

ISHRDV//IHRDV//HRDV SERIES

**80% EFFICIENT
INDIRECT FIRED
DUCT FURNACE
For Firing Natural Gas or Propane**



**ISHRDV MODEL Shown
(Indoor/Separated Combustion)**

**ISHRDV
IHRDV
and
HRDV
MODELS
Power Vented**

FEATURING

Indoor/Outdoor

80% Efficiency

Separated Combustion

Balanced Flue Design

Low Pressure Drop

**Stainless Steel Heat
Exchanger**

**Electronic Spark
Ignition With
Intermittent Pilot**

**Modulating Control
Systems – Down to
30% of Rated Input**



Intertek

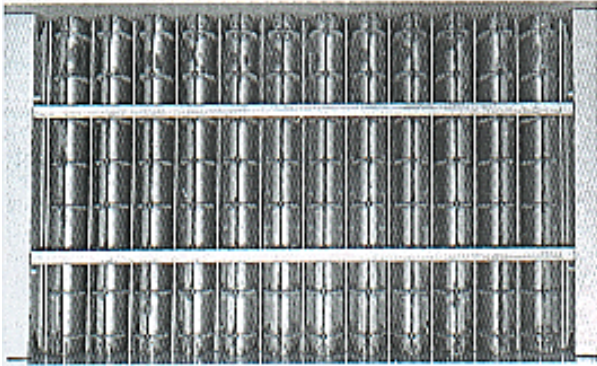
**E.T.L.
All Models
Design Certified**

HRDV SERIES INDOOR/OUTDOOR GAS DUCT FURNACE

The Hastings "80% Efficient" series is a complete line of duct furnaces for indoor/outdoor installation.

This series of duct furnaces utilizes Hastings' patented airfoil shaped heat exchanger, shown in Figure 1, with horizontal radiation ribs and large free area between tubes to yield high heat transfer and low pressure drop.

Figure 1



Internal baffles are included to lengthen the path of the hot flue gas, increasing heat transfer. External vertical airfoil baffles are placed between each pair of tubes to cause the air to scrub the tube surfaces and pick up more heat. The external baffles also deflect more air towards the bottom of the tubes where heat pickup is greatest. On high airflow applications (50° F temperature rise and less), the air velocity is so great

that the external baffles are unnecessary, and they are removed to reduce even further the already low air pressure drop. As a consequence, by-pass ducts and dampers are eliminated, saving both cost and space. The potential problems of air stratification and heat exchanger burnout associated with furnace by-pass systems are also prevented therefore eliminating the need to oversize the duct furnace to avoid by-pass ducts.

To provide protection against the effects of high temperature and corrosion, the heat exchanger for the "HRDV" series is constructed of 409 stainless steel, which is a low carbon steel containing about 12% chromium and a small amount of nickel that offers greater corrosion resistance.

Single furnaces are available from 100 MBH to 400 MBH heat input. Two identical furnaces, each with individual gas manifold, may be factory assembled for heat inputs of 500 to 800 MBH. Models with suffix "A" consist of two furnaces arranged side by side for high airflow; suffix "B" models have two furnaces in series for high temperature rise.

Several types of modulation are offered to adapt "ISHRDV", "IHRDV" and "HRDV" series furnaces to space heating, make-up air, and combined heating and ventilating applications.

All "80% Efficient" series duct furnaces are E.T.L. designed certified and approved for installation downstream from cooling coils.

Standard Equipment

Cabinet:

Aluminized steel weatherproof construction of 20 gauge thickness with enamel exterior finish.

Heating Section:

All electric-welded heat exchangers:

1. Type 409 stainless steel .044" tubes and .050" header plates. Internal baffles are .32" Type 409 stainless steel with stainless steel tips as standard.
2. Type 409 stainless steel secondary heat exchanger standard.

Burners are 18 gauge 409 series stainless steel with type 430 stainless steel ribbon inserts to provide automatic proportioning of primary combustion air. Burners and pilot are mounted in slide-out burner tray for ease of maintenance. Pilot is intermittent with non-100% shut-off as standard for natural gas and 100% shut-off as standard for propane.

Venting System:

Power vented "HRDV" outdoor models feature a balanced flue design with an integral power venter operating to draw combustion air evenly across the burner while venting the products of combustion at the same time.

Indoor IHRDV models feature (1) exhaust vent connection per duct furnace with (2) piece door construction.

Indoor ISHRDV separated combustion models feature (1) exhaust vent connection and (1) combustion air inlet connection per duct furnace with (2) piece door construction.

Gas and Electrical Components

Combination Redundant Gas Valve with electronic spark ignition system, high limit control, 115/24 volt control transformer.

Electrical System:

115 volt primary with 24 volt control circuit.

Gas System:

For inlet gas pressure of 6" to 14" w.c. natural gas, or 11" to 14" w.c. propane.

Certification: E.T.L.

Optional Items:

Intermittent Pilot with 100% shut-off – Provides increased safety for natural gas firing (standard on propane fired units). If pilot fails to ignite within a given time period, system will lockout and require manual restarting.

230/115 OR 460/115 TRANSFORMERS/24 volt control circuit – For high voltage applications.

High fuel pressure regulators:

- ½ lb. to 5 lb. line pressure
- 6 lb. to 40 lb. line pressure (specify gas pressure)

Two-stage gas valve – Provides both 100% and 50% gas input to yield two firing levels. Should be used with two stage thermostat (Natural gas only)

Separated combustion – For applications requiring outside air for combustion.

“Selectra” Modulation Systems – Provides burner modulation down to 30% of full rate input.

MS-1: For applications requiring only make-up air. Maxitrol solid state electronic modulated system provides constant leaving air temperature. Wall mounted temperature Selectra Dial permits adjustment of discharge air temperature from convenient location.

MS-2: For space heating only applications. Maxitrol solid state electronic modulating system provides continuous blower operation and extremely close control of space temperature, by a wallmounted “Selectrastat”. Sensitive to 1/10° F.

MS-3: For make-up air and space heating applications. Same as MS-1, but with two-position overriding room thermostat for space heating as well as make-up air.

MS-5: For interface to modulation input signal, 20-4 MA or 0-10 VDC.

Selection Procedure

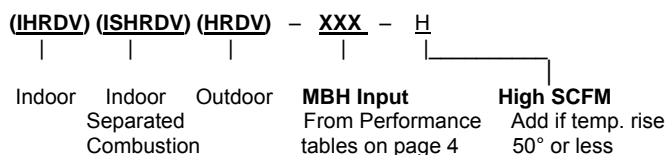
- Determine required model size from performance tables using desired Btuh output. With desired temperature rise, read pressure drop and corresponding airflow.
- Specify the type of fuel, and any optional items or accessories.

Example: Select rooftop duct furnace for required Btuh output with 40° F temperature rise. Application is space heating with inlet temperature of 60° F in non-corrosive environment. Fuel is natural gas.

Selection:

- From Table 1, model size no. 400 is chosen with 320,000 Btuh output. For 40° F rise, pressure drop = 0.080” W.C. and airflow = 7,407 SCFM.
- HRDV-400 model is picked.

MODEL DESIGNATION



Selection is thus complete:

HRDV-400 with 409 stainless steel heat exchanger for natural gas firing. Unit develops 320,000 Btuh output at 0.80” w.c. pressure drop with 40° F rise and 7,407 SCFM.

TABLE 1 – PERFORMANCE FOR SINGLE AND PARALLEL BANK FURNACE MODELS

| Air Temp. Rise (F°)* | | | 10° | 20° | 30° | 40° | 50° |
|-------------------------|-------------|------------------------|----------------|-------|-------|-------|-------|
| Model No. And MBH Input | Btuh Output | Shipping Weight (Lbs.) | HIGH AIR FLOW | | | | |
| | | | Airflow (SCFM) | | | | |
| 100 | 80,000 | 371 | 7407 | 3704 | 2469 | 1852 | 1481 |
| 125 | 100,000 | 371 | 9259 | 4630 | 3086 | 2315 | 1852 |
| 160 | 128,000 | 445 | 11852 | 5926 | 3951 | 2963 | 2370 |
| 210 | 168,000 | 464 | 15556 | 7778 | 5185 | 3889 | 3111 |
| 250 | 200,000 | 542 | 18519 | 9259 | 6173 | 4630 | 3704 |
| 300 | 240,000 | 558 | 22222 | 11111 | 7407 | 5556 | 4444 |
| 400 | 320,000 | 662 | 29630 | 14815 | 9877 | 7407 | 5926 |
| 500A | 400,000 | 1114 | 37038 | 18518 | 12346 | 9260 | 7408 |
| 600A | 480,000 | 1246 | 44444 | 22222 | 14814 | 11112 | 8888 |
| 800A | 640,000 | 1454 | 59630 | 29630 | 19754 | 14814 | 11852 |

| Air Temp. Rise (F°)* | | | 60° | 70° | 80° | 90° | 100° |
|-------------------------|-------------|------------------------|-------------------|------|------|------|------|
| Model No. And MBH Input | Btuh Output | Shipping Weight (Lbs.) | STANDARD AIR FLOW | | | | |
| | | | Airflow (SCFM) | | | | |
| 100 | 80,000 | 371 | 1235 | 1058 | 926 | 823 | 741 |
| 125 | 100,000 | 371 | 1543 | 1323 | 1157 | 1029 | 926 |
| 160 | 128,000 | 445 | 1975 | 1693 | 1481 | 1317 | 1185 |
| 210 | 168,000 | 464 | 2593 | 2222 | 1944 | 1728 | 1556 |
| 250 | 200,000 | 542 | 3086 | 2646 | 2315 | 2058 | 1852 |
| 300 | 240,000 | 558 | 3704 | 3175 | 2778 | 2469 | 2222 |
| 400 | 320,000 | 662 | 4938 | 4233 | 3704 | 3292 | 2963 |
| 500A | 400,000 | 1114 | 6172 | 5292 | 4630 | 4116 | 3704 |
| 600A | 480,000 | 1246 | 7408 | 6350 | 5556 | 4938 | 4444 |
| 800A | 640,000 | 1454 | 9876 | 8466 | 7408 | 6584 | 5926 |

TABLE 2 – PERFORMANCE FOR SERIES BANK FURNACE MODELS

| Air Temp. Rise (F°)* | | | 60° | 70° | 80° | 90° | 100° | 110° | 120° |
|-------------------------|-------------|------------------------|----------------|---------|------|------|------|------|------|
| Model No. And MBH Input | Btuh Output | Shipping Weight (Lbs.) | Airflow (SCFM) | | | | | | |
| | | | 500B | 400,000 | 1074 | 6172 | 5292 | 4630 | 4116 |
| 600B | 480,000 | 1106 | 7408 | 6350 | 5556 | 4938 | 4444 | 4040 | 3704 |
| 800B | 640,000 | 1316 | 9876 | 8466 | 7408 | 6584 | 5926 | 5387 | 4938 |

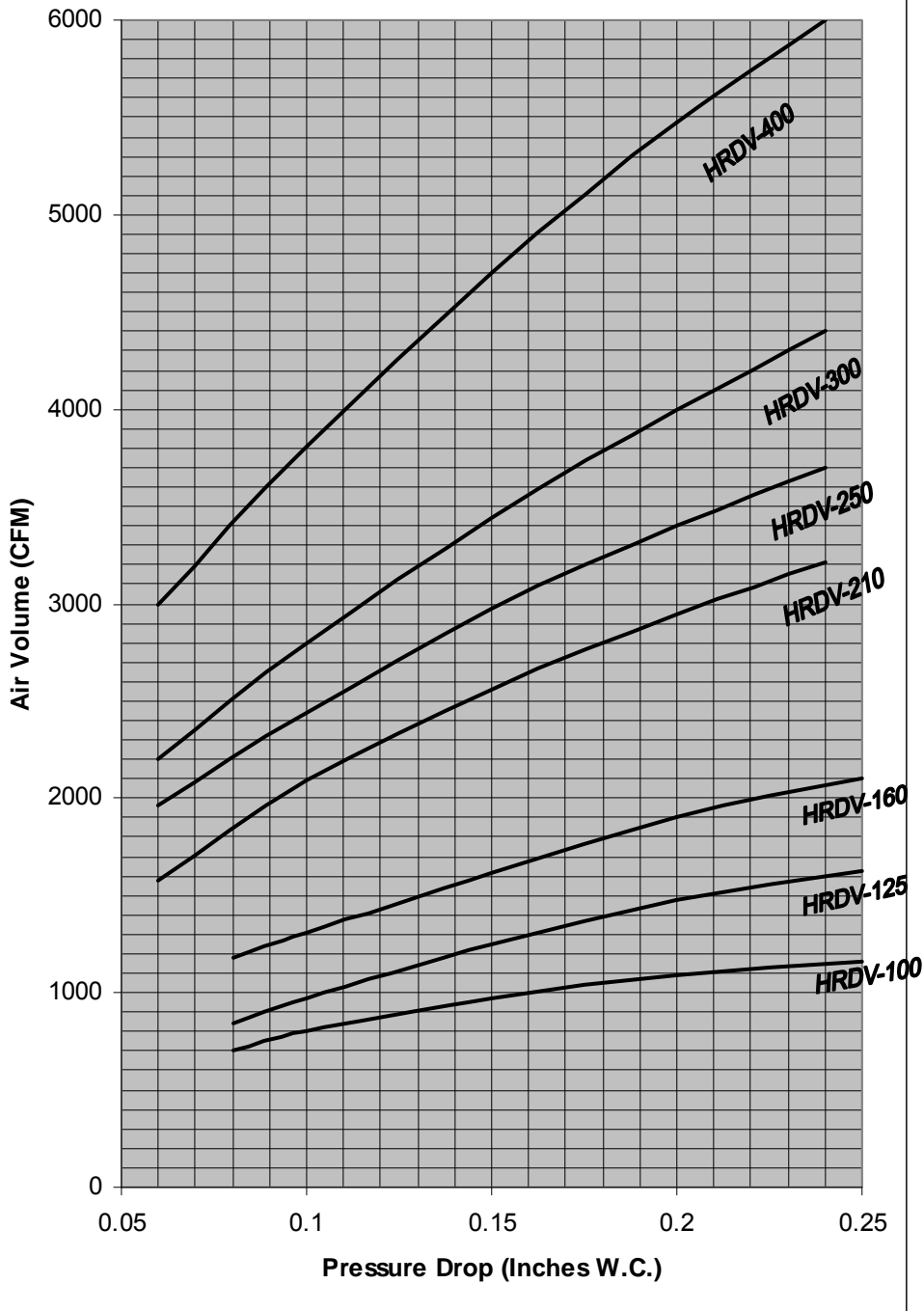
NOTE: For models 500A, 600A, 800A, 500B, 600B, and 800B, E.T.L. approved design certification applies to individual duct furnaces only.

(*) High SCFM type "H" duct furnaces with all the above Series Bank Models or with Single or Parallel Bank Models having 50 degree temperature rise or less. E.T.L. approved design certification only applies on installations on the positive side of air supply.

TABLE 3 – AMP DRAW RATING

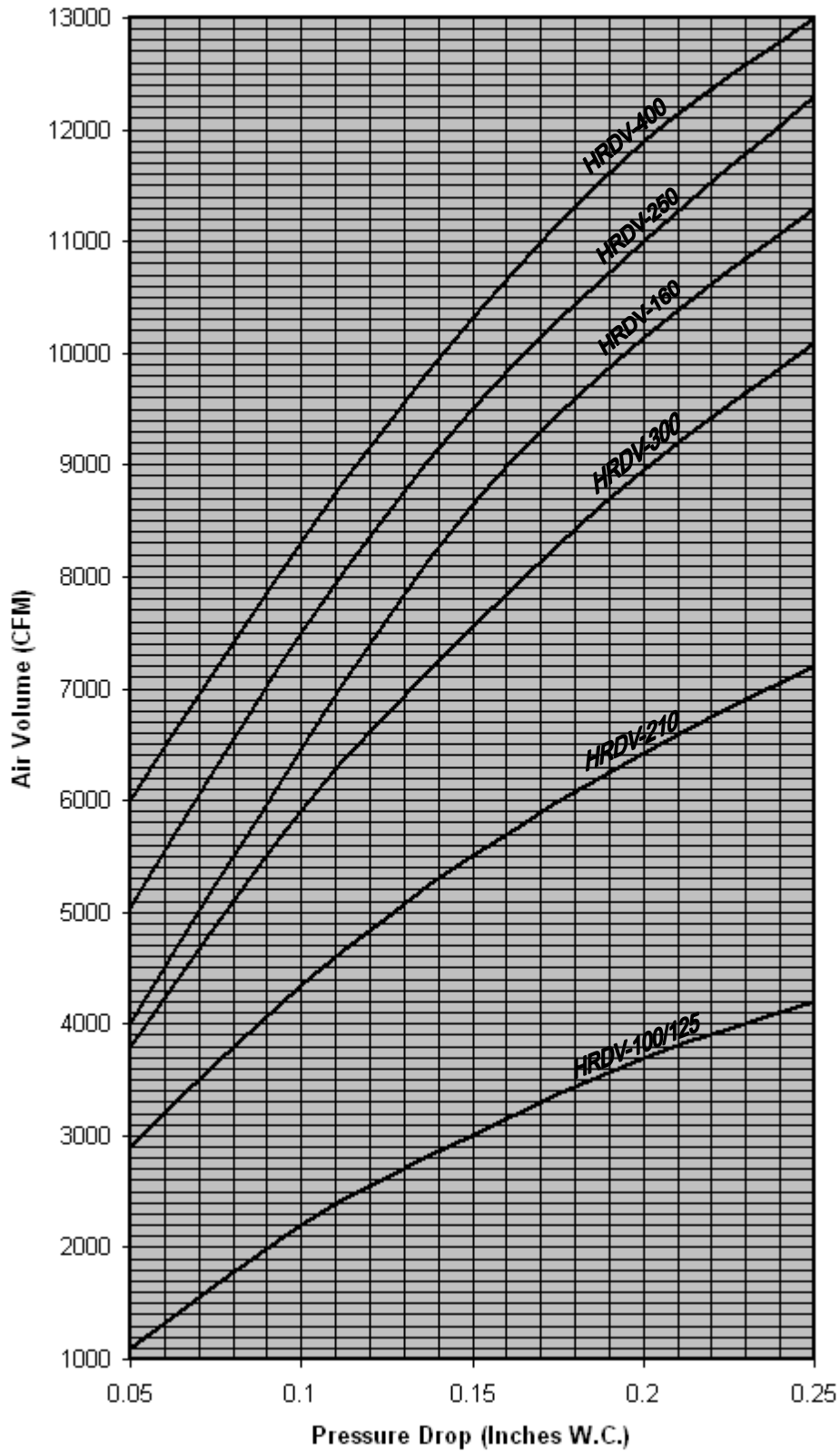
| Model No. MBA Input | On-Off Amp | Selectra (S3) Amp | Sig. Cond. AMP |
|---------------------|------------|-------------------|----------------|
| 100 | 3.5 | 3.8 | 3.8 |
| 125 | 3.5 | 3.8 | 3.8 |
| 160 | 3.5 | 3.8 | 3.8 |
| 210 | 3.5 | 3.8 | 3.8 |
| 250 | 3.5 | 3.8 | 3.8 |
| 300 | 3.5 | 3.8 | 3.8 |
| 400 | 3.5 | 3.8 | 3.8 |
| 500A | 6.9 | 7.5 | 7.2 |
| 600A | 6.9 | 7.5 | 7.2 |
| 800A | 6.9 | 7.5 | 7.2 |
| 500B | 6.9 | 7.5 | 7.2 |
| 600B | 6.9 | 7.5 | 7.2 |
| 800B | 6.9 | 7.5 | 7.2 |

Duct Furnace Air Resistance Low CFM Standard Duct Furnace



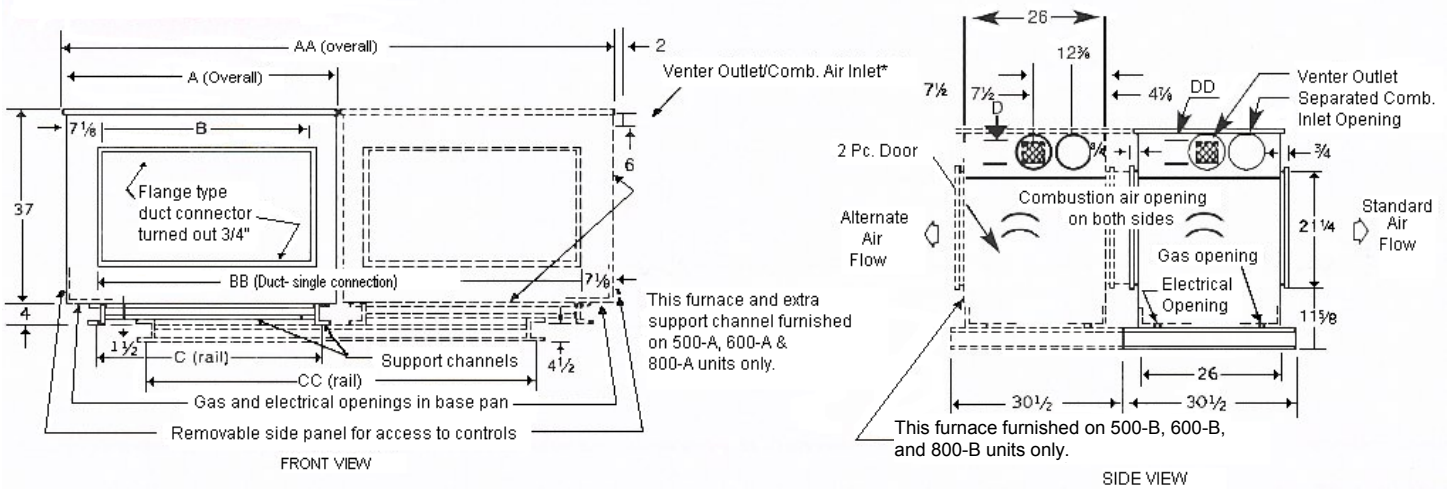
Note: Standard Low CFM furnaces used with single bank "A" units having higher than 40° temperature rise. Resistance Chart applies to all 80% Efficient models.

Type "H" High CFM Duct Furnace



Note: High CFM Type "H" furnaces used with double bank "B" units and single bank "A" units having 60° or less air temperature rise. Resistance Charge applies to all 80% Efficient models.

Dimensions



| | ISHRDV, IHRDV, HRDV MODEL NO. | | | | | | |
|----|-------------------------------|--------|--------|--------|---------|---------|--------|
| | 100 | 125 | 160 | 210 | 250 | 300 | 400 |
| A | 30 5/8 | 30 5/8 | 41 3/8 | 41 3/8 | 52 1/16 | 52 1/16 | 65 1/2 |
| AA | - | - | - | - | - | - | - |
| B | 18 | 18 | 28 3/4 | 28 3/4 | 39 1/2 | 39 1/2 | 52 7/8 |
| BB | - | - | - | - | - | - | - |
| C | 21 7/8 | 21 7/8 | 32 5/8 | 32 5/8 | 43 3/8 | 43 3/8 | 56 7/8 |
| CC | - | - | - | - | - | - | - |
| D | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| DD | (2) 6 | (2) 6 | (2) 6 | (2) 6 | (2) 6 | (2) 6 | (2) 6 |

NOTE: All dimensions in inches. Check installation manual for recommended clearances.

*Indoor Separated Combustion model will have (1) venter outlet and (1) combustion air inlet per duct furnace.

| | ISHRDV, IHRDV, HRDV MODEL NO. | | | | | |
|----|-------------------------------|---------|---------|---------|---------|--------|
| | 500-A | 500-B | 600-A | 600-B | 800-A | 800-B |
| A | - | 52 1/16 | - | 52 1/16 | - | 65 1/2 |
| AA | 104 1/8 | - | 104 1/8 | - | 131 | - |
| B | - | 39 1/2 | - | 39 1/2 | - | 52 7/8 |
| BB | 87 3/4 | - | 87 3/4 | - | 114 5/8 | - |
| C | - | 46 3/8 | - | 43 3/8 | - | 56 7/8 |
| CC | - | - | 69 5/8 | - | 74 5/8 | - |
| D | (2) 6 | (2) 6 | (2) 6 | (2) 6 | (2) 6 | (2) 6 |
| DD | (4) 6 | (4) 6 | (4) 6 | (4) 6 | (4) 6 | (4) 6 |

NOTE: All dimensions in inches. Check installation manual for recommended clearances.

*Indoor Separated Combustion model will have (1) venter outlet and (1) combustion air inlet per duct furnace.

Engineers Specifications

- A. Furnish and install the following (natural gas) (propane) fired rooftop duct furnaces as manufactured by Hastings HVAC, Inc.

| Model Item No. | Btuh No. | Output | Temp. SCFM | Pressure Rise | Drop |
|-------------------|-------------|--------|---------------|------------------|------|
|-------------------|-------------|--------|---------------|------------------|------|

- B. Heat exchangers shall have all electric welded construction with (Type 409 stainless steel, .044" tubes and 050" header plates as standard). (Type 409 stainless steel secondary heat exchanger standard)
- C. Burners shall be made of 18 gauge 409 series stainless steel with Type 430 stainless steel ribbon inserts. Burner tray shall be so constructed as to slide out from compartment for easy service and maintenance.
- D. Gas and electrical components shall consist of not less than the following: Combination Redundant Gas valve with high limit control, 24 volt control transformer, electronic spark ignition system, and (non-100%) (100%) shut-off intermittent pilot
- E. Cabinet shall be weatherproof of 20 gauge aluminized steel construction with an enamel finish.
- F. Duct furnaces shall be E.T.L. designed certified. If installed downstream from cooling coils, duct furnaces shall be E.T.L. design certified for that application.
- G. Units shall be equipped with power venter.
- H. The following options and accessories shall be provided: **(select from page 3 of this bulletin).**

In order to maintain our policy of continuous product improvement, we reserve the right to change prices, specifications, ratings or dimensions without notice or obligation.



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