

# ***Electro-HELPS VIII***

## **ECM Blower, All Hookups, WarmFlo ST/OT CFM Selection**

### ***Assumptions***

1. Typically the furnace will be setup for a top (Y2) speed relating to cooling requirement. Installer must determine whether the setup for cooling is adequate for the CFM required for the electric section, Electro-Mate. Example – 2-ton AC only requires 800 CFM but 20 kW requires 1200 CFM.
2. The furnace bit switch setup may need to be sized for the kW heating instead of the cooling tons, see number 1 above.
3. The Brand X furnace or air handler has a Y1 and a Y2 speed. Y2 relates to the maximum speed (see numbers 1 and 2 above). Y1 typically is 20% to 30% less CFM. If the furnace only has a single Y, it must be assumed this is the highest CFM speed.
4. A furnace manufacturer's proper programming of the ECM motor provides a CFM rating to various terminal block input points, not RPM. The GE Series 2.3 motor, properly programmed, varies its RPM based on static pressure and loading. It makes every attempt to produce the CFM as setup.
5. Furnace terminal point G is typically 50% of full setup CFM. Therefore, the Electro-Mate or WarmFlo cannot be run with a G input only.
6. Certain manufacturers reduce the airflow approximately 10% during heating which is controlled by the furnace O terminal. The 2-speed WF-HP2 takes that into consideration. On other applications the installer may want to run the stat O to the furnace O and also to the outdoor O (to our knowledge, this only relates to manufacturers where reversing valve is high during cooling).
7. If furnace terminal BK is desired, use standard instructions provided with furnace and suggestions from their specified room thermostat or humidistat.
8. Gas furnace 2-stage or variable burner generally ties in with this wiring or field connection decision. See separate document – ***Electro-Helps VII*** – 2-Speed Equipment, Control Interface.

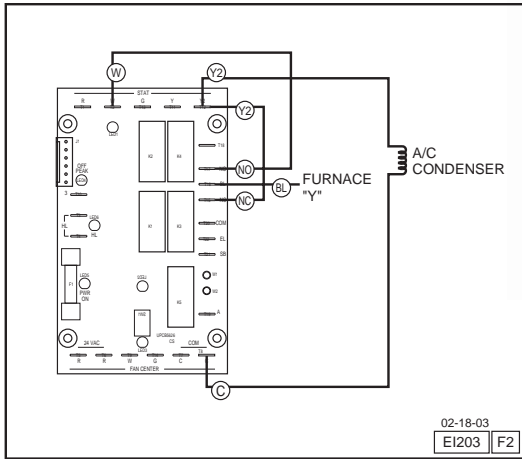
### ***Air Conditioning***

This Helps document reviews each Electro product with suggestions, connection drawings, etc.

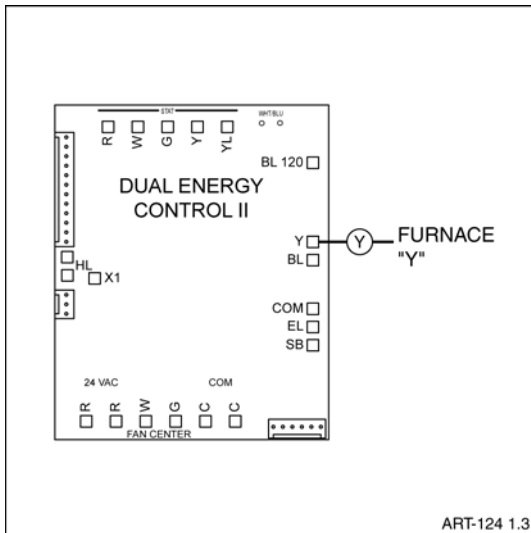
The first three provide only a single speed step-up when in heating or cooling. These relate specifically to single speed air conditioning equipment. See above Assumptions 1 and 2 relating to furnace bit switch setup and the comparison of cooling and heating sizing.

1. **Electro-Mate, DFC type (EH001-1)** – a roomstat W or Y provides a non-feedback 24-volt to a furnace Y\* terminal. Two field installed jumpers are required at the board upper right – W to NO tab and board Y2 to NC tab. The BL tab goes to the furnace Y\*.
2. **HeatChoice (EI203 F2)** – basically identical to DFC.
  - a. **HeatChoice II (EI204 F12)** – effective manufacturing date 8-1-07, only a single wire from the right center “Y” tab directly to the furnace “Y” screw is required. See diagram on next page.
3. **WarmFlo, WF-EM3 (HD319 F1)** – two field installed jumpers, the tabs are similar to DFC but AC-Y to NC tab and stat W to NO tab. The BL tab goes to furnace Y\*. Note the stat G wire goes down to a G1 terminal and there is no wire under the EM3 stat G screw.
4. **Electro-EZ-Mate (EH808) and WarmFlo Select SL1 (EH709)** – configuration mode switch is setup for AC. This board provides a direct terminal to terminal connection arrangement (Y is considered high speed). This latest WF+ board has provisions for a WarmFlo temperature sensing speed-up which typically can be associated with Y2. Drawing EH811 provides 4 hookup options.

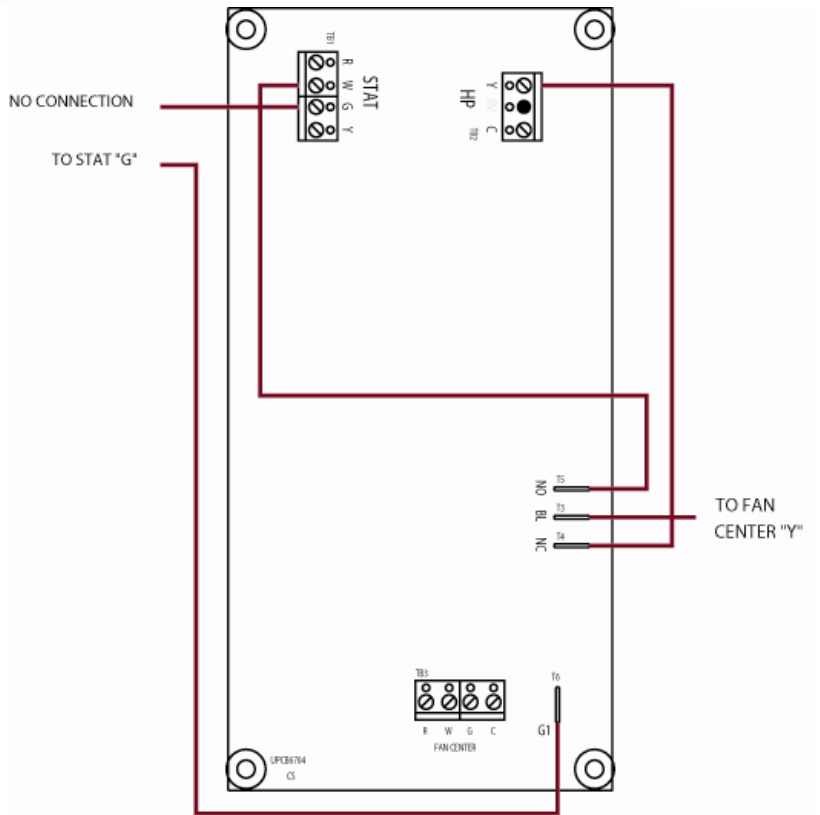
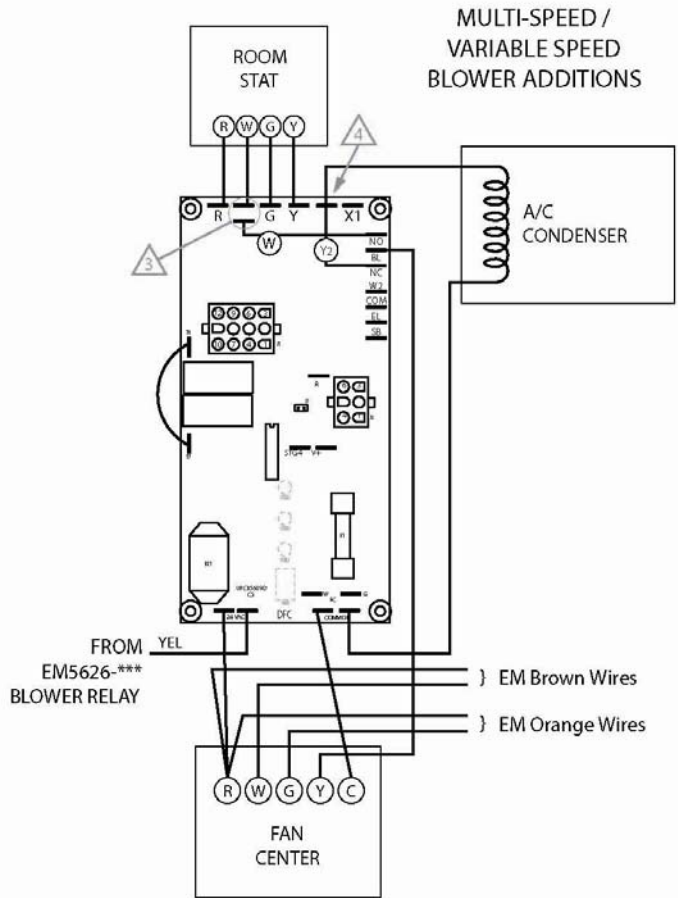
**DFC  
Electro-Mate**



**HeatChoice**



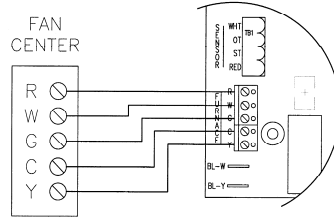
**Figure 12 – HeatChoice II**



**WF-EM3**

**ELECTRO-EZ-MATE  
VARIABLE-SPEED BLOWER OPTIONS**

FURNACE - G & Y ONLY.

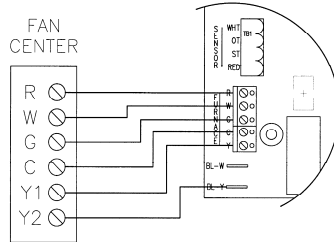


FURNACE - G, Y1, Y2  
Y1 FOR HEAT, Y2 FOR COOL



NOTES:

- HEAT ON Y1 IS PROBABLY OK BECAUSE 10KW (34,000 BTU) ONLY REQUIRES 800CFM.

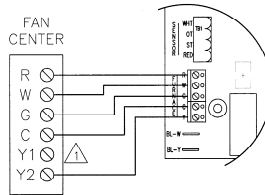


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EH811 P1  
12-30-05

**ELECTRO-EZ-MATE  
VARIABLE-SPEED BLOWER OPTIONS**

FURNACE - G, Y1, Y2  
ALWAYS RUN IN HIGH SPEED



NOTES:

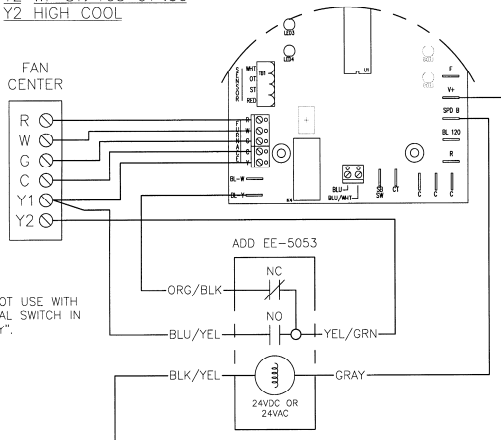
- SOME FURNACES REQUIRE Y1 WITH Y2. IF THIS IS YOUR CASE, JUMPER AS REQUIRED.



FURNACE - G, Y1, Y2  
Y1 LOW HEAT  
Y2 WF ST>105 OT<30  
Y2 HIGH COOL

NOTES:

- DO NOT USE WITH MODE DIAL SWITCH IN "ST ONLY".



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EH811 P2  
12-30-05

## **Heat Pump – Single Speed**

This document reviews each Electro product with suggestions, connection drawings, etc.

The first two provide only a single speed step-up when in heating or cooling. These relate specifically to single speed heat pump equipment. See above Assumptions relating to furnace bit switch setup and the comparison of cooling and heating sizing.

1. **WarmFlo WF-EZ3** (HD319 F4 and HI320 p25) – as shown, this only requires one jumper, T1 tab to NO tab. The BL tab goes to a furnace Y\* terminal.
  - a. **Upgrade WF-EZ3** (HD319 and HI320 p25) – board Rev B and after manufacturing date 9/17/07 – add only a single wire connection between right tab “BL” and furnace “Y” screw.
2. **WarmFlo WF-LGR3 (older) and HP-5043\*\*** (HD319 F4) – same as WF-EZ3 prior to 9-17-07.
3. **WarmFlo WF-LGR4** (HH341) – for furnaces with single Y, as mentioned above, simply add the 5<sup>th</sup> wire from terminal block Y to furnace Y.
4. **Electro-EZ-Mate (EH811) and WarmFlo Select SL1 (EH709)** – configuration mode switch is setup for HP. This board provides a direct terminal to terminal connection arrangement. This latest WF+ board has provisions for a WarmFlo temperature sensing speed-up which typically can be associated with Y2. Drawing EH811 (previous page) provides 4 hookup options.

## **Main WarmFlo II Board – Options**

### **Using Internally Provided ST/OT Temperature Sensing Speed Functions**

Must be 5615B version board, manufactured after 6-04.

Program chip version 2.35 and above, dated 5-10-05 and above, has a Spd A and Spd B output function. An ST and an OT temperature can be assigned to each. When the appropriate sensor passes through this set point, the Spd A or Spd B output is activated. Once the temperature detected point is active, the output continues to the end of that thermostat cycle.

ST setup value – when the ST sensor receives a temperature **greater than** this value, the appropriate speed output is active.

OT setup value – when the ST sensor receives a temperature **less than** this value, the appropriate speed output is active.

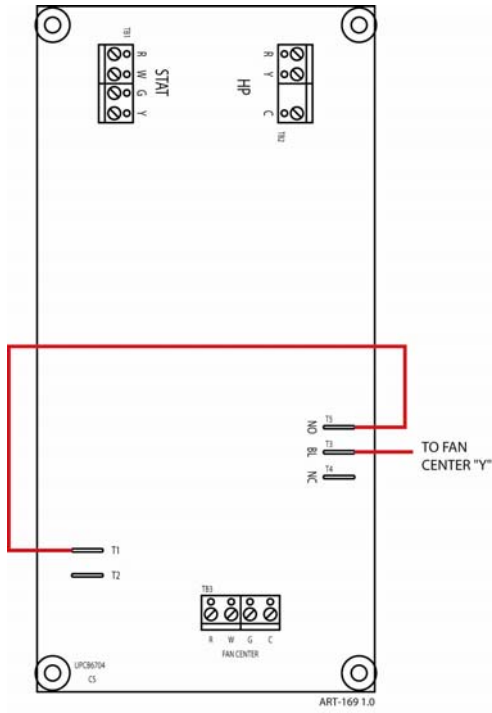
The factory default:

- ST – Spd A – 96°
- ST – Spd B – 104°
- OT – Spd A – 50°
- OT – Spd B – 30°

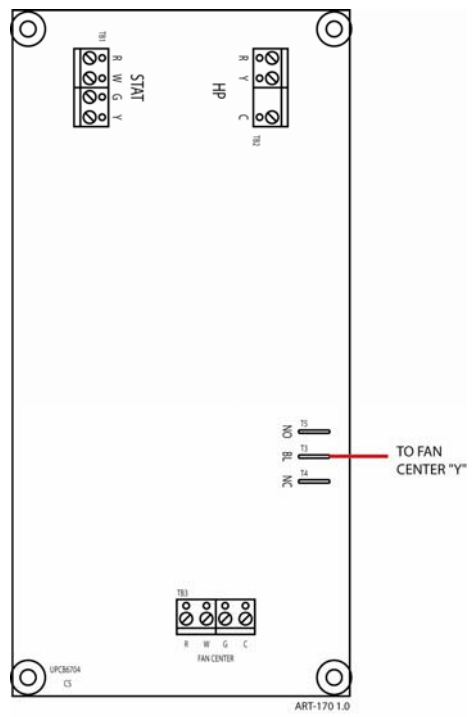
WarmFlo Analyzer, WF-ANZ\*, after 4-05 has the last two screens available for changing these Spd A and Spd B set points. However, WF+ boards only allow speed B. WarmFlo PC software 4.00 dated 4-27-05 also has these functions.

Drawing HH345 provides information to add EE-5053 relays with an Electro cable, WFCBSPD, for interface to furnace Y1 and/or Y2.

This is standard with WF-HP2.



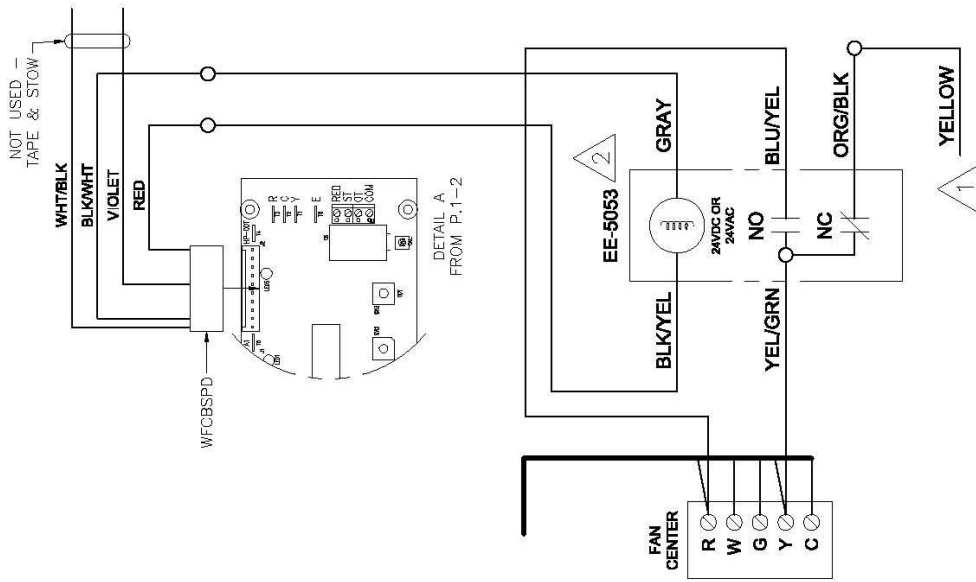
WF-EZ3 AND LGR3  
HP-5043-\*\*



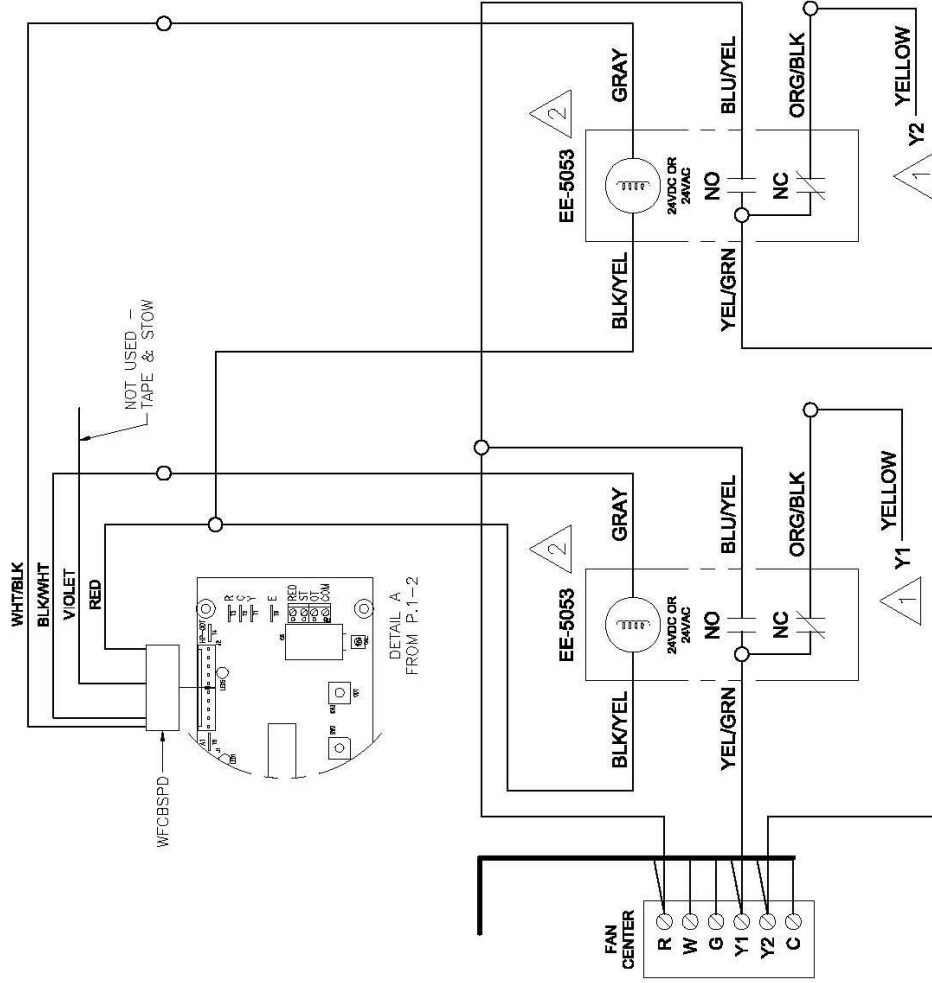
WF-EZ3  
(Board Rev.B after 09-17-07)

# WARMFLO - ANY APPLICATION, MAIN WFII BOARD, 5615B & UP (AFTER JUNE 2004)

## VARIABLE-SPEED - FULL BLOWER 50° OUTDOOR TEMP.



## THREE-SPEED BLOWER 50° & 30° OUTDOOR TEMP.



NOTES:

1. FROM ROOMSTAT, COOLING HIGH SPEED.
2. SPECIAL DC RELAY WITH FILTER. DO NOT USE STOCK RELAY.
3. ORDER BOTH EE-5053 RELAY AND WFCBSPD CABLE.

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HH345  
01-10-06

## **Heat Pump, 2-Speed**

**WarmFlo Select SL2** – This model is designed for single control board interface with all 2-speed heat pump and ECM variable speed furnace requirements. It has provisions and setup arrangements for furnace Y and furnace Y2. See installation manual EI710 with hookup drawing EH710.

- Order EM-WU(WD)\*\*-SL2

**WF-HP2** – the furnace speed relationship is the difference between cooling and heating. In **cooling** there is a direct function by function relationship and action between room thermostat, furnace, and heat pump unit. This is typically just as the heat pump manufacturer's normal arrangement.

- Y1 – Y1 – Y1
- Y2 – Y2 – Y2

In **heating** the furnace Y1 and Y2 speeds are controlled by the WarmFlo sensor or dial switch position A. Dial switch position B provides immediate Y1 and dial switch position C provide immediate both Y1 and Y2 speeds. The following is the heating information directly from the WF-HP2 installation and setup manual, HI210B.

Via factory defaults (changeable via WF-ANZ\* or software downloads) there is a supply temperature setting for furnace Y1 and Y2, plus an OT temperature setting for furnace Y1 and Y2 (see bypass below).  
Factory defaults:

- ST, 96° and above – Y1
- ST, 104° and above – Y2
- OT, 50° and less – Y1
- OT, 30° and less – Y2

In case of the ST, if the temperature **rises** above this preset value, the blower speed will increase. In the case of the OT, if the outdoor is **below** this temperature at the initial call for heat, the blower speed increase. Once this condition is crossed, it remains for the completion of the heat call cycle. This technique allows for maximum heat pump usage with minimum Electro-Mate/WarmFlo resistance.

**Note:** If your furnace only has a Y1 or Y, WF-HP2 Y2 will not be used.

**Setup or installer temperature sensing bypass** – provisions are included for the installer to bypass the above temperature sensing/blower speed provision for direct heat call blower speed up condition. Approximately top center on the circuit board are two dial switches. The “SOT TIME” dial switch is detailed on page 12 (relates to cooling only and 4-wire stat). Above this is a dial switch marked A, B, C, D. The factory default is position B which provides heat call direct control of furnace Y1 and Y2 (1HEAT mode, stat Y1/2HEAT mode, stat Y2). If you desire to use WarmFlo temperature sensing to control the Y1 and Y2 blower speeds as described above, set the dial switch to “A”. If you desire an immediate heat call Y1 blower speed and allow WarmFlo temperature sensing to control Y2 as described above, set dial switch to “C”.

## **WarmFlo Electric Furnace/Air Handler (assuming heat pump model HE-H-\*\*)**

This product has all ECM variable blower motor features with speed selection setups and ST/OT Spd B temperature sensing override features.

The Electro control board provides A, B, C, D pin jumper **cooling** speed selection **and** LO, MED, HI pin jumper **heating** speed selection. Thus you can match the cooling tons and the heating kW to its own speed arrangement. Also if the specific Electro electric furnace model has a WF II board with an ST and OT active sensor code chip, during the heating mode the Spd B function will override the heating setup pin jumper and force blower to full speed. Typically this has a higher factory default, suggest ST = 115° and OT = 30° F.

**Heat Minimal Blower Speed Selection** – On the right side is a peg jumper for a LO/MED/HI selection. The WarmFlo technology and action of both of the remote sensors will determine the full speed or maximum CFM when required by the heating system. This selection is simply a first step blower speed and does not necessarily have to match the kW capacity. The suggestions are as following, but 20 kW will function just fine with the LO position.

- 10 kW LO 765 CFM
- 15 kW MED 900 CFM
- 20 kW HI 1035 CFM

**Cool Minimal Blower Speed Selection** – At the control board right side is A/B/C/D selection. It is very important that this selection be matched to the cooling ton installed within the system. This is independent of the heating as outlined and setup above.

- A – 3-3.5 ton 1200 CFM
- B – 2.5-3 ton 1100 CFM
- C – 2-2.5 ton 1000 CFM
- D – 2 ton 900 CFM



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