



Heating & Cooling Systems


Fix-Right Repair Guide™



Premier Heating & Air Conditioning, LLC.

123 Anywhere Street, City 12345

*The areas leading comfort experts for all your
Heating and Air Conditioning needs*



This repair guide
contains 99% of all
common heating and
cooling system
failures.

Each includes their:

- ☑ Causes of failure
- ☑ ***Fix-Right[®] Solution***
- ☑ How best to ***prevent***
them from happening
again.

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Cooling Systems

Fix-Right[®] Repair Guide

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System Failure Prevention

- ☑ Have maintenance on your heating & air conditioning equipment done one month before heating and airconditioning season.
- ☑ Keep your indoor and outdoor condensing unit free of debris.

SEER2 2023 Minimum Efficiency

2023 SEER2 MINIMUM Residential Split-system Air Conditioners

* Courtesy of HARDI

Region	North	South	Southwest
Compliance Deadline:	Date of manufacture	Date of installation	Date of installation
Inventory Management:	Any non compliant equipment manufactured prior to January 1, 2023 can be sold and installed	All noncompliant equipment must be sold for installation prior to January 1, 2023 or shipped to the North for installation	All noncompliant equipment must be sold for installation prior to January 1, 2023 or shipped to the North for installation
Split-System Air Conditioners with a Certified Cooling Capacity <45,000 Btu/h	13.4 SEER2	14.3 SEER2	14.3 SEER2 / 11.7 EER2** (**9.8 EER2 if ≥ 15.2 SEER2)
Split-System Air Conditioners with a Certified Cooling Capacity ≥45,000 Btu/h	13.4 SEER2	13.8 SEER2	13.8 SEER2 / 11.2 EER2** (**9.8 EER2 if ≥ 15.2 SEER2)

2023 SEER2 MINIMUM Residential Single Package Air Conditioners

* Courtesy of HARDI

Nationwide (North + South Regions)	Southwest Region
13.4 SEER2	13.4 SEER2 / 10.6 EER2

2023 SEER2 MINIMUM Split System & Packaged Heat Pump Systems

All States * Courtesy of HARDI

Nationwide (North + South Regions)	Southwest Region
13.4 SEER2	13.4 SEER2 / 10.6 EER2

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Loose/Burned Wiring

1

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0101 0050	Replace fuseable link	\$ 238.17	\$ 308.64	\$ 202.44	\$ 262.35
0102 0050	Replace ionizing wires	\$ 197.82	\$ 268.29	\$ 168.14	\$ 228.05
0103 0050	Repair minor connection	\$ 280.50	\$ 350.97	\$ 238.42	\$ 298.33
0104 0075	Repair or replace electrical harness	\$ 571.93	\$ 677.64	\$ 486.14	\$ 575.99
0105 0050	Troubleshoot shorted electrical/wires	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
0106 0050	Install thermostat/low voltage per 10 foot	\$ 195.61	\$ 266.08	\$ 166.26	\$ 226.17
0107 0005	Replace wire nut/twist-on wire connector	\$ 15.69	\$ 22.74	\$ 13.34	\$ 19.33
0108 0005	Install conduit per foot	\$ 19.63	\$ 26.68	\$ 16.69	\$ 22.68
0109 0020	Install split bolt connector	\$ 114.23	\$ 142.42	\$ 97.10	\$ 121.06
0110 0100	Install surge protector	\$ 539.18	\$ 680.13	\$ 458.30	\$ 578.11
0111 0050	Replace AC compressor terminal	\$ 398.23	\$ 468.71	\$ 338.50	\$ 398.40
0112 0050	Replace 120V receptacle	\$ 222.35	\$ 292.83	\$ 189.00	\$ 248.90
0113 0050	Repair connector/terminal - Labor Only	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
0114 0075	Repair connection/harness - Labor Only	\$ 211.42	\$ 317.13	\$ 179.71	\$ 269.56
0115 0050	Replace toggle switch 1 pole 2 position	\$ 179.54	\$ 250.02	\$ 152.61	\$ 212.51
0116 0050	Replace toggle switch 2 pole 2 position	\$ 202.70	\$ 273.17	\$ 172.29	\$ 232.20
0117 0050	Replace relay/contacter 1.5 pole- 2 pole	\$ 264.44	\$ 334.92	\$ 224.78	\$ 284.68
0118 0050	Replace furnace disconnect switch	\$ 255.26	\$ 325.74	\$ 216.97	\$ 276.88
0119 0033	Replace furnace pigtail cord	\$ 171.52	\$ 218.04	\$ 145.79	\$ 185.33
0120 0005	Install romex/BX/UF per foot	\$ 27.61	\$ 34.66	\$ 23.47	\$ 29.46
0121 0020	Replace electric / AC wire whip	\$ 298.85	\$ 327.04	\$ 254.02	\$ 277.98
0122 0050	Install fused disconnect	\$ 372.50	\$ 442.98	\$ 316.63	\$ 376.53
0123 0050	Install non-fused disconnect	\$ 346.77	\$ 417.25	\$ 294.76	\$ 354.66
0124 0100	Replace 3 phase switch disconnect 30-60 AMP	\$ 549.37	\$ 690.32	\$ 466.96	\$ 586.77
0125 0100	Replace circuit breaker switch disconnect 30-60 AMP	\$ 549.37	\$ 690.32	\$ 466.96	\$ 586.77
0126 0050	Replace furnace disconnect switch - Labor Only	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
0127 0050	Replace 4x4 1900 box w/switch/receptacle	\$ 261.76	\$ 332.23	\$ 222.50	\$ 282.40
0128 0050	Shipping & Handling/Restocking	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
0129 0025	Access/Ladder Set-up Fee	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85

Technician Notes

CAUTION check for loose wires since they will turn into burned or brittle wires because of bad connections. Always use the special compressor terminal when repairing burned wires at compressor terminals/connectors.

If a flame roll out - check for burned wires in the furnace vestibule.

Check for fusible links they are sometimes hard to find.

A fuse or circuit breaker switch cannot have a higher amp rating than the wire connected to it. Fuses and circuit breaker switches trip and blow for over amperage conditions. Be thorough to identify the cause, including operating equipment through its normal run and start sequences.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
Always mention how to receive a 15% discount off today's repairs

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1

Loose/Burned Wiring

CAUSES OF FAILURE

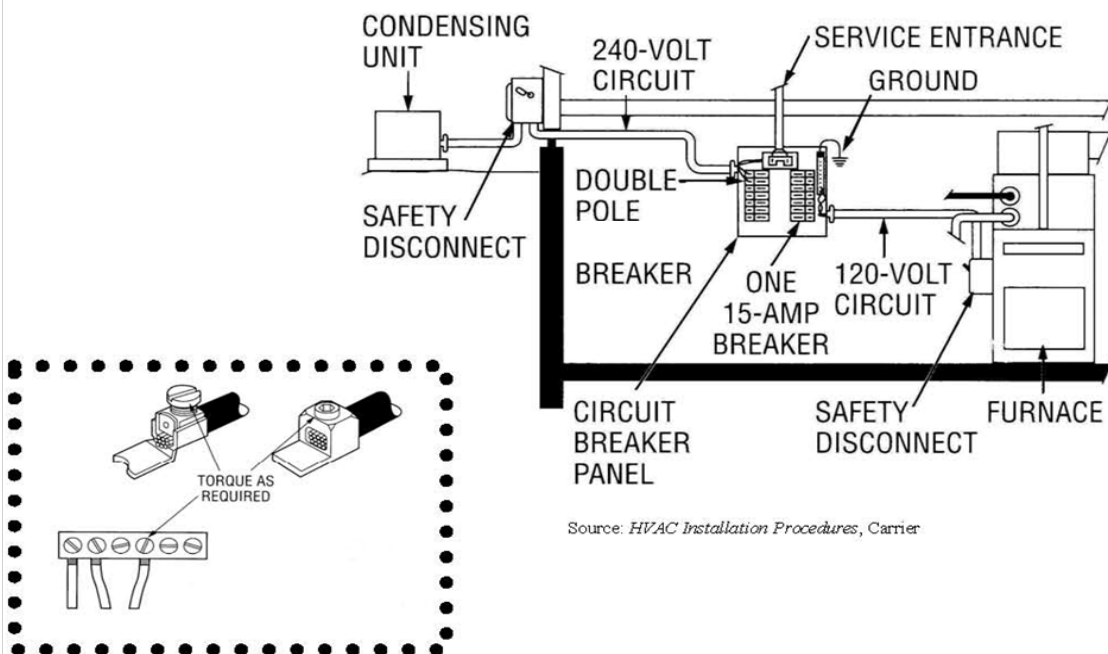
- ☑ Defective connections
- ☑ Electrical shorts
- ☑ Power surges
- ☑ Wrong size wiring

FIX-RIGHT SOLUTION

- ☑ Repair connection
- ☑ Repair electrical short
- ☑ Repair/install power surge protection

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Loose or dirty connections often overheat.
- ☑ Normal equipment vibration requires electrical connections to be periodically cleaned and tightened.



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Failed Contactor

2

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0201 0050	Replace relay/contactor 1.5 pole- 2 pole	\$ 264.44	\$ 334.92	\$ 224.78	\$ 284.68
0202 0050	Replace relay/contactor - 3 pole	\$ 281.28	\$ 351.76	\$ 239.09	\$ 299.00
0203 0050	Replace time delay relay - 2 wire	\$ 265.69	\$ 336.17	\$ 225.84	\$ 285.74
0204 0075	Replace time delay relay - 3 wire	\$ 332.12	\$ 437.83	\$ 282.30	\$ 372.16
0205 0025	Remove insects/debris	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
0206 0050	Replace warranty relay/contactor Labor Only	\$ 214.17	\$ 284.64	\$ 182.04	\$ 241.95
0207 0050	White Roger Sealed Contactor 2-pole 40 amp	\$ 392.38	\$ 462.86	\$ 333.53	\$ 393.43
0208 0050	Shipping & Handling/Restocking	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
0209 0025	Access/Ladder Set-up Fee	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
	Over 220V price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION you are doing your customer a disservice if you leave a contactor in the unit with pitted and/or burned points. Saving the customer this repair money NOW will / could cost him/her a compressor replacement and / or contactor repair LATER.
A contactor must have a higher amp rating than the equipment AMP draw.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like contactors can sometimes cause an expensive part to fail like compressors because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Contactor

2

Failed Contactor

CAUSES OF FAILURE

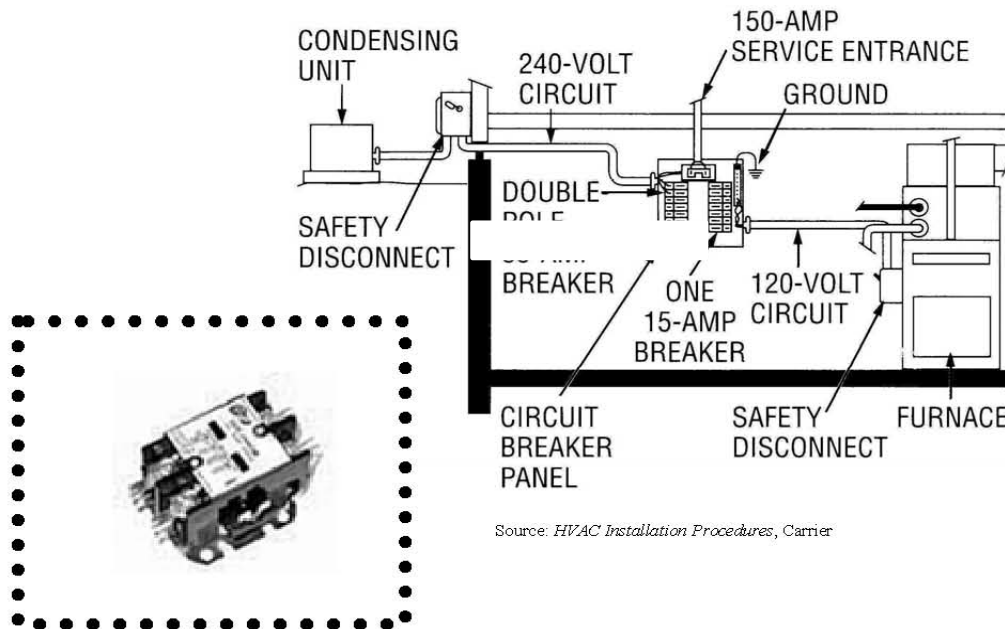
- Over/under line voltage
- Loose connection or mounting plate
- Deterioration and corrosion
- Excessive short cycling
- Age fatigue

FIX-RIGHT SOLUTION

- Correct over/under voltage problem
- Clean and tighten connections and mounting plate
- Replace Contactor
- Correct short cycling problem
- Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Capacitor

3

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0301 0050	Replace run 5-7.5 MFD capacitor Voltage Regulating Device	\$ 191.71	\$ 262.18	\$ 162.95	\$ 222.85
0302 0050	Replace run 10-20 MFD capacitor Voltage Regulating Device	\$ 235.16	\$ 305.63	\$ 199.88	\$ 259.79
0303 0050	Replace run 20-40 MFD capacitor Voltage Regulating Device	\$ 239.05	\$ 309.53	\$ 203.20	\$ 263.10
0304 0050	Replace run 45+ MFD capacitor Voltage Regulating Device	\$ 254.00	\$ 324.47	\$ 215.90	\$ 275.80
0305 0050	Replace warranty run capacitor Voltage Regulating Device	\$ 193.03	\$ 263.51	\$ 164.08	\$ 223.98
0306 0050	Replace warranty dual run capacitor Voltage Regulating Device	\$ 214.68	\$ 285.15	\$ 182.47	\$ 242.38
0307 0050	Turbo Mini replacement capacitors up to 15 mfd	\$ 185.25	\$ 255.72	\$ 157.46	\$ 217.36
0308 0050	Turbo 200 universal replacement capacitors up to 65 mfd	\$ 362.44	\$ 432.91	\$ 308.07	\$ 367.98
0309 0050	Turbo 200x universal replacement capacitors 65+ up to 90 mfd	\$ 417.81	\$ 488.29	\$ 355.14	\$ 415.04
0310 0050	Shipping & Handling/Restocking	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
0311 0025	Access/Ladder Set-up Fee	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
	Over 220V price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION capacitors don't have to be open or shorted to be considered bad. Do not rely only on an open/short test of a capacitor. Use a capacitor meter to take a microfarad reading to verify strength of capacitors. **Safety:** Short out capacitor terminals before pulling wire to avoid an unexpected shock. Capacitor output formula Amps at the run wire divided by volts at capacitor terminals times 2654=MFD output.
Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like capacitors can sometimes cause excessive energy use and or equipment failure, because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
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3

Failed Capacitor

CAUSES OF FAILURE

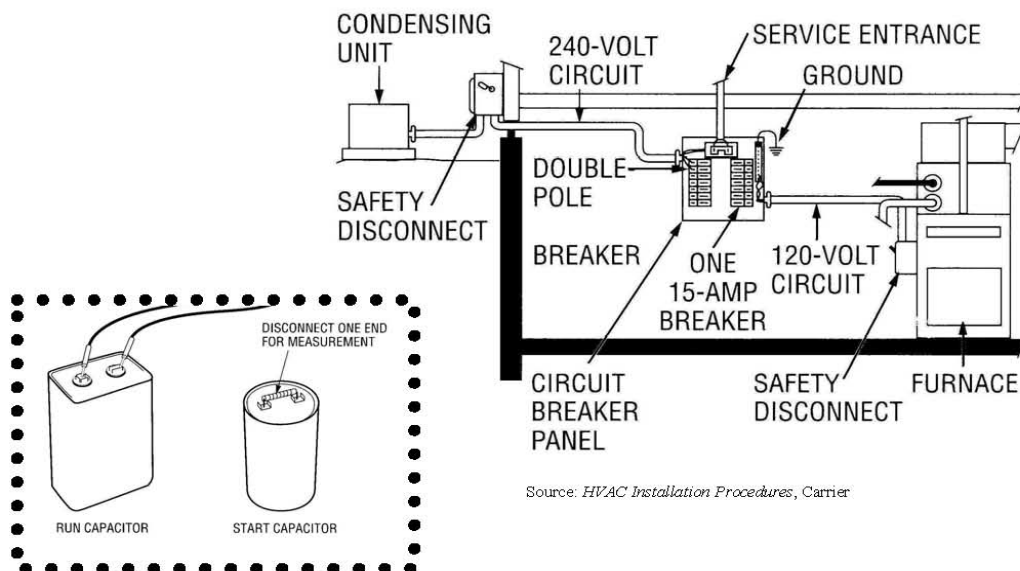
- ☑ Relay failure
- ☑ Starting load too high
- ☑ Excessive short cycling
- ☑ Excessive high voltage
- ☑ Improper capacitor
- ☑ Power surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Repair relay
- ☑ Correct high voltage problem
- ☑ Correct short cycling problem
- ☑ Replace Capacitor
- ☑ Repair/install power surge protection
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.

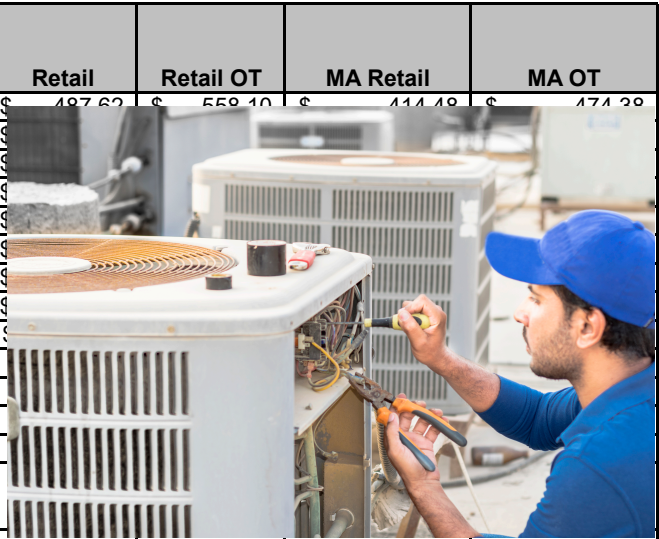


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Failed Defrost Control

4

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0401 0050	Replace defrost control relay	\$ 497.62	\$ 559.10	\$ 414.49	\$ 474.39
0402 0050	Replace defrost control thermostat/switch				
0403 0100	Replace defrost control circuit board - universal				
0404 0100	Replace defrost control circuit board - OEM				
0405 0066	De ice single indoor/outdoor coil				
0406 0050	Replace warranty defrost control relay Labor Only				
0407 0050	Replace warranty defrost control board Labor Only				
0408 0050	Shipping & Handling/Restocking				
0409 0025	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

Caution when replacing a defrost control board, always check the Replace defrost control thermostat for accuracy to make sure it is opening and closing at the right temperature. Run the system through a complete defrost control cycle.

Replace defrost control sensors, thermistors and relays should be checked during a defrost control repair.

Uneven frosting or ice coverage can also mean trouble in the refrigerant circuit.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like the defrost control board can sometimes cause excessive energy use and or equipment failure, because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Defrost Control

4

Failed Defrost Control

4

CAUSES OF FAILURE

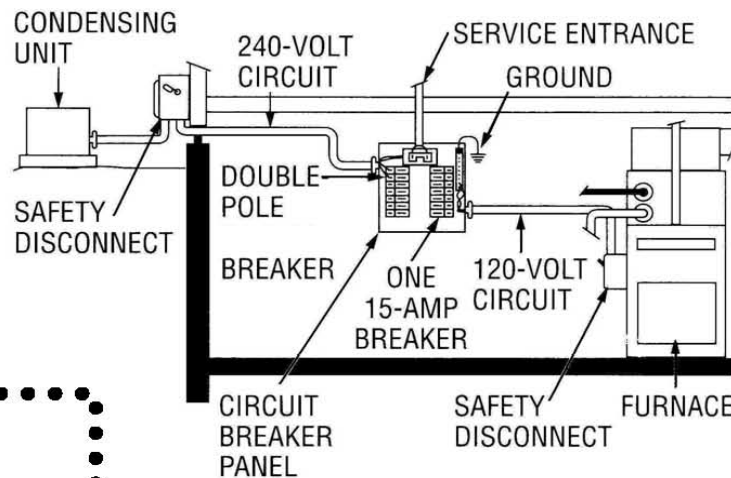
- ☑ Relay failure
- ☑ High moisture
- ☑ Deterioration and corrosion
- ☑ Power surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

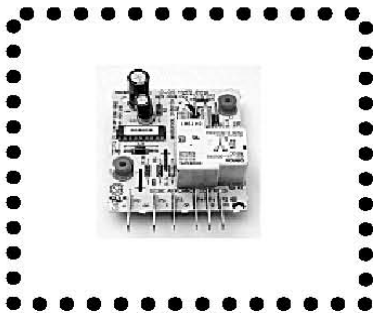
- ☑ Replace defrost control board
- ☑ Correct short cycling problem
- ☑ Repair/install power surge protection
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



Source: HVAC Installation Procedures, Carrier




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Failed Defrost Control

4

Failed Start Kit

5

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0501 0050	Replace start kit- high torque 3 wire 1.5-3 ton				
0502 0050	Replace start kit- universal 3 wire 3.5-5 ton				
0503 0050	Replace hard start kit				
0504 0050	Replace soft start kit				
0505 0050	Replace warranty start kit- high torque 2 wire Labor Only				
0506 0050	Replace warranty hard start kit- universal 3 wire Lbr Only				
0507 0050	Replace warranty soft start kit Labor Only				
0508 0050	Replace warranty start kit Labor Only				
0509 0050	Shipping & Handling/Restocking				
0510 0025	Access/Ladder Set-up Fee				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION capacitors don't have to be open or shorted to be considered bad. Do not rely only on an open/short test of a capacitor. Use a capacitor meter to take a microfarad reading to verify strength of capacitors. **Safety:** Short out capacitor terminals before pulling wire to avoid an unexpected shock.

A weak Replace start capacitor could cause hard start conditions and or compressor failure.

Start kits help reduce start load amperage to protect and extended the compressors life.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like the start-kit can sometimes cause excessive energy use and or equipment failure, because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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5

Failed Start Kit

CAUSES OF FAILURE

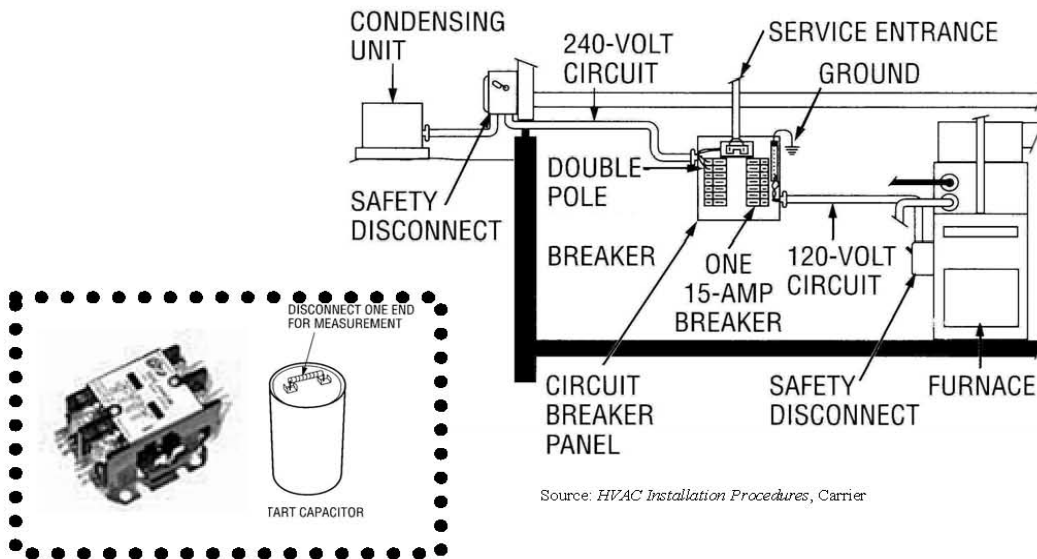
- ☑ Relay failure
- ☑ Failed capacitor
- ☑ Low line voltage
- ☑ Deterioration and corrosion
- ☑ Power surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace start kit
- ☑ Correct low voltage problem
- ☑ Repair/install power surge protection
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Transformer

6

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0601 0075	Replace multi-tap transformer 40VA	\$ 262.59	\$ 368.30	\$ 223.20	\$ 313.05
0602 0075	Replace multi-tap transformer 50-60VA	\$ 466.00	\$ 519.05	\$ 345.00	\$ 425.04
0603 0075	Replace transformer 75VA	\$ 450.00	\$ 519.05	\$ 345.00	\$ 425.04
0604 0075	Replace/add in-line fuse	\$ 150.00	\$ 150.00	\$ 150.00	\$ 150.00
0605 0075	Replace warranty transformer Labor Only	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
0606 0050	Shipping & Handling/Restocking	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
0607 0025	Access/Ladder Set-up Fee	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
	0				
	Over 220V price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION If a transformer is bad, always check for shorts in the control wiring, heat anticipators or coils in relays before replacing the transformer. Always replace with the same VA (Volt Amperage) rating transformer as the transformer you are replacing.

As a best practice - always install in-line fuse when replacing transformer.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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 Call For Next Update Due 6 months from
 3/11/2024

Failed Transformer

6

Failed Transformer

CAUSES OF FAILURE

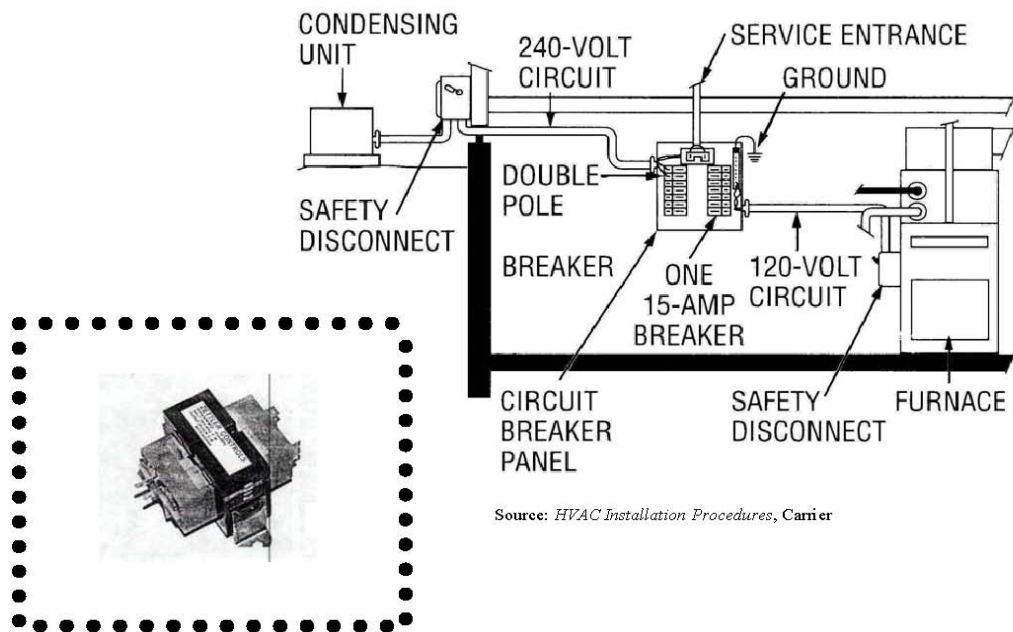
- ☑ High line voltage
- ☑ Power surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace transformer
- ☑ Correct high voltage problem
- ☑ Repair/install power surge protection
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Breaker or Fuse

7

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0701 0025	Reset and test circuit breaker switch	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
0702 0075	Identify source of power surge	\$ 211.42	\$ 317.13	\$ 179.71	\$ 269.56
0703 0005	Replace low voltage control fuse up to 5 amp				
0704 0050	Replace high voltage control fuse				
0705 0005	In-line fuse holder				
0706 0020	Replace electric / AC wire whip				
0707 0005	Replace fuse - Labor Only				
0708 0005	Replace fuse - Labor Only				
0709 0005	Replace Li'l Popper 5 amp				
0710 0005	Replace 3 amp fuse				
0711 0005	Replace 5 amp fuse				
0712 0025	Replace 15 -60 amp fuse				
0713 0050	Replace breaker				
0714 0050	Replace breaker Zinsco				
0715 0050	Shipping & Handling/Restocking				
0716 0025	Access/Ladder Set-up Fee				
	Over 220V price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

Caution a fuse or circuit breaker switch cannot have a higher amp rating than the wire connected to it. Fuses blow and circuit breaker switches trip for a over amperage reason, be thorough to identify the cause, including operating equipment through its normal run and start sequences. Visually inspect all connections including circuit breaker switches, disconnects, contactors and compressors.

Check the UL plate on the equipment for the maximum circuit breaker switch or fuse size.

A fuse or circuit breaker switch cannot have a higher AMP rating than the wire connected to it.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Breaker or Fuse

7

Failed Breaker or Fuse

7

CAUSES OF FAILURE

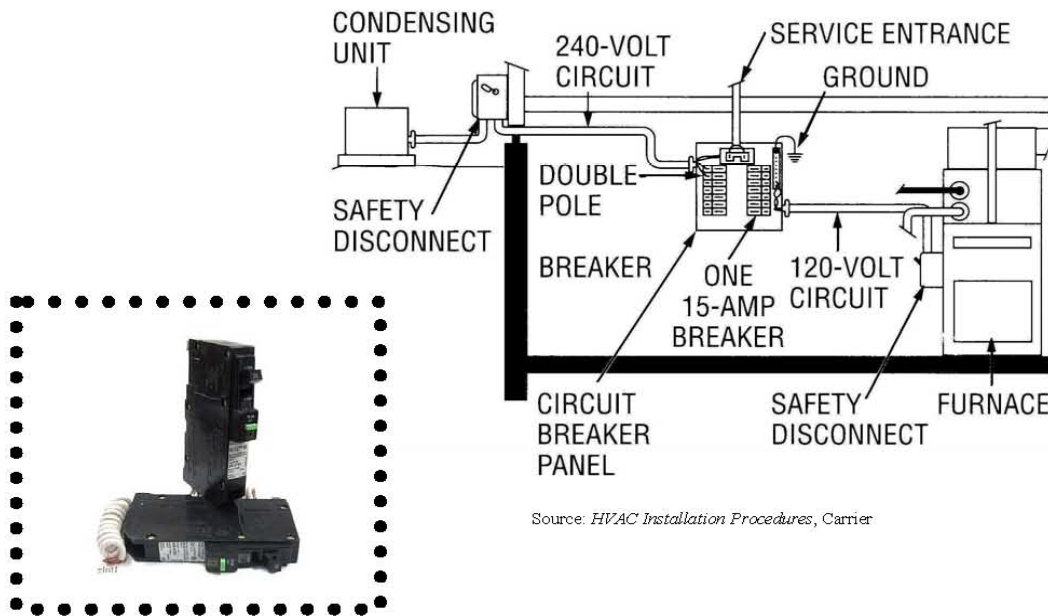
- ☑ High line voltage
- ☑ Power surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace breaker fuse
- ☑ Correct high voltage problem
- ☑ Repair/install power surge protection
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Breaker or Fuse

7

Failed Condenser Fan Motor

8

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0801 0100	Replace Cond Motor #1 - 1/6 to 1/3 universal 1075 RPM Outdoor				
0802 0100	Replace Cond Motor #2 - 1/6 to 1/3 universal 875 RPM Outdoor				
0803 0100	Replace Cond Motor #3 - 1/5 to 1/2 universal 1075 RPM Outdoor				
0804 0100	Replace motor with fan blade universal *				
0805 0150	Replace motor ECM OEM*				
0806 0100	Replace motor with fan blade OEM*				
0807 0050	Replace rain shield only				
0808 0100	Replace rain shield with motor change				
0809 0002	Motor lubrication				
0810 0100	Install warranty cond. fan motor Labor Only				
0811 0100	Replace failed variable/2 speed motor				
0812 0100	Install low ambient kit				
0813 0050	Shipping & Handling/Restocking				
0814 0025	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 54 to price part price to be to the OEM LABOR ONLY price..				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

Insure that the fan blade can be removed from the shaft without damaging the fan before you determine the amount of work that needs to be performed.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

*If the air conditioner or heat pump is over ten years old, and a fan motor failure is found - replacing the entire system is usually the best option for the customer.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

Always mention how to receive a 15% discount off today's repairs

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Failed Condenser Fan Motor

8

Failed Condenser Fan Motor

8

CAUSES OF FAILURE

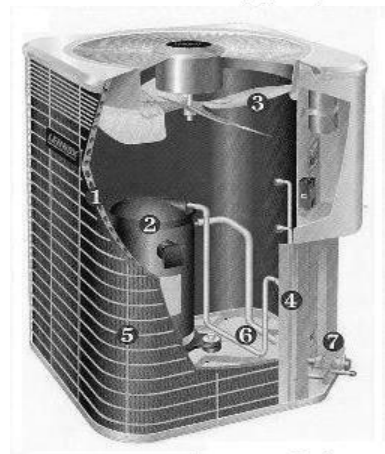
- ☑ Warped or broken blade
- ☑ Operating vibration
- ☑ Worn bearings
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace fan motor
- ☑ Correct vibration problem
- ☑ Replace wear possible motor bearings
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



- ① Outdoor Coil
- ② Scroll Compressor
- ③ Direct-Drive Fan
- ④ Corrosion-Resistant Cabinet
- ⑤ Coil Guard
- ⑥ Drainage Holes
- ⑦ High Pressure Safety Switch

Cut-away of a Lennox Condensing Unit
Typical components of most brands of air conditioners

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Failed Condenser Fan Motor

8

Failed Compressor

9

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
0901 0250	Replace compressor scroll 1.5-3*	\$ 2,049.63	\$ 2,402.00	\$ 1,742.19	\$ 2,041.70
0902 0250	Replace compressor recip 1.5-3 tons *	\$ 1,757.26	\$ 2,109.63	\$ 1,493.67	\$ 1,793.19
0903 0250	Replace compressor scroll 3.5-5 tons *	\$ 2,622.67	\$ 2,975.04	\$ 2,229.27	\$ 2,528.78
0904 0250	Replace compressor recip 3.5-5 tons *	\$ 2,330.30	\$ 2,682.67	\$ 1,980.76	\$ 2,280.27
0905 0250	Replace compressor scroll 1.5-3 tons 410a*				
0906 0250	Replace compressor scroll 3.5-5 tons 410a*				
0907 0250	Replace warranty compressor 1.5-2.5 Labor Only				
0908 0250	Replace warranty compressor 1.5-2.5 Labor Only				
0909 0050	Add for heat pump compressor				
0910 0075	Refresh Kit - new wiring, contactor and capacitor				
0911 0075	Cool down high temp compressor inside control				
0912 0010	Perform compressor acid test				
0913 0050	Replace compressor crank case heater				
0914 0050	Shipping & Handling/Restocking				
0915 0025	Access/Ladder Set-up Fee				
	These repairs do not include refrigeration service - See section 12 for appropriate charges				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION all compressor replacements require refrigerant service and driers replacement.

Compressors fail for a reason. Verify proper equipment operation sequence after the compressor is replaced. Use proper recovery, evacuation and filter drier procedures to protect your customers investment. Pressure ratio- High pressure + 15 divided by low pressure = below 2 compressor is weak; 2.5 compressor is questionable; 2.6-3.5 compressor is ok; above 3.6 something is wrong in the system.

***Best repair on out of warranty R-22 compressor failure is to replace entire condenser and coil.**

*If compressor failure due to a motor burnout, perform an acid test to verify if another refrigerant change is required. Replace liquid and suction driers if another refrigerant charge is required.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

*If the air conditioner or heat pump is over ten years old, and a fan motor failure is found - replacing the entire system is usually the best option for the customer.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

Always mention how to receive a 15% discount off today's repairs

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9

Failed Compressor

CAUSES OF FAILURE

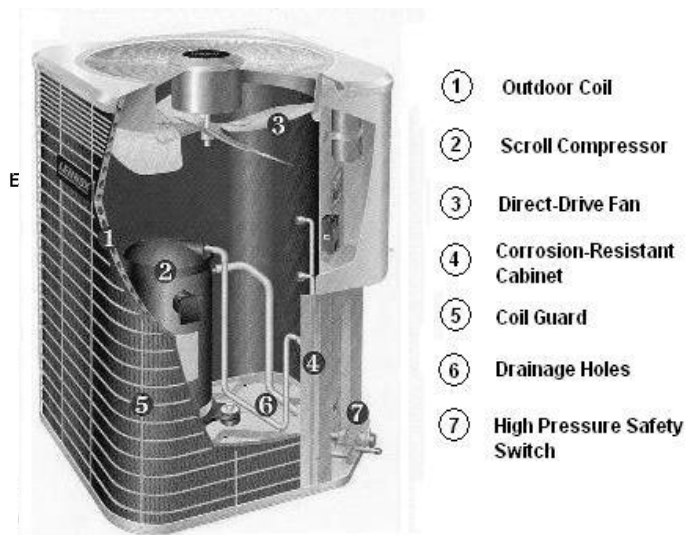
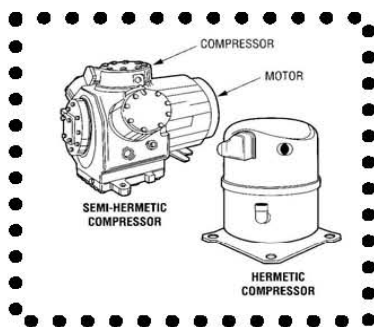
- ☑ Over/Under voltage
- ☑ Refrigerant slugging or high discharge pressure
- ☑ Relay failure
- ☑ Excessive short cycling
- ☑ Power surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Repair over/under voltage problem
- ☑ Clean heat transfer surfaces
- ☑ Replace compressor
- ☑ Repair/install power surge protection
- ☑ Recommended to replace indoor/outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.




Cut-away of a Lennox Condensing Unit
Typical components of most brands of air conditioners

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Failed Expansion Valve or Metering Device

10

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1001 0075	Replace TXV -1.5-3tons R-410				
1002 0125	Replace TXV -3.5-5 tons R-410				
1003 0075	Replace TXV -1.5-3 tons R-22				
1004 0125	Replace TXV -3.5-5 tons R-22				
1005 0200	Replace Sporlan Q-bodyTXV - universal				
1005 0033	Replace piston control - see notes				
1006 0050	Replace piston weld install - see notes				
1007 0050	Clean metering device - see notes				
1008 0075	Replace warranty TXV - Labor Only				
1009 0050	Relocate expansion valve sensing element				
1010 0100	Electronic expansion valves				
1011 0050	Shipping & Handling/Restocking				
1012 0025	Access/Ladder Set-up Fee				
	These repairs do not include refrigeration service - See section 12 for appropriate charges				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION when mounting the expansion bulb, make sure it is in the correct location and insulate the bulb. Recheck superheat or sub cool settings after installation. Use a heat absorbing compound (**not a wet rag**) when welding an expansion valve.

Use proper recovery, evacuation and filter drier procedures to protect the customers investment.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Expansion Valve or Metering Device

10

Failed Expansion Valve or Metering Device

10

CAUSES OF FAILURE

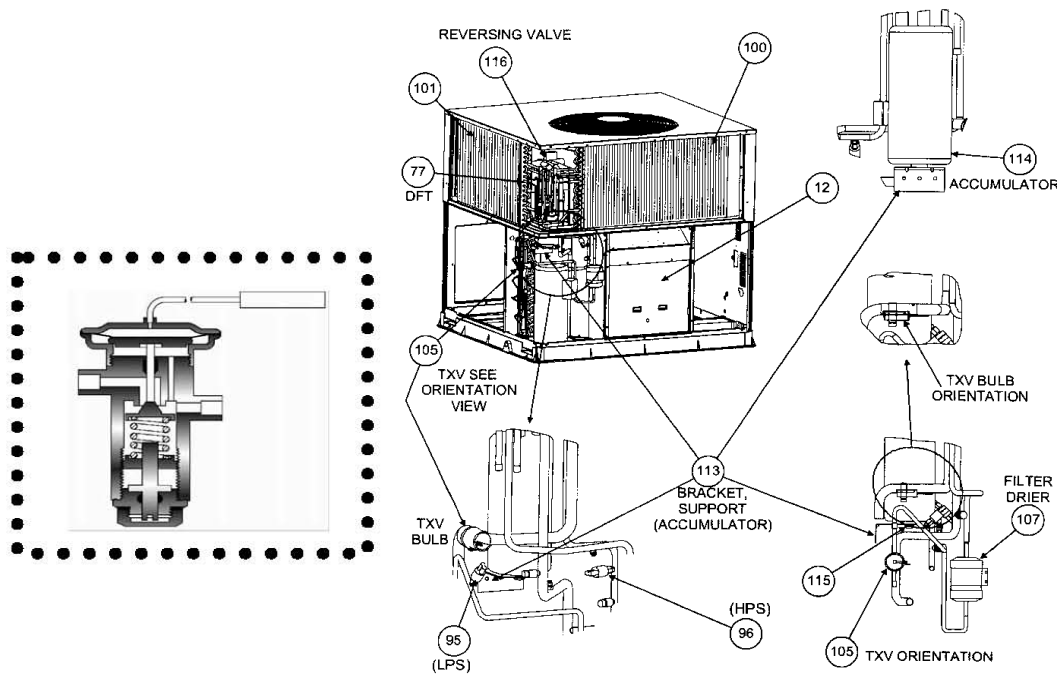
- ☑ Operating vibration
- ☑ Plugged with debris or contaminated
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace expansion valve or metering device
- ☑ Correct vibration problem
- ☑ Flush refrigerant system where appropriate
- ☑ Recommended to replace indoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspection cleaning and tuning help eliminate many contributing causes of failure



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Failed Expansion Valve or Metering Device

10

Failed Liquid Line or Suction Drier

11

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1101 0033	Replace the liquid line filter drier				
1102 0033	Replace bi-flow drier				
1103 0050	Replace suction drier				
1104 0033	Replace warranty drier Labor Only				
1105 0200	Replace liquid line service valve				
1106 0100	Replace bypass with valve				
1107 0050	Replace drier core				
1108 0050	Shipping & Handling/Restocking				
1109 0025	Access/Ladder Set-up Fee				
	These repairs do not include refrigeration service - See section 12 for appropriate charges				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

Caution verify drier is mounted in the correct direction and where possible, suction driers should be mounted vertically to lesson oil trapping. A pressure drop of 3lbs or more across the SLD means it is plugged and should be changed.

Caution there should never be more than one LLD or SLD in the system.

Always use a bi-flow liquid line dryer on a heat pump system.

This repair DOES NOT INCLUDE refrigerant service - See section 12 for appropriate charges.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Liquid Line or Suction Drier

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Failed Liquid Line or Suction Drier

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CAUSES OF FAILURE

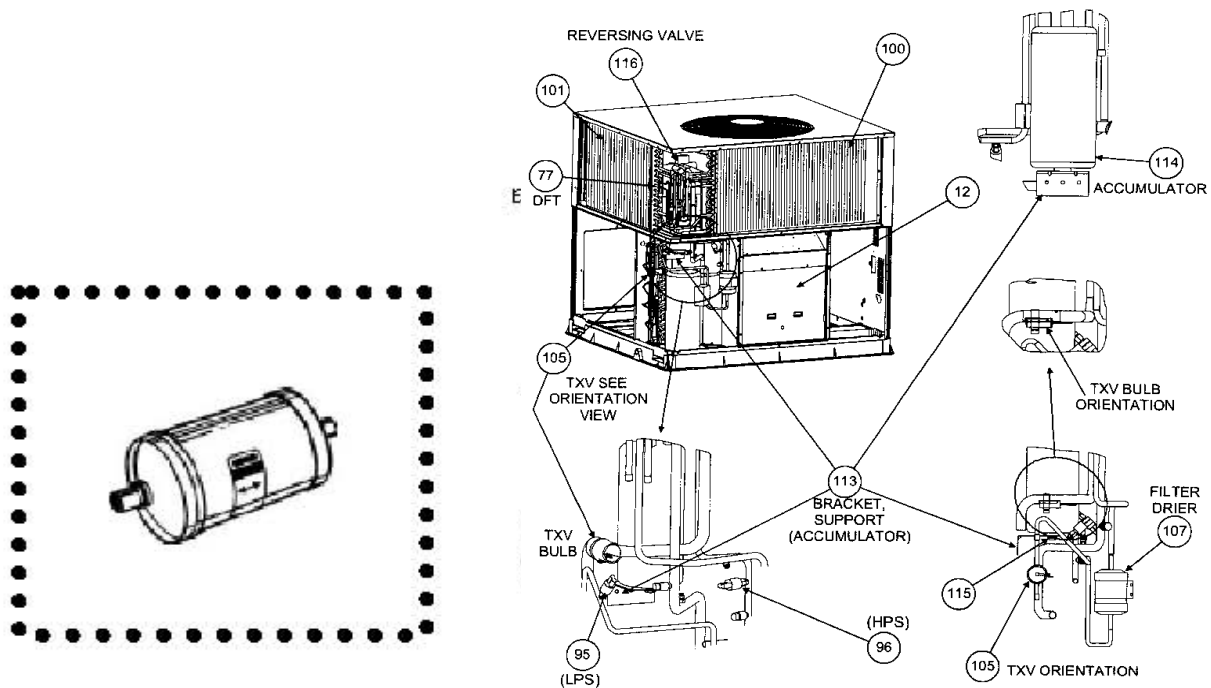
- ☑ Operating vibration
- ☑ Plugged with debris or contaminated
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace liquid line or suction drier
- ☑ Correct vibration problem
- ☑ Flush refrigerant system where appropriate
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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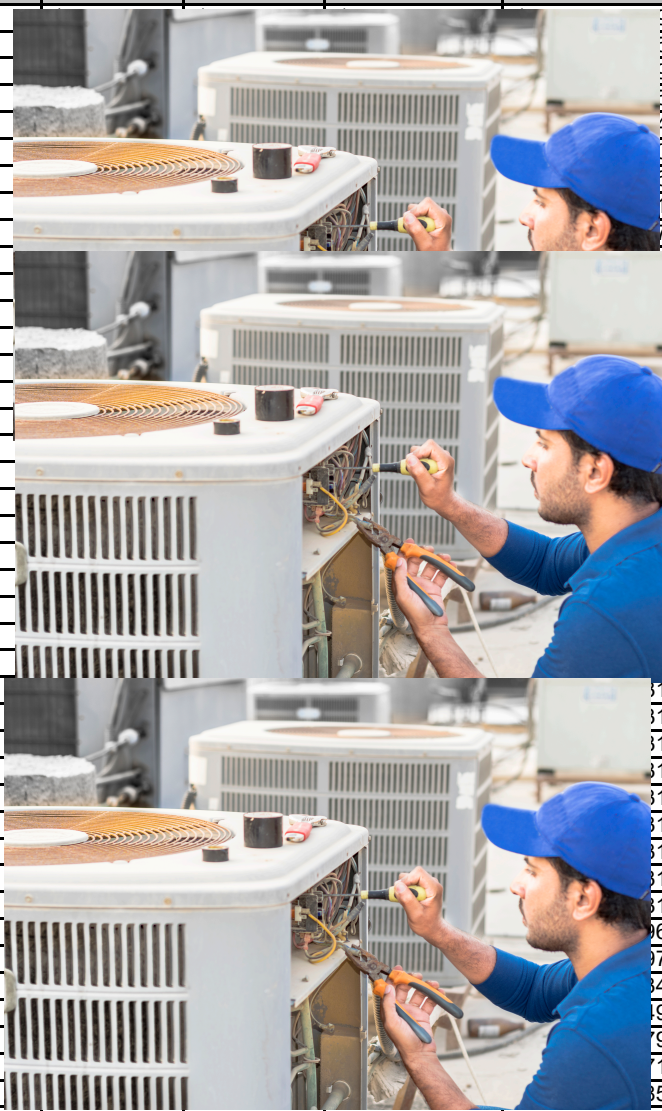
Failed Liquid Line or Suction Drier

11

Refrigerant Testing and System Tuning

12

Code	Repair Description	Retail	Retail OT	MA Retail	MA Retail OT
1201 0060	Balance by superheat/sub cooling R-22 up to 1lbs				9
1202 0015	Additional R-22 - PER POUND				5
1203 0060	Balance by superht/sub cl R-407C up to 1lbs				9
1204 0015	Additional R-407C - PER POUND				5
1205 0050	R-22 to R-407C conversion with DiveriTech 981				4
1206 0060	Balance by superheat/sub cooling R-410A up to 1lbs				0
1207 0015	Additional R-410A - PER POUND				6
1208 0060	Balance by superheat/sub cooling 134A up to 1lbs				1
1209 0015	Additional 134A - PER POUND				7
1210 0060	Balance by superheat/sub cooling 404A up to 1lbs				1
1211 0015	Additional R404 - PER POUND				0
1214 0008	Replace refrigerant valve cap with brass leak-proof valve cap				1
1212 0004	Replace Armaflex refrigerant line insulation per foot				3
1213 0025	Ultraviolet dye insertion application only				7
1214 0025	Leak test-accessible fittings				0
1215 0025	Leak test-single major component				3
1216 0125	Leak test-complete system				8
1217 0025	Tighten fittings or replace Schrader valve				2
1218 0033	Freon leak repair accessible/per leak - see notes				5
1219 0100	Freon leak repair non-accessible/per leak - see notes				6
1220 0025	Refrigerant leak stop sealer				2
1221 0150	Component isolation & pressure test				0
1222 0225	Recover evac drier recharge 1.5-3 ton R-22				0
1223 0225	Recover evac drier recharge 3.5-5 ton R-22				1
1224 0225	Recover evac drier recharge 1.5-3 ton R-410				1
1225 0225	Recover evac drier recharge 3.5-5 ton R-410				1
1222 0225	Recover evac drier recharge 1.5-3 ton R-407C				31
1223 0225	Recover evac drier recharge 3.5-5 ton R-407C				31
1224 0225	Recover evac drier recharge 1.5-3 ton R-410				31
1225 0225	Recover evac drier recharge 3.5-5 ton R-410				31
1226 0225	Recover evac drier recharge 1.5-3 ton 134A				31
1227 0225	Recover evac drier recharge 3.5-5 ton 134A				31
1228 0225	Recover evac drier recharge 1.5-3 ton R-404A				31
1229 0225	Recover evac drier recharge 3.5-5 ton R-404A				31
1230 0100	Recover refrigerant charge				36
1231 0050	Flush charge				07
1232 0150	Pump down press. test evac drier 1.5-5 ton				34
1233 0200	Replace suction line service valve				39
1234 0002	Replace 2 schrader valve caps				39
1235 0050	Shipping & Handling/Restocking				71
1236 0025	Access/Ladder Set-up Fee				35
Technician Notes					
CAUTION use manufacturers charging chart to balance system to manufactures specifications.					
When pressure testing with nitrogen verify that you put equal pressure on both sides of the expansion valve.					
Replacing or installation of a liquid line dryer is recommended if system has been open to atmosphere.					
Balancing superheat includes adding up to one pound of refrigerant or removing overcharge.					
Price service ticket retail or retail overtime and calculate/present total service agreement discount option.					
Always mention how to receive a 15% discount off today's repairs					
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Refrigerant Testing and System Tuning

12

Refrigerant Testing and System Tuning

12

CAUSES OF FAILURE

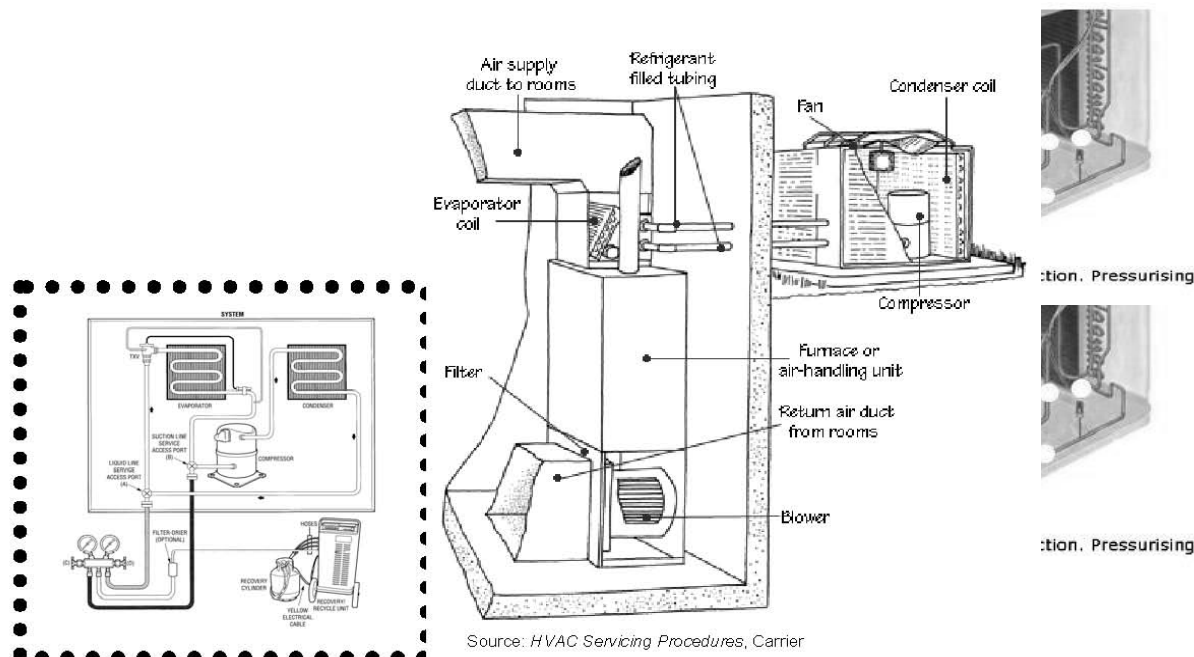
- ☑ Under/over charge
- ☑ Plugged with debris or contaminated
- ☑ System leaks
- ☑ Excessive vibration

FIX-RIGHT SOLUTION

- ☑ Tune system charge by superheat
- ☑ Flush refrigerant system where appropriate
- ☑ Recover or add refrigerant
- ☑ Correct system leaks
- ☑ Replace liquid line or suction line
- ☑ Correct vibration problem

PREVENTION – PROPER

- ☑ Periodic electrical integrity testing, cleaning and tuning help



Refrigerant Testing and System Tuning

12

Failed Refrigerant Reversing Valve

13

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1301 0100	Replace reversing valve w/coil only 1.5-3T- see notes				
1302 0100	Replace reversing valve w/coil 3.5-5T-see notes				
1303 0050	Replace reversing valve coil only				
1304 0100	Replace reversing valve w/coil 1.5-3T OEM -see notes				
1305 0100	Replace reversing valve w/coil 3.5-5T OEM -see notes				
1306 0050	Replace reversing valve coil only OEM				
1307 0100	Replace warranty reversing valve Labor Only				
1308 0050	Replace warranty reversing valve coil Labor Only				
1309 0050	Shipping & Handling/Restocking				
1310 0025	Access/Ladder Set-up Fee				
	These repairs do not include refrigeration service - See section 12 for appropriate charges				
	price to be added to the OEM LABOR ONLY price..				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

This repair DOES NOT INCLUDE refrigerant service - See section 12 for appropriate charges.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Refrigerant Reversing Valve

13

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Failed Refrigerant Reversing Valve

13

CAUSES OF FAILURE

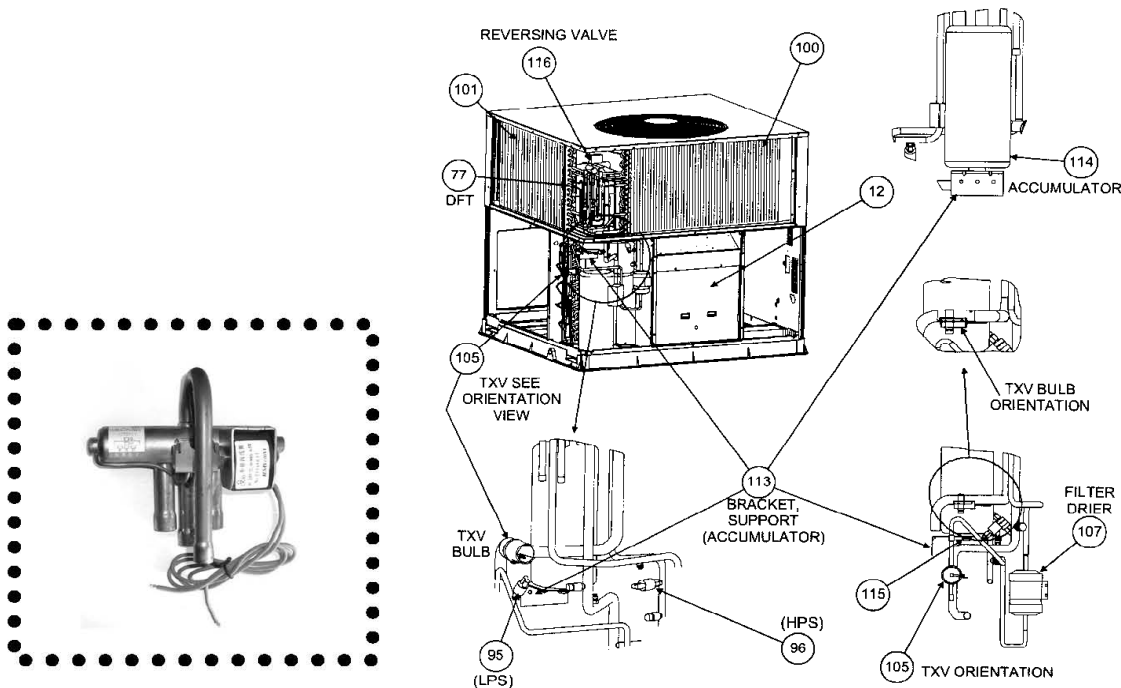
- ☑ System leaks
- ☑ Valve failure
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct system leaks
- ☑ Replace reversing valve
- ☑ Tune system charge by superheat
- ☑ Recover or add refrigerant
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Refrigerant Reversing Valve

13

Failed Suction Line Accumulator

14

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1401 0100	Replace suction line accumulator - see notes	\$ 739.99	\$ 880.94	\$ 628.99	\$ 748.80
1402 0100	Replace warranty suction line accumulator Labor Only				
1403 0050	Shipping & Handling/Restocking				
1404 0025	Access/Ladder Set-up Fee				
	These repairs do not include refrigeration service - See section 12 for appropriate service - See section 12 for appropriate				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION undercoat new accumulator after installing to prevent rust deterioration.

Be careful to protect fusible plugs when welding.

Use proper recovery, evacuation and filter drier procedures to protect your customers investment.

This repair DOES NOT INCLUDE refrigerant service - See section 12 for appropriate charges.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Suction Line Accumulator

14

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Failed Suction Line Accumulator

14

CAUSES OF FAILURE

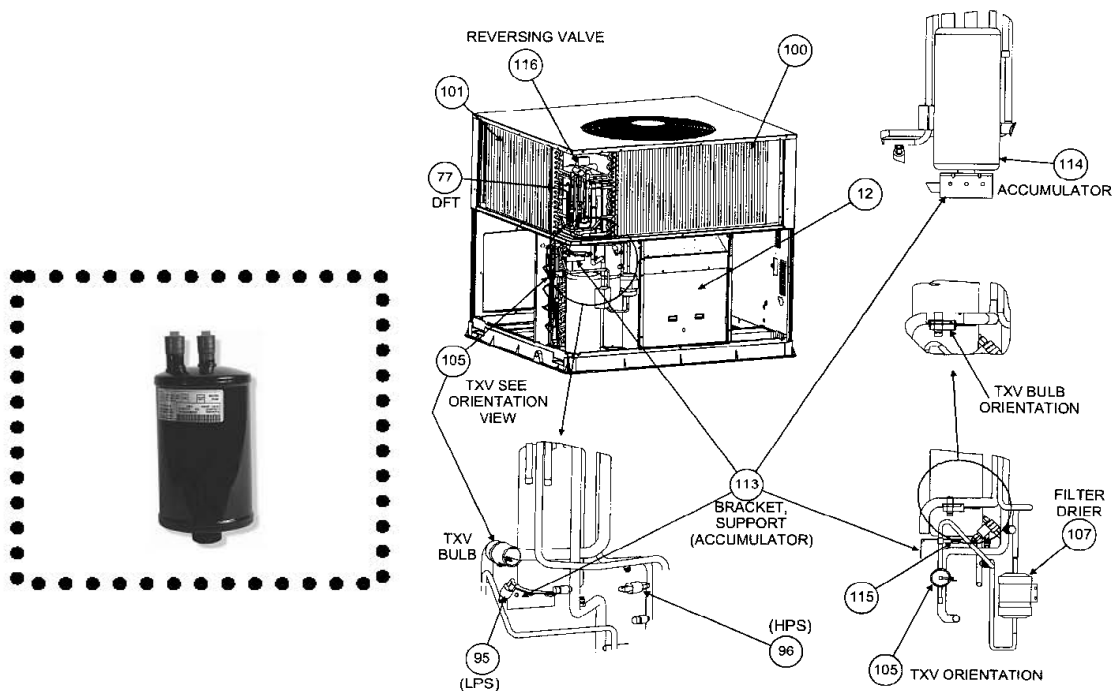
- ☑ Plugged with debris or contaminated
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace suction line accumulator
- ☑ Correct refrigerant restrictions
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Suction Line Accumulator

14

Leak Evaporator Coil

15

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1501 0100	Level AC A coil	\$ 370.00	\$ 510.95	\$ 314.50	\$ 434.30
1502 0200	Replace warranty evaporator coil Labor Only	\$ 1,050.20	\$ 1,222.20	\$ 892.82	\$ 1,122.45
1503 0200	Replace coil out of warranty OEM - Labor Only				
1504 0100	Recover evac drier recharge 1.5-3 ton R-407C				
1505 0100	Weld leak repair				
1506 0050	Shipping & Handling/Restocking				
1507 0025	Access/Ladder Set-up Fee				
	0				
	These repairs do not include refrigeration service - See section 12 for appropriate charges				
	price to be added to the OEM LABOR ONLY price..				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION if leaks are found in the tube sheet, replace the coil.

Evaporator coil repairs are very difficult and highly unreliable - if the leaking evaporator coil is under manufacturers warranty, consider replacing the coil rather than attempting the repair.

This repair DOES NOT INCLUDE refrigerant service - See section 12 for appropriate charges.

Out of warranty coil replacement includes labor only. Call office for parts charges.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

*If the air conditioner or heat pump is over ten years old, and a coil failure is found - replacing the entire system is usually the best option for the customer.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

Always mention how to receive a 15% discount off today's repairs

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Leak Evaporator Coil

15

Leak Evaporator Coil

15

CAUSES OF FAILURE

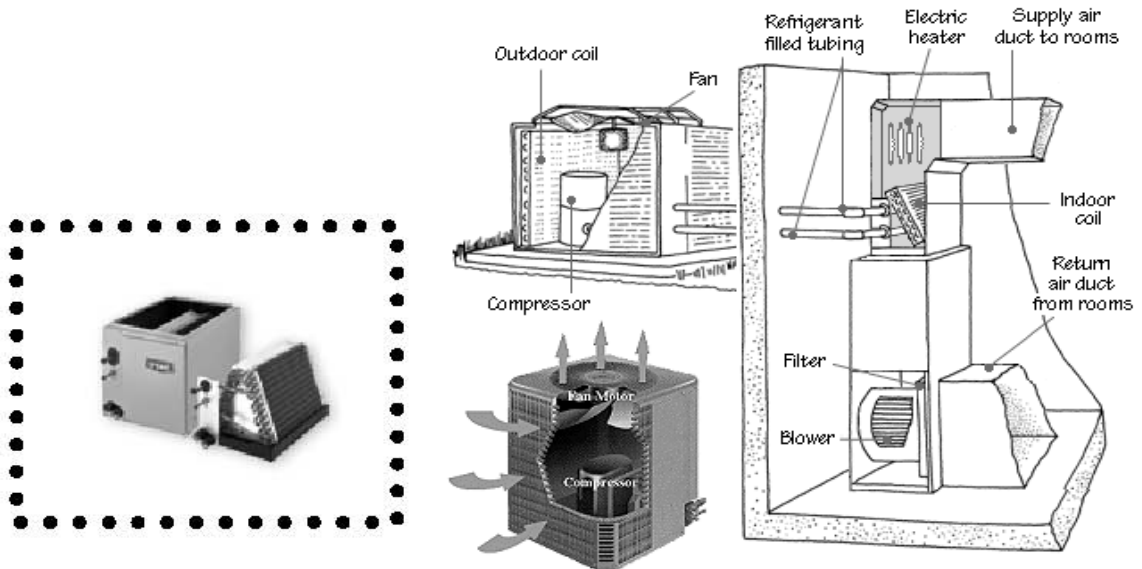
- ☑ Deterioration
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace coil
- ☑ Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic coil cleaning help eliminate many contributing causes premature deterioration and failure.



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Leak Evaporator Coil

15

Leak Condenser Coil

16

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1601 0005	Copper pipe per foot	\$ 52.64	\$ 59.69	\$ 44.74	\$ 50.73
1602 0400	Warranty condenser coil - Labor Only				
1603 0016	Weld leak repair				
1604 0400	Replace condensor coil OEM Labor Only				
1605 0016	AC renew pressurization per can				
1606 0200	Level AC Condenser without refrigerant piping cut out				
1607 0400	Level AC Condenser with refrigerant piping cut out				
1608 0050	Shipping & Handling/Restocking				
1609 0025	Access/Ladder Set-up Fee				
	These repairs do not include refrigeration service - See section 12 for appropriate charges				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

This repair DOES NOT INCLUDE refrigerant service - See section 12 for appropriate charges.

Do a complete leak check of system since 80% of time there is more than one leak. If leaks are found in the tube sheet, replace the coil.
Be sure to triple evacuate system before recharging

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Leak Condenser Coil

16

Leak Condenser Coil

16

CAUSES OF FAILURE

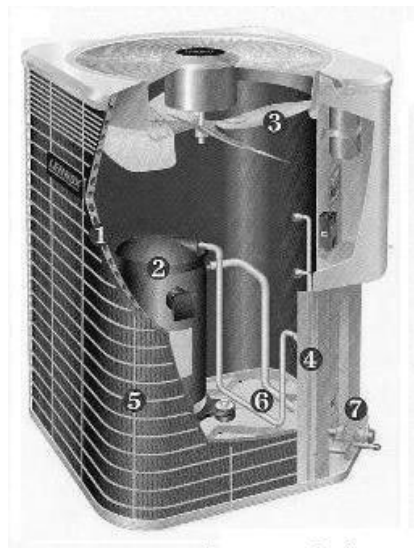
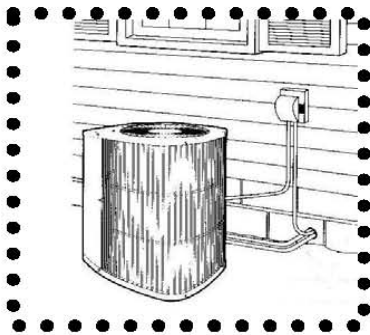
- Deterioration
- Age fatigue

FIX-RIGHT SOLUTION

- Replace leak
- Replace condenser unit if multi-leaks
- Recommended to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- Periodic condenser cleaning help eliminate many contributing causes of premature deterioration and failure.



- ① Outdoor Coil
- ② Scroll Compressor
- ③ Direct-Drive Fan
- ④ Corrosion-Resistant Cabinet
- ⑤ Coil Guard
- ⑥ Drainage Holes
- ⑦ High Pressure Safety Switch

Cut-away of a Lennox Condensing Unit
Typical components of most brands of air conditioners

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Restricted Evaporator or Drain

17

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1701 0050	Cleaning of evap coil accessible	\$ 211.43	\$ 281.90	\$ 179.71	\$ 239.62
1702 0125	Cleaning of evap coil no access	\$ 422.85	\$ 599.04	\$ 359.42	\$ 509.18
1703 0200	Pull and clean evap coil - see notes	\$ 739.99	\$ 1,021.89	\$ 628.99	\$ 868.61
1704 0050	Defrost iced coil	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
1705 0000	Replace drain pan - PRICE USING Section 54				
1706 0050	Clean drain pan/line				
1707 0100	Cut in access panel				
1708 0025	Clear blockage in condensate trap w/nitrogen				
1709 0025	Clear blockage in gravity drain line w/nitrogen				
1710 0025	Clear condensate pump discharge line w/nitrogen				
1711 0050	Replace up to 10' condensate line				
1712 0100	Level suspended air handler/furnance reusing hardware				
1713 0200	Galvanized secondary safety pan w/safety switch				
1714 0075	Drain water overflow (attic)				
1715 0050	Install freeze stat				
1716 0050	Replace condensate removal pump				
1717 0100	Anit-freeze glycol to hydro system -first 5 GAL				
1718 0025	Anit-freeze glycol to hydro system -each 1 GAL				
1719 0050	EZ trap with pan float switch				
1720 0050	Replace high efficiency nuetralizer kit	\$ 374.84	\$ 445.32	\$ 318.62	\$ 378.52
1721 0050	Shipping & Handling/Restocking	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
1722 0025	Access/Ladder Set-up Fee	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
	Drain pan and pump repairs vary by manufacturer. Leveling may require new hardware/job specific labor. See miscellaneous section to estimate the replacement/leveling labor/material charges				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION when replacing an evaporator coil, verify that condensate water drains properly after reinstallation.

Check evaporator drain pan for integrity, leakage, deterioration, or cracking. **If replacement is required call office for repair price.**

This repair DOES NOT INCLUDE refrigerant service - See section 12 for appropriate charges.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

First line of defense against these types of repairs are high efficiency filters and air cleaners.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Restricted Evaporator or Drain

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Restricted Evaporator or Drain

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CAUSES OF FAILURE

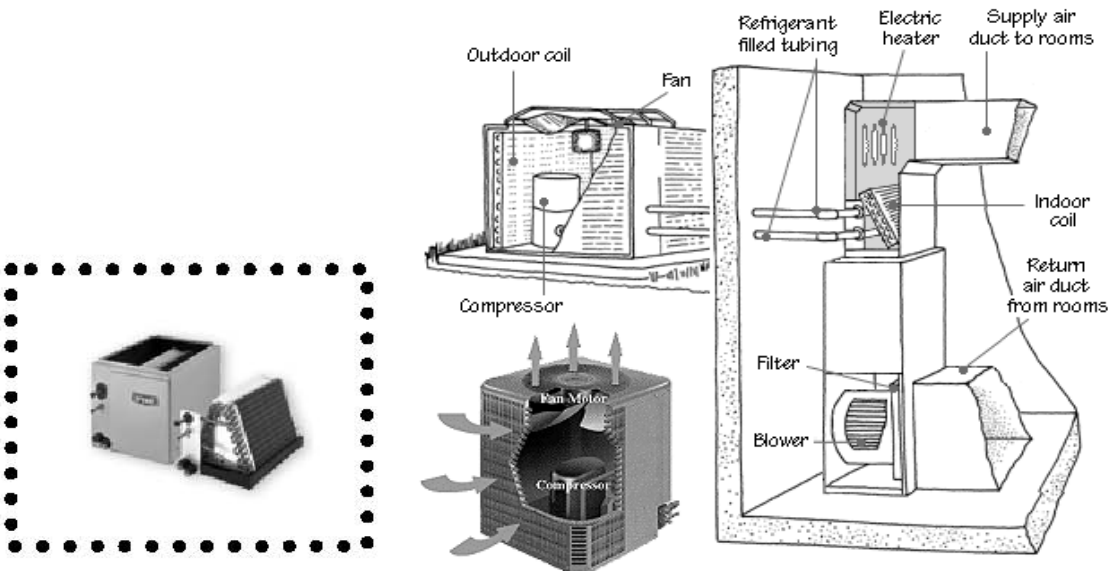
- ☑ Deterioration
- ☑ Dirt, pet hair and house airborne debris
- ☑ Mold and algae build-up
- ☑ Smoke or soot residue
- ☑ Bent fins

FIX-RIGHT SOLUTION

- ☑ Clean evaporator coil
- ☑ Chemical spray mold and algae removal
- ☑ Install higher efficiency filters
- ☑ Install whole system electronic air cleaner
- ☑ Straighten fins

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic coil cleaning helps eliminate many contributing causes of premature deterioration and failure.



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Restricted Evaporator or Drain

17

Restricted Condenser Coil

18

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1801 0025	Clean coil - condenser - EASY	\$ 140.95	\$ 176.19	\$ 119.81	\$ 149.76
1801 0050	Clean coil - condenser - COMPACTED				
1802 0075	Clean coil - non accessible condenser				
1803 0050	Defrost iced outdoor coil				
1804 0050	Straighten coil fins				
1805 0200	Level AC Condenser without refrigerant piping cut out				
1806 0400	Level AC Condenser with refrigerant piping cut out				
1807 0075	Install condenser pad				
1808 0025	Custom made a/c cover direct ship to customer				
1809 0033	Chemical rinse condenser unit				
1810 0100	Powerwash condenser unit				
1811 0150	Clean split condenser coil				
1812 0025	Clean inside of condenser accessible				
1813 0075	Clean inside of condenser non-accessible				
1814 0050	Shipping & Handling/Restocking				
1815 0025	Access/Ladder Set-up Fee				
	These repairs do not include refrigeration service - See section 12 for appropriate charges				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION fin oxidation and corrosion may restrict air flow, they will inhibit proper heat transfer and increase operating energy consumption. Make sure to use approved condenser coil cleaner to regain factory fresh coil surfaces.
Keep water from getting into the motor and shorting it out when cleaning a condenser coil with water.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
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Restricted Condenser Coil

18

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Restricted Condenser Coil

18

CAUSES OF FAILURE

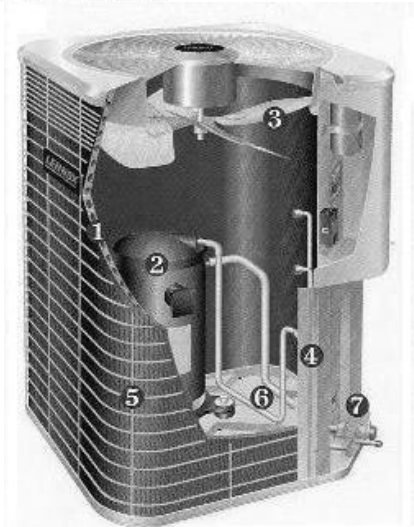
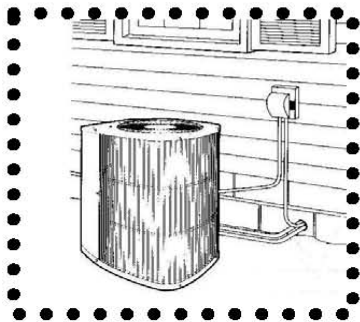
- Deterioration
- Dirt build-up
- Plant debris
- Bent fins

FIX-RIGHT SOLUTION

- Clean condenser coil
- Straighten fins

PREVENTION – PROPER PERIODIC MAINTENANCE

- Periodic condenser cleaning helps eliminate many contributing causes of premature deterioration and failure.



- ① Outdoor Coil
- ② Scroll Compressor
- ③ Direct-Drive Fan
- ④ Corrosion-Resistant Cabinet
- ⑤ Coil Guard
- ⑥ Drainage Holes
- ⑦ High Pressure Safety Switch

Cut-away of a Lennox Condensing Unit
Typical components of most brands of air conditioners

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Heating Systems

Fix-Right[®] Repair Guide

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Failure Prevention

- Set humidistat to setting that reflects outdoor temperature to maintain proper indoor humidity.**
- Furnaces: Check filters every month.**
- Have annual system maintenance done one month before the heating season begins.**


WARNING

- If gas odors can be detected, call the gas company immediately. Do not turn on any electrical equipment or use anything with an open flame.**
- Soot on the front of the furnace or boiler may indicate a draft or combustion problem. A technician should be contacted.**

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Loose/Burned Wiring Heating Section

19

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
1901 0050	Replace fuseable link				
1902 0050	Replace ionizing wires				
1903 0050	Repair minor connection				
1904 0075	Repair or replace electrical harness				
1905 0050	Troubleshoot shorted electrical/wires				
1906 0050	Install thermostat/low voltage per 10 foot				
1907 0005	Replace wire nut/twist-on wire connector				
1908 0005	Install conduit per foot				
1909 0020	Install split bolt connector				
1910 0100	Install surge protector				
1911 0050	Replace AC compressor terminal				
1912 0050	Replace 120V receptacle				
1913 0050	Repair connector/terminal - Labor Only				
1914 0050	Repair connection/harness - Labor Only				
1915 0050	Replace toggle switch 1 pole 2 position				
1916 0050	Replace toggle switch 2 pole 2 position				
1917 0050	Replace relay/contacter 1.5 pole- 2 pole				
1918 0050	Replace furnace disconnect switch				
1919 0033	Replace furnace pigtail cord				
1920 0005	Install romex/BX/UF per foot				
1921 0020	Replace electric / AC wire whip				
1922 0050	Install fused disconnect				
1923 0050	Install non-fused disconnect				
1924 0100	Replace 3 phase switch disconnect 30-60 AMP				
1925 0100	Replace circuit breaker switch disconnect 30-60 AMP				
1926 0050	Replace furnace disconnect switch - Labor Only				
1927 0050	Replace 4x4 1900 box w/switch/receptacle				
1928 0050	Shipping & Handling/Restocking				
1929 0025	Access/Ladder Set-up Fee				

Technician Notes

If a flame roll out - check for burned wires in the furnace vestibule.

Check for fusible links they are sometimes hard to find.

A fuse or circuit breaker switch cannot have a higher amp rating than the wire connected to it. Fuses and circuit breaker switches trip and blow for over amperage conditions. Be thorough to identify the cause, including operating equipment through its normal run and start sequences.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Loose/Burned Wiring Heating Section

19

Loose/Burned Wiring Heating Section

19

CAUSES OF FAILURE

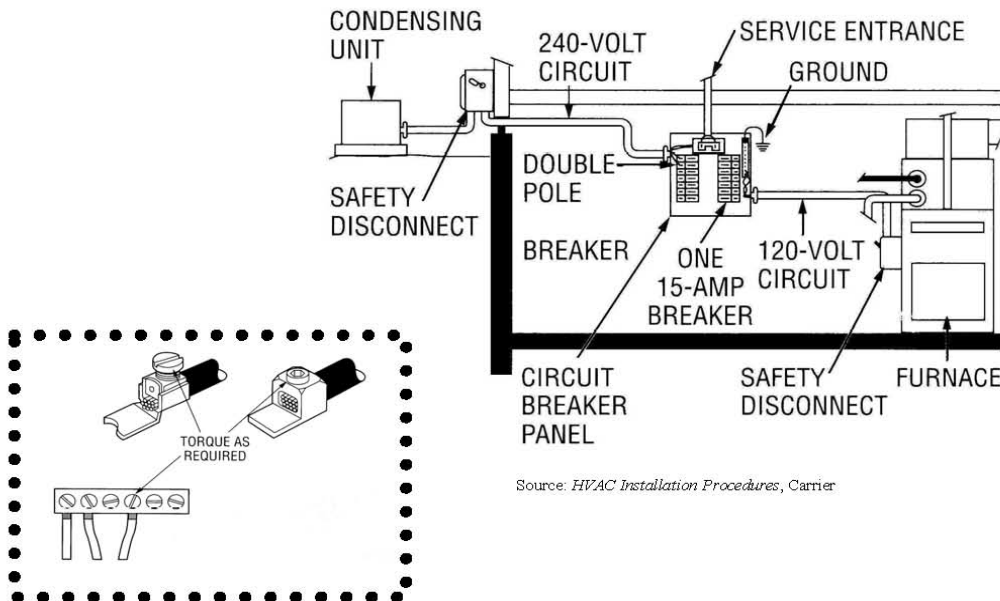
- ☑ Defective connections
- ☑ Electrical short
- ☑ Power surge
- ☑ Flame roll-out
- ☑ Wrong size wiring

FIX-RIGHT SOLUTION

- ☑ Repair connection
- ☑ Repair electrical short
- ☑ Replace wiring
- ☑ Repair/install power surge protection

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Loose or dirty connections often overheat.
- ☑ Normal equipment vibration requires electrical connections to be periodically cleaned and tightened.



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Loose/Burned Wiring Heating Section

19

Failed Relay

20

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2001 0050	Replace relay/contactor 1.5 pole- 2 pole	\$ 264.44	\$ 224.02	\$ 224.79	\$ 224.02
2002 0050	Replace relay/contactor - 3 pole				
2003 0050	Replace time delay relay - 2 wire				
2004 0075	Replace time delay relay - 3 wire				
2005 0050	Remove insects/debris				
2006 0050	Replace warranty relay/contactor Labor Only				
2007 0050	Replace relay- OEM Labor Only				
2008 0050	Replace overload relay				
2009 0050	Fan center control				
2010 0100	Replace 2-zone circulator relay				
2011 0125	Replace 3-zone circulator relay				
2012 0150	Replace 4-zone circulator relay				
2013 0150	Replace outdoor boiler reset control				
2014 0075	Install single zone relay				
2015 0025	Replace switching relay				
2016 0050	Shipping & Handling/Restocking				
2017 0025	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 220V price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION A relay must have a higher amp rating than the equipment AMP draw.
 When adding or replacing a relay, always recheck the heat anticipator.
Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like relay can sometimes cause an expensive part to fail like compressors because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
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Failed Relay

20

Failed Relay

20

CAUSES OF FAILURE

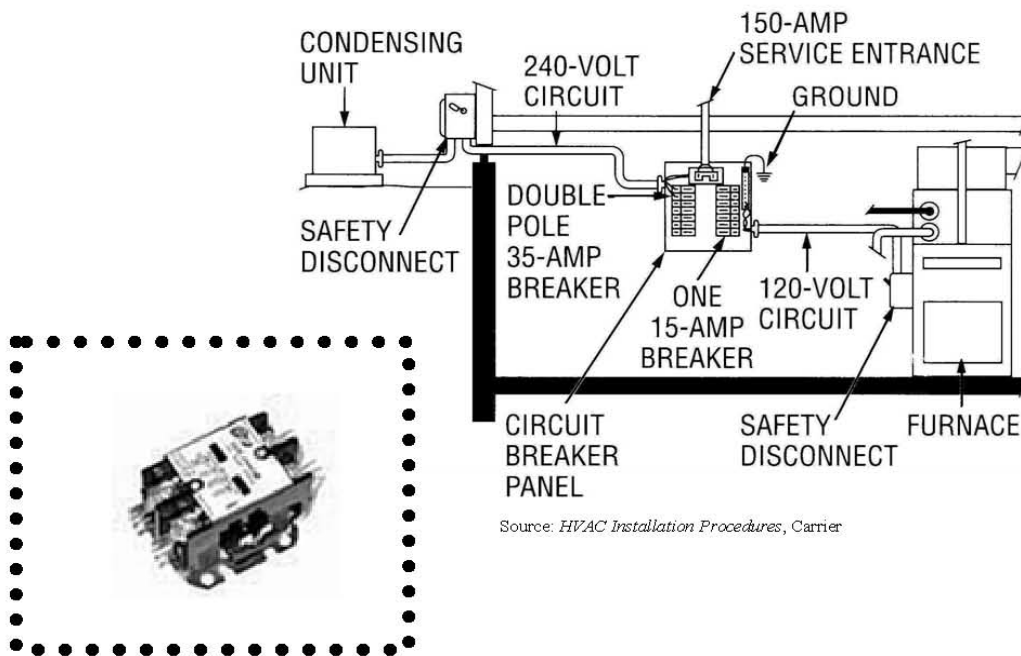
- ☑ Over/under line voltage
- ☑ Loose connection or mounting plate
- ☑ Deterioration and corrosion
- ☑ Excessive short cycling
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct over/under voltage problem
- ☑ Clean and tighten connections and mounting plate
- ☑ Replace Contactor
- ☑ Correct short cycling problem
- ☑ Recommended to replace furnace unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Furnace/AHU Capacitor

21

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2101 0050	Replace run 5-7.5 MFD capacitor Voltage Regulating Device				
2102 0050	Replace run 10-20 MFD capacitor Voltage Regulating Device				
2103 0050	Replace run 20-40 MFD capacitor Voltage Regulating Device				
2104 0050	Replace run 45+ MFD capacitor Voltage Regulating Device				
2105 0050	Replace warranty run capacitor Voltage Regulating Device				
2106 0050	Replace warranty dual run capacitor Voltage Regulating Device				
2107 0050	Turbo Mini replacement capacitors up to 15 mfd				
2108 0050	Turbo 200 universal replacement capacitors up to 65 mfd				
2109 0050	Turbo 200x universal replacement capacitors 65+ up to 90 mfd				
2110 0050	Shipping & Handling/Restocking				
2111 0025	Access/Ladder Set-up Fee				
	Over 220V price labor materials using Miscellaneous Unclassif Section 54				



Technician Notes

CAUTION capacitors don't have to be open or shorted to be considered bad. Do not rely only on an open/short test of a capacitor. Use a capacitor meter to take a microfarad reading to verify strength of capacitors. **Safety:** Short out capacitor terminals before pulling wire to avoid an unexpected shock.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like capacitors can sometimes cause excessive energy use and or equipment failure, because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Furnace/AHU Capacitor

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Failed Furnace/AHU Capacitor

21

CAUSES OF FAILURE

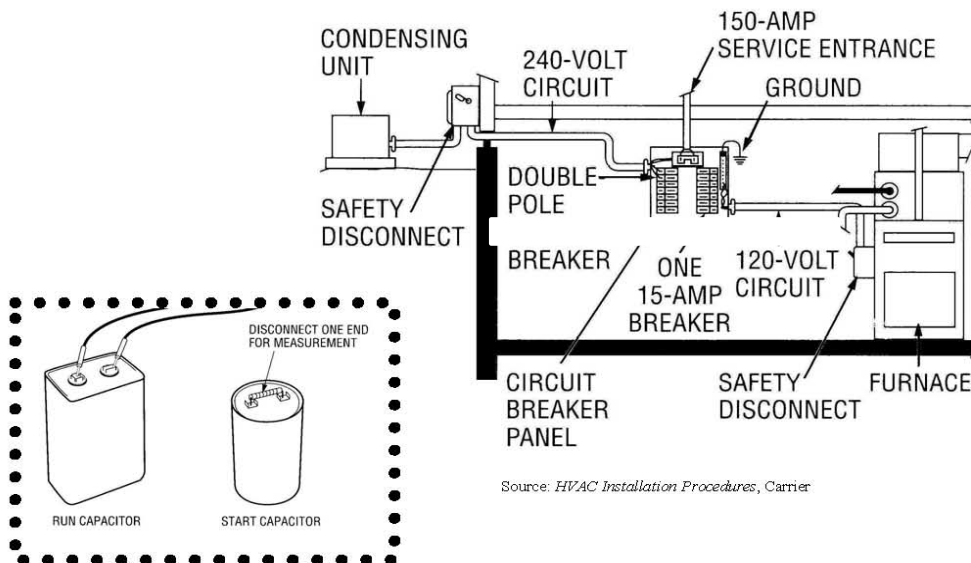
- Relay failure
- Starting load too high
- Excessive short cycling
- Excessive high voltage
- Improper capacitor
- Power surge
- Age fatigue

FIX-RIGHT SOLUTION

- Repair relay
- Correct high voltage problem
- Correct short cycling problem
- Replace Capacitor
- Repair/install power surge protection
- Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- Periodic electrical integrity and proper operating verification inspection and tuning help eliminate many contributing causes of failure.




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Failed Furnace/AHU Capacitor

21

Failed Circuit Board

22

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2201 0050	Single purpose fan or ignition - universal				
2202 0050	Multi-purpose fan or ignition - universal board				
2203 0100	Inducer draft board OEM - Labor Only				
2204 0033	Remount sensor				
2205 0100	Variable speed boards-universal board				
2206 0100	Warranty circuit board Labor Only				
2207 0100	Circuit board OEM Labor Only				
2208 0075	First Company circuit board				
2209 0050	White Rogers universal hot surface ignitor board				
2210 0100	Replace Amana circuit board PCBBF132S				
2211 0100	Replace Amana circuit board 50T35-743				
2212 0100	Replace Amana circuit board 50A55-743				
2213 0100	Replace Lennox circuit board 21D83M-843				
2214 0100	Replace Lennox circuit board 50A55-3797				
2215 0100	Replace York circuit board 50A56-956				
2216 0100	Replace Trane circuit board 50A65-5165				
2217 0100	Replace Carrier circuit board 50M56U-751				
2218 0100	Replace single stage control kit				
2219 0100	Replace single two stage control kit				
2220 0100	Replace single two stage variable control kit				
2221 0050	Shipping & Handling/Restocking				
2222 0025	Access/Ladder Set-up Fee				
	Circuit board repairs vary by manufacturer see Unclassified Repair section to estimate the replacement labor and their purchased circuit board material charges				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 5 ton or 200K BTU price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION make sure to check all safety controls after replacing a circuit board.

Circuit board failure is often caused by external to the board. Inspect circuit board for moisture contamination, wiring integrity and connections.

Check all functions of thermostat and equipment operating sequence when replacing a control board.

OEM board not included - call for price.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like the circuit board can sometimes cause excessive energy use and or equipment failure, because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Circuit Board

22

Failed Circuit Board

22

CAUSES OF FAILURE

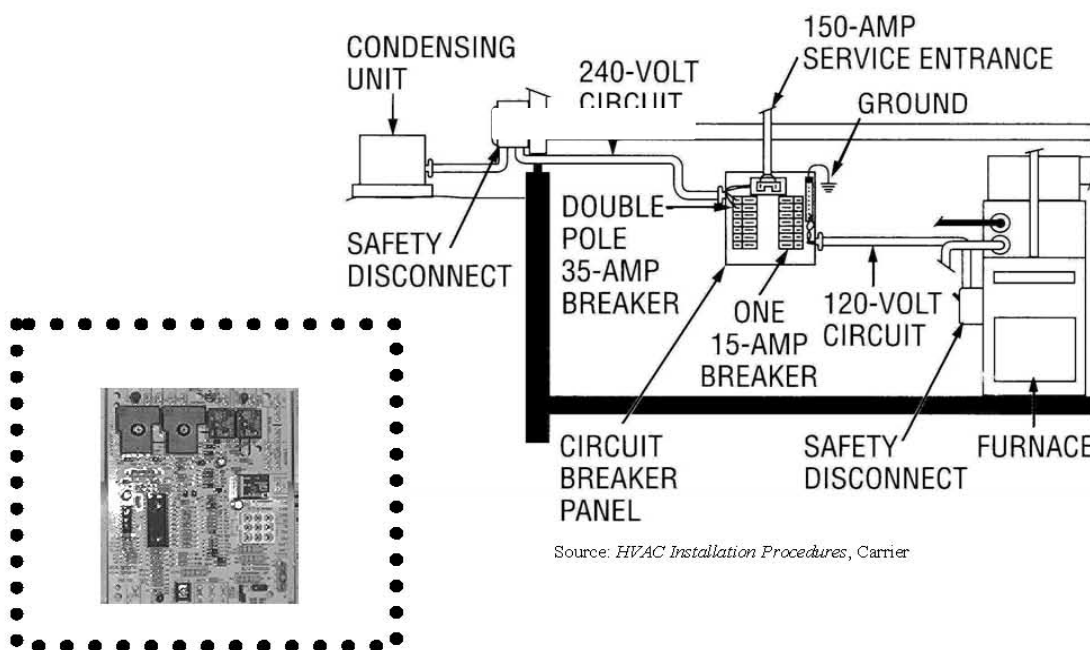
- ☑ Over/under line voltage
- ☑ Loose connection or mounting plate
- ☑ Deterioration and corrosion
- ☑ Excessive short cycling
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct over/under voltage problem
- ☑ Clean and tighten connections and mounting plate
- ☑ Replace circuit board
- ☑ Correct short cycling problem
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.




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Failed Circuit Board

22

Failed Fan Limit Switch

23

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2301 0030	Replace flame rollout/snap disc fan-adjust temp				
2302 0050	Replace fan/limit 5 thru 11				
2303 0050	Replace Adjustable fan/limit 5 thru 11				
2304 0050	Replace fan and limit with preheater assist 24V				
2305 0050	Replace warranty fan limit Labor Only				
2306 0050	Replace furnace valve limit switch				
2307 0050	Shipping & Handling/Restocking				
2308 0025	Access/Ladder Set-up Fee				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION remember to verify the fan limit switch as a high or low voltage limit when replacing it. The fan limit settings are important for safety, efficiency and comfort. Set them correctly.

If we have already recalibrated the fan switch on a prior service call, recommend that it be replaced to avoid further nuisance failures and additional charges.

Set up fan switch to come on at approx.130°, off at approx.100°, and set fan limit no higher than 240°. To check high limit, remove belt or disconnect blower motor. Insert temperature probe into plenum and turn on furnace. Compare temperature of probe to that of the limit when gas valve closes.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like the fan limit switches are safety protection devices and if not working properly result in unsafe or equipment/property damages. Regular maintenance provides safety checks and reduces the chance of expensive repairs.

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Failed Fan Limit Switch

23

Failed Fan Limit Switch

23

CAUSES OF FAILURE

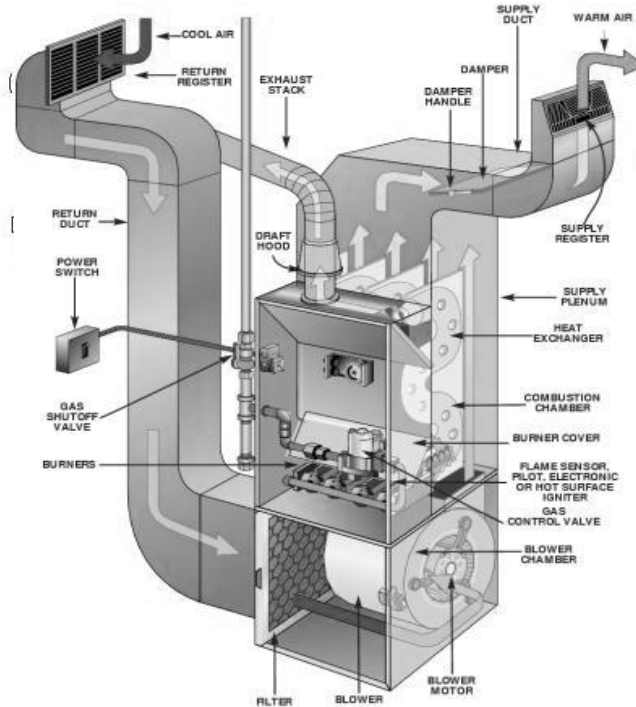
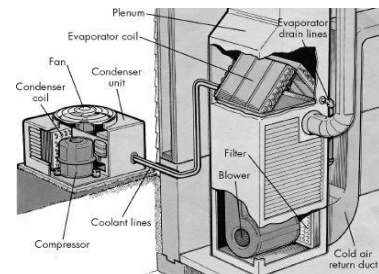
- ☑ Over/under line voltage
- ☑ Loose connection or mounting plate
- ☑ Deterioration and corrosion
- ☑ Restricted flue
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct over/under voltage problem
- ☑ Clean and tighten connections and mounting plate
- ☑ Replace fan limit switch
- ☑ Correct flue restriction
- ☑ Recommend to replace outdoor unit if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Fan Limit Switch

23

Failed Safety Pressure Switch

24

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2401 0025	Clean and test switch	\$ 70.47	\$ 105.71	\$ 50.00	\$ 80.85
2402 0050	Replace pressure switch single				
2403 0050	Replace pressure switch dual				
2404 0050	Replace pressure switch OEM labor only				
2405 0025	Replace door interlock switch				
2406 0020	Pressure switch hose				
2407 0050	Replace warranty pressure switch Labor Only				
2408 0050	Shipping & Handling/Restocking				
2409 0025	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION check flue pipe for any obstructions. Check for any soot buildup in the fan housing. Check actual pressure. Look for LED display on ignition control module to check if flashing code for failure present.

Kinked tubing, condensation, rust and insect nests can distort pressure switch diagnosis. Check tubing integrity and for deterioration that could contribute to improper pressure diagnostics.

Verify to replace with same static pressure rating as replacement safety pressure switch.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Safety Pressure Switch

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Failed Safety Pressure Switch

24

CAUSES OF FAILURE

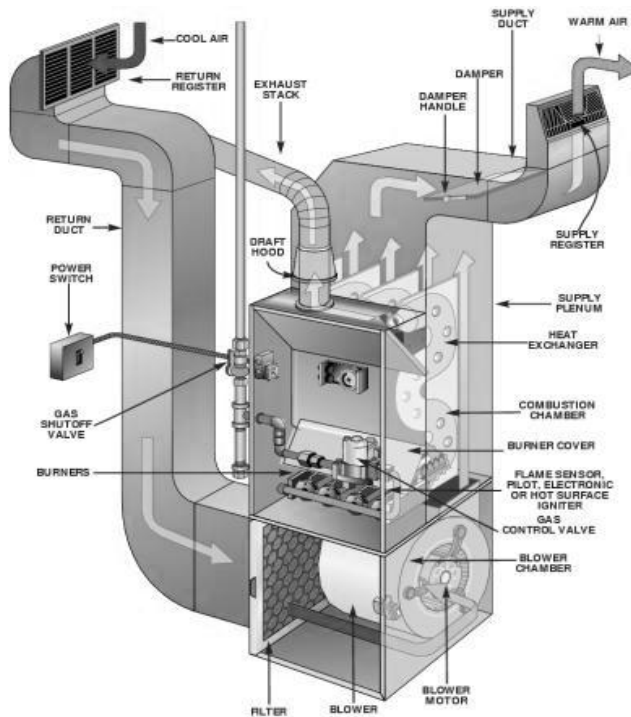
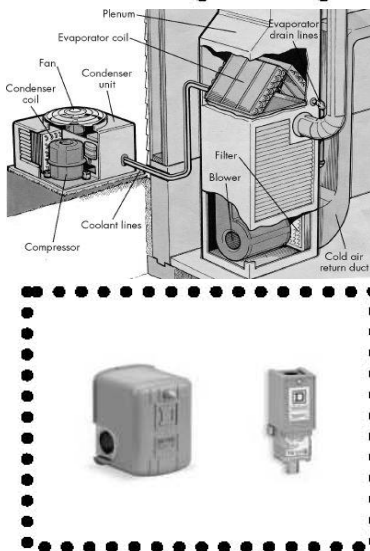
- ☑ Loose connection or mounting plate
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Clean and tighten connections and mounting plate
- ☑ Replace safety pressure switch
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Safety Pressure Switch

24

Failed Igniter Probe

25

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2501 0025	Check electrical connections				5
2502 0100	Replace Gas Valve #5 Pilot Retrofit Kit				4
2503 0075	Install pilot retrofit kit - (during maintenance)				8
2504 0050	Single purpose fan or ignition - universal				5
2505 0050	Replace hot surface igniter - Easy Access				0
2506 0075	Replace 24 volt spark igniter & relight control				0
2507 0075	Silicon nitride hot surface igniter - universal - Difficult Access				8
2508 0050	Replace gas pilot ignition control module				3
2509 0025	Replace flame sensor				8
2510 0025	Replace warranty igniter or flame sensor Labor Only				5
2511 0125	Replace warranty fan and ignition board Labor Only				7
2512 0050	Ignitor for Smart Valve				9
2513 0035	Clean flame sensor				8
2514 0050	Replace spark ignitor				7
2515 0075	Glowfly Universal Hot Surface Igniter				5
2516 0050	Shipping & Handling/Restocking				1
2517 0025	Access/Ladder Set-up Fee				5
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION check for bright hot spots on igniter for apparent hairline cracks. Check electrical continuity, ground & polarity.

Flame sensors must be clean, touching the flame properly and not touching a ground.

Flame sensors must have reading of .04+ DC microamperes (if less replace).

Hot surface igniters must read 80 ohms or less (if greater replace).

Do not grip igniter directly with your hands to prevent oil contamination transfer to igniter which often results in potential igniter hot spots which can cause igniter failure.

Check ignition system wires integrity and connections secured firmly.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Small parts like the igniter can sometimes cause equipment failure, because it's not working properly. Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Igniter Probe

25

Failed Igniter Probe

25

CAUSES OF FAILURE

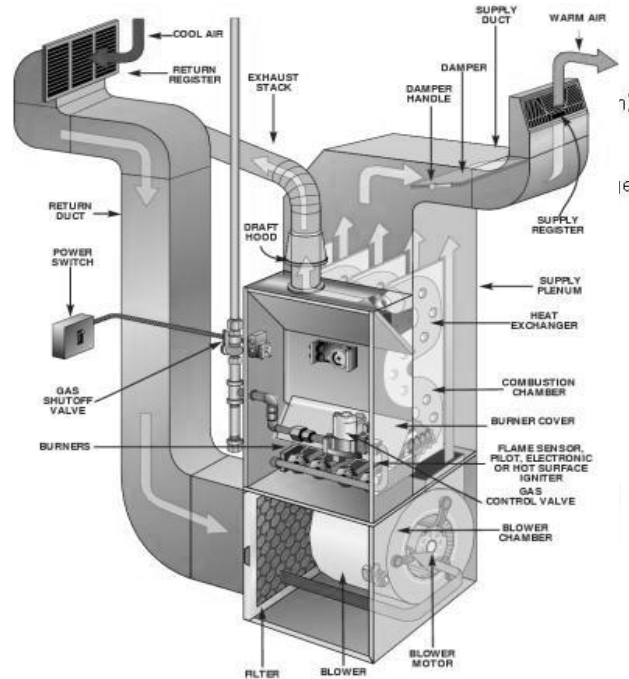
- ☑ Loose connection or mounting plate
- ☑ Wrong ignitor
- ☑ Deterioration and corrosion
- ☑ Power Surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Clean and tighten connections and mounting plate
- ☑ Replace ignitor probe
- ☑ Repair/install power surge protection

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Igniter Probe

25

Failed Igniter Transformer

26

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2601 0050	Replace ignition transformer- universal oil				
2602 0050	Replace electrode/porcelain kit				
2603 0050	Replace warranty ignition transformer Labor Only				
2604 0050	Wayne Transformer				
2605 0050	QB Transformer				
2606 0050	Replace warranty run capacitor Voltage Regulating Device				
2607 0050	Shipping & Handling/Restocking				
2608 0025	Access/Ladder Set-up Fee				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION the ignition transformers operates at 10,000 volt DC output. To check

Safety: do not check voltage with a screwdriver due to severe electrical shock hazard.

If no ignition, verify high voltage transformer operation. If transformer OK, then verify proper electrode gap, then verify proper oil pump pressure and oil nozzle orifice.

All above repairs are for oil furnaces.

OEM ignition transformer not included - call for price.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Igniter Transformer

26

Failed Igniter Transformer

26

CAUSES OF FAILURE

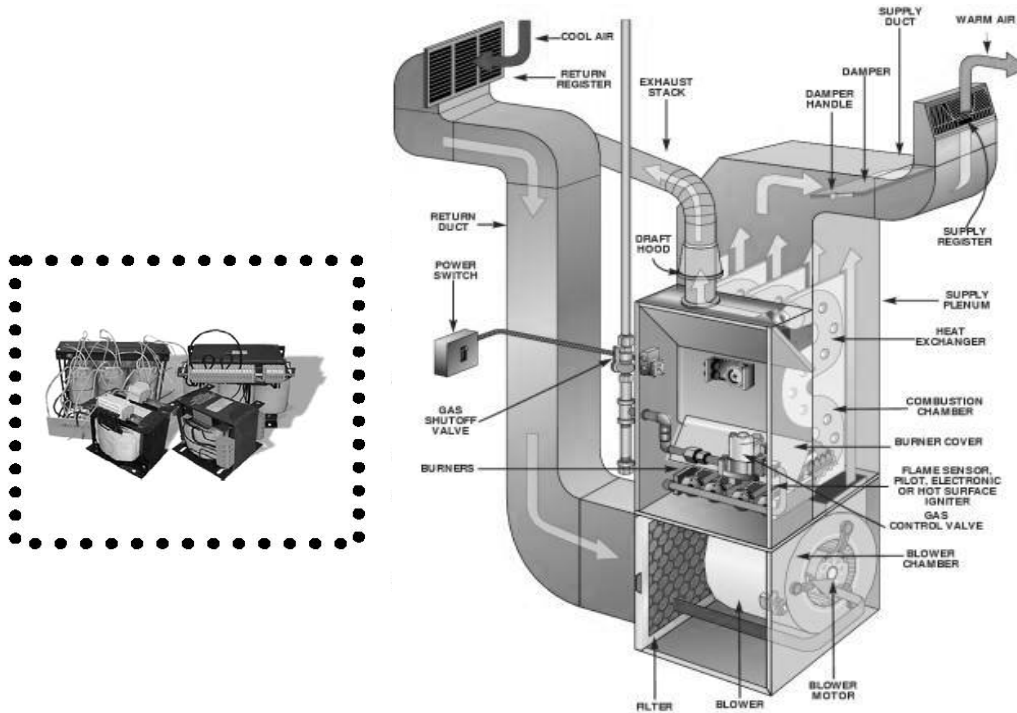
- ☑ Loose connection or mounting plate
- ☑ Deterioration and corrosion
- ☑ Transformer winding failure
- ☑ Power Surge
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Clean and tighten connections and mounting plate
- ☑ Replace igniter transformer
- ☑ Repair/install power surge protection
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



Source: American heating website


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Failed Igniter Transformer

26

Dangerous Delayed Gas Ignition

27

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2701 0075	Clean and align burners				
2702 0033	Calibrate and set gas pressure				
2703 0100	Replace Gas Valve #5 Pilot Retrofit Kit				
2704 0075	Clean pilot assembly				
2705 0075	Relight and verify pilot				
2706 0050	Replace electrode/porcelain kit				
2707 0075	Replace pilot assembly				
2708 0050	Shipping & Handling/Restocking				
2709 0025	Access/Ladder Set-up Fee				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION check heat exchanger, smoke pipe, and chimney for obstructions. Check thermo damper for proper operation. Take a CO reading and record it on the service invoice.

When verifying gas pressure with a manometer, liquid propane gas should be between 9-9.5 es water column and natural gas between 1.8-3.8 es, but always go by the furnace btuh Input as specified on furnace Rating Plate whenever possible.

Orifices for gas pilots are too small to clean effectively. It is recommended to replace the pilot head instead of cleaning it. Check that bridge assemblies are aligned correctly.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

For occupant safety, always recommend installation of a CO sensor if none present.

Regular maintenance saves money on your utility bills and reduces the chance of fires or safety hazards.

Always mention how to receive a 15% discount off today's repairs

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Dangerous Delayed Gas Ignition

27

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Dangerous Delayed Gas Ignition

27

CAUSES OF FAILURE

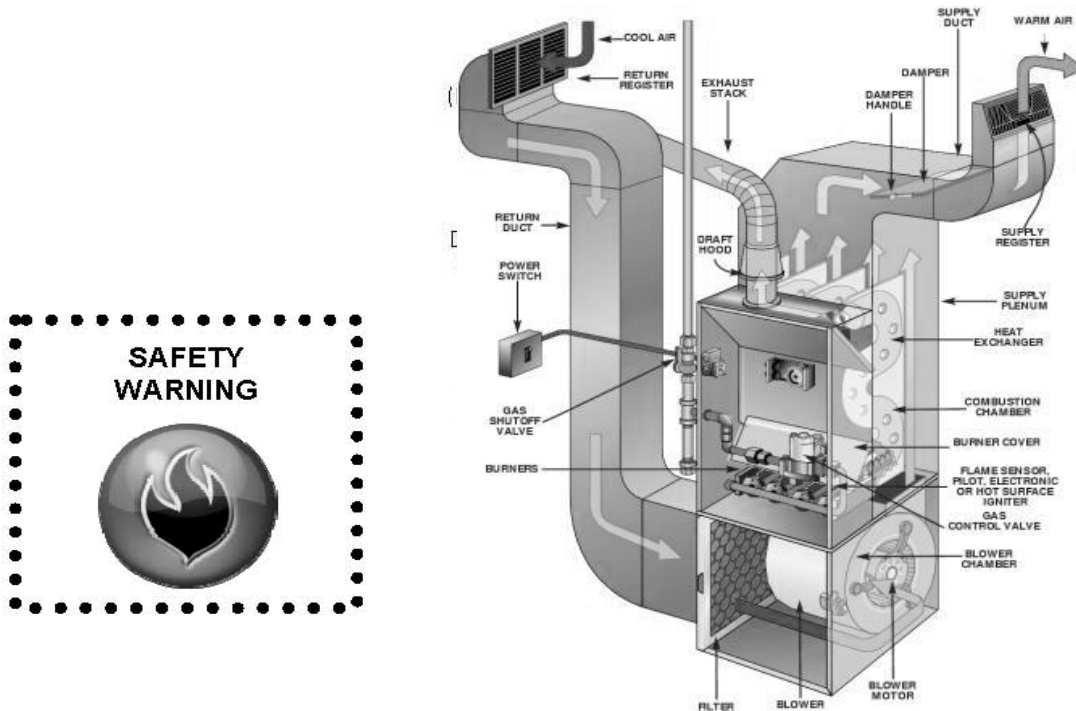
- ☑ Restricted or clogged by lint, dust, or insect pests
- ☑ Fuel deposits
- ☑ Warped burner components
- ☑ Defective ignition components
- ☑ Deterioration and corrosion
- ☑ Improper ignition alignment
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Clearing effected restricted ports
- ☑ Replace warped or defective ignition components
- ☑ Align and verify ignition sequence
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Dangerous Delayed Gas Ignition

27

Failed Pilot Glow Coil

28

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
2801 0075	Replace pilot orifice				
2802 0075	Replace pilot burner tubing				
2803 0075	Replace pilot-universal				
2804 0025	Relight pilot only				
2805 0075	Replace pilot generator				
2806 0050	Replace BDP 3 wire pilot				
2807 0050	Shipping & Handling/Restocking				
2808 0025	Access/Ladder Set-up Fee				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION glow coil should turn bright red. If not operating properly, check voltage and do a continuity, ground & polarity check. Most pilot orifices are too small to clean effectively. Replace the pilot head rather than cleaning it.

Pilot position and direction should match the same position as the pilot being replaced for proper ignition.

Remember, any older furnace pilot tube connected to a main gas line can leak gas into the home if the pilot ever goes out. For customer safety, consider modernizing by replacing the gas valve with a newer safer model.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

For occupant safety, always recommend installation of a CO sensor if none present.

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Failed Pilot Glow Coil

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Failed Pilot Glow Coil

28

CAUSES OF FAILURE

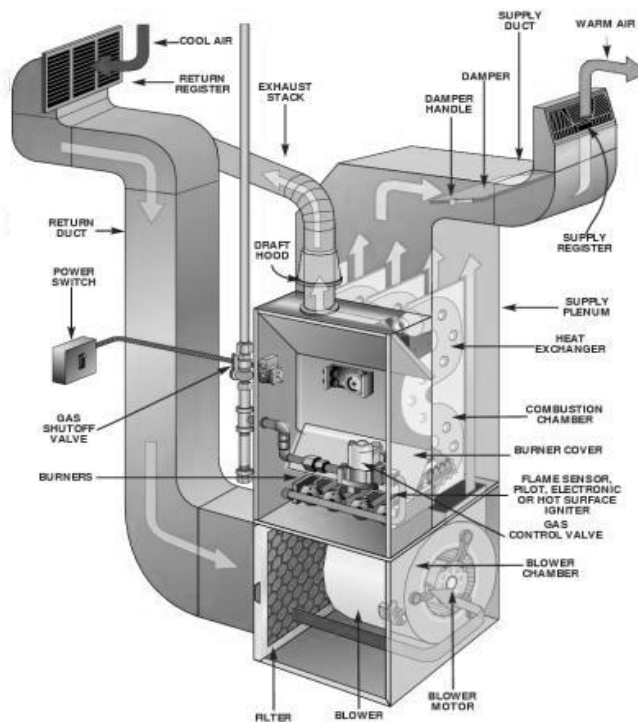
- ☑ Loose connection or mounting plate
- ☑ Restricted or clogged by lint, dust, or insect pests
- ☑ Deterioration and corrosion
- ☑ Improper ignition alignment
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Clean and tighten connections and mounting plate
- ☑ Clearing affected restricted ports
- ☑ Replace pilot glow coil
- ☑ Align and verify ignition sequence
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Pilot Glow Coil

28

Failed Thermocouple

29

CAUSES OF FAILURE

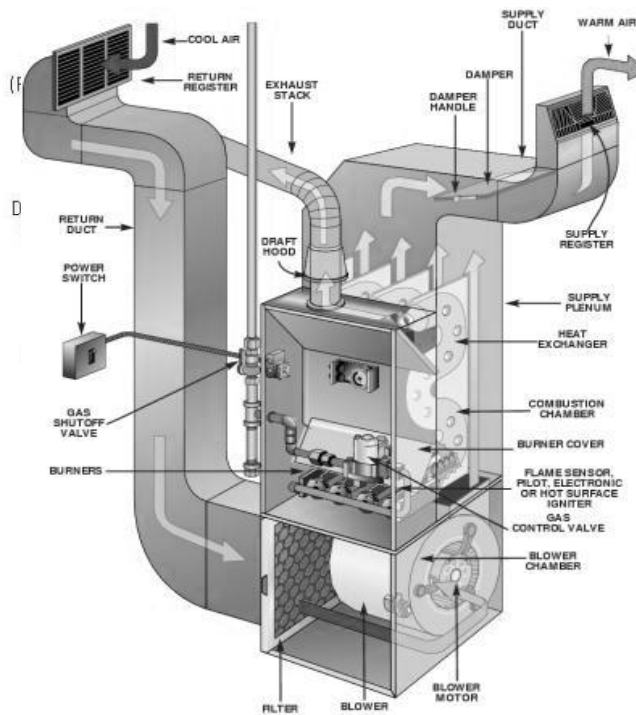
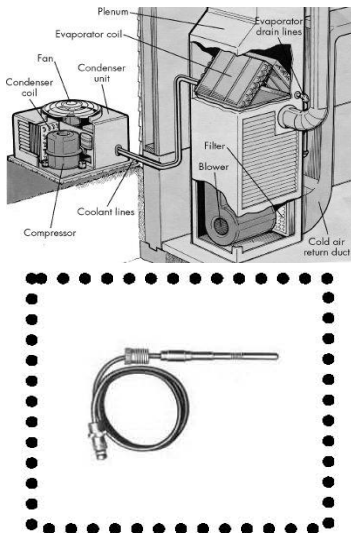
- ☑ Loose connection or mounting plate
- ☑ Restricted or clogged by lint, dust, or insect pests
- ☑ Deterioration and corrosion
- ☑ Improper ignition alignment
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Clean and tighten connections and mounting plate
- ☑ Clearing affected restricted ports
- ☑ Replace thermocouple
- ☑ Align and verify ignition sequence

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Thermocouple

29

Failed Electric Heat Module

30

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3001 0050	Replace heat module control board	\$ 290.54	\$ 361.02	\$ 246.96	\$ 306.86
3002 0050	Replace heat sequencer up to 10kw				
3003 0050	Replace heat sequencer above 15 kw up to 20kw				
3003 0100	Replace restrung kit - see notes				
3004 0025	Additional restrung kits - see notes				
3005 0050	Replace fuse link - see notes				
3006 0020	Adjust limit - see notes				
3007 0100	Replace heat assembly kit up to 7.5 kw				
3008 0100	Replace heat assembly kit 8-15kw				
3009 0100	Replace heat assembly kit 16-25kw				
3010 0033	Replace warranty sequencer Labor Only				
3011 0050	Shipping & Handling/Restocking				
3012 0025	Access/Ladder Set-up Fee				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION when wiring in a heat module, check to make sure all circuit stages are operating and check amp draw.

Heater modules and assemblies are purchased OEM and the above pricing are labor only. If replacement part is required call to identify vendor parts price and go to Section 54 to find what to charge.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Electric Heat Module

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Failed Electric Heat Module

30

CAUSES OF FAILURE

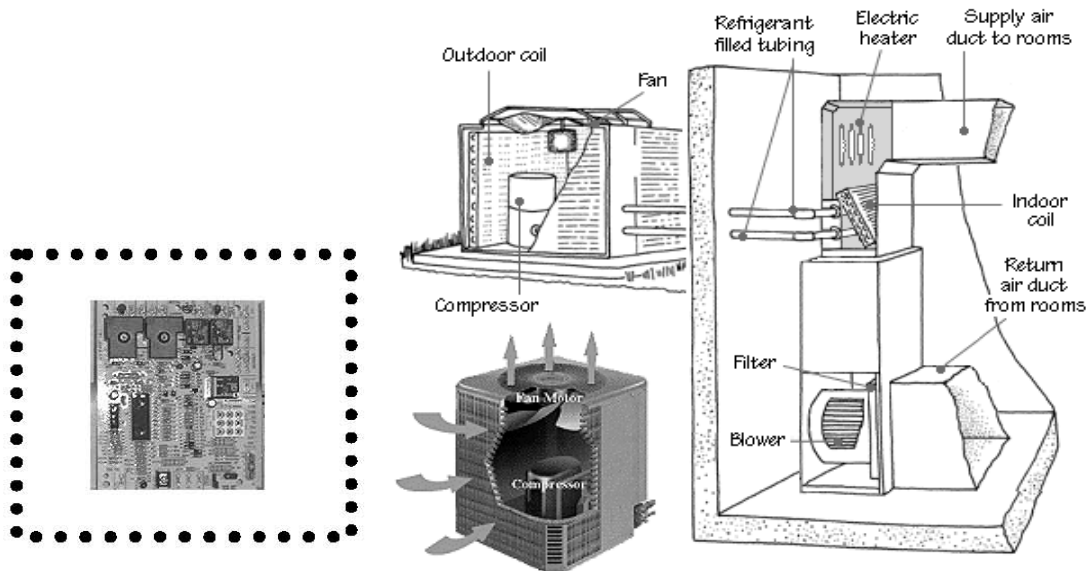
- ☑ Over/under line voltage
- ☑ Loose connection or mounting plate
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct over/under voltage problem
- ☑ Clean and tighten connections and mounting plate
- ☑ Replace electric heat module
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Electric Heat Module

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Thermostat

31

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3101 0030	Reprogram digital thermostat & replace battery	\$ 107.96	\$ 150.24	\$ 91.76	\$ 127.71
3102 0010	Replace thermostat battery				
3103 0050	Install thermostat/low voltage wire per 10 foot				
3104 0050	Thermostat #1 - 1H only				
3105 0050	Thermostat #2 - 1H & 1C non-programmable				
3106 0050	Thermostat #4 - T4 1H & 1C programable				
3107 0050	Thermostat #5 - T6 1H & 1C programable				
3108 0050	Thermostat #6 - T6 2H & 2C programable - conventional				
3109 0050	Thermostat #7 - T6 WIFI 2H & 2C programable				
3110 0050	Thermostat #8 - T6 WIFI 3H & 2C programable				
3111 0050	Install customer supplied thermostat				
3112 0050	Install locking cover				
3113 0050	Warranty thermostat - labor only				
3114 0050	Update firmware				
3115 0025	Additional restring kits - see notes				
3116 0050	Shipping & Handling/Restocking				
3117 0025	Access/Ladder Set-up Fee				



Technician Notes

CAUTION some thermostats require the use of a level for proper level installation. Please use a level.

Make sure thermostat is sealed and not allowing a draft to falsely affect the calibration. When replacing or checking a thermostat, always calibrate and set heat anticipator.

If the thermostat has previously been calibrated by one of our technicians and you now need to recalibrate, due to failure of achieve set-point - recommend replacement of thermostat.

Avoid locations that may be affected by a lamp, sunlight, attic fan blower, or anything that could give the thermostat a false reading.

Always demonstrate to customer how to operate or program t-stat.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Programmable thermostats to provide greater comfort control and reduced energy consumption.

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CAUSES OF FAILURE

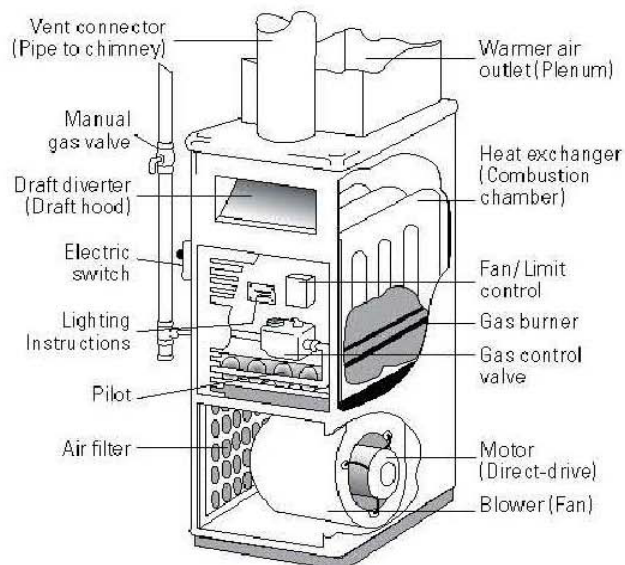
- ☑ Loose connection or mounting plate
- ☑ Improper alignment
- ☑ Improper calibration
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Clean and tighten connections and mounting plate
- ☑ Correct alignment
- ☑ Calibrate and verify sequence
- ☑ Replace thermostat heat anticipator

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Oil Burner

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Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3201 0075	Realign and clean burner assembly	\$ 266.40	\$ 272.20	\$ 226.51	\$ 216.27
3202 0050	Replace burner - see OEM notes				
3203 0050	Replace warranty burner Labor Only				
3204 0050	Adjust electrodes				
3205 0050	Adjust air shutter				
3206 0050	Replace electrode				
3207 0050	Replace nozzle				
3208 0025	Replace oil filter cartridge replacement				
3209 0100	Testo flue gas analysis				
3210 0050	Shipping & Handling/Restocking				
3211 0125	Shipping & Handling/Restocking				
	For heavy soot situations obtain additional cleaning labor in miscellaneous section to estimate.				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes
OEM burner not included - call for price. Price service ticket retail or retail overtime and calculate/present total service agreement discount option.
Customer Notice
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Failed Oil Burner

CAUSES OF FAILURE

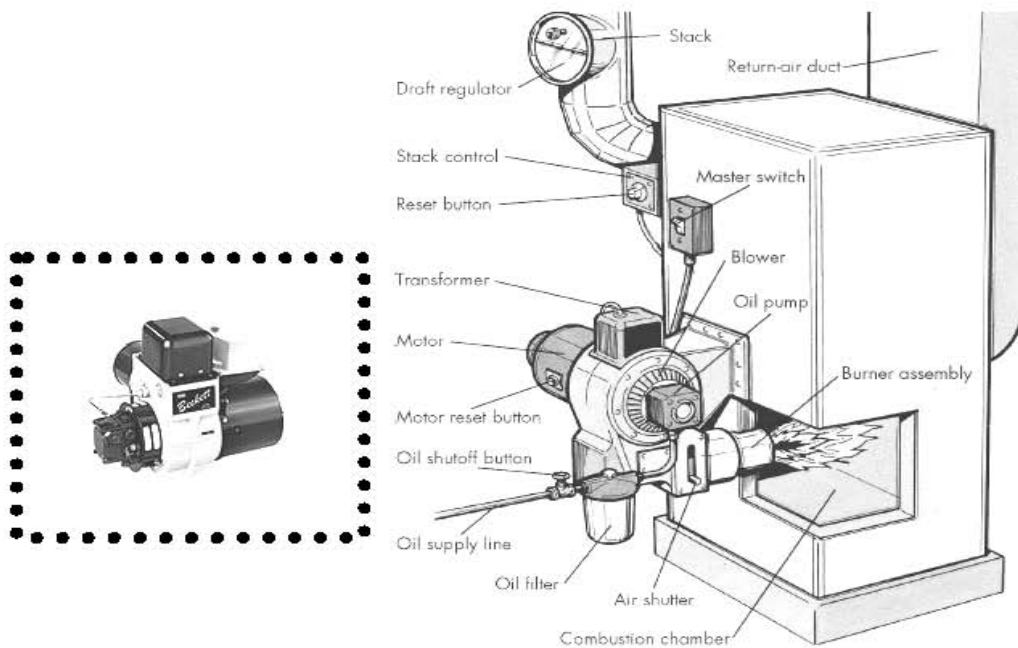
- ☑ Plugged with debris or contaminated
- ☑ Improper air/gas calibration
- ☑ Dirty oil filter
- ☑ Improper alignment
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct restrictions
- ☑ Calibrate and tune combustion
- ☑ Correct alignment
- ☑ Replace burner
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



Source: *American heating website*

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Failed Fan Belt

33

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3301 0025	Adjust belt/pulley	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
3302 0020	Replace belt				
3303 0005	Replace belt with repair				
3304 0050	Replace blower pulley with no motor change				
3305 0050	Replace motor pulley with no motor change				
3306 0050	Replace pulley OEM				
3307 0050	Shipping & Handling/Restocking				
3308 0025	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 5 ton price or 5 hp motot labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION make sure both the fan pulley and the motor pulley are in line with each other when installing a new belt.

Make sure motor and fan pulleys are in good condition. A worn pulley can ruin a new belt in a short amount of time.

Check and verify proper AMP draw of a motor after a belt replacement/ adjustment. Proper tension important for long bearing and belt life.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Fan Belt

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Failed Fan Belt

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CAUSES OF FAILURE

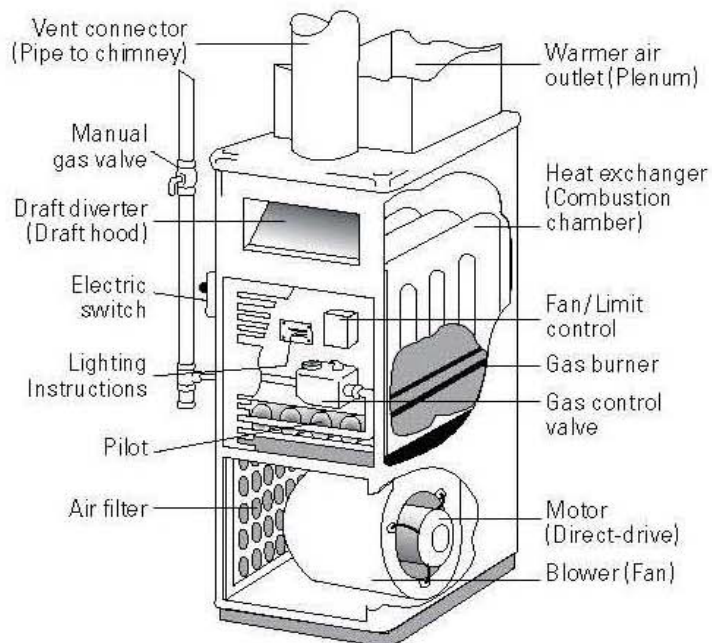
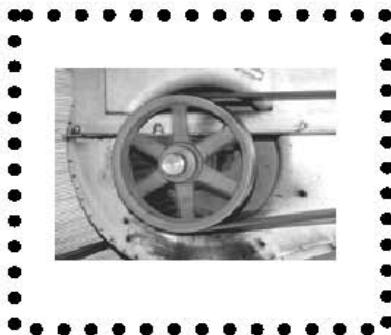
- ☑ Improper alignment or tension
- ☑ Glazing, cracking or fraying
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct alignment or tension
- ☑ Replace belt

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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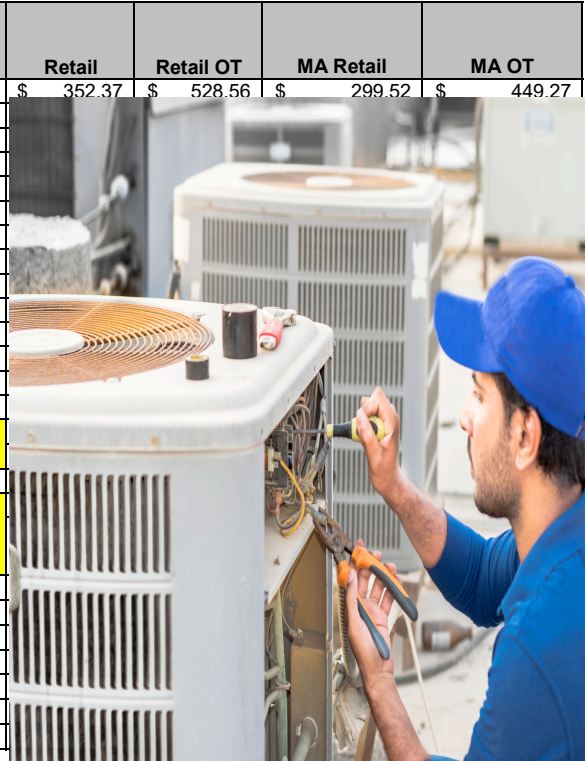
Failed Fan Belt

33

Failed Blower Wheel

34

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3401 0125	Replace OEM motor Labor Only	\$ 352.37	\$ 528.56	\$ 299.52	\$ 449.27
3402 0125	Replace ECM OEM motor Labor Only				
3403 0025	Adjust blower speed				
3404 0050	Replace universal motor mount kit with repair				
3405 0125	Replace universal motor mount without repair				
3406 0125	Replace warranty direct drive motor Labor Only				
3407 0050	Replace warranty motor module Labor Only				
3408 0125	Replace variable speed direct drive motors - Labor Only				
3409 0125	Replace ECM module see - replacement notes				
3410 0100	Replace direct drive blower motor EcoTech				
3411 0100	Pull and clean blower wheel				
3412 0050	Shipping & Handling/Restocking				
3413 0025	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 48 to price part price to be added to the OEM LABOR ONLY price..				
	Over 5 ton or 200K BTU price labor materials using Miscellaneous Unclassified Section 48				



Technician Notes

CAUTION always replace the capacitor when replacing a motor and always match up same horsepower with the one you're replacing. Verify motor amperage on the motor against name plate amperage after installing.

Make sure to first verify motor operation PRIOR to replacing ECM module.

When replacing the belt drive motor, also replace the belt, make sure the pulleys are aligned properly and be sure not to over amp motor above its rating.

Belt adjustment to 1/2 to 3/4 es of belt deflection.

OEM variable speed motors not included - call for price.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Blower Wheel

34

Failed Blower Wheel

CAUSES OF FAILURE

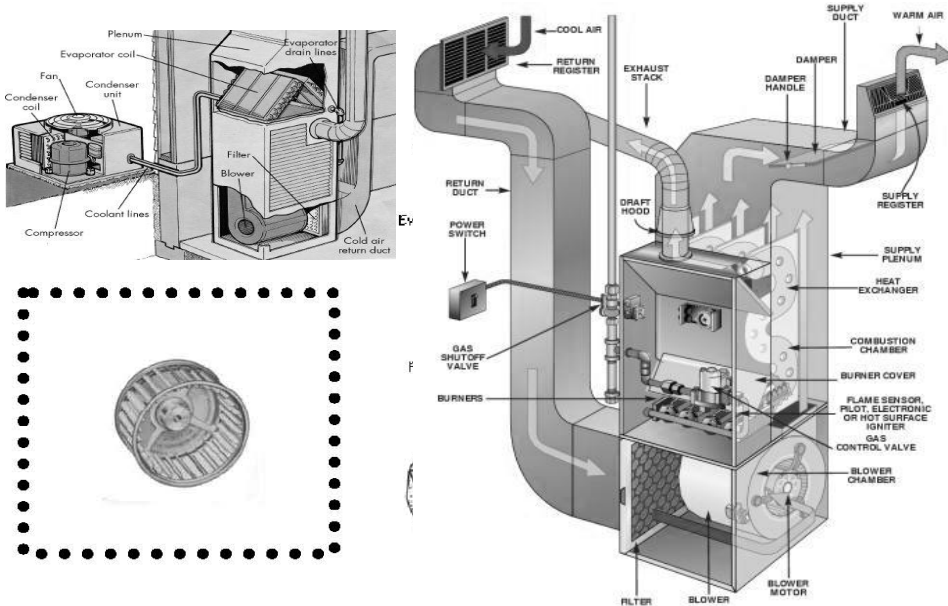
- ☑ Warped or broken squirrel fan
- ☑ Operating vibration
- ☑ Worn bearings
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace fan blower
- ☑ Correct vibration problem
- ☑ Replace wear possible motor bearings
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE


- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Blower Motor

35

1	Repair Description	Retail	Retail OT	MA Retail	MA OT
3501 0100	Replace blower Motor #4 115V, 1/6-1/2 HP,univ,1075 RPM - Easy Access				
3502 0120	Replace blower Motor #4 115V, 1/6-1/2 HP,univ,1075 RPM - Difficult Access				
3503 0100	Replace blower Motor #5 230V, 1/6-1/2 HP,univ and Cap - Easy Access				
3504 0120	Replace blower Motor #5 230V, 1/6-1/2 HP,univ and Cap - Difficult Access				
3505 0100	Replace blower Motor #8 115V, 3/4 HP,univ and Cap - Easy Access				
3506 0120	Replace blower Motor #8 115V, 3/4 HP,univ and Cap - Difficult Access				
3507 0100	Replace blower Motor #9 230V, 3/4 HP,univ and Cap -Easy Access				
3508 0120	Replace blower Motor #9 230V, 3/4 HP,univ and Cap - Difficult Access				
3509 0250	Replace blower Motor Azure Digi - universal variable speed up to 1 HP				
3510 0275	Replace blower Motor Azure Digi X13 - universal variable speed up to 1 HP				
3511 0010	Adjust blower speed				
3512 0050	Replace universal motor mount kit with repair				
3513 0125	Replace universal motor mount without repair				
3514 0025	Adjust pulleys				
3515 0125	Replace warranty direct drive motor Labor Only				
3516 0050	Replace warranty motor module Labor Only				
3517 0125	Replace variable speed direct drive motors - Labor Only				
3518 0125	Replace ECM module see - replacement notes				
3519 0100	Replace direct drive blower motor EcoTech				
3520 0050	Shipping & Handling/Restocking				
3521 0025	Access/Ladder Set-up Fee				

Technician Notes

Make sure to first verify motor operation PRIOR to replacing ECM module.

Belt adjustment to 1/2 to 3/4 es of belt defection.

OEM variable speed motors not included - call for price.
 Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Failed Blower Motor

35

Failed Blower Motor

CAUSES OF FAILURE

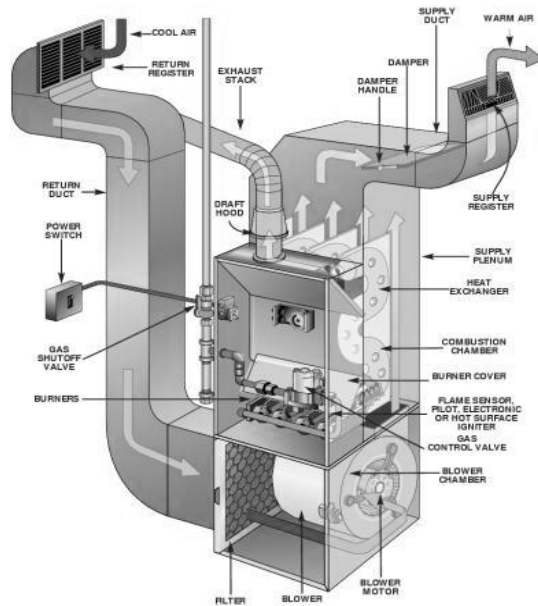
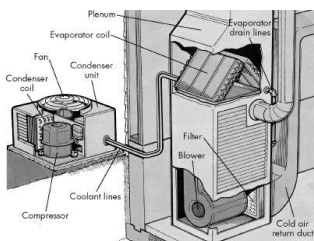
- ☑ Warped or broken squirrel fan
- ☑ Operating vibration
- ☑ Worn bearings
- ☑ Poor lubrication
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace fan motor
- ☑ Correct vibration problem
- ☑ Replace wear possible motor bearings
- ☑ Lubricate motor
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



Restricted Air Filter

36

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3601 0033	Clean permanent filter	\$ 102.22	\$ 149.74	\$ 96.90	\$ 126.42
3602 0016	Replace customer supplied filter				
3603 0010	Replace MERV 5 1" filter				
3603 0010	Replace MERV 5 2" filter				
3604 0010	Replace MERV 5 4" filter				
3605 0025	Replace hog hair filter w / aluminum frame				
3606 0033	Vacuum return box				
3607 0050	Replace ionizing wires				
3608 0075	Clean electronic air cleaners				
3609 0010	Replace Honeywell Humidifier filter DR65				
3610 0010	Replace Honeywell Humidifier filter DR90				
3611 0010	Replace Aprilaire pleated filter 2200				
3612 0010	Replace Aprilaire pleated filter 2400				
3613 0025	Install upgrade kit for Aprilaire 2200/2400				
3614 0010	Replace Honeywell Post Filter				
3615 0010	Replace Air Bear filter				
3616 0025	Replace Trane Perfect Fit				
3617 0050	Shipping & Handling/Restocking				
3618 0025	Shipping & Handling/Restocking				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION when installing high capacity filters, check static pressure (total static) before and after installing filter to verify proper air flow. To prevent air flow restrictions do not exceed manufacturers recommendations.

Electronic air cleaners should be tested after cleaning to ensure proper operation.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

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Restricted Air Filter

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Restricted Air Filter

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CAUSES OF FAILURE

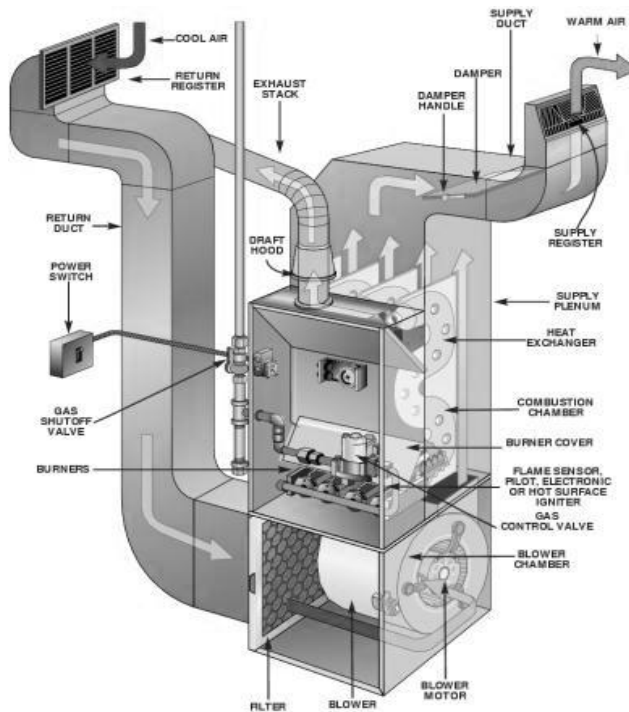
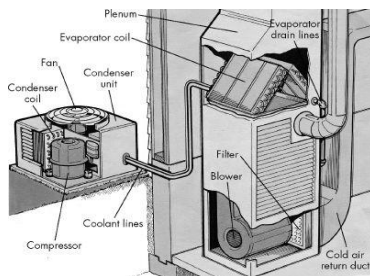
- ☑ Dirt, pet hair and house airborne debris
- ☑ Smoke or soot residue

FIX-RIGHT SOLUTION

- ☑ Install appropriate efficiency filters
- ☑ Install whole system electronic air cleaner

PREVENTION – PROPER PERIODIC MAINTENANCE


- ☑ Periodic filter changes help eliminate many contributing causes of premature deterioration and failure.



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Restricted Air Filter

36

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3701 0100	Replace damper motor only				
3702 0100	Replace zone damper motor & assembly				
3703 0050	Replace zone damper harness				
3704 0050	Replace door spring				
3705 0050	Replace warranty damper motor Labor Only				
3708 0100	Replace 2H 1C 2-zone board up to HZ221				
3709 0100	Replace 1H 1C 3-zone board up to HZ311				
3710 0100	Replace 2H 2C 3-zone board up to HZ322				
3711 0100	Replace 3H 2C 3-zone board up to HZ432				
3712 0050	Shipping & Handling/Restocking				
3713 0025	Access/Ladder Set-up Fee				
	Zone board above HZ322. Use Misc. Unclassified to price repair.				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				

Technician Notes

CAUTION check for any obstruction on the damper operation. Check the shaft on damper to make sure it is turning when motor is powered. Make sure damper switch is operating properly or furnace will not ignite.

Some dampers may not operate if installed incorrectly. Make sure to install per manufactures specifications.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

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CAUSES OF FAILURE

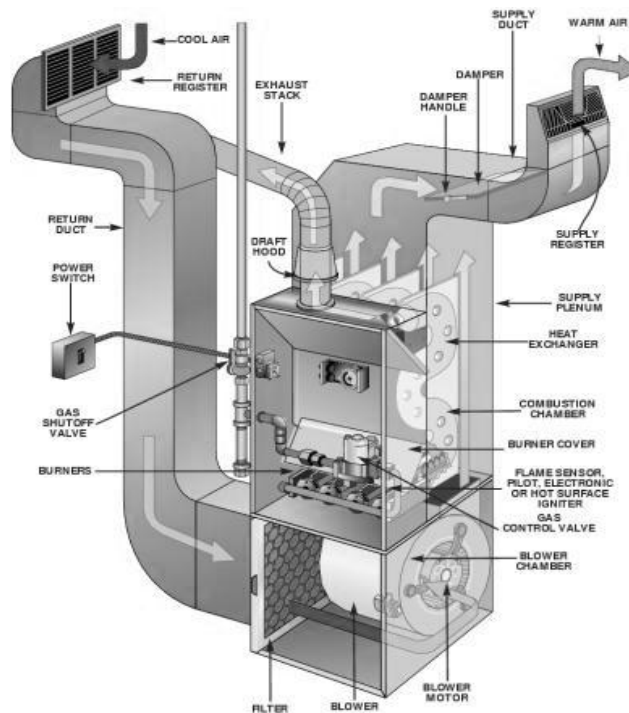
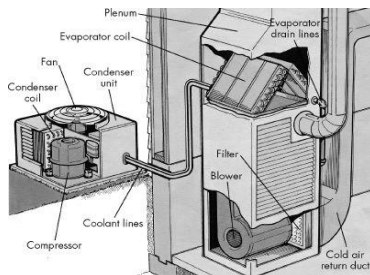
- Defective connections
- Electrical shorts
- Worn bearings or winding failure
- Deterioration and corrosion
- Age fatigue

FIX-RIGHT SOLUTION

- Repair connection
- Repair electrical short
- Replace damper motor

PREVENTION – PROPER PERIODIC MAINTENANCE

- Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Inducer Fan Motor

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Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
3801 0040	Clean/remove obstructions	\$ 112.76	\$ 169.14	\$ 95.84	\$ 143.77
3802 0050	Adjust alignment & lubricate				
3803 0066	Replace inducer wheel				
3804 0100	Replace warranty inducer assembly Labor Only				
3805 0100	Replace inducer assembly				
3806 0125	Replace inducer assembly OEM Labor Only				
3807 0050	Replace hall effect sensor				
3808 0125	Replace spill switch				
3809 0050	Replace rollout switch				
3810 0100	Replace Amana furnace draft inducer 0171M000s				
3811 0050	Replace warranty dual run capacitor Voltage Regulating				
3812 0100	Testo flue gas analysis				
3813 0050	Shipping & Handling/Restocking				
3814 0025	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	If unknown, please call to confirm parts pricing.				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION verify pressure hose from motor housing to pressure switch is not restricted. Check for possible leaks and cracks on hose. Verify air flow or centrifugal switches are properly wired and operating.

For proper flue drafting to occur system panels have to be put back in place on some systems.

Always recommend that any gas fired appliances be tested for carbon monoxide. Cigarette smoking can cause erroneous CO readings, so be sure to air out the house with fresh outside air before testing if you have a concern.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
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Failed Inducer Fan Motor

38

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 3/11/2024

Failed Inducer Fan Motor

38

CAUSES OF FAILURE

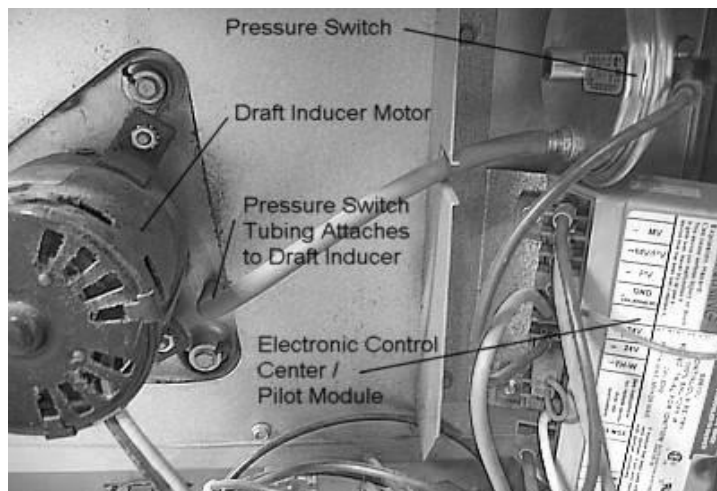
- ☑ Warped or broken squirrel fan
- ☑ Operating vibration
- ☑ Worn bearings
- ☑ Poor lubrication
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace inducer fan motor
- ☑ Correct vibration problem
- ☑ Replace wear possible motor bearings
- ☑ Lubricate motor
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Failed Inducer Fan Motor

38

Restricted Flue or Intake Pipe

39

CAUSES OF FAILURE

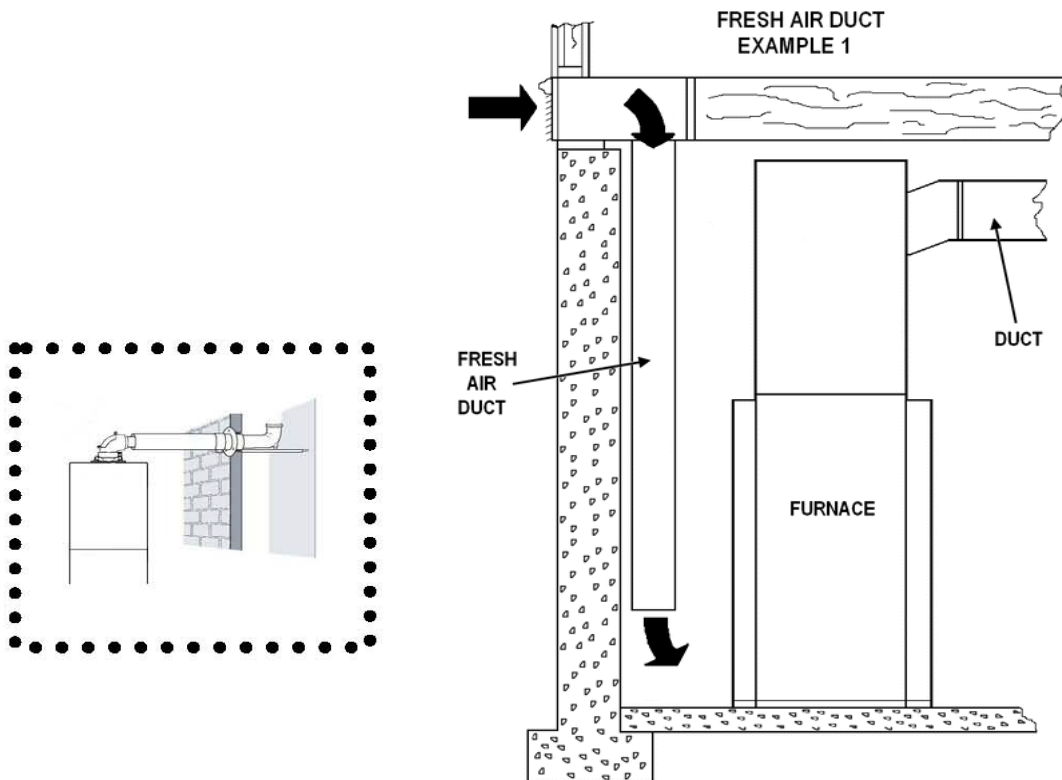
- ☑ Plugged with debris or soot
- ☑ Improper alignment
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct restrictions
- ☑ Correct alignment
- ☑ Replace flue if necessary

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic flue cleaning help eliminate many contributing causes of premature deterioration and failure.



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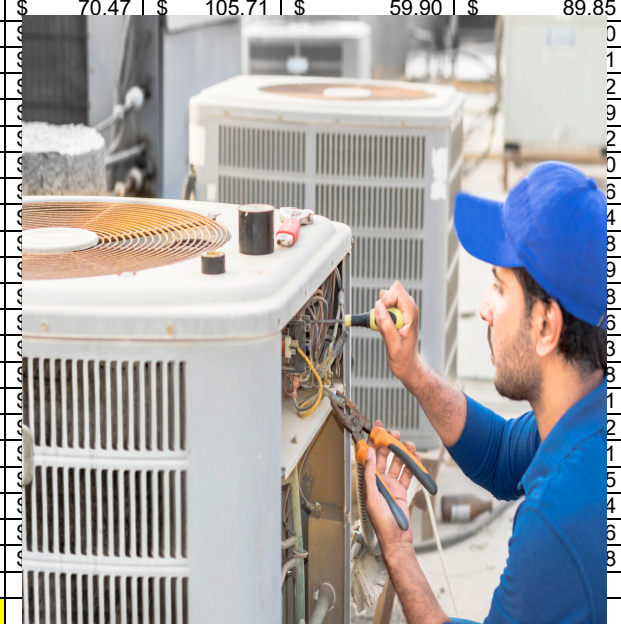
Restricted Flue or Intake Pipe

39

Failed Gas Valve

40

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4001 0025	Adjust gas pressure	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
4002 0075	Replace gas valve #1 - universal, millivolt				0
4003 0075	Replace gas valve #2 - White Rogers 36G Single Stage				1
4004 0075	Replace gas valve #3 - Honeywell VR8345M Std Dual Ign				2
4005 0075	Replace gas valve #4 - Slow Opening - Mobile Home				9
4006 0075	Replace Gas Valve Wall Mounted Heater & Digital Stat				2
4007 0075	Replace gas valve				0
4008 0075	Replace gas valve-OEM - Labor Only				6
4009 0050	Replace gas flex connector				4
4010 0100	Replace gas pipe per 10 feet and misc. fittings				8
4011 0033	Replace gas cock				9
4012 0025	Replace single gas fitting				8
4013 0010	Additional gas fitting				6
4014 0150	Gas leak test				8
4015 0020	Tighten accessible fitting				8
4016 0075	Replace warranty gas valve - Labor Only				1
4017 0100	Replace smart valve				2
4018 0100	Standing pilot conversion to spark ignition				1
4019 0025	Safety check CO and Nat gas leaks				5
4020 0005	Repaint gas line per ft.				4
4021 0050	Shipping & Handling/Restocking				6
4022 0025	Access/Ladder Set-up Fee				8
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 1 price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes
<p>CAUTION always check gas pressure with a magnehelic or manometer when replacing burners and recommended to customer to perform a safety CO test after cleaning or replacing burners.</p> <p>Leak check any fittings replaced or adjusted during a repair. Verify which type of gas is supplied to the furnace.</p> <p>Remember, any pilot tube hooked up to a main gas line can leak gas into the home if the pilot ever goes out. For customer safety, consider upgrading (replacing) the gas valve so you can remove the pilot tube out of the main gas line.</p> <p>Always recommend for any gas fired appliances be tested for carbon monoxide. Cigarette smoking can cause erroneous CO readings, so be sure to air out the house with fresh outside air before testing if you have a concern.</p> <p>Price service ticket retail or retail overtime and calculate/present total service agreement discount option.</p>
Customer Notice
<p>If your furnace is over ten years old, and a gas valve failure is found - due to better reliability and higher energy efficiency, replacing the entire system is usually the best option for the customer.</p> <p>Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.</p> <p>Always mention how to receive a 15% discount off today's repairs</p>

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Failed Gas Valve

40

Failed Gas Valve

40

CAUSES OF FAILURE

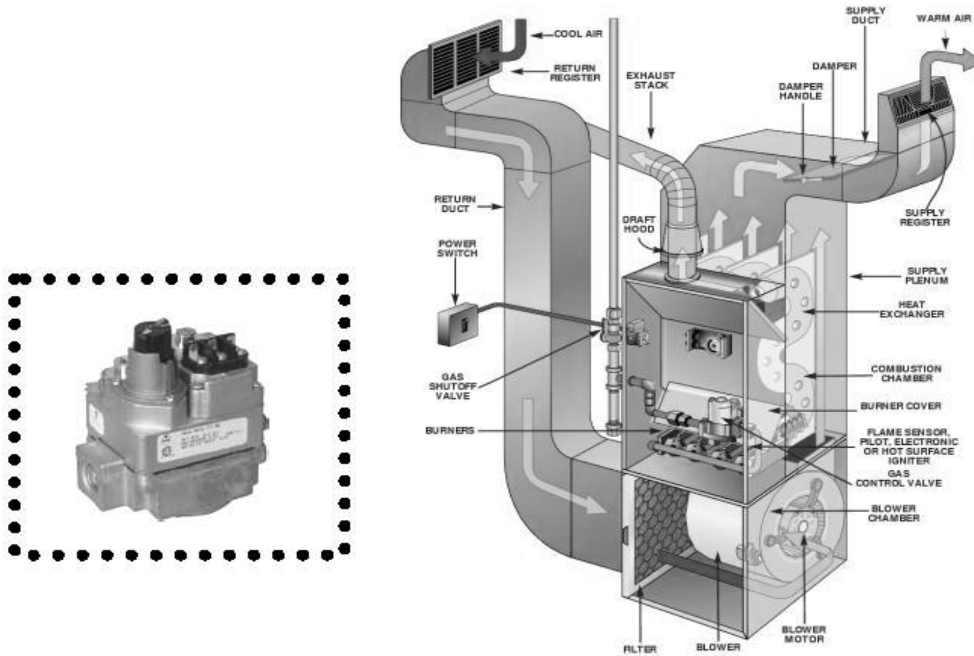
- ☑ Restricted gas-way
- ☑ Improper gas pressure
- ☑ Failed gas regulator
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct restrictions
- ☑ Correct gas pressure
- ☑ Replace gas valve
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic cleaning and tuning help eliminate many contributing causes of premature deterioration and failure.



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Failed Gas Valve

40

Failed Circulator Pump

41

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4101 0100	Replace bearing assembly iron series 100	\$ 842.54	\$ 983.49	\$ 716.16	\$ 835.96
4102 0075	Replace coupling				
4103 0075	Replace circulator pump 1/25 HP flanged				
4104 0100	Replace direct drive pump system lubricated				
4105 0100	Replace B&G motor mounts				
4106 0100	Drain down and refill with repair				
4107 0075	Replace 1/8 hp stainless steel circulator pump				
4108 0075	Upgrade or replace Grundfos Alpha pump				
4109 0075	Replace gasket				
4110 0075	Replace flange 1/2 - 1 1/4 bearing replacement				
4111 0025	Minor repair with pump replacement				
4112 0075	Replace pump OEM Labor Only				
4113 0100	Replace Taco 007 circulator pump				
4114 0100	Replace warranty circulator pump				
4115 0100	Standing pilot conversion to spark ignition				
4116 0050	Shipping & Handling/Restocking				
4117 0100	Access/Ladder Set-up Fee				
	OEM = LABOR ONLY. Use Section 54 to price part price to be added to the OEM LABOR ONLY price..				
	Over 1 hp price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION always keep pump and bearing assembly lubricated. Always inspect coupling for metal fragments- it's a good sign that coupling is about to fly apart or bearing assembly is going bad.

Repair prices do not include drain down and refill systems.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

If your boiler is over fifteen years old, and a circulator pump failure is found - due to better reliability and higher energy efficiency, replacing the entire system is usually the best option for the customer.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
Always mention how to receive a 15% discount off today's repairs

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Failed Circulator Pump

41

Failed Circulator Pump

41

CAUSES OF FAILURE

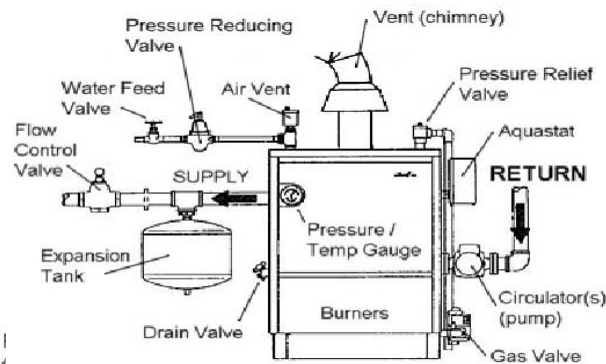
- Over/under line voltage
- Failed coupling
- Deterioration and corrosion
- Age fatigue

FIX-RIGHT SOLUTION

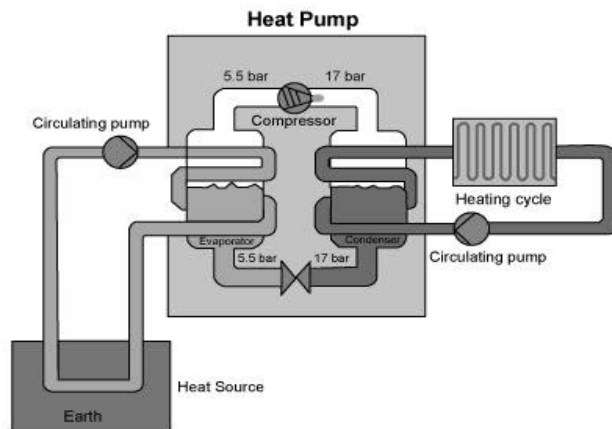
- Correct over/under voltage problem
- Correct coupling
- Replace circulator pump

PREVENTION – PROPER PERIODIC MAINTENANCE

- Periodic maintenance and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



Source: About.com



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Failed Circulator Pump

41

Failed Backflow or Feeder or Zone Valve

42

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4201 0125	Replace complete zone valve	\$ 552.93	\$ 729.12	\$ 469.99	\$ 619.75
4202 0100	Drain down and refill with repair				
4203 0050	Replace pressure relief valve				
4204 0100	Replace feed and relief valve				
4205 0100	Replace 1/2 backflow preventer				
4206 0100	Replace 1/2 combination fill backflow valve				
4207 0100	Install zone valve power head				
4208 0100	Anit-freeze glycol to hydro system -first 5 GAL				
4209 0025	Anit-freeze glycol to hydro system -each 1 GAL				
4210 0050	Shipping & Handling/Restocking				
4211 0025	Access/Ladder Set-up Fee				
	Over 1 price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION always install valve so motor is in straight up position and in proper flow direction. Always remove valve motor from valve when soldering to prevent overheating damage to motor.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

If your boiler is over fifteen years old, and a zone valve failure is found - due to better reliability and higher energy efficiency, replacing the entire system is usually the best option for the customer.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

Always mention how to receive a 15% discount off today's repairs

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Failed Backflow or Feeder or Zone Valve

42

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Failed Backflow or Feeder or Zone Valve

42

CAUSES OF FAILURE

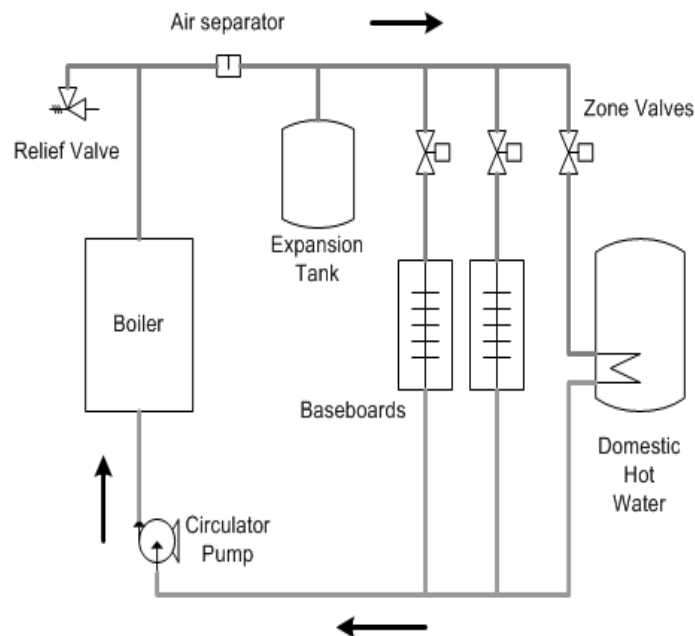
- Over/under line voltage
- Deterioration and corrosion
- Valve failure
- Age fatigue

FIX-RIGHT SOLUTION

- Correct over/under voltage problem
- Replace zone valve

PREVENTION – PROPER PERIODIC MAINTENANCE

- Periodic maintenance and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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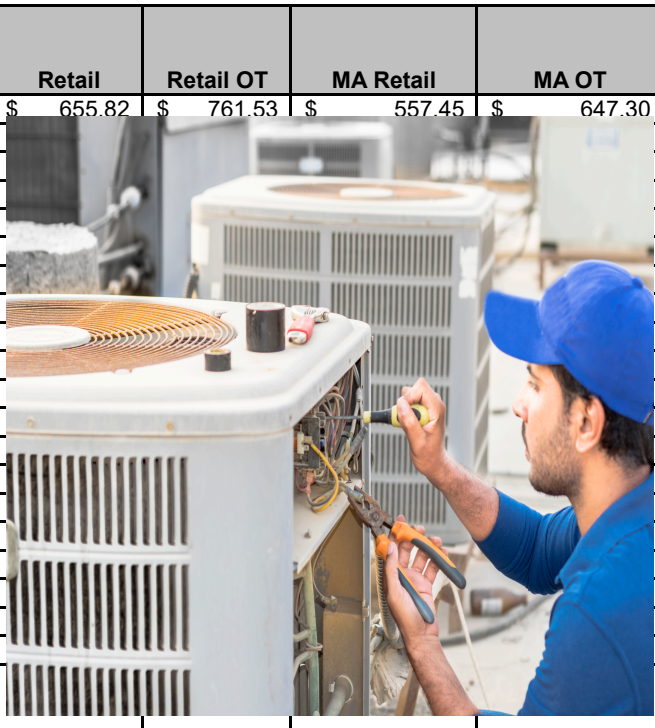
Failed Backflow or Feeder or Zone Valve

42

Failed Aquastat

43

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4301 0075	Replace strap-on aqua stat	\$ 655.82	\$ 761.53	\$ 557.45	\$ 647.30
4302 0100	Replace immersion aqua stat				
4303 0125	Replace triple aqua stat				
4304 0100	Clean mechanical low water cutoff LWCO				
4305 0100	Replace McDonald Miller LWCO				
4306 0100	Replace Watts LWCO				
4307 0100	Replace water LWCO				
4308 0100	Replace pressure control				
4309 0100	Replace steam gage				
4310 0075	Clean or replace pigtail connect				
4311 0075	Replace radiator steam vent				
4312 0050	Replace main steam vent				
4313 0150	Replace gauge glass assembly				
4314 0100	Install single aquastat				
4315 0200	Install universal aquastat				
4316 0200	Replace steam LWCO				
4317 0225	Replace steam LWCO digital				
4318 0050	Shipping & Handling/Restocking				
4319 0025	Access/Ladder Set-up Fee				
	Over 1 price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION make sure when using a strap-on aqua stat that you clean the pipe for a good metal-to-metal contact.

To assure proper operation upon start-up, it's a best practice to put a few drops of oil in the remote-bulb aqua stat well. This will prevent the bulb from sticking in well.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

Always mention how to receive a 15% discount off today's repairs

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Failed Aquastat

43

CAUSES OF FAILURE

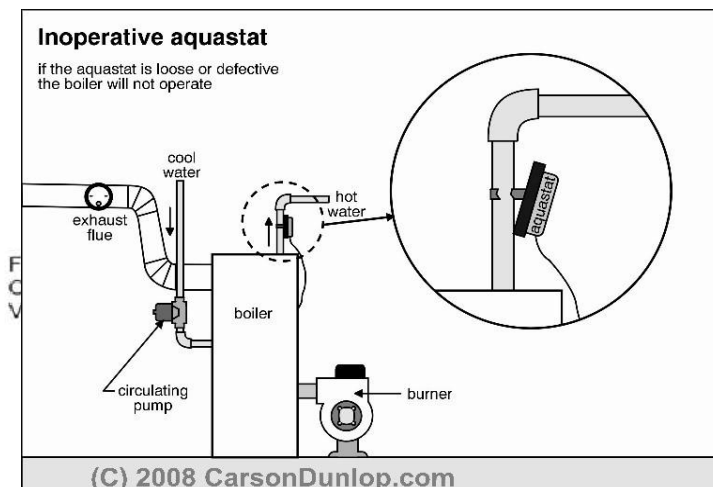
- ☑ Over/under line voltage
- ☑ Deterioration and corrosion
- ☑ Component failure
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct over/under voltage problem
- ☑ Replace aquastat

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic maintenance and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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43

Failed Extrol Expansion Tank

44

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4401 0050	Replace pressure temperature gauge	\$ 236.54	\$ 307.01	\$ 201.06	\$ 260.96
4402 0050	Replace Extrol tank 15# & 30#				
4403 0050	Replace bleed and drain tank				
4404 0030	Verify/refill expansion tank				
4405 0100	Auto fill with expansion tank				
4406 0050	Bleed expansion tank				
4407 0075	Replace tank valve				
4408 0100	Replace extrol tank 60 LBS				
4409 0050	Check and fill expansion tank with proper pressure				
4410 0075	Replace ST12 expansion tank				
4411 0075	Replace warranty expansion tank				
4412 0100	Anit-freeze glycol to hydro system -first 5 GAL				
4413 0075	Anit-freeze glycol to hydro system -each 1 GAL				
4414 0050	Shipping & Handling/Restocking				
4415 0025	Access/Ladder Set-up Fee				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION check for leaks after installation by applying correct pressure on tank at 12 psi on first floor and 18 psi for a second and third floor installation.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

Always mention how to receive a 15% discount off today's repairs

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Failed Extrol Expansion Tank

44

Failed Extrol Expansion Tank

44

CAUSES OF FAILURE

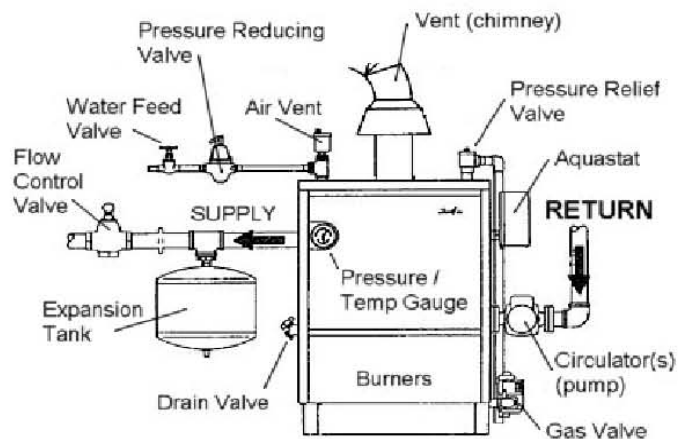
- ☑ Deterioration and corrosion
- ☑ Bladder failure
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace extrol tank

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic maintenance and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



Source: *About.com*

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Failed Extrol Expansion Tank

44

Failed Pressure Reducer/Relief Valve

45

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4501 0100	Replace pressure reducing valve	\$ 523.59	\$ 664.54	\$ 445.05	\$ 564.86
4502 0050	Replace backflow preventer	\$ 110.95	\$ 211.12	\$ 110.81	\$ 170.71
4503 0075	Clean cutoff				
4504 0050	Replace pressure relief valve 3/4 30 psi				
4505 0025	Purge radiators (each)				
4506 0100	Replace feed and relief valve				
4507 0100	Drain down and refill				
4508 0025	Replace air vents- manual				
4509 0025	Replace air vents- automatic				
4510 0100	Replace 1/2 combination fill backflow valve				
4511 0100	Replace flow check valve				
4512 0200	Chemical clean and flush steam boiler				
4513 0400	Chemical clean and flush steam boiler				
4514 0100	UV Dye inspection follow up				
4515 0100	Flush boiler with anti scale solution				
4516 0100	Flush boiler with anti scale solution (during maintenance)				
4517 0150	Install flush valve setup on boiler				
4518 0050	Replace 12 site glass (during maintenance)				
4519 0100	Replace 12 site glass w/washer/nuts				
4520 0050	Replace 14 site glass (during maintenance)				
4521 0100	Replace 14 site glass w/washer/nuts				
4522 0035	Replace boiler drain 1/2				
4523 0035	Replace boiler drain 3/4				
4524 0050	Shipping & Handling/Restocking				
4525 0025	Access/Ladder Set-up Fee				
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION set regulator pressure at 12 psi on first floor and 18 psi for a second and third floor installation.
Do not assume that the relief valve needs replacing because its leaking. Find the root problem first.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
Always mention how to receive a 15% discount off today's repairs

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Failed Pressure Reducer/Relief Valve

45

Failed Pressure Reducer/Relief Valve

45

CAUSES OF FAILURE

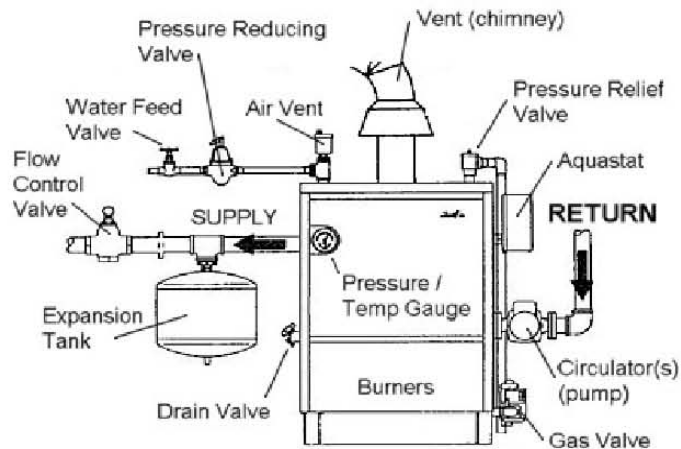
- ☑ Deterioration and corrosion
- ☑ Diaphragm failure
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Replace regulator/relief valve

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic maintenance and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



Source: *Abot.com*

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45

Oil Pump Line/Filters/Controls

46

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4601 0100	Replace single stage oil pump	\$ 567.05	\$ 729.00	\$ 508.04	\$ 627.04
4602 0050	Replace oil pump coupling only				
4603 0150	Replace 1/6 hp burner motor				
4604 0025	Replace oil filter cartridge replacement				
4605 0050	Replace primary control heat only relay				
4606 0050	Replace primary control heat and cool				
4607 0050	Replace stack control heat only Labor Only				
4608 0050	Replace cad cell assembly				
4609 0025	Replace cad cell eye only				
4610 0050	Replace complete fuel filter assembly				
4611 0025	Inspect and test for water in oil				
4612 0030	Prime and start oil burner only				
4613 0075	Clean electrodes & Replace nozzle				
4614 0050	Combustion efficiency test & adjust				
4615 0075	Replace line filter				
4616 0075	Clean pump strainer				
4617 0050	Replace or adjust electrodes				
4618 0050	Replace oil deaerator				
4619 0050	Purge oil line				
4620 0075	Convert pump from 2 line to 1 line				
4621 0100	Flush oil line with solvent				
4622 0100	Clean plugged boiler up to 1.25 GPH				
4623 0150	Clean plugged boiler 1.35 to 2.0 GPH				
4624 0200	Clean plugged boiler 2.1 to 2.5 GPH				
4625 0100	Replace 2-Stage Oil Pump	\$ 729.22	\$ 870.17	\$ 619.84	\$ 739.64
4626 0100	Blow Out Oil Line	\$ 291.64	\$ 432.59	\$ 247.90	\$ 367.70
4627 0075	Nozzle, filter, pump strainer change outs	\$ 421.93	\$ 527.64	\$ 358.64	\$ 448.49
4628 0050	Shipping & Handling/Restocking	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
4629 0025	Access/Ladder Set-up Fee	\$ 77.08	\$ 115.63	\$ 65.52	\$ 98.28
	Over 200K BTU price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION check all safety controls after any repairs.
Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

Keep oil tank 100% full in summer months. This will cut down on condensation in tank. Keep water off the oil.
 Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.
Always mention how to receive a 15% discount off today's repairs

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Oil Pump Line/Filters/Controls

46

Oil Pump Line/Filters/Controls

46

CAUSES OF FAILURE

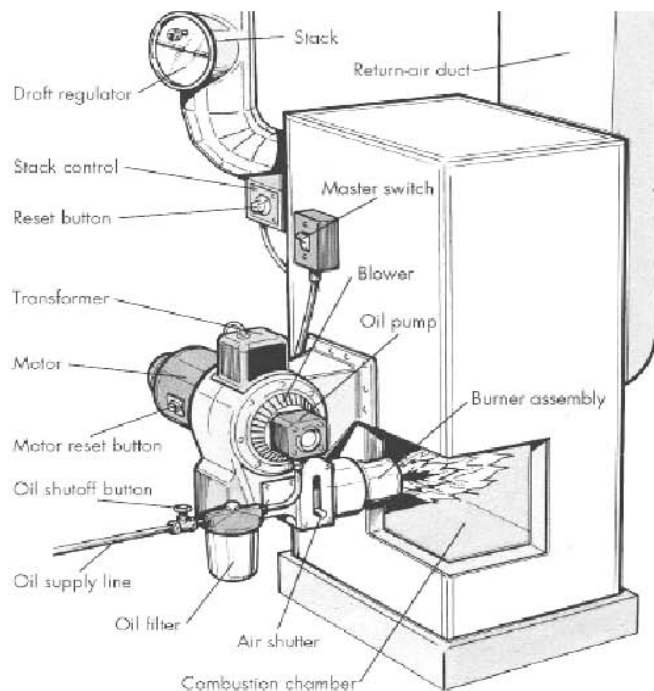
- ☑ Restriction contamination
- ☑ Shaft seal failure
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct restriction
- ☑ Replace oil pump

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic maintenance and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Oil Pump Line/Filters/Controls

46

Restricted Drains and Leaks

47

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4701 0050	Clean flush drain pan and line	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
4701 0075	Remove water from drain pan				
4702 0050	Replace ceiling saver float switch only				
4703 0050	Replace enline safety float switch				
4704 0250	Replace ceiling saver pan & float switch				
4705 0025	Replace existing condensate pump				
4706 0100	Install a new condensate pump				
4707 0050	Repair PVC drain (up to 4 fittings)				
4708 0025	Install a new condensate nitrogen valve only				
4709 0025	Run new drain line per 10 foot w/fittings				
4710 0005	Additional PVC pipe per 5 foot.				
4711 0010	Replace PVC trap				
4712 0033	Level drain pan				
4713 0025	Add algicide pads 1-2.5 ton				
4714 0025	Add algicide pads 3-5 ton				
4715 0025	Add algicide pads 5-7.5 ton				
4716 0010	Add algicide tablets				
4717 0020	Replace 1/2" drain hose				
4718 0020	Replace 5/8" drain hose				
4719 0033	Replace EZ Condensate Traps				
4208 0025	Replace auxiliary water sensor shut off switch				
4721 0050	Shipping & Handling/Restocking				
4722 0025	Access/Ladder Set-up Fee				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION clear all drain lines

Install drain blow out couplings where necessary to properly clear drain pipes.

Do not assume that the relief valve needs replacing because its leaking. Find the root problem first.

Every cooling coil above a finished area should have a secondary condensate pan and safety switch.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

First line of defense against these types of repairs is periodic cleanings.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

Always mention how to receive a 15% discount off today's repairs

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Restricted Drains and Leaks

47

Restricted Drains and Leaks

47

CAUSES OF FAILURE

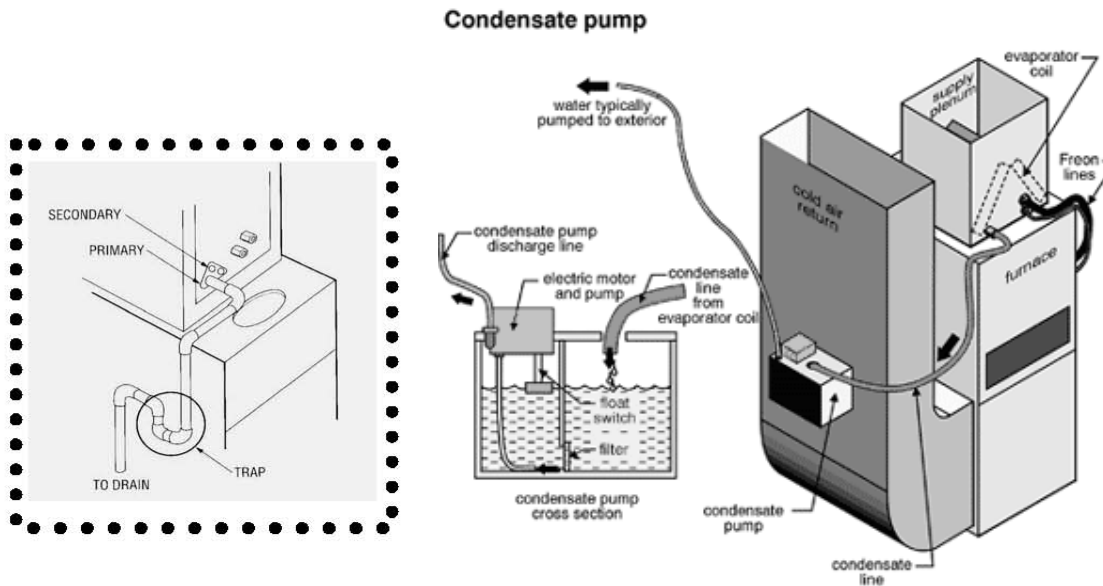
- ☑ Restriction from mold, mildew, dirt contamination
- ☑ Damaged drain components
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct restriction
- ☑ Correct damaged drain components
- ☑ Install secondary drain pan

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic maintenance and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Restricted Drains and Leaks

47

Failed Heat Exchanger

48

Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4801 0075	Clean & check exchanger -burner area				
4802 0150	Clean & check exchanger plugged				
4803 0500	Replace heat exchanger Labor Only				
4804 0150	Replace collector box Labor Only				
4805 0100	Replace cell inlet plate Labor Only				
4806 0700	Replace furnace under warranty Labor Only				
4807 0050	Camera inspection heat exchanger EASY ACCESS				
4808 0100	Camera inspection heat exchanger DIFFICULT				
4809 0050	Shipping & Handling/Restocking				
4810 0025	Access/Ladder Set-up Fee				
	Heat exchange Mat'ls and labor replacement cost vary by mfg. see misc. section to estimate the replmnt mal/labor charges				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION use high temp silicone and gaskets in the correct location. Perform a safety CO test and cycle on high temp limit. When a flame roll-down below the burner occurs it typically is an indicator of a plugged heat exchanger.

Gas pressure should be checked to specifications with a magnehelic or a manometer after any gas component is replaced or adjusted.

Check proper fan limit settings, temperature rise, air flow, orifice sizes, and air/gas mixture.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

If your heating system is over fifteen years old, and a failed heat exchanger failure is found - replacing the entire system is usually the best option for the customer.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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Failed Heat Exchanger

48

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 3/11/2024

Failed Heat Exchanger

48

CAUSES OF FAILURE

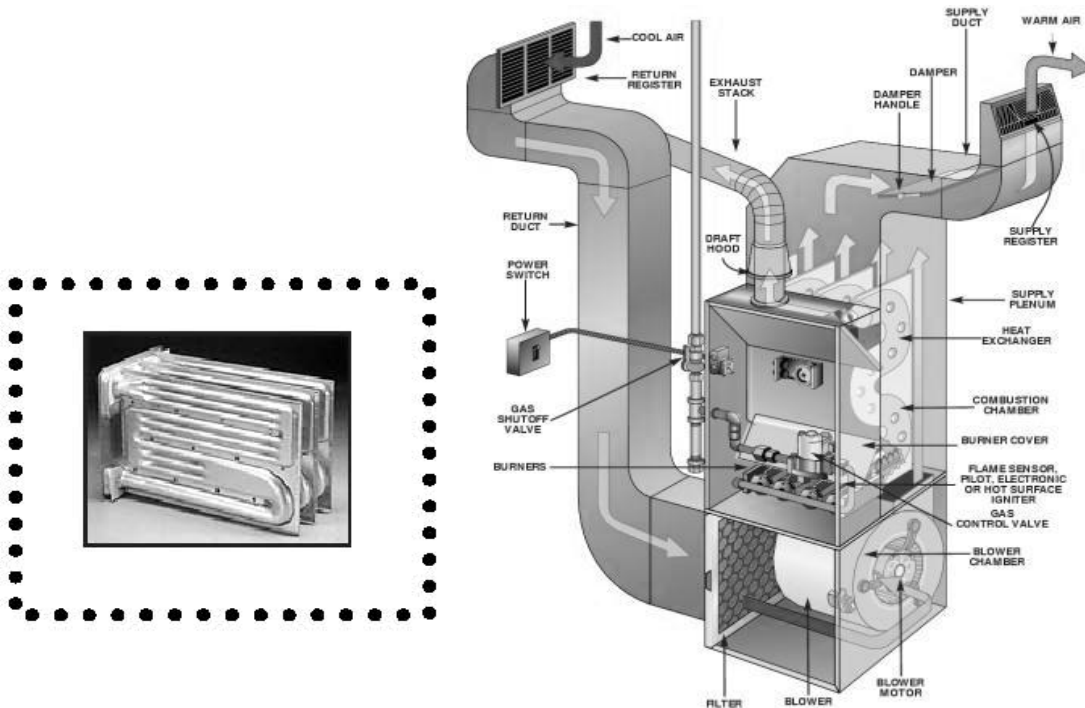
- ☑ Improper fuel combustion
- ☑ Deterioration
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct fuel combustion
- ☑ Replace heat exchanger
- ☑ Recommended to replace furnace if 10 years and older

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic coil cleaning help eliminate many contributing causes of premature deterioration and failure.



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Failed Heat Exchanger

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Failed Humidifier

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Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
4901 0035	Replace saddle valve	\$ 172.72	\$ 222.06	\$ 147.67	\$ 190.60
4902 0050	Replace solenoid valve				
4903 0025	Replace transformer				
4904 0050	Replace transformer/current sensing relay				
4905 0075	Replace fan motor				
4906 0025	Replace scale control (pad holder)				
4907 0025	Replace drain spud kit				
4908 0025	Replace strainer				
4909 0050	Replace humidistat manual				
4910 0050	Replace humidistat digital				
4911 0050	Replace circuit board				
4912 0010	Replace humidifier pad				
4913 0030	Replace humidifier nozzle				
4914 0050	Water feed line 1/4 copper per 10 FT				
4915 0075	Descale humidifier				
4916 0150	Replace humidifier under warranty				
4917 0025	Replace Steam humidifier Canister/ Cylinder				
4918 0050	Shipping & Handling/Restocking				
4919 0025	Access/Ladder Set-up Fee				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Technician Notes

CAUTION always double check the drains to make sure water from the humidifier is draining properly. Also check all water connections to prevent water leaks.

Install drain blow out couplings where necessary to properly clear drain pipes.

You should perform a complete tune-up on an operating humidifier during the furnace tune-up.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

Customer Notice

First line of defense against these types of repairs is periodic cleanings. Humidifiers will protect your furnishings, add to your comfort and allow lower thermostat settings, saving you energy costs.

Regular maintenance saves money on your utility bills and reduces the chance of expensive repairs.

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CAUSES OF FAILURE

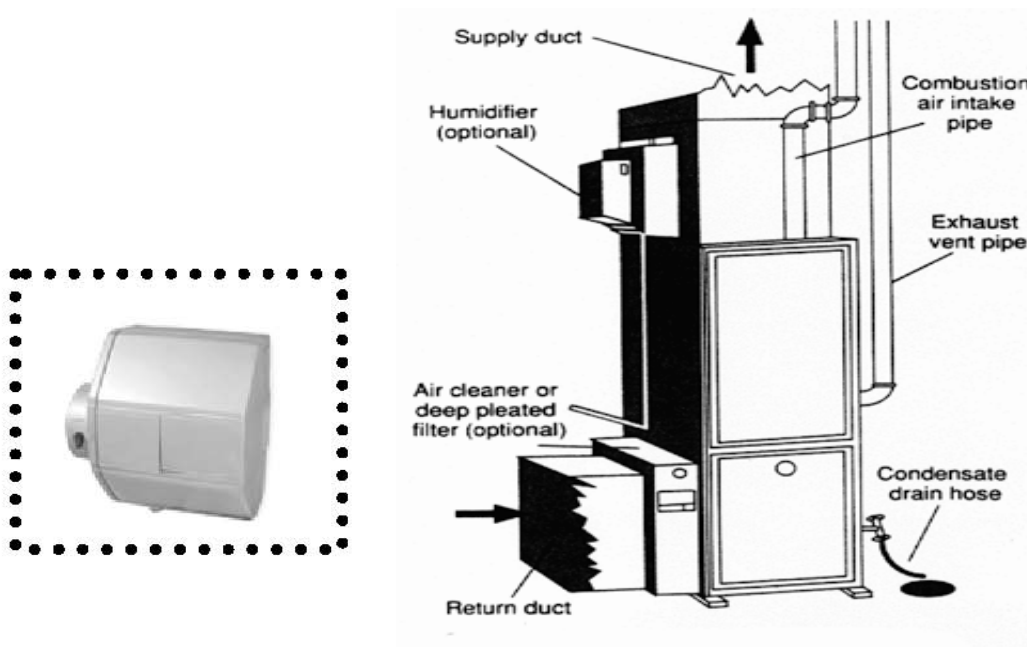
- ☑ Over/under line voltage
- ☑ Loose connection or mounting plate
- ☑ Restricted ports due to mineral buildup
- ☑ Failed humidifier component
- ☑ Deterioration and corrosion
- ☑ Age fatigue

FIX-RIGHT SOLUTION

- ☑ Correct over/under voltage problem
- ☑ Clean and tighten connections and mounting plate
- ☑ Correct restrictions
- ☑ Replace humidifier component
- ☑ Multiple repairs - replace humidifier

PREVENTION – PROPER PERIODIC MAINTENANCE

- ☑ Periodic electrical integrity and proper operating verification inspections, cleaning and tuning help eliminate many contributing causes of failure.



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Geothermal Heat Pumps

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Code	Enhancement Description	Retail	Retail OT	MA Retail	MA OT
5001 0050	Pressurize loop	\$ 140.95	\$ 211.42	\$ 119.81	\$ 179.71
5002 0100	Pressurize loop - difficult				
5003 0150	Replace desuperheater pump				
5004 0100	Replace 2-stage contactor				
5005 0125	Replace flow center pump				
5006 0100	Replace power head brass water valve				
5007 0100	Replace fast acting plastic water valve				
5008 0050	Replace rubber gasket - hot water				
5009 0050	Replace freeze protection sensor				
5010 0150	Replace ECM blower motor				
5011 0300	Flush Geo Loop				
5012 0050	Shipping & Handling/Restocking				
5013 0025	Access/Ladder Set-up Fee				
	Over 5 ton price labor materials using Miscellaneous Unclassified Section 54				



Customer Notice

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Geothermal Heat Pumps

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Water Heaters

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Code	Enhancement Description	Retail	Retail OT	MA Retail	MA OT
5101 0350	Replace Water Heater 40 Gal, natural gas 40K BTU 6 year heater				
5102 0350	Replace Water Heater 50 Gal, natural gas 50K BTU 6 year heater				
5103 0350	Replace Water Heater 40 Gal, propane 40K BTU 6 year heater				
5104 0350	Replace Water Heater 50 Gal, propane gas 50K BTU 6 year heater				
5105 1200	Hot water heater - condensing high efficiency				
5106 0050	Install Water Heater Blanket				
5107 0150	Install system ST5 expansion tank				
5108 0100	Replace anode rod				
5109 0100	Replace dip tube				
5110 0100	Replace regulator				
5111 0050	Shipping & Handling/Restocking				
5112 0025	Access/Ladder Set-up Fee				



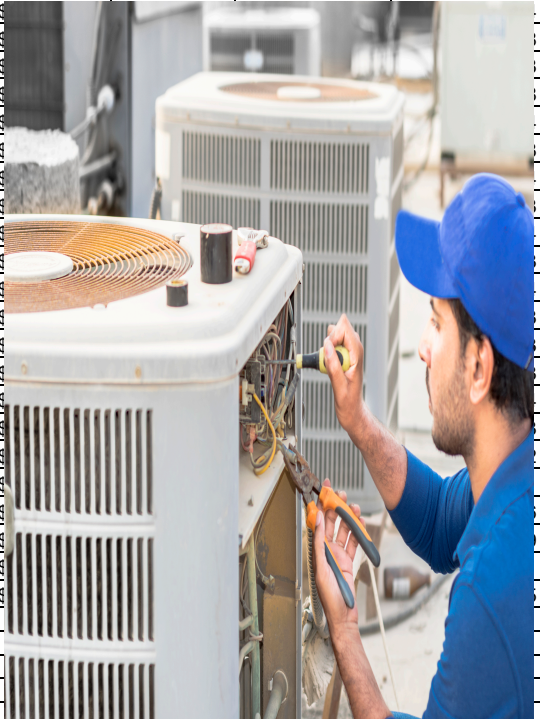
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Re-commissioning Safety Check

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Code	Recommissioning Description	Retail	Retail OT	MA Retail	MA OT	
5201 0030	Recommissioning & Safety Check - Furnace - No cleaning					
5202 0075	Recommissioning & Safety Check - Furnace - With cleaning					
5203 0050	Recommissioning & Safety Check - AC - No Coil Cleaning					
5204 0075	Recommissioning & Safety Check - AC - With coil cleaning					
5205 0030	Recommissioning & Safety Check - AHU - No Coil Cleaning					
5206 0050	Recommissioning & Safety Check - AHU - With coil cleaning					
5207 0030	Recommissioning & Safety Check - Condenser - No Coil Cleaning					
5208 0050	Recommissioning & Safety Check - Condenser - With coil cleaning					
5209 0030	Recommissioning & Safety Check - Boiler Gas - No Cleaning					
5210 0050	Recommissioning & Safety Check - Boiler Gas - With cleaning					
5211 0030	Recommissioning & Safety Check - Boiler Oil - No Cleaning					
5212 0050	Recommissioning & Safety Check - Boiler Oil - With cleaning					
5213 0050	Recommissioning & Safety Check - Accessory/Add-on					
5214 0100	COMMERCIAL AC Recommissioning & Safety Check up to 5 tons					
5215 0125	COMMERCIAL AC Recommissioning & Safety Check up to 10 tons					
5216 0150	COMMERCIAL AC Recommissioning & Safety Check up to 20 tons					
5217 0175	COMMERCIAL AC Recommissioning & Safety Check up to 40 tons					
5218 0200	COMMERCIAL AC Recommissioning & Safety Check up to 60 tons					
5219 0100	COMMERCIAL BOILER Recommissioning & Safety Check up to 500K BTU/HR					
5220 0100	COMMERCIAL BOILER Recommissioning & Safety Check up to 1M BTU/HR					
5221 0050	Shipping & Handling/Restocking					
5222 0025	Access/Ladder Set-up Fee					
	If additional labor required to clean due to above 60 ton or extremely dirty system, see Section 54 for adding labor charges					

Technician Notes

Invoice and Pricing Notes:

The ASHRAE and manufacturer's recommends a "**RECOMMISSIONING of the system at the completion of all repairs which is a system clean and calibration tasking**" is required to properly complete a repair on any system and is designed to allow equipment to operate within the original design comfort and energy efficiency specifications, as well as, to verify safety check prior to system start-up.

Benefits the customer is the first line of defense against up to 50% in wasted energy dollars, avoidance of unnecessary costly repairs, and comfort complaints. **Benefits to the company is to prevent costly call-backs and to assure 100% customer satisfaction.**

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

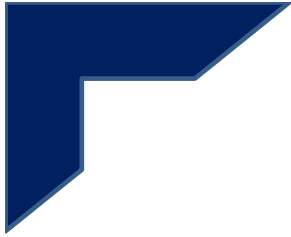
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Re-commissioning Safety Check

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Accessories

Fix-Right[®] Repair Guide

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Failure Prevention

- Humidifiers: Filters and water levels in humidifiers should be checked and adjusted monthly.**

- On systems with air conditioning or a heat pump, the damper in the humidifier ductwork should be closed during the cooling season.**

- Have annual system maintenance done one month before the heating season begins.**

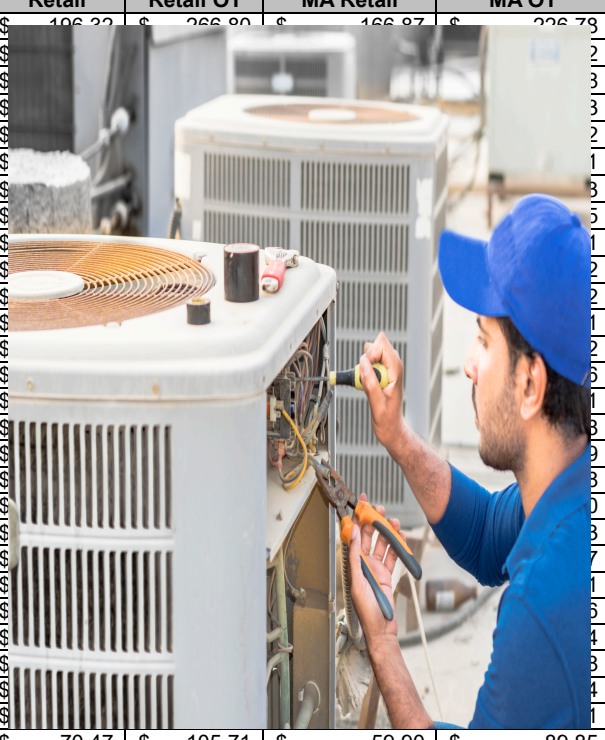
- Electronic Air Cleaners: Replace the main filter every six months to enable device to regain its effectiveness.**

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System Enhancements

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Code	Enhancement Description	Retail	Retail OT	MA Retail	MA OT
5301 0050	Thermostat #1 - 1H only	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5302 0050	Thermostat #2 - 1H & 1C non-programmable	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5303 0050	Thermostat #4 - T4 1H & 1C programable	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5304 0050	Thermostat #5 - T6 1H & 1C programable	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5305 0050	Thermostat #6 - T6 2H & 2C programable - conventional	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5306 0050	Thermostat #7 - T6 WIFI 2H & 2C programable	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5307 0050	Thermostat #8 - T6 WIFI 3H & 2C programable	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5308 0100	Ecobee Lite wi-fi thermostat with remote sensor	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5309 0100	Ecobee Smart thermostat with voice control	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5310 0100	Aprilaire 700M automatic power humidifier automatic	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5311 0100	Install UV light single lamp	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5312 0025	Replace UV light single lamp (bulb only)	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5313 0400	Whole house duct cleaning/w/sanitizer - 1 system	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5314 0075	Dryer vent cleaning	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5315 0050	Dryer vent cleaning w/duct cleaning	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5316 0075	HVAC duct mounted smoke detector	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5317 0100	Install Air Knight 5 Air Purification System up to 2.5 ton	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5318 0100	Install Air Knight 9 Air Purification System up to 3-7.5 ton	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5319 0100	Install Air Knight 14 Air Purification System up to 3-7.5 ton	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5320 0025	Replace Air Knight 5 (bulb & catalyst only)	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5321 0025	Replace Air Knight 9 (bulb & catalyst only)	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5322 0025	Replace Air Knight 14 (bulb & catalyst only)	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5323 0075	Replace combined carbon monoxide CO & smoke detector	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5324 0200	Install surge protector whole house	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5325 0050	Install surge protector single appliance 120V	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5326 0075	Install surge protector single appliance 240V	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5327 0050	Shipping & Handling/Restocking	\$ 106.22	\$ 266.80	\$ 166.87	\$ 226.73
5328 0025	Access/Ladder Set-up Fee	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85



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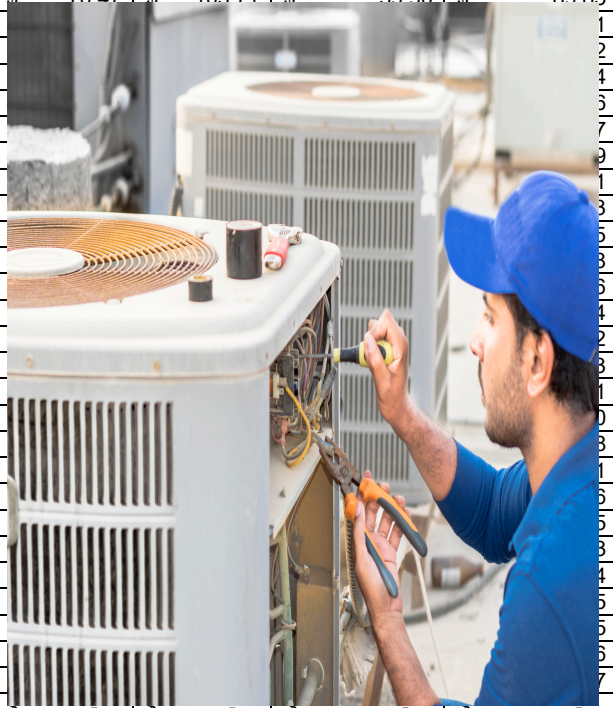
System Enhancements

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OEM Parts Pricing and Quoted Jobs

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Code	Repair Description	Retail	Retail OT	MA Retail	MA OT
5401 0025	Miscellaneous unclassified labor	\$ 70.47	\$ 105.71	\$ 59.90	\$ 89.85
5402 0050	Miscellaneous unclassified labor				
5403 0100	Miscellaneous unclassified labor				
5404 0200	Miscellaneous unclassified labor				
5405 0300	Miscellaneous unclassified labor				
5406 0400	Miscellaneous unclassified labor				
5407 0500	Miscellaneous unclassified labor				
5408 0600	Miscellaneous unclassified labor				
5409 0700	Miscellaneous unclassified labor				
5410 0800	Miscellaneous unclassified labor				
5411 0000	Miscellaneous unclassified parts/materials PM0010				
5412 0000	Miscellaneous unclassified parts/materials PM0020				
5413 0000	Miscellaneous unclassified parts/materials PM0030				
5414 0000	Miscellaneous unclassified parts/materials PM0040				
5415 0000	Miscellaneous unclassified parts/materials PM0050				
5416 0000	Miscellaneous unclassified parts/materials PM0060				
5417 0000	Miscellaneous unclassified parts/materials PM0070				
5418 0000	Miscellaneous unclassified parts/materials PM0080				
5419 0000	Miscellaneous unclassified parts/materials PM0090				
5420 0000	Miscellaneous unclassified parts/materials PM0100				
5421 0000	Miscellaneous unclassified parts/materials PM0150				
5422 0000	Miscellaneous unclassified parts/materials PM0200				
5423 0000	Miscellaneous unclassified parts/materials PM0250				
5424 0000	Miscellaneous unclassified parts/materials PM0300				
5425 0000	Miscellaneous unclassified parts/materials PM0350				
5426 0000	Miscellaneous unclassified parts/materials PM0400				
5427 0000	Miscellaneous unclassified parts/materials PM0450				
5428 0000	Parts/materials needed greater greater than \$500 see notes below	\$ -	\$ -	\$ -	\$ -



Technician Notes

Invoice and Pricing Notes:
 If parts/materials are not in your truck stock, please make sure to add the standard .5 hour or use this section to add the round trip actual travel hours to your service ticket.
 Use the code above - but write on invoice the actual repair description.
 If you need labor hours or repair materials greater than the available tasking items, simply use any two or more to obtain total hours or total materials needed to complete work.
 The miscellaneous parts and material costs needed are listed as PM0000 series and represent vendor supplier costs in dollars.
 Always round up to the next logical price code. Example: If I needed \$46 dollars worth of parts, I would select PM0050 since \$46 is greater than \$40 but less \$50.
 For parts needed greater than \$500 use 5427-0000 code and multiply vendor price by 1.4 to derive sell price.
 Remember, the only thing worse than misspelled words and poor handwriting is no words and no handwriting.

Price service ticket retail or retail overtime and calculate/present total service agreement discount option.

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OEM Parts Pricing and Quoted Jobs

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RECOMMENDED PRICING COMMON RESIDENTIAL REPAIRS

Itemized Repair description	Price
AC/HP Replace Run Capacitor	
0001 0050 Diagnostic/Service Charge	\$89.00
0301 0050 Replace run 5-7.5 MFD capacitor Voltage Regulating Device	\$191.71
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$540.86
Discount	\$81.13
Net Repair Price After Discount	\$459.73
Replace Condensate Pump	
0001 0050 Diagnostic/Service Charge	\$89.00
1716 0050 Replace condensate removal pump	\$405.25
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$754.40
Discount	\$113.16
Net Repair Price After Discount	\$641.24
Clean Drain Line	
0001 0050 Diagnostic/Service Charge	\$89.00
1706 0050 Clean drain pan/line	\$196.01
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$545.16
Discount	\$81.77
Net Repair Price After Discount	\$463.39
Replace Motor & Cap	
0001 0050 Diagnostic/Service Charge	\$89.00
0301 0050 Replace run 5-7.5 MFD capacitor Voltage Regulating Device	\$191.71
0801 0100 Replace Cond Motor #1 - 1/6 to 1/3 universal 1075 F	\$260.15
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$701.01
Discount	\$113.16
Net Repair Price After Discount	\$587.85
Replace Compressor	
0001 0050 Diagnostic/Service Charge	\$89.00
1214 0025 Leak test-accessible fittings	\$196.01
0901 0250 Replace compressor scroll 1.5-3*	\$260.15
1721 0050 Shipping & Handling/Restocking	\$260.15
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$1,065.46
Discount	\$113.16
Net Repair Price After Discount	\$952.30




Net Repair Price After Discount \$2,256.12

RECOMMENDED PRICING COMMON RESIDENTIAL REPAIRS

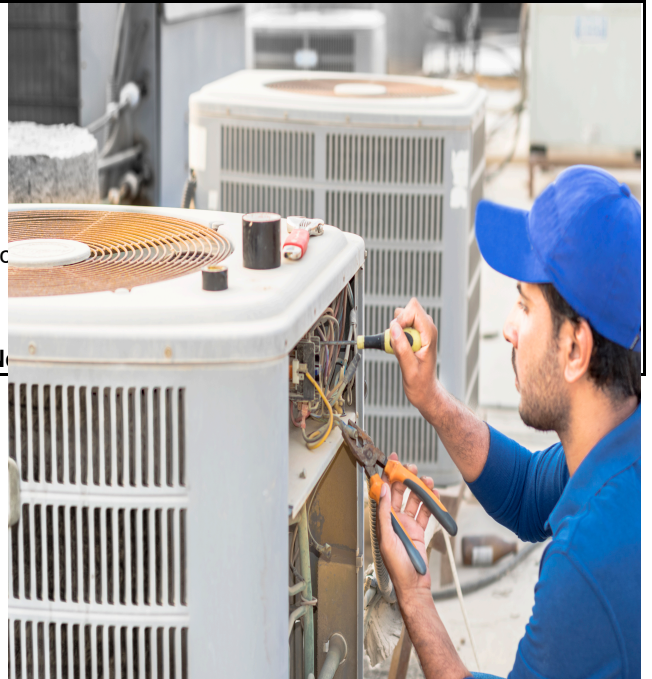
Itemized Repair description	Price
Replace Reversing Valve w/coil	
0001 0050 Diagnostic/Service Charge	\$89.00
1224 0225 Recover evac drier recharge 1.5-3 ton R-410	\$1,052.64
1301 0100 Replace reversing valve w/coil only 1.5-3T- see notes	\$725.59
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$2,127.38
Discount	\$319.11
Net Repair Price After Discount	\$1,808.27
Replace hot surface igniter	
0001 0050 Diagnostic/Service Charge	\$89.00
2505 0050 Replace hot surface igniter - Easy Access	\$312.47
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$661.62
Discount	\$99.24
Net Repair Price After Discount	\$562.38
Replace Circuit Board OEM	
0001 0050 Diagnostic/Service Charge	
2207 0100 Circuit board OEM Labor Only	
5422 0000 Miscellaneous unclassified parts/materials PM0200	
2221 0050 Shipping & Handling/Restocking	
Quoted Job = 2-hours repair tasking + \$123.23	
5404 0200 Miscellaneous unclassified labor	
5420 0000 Miscellaneous unclassified parts/materials PM0100	
2221 0050 Shipping & Handling/Restocking	
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	
	
Net Quoted Job After Discount	
\$1,074.82	

RECOMMENDED PRICING COMMON COMMERCIAL REPAIRS

Itemized Commercial Repair description	Price
AC/HP Replace Run Capacitor	
0001 0050 Diagnostic/Service Charge	\$89.00
1722 0025 Access/Ladder Set-up Fee	\$70.47
0309 0050 Turbo 200x universal replacement capacitors 65+ up to 90 mfd	\$417.81
0301 0050 Replace run 5-7.5 MFD capacitor Voltage Regulating Device	\$191.71
5415 0000 PM0050 comm run cap adjustment	\$160.50
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$1,189.64
Discount	\$178.45
Net Repair Price After Discount	\$1,011.20
Replace Condensate Pump	
0001 0050 Diagnostic/Service Charge	\$89.00
1722 0025 Access/Ladder Set-up Fee	\$70.47
1716 0050 Replace condensate removal pump	\$405.25
5417 0000 PM0070 comm condensate pump adjustment	\$224.70
1721 0050 Shipping & Handling/Restocking	\$140.95
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	\$260.15
Total Repair Price	\$1,190.52
Discount	\$178.58
Net Repair Price After Discount	\$1,011.94
Clean Drain Line	
0001 0050 Diagnostic/Service Charge	
1722 0025 Access/Ladder Set-up Fee	
1706 0050 Clean drain pan/line	
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	
	
Replace Motor & Cap	
0001 0050 Diagnostic/Service Charge	
0309 0050 Turbo 200x universal replacement capacitors 65+ up to 90 mfd	
0301 0050 Replace run 5-7.5 MFD capacitor Voltage Regulating Device	
5412 0000 PM0020 run cap adjustment	
0801 0100 Replace Cond Motor #1 - 1/6 to 1/3 universal 1075 RPM	
5420 0000 PM0100 cond fan motor adjustment	
5204 0075 Recommissioning & Safety Check - AC - With brush coil cleaning	

RECOMMENDED PRICING COMMON COMMERCIAL REPAIRS

Itemized Commercial Repair description	Price
Replace Compressor	
0001 0050 Diagnostic/Service Charge	
1214 0025 Leak test-accessible fittings	
1224 0225 Recover evac drier recharge 1.5-3 ton R-410	
0901 0250 Replace compressor scroll 1.5-3*	
5426 0000 PM0400 compressor adjustment	
1721 0050 Shipping & Handling/Restocking	
5204 0075 Recommissioning & Safety Check - AC - With brush coil c	



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