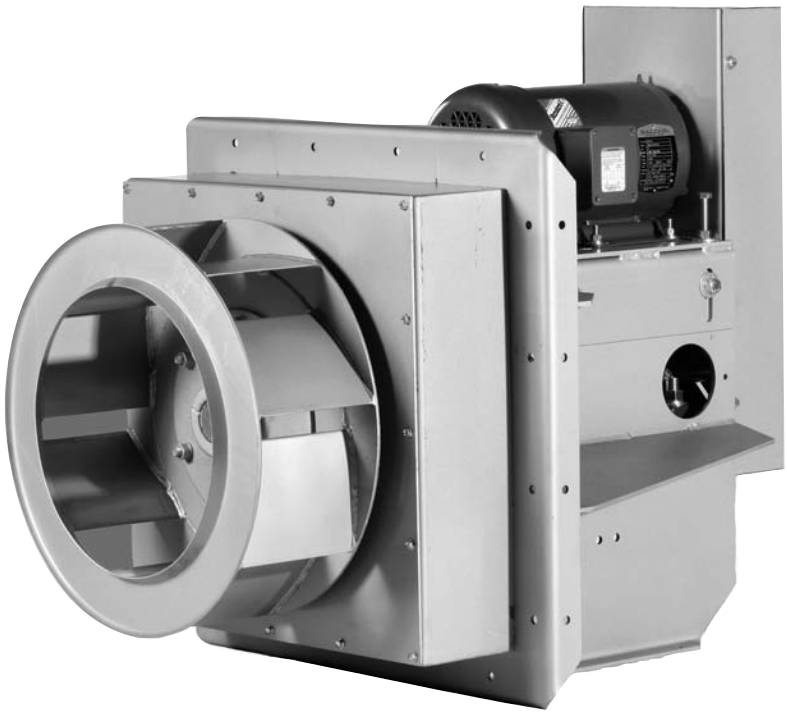
cincinnati fan

OEM and Industrial Air Handling Specialist



SERIES CPAF

CENTRIFUGAL PLUG FANS

CLASS II
CLASS IIP
CLASS III

7697 Snider Road, Mason, OH 45040-9135

Telephone: 513-573-0600

Visit us at www.cincinnatifan.com for more information.

Cat. No. CPAF-508
Supersedes CPAF-305

cincinnati fan

A Company That Stands Behind Its Product

Since the founding of **Cincinnati Fan** in 1956, the company's mission has been to provide quality products at competitive prices, backed by dependable service.

This mission is carried out by specializing in the market for industrial air handling products up to 125 HP. But specialization does not mean the product line is small. **Cincinnati Fan** offers a wide variety of standard and customized products, production flexibility, and customer responsiveness.

Cincinnati Fan has over 170 experienced sales engineers across the U.S. and Canada ready to serve your air handling needs.

Cincinnati Fan can provide:

- Technical evaluation for correct performance conditions.
- Review of air stream and ambient conditions that require special attention.
- Selection of proper components to meet required design specifications.
- Selection of proper accessories.
- System analysis for proper fan design.

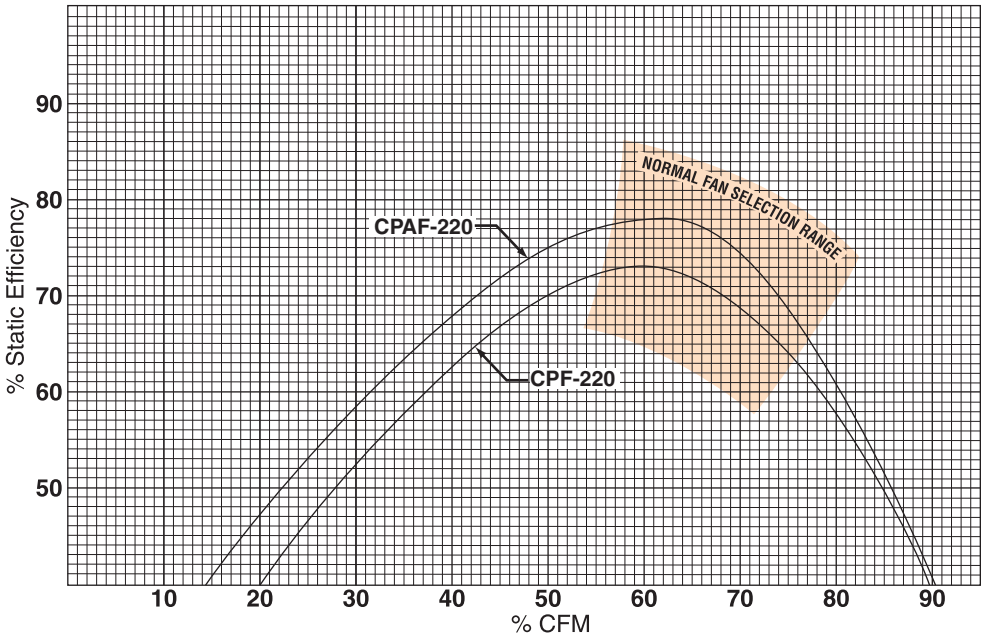
Cincinnati Fan operates in a modern facility specifically designed for world class manufacturing enabling us to build standard products to order, including accessories, and ship within 5 to 10 working days.

With support like this, you can be sure your **Cincinnati Fan** product will be well-built and will provide maximum dependability and longevity.

Visit us at www.cincinnatifan.com for more information.

EFFICIENCY OF AIRFOIL WHEEL vs. BACKWARD INCLINED WHEEL

Airfoil wheels provide the highest efficiency of all centrifugal fan designs. The curve overlays at right comparing a CPAF-220 and a CPF-220 illustrates a 10% increase in static efficiency for the airfoil design versus the backward inclined design in the normal selection range. This benefit results in lower brake horsepower consumption and a reduction in sound levels of 2-6 dBA.



TWO STANDARD ARRANGEMENTS

ARRANGEMENT 4 (DIRECT DRIVE)

- Motor mounted on motor base.
- Wheel mounted on motor shaft.
- Maximum temperature 200°F.
  See other arrangements for higher temperatures.

ARRANGEMENT 9 (V-BELT DRIVE)

- Motor mounted on adjustable base over the fan shaft.
- Wheel mounted on fan shaft with two pillow block bearings.
- Maximum temperature of standard design is 300˚F.
  High temperature fans available up to 800˚F.
- Shown with belt guard and optional plug box.

STANDARD INLET BELL

Designed for smooth air entrance into the wheel for maximum efficiency.

OPTIONAL INSULATION PLUG BOX

Required for 450°F. to 800°F. arrangement 9 only.
May be furnished by customer.
Plug box is available in 2", 3", 4", 5" or 6" depths.

CPAF SERIES FEATURES

A) Airfoil blades are fabricated of high-strength steel to assure long lasting, efficient operation.

B) Turned, ground and polished shafting assures smooth operation.

C) Heavy-duty, self-aligning, relubricatable ball bearings in cast-iron pillow blocks. Bearings are selected for optimal performance depending on fan size and class.

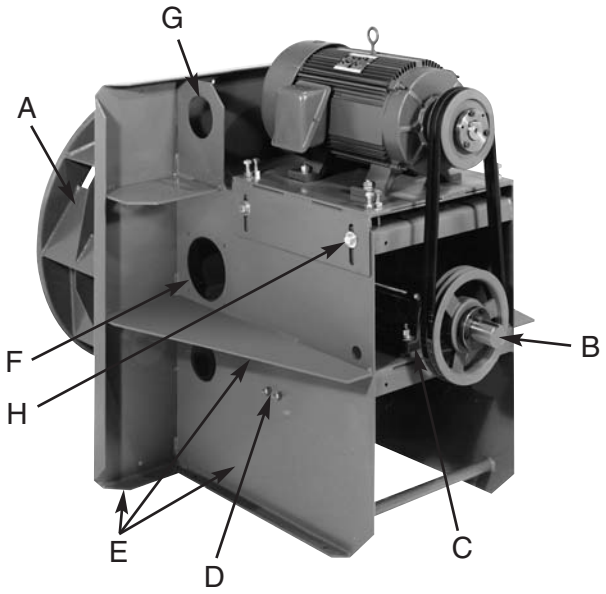
D) Extended grease fittings for easy lubrication of fan bearings.

E) Panel and base construction with internal and external supports to maximize rigidity and assure long equipment life.

F) Inboard bearing access hole.

G) Multiple lifting points for easy installation of fan onto customer's equipment.

H) Heavy duty motor support base with four point adjustability for proper belt tension and alignment.



Arrangement 9 shown with belt guard removed.

HIGH TEMPERATURE CONSTRUCTION

Standard Construction: Arrangement 4 is suitable to 200°F. See page 20.
Arrangement 9 is suitable to 300°F. See page 21.

301°- 450°F. Construction: Standard fan with heat slinger, teflon shaft seal and high temperature aluminum paint.
Arrangement 9 only. See page 21.

451°- 800°F Construction: Standard fan with heat slinger, high temperature shaft seal, high temperature bearings and high temperature aluminum paint. Insulation material is required and may be provided by the customer or, as an option, by Cincinnati Fan. Arrangement 9 only. See page 22.

WARNING: **See speed reduction chart for plug thickness on page 5.**

Temperature Range	Maximum RPM Reduction Factor †
Up to 175°F.	0%
176°-200°	2%
201°-300°	4%
301°-400°	7%
401°-500°	11%
501°-600°	15%
601°-700°	20%
701°-800°	30%

† Steel wheels only.

TEMPERATURE - ALTITUDE CONVERSIONS

AIR TEMP. F°	ALTITUDE IN FEET ABOVE SEA LEVEL										
	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
0°	.87	.91	.94	.98	1.01	1.05	1.09	1.13	1.17	1.22	1.26
40°	.94	.98	1.02	1.06	1.10	1.14	1.19	1 23	1.28	1.32	1.36
70°	1.00	1.04	1.08	1.12	1.16	1.20	1.25	1.30	1.35	1.40	1.45
80°	1.02	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48
100°	1.06	1.10	1.14	1.19	1.23	1.28	1.33	1.38	1.43	1.48	1.54
120°	1.09	1.14	1.18	1.23	1.28	1.32	1.38	1.43	1.48	1.53	1.58
140°	1.13	1.18	1.22	1.27	1.32	1.37	1.42	1.48	1.54	1.58	1.65
160°	1.17	1.22	1.26	1.31	1.36	1.42	1.47	1.53	1.59	1.64	1.70
180°	1.21	1.26	1.30	1.36	1.41	1.46	1.52	1.58	1.64	1.70	1.75
200°	1.25	1.29	1.34	1.40	1.45	1.51	1.57	1.63	1.69	1.75	1.81
250°	1.34	1.39	1.45	1.50	1.56	1.62	1.68	1.74	1.82	1.88	1.94
300°	1.43	1.49	1.55	1.61	1.67	1.74	1.80	1.87	1.94	2.00	2.08
350°	1.53	1.59	1.65	1.72	1.78	1.85	1.92	2.00	2.07	2.14	2.22
400°	1.62	1.69	1.75	1.82	1.89	1.96	2.04	2.12	2.20	2.27	2.35
450°	1.72	1.79	1.86	1.93	2.00	2.08	2.16	2.24	2.33	2.41	2.50
500°	1.81	1.88	1.96	2.03	2.11	2.19	2.28	2.36	2.46	2.54	2.62
550°	1.91	1.98	2.06	2.14	2.22	2.30	2.40	2.49	2.58	2.68	2.77
600°	2.00	2.08	2.16	2.24	2.33	2.42	2.50	2.61	2.71	2.80	2.90
650°	2.10	2.18	2.26	2.35	2.44	2.54	2.63	2.74	2.84	2.94	3.04
700°	2.19	2.27	2.36	2.46	2.55	2.65	2.75	2.86	2.97	3.06	3.18
750°	2.28	2.37	2.47	2.56	2.66	2.76	2.87	2.98	3.10	3.19	3.31
800°	2.38	2.48	2.57	2.66	2.76	2.86	2.98	3.10	3.21	3.33	3.45

Fan performance tables are developed using standard air which is 70°F., 29.92" barometric pressure and .075 lbs. per cubic foot. Density changes resulting from temperature or barometric pressure variations (such as higher altitudes) must be corrected to standard conditions before selecting a fan based on standard performance data.
Temperature and/or altitude conversion factors are used in making corrections to standard conditions.

EXAMPLE:

Select a belt driven CPAF fan to deliver 6300 CFM at 8" SP at 200°F., and 7000' altitude.

STEP 1. From the table, conversion factor is 1.63.

STEP 2. Correct static pressure is:
1.63 x 8" SP = 13.04" SP at standard conditions.

STEP 3. Check CPAF catalog for 6300 CFM at 13" SP. We select a belt driven CPAF-200. Class IIP at 3126 RPM and 15.89 BHP.

STEP 4. Correct the BHP for the lighter air: 15.89 ÷ 1.63 = 9.75 BHP. A 10 HP motor will suffice at 200°F., and 7000' but not at standard conditions. Special motor insulation may be required due to altitude.

SPARK-RESISTANT CONSTRUCTION

For AMCA Type A or B spark resistant construction, please contact your local Cincinnati Fan sales representative.

Type C: Consists of aluminum inlet bell and aluminum plate on drive side of the fan. Maximum Temperature is the same as for high temperature construction below for each arrangement.

⚠ WARNING

The use of aluminum or aluminum alloys in the presence of steel which has been allowed to rust requires special consideration. Research by the U.S. Bureau of Mines and others has shown that aluminum impellers rubbing on rusty steel may cause high intensity sparking.

The use of the above Standard in no way implies a guarantee of safety for any level of spark resistance. Spark-resistant construction also does not protect against ignition of explosive gases caused by catastrophic failure or from any airstream material that may be present in a system.

DESIGN SPECIFICATIONS

MAXIMUM SHAFT & BEARING SPEEDS FOR BELT DRIVEN FANS
WR^2 (Lb.-Ft^2) & MAXIMUM WHEEL SPEEDS FOR ALL FANS

SIZE	CLASS	WR^2 and MAX. WHEEL SPEED @ 70°F.①		MAX. SAFE SHAFT SPEED FOR STD. OVERHANG "GG"②	MAX. SAFE SHAFT SPEED WITH EXTENDED SHAFT "R"②③				
		WR^2	MAX. RPM		R=2"	R=3"	R=4"	R=5"	R=6"
120	II	2.9	5000	4189	4700	4330	3820	3750	3300
130	II	4.1	4600	3834	4500	4280	3910	3580	3230
150	II	5.6	4130	3513	4220	3910	3790	3340	3000
160	II	7.7	3900	3195	3700	3420	3050	2800	2600
180	II	12.9	—	3142	—	—	—	—	—
	IIP	12.9	3810	3810	3720	3430	3120	2880	2680
200	II	17.9	—	2885	—	—	—	—	—
	IIP	17.9	3550	3550	3400	3190	2800	2600	2400
220	II	25.3	—	2668	—	—	—	—	—
	IIP	25.3	3200	3200	3200	2970	2660	2400	2200
240	II	54.7	—	2427	—	—	—	—	—
	IIP	54.7	2900	2900	2600	2550	2450	2300	2150
270	II	81.2	—	1967	—	—	—	—	—
	III	81.2	2550	2478	2300	2200	2130	2050	1930
300	II	117.2	—	1777	—	—	—	—	—
	III	117.2	2310	2239	2000	2000	1950	1780	1600

NOTE: "GG" in above table refers to dimensions shown on pages 20, 21 and 22. **"R"** dimension refers to dimensions shown on page 22.

① At elevated temperatures, the maximum wheel speed must be derated per the high temperature deration factors listed on page 4. In some cases, the derated maximum wheel speed may be lower than the maximum shaft speed with extended shaft "R" (shown above). **The lower of the two speeds prevails.**

② All maximum shaft speeds are independent of temperature.

③ All plug fans with extended shafts ("R" dimension on page 22) include the highest class of wheel construction for each size.

⚠ DANGER

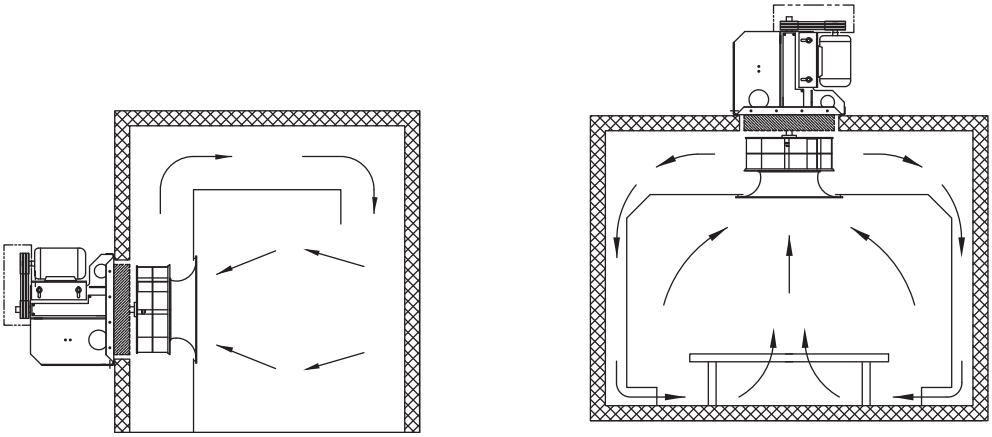
All fans & blowers shown have rotating parts and pinch points. Severe personal injury can result if operated without guards. Stay away from rotating equipment unless it is disconnected from its power source.

Read operating instructions.

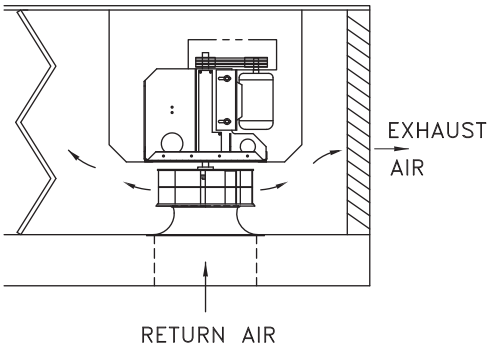
TYPICAL APPLICATIONS

Typical applications for plug fans include ovens, kilns and dryers, where the plug fan circulates the air inside the equipment to maintain even temperatures. In clean rooms, dust collectors and air handling units, they provide the air flow required to move air through the system.

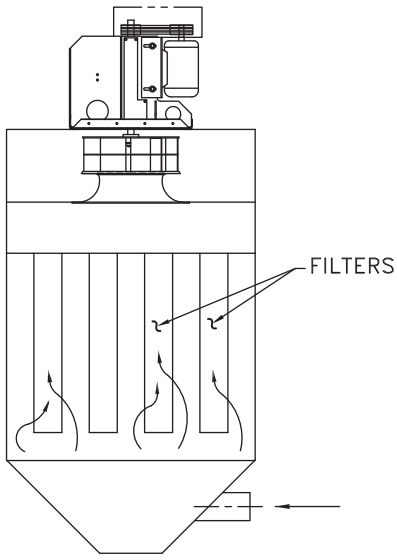
They are used in any system or equipment where a plenum, or a space between two walls, act as the fan housing. Plug fans can also be used with an actual fan housing inside the plenum.



TYPICAL OVEN APPLICATION



AIR HANDLER APPLICATION



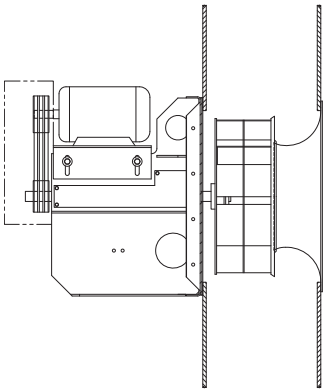
DUST COLLECTOR
APPLICATION

TYPICAL MOUNTING CONFIGURATIONS

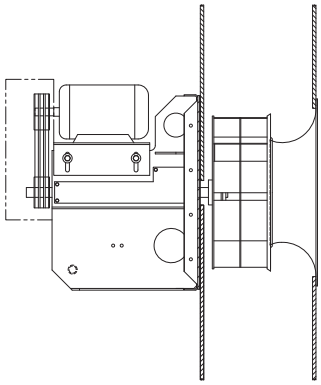
Plug fans can be mounted to the side wall or ceiling of a plenum. A hole, slightly larger than the plug fan wheel diameter, must be provided in the plenum. When the plug fan is installed, the hole will be covered by the plug fan panel. If the plenum wall or ceiling is insulated, as in an oven or kiln, the plug fan can be provided with an insulated plug box having the same thickness, up to 6 inches, as the plenum wall or ceiling. In this case, the hole in the plenum walls would need to be just large enough to clear the dimensions of the insulated plug box. These two methods allow for the use of a completely assembled fan from Cincinnati Fan.

An alternate mounting method is to provide a hole in the plenum wall slightly larger than the shaft diameter of the plug fan. The plug fan panel is mounted to the outside of the plenum and the fan wheel is then mounted onto the fan shaft from the inside of the plenum.

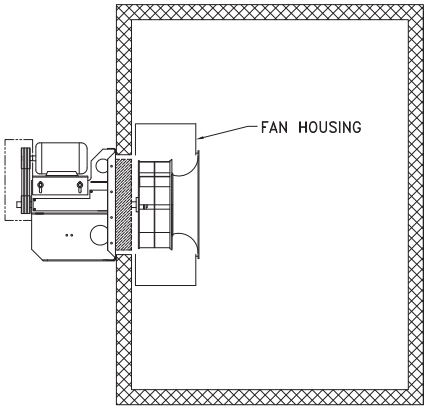
In all mounting methods, the inlet bell for the plug fan wheel is mounted last to maintain the proper bell to wheel clearance. Mounting of a fan housing is sometimes also necessary. See optional housing mounting types shown on page 23.



TYPICAL INSTALLATION
CLEARANCE HOLE FOR
WHEEL IN WALL



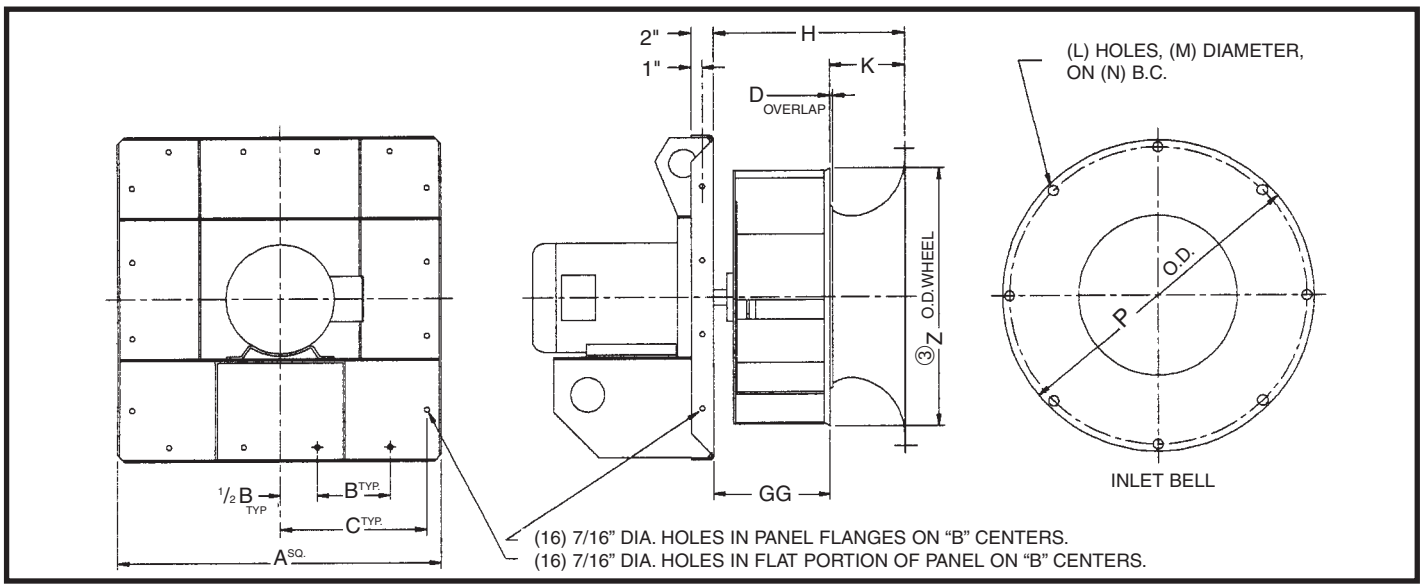
TYPICAL INSTALLATION
CLEARANCE HOLE FOR
SHAFT IN WALL



HOUSED INSTALLATION

DIMENSIONS and SPECIFICATIONS

Arrangement #4, Direct Drive ①



① **MAXIMUM OPERATING TEMPERATURE IS 200°F.**

② Standard machine tool gray paint.

③ Customer installation of fan assembly requires an opening larger than the wheel shroud O.D., reference dimension "Z".

DIMENSIONS IN INCHES ± 1/8"

MODEL	MOTOR FRAME	A	TYP. B	TYP. C	D	GG	H	K	L	M	N	P	Z
CPAF-120	143T-184T	22	5	9 3/4	1/8	5 11/16	9 3/8	3 11/16	8	11/16	14 3/8	15 3/8	12 5/8
CPAF-130	143T-215T	22	5	9 3/4	1/8	6 11/32	10 3/8	4 1/32	8	11/16	15 15/16	17	13 7/8
CPAF-150	143T-215T	22	5	9 3/4	5/16	7 1/32	11 3/8	4 15/32	8	3/4	17 1/2	18 5/8	15 3/8
CPAF-160	143T-256T	22	5	9 3/4	5/16	7 11/16	12 1/2	4 15/16	8	3/4	19 3/8	20 1/2	16 7/8
CPAF-180	143T-324T	28 1/2	6 1/2	13	5/16	8 17/32	13 7/8	5 15/32	8	3/4	21 1/2	22 5/8	18 11/16
CPAF-200	182T-364TS	28 1/2	6 1/2	13	5/16	9 9/32	15 1/4	6 1/32	8	7/8	23 1/2	24 3/4	20 1/2
CPAF-220	182T-324T	28 1/2	6 1/2	13	5/16	10 1/4	16 7/8	6 11/16	8	7/8	26 1/8	27 3/8	22 13/16
CPAF-240	213T-286T	38	9	17 3/4	3/8	11 9/32	18 9/16	7 11/32	16	7/8	28 3/4	30	25
CPAF-270	213T-286T	38	9	17 3/4	7/16	12 13/32	20 7/16	8 3/32	16	1	31 5/8	33	27 5/8
CPAF-300	213T-324T	38	9	17 3/4	1/2	13 7/8	22 3/4	9	16	1	35 1/4	36 5/8	30 3/4

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

CONSTRUCTION GAUGES

Size	Panel and Base	Inlet Bell	WHEEL			
			Shroud	Blades	Back Plate	Reinf. Plate
120	7	16	12	10	7	10
130	7	16	12	10	7	10
150	7	16	12	10	7	10
160	7	16	12	10	7	10
180	7	16	12	7 or 10	7	10
200	7	16	12	7	7	10
220	7	16	12	7	7	10
240	7	14	11	7	7	10
270	7	14	11	7	1/4"	1/4"
300	7*	14	11	7	1/4"	1/4"

* 1/4" for 324T frame motors.

APPROXIMATE SHIPPING WEIGHTS LESS MOTOR

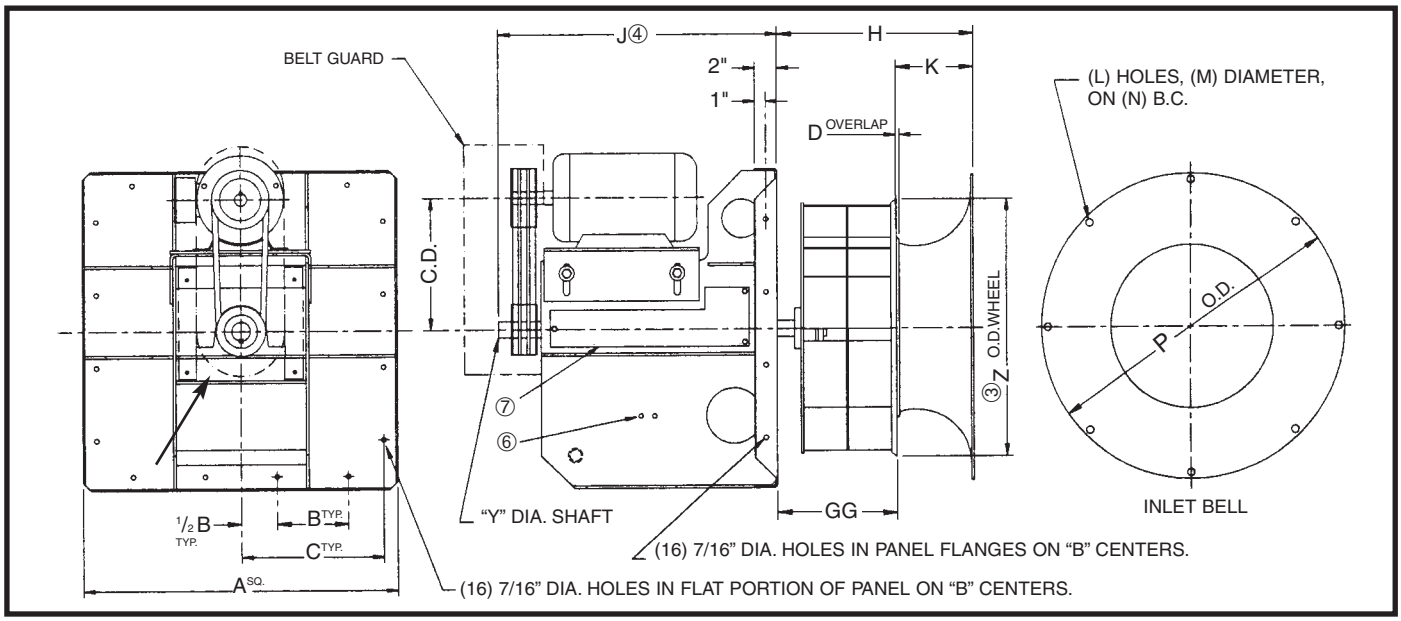
Size	Arrangement #4		Arrangement #9		Standard Insulation Plug Box▲
	Class II	Class III	Class II	Class III	
120	106	106	289	289	31
130	111	111	293	298	31
150	117	117	299	303	31
160	124	128	302	308	31
180	172	177	450	466	44
200	182	188	462	469	44
220	198	205	475	481	44
240	337	344	601	607	70
270	351	394	621	652	70
300	389	416	656	672	70

▲ Insulation material not included.

NOTE: There are construction classes for standard plug fans without extended shafts (i.e., Class II and III). There are no construction classes for plug fans with extended shafts.

DIMENSIONS and SPECIFICATIONS

Arrangement #9, Belt Drive For: Standard construction or 301°- 450° F. construction, both without extended shaft. ①



① Maximum temperature for standard construction is 300°F. For 301° to 450°F. construction, see Note ⑤.

② Standard machine tool gray paint, see Note ⑤.

③ Customer installation of fan assembly requires an opening larger than the wheel shroud O.D., reference dimension "Z".

④ "J" dimension shown is for 56 to 215T frame motors.
Add: 6" for 254T to 286T frame motors.
8" for 324T frame motors.

⑤ Includes heat slinger, teflon shaft seal and high temperature aluminum paint on 301°-450°F. construction only.

⑥ Extended lube lines.

⑦ Bearing access cover (Expanded metal construction).

DIMENSIONS IN INCHES ± 1/8"

MODEL	MOTOR FRAME	A	TYP. B	TYP. C	D	GG	H	J	Y CL.II	Y CL.III	Z
CPAF-120	56-215T	22	5	9 3/4	1/8	5 11/16	9 3/8	25	1 3/16	1 3/16	12 5/8
CPAF-130	56-215T	22	5	9 3/4	1/8	6 11/32	10 3/8	25	1 3/16	1 7/16	13 7/8
CPAF-150	56-215T	22	5	9 3/4	5/16	7 1/32	11 3/8	25	1 7/16	1 11/16	15 3/8
CPAF-160	56-215T	22	5	9 3/4	5/16	7 11/16	12 1/2	25	1 7/16	1 11/16	16 7/8
CPAF-180	56-286T	28 1/2	6 1/2	13	5/16	8 17/32	13 7/8	25	1 7/16	1 11/16	18 11/16
CPAF-200	143T-286T	28 1/2	6 1/2	13	5/16	9 9/32	15 1/4	25	1 7/16	1 15/16	20 1/2
CPAF-220	143T-286T	28 1/2	6 1/2	13	5/16	10 1/4	16 7/8	26	1 7/16	1 15/16	22 13/16
CPAF-240	143T-286T	38	9	17 3/4	3/8	11 9/32	18 9/16	27	1 11/16	2 3/16	25
CPAF-270	143T-324T	38	9	17 3/4	7/16	12 13/32	20 7/16	27	1 11/16	2 3/16	27 5/8
CPAF-300	143T-324T	38	9	17 3/4	1/2	13 7/8	22 3/4	27	1 15/16	2 7/16	30 3/4

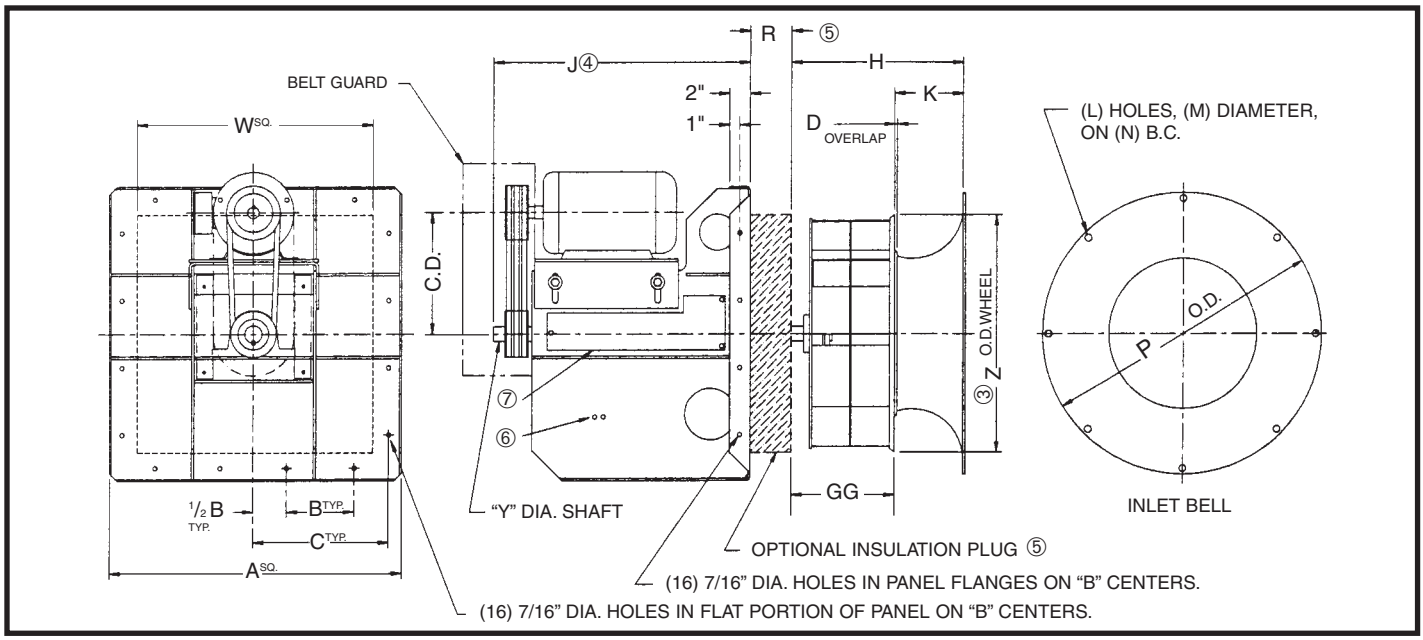
DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

MODEL	K	L	M	N	P
CPAF-120	3 11/16	8	11/16	14 3/8	15 3/8
CPAF-130	4 1/32	8	11/16	15 15/16	17
CPAF-150	4 15/32	8	3/4	17 1/2	18 5/8
CPAF-160	4 15/16	8	3/4	19 3/8	20 1/2
CPAF-180	5 15/32	8	3/4	21 1/2	22 5/8
CPAF-200	6 1/32	8	7/8	23 1/2	24 3/4
CPAF-220	6 11/16	8	7/8	26 1/8	27 3/8
CPAF-240	7 11/32	16	7/8	28 3/4	30
CPAF-270	8 3/32	16	1	31 5/8	33
CPAF-300	9	16	1	35 1/4	36 5/8

MOTOR FRAME	Center Distance Min.	Center Distance Max.
56 to 145T	10 3/4	12 1/4
182T 184T	11 3/4	13 1/4
213T 215T	12 1/2	14
254T 256T	16 1/2	18 5/8
284T 286T	17 1/4	19 3/8
324T	18 1/4	20

DIMENSIONS and SPECIFICATIONS

Arrangement #9, Belt Drive For: (A) 451° - 800° F. construction. ①
(B) Standard temperature or 301°- 450° construction, both WITH extended shaft.②



① Temperature range 451° to 800°F. includes heat slinger, ceramic fiber shaft seal, high temperature aluminum paint and high temperature bearings.

② Standard construction up to 300°F. is painted machine tool gray. 301°F. to 450°F. construction includes heat slinger, teflon shaft seal and high temperature aluminum paint.

③ Installation of fan assembly requires an opening larger than the wheel shroud O.D., reference dimension "Z".

④ "J" dimension shown is for 56 to 215T frame motors.
Add: 6" for 254T to 286T frame motors.
8" for 324T frame motors.

⑤ Optional ***additional*** shaft length "R":
☐ 2" ☐ 3" ☐ 4" ☐ 5" ☐ 6"
☐ With plug and insulation by CFV

⑥ Extended lube lines.

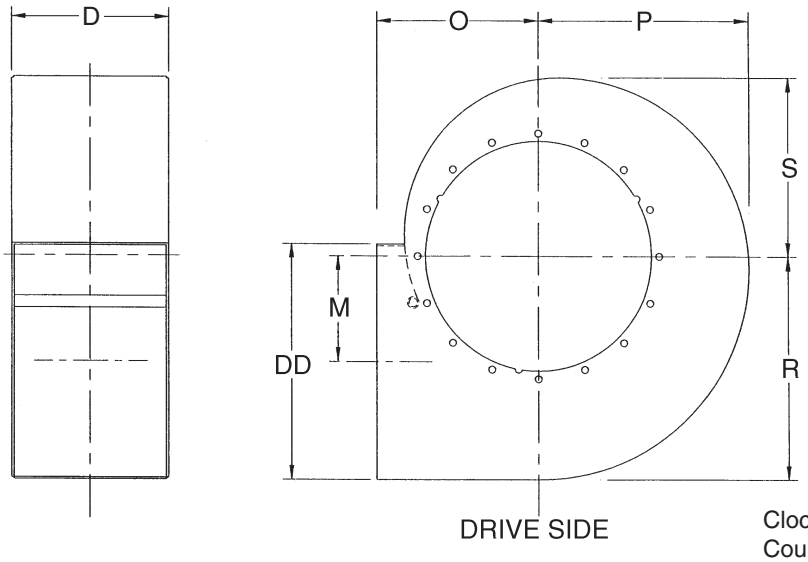
⑦ Bearing access cover (Expanded metal construction).

MODEL	D	M	O	P	R	S	DD
CPAF-120	9 3/8	6 3/16	9 15/16	12 3/8	13	10 3/8	13 3/4
CPAF-130	10 3/8	6 13/16	10 13/16	13 3/4	14 7/16	11 9/16	15 1/4
CPAF-150	11 3/8	7 9/16	11 3/4	15 3/16	15 15/16	12 3/4	16 13/16
CPAF-160	12 1/2	8 5/16	12 11/16	16 11/16	17 1/2	14	18 7/16
CPAF-180	13 7/8	9 1/4	13 13/16	18 7/16	19 7/16	15 1/2	20 3/8
CPAF-200	15 1/4	10 1/16	14 15/16	20 1/4	21 1/4	17	22 3/8
CPAF-220	16 7/8	11 3/16	16 3/8	22 1/2	23 5/8	18 7/8	24 7/8
CPAF-240	18 9/16	12 5/16	18 13/16	24 3/4	26	20 3/4	27 3/8
CPAF-270	20 7/16	13 9/16	20 7/16	27 1/4	28 5/8	22 7/8	30 1/16
CPAF-300	22 3/4	15 1/8	22 7/16	30 3/8	31 7/8	25 1/2	33 9/16

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

DIMENSIONS and SPECIFICATIONS

Optional Housing Dimensions



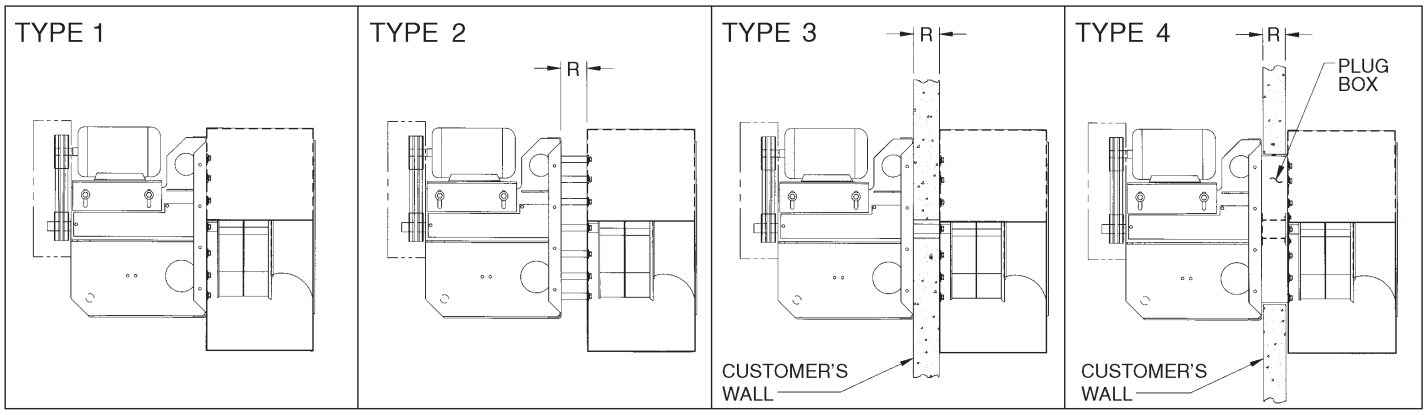
Clockwise rotation shown.
Counterclockwise is opposite

DIMENSIONS IN INCHES± 1/8"

MODEL	D	M	O	P	R	S	DD
CPAF-120	9 3/8	6 3/16	9 15/16	12 3/8	13	10 3/8	13 3/4
CPAF-130	10 3/8	6 13/16	10 13/16	13 3/4	14 7/16	11 9/16	15 1/4
CPAF-150	11 3/8	7 9/16	11 3/4	15 3/16	15 15/16	12 3/4	16 13/16
CPAF-160	12 1/2	8 5/16	12 11/16	16 11/16	17 1/2	14	18 7/16
CPAF-180	13 7/8	9 1/4	13 13/16	18 7/16	19 7/16	15 1/2	20 3/8
CPAF-200	15 1/4	10 1/16	14 15/16	20 1/4	21 1/4	17	22 3/8
CPAF-220	16 7/8	11 3/16	16 3/8	22 1/2	23 5/8	18 7/8	24 7/8
CPAF-240	18 9/16	12 5/16	18 13/16	24 3/4	26	20 3/4	27 3/8
CPAF-270	20 7/16	13 9/16	20 7/16	27 1/4	28 5/8	22 7/8	30 1/16
CPAF-300	22 3/4	15 1/8	22 7/16	30 3/8	31 7/8	25 1/2	33 9/16

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Housing Mounting Types



TYPE 1: Housing bolts directly to plug fan front plate. Hardware supplied by CF.
Arrangement 4 or 9.

TYPE 2: Housing bolts through spacers to plug fan front plate. Specify the "R" dimension for the spacers on your order per note 5 on page 22. Hardware supplied by CF.
Arrangement 9 only.

TYPE 3: Housing bolts through customer's wall into plug fan front plate. Specify "R" dimension for customer's wall, on your order, per note 5 on page 22. Hardware supplied by customer.
Arrangement 9 only.

TYPE 4: Housing bolts to front of plug box. Specify "R" dimension for plug box, on your order, per note 5 on page 22. Hardware supplied by CF.
Arrangement 9 only.