Troubleshooting Variable Speed A/H

FB4, FE4, FF1E,
FH4, FV4, FX4,
PF4, FFM

Residential Fan Coil Units

Service and Maintenance Instructions

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Always check the current fan coil service manual

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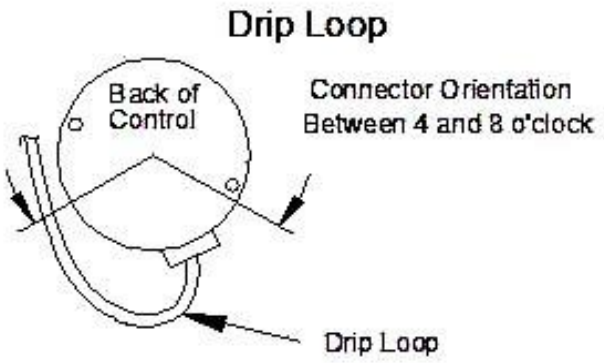
Motor Harness

Installation/Set-up

- Electrical connections should face down between 4 and 8 o-clock position with harness drip loop
  - Prevent water damage to motor control
  - Multi-position systems may require alteration



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FK/FV

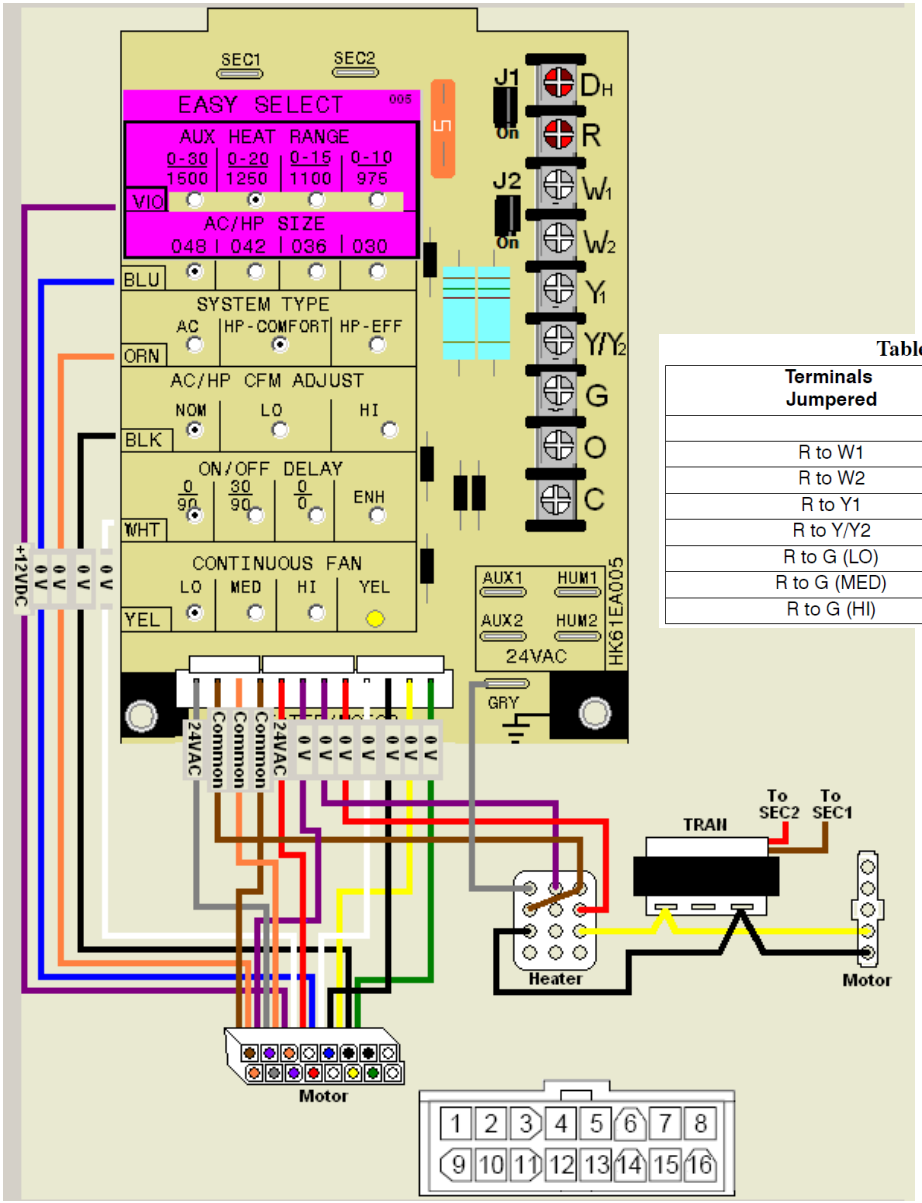

Table 4 – FV4 Motor Control Test Values (With 16-pin connector at motor unplugged)

Terminals Jumpered	Volt Meter on 16-pin Harness Plug		Volt Meter on 12-pin Easy Select Board Plug		Voltage
	+	-	+	-	
R to W1	Pin 2	Pin 1	Pin 7	Pin 9	24Vac
R to W2	Pin 13	Pin 1	Pin 4	Pin 9	24Vac
R to Y1	Pin 6	Pin 1	Pin 3	Pin 9	(-)12Vdc
R to Y/Y2	Pin 14	Pin 1	Pin 2	Pin 9	(-)12Vdc
R to G (LO)	Pin 15	Pin 1	Pin 3	Pin 9	0Vac
R to G (MED)	Pin 6	Pin 1	Pin 3	Pin 9	(-)12Vdc
R to G (HI)	Pin 14	Pin 1	Pin 2	Pin 9	(-)12Vdc

Pg 12 Table 8

FK/FV (Page 19)

TROUBLESHOOTING EXAMPLE:

Motor is not running on a call for heat pump heating after jumpering the Easy Select. Board screw terminals as described in Thermostat section above:

With all thermostat wires removed from Easy Select Board, place a jumper wire between R and Y/Y2 low-voltage screw terminals on the Easy Select Board

1. Check Table 8 for pin number on 16-pin connector associated with the Y/Y2 signal. The correct pin is #14. The far right column of Table 8 shows that (-) 12vdc should be present between pin #14 and pin #1 (common) on the 16-pin connector.

2. Set meter to read DC voltage. Place meter leads between pins #1 (common) and #14 and check for (-) 12vdc. If signal is present, the problem is in the module or motor. If signal is not present, the problem is either in wiring harness or Easy Select Board.

These steps can be repeated for other modes of operation.

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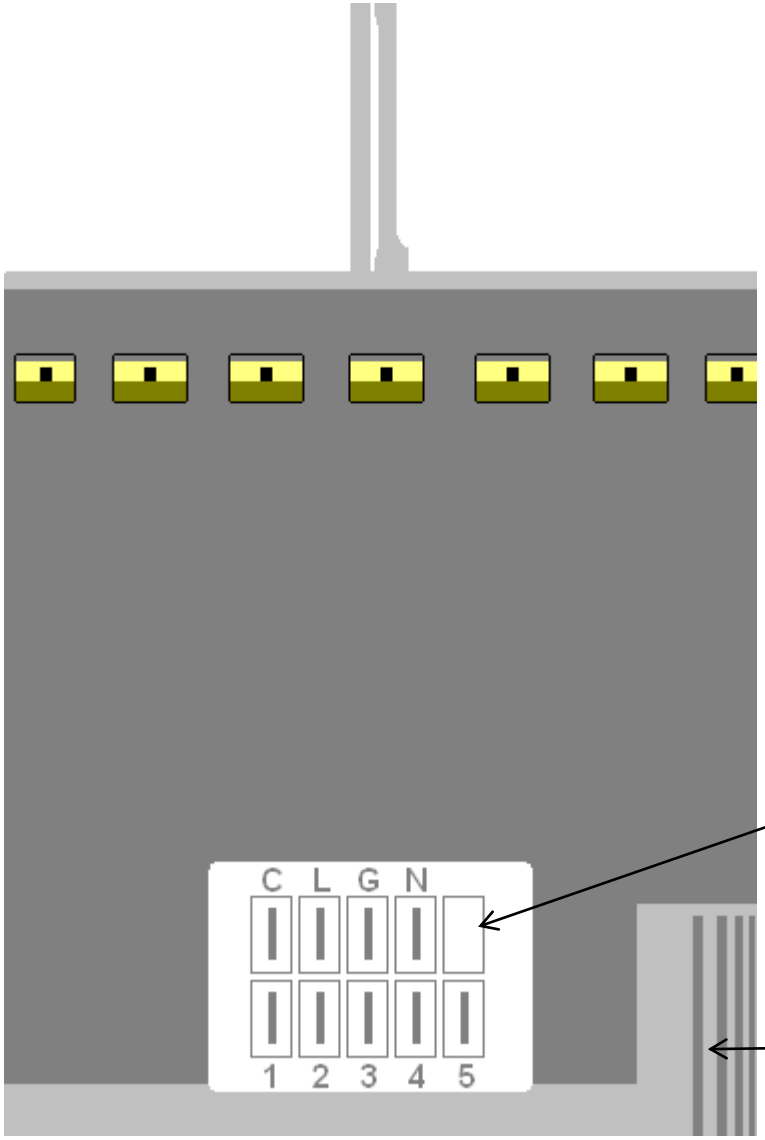
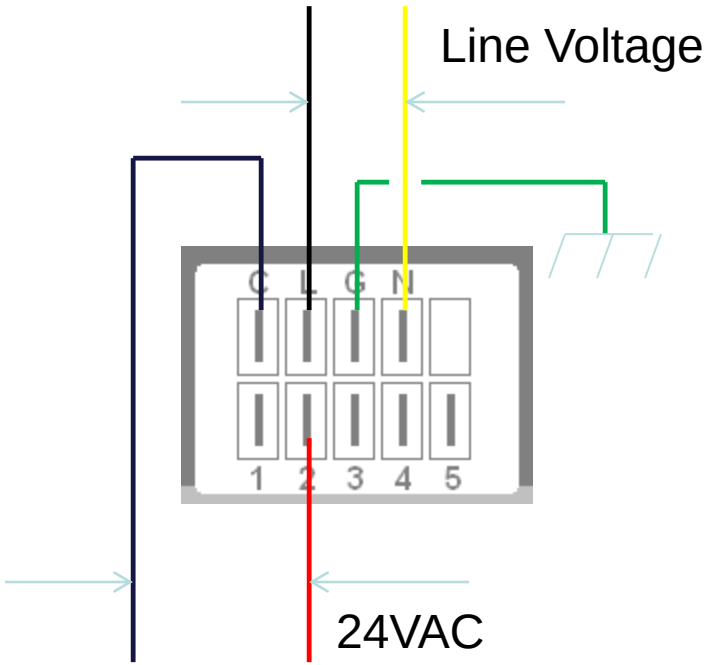
Troubleshooting X-13 Motors



Connections

- C - Low Voltage Common
- L - Line Voltage Hot (L2)
- G - Ground
- N - Line Voltage Neutral (L1)
- 1 - Fan Speed Tap
- 2 - Fan Speed Tap
- 3 – Fan Speed Tap
- 4 – Electric Heat Speed Tap
- 5 - Electric Heat Speed Tap

Quick Diagnosis



If you have:

- Line Voltage between L and N and
- 24VAC between C and any of the programmed* speed taps…

Your motor should be running. If its not running, the motor or the motor controller has failed!

* Not all taps on all motors are programmed. Applying voltage to some motor taps may actually prevent motor from running. As always when replacing parts, be sure when ordering motors or motor controllers to give the full equipment product number.

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About Motor

AIRFLOW PERFORMANCE (CFM)

MODEL & SIZE	BLOWER SPEED	0.10	0.20	0.30	0.40	0.50	0.60
FX4D 019	Tap 5	776	745	696	660	609	572
	Tap 4	683	644	589	548	494	461
	Tap 3	683	644	589	548	494	461
	Tap 2	631	563	500	443	409	361
	Tap 1	625	524	457	417	367	319
FX4D 025	Tap 5	956	920	891	851	816	780
	Tap 4	825	795	757	722	674	634
	Tap 3	825	795	757	722	674	634
	Tap 2	726	695	635	598	543	509
	Tap 1	631	563	500	443	409	361
FX4D 031	Tap 5	1189	1151	1104	1050	1003	959
	Tap 4	1041	998	944	886	837	772
	Tap 3	1041	998	944	886	837	772
	Tap 2	924	876	817	752	704	660
	Tap 1	779	693	628	571	526	476
	Tap 5	1363	1332	1294	1253	1207	1157

- Each motor is programmed to deliver different airflows depending on which motor speed tap is energized
- Taps 1, 2 and 3 are used for constant fan (g signal), cooling and heat pump airflows. Unit is usually defaulted on Tap 2 for these modes. The motor will run on a delay after the call is complete to get more efficiency from the system
- Taps 4 and 5 are used for electric heat. There is no delay after the call. Shipped on Tap 4
- The highest speed tap energized will take precedence. If highest tap energized is not programmed on a particular motor, energizing that tap may cause motor not to run even if lower tap is energized.

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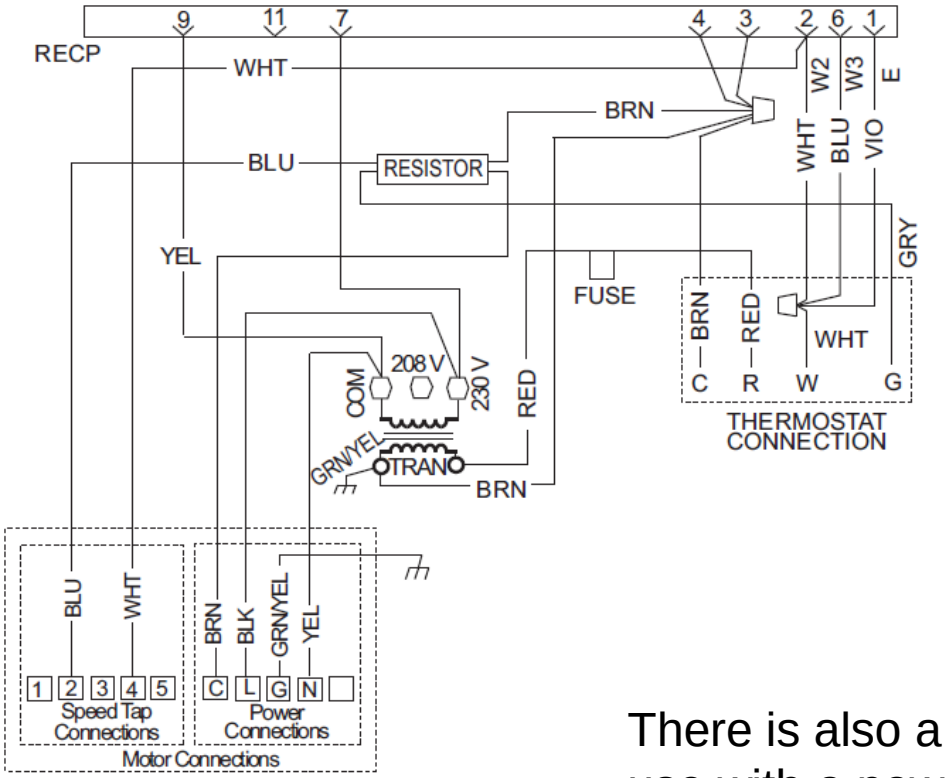
X-13 Wiring



Earlier X-13 motor fan coils may have had a fan coil circuit board switching signal to motor or only one speed tap used on motor, but for the most part, they all look like this now.
There is no circuit board. The constant fan (G signal) blue wire and the electric heat (W) white wire are powered straight from the thermostat. There is a low voltage fuse off of the transformer for protection.

There is also a resistor used in the circuit. This is for use with a power-stealing thermostat. If this resistor fails open, a power-stealing thermostat will not work on the fan coil. If it fails closed, the fuse will blow.

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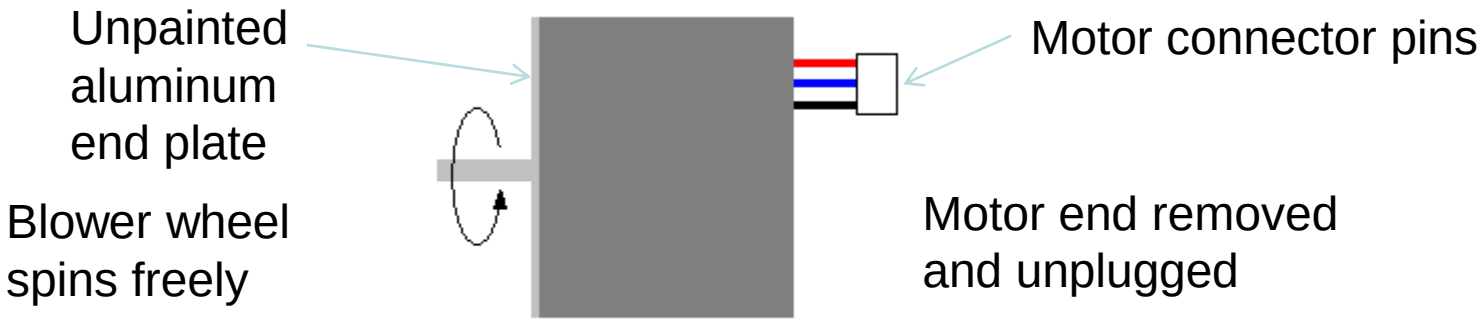
Repairing X-13 Motors

Most failures will be of motor controller. It is less expensive and often easier to change out the motor controller but we must ensure that the winding section of the motor is functioning:

- Check to see if the blower wheel spins freely.
- To check for short to ground, use an ohmmeter to measure the resistance from any one of the motor connector pins to the aluminum end plate of the motor. This resistance should be greater than 100k ohms.
- Check the motor phase-to-phase resistance between each of the leads in the three pin motor connector. The lead to lead resistance across any two leads should be less than 20 ohms. Each lead to lead resistance should be the same within -/+ 10%.



If the motor winding section meets all of the requirements, only replace controller.

Thank you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