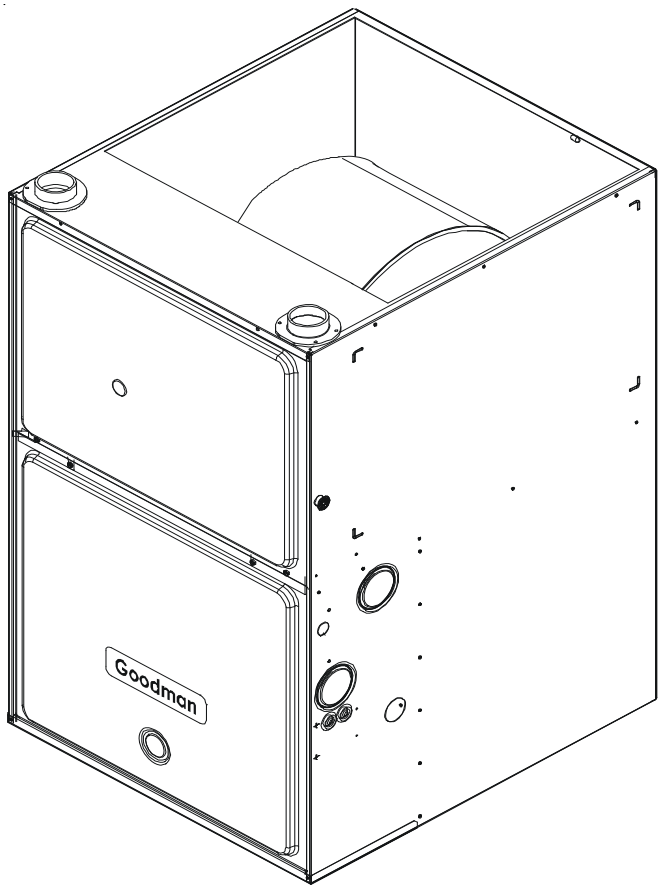
Goodman® TECHNICAL MANUAL

GCH95
40" UP TO 96% Gas Furnace

- Refer to Service Manual RS6610004 for installation, operation, and troubleshooting information.
- All safety information must be followed as provided in the Service Manual.
- Refer to the appropriate Parts Catalog for part number information.
- Model numbers listed on page 3.



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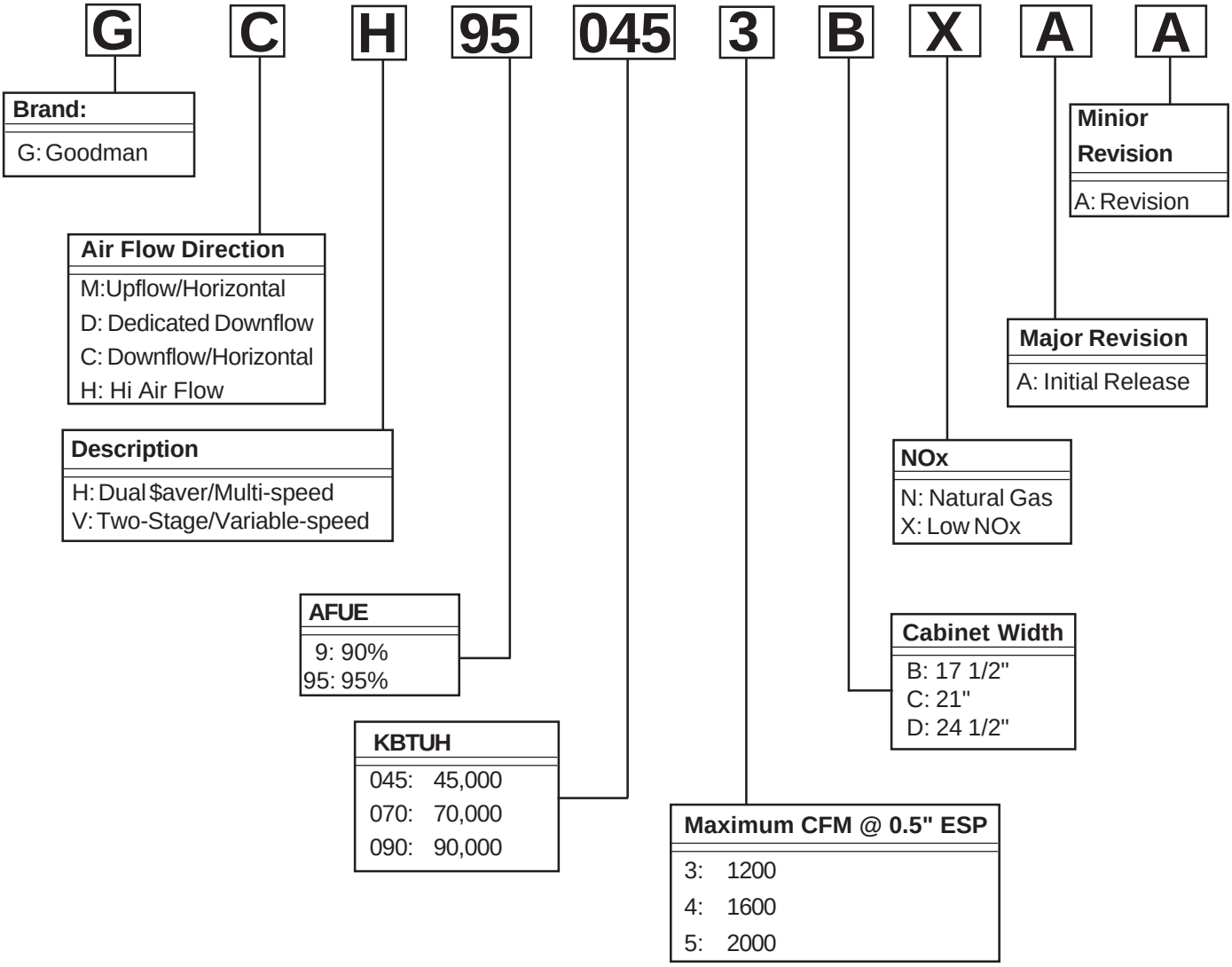
Intertek

This manual is to be used by qualified, professionally trained HVAC technicians only. Goodman does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

RT6612022r6
January 2013

PRODUCT IDENTIFICATION

The model and manufacturing number are used for positive identification of component parts used in manufacturing. Please use these numbers when requesting service or parts information.



⚠ WARNING

HIGH VOLTAGE!

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

⚠ WARNING **Goodman will not be responsible for any injury or property damage arising from improper service or service procedures. If you install or perform service on this unit, you assume responsibility for any personal injury or property damage which may result. Many jurisdictions require a license to install or service heating and air conditioning equipment.**

⚠ WARNING **Installation and repair of this unit should be performed ONLY by individuals meeting the requirements of an "entry level technician", at a minimum, as specified by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). Attempting to install or repair this unit without such background may result in product damage, personal injury or death.**

PRODUCT IDENTIFICATION

The model and manufacturing number are used for positive identification of component parts used in manufacturing. Please use these numbers when requesting service or parts information.

GCH950453BX*
GCH950703BX*
GCH950704CX*
GCH950904CX*
GCH950905DX*

These models are Low NOx.

⚠ WARNING **The United States Environmental Protection Agency ("EPA") has issued various regulations regarding the introduction and disposal of refrigerants introduced into this unit. Failure to follow these regulations may harm the environment and can lead to the imposition of substantial fines. These regulations may vary by jurisdiction. Should questions arise, contact your local EPA office.**

⚠ WARNING **Do not connect or use any device that is not design certified by Goodman for use with this unit. Serious property damage, personal injury, reduced unit performance and/or hazardous conditions may result from the use of such non-approved devices.**

⚠ WARNING **To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.**

PRODUCT DESIGN

General Operation

The GCH95 furnaces are equipped with an electronic ignition device used to light the burners and an induced draft blower to exhaust combustion products.

An interlock switch prevents furnace operation if the blower door is not in place. Keep the blower access door in place except for inspection and maintenance.

This furnace is also equipped with a self-diagnosing electronic control module. In the event a furnace component is not operating properly, the control module LED will flash on and off in a factory-programmed sequence, depending on the problem encountered. This light can be viewed through the observation window in the blower access door. Refer to the *Troubleshooting Chart* for further explanation of the LED codes and *Abnormal Operation - Integrated Ignition Control* section in the Service Instructions for an explanation of the possible problem.

The rated heating capacity of the furnace should be greater than or equal to the total heat loss of the area to be heated. The total heat loss should be calculated by an approved method or in accordance with “ASHRAE Guide” or “Manual J-Load Calculations” published by the Air Conditioning Contractors of America.

*Obtain from: American National Standards Institute 1430 Broadway New York, NY 10018

Location Considerations

- The furnace should be as centralized as is practical with respect to the air distribution system.
- Do not install the furnace directly on carpeting, tile, or combustible material other than wood flooring.
- When suspending the furnace from rafters or joists, use 3/8" threaded rod and 2” x 2” x 3/8” angle as shown in the Installation and Service Instructions. The length of the rod will depend on the application and clearance necessary.
- When installed in a residential garage, the furnace must be positioned so the burners and ignition source are located not less than 18 inches (457 mm) above the floor and protected from physical damage by vehicles.

Notes:

1. Installer must supply one or two PVC pipes: one for combustion air (optional) and one for the flue outlet (required). Vent pipe must be either 2” or 3” in diameter, depending upon furnace input, number of elbows, length of run and installation (1 or 2 pipes). The optional Combustion Air Pipe is dependent on installation/code requirements and must be 2” or 3” diameter PVC.
2. Line voltage wiring can enter through the right or left side of the furnace. Low voltage wiring can enter through the right or left side of furnace.
3. Conversion kits for high altitude natural or propane gas operation are available. See High Altitude Derate chart for details.
4. Installer must supply the following gas line fittings, depending on which entrance is used:

   Left -- Two 90º Elbows, one close nipple, straight pipe.

   Right -- Straight pipe to reach gas valve.

Accessibility Clearances (Minimum)

MINIMUM CLEARANCES TO COMBUSTIBLE MATERIALS (INCHES)						
POSITION*	**FRONT**	**SIDES**	**REAR**	**TOP**	**FLUE**	**FLOOR**
Upflow	3	0	0	1	0	C
Horizontal	3	6	0	6	0	C

*= All positioning is determined as installed unit is viewed from the front.

C= If placed on combustible floor, floor MUST be wood only.

NC= For instalaltion on non-combustible floors only. A non-combustible subbase must be used for installations on combustible flooring.

24" at front is required for servicing or cleaning.

Note: In all cases accessibility clearance shall take precedence over clearances from the enclosure where accessibility clearances are greater. All dimensions are given in inches.

High Altitude Derate

When this furnace is installed at high altitude, the appropriate High Altitude orifice kit must be installed. This is required due to the natural reduction in the density of both the gas fuel and combustion air as altitude increases. The kit will provide the proper design certified input rate within the specified altitude range.

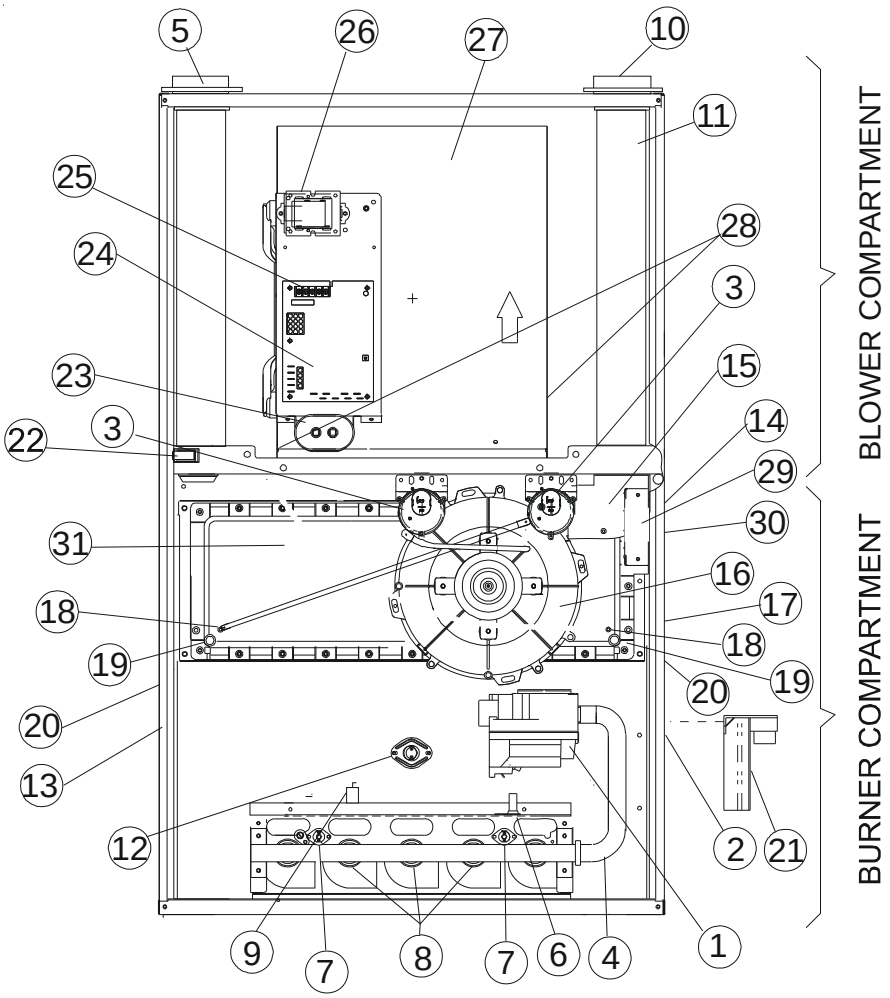
PROPANE AND HIGH ALTITUDE KITS				
MODEL NUMBER	**0 to 7,000 ft.**	**7,001 to 9,000 ft.**	**9,001 to 11,000 ft.**	**7,001 to 11,000 ft.**
GCH9***XA***	**LPM-03**[1] **LPM-05**[1] **LPM-06**[2] Propane Conversion Kit (#55 Orifices)	**HANG11** High Altitude Natural Gas Kit (#44 Orifices)	**HANG12** High Altitude Natural Gas Kit (#45 Orifices)	**HALP 10** High Altitude LP Gas Kit (#56 Orifices)

[1] **LPM-03 / LPM-05 supports White-Rodgers 2-stage valves only**

[2] **LPM-06 supports Honeywell and White-Rodgers 2 stage valves**

High altitude kits are purchased according to the installation altitude and usage of either natural or propane gas. Refer to the chart above for a tabular listing of appropriate altitude ranges and corresponding manufacturer’s high altitude Natural Gas and Propane Gas kits. For a tabular listing of appropriate altitude ranges and corresponding manufacturer's High Altitude Pressure Switch kits, refer to either the *Pressure Switch Trip Points & Usage Chart* in this manual or the *Accessory Charts* in Service Instructions.

COMPONENT IDENTIFICATION



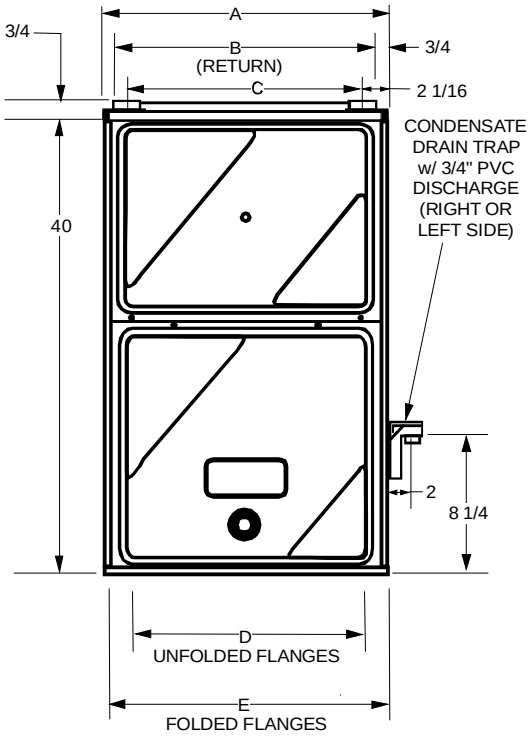
Downflow /Horizontal

1 Two-Stage Gas Valve
2 Gas Line Entrance (Alternate)
3 Pressure Switch(es)
4 Gas Manifold
5 Combustion Air Intake Connection
6 Hot Surface Igniter
7 Rollout Limit
8 Burners
9 Flame Sensor
10 Flue Pipe Connection
11 Flue Pipe
12 Primary Limit
13 Gas Line Entrance
14 Flue Pipe Connection (Alternate)
15 Rubber Elbow
16 Induced Draft Blower
17 Electrical Connection Inlets (Alternate)
18 Coil Front Cover Pressure Tap
19 Coil Front Cover Drain Port
20 Drain Line Penetrations
21 Drain Trap
22 Blower Door Interlock Switch
23 Capicitor
24 Integrated Control Module
(with fuse and diagnostic LED)
25 24 Volt Thermostat Connections
26 Transformer (40 VA)
27 Circulator Blower
28 Auxiliary Limits
29 Junction Box
30 Electrical Connection Inlet
31 Coil Front Cover

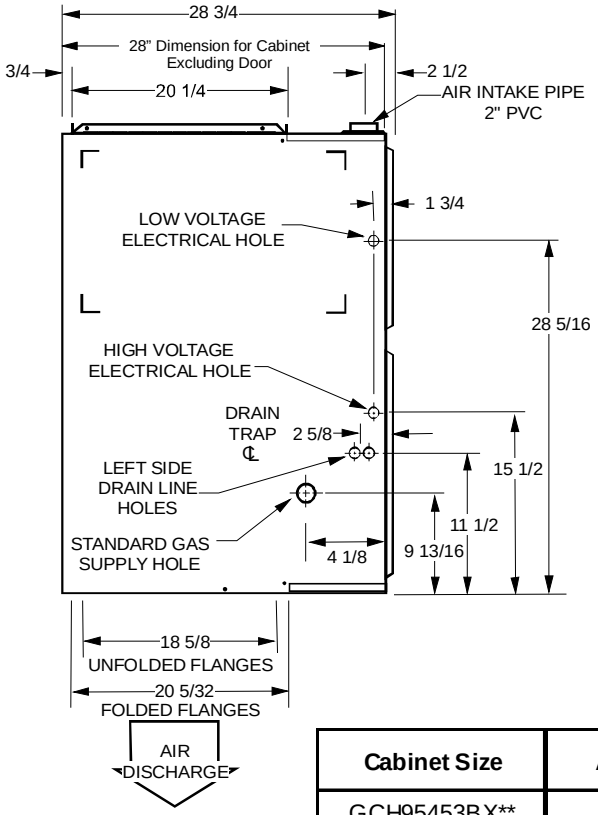
COMPONENT IDENTIFICATION

GCH95****X**

FRONTVIEW

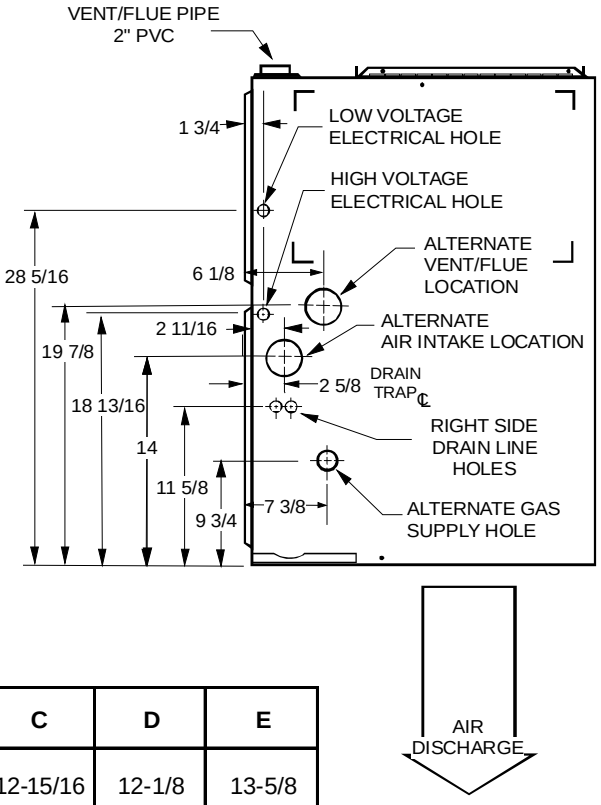


LEFT SIDE VIEW



DISCHARGE

RIGHT SIDE VIEW



Cabinet Size	A	B	C	D	E
GCH95453BX** GCH95703BX**	17-1/2	16	12-15/16	12-1/8	13-5/8
GCH95704CXA* GCH95904CXA*	21	19-1/2	15-15/16	16	17-1/2
GCH95905DXA*	24-1/2	23	20-7/16	19-3/8	20-7/8

All dimensions are in inches.

PRODUCT DESIGN

PRESSURE SWITCH TRIP POINTS AND USAGE CHART				
MODEL	0 to 7,000 ft.			
	TRIP POINT COIL COVER PRESSURE SWITCH	PRESSURE SWITCH PART #	TRIP POINT ID BLOWER PRESSURE SWITCH	ID BLOWER PRESSURE SWITCH PART #
GCH950453BX*	-0.10	0130F00070	-.95	0130F00069
GCH950703BX*	-0.10	0130F00070	-1.20	0130F00068
GCH950704CX*	-0.10	0130F00070	-.95	0130F00069
GCH950904CX*	-0.10	0130F00070	-1.20	0130F00068
GCH950905DX*	-0.10	0130F00070	-.95	0130F00069

Note: Replacement pressure switch number is listed below high altitude kit number.

Note: All negative pressure readings are in inches of water column (" w.c.).

PRIMARY LIMIT		
Part Number	20162903	20162904
Open Setting (°F)	160	150
GCH950453BX*		1
GCH950703BX*		1
GCH950704CX*		1
GCH950904CX*	1	
GCH950905DX*	1	

AUXILIARY LIMIT SWITCHES	
Part Number	0130F00038
Open Setting (°F)	120
GCH950453BX*	2
GCH950703BX*	2
GCH950704CX*	2
GCH950904CX*	2
GCH950905DX*	2

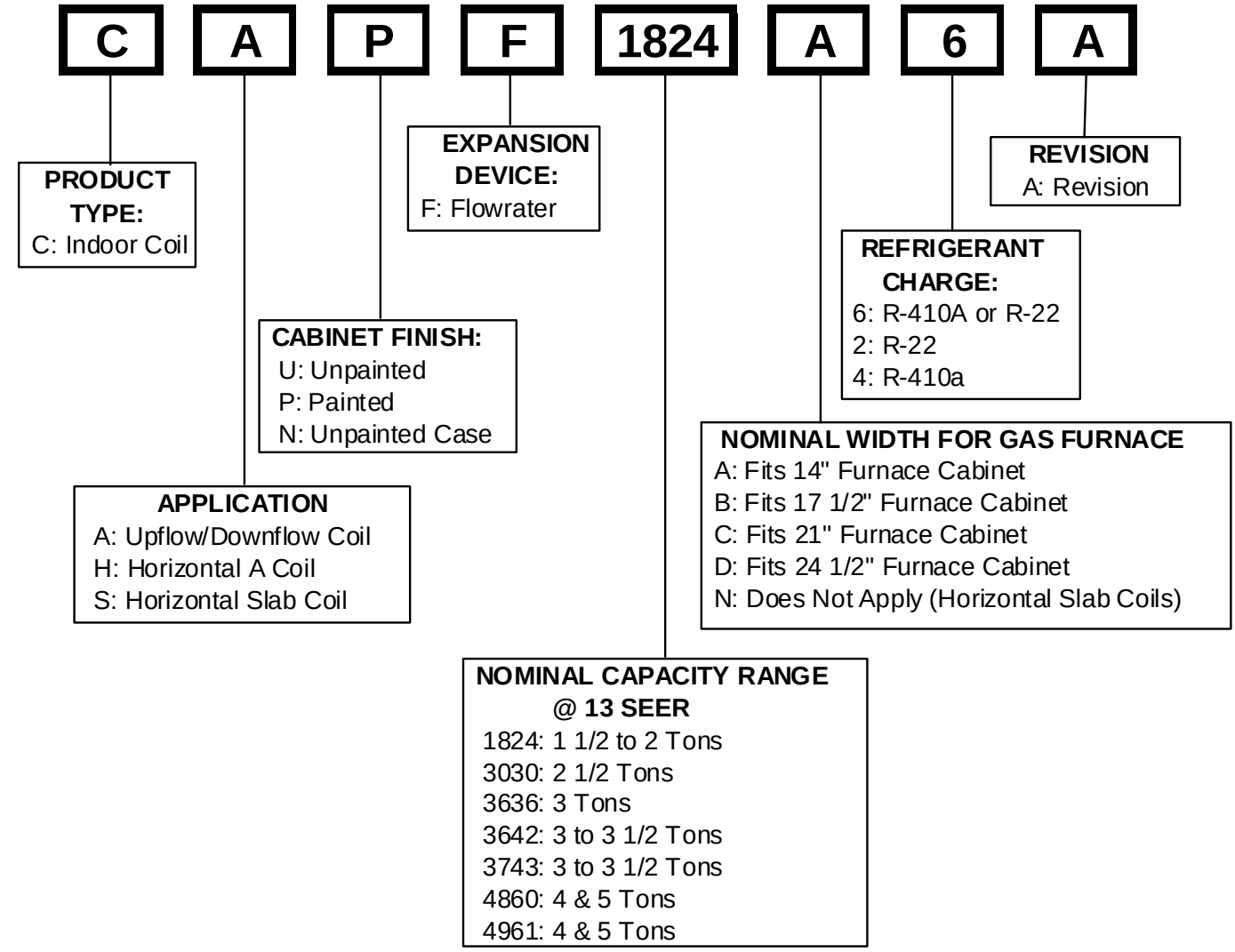
ROLLOUT LIMIT SWITCHES		
Part Number	10123517	10123534
Open Setting (°F)	210	220
GCH950453BX*	1	
GCH950703BX*	2	
GCH950704CX*	2	
GCH950904CX*		2
GCH950905DX*	2	

PRODUCT DESIGN

Coil Matches:

A large array of Amana® brand coils are available for use with the GCH95 furnaces, in either counterflow or horizontal applications. These coils are available in both cased and uncased models (with the option of a field installed TXV expansion device). These 95%+ furnaces match up with the existing Amana® brand coils as shown in the chart below.

Coil Matches (Goodman® units using R22 and R-410A):



- All CAPF coils in B, C, & D widths have insulated blank off plates for use with one size smaller furnaces.
- All CAPF coils have a CAUF equivalent.
- All CHPF coils in B, C & D heights have an insulated Z bracket for use with one size smaller furnace.
- All proper coil combinations are subject to being ARI rated with a matched outdoor unit.

PRODUCT DESIGN

Thermostats:

NOTE: *Complete lineup of thermostats can be found in the Thermostat Specification Sheets.*

Filters:

Filters are required with this furnace and must be provided by the installer. The filters used must comply with UL900 or CAN/ULCS111 standards. Installing this furnace without filters will void the unit warranty.

Upflow Filters

This furnace has provisions for the installation of return air filters at the side and/or bottom return. The furnace will accommodate the following filter sizes depending on cabinet size:

Side Return(s)		
Cabinet Width (in.)	Nominal Filter Size (in.)	Approx. Flow Area (in^2)
All	16 x 25 x 1	400

Bottom Return		
Cabinet Width (in.)	Nominal Filter Size (in.)	Approx. Flow Area (in^2)
17-1/2	14 x 25 x 1	350
21	16 x 25 x 1	400
24-1/2	20 x 25 x 1	500

Refer to Minimum Filter Area tables to determine filter area requirement. **NOTE:** Filters can also be installed elsewhere in the duct system such as a central return.

		COOLING AIRFLOW REQUIREMENT (CFM)						
		600	800	1000	1200	1400	1600	2000
Input Airflow	0453BX*	388*	388*	480	576	---	---	---
	0703BX*	---	647*	647*	647*	672	---	---
	0704CX*	---	---	583*	583*	672	768	---
	0904CX*	---	---	863*	863*	863*	863*	---
	0905DX*	---	---	---	777*	777*	777*	960

*Minimum filter area dictated by heating airflow requirement.

Disposable Minimum Filter Area (in^2)

[*Based on a 300 ft/min filter face velocity]*

		COOLING AIRFLOW REQUIREMENT (CFM)						
		600	800	1000	1200	1400	1600	2000
Input Airflow	0453BXA*	194*	194*	240	288	---	---	---
	0703BXA*	---	324*	324*	324*	336	---	---
	0704CXA*	---	---	291*	291*	336	384	---
	0904CXA*	---	---	432*	432*	432*	432*	---
	0905DXA*	---	---	---	388*	388*	388*	480

*Minimum filter area dictated by heating airflow requirement.

Permanent Minimum Filter Area (in^2)

[Based on 600 ft/min filter face velocity]

PRODUCT DESIGN

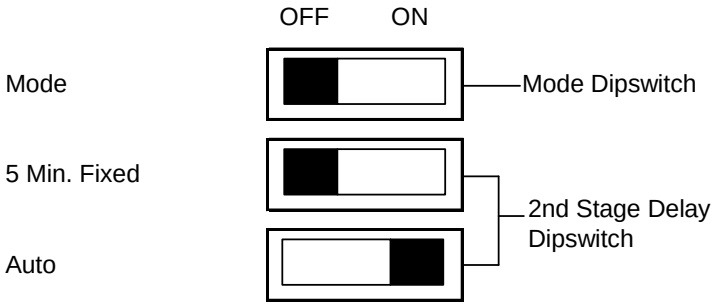
Dual $aver Configuration & Operation

Dual $aver

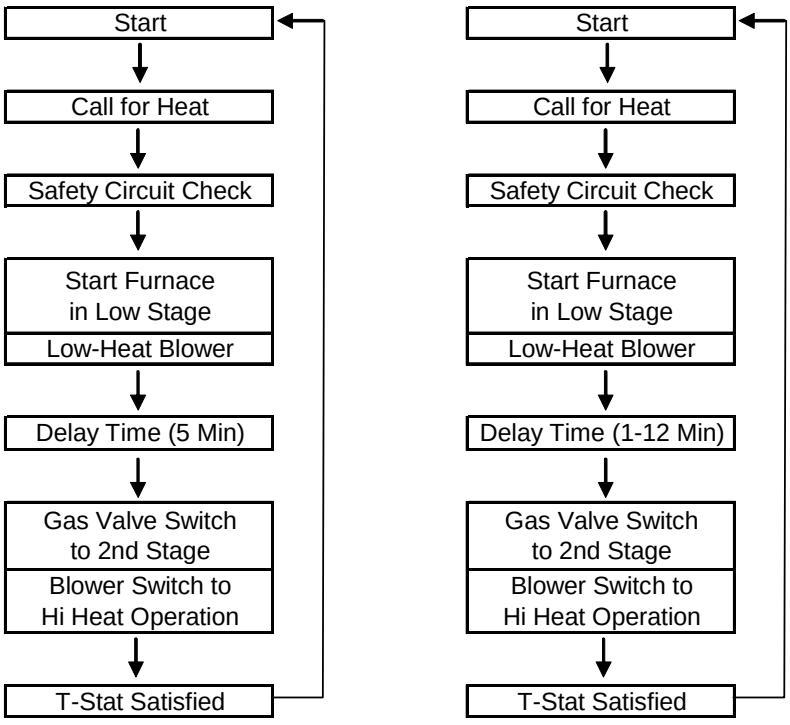
This furnace is capable fo the following heating modes:

- Single Stage (Factory Setting)
- Modified Two-Stage
  - > Fixed 5-Min. Low Stage
  - > Auto Time (1-12 Min.) Low Stage

To change from the factory single-stage operation,
adjust the dipswitches on the ignition control as follows:



Note: This furnace is designed to be used
with a single-stage room thermosat.



FURNACE SPECIFICATIONS GCH95

MODEL	GCH950453BX*	GCH950703BX*	GCH950704BX*	GCH950904CX*	GCH950905DX*
BTUH					
Natural Gas Input *	46,000	69,000	69,000	92,000	92,000
Natural Gas Output	44,200	66,300	66,300	88,400	88,400
LP Gas Input	41,400	62,100	62,100	82,800	82,800
LP Gas Output	39,800	59,700	59,700	79,600	79,600
A.F.U.E.	96.1%	96.1%	96.1%	96.1%	96.1%
Rated External Static (" w.c.)	.20" - .50"	.20" - .50"	.20" - .50"	.20" - .50"	.20" - .50"
Temperature Rise (°F)	25-55	35-65	25-55	40-70	35-65
Pressure Switch Trip Point (" w.c.)	-0.95	-1.20	-0.95	-1.20	-0.95
Front Cover Pressure Switch Trip Point (" w.c)	-0.10	-0.10	-0.10	-0.10	-0.10
Blower Wheel (D" x W")	10 X 8	10 X 8	10 X 10	10 X 10	11 X 10
Blower Horsepower	1/3	1/3	1/2	1/2	3/4
Blower Speeds	4	4	4	4	4
Max CFM @ 0.5 E.S.P.	1,200	1,200	1,600	1,600	2,000
Power Supply	115-60-1	115-60-1	115-60-1	115-60-1	115-60-1
Minimum Circuit Ampacity (MCA)(1)	9.40	9.40	13.80	13.80	13.20
Maximum Overcurrent Device(2)	15	15	15	15	15
Transformer (VA)	40	40	40	40	40
Primary Limit Setting (°F)	150	150	150	160	160
Auxiliary Limit Setting (°F)	120	120	120	120	120
Rollout Limit Setting (°F)	210	210	210	220	210
Fan Delay On Heating	30	30	30	30	30
Off Heating(3)	150	150	150	150	150
Fan Delay On Cooling	5	5	5	5	5
Off Cooling	45	45	45	45	45
Fan Delay On - Fan Only	0	0	0	0	0
Gas Supply Pressure (Natural/Propane) (" w.c.)	7/11	7/11	7/11	7/11	7/11
Manifold Pressure (Natural/Propane)	3.5/10	3.5/10	3.5/10	3.5/10	3.5/10
Orifice Size (Natural/Propane)	43/55	43/55	43/55	43/55	43/55
Number of Burners	2	3	3	4	4
Vent Connector Diameter (inches) (4)	2	2	2	2	2
Shipping Weight (lbs.)	120	123	125	144	146

** Natural Gas BTU/h. For altitudes above 2,000', reduce input rating 4% for each 1,000' above sea level. Low-fire rate is 75% of high-fire rate.*

(1) Wire size should be determined in accordance with National Electrical Codes. Extensive wire runs will require larger wire sizes.
(2) Maximum Overcurrent Protection Device: May use Time Delay Fuse or HACR type Circuit Breaker of the same size as noted.
(3) Off Heating - this fan delay timing is adjustable (100 or 150 seconds), 150 seconds as shipped.
(4) See Installation Instructions for appropriate vent diameter, length and number of elbows.

NOTE: This data is provided as a guide, it is important to electrically connect the unit and properly size fuses/circuit breakers and wires in accordance with all national and/or local electrical codes. Use copper wire only.

1. These furnaces are manufactured for natural gas operation. Optional kits are available for conversion to propane operation.
2. For elevations above 2000 feet the rating should be reduced by 4% for each 1000 feet above sea level. The furnace must not be derated, orifice changes should only be made if necessary for altitude.
3. The total heat loss from the structure as expressed in TOTAL BTU/HR must be calculated by the manufacturers method or in accordance with the "A.S.H.R.A.E. GUIDE" or "MANUAL J-LOAD CALCULATIONS" published by the AIR CONDITIONING CONTRACTORS OF AMERICA. The total heat loss calculated should be equal to or less than the heating capacity. Output based on D.O.E. test procedures.
4. Minimum Circuit Ampacity calculated as: (1.25 x Circulator Blower Amps) + I.D. Blower Amps.

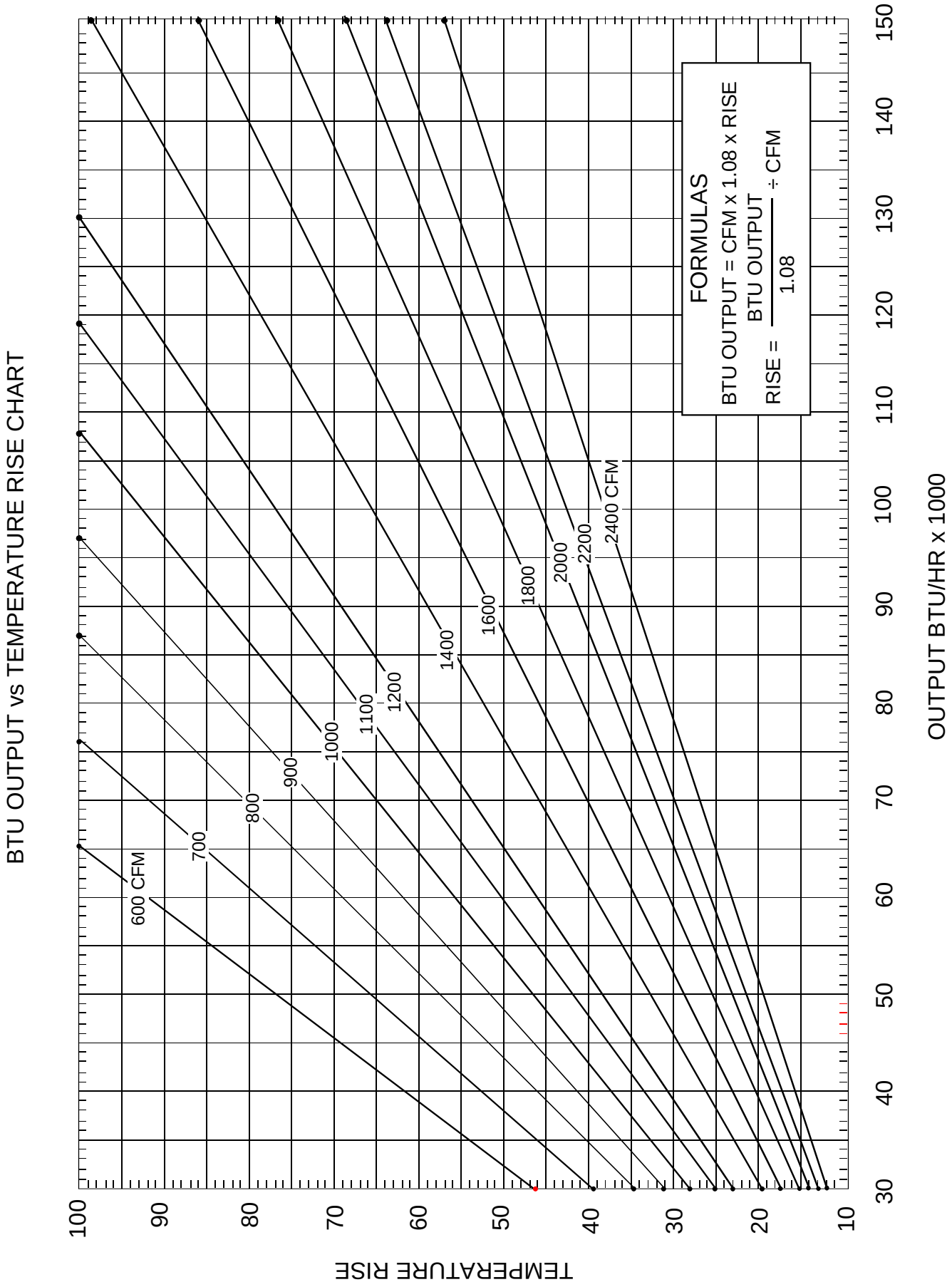
Unit specifications are subject to change without notice. **ALWAYS** refer to the units serial plate for the most up-to-date general and electrical information.

BLOWER PERFORMANCE SPECIFICATIONS

BLOWER PERFORMANCE (CFM & Temperature Rise vs. External Static Pressure)															
Model (Heating Speed As Shipped)	Motor Speed	Tons AC at 0.5" ESP	EXTERNAL STATIC PRESSURE (Inches Water Column)												
			0.1		0.2		0.3		0.4		0.5		0.6	0.7	0.8
			CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	CFM	RISE	CFM	CFM	CFM
GCH950453BX** (MED-HI)	HIGH	3.0	1415	28	1352	30	1290	31	1196	34	1127	36	1035	936	825
	MED	2.5	1221	33	1178	34	1127	36	1073	38	1007	40	932	834	733
	MED-LO	2.0	1034	39	1000	40	976	41	935	43	881	46	818	733	662
	LOW	1.5	860	47	845	48	812	50	783	51	740	54	682	619	534
GCH950703BX** (MED-HI)	HIGH	3.0	1431	42	1368	44	1296	47	1228	49	1150	53	1055	962	860
	MED	2.5	1212	50	1182	51	1138	53	1091	55	1019	59	944	871	769
	MED-LO	2.0	1002	60	978	62	956	63	921	66	878	69	825	738	647
	LOW	1.5	813	74	805	75	790	76	759	80	726	83	689	644	605
GCH950704CX** (MED-HI)	HIGH	4.0	1755	34	1674	36	1632	37	1510	40	1423	42	1325	1241	1116
	MED	3.5	1656	36	1585	38	1536	39	1429	42	1355	45	1268	1145	1059
	MED-LO	3.0	1551	39	1488	41	1427	42	1353	45	1290	47	1195	1100	1017
	LOW	2.5	1286	47	1258	48	1241	49	1185	51	1112	54	1067	983	886
GCH950904CX** (MED-HI)	HIGH	4.0	1734	46	1652	49	1578	51	1508	53	1413	57	1336	1248	1154
	MED	3.5	1642	49	1558	52	1487	54	1418	57	1336	60	1243	1164	1039
	MED-LO	3.0	1522	53	1458	55	1396	58	1321	61	1253	64	1182	1101	986
	LOW	2.5	1287	63	1244	65	1184	68	1148	70	1098	73	1034	953	849
GCH950905DX** (MED-HI)	HIGH	5.0	2189	37	2109	38	2025	40	1948	41	1862	43	1757	1644	1537
	MED	4.0	1885	43	1831	44	1776	45	1711	47	1637	49	1539	1453	1346
	MED-LO	3.5	1665	48	1627	50	1584	51	1524	53	1462	55	1400	1323	1220
	LOW	3.0	1474	55	1440	56	1401	57	1356	59	1310	61	1255	1193	1109

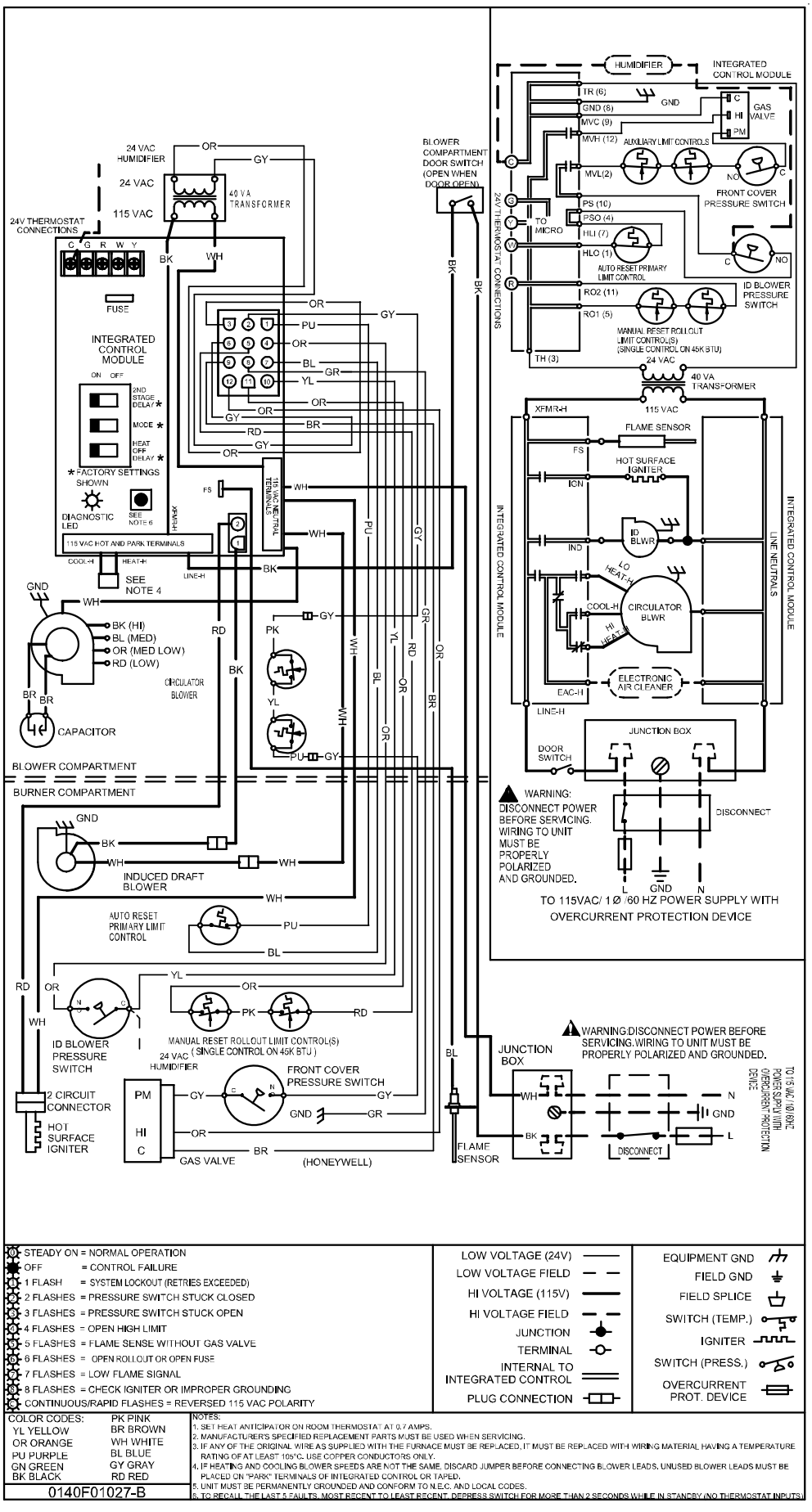
1. CFM in chart is without filters(s). Filters do not ship with this furnace, but must be provided by the installer.
2. All furnaces ship as high speed cooling. Installer must adjust blower cooling speed as needed.
3. For most jobs, about 400 CFM per ton when cooling is desirable.
4. INSTALLATION IS TO BE ADJUSTED TO OBTAIN TEMPERATURE RISE WITHIN THE RANGE SPECIFIED ON THE RATING PLATE.
5. The chart is for information only. For satisfactory operation, external static pressure must not exceed value shown on rating plate. The shaded area indicates ranges in excess of maximum external static pressure allowed when heating. The data for 0.6" w.c. to 0.8" w.c. is shown for air conditioning purposes only.
6 The dashed (---) areas indicate a temperature rise not recommended for this model.
7. The above chart is for U.S. furnaces installed at 0-4000 feet. At higher altitudes, a properly derated unit will have approximately the same temperature rise at a particular CFM, while the ESP at that CFM will be lower.

BLOWER PERFORMANCE SPECIFICATIONS



HIGH VOLTAGE!
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

WARNING



Wiring is subject to change. Always refer to the wiring diagram on the unit for the most up-to-date wiring.