



ECM OPERATION MANUAL

FOR USE WITH MODELS:

CHX1-75N	CDX1-75N
CHX1-100N	CDX1-100N
CHX1-125N	CDX1-125N

⚠WARNING: IF YOU DO NOT FOLLOW THE SAFETY PRECAUTIONS BELOW AND IN THIS MANUAL, A FIRE OR EXPLOSION MAY RESULT CAUSING PROPERTY DAMAGE, PERSONAL INJURY, OR LOSS OF LIFE.

DO NOT STORE OR USE GASOLINE OR OTHER FLAMMABLE VAPORS AND LIQUIDS IN THE VICINITY OF THIS OR ANY OTHER APPLIANCE.

WHAT TO DO IF YOU SMELL GAS:

- DO NOT TRY TO LIGHT ANY APPLIANCE.
- DO NOT TOUCH ANY ELECTRICAL SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.
- LEAVE THE BUILDING IMMEDIATELY.
- IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS.
- IF YOU CANNOT REACH YOUR GAS SUPPLIER; CALL THE FIRE DEPARTMENT.

INSTALLATION AND SERVICE MUST BE PERFORMED BY A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER. (REFERRED TO IN THESE INSTRUCTIONS AS A QUALIFIED HEATING CONTRACTOR).

PLEASE READ THESE INSTRUCTIONS PRIOR TO INSTALLATION, INITIAL FIRING, AND BEFORE PERFORMING ANY SERVICE OR MAINTENANCE. THESE INSTRUCTIONS MUST BE LEFT WITH THE HOMEOWNER AND SHOULD BE RETAINED FOR FUTURE REFERENCE BY QUALIFIED SERVICE PERSONNEL.

THERMO PRODUCTS, LLC.
BOX 217
NORTH JUDSON, IN 46366
PHONE: (574) 896-2133

MADE IN USA



All installations and services must be performed by qualified service personnel.

INDEX

<u>SECTION</u>	<u>BEGINNING PAGE</u>
I. FURNACE SPECIFICATIONS (SHIPPED SETTINGS)	1
II. BLOWER INFORMATION	3
A. WIRING	3
B. CFM TABLES	4
III. ECM TROUBLESHOOTING	6
A. GENERAL GUIDELINES TO TROUBLESHOOTING GE ECM	6
B. TROUBLESHOOTING CHARTS	9

All installations and services must be performed by qualified service personnel.

I. FURNACE SPECIFICATIONS (SHIPPED SETTINGS)

CHX1 SERIES

MODEL NO.	CHX1-75	CHX1-100	CHX1-125
HEAT INPUT RATE IN BTU/HR (High fire/ Low fire)	75,000 / 52,000	100,000 / 70,000	125,000 / 87,500
HEATING CAPACITY IN BTU/HR (High fire/ Low fire)	70,875 / 49,612	94,500 / 66,150	117,500 / 82,250
HEIGHT OF CASING	44-1/4"	44-1/4"	44-1/4"
WIDTH OF CASING	17"	21"	24"
DEPTH OF CASING	27-1/2"	27-1/2"	27-1/2"
WARM AIR OUTLET	15 x 18	19 x 18	22 x 18
RETURN AIR INLET	25 x 16	25 x 16	25 x 16
DIA. OF FLUE	2"	3"	3"
DIA. OF COMBUSTION AIR INTAKE	2"	3"	3"
FLOWRATE from .2" & .5" w.c. EXTERNAL STATIC PRESSURE	COOLING	COOLING	COOLING
@COOLING TAP A (CFM)	1000	1200	1400
@COOLING TAP B (CFM)	800	1000	1200
@COOLING TAP C (CFM)	1200	1400	1600
@COOLING TAP D (CFM)	1400	1600	2000
	HEATING	HEATING	HEATING
@HEATING TAP A (CFM @High fire/Low fire)	931 / 760	1243 / 1015	1556 / 1270
TEMPERATURE RISE (°F)	70 / 60	70 / 60	70 / 60
BLOWER MOTOR HP	.5	.75	1
POWER CHOKES	-	2.65 Mh	2.1 Mh
LARGEST RECOMMENDED AIR CONDITIONER	3.5 Ton	4 Ton	5 Ton
SIZE OF FILTERS	24-3/4" x 15-3/4"	24-3/4" x 15-3/4"	24-3/4" x 19-3/4"

NOTES:

1. Heating capacity based on annual fuel utilization efficiency rated by manufacturer.
2. On all outlet and inlet dimensions, the first dimension is width.
3. To permit largest recommended air conditioning (at .5 static pressure), selection of the highest motor speed is required.
4. Electrical characteristics at 115 volts, 60 Hz., 1 phase (less than 15 amps, for all models).
5. All specifications are subject to change without notice.

All installations and services must be performed by qualified service personnel.

CDX1 SERIES

MODEL NO.	CDX1-75	CDX1-100	CDX1-125
HEATING INPUT RATE IN BTU/HR (High fire / Low fire)	75,000 / 56,250	100,000 / 75,000	125,000 / 93,750
HEATING CAPACITY IN BTU/HR (High fire / Low fire)	69,750 / 52,312	93,000 / 69,750	116,250 / 87,187
HEIGHT OF CASING	46-1/4"	46-1/4"	46-1/4"
WIDTH OF CASING	17"	21"	24"
DEPTH OF CASING	27-1/2"	27-1/2"	27-1/2"
WARM AIR OUTLET	15 x 18	19 x 18	22 x 18
RETURN AIR INLET	15 x 22	19 x 22	22 x 22
DIA. OF FLUE	2"	3"	3"
DIA. OF COMBUSTION AIR INTAKE	2"	3"	3"
FLOWRATE from .2" & .5" w.c. EXTERNAL STATIC PRESSURE	COOLING	COOLING	COOLING
@COOLING TAP A (CFM)	1000	1200	1400
@COOLING TAP B (CFM)	800	1000	1200
@COOLING TAP C (CFM)	1200	1400	1600
@COOLING TAP D (CFM)	1400	1600	2000
	HEATING	HEATING	HEATING
@HEATING TAP C (CFM @ High fire / Low fire)	1012 / 826	1340 / 1094	1673 / 1366
TEMPERATURE RISE (°F)	65 / 60	65 / 60	65 / 60
BLOWER MOTOR HP	.5	.75	1
POWER CHOKES	-	2.65Mh	2.1Mh
LARGEST RECOMMENDED AIR CONDITIONER	3.5 Ton	4 Ton	5 Ton
SIZE OF FILTERS	21-3/4" x 14"(2)	21-3/4" x 14"(2)	21-3/4" x 14"(2)

NOTES:

1. Heating capacity based on annual fuel utilization efficiency rated by manufacturer.
2. On all outlet and inlet dimensions, the first dimension is width.
3. To permit largest recommended air conditioning (at .5 static pressure), selection of the highest motor speed is required.
4. Electrical characteristics at 115 volts, 60 Hz., 1 phase (less than 15 amps. for all models).
5. All specifications are subject to change without notice.

All installations and services must be performed by qualified service personnel.

II. BLOWER INFORMATION

A. WIRING

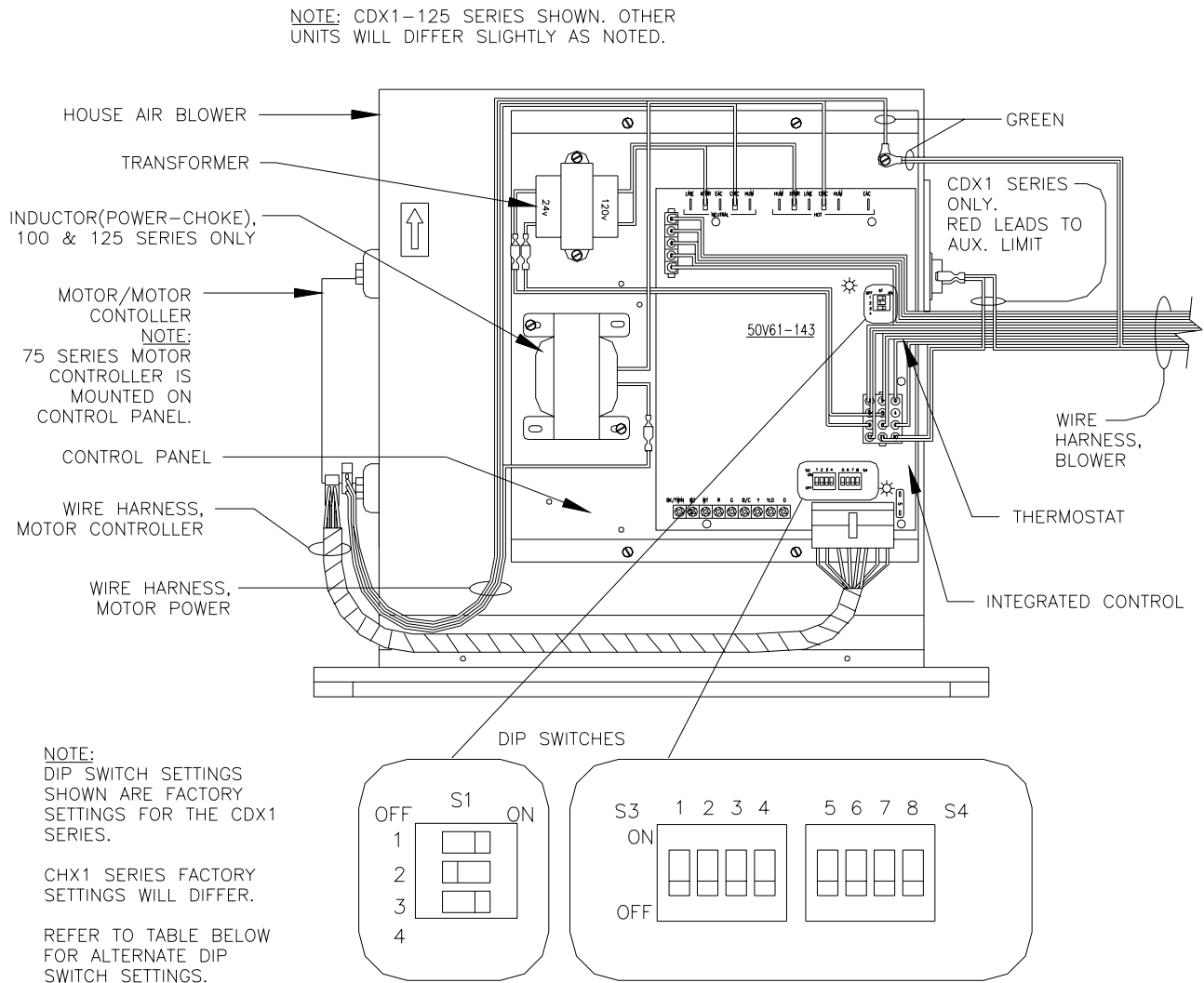


Figure 1: BLOWER WIRING

⚠WARNING: *TURN OFF THE ELECTRICAL POWER to the furnace before attempting to disconnect blower wiring.*

All installations and services must be performed by qualified service personnel.

B. CFM TABLES

The following tables contain blower speed settings and their respective air flowrates for the ECM blower motor. To change air flowrates from that of the shipped settings, use the respective S3 and S4 dipswitches on the furnace's integrated control board (see Figure 1).

HEATING SPEEDS

CDX1-75				
Dip switch settings	Low fire CFM	Rise (°F)	High Fire CFM	Rise (°F)
7-OFF 8-OFF	760	64	931	70
7-ON 8-OFF	708	69	867	75
7-OFF 8-ON	826	59	1012	65
7-ON 8-ON	909	54	1114	59

CHX1-75				
Dip switch settings	Low fire CFM	Rise (°F)	High Fire CFM	Rise (°F)
7-OFF 8-OFF	760	60	931	70
7-ON 8-OFF	708	65	867	75
7-OFF 8-ON	826	55	1012	65
7-ON 8-ON	909	50	1114	59

CDX1-100				
Dip switch settings	Low fire CFM	Rise (°F)	High Fire CFM	Rise (°F)
7-OFF 8-OFF	1015	64	1243	70
7-ON 8-OFF	947	69	1160	75
7-OFF 8-ON	1094	60	1340	65
7-ON 8-ON	1184	55	1450	60

CHX1-100				
Dip switch settings	Low fire CFM	Rise (°F)	High Fire CFM	Rise (°F)
7-OFF 8-OFF	1015	60	1243	70
7-ON 8-OFF	947	64	1160	75
7-OFF 8-ON	1094	56	1340	65
7-ON 8-ON	1184	51	1450	60

CDX1-125				
Dip switch settings	Low fire CFM	Rise (°F)	High Fire CFM	Rise (°F)
7-OFF 8-OFF	1270	64	1556	70
7-ON 8-OFF	1185	69	1452	75
7-OFF 8-ON	1366	60	1673	65
7-ON 8-ON	1480	55	1813	60

CHX1-125				
Dip switch settings	Low fire CFM	Rise (°F)	High Fire CFM	Rise (°F)
7-OFF 8-OFF	1270	60	1556	70
7-ON 8-OFF	1185	64	1452	75
7-OFF 8-ON	1366	56	1673	65
7-ON 8-ON	1480	51	1813	60

 =FACTORY SHIPPED SETTINGS

All installations and services must be performed by qualified service personnel.

COOLING AND CONTINUOUS FAN SPEEDS

CDX1-75 & CHX1-75		
Dip switch setting	Continuous fan CFM	Cooling CFM
1-OFF 2-OFF 3-ON 4-OFF	500	1150
1-OFF 2-OFF 3-OFF 4-OFF	500	1000
1-OFF 2-OFF 3-OFF 4-ON	500	850
1-ON 2-OFF 3-ON 4-OFF	400	920
1-ON 2-OFF 3-OFF 4-OFF	400	800
1-ON 2-OFF 3-OFF 4-ON	400	680
1-OFF 2-ON 3-ON 4-OFF	600	1380
1-OFF 2-ON 3-OFF 4-OFF	600	1200
1-OFF 2-ON 3-OFF 4-ON	600	1020
1-ON 2-ON 3-ON 4-OFF	700	1600
1-ON 2-ON 3-OFF 4-OFF	700	1400
1-ON 2-ON 3-OFF 4-ON	700	1190

CDX1-100 & CHX1-100		
Dip switch setting	Continuous fan CFM	Cooling CFM
1-OFF 2-OFF 3-ON 4-OFF	600	1380
1-OFF 2-OFF 3-OFF 4-OFF	600	1200
1-OFF 2-OFF 3-OFF 4-ON	600	1020
1-ON 2-OFF 3-ON 4-OFF	500	1150
1-ON 2-OFF 3-OFF 4-OFF	500	1000
1-ON 2-OFF 3-OFF 4-ON	500	850
1-OFF 2-ON 3-ON 4-OFF	700	1610
1-OFF 2-ON 3-OFF 4-OFF	700	1400
1-OFF 2-ON 3-OFF 4-ON	700	1190
1-ON 2-ON 3-ON 4-OFF	800	1700
1-ON 2-ON 3-OFF 4-OFF	800	1600
1-ON 2-ON 3-OFF 4-ON	800	1360

CDX1-125 & CHX1-125		
Dip switch setting	Continuous fan CFM	Cooling CFM
1-OFF 2-OFF 3-ON 4-OFF	700	1610
1-OFF 2-OFF 3-OFF 4-OFF	700	1400
1-OFF 2-OFF 3-OFF 4-ON	700	1190
1-ON 2-OFF 3-ON 4-OFF	600	1380
1-ON 2-OFF 3-OFF 4-OFF	600	1200
1-ON 2-OFF 3-OFF 4-ON	600	1020
1-OFF 2-ON 3-ON 4-OFF	800	1840
1-OFF 2-ON 3-OFF 4-OFF	800	1600
1-OFF 2-ON 3-OFF 4-ON	800	1360
1-ON 2-ON 3-ON 4-OFF	1000	2300
1-ON 2-ON 3-OFF 4-OFF	1000	2000
1-ON 2-ON 3-OFF 4-ON	1000	1700

 =FACTORY SHIPPED SETTINGS

All installations and services must be performed by qualified service personnel.

III. ECM TROUBLE SHOOTING

A. GENERAL GUIDELINES TO TROUBLESHOOTING GE ECM – DRIVEN SYSTEMS

⚠CAUTION: Disconnect power from unit before removing or replacing connectors, or servicing motor. Wait at least 5 minutes after disconnecting power before opening motor.

SYMPTOM	CAUSE/PROCEDURE
Motor rocks slightly when starting	<ul style="list-style-type: none"> This is normal start-up for ECM
Motor won't start <ul style="list-style-type: none"> No movement 	<ul style="list-style-type: none"> Check power at motor Check low voltage (24 VAC R to C) at motor Check low voltage connections (G,Y,W,R,C,) at motor Check for unseated pins in connectors on motor harness Test with a temporary jumper between R – G Check motor for tight shaft Perform motor/control replacement check Run Moisture Check
<ul style="list-style-type: none"> Motor rocks, but won't start 	<ul style="list-style-type: none"> Check for loose or compliant motor mount Make sure blower wheel is tight on shaft Perform motor/control replacement check
Motor oscillates up & down while being tested off of blower	<ul style="list-style-type: none"> It is normal for motor to oscillate with no load on shaft.
Motor starts, but runs erratically <ul style="list-style-type: none"> Varies up and down or intermittent 	<ul style="list-style-type: none"> Check line voltage for variation or "sag" Check low voltage connections (G,Y,W,R,C,) at motor, unseated pins in motor harness connectors Check "Bk" for erratic CFM command (in variable speed applications) Check-out system controls – T'stat? Perform Moisture Check
<ul style="list-style-type: none"> "Hunts" or "puffs" at high CFM (speed) 	<ul style="list-style-type: none"> Does removing panel or filter reduce "puffing"? <ul style="list-style-type: none"> ➤ Reduce restriction ➤ Reduce max airflow
<ul style="list-style-type: none"> Stays at low CFM despite system call for cool or heat CFM 	<ul style="list-style-type: none"> Check low voltage (T'stat) wires and connections Verify fan is not in delay mode – wait until delay complete "R" missing/not connected at motor Perform motor/control replacement check
<ul style="list-style-type: none"> Stays at high CFM 	<ul style="list-style-type: none"> "R" missing/not connected at motor Is fan in delay mode? – wait until delay time complete Perform motor/control replacement check
<ul style="list-style-type: none"> Blower won't shut off 	<ul style="list-style-type: none"> Current leakage from controls into G,Y or W? Check for Triac switched t'stat or solid state relay
Excessive noise	<ul style="list-style-type: none"> Determine if it's air noise, cabinet, duct or motor noise – interview customer, if necessary
<ul style="list-style-type: none"> Noisy blower or cabinet 	<ul style="list-style-type: none"> Check for loose blower housing, panels, etc. High static creating high blower speed? <ul style="list-style-type: none"> ➤ Check for air whistling thru seams in ducts, cabinets or panels ➤ Check for cabinet/duct deformation

All installations and services must be performed by qualified service personnel.

<ul style="list-style-type: none"> • “Hunts” or “puffs” at high CFM (speed) 	<ul style="list-style-type: none"> • Does removing panel or filter reduce “puffing”? <ul style="list-style-type: none"> ➢ Reduce restriction ➢ Reduce max airflow
Evidence of Moisture	
<ul style="list-style-type: none"> • Motor failure or malfunction has occurred and moisture is present 	<ul style="list-style-type: none"> • Replace motor and perform Moisture Check
<ul style="list-style-type: none"> • Evidence of moisture present inside air mover 	<ul style="list-style-type: none"> • Perform Moisture Check

<u>DO</u>	<u>DON'T</u>
<ul style="list-style-type: none"> • Check-out motor, controls, wiring and connections thoroughly before replacing motor 	<ul style="list-style-type: none"> • Automatically assume the motor is bad.
<ul style="list-style-type: none"> • Orient connectors down so water can't get in <ul style="list-style-type: none"> ➢ Install “drip loops” 	<ul style="list-style-type: none"> • Locate connectors above 7 and 4 o'clock positions
<ul style="list-style-type: none"> • Use authorized motor and control model #'s for replacement 	<ul style="list-style-type: none"> • Replace one motor or control model # with another (unless an authorized replacement)
<ul style="list-style-type: none"> • Keep static pressure to a minimum: <ul style="list-style-type: none"> ➢ Recommend high efficiency, low static filters ➢ Recommend keeping filters clean ➢ Design ductwork for min static, max comfort ➢ Look for and recommend ductwork improvement, where necessary, in replacement 	<ul style="list-style-type: none"> • Use high pressure drop filters – some have ½” H₂O drop! • Use restricted returns
<ul style="list-style-type: none"> • Size the equipment wisely 	<ul style="list-style-type: none"> • Oversize system then compensate with low airflow
<ul style="list-style-type: none"> • Check orientation before inserting motor connectors 	<ul style="list-style-type: none"> • Plug in power connector backwards • Force plugs

Moisture Check

- Connectors are orientated “down” (or as recommended by equipment manufacturer)
- Arrange harnesses with “drip loop” under motor
- Is condensate drain plugged?
- Check for low airflow (too much latent capacity)
- Check for undercharged condition
- Check and plug leaks in return ducts, cabinet

Comfort Check

- Check proper airflow settings
- Low static pressure for lowest noise
- Set low continuous-fan CFM
- T'stat in bad location?

All installations and services must be performed by qualified service personnel.

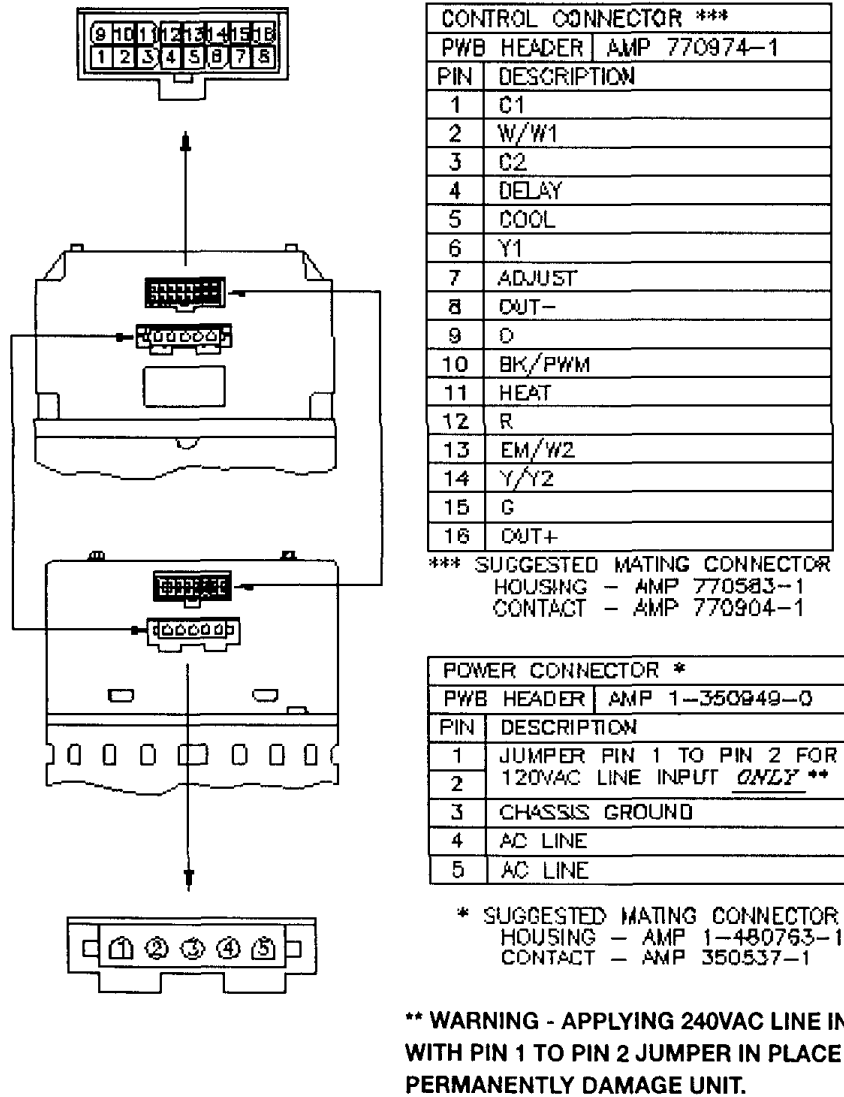


Figure 2: ECM PIN CONNECTORS

Troubleshooting table above and Figure 2 adapted from GE Industrial Systems publication GED-7161C, "Troubleshooting GE ECM - Driven Systems".

All installations and services must be performed by qualified service personnel.

B. TROUBLESHOOTING CHARTS

THIS GUIDE SHOULD BE USED IN THE CASE OF A STOPPED OR MANFUNCTIONED ECM BLOWER MOTOR. THE FOLLOWING SHOULD HELP ESTABLISH THE TYPE OF MALFUNCTION OR DEVIATION FROM THE NORMAL BLOWER OPERATION.

TO USE THIS DIAGRAM, YOU JUST NEED TO FOLLOW THE INSTRUCTIONS IN THE BOXES.

