

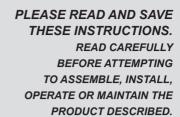




# Belt-Drive Exhaust Fans with "NOM" Certification

Models 28K955 thru 28K969





PROTECT YOURSELF AND
OTHERS BY OBSERVING ALL
SAFETY INFORMATION. FAILURE
TO COMPLY WITH INSTRUCTIONS
COULD RESULT IN PERSONAL
INJURY AND/OR PROPERTY
DAMAGE! RETAIN INSTRUCTIONS
FOR FUTURE REFERENCE.

PLEASE REFER TO BACK COVER FOR INFORMATION REGARDING DAYTON'S WARRANTY AND OTHER IMPORTANT INFORMATION.

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#### **BEFORE YOU BEGIN**



Installation, troubleshooting and parts replacement are to be performed only by



#### **Electrical Requirements:**

 The motor amperage and voltage ratings must be checked for compatibility to supply voltage prior to final electrical connection.
 Wiring must conform to local and national codes.



#### **Tools Needed:**

· Corrosion Resistant Fasteners

#### **Recommended Accessories:**

- NEMA 1 (1H400, 1H401) / NEMA 4 (1H408, 1H409) Disconnect Switch
- Shutter Motor (2C831, 2C832)
- Galvanized Wall Shutter (1C746, 1C055, 4C521, 1C210, 1C211)
- Aluminum Wall Shutter (3C308-3C312)
- Fiberglass Wall Shutter (5C215-5C217, 5C219, 5C220)
- Wall Housing (3FKF8, 3FKF9, 3FKG1-3FKG3)
- Fan Guard (1WBU3-1WBU7)
- Wall Collar (1WBV1-1WBV5)
- Weather Hood (1WBV9, 1WBW1-1WBW4)

#### **UNPACKING**



#### **Contents:**

- Dayton® Belt-Drive Exhaust Fan (1)
- Operating Instructions and Parts Manual (1)



#### Inspect:

- After unpacking unit, inspect carefully for any damage that may have occurred during transit. Check for loose, missing, or damaged parts.
   Shipping damage claim must be filed with carrier.
- Look for hardware kit attached to drive frame of fan.
- Check all bolts, screws, set-screws, etc. for looseness that may have occurred during transit. Retighten as required. Rotate propeller by hand to be sure it turns freely.



 See General Safety Instructions on page 2, and Cautions and Warnings as shown.



#### **GENERAL SAFETY INSTRUCTIONS**

- THIS PRODUCT IS NOT INTENDED FOR USE BY PERSONS (INCLUDING CHILDREN) WHOSE PHYSICAL. SENSORY OR MENTAL CAPABILITIES ARE DIFFERENT OR REDUCED, OR WHO LACK EXPERIENCE OR KNOWLEDGE. UNLESS SUCH PERSONS RECEIVE APPLIANCE TRAINING BY A PERSON RESPONSIBLE FOR THEIR SAFETY.
- CHILDREN MUST BE MONITORED TO ENSURE THEY DON'T USE THE DEVICE AS A TOY.

#### When the product has a power cord:

If the power cord is damaged, it must be replaced by the manufacturer. an authorized service agent or qualified personnel in order to avoid hazard.

#### When the product does not have power cord:

WARNING: MUST BE INSTALLED WITH A SWITCH OR CIRCUIT BREAKER TO DISCONNECT ALL POWER POLES WITH A SEPARATION OF AT LEAST 0.125 in, BETWEEN EACH POLE.

Do not depend on any switch as the sole means **DANGER** of disconnecting power when installing or servicing the fan. Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury. Motor will restart without warning after thermal protector trips. Do not touch operating motor, it may be hot enough to cause injury.

## **DANGER**

Do not place any body parts or objects in fan, motor openings or drives while motor is connected to power source.

## **A** WARNING

Do not use this equipment in explosive atmospheres.

## **A** CAUTION

To reduce the risk of injury to persons, observe the following: OSHA requires OSHA complying quards when fan is installed within 7 feet of floor or working level. UL/cUL Standards require OSHA complying guards when fan is

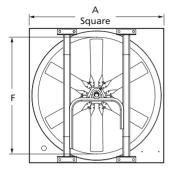
- Read and follow all instructions and cautionary markings. Make sure electrical power source conforms to requirements of equipment and local codes.
- Fans should be installed and serviced by a qualified technician. Have all electrical work performed by a qualified electrician.
- Follow all local electrical and safety codes in the United States and Canada, as well as the National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA) in the United States. Ground motor in accordance with NEC Article 250 (grounding). Follow the Canadian Electric Code (CEC) in Canada.
- Unit must be securely and adequately grounded.

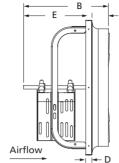
installed within 8 feet of floor or working level.

5. Do not kink power cable or allow it to come in contact with sharp objects, oil, grease, hot surfaces, or chemicals. Replace damaged cords immediately.

## **SPECIFICATIONS**

## **Dimensions (inches)**







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Figure 1

	1WDB9 1AHA1 1AHA8	1AHA2 1AHA9	1WDC1	1WDC2 1AHA3 1AHB1	1WDC3 1AHA4	1AHB2	1WDC4 1AHA5	<b>1AHB3</b>
Α	28	34	34	40	46	46	54	54
В	18	20	21-1/2	22	23-1/2	26-3/8	23-1/2	28
С	4-3/8	5-1/4	5-1/4	6	6	6	7	7
D	1-1/4	1-1/4	1	1	2	2	2	2
E	13-5/8	14-3/4	16-1/4	16	17-1/2	20-3/8	16-1/2	21
F	24-3/8	30-3/8	30-3/8	36-3/8	42-1/2	42-1/2	48-1/2	48-1/2
Propeller Dia.	24	30	30	36	42	42	48	48
Shaft Dia.	3/4	3/4	3/4	1	1-1/4	1-1/2	1-1/4	1-1/2
Recommended Direct To Wall Opening (Sq.)	26-1/2	32-1/2	32-1/2	38-1/2	44-1/2	44-1/2	50-1/2	50-1/2
Recommended Propeller-To- Damper Distance	13	13	13	14	15	15	16	16
Recommended Wall Collar, Wall Collar and Guard, or Wall Housing Opening (Sq.)	29-5/8	35-5/8	35-5/8	41-5/8	47-5/8	47-5/8	55-5/8	55-5/8

TROUBLESHOOTING

ASSEMBLY / INSTALLATION

**GETTING STARTED** 

# PERFORMANCE

Model 115/230V, 2 1-Phase	Model 208-230/460V, 3-Phase	윺	RPM	Max 9 BHP	Max Sones @ .000" BHP SP @ 5 Ft.	.000.	CFM Ai.	r Delivery .250"	CFM Air Delivery @ Static Pressue Shown .125" .250" .375" .500" .625	ressue S	shown .625"	0.750"
28K955	1	1/3	1012	0.39	21	5292	4830	4207	I	Ι	Ι	1
28K956	I	1/3	675	0.39	14.6	7713	6763	5160	I	I	I	I
28K957	1	1/3	477	0.39	12.5	10,484	8176	I	Ι	I	I	I
28K958	I	3/4	482	0.90	20	16,646	14,327	10,507	I	I	I	I
28K959	1	<del>-</del>	429	1.20	19.4	21,827	18,907	13,506	I	1	I	I
28K960	I	1/2	740	0.58	14.7	0969	6216	4806	I	I	I	I
28K961	1	3/4	675	98.0	18.3	11,169	10,067	8391	I	I	I	I
28K962	I	_	542	1.15	17.2	15,636	13,847	11.288	I	I	I	I
28K963	1	<b>—</b>	418	1.15	18.3	19,480	16,358		I	I	I	I
1	28K964	1-1/2	401	1.73	18.6	25,839	22,767	17,182	I	I	I	I
28K965	1	<b>—</b>	1178	1.15	24	8115	2002	7127	6375	5503	2475	1686
1	28K966	1-1/2	686	1.73	27	13,639	12,646	11,452	10,112	I	I	I
-	28K967	1-1/2	783	1.73	28	18,117	16,453	14,122	I	I	I	I
I	28K968	က	762	3.45	31	26,012	23,867	21,621	18,395	I	I	Ι
-	28K969	က	099	3.45	32	33,223	29,689	25,707	I	I	I	I

Dayton Electric Mfg. Co. certifies that the ventilators sent the AMCA seal.

The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of

the AMCA Certified Ratings Program.

Performance certified is for installation type A. Free inlet, Free outlet. Power rating (BHP) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown

calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field

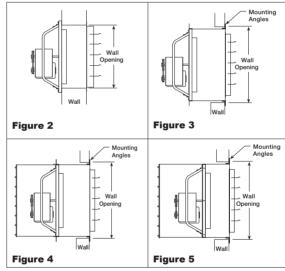
#### **INSTALLATION INSTRUCTIONS**

#### **Wall Mounting**

## **A WARNING**qualified personnel.

Installation, troubleshooting and parts replacement are to be performed only by

- Move fan to the desired location and determine the method by which the fan is to be mounted. Optional wall collar (Figure 3), wall collar and guard (Figure 4), or wall housing (Figure 5) provide a convenient means of mounting as shown.
- 2. Wall opening size and propeller-to-shutter distance are two important dimensions for fan installation. Fans mounted to the wall (Figure 2) require a different opening size than those mounted in collars or housings. When mounting direct to wall, propeller-to-damper distance is important to reduce turbulence and damper flutter which may lead to premature damper failure. See the Dimensions chart on page 3 for recommended wall opening sizes and propeller-to-damper distances.



- 3. Cut an appropriate sized hole in the wall.
- 4. The fan should be securely mounted within a rigid framework to prevent flexing or movement of the fan frame during operation. The fan frame should be equally supported on all sides within the framework and caution should be taken to avoid twisting of the fan frame during installation.

<u>NOTE</u>: Allowing the fan frame to flex or move during operation will create harmful vibrations which may damage the unit.

 Fans should be mounted in opening with 1/4" clearance around perimeter. Framing should be secured to building structure utilizing corrosion resistant fasteners, supplied by others. Fasteners should be used in all pre-punched mounting holes in the fan panel.



- 6. Install remaining components (shutter, intake guard, etc.).
- Check all fasteners and set screws for tightness. This is especially important for bearing set screws.
- 8. Before connecting the fan to power, turn the fan propeller by hand to be sure it is not striking the orifice or any obstacle.

#### **Electrical Connection**

**A WARNING** 

To reduce the risk of electrical shock — do not connect to a circuit operating at more than 150V  $\,$ 

to ground.

NOTE: Refer to motor nameplate for wiring procedures.

- Motor and fan must be securely grounded (bare metal) to a suitable electric ground, such as a grounded water pipe or ground wire system.
- 2. Wire motor for desired voltage per wiring diagram on motor, refer to Figure 6 for connection wiring diagram.

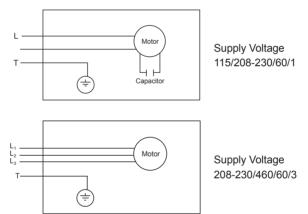


Figure 6

<u>NOTE</u>: For 3-phase installations, fan rotation can be reversed by interchanging any two of the three electrical leads.

- Wire control switches at ground level. Refer to switch manufacturer for installation and wiring procedures.
- Before activating fan, inspect to be sure that there are no obstructions or debris that would interfere with the propeller.

#### **OPERATION**

- Before starting up or operating the unit, check all fasteners for tightness. In particular, check set screws in bearings, propeller hub, and pulleys. While in the OFF position, turn the fan propeller by hand to be sure it is not striking the orifice or any obstacle.
- Check propeller rotation by momentarily energizing the unit. Rotation should correspond to the rotation decal on the unit.

**IMPORTANT:** Rotation of the propeller is critical and incorrect rotation will result in reduced air performance, increased motor loading, and possible motor burnout.

- Check pulleys for proper alignment. Misaligned pulleys lead to excessive belt wear, vibration, and noise.
- When the fan is started, observe the operation and check for any unusual noises.
- Adjust RPM to desired level using a variable pitch pulley. After adjustment, motor amperage should be checked to avoid overloading of the motor.
- With the system in full operation, measure current (amps) input to the motor and compare with the nameplate rating (full-load amps) to determine if the motor is operating under safe load conditions.

**IMPORTANT:** Adjust (tighten) belt tension after the first 24 hours of operation. Too much tension will cause excess bearing wear and noise. Too little tension will cause slippage at start-up and uneven wear.

7. Keep inlets and approaches to fan clean and free from obstruction.



Symptom	Possible Cause(s)	Corrective Action
Fan	Blown fuse or breaker	Replace or repair
inoperative	2. Defective motor	2. Replace or repair
	Incorrectly wired	3. Shut power OFF and check wiring for proper connections
	4. Broken belts	4. Replace belts
	<ol><li>Loose pulley(s)</li></ol>	5. Check alignment and tighten
	6. Electricity turned off	6. Contact local power company
Excessive	Loose or defective bearings	Tighten or replace bearings
noise or vibration	Foreign material inside bearing	2. Replace bearing
	Pulley not tightened on shaft (motor and or fan)	3. Check alignment and tighten set screws and/or bushing screws
	4. Loose propeller	Tighten set screws or taper bushing screws
	5. Belt(s) too loose/tight	5. Adjust tension
	6. Belts are worn, oily or dirty	6. Clean or replace belts
	7. Mis-aligned pulley(s)	7. Re-align pulley(s)
	8. Crooked or damaged propeller	Replace propeller
	9. Fan not securely anchored	9. Secure properly
	10. Bent fan shaft	10. Replace shaft and propeller
	11. Fan propeller out of balance	11. Replace propeller
Insufficient	1. Damper (shutter) stuck shut	Inspect/repair damper
airflow	2. Speed too slow	2. Check for correct drive combination
	3. Belt slippage	<ol><li>Replace/adjust tension and match belt to pulley</li></ol>
	Propeller rotation reversed	Reverse motor rotation, rewire motor
	5. Insufficient static pressure	<ol><li>Check static pressure calculation, adjust VP pulleys to more turns open</li></ol>
Motor overloads or	Propeller RPM too high	Check drives, increase turns open on VP pulley
overheats	2. Shorted motor winding	2. Replace motor
	3. Incorrect propeller rotation	3. Check motor wiring
	4. Over/Under line voltage	4. Contact Power Company
	5. Belt slippage	5. Tighten belt, match belt to pulley

## MAINTENANCE

## **A WARNING**

Disconnect and lockout power source before servicing.

## **A** CAUTION

Uneven cleaning of the propeller will produce an out of balance condition that will cause

vibration in the fan.

- Depending on the usage and severity of the contaminated air, a regularly scheduled inspection for cleaning the fan propeller, housing, and surrounding areas should be established.
- 2. Check for unusual noises when ventilator is running.
- 3. Periodically inspect and tighten set screws.
- 4. Periodically check belts for wear and tightness.

NOTE: When replacing belts, use the same type as supplied with the unit.

NOTE: For belt replacement, loosen the motor mounting hardware to allow removal of the belt by hand.

## **▲ WARNING**

Do not force belts on or off. This may cause cords to break, leading to premature belt failure.

5. Keep bearings clean and well lubricated. In a clean environment and temperatures above 32°F (0°C) and below 200°F (93°C), fan shaft bearings with grease fittings should be lubricated semi-annually using a high-quality lithium based grease. If unusual environmental conditions exist, temperatures below 32°F (0°C) and above 200°F (93°C), moisture or contaminants, more frequent lubrication is required.

With the unit running, add grease very slowly with a manual grease gun until a slight bead of grease forms at the seal. Be careful not to unseat the seal by over lubricating or using excessive pressure. Bearings without grease fittings are lubricated for life.

	y in Months
Operating Speed (RPM)	Bore in Inches 1/2 to 1-1/2
Up to 500	6
500 - 1000	6

1000 - 1500

Any good quality lithium base grease conforming to NLGI Grade 2 consistency such as those listed here may be used.

Mobil 532	Texaco Multifak #2
Mobilux #2	Texaco Premium RB
B Shell Alvania #2	Unirex N2

NOTE: Sealed pillow block bearings require no further lubrication.

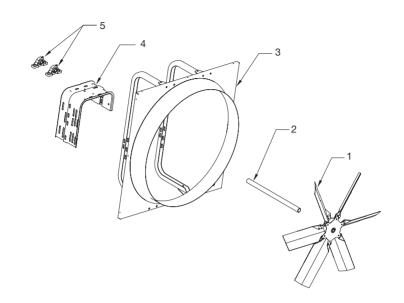
6. Follow motor manufacturer's instructions for motor lubrication.

5

7. For critical applications, a spare motor and belt should be available.



#### **REPAIR PARTS ILLUSTRATION FOR 28K955 THRU 28K959**



## **REPAIR PARTS LIST FOR 28K955 THRU 28K959**

Ref. No.	Description	Part Num 28K955	ber for Mo 28K956	dels: 28K957	28K958	28K959	Qty.
1	Propeller	21DT22	21DT23	21DT24	21DT25	21DT26	1
2	Shaft	21DT19	21DT16	21EC14	21DT17	21DT17	1
3	Fan Panel and Drive Frame Assembly	21DR50	21DR53	21DR56	21DR59	21DR61	1
4	Motor/Bearing Plate	21DR77	21DR77	21DR79	21DR81	21DR81	1
5	Bearings	21DW60	21DW60	21DT70	21DW58	21DW58	2
*	† Hardware Kit	21DR68	21DR68	21DR68	21DR68	21DR68	1

<sup>\*</sup> Not Shown.

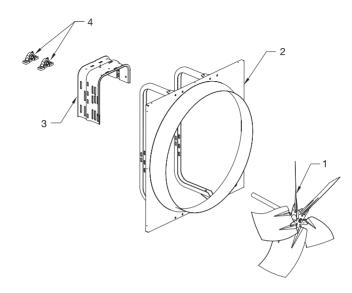
† Hardware Kit includes (4) 3/8-16 Spin-lock Nuts, (4) 5/16-18 Spin-lock Nuts, (4) 3/8-16x3/4 Spin-lock Nuts, (4) 5/16-18x3/4 Spin-lock Nuts, (4) 5/16 Rectangular Flat Washers, (4) 3/8 Flat Washers, (1) 3/16x3/16x1-1/2 Key Shaft, (1) 1/4x1/4x1-1/2 Key Shaft, (1) 3/8x3/8x2 Key Shaft

# For Repair Parts, call 1-800-Grainger 24 hours a day – 365 days a year

Please provide following information:

- -Model number
- -Serial number (if any)
- -Part description and number as shown in parts list

#### **REPAIR PARTS ILLUSTRATION FOR 28K960 THRU 28K964**



### **REPAIR PARTS LIST FOR 28K960 THRU 28K964**

Ref. No.	Description	Part Num 28K960	ber for Mo 28K961	dels: 28K962	28K963	28K964	Qty.
1	Propeller and Shaft	21DR95	21DR97	21DR99	21DT02	21DT03	1
2	Fan Panel and Drive Frame Assembly	21DR50	21DR53	21DR56	21DR59	21DR61	1
3	Motor/Bearing Plate	21DR77	21DR78	21DR79	21DR81	21DR81	1
4	Bearings	21DW56	21DT70	21DT70	21DW58	21DW58	2
*	† Hareware Kit	21DR68	21DR68	21DR68	21DR68	21DR68	1

<sup>\*</sup> Not Shown.

† Hardware Kit includes (4) 3/8-16 Spin-lock Nuts, (4) 5/16-18 Spin-lock Nuts,

 $\label{eq:continuous} \begin{tabular}{ll} (4)\ 3/8-16x3/4\ Spin-lock\ Nuts,\ (4)\ 5/16\ Rectangular\ Flat\ Washers,\ (4)\ 3/8\ Flat\ Washers,\ (1)\ 3/16x3/16x1-1/2\ Key\ Shaft,\ (1)\ 1/4x1/4x1-1/2\ Key\ Shaft,\ (1)\ 3/8x3/8x2\ Key\ Shaft \end{tabular}$ 

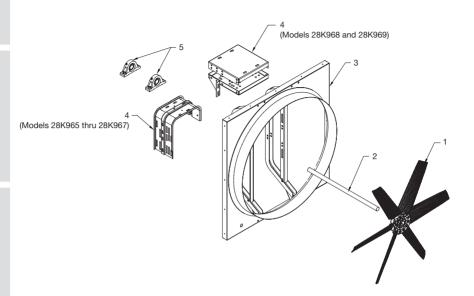
# For Repair Parts, call 1-800-Grainger 24 hours a day – 365 days a year

Please provide following information:

- -Model number
- -Serial number (if any)
- -Part description and number as shown in parts list



#### **REPAIR PARTS ILLUSTRATION FOR 28K965 THRU 28K969**



#### **REPAIR PARTS LIST FOR 28K965 THRU 28K969**

Ref. No.	Description	Part Num 28K965	ber for Mo 28K966	dels: 28K967	28K968	28K969	Qty.
1	Propeller	21DR88	21DR89	21DR90	21DR91	21DR92	1
2	Shaft	21DT07	21DT08	21DT09	21DT10	21DT11	1
3	Fan Panel and Drive Frame Assembly	21DR52	21DR55	21DR58	21DR60	21DR63	1
4	Motor/Bearing Plate	21DR77	21DR78	21DR80	21DR82	21DR83	1
5	Bearings	21DW56	21DT70	21DW58	21DW57	21DW57	2
*	† Hardware Kit	21DR68	21DR68	21DR68	21DR68	21DR68	1

<sup>\*</sup> Not Shown.

† Hardware Kit includes (4) 3/8-16 Spin-lock Nuts, (4) 5/16-18 Spin-lock Nuts, (4) 3/8-16x3/4 Spin-lock Nuts, (4) 5/16-18x3/4 Spin-lock Nuts, (4) 5/16 Rectangular Flat Washers, (4) 3/8 Flat Washers, (1) 3/16x3/16x1-1/2 Key Shaft, (1) 1/4x1/4x1-1/2 Key Shaft, (1) 3/8x3/8x2 Key Shaft

# For Repair Parts, call 1-800-Grainger 24 hours a day – 365 days a year

Please provide following information:

- -Model number
- -Serial number (if any)
- -Part description and number as shown in parts list

NOTES	

#### DAYTON ONE-YEAR LIMITED WARRANTY

<u>DAYTON ONE-YEAR LIMITED WARRANTY.</u> All Dayton\* product models covered in this manual are warranted by Dayton Electric Mfg. Co. ("Dayton") to the original user against defects in workmanship or materials under normal use for one year after date of purchase. If the Dayton product is part of a set, only the portion that is defective is subject to this warranty. Any product or part which is determined to be defective in material or workmanship and returned to an authorized service location, as Dayton or Dayton's designee designates, shipping costs prepaid, will be, as the exclusive remedy, repaired or replaced with a new or reconditioned product or part of equal utility or a full refund given, at Dayton's or Dayton's designee's option, at no charge. For limited warranty claim procedures, see "Warranty Service" below. This warranty is void if there is evidence of misuse, mis-repair, mis-installation, abuse or alteration. This warranty does not cover normal wear and tear of Dayton products or portions of them, or products or portions of them which are consumable in normal use. This limited warranty gives purchasers specific legal rights, and you may also have other rights which vary from jurisdiction to jurisdiction.

#### WARRANTY DISCLAIMERS AND LIMITATIONS OF LIABILITY RELATING TO ALL CUSTOMERS FOR ALL PRODUCTS

<u>LIMITATION OF LIABILITY.</u> TO THE EXTENT ALLOWABLE UNDER APPLICABLE LAW, DAYTON'S LIABILITY FOR CONSEQUENTIAL AND INCIDENTAL DAMAGES IS EXPRESSLY DISCLAIMED. DAYTON'S LIABILITY IN ALL EVENTS IS LIMITED TO AND SHALL NOT EXCEED THE PURCHASE PRICE PAID.

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THIS LIMITED WARRANTY ONLY APPLIES TO UNITED STATES PURCHASERS FOR DELIVERY IN THE UNITED STATES.

#### **WARRANTY SERVICE**

To obtain warranty service if you purchased the covered product directly from W.W. Grainger, Inc. ("Grainger"), (i) write or call or visit the local Grainger branch from which the product was purchased or another Grainger branch near you (see www.grainger.com for a listing of Grainger branches); or (ii) contact Grainger by going to www.grainger.com and clicking on the "Contact Us" link at the top of the page, then clicking on the "Email us" link; or (iii) call Customer Care (toll free) at 1-888-361-8649. To obtain warranty service if you purchased the covered product from another distributor or retailer, (i) go to www.grainger.com for Warranty Service; (ii) write or call or visit a Grainger branch near you; or (iii) call Customer Care (toll free) at 1-888-361-8649. In any case, you will need to provide, to the extent available, the purchase date, the original invoice number, the stock number, a description of the defect, and anything else specified in this Dayton One-Year Limited Warranty. You may be required to send the product in for inspection at your cost. You can follow up on the progress of inspections and corrections in the same ways. Title and risk of loss pass to buyer on delivery to common carrier, so if product was damaged in transit to you, file claim with carrier, not retailer, Grainger or Dayton. For warranty information for purchasers and/or delivery outside the United States, please use the following applicable contact information:

Dayton Electric Mfg. Co., 100 Grainger Parkway, Lake Forest, IL 60045 U.S.A. or call +1-888-361-8649