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KITS COMMON TO COOLING
AND HEAT PUMP EQUIPMENT

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OUTDOOR UNIT CONTROL
REPLACEMENT KIT

Installation Instructions for Replacement Kit (11H36)
for use with Lennox Outdoor Units with iComfort® Control

General

This document provides general guidelines concerning replacement of the outdoor unit's iComfort® control, the removal of the PWM fan control and installation of new compressor solenoid harness for two-stage outdoor units. This new outdoor unit control is compatible with iComfort® systems.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

Application

This outdoor control replacement kit (11H36) is used to replace any of the existing outdoor controls and components listed in table 1.

Shipping and Packing List

Check unit for shipping damage. Consult last carrier immediately if damage is found.

Qty.	Part Description	Part Numbers
1	Outdoor unit control	103369-04
1	Compressor solenoid harness (2-stage units only)	49M7301
7	#10 - 32 x 1/2" hex slotted washer head self-tap screws	P-8-3981
5	Tie wraps	100082-02
8	Replacement wiring diagrams (stickers)	537507-01 537508-01 537509-01 537510-01 537513-01 537514-01 537565-01 537566-01
1	Display and configuration guide (sticker)	580656-01
1	Jumper and Link Guide (sticker)	580657-01

Table 1. iComfort® Existing Outdoor Controls and Components)

Applicable Outdoor Unit	Outdoor Control Part Numbers	PWM Fan Control Part Number	Compressor Solenoid Harness Part Numbers
Single-stage air conditioner	101799-XX	102791-01	N/A
Two-stage air conditioner	101798-XX		100037-01
Single-stage heat pump	101797-XX		N/A
Two-stage heat pump	101796-XX		100037-01
All outdoor units with controls	103369-01, -02 and -03	N/A	N/A

NOTE - This kit can be used in the following models:

- All versions of the XC17, XP17, XP17N, XP21 and XP21N.
- XP19-XX-230-06 only.
- XC21-XX-230-04 or higher.

IMPORTANT !

TWO-STAGE (XP19-XX-230-06 AND XP21) OUTDOOR HEAT PUMP UNITS BUILT BEFORE FEBRUARY 2012

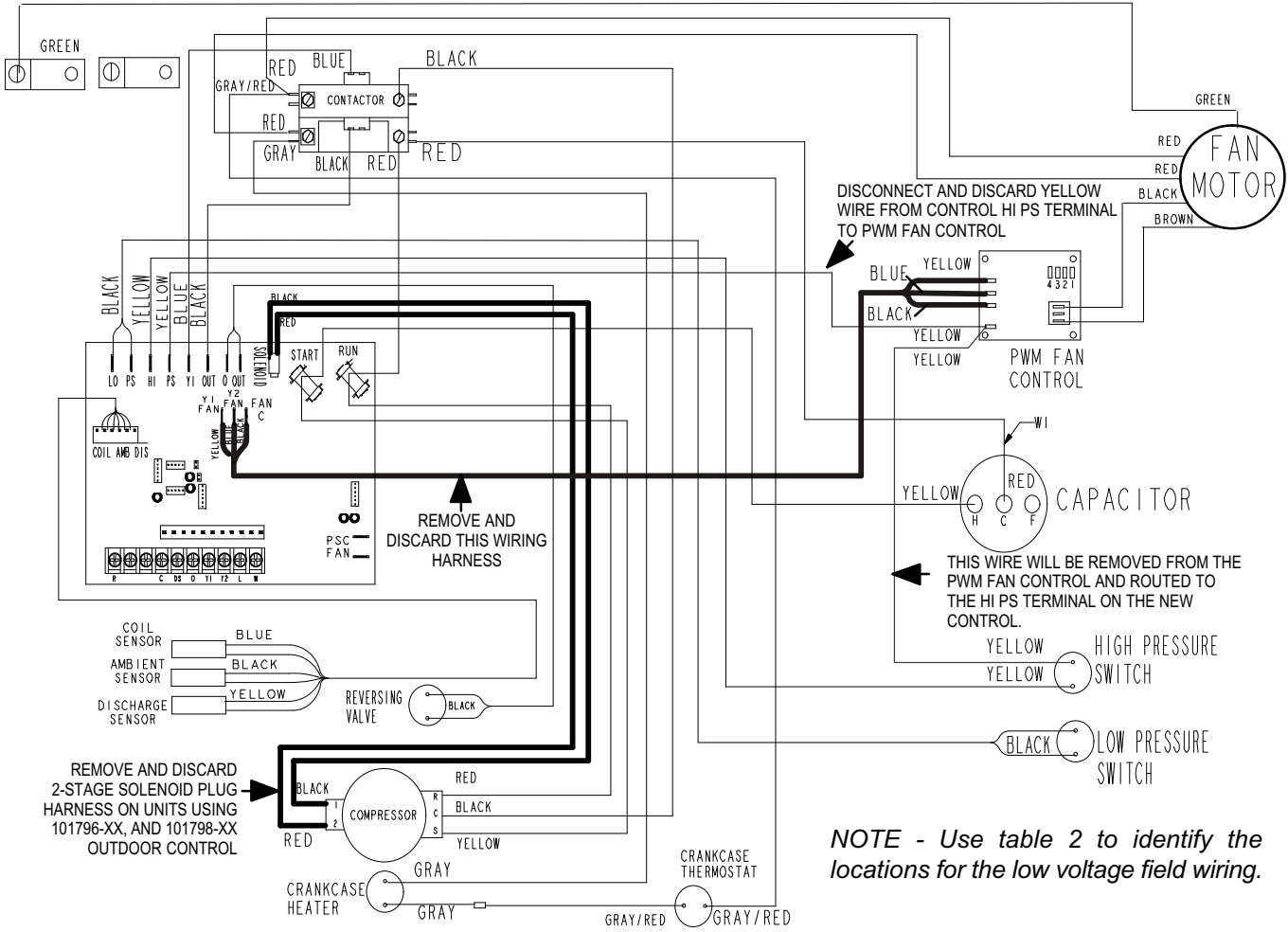
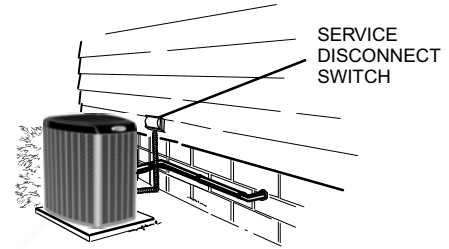
THESE SYSTEMS WILL REQUIRE A 70VA CONTROL TRANSFORMER (CATALOG # 13H2801 - ORDERLY SEPARATELY) FOR INDOOR AIR HANDLERS THAT USE ECB29 ELECTRIC HEAT SECTIONS LARGER THAN 10 KW. THE LARGER 70VA IS REQUIRED TO HANDLE THE REVISED LOADING OF THE TWO-STAGE SOLENOID IN THE COMPRESSOR.



Air Conditioner or Heat Pump Control Removal

1. Disconnect power to the indoor and outdoor units at both service disconnect switches.
2. Remove unit access panel. See unit installation instruction for access panel removal procedure.
3. Remove the necessary wiring attached to the existing control (A175) and PWM fan control (A177) (if present) in order to remove them.

NOTE - Remove the existing 2-stage compressor solenoid harness as noted below and discard.



NOTE - Use table 2 to identify the locations for the low voltage field wiring.

Figure 1. All Units — Electronically Commutated Motor (ECM) made by EBM-PAST (Typical Original Wiring — AC or HP or Heat Pump)

Table 2. Record Low-Voltage Field Wiring

Terminal Designation	Wire Color	Terminal Designation	Wire Color
R		O	
I+		Y1	
I-		Y2	
C		L	
DS		W	

XP19-XX-230-06 Units Only

1. Disconnect power to the indoor and outdoor units at both service disconnect switches.
2. Remove unit access panel. See unit installation instruction for access panel removal procedure.
3. Remove the necessary wiring attached to the existing control (A175).

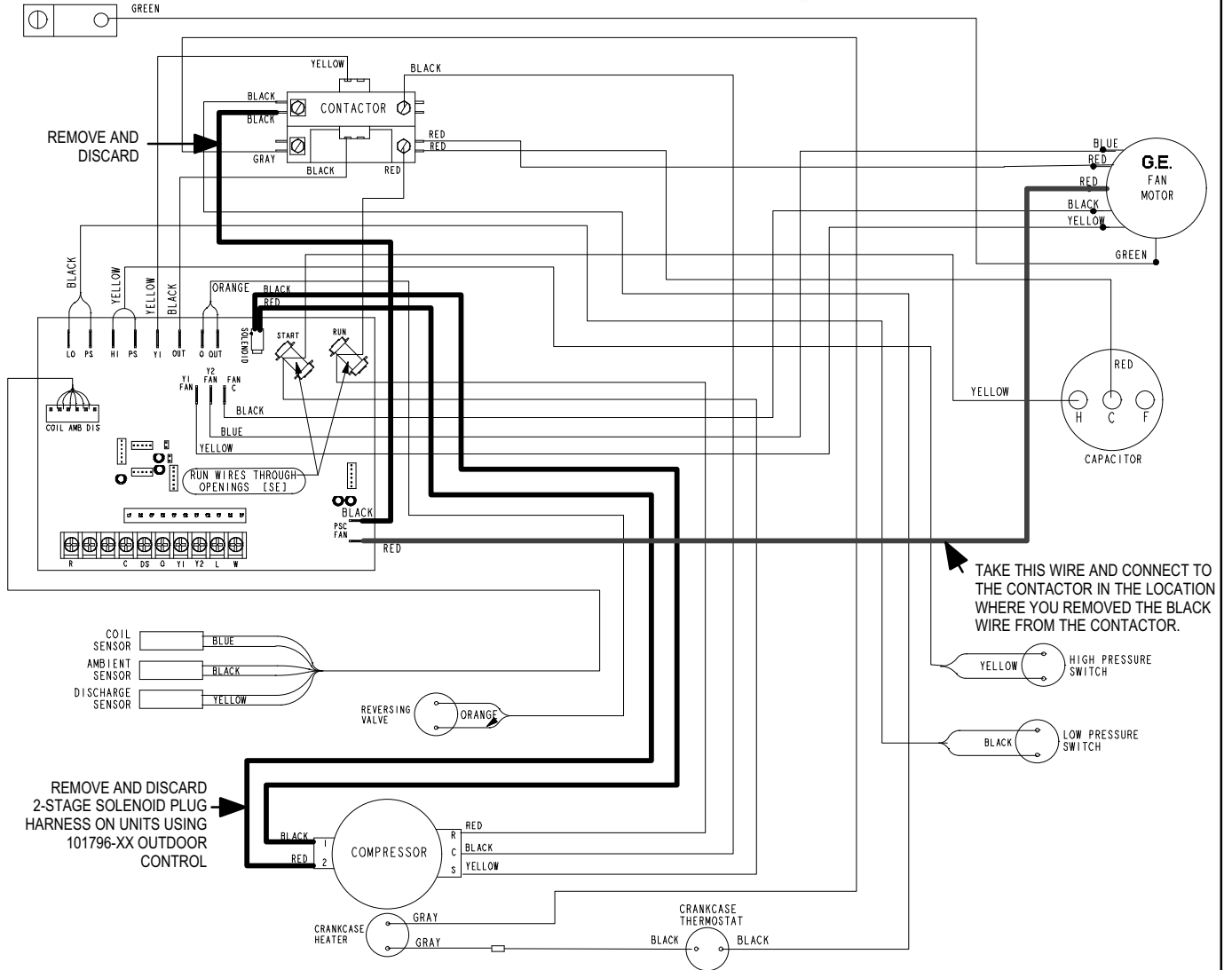
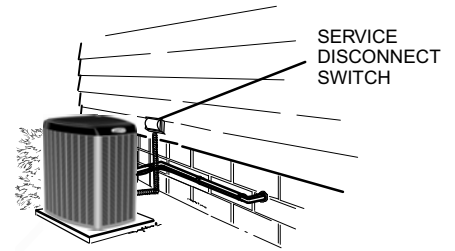


Figure 2. XP19-XXX-230-06 — Electronically Commutated Motor (ECM) Fan Motor (Typical Original Wiring)

Table 3. Record Low-Voltage Field Wiring

Terminal Designation	Wire Color	Terminal Designation	Wire Color
R		O	
I+		Y1	
I-		Y2	
C		L	
DS		W	

XC21-XX-230-04 Units Only

1. Disconnect power to the indoor and outdoor units at both service disconnect switches.
2. Remove unit access panel. See unit installation instruction for access panel removal procedure.
3. Remove the necessary wiring attached to the existing control (A175).

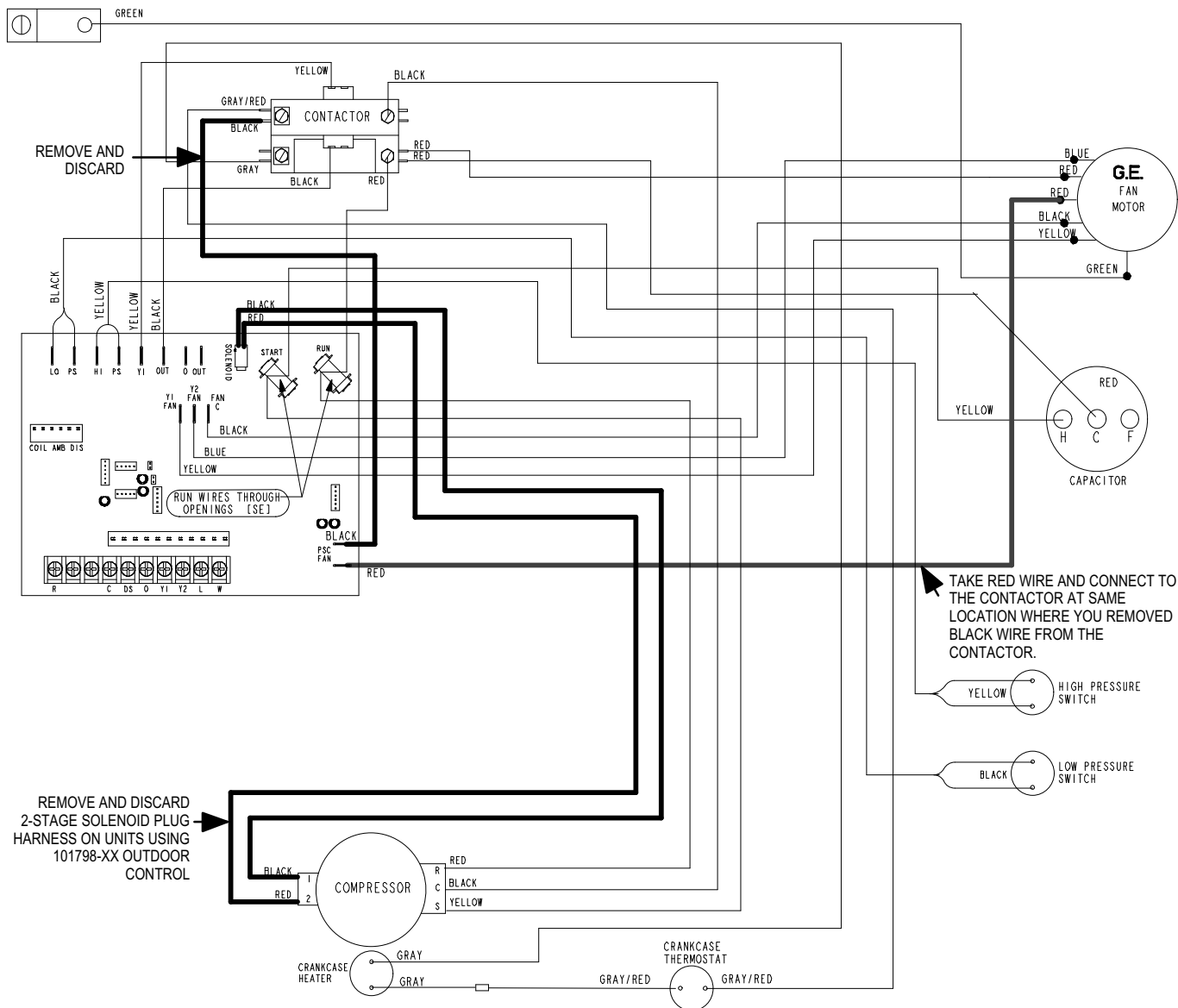
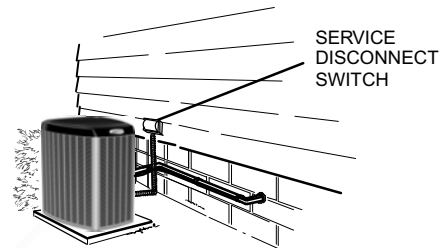
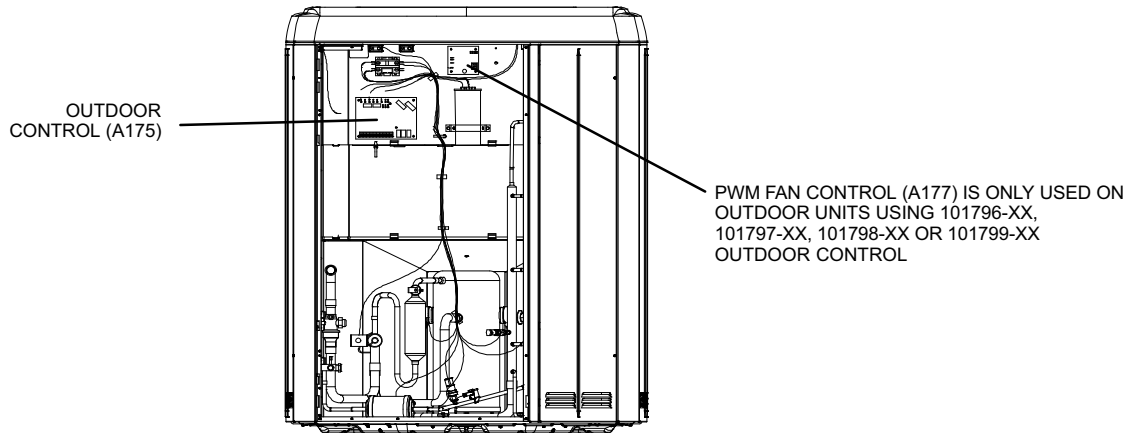


Figure 3. XC21-XXX-230-04 — Electronically Commutated Motor (ECM) Fan Motor (Typical Original Wiring)

Table 4. Record Low-Voltage Field Wiring

Terminal Designation	Wire Color	Terminal Designation	Wire Color
R		O	
I+		Y1	
I-		Y2	
C		L	
DS		W	

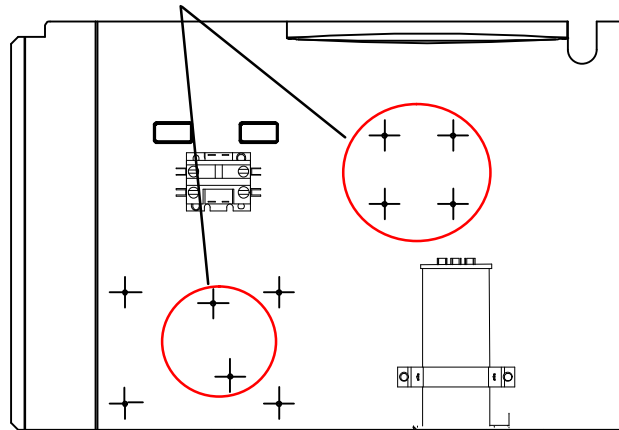
4. Remove existing outdoor control (A175) and PWM fan control (A177) from panel.



5. Plug all unused holes with provided screws to prevent water from entering the control box.

NOTE - Unused holes are only present if 101796-XX, 101797-XX, 101798-XX or 101799-XX outdoor control is being replaced.

.156" DIAMETER (5/32")
UNUSED HOLES



⚠ WARNING



Electric Shock Hazard. Can cause injury or death. Unit must be grounded in accordance with national and local codes.

Line voltage is present at all components when unit is not in operation on units with single-pole contactors. Disconnect all remote electric power supplies before opening access panel. Unit may have multiple power supplies.

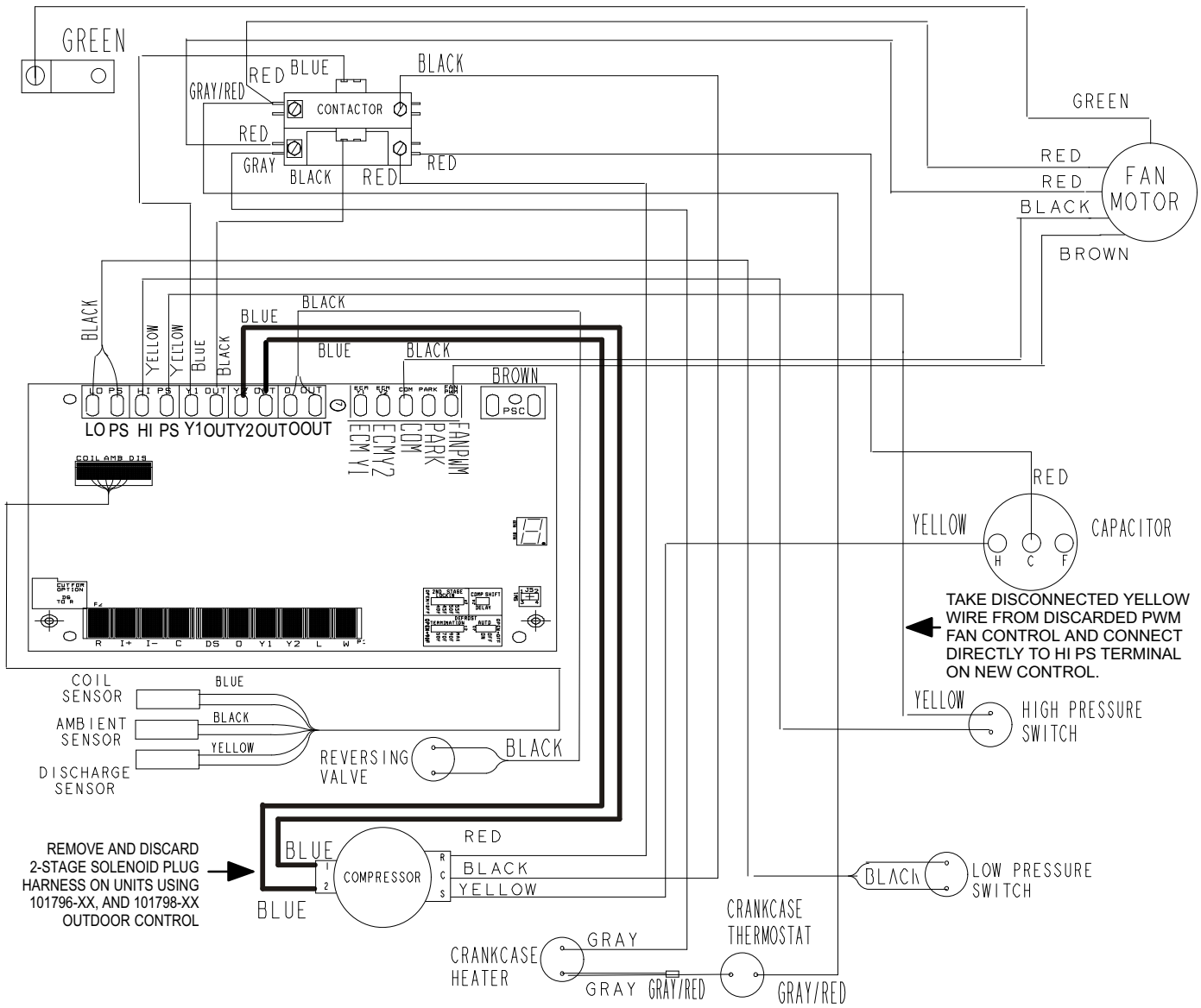
⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during unit installation and serv to protect the unit's electronic controls. Precautions will help to avoid control exposure to electrostatic discharge by putting the unit, the control and the technician at the same electrostatic potential. Neutralize electrostatic charge by touching hand and all tools on an unpainted unit surface before performing any service procedure.

Air Conditioner or Heat Pump Control Installation

1. Install new outdoor control (A175) and wire per wiring diagram below.

NOTE - Install the new two-stage compressor solenoid harness as noted below.



NOTES -

1. Use the information entered in table 2 to make the connections for the low-voltage field wiring.
2. The new outdoor control (A175) does not include an integrated LSOM function. A ComfortAlert Ultratech Diagnostics module will need to be purchased separately (catalog number 85M53) if that feature is desired. The new outdoor control's R, C and L terminals are used to connect this device.

Figure 4. All Units (Typical New Wiring) (Copeland Compressor Used)

⚠ CAUTION

Physical contact with metal edges and corners while applying excessive force or rapid motion can result in personal injury. Be aware of, and use caution when working near these areas during installation or while servicing this equipment.

Table 5. J1 and J3 Function Description

<p>J1- DEFROST TERMINATION TEMPERATURE</p>	<p>1. The J1 jumper is factory-set to 50°F (10°C). This jumper can be repositioned to terminate defrost at 70°F, 90°F or MAX (21°C, 32°C and MAX). If there is no jumper on J1, the default termination temperature is 90°F(32°C). <i>NOTE - Colder climates may require a higher defrost termination temperature to maintain a clear coil.</i></p> <p>2. If the J1 jumper is set to MAX, defrost will run maximum defrost sequence.</p>
<p>J3 - DEFROST AUTO</p>	<p>1. Defrost Auto can be set to either ON or OFF. Factory setting is OFF. Note: If the jumper is missing the default is OFF.</p> <p>2. Defrost Auto is set to OFF, the defrost cycle will run and terminate based on J1 setting.</p> <p>3. Defrost Auto is set to ON, the defrost termination will be determined based on the following rules:</p> <p>A.. The first defrost after the unit is powered up, or the first defrost after cooling call, will terminate based on the J1 setting.</p> <p>B.. The accumulated heating run-time between defrost cycles:</p> <ul style="list-style-type: none"> • If the heating run time between defrost cycles is less than 50 minutes, the defrost termination temperature will be increased for the next defrost cycle based on the current termination setting. If the current termination setting is 50°F or 70°F, then the next defrost termination will be 90°F. If J1 is set at 90°F or MAX, the next defrost cycle will terminate at the MAX setting. • If the heating run time between defrosts is longer than 1 hour for 2 consecutive heating cycles and the termination temperature is set at 50°F, 70°F, or 90°F, then the defrost control will follow the J1 jumper setting during the next defrost cycle. If the J1 jumper is set to MAX, then the next defrost termination temperature will be decreased to 90°F. <p>C.. If J1 is set to MAX, the system will always run at MAX when accumulated compressor OFF time is longer than 30 minutes and ambient temperature is less than 35°F.</p> <p>D.. When the ambient sensor temperature is higher than 40°F and J1 is set to MAX, defrost termination will be 90°F. If J1 is 50°F, 70°F, or 90°F, defrost termination will follow the J1 setting.</p>

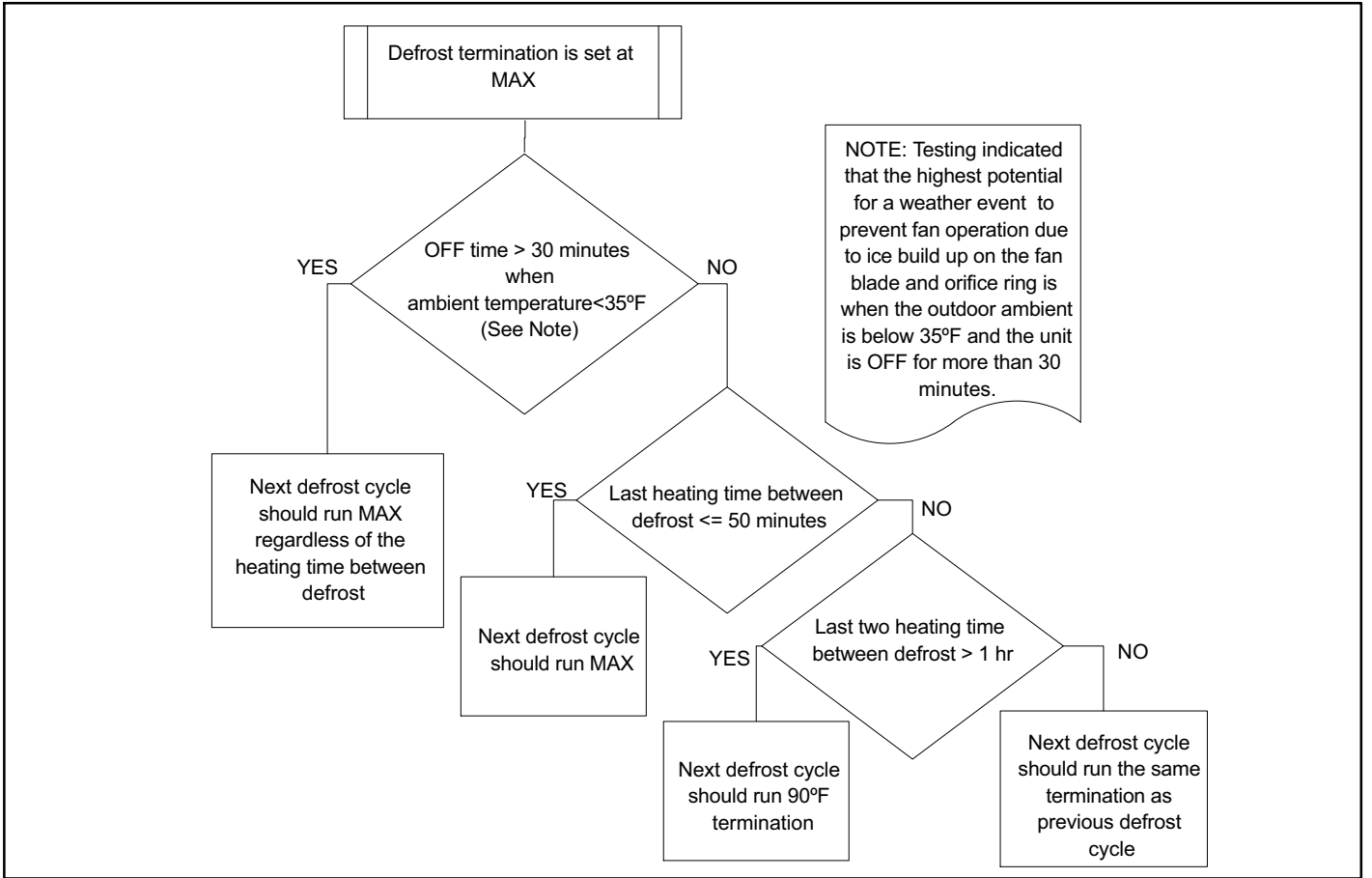
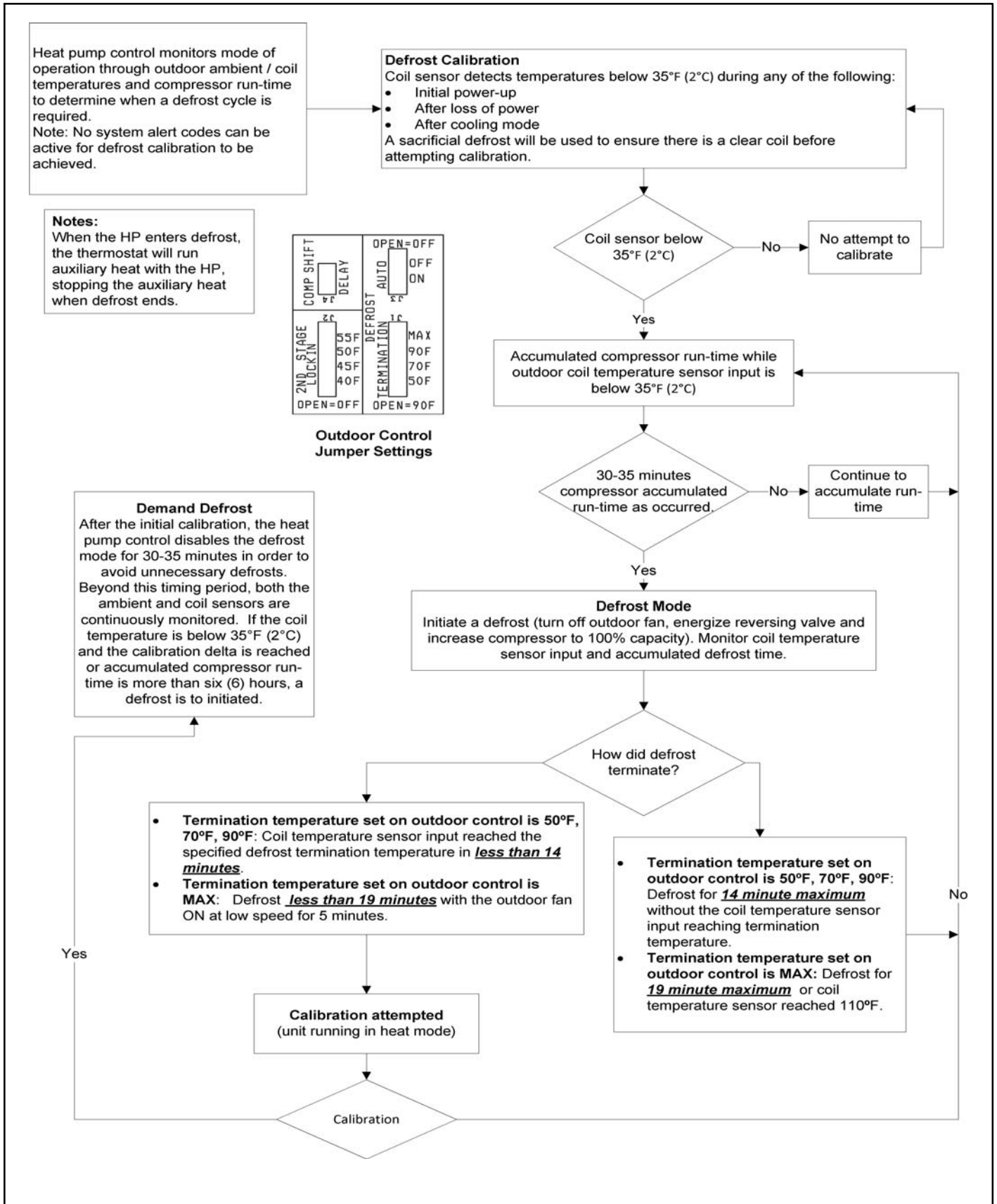


Figure 7. Auto Defrost Rule



Defrost Mode
Initiate a defrost (turn off outdoor fan, energize reversing valve and increase compressor to 100% capacity). Monitor coil temperature sensor input and accumulated defrost time.

How did defrost terminate?

- Termination temperature set on outdoor control is 50°F, 70°F, 90°F: Coil temperature sensor input reached the specified defrost termination temperature in **less than 14 minutes**.
- Termination temperature set on outdoor control is MAX: Defrost **less than 19 minutes** with the outdoor fan ON at low speed for 5 minutes.

- Termination temperature set on outdoor control is 50°F, 70°F, 90°F: Defrost for **14 minute maximum** without the coil temperature sensor input reaching termination temperature.
- Termination temperature set on outdoor control is MAX: Defrost for **19 minute maximum** or coil temperature sensor reached 110°F.

Calibration attempted
(unit running in heat mode)

Calibration

Coil sensor below 35°F (2°C)

No → No attempt to calibrate

Yes → Accumulated compressor run-time while outdoor coil temperature sensor input is below 35°F (2°C)

30-35 minutes compressor accumulated run-time as occurred.

No → Continue to accumulate run-time

Yes → Defrost Mode

How did defrost terminate?

Yes → Calibration attempted

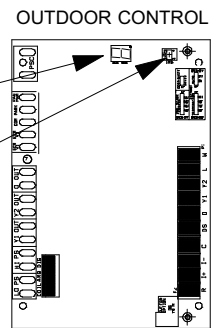
No → No attempt to calibrate

Figure 9. Demand Defrost - MAX Defrost

Configuring Unit Type

During initial power-up the control will auto-detect the unit type. The unit type is automatically determined by what is connected to **Y2 OUT** and/or **O OUT** on the control. The unit type can be permanently stored in the control's memory by manually configuring the unit type using the following procedure. Typically the capacity and fan speed will not be configured and will display the three dashes for each. For manual configuration of the unit type, proceed as indicated.

NOTE: To prevent communication during set up, either remove the room thermostat from its sub-base or disconnect the + and - from the control being configured.



Outdoor control is in **IDLE** mode (No heating or cooling demand) (SEE NOTE)

To enter **unit type**, push and hold button next to single character display until **dash** symbol appears. Immediately release button. Once dash starts blinking, proceed to next step.

Push and hold button until the solid **Pt** sequence appears on the seven-segment display. Immediately release the button.
 [This configuration sequence allows the installer to select a unit type (number / letter combination) that matches the outdoor type and number of stages.]

- Unit Type / Number of Stages
- 1RC** Single-stage air conditioner
 - 2RC** Two-stage air conditioner
 - 1HP** Single-stage heat pump
 - 2HP** Two-stage heat pump

1. When the correct unit type is displayed, release button immediately. [Display will start flashing]
2. Push and hold button until selection stops flashing during one of the three cycles. [Release the button]
3. If selection is not made during those three cycles the control will return to idle mode.

Press and hold the button during the **Pt** cycling display.
 [The **Pt** sequence will repeat 5 times and if a selection is not made the control will return to idle mode.]



The outdoor control will store unit type in memory and will automatically exit the configuration and reset control.

If three horizontal bars display in any part of the 7-segment string during power up, the outdoor control did not store that configuration. (Unit type, capacity or fan RPM. If this happens, the configuration sequence for that section of the string must be repeated.)

During power up of the outdoor control, the seven-segment display will show the stored number of stages unit type, capacity and outdoor fan speed.

2 **H** **P** PAUSE **3** **6** PAUSE **1** **2**

TWO STAGE HEAT PUMP CAPACITY (3-TON) FAN PROFILE

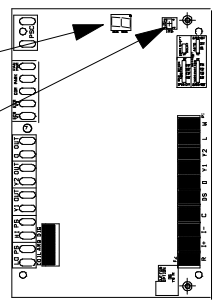
Figure 11. Unit Type Manual Configuration

Configuring Unit Capacity or Fan Profile

Power-up - Unit capacity (two-digit number) and displayed represents unit size code (outdoor unit capacity). During initial power up, the number of stages / unit type, unit capacity and outdoor fan speed will appear on the 7-segment display. If three horizontal bars display in any part of the 7-segment display string during power-up, the outdoor control did not store that configuration (unit type, capacity or fan RPM). If this happens, the configuration sequence for that section of the string must be repeated.

NOTE: To prevent communication during set up, either remove the room thermostat from its sub-base or disconnect the + and - from the control being configured.

OUTDOOR CONTROL



SEVEN-SEGMENT DISPLAY

PUSH BUTTON

Yes

Outdoor control is in **IDLE** mode
(No heating or cooling demand)
(SEE NOTE)

No

Turn room thermostat to OFF

To enter **unit capacity or fan profile configuration**, push and hold button next to single character display until **dash** symbol appears and immediately release button. Once dash starts blinking, proceed to next step.

Push and hold button until the solid **PC** or **PF** sequence is displayed on the seven-segment display and then immediately release the button. This configuration sequence allows the installer to select a unit type (number / letter combination) that matches the outdoor unit type and number of stages.

Either the **PC** or **PF** sequence will repeat 5 times and if a selection is not made the control will return to idle mode. Press and hold the button during the **PC** or **PF** cycling display.

NOT SELECTED

Unit Capacity Code

P	C	12	1-TON
P	C	18	1-1/2-TON
P	C	24	2-TON
P	C	30	2-1/2-TON
P	C	36	3-TON
P	C	42	3-1/2-TON
P	C	48	4-TON
P	C	60	5-TON

Fan Profile Code (see notes)

P	F	SEE NOTE 1
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EBM fan motor with blades
SEE NOTE 2
See table 6 for fan profile.



ECM fan motor
SEE NOTE 3
See table 7 for factory default ECM fan speeds.

END

NOT SELECTED

1. When the correct unit capacity or fan profile is displayed, release button immediately. [Display will start blinking]
2. Push and hold button until selection stops flashing during one of the three cycles. [Release push button]
3. If selection is not made during those three cycles the control will return to idle mode.

NOTES

1. Determine fan motor-type (EBM or ECM).
2. **Units with EBM motors** - The fan motor RPM must be field set or three bars will appear in the fan profile string section of the 7-segment display. The factory default fan speeds are reference in table 6 on page 15.
3. **Units with ECM motors** - The fan motor RPM is factory set and can not be adjusted. The ECM motor speed (fan profile) string will not appear on the 7-segment display. The fan profile displayed is applicable only to EBM fan motor applications. See table 7 on page 15 for model fixed fan speeds.

If three horizontal bars display in any part of the 7-segment display string during power-up, the outdoor control did not store that configuration (unit type, capacity or fan profile). If this occurs, the configuration sequence for that section of the string must be repeated.

The outdoor control will store unit type in memory and will automatically exit the configuration and reset control.

During power up of the outdoor control, the seven-segment display will show the stored number of stages unit type, capacity and outdoor fan speed.

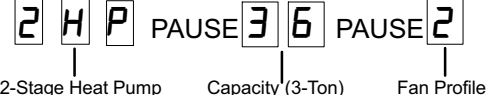


Figure 12. Unit Capacity and Fan Profile

Table 6. EBM Fan RPM Profiles


							
Fan RPM Profile	Model Number	Stage 1 PWM %	Stage 1 RPM	Stage 2 PWM %	Stage 2 RPM	EDA Stage PWM %	EDA Stage RPM
0	XC/XP17-024	55	400	55	400	55	400
1	XC/XP17-030	62	450	62	450	62	450
2	Not assigned	69	500	69	500	69	500
3	Not assigned	71	550	76	550	71	550
4	XC/XP17-036 and -042	83	600	83	600	83	600
5	Not assigned	90	650	90	650	90	650
6	XC/XP17-048 and -060	92	675	92	675	92	675
7	Not assigned	97	700	97	700	97	700
8	Not assigned	48	350	55	400	27	200
9	Not assigned	55	400	62	450	27	200
10	XP21-024	58	425	69	500	27	200
11	XC21-024	65	475	76	550	27	200
12	XC/XP21-036	72	525	83	600	30	225
13	Not assigned	79	575	90	650	30	225
14	XC21-048, - 060 and XP21-048	83	600	92	675	30	225
15	XP21-060	86	625	97	700	30	225

Table 7. Fan RPM for ECM Motors

 ECM MOTOR			
Model Number	Stage 1 RPM	Stage 2 RPM	EDA Stage RPM
XP17N-XX-230-01	700	N/A	250
XP19-XX-230-06, XC21-XX-230-04 and XP21N-XX-230-01	700	850	250

Seven-Segment Alert and System Status Codes

Alert codes are displayed using the seven-segment display located on the outdoor control.

NOTE — System fault and lockout alarm code displays takes precedence over system status (cooling, heating stages or defrost/dehumidification).

The seven-segment will display an abnormal condition (error code) when detected in the system. A list of the codes are shown in table 8.

RESETTING ALERT CODES

Alert codes can be reset manually or automatically:

1. Manual Reset

Manual reset can be achieved by one of the following methods:

- Disconnecting **R** wire from the main control's **R** terminal.
 - Turning the indoor unit off and back on again
- After power-up all existing codes are cleared.

2. Automatic Reset

After an alert is detected, the main control continues to monitor the unit's system and compressor operations. When/if conditions return to normal, the alert code is turned off automatically.

Table 8. Seven-Segment Display Alert Codes

NOTE — System fault and lockout seven-segment display alarm codes takes precedence over system status codes (cooling, heating stages or defrost/dehumidification). Only the latest active fault, or lockout alarm code if present, will be displayed. If no fault or lockout codes are active, then system status codes are routinely displayed.

Alert Codes	Alarm Description	Possible Causes and Clearing Alarm
E 105	The outdoor unit has lost communication with the rest of the system.	Equipment is unable to communicate. This may indicate the existence of other alarms / codes. In most cases errors are related to electrical noise. Make sure high voltage power is separated from RSBus. Check for mis-wired and/or loose connections between the stat, indoor unit and outdoor unit. Check for a high voltage source of noise close to the system. This is a self-recoverable error.
E 120	There is a delay in the outdoor unit responding to the system.	Typically, this alarm/code does not cause any issues and will clear on its own. The alarm / code is usually caused by a delay in the outdoor unit responding to the thermostat. Check all wiring connections. Cleared after unresponsive device responds to any inquiry
E 124	The iComfort® thermostat has lost communication with the outdoor unit for more than 3 minutes.	Equipment lost communication with the thermostat. Check the wiring connections, ohm wires and cycle power. The alarm stops all associated HVAC operations and waits for a heartbeat message from the unit that's not communicating. The alarm / fault clears after communication is re-established.
E 125	There is a hardware problem with the outdoor unit control.	There is a control hardware problem. Replace the outdoor control if the problem prevents operation and is persistent. The alarm / fault is cleared 300 seconds after the fault recovers.
E 126	There is an internal communication problem with the outdoor unit control.	There is an internal hardware problem on the control. Typically the control will re-set itself. Replace the control if the problem prevents operation and is persistent. The alarm / fault is cleared 300 seconds after the fault recovers.
E 131	The outdoor unit control parameters are corrupted	Reconfigure the system. Replace the control if heating or cooling is not available.
E 180	The iComfort® thermostat has found a problem with the outdoor unit's ambient sensor.	In normal operation after outdoor control recognizes sensors, the alarm will be sent if valid temperature reading is lost. Compare outdoor sensor resistance to temperature/resistance charts in unit installation instructions. Replace sensor pack if necessary. At the beginning of (any) configuration, furnace or air-handler control will detect the presence of the sensor(s). If detected (reading in range), appropriate feature will be set as 'installed' and shown in the iComfort® thermostat 'About' screen. The alarm / fault will clear upon configuration, or sensing normal values.
E 345	The "O" relay on the air-handler or outdoor unit has failed. Either the pilot relay contacts did not close or the relay coil did not energize.	O relay / Stage 1 failed. Pilot relay contacts did not close or the relay coil did not energize. Replace control. Cleared after the fault recovered following reset.
E 409	The secondary voltage for the outdoor unit has fallen below 18VAC. If this continues for 10 minutes, the system will shut down.	Secondary voltage is below 18VAC. After 10 minutes, operation is discontinued. Check the indoor line voltage, transformer output voltage. The alarm clears after the voltage is higher than 20VAC for 2 seconds or after a power reset.
E 410	The outdoor unit pressure is below the required limit.	Unit pressure is below the lower limit. The system is shut down. The low pressure switch for HFC-410A will open at 40PSIG and close at 90PSIG. Confirm that the system is properly charged with refrigerant. Check TXV, indoor unit blower motor, dirty filters or clogged refrigerant filter. Confirm that the evaporator coil is clean. The alarm clears after the pressure switch closes or after a power reset.
E 411	The low pressure switch has opened 5 times during one cooling cycle. As a result, the system will shutdown.	Open low pressure switch error count reached 5 strikes. The low pressure switch for R410A will open at 40PSIG and close at 90PSIG. Confirm that the system is properly charged with refrigerant. Check TXV, indoor unit blower motor, dirty filters or clogged refrigerant filter. Confirm that the evaporator coil is clean. The alarm clears after a power reset.
E 412	The outdoor unit pressure is above the required limit. The system will shut down.	Unit pressure is above the upper limit. System is shut down. <ul style="list-style-type: none"> The high pressure switch for HFC-410A will open at 590PSIG and close at 418PSIG. Confirm that the system is properly charged with refrigerant. Check condenser fan motor, TXV, indoor unit blower motor, stuck reversing valve or clogged refrigerant filter. Confirm that the outdoor unit is clean. The alarm clears after 4 consecutive normal compressor run cycles, the pressure switch closes or a power reset. Compressor thermal switch used on XC17 and XP17 when Interlink compressor is used. Units are equipped with a compressor mounted normally-closed temperature switch that prevents compressor damage due to overheating caused by internal friction. The switch is located on top of the compressor casing. This switch senses the compressor casing temperature and opens at 239-257°F (115°C-125°C) to shut off compressor operation. The auto-reset switch closes when the compressor casing temperature falls to 151-187°F (66°C-86°C), and the compressor is re-energized. This single-pole, single-throw (SPST) bi-metallic switch is wired in series with the high pressure switch.
E 413	The high pressure or compressor thermal switch has opened 5 times during one room thermostat demand. As a result, the outdoor control will hard lockout unit.	Open high pressure or compressor thermal switch error count reached 5 strikes. System is shut down. The high pressure switch for HFC-410A will open at 590PSIG and close at 418PSIG. Confirm that the system is properly charged with refrigerant. Check condenser fan motor, TXV, indoor unit blower motor, stuck reversing valve or clogged refrigerant filter. Confirm that the outdoor unit is clean. The alarm clears after a power reset.
E 414	The discharge line temperature is higher than the recommended upper limit of 279°F.	Discharge line temperature is > 279°F. Confirm that the system is properly charged with refrigerant. Check system operating pressures and compare to unit charging charts in installation manual. Confirm that the outdoor unit is clean. The alarm clears after the discharge temperature is < 225°F.

E 415	The discharge line temperature has been consistently higher than the recommended upper limit of 279°F.	Discharge line high temperature error count reached 5 strikes. Confirm that the system is properly charged with refrigerant. Check system operating pressures and compare to unit charging charts in installation manual. Confirm that the outdoor unit is clean. The alarm clears after the discharge temperature is < 225°F. The alarm clears after a power reset.
E 416	The outdoor coil sensor is either open, short-circuited or the temperature is out of sensor range. As a result the outdoor unit control will not perform any defrost tempering.	Coil sensor being detected open or shorted, or temperature is out of coil sensor range. Outdoor unit control will not perform demand or time/temperature defrost operation. System will still heat or cool. Check the resistance of the coil sensor and compare to temperature resistance chart. Replace coil sensor if needed. The alarm clears when outdoor unit control detects proper coil sensor readings or after a power reset.
E 417	The outdoor unit discharge sensor is either open, short-circuited or the temperature is out of sensor range. As a result the outdoor unit control will not perform any defrost tempering.	Outdoor unit control detects open or shorted discharge sensor, or temperature that is out of discharge sensor range. Check the resistance of the discharge sensor and compare to temperature resistance chart - replace if needed. Reset by replacing the discharge sensor. This fault is detected by allowing the unit to run for 90 seconds before checking discharge sensor resistance. If the discharge sensor resistance is not within range after 90 seconds, the board will count one fault. After 5 faults, the board will lock out. Check for proper sensor reading and attachment to line. The alarm clears after a power reset.
E 418	There is a faulty W output circuit.	W terminal is energized while in cooling mode . Possible cause may be a stuck closed relay on the control, or something external to the control that is energizing W terminal when it should not be energized. Solution: Disconnect any wiring from the W terminal. If 24 volts is still on the terminal, then it is a stuck relay. If the 24 volts disappears, then there is a need to check any of the wires hooked up to the W terminal.
E 419	The W output on the outdoor unit has reported more than 5 errors. As a result, the system has shutdown the outdoor unit.	The W output (code E418) on the outdoor unit has reported more than 5-strikes. As a result, the system has shut-down the outdoor unit. Disconnect thermostat lines from W and verify 24VAC on the W . If 24VAC is present, replace the control.
E 420	The heat pump defrost cycle has taken more than 20 minutes to complete.	Defrost cycle lasts longer than 20 minutes. This alarm is applicable with non-communicating heat pump system only. Check heat pump defrost operation. The alarm is cleared after the "W1" signal is removed.
E 421	The W output terminal on the outdoor unit is not wired correctly.	Voltage sensed on W and O when Y1 thermostat input is deactivated. Another device or wiring fault is energizing W Check wiring. The alarm clears when wiring is corrected or after a power reset.

NOTE — Additional codes may be found in iComfort® room thermostat manual.

Table 9. Outdoor Control Seven-Segment Unit Status Displays

Description	Example of Display
<p>Power up / Reset: Unit type and number of stages is displayed. Verify configuration with information published on the unit nameplate. If the information is incorrect, refer to flow chart <i>Manually Configuration of Unit Type</i> to re-configure control.</p>	<p>1 Stage AC: 1AC 2 Stage AC: 2AC 1 Stage AC: 1HP 1 Stage AC: 2HP</p> <p>POWER-UP 7-SEGMENT DISPLAY STRING</p>
<p>Power up / Reset following display of self-discovered configuration: Unit nominal capacity is displayed, if not programmed then three horizontal lines and the decimal point are displayed for 2 seconds.</p>	<p>Power up nominal capacity display of an XP21-036: 36</p> <p>POWER-UP 7-SEGMENT DISPLAY STRING</p>
<p>Power up / Reset following display of nominal capacity: Fan Profile code. (a single or two digit number) See table 6 for applicable fan RPM profile.</p>	<p>Displays the number of the selected fan profile. 3</p> <p>POWER-UP 7-SEGMENT DISPLAY STRING</p>

Table 8. Outdoor Control Seven-Segment Unit Status Displays (continued)

Description	Example of Display
Idle Mode: Decimal point blinks at 1 Hz	Idle Mode: Decimal point blinks at 1 Hz (0.5 second on, 0.5 second off). Display OFF.
Soft Disabled: Top and bottom horizontal line and decimal point blink at 1 Hz.	Soft Disabled: Top and bottom horizontal line and decimal point blink at 1 Hz (0.5 second on, 0.5 second off). See additional information below this table.
O.E.M test mode	All segments flashing at 2 Hz (unless error is detected) Note: Control should be replaced.
Anti-Short Cycle Delay	Middle line shall blink at 1 Hz for 2 seconds, followed by a two second display of the rounded up number of minutes left in the timer (two minutes, one second shall be displayed as "3"). The Anti-Short Cycle Delay time remaining is displayed when the delay is active.
Cooling Stage: Shows what stage of cooling is currently operating.	Following string is repeated if two-stage cooling is active with outdoor fan speed set at 700 RPM. Note: A - If available, displays outdoor ambient temperature. C 2 pause F 7 0 0 pause
Heat Pump Stage: Shows what stage of heat pump is currently operating.	Following string is repeated if first-stage heat pump is active with outdoor fan speed set at 600 RPM. Note: A - If available, displays outdoor ambient temperature. H 1 pause F 6 0 0 pause
Defrost Mode: Shown only while in an active defrost.	Following string is repeated if defrost is active while unit was in first-stage heat pump heating mode: d F pause H 1 pause
Dehumidification mode: Shows that the unit is providing dehumidification instead of straight cooling.	Following string is repeated if dehumidification is active with outdoor fan speed set at 225 RPM: d pause F 2 2 5 pause
Diagnostic recall: Shows the last 10 stored diagnostic error codes.	If first error is E250, second E231: E pause 2 5 0 pause E pause 2 3 1 Next codes (up to 10) are show using same method. If there are no error codes stored: E pause 0 0 0
Fault Memory clear	After the fault memory is cleared, the following string is displayed with 0.5 seconds character on/off time: 0 0 0 0 pause
Active error in outdoor control Idle mode: Shown all active error(s) codes.	Following string is repeated if Error E125 and E201 are present: E 1 2 5 pause E 2 0 1
Active error in run mode: Shown current status and all active error(s) codes.	Following string is repeated if Error E311 is present while blower speed at 700RPM: F 7 0 0 pause E 3 1 1
Outdoor Ambient Temperature (OAT): Any time OAT is sensed in operating range value is displayed if unit is in diagnostic and non-diagnostic modes.	Following string is repeated if second stage cooling is active with outdoor fan speed set at 650 RPM and OAT is 104°F: C 2 pause F 6 5 0 pause A 1 0 4 pause
Outdoor Coil Temperature (OCT): Any time OCT is sensed in operating range value is displayed if unit is in diagnostic mode.	Following string is repeated if 2nd stage heat is active with outdoor fan speed set at 550 RPM and OCT is 25° F: H 2 pause F 5 5 0 pause c 2 5 pause
Discharge Line Temperature (DIS): Any time DIS is sensed in operating range value is displayed if unit is in diagnostic mode.	Following string is repeated if 2nd stage cooling is active with outdoor fan speed set at 650 RPM and DIS is 185° F: C 2 pause F 6 5 0 pause d 1 8 5 pause

SOFT DISABLE

Steps to follow if this control is displaying the soft disable code

1. Confirm proper wiring between all devices (Thermostat, damper control module, indoor and outdoor)
2. Cycle power to the control that is displaying the soft disable code.

3. Put the room thermostat through Set up.
4. Go to **setup / system devices/ thermostat / edit/ push reset.**
5. Go to **setup / system devices / thermostat / edit / push resetAll.**

Table 10. Error Recall Menu Options

Error Code Recall Mode (Note - control must be in idle mode)		
Solid	E	To enter error code recall mode, push and hold button until solid E appears, then release button. Control will display up to 10 error codes stored in memory. If E000 is displayed, there are no stored error codes.
Solid	- - -	To exit error code recall mode push and hold button until solid three horizontal bars appear, then release button. Note - Error codes are not cleared.
Solid	c	To clear error codes stored in memory, continue to hold push button while the 3 horizontal bars are displayed. Release push button when solid c is displayed.
Blinking	c	Hold push button for three seconds to confirm command to delete codes. Error codes are cleared.

*Note once the error history is deleted it cannot be recovered. After the history is deleted, the unit will reset itself.

Table 11. Field Test and Program Menu Options

Display	Display and action (normal operation)	Display and action (configuration and test mode)
Power -UP	Display string displays > number of unit stages > pause > AC or HP unit > pause > unit capacity in BTUs > pause > RPM setting of outdoor fan. If 3 horizontal bars are displayed during any sequence of this string, it indicates that the specific parameter is not configured.	
-	Idle mode — decimal blinks at 1 Hertz > 0.5 second ON, 0.5 second OFF	
A	A in the display string represents the ambient temperature in °F at the outdoor sensor on the outdoor unit.	Enter A test mode: Display will string active error code(s) E , ambient A , coil c and discharge d temperature in °F at outdoor unit.
d	d - dehumidification mode string > d pause > F (Outdoor fan) RPM > pause > A (ambient temp displayed) > pause > repeat mode. IMPORTANT: On 2-stage unit R to DS link must be cut and correct RPM outdoor fan profile selected for outdoor fan to operate at lower RPM speed when EDA is active.	Enter d test mode: Forced defrost. (System must be configured as HP. Unit must be running in heating mode). Test defrost will terminate when coil terminate temperature is reached (or 10 seconds, whichever is longer) or 14 minutes if coil temperature remains below terminate temperature or by pushing button down for less than 2 seconds. Enter A test mode: Display will string active error codes E , ambient A , coil c and discharge d temperature in °F at outdoor unit.
d F	d F displays when system is in defrost mode and termination temperature is 50°F, 70°F or 90°F - unit must be running in heating mode, outdoor ambient must be below 65°F and outdoor coil temperature must be below defrost termination temperature.	
d F 1	d F 1 displays when system is in defrost mode and termination is MAX - unit must be running in heating mode, outdoor ambient must be below 65°F and outdoor coil temperature must be below 110°F.	
F	F in the display string indicates RPM setting output on terminals PWM and com (used with EBM motors). RPM displayed does not apply to motor connected on ECM Y1 and ECM Y2.	Enter F test mode: Control outputs DC Voltage onto PWM and com terminals. Outdoor fan will cycle ON for 10 minutes at 490 RPM. To exit test - Push and hold button until three horizontal bars display. Release button, outdoor fan will cycle OFF. (Test DOES NOT output DC voltage to ECM Y1 and ECM Y2 terminals)
H 1	Heat stage 1 string display > pause > F outdoor fan RPM displayed > pause > A (ambient temperature displayed > pause > repeat mode.	
H 2	Heat stage 2 string display > pause > F outdoor fan RPM displayed > pause > A ambient temperature displayed > pause > repeat mode.	
C 1	Cool stage 1 string display > pause > F outdoor fan RPM displayed > pause > A (ambient temperature displayed > pause > repeat mode.	
C 2	Cool stage 2 string display > pause > F outdoor fan RPM displayed > pause > A (ambient temperature displayed > pause > repeat mode.	

Table 12. Configuring Unit Type

Display	Code	Procedure
Solid	Pt	Release push button — Allows user to select type and number of stages on outdoor unit.. IMPORTANT: Field replacement control may need to be manually configured to validate outdoor unit fan RPM setting is right for unit capacity. See RPM table on unit wiring diagram for proper RPM settings. Type and number of stages: 1AC, 2AC, 1HP, 2HP – AC – air conditioning and HP – Heat Pump
Blinking	Pt	Push and hold button — Control will display type and number of stages for three seconds. When the correct type and number of stages is displayed, release button. Selected code will flash for a 10-second period. During that period, hold push button for 3 seconds to store code. Once code is stored control will automatically exit <i>field test mode</i> . If 10 second period expires or push button is held less than 3 seconds, control will automatically exit field test mode and go into idle mode without storing type and number of stages. If this happens, configuring procedure must be repeated.

Table 13. Configuring Unit Capacity

Configuring Unit Capacity (Note - Control must be in Idle Mode)		
Solid	<i>PC</i>	Release push button — Allows user to select Unit Capacity. IMPORTANT: Field replacement control may need to be manually configured to validate outdoor unit capacity. Refer to unit nameplate model number for capacity in 1,000 of BTUs. (18, 24, 30 ,36,42 48, 60)
Blinking	<i>PC</i>	Push and hold button — Control will display unit capacity number for three seconds. When the correct unit capacity number is displayed, release button. Selected code will flash for a 10 second period. During that period, hold push button for 3 seconds to store code. Once code is stored control will automatically exit <i>Field Test Mode</i> . If 10-second period expires or push button is held less than 3 seconds, control will automatically exit field test mode and go into idle mode without storing unit capacity Number. If this happens, configuring procedure must be repeated.

Table 14. Configuring Outdoor Fan Speed

(Note - Control must be in Idle Mode)		
Display	Code	Procedure
Solid	<i>PF</i>	Release push button — Allows user to select outdoor fan RPM profile. IMPORTANT: New control may need to be manually configured to validate outdoor unit fan RPM setting is correct for unit capacity. Refer to RPM table on unit wiring diagram.
Blinking	<i>PF</i>	Push and hold button — Outdoor control will display a fan RPM profile 3 seconds. When the correct fan RPM profile is displayed, release button. Selected code will flash for a 10 second period. During that period, hold push button for 3 seconds to store code. Once code is stored control will automatically exit field test mode. If 10 second period expires or push button is held less than 3 seconds, control will automatically exit field test mode and go into idle mode without storing fan RPM profile. Repeat procedure to correct.