Power Roof Ventilator Installation, Operation, and Maintenance Manual



Up-blast Centrifugal Utility Fan



Down-blast Centrifugal Fan



Up-blast Centrifugal Fan



Axial Fan

RECEIVING AND INSPECTION

Upon receiving unit, check for any interior and exterior damage, and if found, report it immediately to the carrier. Also check that all accessory items are accounted for and are damage free. Turn the blower wheel by hand to verify free rotation and check the damper (if supplied) for free operation.

WARNING!!

Installation of this ventilator should only be performed by a qualified professional who has read and understands these instructions and is familiar with proper safety precautions. Improper installation poses serious risk of injury due to electric shock, contact with rotating equipment, and other potential hazards. Read this manual thoroughly before installing or servicing this equipment. ALWAYS disconnect power prior to working on fan.

Save these instructions. This document is the property of the owner of this equipment and is required for future maintenance. Leave this document with the owner when installation or service is complete.

A0011032 January 2013 Rev. 7

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WARRANTY

This equipment is warranted to be free from defects in materials and workmanship, under normal use and service, for a period of 12 months from date of shipment. This warranty shall not apply if:

- 1. The equipment is not installed by a qualified installer per the MANUFACTURER'S installation instructions shipped with the product,
- 2. The equipment is not installed in accordance with federal, state and local codes and regulations,
- 3. The equipment is misused or neglected,
- 4. The equipment is not operated within its published capacity,
- 5. The invoice is not paid within the terms of the sales agreement.

The MANUFACTURER shall not be liable for incidental and consequential losses and damages potentially attributable to malfunctioning equipment. Should any part of the equipment prove to be defective in material or workmanship within the 12-month warranty period, upon examination by the MANUFACTURER, such part will be repaired or replaced by MANUFACTURER at no charge. The BUYER shall pay all labor costs incurred in connection with such repair or replacement. Equipment shall not be returned without MANUFACTURER'S prior authorization and all returned equipment shall be shipped by the BUYER, freight prepaid to a destination determined by the MANUFACTURER.

INSTALLATION

It is imperative that this unit is installed and operated with the designed airflow and electrical supply in accordance with this manual. If there are any questions about any items, please call the service department at **1-866-784-6900** for warranty and technical support issues.

Mechanical

WARNING: DO NOT RAISE VENTILATOR BY THE HOOD, BLOWER OR MOTOR SHAFT, OR BEARINGS – USE LIFTING LUGS PROVIDED OR A SLING

Site Preparation

- 1. Provide clearance around installation site to safely rig and lift equipment into its final position. Supports must adequately support equipment. Refer to manufacturer's estimated weights.
- 2. Consider general service and installation space when locating unit.
- 3. Locate unit close to the space it will serve to reduce long, twisted duct runs.
- 4. The fan discharge must be located at least 10 feet away from any supply intakes. The fan discharge shall be located in accordance with the applicable building code provisions.

Roof Mounting

- 1. Ventilators are designed for installation atop a prefabricated or factory built roof curb. Follow manufacturer's instructions for proper curb installation.
- 2. If a backdraft damper is required, it should be secured within the curb using sheet metal screws, to the bottom of a damper box or damper support flanges located below the roof deck. CAUTION: NFPA-96 RECOMMENDS THAT DAMPERS SHOULD NOT BE INSTALLED WHEN EXHAUSTER IS USED FOR REMOVAL OF SMOKE AND GREASE LADEN VAPORS FROM COMMERCIAL KITCHEN EQUIPMENT. CONSULT STATE AND LOCAL CODES FOR DETAILED REQUIREMENTS.
- 3. If an up-blast fan is used for kitchen hood exhaust, ensure discharge is at least 40 inches above the roof surface in accordance with NFPA96.
- 4. On an up-blast fan, normally the power cord is brought through the conduit tube located on the top skirt on the outside of the unit.
- 5. Secure ventilator curb through vertical portion of the ventilator base assembly flange using a minimum of eight (8) lug screws, anchor bolts, or other suitable fasteners (not furnished).
- 6. Before connecting fan motor to power source verify power line wiring is de-energized.
- 7. Connect power supply wiring to the motor as indicated on the motor nameplate or terminal box cover. Make certain that the power source is compatible with the requirements of your equipment.
- 8. Before powering up fan check ventilator wheel for free rotation.
- 9. Check all fasteners for tightness.
- 10. Re-install motor dome.
- 11. A drain pipe is provided for single-point drainage of water and residue on up-blast fans. The drain pipe should be positioned towards the roof slope. Some means for collection of this residue must be provided, either a container directly under the trough or use of an adapter and pipe to carry the residue to a remote collection point. An optional down spout and grease collection box is available as an accessory item for up-blast fans.

Wall Mounting

- 1. The same instructions, warnings and notes found under Roof Mounting section will apply. Refer to steps 2 and 3, and steps 5 through 8.
- 2. **Masonry Wall:** Around the wall opening install an angle iron frame at least 2" x2" x ¼". Frame should be approximately 1/2" smaller than the inside base dimension of the ventilator. Secure the lead cinch type anchors with non-ferrous bolts (3 per side). The ventilator should be mounted to the mounting angle with self-taping sheet metal screws (3 per side).
- 3. **Wood Sidings:** Around the wall opening install a wooden frame 2" high x 2" wide. Frame should be approximately 1/2" smaller than the inside base dimension of the ventilator. Secure with counter-sunk expansion type lag bolts (3 per side). The ventilator should then be mounted to the mounting frame with the square head wood screws (3 per side) 3/8" minimum.
- 4. Steel wall mount brackets are also available as a factory option for the fan.
- 5. The mounting flange connections should be coated with a suitable caulking compound or an approved waterproof mastic sealer.
- 6. Wall mount application is not recommended from fans with wheels 30" or larger.

IMPORTANT: OSHA REGULATIONS REQUIRE THE VENTILATOR TO BE MOUNTED AT LEAST EIGHT (8) FEET ABOVE GROUND OR FLOOR LEVEL.

Curb and Ductwork

This fan was specified for a specific CFM and static pressure. The ductwork attached to this unit will significantly affect the airflow performance. Flexible ductwork and square elbows should not be used.

Also, transitions and turns in ductwork near the fan inlet will cause system effect and will drastically increase the static pressure and reduce airflow. Follow SMACNA guides and recommendations for the remaining duct run. Fans designed for rooftop installation should be installed on a prefabricated or factory built roof curb. Follow curb manufacturer's instructions for proper curb installation. Curbs should be connected to structural roof members with at least four (3) lug screws, anchor bolts, or other suitable fasteners (not furnished) per curb flange. Curb flanges should be caulked to roof.

The fan should be installed on a curb and/or



rail elevated not less than 14" above any surface. Be sure duct connection and fan outlet are properly aligned and sealed. Secure fan to curb through vertical portion of the ventilator base assembly flange using a minimum of eight (8) lug screws, anchor bolts, or other suitable fasteners (not furnished). Shims may be required depending upon curb installation and roofing material. Check all fasteners for tightness. The diagrams below show different mechanical installation configurations.

Up-Blast Roof Mount Installation



Up-Blast Roof Mount Utility Installation



FEATURES:

- ROOF MOUNTED FANS RESTAURANT MODEL
- UL762 HIGH HEAT OPERATION DIRECT DRIVE 300°F (149°C)
- HIGH HEAT OPERATION BELT DRIVE 500°F (260°C)
- HEAT SLINGER
- GREASE CLASSIFICATION TESTING

- TILT OUT WHEEL LOCKING PIN FOR POWER PACK MOTOR WEATHER COVER

NORMAL TEMPERATURE TEST BELT DRIVE EXHAUST FAN MUST DPERATE CONTINUUUSLY WHILE EXHAUSTING AIR AT 500°F (260°C) UNTIL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERLIPATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE DPERATION.

NORMAL TEMPERATURE TEST DIRECT DRIVE EXHAUST FAN MUST DERATE CONTINUOUSLY WHILE EXHAUSTING AIR AT 300°F (149°C) UNTL ALL FAN PARTS HAVE REACHED THERMAL EQUILIBRIUM, AND WITHOUT ANY DETERLIPATING EFFECTS TO THE FAN WHICH WOULD CAUSE UNSAFE DPERATION.

ABNORMAL FLARE-UP TEST BELT & DIRECT DRIVE EXHAUST FAN MUST OPERATE CONTINUOUSLY WHILE EXHAUSTING BURNING GREASE VAPORS AT 600° (316°C) FOR A PERIOD OF 15 MINUTES VITHOUT THE FAN BECOMING DAMAGED TO ANY EXTENT THAT COULD CAUSE AN UNSAFE CONDITION.

OPTIONS: GREASE BOX PITCHED CURB INSULATED CURB RAIN CAF







Up-Blast Wall Mount Installation

Up-Blast Through Wall Mount Installation



Down-Blast Installation



(ROOF OPENING)

Up-Blast Utility Set Hinging Instructions





Typical Hinge Kit – Centrifugal Upblast

Typical Grease Box Installation



Up-Blast Utility Set Rain Cap Option



Rain Cap Option - Up Blast Utility Set

Up-Blast Utility Set Extension Option



Electrical

Before connecting power to the fan, read and understand this entire section of this document. As-built wiring diagrams are available with each fan by the factory.

Electrical wiring and connections should be done in accordance with local ordnances and the National Electric Code, ANSI/NFPA70. Be sure the voltage and phase of the power supply and the wire amperage capacity is in accordance with the motor nameplate. For additional safety information refer to AMCA publication 410-96, *Recommended Safety Practices for Users and Installers of Industrial and Commercial Fans.*

- 1. Always **disconnect power** before working on or near a fan. Lock and tag the disconnect switch or breaker to prevent accidental power up.
- 2. A disconnect switch is shipped with every fan. The switch is located on the exterior of up-blast fans and in the interior of down-blast fans. On down-blast direct drive fans, the disconnect function is built into the speed controller.

WARNING!!

Disconnect power before installing or servicing fan. High voltage electrical input is needed for this equipment. This work should be performed by a qualified electrician.

Copper Wire Ampacity

Wire Size AWG	Maximum Amps
14	20
12	25
10	30
8	40
6	55
4	70

- 3. A dedicated branch circuit should supply the motor circuit with short circuit protection according to the National Electric Code. This dedicated branch should be run to the junction box mentioned above and connected as shown in a following illustration labeled "Fan to Building Wiring Connection".
- 4. Make certain that the power source is compatible with the requirements of your equipment. The fan nameplate identifies the **proper phase and voltage** of the motor.
- 5. Before connecting fan to building power source, verify power line wiring is de-energized.
- 6. Secure the power cable to prevent contact with sharp objects.
- 7. Do not kink power cable and never allow the cable to come in contact with oil, grease, hot surfaces or chemicals.
- 8. Before powering up fan check fan wheel for free rotation and make sure that the interior of the fan is free of loose debris or shipping materials.
- 9. If any of the original wire supplied with the fan must be replaced, it must be replaced with type TW wire or equivalent.

IMPORTANT: FANS WITH HINGE KITS REQUIRE ENOUGH SLACK IN THE WIRING TO THE FAN TO ALLOW FAN TO TILT BACK TO THE OPEN POSITION. ELECTRICIAN MUST CHECK THIS AND ACCOUNT FOR THE RANGE OF MOTION OF THE FAN.

PSC (Permanent Split Capacitor) Motor Speed Control

Some single phase direct drive fans contain speed controls that regulate the amount of voltage going to the motor. Specific PSC motors must be used in conjunction with speed controls. The speed control has a knob with an off position, and high to low range. At high speed, the speed control allows all of the line voltage to pass right to the motor.

A minimum speed adjustment is provided to allow independent control of the minimum speed setting. Minimum speed adjustment ensures motor runs with sufficient torque to prevent stalling. To adjust this:

- 1) Motor must be in actual operating conditions to achieve proper speed adjustment. Motor will not slow down unless proper load is applied.
- 2) Turn main control knob to lowest speed position.
- Locate and adjust minimum speed setting and adjust with small screw driver. This can be found under the speed control faceplate. (rotate clockwise to decrease minimum speed; counterclockwise to increase minimum speed).
- 4) Motor will now operate from this preset minimum speed to full speed.

The lowest minimum voltage that may be applied to these motors is 65VAC. Running lower voltages to the motor can cause premature failure and overheating problems.

ECM (Electronically Controlled Motor) Speed Control

ECM motors and control allows accurate manual adjustment of fan speed. The benefit of ECM motors is exceptional efficiency, performance, and motor life.

The control used with ECM motors features a 4 digit LED numerical display. The blue knob on the control allows the user to set the flow index with a screwdriver. Twenty seconds later, the display shows the motor RPM. Then, the display periodically alternates between the flow index and

motor RPM. The flow index has a range of 0 to 100% and is typically linear with motor RPM.

The ECM control requires a 24 VAC input and can locally turn the motor on and off. The motor can be adjusted between 300 RPM and maximum speed with this control.

NOTE: To adjust the speed of 3 phase direct drive motors, a variable frequency drive is required.

Motorized Damper

On units shipped with the optional motorized damper, power must be supplied to the damper according to the damper nameplate. The damper motor is controlled external to the fan. External wiring to the damper motor is required.







Fan to Building Wiring Connection

OPERATION

Prior to starting up or operating the ventilator, check all fasteners for tightness. In particular, check the set screw in the wheel hub, bearings and the fan sheaves (pulleys). With power to the fan **OFF** or prior to connecting ventilator to power, turn the fan wheel by hand to be sure it is not striking the inlet or any obstacles. Re-center if necessary.

Start Up

Special Tools Required

- AC Voltage Meter
- Tachometer
- Amperage Meter
- Standard Hand Tools

Start Up Procedure

- 1. Check all electrical connections for tightness and continuity.
- 2. Check pulley alignment and belt tension as described below for belt drive fans.
- 3. Inspect the condition of the damper and damper linkage, if provided.
- 4. Inspect the air-stream for obstructions or debris in wheel.
- 5. Compare the supplied **voltage** with the fan's nameplate voltage. If this does not match, correct the problem.
- 6. Start the fan up, by turning the external disconnect to the ON position, and shut it OFF immediately to check rotation of the wheel with the directional arrow on the blower scroll. Reversed rotation will result in poor air performance, motor overloading and possible burnout. For units equipped with a single-phase motor check the motor wiring diagram to change rotation. For 3-phase motors, any two power leads can be interchanged to reverse motor direction.
- 7. When the fan is started up, observe the operation and check for any unusual noises.
- 8. Switch the external disconnect back to the **ON** position and with the air system in full operation and all ducts attached, measure the system airflow. Motor sheave (pulley) is variable pitch, and allows for an increase or decrease of the fan RPM to adjust the airflow, as shown in the illustration below. For your convenience, a RPM chart is included in the following pages. If the fan is a direct drive version, it may have a speed control to adjust speed.
- Once the proper airflow is achieved, measure and record the fan speed with a reliable tachometer. Caution Excessive speed will result in motor overloading or bearing failure. Do not set fan RPMs higher than specified in the maximum RPM chart. See the troubleshooting guide for more information.
- 10. Measure and record the **voltage** and **amperage** to the motor and compare with the motor nameplate to determine if the motor is operating under safe load condition.
- 11. Once the rpm of the ventilator has been properly set, disconnect power and recheck belt tension and pulley alignment as described below.

	•
Thread Size	Torque (IN/Lb)
No. 10 (bushing)	32
1/4" (bushing)	72
5/16"	130

Pulley Setscrew Torque

Pullev Adjustment Illustration



Pulley Adjustment (Belt Drive Fans)

The adjustable motor pulley is factory set for the RPM specified. Speed can be increased by closing or decreased by opening the adjustable motor sheave. Two groove variable pitch pulleys must be adjusted an equal number of turns open or closed. Any increase in speed represents a substantial increase in horsepower required by the unit. Motor amperage should always be checked to avoid serious damage to the motor when the speed is varied. Always torque setscrews according to the setscrew torque chart.



Pulley Alignment

Proper Belt Tension



Pulley Combination Chart

	Fulley Combination Chart														
Motor RPM 1/3 to 1-1/2 HP		1725 MOTOR PULLEY	Dd1	Dd2	Pd1	Pd2									
AX BELTS		1VL34	1.9	2.9	2	3									
BLOWER PULLEY	DATUM DIAMETER	PITCH DIAMETER	Open 5	4 1/2	4	3 1/2	TURNS 3	ON MOTOR 2 1/2	PULLEY 2	1 1/2	1	1/2	Closed 0		
AK114	11	11.2	308	323	339	354	370	385	400	416	431	447	462		
1/3 to 1-1/2 HP		MOTOR PULLEY	Dd1	Dd2	Pd1	Pd2									
AX BELTS		1VL40	2.4	3.4	2.6	3.6	TUDNO	ON MOTOR							
BLOWER PULLEY	DATUM DIAMETER	PITCH DIAMETER	Open 5	4 1/2	4	3 1/2	3	2 1/2	2	1 1/2	1	1/2	Closed 0		
AK114	11	11.2	400	416	431	447	462	477	493	508	524	539	554		
AK94	9	9.2	488	506	525	544	563	581	600	619	638	656	675		
AK79	7.5	7.7	582	605	627	650	672	694	717	739	762	784	806		
AK66 AK54	6.2 5	6.4 5.2	701 863	728 896	755 929	782 962	809 995	836 1028	863 1062	889 1095	916 1128	943 1161	970 1194		
AK46	4.2	4.4	1019	1059	1098	1137	1176	1215	1255	1294	1333	1372	1411	1	
AK39	3.5	3.7	1212	1259	1305	1352	1399	1445	1492	1539	1585	1632	1678		
AK32	3	3.2	1402	1455	1509	1563	1617	1671	1725	1779	1833	1887	1941	l	
2 to 5 HP		MOTOR PULLEY	Dd1	Dd2	Pd1	Pd2									
BX BELTS		2VP42	2.9 Open	3.9	3	4		TURNS	ON MOTOR	PULLEY					Closed
BLOWER PULLEY	DATUM DIAMETER	PITCH DIAMETER	6	5 1/2	5	4 1/2	4	3 1/2	3	2 1/2	2	1 1/2	1	1/2	0
2BK160H	15.4	15.7	330	339	348	357	366	375	385	394	403	412	421	430	439
2BK140H	13.4	13.7	378	388	399	409	420	430	441	451	462	472	483	493	504
2BK120H 2BK110H	11.4	11.7 10.7	442 484	455 497	467 511	479 524	491 537	504 551	516 564	528 578	541 591	553 605	565 618	577 631	590 645
2BK100H	9.4	9.7	534	548	563	578	593	608	622	637	652	667	682	697	711
2BK90H	8.4	8.7	595	611	628	644	661	677	694	710	727	744	760	777	793
2BK80H	7.4	7.7	672	691	709	728	747	765	784	803	821	840	859	877	896
2BK70H 2BK60H	6.4 5.4	6.7 5.7	772 908	794 933	815 958	837 984	858 1009	880 1034	901 1059	923 1084	944 1110	965 1135	987 1160	1008 1185	1030 1211
2BK55H	4.9	5.2	908	1023	1050	1078	11009	1133	1161	1189	1216	1244	1272	1299	1327
2BK50H	4.4	4.7	1101	1132	1162	1193	1223	1254	1285	1315	1346	1376	1407	1438	1468
7-1/2 to 10 HP		MOTOR PULLEY	Dd1	Dd2	Pd1	Pd2									
BX BELTS		2VP60	4.3	5.5	4.7	5.9									
			Open						ON MOTOR						Closed
BLOWER PULLEY	DATUM DIAMETER	PITCH DIAMETER	6	5 1/2	5	4 1/2	4	3 1/2	3	2 1/2	2	1 1/2	1	1/2	0
2BK160H 2BK140H	15.4	15.7 13.7	516 592	527 604	538 617	549 630	560 642	571 655	582 667	593 680	604 693	615 705	626 718	637 730	648 743
2BK140H 2BK120H	11.4	11.7	693	708	722	737	752	767	781	796	811	826	840	855	870
2BK110H	10.4	10.7	758	774	790	806	822	838	854	871	887	903	919	935	951
2BK100H	9.4	9.7	836	854	871	889	907	925	943	960	978	996	1014	1031	1049
2BK90H 2BK80H	8.4 7.4	8.7	932 1053	952 1075	972 1098	991 1120	1011 1143	1031 1165	1051 1187	1071 1210	1091 1232	1110 1255	1130 1277	1150 1299	1170 1322
3 to 5 HP		MOTOR PULLEY	Dd1	Dd2	Pd1	Pd2									
BA BELIS		20942	BX BELTS 2VP42 2.9 3.9 3 4												
BLOWER PULLEY			Open					TURNS	ON MOTOR	PULLEY					Closed
2B5V278	DATUM DIAMETER	PITCH DIAMETER	Open 6	5 1/2	5	4 1/2	4	TURNS 3 1/2	ON MOTOR 3	PULLEY 2 1/2	2	1 1/2	1	1/2	Closed 0
	27.8	28.1	6 184	189	194	200	205	3 1/2 210	3 215	2 1/2 220	225	230	235	240	0 246
2B5V250	27.8 25	28.1 25.3	6 184 205	189 210	194 216	200 222	205 227	3 1/2 210 233	3 215 239	2 1/2 220 244	225 250	230 256	235 261	240 267	0 246 273
2B5V250 2B5V234 2B5V200	27.8	28.1 25.3 23.7	6 184 205 218	189 210 224	194 216 230	200 222 237	205 227 243	3 1/2 210 233 249	3 215 239 255	2 1/2 220 244 261	225 250 267	230 256 273	235 261 279	240 267 285	0 246 273 291
2B5V234	27.8 25 23.4	28.1 25.3	6 184 205	189 210	194 216	200 222	205 227	3 1/2 210 233	3 215 239	2 1/2 220 244	225 250	230 256	235 261	240 267	0 246 273
2B5V234 2B5V200 2B5V184 2B5V160	27.8 25 23.4 20 18.4 16	28.1 25.3 23.7 20.3 18.7 16.3	6 184 205 218 255 277 317	189 210 224 262 284 326	194 216 230 269 292 335	200 222 237 276 300 344	205 227 243 283 307 353	3 1/2 210 233 249 290 315 362	3 215 239 255 297 323 370	2 1/2 220 244 261 304 331 379	225 250 267 312 338 388	230 256 273 319 346 397	235 261 279 326 354 406	240 267 285 333 361 414	0 246 273 291 340 369 423
2B5V234 2B5V200 2B5V184 2B5V160 2B5V154	27.8 25 23.4 20 18.4 16 15.4	28.1 25.3 23.7 20.3 18.7 16.3 15.7	6 184 205 218 255 277 317 330	189 210 224 262 284 326 339	194 216 230 269 292 335 348	200 222 237 276 300 344 357	205 227 243 283 307 353 366	3 1/2 210 233 249 290 315 362 375	3 215 239 255 297 323 370 385	2 1/2 220 244 261 304 331 379 394	225 250 267 312 338 388 403	230 256 273 319 346 397 412	235 261 279 326 354 406 421	240 267 285 333 361 414 430	0 246 273 291 340 369 423 439
2B5V234 2B5V200 2B5V184 2B5V160	27.8 25 23.4 20 18.4 16	28.1 25.3 23.7 20.3 18.7 16.3	6 184 205 218 255 277 317	189 210 224 262 284 326	194 216 230 269 292 335	200 222 237 276 300 344	205 227 243 283 307 353	3 1/2 210 233 249 290 315 362	3 215 239 255 297 323 370	2 1/2 220 244 261 304 331 379	225 250 267 312 338 388	230 256 273 319 346 397	235 261 279 326 354 406	240 267 285 333 361 414	0 246 273 291 340 369 423
2B5V234 2B5V200 2B5V184 2B5V160 2B5V154 2B5V136	27.8 25 23.4 20 18.4 16 15.4 12.6	28.1 25.3 20.3 18.7 16.3 15.7 12.9	6 184 205 218 255 277 317 330 401	189 210 224 262 284 326 339 412	194 216 230 269 292 335 348 423	200 222 237 276 300 344 357 435	205 227 243 283 307 353 366 446	3 1/2 210 233 249 290 315 362 375 457	3 215 239 255 297 323 370 385 468	2 1/2 220 244 261 304 331 379 394 479	225 250 267 312 338 388 403 490	230 256 273 319 346 397 412 501	235 261 279 326 354 406 421 513	240 267 285 333 361 414 430 524	0 246 273 291 340 369 423 439 535
2B5V234 2B5V200 2B5V184 2B5V160 2B5V154 2B5V136 2B5V136 2B5V124 2B5V110	27.8 25 20 18.4 16 15.4 12.6 12.4	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3	6 184 205 218 255 277 317 330 401 407 458	189 210 224 262 284 326 339 412 419 471	194 216 230 269 292 335 348 423 430 483	200 222 237 276 300 344 357 435 441 496	205 227 243 283 307 353 366 446 453	3 1/2 210 233 249 290 315 362 375 457 464	3 215 239 255 297 323 370 385 468 475	2 1/2 220 244 261 304 331 379 394 479 487	225 250 267 312 338 388 403 490 498	230 256 273 319 346 397 412 501 509	235 261 279 326 354 406 421 513 521	240 267 285 333 361 414 430 524 532	0 246 273 291 340 369 423 439 535 543
2B5V234 2B5V200 2B5V184 2B5V160 2B5V154 2B5V154 2B5V136 2B5V124	27.8 25 20 18.4 16 15.4 12.6 12.4	28.1 25.3 20.3 18.7 16.3 15.7 12.9 12.7	6 184 205 218 255 277 317 330 401 407	189 210 224 262 284 326 339 412 419	194 216 230 269 292 335 348 423 430	200 222 237 276 300 344 357 435 441	205 227 243 283 307 353 366 446 453	3 1/2 210 233 249 290 315 362 375 457 464	3 215 239 255 297 323 370 385 468 475	2 1/2 220 244 261 304 331 379 394 479 487	225 250 267 312 338 388 403 490 498	230 256 273 319 346 397 412 501 509	235 261 279 326 354 406 421 513 521	240 267 285 333 361 414 430 524 532	0 246 273 291 340 369 423 439 535 543
285V234 285V200 285V184 285V184 285V154 285V154 285V136 285V124 285V110 7-1/2 to 10 HP BX BELTS	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11	28.1 25.3 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP60	6 184 205 255 277 317 330 401 407 458 Dd1 4.3 Open	189 210 224 262 326 339 412 419 471 Dd2 5.5	194 216 230 269 335 348 423 430 483 Pd1 4.7	200 222 237 276 300 344 357 435 441 496 Pd2 5.9	205 227 243 283 307 353 366 446 453 509	3 1/2 210 233 249 290 315 362 375 457 464 522 TURNS	3 215 239 255 297 323 370 385 468 475	2 1/2 220 244 304 331 379 394 479 487 547 PULLEY	225 250 267 312 338 388 403 490 498 560	230 256 273 319 346 397 412 501 509 572	235 261 279 326 354 406 421 513 521	240 267 285 333 361 414 430 524 532 598	0 246 273 291 340 369 423 439 535 543 611 Closed
285V234 285V200 285V184 285V160 285V154 285V136 285V136 285V136 285V110 7-1/2 to 10 HP BX BELTS BLOWER PULLEY	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER	28.1 25.3 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP60 PITCH DIAMETER	6 184 205 218 255 277 317 330 401 407 458 Dd1 4.3 Open 6	189 210 224 262 284 326 339 412 419 471 Dd2 5.5 5 1/2	194 216 230 269 292 335 348 423 430 483 Pd1 4.7 5	200 222 237 276 300 344 357 435 441 496 Pd2 5.9 4 1/2	205 227 243 283 307 353 366 446 453 509	3 1/2 210 233 249 290 315 362 375 457 464 522 TURNS 3 1/2	3 215 239 255 297 323 370 385 468 475 534	2 1/2 220 244 304 331 379 479 487 547 PULLEY 2 1/2	225 250 267 312 338 403 490 498 560	230 256 273 319 346 397 412 501 509 572	235 261 279 326 354 406 421 513 521 585	240 267 285 333 361 414 430 524 532 598	0 246 273 291 340 369 423 439 535 543 611 Closed 0
285V234 285V200 285V184 285V160 285V154 285V154 285V136 285V110 7-1/2 to 10 HP BX BELTS BLOWER PULLEY 285V278	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 МОТОК РULLEY 2VP60 РІТСН DIAMETER 28.1	6 184 205 218 255 277 330 401 407 458 Dd1 4.3 Open 6 289	189 210 224 262 284 326 339 412 419 471 Dd2 5.5 51/2 295	194 216 230 269 292 335 348 423 430 483 Pd1 4.7 5 301	200 222 237 276 300 344 357 435 441 449 8 9 25.9 Pd2 5.9 4 1/2 307	205 227 243 307 353 366 446 453 509	3 1/2 210 233 249 290 315 362 375 457 464 522 TURNS 3 1/2 319	3 215 239 255 297 323 370 385 468 475 534 0N MOTOR 3 325	2 1/2 220 244 261 304 331 379 487 547 PULLEY 2 1/2 331	225 250 312 338 403 490 498 560 2 2 338	230 256 273 319 346 397 412 501 509 572 1 1/2 344	235 261 279 326 354 406 421 513 521 585 585	240 267 285 333 361 414 430 524 532 598 598	0 246 273 291 340 369 423 535 543 611 Closed 0 362
2B5V224 2B5V200 2B5V184 2B5V160 2B5V154 2B5V136 2B5V110 7-1/2 to 10 HP BK BELTS BLOWER PULLEY 2B5V278 2B5V20	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25	28.1 25.3 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP60 PITCH DIAMETER 28.1 25.3	6 184 205 218 255 277 317 330 401 407 458 Dd1 4.3 Open 6 289 320	189 210 224 262 284 326 339 412 419 471 Dd2 5.5 5 1/2 295 327	194 216 230 269 292 335 423 430 483 Pd1 4.7 5 301 334	200 222 237 276 300 344 435 441 496 Pd2 5.9 Pd2 5.9 4 1/2 307 341	205 227 243 307 353 366 446 453 509 446 453 509	3 1/2 210 233 249 290 315 362 375 457 464 522 TURNS 3 1/2 319 355	3 215 239 255 297 323 370 385 468 475 534 0N MOTOR 3 325 361	2 1/2 220 244 261 304 331 379 394 479 487 547 PULLEY PULLEY 2 1/2 331 368	225 250 312 338 400 498 560 2 2 338 375	230 256 273 319 346 397 412 501 509 572 11/2 11/2 344 382	235 261 279 326 354 406 421 513 521 585 1 1 350 389	240 267 285 333 361 414 430 524 532 598 1/2 356 395	0 246 273 291 340 423 439 543 611 Closed 0 362 402
285V234 285V200 285V184 285V160 285V154 285V154 285V136 285V110 7-1/2 to 10 HP BX BELTS BLOWER PULLEY 285V278	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 МОТОК РULLEY 2VP60 РІТСН DIAMETER 28.1	6 184 205 218 255 277 330 401 407 458 Dd1 4.3 Open 6 289	189 210 224 262 284 326 339 412 419 471 Dd2 5.5 51/2 295	194 216 230 269 292 335 348 423 430 483 Pd1 4.7 5 301	200 222 237 276 300 344 357 435 441 449 8 9 25.9 Pd2 5.9 4 1/2 307	205 227 243 307 353 366 446 453 509	3 1/2 210 233 249 290 315 362 375 457 464 522 TURNS 3 1/2 319	3 215 239 255 297 323 370 385 468 475 534 0N MOTOR 3 325	2 1/2 220 244 261 304 331 379 487 547 PULLEY 2 1/2 331	225 250 312 338 403 490 498 560 2 2 338	230 256 273 319 346 397 412 501 509 572 1 1/2 344	235 261 279 326 354 406 421 513 521 585 585	240 267 285 333 361 414 430 524 532 598 598	0 246 273 291 340 369 423 535 543 611 Closed 0 362
285V234 285V200 285V184 285V160 285V154 285V154 285V136 285V136 285V124 285V10 7-1/2 to 10 HP BX BELTS BLOWER PULLEY 285V278 285V250 285V234 285V234 285V234	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25 23.4 20 18.4	28.1 25.3 23.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP60 PITCH DIAMETER 28.1 25.3 23.7 20.3 18.7	6 184 205 218 255 218 257 317 310 401 407 458 Dd1 407 6 289 20 6 289 320 342 399 434	189 210 224 262 284 339 412 419 471 Dd2 5.5 5 5.5 5 295 327 349 408 443	194 216 230 269 292 3348 423 483 84 483 84 423 483 84 423 483 84 433 84 7 7 1 6 1 1 1 1 1 1 1 1 1 1	200 222 237 276 300 344 357 435 443 57 435 449 802 802 802 804 804 805 805 807 807 307 341 364 461	205 227 283 307 353 366 446 453 509 446 453 509 446 453 509 446 453 509 470	3 1/2 210 233 249 290 315 362 375 457 464 522 TURNS 3 1/2 319 355 378 442 480	3 215 239 255 297 323 370 385 468 475 534 0N MOTOR 3 325 361 386 450 489	2 1/2 220 244 261 304 331 379 394 479 487 547 900000 2 1/2 347 2 1/2 348 368 393 459 498	225 250 267 312 338 403 490 498 560 2 338 375 400 467 507	230 256 273 319 346 397 412 501 509 572 572 11/2 344 382 408 476 517	235 261 279 326 354 400 421 513 521 585 585 1 359 481 350 389 415 484 526	240 267 285 333 361 414 430 524 532 598 598 1/2 356 395 422 493 535	0 246 273 291 340 423 439 535 543 611 Closed 0 0 362 402 402 402 429 501 544
2B5V234 2B5V234 2B5V184 2B5V160 2B5V134 2B5V134 2B5V136 2B5V110 7-1/2 to 10 HP BK BELTS BLOWER PULLEY 2B5V230 2B5V234 2B5V200 2B5V24 2B5V200 2B5V184 2B5V184	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25 23.4 20 18.4 16	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 МОТОК РULLEY 2VP60 РІТСН DIAMETER 28.1 25.3 23.7 20.3 18.7 16.3	6 184 205 218 255 277 317 330 401 407 458 Dd1 4.3 Open 6 289 320 342 399 434 497	189 210 224 262 284 326 339 412 419 471 D62 5.5 51/2 295 327 349 408 443 508	194 216 230 269 292 335 348 423 430 483 Pd1 4.7 5 301 334 4.7 5 5 301 337 416 452 519	200 222 237 276 300 344 357 435 441 496 P62 5.9 41/2 307 341 364 425 425 425 529	205 227 243 363 366 446 453 509 443 313 348 371 433 371 433	3 1/2 210 233 249 290 315 362 375 457 464 557 3 1/2 319 355 378 442 442 480 550	3 215 239 255 297 323 370 385 468 475 534 0N MOTOR 3 325 361 386 450 489 561	2 1/2 220 244 261 301 379 394 479 487 547 8487 547 8487 547 2 1/2 331 368 393 459 459 459 571	225 250 267 312 338 403 490 498 560 2 338 375 560	230 256 273 319 346 397 412 501 509 572 11/2 344 382 408 476 517 593	235 261 279 326 406 421 513 521 585 1 389 415 484 415 484 526 603	240 267 285 333 361 414 430 524 532 598 1/2 356 395 422 493 535 614	0 246 273 340 369 423 439 535 543 611 Closed 0 362 402 402 402 501 544 624
285V234 285V200 285V184 285V160 285V154 285V154 285V136 285V136 285V124 285V10 7-1/2 to 10 HP BX BELTS BLOWER PULLEY 285V278 285V250 285V234 285V234 285V234	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25 23.4 20 18.4	28.1 25.3 23.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP60 PITCH DIAMETER 28.1 25.3 23.7 20.3 18.7	6 184 205 218 255 218 257 317 310 401 407 458 Dd1 407 6 289 20 320 342 399 434	189 210 224 262 284 339 412 419 471 Dd2 5.5 5 5.5 5 295 327 349 408 443	194 216 230 269 292 3348 423 483 84 483 84 423 483 84 423 483 84 433 84 7 7 1 6 1 1 1 1 1 1 1 1 1 1	200 222 237 276 300 344 357 435 443 57 435 449 802 802 802 804 804 805 805 807 807 307 341 364 461	205 227 283 307 353 366 446 453 509 446 453 509 446 453 509 448 313 348 371 433 470	3 1/2 210 233 249 290 315 362 375 457 464 522 TURNS 3 1/2 319 355 378 442 480	3 215 239 255 297 323 370 385 468 475 534 0N MOTOR 3 325 361 386 450 489	2 1/2 220 244 261 304 331 379 394 479 487 547 900000 2 1/2 347 2 1/2 348 368 393 459 498	225 250 267 312 338 403 490 498 560 2 338 375 400 467 507	230 256 273 319 346 397 412 501 509 572 572 11/2 344 382 408 476 517	235 261 279 326 354 400 421 513 521 585 585 1 359 481 350 389 415 484 526	240 267 285 333 361 414 430 524 532 598 598 1/2 356 395 422 493 535	0 246 273 291 340 423 439 535 543 611 Closed 0 0 362 402 402 402 429 501 544
2B5V234 2B5V220 2B5V120 2B5V124 2B5V154 2B5V135 2B5V124 2B5V110 7-1/2 to 10 HP BK BELTS BLOWER PULLEY 2B5V20 2B5V20 2B5V20 2B5V210 2B5V210 2B5V210 2B5V210 2B5V210 2B5V210 2B5V210 2B5V210 2B5V110	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25 23.4 20 18.4 16 15.4 12.6 12.4	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VF60 PITCH DIAMETER 28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7	6 184 205 218 255 218 257 317 317 310 401 407 407 407 407 6 289 320 342 399 434 497 516 628 638	189 210 224 224 264 326 339 412 419 471 D62 5.5 5.5 327 349 408 443 527 642	194 216 230 269 292 335 348 423 430 483 Pd1 4.7 5 301 334 5 301 334 416 452 538 665	200 222 237 276 344 357 435 441 496 P62 5.9 5.9 5.9 307 341 364 41/2 307 341 364 425 461 549 549 669	205 227 243 283 307 353 366 446 453 509 446 453 509 446 453 509 446 453 509 509 60 60 60 60 60 60 60 60 60 60	3 1/2 210 233 249 290 315 362 375 457 457 457 31/2 31/2 31/2 31/2 319 355 378 442 464 4580 5571 695 706	3 215 239 255 297 323 370 385 468 475 534 468 475 534 385 468 475 534 385 534 534 534 534 534 534 535 5361 582 561 582 709 720	2 1/2 220 244 261 304 331 379 394 479 547 547 2 1/2 331 368 393 393 459 459 459 4593 722 733	225 250 312 388 403 490 498 560 2 338 375 400 467 507 587 587 587 587 587 597 400 467	230 256 319 319 397 412 501 502 572 11/2 344 382 406 572 572 572 572 572 572 572 572 572 572	235 261 279 326 354 406 421 513 521 585 585 1 389 415 585 389 415 526 626 626 762 774	240 267 285 333 414 430 524 532 598 1/2 356 395 422 493 535 614 637 776	0 246 273 291 340 423 439 423 439 543 611 Closed 0 0 362 402 402 402 402 402 402 402 402 402 40
2B5V234 2B5V200 2B5V184 2B5V160 2B5V154 2B5V136 2B5V124 2B5V100 7-1/2 to 10 HP BX BELTS BLOWER PULLEY 2B5V278 2B5V778 2B5V7778 2B5V7778 2B5V777778 2B5V777777777777777777777777777777777777	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 11 DATUM DIAMETER 27.8 25 23.4 20 18.4 16 15.4 12.6	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VF60 PITCH DIAMETER 28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9	6 184 205 218 207 218 277 317 330 401 407 458 Dd1 4.3 Open 6 289 320 6 289 320 342 399 497 516 628	189 210 224 262 284 326 339 412 419 471 Dd2 55 51/2 295 327 349 408 508 527 642	194 216 230 269 292 335 348 423 430 483 Pd1 4.7 5 301 334 452 519 538 655	200 222 237 276 300 344 357 435 441 496 Pd2 5.9 9 41/2 307 41/2 307 341 364 425 461 529 549 669	205 227 243 363 366 445 453 509 445 371 433 470 540 540 682	3 1/2 210 233 249 290 315 362 375 457 464 522 375 31/2 319 355 378 442 480 550 571 695	3 215 239 255 297 323 370 385 468 475 468 475 385 385 385 361 386 450 489 561 582 561 582 709	2 1/2 220 244 261 304 479 479 487 479 487 487 847 847 847 847 847 847 847 847	225 250 267 312 338 403 490 498 560 2 338 560 2 338 560 2 3375 400 467 507 582 604 735	230 256 273 319 346 509 572 111/2 344 408 476 517 593 615 749	235 261 279 326 406 421 513 521 585 1 1 350 389 415 484 526 603 626 603	240 267 285 333 414 430 524 532 598 1/2 356 422 493 535 614 637 776	0 246 273 340 369 423 439 535 543 611 Closed 0 362 402 429 501 544 624 624 648 789
2B5V224 2B5V220 2B5V180 2B5V160 2B5V154 2B5V154 2B5V124 2B5V110 7-1/2 to 10 HP BK BELTS BLOWER PULLEY 2B5V228 2B5V20 2B5V20 2B5V210 2B5V210 2B5V210 2B5V210 2B5V210 2B5V210 2B5V150 2B5V160 2B5V154 2B5V136 2B5V136 2B5V136 2B5V124	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25 23.4 20 18.4 16 15.4 12.6 12.4	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VF60 PITCH DIAMETER 28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7	6 184 205 218 255 218 257 317 317 310 401 407 407 407 407 6 289 320 342 399 434 497 516 628 638	189 210 224 224 264 326 339 412 419 471 D62 5.5 5.5 327 349 408 443 527 642	194 216 230 269 292 335 348 423 430 483 Pd1 4.7 5 301 334 5 301 334 416 452 538 665	200 222 237 276 344 357 435 441 496 P62 5.9 5.9 5.9 307 341 364 41/2 307 341 364 425 461 549 549 669	205 227 243 367 353 366 446 453 509 446 453 509 446 453 371 443 348 371 433 470 560 662 662	3 1/2 210 233 249 290 315 362 375 457 457 457 31/2 31/2 31/2 31/2 319 355 378 442 464 4580 5571 695 706	3 215 239 255 297 323 370 385 468 475 534 468 475 534 385 468 475 534 385 534 534 534 534 534 534 535 5361 582 561 582 709 720	2 1/2 220 244 261 304 331 379 394 479 547 547 2 1/2 331 368 393 393 459 459 459 4593 722 733	225 250 312 388 403 490 498 560 2 338 375 400 467 507 587 587 587 587 587 597 400 467	230 256 319 319 397 412 501 502 572 11/2 344 382 406 572 572 572 572 572 572 572 572 572 572	235 261 279 326 354 406 421 513 521 585 585 1 389 415 585 389 415 526 626 626 762 774	240 267 285 333 414 430 524 532 598 1/2 356 395 422 493 535 614 637 776	0 246 273 291 340 423 439 423 439 535 545 611 Closed 0 362 402 402 402 402 402 402 402 402 402 40
2B5V234 2B5V234 2B5V184 2B5V184 2B5V154 2B5V136 2B5V124 2B5V100 2B5V124 2B5V125 BLOWER PULLEY 2B5V278 2B5V278 2B5V234 2B5V160 2B5V184 2B5V184 2B5V184 2B5V136 2B5V124 2B5V136 2B5V110	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25 23.4 20 18.4 16 15.4 12.6 12.4	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 МОТОК РИЦЕУ 2VP60 РЛТСН DIAMETER 28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 12.9	6 184 205 218 205 218 277 317 330 401 401 401 401 458 Dd1 4.3 Open 6 289 320 342 399 434 497 56 628 638 Colored 628 638 Colored 638 Colore	189 210 224 266 326 412 419 471 Dd2 55 51/2 295 327 327 408 408 408 408 508 508 508 527 652 733	194 210 230 269 292 335 423 430 483 Pd1 47 5 301 334 47 5 301 334 416 452 519 538 655 556 666 748	200 222 237 276 344 435 435 441 496 P62 P62 97 307 341 361 41/2 307 341 361 425 469 679 679 763	205 227 243 367 353 366 446 453 509 446 453 509 446 453 371 443 348 371 433 470 560 662 662	3 1/2 210 233 249 315 362 375 457 464 522 700 31/2 319 355 378 442 480 550 571 695 706 794	3 215 239 255 297 323 370 385 468 475 534 468 475 534 386 450 386 450 386 450 386 450 386 450 261 582 709 720 809	2 1/2 220 244 261 301 379 394 479 487 547 547 21/2 331 368 393 459 459 459 459 459 571 593 722 733 824	225 250 312 388 403 490 498 560 2 338 375 400 467 507 587 587 587 587 587 597 400 467	230 256 319 319 397 412 501 502 572 11/2 344 382 406 572 572 572 572 572 572 572 572 572 572	235 261 279 326 354 406 421 513 521 585 585 1 389 415 585 389 415 526 626 626 762 774	240 267 285 333 414 430 524 532 598 1/2 356 395 422 493 535 614 637 776	0 246 273 340 369 423 439 535 543 611 611 611 611 611 612 614 624 648 648 648 648 648 648 648 648 648 64
2B5V224 2B5V220 2B5V120 2B5V184 2B5V160 2B5V154 2B5V110 7-1/2 to 10 HP BK BELTS BLOWER PULLEY 2B5V220 2B5V220 2B5V210 2B5V20 2B5V210 2B5V210 2B5V210 2B5V210 2B5V210 2B5V14 2B5V154 2B5V136 2B5V136 2B5V136 2B5V131 2B5V132 2B5V134 2B5V10 15 to 20 HP BX BELTS	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 DATUM DIAMETER 27.8 25 23.4 20 18.4 16 15.4 16 15.4 12.6 12.4 11	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP60 PITCH DIAMETER 28.1 25.3 28.1 25.3 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP75	6 184 205 218 205 218 277 317 330 401 407 458 Dd1 407 458 Dd1 458 0pen 6 289 434 434 434 434 434 516 628 717 Dd1 518 Open	189 219 224 262 339 412 419 471 Dd2 55 51/2 295 327 340 408 443 508 527 652 733 Dd2 7	194 216 230 269 292 335 423 430 483 434 430 483 434 433 430 483 434 433 443 443 443 443 443 443 443	200 222 237 276 344 435 435 441 496 P02 807 341 441 496 902 307 341 461 529 549 669 679 763 Pd2 7.4	205 227 243 307 353 366 446 453 509 446 453 509 446 453 509 446 453 509 669 3779	3 1/2 210 233 249 315 362 375 457 457 457 375 31/2 31/2 31/2 31/2 355 378 454 522 706 571 695 7794	3 215 239 255 297 323 370 385 468 475 534 475 534 385 361 386 450 489 582 709 720 809	2 1/2 220 244 261 304 331 379 379 379 379 547 547 21/2 311 368 393 393 459 459 498 551 593 722 733 824	225 250 312 338 490 498 560 2 338 375 490 498 560 490 498 560 490 498 560 490 498 560 490 498 560 497 507 582 582 597 840	230 256 319 319 319 501 509 572 572 11/2 344 382 408 476 517 517 517 517 517 615 749 761 855	235 261 279 326 354 406 421 513 521 585 585 1 389 415 484 526 603 626 762 774 870	240 267 285 333 414 430 524 532 598 1/2 356 395 422 493 535 614 637 776 788 885	0 246 273 291 340 423 439 535 535 535 535 611 0 0 0 0 0 20501 2050 402 402 402 402 402 402 402 402 801 501 501 501 501 501 501 501 501 501 5
2B5V234 2B5V234 2B5V184 2B5V160 2B5V154 2B5V154 2B5V124 2B5V124 2B5V124 2B5V124 2B5V124 2B5V125 BLOWER PULLEY 2B5V20 2B5V20 2B5V20 2B5V164 2B5V163 2B5V164 2B5V164 2B5V164 2B5V124 2B5V124 2B5V126 2B5V126 2B5V1278 2B5V120 2B5V124 2B5V124 2B5V124 2B5V124 2B5V124 2B5V110 BLOWER PULLEY BLOWER PULLEY	27.8 25 23.4 20 18.4 16 15.4 12.6 12.4 11 11 DATUM DIAMETER 27.8 25 23.4 20 18.4 16 15.4 12.6 11.5 4 12.6 11.2 4 11 11 DATUM DIAMETER	28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP60 PITCH DIAMETER 28.1 25.3 23.7 20.3 18.7 16.3 15.7 12.9 12.7 11.3 MOTOR PULLEY 2VP75 PITCH DIAMETER	6 184 205 218 207 218 277 310 401 401 401 458 Dd1 433 Open 6 289 342 399 434 497 6 628 638 717 Dd1 5.8 Open 6	189 219 224 224 224 284 326 339 412 419 419 55 295 329 349 408 508 527 642 652 733 Dd2 7 51/2	194 216 230 269 292 292 335 348 423 430 423 430 453 5348 452 519 519 519 519 519 519 519 519 55 5666 665 748 748 748 741 6.2	200 222 237 276 300 344 435 435 435 435 435 435 435 435 435	205 227 243 283 353 366 446 453 509 446 453 509 509 446 453 509 509 509 609 509 779 779 779	3 1/2 210 233 249 315 362 375 457 457 457 457 457 31/2 319 355 378 440 550 571 480 550 571 695 704 794 704 71/2 31/2	3 215 239 255 297 323 370 385 468 468 468 455 534 0N MOTOR 3 325 361 386 450 361 386 450 261 582 709 720 809 809 0N MOTOR 3	2 1/2 220 244 261 301 379 479 547 547 2 1/2 331 368 393 459 498 571 571 571 571 573 824 PULLEY 2 1/2	225 250 267 312 490 493 490 498 560 2 338 375 400 467 507 582 604 735 747 840	230 256 273 319 349 397 412 501 509 572 572 11/2 344 408 476 517 593 6517 593 651 855	235 261 279 326 406 421 513 521 585 585 1 389 415 484 425 603 626 603 626 762 774 870	240 267 285 333 361 414 414 524 532 598 1/2 395 422 493 535 422 493 535 614 637 776 788 885	0 246 273 340 369 423 439 535 543 611 Closed 0 362 402 402 402 402 402 402 402 901 901 901
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Troubleshooting

The following table lists causes and corrective actions for possible problems with the fan units. Review this list prior to consulting manufacturer.

Problem	Potential Cause	Corrective Action
Fan Inoperative	Blown fuse or open circuit breaker	Replace fuse or reset circuit
	Down ruse of open circuit breaker	breaker and check amps
	Disconnect switch in "Off" position	Turn to "On" position
	Motor wired incorrectly	Check motor wiring to wiring
	word wied incorrectly	diagram located on fan motor
	Broken fan belt	Replace belt
	Motor starter overloaded	Reset starter and check amps
Motor Overload	Fan rotating in the wrong direction	Be sure fan is rotating in the
Notor Overload		direction shown on rotation label
	Fan speed is too high	Reduce fan RPM
	Motor wired incorrectly	Check motor wiring to wiring
	,	diagram located on fan motor
	Overload in starter set too low	Set overload to motor FLA value
	Motor HP too low	Determine if HP is sufficient for
		job
	Duct static pressure lower than	Reduce fan RPM
	design	
Insufficient Airflow	Fan rotating in the wrong direction	Be sure fan is rotating in the
		direction shown on rotation label
	Poor inlet/outlet conditions	There should be a straight clear
		duct at the inlet/outlet
	Damper not fully open	Inspect damper linkage and
		replace damper motor if needed
	Duct static pressure higher than	Improve ductwork to eliminate or
	design	reduce duct losses
	Blower speed too low	Increase fan RPM. Do not
		overload motor
	Belt slippage	Adjust belt tension
Excessive Airflow	Blower speed to high	Reduce fan RPM
	Duct static pressure lower than	Reduce fan RPM
	design	
Excessive Vibration and Noise	Misaligned pulleys	Align pulleys
	Damaged or unbalanced wheel	Replace wheel
	Fan is operating in the unstable	Refer to performance curve for
	region of the fan curve	fan
	Bearings need lubrication or	Lubricate or replace
	replacement	
	Fan speed is too high	Reduce fan RPM
	Belts too loose, worn or oily	Inspect and replace if needed

Troubleshooting Chart

MAINTENANCE

To guarantee trouble free operation of this fan, the manufacturer suggests following these guidelines. Most problems associated with fan failures are directly related to poor service and maintenance.

Please record any maintenance or service performed on this fan in the documentation section located at the end of this manual.

WARNING: DO NOT ATTEMPT MAINTENANCE ON THE FAN UNTIL THE ELECTRICAL SUPPLY HAS BEEN COMPLETELY DISCONNECTED

General Maintenance

- 1. Fan discharge and approaches to ventilator should be kept clean and free from any obstruction.
- 2. Motors are normally permanently lubricated. Check bearings periodically. If they have grease fittings lubricate each season. Use caution when lubricating bearings, wipe the fittings clean, the unit should be rotated by hand while lubricating. Bearings should be lubricated every 2 months. The type of grease and the amount of grease can is shown below. Caution: Bearings are sealed and over-greasing bearings can cause damage to the bearings. Do not grease until grease comes out of seals. Only add the appropriate amount of grease.
- 3. All fasteners should be checked for tightness each time maintenance checks are preformed prior to restarting unit.
- 4. Fans require very little attention when moving clean air. Occasionally oil and dust may accumulate causing imbalance. If the fan is installed in a corrosive or dirty atmosphere, periodically inspect and clean the wheel, inlet and other moving parts to ensure smooth and safe operation.

Bearing	Grease	Charge
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Ball Be	earings
Shaft Size (Inches)	Grease Charge (Ounces)
1/2 to 3/4	0.03
7/8 to 1 3/16	0.10
1 1/4 to 1 1/2	0.15
1 11/16 to 1 15/16	0.20
2 to 2 7/16	0.30
2 1/2 to 2 15/16	0.50
3 to 3 7/16	0.85
3 1/2 to 4	1.50

Bearing Grease Type

Thickener	Lithium Complex
Oil	Petroleum
Thickness	NLGI 2
Operating Temperature	-20 F to 200 F Intermittent to 250 F

2 weeks after startup

- 1. Belt tension should be checked after the first 2 weeks of fan operation on belt drive fans. Belts tend to stretch and settle into pulleys after an initial start-up sequence. Do not tension belts by changing the setting of the motor pulley, this will change the fan speed and may damage the motor. To re-tension belts, turn the power to the fan motor OFF. Loosen the fasteners that hold the motor to the fan. Move the motor to the left or right to adjust the belt tension. Belt tension should be adjusted to allow 1/64" of deflection per inch of belt span. Exercise extreme care when adjusting V-belts as not to misalign pulleys. Any misalignment will cause a sharp reduction in belt life and produce squeaky noises. Over-tightening will cause excessive belt and bearing wear as well as noise. Too little tension will cause slippage at startup and uneven wear. Whenever belts are removed or installed, never force belts over pulleys without loosening motor first to relieve belt tension. When replacing belts, use the same type as supplied by the manufacturer. On units shipped with double groove pulleys, matched belts should always be used.
- 2. All fasteners should be checked for tightness each time maintenance checks are preformed prior to restarting unit.

Every 3 months

- 1. Belt tension should be checked quarterly for belt drive fans. See instructions in the previous maintenance section. Over-tightening will cause excessive bearing wear and noise. Too little tension will cause slippage at startup and uneven wear.
- 2. Fans need to be cleaned quarterly, and more often in severe conditions.

Yearly

- 1. Inspect bearings for wear and deterioration. Replace/grease if necessary.
- 2. Inspect belt wear and replace torn or worn belts on belt drive fans.
- 3. Inspect bolts and set screws for tightness. Tighten as necessary.
- 4. Inspect motor for cleanliness. Clean exterior surfaces only. Remove dust and grease from the motor housing to ensure proper motor cooling. Remove dirt and grease from the wheel and housing to prevent imbalance and damage.

Start-Up and Maintenance Documentation

START-UP AND MEASUREMENTS SHOULD BE PERFORMED AFTER THE SYSTEM HAS BEEN AIR BALANCED (Warranty will be void without completion of this form)

Job Information

Job Name	Service Company
Address	Address
City	City
State	State
Zip	Zip
Phone Number	Phone Number
Fax Number	Fax Number
Contact	Contact
Purchase Date	Start-Up Date

Fan Unit Information

Refer to the start-up procedure in this manual to complete this section.

Name Plate and U	Init Information
Model Number	
Serial Number	
Volts	
Hertz	
Phase	
FLA	
HP	
Blower Pulley	
Motor Pulley	
Belt Number	

te this section.	
Field Measured Ir	nformation
Voltage	
Amperage**	
RPM	

Blower Rotation	Correct	
	Incorrect	

**If measured amps exceed the FLA rating on the nameplate, fan RPM must be reduced to decrease the measured amps below the nameplate FLA rating.

Maintenance Record

Date	Service Performed

Date	Service Performed

Factory Service Department

Phone: 1-866-784-6900 Fax: 1-919-554-9374