

Eon User Guide



Operating the Eon Motor

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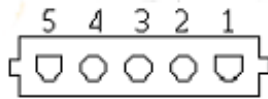
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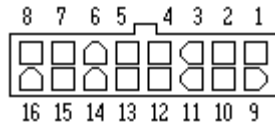
How do I connect it?

Power Connection: The Eon motor has the same power pin out as the ECM 2.3



Power Connector	
<i>Pin</i>	<i>Description</i>
1	JUMPER PIN 1 TO PIN 2 FOR
2	120 VAC LINE INPUT ONLY
3	CHASSIS GROUND
4	AC LINE
5	AC LINE

Signal Connection: The Eon motor has the same signal pin out as the ECM 2.3



How do I program it?

Standard Eon Torque Program

This is the same development program as used on the ECM 2.3 to run the motor in torque mode.

Import ECM 2.3 Program

This option allows you to import an existing ECM 2.3 program file created with the old ICM2 DOS software and convert it to the Eon format in the ECM Toolbox.

Emulate ECM 2.3 Performance

The Eon demonstrates improved torque regulation characteristics over all legacy products. As a result, in some cases, slight differences in airflow delivery at some operating points may be observed when comparing the Eon and 2.3 with imported 2.3 programs. We have provided an option in the ECM Toolbox to force the Eon to emulate the 2.3 torque regulation if so desired.

Eon Airflow Characterization

The airflow characterization process allows motor control, data recording and airflow constant calculation to be managed directly from the computer through the ECM Toolbox.

How do I program it?

Creating a new Program

The screenshot displays the ECM Toolbox software interface. The main window is titled "ECM Toolbox" and has a menu bar with "File", "View", "Options", "Tools", and "Window". A sidebar on the left contains a "Motor Application/Program" menu with options like "New Application", "Open Program", "Save Program", "Copy Application", "Delete Application", "Import an ECM 2.3 Motor...", "Batch Import ECM 2.3...", "Save Legacy ECM 2.3...", "Mail Application File To...", "Read from Motor", and "Write to Motor".

The "New Application" dialog box is open, showing a "Motor Type" section with several motor icons: "Iron Pulses", "SAMM", "ThinkTank 3.0", and "Eon". The "Eon" motor is selected. Below the motor type selection, there are input fields for "Application Name" (containing "First Test"), "Application Notes", "Filter", and "Motor Program Name" (containing "My Test"). There are "OK" and "Cancel" buttons at the bottom.

The "Motor Program Edit" dialog box is also open, showing fields for "Name" (containing "My Test"), "Part Number" (containing "1"), "Status" (set to "Current"), and "Notes". There are "OK" and "Cancel" buttons at the bottom.

Four numbered callouts in red text provide instructions:

1. Click New Application
2. Enter Application & Motor Program Names
3. Select Motor Type
4. Enter Part Number

How do I program it?

Opening an Existing Program

1. Click Open Program

2. Select Eon Program from list

Motor Product Type	App Name	Pgm Name	Status
Eon	First Test	My Test	Current
ECM X13	Test	My Test	Current

How do I program it?

Importing an ECM 2.3 Program

1. Select Import ECM 2.3

2. Select Program File

3. Enter Application Name

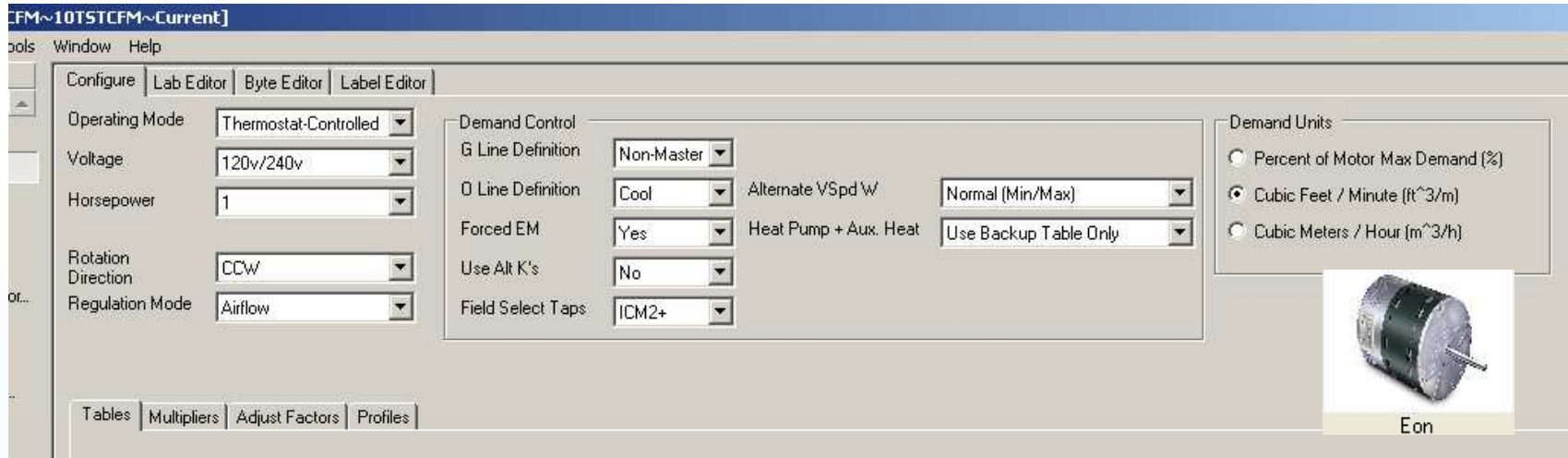
4. Enter Program Name

The image illustrates the process of importing an ECM 2.3 program into the software. It shows four sequential steps:

- 1. Select Import ECM 2.3:** The user selects the 'Import an ECM 2.3 Motor...' option in the 'Motor Application/Program' menu of the 'ECM Toolbox'.
- 2. Select Program File:** The 'Select ICM2 File To Import' dialog box is shown, displaying a list of files in the 'ICM2 Program' folder. The file 'STEP2_1.GEM' is selected.
- 3. Enter Application Name:** The 'Application Edit' dialog box is shown, where the 'Application Name' field is set to 'STEP2_1'. The 'Application Notes' field contains the text: 'App created from ECM 2_3 import file STEP2_1_GEM'.
- 4. Enter Program Name:** The 'Motor Program Edit' dialog box is shown, where the 'Name' field is set to 'STEP2_1'. The 'Part Number' is '1', and the 'Status' is 'Current'. The 'Notes' field contains: 'GE base 001 Test Program for Blower Char_ ECM23 1HP Kumer_ Brent 10-26-2004 NON PRODUCTION MODEL A'.

Configuring a Program

Configuration Inputs



The screenshot shows the 'Configure' tab of the ICM2 software interface. The window title is '[FM~10TSTCFM~Current]'. The menu bar includes 'Tools', 'Window', and 'Help'. The 'Configure' tab is active, with other tabs being 'Lab Editor', 'Byte Editor', and 'Label Editor'. The settings are organized into several sections:

- Operating Mode:** Thermostat-Controlled
- Voltage:** 120v/240v
- Horsepower:** 1
- Rotation Direction:** CCW
- Regulation Mode:** Airflow
- Demand Control:** Non-Master
- G Line Definition:** Cool
- O Line Definition:** Cool
- Forced EM:** Yes
- Use Alt K's:** No
- Field Select Taps:** ICM2+
- Alternate VSpd W:** Normal (Min/Max)
- Heat Pump + Aux. Heat:** Use Backup Table Only
- Demand Units:** Radio buttons for Percent of Motor Max Demand (%), Cubic Feet / Minute (ft³/m), and Cubic Meters / Hour (m³/h). The 'Cubic Feet / Minute (ft³/m)' option is selected.

At the bottom of the interface, there are tabs for 'Tables', 'Multipliers', 'Adjust Factors', and 'Profiles'. An image of a motor is shown in the bottom right corner with the label 'Eon'.

The Configure tab contains many of the parameters that were previously part of the Flags settings in the ICM2 program.

The Tabs at the bottom contain the remainder of the parameter Settings and are shown on the following pages.

Configuring a Program

Tab 1 - Tables

The screenshot shows the 'Configure' window for a motor. The 'Tables' tab is selected and highlighted with a red circle. The 'Demand Units' section has 'Cubic Feet / Minute (ft³/m)' selected. The table below shows the following data:

Field Tap Position	Min	Max	Cool	Heat Pump	Back Up
A	904	1572	1402	1336	1007
B	904	1572	1054	998	1007
C	904	1506	875	838	809
D	904	1506	706	668	809
Tstat Tap			Cool	Cool	Heat

The appropriate airflows or torque values should be entered in the Table as was previously done in ICM2.

Configuring a Program

Tab 2 - Multipliers

The screenshot shows the configuration window for a motor, titled "[CFM~10TSTCFM~Current]". The interface includes several tabs: "Configure", "Lab Editor", "Byte Editor", and "Label Editor". The "Configure" tab is active, showing various settings for the motor's operation. The "Multipliers" sub-tab is selected, and the "2.3 Airflow Emulation" checkbox is checked and highlighted with a red circle. Other settings include "Operating Mode" (Thermostat-Controlled), "Voltage" (120v/240v), "Horsepower" (1), "Rotation Direction" (CCW), and "Regulation Mode" (Airflow). The "Demand Control" section includes "G Line Definition" (Non-Master), "O Line Definition" (Cool), "Forced EM" (Yes), "Use Alt K's" (No), and "Field Select Taps" (ICM2+). The "Demand Units" section has radio buttons for "Percent of Motor Max Demand (%)", "Cubic Feet / Minute (ft^3/m)", and "Cubic Meters / Hour (m^3/h)". The "Heating / Backup Heat" section includes "K Comb" (1.000) and "K EM" (1.203). The "Cooling / Heat Pump" section includes "K Fan" (0.50), "K DeHum" (0.797), "K 2SpdHi" (1.047), and "K 2SpdLo" (0.648). The "Constant Airflow" section includes "Max Airflow" (2400) and "Min Airflow" (602). The "Modified 5.0 Airflow Constants" section includes "A1" (1.2000), "A2" (0.2980), "A3" (2.690E-005), and "A4" (0.8471). The "Original 2.3 Airflow Constants" section includes "A1" (1.2000), "A2" (0.3000), "A3" (2.690E-005), and "A4" (0.8500). The "Zone Control" section includes "Cool" (1.00), "Emergency" (1.00), "Heat" (1.00), and "Heat Pump" (1.00). The "Output Channel" section includes "Aux Output" (RPM Mode). The "Torque Cutback" section includes "HiLimit Speed" (1303) and "HiLimit Rate" (0.48). The "Demand Units" section includes a radio button for "Percent of Motor Max Demand (%)", a radio button for "Cubic Feet / Minute (ft^3/m)", and a radio button for "Cubic Meters / Hour (m^3/h)". The "Demand Units" section also includes an image of a motor and the label "Eon".

The Multiplier Tab contains the same parameters as in ICM2. Note the check box for emulating ECM 2.3 torque regulation.

Configuring a Program

Tab 3 – Adjust Factors

The screenshot shows the 'Adjust Factors' tab in the software interface. The 'Adjust Factors' tab is highlighted with a red circle. The interface includes various configuration options such as Operating Mode (Thermostat-Controlled), Voltage (120v/240v), Horsepower (1), Rotation Direction (CCW), and Regulation Mode (Airflow). It also features Demand Control settings like G Line Definition (Non-Master), D Line Definition (Cool), and Field Select Taps (ICM2+). A 'Demand Units' section is visible on the right, with options for Percent of Motor Max Demand (%), Cubic Feet / Minute (ft³/m), and Cubic Meters / Hour (m³/h). A 'Test Mode' dropdown is set to 'UnUsed'. At the bottom, a table displays Adjust Tap Position settings for various modes.

Adjust Tap Position	Variable Speed	Fan Only	Normal Humidity	High Humidity	Heat Pump	Back Up Heat
High (+)	1.00	1.15	1.15	1.15	1.15	1.15
Normal	1.00	1.00	1.00	1.00	1.00	1.00
Low (-)	1.00	0.90	0.90	1.00	0.90	0.90
Test Mode	UnUsed	UnUsed	UnUsed	UnUsed	UnUsed	UnUsed

The Adjust Factors Tab contains the same parameters as in ICM2. Note that in Test mode, the Freeze option is not yet enabled.

Configuring a Program

Tab 4 - Profiles

The screenshot shows the 'Profiles' configuration window in the TCFM software. The 'Profiles' tab is highlighted with a red circle. The window is divided into several sections:

- Configuration Section:** Includes dropdowns for Operating Mode (Thermostat-Controlled), Voltage (120v/240v), Horsepower (1), Rotation Direction (CCW), and Regulation Mode (Airflow). It also has sections for Demand Control (G Line Definition: Non-Master, D Line Definition: Cool, Forced EM: Yes, Use Alt K's: No, Field Select Taps: ICM2+), Demand Units (Cubic Feet / Minute (ft³/m)), and a motor image labeled 'Eon'.
- Heat Pump Profiles Section:** Includes dropdowns for Pre-Run, Short-Run, and Off-Delay, all set to 'Same as Cool'. It also has a 'Field Select Profile' dropdown set to 'Cool' and a 'Slew Rates' section with values for Cool (60), Emergency (60), Heat (30), Heat Pump (60), and Off (Same as On).
- Graph Section:** A line graph titled 'Cool / Heat Pump Profile(A)' showing Demand (ft³/min) on the y-axis (0 to 2500) and Time (Minutes) on the x-axis (0 to 2). The graph shows a ramp up from 0 to 2500 ft³/min at 1 minute, a constant demand of 2500 ft³/min until 2 minutes, and a ramp down to 0. A legend indicates: Profile (black line), Full Capacity (Run Time Set By Thermostat) (green area), Pre-Run (light blue area), and Off-Delay (orange area).
- Table Section:** A table with columns for Profile A through Profile F and rows for various parameters.
- Buttons:** 'Import Profile', 'Export Profile', 'Import All', and 'Export All'.

Delay Tap Position	Profile A	Profile B	Profile C	Profile D	Profile E	Profile F
Mode	Cool/HP	Cool/HP	Cool/HP	Cool/HP	Heat	Emer
Pre-Run Minutes	0.00	0.00	0.50	0.50	0.75	0.50
Pre-Run (ft ³ /min)			1200	1200	312	600
Short-Run Minutes	0.00	0.00	0.00	0.00	0.00	1.00
Short-Run (ft ³ /min)						600
Off-Delay Minutes	0.00	1.50	1.00	0.75	2.00	0.50
Off-Delay (ft ³ /min)		1200	1512	1800	2400	312
Slew Rate Seconds	60/60	60/60	60/60	60/60	30	60

The Delay Profiles have been enhanced graphically to illustrate visually the on and off delay timing and demand levels.

Configuring a Program

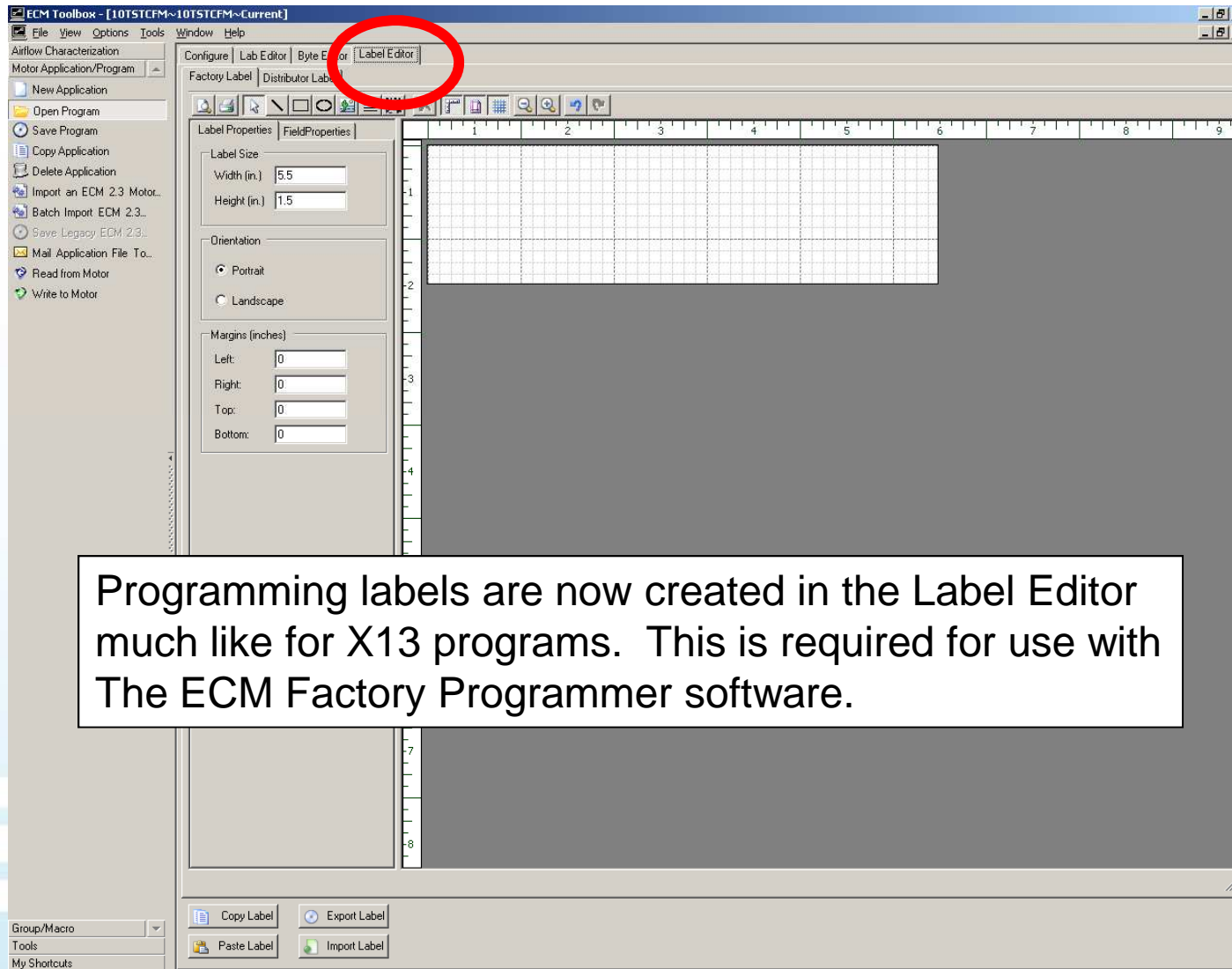
ICM2 Flags Cross Reference to ECM Toolbox

The old ICM2 terms for Flags have been replaced by more descriptive parameters. The table below is a cross reference that describes where the old ICM2 program Flag parameters can be found in the new ECM Toolbox Application program.

ECM 2.3 Flag#	Description	ECM 5.0 Toolbox Name	Location
1	Control line input freq.	Not required for the 5.0	n/a
4	Regulate mode	Regulation mode	Configure tab
6	Turn OFF for Vspd mode	Instant Off	Configure tab (Inside Demand control box, Only displayed for Vspd & Autoswitch modes)
7	Aux output definition	Aux Output	Multipliers tab
8	Test mode (adjust tap D)	Test Mode	Adjust factors tab
9	Control mode	Operating mode	Configure tab
10	Field select taps	Field select taps	Configure tab (Inside Demand control box)
11	G line def.	G line definition	Configure tab (Inside Demand control box)
12	W/W1 def. W/Vspd	Alternate VSpd W	Configure tab (Inside Demand control box)
13	HP prerun profile	Pre-Run	Profiles tab (Inside Heat Pump Profiles box)
14	HP shortrun profile	Short-Run	Profiles tab (Inside Heat Pump Profiles box)
15	HP offdelay profile	Off-Delay	Profiles tab (Inside Heat Pump Profiles box)
16	Rotation	Rotation Direction	Configure tab
17	HP + HEAT tables	Heat Pump+Aux. Heat	Configure tab (Inside Demand control box)
18	O line definition	O Line Definition	Configure tab (Inside Demand control box)
20	Vspd mode slew rate	VSpd Slew Rate	Configure tab (Inside Demand control box, Only displayed for Vspd & Autoswitch modes)
22	Field selectable profiles	Field Select Profile	Profiles tab
23	Tstat mode off slew rate	Off	Profiles tab (Inside Slew Rates box)
24	Norm/Alt K2spdlo, Kem	Use Alt K's	Configure tab (Inside Demand control box)
25	R line OFF for EM mode	Forced EM	Configure tab (Inside Demand control box)

Configuring a Program

Creating programming label data



Airflow Characterization

Step 1 – Session Info

1. Select Open or New Session

2. Go to Session Info Tab

3. Enter required fields

ECM Toolbox - [Airflow Characterization Session: Application Note - Airflow Verification]

File View Options Tools Window Help

Airflow Characterization

- New Session
- Open Session
- Save Session
- Mail Session File to ECM...

Session View

Session Info

Grid Data

Session Name: Application Note - Airflow Verification *

Serial Number:

System ID:

Blower ID:

Outlet Duct Dimensions:

Blower Scroll:

Wheel:

Blower Characteristics:

Horsepower: One Half *

Voltage:

Rotation: CCW *

Cutback Speed: 1300

Cutback Slope: 0.2%

Motor Model:

Description:

Constant torque data for determining airflow constants

* indicates required fields

Speed

The airflow characterization process now follows the same steps as the ECM 3.0. The 3.0 training video on Elitelink should be referenced for detailed instructions.

Airflow Characterization

Step 2 – Initial data points & calculating constants

Application Note - Airflow Verification~
Step Name: Pre-Airflow Mode
Max Airflow (ft³/min): 2400

Demand Units:
 Percent of Full Output
 English Units
 Metric Units

	Color	Static	Torque[oz]	TargetAirFlow	Airflow	Speed	Watts	Weight	Error	Notes
1	Black	0.100	26.3	0	2109	912	0	High	-	
2	Black	0.500	29.8	0	2112	1100	0	High	-	
3	Black	0.900	34.1	0	2109	1282	0	High	-	
4	Blue	0.100	18.5	0	1682	768	0	High	-	
5	Blue	0.500	21.8	0	1690	969	0	High	-	
6	Blue	0.900	25.7	0	1680	1174	0	High	-	
7	Red	0.100	11.6	0	1260	623	0	High	-	
8	Red	0.500	14.8	0	1260	857	0	High	-	
9	Red	0.900	18.6	0	1261	1088	0	High	-	
10										
11										
12										
13										
14										
15										
16										
17										

Calculated Constants
Max Airflow (ft³/min): 2400
A1 1.0350 A2 0.1180
A3 2.009E-004 A4 0.7840
R2 Error: 0.2710

Motor Controls/Status
Torque (oz-ft) 0.00 Apply
Coarse Fine
Capture Data
Start Motor
Enter Freeze Mode

Speed vs. Torque(%)
Speed
Torque(%)
Scale: 100 %

1. Go to grid data

2. Use motor control to set torque, Use capture data button to record torque & rpm, Fill in actual cfm, Click calculate constants.

Airflow Characterization

Step 3 – Airflow confirmation & more

Application Note - Airflow Verification
Step Name: Airflow Mode Step 1 [current]
Max Airflow (ft³/min): 2400

Demand Units:
 Percent of Full Output
 English Units
 Metric Units

	Color	Static	Torque(oz)	TargetAirFlow	Airflow	Speed	Watts	Weight	Error	Notes
1	Black	0.100	23.5	2000	1928	863	0	High	0.000	
2	Black	0.500	27.3	2000	1895	1041	0	High	0.000	
3	Black	0.900	31.3	2000	1928	1232	0	High	0.000	
4	Blue	0.100	15.9	1600	1514	690	0	High	0.000	
5	Blue	0.500	20.2	1600	1578	933	0	High	0.000	
6	Blue	0.900	23.7	1600	1563	1139	0	High	0.000	
7	Red	0.100	10.5	1200	1186	580	0	High	0.000	
8	Red	0.500	14.1	1200	1213	838	0	High	0.000	
9	Red	0.900	17.1	1200	1203	1066	0	High	0.000	
10										
11										
12										
13										
14										

Speed vs. Torque(%)

Scale: 100 %

Calculated Constants
Max Airflow (ft³/min): 2400
A1: 0.0000 A2: 0.0000
A3: 0.000E+000 A4: 0.0000
R2 Error: 100.0000

Motor Controls/Status
Active Constants:
A1: 1.0350 A2: 0.1180
A3: 2.009E-004 A4: 0.7840
Target Airflow (ft³/min): 0.00
Coarse
Fine

1. Use motor control to set cfm,
Use capture data button to record data,
Compare results to target,
If needed, calculate new constants and repeat.

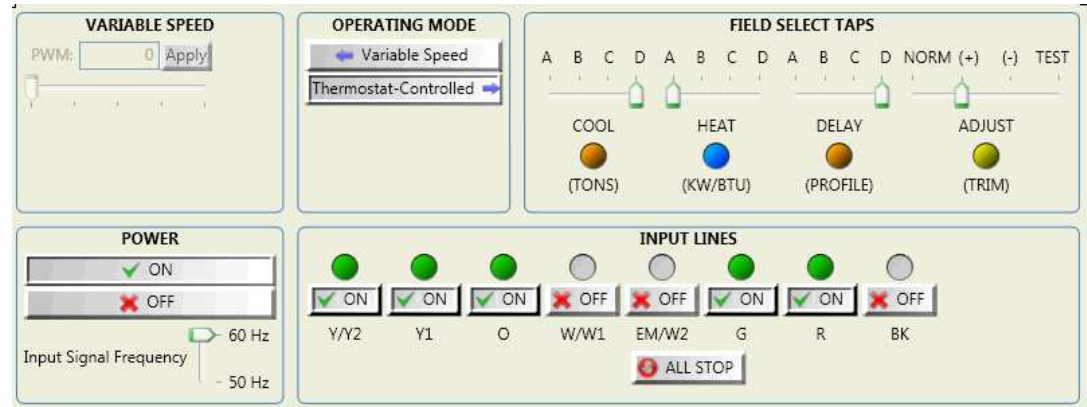
Motor Application/Program
Group/Macro
Tools
My Shortcuts

Edit/Add Custom Help Edit/Add Standard Help

Development Unit



ECM Dev. Box



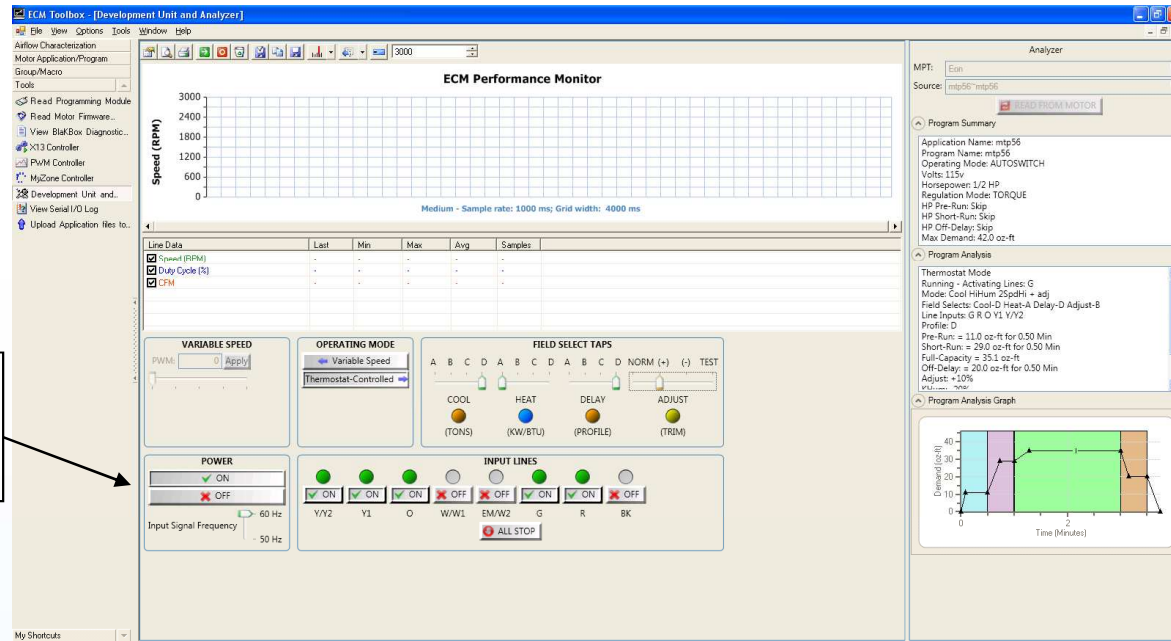
Development Unit



Serial Box

The old ECM Development box has been functionally replaced in the ECM Toolbox by the Development Unit & Genteq Serial box accessory.

Development Unit & Analyzer



Power On/Off
Enables/disables
Input lines & taps.

ANALYZER:
Select motor type and
Source for input lines to
be sent to.

Results of program file
Or motor output are
Displayed for review.

Graphical representation
of demand and profile
Timing is displayed

It is now possible to send either 24VAC or PWM duty cycle input signals to the Eon motor directly from the computer thru the Serial box using development cable 8794707LR. Can be used in the lab to simulate control board or Tstat inputs.

The Analyzer allows input/output analysis for either a program file or connected motor.