

TECHNICAL INFORMATION COMMUNICATION



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Quality and Continuous Improvement

Number: TIC2018-0001

Date: 03/16/2018

Title: Sound Troubleshooting Guide

Product Category: Outdoor Split Systems

Products Affected:

Split Systems

Situation:

The Residential Air Conditioner and Heat Pumps service manual is in process of being updated to assist in troubleshooting sound complaints in split system products.

Technical Information:

The service manual is in process of being updated to include a troubleshooting guide to better identify the source of split- system sound complaints. When assisting technicians with troubleshooting sound complaints, please reference the Sound Troubleshooting Guide & Sound Checklist. Gather relevant field information from these sites by completing both of the below documents, and attaching them to a new CRM case. The data will be analyzed by engineering and sound & vibration to better understand future sound complaints and support current investigative projects.

Before the Sound Troubleshooting Guide is used, verification of system performance must be conducted per the installation instructions. These verifications include charge, indoor airflow and correct voltage to the unit. The guide was produced with the assumption that performance of the unit has been verified.

Operate the unit in the condition and mode that the customer complaint occurred. If there is not a steady noise (constant and unchanging), the guide does not apply. Transient noises (short duration) like reversing valves, contactors, or TXV chattering should be resolved before completing checklist.

References

A copy of the troubleshooting guide is below along with Sound Complaint Checklist to include in CRM cases.

Only trained and qualified personnel should design, install, repair and service HVAC systems and equipment. All national standards and safety codes must be followed when designing, installing, repairing and servicing HVAC systems and equipment. It is the responsibility of the Dealer to ensure local codes, standards, and ordinances are met.

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Sound Troubleshooting Guide

Before using the Sound Troubleshooting Guide, conduct verification of system performance per the installation instructions. These verifications include charge, indoor airflow and correct voltage to the unit. The guide below was produced with the assumption that performance of the unit has been verified.

Operate the unit in the condition that the customer complaint occurred. If there is not a steady sound (constant and unchanging), the guide below does not apply. Transient sounds (short duration) like reversing valves, contactors, or TXV chattering should be resolved before completing this guide.

Step	Action	Yes	No	Go To	Notes
1	Turn off unit; disconnect compressor from contactor.			2	
2	Turn on unit; is the complaint still present?	6	3		
3	Turn off unit; disconnect fan & reconnect compressor to contactor			4	
4	Turn on unit; is the complaint still present?	10	5		
5	Turn off unit; reconnect fan to contactor. Turn on unit.			6	
6	Feel the motor plate & side edge of top cover; is the motor plate vibrating more than the side edge of top cover?	9	7		Motor plate vibration indicates possible fan misalignment. Side edge vibration indicates blade imbalance.
7	Replace fan blade; is the complaint still present?	8	End		
8	Replace the motor.			End	
9	Shift position of fan blade up on the shaft. Ensure that the fan will still rotate freely. Is the complaint still present?	7	End		
10	Turn off unit; reconnect fan to contactor. Turn on unit.			11	
11	Listen to the noise from inside the home. Is the noise worse than outside?	12	18		
12	Does the noise seem to be coming from the line set itself?	13	14		
13	Install an inline muffler on the liquid line; is the complaint still present?	15	End		See installation instructions for inline muffler procedure.
14	Does the noise seem to be coming from the line set vibrating against a wall or duct?	15	16		
15	Use isolation hangers near the point(s) of contact to reduce the vibration; is the complaint still present?	18	End		Check that the wall pass-through is properly insulated. See installation instructions for line set routing and pass-through tips.
16	Does the noise seem to be coming either through the ductwork or directly from the indoor unit?	17	18		Metal duct systems that do not have a 90-degree elbow and 10-ft of main duct to the first branch take-off may require internal acoustical lining. As an alternative, fibrous ductwork may be used in accordance with the SMACNA standard for fibrous glass ducts.
17	Replace the indoor unit or its components.			End	
18	Does the noise seem to be coming from a rattling grille, panel, or louver?	19	20		
19	Verify all screws are tight and the unit is level. Is the complaint still present?	20	End		
20	Apply sideways pressure to the unit, slightly lifting base pan off its support. Does this affect the complaint?	21	22		
21	Place rubber isolation pads under the base pan on all four corners of the unit. Is the complaint still present?	22	End		
22	Release both service valves from the base pan by removing the four (4) mounting screws. Apply pressure to the line-set between the unit and the wall pass-through. Does this affect the complaint?	23	26		If applying pressure to the line-set affects the complaint, this could also indicate a point of contact inside the wall or ceiling.
23	Place rubber mass damper on the line-set between the unit and the wall pass-through. Is the complaint still present?	24	End		
24	Turn off unit; insert additional length to the line-set by rotating the unit 90 degrees.			25	
25	Turn on unit; is the complaint still present?	26	End		
26	Turn off unit; release the compressor feet from the base pan by removing the four (4) mounting screws.			27	
27	Turn on unit; did releasing the compressor feet affect the complaint?	28	30		
28	Turn off unit; change to split-post compressor grommets.			29	Order replacement component P/N: KA75UG100
29	Turn on unit; is the complaint still present?	31	End		
30	Turn off unit; re-torque compressor bolts to factory spec of 90 in-lb.			31	
31	Turn off unit; install sound shield (if shield is already installed, change to miter box).			32	For sound blanket, use accessory kit KSASH0601COP (P/N: 317037-401) For miter box, use P/N: 337905-401 & 337906-401
32	Turn on unit; is the complaint still present?	33	End		
33	Replace the compressor.			End	See the section titled "Noisy Compressor" in the service manual for further troubleshooting guidance.

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Sound Complaint Checklist

✓ Check and/or provide all that apply:

Outdoor Unit: _____ Serial: _____ Line set length: _____
Indoor Unit: _____ Serial: _____ Vertical rise in line set? _____ If yes,
Liquid Line Diameter: _____ how long? _____
Suction Line Diameter: _____
Routing of line set? (inside or outside of structure?)
Compressor model/serial?

Condenser above or below indoor?

1. Where do you believe sound is coming from?

- Compressor Sheet Metal
 Fan/motor Line Set/Tubing
 Reversing Valve Unknown (Provided as much detail as possible)

2. During what cycle is the sound occurring?

- Defrost
 Cooling
 Heating
 Shut Down

3. When during this cycle is the sound occurring?

- Start of cycle
 Termination of cycle
 Unit shut down
 Unit start up
 Operational
 Increases in volume the longer the cycle runs
 Decreases in volume the longer the cycle runs
 The noise level has increased over the life of the product.
 The noise has been occurring since time of installation.
 The noise level increases as OD ambient increases
 The noise level increases as OD ambient decreases

4. How would you best describe the sound?

- | | | |
|-----------------------------------|---|---|
| <input type="checkbox"/> Clunk | <input type="checkbox"/> Wha wha | <input type="checkbox"/> Grinding |
| <input type="checkbox"/> Harmonic | <input type="checkbox"/> Moose Call | <input type="checkbox"/> Low frequency rumble |
| <input type="checkbox"/> Whistle | <input type="checkbox"/> Rattle | <input type="checkbox"/> Tone / Tonal |
| <input type="checkbox"/> Swoosh | <input type="checkbox"/> Hammer | <input type="checkbox"/> Other, please describe |
| <input type="checkbox"/> Chirp | <input type="checkbox"/> Helicopter | _____ |
| <input type="checkbox"/> Growl | <input type="checkbox"/> Tinny/Metallic | |

5. Where is the location of the sound complaint prominent? (Outside, In the house? If in house where in the house is it most noticeable)

6. What are the ambient conditions during complaint?

- > OD ambient _____ > ID dry bulb _____
> ID wet bulb _____

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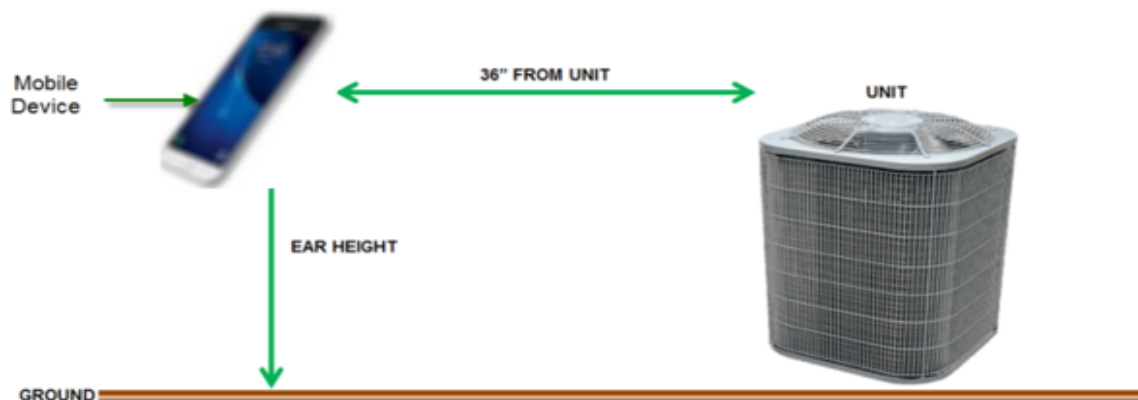
7. What is the charge and air flow condition?
- Suction pressure _____
 - Discharge pressure _____
 - Subcooling _____
 - Superheat _____
 - Airflow CFM _____
 - Static _____
8. What type of metering device is on the system? (size or number if known)
- TXV part number _____
 - Cooling Piston size _____
 - Heating Piston size _____
9. If **compressor, fan or line** sound is suspect conduct the following procedures if applicable:
Isolate the compressor and fan from each other and run with only one on at time.
- Fan Only Results – What happens to the sound? _____
 - Compressor Only Results – What happens to the sound? _____

If line noise, does applying pressure in any particular location around suspected noise change the tone?

- (explain) _____

10. If sound is suspected in the **fan motor, blade or grille** observe the following if applicable:
- ✓ Inspect grille for loose screws or broken wires. Results? _____
 - ✓ Does blade have any visible damage? _____
 - ✓ If blade is moved up on the shaft does noise subside? _____
11. If sound is a **grille, panel or louver** observe the following as applicable:
- ✓ Are all screws tight? _____
 - ✓ Do parts appear to fit together properly? (explain) _____
 - ✓ Is the unit level? YES NO
 - ✓ Is the unit base on a clean flat surface? YES NO
12. Please take sound or video recording with mobile device per the chart below. (A 20 second clip is sufficient)

General Guidelines



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