KSALA0201R22
KSALA0301410
KSALA1001454

LOW AMBIENT PRESSURE SWITCH KIT

Installation Instructions

NOTE: Read this entire instruction manual before starting the installation.

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock, or other conditions which may cause death, personal injury, or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses, protective clothing, and work gloves. Use quenching cloth for brazing operations. Have a dry powder or CO_2 fire extinguisher available.. Read these instructions thoroughly and follow all warnings or cautions included in literature and attached to the unit.. Consult local building codes and current editions of the National Electrical Code (NEC) NFPA 70. In Canada, refer to current editions of the Canadian electrical code CSA 22.1.

Recognize safety information. This is the safety-alert symbol ⚠ When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.
Understand these signal words; DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. **DANGER** identifies the most serious hazards which will result in severe personal injury or death. **WARNING** signifies hazards which could result in personal injury or death. **CAUTION** is used to identify unsafe practices which would result in minor personal injury or product and property damage. **NOTE** is used to highlight suggestions which will result in enhanced installation, reliability, or operation.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Before installing, modifying, or servicing system, main electrical disconnect switch must be in the OFF position. There may be more than 1 disconnect switch. Lock out and tag switch with a suitable warning label.

Use only the kit components described in this installation procedure.

INTRODUCTION

These instructions cover the installation of Low-Ambient Pressure Switch Part No. KSALA0201R22 and KSALA0301410 in all single and two stage non-communicating or communicating capable (using a standard thermostat) split air conditioners, split heat pumps, packaged air conditioners, or packaged heat pumps using R-22, R-410A, or R-454B refrigerants and permanent split capacitor (PSC) fan motors. Kit KSALA1001454 is required for single and two stage non-communicating or communicating capable (using a standard thermostat) units with R-454B and using electronically commutated (ECM) outdoor fan motors. Refer to Table 1 for kit usage.

NOTE: Fully communicating systems (including Outdoor, Indoor, and Communicating System Control) have low ambient algorithm and do not require accessories.

DESCRIPTION AND USAGE

The Low-Ambient Pressure Switch Kit is a long-life pressure switch which turns the fan on and off as shown in Table 1. It is wired in series with black fan lead. It is recommended that ball-bearing motors be used with this control.

Other accessories may be required. Refer to the Required Changes for Cooling Units and Heat Pump Units section in this document for further details.

⚠ CAUTION

CUT HAZARD

Failure to follow this caution may result in personal injury.

Sheet metal parts may have sharp edges or burrs. Use care and wear appropriate protective clothing and gloves when handling parts.

Kit Contents	KSALA0201R22	KSALA0301410	KSALA1001454
Pressure Switch	X	X	X
Check Valve	X	X	X
Connector	X	X	X
Adapter Tube	X	X	X
BLU Wire #1			X
YEL/BLU Wire #1			X
BLU Wire #2			X
YEL/BLU Wire #2			X
Installation Instructions	X	X	X

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

INSTALLATION

The pressure switch is mounted inside the outdoor unit cabinet by using adapter tube supplied. The adapter tee is mounted to liquid service valve and tube is either routed through one of the knockout holes in unit cabinet (vertical discharge product) or through one of the service valve holes in unit cabinet (horizontal discharge product). From inside cabinet, the flare nut is attached to extender tube. (See Fig. 1.) The pressure switch is wired in series with black or common fan lead.

WIRING FOR ALL VOLTAGES OF COOLING UNITS

A.Single- And Two-Stage PSC Fan Motor Non-Communicating

For all voltages of cooling units, refer to Fig. 2 and wire low-ambient pressure switch as follows:

1. Disconnect black fan lead from contactor and connect this lead to yellow or violet wire from low-ambient pressure switch using connector supplied.

NOTE: To ensure electrical isolation and strain relief, it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1 inch.

2. Connect remaining blue wire from low-ambient pressure switch to contactor terminal from which black fan lead was removed.

B.Single- And Two-Stage ECM Outdoor Fan Motor Non-Communicating Capable

For all voltages of cooling units, refer to Fig. 7 and wire low-ambient pressure switch as follows:

1. Disconnect YEL/BLU fan lead from contactor and connect this lead to 1/8” male connector on the supplied YEL/BLU wire. Connect the other end of the YEL/BLU wire to the violet wire from the low ambient pressure switch.

NOTE: To ensure electrical isolation and strain relief, it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1 inch.

2. Connect remaining blue wire from low-ambient pressure switch to the 1/4” male connection of the supplied Blue wire. Connect the other end of the blue wire to the contactor terminal from which the YEL/BLU fan wire was removed.

C.Single- and Two-Stage PSC Fan Motor Communicating Capable (using standard thermostat)

For all voltages of cooling units, refer to Fig. 3 and use Low-Ambient Pressure Switch as follows:

1. Disconnect black fan lead from control board and connect it to yellow or violet wire from low ambient pressure switch connector supplied.

NOTE: To ensure electrical isolation and strain relief, it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1 inch.

2. Connect blue wire from low-ambient pressure switch to control board terminal from black fan lead was removed.

D.Single- and Two-Stage ECM Fan Motor Communicating Capable (using standard thermostat)

For all voltages of cooling units, refer to Fig. 9 and use Low-Ambient

Pressure Switch as follows:

1. Disconnect BLU fan lead from control board and connect this lead to 3/16” male connector on the supplied YEL/BLU wire. Connect the other end of the YEL/BLU wire to the violet wire from the low ambient pressure switch.

NOTE: To ensure electrical isolation and strain relief, it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1”

2. Connect remaining blue wire from low-ambient pressure switch to the 1/4” male connection of the supplied Blue wire. Connect the other end of the blue wire to the control board terminal from which the BLU fan wire was removed.

WIRING FOR HEAT PUMPS

Heat pumps require a normally closed Isolation Relay (Part No. KHAIR0201AAA/KHAIR0301AAA or equivalent) with the 24v coil connected to the C and O terminals of defrost board or control board.

A. 208/230v Applications using PSC outdoor fan motors

For 208/230v heat pump applications, refer to Fig. 4 and wire low-ambient pressure switch as follows:

1. Remove black lead of outdoor fan motor connected to defrost board OF2 or control board ODF depending on type of unit.
2. Install piggyback female terminal on violet wire harness (provided in isolation relay kit) to tab 1 of isolation relay. Connect non-piggyback female termination of same violet wire to one side of provided connector. Connect the female termination of violet (or yellow) lead of low ambient pressure switch to the other side of the provided connector. Connect the female termination of the black fan motor lead to the male piggy back terminal located at tab 1 of relay.

NOTE: To ensure electrical isolation and strain relief it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1".

3. Install piggyback female terminal on black wire harness (provided in isolation relay kit) to tab 2 of relay. Connect non-piggyback female termination of same black wire to OF2 on defrost board or ODF on control board. Connect the female termination of blue lead of low ambient pressure switch to the male piggyback terminal located at tab 2 of relay.

Install orange wire (provided in isolation relay kit) to one side of the relay coil. Connect the other side to the O wire coming from defrost board or control board.

4. Install black wire (provided in isolation relay kit) to opposite side of the relay coil. Connect the other side to the C wire coming from defrost board or control board.
5. Reinstall control box cover and reconnect power to unit.

B. 208/230v Non-Communicating Applications Using ECM Outdoor Fan Motors.

For 208/230v heat pump applications, refer to Fig. 8 and wire low-ambient pressure switch as follows:

1. Disconnect power to the unit.
2. Mount isolation relay in control box with provided screws. If necessary, mark and drill 1/8 -inch diameter pilot holes.
3. Remove Yellow/Blue lead of outdoor fan motor connected to defrost board OF2 or control board ODF.
4. Install piggyback female terminal on provided violet wire harness to Tab 1 of relay.
   - Connect non -piggyback female termination of same violet wire to one side of provided connector.
   - Connect the female termination of violet (or yellow) lead of low ambient pressure switch to the other side of the provided connector.
   - Connect the male termination of the provided yellow/blue wire to the female termination of the yellow/blue fan wire.
   - Connect female termination of the provided yellow/blue wire to the male piggyback terminal located at tab 1 of relay.

NOTE: To ensure electrical isolation and strain relief, it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1 inch.

5. Using the provided black wire with the 3/16 female connector, install the piggyback female terminal to Tab 2 of the relay.
   Connect non -piggyback female termination to same black wire to OF2 on defrost board or ODF on control board.
   Connect the female termination of blue lead of low -ambient pressure switch to male piggyback terminal located at Tab 2 of relay.
6. Install provided orange wire to one side of the relay coil. Connect the other side to the O wire coming from defrost board.
7. Install provided black wire to opposite side of the relay coil. Connect the other side to the C wire coming from defrost board.
8. Reinstall control box cover and reconnect power to unit.

Manufacturer reserves the right to change, at any time, specifications and designs without notice and without obligations.

C. 460v Applications

For 460v heat pump applications, refer to Fig. 5 and wire low-ambient pressure switch as follows:

1. Remove black lead of outdoor fan motor connected to out- door fan relay terminal 3.
2. Install piggyback female terminal on violet wire harness (provided in isolation relay kit) to tab 1 of isolation relay. Connect non-piggyback female termination of same violet wire to one side of provided connector. Connect the female termination of violet (or yellow) lead of low ambient pressure switch to the other side of the provided connector. Connect the female termination of the black fan motor lead to the male piggy back terminal located at tab 1 of relay.

NOTE: To ensure electrical isolation and strain relief it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1" (25.4 mm).

3. Install piggyback female terminal on black wire harness (provided in isolation relay kit) to tab 2 of relay. Connect non-piggyback female termination of same black wire to outdoor fan relay terminal 3. Connect the female termination of blue lead of low ambient pressure switch to the male piggyback terminal located at tab 2 of relay.
4. Install orange wire (provided in isolation relay kit) to one side of the relay coil. Connect the other side to the O wire coming from defrost board or control board.
5. Install black wire (provided in isolation relay kit) to opposite side of the relay coil. Connect the other side to the C wire coming from defrost board or control board.
6. Reinstall control box cover and reconnect power to unit.

D. 208/230v Communicating Capable (Using standard thermostat) Applications Using ECM Outdoor Fan Motors.

For 208/230v heat pump applications, refer to Fig. 10 and wire low-ambient pressure switch as follows:

1. Disconnect power to the unit.
2. Mount isolation relay in control box with provided screws. If necessary, mark and drill 1/8” diameter pilot holes.
3. Remove Blue lead of outdoor fan motor connected to control board ODF (single stage) or control board PWM2 (two stage).
4. Install piggyback female terminal on provided violet wire harness to Tab 1 of relay.
   – Connect non -piggyback female termination of same violet wire to one side of provided connector.
   – Connect the female termination of violet (or yellow) lead of low ambient pressure switch to the other side of the provided connector.
   – Connect the male termination of the provided yellow/blue wire to the female termination of the yellow/blue fan wire.
   – Connect female termination of the provided yellow/blue wire to the male piggyback terminal located at tab 1 of relay.

NOTE: To ensure electrical isolation and strain relief, it is recommended to wrap connector with UL approved electrical tape overlapping the wires on each side by a minimum of 1”.

5. Using the provided black wire with the 3/16” female connector, install the piggyback female terminal to Tab 2 of the relay.
   – Connect non -piggyback female termination to same black wire to control board ODF (single stage) or control board PWM2 (two stage).
   – Connect the female termination of blue lead of low -ambient pressure switch to male piggyback terminal located at Tab 2 of relay.
6. Install provided orange wire to one side of the relay coil. Connect the other side to the O wire coming from defrost board.
7. Install provided black wire to opposite side of the relay coil.
   – Connect the other side to the C wire coming from defrost board.

REQUIRED CHANGES FOR SPLIT COOLING UNITS AND SPLIT HEAT PUMP UNITS

1. Crankcase heaters are required on all applications where low-ambient controls are used.
2. Start capacitor and relay (hard start) kits are required on all single-phase applications where low-ambient controls are used.
3. Evaporator freeze thermostat KSAFT0101AAA is required on all applications where low-ambient controls are used.
4. Wind baffles are recommended for temperatures below 0°F (-17.80°C) or where there is substantial wind. For vertical discharge outdoor products see Fig. 7 for dimensions of Baffle Assembly. For horizontal discharge outdoor products consult Product Data for Wind Baffle Kits.

NOTE: When wind baffles are used on vertical discharge products, raising the unit off of pad a minimum of 4 in. is required to provide better airflow for moderate? and high-ambient temperatures. Check pre-sale literature for available support feet or unit risers.

5. For cooling applications only, winter start control KAAWS0101AAA must be used where low-pressure switch tripping may be encountered. Winter start control must be wired in parallel with low-pressure switch. This allows a delay of 3 minutes before low-pressure switch be- comes part of control circuit. (See Fig. 6.)

NOTE: See Winter Start Control Kit for detailed Installation Instructions.

REQUIRED CHANGES FOR PACKAGED AIR CONDITIONERS AND PACKAGED HEAT PUMPS

1. Crankcase heaters are required on all applications where low-ambient controls are used (Current 3-Phase production units have crankcase heaters factory-installed).
2. Compressor hard start kit is recommended.
3. Louvered panels are required (many models have louvered panels factory-installed)
4. For heat pump applications, isolation relay is required.

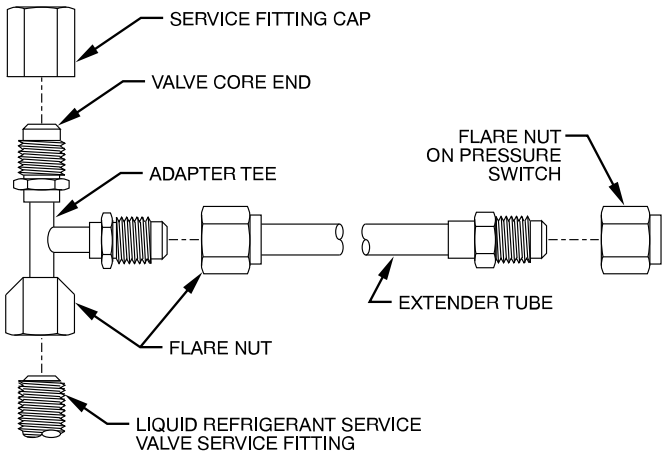


Fig. 1 – Low Ambient Pressure Switch

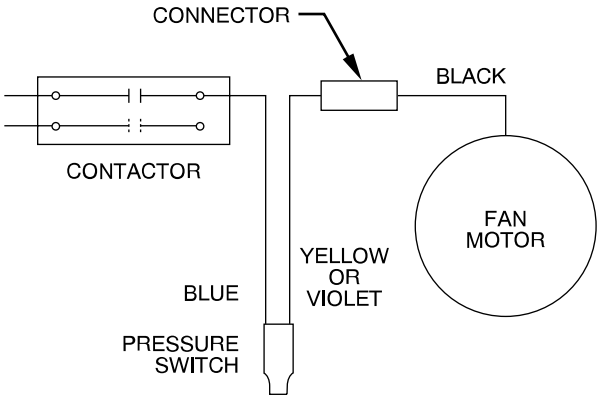


Fig. 2 – Power Wiring for All Voltages of Cooling Applications - Single and Two-Stage Non-Communicating Capable PSC Outdoor Fan Motors Only

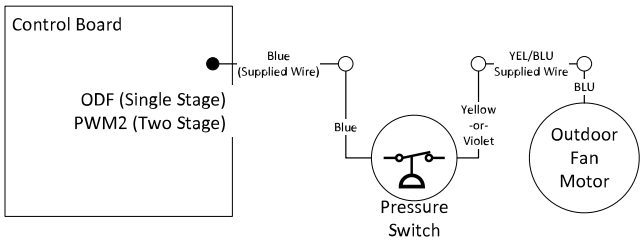


Fig. 3 – Power Wiring for All Voltages of Cooling Applications - Single and Two-Stage Communicating Capable (using standard thermostat) PSC Outdoor Fan Motors Only

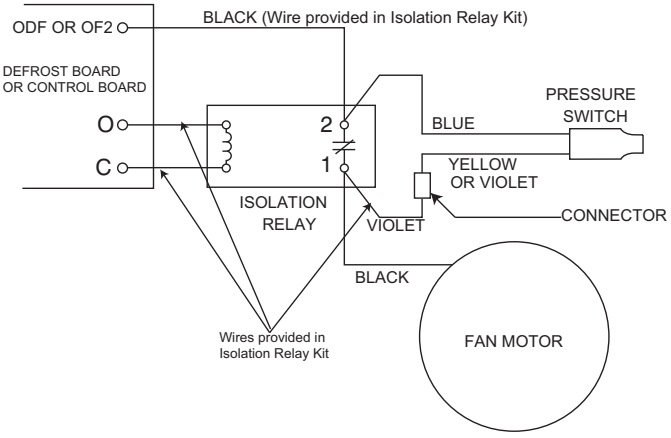


Fig. 4 – Power Wiring for 208/230v Heat Pump Applications. PSC Outdoor Fan Motors Only

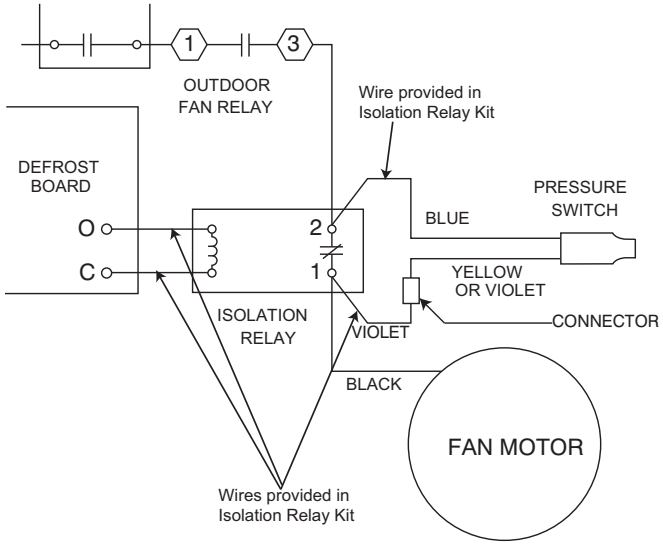


Fig. 5 – Power Wiring for 460v Heat Pump Applications

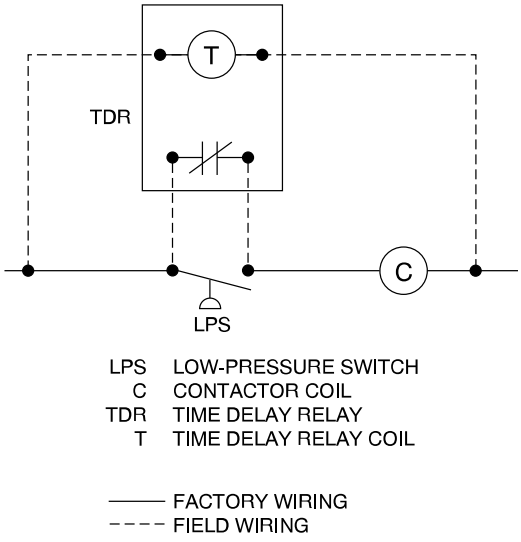


Fig. 6 – Low Voltage for Winter Start Control

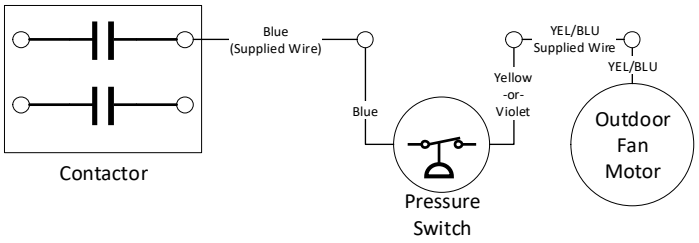


Fig. 7 – Power Wiring for All Voltages of Cooling Applications - Single and Two-Stage Non-Communicating Capable ECM Outdoor Fan Motors Only

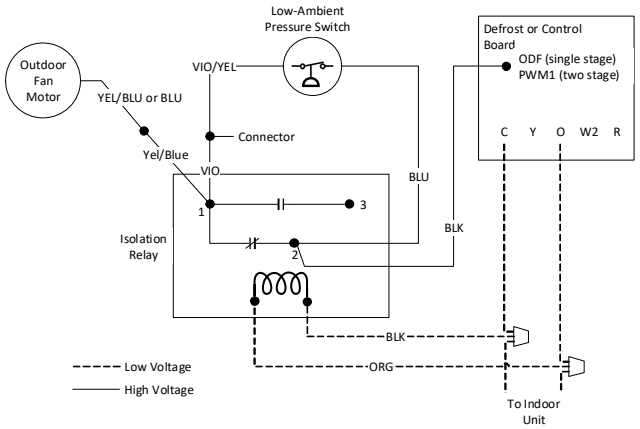


Fig. 8 – Power Wiring for 208/230v Heat Pump Non-Communicating Applications with ECM Outdoor Fan Motors

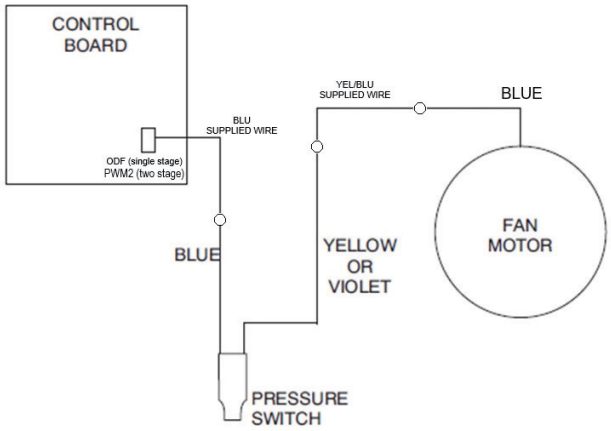


Fig. 9 – Power Wiring for All Voltages of Cooling Applications - Single and Two-Stage Communicating Capable (using standard thermostat) ECM Outdoor Fan Motors Only

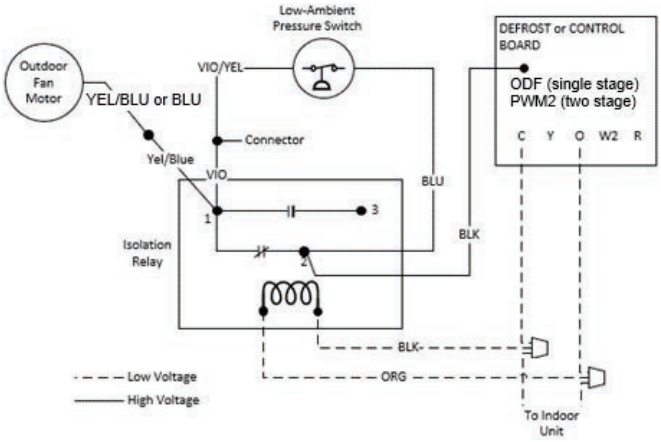


Fig. 10 – Power Wiring for All Voltages of Heat Pump Applications - Single and Two-Stage Communicating Capable (using standard thermostat) ECM Outdoor Fan Motors Only

START-UP

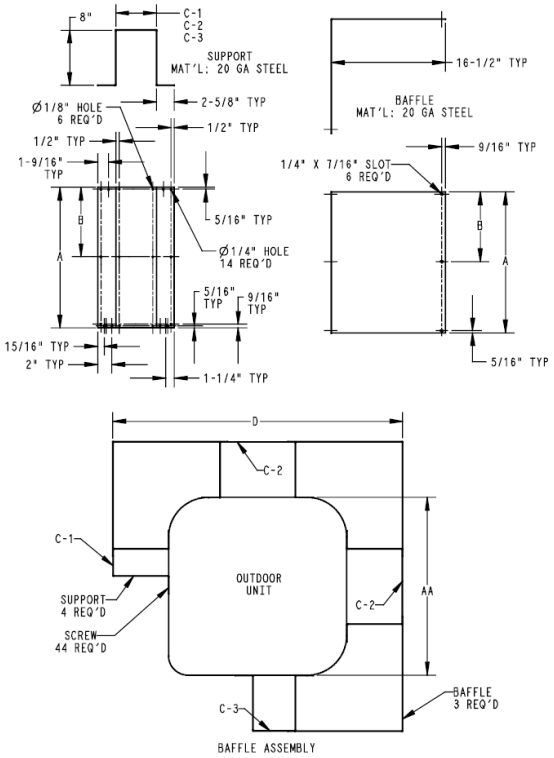
To start units equipped with the low-ambient pressure switch, perform the following steps:

1. Turn power on to unit.
2. Set thermostat below room temperature.
3. Wait for the unit to start. There may be a 5 minute delay in the thermostat or in the outdoor unit.
4. Observe unit operation as described below.
   – The fan will be off when compressor starts.
   – At outdoor temperatures around 0°F (-17.8°C), fan may not run at all.
   – At summer temperatures, fan will start after 10 to 30 seconds of compressor operation and may not turn off until thermostat is satisfied.
   – At outdoor ambient between 80°F (26.7°C) and 20°F (-6.7°C), fan will turn on and off to maintain pressure as shown in Table 1.

Table 1 – Kit Usage And Cut-In / Cut-Out Pressures

KIT PART NO.	REFRIGERANT	PRESSURE SWITCH CLOSES (PSIG)	PRESSURE SWITCH OPENS (PSIG)	WIRE COLORS
KSALA0201R22	R-22	225	100	Blue and Yellow
KSALA0301410	R-410A and R-454B (PSC OD Motor)	365	200	Blue and Violet
KSALA1001454	R-454B (ECM OD Motor)	365	200	Blue and Violet

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UNIT SIZE	AA	UNIT HEIGHT	A	B	C - 1	C - 2	C - 3	D
Mini	23 -1/8	25 -5/16	20 -3/8	10 -1/16	1 -5/16	8 -1/4	3 -1/2	39 -1/4
		28 -11/16	23 -13/16	11 -3/4				
		32 -1/8	27 -3/16	13 -1/2				
		35 -1/2	30 -5/8	15 -3/16				
		38 -15/16	34	16 -7/8				
		42 -5/16	37 -3/8	18 -9/16				
		45 -11/16	40 -13/16	20 -1/4				
Small	25 -3/4	25	20 -3/8	10 -1/16	3 -15/16	10 -7/8	6 -1/8	41 -7/8
		28 -7/16	23 -13/16	11 -3/4				
		31 -13/16	27 -3/16	13 -1/2				
		35 -1/4	30 -5/8	15 -3/16				
		38 -5/8	34	16 -7/8				
		42	37 -3/8	18 -9/16				
		45 -7/16	40 -13/16	20 -1/4				
Medium	31 -1/4	25 -1/2	20 -3/8	10 -1/16	9 -3/8	16 -5/16	11 -9/16	47 -3/8
		28 -15/16	23 -13/16	11 -3/4				
		32 -5/16	27 -3/16	13 -1/2				
		35 -3/4	30 -5/8	15 -3/16				
		39 -1/8	34	16 -7/8				
		42 -1/2	37 -3/8	18 -9/16				
		45 -15/16	40 -13/16	20 -1/4				
Large	35	25 -1/2	20 -3/8	10 -1/16	13 -3/16	20 -1/8	15 -3/8	51 -1/8
		28 -15/16	23 -13/16	11 -3/4				
		32 -5/16	27 -3/16	13 -1/2				
		35 -3/4	30 -5/8	15 -3/16				
		39 -1/8	34	16 -7/8				
		42 -1/2	37 -3/8	18 -9/16				
		45 -15/16	40 -13/16	20 -1/4				

Fig. 11 – Vertical Discharge Products Baffle Assembly (splits units only)

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