power to appliance.
10. Set thermostat to desired setting.

    NOTE - *When unit is initially started, steps 1 through 10 may need to be repeated to purge air from gas line.*
11. The ignition sequence will start.
12. If the appliance does not light the first time (gas line not fully purged), it will attempt two more ignitions before locking out.
13. If lockout occurs, repeat steps 1 through 10.
14. If the appliance will not operate, follow the instructions "Turning Off Gas to Appliance" and call your service technician or gas supplier.

Turning Off Gas to Appliance

1. If using an electromechanical thermostat, set to the lowest setting.
2. Before performing any service, turn off all electrical power to the appliance.
3. Open or remove the heat section access panel.
4. MOVE gas valve switch to "OFF". Do not force. See Figure 36 and Figure 37.
5. Close or replace the control access panel.

D–Safety or Emergency Shutdown

Turn off power to the unit. Close manual and main gas valves. No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed

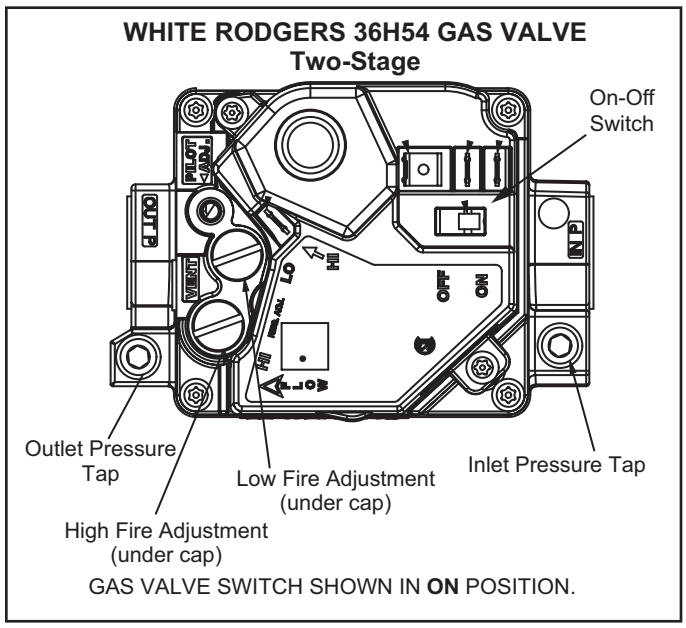


Figure 36

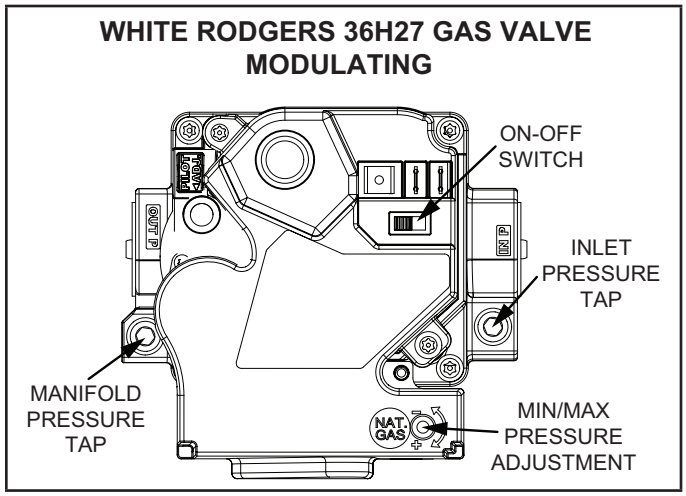


Figure 37

E–Cooling Start Up

⚠ IMPORTANT

If unit is equipped with a crankcase heater. Make sure heater is energized 24 hours before unit start-up to prevent compressor damage as a result of slugging.

1 - Initiate full load cooling operation using the following mobile service app menu path:

RTU MENU > SERVICE > COMPONENT TEST > COOLING > COOLING STAGE 3

2 - Refer to Cooling Operation section for cooling start-up.

3 - Units have two refrigerant circuits. See Figure 38 or Figure 39.

4 - Each refrigerant circuit is charged with R454B refrigerant. See unit rating plate for correct amount of charge.

5 - Refer to Refrigerant Check and Charge section for proper method to check refrigerant charge.

Three Phase Scroll Compressor Voltage Phasing

Three phase power supplied to the unit disconnect switch must be phased sequentially to ensure the scroll compressor and indoor blower rotate in the correct direction. Compressor and blower are wired in phase at the factory. Power wires are color-coded as follows: line 1-red, line 2-yellow, line 3-blue.

1 - Observe suction and discharge pressures on unit start-up.

2 - Suction pressure must drop, discharge pressure must rise.

If pressure differential is not observed:

3 - Disconnect all remote electrical power supplies.

4 - Reverse any two field-installed wires connected to the power entry component, disconnect switch (S48), circuit breaker (CB10), or terminal block (TB2).

5 - Make sure the connections are tight. Discharge and suction pressures should operate at their normal start-up ranges.

F–Safety or Emergency Shutdown

Turn off power to the unit. Close manual and main gas valves.

REFRIGERANT STAGES - TWO FANS
LDT078, 092, 102, 120:

Two-Stage Thermostat/Control:

Y1 Demand = Outdoor Fan 1 HIGH Speed, Fan 2 OFF
Y2 Demand = Outdoor Fans 1 & 2 HIGH Speed
W1 Demand (Heat Pump Heating) =
Outdoor Fans 1 & 2 HIGH Speed

Three-Stage Thermostat/Control:

Y1 Demand = Outdoor Fan 1 LOW Speed, Fan 2 OFF
Y2 Demand = Outdoor Fans 1, 2 MEDIUM Speed
Y3 Demand = Outdoor fans 1, 2, HIGH Speed
W1 Demand (HP Heating)=
Outdoor Fans 1, 2 High Speed

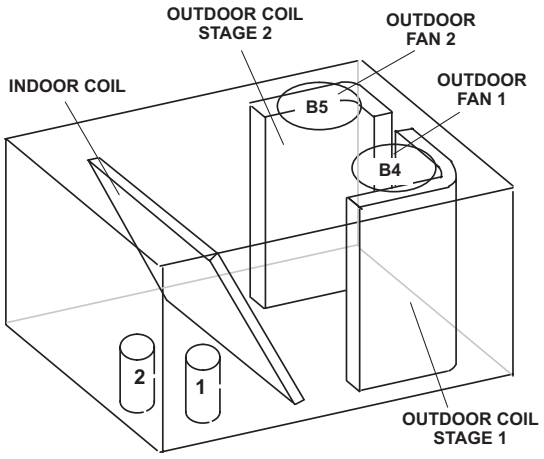


Figure 38

REFRIGERANT STAGES - 152

Two-Stage Thermostat/Control:

Y1 Demand = Outdoor Fans 1 & 3, HIGH Speed, 2 & 4 OFF
Y2 Demand = Outdoor Fans 1, 2, 3, & 4 HIGH Speed
W1 Demand (Heat Pump Heating) =
Outdoor Fans 1, 2, 3, & 4 HIGH Speed

Three-Stage Thermostat/Control:

Y1 Demand = Outdoor Fans 1 & 3, LOW Speed
Y2 Demand = Outdoor Fans 1, 2, 3, & 4 MEDIUM Speed
Y3 Demand = Outdoor Fans 1, 2, 3, & 4 HIGH Speed
W1 Demand (HP Heating)=
Outdoor Fans 1, 2, 3, & 4 HIGH Speed

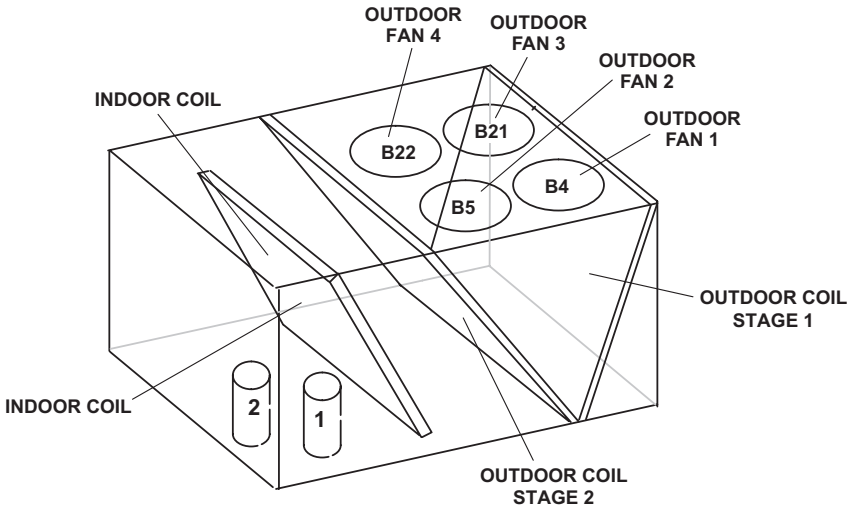


Figure 39

IV–SYSTEMS SERVICE CHECKS

⚠ WARNING

Refrigerant can be harmful if it is inhaled. Refrigerant must be used and recovered responsibly.

Failure to follow this warning may result in personal injury or death.

A–Charging

⚠ WARNING

Do not exceed nameplate charge under any condition.

This unit is factory charged and should require no further adjustment. If the system requires additional refrigerant, reclaim the charge, evacuate the system, and add required nameplate charge.

Refrigerant Charge R-454B			
Unit	Stage	M_c(lbs)	M_c(kg)
LDT 078	Stage 1	11.50	5.22
	Stage 2	11.00	4.99
LDT 092	Stage 1	11.00	4.99
	Stage 2	11.25	5.10
LDT 102	Stage 1	10.85	4.92
	Stage 2	11.25	5.10
LDT 120	Stage 1	10.69	4.85
	Stage 2	10.63	4.82
LDT 152	Stage 1	15.00	6.80
	Stage 2	12.75	5.78
LDT078 w/ Humiditrol	Stage 1	13.00	5.90
	Stage 2	11.00	4.99
LDT092 w/ Humiditrol	Stage 1	13.75	6.24
	Stage 2	11.25	5.10
LDT102 w/ Humiditrol	Stage 1	15.50	7.03
	Stage 2	11.25	5.10
LDT120 w/ Humiditrol	Stage 1	13.50	6.12
	Stage 2	10.63	4.82
LDT152 w/ Humiditrol	Stage 1	16.00	7.26
	Stage 2	12.75	5.78

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed and, since flammability is a consideration, the following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations,
- Evacuate the circuit,
- Purge the circuit with inert gas,
- Evacuate,
- Purge with inert gas,
- Open the circuit

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

In addition to conventional charging procedures, the following requirements shall be followed.

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the refrigerating unit is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigerating unit.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely. When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i. e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure- relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

NOTE - *System charging is not recommended below 60F (15C). In temperatures below 60F (15C), the charge must be weighed into the system.*

If weighing facilities are not available, or to check the charge, use the following procedure:

⚠ IMPORTANT

Charge unit in standard cooling mode.

1 - Attach gauge manifolds to discharge and suction lines. With the economizer disabled, operate the unit in cooling mode at high speed using the following mobile service app menu path:

SERVICE > COMPONENT TEST > COOLING > COOLING STAGE 3

2 - Use a thermometer to accurately measure the outdoor ambient temperature.

3 - Apply the outdoor temperature to Table 8 through Table 17 to determine normal operating pressures.

4 - Pressures are listed for sea level applications at 80F dry bulb and 67F wet bulb return air.

5 - Compare the normal operating pressures to the pressures obtained from the gauges. Minor variations in these pressures may be expected due to differences in installations. Significant differences could mean that the system is not properly charged or that a problem exists with some component in the system. Correct any system problems before proceeding.

6 - If discharge pressure is high, remove refrigerant from the system. If discharge pressure is low, add refrigerant to the system.

- Add or remove charge in increments.
- Allow the system to stabilize each time refrigerant is added or removed.

7 - Use the following approach method along with the normal operating pressures to confirm readings

Table 8 581257-01
LDT078

OD Coil Entering Air Temp	Circuit 1			Circuit 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp ±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp ± 1°F
65°F	238	127	2	220	131	5
75°F	274	130	2	254	135	3
85°F	314	131	2	292	137	1
95°F	357	132	2	333	138	1
100°F	404	133	3	376	140	1
115°F	452	136	2	431	143	2

Table 9 581434-01
LDT078 w/ Reheat

OD Coil Entering Air Temp	Circuit 1			Circuit 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp ±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp ± 1°F
65°F	243	125	2	220	131	5
75°F	276	126	2	254	135	3
85°F	317	128	2	292	137	2
95°F	361	128	2	333	138	2
100°F	406	131	2	376	140	2
115°F	466	132	2	431	143	2

Table 10 581258-01
LDT092

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	232	120	4	235	125	7
75 °F	269	125	2	271	129	6
85 °F	308	127	2	311	131	3
95 °F	352	130	3	356	133	4
105 °F	398	132	3	401	136	4
115 °F	450	134	4	453	139	5

Table 11 581435-01
LDT092 w/ Reheat

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	241	126	2	235	125	7
75 °F	279	127	2	271	129	6
85 °F	321	129	2	311	131	3
95 °F	371	132	3	356	133	4
105 °F	419	133	3	401	136	4
115 °F	472	135	3	453	139	5

Table 12 581259-01
LDT102

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	233	122	5	246	121	8
75 °F	271	127	3	282	125	8
85 °F	309	127	3	323	127	4
95 °F	351	129	3	365	129	4
105 °F	398	130	3	413	132	5
115 °F	447	132	4	464	135	6

Table 13 581436-01
LDT102 w/ Reheat

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	244	125	2	246	121	8
75 °F	287	126	3	282	125	8
85 °F	324	128	2	323	127	4
95 °F	378	131	3	365	129	4
105 °F	426	133	3	413	132	5
115 °F	477	134	2	464	135	6

Table 14 581260-01
LDT120

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	247.2	121.2	9	255.6	122	12
75 °F	284.3	124.7	8	293.2	125.2	8
85 °F	325.1	129.6	6	335.1	127.5	8
95 °F	368.1	132.7	6	376.4	130.6	7
105 °F	416	135.5	7	426.6	134.4	8
115 °F	464.2	137.9	8	473.1	137.2	9

Table 15 581437-01
LDT120 w/ Reheat

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	218	121	2	256	122	12
75 °F	220	122	2	293	125	8
85 °F	239	122	2	335	128	8
95 °F	379	123	2	376	131	7
105 °F	311	126	2	427	134	8
115 °F	346	128	2	473	137	9

Table 16 581261-01
LDT152

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	239	122	9	258	122	10
75 °F	276	125	8	296	124	4
85 °F	318	127	2	336	126	4
95 °F	363	132	3	389	129	5
105 °F	412	133	4	425	129	5
115 °F	467	135	4	475	131	5

Table 17 581438-01
LDT152 w/ Reheat

OD Coil Entering Temp.	CIRCUIT 1			CIRCUIT 2		
	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F	Disch. ± 10 psig	Suct. ± 5 psig	Appr. Temp±1°F
65 °F	246	124	11	258	122	10
75 °F	284	126	3	296	124	4
85 °F	325	126	2	336	126	4
95 °F	372	130	2	389	129	5
105 °F	418	133	2	425	129	5
115 °F	472	136	2	475	131	5

B–Charging - Approach Method

1 - Attach gauge manifolds to discharge and suction lines. With the economizer disabled, operate the unit in cooling mode at high speed using the following mobile service app menu path:

RTU MENU > SERVICE > COMPONENT TEST > COOLING > COOL STAGE 3

2 - Using the same thermometer, compare liquid temperature to outdoor ambient temperature.

3 - Approach Temperature = Liquid temperature (at liquid line close to pressure tap) minus ambient temperature.

4 - Refer to Table 8 through Table 17 for approach temperatures. An approach temperature greater than value shown indicates an undercharge. An approach temperature less than value shown indicates an overcharge.

5 - The approach method is not valid for grossly over or undercharged systems. Use Table 8 through Table 17 as a guide for typical operating pressures

C–Heating System Service Checks

All LDT units are ETL/CSA design certified without modification.

Before checking piping, check with gas company or authorities having jurisdiction for local code requirements. Refer to the LDT Installation instruction for more information.

1–Gas Piping

Gas supply piping must not allow more than 0.5”W.C. (124.3 Pa) drop in pressure between the gas meter and the unit. Supply gas pipe must not be smaller than the unit gas connection. Refer to installation instructions for details.

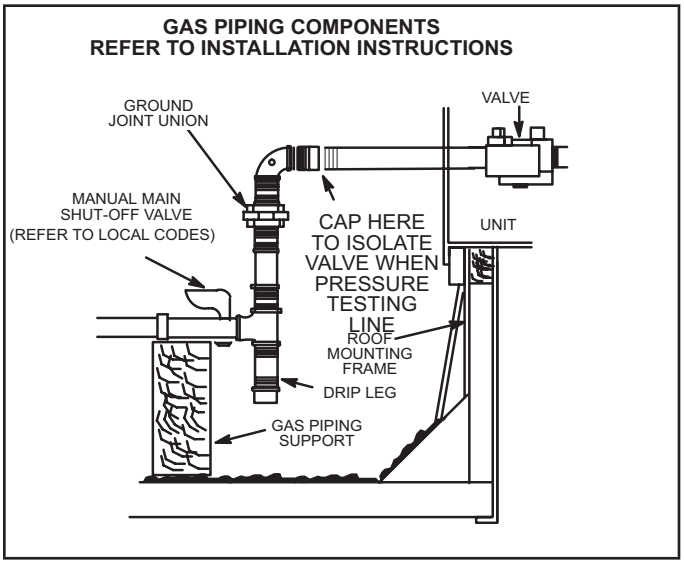


Figure 40

2–Testing Gas Piping

NOTE - *In case emergency shutdown is required, turn off the main manual shut-off valve and disconnect the main power to the unit. These controls should be properly labeled by the installer.*

When pressure testing gas lines, the gas valve must be disconnected and isolated. ***Gas valves can be damaged if subjected to more than 0.5 psig [14"W.C. (3481 Pa)].***

See Figure 40.

When checking piping connection for gas leaks, use the preferred means. Common kitchen detergents can cause harmful corrosion on various metals used in gas piping.

The use of specialty Gas Leak Detector is strongly recommended.

Do not use matches, candles, flame or any other source of ignition to check for gas leaks.

3–Supply Gas Pressure

Supply pressure should be checked with unit firing at maximum rate. For Natural Gas, supply pressure should be maintained in accordance with the specified minimum and maximum supply pressures on the unit rating plate.

For LP/propane, a natural gas to LP/propane gas changeover kit is required to convert the unit in the field. Refer to installation instructions provided with changeover kit for conversion procedure along with propane minimum and maximum supply pressures.

NOTE - *On multiple unit installations, each unit should be checked separately, with and without other units operating. Supply pressures on both single and multiple unit installations must fall within range listed on the rating plate.*

4–Supply Gas Pressure Measurement

1. Shut off the manual main supply valve (field furnished) when installing or removing the measuring device (Steps 2 and 6).
2. Connect the measuring device based upon type of gas valve.

   For White Rodgers 36H54 and 36H27 valves (Figure 36 and Figure 37), supply pressure is accessed by removing 1/8" hex screw. Remove the 1/8" hex screw and install a 1/8" fitting with hose barb. Connect tubing from the barbed fitting and route to measuring device to measure supply pressure.
3. Open manual main supply valve.
4. Ignite unit and let run for 5 minutes to allow for steady state conditions.
5. After allowing unit to stabilize for 5 minutes, record supply pressure.
6. Shut unit off and remove measuring device, tubing, or fittings as soon as an accurate reading has been obtained.

   For White Rodgers 36H54 and 36H27 valves (Figure 36 and Figure 37), remove supply pressure barbed fitting and reinstall the 1/8" hex screw.

5–Manifold Pressure Measurement and Adjustment

1 - Shut off the manual main supply valve (field furnished) when installing or removing the measuring devise (Steps 2 and 7).

2 - Connect the measuring device based upon the type of gas valve.

   For White Rodgers 36H54 and 36H27 valves (Figure 36 and Figure 37) manifold pressure, remove the 1/8" hex screw, install 1/8" fitting with hose barb, connect hose from barb to "+" side of measuring device.

3 - Ignite unit and let run for 5 minutes to allow for steady state conditions. If unit has 2 heating inputs, start on higher input.

4 - After allowing unit to stabilize for 5 minutes, record manifold pressure. Compare measurement to the unit nameplate values.

NOTE - *For elevations higher than 4500 feet above sea level, see High Altitude Adjustment section for details.*

5 - If necessary, adjust manifold pressure. Figure 36 and Figure 37 show adjustment screw(s) locations.

6 - Repeat steps 3, 4 and 5 on lower input.

7 - Shut unit off and remove measuring device as soon as accurate reading has been obtained.

   For White Rodgers 36H54 and 36H27 valves (Figure 36 and Figure 37), remove 1/8" fitting with hose barb and reinstall 1/8" hex screw.

8 - Start unit and perform leak check. Seal leaks if found.

⚠ CAUTION

For safety, connect a shut-off valve between the manometer and the gas tap to permit shut off of gas pressure to the manometer.

⚠ CAUTION

Disconnect heating demand as soon as an accurate reading has been obtained.

6–Proper Gas Flow

Furnace should operate at least 5 minutes before checking gas flow. Determine time in seconds for two revolutions of gas through the meter. (Two revolutions assures a more accurate time.) Divide by two and compare to time in Table 18. Seconds in Table 18 are based on a 1 cu.ft. dial and gas value of 1000 btu's for natural and 2500 btu's for LP. Adjust manifold pressure on gas valve to match time needed.

NOTE - *To obtain accurate reading, shut off all other gas appliances connected to meter.*

Table 18

Unit in Btu's	Seconds for Natural	Seconds for Propane
130,000	28	69
180,000	20	50
240,000	15	38

NOTE - *Table assumes standard temperature (60°F), pressure (30in. Hg.), and fuel heating values (Btuh/Ft.3). Apply pressure corrections in altitudes above 2000 ft.*

7–Heat Exchanger

To Access or Remove Heat Exchanger From Unit:

1 - Turn off gas and electric power.

2 - Remove access panel(s) and unit center mullion.

3 - Remove gas valve, manifold assembly and burners.

4 - Remove combustion air inducer and flue box cover. Pay careful attention to the order in which gaskets and orifice are removed.

5 - Support heat exchanger (to prevent it from falling when final screws are removed.)

6 - Remove screws supporting heat exchanger.

7 - To install heat exchanger, reverse procedure. Be sure to secure all wires and check plumbing and burner plate for airtight seal. Screws must be torqued to 35 in.-lbs. to ensure proper operation.

Combustion gases

Flue products must be analyzed and compared to the unit specifications. Problems detected during the inspection may make it necessary to temporarily shut down the furnace until the items can be repaired or replaced.

8–Inshot Burner

Burners are factory set for maximum air and cannot be adjusted. Always operate unit with access panel in place. A peep hole is furnished in the heating access panel for flame viewing. Natural gas should burn basically blue with some clear streaks. L.P. gas should burn mostly blue with some clear yellow streaks.

Follow steps below to remove burner assembly.

1. Turn off power to unit and shut off gas supply.
2. Remove screws holding the burner cap.
3. Burner assembly is a cluster assembly (Figure 41) and can be removed as one.
4. Clean and reassemble (reverse steps 1-3).
5. Be sure to secure all wires and check plumbing.
6. Turn on power to unit. Follow lighting instructions attached to unit and operate unit in heating mode. Check burner flames. They should be blue with yellow streaks

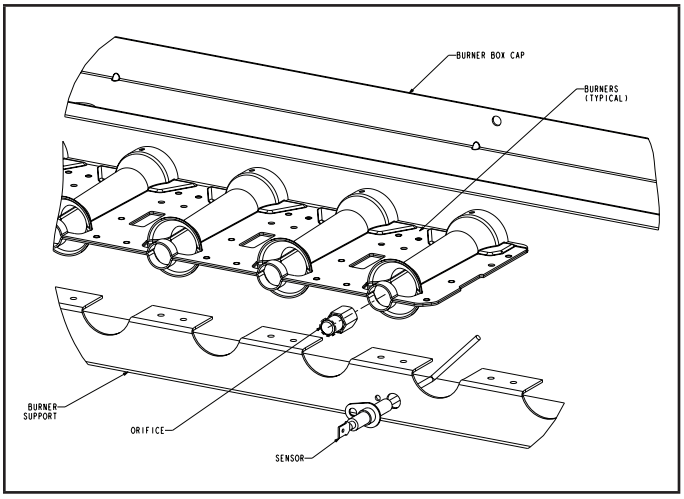


Figure 41

9–Combustion Air Inducer

The combustion air inducer is factory set and is not field adjustable. However, operation should be monitored to ensure proper operation. The combustion air inducer is used to draw fresh air into the combustion chamber while simultaneously expelling exhaust gases. The inducer operates throughout the heating cycle.

On a heating demand, the ignition control is energized by the A55 Unit Controller. The ignition control then allows 30 to 40 seconds for the combustion air inducer to vent exhaust gases from the burners. When the combustion air inducer is purging the exhaust gases, the combustion air prove switch is closing proving that the combustion air inducer is operating before allowing the ignition control to energize.

When the combustion air prove switch is closed and the delay is over, the ignition control activates the first stage operator of the gas valve (low fire), the spark and the flame sensing electrode. Sparking stops immediately after flame is sensed.

D–Cooling System Service Checks

LDT units are factory charged and require no further adjustment; however, charge should be checked periodically using the approach method. The approach method compares actual liquid temperature with the outdoor ambient temperature. See Charging - Approach Method section.

NOTE-*When unit is properly charged discharge line pressures should approximate those in Table 8 through Table 17.*

V–MAINTENANCE

The unit should be inspected once a year by a qualified service technician.

⚠ WARNING

Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.

⚠ IMPORTANT

Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

⚠ WARNING

Any service personnel installing, decommissioning, or performing maintenance on the unit must be properly trained with A2L refrigerants

Prior to beginning work on systems containing refrigerant to ensure the risk of ignition is minimized:

- All work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.
- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i. e. non-sparking, adequately sealed or intrinsically safe.
- If any hot work is to be conducted on the refrigerating equipment or any associated parts, the appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.
- No person carrying out work in relation to a refrigerating system which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. “No Smoking” signs shall be displayed.
- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work.

A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

- Where electrical components are being changed, service technicians shall be fit for the purpose and to the correct specification. At all times the manufacturer’s maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer’s technical department for assistance. The following checks shall be applied to installations using flammable refrigerants as applicable:

1 - The actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed.

2 - The ventilation machinery and outlets are operating adequately and are not obstructed.

3 - If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.

4 - Markings on the equipment should be visible and legible. Markings and signs that are illegible shall be corrected.

5 - Refrigerating pipes or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded. For systems containing refrigerant all repair and maintenance to electrical components shall include initial safety checks and component inspection procedures such as that capacitors are discharged in a safe manner to avoid possibility of sparking, that no live electrical components and wiring are exposed while charging, recovering, or purging the system, and that there is continuity of earth bonding. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used that is reported to the owner of the equipment, so all parties are advised.

NOTE - *Sealed electrical components shall be replaced, not repaired.*

NOTE - *Intrinsically safe components must be replaced, not repaired.*

- Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

  a. Safely remove refrigerant following local and national regulations,

  b. Evacuate the circuit,

  c. Purge the circuit with inert gas,

  d. Evacuate,

  e. Purge with inert gas,

  f. Open the circuit.

- The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

A–Lubrication

All motors are lubricated at the factory. No further lubrication is required.

B–Filters

Units are equipped with four 20 X 25 X 2” filters. Filters should be checked monthly and replaced when necessary with filters of like kind and size. Take note of air flow direction marking on filter frame when reinstalling filters. See Figure 42.

NOTE - *Filters must be U.L.C. certified or equivalent for use in Canada.*

C–Supply Air Blower Wheel

Annually inspect supply air blower wheel for accumulated dirt or dust. Turn off power before attempting to remove access panel or to clean blower wheel.

D–Evaporator Coil

Inspect and clean coil at beginning of each cooling season. Clean the all-aluminum coil by spraying the coil steadily and uniformly from top to bottom. Do not exceed 900 psi or a 45° angle; nozzle must be at least 12 inches from the coil face. Take care not to fracture the braze between fins and refrigerant tubes. Reduce pressure and work cautiously to prevent damage. Flush condensate drain with water, taking care not to get insulation, filters, and return air ducts wet through entire cleaning process.

E–Condensor Coil

Clean outdoor coil annually with detergent or commercial coil cleaner and inspect monthly during the cooling season. For LDT078-120H Models, outdoor coils are made of two formed slabs. Dirt and debris may become trapped between the slabs. To clean between slabs, carefully separate coil slabs (no more than 4 inches) and wash them thoroughly. See Figure 47. Flush coils with water following cleaning. Check connecting lines and coil for evidence of oil and refrigerant leaks.

F–Filter Drier

The unit is equipped with a bi-flow filter drier. If replacement is necessary, order another of like design.

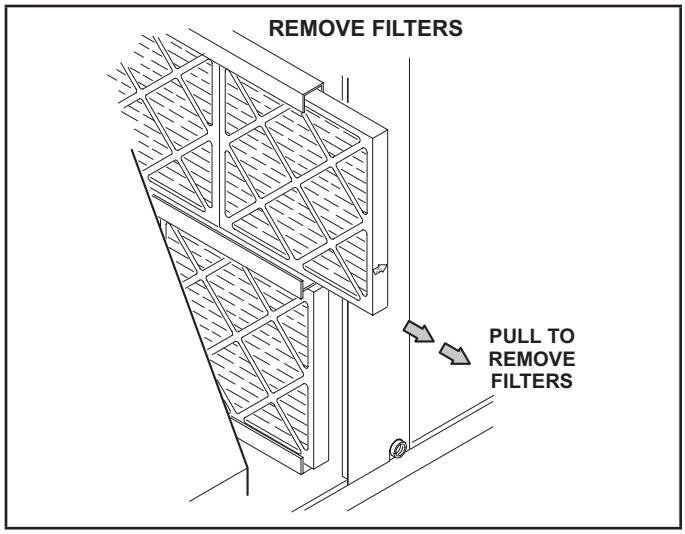


Figure 42

G-Burners

Periodically examine burner flames for proper appearance during the heating season. Before each heating season examine the burners for any deposits or blockage which may have occurred.

Clean burners as follows:

1. Turn off both electrical power and gas supply to unit.
2. Remove burner compartment access panel.
3. Remove top burner box panel.
4. Remove two screws securing cluster burners assembly to burner support and lift the burners from the orifices. Clean as necessary.

H-Combustion Air Inducer

A combustion air proving switch checks combustion air inducer operation before allowing power to the gas controller.

Gas controller will not operate if inducer is obstructed. Under normal operating conditions, the combustion air inducer wheel should be checked and cleaned prior to the heating season. However, it should be examined periodically during the heating season to establish an ideal cleaning schedule.

Clean combustion air inducer as follows:

1. Shut off power supply and gas to unit.
2. Remove the mullion on the right side of the heat section.
3. Disconnect pressure switch air tubing from combustion air inducer port.
4. Remove and retain screws securing combustion air inducer to flue box cover. Remove vent connector.
5. Clean inducer wheel blades with a small brush and wipe off any dust from housing. Take care not to damage exposed fan blades. Clean accumulated dust from front of flue box cover. See Figure 14
6. Return combustion air inducer motor and vent connector to original location and secure with retained screws. It is recommended that gaskets be replaced during reassembly.
7. Replace mullion.
8. Clean combustion air inlet louvers on heat access panel using a small brush.

I - Flue Passageway and Flue Cover Plate

Remove flue cover plate only when necessary for equipment repair. Clean inside of flue cover plate and heat exchanger tubes with a wire brush when flue cover plate has to be removed. Install a new flue cover plate gasket and replace cover. Make sure edges around flue box cover are tightly sealed.

VI–ACCESSORIES

The accessories section describes the application of most of the optional accessories which can be factory or field installed to the LDT units.

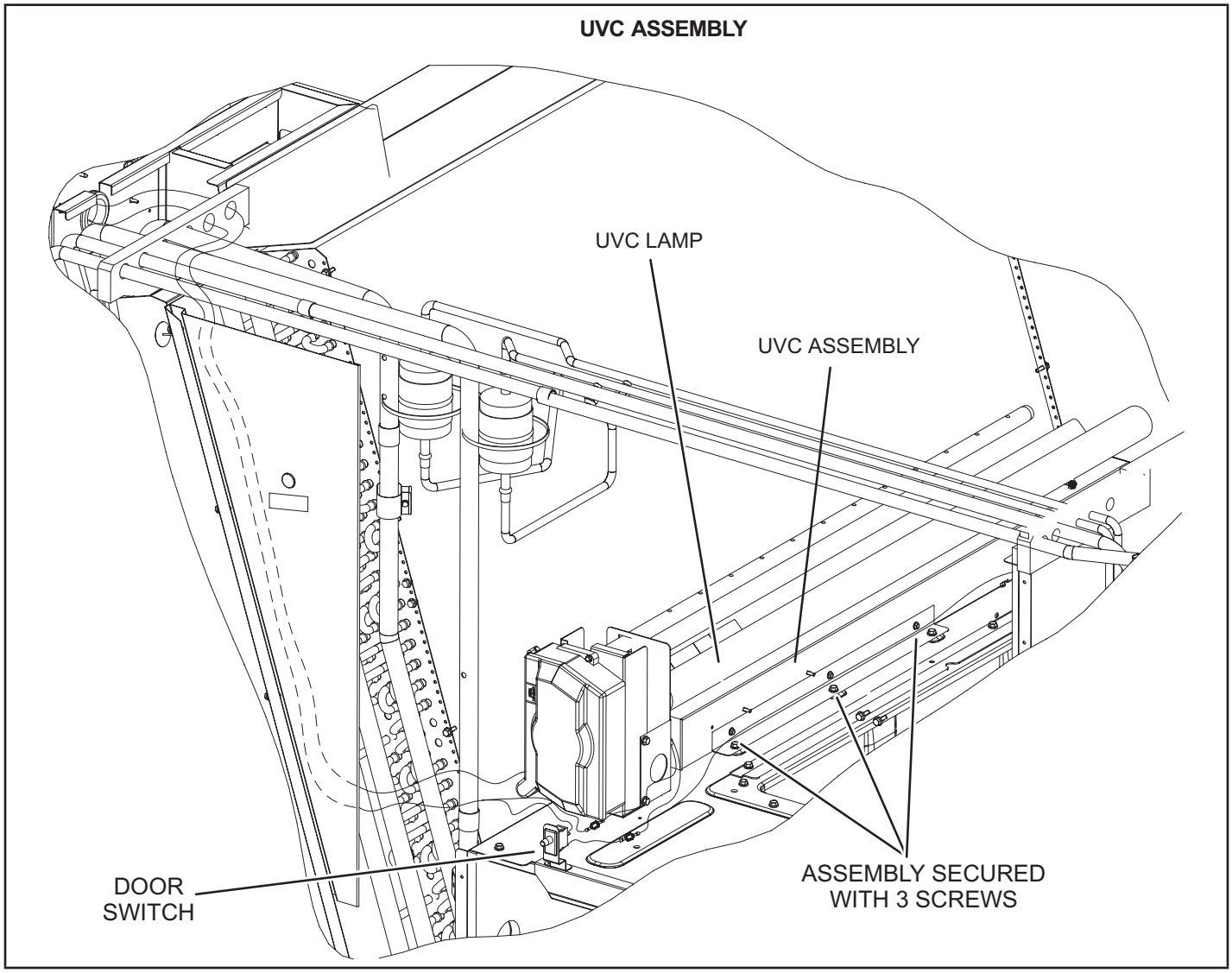


Figure 43

K-UVC Light

When field-installed, use only UVC Light Kit assembly 106882-01 (21A93) with this appliance.

Factory-Installed UVC Light

When the UVC light is factory installed, the lamp is shipped in a foam sleeve. The lamp is attached to the UVC light assembly on the blower deck. See Figure 43. Remove the lamp and install into the UVC light assembly as shown in steps 2 through 11.

Annual Lamp Replacement

⚠ WARNING

Personal Burn Hazard.

Personal injury may result from hot lamps. During replacement, allow lamp to cool for 10 minutes be fore removing lamp from fixture.

The lamp should be replaced every 12 months, as UVC energy production diminishes over time.

1 - Obtain replacement lamp 101087-01 for your germicidal light model.

2 - Disconnect power to the rooftop unit before servicing the UVC kit.

3 - Open the blower access door.

4 - Remove the screw in wire tie from the UVC assembly and disconnect the 4-pin connector from the lamp end.

5 - Remove and retain the (3) screws securing the UVC assembly. Carefully slide the complete UVC assembly out through the blower access door. See Figure 43.

6 - Allow 10 minutes before touching the lamps. Then, carefully remove the old lamp from the lamp holder clips.

7 - Wear cotton gloves or use a cotton cloth when handling the new lamp. Place the new lamp in the holder clips of the UVC assembly. Verify that the lamp flange at the connector end is sandwiched between the lamp holder clip and the sheet-metal end stop (see Figure 44).

8 - Carefully place the UVC assembly on the blower deck. Line up the mounting holes on the UVC assembly with the mounting holes on the blower deck See Figure 43. Use the retained screws provided to attach the UVC assembly in place.

9 - Close the blower access door.

10 - Reconnect power to the rooftop unit.

11 - Open the filter access door and look through the view port in the triangular sheet-metal panel to verify that the UVC light is on.

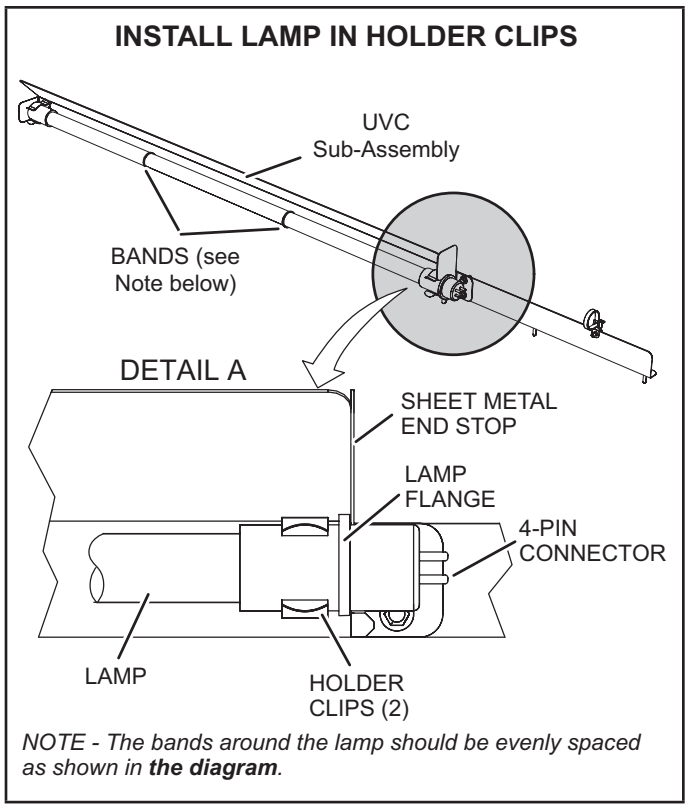


Figure 44

If UVC lamp does not come on:

1 - Check Power Wiring: Disconnect 1/4" QC (quick connects) of the UVC cable near the UVC assembly. With Power ON, use multimeter to test 110-230V at the 1/4"QC quick connects from the control panel.

2 - Check Lamp: Carefully remove the UVC assembly out of the rooftop unit. Use multimeter to test for continuity across each pair of pins at each end of the lamp.

3 - Check Lamp Installation: Make sure that lamp's pins snap properly into the lamp holder.

LED(s) not illuminated

Power status LED not lit—Check that the lamp unit is connected to the proper power source and is wired correctly.

Lamp status LED(s) not lit—

1 - Check that lamp 4-pin connectors are properly engaged.

2 - Ohm-check across the lamp pins to check for continuity of lamp filaments (see Figure 44).

Troubleshooting charts are provided to aid in determining the cause of any problems encountered (Figure 43 and Figure 44).

Lamp Disposal

Hg-LAMP Contains Mercury - Manage in accordance with local, state and federal disposal laws. Refer to www.lamprecycle.org or call 800-953-6669.

Proper Clean-up Technique in Case of Lamp Breakage

Wear protective gloves, eye wear and mask.

Sweep the broken glass and debris into a plastic bag, seal the bag, and dispose of properly. Contact your local waste management office for proper disposal.

Do not use a vacuum cleaner. Do not incinerate.

Maintenance

- For all maintenance, contact a qualified HVAC technician.
- Read the maintenance instructions before opening unit panels.
- Unintended use of the unit or damage to the unit housing may result in the escape of dangerous UVC radiation. UVC radiation may, even in small doses, cause harm to the eyes and skin.
- Do not operate units that are obviously damaged.
- Do not discard the triangular UVC light shield or any barriers with an ultraviolet radiation symbol.
- Do not override the door interlock switch that interrupts power to the UVC light.
- Do not operate the UVC light outside of the unit.

⚠ DANGER

Ultraviolet (UVC) Radiation hazard.

Any exposure will cause significant eye damage and may cause skin damage.

DO NOT look into UVC light source.

Access panels must be in place during appliance operation.

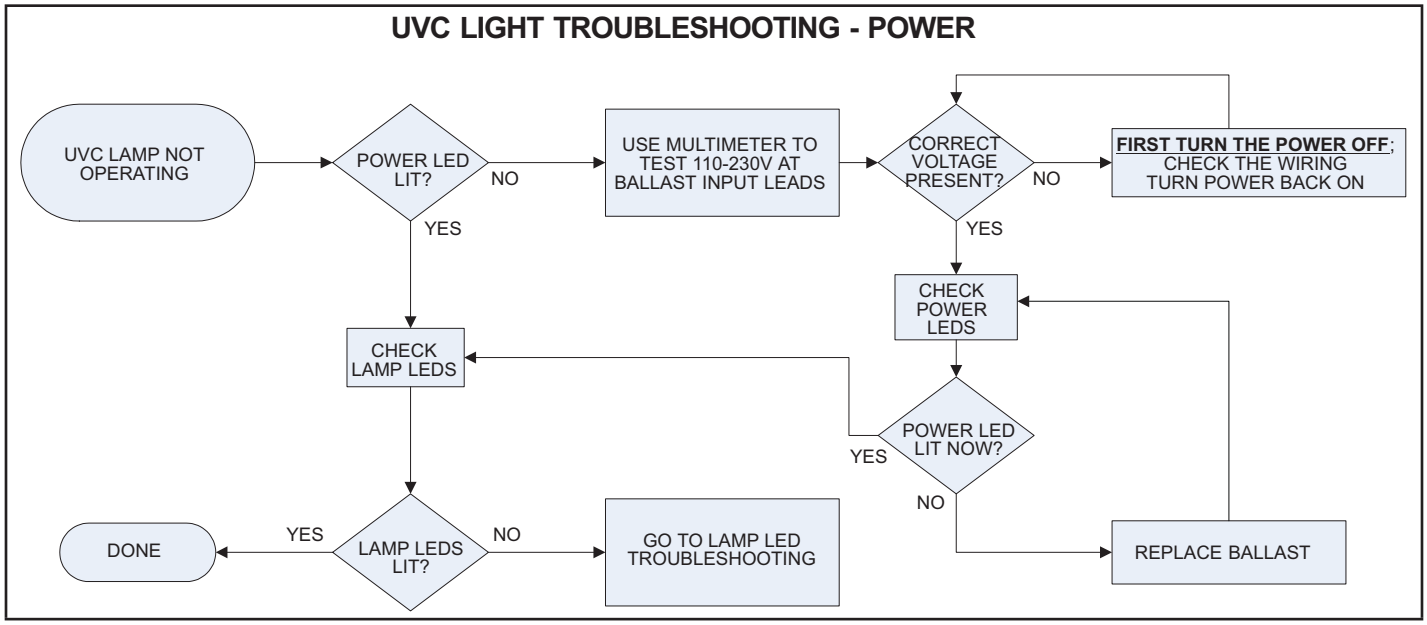


Figure 45

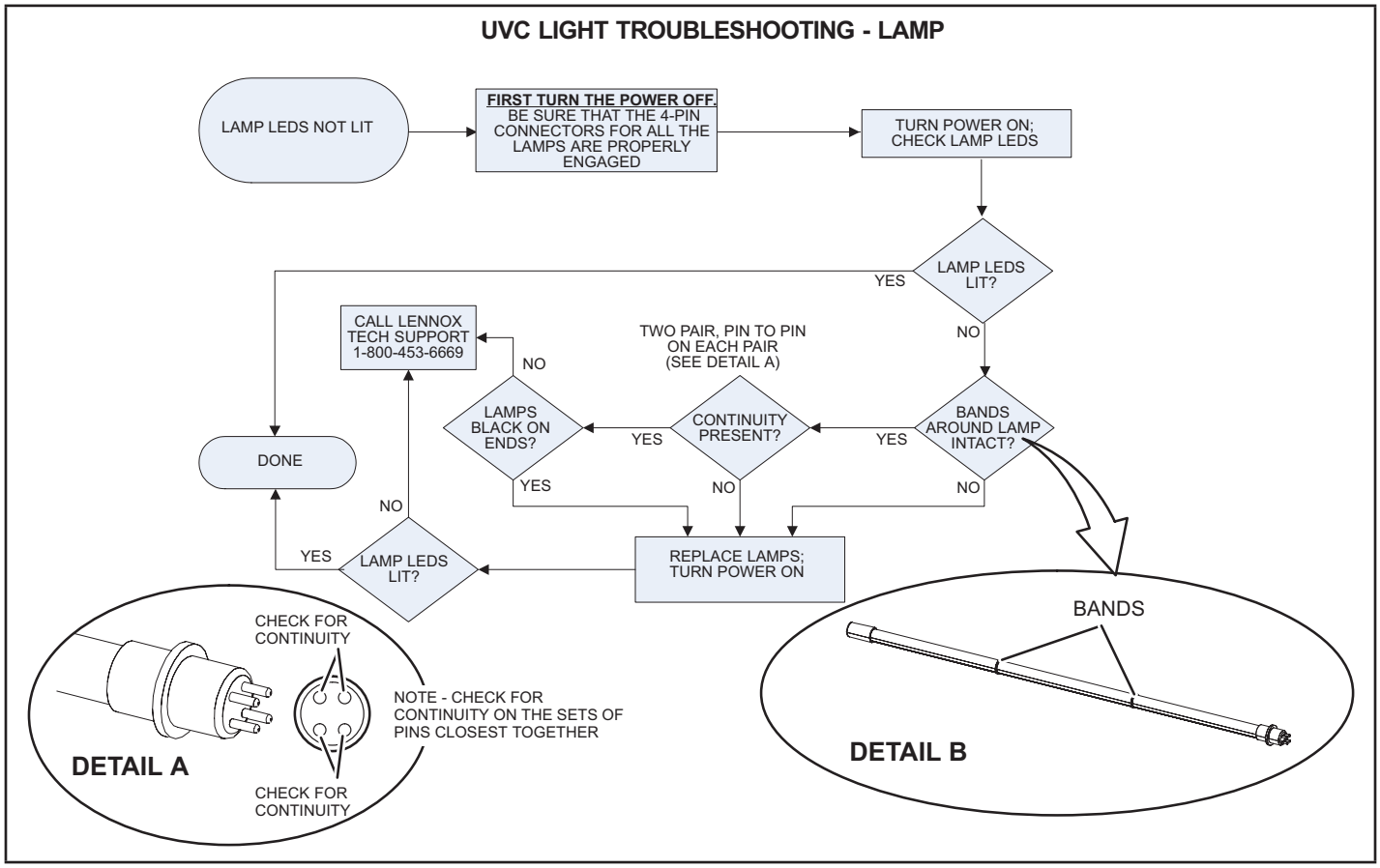
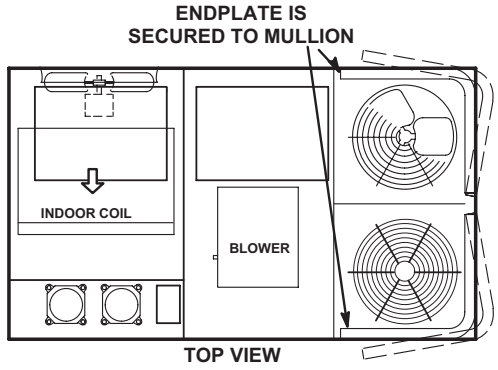


Figure 46

CLEAN OUTDOOR COIL (LDT078-120H MODELS)



1- Remove screws securing coil end plate to mullion.

2- Remove clips connecting coils slabs and separate slabs 3-4" (76-102mm).

3- Clean coils with detergent or commercial coil cleaner.

4- Rinse thoroughly with water and reassemble.

Figure 47

A–Mounting Frames

When installing the LDT units on a combustible surface for downflow discharge applications, the C1CURB roof mounting frame is used. The roof mounting frames are available in heights from 8 to 24 inches and are recommended in all other applications but not required. If the LDT units are not mounted on a flat (roof) surface, they MUST be supported under all edges and under the middle of the unit to prevent sagging. The units MUST be mounted level within 1/16" per linear foot or 5mm per meter in any direction.

The assembled C1CURB mounting frame is shown in Figure 48. Refer to the roof mounting frame installation instructions for details of proper assembly and mounting.

The roof mounting frame MUST be squared to the roof and level before mounting. Plenum system MUST be installed before the unit is set on the mounting frame. Typical roof curbing and flashing is shown in Figure 49. Refer to the roof mounting frame installation instructions for proper plenum construction and attachment.

ASSEMBLED ROOF MOUNTING FRAME

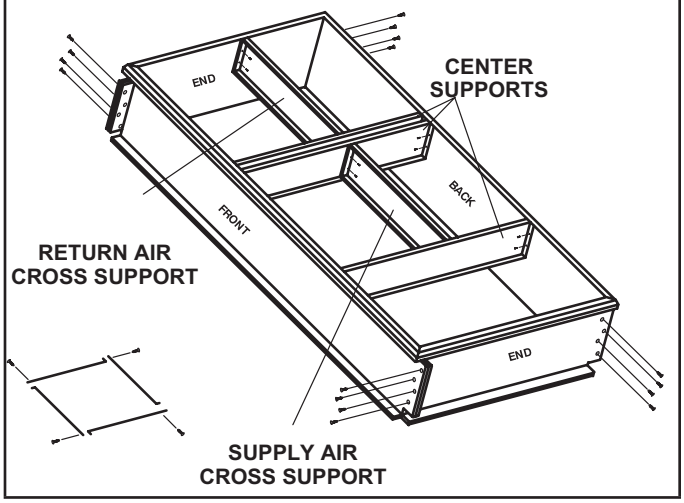


Figure 48

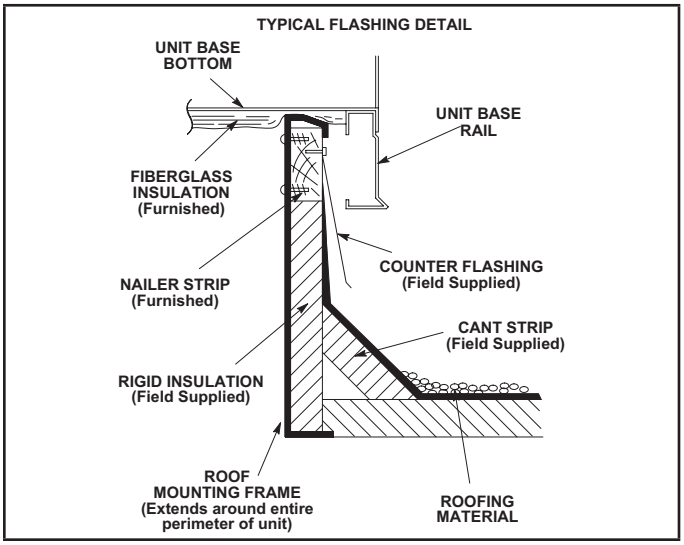


Figure 49

B–Transitions

Optional supply/return transition C1DIFF30B-1 is available for use with LDT 7.5-ton units. C1DIFF31B-1 is available for 8.5 and 10-ton units and C1DIFF32B-1 is available for use with LDT 12.5 ton units. All transitions are used with the appropriate C1CURB roof mounting frame. Transition must be installed in the mounting frame before installing the unit on the frame. Refer to the manufacturer's instructions included with the transition for detailed installation procedures.

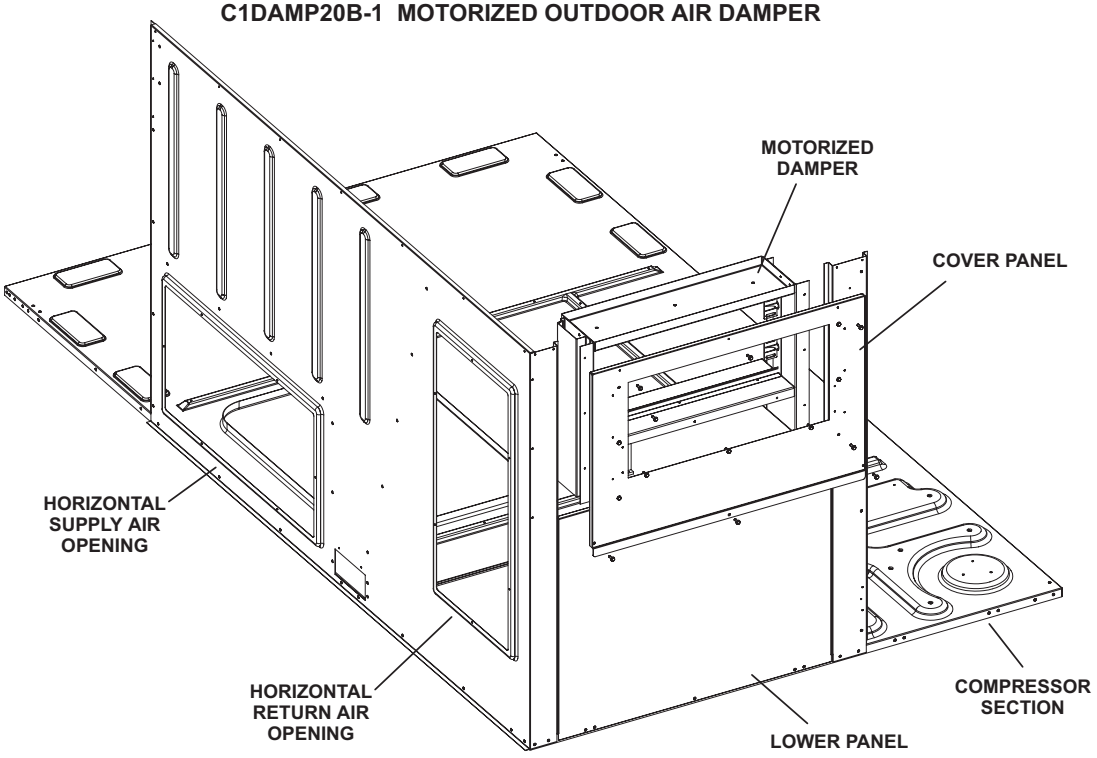
C–Supply and Return Diffusers

Optional flush mount diffuser/return FD11 and extended mount diffuser/return RTD11 are available for use with all LDT units. Refer to manufacturer's instructions included with transition for detailed installation procedures.

D–C1DAMP Outdoor Air Dampers Field- or Factory-Installed

Optional manual (C1DAMP10B-2) and motorized (C1DAMP20B-1) outdoor air dampers provide up to 25 percent fresh air for return. Motorized damper opens to minimum position simultaneously with the blower during the occupied period and remains closed during the unoccupied period. Manual damper assembly is manually operated; damper position is manually set at installation and remains in that position.

C1DAMP20B-1 MOTORIZED OUTDOOR AIR DAMPER



C1DAMP10B-2 MANUAL OUTDOOR AIR DAMPER

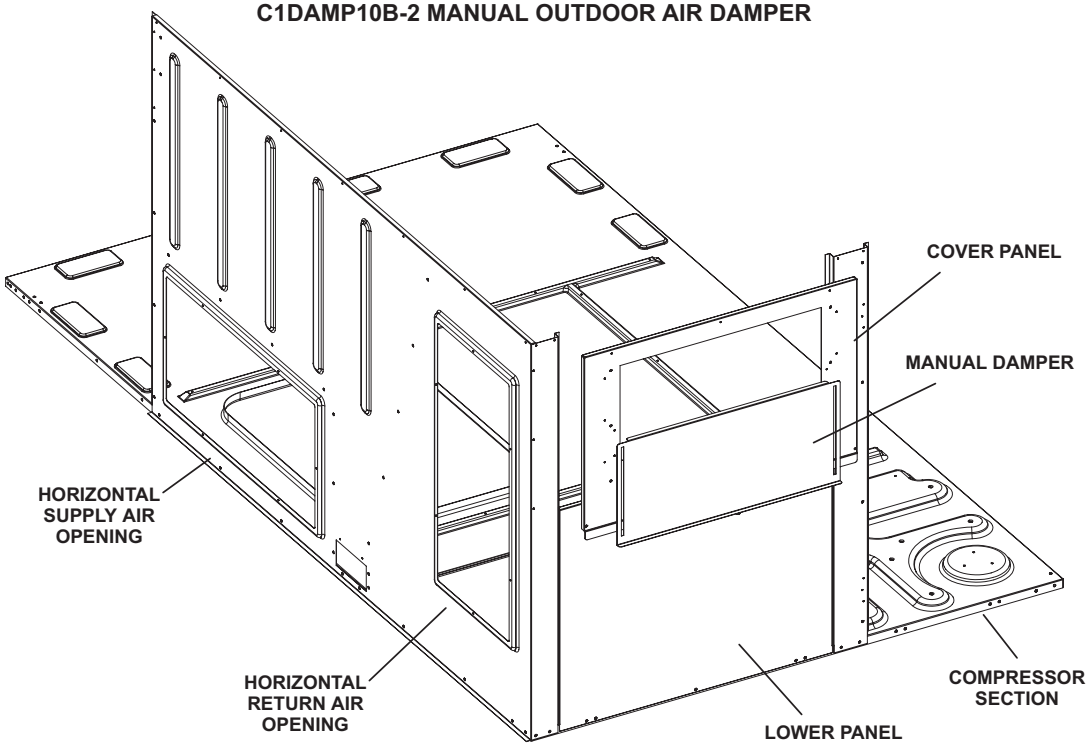


Figure 50

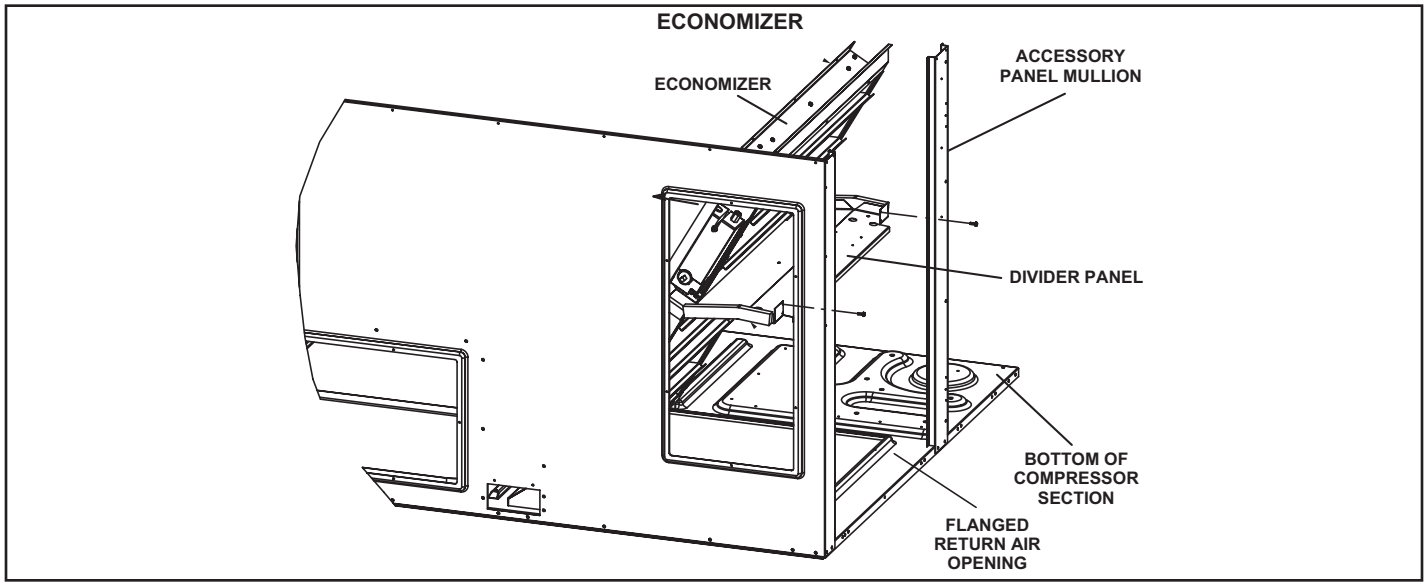


Figure 51

Table 19

ECONOMIZER MODES AND SETPOINT

Free Cooling Mode	Free Cooling Set Point	Field Provided Sensors	Dampers will modulate to 55°F (default, parameter 159) discharge air (RT6) when outdoor air is suitable:	Input Ranges
TEMP	OFFSET	None Needed	Outdoor air temperature (RT17) is less than return air temperature (RT16) by at least the OFFSET value (10°F default; parameter 161).	0-40°F
TEMP	OAT STPT	None Needed	Outdoor air temperature (RT17) is less than the OAT STPT value (75°F default; parameter 160).	41-75°F
Remote	Remote	Energy Management System**	Either of the TEMP modes can be used when a network OAS signal is provided by an energy management or building control system, via BACnet, LonTalk, or L Connection. The network can command OAS, NOT OAS, or AUTO. AUTO returns to local control of OAS, which is the selected TEMP mode.	NA
ENTH	DIFF OFFSET	(Two) C7400	Outdoor air enthalpy* (A7) is less than return air enthalpy (A62) by at least the OFFSET value (1mA = 2°F default; parameter 163).	0mA-4mA
ENTH	ODE STPT	C7400	Outdoor air enthalpy (A7) is less than free cooling setpoint (12mA = 75°F default, parameter 162).	12-19mA
GLOBAL	GLOBAL	24VAC Input Signal	Global input is energized by (P297-9). This setting is also used for outdoor air damper applications. Global input also brings on the blower. (This mode is NOT used when OAS signal is provided via network connection. GLO is only used when a 24VAC signal is used to energize the P297-9 GLO input.)	NA

*Enthalpy includes effects of both temperature and humidity.

**Energy management systems may require additional field-provided sensors; refer to manufacturer's instructions.

E–Dirty Filter Switch S27

The dirty filter switch senses static pressure increase indicating a dirty filter condition. The switch is N.O. and closes at 1" W.C. (248.6 Pa) The switch is mounted on the top filter channel corner. Wiring for the dirty filter switch is shown on the temperature control section (C2) wiring diagram in back of this manual.

F–K1ECON20B Economizer

(Field- or Factory-Installed)

The optional E1ECON15 economizer can be used with downflow and horizontal air discharge applications. See Figure 51. The economizer uses outdoor air for free cooling when outdoor temperature and/or humidity is suitable. The economizer is controlled by the A55 Unit Controller.

Free Cooling Mode

The Unit Controller will allow free cooling in one of five modes. Each mode uses different combinations of sensors to determine outdoor air suitability. See Table 19 for modes. Temperature offset is the default free cooling mode.

NOTE - *All free cooling modes of operation will modulate dampers to 55F (13C) supply / discharge air.*

Unit Controller Settings

On early versions, switches are located on the Unit Controller to adjust settings. On newer versions, the display and keypad on the Unit Controller are used to navigate through menus to adjust settings. Some versions require a configuration ID be entered to enable the economizer. Refer to economizer installation instructions and Unit Controller installation and application manuals

G–Barometric Relief Dampers

Dampers are used in downflow (Figure 52) and horizontal (Figure 53) air discharge applications. Horizontal barometric relief dampers are installed in the return air duct. The dampers must be used any time an economizer and a power exhaust fan is applied to LDT series units.

Barometric relief dampers allow exhaust air to be discharged from the system when an economizer and/or power exhaust is operating. Barometric relief dampers also prevent outdoor air infiltration during unit off cycle. See installation instructions for more detail.

NOTE- *Barometric relief damper is optional except required with power exhaust dampers.*

H–Power Exhaust Fan

The power exhaust fan (K1PWRE10B) requires an optional gravity exhaust damper and economizer and is used in downflow applications only. See Figure 54. The power exhaust fan provides exhaust air pressure relief and also runs when return air dampers are closed and the supply air blower is operating. See installation instructions for more detail.

Power Exhaust Setpoint Adjustment

Locate the A6 enthalpy control in the control area. The EXH SET potentiometer is factory-set at approximately 50% of the dial range. See Figure 55. Power exhaust fans will be energized 30 seconds after dampers are 50% open. Adjust the EXH SET potentiometer higher (clockwise toward 10V) to energize fans when dampers are further open. Adjust the EXH SET potentiometer lower (counterclockwise toward 2V) to energize fans when dampers are further closed. (Thirty-second delay allows dampers to partially open before exhaust fan starts.)

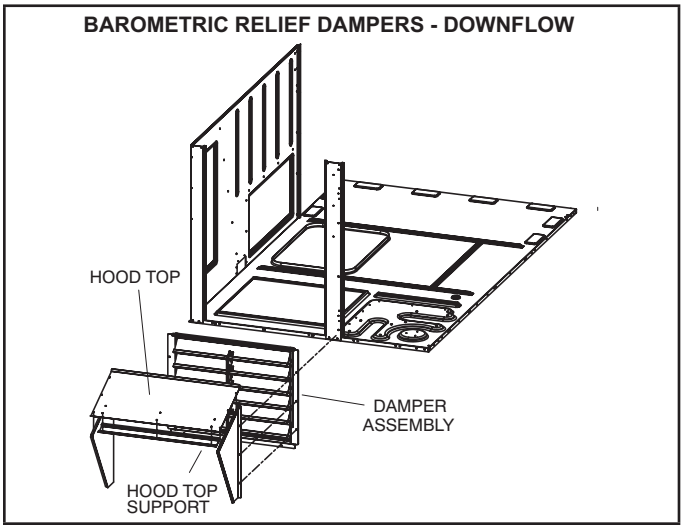


Figure 52

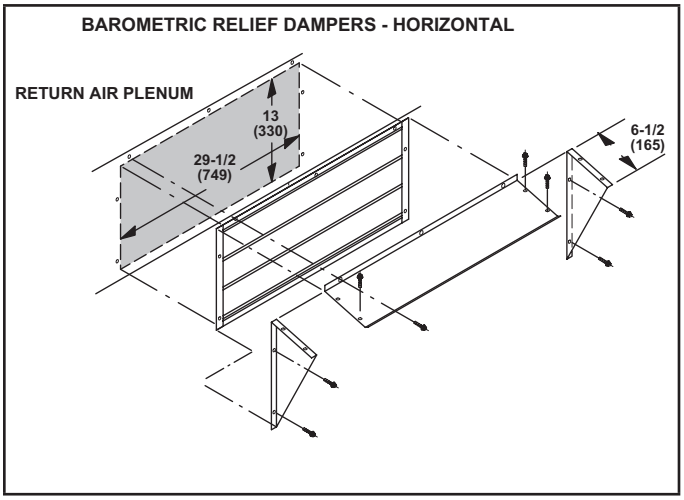


Figure 53

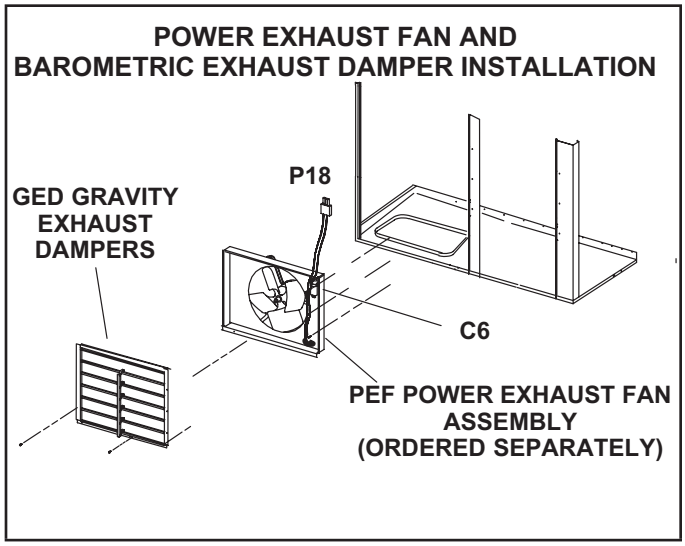


Figure 54

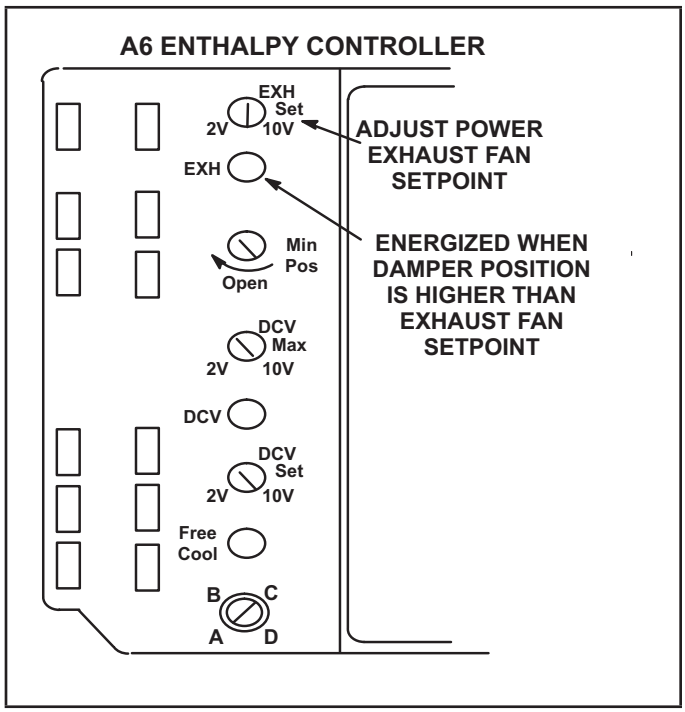


Figure 55

I–Control Systems

The A55 Unit Controller provides all control function for the rooftop unit. Default operation requires a standard room thermostat or direct digital controller (DDC). The A55 can also control the unit from a zone temperature sensor. The A55 Unit Controller is a network controller when daisychained to the L Connection® Network Control System. For ease of configuration, the A55 can be connected to a PC with Unit Controller PC software installed.

J–Drain Pan Overflow Switch S149 (optional)

The overflow switch is used to interrupt cooling operation when excessive condensate collects in the drain pan. The N.C. overflow switch is connected to the M2 Unit Controller (A55) through DI-3. When the switch opens, the Unit Controller will shut off the unit. After a five-minute time out, the Unit Controller will verify the overflow switch position and restart the unit (if the switch has closed). The Unit Controller has a three-strike counter before the unit locks out. This means the Unit Controller will allow the overflow switch to open three times per thermostat demand. If the unit locks out, a reset of the Unit Controller is required after the switch has closed to restore unit operation.

K–Smoke Detectors A17 and A64

Photoelectric smoke detectors are a factory installed option. The smoke detectors can be installed in the supply air section (A64), return air section (A17), or in both the supply and return air section. Wiring for the smoke detectors are shown on the temperature control section (C2) wiring diagram in back of this manual.

L–LP / Propane Kit

Natural to LP/propane kit includes (1) spring kit for the 36H54 2- stage gas valve and (1) jumper kit for the 36H27 modulating gas valve. In addition, the LP kit will also have three stickers and 11 burner orifices. For more details refer to the natural to LP gas changeover kit installation instructions.

See page 3 (OPTIONS / ACCESSORIES) to determine applicable kit.

M–Optional Cold Weather Kit (Canada only)

Electric heater is available to automatically control the minimum temperature in the gas burner compartment. Heater is CSA certified to allow cold weather operation of unit down to -60° F (-50° C).

The kit includes the following parts:

1. A heater assembly is installed on the vestibule of the heating compartment. Included in the box are the following:
   a. Electric strip heat (HR6).
   b. Thermostat switch (S59) is an auto-reset SPST N.C. switch which opens on a temperature drop. The switch is wired in series with 24v power and the combustion air blower switch. When the temperature drops below -30° F (-35°C) the switch opens and the gas heat section is de-energized. The switch automatically resets when the heating compartment temperature reaches -10° F (-12° C).
   c. Thermostat switch (S60) is an auto-reset SPST N.C. switch which opens on a temperature rise. The switch is wired in series with HR6. When the temperature rises above 20° F (-7° C) the switch opens and the electric heater is de-energized. The switch automatically resets when the heating compartment temperature reaches -10° F (23.3° C).
   d. Thermostat switch (S61) is an auto-reset SPST N.O. switch which closes on a temperature drop. The switch is wired in series with HR6. When temperature drops below 20° F (-7° C) the switch closes and electric heater is energized. The switch automatically opens when heating compartment temperature reaches 76° F (24° C).
2. K125 heat shutoff relay de-energizes HR6 heaters when S60 or S61 thermostat switches open. K125 must be installed in the control section.
3. Wire harness is routed between the heat section components and the unit control box. Follow instructions provided with kit for wire connections.

N–Hot Gas Reheat

General

Hot gas reheat units provide a dehumidifying mode of operation. These units contain a reheat coil adjacent to and downstream of the evaporator coil. Reheat coil solenoid valve, L14, routes hot discharge gas from the compressor to the reheat coil. Return air pulled across the evaporator coil is cooled and dehumidified; the reheat coil adds heat to supply air. See Figure 56 for cooling refrigerant routing, Figure 57 for heating refrigerant routing and Figure 58 for reheat refrigerant routing.

L14 Reheat Coil Solenoid Valve

When Unit Controller input (Unit Controller J298-5 or J299-8) indicates room conditions require dehumidification, L14 reheat valve is energized (Unit Controller P269-3) and refrigerant is routed to the reheat coil.

Reheat Setpoint

Reheat is factory-set to energize when indoor relative humidity rises above 60% (default). The reheat setpoint can be adjusted by changing mobile service app Settings

- Control menu. A setting of 100% will operate reheat from an energy management system digital output. The reheat setpoint can also be adjusted using an optional Network Control Panel (NCP).

Reheat will terminate when the indoor relative humidity falls 3% (57% default) or the digital output de-energizes. The reheat deadband can be adjusted at Settings - Control menu.

Check-Out

Test reheat operation using the following procedure.

Make sure reheat is wired as shown in wiring section.

Make sure unit is in local thermostat mode.

Use mobile service app menu path to select:

RTU MENU > COMPONENT TEST > DEHUMIDIFICATION

The blower, compressor, and reheat valve should be energized. Pressure can be checked on the reheat line pressure tap. Pressure on the reheat line should match discharge pressure closely in reheat mode.

Default Reheat Operation

During reheat mode free cooling is locked out.

No Y1 demand but a call for dehumidification:

Compressor is operating, blower is on, and the reheat valve is energized.

Y1 demand:

Compressor is operating, blower is on, and the reheat valve is de-energized.

Y2 demand:

Compressor is operating, blower is on, and the reheat valve is de-energized.

VII–DIRECTPLUS SUPPLY AIR

If a test and balance contractor has not commissioned the unit, use this section to set supply air CFM.

A–Set Blower Speed

1. Use Table 20 to fill in field-provided, design specified blower CFM.

Table 20

Blower CFM Design Specifications

Blower Speed	Design Specified CFM
Heating	
Cooling High	
Cooling Medium	
Cooling Low	
Ventilation	

2. Use the following menu to enter the blower design specified CFM into the Unit Controller. Don't press "SAVE" until all CFM are entered. Refer to the Unit Controller manual provided with unit.

   SETUP > TEST & BALANCE > BLOWER

3. Once all four speeds are entered, the target (highest of the heating and cooling settings) CFM and default RPM will be displayed.

   Note - *When units are not equipped with heat, the Blower Heat speed will not be displayed. Blower Cooling High will be the first blower speed to appear.*

4. Measure the static pressure as shown in the Blower Start-Up section. Use the static pressure, target CFM and blower tables to determine the RPM needed. Values in the blower table reflect the static pressures taken in locations shown in Figure 12.
5. Enter the RPM and repeat the previous step until the design CFM is reached.
6. Press SAVE followed by MAIN MENU.

   Note - *Once the CFM settings are saved, the Unit Controller will set all other blower CFM.*

B-Set Damper Minimum Position

To maintain required minimum ventilation air volumes when the unit is in the occupied mode, two minimum damper positions must be set. The Unit Controller will open the dampers to "Min OCP Blwr Low" when blower CFM is BELOW a "midpoint" CFM. The Unit Controller will open the damper to "Min OCP Blwr High" when blower CFM is at or ABOVE the "midpoint" CFM.

The Unit Controller will calculate the "midpoint" CFM.

Set Minimum Position 1

Use the following menu in the Unit Controller to set "Min OCP Blwr Low" for the blower CFM below the "midpoint" CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

SETTINGS > RTU Options > EDIT PARAMETER > ENTER DATA ID - 9 > MIN DAMPER LOW BLOWER = X.X %

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

Note - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

Set Minimum Position 2

Use the same menu in the Unit Controller to set "Min OCP Blwr High" for the blower CFM above the "midpoint" CFM. When navigating into this menu, the Unit Controller will bring on the corresponding blower speed and allow damper position adjustment.

SETTINGS > RTU OPTIONS > DAMPER > MIN DAMPER POSITION BLOWER ON HIGH = X.X %

Measure the intake air CFM. If the CFM is lower than the design specified CFM for ventilation air, use the Unit Controller to increase the damper percent open. If the CFM is higher than specified, decrease the damper percent open.

Note - *Intake air CFM can also be determined using the outdoor air temperature, return air temperature and mixed air temperature. Refer to the economizer or outdoor air damper installation instructions.*

Table 21

MINIMUM AND MAXIMUM CFM

Gas Heat Minimum CFM		
Unit	Gas Heat Size	Airflow CFM*
LDT078H-152H	Standard	2150
	Medium	2550
	High	2600

Staged Supply Air Operation

This is a summary of cooling operation for both belt and direct drive blowers.

Note - *During a dehumidification demand the blower operates at the highest speed. Free cooling is locked-out during reheat operation. Refer to Hot Gas Reheat start-up and operation section for details.*

A–Two-Stage Thermostat

1-Economizer With Outdoor Air Suitable

Y1 Demand -

Compressors Off
Blower Cooling Low
Dampers modulate to maintain 55° supply air

Y2 Demand -

Compressors Off
Blower Cooling High
Dampers Modulate to maintain 55° supply air

Note - *If dampers are at maximum open for three minutes, compressor 1 is energized and blower stays on cooling high.*

2-No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 On
Blower Cooling Low

Y2 Demand -

Compressor 1 and 2 On
Blower Cooling High

B–Three-Stage Thermostat OR Zone Sensor

1-Economizer With Outdoor Air Suitable

Y1 Demand -

Compressors Off
Blower Cooling Low
Dampers modulate to maintain 55° supply air

Y2 Demand -

Compressors Off
Blower Cooling High
Dampers Modulate to maintain 55° supply air

Note - *If dampers are at maximum open for three minutes, compressor 1 is energized and blower stays on cooling igh. Economizer stays at maximum position after compressors are energized.*

Y3 Demand -

Compressors 1 and 2 On
Blower Cooling High
Dampers Maximum Open

2-No Economizer or Outdoor Air Not Suitable

Y1 Demand -

Compressor 1 On Part Load
Blower Cooling Low

Y2 Demand -

Compressor 1 On Part Load Compressor 2 On.
Blower Cooling Medium

Y3 Demand -

Compressors 1 and 2 On
Blower Cooling High

COOLING REFRIGERANT ROUTING

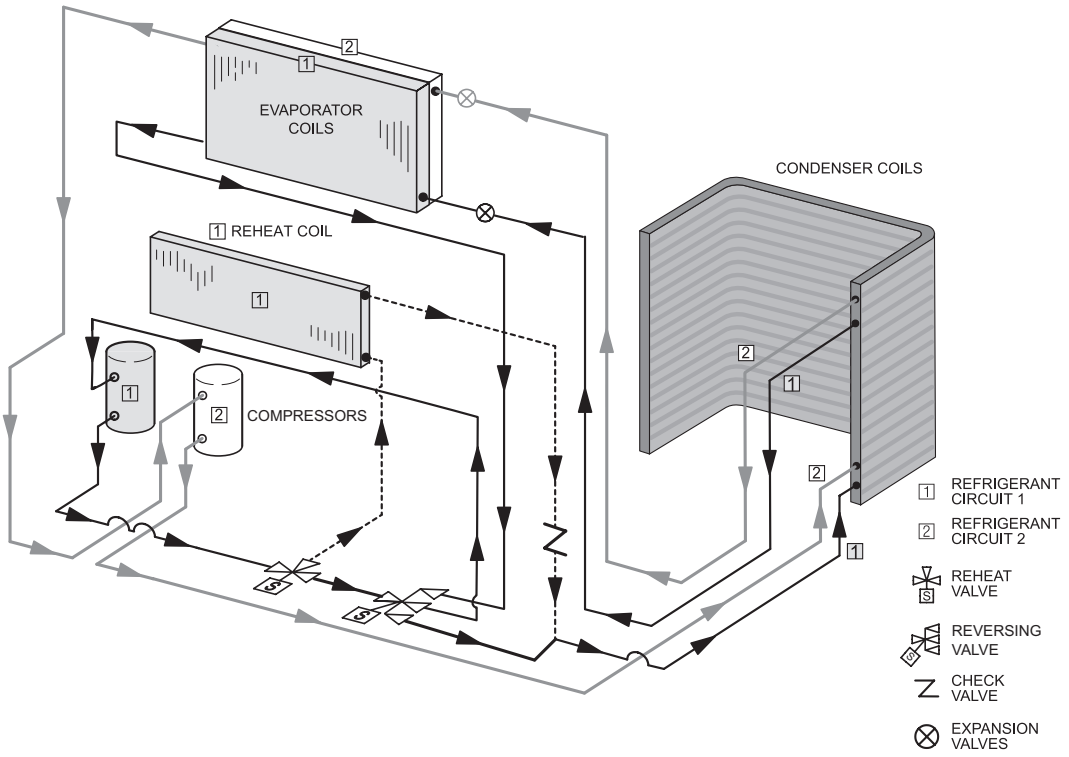
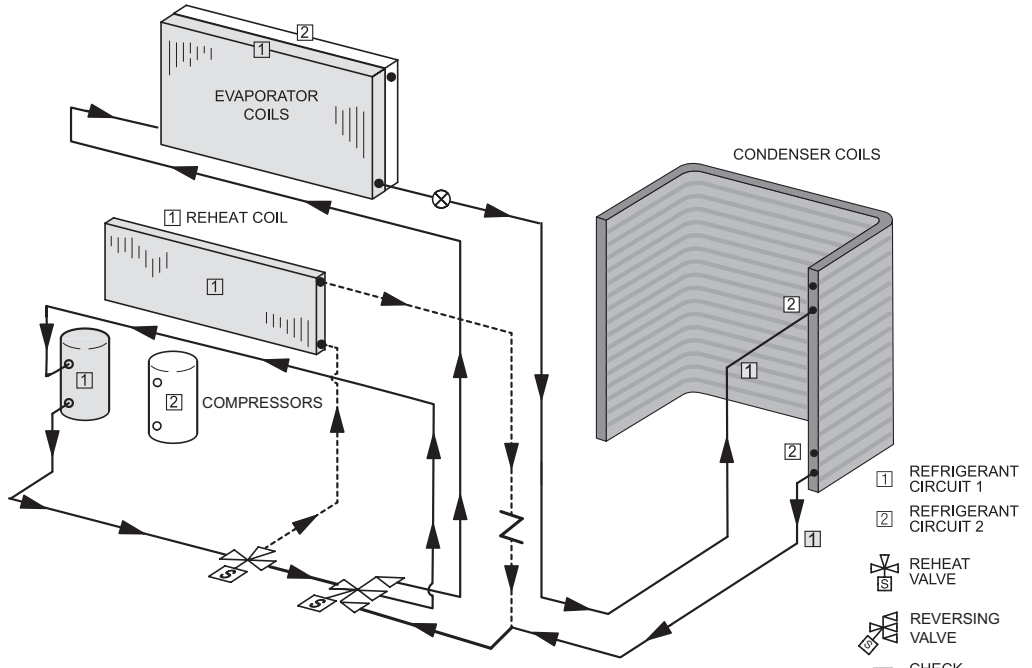


Figure 56

HEATING REFRIGERANT ROUTING



NOTE - Circuit 2 not shown. Circuit 2 operates the same as circuit 1 without reheat.

Figure 57

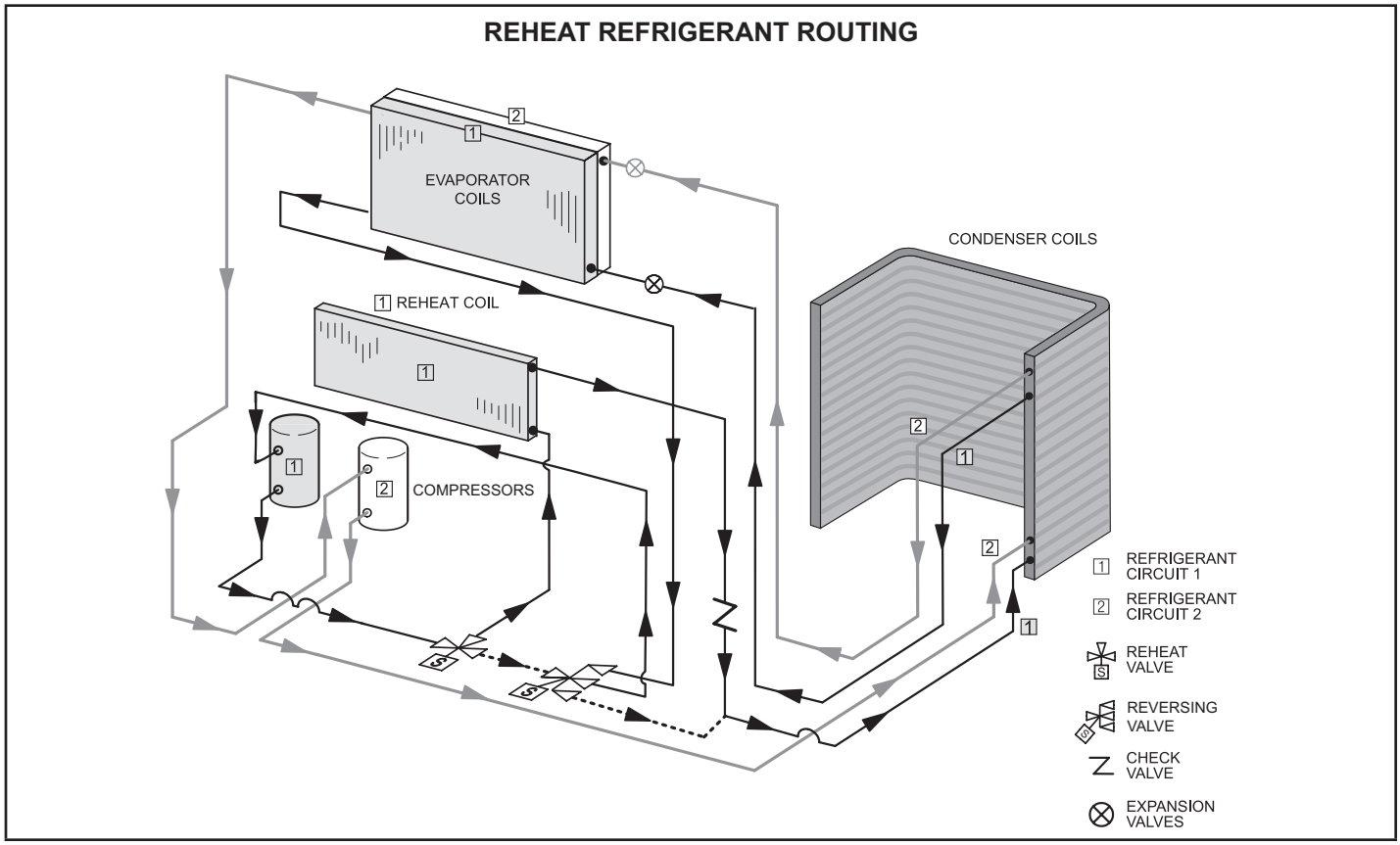
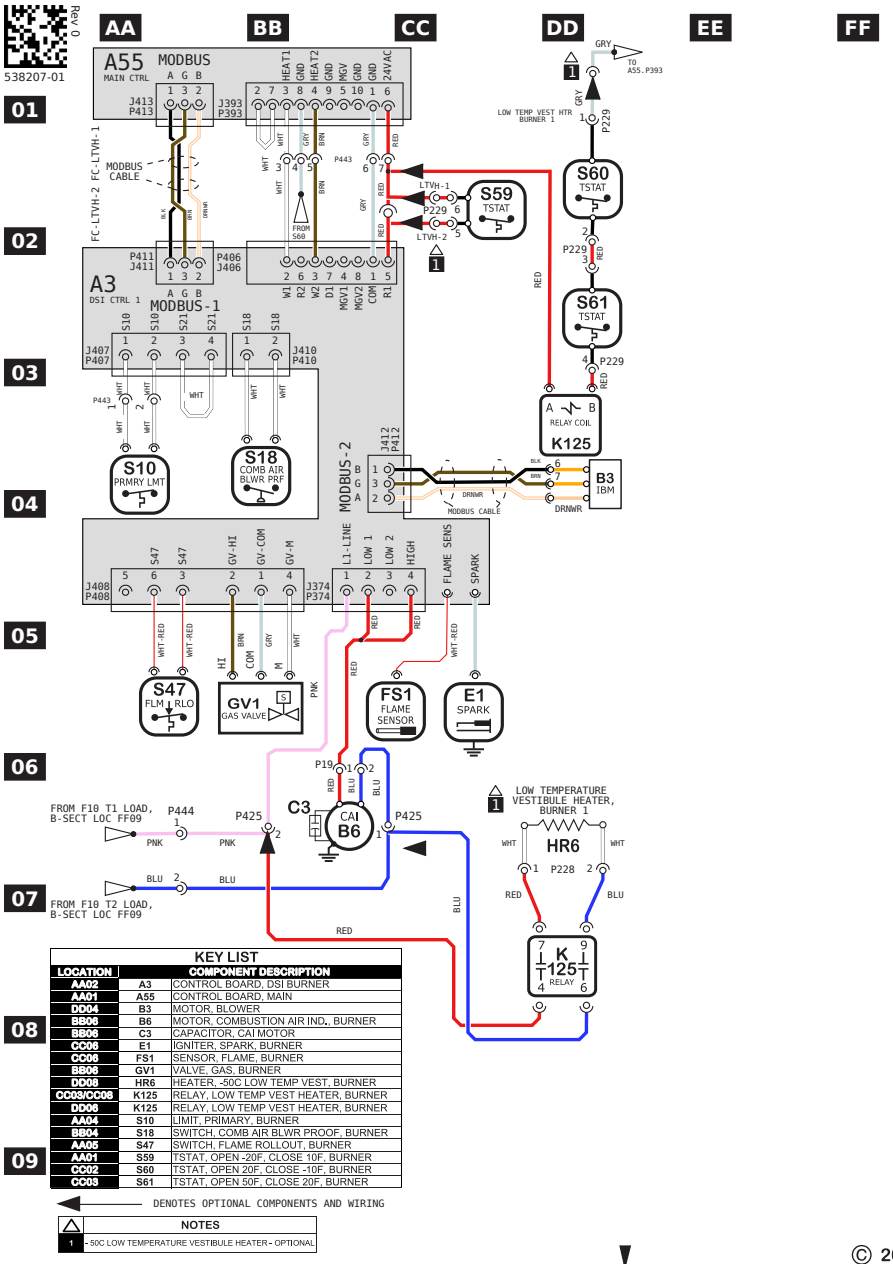

REHEAT REFRIGERANT ROUTING
EVAPORATOR COILS
CONDENSER COILS
REHEAT COIL
COMPRESSORS
REFRIGERANT CIRCUIT 1
REFRIGERANT CIRCUIT 2
REHEAT VALVE
REVERSING VALVE
CHECK VALVE
EXPANSION VALVES

Figure 58

GAS HEAT - Y AND G VOLT



KEY LIST

LOCATION		COMPONENT DESCRIPTION
AA02	A3	CONTROL BOARD, DSI BURNER
AA01	A55	CONTROL BOARD, MAIN
DD04	B3	MOTOR, BLOWER
BB06	B6	MOTOR, COMBUSTION AIR IND., BURNER
BB08	C3	CAPACITOR, CAI MOTOR
CC05	E1	IGNITER, SPARK, BURNER
CC08	FS1	SENSOR, FLAME, BURNER
BB09	GV1	VALVE, GAS, BURNER
DD09	HR6	HEATER, -50C LOW TEMP VEST, BURNER
CC08/CC09	K125	RELAY, LOW TEMP VEST HEATER, BURNER
DD08	K125	RELAY, LOW TEMP VEST HEATER, BURNER
AA04	S10	LIMIT, PRIMARY, BURNER
BB04	S18	SWITCH, COMB AIR BLWR PROOF, BURNER
AA05	S47	SWITCH, FLAME ROLLOUT, BURNER
AA01	S59	TSTAT, OPEN -20F, CLOSE 10F, BURNER
CC02	S60	TSTAT, OPEN 20F, CLOSE -10F, BURNER
CC03	S61	TSTAT, OPEN 50F, CLOSE 20F, BURNER

DENOTES OPTIONAL COMPONENTS AND WIRING

NOTES

1 - 50C LOW TEMPERATURE VESTIBULE HEATER - OPTIONAL

Model: LG*/LD* Series RTU - Gas Heat
130k, 180k, 240k BtuH
Voltage: 208/240/3/60(Y),460/3/60(G)
Supersedes: XXXXXX-XX Form No: 538207-01 Rev: 0

HEATING SECTION A	COOLING SECTION B	COOLING SECTION B3/5	ACCS SECTION C	ACCS SECTION D

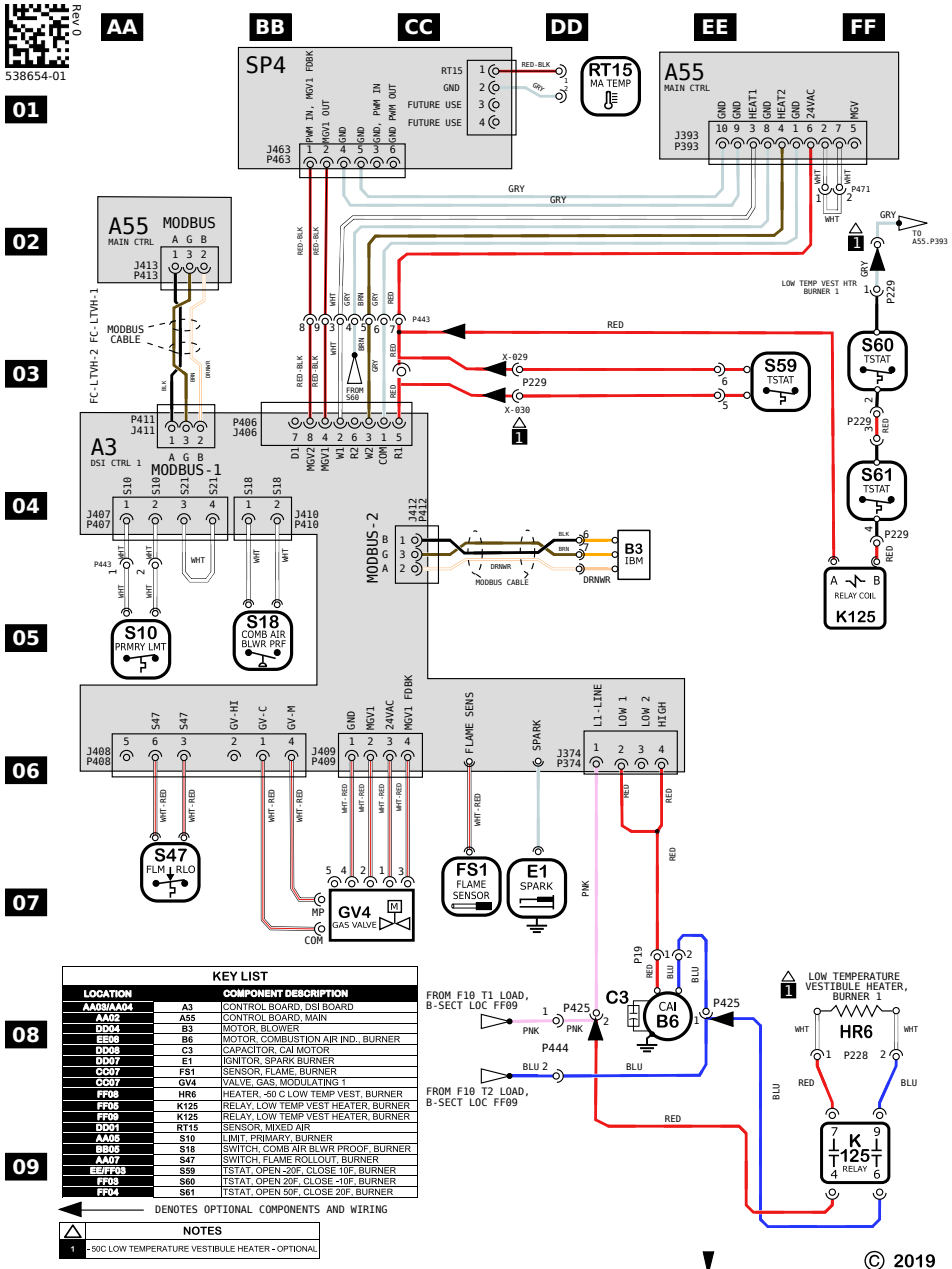
WIRING DIAGRAM FLOW

7x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012081C	04-29-2024	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX

GAS HEAT - Y AND G VOLT - MODULATING

538654-01 Rev 0



KEY LIST		
LOCATION		COMPONENT DESCRIPTION
AA03/AA04	A3	CONTROL BOARD, DSI BOARD
AA02	A55	CONTROL BOARD, MAIN
DD04	B3	MOTOR, BLOWER
EE06	B6	MOTOR, COMBUSTION AIR IND., BURNER
DD08	C3	CAPACITOR, CAI MOTOR
DD07	E1	IGNITOR, SPARK BURNER
CC07	FS1	SENSOR, FLAME, BURNER
CC07	GV4	VALVE, GAS, MODULATING 1
FF04	HR6	HEATER, -50 C LOW TEMP VEST, BURNER
FF05	K125	RELAY, LOW TEMP VEST HEATER, BURNER
FF09	K125	RELAY, LOW TEMP VEST HEATER, BURNER
DD01	RT15	SENSOR, MIXED AIR
AA05	S10	LIMIT, PRIMARY, BURNER
BB05	S18	SWITCH, COMB AIR BLWR PROOF, BURNER
AA07	S47	SWITCH, FLAME ROLLOUT, BURNER
EE/FF08	S59	TSTAT, OPEN -20F, CLOSE 10F, BURNER
FF03	S60	TSTAT, OPEN 20F, CLOSE -10F, BURNER
FF04	S61	TSTAT, OPEN 50F, CLOSE 20F, BURNER

DENOTES OPTIONAL COMPONENTS AND WIRING

NOTES	
1	-50C LOW TEMPERATURE VESTIBULE HEATER - OPTIONAL

Model: LG*/LD* Series RTU - Mod Gas Heat
130k, 180k, 240k BtuH
Voltage: 208/240/3/60(Y),460/3/60(G)
Supersedes: XXXXXX-XX Form No: 538654-01 Rev: 0

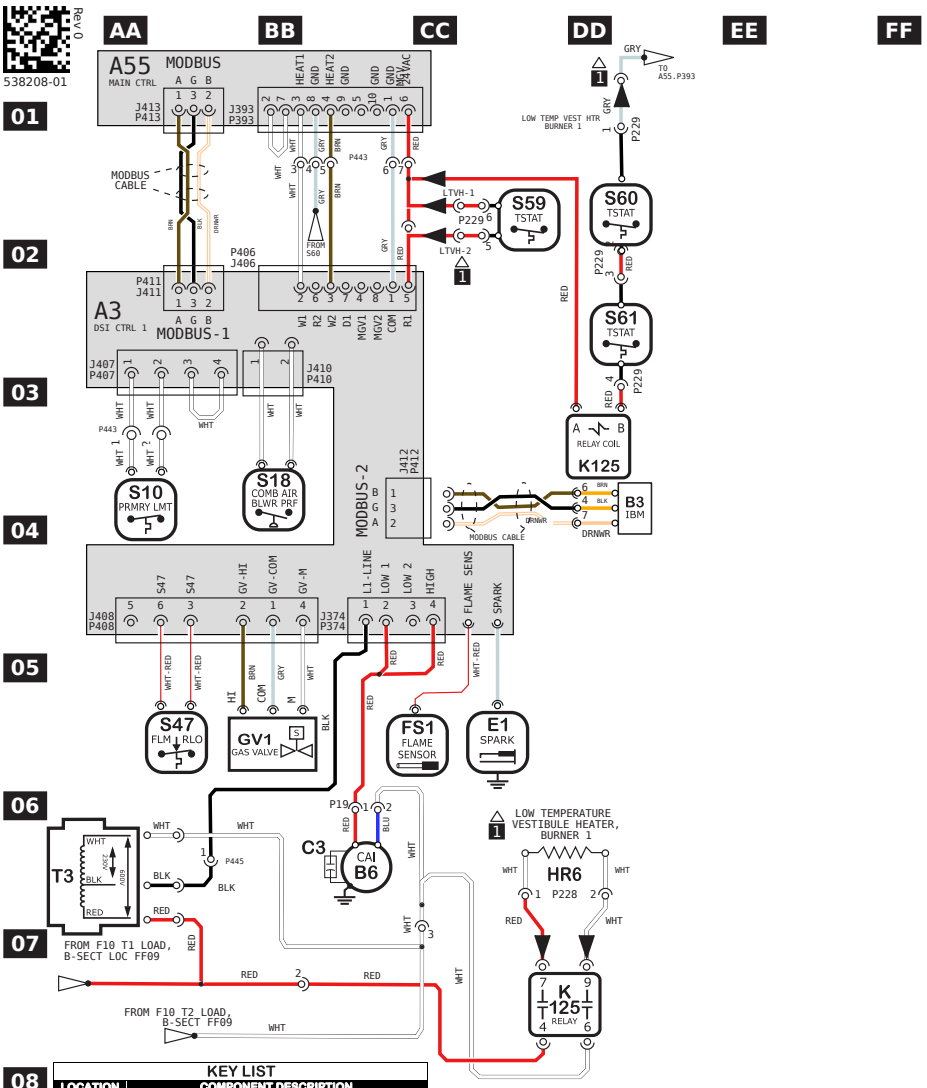
HEATING	COOLING	COOLING	ACCS	ACCS
SECTION A	SECTION B	SECTION B3/5	SECTION C	SECTION D

WIRING DIAGRAM FLOW

7x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-013678	10-09-2025	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX

GAS HEAT - J VOLT



KEY LIST		
LOCATION		COMPONENT DESCRIPTION
AA02	A3	CONTROL BOARD, DSI BURNER
AA01	A55	CONTROL BOARD, MAIN
DD04	B3	MOTOR, BLOWER
BB06	B6	MOTOR, COMBUSTION AIR IND., BURNER
BB06	C3	CAPACITOR, CAI MOTOR
CC06	E1	IGNITER, SPARK, BURNER
CC06	FS1	SENSOR, FLAME, BURNER
BB06	GV1	VALVE, GAS, BURNER
DD08	HR6	HEATER, -50C LOW TEMP VEST, BURNER
CC08/DD08	K125	RELAY, LOW TEMP VEST HEATER, BURNER
AA04	S10	LIMIT, PRIMARY, BURNER
BB04	S18	SWITCH, COMB AIR BLWR PROOF, BURNER
AA05	S47	SWITCH, FLAME ROLLOUT, BURNER
AA01	S59	TSTAT, OPEN -20F, CLOSE 10F, BURNER
CC02	S60	TSTAT, OPEN 20F, CLOSE -10F, BURNER
CC03	S61	TSTAT, OPEN 50F, CLOSE 20F, BURNER
AA06/AA07	T3	TRANSFORMER, COMBUSTION AIR BLOWER

DENOTES OPTIONAL COMPONENTS AND WIRING

NOTES
1 - 50C LOW TEMPERATURE VESTIBULE HEATER - OPTIONAL

Model: LG*/LD* Series RTU - Gas Heat - J VOLT
130k, 180k, 240k BtuH
Voltage: 575/3/60 (J)
Supersedes: XXXXXX-XX Form No: 538208-01 Rev: 0

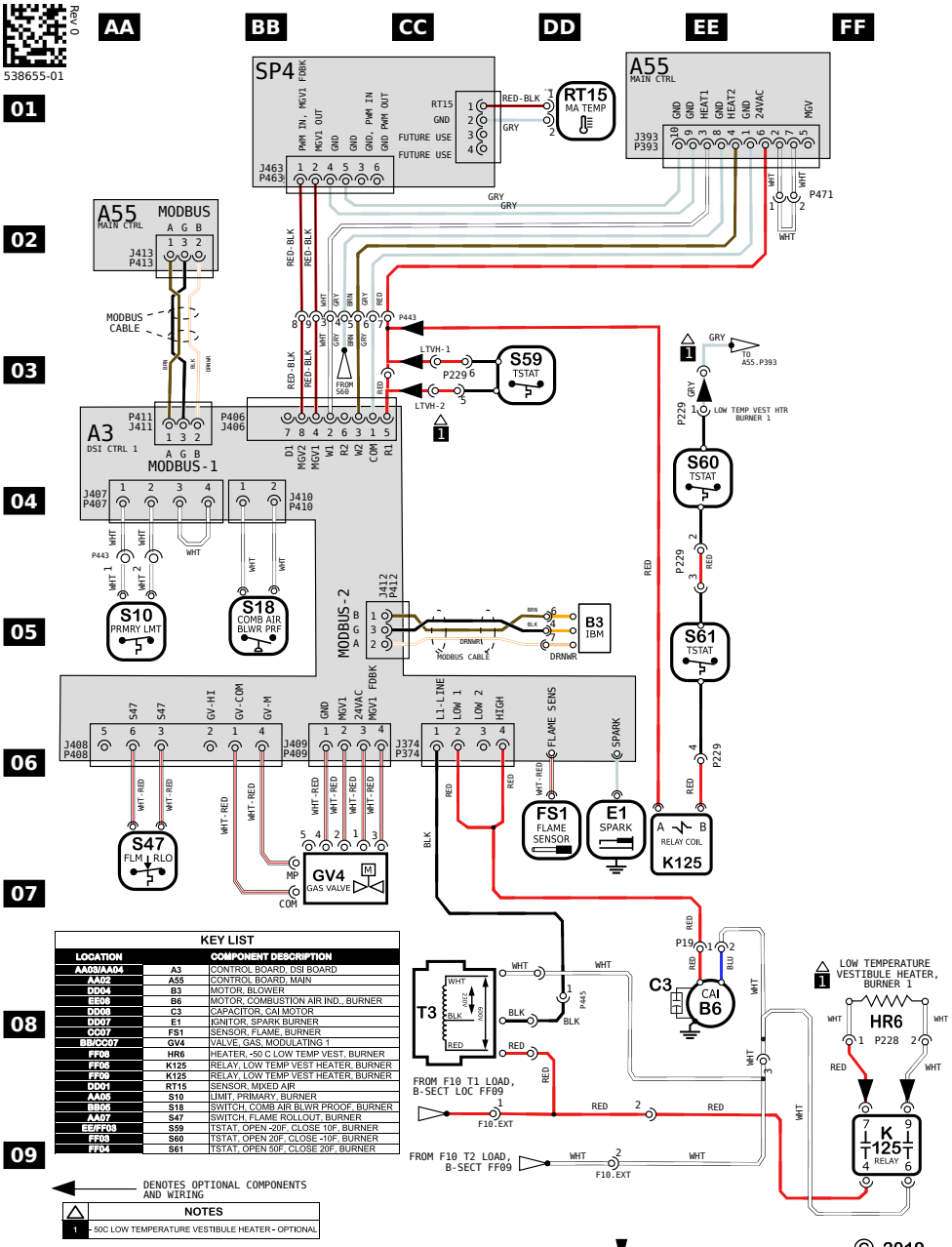
HEATING	COOLING	COOLING	ACCS	ACCS
SECTION A	SECTION B	SECTION B3/5	SECTION C	SECTION D

WIRING DIAGRAM FLOW

7x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012081C	04-29-2024	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX

GAS HEAT - J VOLT - MODULATING



KEY LIST		
LOCATION		COMPONENT DESCRIPTION
AA05/AA04	A3	CONTROL BOARD, DSI BOARD
AA02	A55	CONTROL BOARD, MAIN
DD04	B3	MOTOR, BLOWER
EE06	B6	MOTOR, COMBUSTION AIR IND., BURNER
EE08	C3	CAPACITOR, CAI MOTOR
DD07	E1	IGNITOR, SPARK BURNER
CC07	FS1	SENSOR, FLAME, BURNER
BB/CC07	GV4	VALVE, GAS, MODULATING 1
FF08	HR6	HEATER, -50 C LOW TEMP VEST, BURNER
FF06	K125	RELAY, LOW TEMP VEST HEATER, BURNER
FF09	K125	RELAY, LOW TEMP VEST HEATER, BURNER
DD01	RT15	SENSOR, MIXED AIR
AA05	S10	LIMIT, PRIMARY, BURNER
BB06	S18	SWITCH, COMB AIR BLWR PROOF, BURNER
AA07	S47	SWITCH, FLAME ROLLOUT, BURNER
EE/FF03	S59	TSTAT, OPEN -20F, CLOSE 10F, BURNER
FF08	S60	TSTAT, OPEN 20F, CLOSE -10F, BURNER
FF04	S61	TSTAT, OPEN 50F, CLOSE 20F, BURNER

DENOTES OPTIONAL COMPONENTS AND WIRING

NOTES
1 - 50C LOW TEMPERATURE VESTIBULE HEATER - OPTIONAL

Model: LG*/LD* Series RTU - MOD Gas Heat - J VO…
130k, 180k, 240k BtuH
Voltage: 575/3/60 (J)
Supersedes: XXXXXX-XX Form No: 538655-01 Rev: 0

HEATING SECTION A	COOLING SECTION B	COOLING SECTION B3/5	ACCS SECTION C	ACCS SECTION D

WIRING DIAGRAM FLOW

7x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-013678	02-09-2026	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX

TWO-STAGE GAS HEAT SEQUENCE OF OPERATION LDT078H-152H

FIRST STAGE HEAT DEMAND (INCLUDING IGNITION SEQUENCE)

1. Thermostat initiates heating demand (W1) to A55.
2. A55 Main Control board activates HEAT1 demand signal to W1 on A3 Direct Spark Ignition control.
3. A3 control verifies S10 and S47 contacts are closed, then A3 activates B6 Combustion Air Inducer by energizing LOW 1, HIGH.
4. A3 waits until S18 Pressure switch contacts change from open to closed proving B6 operation.
5. After a pre-purge period (30 seconds), A3 control energizes the E1 spark electrode and opens gas valve (Low Fire) by energizing GV-M.
6. The E1 spark electrode ignites the gas, and flame is verified by FS1 flame sensor. When flame is sensed, A55 starts the B3 Blower On Delay time.
7. After Blower On Delay expires, A55 starts B3 indoor blower operation. A55 operates B3 indoor blower at the Blower Heating High CFM Setpoint (refer to Table 1).

SECOND STAGE HEAT DEMAND

1. With 1st stage heating (W1) operating, the thermostat initiates W2 demand to A55.
2. A55 activates HEAT2 demand signal to W2 on A3 control.
3. A55 provides the 24VAC to the A3 Ignition control. Then opens gas valve to next setting (High Fire) by energizing GV-HI.

FIRST AND SECOND STAGE HEATING DEMAND TERMINATION

1. When thermostat demand is satisfied, heating demands (W1, W2) are removed from A55.
2. A55 removes any active demand signals (HEAT1, HEAT2) to A3 control.
3. A3 de-actives any active signals to the GV1 (GV-M, GV-HI) which closes the valve.
4. A3 maintains B6 operation for post purge period (45 seconds), then A3 removes the active signals shutting off B6.
5. A55 maintains B3 operation until Gas Blower Off Delay expires, then A55 shuts off the B3 indoor blower.

OPTIONAL LOW AMBIENT KIT

(C.S.A. -50°C Low Ambient Kit)

1. Line voltage (or transformer T20 in 460V and 575V only) is roted through the low ambient kit fuses F20 and N.C. low ambient kit thermostats S60 and S61, to energize low ambient kit hater HR6.

MODULATING GAS HEAT SEQUENCE OF OPERATION LDT078H-152H

MODULATING IGNITION SEQUENCE

1. Thermostat initiates heating demand (W1) to A55.
2. A55 Main Control board activates HEAT1 demand signal to W1 on A3 Direct Spark Ignition control.
3. A3 control verifies S10 and S47 contacts are closed, then A3 activates B6 Combustion Air Inducer by energizing LOW 1 and HIGH.
4. A3 waits until S18 Pressure switch contacts change from open to closed proving B6 operation.
5. After a pre-purge period (30 seconds), A3 control energizes the E1 spark electrode and opens GV4 by energizing GV-M.
6. A133 transmits MGV1 OUT (0VDC) signal to A3 MGV1. Signal passes through A3 and out MGV1 to GV4 (pin 2).
7. The E1 spark electrode ignites the gas, and flame is verified by FS1 flame sensor. When flame is sensed, A55 starts the B3 Blower On Delay time.
8. After Blower On Delay expires, A55 starts B3 indoor blower operation at the Blower Heating Low CFM Setpoint (refer to Table 1) and A133 MGV1 OUT start varying based upon CORE internal algorithm results (0VDC - 10VDC).
9. When Thermostat adds a W2 heating signal to A55, A55 changes B3 indoor blower operation to Blower Heating High CFM Setpoint (refer to Table 1).

MODULATING HEATING DEMAND – GAS VALVE POSITIONS

1. CORE monitors RT6 (Discharge Air Temperature), compares RT6 value to the user setpoint, and calculates new value for the gas valve position (A133 MGV1 OUT).
2. A133 updates the MGV1 OUT to the GV4 (valve position signal).
3. GV4 receives the new signal from A3 MGV1 output and adjusts accordingly.

   NOTE - *During modulating heating demand, A133 monitors RT15. CORE calculates the Rise Range (difference between RT15 and RT6) and maintains operation below maximum rise.*
4. Steps 1 thru 3 are repeated until heating demand has been satisfied.

MODULATING HEATING DEMAND TERMINATION

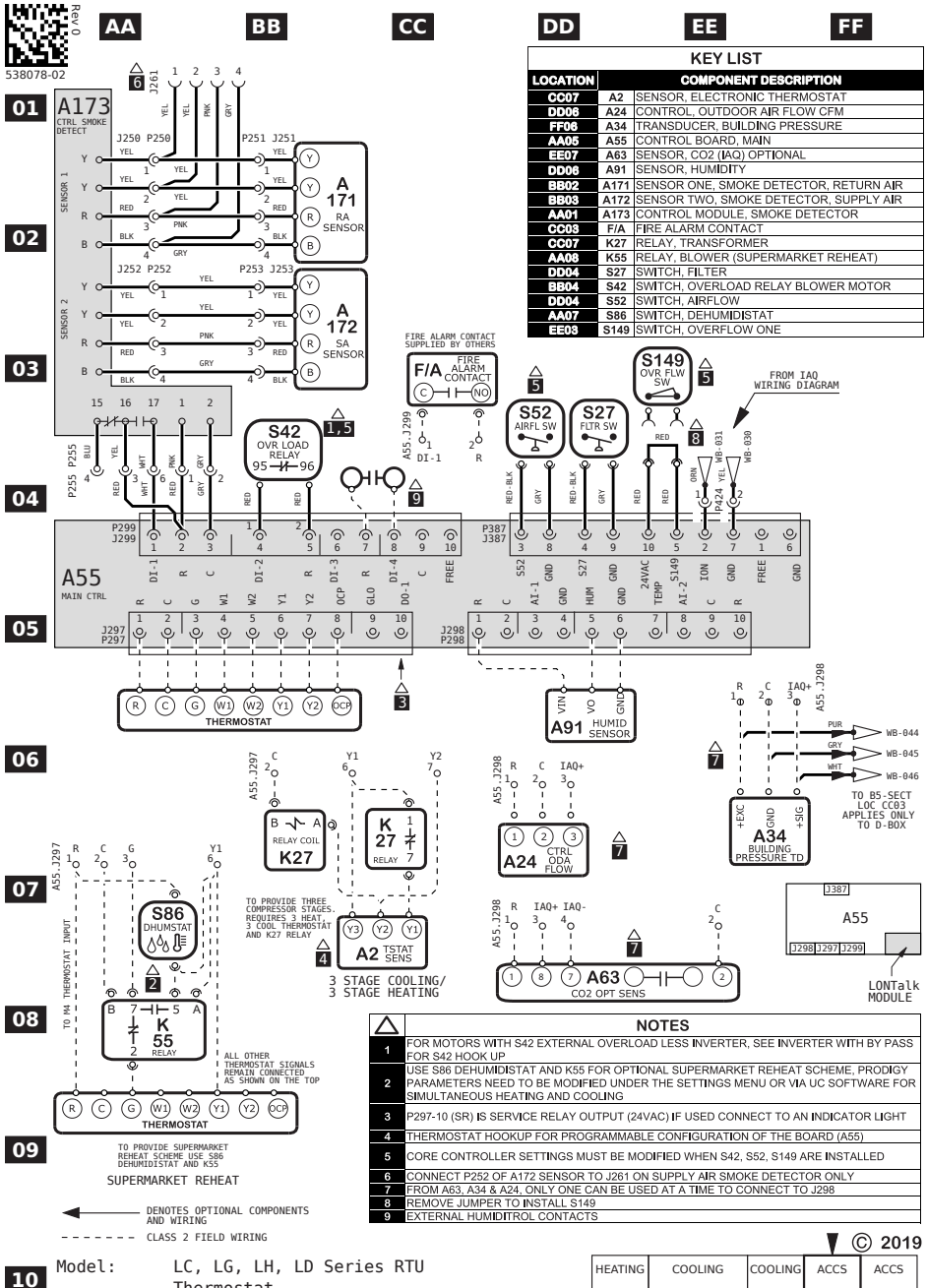
1. When thermostat demand is satisfied, heating demands (W1, W2) are removed from A55.
2. A55 removes any active demand signals (HEAT1, HEAT2) to A3 control. A133 removes the MGV1 OUT signal.
3. A3 control closes GV4 by deactivating GV-M signal.
4. A3 control maintains B6 operation for post purge period (45 seconds), then shuts off B6 by removing active signal (LOW 1, HIGH).
5. A55 maintains B3 indoor blower operation until Gas Blower Off Delay expires, then A55 shuts off the indoor blower.

OPTIONAL LOW AMBIENT KIT

(C.S.A. -50°C Low Ambient Kit)

1. Line voltage (or transformer T20 in 460V and 575V only) is roted through the low ambient kit fuses F20 and N.C. low ambient kit thermostats S60 and S61, to energize low ambient kit hater HR6.

ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT



KEY LIST

LOCATION		COMPONENT DESCRIPTION
CC07	A2	SENSOR, ELECTRONIC THERMOSTAT
DD06	A24	CONTROL, OUTDOOR AIR FLOW CFM
FF06	A34	TRANSDUCER, BUILDING PRESSURE
AA05	A55	CONTROL BOARD, MAIN
EE07	A63	SENSOR, CO2 (IAQ) OPTIONAL
DD06	A91	SENSOR, HUMIDITY
BB02	A171	SENSOR ONE, SMOKE DETECTOR, RETURN AIR
BB03	A172	SENSOR TWO, SMOKE DETECTOR, SUPPLY AIR
AA01	A173	CONTROL MODULE, SMOKE DETECTOR
CC03	F/A	FIRE ALARM CONTACT
CC07	K27	RELAY, TRANSFORMER
AA08	K55	RELAY, BLOWER (SUPERMARKET REHEAT)
DD04	S27	SWITCH, FILTER
BB04	S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
DD04	S52	SWITCH, AIRFLOW
AA07	S86	SWITCH, DEHUMIDISTAT
EE03	S149	SWITCH, OVERFLOW ONE

NOTES

1	FOR MOTORS WITH S42 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2	USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, PRODIGY PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING
3	P297-10 (SR) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
4	THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE BOARD (A55)
5	CORE CONTROLLER SETTINGS MUST BE MODIFIED WHEN S42, S52, S149 ARE INSTALLED
6	CONNECT P252 OF A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY
7	FROM A63, A34 & A24, ONLY ONE CAN BE USED AT A TIME TO CONNECT TO J298
8	REMOVE JUMPER TO INSTALL S149
9	EXTERNAL HUMIDITROL CONTACTS

Model: LC, LG, LH, LD Series RTU
Thermostat
Voltage: All Voltages
Supersedes: 538078-01 Form No: 538078-02 Rev: 0

HEATING	COOLING	COOLING	ACCS	ACCS
SECTION A	SECTION B	SECTION B3/5	SECTION C	SECTION D

WIRING DIAGRAM FLOW

7x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-012295C	04-03-2024	MXR6	MXT5	ORIGINATED AT PD&R CARROLLTON, TX

ECONOMIZER

538072-02 Rev. 0

AA BB CC DD

01

02

03

04

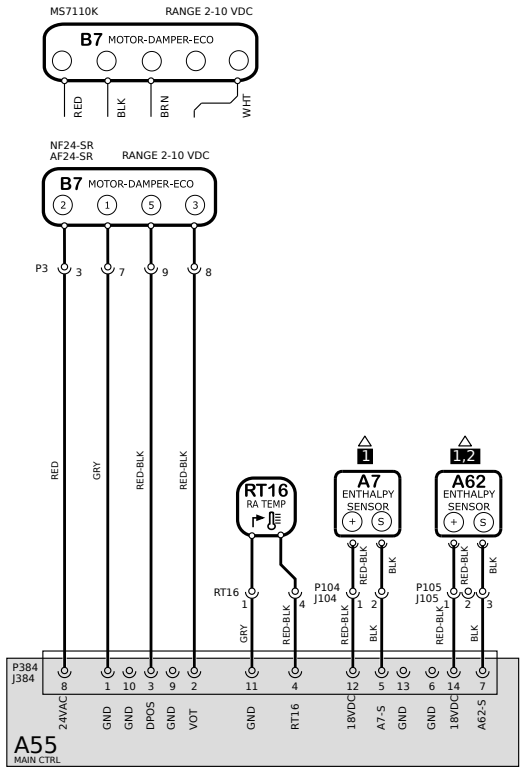
05

06

07

08

09



△	NOTES
1	A7 AND A62 NOT USED FOR SENSIBLE TEMPERATURE CONTROL
2	FOR UNIT DIFFERENTIAL ENTHALPY CONTROL, ADD A62 RETURN AIR ENTHALPY SENSOR

KEY LIST

LOCATION		COMPONENT DESCRIPTION
CC05	A7	SENSOR, SOLID STATE ENTHALPY
AA06	A55	CONTROL BOARD, MAIN
DD05	A62	SENSOR, ENTHALPY INDOOR
BB02	B7	MOTOR, DAMPER ECONOMIZER
CC05	RT16	SENSOR, RETURN AIR TEMP

10

Model: Econ & Motor OAD - LC/LG/LH/LD SC/SG/SH/SD

Voltage: All Voltages

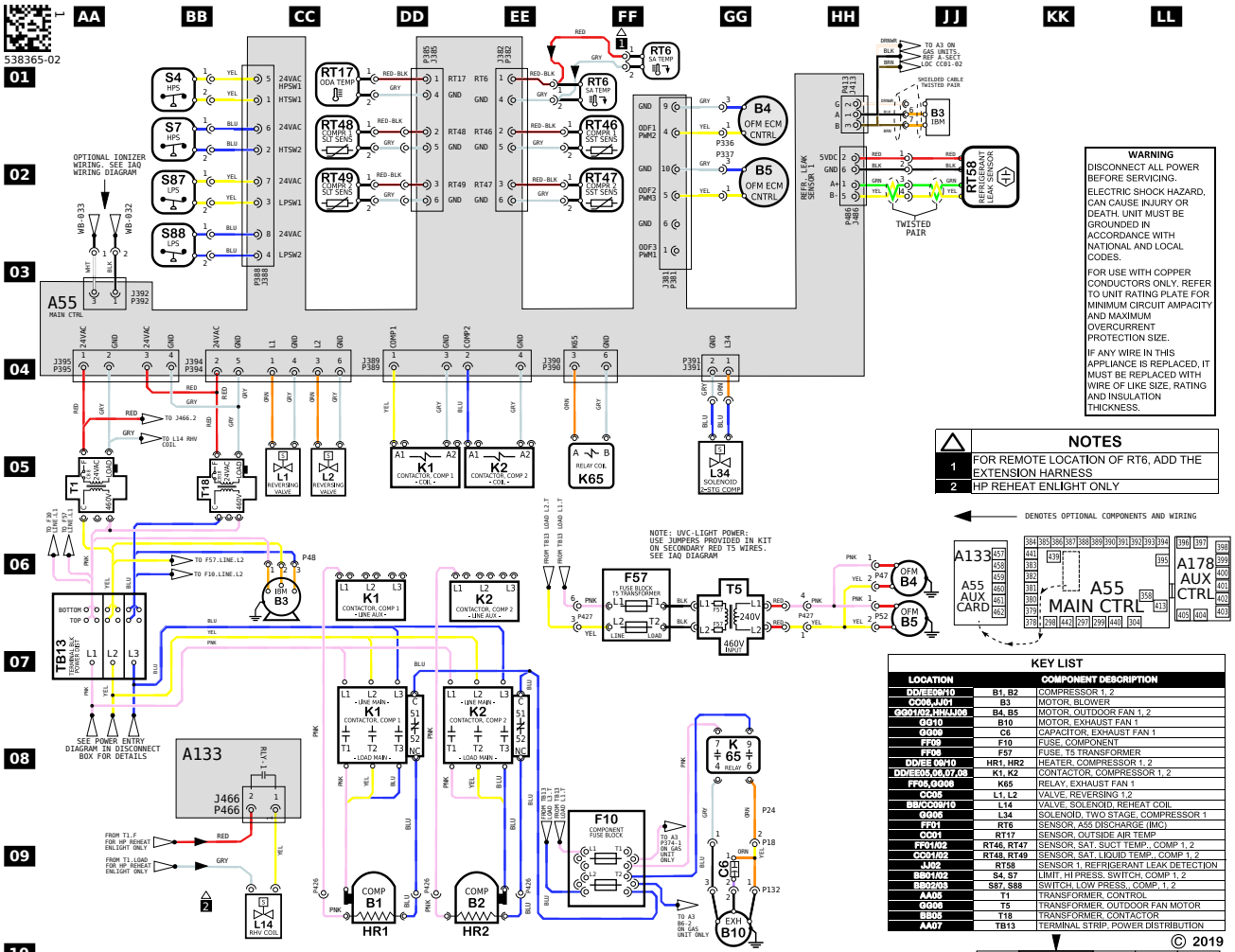
Supersedes: N/A Form No: 538072-02 Rev: 0

HTG SEC A	CLG SEC B	CLG SEC B3	ACCS SEC C	ACCS SEC D

WIRING DIAGRAM FLOW

5x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
0	CN-013234R	08-25-2025	RV	AC	ORIGINATED AT PD&R CARROLLTON, TX

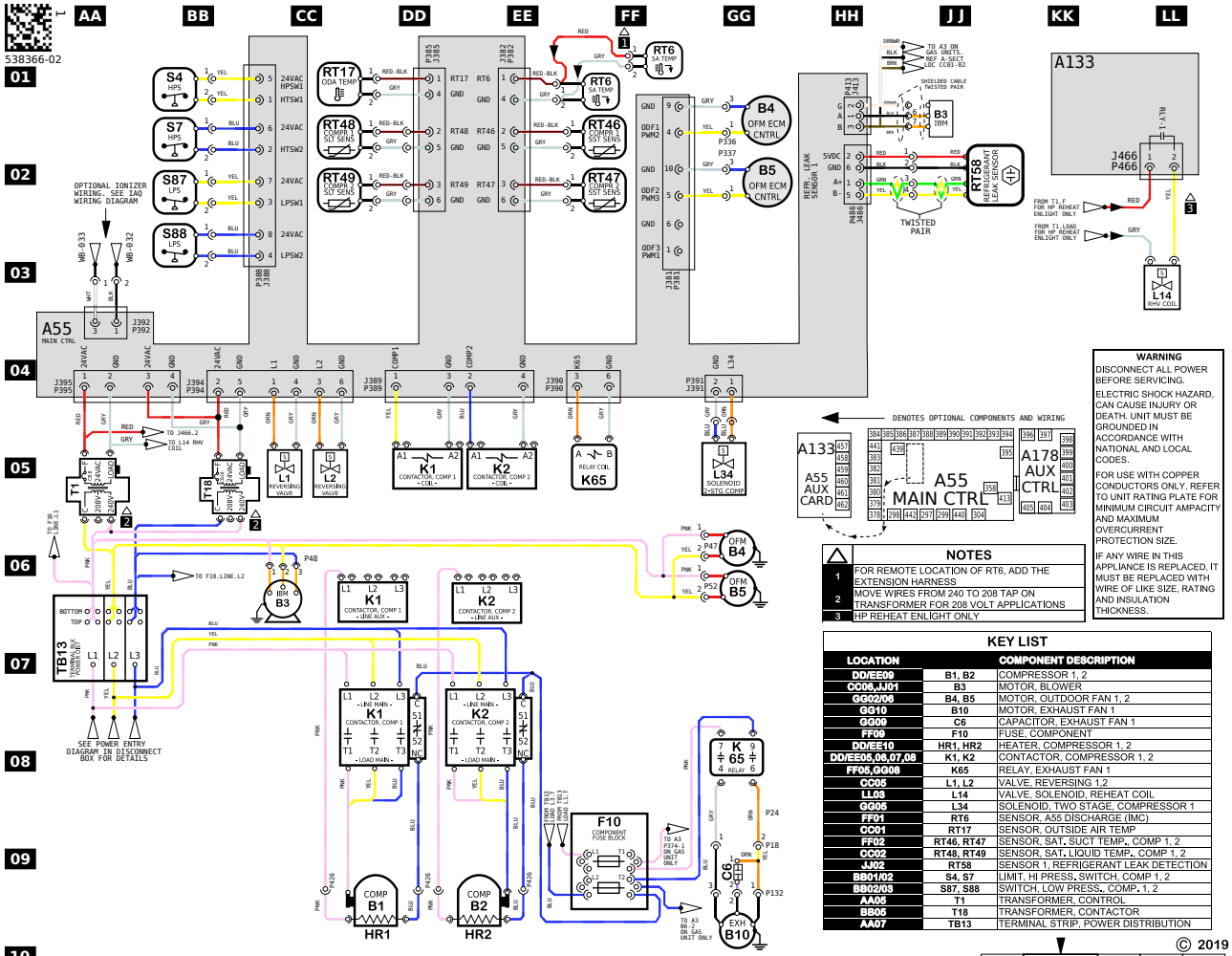


Product: LHT, LDT B Box - G & J VOLT 078-120
Heat Pump Diagram with Higher SCCR

Voltage: 460V/3~/60Hz (G)
Supersedes: 538365-01 Form No: 538365-02 Rev: 1

10x12 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-013678	01-21-2026	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX
001	CN-013678D	05-15-2026	FEP	MCF	UPDATED L14 CONNECTION DUE TO UPDATED HARNESS



WARNING

DISCONNECT ALL POWER BEFORE SERVICING.

ELECTRIC SHOCK HAZARD, CAN CAUSE INJURY OR DEATH. UNIT MUST BE GROUNDED IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.

FOR USE WITH COPPER CONDUCTORS ONLY. REFER TO UNIT RATING PLATE FOR MINIMUM CIRCUIT AMPACITY AND MAXIMUM OVERCURRENT PROTECTION SIZE.

IF ANY WIRE IN THIS APPLIANCE IS REPLACED, IT MUST BE REPLACED WITH WIRE OF LIKE SIZE, RATING AND INSULATION THICKNESS.

NOTES

1	FOR REMOTE LOCATION OF RT6, ADD THE EXTENSION HARNESS
2	MOVE WIRES FROM 240 TO 208 TAP ON TRANSFORMER FOR 208 VOLT APPLICATIONS
3	HP REHEAT ENLIGHT ONLY

KEY LIST

LOCATION		COMPONENT DESCRIPTION
DD/EE09	B1, B2	COMPRESSOR 1, 2
CC06,JJ01	B3	MOTOR, BLOWER
GG02/06	B4, B5	MOTOR, OUTDOOR FAN 1, 2
GG10	B10	MOTOR, EXHAUST FAN 1
GG09	C6	CAPACITOR, EXHAUST FAN 1
FF02	F10	FUSE, COMPONENT
DD/EE10	HR1, HR2	HEATER, COMPRESSOR 1, 2
DD/EE05,06,07,08	K1, K2	CONTACTOR, COMPRESSOR 1, 2
FF05,GG08	K65	RELAY, EXHAUST FAN 1
CC05	L1, L2	VALVE, REVERSING 1,2
LL03	L14	VALVE, SOLENOID, REHEAT COIL
GG05	L34	SOLENOID, TWO STAGE, COMPRESSOR 1
FF01	RT6	SENSOR, A55 DISCHARGE (IMC)
CC01	RT17	SENSOR, OUTSIDE AIR TEMP
FF03	RT46, RT47	SENSOR, SAT. SUCT TEMP., COMP 1, 2
CC02	RT48, RT49	SENSOR, SAT. LIQUID TEMP., COMP 1, 2
JJ02	RT58	SENSOR 1, REFRIGERANT LEAK DETECTION
BB01/02	S4, S7	LIMIT, HI PRESS. SWITCH, COMP 1, 2
BB02/03	S87, S88	SWITCH, LOW PRESS., COMP. 1, 2
AA05	T1	TRANSFORMER, CONTROL
BB05	T18	TRANSFORMER, CONTACTOR
AA07	TB13	TERMINAL STRIP, POWER DISTRIBUTION

Product: LHT, LDT B Box - Y VOLT 078-120
Heat Pump Diagram with Higher SCCR

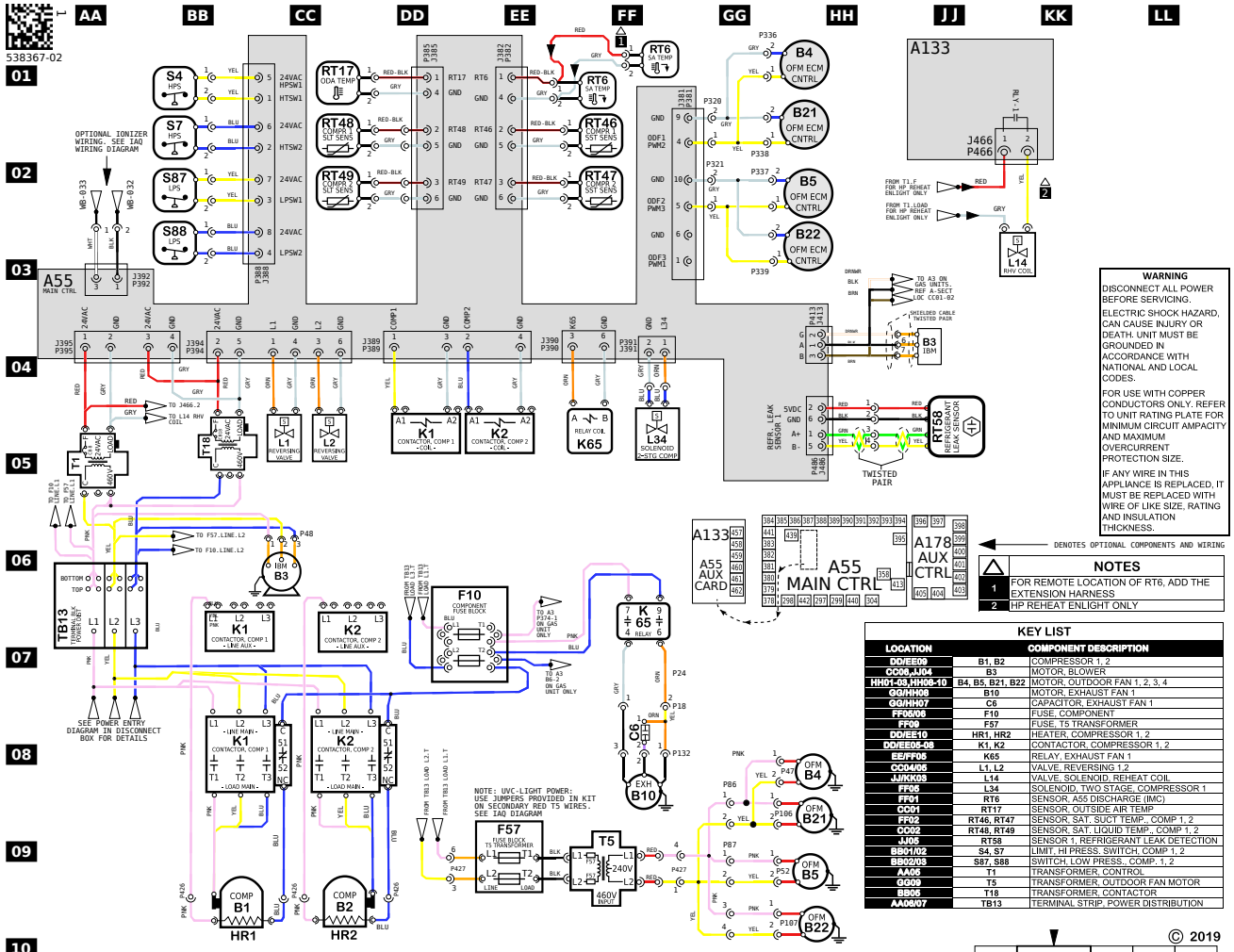
Voltage: 208-230V/3~/60Hz (Y)
Supersedes: 538366-01 Form No: 538366-02 Rev: 1

WIRING DIAGRAM FLOW

HEATING	COOLING	COOLING	ACCS	ACCS
SECTION A	SECTION B	SECTION B3/5	SECTION C	SECTION D

10x12 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-013678	01-27-2026	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX
001	CN-013678D	05-15-2026	FEP	MCF	UPDATED L14 CONNECTION DUE TO UPDATED HARNESS

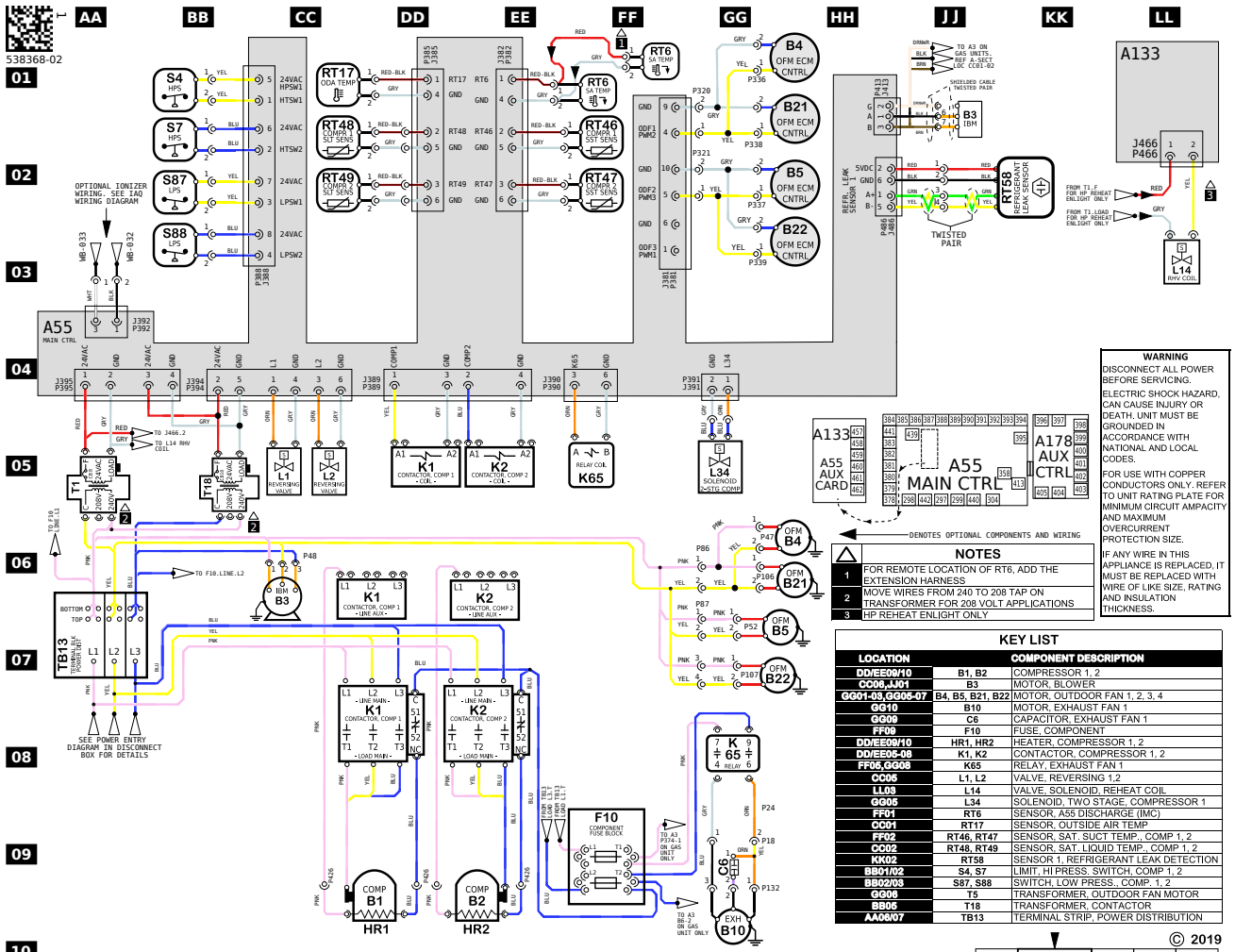


Product: LHT, LDT B Box - G & J VOLT 152
Heat Pump Diagram with Higher SCCR

Voltage: 460V/3~/60Hz (G)
Supersedes: 538367-01 Form No: 538367-02 Rev: 1

10x12 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-013678	01-18-2026	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX
001	CN-013678D	05-15-2026	FEP	MCF	UPDATED L14 CONNECTION DUE TO UPDATED HARNESS



Product: LHT, LDT B Box - Y VOLT 152
Heat Pump Diagram with Higher SCCR

Voltage: 208-230V/3~/60Hz (Y)
Supersedes: 538368-0… Form No: 538368-02 Rev: 1

10x12 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-013678	01-20-2026	FEP	MCF	ORIGINATED AT PD&R CARROLLTON, TX
001	CN-013678D	05-15-2026	FEP	MCF	UPDATED L14 CONNECTION DUE TO UPDATED HARNESS

LDT078-152H SEQUENCE OF OPERATION

Power:

1 - Line voltage through the S48 unit disconnect, TB2 terminal block, or CB10 circuit breaker energizes the T1 transformer. T1 provides 24VAC power to A55 Unit Controller which provides 24VAC to the unit cooling, heating and blower controls.

2 - Line voltage is also routed to compressor crankcase heaters, compressor contactors, the blower motor, condenser fan relays and exhaust fan relays.

Blower Operation:

3 - The A55 Unit Controller module receives a demand from thermostat terminal G.

4 - B3 receives the pre-set blower setting through MODUS. Economizer Operation:

5 - A55 receives a demand and energizes exhaust fan relay K65 with 24VAC at 50% outside air damper open (adjustable).

6 - N.O. K65-1 and N.O. K65-2 both close, energizing exhaust fan motor B10.

First Stage Cooling Demand (compressor B1)

7 - A55 receives a Y1 thermostat demand.

8 - After A55 proves N.C. low pressure switch S87, RT46 reading above freeze point and N.C. high pressure switch S4, compressor contactor K1 is energized.

9 - N.O. contacts K1-1 close energizing compressor B1. Crankcase heater HR1 is de-energized.

10 - At the same time condenser fans B4 and B5 and are energized.

Second Stage Cooling Demand (compressor B2)

11 - A55 receives a Y2 thermostat demand.

12 - After A55 proves N.C. low pressure switch S88, RT47 reading above freeze point, and N.C. high pressure switch S7, compressor contactor K2 is energized.

13 - N.O. contacts K2-1 close energizing compressor B2. Crankcase heater HR2 is de-energized.

3rd Stage Cooling (compressor B1 in full load and compressor 2 is energized)

14 - A55 receives a Y3 thermostat demand (Y1 + Y2 thermostat inputs).

15 - A55 sends 24VAC to B1 compressor solenoid (L14), B1 compressor runs at full load.

Outdoor Ambient Temperature	W1 Demand	W2 Demand
Above Balance Point *Temperature Setting**	Compr. 1 & 2 On* Gas Heat Off	Compr. 1 & 2 Off Gas Heat High
Below Balance Point Temperature Setting**	Compr. 1 & 2 Off Gas Heat Low	Compr. 1 & 2 Off Gas Heat High

*L1 and L2 reversing valves are de-energized with a heating demand. The heat pump will heat only, not cool.

**Balance Point temperature setting can be adjusted using the following mobile service app menu path:

RTU MENU > SETTING > RTU OPTIONS > EDIT PARAMETER = 526 (HP DF BALANCE POINT)

First Stage Heat - OD Temp **ABOVE** Balance Point (35°F Default)

1 - Unit controller A55 receives W1 demand. If the OD air temperature is above the balance point setpoint (35 F default), HP heating is initiated.

2 - After A55 proves N.C. low pressure switch S87, S88 high pressure switch S4, S7 compressors contactors K1, K2 are energized.

3 - K1-1 and K2-1 close energizing compressor B1 and B2. K1 and K2 auxiliary switch open de-energizing crankcase heaters.

4 - Outdoor ECM fans B4, B5 and (B21, B22 in LDT152 units) receive pre-set fan settings at high speed from A55 unit controller.

First Stage Heat - OD Temp **BELOW** Balance Point (35°F Default)

5 - Unit controller A55 receives W1 demand. If the OD air temperature is BELOW the balance point setpoint (35 F default), it will activate for low gas heat.

6 - See sequence of operation for gas heat.

NOTE - *For first stage heat, the OD temp is only checked upon a change in demand. The controller will continue with the selected heat source until a change in heating demand is received.*

NOTE - *If the OAT sensor on an LDT unit fails, the controller will assume OAT is not suitable for HP and will use gas heat.*

Second Stage Heat - Regardless of OD Temperature

7 - Second stage heat demand energizes W2 in the thermostat.

8 - See sequence of operation for gas heat.

Defrost Mode:

Defrost is enabled when outdoor coil temperature is below 35°F. The Unit Controller will cycle in and out of defrost depending on the temperature difference between the outdoor coil and outdoor air temperature. Defrost is also initiated when the accumulated run time with the outdoor coil temperature below 35°F reaches six hours.

Note - *Only one refrigerant circuit will go into defrost at a time.*

DIRECT DRIVE BLOWER SEQUENCE OF OPERATION / TROUBLESHOOTING

Blower Operation:

1 - Line voltage is routed to B3 blower motor through TB2 terminal strip, TB13 terminal strip and J/P48 terminals 1, 2 and 3.

2 - B3 blower motor runs internal diagnostics to check for proper temperature, voltage, etc. (KL2-2 and -3). This process takes approximately 10 seconds. Refer to the Failure Handling/Troubleshooting section.

3 - A55 Unit Controller receives a thermostat demand. After theA55 proves (P259-7 and -6) that B3 blower motor internal relay (KL2-2 and -3) is closed, B3 blower motor is energized (0-10VDC from P259-4 to KL3-4). B3 blower motor controls are grounded through KL2-2 and -3 to A55 P259-6.

4 - If configured, A55 checks S52 blower proving switch to make sure it closes within 16 seconds of the 0-10VCD signal being sent to B3 blower motor.

Blower Fault Sequence Direct Drive Motor - No S52:

1 - Line voltage is provided to B3 blower motor.

2 - After 10 seconds, the B3 blower motor internal relay does not close.

3 - Alarm 186 is set by the A55 Unit Controller, de-energizing unit. If one of the “Error” failures listed in Table 22 occurs (“Warning” failures will not set Alarm 186), service is required. Refer to the Failure Handling/Troubleshooting section.

4 - If B3 blower motor internal relay closes continue to next step.

5 - A55 sends 0-10VDC signal to B3 blower motor.

6 - During B3 blower motor operation, the internal motor relay opens.

7 - Alarm 186 is set by A55 and de-energizes the unit. Service is required. Refer to the Failure Handling/Troubleshooting section.

Blower Fault Sequence Direct Drive Motor - With S52 (If Configured):

1 - A55 Unit Controller sends 0-10VDC signal to B3 blower motor.

2 - After 16 seconds, if S52 blower proving switch remains open, A55 will remove 0-10VDC signal for 5 minutes.

3 - A55 sends 0-10VDC signal to B3 blower motor.

4 - After 16 seconds, if S52 blower proving switch remains open, A55 will remove 0-10VDC signal for another 5 minutes.

5 - After the third try, A55 will de-energize the unit. Service is required.

Failure Handling/Troubleshooting:

1 - Follow Table 22 to troubleshoot possible failures that would cause Alarm 186 to set.

2 - BEFORE DETERMINING THAT THE BLOWER ASSEMBLY HAS FAILED, use the A55 Unit Controller to clear delays and operate the blower.

3 - Main Menu > Service > Offline > Clear Delays > Yes > Save

4 - Main Menu > Service > Test > Blower

5 - Observe if the blower operates or if Alarm 186 sets again.

6 - If blower does not operate and Alarm 186 is set again, blower assembly must be replaced.

7 - If blower assembly does operate, wait a minimum of 30 minutes to ensure Alarm 186 is not set again.

Table 22

DIRECT DRIVE BLOWER MOTOR TROUBLESHOOTING

Failure	Error	Warning	Reason	Troubleshoot
Locked Rotor	o		No changes in hall signals within 2000ms	Check for obstruction keeping impeller from rotating
Braking Mode		o	Warning, no error code set, Motor start not possible after 20 sec	Check for secondary airflow source in the system causing the impeller to rotate backwards when off
Hall Error	o		Combination of 3 hall signals gives false signal after one rotation	Measure voltage across each leg, Check electrical connections
Power Module Overheated	o		Temperature > 115°C	Check operating conditions in blower compartment, Check for high motor load (current draw), Check for corrosion-free and secure electrical connections
Motor Overheated	o		Motor over-temperature protector opens	
Gate Driver Error	o		Internal software fault	Measure voltage across each leg, Check electrical connections
Phase Failure	o		Input voltage has phase imbalance	Measure voltage across each leg, Check electrical connections, Repair low/high voltage leg(s)
DC Link Voltage Low	o		Rectified DC link voltage is too low	
DC Link Over-voltage	o		Rectified DC link voltage is too high	
Line Over-voltage	o		Line voltage too high	
Line Under-voltage	o		Line voltage too low	
Communication Error			Internal communication failure. Not connected with master/slave wiring	Check low voltage wiring connections
DC Link Voltage Low		o	Warning, not low enough to set error code	Measure voltage across each leg, Check electrical connections, Repair low/high voltage leg(s)
Electronics Temp High		o	Warning, not high enough to set error code, Temperature > 95°C	Check operating conditions in blower compartment, Check for high motor load (current draw), Check for corrosion-free and secure electrical connections
Power Module Temp High		o	Warning, not high enough to set error code, Temperature > 105°C	
Motor Temp High		o	Warning, not high enough to set error code, Temperature > 130°C	

IX–DECOMMISSIONING

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available befor the task is commenced.

Steps to ensure this are:

- Become familiar with the equipment and its operation,
- Isolate the system electrically,
- Ensure that before attempting the procedure that mechanical handling equipment is available, if required, for handling refrigerant cylinders, and that all personal protective equipment is available and being used correctly while the recovery process is supervised at all times by a competent person and that the recovery equipment and cylinders conform to the appropriate standards.

Additionally, pump down refrigerant system, if possible, and if a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system. Make sure that cylinders are situated on the scales before recovery takes place. Start the recovery machine and operate in accordance with instructions. Do not overfill cylinders (no more than 80 % volume liquid charge). Do not exceed the maximum working pressure of the cylinder, even temporarily. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off. Recovered refrigerant shall not be charged into another refrigerating system unless it has been cleaned and checked.

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of flammable refrigerants, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area)

Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed. Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations,
- Evacuate the circuit,
- Purge the circuit with inert gas,
- Evacuate,
- Purge with inert gas,
- Open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems. Refrigerant purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.