Installation Instructions

ADDENDUM

iQDrive® EXV

1. Scope

This Installation Instruction supplement describes an update to the electronic expansion valve (EXV) system which has been installed on this equipment, as part of an iQ 23 SEER split air conditioning system.

The updated EXV system is installed on the following air handlers. No further installation work is required on these units.

- B5VM-E36K-B (SKU 904390E)
- PAH2VM-E36K-B (SKU 904390PE)
- B5VM-E48K-C (SKU 904391E)
- PAH2VM-E48K-C (SKU 904391PE)

On iQ systems whose indoor equipment is made up of a separate coil and blower (either in a furnace or in a furnace blower kit), the updated EXV system must be interconnected between these parts. Models to which this applies includes one of the following coil assemblies plus either the furnace blower kit or a gas furnace listed below:

- Coil assemblies
  - C5BH-E36C-B (SKU 919230E)
  - C5BH-E48C-C (SKU 919231E)
  - field replacement coil E24/36 (SKU 919457E)
  - field replacement coil E48 (SKU 919458E)
- Furnace blower kit 904621
- Gas furnaces:

Model		SKU	Model		SKU
FG6TE	060C-IQBA	904623F	FG6TE	060N-IQBA	904627F
PGF1TE	060C-IQBA	904623P	PGF1TE	060N-IQBA	904627P
MGF1TE	060C-IQBA	904623L	MGF1TE	060N-IQBA	904627L
FG6TE	080C-IQBA	904624F	FG6TE	080N-IQBA	904628F
PGF1TE	080C-IQBA	904624P	PGF1TE	080N-IQBA	904628P
MGF1TE	080C-IQBA	904624L	MGF1TE	080N-IQBA	904628L
FG6TE	100C-IQBA	904625F	FG6TE	100N-IQBA	904629F
PGF1TE	100C-IQBA	904625P	PGF1TE	100N-IQBA	904629P
MGF1TE	100C-IQBA	904625L	MGF1TE	100N-IQBA	904629L
FG6TE	120C-IQCA	904626F	FG6TE	120N-IQCA	904630F
PGF1TE	120C-IQCA	904626P	PGF1TE	120N-IQCA	904630P
MGF1TE	120C-IQCA	904626L	MGF1TE	120N-IQCA	904630L

Table 1. Gas Furnaces

2. General

These instructions are primarily intended to assist qualified individuals experienced in the proper installation of Heating and Air Conditioning equipment including the iQ Drive System. Local codes may require licensed installation/service personnel for this type of equipment.

All safety cautions, warnings, and advisories stated in the primary Installation Instructions document apply.

This document supplements the primary Installation Instructions for the associated equipment.

3. Parts

Remove the front cover of the coil assembly, and locate the following parts associated with the EXV system found with the coil assembly:

- Electronic expansion valve (EXV) (connected to the distributor) and attached coil, with 6-wire cable (Figure 1)
- Pressure transducer, with associated 3-wire cable (Figure 2)
- Suction line temperature sensor (covered with tar tape), with associated 2-wire cable (red wires) (Figure 3)

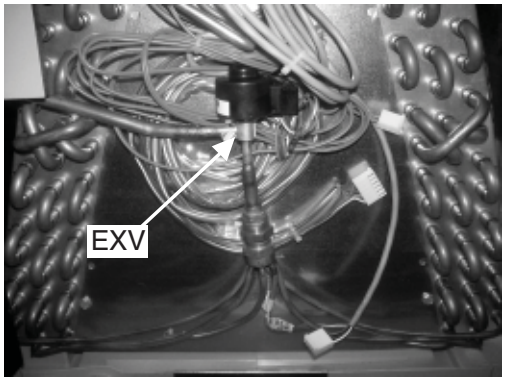

Figure 1. iQ Coil Assembly 919230E Front View, Showing EXV and 6-Wire Coil Cable

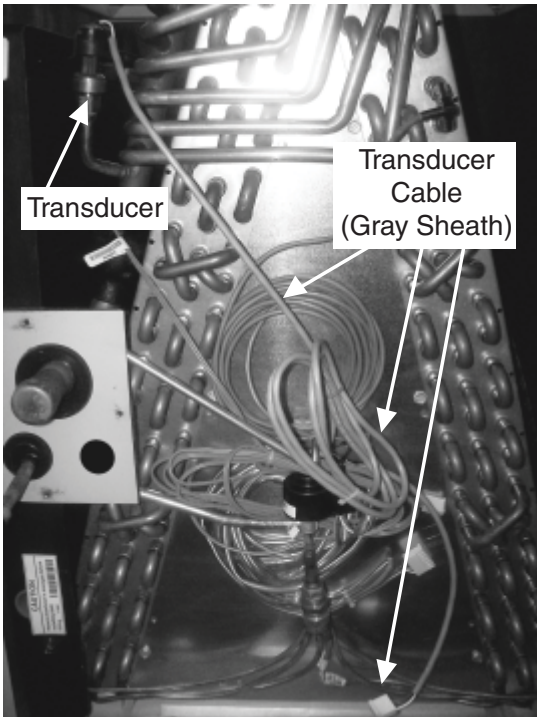

Figure 2. Pressure Transducer and Cable in iQ Drive® coil Assembly 919230E

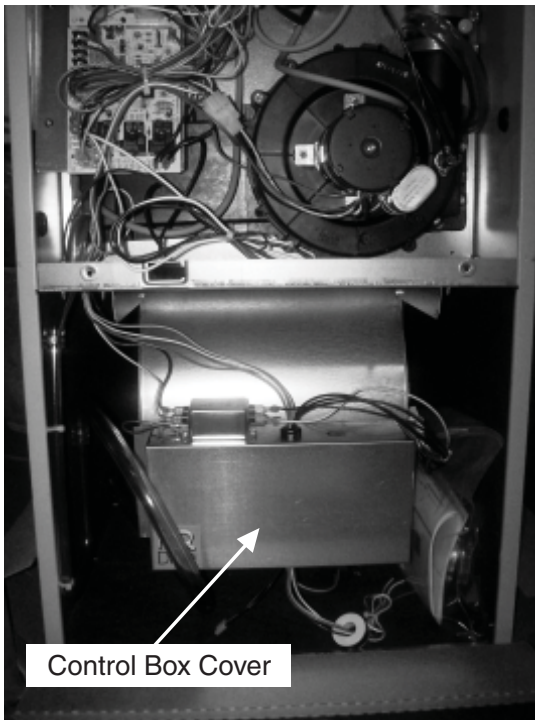

Figure 4. iQ Drive Gas Furnace with Front Cover Off, Showing control Box Cover.

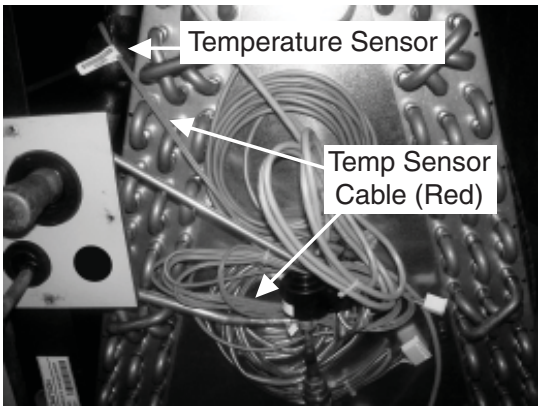

Figure 3. Suction Line Temperature Sensor and 2-Wire cable in iQ Drive Coil Assembly 919230E

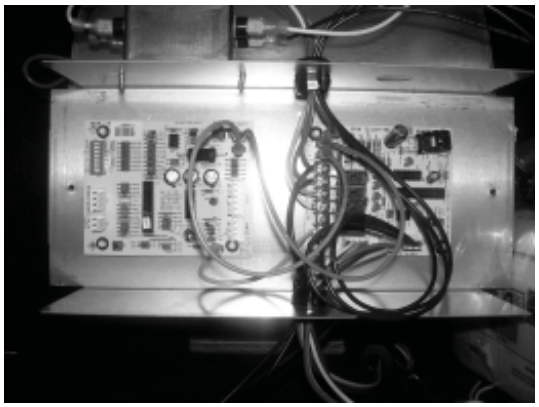

Figure 5. Gas Furnace Control Box with Cover Removed (EXV Board on Left).

⚠ CAUTION:

Switch off power to the furnace and furnace controls before opening furnace compartments.

Remove the furnace blower compartment front door. Locate the control box inside the blower compartment, remove its cover, and locate the EXV control circuit board on the left side within the control box. Refer to Figures 4 and 5.

4. Installation

⚠ WARNING:

Assure that all electrical power is OFF when connecting the parts of the EXV systems.

a. Route the following cables from the coil compartment out hole “C” shown in Figure 6. Cut wire ties to allow extension of the cables. A flexible black plastic sheath (split harness wrap) is provided for bundling and routing all of the following cables together:

1. EXV coil cable (6-wire) with 6-pin white connector plug.
2. Pressure transducer cable (3-wire) with 4-pin white connector plug.
3. Temperature sensor cable (red 2-wire) with 3-pin white connector plug.

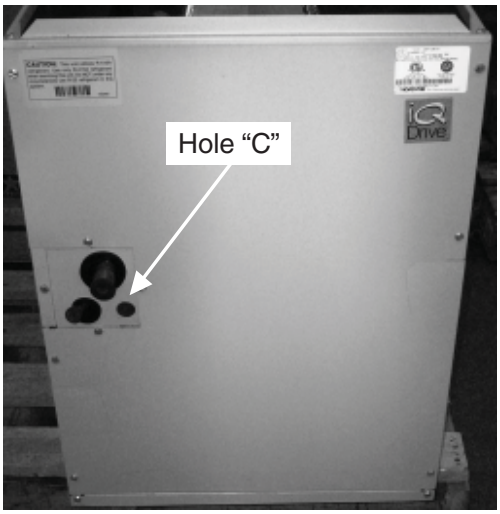

Figure 6. Coil 919230E Front Panel

b. Route the bundle of three cables into the side of the furnace compartment. Use of existing hole(s), such as the oblong hole on whichever side is not used for gas line entry, is recommended. (See Figure 7)

Figure 7. Holes on Left Side of Gas Furnace.

c. Remove the small rectangular plate at the front left corner of the floor panel of the furnace compartment, and route the three cables through the hole. Assure that the cables are not located in such a way as to be in danger of damage by sharp sheet metal edges. (See Figure 8)

d. Route the cables to the EXV circuit board (board #1179-200, with the red DIP switch block). This may require cutting an access hole in the side or top of the control box (with the furnace or furnace blower kit). (See Figures 4 and 5)

e. Connect the 6-pin EXV coil cable plug to the P1 connector marked “EXV” on the edge of the board. Make sure that the “ears” of the plug face inward on the board, towards the side of the connector with the back. (See Figure 9)

f. Connect the 3-pin plug (with the two red wires) to the P2 connector on the EXV board, also labeled “THERM #1 #2” at the edge of the board. Make sure that the “ears” of the plug face inward on the board, towards the side of the connector with the back. (See Figure 9)

g. Connect the 4-pin plug (with the three wires) to the P3 connector on the EXV board, also labeled “THERM/PRESS” at the edge of the board. Make sure that the “ears” of the plug face inward on the board, towards the side of the connector with the back. (See Figure 9)

h. Neaten and straighten the routing of all three cables on the exterior of the coil and furnace enclosures. Fix the routing neatly using adhesive-backed wire tie anchors and wire ties. Use wire ties to neatly bind up any excess cable in the blower compartment. Assure that no sharp edges are in contact with wiring.

i. Proceed with system check-out (when the remainder of the installation is ready).

5. Service Information

a. General

Normally no adjustments are required, and system checkout is merely a precautionary measure. The iQ Drive® thermostat does not communicate with, and cannot provide information about the status of the EXV system.

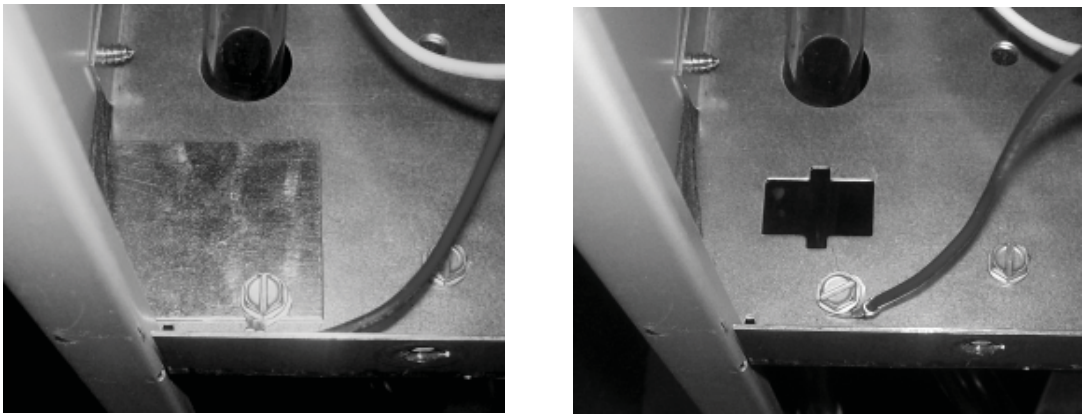

Figure 8. Opening in Front Left Floor Panel of furnace Burner compartment, Covered and Uncovered.

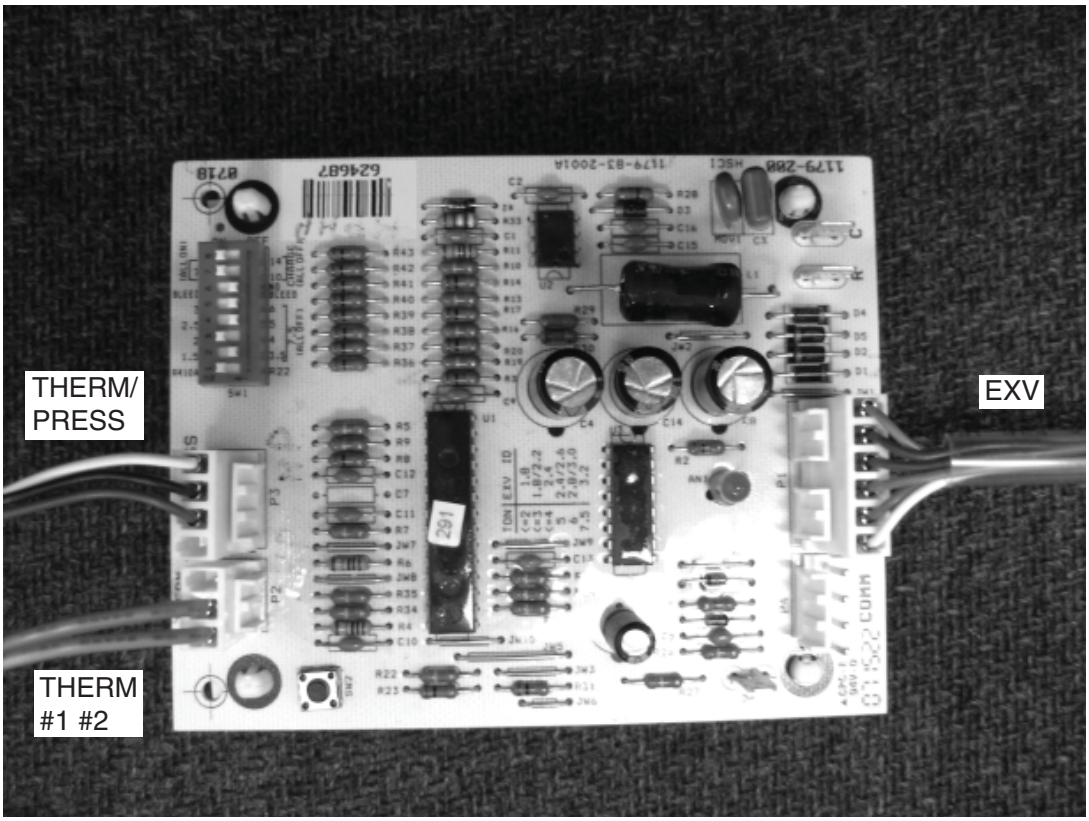

Figure 9. EXV Circuit Board Showing EXV Coil Harness (6-wire), Pressure Transducer Cable (3-wire), and Temperature Sensor Cable (2-wire) Connections.

b. Configuration

The EXV circuit board is configured using DIP switches on the EXV circuit board (white switches on a red plastic block). This will already be done at the factory (except for replacement boards). Note numbers on one side of the set of switches. If a switch is towards the number, it is ON. Compare/set switch positions to the row in Table 2 based on the nominal size in tons of the unit.

Switch #	1	2	3	4	5	6	7	8
2 ton	ON	off	ON	off	off	off	ON	ON
3 ton	ON	off	off	off	ON	off	ON	ON
4 ton	ON	ON	off	ON	ON	off	ON	ON

Table 2. Switch Configuration

c. System Checkout

After the wiring described in Section 4 has been completed, prepare the control box and blower compartment for closure (remove debris and tools, etc.), but leave control box cover and blower compartment door off. Temporarily rig the blower compartment door switch so that when control power is applied, the switch will be closed. Switch on control power. This will allow observing the EXV board in a powered-up state. The following are indications of a normal operating EXV system:

- After the first few seconds, the green LED on the EXV board should remain lit.
- During initial power-up and when the valve is moving to a new position, a soft clicking sound will normally be audible, indicating that the valve is operating. With power applied to the system, start the unit in cooling mode. The clicking sound should be audible for several seconds as the valve opens. Suction pressure should remain above 100 psi during startup and operation. Once the system has stabilized, suction superheat should be between 6°F and 12°F.
- The position of the valve (steps open out of a maximum of 500) can be determined as follows. Locate the small black round button on the EXV board. With the system operating, press this button for <u>less than 1 second</u> and watch the green LED for flashes. No flashes indicate that the valve is shut (abnormal). A normal response of 1 to 3 flashes indicates the valve position range (up to 100, up to 300 steps).

When the checkout has been successfully completed, turn off power and remove any means used to temporarily close the door safety switch. Reinstall the control box cover and blower compartment door. Restore control power.

d. Troubleshooting

1. SYMPTOMS: Green LED is not lit, and there is no indication of valve closing (clicking) when power is turned on.

   CHECK: Measure AC volts across the R and C terminals on the EXV board. Expected reading is 22-28 vac. If voltage is absent, check wiring and voltage back to the interface board R and C terminals.

2. SYMPTOMS: Green LED is lit with power on, but there is no indication of valve operation.

   CHECK: Check for proper wiring and connections of the EXV coil 6-wire cable. Using a DC voltmeter, check for non-zero voltage between orange and gray wire terminals (with the plug connected) when the valve is in the process of opening or closing (e.g., upon first power-up). (No precise voltage value can be given since it is a pulsed signal.) If no pulsed signal is detected, the EXV board may be defective.

3. SYMPTOMS: There is no indication of valve opening (clicking) when the system is running in cooling mode.

   CHECK: Measure AC volts across the Y and C terminals on the EXV board when system is running in cooling mode. Expected reading is 22-28 vac. If voltage is 0, check voltage between Y and R. If this voltage is 22-28 vac, turn off power and swap the wires connected to R and C (from the interface board), and check the voltages in this test again.

4. SYMPTOMS: Green LED blinks 1 second on, 1 second off when unit is running.

   CHECK: This indicates that one of the sensor readings is out of range. With control power on, check for voltages on the 3-wire pressure transducer connection (at the circuit board, connected) as follows with a DC voltmeter:

   NOTE: If local space temperature exceeds 104°F, this symptom (out of range – high) will occur when the system is off or just starting.

   BLK (+) to GRN (-) should be 4.90 to 5.10 DC volts. If this is 0 when 24 vac power is confirmed to the board, check with the plug to the transducer disconnected (at the board). If there is 5 DC volts with the plug disconnected but 0 DC volts with it connected, there is a short in the transducer or its cable. If there is 0 DC volts when it is disconnected with power confirmed to the board, the board is defective.

WHT (+) to GRN (-) should normally be somewhere between 1.0 to 5.0 DC volts, depending on pressure in the line. With the unit off, check the suction pressure with gages. If the BLK-GRN voltage is 5.00 DC volts, the expected voltage is:

[Volts WHT-GRN] = psig/75 + 0.5

If this reads 0 DC volts with 5 volts between BLK and GRN, check the connection between the transducer cable and the transducer. If that connection appears to be good and not corroded, the transducer or transducer cable is defective. If the voltage is greater than 0.5 but very low, check for loss of charge.

With control power off, disconnect the 2-wire thermistor plug from the board and check the resistance between the leads at the plug. Resistance should be somewhere between 25.4 kΩ (at 41°F) to 8.1 kΩ (at 86°F), decreasing as temperature increases. (Note: This check is not valid if the sensor is still connected to the board!) If reading is 0 or out of range (infinite) on the meter, the sensor or its cable is defective. See chart of resistances below.

NOTE: If local space temperature exceeds 104°F, this symptom (out of range – high) will occur when the system is off or just starting.

5. SYMPTOMS: Valve opens, but green LED continually flashes on and off rapidly (1/3 second each).

   CHECK: This indicates that DIP switches 2-5 are not set properly. Cycle each switch on and off, and set as directed in Table 2 .

6. SYMPTOMS: Green LED blinks in a heartbeat pattern (1/6 sec. on, 1/6 sec. off, 1/4 sec. on, 1 sec off) when unit is running.

   CHECK: This indicates EXV board is operating in fixed opening mode. Press and hold the black button on the EXV board for more than 3 seconds. If green LED is still not on steady, check other troubleshooting steps.

e. Service Reference Information

- Suction Line Thermistor Resistance Interpretation. (Measure sensor leads when disconnected from the board.)

Temperature		Ohms	Temperature		Ohms
-40 °C	-40 °F	336K	25 °C	77 °F	10.0K
-35 °C	-31 °F	243K	30 °C	86 °F	8.06K
-30 °C	-22 °F	177K	35 °C	95 °F	6.53K
-25 °C	-13 °F	130K	40 °C	104 °F	5.33K
-20 °C	-4 °F	97.1K	45 °C	113 °F	4370
-15 °C	5 °F	72.9K	50 °C	122 °F	3603
-10 °C	14 °F	55.3K	55 °C	131 °F	2986
-5 °C	23 °F	42.3K	60 °C	140 °F	2488
0 °C	32 °F	32.7K	65 °C	149 °F	2083
5 °C	41 °F	25.4K	70 °C	158 °F	1752
10 °C	50 °F	19.9K	75 °C	167 °F	1480
15 °C	59 °F	15.7K	80 °C	176 °F	1255
20 °C	68 °F	12.5K			

Table 3. Suction Line Thermistor Resistance Interpretation

- Pressure Transducer Output Interpretation. In the following table, Vo is the DC volts between WHT(+) and GRN(-) wires when connected to the board, powered up. The values shown apply when BLK(+) to GRN(-) is exactly 5.00 volts.

Vo	psig	Tsat (R410a)	Vo	psig	Tsat (R410a)
0.7	15.0	-35 °F	2.9	180.0	62 °F
0.8	22.5	-26 °F	3.0	187.5	65 °F
0.9	30.0	-17 °F	3.1	195.0	68 °F
1.0	37.5	-10 °F	3.2	202.5	69 °F
1.1	45.0	-4 °F	3.3	210.0	72 °F
1.2	52.5	2 °F	3.4	217.5	74 °F
1.3	60.0	8 °F	3.5	225.0	76 °F
1.4	67.5	12 °F	3.6	232.5	78 °F
1.5	75.0	17 °F	3.7	240.0	80 °F
1.6	82.5	21 °F	3.8	247.5	83 °F
1.7	90.0	26 °F	3.9	255.0	84 °F
1.8	97.5	29 °F	4.0	262.5	86 °F
1.9	105.0	33 °F	4.1	270.0	88 °F
2.0	112.5	37 °F	4.2	277.5	90 °F
2.1	120.0	40 °F	4.3	285.0	92 °F
2.2	127.5	43 °F	4.4	292.5	94 °F
2.3	135.0	46 °F	4.5	300.0	96 °F
2.4	142.5	49 °F	4.6	307.5	97 °F
2.5	150.0	52 °F	4.7	315.0	99 °F
2.6	157.5	55 °F	4.8	322.5	100 °F
2.7	165.0	58 °F	4.9	330.0	102 °F
2.8	172.5	60 °F	5.0	337.5	104 °F

Table 4. Pressure Transducer Output Interpretation

INSTALLER: PLEASE LEAVE THESE INSTALLATION INSTRUCTIONS WITH THE HOMEOWNER

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