

SPECIAL INSTRUCTIONS

MULTI-POSITION INDUCED DRAFT VARIABLE SPEED 2-STAGE HEAT GAS FURNACE GMPE-A SERIES

READ THIS SUPPLEMENTAL INSTRUCTION MANUAL AND THE ENTIRE INSTALLATION / OPERATION BOOKLET BEFORE ATTEMPTING TO INSTALL OR SERVICE THIS FURNACE.

- The **GMPE-A** series of gas fired furnaces is not intended to be twinned. It should be installed as a dedicated heating or heating / cooling system.
- The wiring diagram contained in this manual supersedes the diagram found elsewhere in the Installation and Operating instructions.
- The **ECMTM-2** motors used in the **GMPE-A** series of furnaces are, at full load, over 20% more efficient than the motors used in a typical furnace. They maintain their efficiency throughout the entire load range in various applications.
- When coupled with a High Efficiency condensing unit and matching indoor coil, the **S.E.E.R.** ratings will increase.
- Used as a two stage gas furnace the **GMPE-A** furnace uses less gas to maintain the desired comfort level.

ALL INFORMATION SUBJECT TO CHANGE WITHOUT NOTICE

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Constant CFM vs. Static Pressure

Typically the air flow delivered to the air distribution system is dependent upon the static pressure required for comfort. This requires careful attention to the design of this distribution system. Often the system's air flow requirements in the cooling and heating mode differ greatly. This makes the system design much more difficult to achieve. In most cases it is a compromise. In such cases the system's capacity may be reduced, resulting in higher operating costs while the comfort level decreases.

The **GMPE-A** series of furnaces delivers the optimum air flow for the system size, whether in the heating or cooling mode. This is done without regard to the static pressure imposed by the air distribution system.

Constant Fan Operation

The air flow delivered to the system in the constant fan operation by the typical furnace is the full system requirement. In most applications the constant fan operation is intended to provide air circulation throughout the conditioned space to prevent air stratification (dead air). In such applications the full system air flow is not desired due to the high level of background noise and increased operation costs.

The **GMPE-A** series of furnaces deliver approximately 30% of the system's full air flow. This results in low background noise and reduced operating costs.

Humidity Control

The typical furnace, when coupled with today's High Efficiency outdoor sections and operating under high humidity conditions, may not remove sufficient moisture from the conditioned air to provide desired comfort levels.

The **GMPE-A** series of furnaces provide humidity control when operated with a standard 24V humidistat. When the humidistat detects a high humidity condition the air flow supplied to the system is reduced to 70% of full load. This in turn allows the indoor coil to remove more moisture from the conditioned air. When the humidistat detects reduced humidity conditions, the air flow to the system returns to normal operation.

Soft start/stop vs. Instant on/off

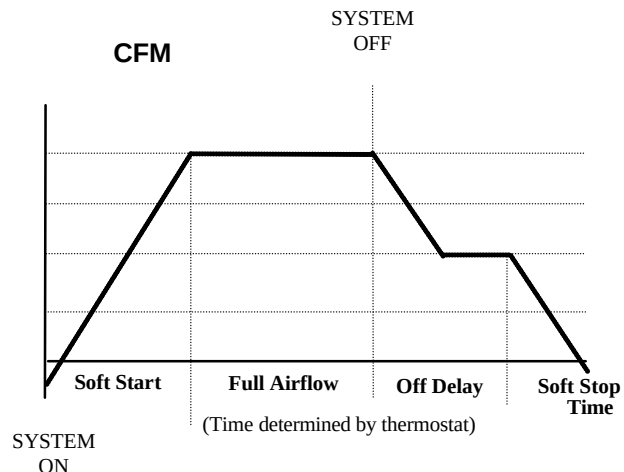
Upon a call for system operation, the **GMPE-A** furnace motor provides a soft start. This means that the air flow delivered to the system "ramps" from zero to the system's full air flow requirements. Ramping the air flow during the system start-up matches the air flow requirements more closely to the immediate system capacity needs. This eliminates the complaints of warm or cool air blasts.

Upon satisfying the heat or cool demand, the **GMPE-A** furnace motor provides a soft stop. This means that the air flow delivered to the system ramps down to approximately 50% of the full system requirements. It remains there for a short period of time before ramping down to a full stop. The intent of the shut-down air profile is to take advantage of the residual heating or cooling capacity without warm or cool air blasts.

The start-up and shut-down ramping of the air flow requirements eliminate the perceived noise and distraction that occurs during the normal operation of heating and cooling equipment.

Two Stage Heating Operation

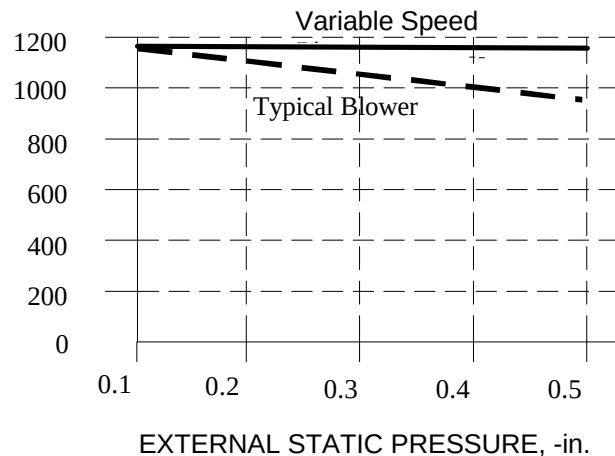
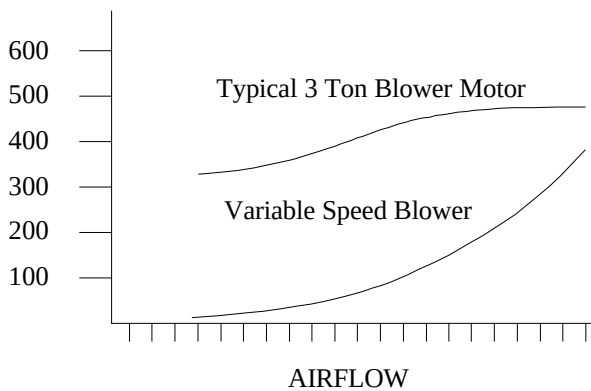
The **GMPE-A** furnace incorporates a two stage heating function. Controlled by a two stage room thermostat, this furnace reduces the firing input to match the house demand. This feature saves gas and electrical usage while providing maximum comfort.



AIR FLOW CHANGE

The **GMPE-A** series furnace blower motor has an internal microprocessor control circuit that has been programmed with pertinent information about the system. As such, the motor responds directly to the demands communicated by the thermostat and other control lines in a preprogrammed manner. Simply by flipping a switch or removing a jumper wire on the field wiring low voltage input board, it is possible to tailor the air flow delivered by the furnace.

The **GMPE-A** series furnace blower motors have been preprogrammed for operation at four (4) distinct air flow levels. These are as follows: cooling, gas heat, heat pump, and heat pump with gas heat back-up. The various combinations on the low voltage terminal board permit different air flow selections for each mode of operation. The use of a humidistat or other low voltage controller allows for further variation.



BLOWER PERFORMANCE

GMPE075-3A

	1 st STAGE COOLING CFM	2 nd STAGE COOLING CFM	1 st STAGE HEATING CFM	2 nd STAGE HEATING CFM	HEAT PUMP CFM
A (3 TON)	840	1200	800	1120	1250
B (2.5 TON)	700	1000	800	1120	1050
C (2 TON)	560	800	650	910	850
D (1.5 TON)	490	700	650	910	750

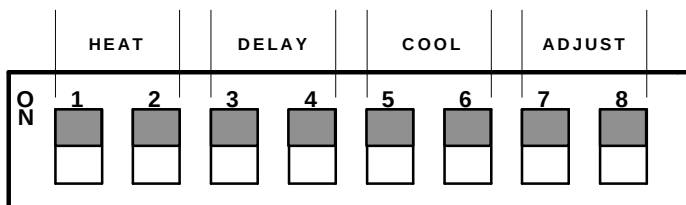
GMPE100-4A

	1 st STAGE COOLING CFM	2 nd STAGE COOLING CFM	1 st STAGE HEATING CFM	2 nd STAGE HEATING CFM	HEAT PUMP CFM
A (4 TON)	1120	1600	1050	1470	1650
B (3.5 TON)	980	1400	1050	1470	1450
C (3 TON)	840	1200	900	1260	1250
D (2.5 TON)	700	1000	900	1260	1050

GMPE125-5A

	1 st STAGE COOLING CFM	2 nd STAGE COOLING CFM	1 st STAGE HEATING CFM	2 nd STAGE HEATING CFM	HEAT PUMP CFM
A (5 TON)	1400	2000	1300	1690	2050
B (4 TON)	1120	1600	1300	1690	1650
C (3.5 TON)	980	1400	1150	1495	1450
D (3 TON)	840	1200	1150	1495	1250

"FAN ONLY" = CFM of selected mode X .3
 "HUMIDISTAT" = CFM of selected mode X .85
 "ADJUST" POSITION C = Decreases selected speed by 15% (Switches 7 & 8)
 "ADJUST" POSITION B = Increases selected speed by 10% (Switches 7 & 8)



	HEAT		DELAY (F)		COOL		ADJUST	
A	OF	OF	OF	OF	OF	OF	OF	OF
B	ON	OF	ON	OF	ON	OF	ON	OF
C	OF	ON	OF	ON	OF	ON	OF	ON
D	ON	ON	ON	ON	ON	ON	ON	ON
	1	2	3	4	5	6	7	8
DIP SWITCH NUMBER (F = Factory Setting)								

NOTE: For desired Cooling and Heating airflow, set the dip switches according to the blower performance table.

AIR FLOW SELECTION PROCEDURE

Using the following charts the proper airflow for the system can be selected and set.
 All of **GMPE-A**'s furnaces will be shipped factory set to deliver maximum CFM which is switch combination A.

DIP SWITCH COMBINATIONS - COOLING / HEATING - HEAT PUMP MODE

GMPE075 - 3A

Unit capacity tons	Switch combination
3	A
2.5	B
2	C
1.5	D

GMPE100 - 4A

Unit capacity tons	Switch combination
4	A
3.5	B
3	C
2.5	D

GMPE125 - 5A

Unit capacity tons	Switch combination
5	A
4	B
3.5	C
3	D

EXAMPLE: GMPE075-3A WITH A 2 TONS OUTDOOR SECTION

DISCONNECT POWER FROM UNIT BEFORE SERVICING MOTOR

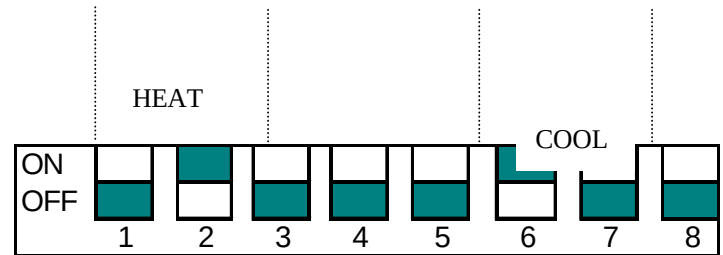
GMPE075-3A

Unit capacity tons	Switch combination
3	A
2.5	B
2	C
1.5	D

	HEAT		DELAY (F)		COOL		ADJUST	
A	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
B	ON	OFF	ON	OFF	ON	OFF	ON	OFF
C	OFF	ON	OFF	ON	OFF	ON	OFF	ON
D	ON	ON	ON	ON	ON	ON	ON	ON
	1	2	3	4	5	6	7	8
DIP SWITCH NUMBER (F= FACTORY SETTING)								

COOLING AND HEATING CFM

1. From the COOLING / HEAT mode dip switch selection tables determine the switch setting combination.
2. Referring to the switch combination table determine the proper switch settings for switch combination C switch 1 "OFF", switch 2 "ON" for HEATING CFM, and switch 5 "OFF", switch 6 "ON" for COOLING CFM.



3. Move the dip switches 1 & 2, and 5 & 6 located on the Low Voltage Terminal Board to "OFF" & "ON" respectively.

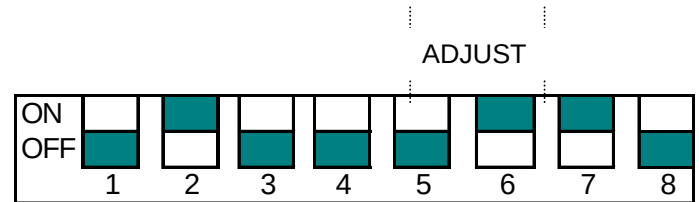
NOTE: Dip switch number 4 are factory setting. Leave it as is.

AIR FLOW ADJUSTMENT

The air flow delivered by the GMPE-A's Furnaces can be adjusted from the selected CFMs by + 10% or - 15% using the "ADJUST" dip switches 7 & 8 on the Low Voltage Terminal Board.

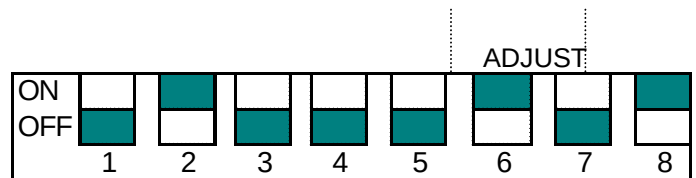
INCREASE SELECTED CFMs BY 10%

Using last example, to increase air flow by 10%, referring to the "Blower Performance" tables "ADJUST" position B should be used - switch 7 "ON" & switch 8 "OFF". So the total CFM for a 2 tons system should be 800 CFM + 80 CFM (10% of 800) => 880 CFM

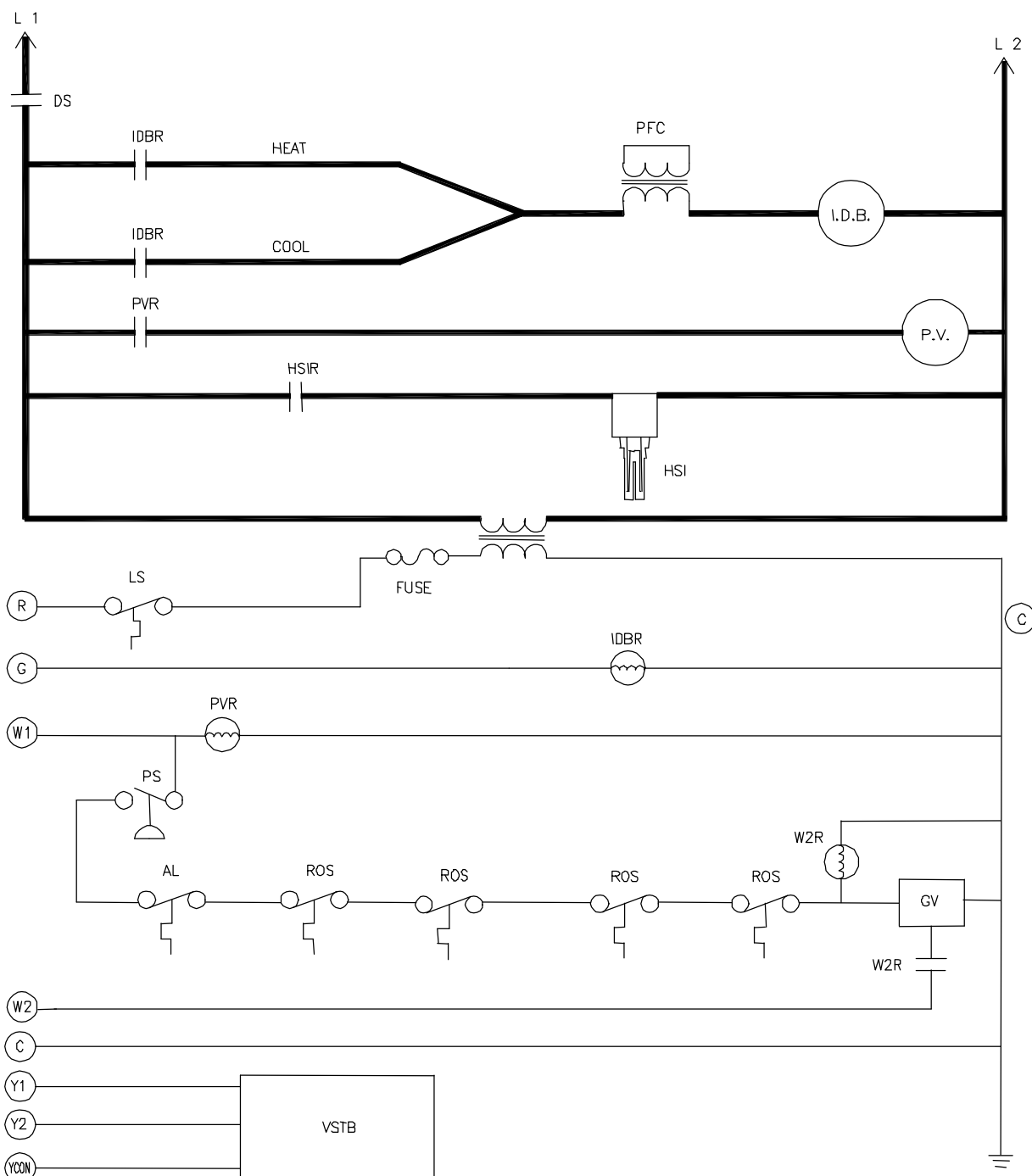


DECREASE THE SELECTED CFMs BY 15%

Using last example, to decrease air flow by 15%, referring to the "Blower Performance" tables "ADJUST" position C should be used - switch 7 "OFF" & switch 8 "ON". So the total CFM for a 2 tons system should be 800 CFM - 120 CFM (15% of 800) => 680 CFM



NOTE - "ADJUST" combination A and D has no effect on the set airflow.



PFC - POWER-FACTOR CHOKE TRANSFORMER
 ALS - AUXILIARY LIMIT SWITCH
 DS - DOOR SWITCH
 CR - COOL RELAY
 HR - HEAT RELAY
 FS - FLAME SENSOR
 GV - GAS VALVE
 HSI - HOT SURFACE IGNITOR
 ICB - INTEGRATED CIRCUIT BOARD
 IDB - INDOOR BLOWER
 IDBR - INDOOR BLOWER RELAY
 LS - LIMIT SWITCH
 PS - PRESSURE SWITCH
 PV - POWER VENTOR
 PVR - POWER VENT RELAY
 ROS - ROLLOUT SWITCH
 MC - MOTOR CONTROLLER
 TR - TRANSFORMER
 HSIR - HOT SURFACE IGNITOR RELAY
 W2R - W2 RELAY
 VSTB - VARIABLE SPEED TERMINAL BOARD

WIRING CODE

FACTORY WIRING
 HIGH VOLTAGE
 LOW VOLTAGE

FIELD WIRING
 HIGH VOLTAGE
 LOW VOLTAGE

WIRE COLOR CODE

B — BLACK	PK — PINK
BL — BLUE	P — PURPLE
BR — BROWN	W — WHITE
G — GREEN	Y — YELLOW
O — ORANGE	R — RED

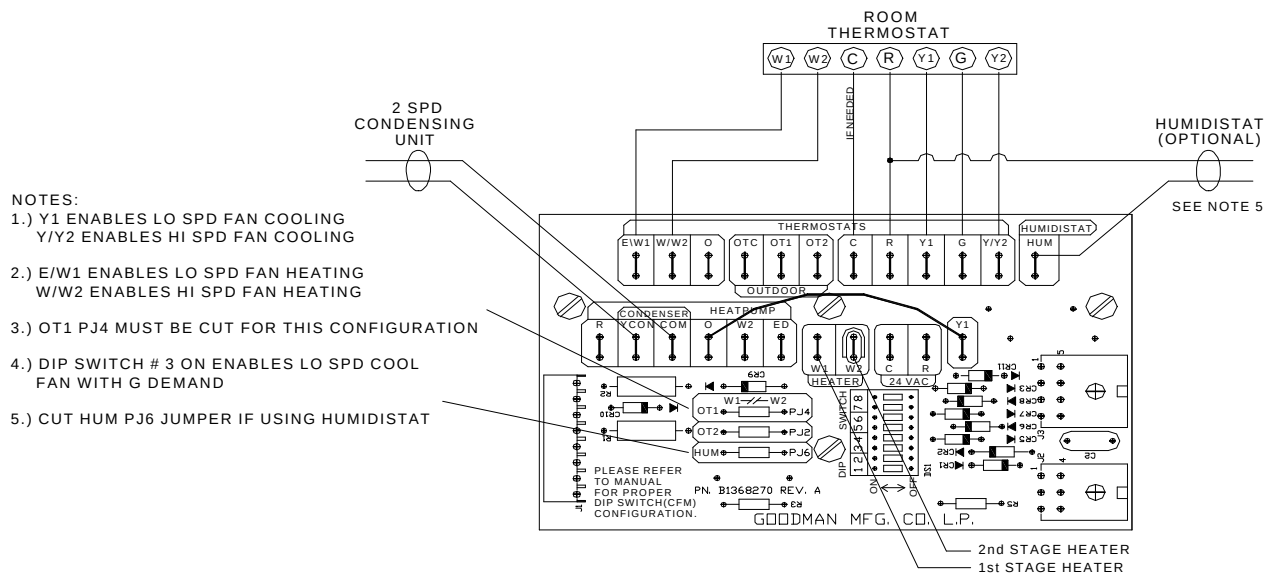
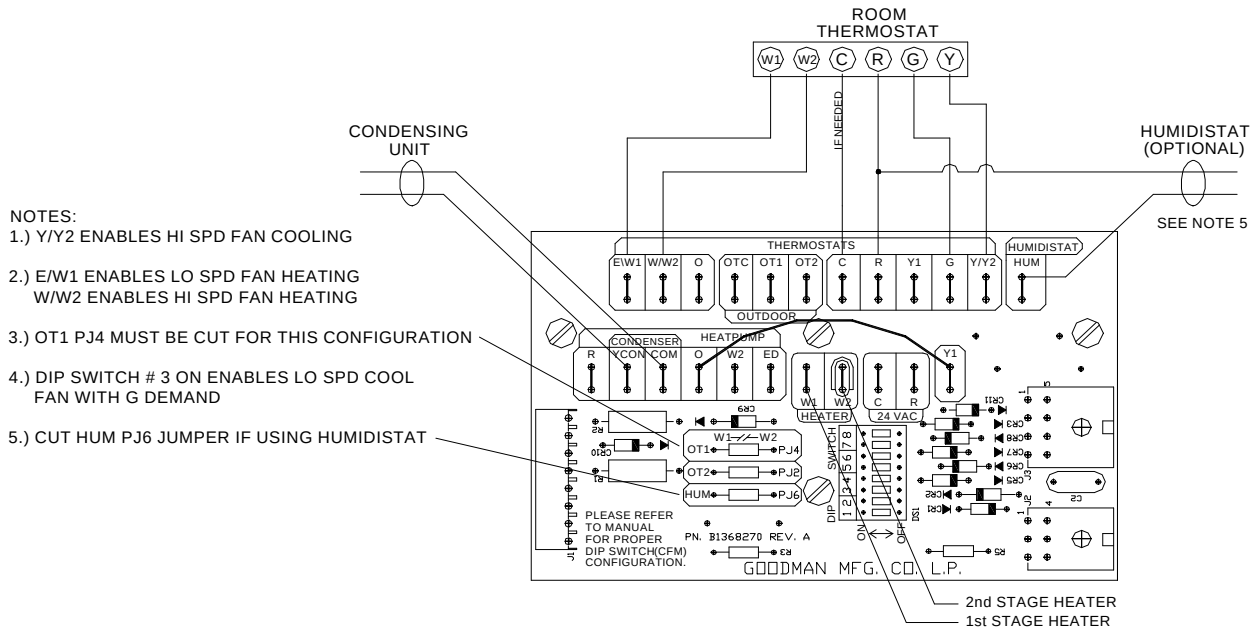
NOTES:

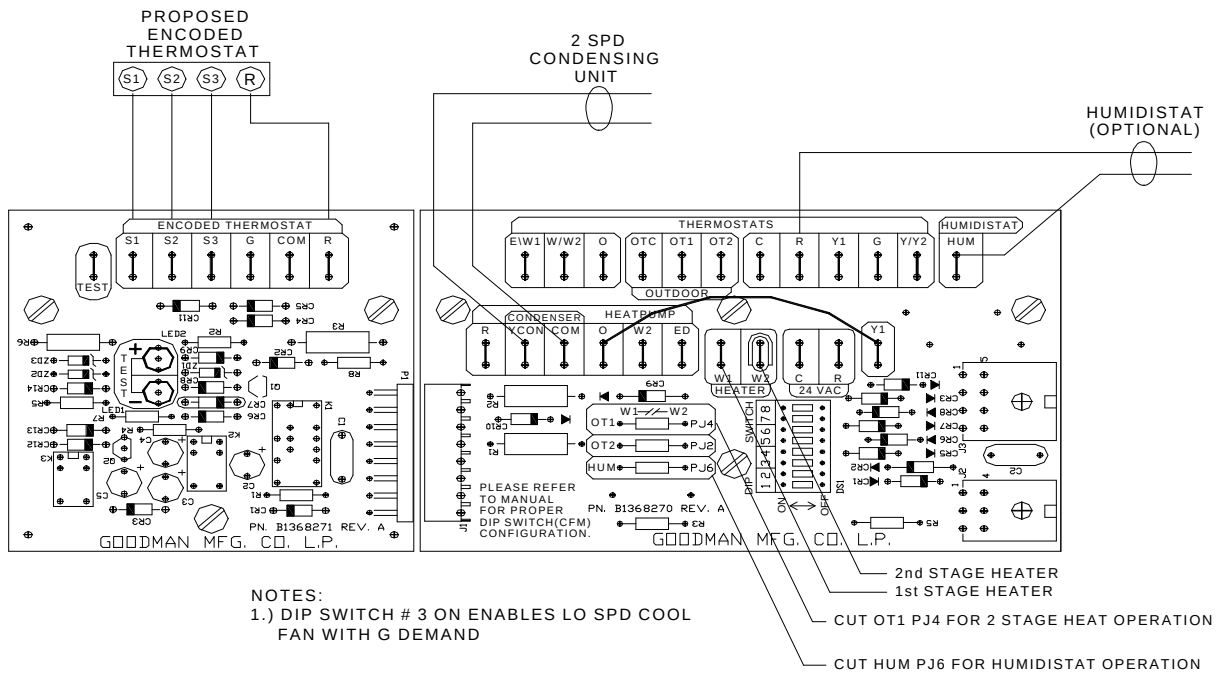
1. REPLACEMENT WIRE MUST BE THE SAME SIZE AND TYPE OF INSULATION AS ORIGINAL (105°C)
2. WARNING CABINET MUST BE PERMANENTLY GROUNDED AND CONFORM TO N.E.C. & LOCAL CODES.
3. PFC USED ON GMPE100-4A & GMPE125-5A MODELS ONLY.

LOW VOLTAGE CONTROL WIRING

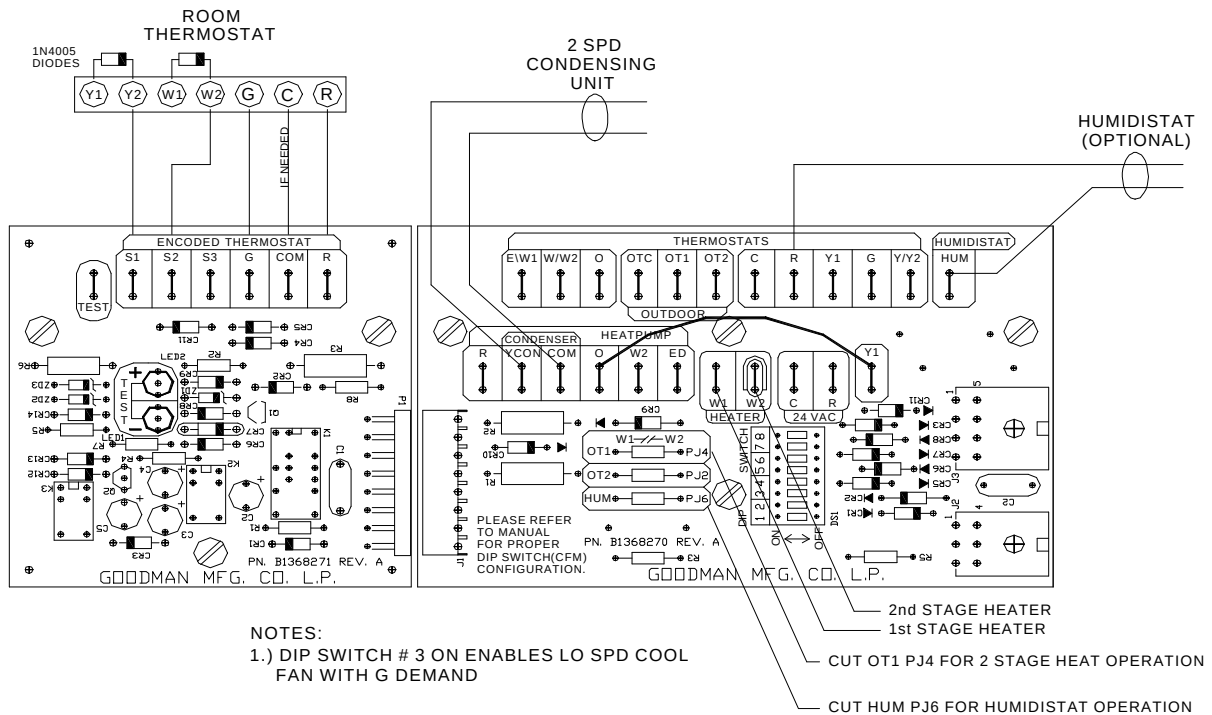
Field connections for low voltage control wiring are made at the low voltage field wiring terminal block located within the GMPE-A's furnaces. Consult installation instructions provided with accessory items for specific information on the control wiring.

LOW VOLTAGE FIELD WIRING COMPOSITE WIRING DIAGRAMS





ENCODED 2 SPD COOLING - WITH 1 OR 2 STAGE GAS HEAT



ENCODED 2 SPD COOLING - WITH 1 OR 2 STAGE GAS HEAT

Troubleshooting ICM-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 lightly when starting	This is normal start-up for ICM
Motor won't start No movement Motor rocks, but won't start	Check power at motor Check low voltage (24 VAC R to C) at motor Check low voltage connections (G, Y, W1, W2, 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 Run Moisture Check Check for loose or compliant motor mount Make sure blower wheel is tight on shaft
Motor oscillates up & down while being tested	It is normal for motor to oscillate with no load on shaft
Motor starts, but runs erratically Varies up and down or intermittent	Check line voltage for variation or "sag" Check low voltage connections (G, Y, W1, W2, R, C) at motor harness connectors Check "HUM" for erratic CFM command (in variable speed applications) Check out system controls - T'stat? Perform Moisture Check
"Hunts" or "puffs" at high CFM (speed)	Does removing panel or filter reduce "puffing"? - Reduce restriction - Reduce max airflow
Stays at low CFM despite system call for cool or heat CFM.	Check low voltage (T'stat) wires and connections Verify fan is not in delay mode - wait until delay complete
Stays at high CFM	"R" missing/not connected at motor Is fan in delay mode? - wait until delay time complete
Blower won't shut off	Current leakage from controls into G, Y, or W? Check for Triac switched t'stat or solid state relay
Excessive noise	Determine if it's air noise, cabinet, duct or motor noise - interview customer, if necessary
Air noise	High static creating high blower speed? - Is Airflow set properly? Does removing filter cause blower to slow down? Check/replace filter - Use low pressure drop filter - Check/correct duct restrictions
Evidence of Moisture Motor failure or malfunction has occurred and moisture is present.	Replace motor and perform Moisture Check
Evidence of moisture present inside air mover	Perform Moisture Check

DO'S AND DON'TS

Do	Don't
Check-out motor, controls, wiring, and connections thoroughly before replacing motor	Automatically assume the motor is bad
Orient connectors down so water cannot get in - Install "drip loops"	Locate connectors above 7 and 4 o'clock positions
Use authorized motor and control model #'s for replacement.	• Replace one motor or control model # with another (unless and authorized replacement)
Keep static pressure to a minimum: - 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	Use high pressure drop filters - some have 1/2" H2O drop! Use restricted returns
Size the equipment wisely	Oversize system then compensate with low airflow.
Check orientation before inserting motor connectors	Plug in power connector backwards Force plugs

MOISTURE CHECK

1. Connectors are oriented "down"
2. Arrange harnesses with "drip loop" under motor.
3. Is condensate drain plugged?
4. Check for low airflow (too much latent capacity).
5. Check for undercharged condition.
6. Check and plug leaks in return ducts, cabinet.

Replacing ICM Control Module

To replace the control module for the GE variable speed indoor blower motor you need to take the following steps:

1. You **MUST** have the correct replacement module. The controls are factory programmed for specific operating modes. Even though they look alike, different modules may have completely different functionality.

CAUTION

USING THE WRONG CONTROL MODULE VOIDS ALL PRODUCT WARRANTIES AND MAY PRODUCE UNEXPECTED RESULTS.

2. Begin by removing AC power from the furnace or airhandler being serviced. **DO NOT WORK ON THE MOTOR WITH AC POWER APPLIED.** Wait at least 5 minutes after disconnecting AC power from the equipment before opening the motor.
3. It is usually not necessary to remove the motor from the blower assembly. However it is recommended that the whole blower assembly, with the motor, be removed from the furnace/airhandler. (Follow the manufacturer's procedures.) Unplug the two cable connectors to the motor. There are latches on each connector. **DO NOT PULL ON THE WIRES.** The plugs remove easily when properly released.
4. Observe the flat end of the motor control-module casting and locate the two standard 1/4" hex head bolts. Remove these bolts from the motor while holding the control module. **DO NOT REMOVE THE TWO SCREWS TORX HEADS.**
5. The control module is now free of the motor but is still attached by a plug and cable. Carefully rotate the control so as to gain access to the plug on the end of the cable. Squeeze the release latch and gently pull the plug on the end of the cable. Squeeze the release latch and gently pull the plug out of the control module. **DO NOT PULL ON THE WIRES. GRIP THE PLUG ONLY.**

6. The control module is now completely detached from the motor. Verify with a standard ohmmeter that the resistance from each motor lead (in the motor plug just removed) to the motor shell is > 100K ohms. (Measure to unpainted motor end plate). If any motor lead fails this test do not proceed to install the control module. **THE MOTOR IS DEFECTIVE AND MUST BE REPLACED.** Installing the new control module will cause it to fail also.
7. Verify that the replacement control module is correct for your application. If so, orient the new module next to the motor and carefully insert the plug removed in step 5. **BE SURE THE PLUG LATCHES. IT WILL CLICK WHEN PROPERLY INSERTED.**
8. Install the new control module back on the motor being careful to engage the locating pin into the appropriate mating motor hole. Replace the two 1/4" hex head bolts. Tighten the bolts snugly. **IT IS NOT NECESSARY TO OVERTIGHTEN.**
- * Before replacing the blower/motor assembly, it is important to look at the installation to see if some application fault has caused the motor to fail.
Is there any evidence of water damage to the failed control? (Corrosion on the inside or outside of the casting.)
If yes, do **MOISTURE CHECK.**
9. Re-install the blower/motor assembly into the HVAC equipment. Follow the manufacturers suggested procedures.
10. Plug the 16-pin control plug into the motor. The plug is keyed. Make sure the connector is properly seated and latched.
11. Plug the 5-pin power connector into the motor. Even though the plug is keyed, **OBSERVE THE PROPER ORIENTATION. DO NOT FORCE THE CONNECTOR.** It plugs in very easily when properly oriented. **REVERSING THIS PLUG WILL CAUSE IMMEDIATE FAILURE OF THE CONTROL MODULE.**
12. Final installation check make sure the motor is installed as follows:
 - a. As far INTO the blower housing as possible
 - b. Belly bands not covering vent holes or on the control module
 - c. Motor connectors should be straight down (i.e. 6 o'clock)
 - d. Appropriate drip loop in the motor cables

The installation is now complete. Reapply the AC power to the HVAC equipment and verify that the new motor control module is working properly. Follow the manufacturers procedures for disposition of the old control module.