iQDrive® **EXV**

Installation Instructions

Split System Indoor Coils for iQ Drive® Systems

SAFETY INFORMATION

IMPORTANT: Please read all instructions before servicing this equipment. Pay attention to all safety warnings and any other special notes highlighted in the manual. Safety markings are used frequently throughout this manual to designate a degree or level of seriousness and should not be ignored. **WARNING** indicates a potentially hazardous situation that if not avoided, could result in personal injury or death. **CAUTION** indicates a potentially hazardous situation that if not avoided, may result in minor or moderate injury or property damage

⚠ WARNING:

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

⚠ WARNING:

Improper installation, service, adjustment, or maintenance may cause explosion, fire, electrical shock or other hazardous conditions which may result in personal injury or property damage. Unless otherwise noted in these instructions, only factory authorized kits or accessories may be used with this product.

⚠ WARNING:

PROPOSITION 65 WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

GENERAL INFORMATION

iQ Drive® cased coils are designed for upflow or horizontal applications. These coils are equipped with ESX step motor expansion valve which provides precise flow control for maximum efficiency and reliability.

These coils are also equipped with a coil temperature sensor (to monitor coil temperature during dehumidification mode) and with braze type refrigerant connections for easy installation.

- Read the installation manual supplied with the outdoor unit for: refrigerant line connection procedures, required line sizes, and connection of additional components of the iQ Drive® system.
- Verify that the air delivery of the furnace/air handler is adequate to handle the static pressure drop of the coil, filter, and duct work.
- If precise forming of refrigerant lines is required, a copper tubing bender designed for the size lines used is recommended. Avoid sharp bends and contact of the refrigerant lines with metal surfaces.
- Refrigerant lines should be wrapped with pressure sensitive neoprene or other suitable material where they pass through roughly edged holes.

COIL INSTALLATION

⚠ WARNING:

Shut off all electrical power to the furnace and outdoor condensing unit before performing any maintenance or service on the system.

Note: All condensate pans have primary and secondary drain connections to meet FHA requirements. If the application is located in or above a living space where damage may result from condensate overflow, a separate 3/4 inch drain must be provided from the secondary drain connection and a secondary drain pan must be installed under the entire unit. Run secondary drain lines to a place where they are noticeable if used.

Upflow Furnace

1. Disconnect all electrical power to the furnace.
2. Remove the lower coil access door.
3. Remove the drain pan (horizontal applications) and install the coil as level as possible.

⚠ CAUTION:

The coil must be level to ensure proper condensate drainage. An unlevel installation may result in structural damage, premature equipment failure, or possible personal injury.

4. Connect the refrigerant lines as outlined in the Refrigerant Lines Connection section.
5. Seal the enclosure as required to minimize air leakage.
6. Proceed with EXV System Installation as shown on page 5.

Horizontal Left Installations

1. Disconnect all electrical power to the furnace.
2. Remove the lower coil access door.
3. Remove the plug and knockout from one of the threaded holes in the horizontal drain pan.

⚠ CAUTION:

The knockout must be removed and discarded to ensure proper condensate drainage. Improper drainage may result in structural damage, premature equipment failure, or possible personal injury.

4. Install plug (from horizontal drain pan) in the open drain hole in the drain pan at the bottom of the unit. This will block bypass air from entering the system.
5. Remove the drain line knockout from the coil access door. This will allow access to the horizontal drain.
6. Connect the refrigerant lines as outlined in the Refrigerant Lines Connection section.
7. Seal the enclosure as required to minimize air leakage.
8. Proceed with EXV System Installation as shown on page 5.

Horizontal Right Installations

1. Disconnect all electrical power to the furnace.
2. Remove the lower coil access door.
3. Remove the plug and knockout from one of the threaded holes in the horizontal drain pan.

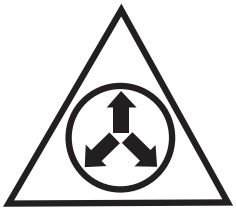
⚠ CAUTION:

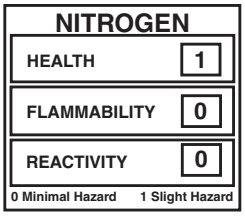
The knockout must be removed and discarded to ensure proper condensate drainage. Failure to do so may result in structural damage, premature equipment failure, or possible personal injury.

4. Place the horizontal drain pan on the opposite side of the coil. (If unit has 2 sets of knockouts, remove the other set of knockouts in the coil spacing plates and insert support rod).
5. Install plug (from horizontal drain pan) in the open drain hole in the drain pan at the bottom of the unit. This will block bypass air from entering the system.
6. Slide the coil and the horizontal drain pan assembly back into the unit.
7. Remove the drain line knockout from the coil access door. This will allow access to the horizontal drain.
8. Connect the refrigerant lines as outlined in the Refrigerant Lines Connection section.
9. Seal the enclosure as required to minimize air leakage.
10. Proceed with EXV System Installation as shown on page 5.

Refrigerant Line Connections

⚠ WARNING:





This coil is pressurized with Nitrogen. Avoid direct face exposure or contact with valve when gas is escaping. Always ensure adequate ventilation is present during the depressurization process. Any uncertainties should be addressed before proceeding.

1. Remove grommet from the suction line stub.
2. Remove the valve cap from the end of the liquid line stub and depress the valve. This will relieve all pressure from the coil.
3. Remove the valve core and valve core holder on the liquid line. DO NOT reuse the valve, threaded valve holder or O-ring.
4. Unbraze and remove the cap on the suction line.

⚠ CAUTION:

It is recommended that a wet rag be wrapped around the suction line between the sensing bulb and the line set braze joint before applying heat. Failure to keep components cool during brazing may result in structural damage, premature equipment failure, or possible personal injury.

5. Cut the line set tubing to the proper length in accordance with the outdoor unit specifications.
6. Inspect both refrigerant lines, ensuring ends of the lines are round, clean, and free of any burrs.
7. Position grommet on line set while allowing sufficient distance to braze joint.
8. Install the suction line set tube into the coil suction tube stub until it bottoms out.
9. Slip the nut from the Schrader valve holder onto the liquid line while maintaining correct orientation.
10. Insert liquid line into liquid line stub until it bottoms out. **NOTE:** Liquid line stub is shipped with the coil but is not attached.
11. Braze the individual connections with dry nitrogen flowing through the joints. This will prevent internal oxidation and scaling from occurring.
12. Fasten nut to secure the liquid line to the bulkhead fitting. No O-ring is required.
13. Check the assembly for leaks.
14. Reposition the sensing bulb on the suction line to the 4 o'clock or 8 o'clock position (Horizontal models only).
15. Properly dispose of all removed parts.

Condensate Drain

⚠ CAUTION:

The coil must be level to ensure proper condensate drainage. An unlevel installation may result in structural damage, premature equipment failure, or possible personal injury.

1. The coil condensate pan is designed with 3/4" NPSC drain connections. Use a PVC or similar material fitting to attach the drain line to the pan. **IMPORTANT NOTE: The fitting should be hand tightened only. Overtightening may crack the drain pan and cause condensate to leak.**
2. Connect the drain line and run to a suitable drain avoiding sharp bends and pinching of the line. Install a condensate trap and prime with water.
3. During system checkout, inspect the drain line and connections to verify proper condensate disposal.

Air Filter

Air filters are not supplied as an integral part of this coil; however, a filter must be installed upstream of the coil and inspected frequently. When the filter becomes clogged with dust or lint, it should be replaced (disposable type) or cleaned (washable type). It is recommended that filters be inspected and replaced at least twice during the year. Generally it is best to replace or clean the filters at the start of each heating and cooling season.

Panels

Reinstall all inner and outer panels of the coil case and furnace that were previously removed.

Refrigerant Charging

These cased indoor coils are not factory charged with refrigerant.

Always evacuate the indoor coil and line set prior to charging. Refer to the outdoor unit installation manual for detailed charges and instructions.

Maintenance and Service

⚠ WARNING:

Shut off all electrical power to the furnace and outdoor condensing unit before performing any maintenance or service on the system.

To ensure optimum performance and to minimize possible equipment failure, the following maintenance tasks should be performed periodically on this equipment:

COIL SPECIFICATIONS

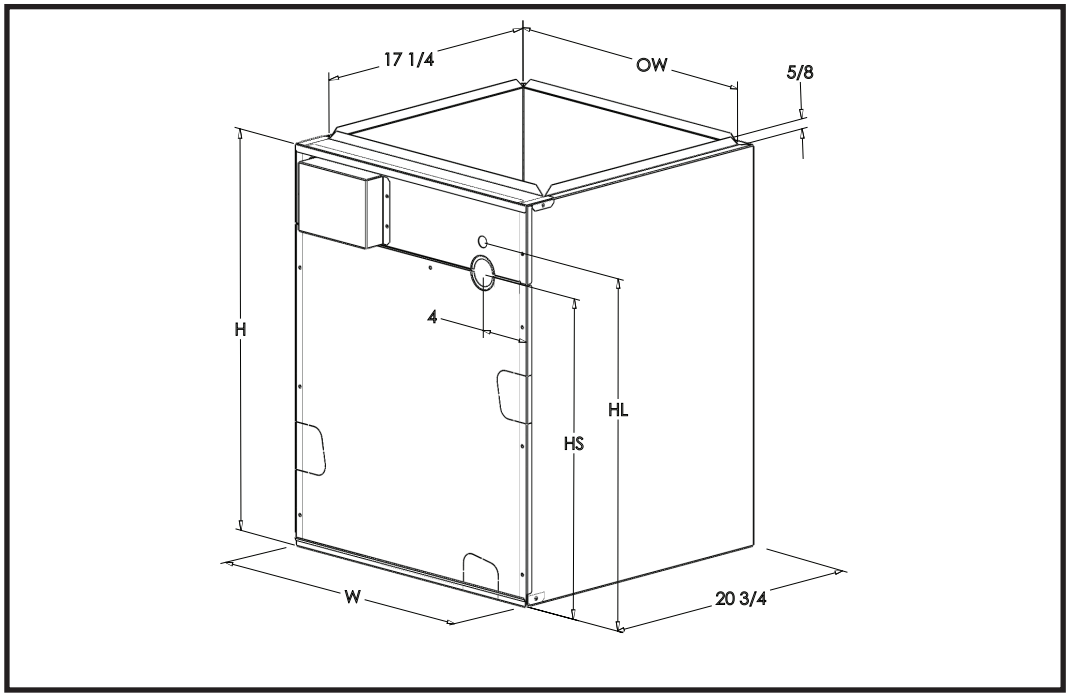


Figure 1 Coil Dimensions

Coil Model C6BH [1, 2]	I24-B	I36-B	I36-C	I48-C	I48-D
Nominal Capacity BTUH [3]	24,000	36,000	36,000	48,000	48,000
Nominal Airflow (CFM)	800	1,200	1,200	1,600	1,600
W - Width (in.)	17 1/2	17 1/2	21	21	24 1/2
H - Height (in.)	20 3/4	26 3/4	26 3/4	30 1/4	30 1/4
HL - Height of Liquid Line (in.)	17 1/2	23 1/2	23 1/2	27	27
HS - Height of Suction Line (in.)	15 1/2	21 1/2	21 1/2	25	25
Connection - Liquid Line	3/8	3/8	3/8	3/8	3/8
Connection - Suction Line	3/4	3/4	7/8	7/8	7/8
NOTES:					
1. Refer to sales specification sheets for Listed/Certified combinations of equipment and required accessories					
2. “I” in the model description designates factory installed electronic TXV for R-410a refrigerant.					
3. Refer to the current ARI Directory for certified ratings of split systems.					

Table 1. Coil Specifications

1. The air filter installed with the system should be checked and cleaned or replaced twice per year.
2. Check the coil, drain pan, and condensate drain line for cleanliness at the start of each heating and cooling season. Clean as needed.

⚠ CAUTION:

Do not operate the system without a suitable filter in the return air duct system. Always replace the filter with the same size and type.

EXV INSTALLATION

These Instructions describe an update to the electronic expansion valve (EXV) system which has been installed on this equipment, as part of an iQ Drive® 23 SEER split air conditioning or heat pump system.

The ESX valve is controlled to maintain constant superheat in a wide range of conditions via a pressure transducer and a temperature sensor installed on the coil suction header.

On iQ Drive® systems whose indoor equipment is made up of a separate coil and blower (furnace or furnace blower kit), the updated EXV system must be interconnected between these parts. Models that this applies to include one of the following coil assemblies plus either the furnace blower kit or a gas furnace listed in Table 2.

COIL ASSEMBLIES	SKU
C6BH-I24C-B	920781
C6BH-I36C-B	920782
C6BH-I36C-C	920783
C6BH-I48C-C	920784
C6BH-I48C-D	920785
C6BH-I24U-B FRU	920790
C6BH-I36U-B FRU	920791
C6BH-I36U-C FRU	920792
C6BH-I48U-C FRU	920793
C6BH-I48U-D FRU	920794
FURNACE BLOWER KITS	**SKU**
A Cabinet variable speed, high efficiency, VSHE	904876
B Cabinet variable speed, high efficiency, VSHE	904877
C Cabinet variable speed, high efficiency, VSHE	904878
D Cabinet variable speed, high efficiency, VSHE	904879
GAS FURNACES	**SKU**
Any furnace with an iSEER ™ variable speed blower	

Table 2. Coils, Blower Kits, and Furnaces

⚠ WARNING:

To avoid electric shock, personal injury, or death, turn off the electric power at the disconnect or the main service panel before making any electrical connections to EXV System.

1. Remove the lower door from the coil assembly and the furnace's blower compartment.
2. Locate the bundled set of cables in the coil case and cut the wire ties.
3. Route the following cables out through hole "C" (Figure 2):
   - EXV coil cable (6-wire) with 6-pin connector plug (1).
   - Pressure Transducer cable (3-wire) with 4-pin connector plug (2).
   - Suction Line Thermistor cable (2 red wires) with 2-pin connector (3).
   - Indoor Coil Temperature Sensor cable (4).

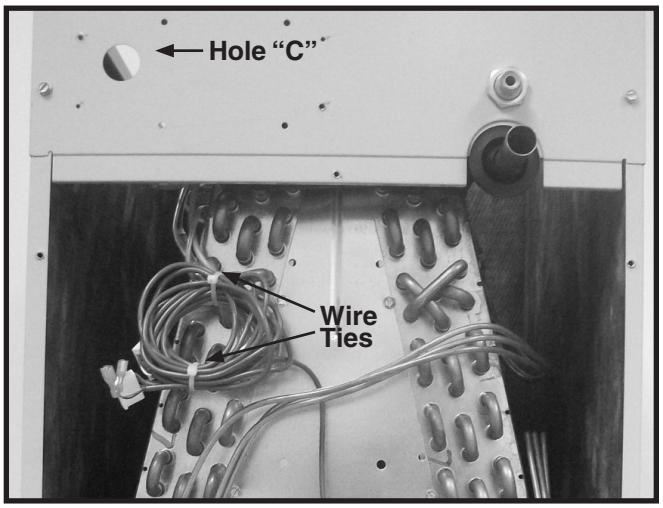


Figure 2. Cables with wire ties

4. Remove EXV circuit board from packaging and install on upper cabinet as shown in Figure 3.

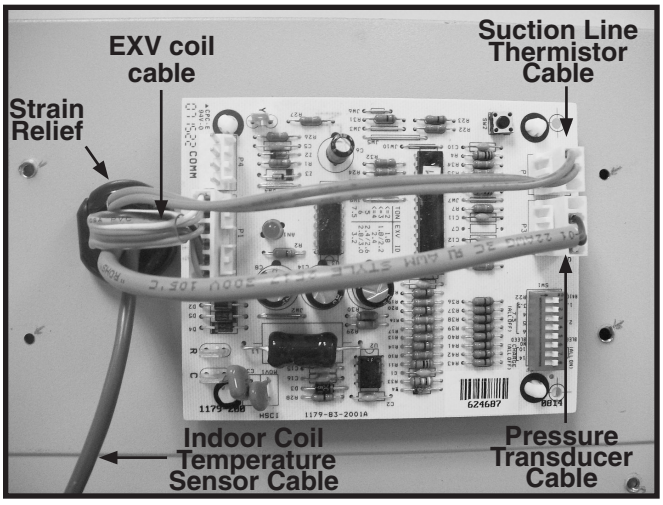


Figure 3. Control Board and Cables

IMPORTANT NOTE: When connecting the cables to the control board in steps 5 - 7, the "tabs" on the cable connectors must face inward on the board.

5. Connect the EXV coil cable (6-pin connector) to the control board's P1 ("EXV") terminal.
6. Connect the Suction Line Thermistor cable (two pin connector) to the control board's P2 ("THERM") terminal.
7. Connect the Pressure Transducer cable (4-pin connector) to the control board's P3 ("THERM/ PRESS") terminal.
8. Install strain relief (PN 632199) around cables in steps 4-7 and inside of hole "C".
9. Connect the provided yellow, red, and gray terminated wires to the proper terminals on the EXV Board. See Figure 4 and the wiring diagram in Figure 5.

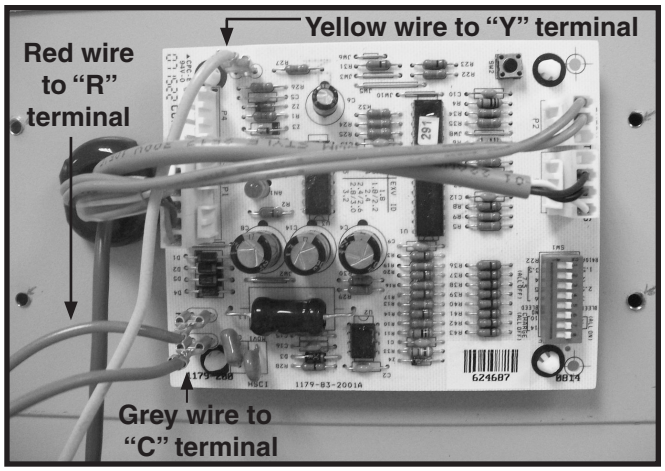


Figure 4. Control Board with Y, R, & C Wires

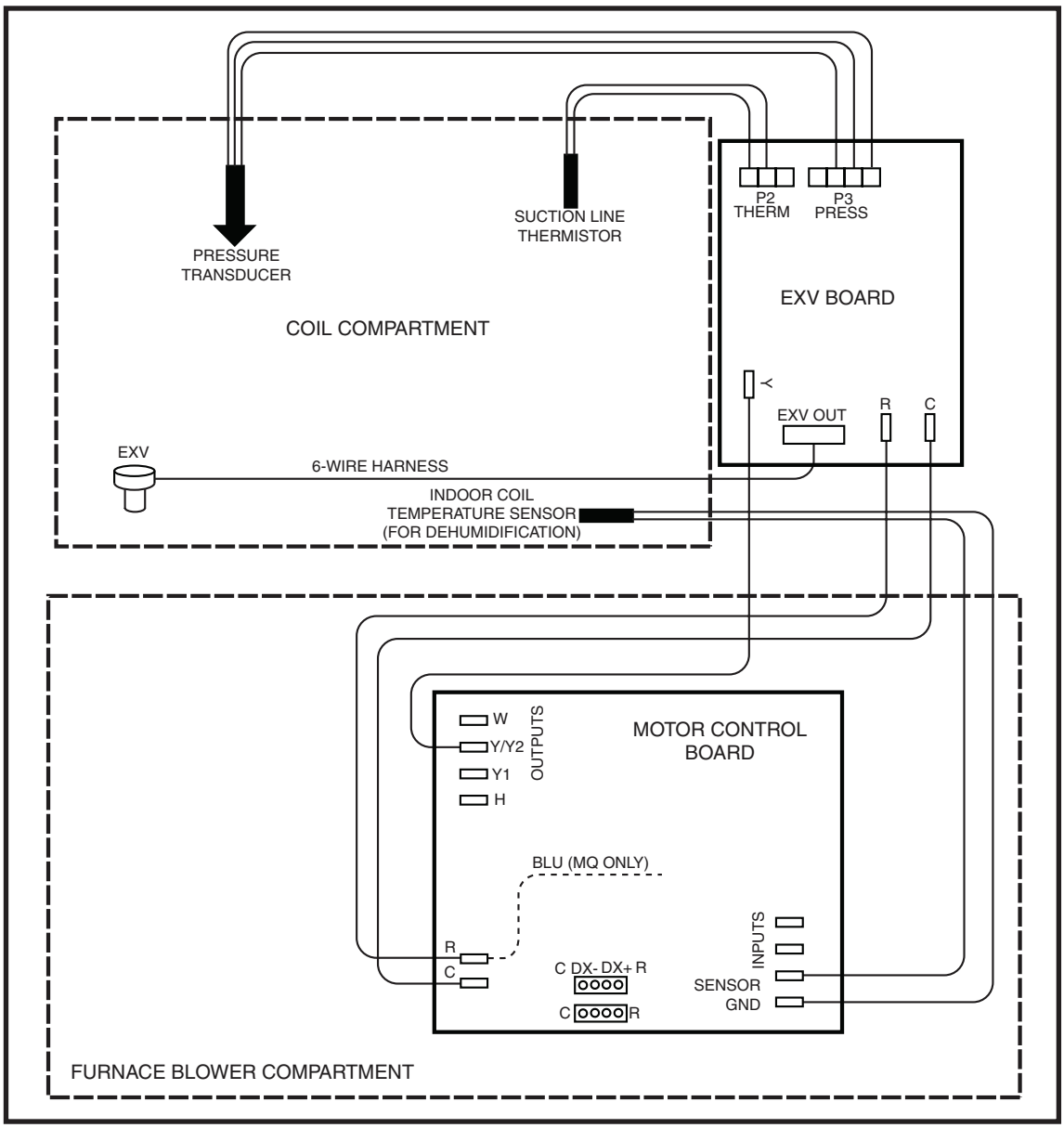


Figure 5. Wiring Diagram

10. Route the following wires thru the hole in the EXV board box (Figure 6):
    - Terminated red, yellow, and grey wires.
    - Indoor coil temperature sensor cable.

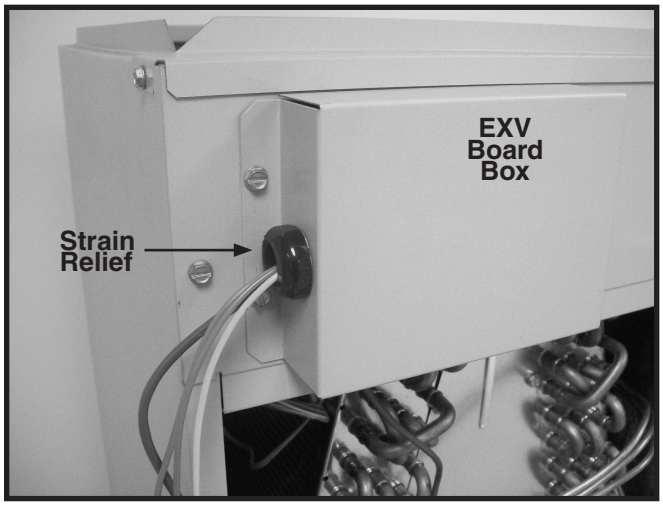


Figure 6. EXV Board Box

11. Route the red, yellow, and grey wires and the Indoor Coil Temperature Sensor cable down the side of the cabinet into any available hole opposite of the gas line. Run wires inside of the furnace until they are routed to the control board.
12. Connect the wires in the Indoor Coil Temperature Sensor Cable to the Motor Control Board (Figure 7) located in the blower compartment:
    - Attach the red wire to the terminal labeled SENSOR (1).
    - Attach the black wire to the terminal labeled GROUND (2).

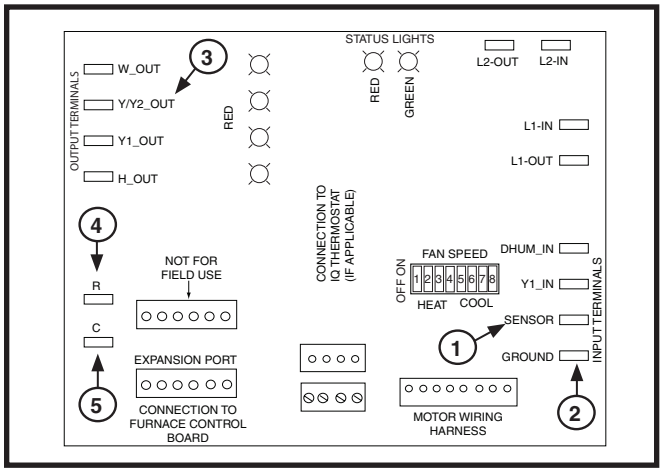


Figure 7. Motor Control Board

13. Connect the other end of the terminated wires to the Motor Control Board (Figure 6).
    - Attach the yellow wire to the "Y/Y2_OUT" Terminal (3).
    - Attach the red wire to the "R" Terminal (4).
    - Attach the GREY wire to the "C" Terminal (5).
14. Proceed to the System Checkout section after all wiring is connected. DO NOT install the control box cover or blower compartment door

System Checkout

Normally, adjustments are not required, and system checkout is just a precautionary measure for verifying communication of the EXV system and electrical operation of the valve. **The iQ Drive® thermostat does not communicate with, and cannot provide information about the status of the EXV system.**

Configuration

The EXV circuit board contains DIP switches (white switches on a red plastic block) that are configured at the factory (except for replacement boards).

Numbers appear on one side of the red block. If a switch is near the number, this indicates that the switch is ON. Compare/set switch positions to the row in Table 3 based on the nominal size in tons of the unit. **Verify switch settings match the required settings for the application.**

Switch #	1	2	3	4	5	6	7	8
2 TON	ON	OFF	ON	OFF	OFF	ON	ON	ON
3 TON	ON	OFF	OFF	OFF	ON	ON	ON	ON
4 TON	ON	ON	OFF	ON	ON	ON	ON	ON

Table 3. Recommended DIP Switch Settings

Startup and Operation

1. Use an alternative (but temporary) means to prop the door switch on the blower compartment so that when the control power is applied, the closed switch will allow the unit to operate. This will allow observing the EXV board in a powered-up state.
2. Switch on the control power. 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 but audible clicking sound may be heard, indicating that the valve is operating.

System Shutdown

1. When the checkout has been successfully completed, turn off power and remove the prop that was used to temporarily close the door switch.
2. Install strain relief (PN 632199) around the four wires and inside of hole in the EXV board box.
3. Using four screws, install EXV board box (figure 12) on front of cabinet

⚠ CAUTION:

Do not allow the wiring to come into contact with any sharp edges on the wire ties or the metal casing.

4. Secure the wires and cable against the side of the cabinet with adhesive-backed wire tie anchors and wire ties.
5. Install the doors on the coil assembly and the blower compartment.
6. Restore control power.

⚠ WARNING:

Upon completion of the furnace installation, carefully inspect the entire flue system both inside and outside the furnace to assure it is properly sealed. Leaks in the flue system can result in serious personal injury or death due to exposure of flue products, including carbon monoxide.

Vo	psig	Tsat (R410a)		Vo	psig	Tsat (R410a)	
0.7	15.0	-35° F	-31° C	2.9	180.0	62° F	16° C
0.8	22.5	-26° F	-32° C	3.0	187.5	65° F	18° C
0.9	30.0	-17° F	-27° C	3.1	195.0	68° F	20° C
1.0	37.5	-10° F	-23° C	3.2	202.5	69° F	21° C
1.1	45.0	-4° F	-20° C	3.3	210.0	72° F	22° C
1.2	52.5	2° F	-16° C	3.4	217.5	74° F	23° C
1.3	60.0	8° F	-13° C	3.5	225.0	76° F	24° C
1.4	67.5	12° F	-11° C	3.6	232.5	78° F	25° C
1.5	75.0	17° F	-8° C	3.7	240.0	80° F	26° C
1.6	82.5	21° F	-6° C	3.8	247.5	83° F	28° C
1.7	90.0	26° F	-3° C	3.9	255.0	84° F	29° C
1.8	97.5	29° F	-1° C	4.0	262.5	86° F	30° C
1.9	105.0	33° F	0° C	4.1	270.0	88° F	31° C
2.0	112.5	37° F	2° C	4.2	277.5	90° F	32° C
2.1	120.0	40° F	4° C	4.3	285.0	92° F	33° C
2.2	127.5	43° F	6° C	4.4	292.5	94° F	34° C
2.3	135.0	46° F	7° C	4.5	300.0	96° F	35° C
2.4	142.5	49° F	9° C	4.6	307.5	97° F	36° C
2.5	150.0	52° F	11° C	4.7	315.0	99° F	37° C
2.6	157.5	55° F	12° C	4.8	322.5	100° F	38° C
2.7	165.0	58° F	14° C	4.9	330.0	102° F	39° C
2.8	172.5	60° F	15° C	5.0	337.5	104° F	40° C

Table 4. Pressure Transducer Output Interpretation

SERVICE REFERENCE INFORMATION

Pressure Transducer Output Interpretation:

- 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 (See Table 4).

Suction Line Thermistor Resistance Interpretation:

- Measure sensor leads when disconnected from the board (See Table 5).

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

Table 5. Suction Line Thermistor Resistance Interpretation

TROUBLESHOOTING

SYMPTOM	SOLUTION
Green LED is not lit and there is no indication of valve closing (clicking) when power is turned on.	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
Green LED is lit with power on, but there is no indication of valve operation.	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.
There is no indication of valve opening (clicking) when the system is running in cooling mode.	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.
Green LED blinks 1 second on, 1 second off when unit is running.	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. • BBLK (+) 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 k (at 41° F) to 8.1 k (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.
Valve opens, but green LED continually flashes on and off rapidly (1/3 second each).	This indicates that DIP switches 2-5 are not set properly. Cycle each switch on and off, and set as directed above.
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.	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.

The installer performing this work assumes all responsibility for this installation. These instructions are primarily intended to assist qualified individuals experienced in the proper installation of these components. Some local codes require licensed installation/service personnel for this type of equipment. Safety should always be the deciding factor when installing this product and using common sense plays an important role as well. Improper installation of the components or failure to follow safety warnings could result in serious injury, death, or property damage. After completing the installation, return these instructions to the Homeowner's Package for owner-user's future reference.

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