READ AND SAVE THESE INSTRUCTIONS

CARNES®

Direct Drive Models: **WPDC11 - WPDC12 - WPDC13**
Belt Drive Models: **WPBC21 - WPBC22 - WPBC23**

DESIGN SERIES "C"

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

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Energy Recovery (ER) Plate Unit

FORM 21217
ISSUED: 02-17

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Introduction — Safety, Warnings, and Cautions

CAUTION!

DO NOT INSTALL, USE OR OPERATE THIS EQUIPMENT UNTIL THIS MANUAL HAS BEEN READ AND UNDERSTOOD. READ AND SAVE THESE INSTRUCTIONS FOR FUTURE USE.

CAUTION — *Perform all basic safety steps in this ERV manual before starting unit.*

Follow all recommendations, instructions, and precautions in this Installation, Operation, and Maintenance Manual to maximize performance, maintain efficiency, and to provide a safe operational environment.

WARNING: HOT SURFACES —

When servicing the unit, the internal components may be hot enough to cause pain or injury. Allow time for cooling before servicing.

WARNING — De-energize Electrical Supply

Before any service or maintenance is performed make sure main power supply is disconnected and safety labeled. Always disconnect power before working on or near this equipment. Lock and tag the disconnect switch or breaker to prevent accidental power up. Failure to turn off main power supply could result in fire, electrical shock or both, resulting in damage to property, personal injury, or death.

Propriety Notice:

This document and the information disclosed herein are proprietary data of Carnes. Neither this document nor the information contained herein shall be reproduced, used, or disclosed to others without the written authorization of Carnes, except to the extent required for installation or maintenance of the owner's equipment.

Liability:

Carnes does not accept any liability for installations of ERV equipment installed by unqualified personnel or the use of parts, components, equipment, or alterations of Carnes manufactured equipment that is not authorized or approved by Carnes.

General Safety Information:

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC), the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electric Code (CEC) in Canada.
2. Only qualified personnel should install this system.
3. All moving parts must be free to rotate.
4. Unit must be securely and adequately grounded.
5. Adjustments to fan speed significantly affect motor load. If the fan RPM is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.
6. Never open access doors to the unit while it is running.
7. Verify that the power source is compatible with the equipment.

Introduction

Product Information

The Carnes WPDC & WPBC Energy Recovery Ventilator is shipped as a factory assembled factory-wired and run-tested unit. This includes an air-to-air plate exchanger, supply and exhaust fans, supply and exhaust filters, electrical control panel, and external disconnect. The ventilator is housed in a G90 galvanized steel cabinet. Optional dampers, controls and safety devices may be included. This manual describes basic installation, operation and maintenance requirements for the cataloged features. Non cataloged features may be covered by the Equipment Submittal or separate Carnes Instructions.

Unit Serial #:	No. of ERV's:	Communication Protocol:
Unit Model #:	Voltage / Phase:	CFM Output
	_____ V / _____ Phase	_____CFM
Customer / Job:	Facility Address:	Sales Rep / Distributor:

Introduction

"C" Series WPDC & WPBD Models

Models: Direct Drive WPDC11 (600 CFM), WPDC12 (1200 CFM), and WPDC13 (1800 CFM)

INDOOR USE ONLY

Models: Belt Drive WPBC21 (2000 CFM), WPBC22 (4000 CFM), and WPBC23 (6000 CFM)

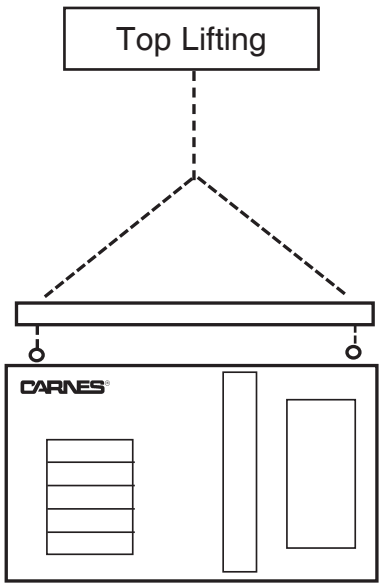
INDOOR/OURDOOR USE

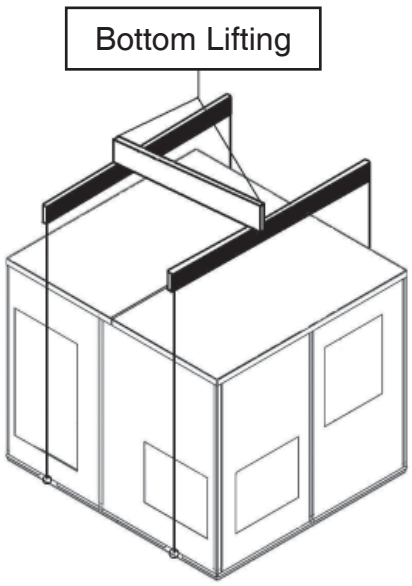
Installation — Receipt and Storage

1. The unit must be thoroughly inspected before accepting delivery from the carrier. Inspect for:
   a. Impact damage or serious scratches to the exterior.
   b. Damage to the interior components such as energy exchange core, fan and motor mountings or wiring.
2. Any discrepancies in equipment or condition as received must be reported in writing to the carrier and Carnes Company immediately. Note: the optional roof curb is shipped in advance for installation as part of the building roof.
3. If extended storage without operation is expected (this applies to all model WP units):
   a. Any special unit roof penetration not connected to operating ductwork should be covered with rainproof coverings.
   b. All access panels should be tightly closed.
   c. Store the unit indoors, under roof. Moisture and high and low temperature extremes may harm the unit. If stored 3 months or more, rotate the fans at least 3 turns by hand every 3 months.

Installation — Placement

1. Hoist the ventilator only with the lifting brackets provided. Attach a suitable chain or strap and a spreader bar. Access panels must be in place during lifting to prevent damage.
2. Before lifting for final placement, confirm the duct locations are correctly oriented to the building connections. Install the foam gasket provided with the optional curb on the top flange of the curb to seal against the underside of the system.
3. After all items have been completed, lift the system into position on the curb. Carnes optional curb allows a tolerance of 1" (25mm) to 2" (51mm) on each axis when positioning the system, so care must be taken for accurate placement to match with ductwork and utility connections through the curb.
4. After removing shipping covers from air flow openings, fasten and seal the connecting ductwork. No specific provisions are made for fastening the unit base to the curb. If this is required, use caution to maintain the weather tightness of the unit, curb, and roof.
5. The electrical diagram for the plate recovery unit is found inside the electrical enclosure. Verify that the available power matches the requirement of the unit. Then, incorporating applicable **NEC** and local code requirements, run the power supply to the main disconnect switch.
6. Damper motor and safety controls are wired by Carnes. Verify from the project plans and specifications, or Carnes electrical diagram which controls or equipment within the system are to be "field wired" or "provided and wired in the field."
7. In specific instances, other building controls (i.e., master time clocks or fire protection systems) may interface with the Carnes energy recovery system. Verify that building controls are compatible with the controls on the Carnes electrical diagram.





Installation

Mounting Weather Hoods

1. This only applies if the unit was shipped with the weather hoods not attached. The unassembled exhaust weather hood may be located in the inlet air compartment with assembly instructions.
2. If the intake and exhaust openings are covered for shipment, remove the covers before installing the weather hoods. The weather hoods will be labeled for either exhaust or intake. The assembled weather hoods come with gaskets already installed.
3. If the unit is supplied with electric pre-heat, install the pre-heater over the outside air intake. The intake air weather hood is then installed to the electric pre-heater.
4. For weather hoods with gravity back draft dampers, center the weather hood over the appropriate exhaust or intake hole. Then mount the weather hood onto the cabinet with sheet metal screws using the pre-made holes in the weather hood flanges. It may be necessary to mark and pre-drill holes in the cabinet for the sheet metal screws.
5. For weather hoods with motorized dampers: The damper will be pre-wired with an appropriate length of conduit and wire to be wired into the junction box mounted inside the cabinet. Located on the side of the cabinet will be a pre-made hole to feed the conduit through and then a qualified electrician can connect the motorized damper in the junction box mounted inside the cabinet. Center the weather hood over the appropriate exhaust or intake hole then mount the weather hood onto the cabinet with sheet metal screws using the pre-made holes in the weather hood flanges. It may be necessary to mark and pre-drill holes in the cabinet for the sheet metal screws.

Installation

Dimensions and Weights - WPDC Direct Drive

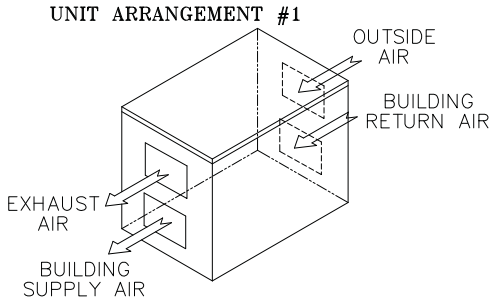
STANDARD FEATURES

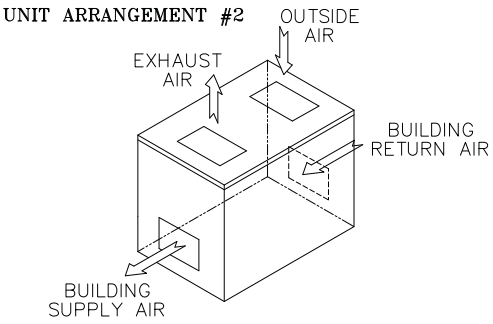
- Durable, 20 ga. galvanized construction
- 100 to 1800 CFM
- Access doors (2)
- 1" rigid duct board insulation
- Indoor applications only
- ODP Electrically Commutated (EC) Motors
  - 3-core configuration uses *DecStar ECM*
- MERV8 filters
- Control input terminal strip
  - Unit ON/OFF and filter switch
- Door interlocking disconnect
- UL listed
- AHRI 1060 certified

AVAILABLE OPTIONS

- High efficiency sensible or enthalpy cores
- 1, 2 & 3 core configurations
- Horizontal or horizontal/vertical (top) duct connections
- Multiple defrost options:
  - Exhaust only
  - Exhaust recirculation
  - Electric pre-heat (mounted in inlet hood)
- Supply and exhaust dampers with motors
  - Single phase power; 120/208/240
- Single side access
- MERV13 filters

DUCT ARRANGEMENTS





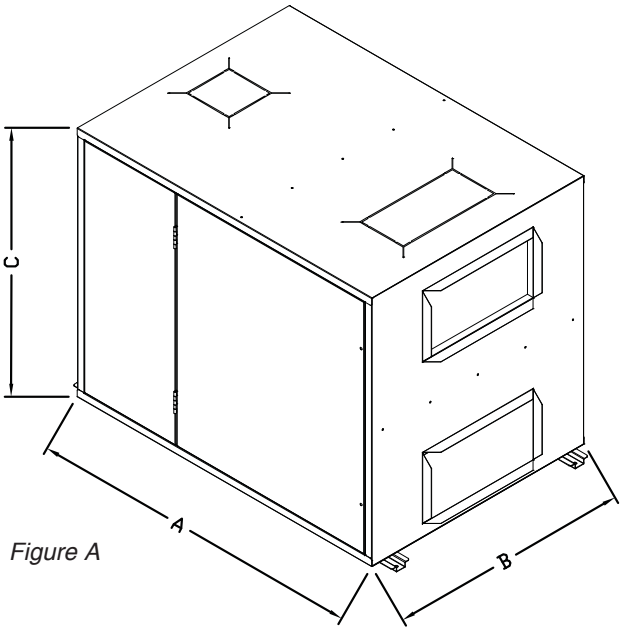


Figure A

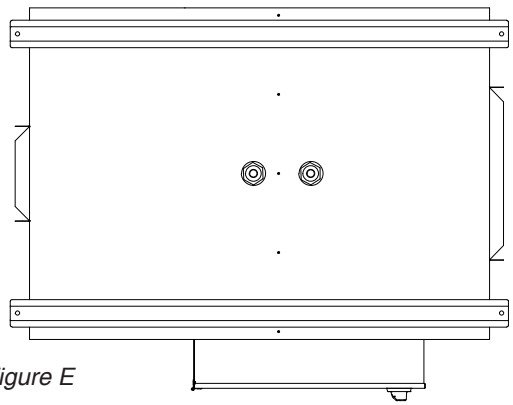


Figure E

Bottom View

Figure A Dimensions						
Size	CFM	# of Cores	A	B	C	Weight
11	100-600	1	46	18.625	34.625	300
12	200-1200	2	48	34.75	38.625	400
13	300-1800	3	57	50.625	42.625	500

Installation

Dimensions and Weights - WPDC Direct Drive

Figure B

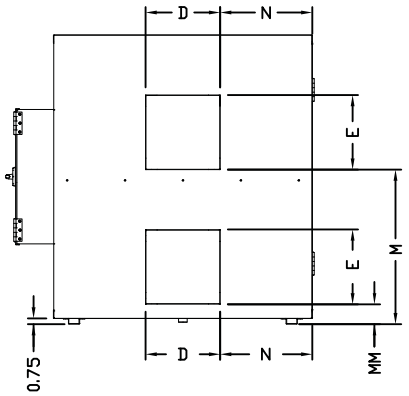


Figure B Dimensions					
Size	D	E	M	N	MM
11	8.5	9.875	18.75	5	2.625
12	9.875	9.875	20.75	12.375	2.625
13	14.75	12.125	22.75	17.875	2.625

Figure C

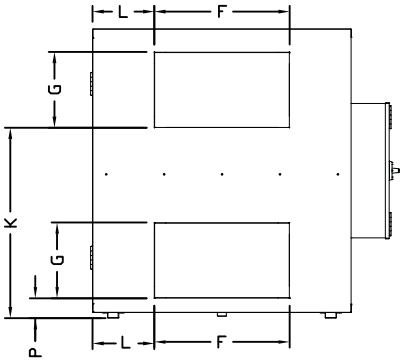


Figure C Dimensions					
Size	F	G	K	L	P
11	8.5	9.875	21.625	5	2.625
12	18	10	25.5	8.25	2.625
13	20	14	25.5	15.25	2.625

Figure D

Top View

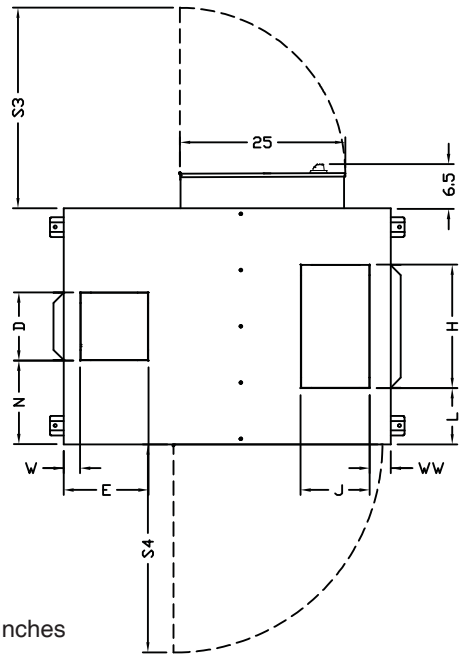


Figure D Dimensions				
Size	W	WW	S3	S4
11	2.5	3.125	32	32
12	2.5	3.125	32	32
13	2.5	3.125	32	36

Note: All sizes in Inches

Installation

Dimensions and Weights - WPBC Belt Drive

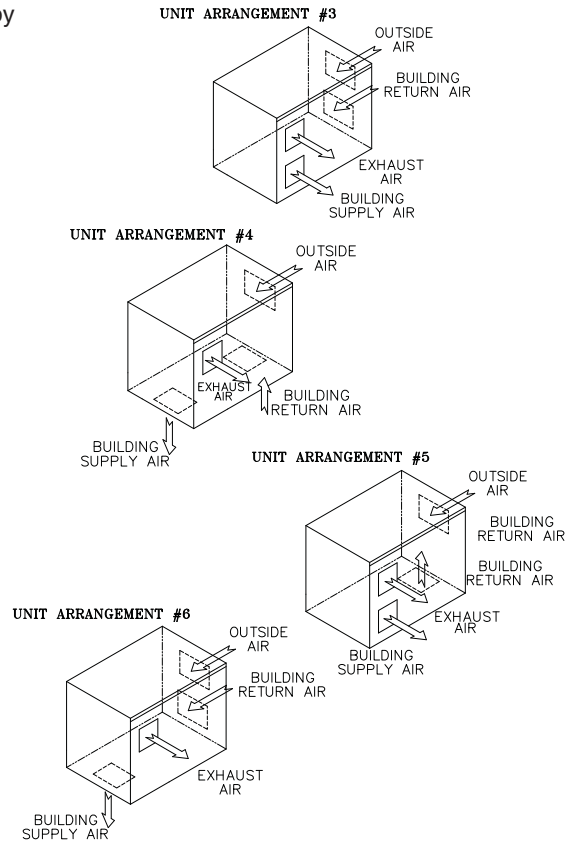
STANDARD FEATURES

- Durable, dual wall
- Galvanized construction
  - 18 ga. exterior wall
  - 22 ga. interior wall
- 600 to 6800 CFM
- Access doors (2)
- 1" rigid duct board insulation
- Indoor or outdoor applications
- VFD compatible motors
- MERV8 filters
- Control input terminal strip
  - Unit ON/OFF and filter switch
- Door interlocking disconnect
- UL listed
- AHRI 1060 certified

AVAILABLE OPTIONS

- High efficiency sensible or enthalpy cores
- 1, 2 & 3 core configurations
- Horizontal or horizontal/vertical (bottom) duct connections
- Economizer mode (supply only)
- Multiple defrost options:
  - Exhaust only
  - Exhaust recirculation
  - Electric pre-heat (mounted in inlet hood)
  - Bypass
- Supply and exhaust dampers with motors
  - Single and three-phase power; 120/208/240/277/480/575
- MERV13 filters
  - Weather hood with aluminum moisture-eliminating filters

DUCT ARRANGEMENTS



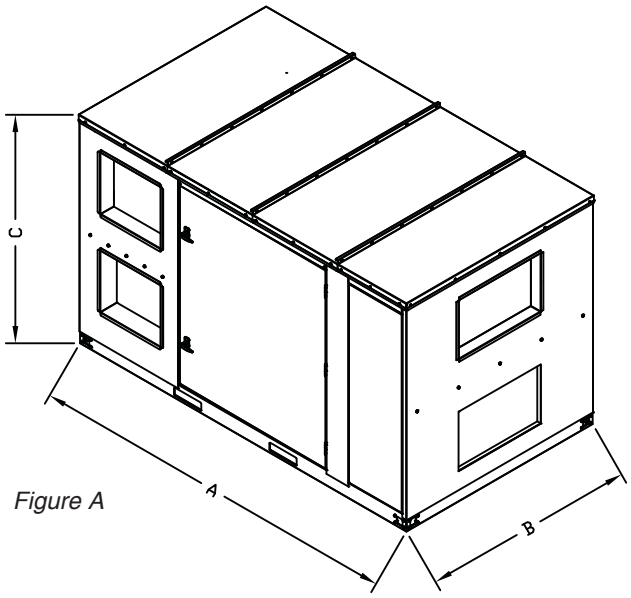


Figure A

Figure A Dimensions					
Size	CFM	A	B	C	Weight
21	600-2250	92	34.25	59	1150
22	1200-4500	96	54.75	59	1450
23	1800-6800	100	80.75	66	1950

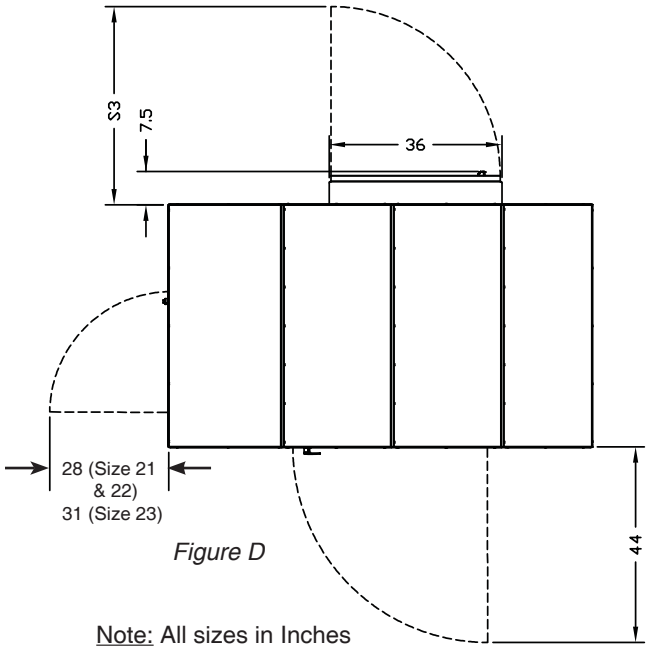


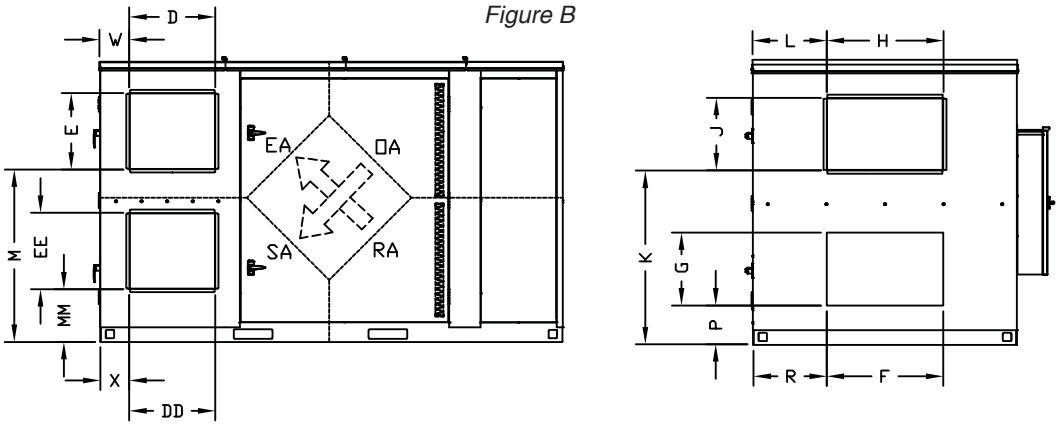
Figure D

Note: All sizes in Inches

Installation

Dimensions and Weights - WPBC Belt Drive

Figure B



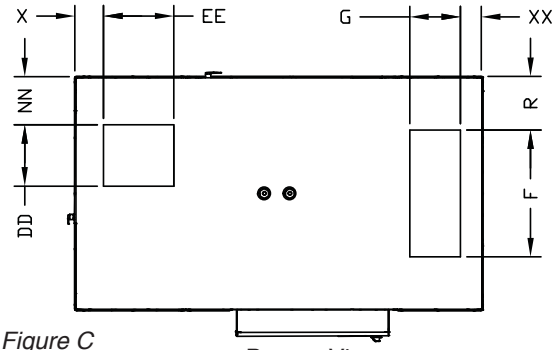


Figure C

Figure B Dimensions						
Size	F	G	R	P	EE	MM
21	17	15	8.625	8.375	15	8.5
22	24	15	15.375	8.375	15.75	11
23	36	15	22.375	8.375	18	12.75

Figure C Dimensions						
Size	F	G	R	XX	EE	NN
21	16	12	9.125	5	14.5	6.75
22	30	12	12.375	5	14.5	11.125
23	42	12	19.375	5	16.875	12.375

Figure B & Figure C Dimensions										
Size	D	E	M	W	H	J	L	K	DD	X
21	14	16	33.5	6	17	15	8.625	36.25	17	6
22	17.75	15.75	36	6.25	24	15	15.375	36.25	17.75	6.25
23	20.75	18	40.375	7.125	36	15	22.375	40.25	20.75	7.125

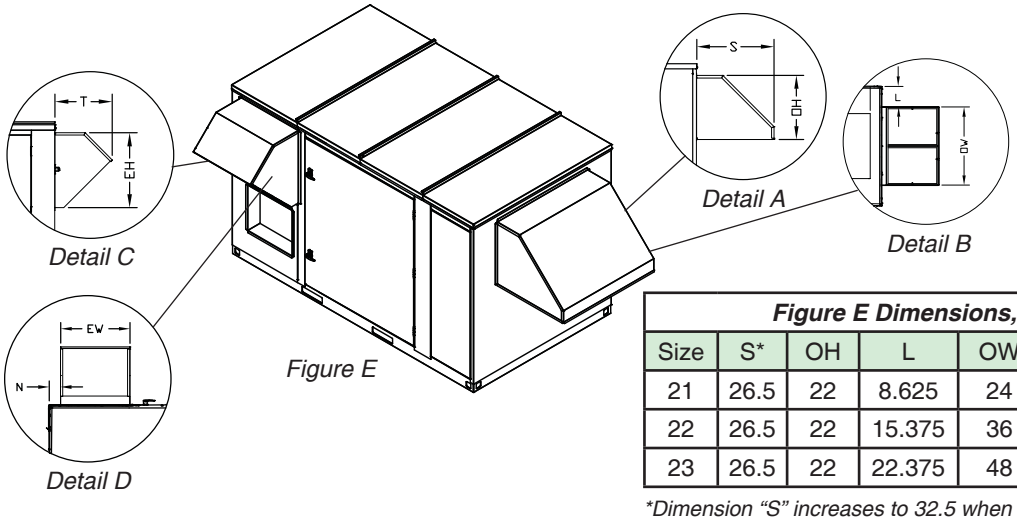
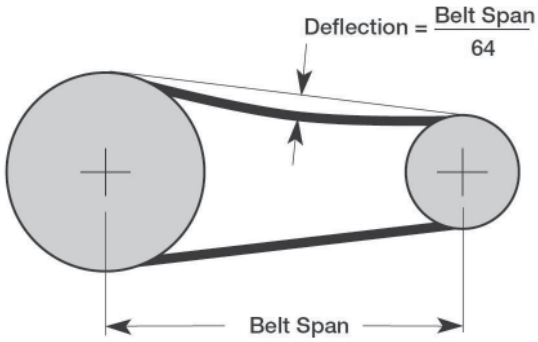


Figure E Dimensions, Detail A, B, C & D								
Size	S*	OH	L	OW	T	EH	N	EW
21	26.5	22	8.625	24	17	19.5	0	26
22	26.5	22	15.375	36	19	25	0	30.25
23	26.5	22	22.375	48	19	25	0	35

**Dimension "S" increases to 32.5 when Coil Option "P" is selected.*

Operation — Start-up and Operation Procedure

- ☐ **VERIFY THAT ALL PLACEMENT AND INSTALLATION TASKS HAVE BEEN COMPLETED, INCLUDING THE REMOVAL OF ALL SHIPMENT COVERS.**
- ☐ **INSTALL FILTERS OBSERVING THE AIR FLOW DIRECTION ARROWS.**
- ☐ **VERIFY TENSION ON FAN BELT IS PROPER. THE BELTS SHOULD BE TIGHT ENOUGH NOT TO "SQUEAL" AUDIBLY ON START-UP. "A" BELTS, WHEN PROPERLY ADJUSTED ON TYPICAL FAN DRIVES, REQUIRE 8-1/4 POUNDS (3.75 KG) [+10%] TO DEFLECT THE MIDPOINT ON THE BELT 1/64 OF THE DISTANCE BETWEEN THE SHEAVE CENTERS. IF THEY ARE ALLOWED TO SQUEAL ON START-UP, ACCELERATED BELT AND SHEAVE WEAR WILL RESULT.**



- ☐ **CHECK UNIT ELECTRICAL DIAGRAM FOR SETTINGS ON OPTIONAL THERMOSTATS, TIMERS, AND MOTOR CONTROLS THAT ARE INCLUDED.**
  - ☐ **DO NOT EXCEED 2 MINUTES RUN TIME WITH THE ACCESS PANEL REMOVED. FORWARD-CURVED FANS WILL OVERLOAD SEVERLY IF OPERATED WITHOUT ALL ACCESS PANELS IN PLACE. IF LONGER THAN 2 MINUTES, TRIPPING MOTOR STARTER, THERMAL OVERLOADS AND/OR DAMAGE TO THE MOTOR AND WIRING COULD OCCUR.**
- ☐ **IF YOU ARE UNABLE TO START THE UNIT, CHECK FOR:**
  - ☐ **PROPER ELECTRICAL POWER SUPPLIES, CONTROL POWER, AND SUPPLEMENTAL UTILITY SUPPLIES.**
  - ☐ **RESET THE THERMAL OVERLOAD(S) ON THE FAN MOTORS.**
  - ☐ **ALL DISCONNECT SWITCH(ES) WITHIN THE UNIT ARE ON THE POWER SUPPLIED TO THE UNIT WHEN POWER IS SWITCHED ON.**
  - ☐ **ALL "FIELD WIRED" AND/OR "PROVIDED" CONTROLS ARE PROPERLY INSTALLED, COMPATIBLE WITH UNIT EQUIPMENT AND CONTROLS, AND SET TO THE PROPER SETTINGS FOR UNIT OPERATION.**
- ☐ **AFTER BALANCING THE DUCKWORK AND CONTROL SYSTEM SERVED BY THE UNIT -- INCLUDING ANY UNIT FAN SPEED CHANGES MADE WITH THE VARIABLE PITCH SHEAVES PROVIDED -- VERIFY ACCEPTABLE FAN MOTOR CURRENT.**

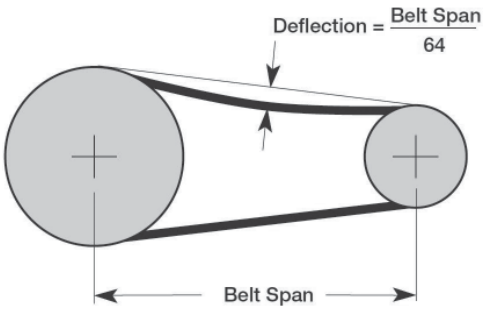
Maintenance — Troubleshooting & Maintenance

IF YOU ARE UNABLE TO START THE UNIT, CHECK FOR:

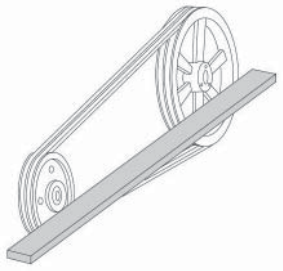
- Proper electrical power supplies, control power, and supplemental utility supplies.
- Reset the thermal overload(s) on the fan motors.
- All disconnect switch(es) within the unit are on the power supplied to the unit when power is switched on.
- All "Field Wired" and/or "Provided" controls are properly installed, compatible with unit equipment and controls, and set to the proper settings for unit operation.

Fan Belt Maintenance:

- Fan belts must be checked on a regular basis for wear, tension, alignment, and dirt accumulation.
- Both loose and tight belts can cause fan vibration and fan failure. The proper tension for belt setting is the lowest tension at which the belt will not slip under peak load. For initial tensioning, set the belt deflection at moderate thumb pressure to 1/64-inch for each inch of belt span. Check the tension twice in the first 24 hours and periodically after that.



- When replacing belts do not pry belts on or off the sheave. Loosen belt tension until belts can be removed easily. On multiple groove drives, all belts should be replaced at the same time to provide uniform drive loading. Do not install new belts on worn sheaves. Replace the worn sheaves with new ones before new belts are installed.
- Check fan and motor shafts for parallel and angular alignment. Make sure motor and fan sheaves are aligned properly and if needed use a straight edge to align the sheaves properly.



If trouble occurs and the energy recovery ventilator operation is suspected, check the following items as well -

- Confirm that all interlocks (i e., motor starter, auxiliary contacts, or damper motor end switches) are operating.
- Confirm that all field-provided safety devices (i.e., fire stat, freeze stat, or smoke detector) are operating.
- Verify that all fuses, circuit breakers, switches and motor starter overloads within and serving the unit, are in running condition.
- Verify that all dampers and linkages operate properly.
- Measure static pressures to and from the unit and verify agreement with original operation and values for which the unit was designed.

REGULAR MAINTENANCE

1. Inspect filter conditions quarterly and replace with equivalent panel filters.

2. Inspect and, if necessary, adjust the fan belt tension as discussed under Start-Up and Operation. If the belts are frayed, slip after tension adjustment or require frequent adjustment to maintain tension, replace with equivalent belts. After years of operation (particularly if belt tension has not been properly maintained) the contact surfaces of the drive or driven sheaves may exhibit "cutting" from the belts wear. If this happens, replace the sheave(s) with equivalent unit.

Control Options

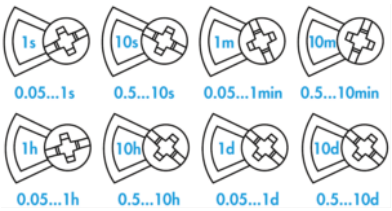
Timed Defrost Control

Exhaust Only/ Plenum Recirculation/ Exhaust Recirculation/ Bypass
Extremely cold outdoor air temperatures can cause moisture condensation and frosting on the energy recovery core. Optional timed frost control features will prevent/control core frosting. Timed frost control includes a timer as well as a temperature switch with the sensor installed in the outdoor air. The temperature switch initiates frost control when the temperature drops below the set point.

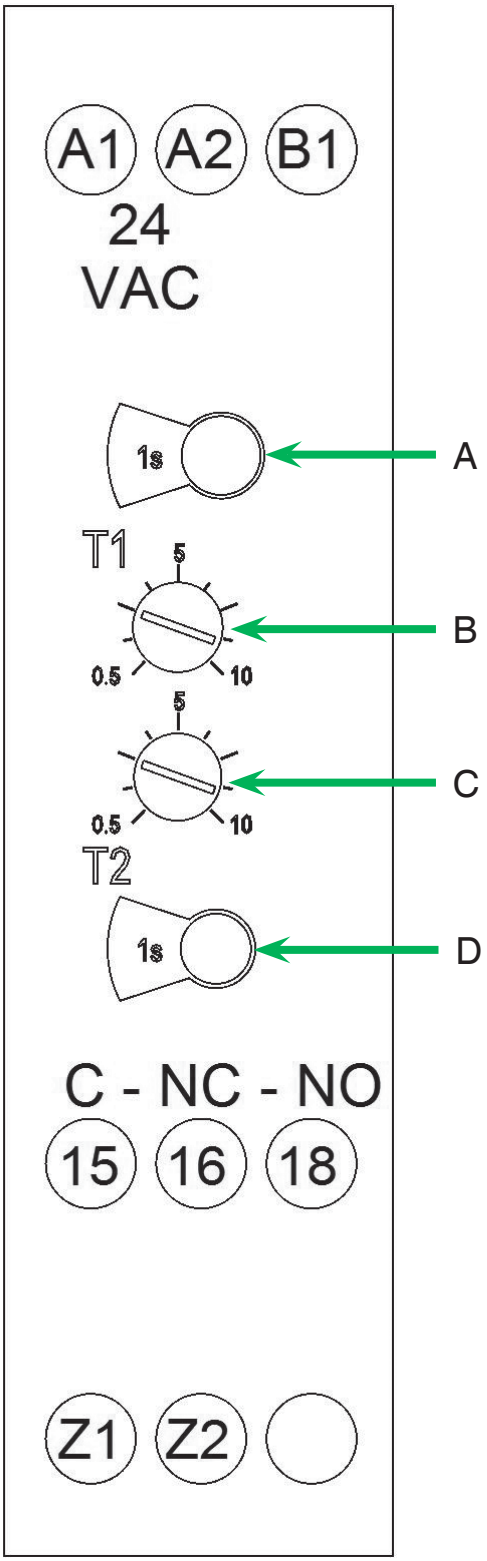
- When ***Exhaust Only*** frost control is initiated, the timer will turn the supply blower off. Exhaust only frost control will shut down the supply fan for T1 every T2 to allow exhaust air to defrost energy core.
- When ***Plenum Recirculation*** frost control is initiated, the timer will close the outdoor air damper and open the plenum damper for T1 every T2 to allow plenum air to defrost energy core.
- When ***Exhaust Recirculation*** frost control is initiated, the timer will close the outdoor air damper and open the exhaust recirculation damper for T1 every T2 to allow exhaust air to defrost energy core.
- When ***Bypass*** frost control is initiated, the timer will open the bypass damper for T1 every T2 to allow exhaust air to defrost energy core.

Frost Control Cycle Timer
A =Time range rotary selector (T1)
B =Time scale (T1)*
C =Time scale (T2)*
D =Time range rotary selector (T2)
T1 = Time defrost cycle is on
T2 = Time defrost cycle is off before another cycle can start
*0.5=5%, 5=50%, 10=100%

Time Ranges



Setting Time
T1=A(B/10)
T2=D(C/10)
Example: T1= 1 hour x 5/10 = 0.5 hour



Control Options — Timed Defrost Control

Timer Settings: (settings may need to be adjusted for optimization of climate)

- T1 timer scale (B) set to 5 and timer range (A) set to 10m for 5 minutes of DEFROST ON time.
- T2 timer scale (C) set to 5 and timer range (D) set to 1h for 30 minutes of DEFROST OFF time.

Operational Test Procedure

1. Disconnect power to the unit.
2. Place a jumper between A1 and B1 on the timer relay.
3. Set T1 and T2 timer range to 1 minute and the T1 and T2 timer scale to 7.5
4. Put power to the unit. The unit will start the defrost cycle.
    - Exhaust Only: Supply blower will shut down for 45 seconds and turn on for 45 seconds.
    - Plenum Recirculation: Outdoor air damper will close and open the plenum damper for 45 seconds. Then open the OA damper and close the plenum damper for 45 seconds.
    - Exhaust Recirculation: Outdoor air damper will close and open the recirculation damper for 45 seconds. Then open the OA damper and close the recirculation damper for 45 seconds.
    - Bypass: The bypass damper will open 45 seconds and then close the bypass damper for 45 seconds.
5. Remove power from the unit. Reset timer settings and remove any jumpers that were installed. See suggested timer settings.

Control Options — Pre-heater Frost Control

Extremely cold outdoor air temperatures can cause moisture condensation and frosting on the energy recovery core. Optional pre-heater frost control features will prevent/control core frosting by heating the outdoor air temperature above the frost point. A thermostat controls the incoming air temperature.

Frost Control Temperature Switch

The temperature switch sensor is installed in the outdoor air. The temperature switch initiates frost control when the outdoor air temperature drops below the set point.

Set Point Programing

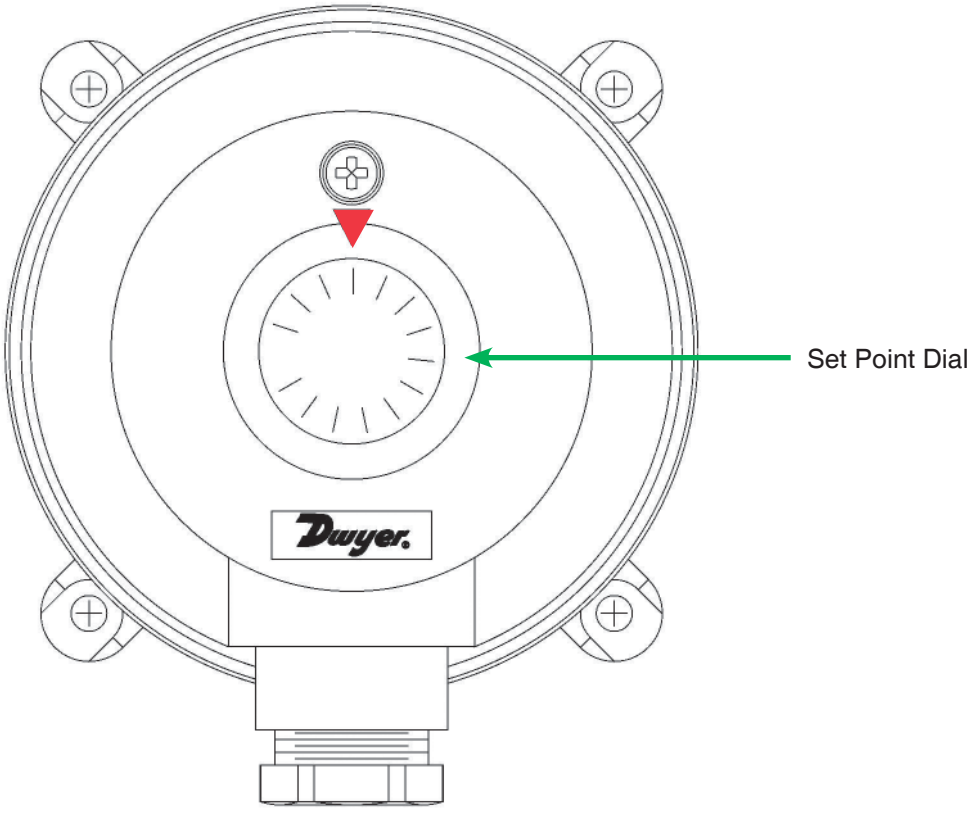
- Press and release SET. SP text appears on the display.
- Press SET again. The real value is shown on the display.
- Modify the value using the UP and DOWN keys.
- Press SET to store the new SP value.
- Press SET and DOWN to quit programming, or wait 1 minute for the controller to TIMEOUT.

Control Options — Dirty Filter Switch

As the filters become clogged with dust and debris over time the differential pressure across the filters will increase. When the pressure difference reaches the set limit on the filter switch the filter switch will trip. The filter switch can either be normally open or normally closed. The switch can be used to turn on or off a signal device provided by others to indicate dirty filters.

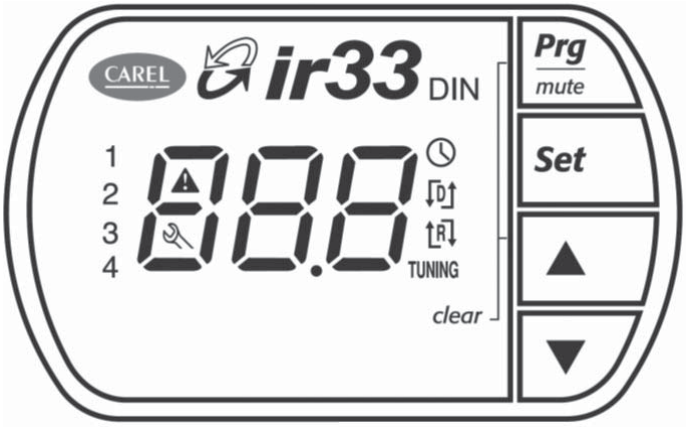
Set Point Tuning

The dial on the filter switch indicates the differential pressure that the switch will trip. If the set point pressure is known turn the dial until the red arrow points at the pressure desired. If the set point pressure is not known, the following set up procedure is recommended. To find the set point for dirty filters the unit should be air balanced and have clean new filters in place. With the power to the unit disconnected block 40-50% of the filters in each air stream, cardboard works well for this. Close the unit up and turn it back on. Turn the pressure switch dials all the way up. Slowly turn the dial down until the switch trips and stop turning the dial. This is your dirty filter pressure set point. Disconnect power to the unit and remove what was used to block the filters and close up the unit.



Control Options — Temperature Economizer

When the outside air falls within a set range of temperatures between the high and low limit set points the bypass damper is opened. This means that no energy is being transferred from the exhaust and supply air stream which allows free cooling of the building to occur. The high limit set point is typically set to the return air temperature found on the submittal (~75°F). The low limit thermostat is typically set to 60°F.



Setting Low Limit; set point 1 (St1)
To change set point 1:

- Press ***Set*** the display shows St1 and then the current value of St1
- Press ▲ or ▼ to reach the desired value
- Press ***Set*** to confirm the new value of St1
- The display returns to the standard view.

Setting High Limit; set point 2 (St2)
To change set point 2:

- Press ***Set*** twice slowly; the display shows St2 and then the current value of St2
- Press ▲ or ▼ until reaching the required value
- Press ***Set*** to confirm the new value of St2;
- The display returns to the standard view.

Operational Test Procedure
With the unit running verify the outside are temperature is either above, inside, or below the economizer range. To view the current economizer range, press the up or down arrow to view the low limit St1 and the high limit St2.

- Outside air temperature is ***above*** the economizer range. Change St2 to at least 3°F higher than the outside are temperature. Verify the bypass damper opens.
- Outside are temperature is ***inside*** the economizer range. Verify that the bypass damper is open.
- Outside are temperature is ***below*** the economizer range. Change St1 to at least 3°F lower than the outside are temperature. Verify the bypass damper opens.

Return any changed set points to the desired economizer temperature range.

ADDITIONAL INFORMATION

For more details on the installation or the operation of your unit, contact your dealer. We will be glad to help you.

Carnes
448 S. Main Street
P.O. Box 930040
Verona, WI 53593-0040

Phone: 608/845-6411
Fax: 608/845-6504

PRODUCT INFORMATION

Date of purchase_____

Serial Number _____

Maintenance Sheet (Description of Work Done)	Date

Maintenance Sheet (Description of Work Done)	Date

REPLACEMENT PARTS

Description	Size 11	Size 12	Size 13	Size 21	Size 22	Size 23
Enthalpy Core	998-2101 (1)	998-2101 (2)	998-2101 (3)	998-2102 (1)	998-2102 (2)	998-2102 (3)
Sensible Core	998-2106 (1)	998-2106 (2)	998-2106 (3)	998-2107 (1)	998-2107 (2)	998-2107 (3)
Blower	999-2568	999-2546	999-2547	999-2548	999-2551	999-2552
Blower Motor	993-0203	993-0204	(w/Blower)	(SEE CHART)		
Blower Motor Belly Band	999-5246	999-5246	---	---	---	---
Blower Motor Belly Band Mounting Leg	999-5248	999-5248	---	---	---	---
VCU ECM Control	999-5223	999-5223	999-5223	---	---	---
ACU ECM Control	999-5224	999-5224	999-5224	---	---	---
40A Main Disconnect Switch	999-7374	999-7374	999-7374	999-7374	999-7374	999-7374
80A Main Disconnect Switch	---	---	---	---	---	999-7375
Disconnect Switch Handle	999-7380	999-7380	999-7380	999-7380	999-7380	999-7380
24vac Transformer (115-460V)	998-9537	998-9537	998-9537	998-9537	998-9537	998-9537
24vac Transformer (575V)	---	---	---	998-9539	998-9539	998-9539
Damper Motor	999-9296	999-9296	999-9296	999-9296	999-9296	999-9296
Filter Switch	999-7363	999-7363	999-7363	999-7363	999-7363	999-7363
Filter Switch Tube Kit	999-7364	999-7364	999-7364	999-7364	999-7364	999-7364
Digital Temperature Switch	999-7367	999-7367	999-7367	999-7367	999-7367	999-7367
Digital Temperature Switch Sensor	999-7368	999-7368	999-7368	999-7368	999-7368	999-7368
Cycle Timing Relay	999-7366	999-7366	999-7366	999-7366	999-7366	999-7366
Std Air Filter (Qty)	999-8893 (2)	999-8893 (4)	999-8872 (6)	999-8994 (4)	999-8894 (4)	999-8895 (8)
Std Air Filter Size	16x16x2	16x16x2	16x20x2	16x24x2	16x24x2	20x24x2
Std Air Filter (Qty)	---	---	---	---	999-8895 (2)	---
Std Air Filter Size	---	---	---	---	20x24x2	---
Optional MERV13 Air Filter (Qty)	999-8885 (2)	999-8885 (4)	999-8874 (6)	999-8896 (4)	999-8896 (4)	999-8897 (8)
Optional MERV13 Air Filter Size	16x16x2	16x16x2	16x20x2	16x24x2	16x24x2	20x24x2
Optional MERV13 Air Filter (Qty)	---	---	---	---	999-8897 (2)	---
Optional MERV13 Air Filter Size	---	---	---	---	20x24x2	---
Replacement Intake Moisture Eliminator	---	---	---	999-8864 (1)	999-8982 (2)	999-8864 (2)
Intake Hood Assembly (Includes Moisture Elim.)	---	---	---	393-2127	393-2128	393-2129
Exhaust Hood Assembly	---	---	---	393-2121	393-2122	393-2122
Blower Isolator (4/Blower)	---	---	---	999-9748	999-9748	999-9748

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Control Options

Product Information

VOLTAGE	HP PID	HP	FLA	CONTACTOR	OVERLOAD	OVERLOAD AMP RANGE	FUSE	FUSE AMP	MOTOR ODP	MOTOR TEFC	VFD (10A FUSE MIN.)
(A) 115 VOLT, 1 PHASE	P	1/2	7.2	999-2656	999-2608	7-11	999-2706	20	993-1362	993-5354	N/A
	R	3/4	10.8	999-2657	999-2609	9-13	999-2723	25	993-1366	993-5360	N/A
	S	1	12.8	999-2657	999-2609	9-13	999-2724	30	993-1368	993-5364	N/A
	T	1 1/2	18	999-2659	999-2614	16-22	999-2724	30	993-1370	993-5367	N/A
	V	2		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	W	3		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	X	5		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	Y	7 1/2		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	C	10		N/A	N/A		N/A	N/A	N/A	N/A	N/A
(B) 208 VOLT, 1 PHASE	P	1/2	3.6	999-2656	999-2605	2.8-4.2	999-2719	12	993-1362	993-5354	N/A
	R	3/4	5.3	999-2656	999-2607	5-8	999-2720	15	993-1366	993-5360	N/A
	S	1	6.4	999-2656	999-2607	5-8	999-2721	17-1/2	993-1368	993-5364	N/A
	T	1 1/2	10.2	999-2656	999-2608	7-11	999-2723	25	993-1370	993-5367	N/A
	V	2		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	W	3		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	X	5		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	Y	7 1/2		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	C	10		N/A	N/A		N/A	N/A	N/A	N/A	N/A
(C) 208 VOLT, 3 PHASE	P	1/2	2.4	999-2656	999-2604	1.7-2.6	999-2714	6	993-1309	993-5307	999-7220
	R	3/4	3.3	999-2656	999-2605	2.8-4.2	999-2716	8	993-1313	993-5311	999-7220
	S	1	3.6	999-2656	999-2605	2.8-4.2	999-2718	10	993-1314	993-5313	999-7220
	T	1 1/2	5	999-2656	999-2606	4-6	999-2720	15	993-1317	993-5405	999-7221
	V	2	6.8	999-2656	999-2607	5-8	999-2721	17-1/2	993-8410	993-5408	999-7221
	W	3	8.5	999-2656	999-2608	7-11	999-2722	20	993-8502	993-5504	999-7222
	X	5	13.4	999-2657	999-2611	12-18	999-2724	30	993-8504	993-5508	999-7223
	Y	7 1/2	24	999-2659	999-2612	21-26	999-2727	45	993-8601	993-5602	999-7224
	C	10	28.6	999-2659	999-2613	24-36	999-2729	60	993-8603	993-5605	999-7224

Control Options

Product Information

VOLTAGE	HP PID	HP	FLA	CONTACTOR	OVERLOAD	AMP RANGE	FUSE	AMP	MOTOR ODP	MOTOR TEFC	VFD (10A FUSE MIN.)
(D) 230 VOLT, 1 PHASE	P	1/2	3.6	999-2656	999-2605	2.8-4.2	999-2718	10	993-1362	993-5354	N/A
	R	3/4	5.3	999-2656	999-2607	5-8	999-2719	12	993-1366	993-5360	N/A
	S	1	6.4	999-2656	999-2607	5-8	999-2721	17-1/2	993-1368	993-5364	N/A
	T	1 1/2	9.2	999-2656	999-2608	7-11	999-2723	25	993-1370	993-5367	N/A
	V	2		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	W	3		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	X	5		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	Y	7 1/2		N/A	N/A		N/A	N/A	N/A	N/A	N/A
	C	10		N/A	N/A		N/A	N/A	N/A	N/A	N/A
(E) 230 VOLT, 3 PHASE	P	1/2	2.3	999-2656	999-2604	1.7-2.6	999-2714	6	993-1309	993-5307	999-7220
	R	3/4	3.2	999-2656	999-2605	2.8-4.2	999-2716	8	993-1313	993-5311	999-7220
	S	1	3.5	999-2656	999-2605	2.8-4.2	999-2716	8	993-1314	993-5313	999-7220
	T	1 1/2	4.8	999-2656	999-2606	4-6	999-2719	12	993-1317	993-5405	999-7221
	V	2	6.4	999-2656	999-2607	5-8	999-2720	15	993-8410	993-5408	999-7221
	W	3	8.6	999-2656	999-2608	7-11	999-2722	20	993-8502	993-5504	999-7222
	X	5	13.4	999-2657	999-2611	12-18	999-2724	30	993-8504	993-5508	999-7223
	Y	7 1/2	24	999-2658	999-2612	21-26	999-2727	45	993-8601	993-5602	999-7224
	C	10	28.6	999-2659	999-2613	24-36	999-2728	50	993-8603	993-5605	999-7224
(G) 460 VOLT, 3 PHASE	P	1/2	1.2	999-2656	999-2602	.95-1.45	999-2709	3	993-1309	993-5307	999-7225
	R	3/4	1.7	999-2656	999-2603	1.4-2.2	999-2711	4	993-1313	993-5311	999-7226
	S	1	1.8	999-2656	999-2603	1.4-2.2	999-2711	4	993-1314	993-5313	999-7226
	T	1 1/2	2.4	999-2656	999-2604	1.7-2.6	999-2714	6	993-1317	993-5405	999-7227
	V	2	3.2	999-2656	999-2605	2.8-4.2	999-2716	8	993-8410	993-5408	999-7227
	W	3	4.3	999-2656	999-2606	4-6	999-2718	10	993-8502	993-5504	999-7228
	X	5	6.7	999-2656	999-2607	5-8	999-2721	17-1/2	993-8504	993-5508	999-7229
	Y	7 1/2	10.8	999-2657	999-2609	9-13	999-2723	25	993-8601	993-5602	999-7285
	C	10	13.2	999-2657	999-2611	12-18	999-2724	30	993-8603	993-5605	999-7285
(H) 600 VOLT, 3 PHASE	P	1/2	0.9	999-2656	999-2601	.64-.96	999-2708	2-1/2	993-1310	993-5308	999-7254
	R	3/4	1.2	999-2656	999-2602	.95-1.45	999-2709	3	993-1312	993-5312	999-7254
	S	1	1.4	999-2656	999-2602	.95-1.45	999-2709	3	993-1405	993-5403	999-7254
	T	1 1/2	1.8	999-2656	999-2604	1.7-2.6	999-2713	5	993-1409	993-5406	999-7255
	V	2	2.4	999-2656	999-2604	1.7-2.6	999-2714	6	993-1410	993-5409	999-7255
	W	3	3.3	999-2656	999-2605	2.8-4.2	999-2716	8	993-1504	993-5505	999-7256
	X	5	5	999-2656	999-2606	4-6	999-2720	15	993-1506	993-5509	999-7257
	Y	7 1/2	7.7	999-2656	999-2608	7-11	999-2722	20	993-1602	993-5603	999-7258
	C	10	9.5	999-2657	999-2609	9-13	999-2723	25	993-1606	993-5606	999-7259